NETWORK PRODUCTS

NETWORK ACCESS METHOD
VERSION 1
NETWORK DEFINITION LANGUAGE
REFERENCE MANUAL

CDC® OPERATING SYSTEM:
NOS 2
## REVISION RECORD

<table>
<thead>
<tr>
<th>Revision</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (04/01/77)</td>
<td>Revised at PSR level 446 for technical corrections.</td>
</tr>
<tr>
<td>C (04/28/78)</td>
<td>Completely revised for NAM Version 1.1 release at PSR level 472 to include support of remote and foreign NPUs, asynchronous and HASP TIPs, virtual terminals, IAF, and TVF.</td>
</tr>
<tr>
<td>D (08/15/78)</td>
<td>Revised at PSR level 477 for technical corrections.</td>
</tr>
<tr>
<td>E (12/18/78)</td>
<td>Revised at PSR level 485 to include autorecognition up to 1200 baud and for technical corrections.</td>
</tr>
<tr>
<td>F (08/10/79)</td>
<td>Revised to reflect release of NAM Version 1.2. Included are descriptions of special editing support, extended APL support, and various technical corrections.</td>
</tr>
<tr>
<td>G (05/23/80)</td>
<td>Revised at PSR level 517 to reflect support of the 714-30 terminal class, and of 714-10/20 and 714-30 line printers. Various technical corrections are also included.</td>
</tr>
<tr>
<td>H (10/31/80)</td>
<td>Revised at PSR level 528 to document support of the X.25 protocol.</td>
</tr>
<tr>
<td>J (05/29/81)</td>
<td>Revised to reflect release of NAM Version 1.3 at PSR level 541 to document support of the PRU interface and the BSC protocol (2780/3780 terminal support). Also includes various technical corrections.</td>
</tr>
<tr>
<td>K (12/22/82)</td>
<td>Revised to reflect release of NAM Version 1.5 (Version 1.4 does not exist) at PSR level 580, which supports the Network Access Method and Communication Control Program Version 3.5 under NOS Version 2; this manual no longer applies to NOS Version 1 systems. This is a complete reprint.</td>
</tr>
<tr>
<td>L (09/30/83)</td>
<td>Revised to reflect release of NAM Version 1.6 at PSR level 599, which supports the Network Access Method and Communications Control Program Version 3.6 under NOS Version 2. This is a complete reprint.</td>
</tr>
<tr>
<td>M (09/19/84)</td>
<td>Revised to reflect release of NAM Version 1.7 at PSR level 617, which supports the Network Access Method and Communications Control Program Version 3.7 under NOS Version 2.3. Support of the CYBER 170 800 Series models and the CYBER 180 Computer Systems is documented.</td>
</tr>
<tr>
<td>N (09/30/85)</td>
<td>Revised to reflect release of NAM Version 1.8 at PSR level 642, which supports the Network Access Method and Communications Control Program Version 3.8 under NOS Version 2.4.2. Miscellaneous technical changes are included. This is a complete reprint.</td>
</tr>
<tr>
<td>P (12/16/85)</td>
<td>Revised to reflect release of NAM Version 1.8 at PSR level 647, which supports the Network Access Method and Communications Control Program Version 3.8 under NOS 2.4.3 and the release of CDCNET Version 1.0. Miscellaneous technical changes are included.</td>
</tr>
<tr>
<td>R (07/31/86)</td>
<td>Revised to reflect release of NAM Version 1.8 at PSR level 664, which supports the Network Access Method and Communications Control Program Version 3.8 under NOS 2.5.1 and the release of CDCNET 1.1. Miscellaneous technical changes are included.</td>
</tr>
<tr>
<td>S (04/23/87)</td>
<td>Revised to reflect release of NAM Version 1.8 at PSR level 678, which supports the Network Access Method and Communications Control Program Version 3.8 under NOS 2.5.2 and the release of CDCNET 1.2. Three new parameters have been added to the OUTCALL statement and changes have been made to default values for other parameters to simplify connections to NOS/VE. Miscellaneous technical changes are included.</td>
</tr>
<tr>
<td>T (12/08/88)</td>
<td>Revised to reflect release of NAM Version 1.8 at PSR level 716, which supports the Network Access Method and Communications Control Program Version 3.8 under NOS 2.7.1 and the release of CDCNET 1.4. Miscellaneous technical changes are included.</td>
</tr>
</tbody>
</table>

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New features, as well as changes, deletions, and additions to information in this manual are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

### LIST OF EFFECTIVE PAGES

<table>
<thead>
<tr>
<th>Page</th>
<th>Revision</th>
<th>Page</th>
<th>Revision</th>
<th>Page</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Cover</td>
<td>-</td>
<td>1-18</td>
<td>T</td>
<td>8-1 thru 8-5</td>
<td>S</td>
</tr>
<tr>
<td>Title Page</td>
<td>-</td>
<td>19 thru 4-23</td>
<td>N</td>
<td>8-6 thru 8-12</td>
<td>T</td>
</tr>
<tr>
<td>11</td>
<td>T</td>
<td>4-24</td>
<td>R</td>
<td>9-1</td>
<td>N</td>
</tr>
<tr>
<td>iii/iv</td>
<td>S</td>
<td>4-25 thru 4-27</td>
<td>N</td>
<td>9-2</td>
<td>M</td>
</tr>
<tr>
<td>vi/vi</td>
<td>R</td>
<td>5-1</td>
<td>M</td>
<td>10-1</td>
<td>K</td>
</tr>
<tr>
<td>viij</td>
<td>P</td>
<td>5-2 thru 5-6</td>
<td>P</td>
<td>10-2</td>
<td>S</td>
</tr>
<tr>
<td>viii</td>
<td>N</td>
<td>5-7</td>
<td>P</td>
<td>10-3</td>
<td>P</td>
</tr>
<tr>
<td>ix</td>
<td>S</td>
<td>5-8 thru 5-20</td>
<td>N</td>
<td>10-4</td>
<td>P</td>
</tr>
<tr>
<td>x</td>
<td>P</td>
<td>5-21</td>
<td>P</td>
<td>11-1 thru 11-28</td>
<td>N</td>
</tr>
<tr>
<td>xi/xii</td>
<td>S</td>
<td>5-22</td>
<td>N</td>
<td>A-1 thru A-3</td>
<td>L</td>
</tr>
<tr>
<td>l-1</td>
<td>M</td>
<td>6-1</td>
<td>M</td>
<td>A-4</td>
<td>R</td>
</tr>
<tr>
<td>l-2</td>
<td>P</td>
<td>6-2 thru 6-5</td>
<td>N</td>
<td>A-5</td>
<td>L</td>
</tr>
<tr>
<td>l-3</td>
<td>L</td>
<td>6-6</td>
<td>P</td>
<td>A-6</td>
<td>L</td>
</tr>
<tr>
<td>l-4</td>
<td>L</td>
<td>6-7 thru 6-17</td>
<td>N</td>
<td>A-7 thru A-19</td>
<td>K</td>
</tr>
<tr>
<td>l-5</td>
<td>N</td>
<td>6-18</td>
<td>M</td>
<td>A-20 thru A-23</td>
<td>M</td>
</tr>
<tr>
<td>l-6</td>
<td>M</td>
<td>6-19</td>
<td>S</td>
<td>A-24 thru A-32</td>
<td>N</td>
</tr>
<tr>
<td>l-7</td>
<td>L</td>
<td>6-20 thru 6-40</td>
<td>N</td>
<td>A-33 thru A-48</td>
<td>L</td>
</tr>
<tr>
<td>l-8</td>
<td>M</td>
<td>6-41</td>
<td>P</td>
<td>B-1</td>
<td>N</td>
</tr>
<tr>
<td>l-9</td>
<td>M</td>
<td>6-42 thru 6-49</td>
<td>N</td>
<td>B-2</td>
<td>M</td>
</tr>
<tr>
<td>1-10</td>
<td>L</td>
<td>7-1</td>
<td>N</td>
<td>B-3</td>
<td>K</td>
</tr>
<tr>
<td>1-11 thru 1-18</td>
<td>P</td>
<td>7-2</td>
<td>S</td>
<td>B-4 thru B-8</td>
<td>L</td>
</tr>
<tr>
<td>2-1</td>
<td>L</td>
<td>7-3</td>
<td>N</td>
<td>B-9</td>
<td>T</td>
</tr>
<tr>
<td>2-2</td>
<td>M</td>
<td>7-4</td>
<td>K</td>
<td>B-10</td>
<td>N</td>
</tr>
<tr>
<td>2-3</td>
<td>M</td>
<td>7-5</td>
<td>N</td>
<td>B-11</td>
<td>L</td>
</tr>
<tr>
<td>2-4</td>
<td>N</td>
<td>7-6</td>
<td>N</td>
<td>C-1 thru C-3</td>
<td>P</td>
</tr>
<tr>
<td>2-5</td>
<td>M</td>
<td>7-7</td>
<td>S</td>
<td>C-4</td>
<td>N</td>
</tr>
<tr>
<td>2-6</td>
<td>L</td>
<td>7-8</td>
<td>N</td>
<td>C-5</td>
<td>M</td>
</tr>
<tr>
<td>2-7</td>
<td>M</td>
<td>7-9</td>
<td>N</td>
<td>C-6</td>
<td>M</td>
</tr>
<tr>
<td>2-8</td>
<td>M</td>
<td>7-10</td>
<td>P</td>
<td>D-1</td>
<td>S</td>
</tr>
<tr>
<td>3-1</td>
<td>P</td>
<td>7-11</td>
<td>N</td>
<td>D-2</td>
<td>S</td>
</tr>
<tr>
<td>3-2 thru 3-9</td>
<td>N</td>
<td>7-12</td>
<td>M</td>
<td>D-3</td>
<td>M</td>
</tr>
<tr>
<td>4-1</td>
<td>L</td>
<td>7-13</td>
<td>M</td>
<td>E-1</td>
<td>K</td>
</tr>
<tr>
<td>4-2</td>
<td>N</td>
<td>7-14 thru 7-22</td>
<td>N</td>
<td>E-2 thru E-6</td>
<td>S</td>
</tr>
<tr>
<td>4-3 thru 4-5</td>
<td>S</td>
<td>7-23</td>
<td>M</td>
<td>F-1</td>
<td>L</td>
</tr>
<tr>
<td>4-6</td>
<td>P</td>
<td>7-24</td>
<td>N</td>
<td>Index-1 thru -15</td>
<td>S</td>
</tr>
<tr>
<td>4-7</td>
<td>T</td>
<td>7-25</td>
<td>R</td>
<td>Comment Sheet-Mailer</td>
<td>T</td>
</tr>
<tr>
<td>4-8</td>
<td>N</td>
<td>7-26 thru 7-28</td>
<td>N</td>
<td>Back Cover</td>
<td></td>
</tr>
<tr>
<td>4-9</td>
<td>N</td>
<td>8-1</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-10</td>
<td>T</td>
<td>8-2</td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-11 thru 4-17</td>
<td>N</td>
<td>8-3</td>
<td>T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This manual describes the Network Definition Language (NDL) for the CONTROL DATA® Network Access Method (NAM), Version 1.8. It assumes that the reader is a network site administrator familiar with the Network Operating System (NOS) and other software in the networks product set.

The Network Access Method Version 1.8 operates under control of the NOS 2 operating system for the CDC® CYBER 180 Series; CYBER 170 Series; CDC CYBER 70 Models 71, 72, 73, and 74; and 6000 Series Computer Systems.

The Network Definition Language processor is a compiler used by a network administrator to create and maintain the files that define the physical and logical structure of the network for other network software, which in turn establishes, initializes, and operates the network.

RELATED PUBLICATIONS

Related material is contained in the Control Data Corporation publications listed below. The publications are listed within groupings that indicate relative importance to readers of this manual.

The following publications are of primary interest:

<table>
<thead>
<tr>
<th>Publication</th>
<th>Publication Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDCNET Conceptual Overview</td>
<td>60461540</td>
</tr>
<tr>
<td>CDCNET Configuration and Site Administration Manual</td>
<td>60461550</td>
</tr>
<tr>
<td>CDCNET Systems Programmer's Reference Manual Volume 1, Base System Software</td>
<td>60462410</td>
</tr>
<tr>
<td>CDCNET Terminal Interface Usage Manual</td>
<td>60461530</td>
</tr>
<tr>
<td>CYBER Cross System Version 1 Build Utilities Reference Manual</td>
<td>60471200</td>
</tr>
<tr>
<td>Network Access Method Version 1/ Communications Control Program Version 3 Terminal Interfaces Reference Manual</td>
<td>60480600</td>
</tr>
<tr>
<td>NOS Version 2 Reference Set, Volume 3, System Commands</td>
<td>60459680</td>
</tr>
<tr>
<td>NOS Version 2 Analysis Handbook</td>
<td>60459300</td>
</tr>
</tbody>
</table>
The following publication is of secondary interest:

Publication

NOS Version 2 Installation Handbook

Publication Number

60459320

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Also, if you have access to SOLVER, the CDC online facility for reporting problems, you can use it to submit comments about this manual. When it prompts you for a product identifier for your report, please specify NA5.
## CONTENTS

### NOTATIONS

<table>
<thead>
<tr>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>xiii</td>
</tr>
</tbody>
</table>

### 1. INTRODUCTION

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Definition Language Processor</td>
<td>1-1</td>
</tr>
<tr>
<td>Basic Network Concepts</td>
<td>1-1</td>
</tr>
<tr>
<td>Supervisory Programs</td>
<td>1-2</td>
</tr>
<tr>
<td>Network Access Method Interfaces</td>
<td>1-2</td>
</tr>
<tr>
<td>Simple Network</td>
<td>1-4</td>
</tr>
<tr>
<td>Administrative Operators</td>
<td>1-4</td>
</tr>
<tr>
<td>Variants of NPU Software</td>
<td>1-4</td>
</tr>
<tr>
<td>Packet-Switching Network</td>
<td>1-5</td>
</tr>
<tr>
<td>Multiple-Host Network</td>
<td>1-6</td>
</tr>
<tr>
<td>Defining a CDC Network</td>
<td>1-6</td>
</tr>
<tr>
<td>Hardware Elements</td>
<td>1-8</td>
</tr>
<tr>
<td>Host Processors</td>
<td>1-8</td>
</tr>
<tr>
<td>Network Processing Units</td>
<td>1-8</td>
</tr>
<tr>
<td>Couplers</td>
<td>1-8</td>
</tr>
<tr>
<td>Trunks</td>
<td>1-8</td>
</tr>
<tr>
<td>Communication Lines</td>
<td>1-8</td>
</tr>
<tr>
<td>Terminals</td>
<td>1-9</td>
</tr>
<tr>
<td>Devices</td>
<td>1-9</td>
</tr>
<tr>
<td>Software Elements</td>
<td>1-9</td>
</tr>
<tr>
<td>Data Structures and Flow</td>
<td>1-9</td>
</tr>
<tr>
<td>Host-Resident Software</td>
<td>1-12</td>
</tr>
<tr>
<td>NPU-Resident Software</td>
<td>1-12</td>
</tr>
<tr>
<td>CDCNET Network</td>
<td>1-13</td>
</tr>
<tr>
<td>CDCNET Device Interfaces</td>
<td>1-13</td>
</tr>
<tr>
<td>CDCNET Device Interface Software</td>
<td>1-14</td>
</tr>
<tr>
<td>Logical Elements</td>
<td>1-15</td>
</tr>
<tr>
<td>Nodes and Logical Links</td>
<td>1-15</td>
</tr>
<tr>
<td>Logical Configuration of Hosts</td>
<td>1-16</td>
</tr>
<tr>
<td>Logical Configuration of Terminals</td>
<td>1-16</td>
</tr>
<tr>
<td>Application-to-Application Connections</td>
<td>1-16</td>
</tr>
<tr>
<td>Multilevel Security</td>
<td>1-17</td>
</tr>
</tbody>
</table>

### 2. THE NETWORK DEFINITION LANGUAGE

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional Syntax and Formats</td>
<td>2-1</td>
</tr>
<tr>
<td>Value Declaration Formats</td>
<td>2-1</td>
</tr>
<tr>
<td>Value-Required Keywords</td>
<td>2-1</td>
</tr>
<tr>
<td>Stand-Alone Keywords</td>
<td>2-4</td>
</tr>
<tr>
<td>Parameter Values</td>
<td>2-4</td>
</tr>
<tr>
<td>Statement Length and Continuations</td>
<td>2-4</td>
</tr>
<tr>
<td>Definition Structure</td>
<td>2-4</td>
</tr>
<tr>
<td>Division Hierarchy</td>
<td>2-5</td>
</tr>
<tr>
<td>Statement Hierarchy</td>
<td>2-5</td>
</tr>
<tr>
<td>Special-Purpose Statements</td>
<td>2-5</td>
</tr>
<tr>
<td>TITLE Statement</td>
<td>2-5</td>
</tr>
<tr>
<td>COMMENT Statement</td>
<td>2-5</td>
</tr>
<tr>
<td>DEFINE Statement</td>
<td>2-7</td>
</tr>
<tr>
<td>END Statement</td>
<td>2-8</td>
</tr>
</tbody>
</table>

### 3. NETWORK DIVISION STATEMENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFILE Statement</td>
<td>3-1</td>
</tr>
<tr>
<td>Network Node and Link Definition Statements</td>
<td>3-1</td>
</tr>
<tr>
<td>NPU Statement</td>
<td>3-2</td>
</tr>
<tr>
<td>SUPLINK Statement</td>
<td>3-3</td>
</tr>
<tr>
<td>COUPLER Statement</td>
<td>3-3</td>
</tr>
<tr>
<td>LOGLINK Statement</td>
<td>3-4</td>
</tr>
<tr>
<td>TRUNK Statement</td>
<td>3-6</td>
</tr>
</tbody>
</table>

### 4. ASYNCHRONOUS LINES, TERMINALS, AND DEVICES

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Line Definition</td>
<td>4-1</td>
</tr>
<tr>
<td>LINE Statement Parameters</td>
<td>4-1</td>
</tr>
<tr>
<td>GROUP Statement Parameters</td>
<td>4-2</td>
</tr>
<tr>
<td>Terminal Definitions</td>
<td>4-6</td>
</tr>
<tr>
<td>STIP Parameter</td>
<td>4-7</td>
</tr>
<tr>
<td>TC Parameter</td>
<td>4-7</td>
</tr>
<tr>
<td>CSET Parameter</td>
<td>4-7</td>
</tr>
<tr>
<td>RIC Parameter</td>
<td>4-9</td>
</tr>
<tr>
<td>TSPEED Parameter</td>
<td>4-9</td>
</tr>
<tr>
<td>Device Definitions</td>
<td>4-9</td>
</tr>
<tr>
<td>DT Parameter</td>
<td>4-10</td>
</tr>
<tr>
<td>AB Parameter</td>
<td>4-10</td>
</tr>
<tr>
<td>ABL Parameter</td>
<td>4-10</td>
</tr>
<tr>
<td>AUTOCON Parameter</td>
<td>4-11</td>
</tr>
<tr>
<td>BK Parameter</td>
<td>4-11</td>
</tr>
<tr>
<td>BS Parameter</td>
<td>4-11</td>
</tr>
<tr>
<td>BL Parameter</td>
<td>4-12</td>
</tr>
<tr>
<td>CI Parameter</td>
<td>4-13</td>
</tr>
<tr>
<td>CN Parameter</td>
<td>4-13</td>
</tr>
<tr>
<td>CP Parameter</td>
<td>4-13</td>
</tr>
<tr>
<td>CT Parameter</td>
<td>4-14</td>
</tr>
<tr>
<td>DBL Parameter</td>
<td>4-14</td>
</tr>
<tr>
<td>DBZ Parameter</td>
<td>4-14</td>
</tr>
<tr>
<td>DI Parameter</td>
<td>4-15</td>
</tr>
<tr>
<td>DLC Parameter</td>
<td>4-15</td>
</tr>
<tr>
<td>DITO Parameter</td>
<td>4-15</td>
</tr>
<tr>
<td>DLX Parameter</td>
<td>4-15</td>
</tr>
<tr>
<td>EBR Parameter</td>
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<td>EBR Parameter</td>
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<td>ELR Parameter</td>
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<td>ELX Parameter</td>
<td>4-17</td>
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<tr>
<td>EP Parameter</td>
<td>4-17</td>
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<td>HD Parameter</td>
<td>4-18</td>
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<td>HN Parameter</td>
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<tr>
<td>IC Parameter</td>
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<tr>
<td>IN Parameter</td>
<td>4-19</td>
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<tr>
<td>LI Parameter</td>
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<tr>
<td>LK Parameter</td>
<td>4-19</td>
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<tr>
<td>MCI Parameter</td>
<td>4-20</td>
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<tr>
<td>MLI Parameter</td>
<td>4-20</td>
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<tr>
<td>OC Parameter</td>
<td>4-20</td>
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<tr>
<td>OP Parameter</td>
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<tr>
<td>PA Parameter</td>
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<tr>
<td>PG Parameter</td>
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<td>PL Parameter</td>
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<td>PRI Parameter</td>
<td>4-23</td>
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<tr>
<td>PW Parameter</td>
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<tr>
<td>P90 Through P99 Parameters</td>
<td>4-24</td>
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<td>RTS Parameter</td>
<td>4-24</td>
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<tr>
<td>UBL Parameter</td>
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<td>UBL Parameter</td>
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<td>UBZ Parameter</td>
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<tr>
<td>X25 Parameter</td>
<td>4-25</td>
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<tr>
<td>XLC Parameter</td>
<td>4-25</td>
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</tbody>
</table>
5. X.25 PROTOCOL LINES, TERMINALS, AND DEVICES

Line Definition

Line Statement Parameters

PAD and User Terminal Definitions

STIP Parameter
TC Parameter
COLLECT Parameter
CSET Parameter
NCIR Parameter
NEN Parameter
PAD Parameter
RIC Parameter

PAD and User Device Definitions

DT Parameter
ABL Parameter
AUTOCON Parameter
Bl Parameter
B2 Parameter
CN Parameter
CT Parameter
DBL Parameter
DBZ Parameter
DI Parameter
DO Parameter
EL Parameter
ET Parameter
DI Parameter
DO Parameter
ELO Parameter
HD Parameter
HN Parameter
LK Parameter
PG Parameter
PL Parameter
PRI Parameter
PW Parameter
P90 Through P99 Parameters

HASP Terminal Definitions

STIP Parameter
TC Parameter
CSET Parameter
RIC Parameter

HASP Device Definitions

DT Parameter
ABL Parameter
AUTOCON Parameter
Bl Parameter
B2 Parameter
CN Parameter
CT Parameter
DBL Parameter
DBZ Parameter
DI Parameter
DO Parameter
EL Parameter
ET Parameter
DI Parameter
DO Parameter
ELO Parameter
HD Parameter
HN Parameter
LK Parameter
PG Parameter
PL Parameter
PRI Parameter
PW Parameter
P90 Through P99 Parameters

STREAM Parameter
UBL Parameter
UBZ Parameter
XBL Parameter

Application-to-Application Connection Definitions

Terminal Definitions

STIP Parameter
CSET Parameter
NCIR Parameter
NEN Parameter

Device Definitions

XLTO Parameter
XLX Parameter
XLY Parameter

Buffering of Data

6. MODE 4, HASP, 2780/3780 AND 3270

BISYNCHRONOUS LINES, TERMINALS, AND DEVICES

Line Definition

LINE Statement Parameters

Mode 4 Terminal Definitions

STIP Parameter
TC Parameter
CSET Parameter
EOF Parameter
RIC Parameter

Mode 4 Device Definitions

DT Parameter
ABL Parameter
AUTOCON Parameter
Bl Parameter
B2 Parameter
CN Parameter
CT Parameter
DBL Parameter
DBZ Parameter
DI Parameter
DO Parameter
EL Parameter
ET Parameter
DI Parameter
DO Parameter
ELO Parameter
HD Parameter
HN Parameter
LK Parameter
PG Parameter
PL Parameter
PRI Parameter
PW Parameter
P90 Through P99 Parameters

HASP Terminal Definitions

STIP Parameter
TC Parameter
CSET Parameter
RIC Parameter

HASP Device Definitions

DT Parameter
ABL Parameter
AUTOCON Parameter
Bl Parameter
B2 Parameter
CN Parameter
CT Parameter
DBL Parameter
DBZ Parameter
DI Parameter
DO Parameter
EL Parameter
ET Parameter
DI Parameter
DO Parameter
ELO Parameter
HD Parameter
HN Parameter
LK Parameter
PG Parameter
PL Parameter
PRI Parameter
PW Parameter
P90 Through P99 Parameters

STREAM Parameter
UBL Parameter
UBZ Parameter
XBL Parameter
Throughout this manual, the following conventions are used to present statement formats and diagnostic messages:

[ ] Square brackets indicate that the enclosed parameters or values are optional. When two or more items are stacked vertically within brackets, one of them can be used or all may be omitted. An entire parameter or part of a parameter can be optional. For example, the brackets in [ CP=cp ] indicate that the whole parameter is optional and can be omitted, but the brackets in AUTO [ =ynl ] show that you can specify the parameter as either AUTO=ynl or AUTO only.

lowercase Lowercase words identify variables for which values are supplied by you or by the system as output. These words generally indicate the nature of the information they represent (numerical value, file or job name, and so forth).

Δ The delta symbol represents a blank used as a separator. Anywhere a delta symbol is shown, a comma can be used. Multiple blanks or a blank following a comma is ignored. Multiple commas are illegal, except when they separate unused optional parameters in the login procedure.

CT The boxed cr symbol represents the terminal key that ends a message; usually, this is the same key that causes a carriage return operation.

LF The LF symbol represents a one-line vertical repositioning of the cursor or output mechanism. LF also designates a character or character code associated with such a line feed operation.

A circle around a character represents a character key that is pressed in conjunction with a control key (CTL, CNTRL, CONTRL, CONTROL, or equivalent).

Unless otherwise specified, all references to numbers are to decimal values; all references to characters are to 6-bit display coded characters.
As a site administrator, you must code and run a job that uses the CDC Network Definition Language to describe the hardware and software elements that comprise the computer and communication network for your site. A Network Definition Language (NDL) job creates two types of network definition files: network configuration files and local configuration files.

The network configuration file contains information about the physical and logical configuration of the network. The local configuration file contains information about the network application programs that run in a host computer and provide services to the network, defines login options for the devices that access a host computer, and defines connections that applications can have to other hosts.

Only the local configuration file applies to Control Data Distributed Communications Networks (CDCNET). For information on configuring CDCNET networks, refer to the CDCNET Configuration and Site Administration Manual.

NETWORK DEFINITION LANGUAGE PROCESSOR

Your job processes source statements through the Network Definition Language processor. The NDL processor creates the network definition files, as shown in figure 1-1.

In addition to the two types of network definition files, the NDL processor produces a job listing file. You can make the processor provide the following information in the listing file:

- An annotated copy of the NDL program source statements input to the processor
- Descriptions of errors noted on a source statement listing
- Descriptions of the network configuration file and local configuration file contents
- A list of all legal DEFINE statements (statements used like macros to equate a character string with an identifier for later insertion in one of the definitions)
- An annotated copy of the NDL program source statements input to the processor, with all DEFINE statement character strings inserted in place of identifiers

The listing file contents are described further in section 10, Job Structure.

The NDL processor executes as a batch preprocessing compiler; it does not interact with the network during network operation.

BASIC NETWORK CONCEPTS

The following concepts will help you understand the relationships among the hardware and software elements in your network. A more detailed description of the elements of a CDC network is presented at the end of this section.

CDC network software supports the seven layers of protocols defined in the International Standards Organization Model for Open System Interconnection (ISO/OSI), as described in document TC97/SC16/N227 or N309. References in this manual to layer numbers are references to the layer definitions in that document. The ISO/OSI layers are:

1. Layer 1 - Protocols defining the physical and electrical characteristics of connections between two components of the network
2. Layer 2 - Protocols for physical linkages that connect elements within the network
3. Layer 3 - Protocols for logical linkages that connect elements through the network
4. Layer 4 - Protocols for physical data transport within the network
5. Layer 5 - Protocols for managing data transport through the network
6. Layer 6 - Protocols for data formats between elements connected to the network

Figure 1-1. Creation of Network Definition Files
Layer 7 - Protocols for element supervision within the network

You do not need to know the protocols in these seven layers. However, some of the things you must include in your network definition are determined by the needs each protocol imposes on the network software.

You can think of a CDC network as a hierarchy of hardware and software elements with three functional levels. Each functional level implements one or more of the ISO/OSI protocol layers.

The separated portions of these three levels are shown in Figure 1-2. The outermost level is the service network. The service network comprises the site's local service elements. The local service elements include the network application programs in a host computer and the people at terminals using those programs.

The middle level is the computer network. The computer network comprises the site-administered local and remote computer elements. The computer elements include the terminals, a host computer, and network software supervisory programs in a host computer.

The innermost level is the communications network. The communications network comprises the local and remote communications elements. The communications elements include the communications concentrator hardware (called network processing units, or NPUs), the concentrator software, and the linkages (ISO/OSI layers 2 and 3) among these elements needed to connect the isolated ends of the other levels.

To ensure proper functioning of a CDC network, you must configure the functional levels correctly. Using NDL source statements, you provide the information necessary to identify the hardware and software elements in each level of the network to the other levels of the network. You must also establish logical relationships among the hardware and software elements.

SUPERVISORY PROGRAMS

Each functional level of the network hierarchy has corresponding supervisory software. CDC provides three supervisory programs:

The Network Validation Facility
The Communications Supervisor
The Network Supervisor

These supervisory programs run in a host computer and use the network definition files to initialize, monitor, and control network operations (ISO/OSI layer 7). Figure 1-3 shows the administrative files used by these supervisory programs.

The Network Validation Facility (NVF) uses the local configuration file in conjunction with the NOS system validation file (VALIDUz) to determine which host resources terminal users are allowed to access and which applications can run in the network. NVF runs in each host in the network.

The Communications Supervisor (CS) uses information from the network configuration file to monitor and control NPU and device operations (ISO/OSI layer 5). CS oversees the continuing operations of the communication elements and the computer elements outside of the site host. CS can run on one or more hosts in the network.

The Network Supervisor (NS) uses information from the network configuration file in conjunction with the NPU load file to load network processing units. The information NS loads determines the initial operation of the communication elements. NS can run in one or more hosts in the network.

NETWORK ACCESS METHOD INTERFACES

All data messages pass through the Network Access Method (NAM) to ensure their integrity as they are routed among terminals, the host computer, and applications. NAM consists primarily of three interface programs (ISO/OSI layers 4 and 5) in the host computer:

The Peripheral Interface Program
The Network Interface Program
The Application Interface Program

The Peripheral Interface Program runs in a host computer peripheral processor. The Network Interface Program runs in the host computer's central processor and uses a system control point; it is thus able to communicate with other programs using other control points. A copy of the Application Interface Program runs in the field length of every network application program, including the supervisory programs. Figure 1-4 shows the relationships among this software.
Figure 1-3. Supervisory Programs and File Use

Figure 1-4. The Network Access Method
The supervisory application program in figure 1-4 could be one of the three CDC-written programs shown in figure 1-3, or it could be a site-written program tailored to your needs. You can provide your own network service application programs, or you can use CDC-written service programs such as the Interactive Facility or the Remote Batch Facility. The CDC-written network service programs are described later in this section.

SIMPLE NETWORK

Figure 1-5 shows a possible network, Simnet. In this simple network, a single host computer, a CYBER 170 Model 176, is connected to a network processing unit; the NPU is a small, independent processor. This connection consists of a CYBER 170 host computer data channel cabled to a hardware module (called a coupler) in the NPU. An NPU connected to the host in this manner is known as a front-end NPU. The front-end NPU in Simnet is NPU1, a CDC 255x Communications Processor.

The front-end NPU can support terminals and other NPUs, known as remote NPUs. Remote NPUs can also support terminals. The only remote NPU in this network is NPU2, a CDC 255x Communications Processor.

The front-end network processing unit NPU1 supports terminal T1, and the remote processing unit NPU2 supports terminals T2 and T3. CDC provides support for many different types of terminals and terminal devices, as described in sections 4 through 7.

In the figure, Cl is the host computer's system console. The system console is not considered a network terminal and therefore is not defined in an NDL program. The person at the system console, however, is an administrative operator for the network.

Administrative Operators

A CDC network supports three types of administrative operators:

- The host operator (HOP)
- The NPU operator (NOP)
- The diagnostic operator (DOP)

The host operator is located at the system console for the site's host computer. The HOP can monitor and control application status, monitor NPU dump and load status, plus perform all of the functions of an NPU operator. The HOP always has control over all of the network.

The NPU operator is located at a terminal or host computer console. The NOP can obtain and change the status of network elements, communicate with terminal users, and run diagnostic tests. Each NPU can have one controlling NOP.

The diagnostic operator is located at a terminal serviced by the network. The DOP can monitor the status of network elements and can run diagnostic tests on an NPU. Any terminal user with permission to log in to the Communications Supervisor can become a DOP. There can be several DOPs active at the same time.

In Simnet, the host operator is located at the system console (Cl), and an NPU operator is located at terminal T1. Both administrative operators communicate with the Communications Supervisor in the host computer.

Variants of NPU Software

Each NPU, because it is an independent processor, has its own software. The software an NPU requires to access the network is called its variant. You must describe each NPU's software to the supervisory programs. You do so by identifying which program initiation control block (PICB) within the NPU load file properly describes the software in each NPU.

CDC 255x NPUs require loading, configuring, and operational control from the supervisory programs in the host. NPUs that can load themselves but require host configuration and supervision to operate or that are self-loading and self-configuring can also belong to the network.

The software variant used in a particular NPU depends on various aspects of the network to be configured, including:

- The type of NPU and host hardware in your network (CDC or non-CDC equipment, front-end or remote NPU, and so forth)
- The network topology (connections between front-end and remote NPUs)

60480000 L
The types of terminals and devices the NPU must support

The software in a CDC 255x series Communications Processor network processing unit is collectively called the Communication Control Program (CCP). CCP can contain three types of interface programs:

A Host Interface Program (HIP)

A Link Interface Program (LIP)

One or more Terminal Interface Programs (TIPs)

A HIP is needed only if the CCP variant links a front-end NPU to a host computer (ISO/OSI layer 2). A LIP is needed only if the CCP variant links a remote NPU and a front-end NPU (ISO/OSI layer 2). A TIP is needed only if the CCP variant links terminals to the network or an X.25 application-to-application connection (ISO/OSI layers 2, 4, and 6).

Figure 1-6 presents another view of Simnet, illustrating the relationships among these interface programs. Note that terminals T2 and T3 each connect to a different Terminal Interface Program. T2 is a CDC 752, which is an asynchronous terminal; T3 is a CDC 200 User Terminal, which is a synchronous terminal. Each has different support requirements; therefore, a different interface program is required for each.

The network software currently supports TIPs for five general terminal protocols. Your site can provide its own Terminal Interface Program software to support up to three additional protocols; your site can also modify CDC-written Terminal Interface Programs to support local variants of the five general protocols.

PACKET-SWITCHING NETWORK

CDC network software provides support for asynchronous terminals connected to public packet-switching networks (PSNs). This support complies with recommendation X.25 of the International Telegraph and Telephone Consultative Committee (CCITT) for standardizing the interface between data terminal equipment and packet-switching networks. (Packet-switching networks are sometimes called public data networks, or PDNs.)

Figure 1-7 shows the packet assembly/disassembly (PAD) service, which is one part of the interface between the network and the data terminal equipment. This part of the interface is provided by the packet-switching network.
Since the X.25 protocol is not symmetric, the roles played by each end of an X.25 link must be identified for each X.25 line. The ends of a X.25 link are the data terminal equipment (DTE) and the data circuit equipment (DCE).

A calling terminal is linked with the Communication Control Program in the NPU via a logical path called a virtual circuit. The site must subscribe to the packet-switching network for the desired number of virtual circuits as well as other parameters (described in section 5) affecting the operation of the NPU-PSN interface. CDC support of this type of configuration is described in detail in section 5.

MULTIPLE-HOST NETWORK

Network software supports networks with multiple host computers. A simple multiple-host configuration is illustrated by Dualnet in figure 1-8. A second host has been added to the network, connecting to a coupler in NPU2. Both NPU1 and NPU2 are channel-connected as front-end NPUs to a local host and are connected to a remote host via a trunk communication line.

A more complicated multiple-host network concept is illustrated by Multinet in figure 1-9. Note that each side of the figure resembles Simnet in figure 1-5. In effect, two entire networks have been merged. This has been accomplished by connecting each front-end processor to both hosts. Figure 1-7 shows a multiple-host network where the hosts are interconnected by an X.25 packet-switching network.

Multiple-host networks offer three features that are not available in single-networks. These are:

The ability of a terminal user to connect to one of many hosts.

The ability of an application in one host to communicate with an application in one or more other hosts.

The ability of the NPUs in the network to be loaded, configured, and supervised by one of several hosts in the network.

The installation can either preassign terminal users to hosts, or can allow them to select a host when they connect to the network. In both cases, terminal users can either be required to log in to the selected host or can be automatically logged in to the host.

Applications wanting to establish connections with applications in other hosts do not need to be aware of the topography of the network. Instead, the installation must specify the addressing and flow control parameters that the network software can use to establish the connection. This must be done for each path that can be used for an application-to-application connection.

As part of the definition of the network configuration, the installation also defines the supervision paths to hosts that an NPU can use to obtain its configuration and its operator interface.

DEFINING A CDC NETWORK

When defining your network, you must specify both its physical and its logical characteristics. The Network Definition Language helps you create your definition in a simple and logical manner. This section presents three aspects of the network that must be described in your NDL program: its hardware elements, its software elements, and the logical relationships you must define among them.

HARDWARE ELEMENTS

To ensure proper operation of the network, you must carefully define all of its hardware elements and establish the relationships among them. The configurable hardware elements of the network are shown in figure 1-10. Each type of element is described in detail below.
Figure 1-9. Multinet

Figure 1-10. Configurable Hardware Elements
Host Processors

A host processor is any computer mainframe that is linked to the network to run network application programs. Host computers contain the portions of the network software necessary for applications to access the network.

A host can be connected through its data channels to one or more network processing unit data channel couplers, as was illustrated by the network processing units NPU1 and NPU2 of Simnet (figure 1-5), which in turn can be connected to other hosts.

No separate NDL statements exist to define a host. Hosts are assumed to be attached to couplers, so you can specify all needed host access information when you configure the couplers. Computers that access the network without couplers are treated by the network as terminals or as foreign hosts and access the network via X.25 connections. These computers must communicate through one of the terminal protocols described in sections 4 through 7.

Network Processing Units

Network processing units can be either CDC 255x series Communications Processors or non-CDC processors with compatible communication procedure software. Unless otherwise qualified, subsequent references to network processing units in this manual apply to both types of equipment.

Networks can contain two types of 255x network processing units: the 2550 (sometimes called a 2530 Host Communications Processor) and the 2551. A 2550 NPU has at least one coupler and always operates as a front-end NPU. A 2551 can have a coupler, but need not have one, and can be configured as either a front-end or remote NPU.

The 2551 series Communications Processor has both a programmable micromemory and a macromemory; each model of the 2551 series has varying amounts of macromemory, with several sizes of random access micromemory (RAM) logic. To run the current release of macromemory, with several sizes of random access model of the 2551 series has varying amounts of the 2551 has two couplers or is used as a remote NPU. When an NPU has a cassette drive, the drive is used to begin the loading of CCP from a host computer.

The cassette drive loads a copy of the system auto-start module program (SAM-P) from a CDC-supplied cassette. SAM-P is essentially a bootstrap loader that obtains the copy of CCP appropriate for its NPU from a copy of the Network Supervisor program in a host computer.

The cassette drive can also be used to load optional off-line hardware diagnostic software for use with the NPU's console.
Model 2561 series asynchronous CLAs, used to support lines connecting teletypewriter-compatible or IBM 2741-compatible terminals to the NPU.

Model 2563 series high-level data link control (HDLC) CLAs, used to support trunks connecting other NPUs or lines connecting asynchronous terminals, NPUs with hosts, or foreign hosts to the NPU through X.25 packet-switching networks.

SOFTWARE ELEMENTS

Network software runs in two environments: the host and the NPU. Standard CDC software runs in both to support many network configurations. Your site can also provide its own software to support other types of equipment and other uses. The characteristics of software not provided by CDC are unknown, and therefore are not addressed by this manual.

Data Structures and Flow

Data flow in the network is defined from the viewpoint of the host computer. Data coming to the host is said to be traveling upline; data moving away from the host is said to be traveling downline. This concept is shown in figure 1-11.

![Figure 1-11. Data Flow Directions](image)

Upline and downline information within the host and NPUs is always grouped into physical network blocks. Network data blocks are grouped into logical messages. Messages exchanged between an NPU and a device can also be grouped into physical transmission blocks of one or more logical lines. Figure 1-12 shows these concepts.

A single network data block is a collection of character bytes, analogous to a clause in English. It is a partially independent unit of information and might need to be used with other blocks to form a message.

Terminals

A terminal is a single point of access between one or more devices and a communication line. The current network software provides support for five basic types of terminals:

Asynchronous terminals, such as the CDC 751, using either asynchronous protocol or X.25 protocol

Mode 4 protocol synchronous terminals, such as the CDC 200 User Terminal

Multileaving bisynchronous terminals, such as IBM Corporation's HASP workstations

Binary synchronous terminals, such as IBM Corporation's 2780 or 3780 terminals

Binary synchronous terminals such as IBM Corporation's 3270 terminal

You can configure up to three more types of terminals with a site-provided TIP for each type.

Terminals are grouped into classes by their specific hardware characteristics. A terminal class parameter is used to define some physical characteristics of the terminal and to determine the default values of operational characteristics. The network software supports 18 CDC-defined terminal classes. These terminal classes are described in greater detail in sections 4 through 6.

If you provide your own support software, you can use features of the Network Definition Language to define up to four additional terminal classes. CDC cannot anticipate the support required for such terminals, and thus cannot document such support. You can find information pertinent to defining your own terminals in sections 4 through 7.

Devices

Each terminal includes one or more separately configured devices that perform both input and output, input only, or output only. For X.25 and asynchronous protocols, a device such as a console is a terminal. For synchronous protocols, a device such as a console is only a portion of a terminal.

An interactive device such as a console can perform both input and output, and its user can participate easily in dialog with host software. A passive or batch device such as a card reader or line printer can perform only one-half of such dialog. Interactive and passive devices use different types of data structures and paths through the network.
A network data block can contain all or part of a message; you control which occurs by establishing the size a network data block can have. The size of an upline network block is fixed at the number of characters you specify when you configure the device that produces it. The size of a downline block is chosen by the application program sending it, but you can recommend a value to that program when you configure the device that receives it. You use the UBZ and DBZ parameters to control these sizes; these parameters are described in sections 4 through 7.

In upline data, a logical line of information is a single message, analogous to an English sentence. It is a complete unit.

Upline logical lines end when a device transmits certain characters or causes certain events. An upline message is normally transmitted to the host as soon as a logical line ends. A logical line ends when CCP receives an end-of-line indicator (the end of a logical line).

Terminals can transmit one line at a time to the NPU and wait for output or they can transmit several lines at a time (block mode). With line-by-line transmission, CCP detects the end of each logical line by an end-of-line character or indicator. Each logical line becomes a separate network message when the NPU receives it. Block mode terminals group logical lines in the terminal until the transmission key is pressed; these groups reach the network software as a single transmission block. The network software forwards each message to the application as a separate transmission. With block mode transmission, CCP detects the end of a transmission block by an end-of-block character or indicator.

For upline data, you can configure a device so that CCP ignores the character or event that normally causes it to detect the end of a logical line and transmit a message to the host. Instead, you make CCP use a different character or event to trigger transmission to the host. This option allows the terminal user to pack many logical lines into one set of upline network blocks; each line includes the character that terminates it. The host receives only one message. From the application and the terminal user’s viewpoint, one message is many logical lines. This mode of operation is suitable mainly for block mode terminals where the user can compose an entire screen of data and then transmit the entire screen to the NPU at one time.

Figure 1-12. Physical and Logical Information Structures
If a single message fits into an upline network data block (you should try to make this happen as often as possible), the network data block becomes a single-message block. If one upline message cannot be fit into a network data block, CCP splits it into as many blocks as necessary. The text of sections 4 through 7 assumes that each network data block contains a complete message.

A downline message ends when an application program indicates that condition. A downline message can contain many logical lines of output.

Network data blocks are restructured into other types of blocks at points of entrance and exit from the network processing units. Figure 1-13 shows these points as circles. Transmission blocks exchanged with X.25 devices are called packets and have different size and protocol content requirements than transmission blocks exchanged directly with a terminal. You can control some of the characteristics of packets.

Network Data Blocking for Interactive Device Input

A network data block is created every time the number of characters transmitted from a device exceeds the upline block size. A message block is created each time the terminal user enters an end-of-line character. You define the character that must be entered from a device in the network to end a logical line.

A block transmission exists each time a group of logical lines is transmitted as a unit by a device. If the terminal user enters an end-of-block character, any incomplete logical line is terminated and a message block is generated. You define the character that must be entered from a device in the network to end a multiple-message block.

Network Data Blocking for Batch Device Input or Output

Batch devices require large amounts of data to be moved to or from a host computer's mass storage devices. Batch upline data is therefore assembled into messages of multiple network data blocks. Each network data block contains one or more mass storage physical record units (PRUs). Batch downline data is disassembled from such sets of blocks.

Terminal Output Data Blocking

Terminals sometimes require data to be received in blocks of a maximum length, independent of the data's structure within the network. Such blocks are called transmission blocks; you can define the transmission block size for each device in the network using its XBZ parameter.

Link Data Blocking

Transmission blocks exchanged between NPUs have different structure and content requirements than those exchanged directly with terminals. Such physical link transmission blocks are called frames. Regardless of data type, network data blocks are reassembled into frames of a maximum number of bytes before transmitting them across a trunk. Data received from a trunk is reassembled into network data blocks. Frames are constructed and disassembled at points also shown with circles in figure 1-13. You must define the number of character bytes that comprise a frame on each trunk in the network.

CDCNET data structures are discussed in the CDCNET Terminal Interface Usage Manual.
Host-Resident Software

Two types of programs are associated with the host computer: CDC-written application programs and site-written application programs.

CDC-Written Application Programs

CDC host software includes programs that support a number of network device applications. The following CDC-written programs are currently supported:

- The Interactive Facility (IAF)
- The Remote Batch Facility (RBF)
- The Transaction Facility (TAF)
- The Terminal Verification Facility (TVF)
- The Message Control System (MCS)
- The PLATO/NAM Interface-PNI (PLATO)
- The Printer Support Utility (PSU)
- The Permanent File Transfer Initiator (PTFI)
- The Permanent File Transfer Server (PTFS)
- The Queue File Transfer Initiator (QTFI)
- The Queue File Transfer Server (QTFS)
- The NOS/VE Interactive Facility (VEIAF)
- The Interactive Transfer Facility (ITF)
- The Network Log Server (NETLS)
- The Network Operator Facility (NOF)
- The Network File Server (NETFS)
- The Initialize MDI Server (INITMDI)
- The Network Log Termination Utility (NLTERM)

IAF provides the terminal user with the ability to create files and programs from an interactive device and to execute jobs from that device.

RBF transfers job input files between remotely located batch terminals and a host computer. It also allows monitoring of a job's progress through the network and provides file output at the remote batch terminal.

TAF provides on-line transaction processing, allowing the terminal user to manipulate information in a data base directly from the terminal. TAF requires very little dialog to update a data base.

TVF provides the terminal user with the ability to test an interactive device's data transmitting and receiving functions.

MCS provides the terminal user with a mechanism for transferring data between an interactive device and a COBOL program or between two COBOL programs.

PSU provides the ability to print NOS queue files on a C533/C536 printer using asynchronous connections to the NPU.

PTFx provides a mechanism for using NAM and NPUs to transfer permanent files between hosts.

QTFx provides a mechanism for using NAM and NPUs to transfer queue files between hosts.

VEIAF provides the terminal user with the ability to create files and execute jobs on NOS/VE.

ITF provides the terminal user with the ability to connect to the CYBER 200 family of computers.

NETLS provides logging functions for the CDCNET network.

NOF provides operator interface functions for the CDCNET network.

NETFS provides file access functions for the CDCNET network.

INITMDI provides dump and load MDI functions for the CDCNET network.

NLTERM provides network log termination functions for the CDCNET network.

Site-Written Application Programs

If your installation runs its own application programs, characteristics of each application program might need to be relayed to the network software.

For more information on writing network application programs, see the Network Access Method Version 1 Host Application Programming Reference Manual listed in the preface.

NPU-Resident Software

Each CDC NPU in the network contains a copy of the Communications Control Program (CCP) tailored to the specific functions to be provided by that NPU. Each NPU might require its own variant of CCP, depending on the macromemory size of the unit and the software modules that need to reside in the unit. Variants are generated as described in the NOS Version 2 Installation Handbook. These variants reside in the host NPU load file (NLF). The appropriate variant for loading into each NPU is determined by the host Network Supervisor program from information contained in the network configuration file.

If the network processing units in your network are CDC 255x Communication Processors, you will probably be concerned with only the interface programs. These are the HIP, LIP, and TIP modules depicted in figure 1-14.
Your concern with the HIP and LIP modules is likely to be limited to ensuring that the CCP load variant for each NPU contains only the necessary modules. For example, NPU2 is a remote NPU, so it does not need a HIP. Since NPU3 does not service a remote NPU, it does not require a LIP. Since a LIP requires additional memory, you would want a CCP variant for NPU3 that does not include a LIP.

The TIPs contained in each CCP load variant must correspond to the TIPs referenced in the LINE, GROUP, TERMINAL, and TERMDEV statements for the NPUs into which the variant will be loaded. For example, in figure 1-14, because NPU2 only supports CDC 713 terminals, it need only contain the ASYNC TIP. NPU3, however, must contain both the MODE4 TIP for the CDC 734 and the ASYNC TIP for the M33 Teletype.


**CDCNET Device Interfaces**

Small communications processors called device interfaces (DIs) constitute the hardware portion of CDCNET.

Because CDCNET distributes major communications functions throughout a network, DIs perform different functions depending on their particular network task:

- The Mainframe Device Interface (MDI) lets you connect a host CYBER computer system to a local area network.
- The Terminal Device Interface (TDI) lets you connect user terminals and workstations to a local area network.
- The Network Device Interface (NDI) lets you connect one CDCNET local area network to other networks.
- The Mainframe Terminal Interface (MTI) lets you connect user terminals/workstations to a CYBER host without requiring that they be tied into a local area network.

You can find further information on CDCNET network device interfaces in the CDCNET Reference Manual.
**Figure 1-15 CDCNET Networks**

**CDCNET Device Interface Software**

The software which resides in a device interface is comprised of the following:

- **Base system software**
- **Layer software**
- **Interface software and gateways**
- **Network management software**

**Base System Software**

The base system software performs two major tasks:

- Initializes the operation of the device interface (DI)
- Maintains the operational environment of the DI by serving as its executive routine, detecting and reporting DI malfunctions, and managing the DI's onboard diagnostics

You can find more information on the CDCNET base system software by referring to the CDCNET Systems Programmer's Reference Manual, Volume 1, Base System Software.

**Layer Software**

CDCNET layer software enables applications software, end users, terminals or workstations, and host computers to exchange information through a compatible set of protocols and interfaces.

You can find more information on the CDCNET layer software by referring to the CDCNET Systems Programmer's Reference Manual, Volume 2, Network Management Entities and Layer Interfaces.

**Interface Software and Gateways**

CDCNET interface software and gateways consist of various software packages that enable CDCNET DIs and hosts that accommodate Control Data Network Architecture (CDNA) to communicate with other...
hosts, networks, and terminals/workstations which do not support CDNA.


Network Management Software

CDCNET network management software performs daily and periodic tasks related to the administration, maintenance, and operation of the communications network.

You can find more information on the CDCNET network management software by referring to the CDCNET Systems Programmer's Reference Manual, Volume 2, Network Management Entities and Layer Interfaces.

LOGICAL ELEMENTS

In addition to the hardware and software elements of your network, you must define certain logical elements. These logical elements establish the association between terminals and application programs, as well as between one application program and another. Using these logical elements, the network software performs as though it were independent of the physical organization of the network.

Nodes and Logical Links

A logical path concept is used to describe the connections between elements of the network in a manner that is independent of the physical data paths between them. Each junction of possible branches in these logical paths must be known to the network. These junctions are called network nodes. In your NDL program, you identify each network node by assigning the hardware that contains it a unique node number from 1 to 255. The network software uses these numbers to route messages from a source node to a destination node.

Figure 1-16 shows the nodes (node numbers are circled) in a multiple-host network. Node number 1 is assigned to the coupler. Because the coupler is the means of addressing the host, the coupler is known as the host node.

Figure 1-16. Nodes and Logical Links
The front-end NPU has a separate node from its coupler because a front-end NPU must be separately addressable from its couplers. Node 7 and node 8, within the front-end and remote NPUs, are known as terminal nodes.

Figure 1-16 shows the four logical links in the network, labeled LL1 through LL4, originating in coupler 1. Logical links are known by the end points of the path they traverse. One end point is always a host node in a coupler; the second end point is a terminal node in an NPU or another host node.

You must define each logical link that originates in a coupler when you configure the NPU that houses the coupler. You do so by identifying the NPU that is the terminal node or other coupler node of the link.

Table space for node numbers is reserved within the host software, with space assigned to all numbers from 1 to the highest number used; unused numbers have corresponding table space. You can minimize memory resource requirements by assigning node numbers sequentially, giving host nodes lower values than terminal nodes.

You must specify for each NPU the logical links to hosts which are allowed to configure and control the NPU. These are called supervisory links. When each trunk between NPUs is defined, you specify whether either NPU can be loaded via the trunk. Loading, configuration, and control are supervisory functions which can take place only between hosts and NPUs that belong to the same site.

Subnetworks or Sites

A site is defined as being all of the hosts and NPUs under single administrative control. NPUs can be loaded and supervised only by hosts within their site, but terminals connected to an NPU and applications running in a host can connect to hosts belonging to different sites.

When you define a network, you include all of the NPUs in your site as well as all of the NPUs belonging to other sites to which your site's NPUs have physical and logical connections. Lines and terminal definitions need to be specified only for the NPUs belonging to your site, and the supervisory links specified for each NPU must all be to hosts that belong to the NPU's site.

The concept of a site is very important when upgrading release levels of NPU and host software. Throughout the remainder of this manual, except where specifically stated, the term network will refer to a single-site network.

Logical Configuration of Hosts

You can describe a host computer in your program in terms of the application programs it is to run. A local division is provided in the NDL program structure for this purpose.

Logical Configuration of Terminals

In addition to the hardware description of your terminals specified in the network division, you can supply, in the local division, information concerning their ability to access network resources. This information includes:

| Mandatory, primary, or default values for login operating system validation parameters |
| Mandatory or primary default values for login application program name |

APPLICATION-TO-APPLICATION CONNECTIONS

Figure 1-17 shows an application-to-application connection within the same host. Figure 1-18 shows that interhost application-to-application connections can either be made via a trunk or a single NPU. Figure 1-19 shows the possibilities for application-to-application connections via a X.25 packet-switching network.

![Figure 1-17. Intrahost Application-to-Application Connection](image-url)}
Figure 1-18. Interhost Application-to-Application Connections

requested to accept a connection from another application.

MULTILEVEL SECURITY

Access to files by terminal users can be limited by the access level (AL parameter) assigned to the communication line by which they access the network.

NOS multilevel security is based on the use of hierarchical security access levels. There are eight security access levels available for the classification of data, ranging from level 0 to level 7. The lowest (unsecured or unclassified) level is 0, and the highest (most secured or classified) level is 7.

The creator (or owner) of a permanent file, a local file, or a magnetic tape can assign an access level to that file, depending upon individual validation privileges and upon operating system constraints. Alternatively, the owner can allow the access level of the file to be assigned automatically by the operating system.
Figure 1-19. Interhost X.25 Application-to-Application Connections
This section presents the format and functional syntax of the Network Definition Language. The NDL program statements you will use to create the network definition files are described in separate subsections.

All the examples in this section and sections 3 through 8 refer to the hypothetical network SVLnet, shown in figure 2-1.

FUNCTIONAL SYNTAX AND FORMATS

Each NDL statement has the general form given in figure 2-2. Separators, terminators, and format representation conventions are explained on the notation page at the front of this manual. The formal syntax of the Network Definition Language (in Backus-Naur form) and a concise summary of each statement's syntax and format are given in appendix E.

Unless otherwise indicated in the format descriptions presented later in this section, all values declared for keywords are either unsigned decimal integers or character strings of one through seven letters and digits. Element names are also restricted to one initial letter and up to six more letters and/or digits. All value declarations identified as hexadecimal integers are also unsigned. NOS user names declared as values can contain asterisks.

VALUE DECLARATION FORMATS

Value declarations are position-independent. You can place declarations within a statement in any order. You do not use commas to indicate omitted declarations; such null-value parameter declarations cause an error diagnostic.

All value declarations can have the form:

keyword=value

All optional keyword=value declarations have an explicit value that is equivalent to omitting the declaration.

You can specify any keyword more than once in a single statement; the latest declaration in the statement takes precedence. This ability allows you to override previously established values.

For example, a DEFINE statement can contain a declaration for the DLX parameter that is used in the definition of all asynchronous consoles of the network. That parameter can be reset to a different value for one terminal by placing a specific DLX keyword declaration after the DEFINE statement identifier on the appropriate DEVICE or TERMDEV statement.

The format you use to declare parameter values depends upon the parameter being declared and upon the presence or absence of the value. The value portion of the declaration can have one of two forms:

value-required

stand-alone

Value-Required Keywords

A declaration containing a value-required keyword has the form

keyword=value

For example, the following statement contains a value-required keyword (NODE) and an explicit value (1) in its declaration:

CPLR1: COUPLER NODE=1.

You can use either explicit or implicit values for value-required keyword declarations. The legal values for explicit declarations are given in sections 3 through 7. Implicit value declarations are allowed only for automatic-recognition dependent, CCP-default, or no-default keywords; after such a declaration, the network software implies the value to use from the context of the parameter.

Automatic-Recognition-Dependent Keywords

The automatic-recognition-dependent keywords are:

CA
STREAM
CF
TA
CSET
TSPEED
STIP

If you declare an explicit value for one of these keywords, the declared value is always used. You can also declare a value of AUTOREC for such keywords and use the implicit value for the parameter.

When you use the value AUTOREC, CCP determines the value needed when it performs automatic recognition for the communication line or terminal. (AUTOREC can be used only if the line is an automatic recognition line.)

Using the value of AUTOREC has the same effect as not specifying the keyword. Specifying AUTOREC makes your network definition less dependent on terminal type.
Figure 2-1. SVLnets - Configuration Example
element-name The name given to the entity being defined. When the NDL processor requires an element name, the name specified must be unique within a division. Element names comprise one alphabetic character optionally followed by up to six alphabetic or numeric characters from the 6-bit display code set. The host and NPU operators use the element name to monitor and alter the status of the named entity.

: The colon separates the element name from the reserved statement name. When an element name is specified, a colon must follow it. The colon does not become part of the element name.

Δ The Greek capital delta character represents a separator. Blanks and commas are separators and are required where shown in the prototype statement formats; blanks can be used where commas are shown. One blank is sufficient as a separator, and multiple blanks are treated as one. One or more blanks preceding or following a colon or comma are ignored.

statement-name A reserved word specifying the statement type. Each statement type has a unique statement name.

keyword=valuei or keywordi A value declaration of the statement. This has two possible formats, depending upon the keyword and upon inclusion of the value in the declaration. (See Value Declaration Formats.)

Commas (and blanks) are separators. Separators are required between declarations. A comma preceded or followed by one or more blanks is treated as a single separator. A comma indicates that the NDL processor should interpret whatever follows it as a new keyword.

A period is required to terminate each statement.

*text Comment text can appear on the same line as a statement, but must be written after the period, preceded by an asterisk, and cannot be continued on the next line without specifying COMMENT or * again.

Figure 2-2. Functional Syntax of NDL Statements

CCP-Default Keywords

The CCP-default keywords are:

<table>
<thead>
<tr>
<th>AB</th>
<th>CT</th>
<th>ELR</th>
<th>OC</th>
<th>XLC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BR</td>
<td>DLC</td>
<td>ELX</td>
<td>OP</td>
<td>XLT</td>
</tr>
<tr>
<td>BS</td>
<td>DLTO</td>
<td>EP</td>
<td>FA</td>
<td>XLX</td>
</tr>
<tr>
<td>BL</td>
<td>DLX</td>
<td>IC</td>
<td>PC</td>
<td>XLY</td>
</tr>
<tr>
<td>BZ</td>
<td>EBO</td>
<td>IN</td>
<td>PL</td>
<td></td>
</tr>
<tr>
<td>CI</td>
<td>EBR</td>
<td>LI</td>
<td>FM</td>
<td></td>
</tr>
<tr>
<td>CN</td>
<td>EBX</td>
<td>LK</td>
<td>SDT</td>
<td></td>
</tr>
<tr>
<td>CP</td>
<td>ELO</td>
<td>NREC</td>
<td>TC</td>
<td></td>
</tr>
</tbody>
</table>

If you declare an explicit value for one of these keywords, the declared value is always used. You can also declare a value of CCP for such keywords and use the implicit value for the parameter.

When you use the value CCP, the Communication Control Program (CCP) supplies the default value for the terminal class when it configures the device. (CCP should be specified only if the line uses a TIPTYPE value for a CDC-written Terminal Interface Program.) Using the value CCP has the same effect as not specifying the keyword except that it overrides a previously declared explicit value.

No-Default Keywords

The no-default keywords are:

<table>
<thead>
<tr>
<th>AL</th>
<th>MFAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFAM</td>
<td>MUSER</td>
</tr>
<tr>
<td>DUSER</td>
<td>PAPPL</td>
</tr>
<tr>
<td>HN</td>
<td>PFAM</td>
</tr>
<tr>
<td>MAPPL</td>
<td>FUSER</td>
</tr>
</tbody>
</table>

If you declare an explicit value for one of these keywords, the declared value is always used. You can also declare a value of NONE for such keywords.

When you use the value NONE, the NDL processor ignores the keyword declaration. Using the value of NONE has the same effect as not specifying the keyword.

Specifying NONE allows you to override a previously declared explicit definition for the parameter value.
Stand-Alone Keywords

A declaration containing a stand-alone keyword can have the same form as a declaration containing a value-required keyword, or it can have the form keyword

For example, the following statement contains a stand-alone keyword (DI) as its second declaration:

LGLK1: LOGLINK NCNAME=NPUA,DI.

The stand-alone keywords are:

- ARSPEED
- AUTO
- AUTOCON
- BCF
- COLLECT
- DCE
- DI
- DNP
- NOLOAD
- PAD
- PRIV
- PRU
- QMF
- RS
- RIC
- UID
- XAUTO
- OPGO

You can use either explicit or implicit values for these keyword declarations. If you declare an explicit value for one of these keywords, the declared value is always used. You can also omit such keywords and use the implicit value as a default for the parameter.

The legal values for explicit declarations are YES and NO. An omitted stand-alone keyword usually has its default value. Specifying the keyword alone is the same as specifying the implicit value of YES. If you want to change a previously declared explicit value of YES or document the use of the default value, you can use the explicit value of NO. If you want to change a previously declared stand-alone keyword, you can use the explicit value of NO.

For example, consider the following statement:

LGLK1: LOGLINK NCNAME=NPUA,DI=NO.

This statement has an effect opposite to the first example given. The NO value says that the logical link is not disabled (it is enabled).

PARAMETER VALUES

Parameter values can be specified either as an unbroken sequence of alphabetic and numeric characters or in string form enclosed in single quotes.

String parameter values can span one or more lines and can contain embedded blanks for readability. Only alphabetic or numeric characters are taken from string parameters. Embedded blanks are ignored, and the parameter is terminated by any nonblank, nonalphanumeric or nonnumeric character (preferably a single quote).

For example, either of the following formats (which result in identical definitions) can be used:

- PAD = '1A2B3C4D5E6F2A3B4C5D6E7F'.
- PAD = "1A2B 3C4D 5E6F 2A3B 4C5D 6E7F".

STATEMENT LENGTH AND CONTINUATIONS

NDL statements are assumed to be input from either card readers or terminal keyboards. Because these input sources are physically different, there are no restrictions (such as card column or line character position usage) on the format of the statements. You can define your own formatting conventions, with the following exceptions:

You must divide NDL statements into units of 90 or fewer characters. Characters 73 through 90 of each unit are reserved for your convenience as an Update or Modify sequence number field and are not interpreted by the NDL processor. Characters in the sequence number field, however, are included in the count of characters in each statement unit.

If you split a statement of more than 72 meaningful characters into two or more units, the meaningful portion of each unit must end with a legal separator.

You cannot divide a value declaration over two units.

You must terminate all statements except COMMENT statements with a period. If you do not terminate a statement with a period, NDLP assumes that the next statement is a continuation of the present one; this assumption can produce errors. Comment text can follow a period if the text is preceded by an asterisk.

You cannot declare more than one statement in a single unit.

You cannot continue comments on the next line unless COMMENT is specified at the beginning of each comment line; that is, you cannot break COMMENT statement text into separate units within a single statement.

There is no limit on the number of units into which you can break a statement. Empty (blank) units are permitted.

These constraints are illustrated by the examples in figure 2-3.

DEFINITION STRUCTURE

The structure of the NDL program that defines your network will parallel the physical and logical structure of the network. An NDL program can contain two formal types of divisions:

A network division, corresponding to each network configuration file (NCF) to be produced

A local division, corresponding to each local configuration file (LCF) to be produced

To configure your network initially, you must provide a NCF for each host in the network running the Network Supervisor (NS) or the Communications Supervisor (CS). The NCFs do not need to be exactly the same. You must also provide a LCF for each host in the network for the Network Validation Facility (NVF). All hosts may use the same LCF. The NCF and LCF can be created with a single NDL program containing two or more divisions or with
In these examples, the character sequence of $\Delta \ldots \Delta$ represents an ellipsis of blanks and does not contain a period as part of the represented input.

The following three-unit statement is correct:

GOODTRY: $\Delta$COUPLER$\Delta$NODE=1, $\Delta\ldots\Delta$
$\Delta$LOC=PRIMARY.

The following two-unit statement is incorrect because it divides a value declaration with a separator (a blank):

BADTRY1: $\Delta$COUPLER$\Delta$NODE=$\Delta\ldots\Delta$
1, $\Delta$LOC=PRIMARY.

The following two-unit statement is incorrect because it omits the period terminator:

BADTRY2: $\Delta$COUPLER$\Delta$NODE=3, $\Delta\ldots\Delta$
LOC=PRIMARY$\Delta$

The following one-unit statement is incorrect because it contains more than 72 characters and is not divided into two units at a separator:

DEVICE1: $\Delta$DEVICE$\Delta$DT=DT12, $\Delta$ABL=7, $\Delta$DBZ=2043, $\Delta$UBZ=2000, $\Delta$DBL=7, $\Delta$UBL=31, $\Delta$XDB=2043, $\Delta$PRI.

Figure 2-3. Statement Continuation Examples

two or more NDL programs that contain one division each. Subsequently, you can update the network configuration by changing either the NCF or LCF or both.

DIVISION HIERARCHY

An NDL input file can consist of several network and local divisions; these divisions can appear in any order within the network definition. NDLP creates one network configuration file for each network division it encounters while processing your program. NDLP also creates one local configuration file for each local division in your program.

STATEMENT HIERARCHY

The relationship between network elements is defined by the placement of the statements used to define them. For example, a COUPLER statement that follows an NPU statement defines a coupler that is connected to that NPU. Further, a LOGLINK statement that follows the COUPLER statement defines a logical link that originates in that coupler.

Statements must occur within the proper division and, except for the following statements, must occur in the order shown in figure 2-4:

APPL OUTCALL
COMMENT TITLE
DEFINE TRUNK
INCALL USER

SPECIAL-PURPOSE STATEMENTS

Four special-purpose statements are supplied to document, simplify, and separate network definitions:

- TITLE statement
- COMMENT statement
- DEFINE statement
- END statement

The DEFINE and COMMENT statements are not shown in figure 2-4 because they need not appear in a particular order or within a particular division.

TITLE STATEMENT

A TITLE statement allows you to title each page of your output listing. The format of the TITLE statement is shown in figure 2-5.

There can be only one TITLE statement in each program division. You can place TITLE statements anywhere within NDL program divisions after the NFILE or LFILE statements.

Use of the TITLE statement is optional. If you do not use the TITLE statement, the file name specified on the NFILE or LFILE statement is used as the title of the NCF or LCF. A TITLE statement without a character string produces an untitled listing. Character strings must not exceed 45 characters.
Network Division

NFILE statement

[TITLE statement]

TRUNK statement

[NTITLE statement]

NPU statement

SUPLINK statement

COUPLER statement

LOGLINK statement

LINE statement

[GROUP statement]

TERMINAL statement

DEVICE statement

[TERMDEV statement]

NPU statement

Local Division

LFILE statement

[TITLE statement]

[USER statement]

[APPL statement]

[OUTCALL statement]

[INCALL statement]

END statement

Figure 2-4. NDL Program Statement Hierarchy
TITLE[string].

string Character string up to 45 characters long; includes any blanks following a comma separator. The string can contain any characters in the 6-bit display code set except for a period; a period terminates the title definition. The default string is 45 blanks.

Figure 2-5. TITLE Statement Format

An example of a valid TITLE statement is

TITLE, SUNNYVALE CLOSED SHOP MHR NCF.

In this example, the listings and the network configuration file produced by the NDL program would contain the title line shown, identifying the CDC Sunnyvale facility environment NCF used by the CDC CYBER 170 closed-shop multiple-host network.

COMMENT STATEMENT

A COMMENT statement permits you to insert text comments into NDL input. The NDL processor copies these comments, without editing or interpretation, into the output listing of your NDL source statements. The format of the COMMENT statement is shown in figure 2-6.

\[\text{COMMENT} [*, \text{string}] .] \]

string Character string up to 89 characters long (asterisk form) or up to 82 characters long (COMMENT form). The string can contain any characters in the 6-bit display code set. A comment string terminates at the end of a line, regardless of whether or not there is a terminating period. There is no default for string.

Comments that appear after the terminating period of a statement must be in the form:

*string

Figure 2-6. COMMENT Statement Format

Use of the COMMENT statement is optional. COMMENT statements can be placed anywhere within NDL program divisions.

An example of a valid COMMENT statement is

COMMENT THIS IS A VALID COMMENT STATEMENT

DEFINE STATEMENT

A DEFINE statement allows you to assign a label (identifier) to a set of keyword and value declarations that is cumbersome to enter repeatedly. The set of declarations is then stored as a character string for insertion in subsequent parts of the NDL program; the string is inserted by placing the identifier in statements where the stored declaration set is needed.

Use of the DEFINE statement is optional. The format of the DEFINE statement is shown in figure 2-7.

defname: DEFINE[string].

defname The identifier assigned to the character string. This is a name of one to seven letters or digits, the first of which must be a letter. The identifier should not be an NDL reserved word (see appendix D) and cannot be an NDL statement name or keyword. This name is required; there is no default value.

string The character string for which the defname identifier is substituted when writing other NDL statements. This character string must contain complete value declarations and can contain commas, equals signs, blanks, and any letters or digits; it cannot contain a period, because a period is interpreted as the end of the DEFINE statement. The string can contain NDL reserved words but cannot contain NDL statement names or another DEFINE name.

Figure 2-7. DEFINE Statement Format

A DEFINE statement must precede any other statement that uses the identifier specified in the DEFINE statement. The defname identifier can only be used in an NDL statement where the NDL processor expects to find a keyword.

DEFINE statements can be placed anywhere within NDL program divisions after the NFILE or LFILE statements. DEFINE statements apply only to the division in which they occur.

Nested DEFINE statements are not permitted. The identifier of one DEFINE statement cannot be used in the character string that defines the declaration set of the same or another DEFINE statement. The character string of a DEFINE statement cannot contain another DEFINE statement.

As an example of this statement's function, consider the following portion of an NDL program:

LTYPE3: DEFINE LTYPE=A1, TIPTYPE=ASYNC.
PORTA: DEFINE PORT=1.
.
.
LINES: LINES PORTA, LTYPE3.

The first DEFINE statement permits the identifier LTYPE3 to be substituted in subsequent NDL statements (such as the last statement in this example)
for the character string LTYPE=A1, TIPTYPE=ASYNC. Note that the LINE statement is still terminated by a period because this character string is considered to end with the C, not with the period that terminates the DEFINE statement.

The second DEFINE statement equates the identifier PORTA to the character string PORT=1, so that the LINE statement is actually interpreted by the NDL processor as if it had been written:

```
LINE5: LINE PORT=1, LTYPE=A1, TIPTYPE=ASYNC.
```

DEFINE statements receive separate diagnostic treatment when the NDL program is processed. However, if a DEFINE statement contains an NDL coding error in its character string, the error might not be diagnosed until an attempt is made to expand the defname identifier.

The following combination of statements would not be recognized as expanding into a valid NDL statement, because the reserved statement name LINE cannot be found in the unexpanded version of LINE5:

```
LINEA: DEFINE LINE, PORT=1.
LTYPE3: DEFINE LTYPE=A2.
  ...
LINE5: LINEA, LTYPE3, TIPTYPE=ASYNC.
```

END STATEMENT

An END statement must explicitly terminate the last division in the NDL program. The NDL processor requires this statement to determine that the input file is complete.

This statement has the format shown in figure 2-8.

```
END.
```

Figure 2-8. END Statement Format
The network division describes the physical and logical configuration of the network. This includes a description of the processors within the network, the physical and logical links between processors, the communication lines and terminals, and the initial status of each of these elements.

Each host in the network running a copy of the Network Supervisor (NS) program or the Communications Supervisor (CS) program must also have a network configuration file (NCF). All of the NCFs for hosts belonging to the same site must be identical with one another except for line and terminal definitions. This means that the node information (couplers, logical links, and trunks) must all be the same for each NCF. The line and terminal definitions in the NCF used to load and configure an NPU must agree with the one used to supervise it.

Within a site, all NPUs must run the same release level of CCP. For sites running different release versions of host software and CCP, the level of NCF must correspond to the level of CCP being used. The level of NCF is defined as the release level of the NDLP that was used to create it. The level of NCF, however, does not need to match the level of NS or CS using it.

You can omit the network division from an NDL program if no network configuration file is to be created; otherwise, one network configuration file is created for each network division you define.

The network division does not apply to CDCNET networks.

**NFILE STATEMENT**

The NFILE statement identifies the network configuration file to be created. It must be the first statement, other than a COMMENT statement, in the network division.

The name of the NOS local file specified in the NFILE statement should not be the same as that of another local file assigned to your job. The network configuration file is described in more detail in section 9.

The format of the NFILE statement is shown in figure 3-1. An example of a valid NFILE statement is

```
NETFILE: NFILE.
```

This statement creates a network configuration file with the NOS local file name NETFILE.

**NETWORK NODE AND LINK DEFINITION STATEMENTS**

Your NDL program's network division must describe all communication nodes, physical linkages, and logical linkages within the set of network processing units. You use the following statements to do this:

**NPU statements** define the loading, dumping, and network node requirements of each NPU.

**SUPLINK statements** define each logical link available as a path from an NPU to a Communications Supervisor for initiating, monitoring, and assisting NPU operations.

**COUPLER statements** define the physical linkages between each front-end NPU and a host computer data channel.

**LOGLINK statements** define the logical linkages between host nodes and network nodes within the set of NPUs or between one host node and another.

**TRUNK statements** define the physical linkages between NPUs.

Several of these statements require you to use the parameter values declared in other statements; that is, you must use the same value on two different statements. The NODE parameter also appears in several statements; however, values you define for NODE must be unique and should be assigned consecutively from 1.
**NPU Statement**

The NPU statement names the NPU and defines the node number by which the NPU is to be referenced by the network software. There must be one NPU statement for every Network Processing Unit in the network. The format of the NPU statement is shown in figure 3-2.

The OPGO value used remains in effect for as long as the network definition is used. The DMP value used remains in effect until it is overridden by an operator DUMP command or LOAD command NDMP option. An operator LOAD command applies only to one loading operation on the NPU, so the DMP parameter value is again used when that operation is completed. An operator DUMP command remains in effect until the network is shut down, so the DMP parameter value is not used until the network is again initialized.

For example, consider the following NPU statement:

```
npu: npu, node=2, variant=picbname, opgo=yn1, dmp=yn2.
```

This definition describes NPUA (a front-end NPU with a node number of 2). NPUA is loaded according to the Network Supervisor program directives in the program initiation control block (PICB) called N3L within the network load file.

Because OPGO is used, an operator intervention requirement exists for NPUA whenever its loading process is completed. Before typing GO, the operator can enable or disable any of the network elements associated with the NPU. NPUA always establishes a supervisory relationship with a Communications Supervisor (CS) program and then requests operator permission (a GO command) before it begins to service its configured communication lines.

Because DMP is used, the long-term dump flag of the Network Supervisor (NS) for NPUA is set. The NS will dump the memory of NPUA each time NPUA is loaded, unless a NOP, a diagnostic or a host operator (NOP, DOP, or HOP) unsets the dump flag with a DMP command, or unless repeated loads occur within a short time span. (Repeated reloading during a short time span is presumed to result from repeated failures with the same cause, so multiple dumps are redundant.)

If DMP=NO were specified on the NPU definition statement, the long-term dump flag for NPUA would not be set at network initiation (unless the NOP or HOP set it with a command).

---

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>npu</td>
<td>The network node name of the NPU being described. This name is required; there is no default value.</td>
</tr>
<tr>
<td>node</td>
<td>The network node number (1 &lt; node &lt; 255) by which the network software references this NPU. All values declared for node must be unique within the current network definition and should be numbered consecutively. This number is required; there is no default value.</td>
</tr>
<tr>
<td>picbname</td>
<td>The name assigned to the program initiation control block (PICB) on the network load file for this NPU. The PICB contains directives to the Network Supervisor for dumping and loading a given NPU. This name consists of one through six alphabetic and numeric characters, the first of which must be alphabetic. The name is required; there is no default value. (Self-loading, self-configuring NPUs also must have a value declared for this parameter; use a dummy name.) See the NOS installation handbook for more information about this parameter.</td>
</tr>
<tr>
<td>yn1</td>
<td>An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter indicates whether an operator GO command is required to start NPU operation after loading is completed. If OPGO or OPG0=YES is specified, the HOP or controlling NOP must type GO each time the NPU is loaded before the NPU can become active. If OPGO is omitted or OPG0=NO is specified, operator intervention is not required to start the NPU. You should define an OPG0=YES value only if frequent configuration changes are anticipated for the NPU.</td>
</tr>
<tr>
<td>yn2</td>
<td>An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter indicates whether a long-term requirement exists for an NPU dump each time the NPU is loaded. If DMP or DMP=YES is specified, or if DMP is omitted, the NPU is dumped before it is loaded, unless the operation is overridden by a HOP or NOP command. If DMP=NO is specified, no dump occurs before the NPU is loaded, unless specifically requested by a HOP or NOP command. (Note that an NPU dump is essential for CDC to analyze NPU failure problems.)</td>
</tr>
</tbody>
</table>

---

Figure 3-2. NPU Statement Format
SUPLINK STATEMENT

The SUPLINK statement describes a supervision path between the NPU and a copy of CS which can supervise that NPU and defines the priority for use of that path. A supervision path, or supervisory link, corresponds to a logical link between the NPU and a host.

Only one supervisory link can be defined in each SUPLINK statement. If there is more than one logical link between an NPU and the host computer, each can appear in a separate SUPLINK statement; these statements must appear in descending order of priority. The first supervisory link defined has the highest priority, the second defined has the next highest priority, and so on. The supervisory links are used in the order of their priority if the logical link in a higher priority supervision path fails or the CS becomes available.

The SUPLINK statement must follow an NPU statement or another SUPLINK statement. The SUPLINK statement is optional if there is only one logical link between the NPU and a host. The format of the SUPLINK statement is shown in figure 3-3.

SUPLINK, LLNAME=loglink.

loglink Element name of the logical link that is to be used as a supervisory link by the NPU. This name must appear on a LOGLINK statement within the same network division.

Figure 3-3. SUPLINK Statement Format

An example of the SUPLINK statement in an NDL program sequence is

NPUA: NPU, NODE=5, VARIANT=N3L, DMP=YES.
SUPLINK, LLNAME=LGLNK1.
CPLR1: COUPLER, NODE=1.
LGLNK1: LOGLINK, NCNAME=NPUA.

This example defines the logical link called LGLNK1 as the only logical link for NPU supervisory message traffic with a Communications Supervisor program. LGLNK1 exists between coupler node 1 and network node 5 within the NPU called NPua. For an NPU which has logical links to more than one host, you can define the logical link as a supervisory link only if the release level of the NCF being used on the host matches the release level of the CCP being run on the NPU.

COUPLER STATEMENT

The COUPLER statement identifies a channel coupler to an NPU. A front-end NPU can be equipped with one or two channel couplers connecting the NPU to a host. The format of the COUPLER statement is shown in figure 3-4.

One COUPLER statement is required for each coupler in the network. The COUPLER statement must follow the NPU statement defining the NPU that uses the coupler to function as a front-end NPU.

Each CDC host computer can support up to eight couplers on separate data channels. CDC host software identification of each coupler is determined by an entry in the NOS equipment status table (EST).

The value you use for the NODE declaration on each COUPLER statement must be the value assigned as the node number in the EST entry for the corresponding NPU coupler. The coupler’s enabled or disabled status at network initiation is also controlled by this EST entry.

coupler: COUPLER, NODE=node[, HNAME=hostnam, LOC=cplrlc].
coupler The element name to assign to the front-end coupler being configured. This name is required; there is no default value.
node The host node number (1 £ node £ 255) by which the network software references this coupler. This value must match the node number in the EST entry for the coupler. All values declared for NODE keywords must be unique within the current NDL program division and should be numbered consecutively. This number is required; there is no default value.
hostnam The name assigned to the host to which the coupler connects. The hostnam value is 1 to 7 letters or digits; the first character must be a letter. The hostnam you assign identifies the corresponding node number on the host availability display seen by the terminal user. This parameter is optional; if omitted, the default value is ASCII blanks.
cplrlc The reserved word value (PRIMARY or SECOND) that indicates the coupler’s location in the 255x cabinet. PRIMARY specifies the coupler in the primary coupler slots and SECOND specifies the coupler in the secondary coupler slots. If an NPU has two couplers, LOC=SECOND is required for the secondary coupler. This parameter is optional; the default value is PRIMARY.

Figure 3-4. COUPLER Statement Format

60480000 N
The NODE value and the HNAME value appear as a set on the host availability display seen by the terminal user. The user can select connection to a host by specifying a node number or host name in a command to CCP; nonblank HNAME values are recommended to aid users in selecting the appropriate node.

The circuit boards for a coupler are located in slots marked as either primary or secondary within the upper card cage of the 255x series NPU cabinet. These markings are similar to port numbers for the couplers and are used in that manner for the LOC parameter.

If the NPU has one coupler, it can be located in either the primary or secondary slot. If the NPU has a coupler in the secondary slot, the coupler must be defined as a secondary coupler.

For example, suppose NPUA in SVLnet (figure 2-1 in section 2) contained two couplers, only one of which (the secondary one) belonged to the network shown. The circuit boards in the secondary slot would be cabled to host data channel number 4; the EST entry would associate node number 1 with data channel number 4. This coupler could be configured correctly only by the statement:

```
NPUA: NPU, NODE=5, VARIANT=N3L, DMP.
CPLR1: COUPLER NODE=1, LOC=SECOND.
```

As used in the sample network configured by section 11, NPUA contains only one coupler. It therefore is configured correctly by the statement:

```
NPUA: NPU, NODE=5, VARIANT=N3L, DMP.
CPLR1: COUPLER NODE=1, HNAME=SYS173.
```

Both examples define coupler CPLR1, which is physically contained in the cabinet of NPUA; NPUA uses CPLR1 to function as a front-end NPU. CPLR1 has a NOS EST entry of 1 for its host node number. Note that NPUA contains both a host node (node 1) for its coupler and a network node (node 5) for itself.

The COUPLER statement also defines a possible path the NPU can use for a request to be loaded and/or dumped by a host.

**LOGLINK STATEMENT**

The LOGLINK statements define a path over which terminal-to-application or application-to-application connections can be established. You must supply one LOGLINK statement for each logical link in your network. You need LOGLINK statements to define the logical link between a coupler and the NPU that contains the coupler and between a coupler and each NPU connected to the front-end NPU containing the coupler. You also need a LOGLINK statement to define each host-to-host logical link between two hosts if application programs in the two hosts are to communicate with each other.

Application programs in two hosts can communicate with each other without having a LOGLINK statement for the two couplers involved only if there is an intervening X.25 network between the two hosts. (Logical links cannot span X.25 public data networks, but always terminate at the NPU connected to the public data network.)

Only one logical link can be defined between any given pair of coupler and NPU or coupler node numbers. It is possible, however, to have more than one logical link between an NPU and a host computer. Figure 3-5 shows the logical links in SVLnet. Each logical link uses a separate trunk between the NPU and/or a different coupler.

Logical links can only be defined over paths that do not cross more than one trunk. In the example shown in figure 3-5, no logical link can exist between NPUC and coupler 11.

The LOGLINK statement must follow the COUPLER statement that defines the coupler for the host end of the logical link being defined. LOGLINK statements define which NPU’s can access that coupler. For a coupler-to-coupler link, the LOGLINK statement can follow either of the COUPLER statements, but cannot appear after both. The format of the LOGLINK statement is shown in figure 3-6.

For example, in SVLnet (figure 2-1 in section 2), NPUA (node 5) contains coupler CPLR1 (node 1) and is connected to NPUE (node 9). NPUB (node 6) contains coupler CPLR2 (node 2) and is also connected to NPUE. NPUE has connections to several other front-end NPU’s, giving its network node four possible logical links to the same host.

The host node in NPUA is node 1; the host node in NPUB is 2 (the host node number is always the number associated with the coupler). The following LOGLINK statements would properly configure two of the logical links involving NPUE as network node 9:

```
NPUA: NPU, NODE=5, VARIANT=N3L, DMP.
CPLR1: COUPLER NODE=1, HNAME=SYS173.
  LINK1: LOGLINK NCNAME=NPUE.
NPUB: NPU, NODE=6, VARIANT=N5L.
CPLR2: COUPLER NODE=2, HNAME=SYS173.
  LINK2: LOGLINK NCNAME=NPUE.
NPUE: NPU, NODE=9,...
```
Figure 3-5. Logical Links
The element name to assign to the logical link you are configuring. This name is required; there is no default value.

The element name of the NPU or coupler that is the other end of this logical link. This name must be the element name used in an NPU or coupler statement in the same network division. This name is required; there is no default value.

An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this logical link at network initiation. When DI or DI=YES is specified, the logical link is disabled at network initiation and cannot be used until the HOP or NOP enables it. If DI is omitted or DI=NO is specified, the logical link is given an initial status of enabled unless the NOP or HOP specifies otherwise.

Table 3-1. Recommended Frame Sizes for Trunk Lines

<table>
<thead>
<tr>
<th>Traffic is Mostly</th>
<th>Trunk Line Speed in Bits Per Second</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4800 or Less</td>
</tr>
<tr>
<td>Interactive</td>
<td>1050</td>
</tr>
<tr>
<td>Batch and Interactive</td>
<td>256</td>
</tr>
<tr>
<td>Batch</td>
<td>1050</td>
</tr>
</tbody>
</table>

The N1 and N2 values indicate that the trunk connects the NPUs NPUA and NPUE. The P1 and P2 parameters indicate that the trunk is connected to the Communications Line Adapter (CLA) port 1 in NPUA and to port 2 in NPUE.

Protocol-Dependent Definition Statements

The Network Definition Language allows you to configure communication lines, terminals, and devices using the following communication line protocols:

- Asynchronous (IBM 2741- or teletypewriter-compatible devices)
- X.25 packet-switching network (teletypewriter-compatible devices)
- IBM HASP bisynchronous (HASP-compatible devices, including batch equipment)
- CDC Mode 4 synchronous (200-User-Terminal or Mode-4C-compatible devices, including batch equipment)
- IBM bisynchronous (IBM 2780-, 3780-, or 3270-compatible devices, including batch equipment)
- Site-defined (any devices, compatible or incompatible with any of the above)

Your NDL program's network division must describe all communication lines, terminals, and devices connected to the set of network processing units. You use the following statements to do this:

- LINE or GROUP statements define the physical and logical service requirements of each communication line on each NPU.
- TERMINAL or TERMDEV statements define the clustering of devices connected to each communication line.
- DEVICE or TERMDEV statements define the physical and logical support requirements of each device within a terminal.

Figure 3-6. LOGLINK Statement Format
trunk: TRUNK,N1=npu1,N2=npu2,P1=port1,P2=port2,
[,NOLOAD1=[yn1],NOLOAD2=[yn2],FRAME=frame,DIC=[yn3]].

trunk  The element name to be assigned to the trunk communication line being defined. This name is required; there is no default value.

npu1 The element name for one of the two NPUs connected by the trunk. This name must appear on an NPU statement in the same network definition. This name is required; there is no default value.

npu2 The element name for the other of the two NPUs connected by the trunk. This name must appear on an NPU statement in the same network definition. This name is required; there is no default value.

port1 The hexadecimal number (1 ≤ port1 ≤ FE) of the port on npu1 to which this trunk is connected. This number cannot appear on another TRUNK or LINE statement (or within a GROUP statement expansion) for definitions applying to npu1 in the same network division; all trunk lines on an NPU must be assigned consecutively numbered ports starting at 1, and this number must be the thumbwheel number on the CLA for the trunk line. If npu1 is to be loaded over this trunk, 1 ≤ port1 ≤ 4.

port2 The hexadecimal number (1 ≤ port2 ≤ FE) of the port on npu2 to which this trunk is connected. This number cannot appear on another TRUNK or LINE statement (or within a GROUP statement expansion) for definitions applying to npu2 in the same network division; all trunk lines on an NPU must be assigned consecutively numbered ports starting at 1, and this number must be the thumbwheel number on the CLA for the trunk line. If npu2 is to be loaded over this trunk, 1 ≤ port2 ≤ 4.

yn1 An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter prohibits loading npu1 over this trunk. If NOLOAD1 or NOLOAD1=YES is specified, npu1 cannot be loaded by npu2. If NOLOAD1 is omitted or NOLOAD1=NO is specified, npu1 will be loaded by npu2 whenever npu1 requests that operation. Usually a NO value is specified for trunks connecting NPUs if administrative responsibility for the two NPUs rests with a single site. If the two NPUs are administered by different sites, a YES value is specified.

yn2 An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter prohibits loading npu2 over this trunk. If NOLOAD2 or NOLOAD2=YES is specified, npu2 cannot be loaded by npu1. If NOLOAD2 is omitted or NOLOAD2=NO is specified, npu2 will be loaded by npu1 whenever npu2 requests that operation.

frame The approximate decimal number (0 ≤ frame ≤ 1200) of 8-bit character bytes that will be transmitted as one frame across this trunk. The value you should declare for this parameter depends on the type of data traffic across the trunk and the speed of data transmission on the line. Recommended values appear in table 3-1; declared values are rounded as follows:

<table>
<thead>
<tr>
<th>Declared Frame Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 thru 499</td>
<td>256</td>
</tr>
<tr>
<td>500 thru 1049</td>
<td>500</td>
</tr>
<tr>
<td>1050 thru 1200</td>
<td>1050</td>
</tr>
</tbody>
</table>

yn3 An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this trunk at network initiation. When DI or DI=YES is specified, the trunk is disabled at network initiation and cannot be used until the HOP or NOP enables it. If DI is omitted or DI=NO is specified, the trunk is given an initial status of enabled unless the NOP or HOP specifies otherwise.

Figure 3-7. TRUNK Statement Format

These statements must contain value declarations to support hardware and protocols known to CDC but can also contain declarations to support site-defined hardware or protocols. Site-defined value declarations do not have the interdependencies of CDC-defined value declarations and receive less diagnostic inspection during NDL processor execution. You are responsible for proper agreement among values on these statements when one statement contains a site-defined value.

These five statements provide the network software with information that it transmits to CCP as a set of paired information bytes called field number/field value (FN/FV) pairs. Each of these statements (except the TERMINAL statement) can contain the keywords P90 through P99, identifying field numbers not used by the released version of CDC network software.
If your site has modified CCP software or has written its own Terminal Interface Program, these optional field number parameters allow you to specify the values to be transmitted for the corresponding field number when the terminal or device is configured. If you place the same field number parameter in more than one of the statements in a hierarchical set, each value specified is used separately. Each line and device has a separate set of field number/field value pairs associated with it.

For example, if you place P90 on the GROUP statement and on one of the DEVICE statements in the following set:

GROUP statement
   TERMINAL statement
   DEVICE statement
   DEVICE statement
   DEVICE statement

the value specified on the DEVICE statement is used as field 90 for the configuration transmitted to CCP for that device, and the value specified on the GROUP statement is used as field 90 for each communication line. No 90 value exists for the remaining devices.

The parameters required and the values allowed on the GROUP, LINE, TERMINAL, TERMDEV, and DEVICE statements depend upon the line protocol used. This section presents the general form of each statement. The following sections present the form of each statement and the parameters applicable to each line protocol:

Section 4 applies to asynchronous protocol lines.

Section 5 applies to X.25 protocol lines.

Section 6 applies to synchronous protocol lines.

Section 7 applies to site-defined protocol lines.

LINE STATEMENT

Each LINE statement defines one communication line between a terminal and the NPU. There must be one LINE statement for each CLA port on the NPU that supports terminal access. Figure 3-8 shows the general format of the LINE statement.

GROUP STATEMENT

You can use the GROUP statement in place of the LINE statement when you want to repeat a line definition a specified number of times. NDLP does not allow GROUP statements for X.25 protocol communication lines.

DEVICE STATEMENT

The DEVICE statement defines the characteristics of a single terminal input and/or output device, such as a console or card reader. This statement has the general format shown in figure 3-11.

TERMDEV STATEMENT

The TERMINAL statement defines the characteristics of a multiple device workstation, such as a mode 4C terminal device cluster. This statement has the general format shown in figure 3-10.

Figure 3-8. General LINE Statement Format

Using the GROUP statement can reduce the number of definitions you must provide in your NDL program without reducing the number of definitions provided in the network configuration file. The general format of the GROUP statement is shown in figure 3-9.
group: GROUP,PORT=port,LTYPE=ltype
[TIPTYPE=tiptype,AUT0C=yn1,]
[XAUTO=yn2,DIR=yn3,LSPEED=lspeed,]
[AL=accelv,NI=iter,ARSPEED=yn4,]
[IMDISC=yn5,LCN=lcn,RIC=yn6,]
[P90=fv90,...,P99=fv99,.
Parameters are described in sections 4 through 7.

Figure 3-9. General GROUP Statement Format

TERMINAL,STIP=stiptyp,TC=trmclas,
[CSET=charset,TSPEED=trmsped,]
[CA=clsadr,RIC=yn1,]
[CO=conord,BCF=yn2,MREC=rec,]
[W=pacwndw,CTYP=cttyp,MIC=mcir,]
[CPAD=string,EOF=yn3,]
[NEN=encir,COLECTC=yn3,]

Parameters are described in sections 4 through 7.

Figure 3-10. General TERMINAL Statement Format

device: DEVICE,DT=devtyp,SDT=subdt,TA=trmaddr,ABL=abl,DBZ=dwnlsiz,UBZ=upbsize,]
[DDB=dwnblim,UBL=upblim,XBZ=xtmitsiz,DO=devord,STREAM=streamno,]
[ARCON=yn1,PRI=yn2,DIC=yn3,HN=node,HDC=yn4,LK=yn5,AB=ab,BR=br,CP=cp,BS=bs,B1=b1,]
[B2=b2,C1=c1,CN=cn,CT=ct,DL=dlc,DLTO=dlto,DLX=dlx,EBX=ebx,EBR=eb,r,EBZ=ebz,]
[CLX=elx,ELR=elr,ELD=eld,XC=xl,LC=lc,LCX=lcx,LCX=lx,LCY=ly,IC=ic,]
[IN=ln,LI=li,OP=op,OC=oc,PA=pA,PG=pg,PL=pl,PW=pw,RTS=yn6,MCI=mcir,]
[P90=fv90,...,P99=fv99,.
Parameters are described in sections 4 through 7.

Figure 3-11. General DEVICE Statement Format

device: TERMDEV,STIP=stiptyp,TC=trmclas,CSET=charset,TSPEED=trmsped,CA=clsadr,RIC=yn1,]
[CO=conord,BCF=yn2,MREC=rec,WP=pacwndw,NC=mcir,PD=string,NEN=encir,]
[COLECT=yn3,DT=devtyp,SDT=subdt,TA=trmaddr,ABL=abl,DBZ=dwnlsiz,UBZ=upbsize,]
[DDB=dwnblim,UBL=upblim,XBZ=xtmitsiz,DO=devord,STREAM=streamno,]
[ARCON=yn1,PRI=yn2,DIC=yn3,HN=node,HDC=yn4,LK=yn5,AB=ab,BR=br,CP=cp,BS=bs,B1=b1,]
[B2=b2,C1=c1,CN=cn,CT=ct,DL=dlc,DLTO=dlto,DLX=dlx,EBX=ebx,EBR=eb,r,EBZ=ebz,]
[CLX=elx,ELR=elr,ELD=eld,XC=xl,LC=lc,LCX=lcx,LCX=lx,LCY=ly,IC=ic,]
[IN=ln,LI=li,OP=op,OC=oc,PA=pA,PG=pg,PL=pl,PW=pw,RTS=yn6,MCI=mcir,]
[P90=fv90,...,P99=fv99,.
Parameters are described in sections 4 through 7.

Figure 3-12. General TERMDEV Statement Format

3-9
The parameters required and the values allowed on the GROUP, LINE, TERMINAL, TERMDEV, and DEVICE statements depend upon the line protocol used. This section describes the form of a statement applicable to asynchronous protocol lines.

Asynchronous communication lines are those using the line types defined in Table 4-1. Such lines are serviced by the CDC-supplied ASYN TIP. If you use the site-defined line type, the ASYN TIP is presumed to be modified by your site (if necessary) to support:

- A standard communication line adapter in a non-standard manner
- A specially built communication line adapter

### LINE DEFINITION

You configure terminals on an asynchronous communication line by using the following statements:

- One LINE or GROUP statement that defines the line.
- One TERMINAL or TERMDEV statement for each potential terminal on the line (only one can access the line at a given time; multiple-drop asynchronous lines are not supported).
- One DEVICE statement for the device that accesses the line through each terminal; if you use a TERMDEV statement, you cannot also use a DEVICE statement.

### LINE STATEMENT PARAMETERS

Each LINE statement defines one communication line between a terminal and the NPU. There must be one LINE statement for each CLA port on the NPU that supports terminal access.

Figure 4-1 shows the format of the LINE statement and the valid parameter values for CDC-defined asynchronous lines. Table 4-1 shows permitted line type values for the LTYPE parameter.

You use the AUTO or XAUTO parameter to define a communication line as having a fixed or an automatic recognition configuration. You can use either of these configuration types for a switchable (dialup) line or for a dedicated (hardwired) line.

If you define a fixed-configuration line by omitting AUTO and XAUTO or by specifying AUTO=NO or XAUTO=NO, you must know and specify certain characteristics of the terminal devices that will use that line. Only a terminal device with the specified characteristics can use that line.

The characteristics of a fixed-configuration line are:

- Line speed (LINE statement LSPEED parameter)
- SubTIPtype (TERMINAL or TERMDEV statement STIP parameter)
- Code and character set (TERMINAL or TERMDEV statement CSET parameter)
- Device type (TERMDEV or DEVICE statement DT parameter)

### TABLE 4-1. ASYNCHRONOUS LINE TYPE DEFINITIONS

<table>
<thead>
<tr>
<th>LTYPE Value</th>
<th>Transmission Mode</th>
<th>Transmission Operation</th>
<th>Circuit Type</th>
<th>Modem Type†</th>
<th>CLA Type</th>
<th>Maximum Speed, Bits per Second</th>
<th>Carrier Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>Asynchronous</td>
<td>Full-duplex</td>
<td>Switched (Dialup)</td>
<td>RS232C, Bell 103E/113/212A compatible</td>
<td>2561-1</td>
<td>9600</td>
<td>Constant</td>
</tr>
<tr>
<td>A2</td>
<td>Asynchronous</td>
<td>Full-duplex</td>
<td>Dedicated (Hardwired)</td>
<td>RS232C, Bell 103E/113/212A compatible</td>
<td>2561-1</td>
<td>9600</td>
<td>Constant</td>
</tr>
<tr>
<td>A6 (For site-defined use)</td>
<td>Asynchronous</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
</tr>
</tbody>
</table>

†Modem types supported by each type of CLA may differ.
line: LINE, PORT=port, LTYPE=ltype, TIPTYPE=tiptype, AUTO=yn1, XAUTO=yn2, ARSPEED=arspeed, DI=yn3, [IMDISC=yn4, LSPEED=lspeed, AL=accel, RC=yn5, P90=fv90, ..., P99=fv99].

line
The element name to be assigned to the communication line being defined. This name is required; there is no default value.

port
The hexadecimal number (1 £ port £ FE) of the port to which this communication line connects on the NPU currently being defined. Within an NDL program, the port number is independent of the number of ports on the NPU; for example, a 128-port NPU can have a port numbered FE (254 decimal). However, we strongly recommend that you assign port numbers consecutively, starting with 1. All values declared for PORT parameters must be unique within the current network definition of each NPU. The value specified for port cannot be the same as the number declared for a port in any other LINE or TRUNK statement (or within a GROUP statement expansion) for this NPU, and cannot be lower than the highest port number used by a trunk. This number is required; there is no default value.

ltype
A reserved word value that identifies the type of communication line adapter/modem/circuit combination that is used on this line. This word must be supplied; there is no default value. The legal words for this value declaration are described in table 4-1.

tiptype
A reserved word value that identifies the type of CCP Terminal Interface Program required for the terminals on this line. This word is required for lines being configured to service an asynchronous protocol terminal. The legal value for this declaration is:

ASYNC Asynchronous protocol TIP is required.

yn1
An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of low line speeds (110 thru 2400 bits per second) and/or recognition of protocol subTIPtype by CCP whenever a terminal is connected to the line. When AUTO or AUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, CCP attempts to determine as many definition parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO and XAUTO are omitted or if AUTO=NO or XAUTO=NO is specified, CCP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL and DEVICE or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal.

yn2
An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of high line speeds (600 thru 9600 bits per second) and/or recognition of protocol subTIPtype by CCP whenever a terminal is connected to the line. When XAUTO or XAUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, CCP attempts to determine as many definition parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO and XAUTO are omitted or if AUTO=NO or XAUTO=NO is specified, CCP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL and DEVICE or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal.

arspeed
An optional reserved word value (YES or NO) indicating whether the user can change the line speed by using the AR TIP command. The default value of YES is used if AUTO or XAUTO is specified. The default value of NO is used if AUTO or XAUTO is not specified.

yn3
An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this communication line at network initiation. When DI or DI=YES is specified, the line is disabled at network initiation and cannot be used until the NOP or HOP enables it. If DI is omitted or DI=NO is specified, the line is given an initial status of enabled unless the NOP or HOP specifies otherwise.

yn4
An optional reserved word value (YES or NO) which specifies whether the Immediate Disconnect feature is enabled for this line. When IMDISC or IMDISC=YES is specified, any terminal on the line is disconnected immediately after the terminal has logged out (disconnected) from the host. When IMDISC is omitted or IMDISC=NO is specified, a terminal on the line is disconnected only after a two-minute timer expires.

Figure 4-1. Asynchronous LINE Statement Format (Sheet 1 of 2)
**lspeed**
The baud rate used by the modems or devices accessing this line. When the line is configured for automatic recognition (AUTO or XAUTO is declared), this parameter cannot be used. This parameter is optional when the line is not configured for automatic recognition of terminals. The following values are recognized:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>300 default</td>
</tr>
<tr>
<td>134</td>
<td>600</td>
</tr>
<tr>
<td>150</td>
<td>1200</td>
</tr>
<tr>
<td>2400</td>
<td></td>
</tr>
<tr>
<td>38400</td>
<td></td>
</tr>
<tr>
<td>9600</td>
<td></td>
</tr>
</tbody>
</table>

This value can be changed by the user if ARSPEED= YES. When lspeed is not declared for a line configured without automatic recognition, the default of 300 baud is used.

**accelev**
The decimal access level limit (0 ≤ accelev ≤ 7) for the line. The lowest access level is 0 (unclassified), the highest is 7. If AL is omitted or AL=None is specified, no access level limit is associated with the line (equivalent to specifying AL=0).

**yn5**
An optional reserved word value (YES or NO) which specifies whether the reconfiguration indicator is enabled for this line. When RC or RC= YES is specified, the terminal characteristics are reset to their original NDL values (or to a default if no NDL values were specified) when the terminal disconnects from a host. When RC is omitted or RC=NO is specified, the reconfiguration indicator is not enabled for this line.

**fv9i**
The hexadecimal field value (0 ≤ fv9i ≤ FF) to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this line. The released version of the CDC-writen ASYNC TIP does not use any of these ten field number/field value pairs.

---

**Figure 4-1. Asynchronous LINE Statement Format (Sheet 2 of 2)**

If you define an automatic recognition line by specifying AUTO, XAUTO, XAUTO= YES, or AUTO= YES, CCP determines these characteristics when a terminal becomes active on the line. This allows more flexible access to the network.

A terminal on an automatic recognition line is not completely configured until it becomes active. At that time, the Communications Supervisor (CS) compares the determined characteristics against the characteristics you have defined for each terminal configured on the line. CS uses the first terminal definition that matches to finish configuring the terminal. CCP then services the terminal device according to the finished configuration.

Only a terminal that completely matches all declared values can use the line. It must operate with the characteristics you declare for any required or optional parameters in your terminal definition, or the terminal user must change its characteristics to match. If you declare AUTOREC instead of values for all of the automatically recognized parameters, then any terminal will match the terminal definition.

If you declare values instead of AUTOREC for some of the automatically recognized parameters, then any terminal that successfully accesses the line and has characteristics matching the declared values will match your terminal definition. If you declare values instead of AUTOREC for all of the automatically recognized parameters, then only a terminal with automatically recognized characteristics that are the same as your values will match the terminal definition.

You can specify more than one terminal definition on an automatic recognition line. Each definition should vary from the others in one of the automatically recognized characteristics; unless differences exist, CS will not use any definition other than the first one.

Using automatic recognition increases the number of terminal devices that potentially can use the line. You can configure a switchable line for automatic recognition with more logical terminal devices than the physical terminal devices that simultaneously can access it; only one physical device can access the line at a time.

For example, the statement

```
LNIA: LINE PORT=9, LTYPE=A1, TIPTYPE=ASYNC,AUTO.
```

defines a switchable (dialup) communication line (on NPU in SVPN, see section 2) for automatic recognition of any asynchronous protocol terminal with line speed less than or equal to 2400 b/s. The line is identified as LNIA, connects to the NPU at port 9, and is enabled by default at network initiation.

If the fixed-configuration form of the statement

```
LNIA: LINE PORT=9, LTYPE=A1, TIPTYPE=ASYNC.
```

were used instead, all of the terminals capable of accessing this switchable line would have to use the explicit configuration provided by the same TERMINAL and DEVICE statement set.

The following two LINE statements are equivalent:

```
LNIA: LINE PORT=9, LTYPE=A1, TIPTYPE=ASYNC, LSPEED=300.
```

```
LNIA: LINE PORT=9, LTYPE=A1, TIPTYPE=ASYNC.
```

Both statements define a switchable, enabled, fixed-configuration asynchronous line accessing the NPU (NPU in SVPN) through port 9 and using modems at 300 baud (the default rate). The terminal actually accessing this line must use the same explicit configuration as any other that can potentially access it because the line is not configured for automatic recognition.
The network configuration defined for systems containing Centronics 533/536 printers must include definitions for these printers. There may be up to twelve printers connected to PSU, consisting of any mixture of 533/536 and Hitachi 585 printers. However, if there are more than eight 533/536 printers or more than four 585 printers, changes to the PSU EVFU file are required. Network configuration directives in the Network Division are required only for 533/536 printers, while USER statements in the Local Division are required for all printers connected to PSU.

The following statements may be used for the Network Division definitions:

**LCENTR**: DEFINE LTYPE=A2, TIPTYPE=ASYNC, LSPEED=9600.

**TCENTR**: DEFINE TC=721, AUTOCON, LX=YES, OC=YES, PA=0, PL=0, PW=0.

linex: LINE LCENTR, PORT=portx.

devicex: TERMDEV TCENTR, HN=hostnode.

where linex is the line name for the printer, portx is the port number for the printer line, devicex is the device name for the printer, and hostnode is the NODE number of the host coupler to which the printer is connected.

**GROUP STATEMENT PARAMETERS**

You can use the GROUP statement in place of the LINE statement when you want to repeat a line definition a specified number of times.

NDLP creates identical line, terminal, and device definitions (except for port number, line name, and device name) the number of times specified by the NI parameter. NDLP generates unique port numbers by incrementing the previously defined port number by one. NDLP generates unique line and device element names by adding the LINE's port number in two-digit hexadecimal form to the one-to-five-character root element name you supply.

Figure 4-2 shows the format of the GROUP statement and the valid parameter values for CDC-defined asynchronous lines. Table 4-1 shows permitted line type values for the LTYPE parameter.

Using the GROUP statement can reduce the number of definitions you must provide in your NDL program.

---

**Figure 4-2. Asynchronous GROUP Statement Format (Sheet 1 of 2)**
An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of high line speeds (600 thru 9600 bits per second) and/or recognition of protocol subTIP type by CCP whenever a terminal is connected to the line. When XAUTO or XAUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, CCP attempts to determine as many definition parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO and XAUTO are omitted or if AUTO=NO or XAUTO=NO is specified, CCP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL and DEVICE or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal.

An optional reserved word value (YES or NO) indicating whether the user can change the line speed by using the AR TIP command. The default value of YES is used if AUTO or XAUTO is specified. The default value of NO is used if AUTO or XAUTO is not specified.

An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this communication line at network initiation. When DI or DI=YES is specified, the line is disabled at network initiation and cannot be used until the NOP or NOP enables it. If DI is omitted or DI=NO is specified, the line is given an initial status of enabled unless the NOP or HOP specifies otherwise.

An optional reserved word value (YES or NO) which specifies whether the Immediate Disconnect feature is enabled for this line. When IMDISC or IMDISC=YES is specified, any terminal on the line is disconnected immediately after the terminal has logged out (disconnected) from the host. When IMDISC is omitted or IMDISC=NO is specified, a terminal on the line is disconnected only after a two-minute timer expires.

The baud rate used by the modems or devices accessing this line. When the line is configured for automatic recognition (AUTO or XAUTO is declared), this parameter cannot be used. This parameter is optional when the line is not configured for automatic recognition of terminals; the following values are recognized:

```
  110  300 default  2400  19200
  134  600        4800  38400
  150  1200       9600
```

This value can be changed by the user if ARSPEED=YES. When Ispeed is not declared for a line configured without automatic recognition, the default of 300 baud is used.

The decimal access level limit (0 £ acclev £ 7) for the line. The lowest access level is 0 (unclassified), the highest is 7. If AL is omitted or AL=NONE is specified, no access level limit is associated with the line (equivalent to specifying AL=0).

An optional reserved word value (YES or NO) which specifies whether the reconfiguration indicator is enabled for this line. When RC or RC=YES is specified, the terminal characteristics are reset to their original NDL values (or to a default if no NDL values were specified) when the terminal disconnects from a host. When RC is omitted or RC=NO is specified, the reconfiguration indicator is not enabled for this line.

The hexadecimal field value (0 £ fv9i £ FF) to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this line. The released version of the CDC-written ASYNC TIP does not use any of these ten field number/field value pairs.

The decimal number (1 £ iter £ 254) of iterations of this line definition and of all TERMINAL, TERMDEV, or DEVICE Statements following this GROUP statement. This parameter is optional; the default is 1.

Figure 4-2. Asynchronous GROUP Statement Format (Sheet 2 of 2)

You use the AUTO or XAUTO parameter to define a communication line having of fixed or an automatic recognition configuration. You can use either of these configuration types for a dialup line or for a dedicated (hardwired) line.

If you define a fixed-configuration line by omitting AUTO and XAUTO or by specifying AUTO=NO or XAUTO=NO, you must know and specify certain characteristics of the terminal device that will use the line. Only a terminal device with the specified characteristics can use that line.

The characteristics of a fixed-configuration line are:

- **Line speed (GROUP statement LSPEED parameter)**

without reducing the number of definitions provided in the network configuration file. An example of GROUP statement use is shown in figure 4-3.
If you declare values instead of AUTOREC for some of the automatically recognized parameters, then any terminal that successfully accesses the line and has characteristics matching the declared values will match your terminal definition. If you declare values instead of AUTOREC for all of the automatically recognized parameters, then only a terminal with automatically recognized characteristics that are the same as your values will match the terminal definition.

You can specify more than one terminal definition on an automatic recognition line. Each definition should vary from the others in one of the automatically recognized characteristics; unless differences exist, CS will not use any definition other than the first one.

Using automatic recognition increases the number of terminal devices that potentially can use the line. You can configure a switchable line for automatic recognition with more logical terminal devices than the physical terminal devices that simultaneously can access it; only one physical device can access the line at a time.

For example, the statement

```
LN1A: GROUP, PORT=9, LTYPE=A1, TIPTYPE=ASYNC, AUTO, NI=2.
```

defines two switchable (dialup) communication lines (not shown in figure 2-1 of section 2) for automatic recognition of asynchronous protocol terminals. The lines are identified as LN1A09 and LN1A0A, connect to the NPU at ports 9 and 0A, and are enabled by default at network initiation.

If the fixed-configuration form of the statement

```
LN1A: GROUP, PORT=9, LTYPE=A1, TIPTYPE=ASYNC, NI=2.
```

were used instead, all of the terminals capable of accessing these switchable lines would have to use the same explicit configuration provided by the TERMINAL and DEVICE statement set following the GROUP statement.

The following two GROUP statements are equivalent:

```
LN1A: GROUP, PORT=9, LTYPE=A1, TIPTYPE=ASYNC, LSPEED=300, NI=5.
LN1A: GROUP, PORT=9, LTYPE=A1, TIPTYPE=ASYNC, NI=5.
```

Each statement defines five switchable, enabled, fixed-configuration asynchronous lines accessing the NPU at ports 9 through 0D and using modems at 300 baud (the default rate). The terminals actually accessing these lines must use the same explicit configuration as any that can potentially access the lines, because the lines are not configured for automatic recognition.

### TERMINAL DEFINITIONS

On an asynchronous communication line, a terminal definition is the first portion of a device definition. An asynchronous terminal consists of only one device, normally a console; terminal and device are synonymous.
If you defined the communication line as a fixed-configuration line, you can declare only one TERMINAL or one TERMDEV statement for the line. If you defined the line as an automatic recognition line, you can declare up to 255 TERMINAL statements or TERMDEV statements for the line (only one can be connected at a given time).

Figures 4-4 and 4-5 present the formats of these statements for terminals on CDC-defined asynchronous lines. The following TERMINAL and TERMDEV parameters provide the terminal definition for the line:

- **CSET**
- **RIC**
- **STIP**
- **TC**
- **TSPEED**

**Figure 4-4. TERMINAL Statement Format for Communication Lines of TIPTYPE=ASYNC**

The STIP and TC parameters are described first because they are related and affect the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

**device: TERMDEV[.,STIP=stiptyp,TC=trmclas,] [CSET=charset,TSPEED=trmsped,] [RIC=yn1].**

Parameters are described in the text.

**Figure 4-5. TERMDEV Statement Format for Communication Lines of TIPTYPE=ASYNC**

The STIP parameter specifies the subTIPtype required to support the terminal definition. This parameter is optional if the TC parameter specifies a CDC-defined terminal class. If STIP is omitted, the TC parameter must be specified and cannot be CCP or TC28 through TC31.

When you declare a value for STIP, it must be one of the following reserved words:

- **AUTOREC** Specifies that the subTIPtype appropriate for the terminal class should be used (valid only if TC is specified); using this value is equivalent to omitting the parameter.
- **N2741** Identifies an asynchronous terminal that does not use IBM 2741 protocol.
- **2741** Identifies an asynchronous terminal that uses IBM 2741 protocol.

If you omit this parameter or use the value AUTOREC, the default is selected according to the terminal class declared. The defaults are:

<table>
<thead>
<tr>
<th>TC</th>
<th>STIP</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>N2741</td>
<td></td>
</tr>
<tr>
<td>713</td>
<td>N2741</td>
<td></td>
</tr>
<tr>
<td>721</td>
<td>N2741</td>
<td></td>
</tr>
<tr>
<td>M40</td>
<td>N2741</td>
<td></td>
</tr>
<tr>
<td>N2000</td>
<td>N2741</td>
<td></td>
</tr>
<tr>
<td>X364</td>
<td>N2741</td>
<td></td>
</tr>
<tr>
<td>T4014</td>
<td>N2741</td>
<td></td>
</tr>
<tr>
<td>2741</td>
<td>2741</td>
<td></td>
</tr>
</tbody>
</table>

**device** The element name of the terminal device being defined. This name can be one through seven characters long. The first character must be a letter; the other characters can be letters or digits. If this statement is used within the set following a GROUP statement, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.
The TC PARAMETER specifies the terminal class appropriate for the device. Supported devices are grouped into terminal classes, according to their hardware characteristics.

Each CDC-defined terminal class has the default characteristics associated with an archetype terminal. Each CDC-defined terminal class has a range of possible characteristics. These ranges determine the values legal for parameters you specify on the TERMINAL or DEVICE statements.

Because the network cannot recognize differences among some terminal classes, a default terminal class exists for each subcategory of the TIP type (the subTITctype, defined by the STIP parameter of the TERMINAL or TERMDEV statement); these defaults can be used when you declare a STIP parameter.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes, with the following exceptions: you can use TC28, TC29, TC30, and TC31 to identify site-defined terminal classes with no default characteristics, corresponding to reserved Network Access Method (NAM) terminal class numbers.

Because the characteristics of terminals in site-defined classes are unknown, TERMINAL, TERMDEV, or DEVICE statement parameter value ranges are checked against those valid for the STIP value specified. Any value declared for a terminal or device parameter is valid if the parameter and value conform to requirements of that subTITctype.

This parameter is optional. When you declare a value for TC, it must be one of the following reserved words:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCP</td>
<td>Specifies that CCP is to provide the default terminal class appropriate for the subTITctype; using this value is equivalent to omitting the parameter.</td>
</tr>
<tr>
<td>M33</td>
<td>Identifies a terminal device compatible with Teletype Model 30 series equipment.</td>
</tr>
<tr>
<td>M40</td>
<td>Identifies a terminal device compatible with Teletype Model 40-2 equipment.</td>
</tr>
<tr>
<td>TC28</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 28.</td>
</tr>
<tr>
<td>TC29</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 29.</td>
</tr>
<tr>
<td>TC30</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 30.</td>
</tr>
<tr>
<td>TC31</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 31.</td>
</tr>
<tr>
<td>X364</td>
<td>Identifies a terminal device compatible with the ANSI X3.64 standard (DEC VT100 or CDC 722-30).</td>
</tr>
<tr>
<td>2741</td>
<td>Identifies a terminal device compatible with IBM 2741 equipment.</td>
</tr>
<tr>
<td>713</td>
<td>Identifies a terminal device compatible with CDC Model 713, 722-10, 751, 752, or 756 series equipment.</td>
</tr>
<tr>
<td>721</td>
<td>Identifies a terminal device compatible with CDC Model 721 equipment.</td>
</tr>
</tbody>
</table>

If the TC parameter is omitted, the STIP parameter must be specified. If the TC parameter is specified with a value of CCP or TC28 through TC31, the STIP parameter must be specified. If the STIP parameter is omitted, the TC parameter must be specified and cannot have the values CCP or TC28 through TC31.

If the TC parameter is specified with a value of TC28, TC29, TC30, or TC31, then CCP must also be modified to accept these values. If the appropriate support code for TC28, TC29, TC30, or TC31 is not added to CCP, these values will be considered invalid by CCP.

If you omit the TC parameter or specify the value CCP, the default is selected according to the STIP value declared. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>TC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M2741</td>
<td>M33</td>
</tr>
<tr>
<td>2741</td>
<td>2741</td>
</tr>
</tbody>
</table>

The CSET parameter specifies the code and character set of the terminal. This parameter is optional.

When you declare a value for CSET, it must be one of the following reserved words. For terminals in class 2741 or in site-defined terminal classes with a STIP value of 2741, the value can be:

<table>
<thead>
<tr>
<th>Code Set</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTOREC</td>
<td>The code set appropriate for the terminal or determined by automatic recognition should be used; using this value is equivalent to omitting the parameter.</td>
</tr>
<tr>
<td>CORAPL</td>
<td>IBM Correspondence code set with APL character set.</td>
</tr>
<tr>
<td>CORRES</td>
<td>IBM Correspondence code with Correspondence code character set.</td>
</tr>
<tr>
<td>CSET15</td>
<td>Site-defined code and character set, identified within the network software as character set number 15.</td>
</tr>
<tr>
<td>EBCD</td>
<td>IBM Extended BCD code and character set.</td>
</tr>
<tr>
<td>EBCDA PL</td>
<td>IBM Extended ECD code set with APL character set.</td>
</tr>
</tbody>
</table>

For terminals in classes M33, 713, 721, X364, M40, M2000, and T4014, or in site-defined terminal classes with a STIP value of N2741, the value can be:

<table>
<thead>
<tr>
<th>Code Set</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>Identifies a terminal device compatible with Hazeltine 2000 series equipment emulating a teletypewriter.</td>
</tr>
<tr>
<td>T4014</td>
<td>Identifies a terminal device compatible with Tektronix 4014 series equipment emulating a teletypewriter.</td>
</tr>
</tbody>
</table>
TSPEED PARAMETER

The TSPEED parameter specifies the baud rate of the terminal. This parameter is optional and valid only when the communication line is defined for automatic recognition.

If you specify a TSPEED value, the network software performs an additional match while identifying the terminal in the configuration file. Any terminal accessing the communication line using the speed you specify might match the terminal definition.

If AUTO is specified, the TSPEED parameter can have the following values:

110 134 150 300 600 1200 2400
AUTOREC

If XAUTO is specified, the TSPEED parameter can have the following values:

600 1200 2400 4800 9600 AUTOREC

If you omit this parameter or use the value AUTOREC, CCP determines the baud rate when it performs automatic recognition for the terminal; CCP recognizes any transmission speed valid for the communication line.

DEVICE DEFINITIONS

You must provide one device definition for the device that can access the communication line through the terminal. If a TERMDEV statement is used in place of the TERMINAL statement, a DEVICE statement cannot be used. Each TERMINAL statement can have only one DEVICE statement.

The released version of the network software does not provide support for passive devices on asynchronous lines. You can configure your own passive devices using the terminal classes TC28 through TC31, or you can connect them as secondary devices to merely echo the input and output of the console device.

Figures 4-5 and 4-6 present the formats of the TERMDEV and DEVICE statements for devices on asynchronous lines. The following DEVICE and TERMDEV parameters provide the definition for an asynchronous terminal device:

| AB  | DBZ | HN | PRI |
| ABL | DL  | IC | PW  |
| AUTOCON | DLC | IN | P90 through P99 |
| BR | DLTO | LI | RTS |
| BS | DLX | LK | UBL |
| B1 | DT | MCI | UBJ |
| B2 | EBR | MLI | XBJ |
| CI | RBX | OC | XLC |
| CN | ELR | OP | XLTO |
| CP | ELX | PA | XLX |
| CT | EP | PG | XLY |
| DBL | HD | PL |

The DT parameter is described first because it affects the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.
device: DEVICE[DT=devtyp,ABL=abl,DBZ=dwnlsiz,UBZ=upbsize,DBL=dwnblim,UBL=upblim,]

[XBI=xmitsiz,AUTOCONC=yn1,PRI=[yn2],D[IC=yn3],HN=node,LK=yn3,AB=abl,BR=br,]
[CP=cp,BS=bs,B1=b1,B2=b2,CI=ci,CN=cn,CT=ct,DL[=d=lc,DLTO=dlt0,DLX=dlx,EBX=ebx,]
[E[BR=ebr,ELX=elx,ELR=elr,EP=ep,XLC=xlc,XLTO=xlto,XLX=xlx,]
[XLY=xly,IC=ic,IN=in,LI=li,OP=op,OC=oc,PA=pa,PG=pg,PL=pl,PW=pw,RTS=yn6,MC=mc,ML=ml,]
[P90=fv90,...,P99=fv99].

device The element name of the terminal device being defined. This name can be one through seven
characters long. The first character must be a letter; the other characters can be
letters or digits. If this statement is used within the set following a GROUP statement,
the device name cannot be longer than five characters. This is the name used by the host
or NPU operator to monitor and control the device. This name is required; there is no
default value.

All other parameters are described in the text.

Figure 4-6. DEVICE Statement Format for Communication Lines of TIPTYPE=ASYNC

DT PARAMETER

The DT parameter specifies the device type being
defined. You can declare either a CDC-defined
device type or a site-defined device type.

If you specify a CDC-defined device type, the other
device definition parameters on the DEVICE or
TERMDEV statement:

- Are required by the NDL processor where
indicated in the text
- Have the predefined default shown in the text
- Have the predefined ranges shown in the text

If you specify a site-defined device type, the other
device definition parameters on the DEVICE or
TERMDEV statement:

- Are not required by the NDL processor
- Have no predefined default
- Are not checked for uniqueness
- Are not checked for compatibility with other
device definition parameters on the same
statement

When you specify the DT parameter, the following
values are valid:

- **CON** Identifies a CDC-defined console device.
- **DT12** Identifies a site-defined device with
  no predefined characteristics, using
  the device type number 12 within NAM.

If you omit the DT parameter, the default value of
CON is used.

AB PARAMETER

The AB parameter specifies the character to be used
to abort an output block. When the terminal user
enters this character as the only character on a
line, CCP discards the block of data being trans-
mitted to the terminal.

This parameter is optional. If you specify a value,
it must be either the reserved word CCP or a hexa-
decimal value for the 7-bit ASCII code that
represents the character to be used (table A-2 in
appendix A lists all of the codes in the 7-bit
ASCII code set).

You cannot use any of the following values:

- **00, 01, or 02** (characters NUL, SOH, or STX)
- **3D, 7F, or 20** (characters =, DEL, or space)
- **30 through 39** (characters 0 through 9)
- **41 through 5A or 61 through 7A** (alphan-
betic characters A through Z or a through z)
- Any value that you declare or use by default
  for the BS, B1, B2, CT, EBX, or ELX parameters

If the terminal does not use an ASCII character
set, you should choose a character that has a unique
translation to a character in the 7-bit ASCII code
set.

If you omit the AB parameter or specify the value
CCP, the default value is used (DT of CON only).
The default value depends on the value declared or
used for the STIP parameter. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>AB Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2741</td>
<td>18</td>
<td>CAN (CTRL and X keys)</td>
</tr>
<tr>
<td>2741</td>
<td>28</td>
<td>()</td>
</tr>
</tbody>
</table>


The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**ABL PARAMETER**

The application block limit (ABL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between an application program and this terminal. The value you choose should keep the terminal busy for 2 seconds by maintaining that number of outstanding blocks of the size specified by the DBZ parameter.

This parameter is optional. The ABL parameter has the following value range:

\[ 1 \leq \text{abl} \leq 7 \]

The value you declare should be greater than or equal to the downline block limit (DBL parameter value) of the terminal. The host queues \( \text{abl} - \text{dbl} \) blocks; the NPU queues \( \text{dbl} \) blocks. An ABL value significantly larger than the DBL value causes NAM to use more host memory but might reduce the number of times an application program is rolled out.

If you omit the ABL parameter, a default value is used (DT of CON only). Default values depend on the value declared or used for the LSPEED parameter from the corresponding LINE or GROUP statement. The defaults are:

<table>
<thead>
<tr>
<th>LSPEED Value (b/s)</th>
<th>ABL Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \leq 300 )</td>
<td>1</td>
</tr>
<tr>
<td>( \leq 9600 )</td>
<td>2</td>
</tr>
</tbody>
</table>

**AUTOCON PARAMETER**

The AUTOCON parameter is a stand-alone keyword that determines whether CCP should automatically connect the console device to the selected host node. This parameter is valid only for console devices.

If all logical links terminating in the NPU being defined are to the same host (all HNAME values are equal), and the NDL processor provides a default host node, then the NDL processor also sets AUTOCON unless AUTOCON=NO is specified.

This parameter and its values are optional. You can specify either of the following values:

- **NO** Indicates that CCP should not attempt automatic connection.
- **YES** Indicates that CCP should attempt automatic connection.

If you omit the AUTOCON parameter, the default value of NO is used for a DT of CON. If you specify this parameter without a value, the value of YES is used.

**BR PARAMETER**

The BR parameter determines whether CCP associates data control functions with the pressing of the break function key. The break function key is usually labeled BREAK, ATTN, INTERRUPT, or something similar.

If the break function key is not associated with data control, pressing the break function key only interrupts output. After input is completed, output is resumed at the next character.

If the break function key is associated with data control, the following occurs when the terminal user presses the break function key:

- If input is in progress, the network software discards the current logical line of input (the function also associated with the character defined by the CN parameter).
- If output is in progress, CCP discards all output queued for the device.
- If output is in progress, or the terminal is idle, CCP sends a user break 1 message upline (the function also associated with the character defined by the BI parameter).

After input occurs, output resumes with the next block transmitted from the host.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, the following values are recognised:

- **CCP** Indicates that CCP should perform the default action appropriate for the terminal class. Using this value is equivalent to omitting the parameter.
- **NO** Indicates that the break function key has no control functions.
- **YES** Indicates that the break function key has control functions.

If you omit the BR parameter or specify the value CCP, the default value of NO is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**BS PARAMETER**

The BS parameter specifies the character to be used for the single-character deletion function. When the terminal user enters this character, CCP discards the preceding character transmitted by the terminal (unless the character has already been sent to the host). The character code used for the deletion function does not produce a physical backspace at the device unless the device also recognizes the code for that function.
This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetical characters A through Z or a through z)

Any value that you declare or use by default for the AB, BS, B1, CN, CT, EBX, or ELX parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the BS parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the TC parameter. The default for all terminal classes except M40 is:

<table>
<thead>
<tr>
<th>BS Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>BS (CTRL and H keys, or &lt;— key, or BACKSPACE key)</td>
</tr>
</tbody>
</table>

Terminal class M40 has no default for this parameter.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

### B1 Parameter

The B1 parameter specifies the character to be used as a user break 1 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 1 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 1 message as a job step interrupt from the terminal user.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetical characters A through Z or a through z)

Any value that you declare or use by default for the AB, BS, B1, CN, CT, EBX, or ELX parameters
If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the B2 parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the STIP parameter. The defaults are:

<table>
<thead>
<tr>
<th>STIP</th>
<th>B2 Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2741</td>
<td>14</td>
<td>DC4 (CTRL and T keys)</td>
</tr>
<tr>
<td>2741</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**CI PARAMETER**

The CI parameter specifies the number of idle characters to insert in the downline data after a carriage return. The number of idle characters inserted must be sufficient to provide the time needed by the terminal to physically return the carriage of the device to its left margin for the next line of output.

This parameter is optional. If you declare this parameter, you must use the reserved word CCP or a value in the following range:

\[ 0 \leq \text{ci} \leq 127 \]

If you omit the CI parameter or specify the value CCP, the default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>CI Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2000</td>
<td>0</td>
</tr>
<tr>
<td>M33</td>
<td>2</td>
</tr>
<tr>
<td>H40</td>
<td>1</td>
</tr>
<tr>
<td>T4014</td>
<td>0</td>
</tr>
<tr>
<td>2741</td>
<td>8</td>
</tr>
<tr>
<td>713</td>
<td>0</td>
</tr>
<tr>
<td>721</td>
<td>0</td>
</tr>
<tr>
<td>X364</td>
<td>0</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**CN PARAMETER**

The CN parameter specifies the character to be used to abort (cancel) an input message. When the terminal user enters this character as the last character of a logical line, the network software discards the entire logical line, including any portion already transmitted from the terminal.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z)
- Any value that you declare or use by default for the BS, Bl, B2, CT, EBX, or ELX parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CN parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the STIP parameter. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>CN Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>N2741</td>
<td>18</td>
<td>CAN (CTRL and X keys)</td>
</tr>
<tr>
<td>2741</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**CP PARAMETER**

The CP parameter specifies whether CCP should make a cursor positioning response when the terminal user enters a linefeed or an end-of-line or end-of-block character, such as a CR or EOT. (The end-of-line and end-of-block characters are the current values of the ELX and ELB parameters.) The cursor positioning response to linefeed is a carriage return. The cursor positioning response used by CCP to end-of-line or end-of-block is determined by the the current settings of the ELR and EBR parameters. The default response moves the cursor to the beginning (left margin) of the next line on the screen; this is equivalent to a carriage return and linefeed operation.

The CP parameter is optional; this parameter is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following reserved words:

- **CCP** Indicates that CCP should use the default setting appropriate for the terminal class; using this value is equivalent to omitting the parameter.
NO Indicates that no cursor positioning response should occur.

YES Indicates that the cursor should be repositioned.

If you omit this parameter or specify the value of CCP, the default value of YES is used for a DT of CON.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

CT PARAMETER

The CT parameter specifies the character to be used as a flag for a terminal definition command. When the terminal user enters this character as the first character on a line, CCP interprets the line as a command. Among other functions, CCP supports terminal definition commands to determine or change the values you have established for the following parameters:

- AB
- CP
- ELR
- OC
- XLC
- BR
- CT
- ELX
- OP
- XLY
- BS
- DLC
- EP
- PA
- XLL
- B1
- DLTO
- HN
- PG
- XLY
- B2
- DLX
- IC
- FL
- CN
- EBX
- LI
- TC

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the AB, BS, B1, B2, CN, EBX, or ELX parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CT parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>CT Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>1B</td>
<td>ESC (CTRL and [ keys or ESCAPE key)</td>
</tr>
<tr>
<td>M33</td>
<td>1B</td>
<td>ESC (CTRL and [ keys or ESCAPE key)</td>
</tr>
<tr>
<td>M40</td>
<td>1B</td>
<td>ESC (CTRL and [ keys or ESCAPE key)</td>
</tr>
<tr>
<td>T4014</td>
<td>1B</td>
<td>ESC (CTRL and [ keys or ESCAPE key)</td>
</tr>
<tr>
<td>2741</td>
<td>25</td>
<td>Z</td>
</tr>
<tr>
<td>713</td>
<td>1B</td>
<td>ESC (CTRL and [ keys or ESCAPE key)</td>
</tr>
<tr>
<td>721</td>
<td>1B</td>
<td>ESC (CTRL and [ keys or ESCAPE key)</td>
</tr>
<tr>
<td>X364</td>
<td>25</td>
<td>Z</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

DBL PARAMETER

The downline block limit (DBL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between the host computer and this terminal. The value you choose determines how many blocks of data the NPU queues from the total number of outstanding blocks (ABL parameter value) of the size specified by the DBZ parameter.

This parameter is optional. The DBL parameter has the following value range:

1 ≤ dbl ≤ 7

The value you declare should be less than or equal to the application block limit (ABL parameter value) of the terminal. The host queues abl - dbl blocks; the NPU queues dbl blocks. Small DBL values use less NPU memory but cause slower data transfers.

If you omit the DBL parameter, a default value is used (DT of CON only). The default value depends on the value declared or used for the LSPEED parameter from the corresponding LINE or GROUP statement. The default is:

<table>
<thead>
<tr>
<th>LSPEED Value (b/s)</th>
<th>DBL Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 9600</td>
<td>1</td>
</tr>
</tbody>
</table>

DBZ PARAMETER

The downline block size (DBZ) parameter specifies the maximum number of character bytes each downline block can contain. The value you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host. Larger DBZ values cause fewer disk accesses by the host. This value can be used by the application programs to divide downline messages into blocks.
This parameter is optional. The DBZ parameter has the following value range:

\[ 1 \leq \text{dbz} \leq 2043 \]

The value you declare should be chosen together with the value used for the DBL parameter.

If you omit the DBZ parameter, a default value is used (DT of CON only). Default values depend on the value declared or used for the LSPEED parameter from the corresponding LINE or GROUP statement. The defaults are:

<table>
<thead>
<tr>
<th>LSPEED Value (b/s)</th>
<th>DBZ Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>\leq 2400</td>
<td>230</td>
</tr>
<tr>
<td>\leq 4800</td>
<td>460</td>
</tr>
<tr>
<td>\leq 9600</td>
<td>940</td>
</tr>
</tbody>
</table>

These defaults optimize use of the default values for the DBL parameter.

**DI PARAMETER**

The DI parameter is a stand-alone keyword that specifies a device as initially enabled or disabled. An enabled device is configured and serviced as soon as the communication line becomes active. A disabled device is neither configured nor serviced when the line becomes active.

If you initially disable the device, a host or NPU operator can change the device status to enabled. This change can be made only when the line becomes active (when a call is received on a dialup line, or when communications are established on a hardwired line).

This parameter is optional. If you specify the DI parameter, you must use one of the following values:

- **NO** Indicates that the device is initially enabled.
- **YES** Indicates that the device is initially disabled.

If you specify the DI parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

**DLC PARAMETER**

The DLC parameter indicates the maximum number of characters that can be input in each single-message transparent mode upline message from this terminal. After the terminal user or the application program changes the device's input mode to transparent from normalized, CCP forwards a message block to the application and changes back from transparent mode to normalized mode when the device transmits the indicated number of characters.

This parameter is optional; it is allowed for all terminal classes except 2741. You should not declare this parameter if you declare the XLC, XLO, XLX, or XLY parameters. You can use the following values:

- **CCP** Indicates that CCP should use the default number appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[ 1 \leq \text{die} \leq 4095 \]

Indicates the maximum decimal number of characters that the terminal can transmit as a single transparent mode message.

If you omit this parameter or specify the value CCP, the default value of 2043 is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**DLTO PARAMETER**

The DLTO parameter specifies whether a 200- to 400-millisecond timeout on the communication line ends single message transparent mode input. After the terminal user or the application program changes the device's input mode to transparent from normalized, CCP forwards a message block to the application and changes back from transparent mode to normalized mode when the device stops transmitting for the indicated timeout period.

This parameter is optional; it is allowed for all terminal classes except 2741. You cannot use the DLTO parameter if you use the XLC, XLO, XLX, or XLY parameters. When you specify the DLTO parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that a timeout does not end transparent mode input.
- **YES** Indicates that transparent mode input ends when a timeout occurs.

If you omit this parameter or specify the value CCP, the default value of NO is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.
DLX PARAMETER

The DLX parameter indicates the hexadecimal value of the character code that should end input of a single-message transparent mode message from the device. After the terminal user or the application program changes the device's input mode to transparent from normalized, CCP forwards a message block to the application and changes back from transparent mode to normalized mode when the device transmits this character.

This parameter is optional; it is allowed for all terminal classes except 2741. You cannot use the DLX parameter if you use the XLC, XLTO, XLX, or XLY parameters.

You should select transparent mode input delimiters with care. The character code you declare as the DLX value must be the code of a character that the physical device can input. If the delimiter is a character that cannot be input (either because of device hardware limitations or because of the PA parameter value declared for the device), then CCP cannot terminate transparent mode input and the device will be trapped in that mode of operation once it has begun.

The value valid for a given character depends on the character code set used by the terminal. You can use the following values:

CCP
Indicates that CCP should use the default character code appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[0 \leq \text{dlx} \leq 63\]
Indicates the hexadecimal code that ends single message transparent input.

Values above 7F should not be used unless the PA parameter value of N or I is used. Codes above 7F are not seen by CCP unless the eighth (parity) bit of each input byte is defined as data.

If you omit this parameter or specify the value CCP, the default value of OD is used (DT of CON only). This is the ASCII code for the carriage return character.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

EBX PARAMETER

The EBX parameter identifies the character code that ends a block of one or more messages (one or more logical lines) from the device. When CCP detects this code in input, it forwards the last message of the block upline. The character is significant only when the terminal is operating in block input mode. If the device is operating in normalized block mode (IN parameter value of BK), CCP retains output until this code is received.

This parameter is optional; it is allowed for all terminal classes except 2741.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

00, 01, or 02 (characters NUL, SOH, or STX)

3D, 7F, or 20 (characters =, DEL, or space)

30 through 39 (characters 0 through 9)

41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

Any value that you declare or use by default for the AB, BS, BI, B2, CM, or CT parameters
If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit this parameter or specify the value CCP, the default value of 04 is used (DT of CON only). That value is the ASCII end-of-transmission (EOT) character, generated by the CTRL and D keys.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**ELR PARAMETER**

The ELR parameter indicates the appropriate cursor positioning response whenever a message (logical line) of input ends. A logical line of input ends when CCP receives the currently defined end-of-line character (ELX parameter value). Whether cursor positioning occurs is determined by the value declared or used for the CP parameter.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that CCP should perform the default response appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **CL** Indicates that CCP should perform a carriage return and linefeed operation (move the cursor left and down to the beginning of the next physical line).
- **CR** Indicates that CCP should perform a carriage return operation (move the cursor left to the beginning of the current physical line).
- **LF** Indicates that CCP should perform a linefeed operation (move the cursor down to the next physical line).
- **NO** Indicates that CCP should not reposition the cursor.

If you omit this parameter or specify the value CCP, the default value of LF is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**ELX PARAMETER**

The ELX parameter identifies the character code that ends a message (logical line) from the device. When CCP detects this code in input, it forwards the message upline and discards this code. If the device is operating in normalized line mode (IN parameter of KB), CCP begins output of any queued downline blocks after receiving this code.

This parameter is optional; it is allowed for all terminal classes except 2741.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 30, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the AB, BS, Bl, B2, CN, or CT parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit this parameter or specify the value CCP, the default value 0D is used (DT of CON only). That value is the ASCII carriage return character.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**EP PARAMETER**

The echoplex (EP) parameter causes or prevents the echoing of input characters back to the output mechanism of the device. Echoplexing is normally required when the device operates in full-duplex mode and no echoing is performed by hardware between the device input hardware and CCP.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify the EP parameter, you must use one of the following values:

- **CCP** Indicates that CCP should echo input if that is the appropriate default action for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that CCP should not echo input characters.
- **YES** Indicates that CCP should echo input characters.

If you omit the EP parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:
The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**HN PARAMETER**

The HN parameter identifies the node number of the host that a console device and any associated batch devices are connected to unless another path is selected by the terminal user.

This parameter is optional and is valid only for console devices. If you declare this parameter, you must use one of the following values:

- **NONE**
  - Indicates that no node number is specified. This has the same effect as not declaring the parameter. A value of NONE cannot be declared if AUTOCON is also specified and there are logical links to more than one host terminating in the NPU being defined.

  \[
  1 \leq hn \leq 255
  \]
  - Indicates the node number of the host that the console device and any associated batch devices are to be connected to.

The value declared for the HN parameter must be the same as the NODE value in a COUPLER statement within the same network definition. If all the COUPLER statements for all the logical links to the NPU being defined have equal HNAME parameters, the NDL processor provides a default host node. The default host node is the last coupler specified. If the HN parameter is not specified, the terminal user must select a host before a connection can be made. If the AUTOCON parameter is specified, then the HN parameter must also be specified.

The value of this parameter does not change when the terminal class is changed from the console. The terminal user can change any value that you specify.

**IC PARAMETER**

The IC parameter specifies whether or not the input mechanism of the device supports an ASCII DC3 code (X-OFF character) as a signal to stop input and an ASCII DC1 code (X-ON character) as a signal to resume input. CCP transmits these codes to control input flow when the device can support them.

This parameter allows you to configure a device so that input from an intelligent terminal such as a personal computer or from a cassette mechanism can be interrupted and restarted as needed without terminal user intervention. CCP sometimes needs to suspend input because the volume of network traffic has temporarily used all available storage space.

You should be careful that this parameter is appropriately defined for the device hardware that actually uses the line. These codes are used for many purposes by device manufacturers; receiving either code can have effects other than resuming or stopping input.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following values:

- **CCP**
  - Indicates that CCP should use the default appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **NO**
  - Indicates that CCP cannot use X-ON and X-OFF characters to control input.

- **YES**
  - Indicates that CCP can use X-ON and X-OFF characters to control input.

If you omit the IC parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:
The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**IN PARAMETER**

The IN parameter identifies the input mechanism and the input message blocking of the device. (Terminal users can use a similar command that also defines whether input is in transparent mode or normalized mode; you cannot configure a device to begin accessing the network in transparent mode.)

As the input device, you can specify either:

- The keyboard
- The paper tape reader

As the input transmission mode, you can specify either:

- Normalized line mode (one message or logical line per block)
- Normalized block mode (one or more logical lines or messages collected into a block before it is transmitted. Cursor positioning at line-feed and end-of-line is not performed and output is not sent until end-of-block is reached.)

This parameter is optional; it is allowed for all terminal classes. Possible values are:

- **BK** Indicates keyboard input in block mode. This is not valid for TC=2741.
- **CCP** Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **KB** Indicates keyboard input in line mode.
- **PT** Indicates paper tape input in block mode. This is not valid for TC=2741.

When the IN value is set to PT, CCP treats the paper tape reader as a block mode device with a fixed end-of-block character (the ASCII DC3 code, representing the X-OFF character). Whenever CCP expects input from the device, it sends an ASCII DC1 code to start the paper tape reader. This X-ON character is issued after the end of a message is output to the device and the message empties CCP's output queue for the device. If CCP receives an ASCII DC3 code (X-OFF character) after an end-of-line character code, it views that code as a signal intended to stop the tape reader; the X-OFF is discarded.

Any other DC3 code is forwarded to the host as part of the message.

If you omit this parameter or specify the value CCP, the default value of KB is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**LI PARAMETER**

The LI parameter specifies the number of idle characters to insert in the downline data after a line-feed code. The number of idle characters inserted must be sufficient to provide the time needed by the terminal to physically move the carriage of the device to its next line for output.

This parameter is optional. If you declare this parameter, you must use the reserved word CCP or a value in the following range:

\[0 \leq LI \leq 127\]

If you omit the LI parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>LI Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>3</td>
</tr>
<tr>
<td>M33</td>
<td>1</td>
</tr>
<tr>
<td>M40</td>
<td>3</td>
</tr>
<tr>
<td>T4014</td>
<td>0</td>
</tr>
<tr>
<td>2741</td>
<td>1</td>
</tr>
<tr>
<td>713</td>
<td>0</td>
</tr>
<tr>
<td>721</td>
<td>0</td>
</tr>
<tr>
<td>X364</td>
<td>0</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**LK PARAMETER**

The LK parameter specifies whether unsolicited messages from the NPU or host operator can appear at the terminal. This parameter is optional.

If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default mode appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that unsolicited messages should be delivered to the terminal as soon as received by CCP.
- **YES** Indicates that unsolicited messages should be discarded (locked out).
If you omit this parameter or specify the value CCP, the default value of NO is used (DT of CON only).

The value of this parameter does not revert to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**MCI PARAMETER**

The MCI parameter specifies the delay after a carriage return is output. This delay is in 4-millisecond increments. This value is used by CCP to compute the number of idle characters output.

This parameter is optional. The MCI parameter has the following value range:

\[ 0 \leq \text{mci} \leq 250 \]

Entering the terminal definition command CI to change the number of idle characters after a carriage return overrides the MCI value specified by either the application program or in the NDL. When the CI parameter and the MCI parameter are both specified in the NDL, whichever value is specified second overrides the first value. Entering the TC command to change the terminal class restores the default terminal class settings.

**MLI PARAMETER**

The MLI parameter specifies the delay after a line feed is output. This delay is in 4-millisecond increments. This value is used by CCP to compute the number of idle characters output.

This parameter is optional. The MLI parameter has the following value range:

\[ 0 \leq \text{mil} \leq 250 \]

Entering the terminal definition command LI to change the number of idle characters after a line feed overrides the MLI value specified by either the application program or in the NDL. When the LI parameter and the MLI parameter are both specified in the NDL, whichever value is specified second overrides the first value. Entering the TC command to change the terminal class restores the default terminal class settings.

**OC PARAMETER**

The OC parameter specifies whether or not the output mechanism of the device sends an ASCII DC3 code (X-OFF character) as a signal for CCP to interrupt output and an ASCII DC1 code (X-ON character) as a signal for CCP to resume output. CCP can accept these codes for control of output flow by devices that must periodically interrupt output to perform such functions as emptying buffers to offline storage devices. DC1 and DC3 codes used in this manner are discarded by CCP.

You should only use this parameter when the device actually using the line requires it. The DC1 and DC3 codes can be sent for many purposes by terminal users; either code in input might be intended as data for the host application program.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that CCP should ignore X-ON and X-OFF characters in input; output control by the device is unnecessary.
- **YES** Indicates that CCP should recognize X-ON and X-OFF characters in input as output control by the device.

If you omit the OC parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>NO</td>
</tr>
<tr>
<td>M33</td>
<td>NO</td>
</tr>
<tr>
<td>M40</td>
<td>NO</td>
</tr>
<tr>
<td>T4014</td>
<td>NO</td>
</tr>
<tr>
<td>2741</td>
<td>NO</td>
</tr>
<tr>
<td>713</td>
<td>NO</td>
</tr>
<tr>
<td>721</td>
<td>NO</td>
</tr>
<tr>
<td>X364</td>
<td>YES</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**OP PARAMETER**

The OP parameter identifies the output mechanism, page width processing requirement, and page length processing requirement of the device. CCP supports these possible output mechanisms:

- A console screen
- A hardcopy mechanism, such as a printer
- A paper tape punch

CCP performs one of these processing actions when a finite page width is reached:

- Inserts the codes appropriate to return the cursor or carriage to the beginning of the next physical line
- Inserts no codes, which performs no action

If the device has a page width of 0, the second choice is always used. Refer to the description under the heading PW Parameter.

CCP performs one of these processing actions when a finite page length is reached:

- Inserts the codes appropriate to cause the cursor or carriage to move to the next page (clear screen, formfeed, and so forth)
Inserts no codes, which performs no action

If the device has a page length of 0, the second choice is always used. Refer to the PL Parameter description.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **DI**: Indicates that the console display screen is used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.
- **PR**: Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.
- **PT**: Indicates that a paper tape punch is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should not be inserted when page length is reached.

When the OP value is set to PT, CCP sends an ASCII DC3 code (the X-OFF character) at the end-of-message with postprint format control.

If you omit this parameter or specify the value CCP, a default value is used. The default used depends on the TC parameter value declared or used; the default values are (DT of CON only):

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>2741</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
</tr>
<tr>
<td>721</td>
<td>DI</td>
</tr>
<tr>
<td>X364</td>
<td>DI</td>
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<tr>
<td>E2000</td>
<td>DI</td>
</tr>
<tr>
<td>T4014</td>
<td>DI</td>
</tr>
<tr>
<td>E40</td>
<td>DI</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PA PARAMETER**

The PA parameter indicates the processing CCP should perform for the parity bit within each character byte of upline or downline data. CCP processes the parity bit of all upline character codes in one of five ways:

- **CCP**: Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **DI**: Indicates that the console display screen is used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.
- **PR**: Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.
- **PT**: Indicates that a paper tape punch is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should not be inserted when page length is reached.

When the OP value is set to PT, CCP sends an ASCII DC3 code (the X-OFF character) at the end-of-message with postprint format control.

If you omit this parameter or specify the value CCP, a default value is used. The default used depends on the TC parameter value declared or used; the default values are (DT of CON only):

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>2741</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
</tr>
<tr>
<td>721</td>
<td>DI</td>
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<tr>
<td>X364</td>
<td>DI</td>
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<tr>
<td>E2000</td>
<td>DI</td>
</tr>
<tr>
<td>T4014</td>
<td>DI</td>
</tr>
<tr>
<td>E40</td>
<td>DI</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**CCP** also processes the upper bit (bit 7) of all downline character code bytes in one of the following ways:

- **CCP**: Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **DI**: Indicates that the console display screen is used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.
- **PR**: Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.
- **PT**: Indicates that a paper tape punch is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should not be inserted when page length is reached.

When the OP value is set to PT, CCP sends an ASCII DC3 code (the X-OFF character) at the end-of-message with postprint format control.

If you omit this parameter or specify the value CCP, a default value is used. The default used depends on the TC parameter value declared or used; the default values are (DT of CON only):

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>2741</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
</tr>
<tr>
<td>721</td>
<td>DI</td>
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<tr>
<td>X364</td>
<td>DI</td>
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<tr>
<td>E2000</td>
<td>DI</td>
</tr>
<tr>
<td>T4014</td>
<td>DI</td>
</tr>
<tr>
<td>E40</td>
<td>DI</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PA PARAMETER**

The PA parameter indicates the processing CCP should perform for the parity bit within each character byte of upline or downline data. CCP processes the parity bit of all upline character codes in one of five ways:

- **CCP**: Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **DI**: Indicates that the console display screen is used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.
- **PR**: Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.
- **PT**: Indicates that a paper tape punch is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should not be inserted when page length is reached.

When the OP value is set to PT, CCP sends an ASCII DC3 code (the X-OFF character) at the end-of-message with postprint format control.

If you omit this parameter or specify the value CCP, a default value is used. The default used depends on the TC parameter value declared or used; the default values are (DT of CON only):

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>2741</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
</tr>
<tr>
<td>721</td>
<td>DI</td>
</tr>
<tr>
<td>X364</td>
<td>DI</td>
</tr>
<tr>
<td>E2000</td>
<td>DI</td>
</tr>
<tr>
<td>T4014</td>
<td>DI</td>
</tr>
<tr>
<td>E40</td>
<td>DI</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PA PARAMETER**

The PA parameter indicates the processing CCP should perform for the parity bit within each character byte of upline or downline data. CCP processes the parity bit of all upline character codes in one of five ways:

- **CCP**: Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **DI**: Indicates that the console display screen is used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.
- **PR**: Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.
- **PT**: Indicates that a paper tape punch is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should not be inserted when page length is reached.

When the OP value is set to PT, CCP sends an ASCII DC3 code (the X-OFF character) at the end-of-message with postprint format control.

If you omit this parameter or specify the value CCP, a default value is used. The default used depends on the TC parameter value declared or used; the default values are (DT of CON only):

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>2741</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
</tr>
<tr>
<td>721</td>
<td>DI</td>
</tr>
<tr>
<td>X364</td>
<td>DI</td>
</tr>
<tr>
<td>E2000</td>
<td>DI</td>
</tr>
<tr>
<td>T4014</td>
<td>DI</td>
</tr>
<tr>
<td>E40</td>
<td>DI</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PA PARAMETER**

The PA parameter indicates the processing CCP should perform for the parity bit within each character byte of upline or downline data. CCP processes the parity bit of all upline character codes in one of five ways:

- **CCP**: Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **DI**: Indicates that the console display screen is used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.
- **PR**: Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.
- **PT**: Indicates that a paper tape punch is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should not be inserted when page length is reached.

When the OP value is set to PT, CCP sends an ASCII DC3 code (the X-OFF character) at the end-of-message with postprint format control.

If you omit this parameter or specify the value CCP, a default value is used. The default used depends on the TC parameter value declared or used; the default values are (DT of CON only):

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>2741</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
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<tr>
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<td>T4014</td>
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<td>E40</td>
<td>DI</td>
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</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.
If the device is operating in normalized mode, CCP converts the lower seven bits of the byte, if necessary, to the code set used by the device. The parity bit in the output byte is set to zero or one, as necessary to give the byte an odd number of set bits; the setting of bit 7 in the downline byte is ignored. This is called odd parity processing.

If the device is operating in normalized mode, CCP converts the lower seven bits of the byte, if necessary, to the code set used by the device and the parity bit in the output byte is set to zero, regardless of the setting of bit 7 in the downline byte. If the device is operating in transparent mode, the parity bit in the output byte is unchanged from the setting of bit 7 in the downline byte (for devices that can receive 8-bit bytes, this allows the application program to use bit 7 as data). This is the method CCP uses for both no parity and ignore parity processing.

You can specify one of these input and output processing options to match the parity bit input processing performed by the device and the output processing expected by it. If the device will operate in transparent mode, you must specify either the no parity or the ignore parity option for an application program and the device to exchange hexadecimal codes with values between 7F and FF (using bit 7 as data).

No parity and ignore parity processing differ only in the way that a transparent input delimiter is recognized. For both PA=N and PA=I, all 8 bits are treated as data during transparent input and output. For PA=N, a transparent input delimiter is recognized when the 8-bit byte input from the device matches the 8-bit byte specified as the delimiter. For PA=I, a transparent input delimiter is recognized when the bottom 7 bits of the byte input from the device match the bottom 7 bits of the specified delimiter; the parity bit is ignored.

This parameter is optional. If you specify the PA parameter, you must use one of the following values:

- **CCP** Indicates that CCP performs the parity processing appropriate as a default for the terminal class; using this value is equivalent to omitting this parameter.
- **E** Indicates that CCP should perform even parity processing for both input and output bytes.
- **I** Indicates that CCP performs ignore parity processing for both input and output bytes.
- **N** Indicates that CCP should perform no parity processing for both input and output bytes.
- **O** Indicates that CCP should perform odd parity processing for both input and output bytes.
- **Z** Indicates that CCP should perform zero parity processing for both input and output bytes.

If you omit this parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the terminal class. The defaults are:

<table>
<thead>
<tr>
<th>Value</th>
<th>Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>E</td>
</tr>
<tr>
<td>713</td>
<td>E</td>
</tr>
<tr>
<td>721</td>
<td>E</td>
</tr>
<tr>
<td>H40</td>
<td>E</td>
</tr>
<tr>
<td>H2000</td>
<td>E</td>
</tr>
<tr>
<td>T4014</td>
<td>E</td>
</tr>
<tr>
<td>X364</td>
<td>E</td>
</tr>
<tr>
<td>2741</td>
<td>0</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PG Parameter**

The PG parameter specifies whether CCP should wait at each output page boundary for terminal user acknowledgment before it displays the next page of data. In certain situations, page waiting can occur other than at page boundaries; CCP produces a prompting message (OVER..) when this type of page waiting occurs. The user's response to page waiting is entry of a line, usually empty.

CCP views a new page as beginning at the start of each downline message. CCP calculates the length of a page from the current values of the page width and page length (see PW and PL Parameter descriptions). If the page width is infinite (PW=0), a page consists of one line less than the number of logical lines specified as the page length. If the page width is finite (PW is nonzero), a page consists of one line less than the number of physical lines specified by the page length; CCP calculates the number of physical lines by dividing each logical line into units less than or equal to the page width.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default setting appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that page waiting should not occur.
- **YES** Indicates that page waiting should occur.

When you specify PG=YES, you should also specify a nonzero value for the PL parameter. CCP cannot perform page waiting at the boundaries of infinitely long pages (PL=0).

If you omit the PG parameter or specify a value of CCP, the default value of NO is used (DT of CON only).
The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PL PARAMETER**

The PL parameter specifies the number of physical lines per page of output for the device. If the device is configured for page waiting (PG parameter), any message containing more lines of output than the page length will be interrupted by CCP for a page waiting response from the terminal user. The interruption occurs after line \( pl - 1 \) is output. If the device is defined with a printer as its output mechanism (OP of PR), CCP inserts form-feed codes at page length boundaries.

This parameter is optional. If you specify the PL parameter, you must use one of the following values:

- **CCP**
  - Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **0**
  - Indicates an infinite page length. An infinite page length means that no page waiting occurs and no form-feed codes are inserted.
- \( 8 \leq pl \leq 255 \)
  - Indicates the number of physical lines per page.

If you omit the PL parameter or specify the value CCP, a default value is used (DT of CON or DT of LP only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>PL Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>0</td>
</tr>
<tr>
<td>713</td>
<td>24</td>
</tr>
<tr>
<td>721</td>
<td>30</td>
</tr>
<tr>
<td>2741</td>
<td>0</td>
</tr>
<tr>
<td>M40</td>
<td>24</td>
</tr>
<tr>
<td>R20000</td>
<td>27</td>
</tr>
<tr>
<td>X364</td>
<td>24</td>
</tr>
<tr>
<td>T4014</td>
<td>35</td>
</tr>
</tbody>
</table>

The NDL default value of the PL parameter for DT of LP is 64.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PRI PARAMETER**

The PRI parameter is a stand-alone keyword. This parameter indicates whether data to or from the device is to have traffic priority over that to or from other devices in the network. Data to or from a device that does not have traffic priority is suspended to relieve network congestion before data to or from terminals with traffic priority is suspended. Interactive devices should usually be given traffic priority over batch devices.

This parameter is optional. If you specify the PRI parameter, you must use one of the following values:

- **NO**
  - Indicates that the device should not have data traffic priority.
- **YES**
  - Indicates that the device should have data traffic priority.

If you declare this parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

**PW PARAMETER**

The PW parameter defines the number of characters per physical line of output for this device. This physical line length is also called the page width.

For console devices (DT of CON) with a printer defined as the output mechanism (OP of PR), output lines longer than pw characters are divided into lines of pw or fewer characters each. For console devices with a display defined as the output mechanism (OP of DI), output lines longer than pw characters might be divided into lines of pw or fewer characters each by the host application program; if the PW value for a device is inappropriate, loss of visual fidelity can occur (the application program might divide the data into lines that are too short or too long for the screen's capacity, instead of allowing the terminal to wrap lines when needed). An inappropriate PW value also affects line counting for page waiting; refer to the PG parameter description.

This parameter is optional. If you specify the PW parameter, you must use one of the following values:

- **CCP**
  - Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **0**
  - Indicates that the device has an infinite page width. An infinite page width means that physical line length has no effect on output format.
- \( 20 \leq pw \leq 255 \)
  - Indicates that the device can support physical lines no longer than the indicated decimal value.
If you omit this parameter or specify the value CCP, a default value is used. The default value depends on the terminal class. Default values for console devices (DT of CON) are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>PW Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>72</td>
</tr>
<tr>
<td>713</td>
<td>80</td>
</tr>
<tr>
<td>721</td>
<td>80</td>
</tr>
<tr>
<td>X364</td>
<td>80</td>
</tr>
<tr>
<td>2741</td>
<td>132</td>
</tr>
<tr>
<td>M40</td>
<td>80</td>
</tr>
<tr>
<td>H2000</td>
<td>74</td>
</tr>
<tr>
<td>T4014</td>
<td>74</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

P90 THROUGH P99 PARAMETERS

These ten parameters indicate the hexadecimal field value to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this device. The released version of the CDC-defined ASYNC TIP does not use any of these ten field number/field value pairs.

These parameters are optional. If you specify a value, it must be within the following range:

\[ 0 \leq \text{tv9i} \leq \text{FF} \]

If you omit these parameters, there are no default values.

**RTS PARAMETER**

The RTS parameter specifies whether RTS input flow control is in effect on the line.

If this parameter is selected, CCP drops the RS-232C Request to Send (RTS) signal when it needs to regulate input flow on a line. When CCP can again receive input on the line, it will raise the RTS signal and the flow of input resumes.

RTS input flow control can be used to regulate input if and only if the following two conditions are satisfied. The sending device (for example, the terminal connected to CCP) must be able to recognize one of the RS-232C signals as a sign to stop and start transmission of data. In addition, the connection between the NPU and the terminal must be wired such that RTS from CCP is received as the signal recognized by the terminal, most commonly Clear to Send (CTS).

This parameter is optional. If you specify the RTS parameter, you must use one of the following values:

- **NO** Indicates that the RTS signal is not raised or dropped to effect input flow control.

- **YES** Indicates that the RTS signal is raised and dropped to effect input flow control.

If you omit this parameter, the default value of **NO** is used.

**UBL PARAMETER**

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and DBL parameters.

You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input messages and if you choose a UBL value smaller than this number, the application program becomes dead-locked (it waits for blocks of data that CCP is forced to discard because the block limit has been reached for upline queueing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.

This parameter is optional. The UBL parameter has the following value range:

\[ 1 \leq \text{UBL} \leq 31 \]

The NPU queues all upline blocks. Large UBL values rapidly use up NPU memory and cause slower data transfers.

If you omit the UBL parameter, a default value is used (DT of CON only). The default value depends on the value declared or used for the LSPEED parameter from the corresponding LINE statement. The default value is:

<table>
<thead>
<tr>
<th>LSPEED Value (b/s)</th>
<th>UBL Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>\leq 9600</td>
<td>7</td>
</tr>
</tbody>
</table>

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline block can contain. CCP divides each message from the device into network data blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host.

You should choose a value that allows most of the logical lines entered by the device to fit into a single network data block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional. The UBZ parameter has the following value range for console devices (DT of CON):

\[ 0 \leq \text{UBZ} \leq 2000 \]
For site-defined devices (DT of DT12), the following range exists:

\[ 0 < ubz < 2043 \]

If you specify 0, CCP sends an upline block whenever it receives 100 characters, or it detects a linefeed code.

The value you declare should be chosen after considering the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value in File</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 ≤ ubz &lt; 100</td>
<td>100</td>
</tr>
<tr>
<td>101 ≤ ubz &lt; 200</td>
<td>200</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>1901 ≤ ubz &lt; 2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it adjusts the UBZ value that you specify.

If you omit the UBZ parameter, a default value is used (DT of CON only). The default value depends on the value declared or used for the LSPEED parameter from the corresponding LINE statement. The default value is:

<table>
<thead>
<tr>
<th>LSPEED Value (b/s)</th>
<th>UBZ Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 9600</td>
<td>450</td>
</tr>
</tbody>
</table>

The application program can change any value that you specify.

**XLC PARAMETER**

The XLC parameter indicates the maximum number of characters that can be input in each message of multiple-message transparent mode input from this device. After the terminal user or the application program changes the device's input mode to transparent from normalized, the following occurs. When the device transmits the given number of characters, a message block is forwarded to the application and the device remains in transparent mode.

This parameter is optional; it is allowed for all terminal classes except 2741. You cannot use the XLC parameter if you use the DLC, DLTO, or DLX parameters. If specified, XLX or XLTO must also be specified. You can use the following values:

CCP

Indicates that CCP should use the default number appropriate for the terminal class; using this value is equivalent to omitting the parameter.

1 ≤ xlc ≤ 4095

Indicates the maximum decimal number of characters that the terminal can transmit as one multiple-message transparent mode message.

If you omit this parameter or specify the value CCP, the default value of 2043 is used (DT of CON only). The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**XBZ PARAMETER**

The transmission block size (XBZ) parameter specifies the maximum number of character bytes each block sent to the terminal can contain. CCP divides downline blocks as necessary to create a block of the specified number of characters. The value you choose should be less than or equal to the size of any buffer memory within the terminal.

This parameter is optional. The XBZ parameter has the following range of values:

\[ 200 ≤ xbz ≤ 2043 \]

If you omit the XBZ parameter, a default value is used (DT of CON only). The default value depends on the value declared or used for the LSPEED parameter from the corresponding LINE statement. The default value is:

<table>
<thead>
<tr>
<th>LSPEED Value (b/s)</th>
<th>XBZ Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 9600</td>
<td>450</td>
</tr>
</tbody>
</table>

The application program can change any value that you specify.

**XLTO PARAMETER**

The XLTO parameter specifies whether a 200- to 400-millisecond timeout on the communication line ends multiple-message transparent mode input. After the terminal user or the application program changes the device's input mode to transparent from normalized, CCP forwards a message block to the application and changes back from transparent mode to normalized mode when the device stops transmitting for the indicated timeout period.

This parameter is optional; it is allowed for all terminal classes except 2741. You cannot use this parameter if you use the DLC, DLTO, or DLX parameters.
If you specify the XLTO parameter, you must use one of the following values:

- **CCP**
  Indicates that CCP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **NO**
  Indicates that a timeout does not end transparent mode input.

- **YES**
  Indicates that transparent mode input ends when a timeout occurs.

If you omit this parameter or specify the value CCP, no default exists. The application program or the terminal user can define a value or change any value that you specify.

### XLY Parameter

The XLY parameter indicates the hexadecimal value of the character code that ends multiple-message transparent mode operation when entered following the XLX character code. After the terminal user or the application program changes the device's input mode to transparent from normalized, CCP changes back from transparent mode to normalized mode when the device transmits this character immediately after the character defined for the XLX parameter. If this character is also used for the XLY parameter, the code does not change the device's input mode unless it is input twice in succession.

You should select transparent mode input delimiters with care. The character code you declare as the XLY value must be the code of a character that the physical device can input. If the delimiter you declare is a character that cannot be input (either because of device hardware limitations or because of the PA parameter value declared for the device), then CCP cannot terminate transparent mode input and the device will be trapped in that mode of operation once it has begun.

This parameter is optional; it is allowed for all terminal classes except 2741. You should not declare this parameter if you declare the DLC, DLTO, or DLX parameters. If you use the XLY parameter, you must also use the XLX parameter.

The value that is valid for a given character depends on the character code set used by the terminal. You can use the following values:

- **CCP**
  Indicates that CCP should use the default character code appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **0 ≤ xly ≤ FF**
  Indicates the hexadecimal code that ends multiple-message transparent input.

Values above 7F should not be used unless the PA parameter value of N or I is used. Codes above 7F are not seen by CCP unless the eighth (parity) bit of each input byte is defined as data.

If you omit this parameter or specify the value CCP, and XLX is also specified, the default value is the code specified for XLX. Otherwise, no default exists. The value of this parameter reverts to the default of no value when the terminal class is changed from the console or by the application program. The application program or the terminal user can change any value that you specify.
BUFFERING OF DATA

It is desirable to maintain double buffering of data for each connection in the network. By using double buffering data will always be available to be sent over the communications line. Setting the ABL parameter to 2 and the DBL parameter to 1 will generally result in double buffering.

CCP buffer usage is optimized when downline block size follows the following relationship:

\[ DBZ = 113 + n \times 118 \]

where \( n \) is an integer and \( n + 1 \) is the number of buffers required in CCP to hold the block. This relationship is of most use for application programs that can control the size of the downline blocks they send to the network. Since it is necessary for a block to contain an integral number of logical lines, the lower bound of DBZ should not be smaller than the largest allowable PW for a device.

Default values for the ABL, DBL, and DBZ parameters are listed in Table 4-2.

<table>
<thead>
<tr>
<th>Line Speed</th>
<th>ABL</th>
<th>DBL</th>
<th>DBZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>1</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>300</td>
<td>1</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>600</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>1200</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>2400</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>4800</td>
<td>2</td>
<td>1</td>
<td>460</td>
</tr>
<tr>
<td>9600</td>
<td>2</td>
<td>1</td>
<td>940</td>
</tr>
</tbody>
</table>
The parameters required and the values allowed on the LINE, TERMINAL, TERMDEV, and DEVICE statements depend upon the line protocol used. This section describes the form of a statement applicable to X.25 protocol lines. The first part of this section describes only terminal definitions. Application definitions are described after terminal definitions.

X.25 communication lines are those using the line types defined in table 5-1. Such lines are serviced by the CDC-supplied X.25 TIP and must be defined as fixed-configuration lines. If you use the site-defined line type, the X.25 TIP is presumed to be modified by your site (if necessary) to support either a standard communication line adapter or a specially built communication line adapter.

**LINE DEFINITION**

You configure terminals on an X.25 communication line by using the following statements:

- One LINE statement that defines the line
- A single TERMINAL or TERMDEV statement for all switched virtual circuits of the X25 subTIP on the line
- A single TERMINAL or TERMDEV statement for all switched virtual circuits of the PAD subTIP on the line
- One DEVICE statement for all switched virtual circuits of the PAD, X25, or USER subTIP on the line, unless a TERMDEV statement has been used

**LINE STATEMENT PARAMETERS**

Each LINE statement defines one communication line between an X.25 network or device and the NPU. There must be one LINE statement for each CLA port on the NPU that supports X.25 access.

Figure 5-1 shows the format of the LINE statement and the valid parameter values for X.25 communication lines. Table 5-1 shows permitted line type values for the LTYPE parameter.

As an example, the statement

```
LN11A: LINE PORT=11,LTYPE=H1,TIPTYPE=X25,
       DFL=>32,FRAME=1,RTIME=1,PSN=TELENET.
```

defines a high-level data link control (HDLC) line connected to the TELENET X.25 packet-switching network.

**TABLE 5-1. X.25 LINE TYPE DEFINITIONS**

<table>
<thead>
<tr>
<th>LTYPE Value</th>
<th>Transmission Mode</th>
<th>Transmission Operation</th>
<th>Circuit Type</th>
<th>Modem Type†</th>
<th>CLA Type</th>
<th>Maximum Speed, Bits per Second</th>
<th>Carrier Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Bit-oriented synchronous HDLC</td>
<td>Full-duplex</td>
<td>Dedicated (Hardwired)</td>
<td>RS232C, Bell 201B compatible, V.35 Standard compatible</td>
<td>2563-1</td>
<td>19200</td>
<td>Constant</td>
</tr>
<tr>
<td>H2 (For site-defined use)</td>
<td>HDLC</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned Unassigned Unassigned Unassigned</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

†Modem types supported by each type of CLA may differ.
**X.25 LINE Statement Format (Sheet 1 of 2)**

Line: `LINE,PORT=port,LTYPE=ltype,TIPTYPE=tiptype,[DIIC=yn1],`  
`DFL=dfl,FRAME=frame,RTIME=timer,PSN=psn[,RCOUNT=count],`  
`CNSVC=svcirc,DCEC=yn21,DTEA=locadr,IHDISCC=yn33,LCN=lcn,AL=acclev,RCC=yn43,P90=fv90,...,P99=fv99].`

**line**  
The element name to be assigned to the communication line being defined. This name is required; there is no default value.

**port**  
The hexadecimal number (1 ≤ port ≤ FE) of the port to which this communication line connects on the NPU currently being defined. Within an NDL program, the port number is independent of the number of ports on the NPU; for example, a 128-port NPU can have a port numbered FE (254 decimal). However, we strongly recommend that you assign port numbers consecutively, starting with 1. All values declared for PORT parameters must be unique within the current network definition of each NPU. The value specified for port cannot be the same as the number declared for a port in any other LINE or TRUNK statement (or within a GROUP statement expansion) for this NPU and cannot be lower than the highest port number used by a trunk. This number is required; there is no default value.

**ltype**  
A reserved word value that identifies the type of communication line adapter/modem/circuit combination that is used on this line. This word is required; there is no default value. The legal words for this value declaration are described in table 5-1.

**tiptype**  
A reserved word value that identifies the type of CCP Terminal Interface Program required for the terminals on this line. This word is required; there is no default value. The legal value for this declaration is:  

- X25  
  X.25 protocol TIP is required.

**yn1**  
An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this communication line at network initiation. When DI or DI=YES is specified, the line is disabled at network initiation and cannot be used until the HOP or NOP enables it. If DI is omitted or DI=NO is specified, the line is given an initial status of enabled unless the NOP or HOP specifies otherwise.

**dfl**  
The maximum decimal number (16 ≤ dfl ≤ 1024) of 8-bit characters or octets in a data packet. The parameter must be identical to the number of octets in a data packet contracted from the packet-switching network. This value is required; there is no default value.

**frame**  
The frame window (1 ≤ frame ≤ 7); the maximum number of outstanding unacknowledged packets between the network processing unit and the X.25 network (this is the K parameter defined by the X.25 protocol standard). The parameter must be identical to the frame window size contracted from the packet-switching network. This value is required; there is no default value.

**timer**  
The decimal retransmission timing period (1 ≤ timer ≤ 25500) in milliseconds; the time that must elapse before retransmission of an unacknowledged X.25 data frame is attempted (this is the T1 parameter defined by the X.25 protocol standard). This value is required; there is no default value. NDLP rounds the value specified for timer to the next multiple of 100.

**count**  
The decimal retransmission count (1 ≤ count ≤ 15); the number of times retransmission of an unacknowledged X.25 data frame is attempted (this is the N2 parameter defined by the X.25 protocol standard). This parameter is optional. When count is not specified, the default value of 15 is used.

**svcirc**  
The decimal number (0 ≤ svcirc ≤ 255) of available switched virtual circuits (SVC) for this line. This parameter is optional; the default is 0. The parameter must be identical to the number of switched virtual circuits contracted from the packet-switching network and must conform to the following rules:

- The total number of virtual circuits defined (by the NCIR parameter on the TERMINAL or TERMDEV statement) for each STIP must be ≤ svcirc.

**psn**  
A reserved word value identifying the packet-switching network to which the line is connected. This parameter is required; there is no default value. The following values are recognized:

- CDSN  
  Packet-switching network is compatible with the commercial CDSN network.
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C120</td>
<td>Packet-switching network is compatible with the CDC CYBER 120.</td>
</tr>
<tr>
<td>DATAPAC</td>
<td>Packet-switching network is compatible with the commercial DATAPAC network.</td>
</tr>
<tr>
<td>PSN253</td>
<td>Site-defined packet-switching network type, identified by the number 253 within the network software.</td>
</tr>
<tr>
<td>PSN254</td>
<td>Site-defined packet-switching network type, identified by the number 254 within the network software.</td>
</tr>
<tr>
<td>PSN255</td>
<td>Site-defined packet-switching network type, identified by the number 255 within the network software.</td>
</tr>
<tr>
<td>TELENET</td>
<td>Packet-switching network is compatible with the commercial TELENET network.</td>
</tr>
<tr>
<td>TRNSPAC</td>
<td>Packet-switching network is compatible with the commercial TRANSPAC network.</td>
</tr>
<tr>
<td>TYMNET</td>
<td>Packet-switching network is compatible with the commercial TYMNET network.</td>
</tr>
<tr>
<td>UNINET</td>
<td>Packet-switching network is compatible with the commercial UNINET network.</td>
</tr>
</tbody>
</table>

Commercial packet-switching networks do not have identical interface requirements. CDC supports as general an X.25 interface as possible. As of the PSR level shown on the record of revision page, CDC code supported all of the commercial networks listed above. TELENET and TYMNET have certified CDC support; when major changes occur in either of these packet-switching networks, CDC verifies continued certification and releases any needed support code as soon as feasible. Users of the other commercial networks should contact their local sales offices if questions of continued compatibility arise.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>yn2</td>
<td>An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter tells the NPU what role to play in the X.25 protocols. If DCE or DCE=YES is specified, the NPU must act as data circuit terminating equipment (DCE). If DCE is omitted or DCE=NO is specified, the NPU must act as data terminal equipment (DTE).</td>
</tr>
<tr>
<td>locadr</td>
<td>The decimal address (0 ≤ locadr ≤ 99) assigned to the local end of the X.25 link. This value specifies the address by which the X.25 protocol identifies calls to and from the connected NPU. The value declared will be the calling DTE address for outgoing call requests when DCE=YES is specified. This parameter is optional; if DTEA is specified, DCE also must be specified. There is no default value.</td>
</tr>
<tr>
<td>yn3</td>
<td>An optional reserved word value (YES or NO) which specifies whether the Immediate Disconnect feature is enabled for this line. When IMDISC or IMDISC=YES is specified, any terminal on the line is disconnected immediately after the terminal has logged out (disconnected) from the host. When IMDISC is omitted or IMDISC=NO is specified, a terminal on the line is disconnected only after a two minute timer expires.</td>
</tr>
<tr>
<td>lcn</td>
<td>The logical channel number (0 ≤ lcn ≤ 255) which corresponds to the lowest numbered channel that a DTE CCP can use to make an outgoing application-to-application call. If CCP is a DCE, it corresponds to the highest numbered virtual circuit CCP can use to make outgoing application-to-application calls. This value must not exceed the total number of switched virtual circuits specified by the NSVC parameter. This parameter is optional; the default is 0. All NSVC circuits can be used.</td>
</tr>
<tr>
<td>accllev</td>
<td>The decimal access level limit (0 ≤ accllev ≤ 7) for the line. The lowest access level is 0 (unclassified), the highest is 7. If AL is omitted or AL=NONE is specified, no access level limit is associated with the line (equivalent to specifying AL=0).</td>
</tr>
<tr>
<td>yn4</td>
<td>An optional reserved word value (YES or NO) which specifies whether the reconfiguration indicator is enabled for this line. When RC or RC=YES is specified, the terminal characteristics are reset to their original NDL values (or to a default if no NDL values were specified) when the terminal disconnects from a host. When RC is omitted or RC=NO is specified, the reconfiguration indicator is not enabled for this line.</td>
</tr>
<tr>
<td>fv9i</td>
<td>The hexadecimal field value (0 ≤ fv9i ≤ FF) to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this line. The released version of the CDC-written X.25 TIP does not use any of these ten field number/field value pairs.</td>
</tr>
</tbody>
</table>

Figure 5-1. X.25 LINE Statement Format (Sheet 2 of 2)
PAD AND USER TERMINAL DEFINITIONS

On an X.25 communication line, a terminal definition is the first portion of a virtual circuit definition. An X.25 terminal and device definition, however, does not directly represent a piece of physical equipment. Each X.25 terminal and device definition represents one or more switched virtual circuits. Each virtual circuit can service one terminal device.

Switched virtual circuits are comparable to terminal devices using dialup lines (the characteristics of the device using the line can change from use to use of the line). You specify only one terminal device definition for the terminals that use the line. As each switched virtual circuit becomes active, CCP creates a separate device definition for it, creating an element name for each definition. This device name consists of the one to five characters you declare, plus an ordinal consisting of the switched virtual circuit number.

You must provide one TERMINAL or TERMDEV statement for all packet assembly/disassembly (PAD) terminals that can access the communication line. Figures 5-2 and 5-3 present the formats of these statements for terminals on X.25 lines.

If any switched virtual circuits are defined, the LINE statement must specify the total number of circuits available from the packet-switching network via that line (NSVC parameter). When the line supports switched virtual circuits, you can declare only one TERMINAL and DEVICE or one TERMDEV statement for each subTIPtype (STIP parameter) on the line. You can use the TERMINAL or TERMDEV statement NCIR parameter to define more than one circuit with that statement. The NCIR parameter determines the highest ordinal number used to generate a unique element name for each device using the circuit.

The following parameters provide the terminal definition for the line:

- COLLECT
- NCIR
- RIC
- STIP
- PAD
- TC

The STIP and TC parameters are described first because they are related and affect the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

**STIP PARAMETER**

The STIP parameter specifies the packet protocol required to support the terminal definition. This parameter is optional if the TC parameter does not specify a site-defined terminal class. If STIP is omitted, the TC parameter must be specified and cannot be CCP or TC28 through TC31.

When you declare a value for STIP, it must be one of the following reserved words:

- PAD Identifies a terminal that is connected via the asynchronous stop-start (X.29) packet assembly/disassembly protocol.
- USER Identifies a terminal that uses a site-defined packet protocol.

The element name of the terminal device being defined. This name can be one through five characters long. The first character must be a letter; the other characters can be letters or digits. This name concatenated with the virtual circuit number is used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

---

**Figure 5-2. TERMINAL Statement Format for Communication Lines of TIPTYPE=X25**

**Figure 5-3. TERMDEV Statement Format for Communication Lines of TIPTYPE=X25**
If you omit STIP, you must declare the terminal class. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>STIP Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33, 713, 721, 752, 756</td>
<td>PAD</td>
</tr>
<tr>
<td>N40, H2000, X364, T4014</td>
<td></td>
</tr>
</tbody>
</table>

**TC PARAMETER**

The TC parameter specifies the terminal class appropriate for terminal connections. Supported devices are grouped into terminal classes, according to their hardware characteristics.

Each CDC-defined terminal class has the default characteristics associated with an archetype terminal. Each CDC-defined terminal class has a range of possible characteristics. These ranges determine the values legal for parameters you specify on the TERMDEV or DEVICE statements.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes, with the following exceptions: you can use TC28, TC29, TC30, and TC31 to identify site-defined terminal classes with no default characteristics, corresponding to reserved Network Access Method (NAM) terminal class numbers.

Because the network cannot recognize differences among some terminal classes, a default terminal class exists for each subcategory of the TIP type (the subTIPtype, defined by the STIP parameter of the TERMINAL or TERMDEV statement); these defaults can be used when you declare a STIP parameter.

Because the characteristics of terminals in site-defined classes are unknown, TERMINAL, TERMDEV, or DEVICE statement parameter value ranges are checked against those valid for the STIP value specified. Any value declared for a terminal or device parameter is valid if the parameter and value conform to requirements of that subTIPtype.

The TC parameter is optional and is allowed only for PAD or USER subTIPs. If TC is omitted, the STIP parameter must be specified. If TC is specified as CCP or TC28 through TC31, the STIP parameter must be specified. If STIP is omitted, the TC parameter must be specified and cannot be CCP or TC28 through TC31.

When you declare a value for TC, you must use one of the following words:

- **CCP** Specifies that CCP is to provide the default terminal class appropriate for the subTIPtype; using this value is equivalent to omitting the parameter.
- **H2000** Identifies a terminal device compatible with Hazeltine 2000 series equipment emulating a teletypewriter.
- **M33** Identifies a terminal device compatible with Teletype Model 30 series equipment.
- **M40** Identifies a terminal device compatible with Teletype Model 40-2 equipment.
- **TC28** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 28.
- **TC29** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 29.
- **TC30** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 30.
- **TC31** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 31.
- **T4014** Identifies a terminal device compatible with Tektronix 4014 series equipment emulating a teletypewriter.
- **X364** Identifies a terminal device compatible with the ANSI X3.64 standard (DEC VT100 or CDC 722-30).
- **713** Identifies a terminal device compatible with CDC Model 713, 722-10/20, 751, 752, or 756 series equipment.
- **721** Identifies a terminal device compatible with CDC Model 721 equipment.

If the TC parameter is specified with a value of TC28, TC29, TC30, or TC31, then CCP must also be modified to accept these values. If the appropriate support code for TC28, TC29, TC30, or TC31 is not added to CCP, these values will be considered invalid by CCP.

If you omit the TC parameter or use the value CCP, the default is selected according to the STIP value declared. The default is:

<table>
<thead>
<tr>
<th>STIP Value Used</th>
<th>TC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD</td>
<td>M33</td>
</tr>
</tbody>
</table>

**COLLECT PARAMETER**

The COLLECT parameter specifies whether CCP accepts charges for incoming calls from X.25 terminals connected through the packet assembly/disassembly service. This stand-alone parameter is optional.

The COLLECT parameter can have the following values:

- **NO** CCP rejects any incoming call when the X.25 network indicates that charges will occur.
- **YES** CCP accepts charges from the X.25 network.

If you specify the COLLECT parameter without a value, the value of YES is used. If you omit the COLLECT parameter, the default value of NO is used.

**CSET PARAMETER**

The CSET parameter specifies the code and character set of the terminal. The CSET parameter is optional.
When you declare a value for CSET, you must use one of the following words:

- **ASCII** ASCII code and character set
- **CSET15** Site-defined code and character set, identified within the network software as character set number 15

If you omit CSET, the default value of ASCII is used.

### NCIR Parameter

The NCIR parameter specifies the decimal number of virtual circuits of the same subTIP type you are defining. This parameter is optional.

If you specify this parameter, the value you use must be less than or equal to the NSVC value declared or used on the corresponding LINE statement. The NCIR parameter has the following range of values:

\[ 1 \leq \text{ncirc} \leq 255 \]

If you omit this parameter, the default value of 1 is used.

### NEN Parameter

The NEN parameter specifies the decimal number of virtual circuits of the same subTIP type that are initially enabled. This parameter is optional.

If you specify this parameter, the value you use must be less than or equal to the NCIR value declared or used on the same TERMINAL or TERMDEV statement. The NEN parameter has the following range of values:

\[ 1 \leq \text{encir} \leq 255 \]

If you omit this parameter, the default value of 1 is used.

### PAD Parameter

The PAD parameter specifies a string of 4 to 64 hexadecimal digits representing the ASCII equivalent of PAD parameter fields. Substrings should consist of groups of 4 hexadecimal digits (2 ASCII characters). CCP uses the value to initialize PAD parameters when the terminal is connected.

The PAD parameter is optional. There is no default value.

### RIC Parameter

The RIC parameter indicates that the terminal has restricted interactive capabilities. This parameter is optional.

A terminal can have restricted interactive capabilities for many reasons; for example, perhaps no console device actually exists and interactive dialog must occur through a site-defined device.

The effect this parameter has depends on the application program the terminal uses. For example, RBF does not output the READY prompt and does not require a GO command to enable any defined passive devices when RIC is specified.

You can use the following values for this parameter:

- **NO** Indicates that the terminal has full interactive capabilities.
- **YES** Indicates that the terminal has limited interactive capabilities.

If you omit the RIC parameter, the default value of NO is used.

### W Parameter

The W parameter specifies the default packet level window size for the virtual circuit you are defining. This parameter is optional.

The packet level window is the maximum number of unacknowledged packets you allow CCP to send before it suspends further output to the terminal using the virtual circuit. The parameter must be identical to the packet level window size contracted from the packet-switching network. This parameter has the following range of values:

\[ 1 \leq \text{pacwndw} \leq 7 \]

If you omit the W parameter, the default value of 2 is used.

### PAD and User Device Definitions

You must provide one TERMDEV or DEVICE statement for:

- All switched virtual circuit application-to-application connections
- All switched virtual circuit terminals

that can access the communication line through the terminal. Each TERMINAL statement can have only one DEVICE statement. Figures 5-3 and 5-4 present the formats of the TERMDEV and DEVICE statements for terminals on X.25 lines.

The following parameters provide the definition for a CDC-defined X.25 terminal device:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABL</td>
<td>DBZ</td>
</tr>
<tr>
<td>AUTOCON</td>
<td>DLC</td>
</tr>
<tr>
<td>BR</td>
<td>IC</td>
</tr>
<tr>
<td>BS</td>
<td>IN</td>
</tr>
<tr>
<td>B1</td>
<td>DT</td>
</tr>
<tr>
<td>B2</td>
<td>EBR</td>
</tr>
<tr>
<td>CI</td>
<td>ERX</td>
</tr>
<tr>
<td>CN</td>
<td>ELR</td>
</tr>
<tr>
<td>CP</td>
<td>ELX</td>
</tr>
<tr>
<td>CT</td>
<td>EP</td>
</tr>
<tr>
<td>DBL</td>
<td>HD</td>
</tr>
</tbody>
</table>

The DT parameter is described first because it affects the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.
device: DEVICE[,DT=devtyp,ABL=abl,DBZ=dwnlsiz,UBZ=iipbsize,DBL=dwnblim,UBL=upblim,3
CAUTOCON=yn13,PRIC=yn23,HN=node,HDC=yn33,LK=yn4,BR=br,BS=bs,Bl=b1,B2=b2,CI=ci,CN=cn,3
CCP=cp,CT=ct,DLC=dlc,DLTO=dlto,DLX=dlx,EBX=ebx,EBR=ebx,ELX=elx,ELR=elr,EP=ep,]3

device The element name of the terminal device being defined. This name can be one through five characters long. The first character must be a letter; the other characters can be letters or digits. This name concatenated with the virtual circuit number is used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

Figure 5-4. DEVICE Statement Format for Communication Lines of TIPTYPE=X25

DT PARAMETER

The DT parameter specifies the device type being defined. You can declare either a CDC-defined device type or a site-defined device type.

If you specify a CDC-defined device type and the terminal has a STIP of PAD, the other device definition parameters on the DEVICE or TERMDEV statement:

- Are required by the NDL processor where indicated in the text
- Are checked for compatibility and uniqueness
- Have the predefined ranges shown in the text

If you specify a site-defined device type or the terminal has a STIP of USER, the other device definition parameters on the DEVICE statement:

- Are not required by the NDL processor
- Have no predefined default
- Are checked for multiple definitions of the same parameter
- Are not checked for compatibility with other device definition parameters on the same statement

When you declare the DT parameter, the following values are valid:

- **CON** Identifies a CDC-defined console device (for PAD subTIP only).
- **DT12** Identifies a site-defined device with no predefined characteristics, using the device type number 12 within NAM.

If you omit the DT parameter and STIP=PAD, the value of CON is used.

ABL PARAMETER

The application block limit (ABL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between an application program and this virtual circuit. The value you choose should keep the terminal busy for 2 seconds by maintaining that number of outstanding blocks of the size specified by the DBZ parameter. Refer to the description under Buffering of Data at the end of this section.

This parameter is optional. The ABL parameter has the following range of values:

\[ 1 \leq abl \leq 7 \]

The value you declare should be greater than or equal to the downline block limit (DBL parameter value) of the terminal. The host queues abl - dbl blocks; the NPU queues dbl blocks. An ABL value significantly larger than the DBL value causes NAM to use more host memory but might reduce the number of times an application program is rolled out.

If you omit the ABL parameter, a default value is used (DT of CON only). The default is 2.

AUTOCON PARAMETER

The AUTOCON parameter is a stand-alone keyword that determines whether CCP should automatically connect the console device to the selected host node. This parameter is valid only for console devices.

If all logical links terminating in the NPU being defined are to the same host (all HNAME values are equal), and the NDL processor provides a default host node, then the NDL processor also sets AUTOCON unless AUTOCON=NO is specified.

This parameter and its values are optional. You can specify either of the following values:

- **NO** Indicates that CCP should not attempt automatic connection.
YES Indicates that CCP should attempt automatic connection.

If you omit the AUTOCON parameter, the default value of NO is used for a DT of CON. If you specify this parameter without a value, the value of YES is used.

**BR PARAMETER**

The BR parameter determines whether CCP associates data control functions with the pressing of the break function key. The break function key is usually labeled BREAK, ATTN, INTERRUPT, or something similar.

When the break function key is not associated with data control, pressing the break function key only interrupts output. After input is completed, output will be resumed at the next character.

When the break function key is associated with data control, the following occurs when the terminal user presses the key:

- If output is in progress, CCP discards all output queued for the device.
- If the terminal is idle or output is in progress, CCP sends a user break 1 message upline (the function also associated with the character defined by the Bl parameter).

After input occurs, output resumes with the next block transmitted from the host.

The BR parameter is optional. If you specify this parameter, the following values are recognized:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCP</td>
<td>Indicates that CCP should perform the default action appropriate for the terminal class. Using this value is equivalent to omitting the parameter.</td>
</tr>
<tr>
<td>NO</td>
<td>Indicates that the break function key has no control functions.</td>
</tr>
<tr>
<td>YES</td>
<td>Indicates that the break function key has control functions.</td>
</tr>
</tbody>
</table>

If you omit the BR parameter or specify the value CCP, the default value of NO is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**BS PARAMETER**

The BS parameter specifies the character to be used for the single-character deletion function. When the terminal user enters this character, CCP discards the preceding character transmitted by the terminal (unless the character has already been sent to the host). The character code used for the deletion function does not produce a physical backspace at the device unless the device also recognizes the code for that function.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)
- Any value that you declare or use by default for the Bl, B2, CN, CT, EBX, or ELX parameters

<table>
<thead>
<tr>
<th>ASCII Character</th>
<th>BS Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>08</td>
<td>BS (CTRL and H keys, or ← key, or BACKSPACE key)</td>
</tr>
</tbody>
</table>

Terminal class M40 has no default character for this function.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**B1 PARAMETER**

The B1 parameter specifies the character to be used as a user break 1 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 1 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 1 message as a job step interrupt from the terminal user.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the BS, B2, CN, CT, EBX, or ELX parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the Bl parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the STIP parameter. The default is:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>B1 Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD</td>
<td>10</td>
<td>DLE (CTRL and P keys)</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

### B2 PARAMETER

The B2 parameter specifies the character to be used as a user break 2 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 2 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 2 message as a job step termination from the terminal user.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the BS, B1, CN, CT, EBX, or ELX parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>B2 Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD</td>
<td>14</td>
<td>DC4 (CTRL and T keys)</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

### CI PARAMETER

The CI parameter specifies the number of idle characters to insert in the downline data after a carriage return. The number of idle characters inserted must be sufficient to provide the time needed by the terminal to physically return the carriage of the device to its left margin for the next line of output.

This parameter is optional. If you declare this parameter, you must use the reserved word CCP or a value in the following range:

\[ 0 \leq CI \leq 127 \]

If you omit the CI parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>CI Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>0</td>
</tr>
<tr>
<td>M33</td>
<td>2</td>
</tr>
<tr>
<td>M40</td>
<td>1</td>
</tr>
<tr>
<td>T4014</td>
<td>0</td>
</tr>
<tr>
<td>713</td>
<td>0</td>
</tr>
<tr>
<td>721</td>
<td>0</td>
</tr>
<tr>
<td>X364</td>
<td>0</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

### CN PARAMETER

The CN parameter specifies the character to be used to abort (cancel) an input message. When the terminal user enters this character as the last character on a line, the network software discards the last logical line transmitted from the terminal.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the BS, B1, B2, CT, EBX, or ELX parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.
If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CN parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the STIP parameter. The default is:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>CN Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD</td>
<td>18</td>
<td>CAN (CTRL and X keys)</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**CP PARAMETER**

The CP parameter specifies whether CCP should make a cursor positioning response when the terminal user enters a packet-forwarding signal. A packet-forwarding signal is usually a carriage return but can be set by the terminal user to other values. CCP can perform cursor positioning only on receipt of a packet sequence.

The cursor positioning response used by CCP is determined by the current settings of the EBR parameter. The default response for terminals that are using X.25 lines is no response.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that CCP should use the default setting appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that no cursor positioning response should occur.
- **YES**: Indicates that the cursor should be repositioned.

If you omit this parameter or specify the value of CCP, the default value of NO is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**CT PARAMETER**

The CT parameter specifies the character to be used as a flag for a terminal definition command. When the terminal user enters this character as the first character on a line, CCP interprets the line as a command. Among other functions, CCP supports terminal definition commands to determine or change the values you have established for the following parameters:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>CT Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD</td>
<td>1B</td>
<td>ESC (CTRL and [ keys or ESCAPE key)</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**DBL PARAMETER**

The downline block limit (DBL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between the host computer and this virtual circuit. The value you choose determines how many blocks of data the NPU queues from the total number of outstanding blocks (ABL parameter value) of the size specified by the DBZ parameter.

This parameter is optional. The DBL parameter has the following value range:

\[ 1 \leq \text{dbl} \leq 7 \]
The value you declare should be less than or equal to the application block limit (ABL parameter value) of the virtual circuit. The host queues abl - db1 blocks; the NPU queues db1 blocks. Small DBL values use less NPU memory but cause slower data transfers.

If you omit the DBL parameter, a default value is used (DT of CON only). The default value is 2.

**DBZ PARAMETER**

The downline block size (DBZ) parameter specifies the maximum number of character bytes each downline block can contain. The value you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host. This value can be used by the application programs to divide downline messages into blocks.

This parameter is optional. The DBZ parameter has the following range of values:

\[1 \leq \text{dbz} \leq 2043\]

The value you declare should be chosen together with the value used for the DBL parameter.

If you omit the DBZ parameter, a default value is used (DT of CON only). The default value is 225. This default optimizes use of the default value for the DBL parameter.

**DLC PARAMETER**

The DLC parameter indicates the maximum number of characters that can be input in each single-message transparent mode upline message from this terminal. After the terminal user or application program changes the device's input mode to transparent from normalized, CCP forwards a message block to the application and changes back from transparent to normalized mode when the device transmits the end-of-packet sequence.

This parameter is optional. You cannot use the DLC parameter if you use the XLC, XLTO, XLX, or XLY parameters. If you specify the DLX parameter, you must use one of the following values:

CCP

Indicates that CCP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[1 \leq \text{dlc} \leq 4095\]

Indicates the maximum decimal number of characters that the terminal can transmit as a single transparent mode message.

If you omit this parameter or specify the value CCP, the default value of 2043 is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**DLX PARAMETER**

The DLX parameter indicates the hexadecimal value of the character code that should end input of a single-message transparent mode message from the device. After the terminal user or application program changes the device's input mode to transparent from normalized, CCP forwards a message block to the application and changes back from transparent to normalized mode when the device transmits this character.

This parameter is optional. You cannot use the DLX parameter if you use the XLC, XLTO, XLX, or XLY parameters.

The value that is valid for a given character depends on the character code set used by the terminal. You can use the following values:

CCP

Indicates that CCP should use the default character code appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[0 \leq \text{dlx} \leq \text{FF}\]

Indicates the hexadecimal code that ends single message transparent input.

Values above 7F should not be used unless the PA parameter value of N or I is used. Codes above 7F are not seen by CCP unless the eighth (parity) bit of each input byte is defined as data.
You should select transparent mode input delimiters with care. The character code you declare as the DLX value must be the code of a character that the physical device can input. If the delimiter is a character that cannot be input (either because of terminal hardware limitations or because of the PA parameter value declared for the device), then the Terminal Interface Program cannot terminate transparent mode input and the terminal will be trapped in that mode of operation once it has begun.

If you omit this parameter or specify the value CCP, the default value of OD is used (DT of CON only). This is the ASCII code for the carriage return character.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**EBR PARAMETER**

The EBR parameter indicates the appropriate cursor positioning response whenever a block of input ends. A block of input ends when CCP detects the end-of-packet indicator (M bit value of zero). Whether cursor positioning occurs is determined by the value declared or used for the CP parameter.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that CCP should perform the default response appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **CL** Indicates that CCP should perform a carriage return and linefeed operation (move the cursor left and down to the beginning of the next physical line).
- **CR** Indicates that CCP should perform a carriage return operation (move the cursor left to the beginning of the current physical line).
- **LF** Indicates that CCP should perform a linefeed operation (move the cursor down to the next physical line).
- **NO** Indicates that CCP should not reposition the cursor.

If you omit this parameter or specify the value CCP, the default value of CL is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program.

**EBX PARAMETER**

The EBX parameter identifies the character code that ends a block of one or more messages in the packet-forwarding signal from the device. When this code occurs as the last character in a packet sequence, it is treated as the end-of-block character and not as part of normalized mode data; CCP discards it. This parameter is optional. It is significant only when the terminal is in block input mode.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- Any value that you declare or use by default for the BS, Bl, B2, CN, or CT parameters

If you omit this parameter or specify the value CCP, the default value 04 is used (DT of CON only). That value is the ASCII end-of-transmission character (EOT) generated by the CTRL and D keys.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**ELR PARAMETER**

The ELR parameter indicates the appropriate cursor positioning response whenever a message (logical line) of input ends. A logical line of input ends when CCP receives the currently defined end-of-line character (ELX parameter value). Whether cursor positioning occurs is determined by the value declared or used for the CP parameter.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following values:

- **CCF** Indicates that CCP performs the default response appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **CL** Indicates that CCP performs a carriage return and linefeed operation (move the cursor left and down to the beginning of the next physical line).
- **CR** Indicates that CCP performs a carriage return operation (move the cursor left to the beginning of the current physical line).
- **LF** Indicates that CCP performs a linefeed operation (move the cursor down to the next physical line).
- **NO** Indicates that CCP does not reposition the cursor.

If you omit this parameter or specify the value CCP, the default value of LF is used (DT of CON only).
The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**ELX PARAMETER**

The ELX parameter identifies the character code that ends a message (logical line) to or from the device. When CCP detects this code in input, it forwards the message upline.

This parameter is optional. You cannot declare the ELX parameter if you declare the ELO parameter for the same device.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 30 through 3E (all graphic characters)
- Any value that you declare or use by default for the BS, BS, BS, CM, or CT parameters

If you omit this parameter or specify the value CCP, the default value of 0D is used (DT of CON only). That value is the ASCII carriage return character.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**EP PARAMETER**

The echoplex (EP) parameter causes the echoing of input characters back to the output mechanism of the device. Echoplexing is normally required when the device operates in full-duplex mode and no echoing is performed by hardware between the device input hardware and the PAD.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify the EP parameter, you must use one of the following values:

- CCP Indicates that CCP should notify the PAD to echo input if that is the appropriate action for the terminal class; using this value is equivalent to omitting the parameter.
- NO Indicates that CCP should not notify the PAD to echo input characters.
- YES Indicates that CCP should notify the PAD to echo input characters.

If you omit the EP parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>EP Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>NO</td>
</tr>
<tr>
<td>M33</td>
<td>NO</td>
</tr>
<tr>
<td>M40</td>
<td>NO</td>
</tr>
<tr>
<td>T4014</td>
<td>NO</td>
</tr>
<tr>
<td>2741</td>
<td>NO</td>
</tr>
<tr>
<td>713</td>
<td>NO</td>
</tr>
<tr>
<td>721</td>
<td>NO</td>
</tr>
<tr>
<td>X364</td>
<td>YES</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value you specify.

**HD PARAMETER**

The HD parameter controls whether or not the full host availability display (HAD) is presented to the terminal user. This parameter is optional.

If you specify this parameter, you must use one of the following values:

- NO Indicates that the full host availability display is not presented to the terminal user. The terminal user receives only the host status message and the prompt message.
- YES Indicates that the full host availability display is presented to the terminal user.

If you omit this parameter and only a single host is defined, the default value of NO is used. If you omit this parameter and multiple hosts are defined, the default value of YES is used.

The value of this parameter does not change when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change the value you specify.

**HN PARAMETER**

The HN parameter identifies the node number of the host that a console device is connected to unless another path is selected by the terminal user.

This parameter is optional. If you declare this parameter, you must use one of the following values:

- NONE Indicates that no node number is specified. This has the same effect as not declaring the parameter. A value of NONE cannot be declared if AUTOCON is also specified and there are logical links to more than one host terminating in the NPU being defined.
Indicates the node number of the host that the console device and any associated batch devices are to be connected to.

The value declared for the HN parameter must be the same as the NODE value in a COUPLER statement within the same network definition. If all the COUPLER statements for all the logical links to the NPUs being defined have equal HNAME parameters, the NDL processor provides a default host node. The default host node is the last coupler specified. If the HN parameter is not specified, the terminal user must select a host before a connection can be made. If the AUTOCON parameter is specified, then the HN parameter must also be specified.

The value of this parameter does not change when the terminal class is changed from the console. The terminal user can change the value you specify.

**IC PARAMETER**

The IC parameter specifies whether or not the input mechanism of the device supports an ASCII DC3 code (X-OFF character) as a signal to stop input and an ASCII DC1 code (X-ON character) as a signal to resume input. CCP notifies the PAD to use these codes to control input flow when the device can support them.

This parameter allows you to configure a device so that input from an intelligent terminal such as a personal computer or from a cassette mechanism can be interrupted and restarted as needed without terminal user intervention. The PAD sometimes needs to suspend input on a line or circuit because the volume of network traffic has temporarily used all available storage space.

You should be careful that this parameter is appropriately defined for the device hardware that actually uses the line. These codes are used for many purposes by device manufacturers; receiving either code can have effects other than resuming or stopping input.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following values:

- CCF Indicates that CCP should use the default appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- NO Indicates that CCP should not notify the PAD to use X-ON and X-OFF characters to control input.
- YES Indicates that CCP should notify the PAD to use X-ON and X-OFF characters to control input.

If you omit the IC parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>IC Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>NO</td>
</tr>
<tr>
<td>M33</td>
<td>NO</td>
</tr>
<tr>
<td>M40</td>
<td>NO</td>
</tr>
<tr>
<td>T4014</td>
<td>NO</td>
</tr>
<tr>
<td>2741</td>
<td>NO</td>
</tr>
<tr>
<td>713</td>
<td>NO</td>
</tr>
<tr>
<td>721</td>
<td>NO</td>
</tr>
<tr>
<td>X364</td>
<td>YES</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value you specify.

**IN PARAMETER**

The IN parameter identifies the input mechanism and the input message blocking of the device. (Terminal users can use a similar command that also defines whether input is in transparent mode or normalized mode; you cannot configure a device to begin accessing the network in transparent mode.)

As the input transmission mode, you can specify either:

- Normalized line mode (one message or logical line per block).
- Normalized block mode (one or more logical lines or messages collected into a block before it is transmitted. Cursor positioning at linefeed and end-of-line is not performed and output is not sent until end-of-block is reached.)

This parameter is optional; it is allowed for all terminal classes. Possible values are:

- BK Indicates keyboard input in block mode.
- CCP Indicates that CCP uses the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- KB Indicates keyboard input in line mode.

If you omit this parameter or specify the value CCP, the default value of KB is used (DT of CON only).

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.
LI PARAMETER

The LI parameter specifies the number of idle characters to insert in the downline data after a linefeed code. The number of idle characters inserted must be sufficient to provide the time needed by the terminal to physically move the carriage of the device to its next line for output.

This parameter is optional. If you declare this parameter, you must use the reserved word CCP or a value in the following range:

\[ 0 \leq li \leq 127 \]

If you omit the LI parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>LI Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>3</td>
</tr>
<tr>
<td>M33</td>
<td>1</td>
</tr>
<tr>
<td>M40</td>
<td>3</td>
</tr>
<tr>
<td>T4014</td>
<td>0</td>
</tr>
<tr>
<td>713</td>
<td>0</td>
</tr>
<tr>
<td>721</td>
<td>0</td>
</tr>
<tr>
<td>X364</td>
<td>0</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

LK PARAMETER

The LK parameter specifies whether unsolicited messages from the NPU or host operator can appear at the terminal. This parameter is optional.

If you declare this parameter, you must specify one of the following values:

- **CCP**: Indicates that CCP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that unsolicited messages should be delivered to the terminal as soon as received by CCP.
- **YES**: Indicates that unsolicited messages should be discarded (locked out).

If you omit this parameter or specify the value CCP, the default value of NO is used (DT of CON only).

The application program or terminal user can also change the value you specify.

MCI PARAMETER

The MCI parameter specifies the delay after a carriage return is output. This delay is in 4-millisecond increments. This value is used by CCP to compute the number of idle characters output.

This parameter is optional. The MCI parameter has the following value range:

\[ 0 \leq mci \leq 250 \]

Entering the terminal definition command CI to change the number of idle characters after a carriage return overrides the MCI value specified by either the application program or in the NDL. If the CI parameter and the MCI parameter are both specified in the NDL, whichever value is specified second overrides the first value. Entering the TC command to change the terminal class restores the default terminal class settings.

MLI PARAMETER

The MLI parameter specifies the delay after a linefeed is output. This delay is in 4-millisecond increments. This value is used by CCP to compute the number of idle characters output.

This parameter is optional. The MLI parameter has the following value range:

\[ 0 \leq mli \leq 250 \]

Entering the terminal definition command LI to change the number of idle characters after a linefeed overrides the MLI value specified by either the application program or in the NDL. If the LI parameter and the MLI parameter are both specified in the NDL, whichever value is specified second overrides the first value. Entering the TC command to change the terminal class restores the default terminal class settings.

OC PARAMETER

The OC parameter specifies whether or not the output mechanism of the device sends an ASCII DC3 code (X-OFF character) as a signal for the PAD to interrupt output and an ASCII DC1 code (X-ON character) as a signal for the PAD to resume output. The PAD can accept these codes for control of output flow by devices that must periodically interrupt output to perform such functions as emptying buffers to offline storage devices. DC1 and DC3 codes used in this manner are discarded by the PAD.

You should only use this parameter when the device actually using the line requires it. The DC1 and DC3 codes can be sent for many purposes by terminal users; either code in input might be intended as data for the host application program.

This parameter is optional; it is allowed for all terminal classes except 2741. If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that CCP should use the default appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that CCP should notify the PAD to ignore X-ON and X-OFF characters in input; output control by the device is unnecessary.
### TC Parameter

This parameter is optional. If you specify this parameter, you must use one of the following values:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>IC Value</th>
<th>Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2000</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>M33</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>M40</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>T4014</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>2741</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>713</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>721</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>X364</td>
<td>YES</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value you specify.

### OP Parameter

The OP parameter identifies the output mechanism, page width processing requirement, and page length processing requirement of the device. CCP supports these possible output mechanisms:

- A console screen
- A hardcopy mechanism, such as a printer

CCP performs one of these processing actions when a finite page width is reached:

- Inserts the codes appropriate to return the cursor or carriage to the beginning of the next physical line.

- Inserts no codes, which performs no action.

If the device has a page width of 0, the second choice is always used. Refer to the description under the heading FW Parameter.

CCP performs one of these processing actions when a finite page length is reached:

- Inserts the codes appropriate to cause the cursor or carriage to move to the next page (clear screen, formfeed, and so forth).

- Inserts no codes, which performs no action.

If the device has a page length of 0, the second choice is always used. Refer to the PL Parameter description.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.

### PA Parameter

The PA parameter indicates the processing the X25 TIP should perform for the parity bit within each character byte of upline or downline data. This TIP processes the parity bit of all upline character codes in the following way:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
</tr>
<tr>
<td>721</td>
<td>DI</td>
</tr>
<tr>
<td>X364</td>
<td>DI</td>
</tr>
<tr>
<td>H2000</td>
<td>DI</td>
</tr>
<tr>
<td>T4014</td>
<td>DI</td>
</tr>
<tr>
<td>M40</td>
<td>DI</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

### DI Parameter

Indicates that the console display screen is used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.

### PR Parameter

Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.

<table>
<thead>
<tr>
<th>TC Value</th>
<th>OP Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>PR</td>
</tr>
<tr>
<td>713</td>
<td>DI</td>
</tr>
<tr>
<td>721</td>
<td>DI</td>
</tr>
<tr>
<td>X364</td>
<td>DI</td>
</tr>
<tr>
<td>H2000</td>
<td>DI</td>
</tr>
<tr>
<td>T4014</td>
<td>DI</td>
</tr>
<tr>
<td>M40</td>
<td>DI</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

### CCP Parameter

CCP also processes the upper bit (bit 7) of all downline character code bytes in the following ways:

The parity bit in the output byte is set to zero, regardless of the setting of bit 7 in the downline byte. This is called zero parity processing.

The parity bit in the output byte is set to zero or one, as necessary to give the byte an odd number of set bits; the setting of bit 7 in the downline byte is ignored. This is called odd parity processing.
The parity bit in the output byte is set to zero or one, as necessary to give the byte an even number of set bits; the setting of bit 7 in the downline byte is ignored. This is called even parity processing.

The parity bit in the output byte is set to zero, regardless of the setting of bit 7 in the downline byte. If the terminal is operating in transparent mode, the parity bit in the output byte is unchanged from the setting of bit 7 in the downline byte (for devices that can receive 8-bit bytes, this allows the application program to use bit 7 as data). This is the method CCP uses for both no parity and ignore parity processing.

You can specify one of these input and output processing options to match the parity bit input processing performed by the device and the output processing expected by it. If the device will operate in transparent mode, you must specify either the no parity or the ignore parity option for an application program and the device to exchange hexadecimal codes with values between 7F and FF (using bit 7 as data).

This parameter is optional. If you specify the PA parameter, you must use one of the following values:

- **CCP**: Indicates that CCP performs the parity processing appropriate as a default for the terminal class; using this value is equivalent to omitting the parameter.
- **E**: Indicates that CCP should perform even parity processing for output bytes.
- **I**: Indicates that CCP performs ignore parity processing for both input and output bytes.
- **N**: Indicates that CCP should perform no parity processing for output bytes.
- **O**: Indicates that CCP should perform odd parity processing for output bytes.
- **Z**: Indicates that CCP should perform zero parity processing for output bytes.

If you omit this parameter or specify the value CCP, a default value of even parity processing is used.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**PG PARAMETER**

The PG parameter specifies whether CCP should wait at each output page boundary for terminal user acknowledgment before it displays the next page of data. In certain situations, page waiting can occur other than at page boundaries; CCP produces a prompting message (OVER...) when this type of page waiting occurs. The user's response to page waiting is entry of a line, usually empty.

CCP views a new page as beginning at the start of each downline message. CCP calculates the length of a page from the current values of the page width and page length (see PW and PL Parameter descriptions). If the page width is infinite (PW=0), a page consists of one line less than the number of logical lines specified as the page length. If the page width is finite (PW is nonzero), a page consists of one line less than the number of physical lines specified by the page length; CCP calculates the number of physical lines by dividing each logical line into units less than or equal to the page width.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that CCP should use the default setting appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that page waiting should not occur.
- **YES**: Indicates that page waiting should occur.

When you specify PG=YES, you should also specify a nonzero value for the PL parameter. CCP cannot perform page waiting at the boundaries of infinitely long pages (PL=0).

If you omit the PG parameter or specify a value of CCP, the default value of NO is used (DT of CON only). The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**PL PARAMETER**

The PL parameter specifies the number of physical lines per page of input or output for the device. If the device is configured for page waiting (PG parameter), any message containing more lines of output than the page length will be interrupted by CCP for a page waiting response from the terminal user. The interruption occurs after line pl - 1 is output. If the device is defined with a printer as its output device (OP value of PR), CCP inserts formfeed codes at page length boundaries.

This parameter is optional. If you specify the PL parameter, you must use one of the following values:

- **CCP**: Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **O**: Indicates an infinite page length. An infinite page length means that no page waiting occurs and no formfeed codes are inserted.
If you omit the PL parameter or specify the value CCP, a default value is used (DT of CON only). The default value used depends on the TC parameter value used for the terminal. The default values are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>PL Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>0</td>
</tr>
<tr>
<td>713</td>
<td>24</td>
</tr>
<tr>
<td>721</td>
<td>30</td>
</tr>
<tr>
<td>H40</td>
<td>24</td>
</tr>
<tr>
<td>H2000</td>
<td>27</td>
</tr>
<tr>
<td>X364</td>
<td>24</td>
</tr>
<tr>
<td>T4014</td>
<td>35</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**PRI PARAMETER**

The PRI parameter is a stand-alone keyword. This keyword indicates whether data to or from the device is to have traffic priority over that to or from other devices in the network. Data to or from a device that does not have traffic priority is suspended to relieve network congestion before data to or from terminals with traffic priority is suspended. Interactive terminals should usually be given traffic priority over batch devices and application-to-application connections.

This parameter is optional. If you specify the PRI parameter, you must use one of the following values:

- **NO** Indicates that the circuit should not have data traffic priority.
- **YES** Indicates that the circuit should have data traffic priority.

If you declare this parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

**PW PARAMETER**

The PW parameter defines the number of characters per physical line of input or output for this device. This physical line length is also called the page width.

For console devices (DT of CON) with a printer defined as the output mechanism (OP of PR), output lines longer than pw characters are divided into lines of pw or fewer characters each. For console devices with a display defined as the output mechanism (OP of DI), output lines longer than pw characters might be divided into lines of pw or fewer characters each by the host application program; if the PW value for a device is inappropriate, loss of visual fidelity can occur (the application program might divide the data into lines that are too short or too long for the screen's capacity, instead of allowing the terminal to wrap lines when needed).

This parameter is optional. If you specify the PW parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **0** Indicates that the device has an infinite page width. An infinite page width means that physical line length has no effect on output line formatting.

20 ≤ pw ≤ 255

Indicates that the device can support physical lines no longer than the indicated decimal value.

If you omit this parameter or specify the value CCP, a default value is used. The default value depends on the terminal class. Default values for console devices (DT of CON) are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>PW Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M33</td>
<td>72</td>
</tr>
<tr>
<td>713</td>
<td>80</td>
</tr>
<tr>
<td>721</td>
<td>80</td>
</tr>
<tr>
<td>X364</td>
<td>80</td>
</tr>
<tr>
<td>H40</td>
<td>80</td>
</tr>
<tr>
<td>H2000</td>
<td>74</td>
</tr>
<tr>
<td>T4014</td>
<td>74</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or terminal user can also change the value you specify.

**P90 THROUGH P99 PARAMETERS**

These ten parameters indicate the hexadecimal field value to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this device. The released version of the CDC-defined X25 subTIP does not use any of these ten field number/field value pairs.

These parameters are optional. If you specify a value, it must be within the following range:

0 ≤ fv9i ≤ FF

If you omit these parameters, there are no default values.

**UBL PARAMETER**

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and BBL parameters.
You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input messages and if you choose a UBL value smaller than this number, the application program becomes deadlocked (it waits for blocks of data that CCP is forced to discard because the block limit has been reached for upline queuing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.

This parameter is optional. The UBL parameter has the following value range:

\[ 1 \leq \text{UBL} \leq 31 \]

The NPU queues all upline blocks. Large UBL values rapidly use up NPU memory and cause slower data transfers.

If you omit the UBL parameter, a default value is used (DT of CON only). The default is 7. The application program can change the value you specify.

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline block can contain. CCP divides each message from the terminal into blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data the NPU and the host each queue.

You should choose a value that allows most of the logical lines entered by the device to fit into a single block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional. The UBZ parameter has the following value range for console devices (DT of CON):

\[ 0 \leq \text{UBZ} \leq 2000 \]

Site-defined devices can use the following range:

\[ 0 \leq \text{UBZ} \leq 2043 \]

If you specify 0, CCP sends an upline block whenever it receives 100 characters or it detects a linefeed character.

The value you declare should be chosen together with the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes, as follows:

### Value Supplied | Value Used
---|---
0 | 0
1 < \text{UBZ} < 100 | 100
101 < \text{UBZ} < 200 | 200
---

The NDL processor issues an informative message if it adjusts the UBZ value that you specify.

If you omit the UBZ parameter, a default value is used (DT of CON only). The default is 100. This default optimizes use of the default value for the UBL parameter.

For the Message Control System (MCS), the upline block size must be set to 0.

The application program can change any value you specify. The terminal user can change the value within the following range:

\[ 0 \leq \text{UBZ} \leq 200 \]

**XLC PARAMETER**

The XLC parameter indicates the maximum number of characters that can be input in each message of multiple-message transparent mode input from this device. After the terminal user or the application program changes the device’s input mode to transparent from normalized, the following occurs. When the device transmits the given number of characters, a message block is forwarded to the application and the device remains in transparent mode.

This parameter is optional. You cannot use the XLC parameter if you use the DLC, DLTO, or DLX parameters. If specified, XLX or XLTO must also be specified. You can use one of the following values:

- CCP
- Indicates that CCP should use the default number appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- \[ 1 \leq \text{XLC} \leq 4095 \]
- Indicates the maximum decimal number of characters that the terminal can transmit as one transparent mode message.

If you specify 0, CCP sends an upline block whenever it receives 100 characters or it detects a linefeed character.

The value you declare should be chosen together with the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes, as follows:

### Value Supplied | Value Used
---|---
0 | 0
1 < \text{XLC} < 100 | 100
101 < \text{XLC} < 200 | 200
---

If you omit this parameter or specify the value CCP, no default exists.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value you specify.
XLTO PARAMETER

The XLTO parameter specifies whether an end-of-packet ends multiple message transparent mode input. After the terminal user or the application program changes the device's input mode to transparent from normalized, CCP forwards a message block to the application and changes back from transparent mode to normalized mode when the device transmits the end-of-packet sequence.

This parameter is optional. You cannot use the XLTO parameter if you use the DLC, DLTO, or DLX parameters. You can use one of the following values:

- **CCP**: Indicates that CCP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that a timeout does not end transparent mode input.
- **YES**: Indicates that transparent mode input ends when a timeout occurs.

If you omit this parameter or specify the value CCP, no default exists.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can also change the value you specify.

XLX PARAMETER

The XLX parameter indicates the hexadecimal value of the character code that causes upline transmission of a message in multiple-message transparent mode. If this character code is also used as the value for the XLX parameter and is input twice in succession, the device will be put back in normalized mode as determined by the IN parameter.

This parameter is optional. You cannot use the XLX parameter if you use the DLC, DLTO, or DLX parameters.

The value that is valid for a given character depends on the character code set used by the terminal. You can use one of the following values:

- **CCP**: Indicates that CCP should use the default character code appropriate for the terminal class; using this value is equivalent to omitting the parameter.

Values above 7F should not be used unless the PA parameter value of N or I is used. Codes above 7F are not seen by CCP unless the eighth (parity) bit of each input byte is defined as data.
APPLICATION-TO-APPLICATION CONNECTION DEFINITIONS

Each X.25 application-to-application connection definition consists of a TERMINAL definition and a DEVICE definition and represents one or more switched virtual circuits. Each virtual circuit can service one application connection.

Switched virtual circuits are comparable to terminals using dialup lines in that the characteristics of the device using the line can change from use to use of the line.

You specify only one application-to-application connection definition for all of the application connections that can use the line. As each switched virtual circuit becomes active, CCP creates a separate device definition for it, creating an element name for each definition. This device name consists of the one to five characters you declare, plus an ordinal consisting of the switched virtual circuit number.

TERMINAL DEFINITIONS

You must provide one TERMINAL or TERMDEV statement for the application connections that can access the link. Figures 5-5 and 5-6 present the format of these statements for application-to-application connections on X.25 lines.

**TERMINAL** [,**STIP**=stiptyp,**CSET**=charset,**NCIR**=numcir,**NEN**=encir].

Parameters are described in the text.

Figure 5-5. TERMINAL Statement Format for Communication Lines of TIPTYPE=X25

The LINE statement must specify the total number of circuits available from the packet-switching network via the line (NSVC parameter). You can declare only one TERMINAL and DEVICE statement or one TERMDEV statement for each subTIPtype (STIP parameter) on the line. You can use the TERMINAL or TERMDEV statement NCIR parameter to define more than one circuit with that statement. The NCIR parameter determines the highest ordinal number used to generate a unique element name for each device using the circuit.

The following parameters provide the terminal definition for the line:

- CSET
- NCIR
- NEN
- STIP

The STIP parameter is described first because it affects the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

STIP Parameter

The STIP parameter specifies the packet protocol required to support the terminal definition. This parameter is required for application-to-application connections.

When you declare a value for STIP, it must be one of the following reserved words:

- XAA Identifies the application-to-application X.25 subTIP.

CSET Parameter

The CSET parameter specifies the code and character set of the terminal. The CSET parameter is optional.

When you declare a value for CSET, you must use one of the following words:

- ASCII ASCII code and character set
- CSET15 Site-defined code and character set, identified within the network software as character set number 15

If you omit CSET, the default value of ASCII is used.

NCIR Parameter

The NCIR parameter specifies the decimal number of virtual circuits of the same subTIPtype you are defining. This parameter is optional.

If you specify this parameter, the value you use must be less than or equal to the NSVC value declared or used on the corresponding LINE statement. The NCIR parameter has the following range of values:

\[ 1 \leq \text{numcir} \leq 255 \]

If you omit this parameter, the default value of 1 is used.

NEN Parameter

The NEN parameter specifies the decimal number of virtual circuits of the same subTIPtype that are initially enabled. This parameter is optional.

If you specify this parameter, the value you use must be less than or equal to the NCIR value declared or used on the same TERMINAL or TERMDEV statement. The NEN parameter has the following range of values:

\[ 1 \leq \text{encir} \leq 255 \]

If you omit this parameter, the default value of 1 is used.
DEVICE DEFINITIONS

You must provide one TERMDEV or DEVICE statement for all switched virtual circuit application-to-application connections that can access the communication line through the terminal. Each terminal statement can have only one DEVICE statement. Figures 5-6 and 5-7 present the formats of the TERMDEV and DEVICE statements for terminals on X.25.

The following parameters provide the definition for a CDC-defined X.25 terminal device:

**DT**

### DT Parameter

The DT parameter specifies the device type being defined. You can declare either a CDC-defined device type or a site-defined device type.

**When you declare the DT parameter, the following values are valid:**

- **AP** - Identifies an interhost application-to-application connection.
- **DT12** - Identifies a site-defined device with no predefined characteristics, using the device type number 12 within NAM.

If you omit the DT parameter, AP is used for STIP=XAA.

### BUFFERING OF DATA

It is desirable to maintain double buffering of data for each connection in the network. By using double buffering data will always be available to be sent over the communications line. Setting the ABL parameter to 2 and the DBL parameter to 1 will generally result in double buffering.

```
device: TERMD,STIP=stiptyp,CSET=charset,NCIR=nmcir,NEN=encir,DT=devtyp3.
```

**device** - The element name of the connection being defined. This name can be one through five characters long. The first character must be a letter; the other characters can be letters or digits. This name concatenated with the virtual circuit number is used by the host or NPU operator to monitor and control the connection. This name is required; there is no default value.

All other parameters are described in the text.

*Figure 5-6. TERMDEV Statement Format for Application Programs Using Communication Lines of TIPTYPE=X25*

```
device: DEVICE,DT=devtyp3.
```

**device** - The element name of the connection being defined. This name can be one through five characters long. The first character must be a letter; the other characters can be letters or digits. This name concatenated with the virtual circuit number is used by the host or NPU operator to monitor and control the connection. This name is required; there is no default value.

All other parameters are described in the text.

*Figure 5-7. DEVICE Statement Format for Application Programs Using Communication Lines of TIPTYPE=X25*
CCP buffer usage is optimized when downline block size follows the following relationship:

\[ DBZ = 113 + n \times 118. \]

where \( n \) is an integer and \( n + 1 \) is the number of buffers required in CCP to hold the block. This relationship is of most use for application programs that can control the size of the downline blocks they send to the network. Since it is necessary for a block to contain an integral number of logical lines, the lower bound of DBZ should not be smaller than the largest allowable PW for a device.

Default values for the ABL, DBL, and DBZ parameters are listed in table 5-2.

<table>
<thead>
<tr>
<th>Line Speed</th>
<th>ABL</th>
<th>DBL</th>
<th>DBZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>1</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>300</td>
<td>1</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>600</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>1200</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>2400</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>4800</td>
<td>2</td>
<td>1</td>
<td>460</td>
</tr>
<tr>
<td>9600</td>
<td>2</td>
<td>1</td>
<td>940</td>
</tr>
</tbody>
</table>
The parameters required and the values allowed on the GROUP, LINE, TERMINAL, TERMDEV, and DEVICE statements depend upon the line protocol used. This section describes the form of a statement applicable to synchronous protocol lines.

Synchronous communication lines are those using the line types defined in Table 6-1. Such lines are serviced by the CDC-supplied MODE4, HASP, BSC, or 3270 TIPs. If you use the site-defined line type, one of these TIPs is presumed to be modified by your site (if necessary) to support either a standard communication line adapter or a specially built communication line adapter.

### LINE DEFINITION

You configure terminals on a synchronous communication line by using the following statements:

One LINE or GROUP statement that defines the line.

One TERMINAL or TERMDEV statement for each potential terminal on the line (more than one mode 4C protocol terminal can access the line at a given time; multiple-drop synchronous lines of this type are supported).

One DEVICE statement for each device that accesses the line through a terminal; if you use a TERMDEV statement, you cannot use DEVICE statements for the same terminal.

### LINE STATEMENT PARAMETERS

Each LINE statement defines one communication line between a terminal and the NPU. There must be one LINE statement for each CLA port on the NPU that supports terminal access.

Figure 6-1 shows the format of the LINE statement and the valid parameter values for CDC-defined synchronous lines. Table 6-1 shows permitted line type values for the LTYPE parameter.

### Table 6-1. Synchronous Line Type Definitions

<table>
<thead>
<tr>
<th>LTYPE Value</th>
<th>Transmission Mode</th>
<th>Transmission Operation</th>
<th>Circuit Type</th>
<th>Modem Type†</th>
<th>CLA Type</th>
<th>Maximum Speed, Bits per Second</th>
<th>Carrier Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>Synchronous</td>
<td>Half-duplex</td>
<td>Switched</td>
<td>RS232C, Bell 201A/208B compatible</td>
<td>2560-1</td>
<td>4800</td>
<td>Controlled</td>
</tr>
<tr>
<td>S2</td>
<td>Synchronous</td>
<td>Full-duplex but operating half-duplex</td>
<td>Dedicated (Hard-wired)</td>
<td>RS232C, Bell 201B/208A compatible</td>
<td>2560-1</td>
<td>19200</td>
<td>Controlled</td>
</tr>
<tr>
<td>S3</td>
<td>Synchronous</td>
<td>Full-duplex</td>
<td>Dedicated (Hard-wired)</td>
<td>RS232C, Bell 201B/208A compatible Bell 301/303 compatible V.35 Standard compatible</td>
<td>2560-2</td>
<td>50000 (HASP only)</td>
<td>Constant</td>
</tr>
<tr>
<td>S4</td>
<td>Synchronous</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>2560-3</td>
<td>56000 (HASP (only)</td>
<td></td>
</tr>
</tbody>
</table>

†Modem types supported by each type of CLA may differ.
Line:  LINE, PORT=port, LTYPE=ltype, TIPTYPE=tiptype, AUTO=yn1, DI=yn2, AL=acclev, IMDISC=yn3, [RC=yn4], P90=fv90, ..., P99=fv99].

Line  The element name to be assigned to the communication line being defined. This name is required; there is no default value.

Port  The hexadecimal number (1 ≤ port ≤ FE) of the port to which this communication line connects on the NPU currently being defined. Within an NDL program, the port number is independent of the number of ports on the NPU; for example, a 128-port NPU can have a port numbered FE (254 decimal). However, we strongly recommend that you assign port numbers consecutively, starting with 1. All values declared for PORT parameters must be unique within the current network definition of each NPU. The value specified for port cannot be the same as the number declared for a port in any other LINE or TRUNK statement (or within a GROUP statement expansion) for this NPU, and cannot be lower than the highest port number used by a trunk. This number is required; there is no default value.

LType  A reserved word value that identifies the type of communication line adapter/modem/circuit combination that is used on this line. This word must be supplied; there is no default value. The legal words for this value declaration are described in Table 6-1.

Tiptype  A reserved word value that identifies the type of CCP Terminal Interface Program protocol required for the terminals on this line. This word is optional for lines being configured for automatic recognition of a synchronous protocol terminal; otherwise it must be supplied (there is no default value). The legal words for this value declaration are:

- BSC 2780/3780 binary synchronous protocol TIP is required.
- HASP HASP multileaving workstation binary synchronous protocol TIP is required.
- MODE4 Control Data mode 4 protocol TIP is required.
- 3270 3270 binary synchronous protocol TIP is required.

Yn1  An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of protocol and subTiptype by CCP whenever a terminal is connected to the line. When AUTO or AUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, CCP attempts to determine as many addressing parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO is omitted or AUTO=NO is specified, CCP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal. AUTO cannot be specified for lines with Tiptype=3270.

Yn2  An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this communication line at network initiation. When DI or DI=YES is specified, the line is disabled at network initiation and cannot be used until the HOP or NOP enables it. If DI is omitted or DI=NO is specified, the line is given an initial status of enabled unless the NOP or HOP specifies otherwise.

Acclev  The decimal access level limit (0 ≤ acclev ≤ 7) for the line. The lowest access level is 0 (unclassified), the highest is 7. If AL is omitted or AL=None is specified, no access level limit is associated with the line (equivalent to specifying AL=0).

Yn3  An optional reserved word value (YES or NO) which specifies whether the Immediate Disconnect feature is enabled for this line. When IMDISC or IMDISC=YES is specified, any terminal on the line is disconnected immediately after the terminal has logged out (disconnected) from the host. When IMDISC is omitted or IMDISC=NO is specified, a terminal on the line is disconnected only after a two minute timer expires.

Yn4  An optional reserved word value (YES or NO) which specifies whether the reconfiguration indicator is enabled for this line. When RC or RC=YES is specified, the terminal characteristics are reset to their original NDL values (or to a default if no NDL values were specified) when the terminal disconnects from a host. When RC is omitted or RC=NO is specified, the reconfiguration indicator is not enabled for this line.

Fv9i  The hexadecimal field value (0 ≤ fv9i ≤ FF) to use for the corresponding field number within the Terminal Interface Program Configuration information transmitted for this line. The released version of the CDC-written MODE4, HASP, BSC, and 3270 TIPs do not use any of these ten field number/field value pairs.

Figure 6-1. Synchronous LINE Statement Format
You use the AUTO parameter to define a communication line as having a fixed or an automatic recognition configuration. You can use either of these configuration types for a switchable (dialup) line or for a dedicated (hardwired) line.

Auto-recognition of 3270 terminals is not performed. For this reason, dial-up 3270 terminals must dial into synchronous ports that support only 3270s. The LINE definition for a 3270 terminal must include all cluster and terminal addresses that can connect to the port.

If you define a fixed-configuration line by omitting AUTO or specifying AUTO=NO, you must know and include all cluster and terminal addresses that must dial into synchronous ports that support only performed. For this reason, dial-up 3270 terminals.

A u t o - r e c o g n i t i o n o f 3 2 7 0 t e r m i n a l s i s n o t for a dedicated (hardwired) line.

Fi g u r a t i o n t y p e s f o r a s w i t c h a b l e ( d i a l u p ) l i n e o r c o n fi g u r a t i o n . Yo u c a n u s e e i t h e r o f t h e s e c o n d line as having a fixed or an automatic recognition configuration.

The characteristics of a fixed-configuration line are:

**CCP Terminal Interface Program type**

.LINE statement TIPTYPE parameter

- **SubTIPType** (TERMD or TERMDEV statement STIP parameter)
- **Cluster addresses** (TERMD or TERMDEV statement CA parameter; required for mode 4 and 3270 protocol lines only). Hardwired fixed-configuration lines can support multiple mode 4 terminals
- **Code and character set** (TERMD or TERMDEV statement CSET parameter)
- **Terminal address** (TERMD or DEVICE statement TA parameter; required for mode 4, BSC, and 3270 protocol lines only)
- **Device stream number** (DEVICE statement STREAM parameter; required for HASP protocol lines only)
- **Device type** (TERMD or DEVICE statement DT parameter)
- **Number of devices** (implied from number of TERMD or DEVICE statements)

If you define an automatic recognition line by specifying AUTO or AUTO=YES, CCP determines these characteristics when a terminal becomes active on the line. This allows more flexible access to the network.

For mode 4 protocol terminals, CCP determines the automatic recognition information from the first codes it receives when the terminal becomes active. For HASP terminals, CCP requires one of the following:

The protocol signon block must contain a /*CONFIG card image with the same configuration ordinal and device number information as the definition you create for that terminal.

A /*CONFIG card image must be the first input from the terminal. This card must contain the same configuration ordinal and device number information as the definition you create for that terminal.

For bisynchronous terminals, CCP requires that a /*CONFIG card image be the first input from the terminal. This card must contain the same configuration ordinal and device number information as the definition you create for that terminal.

A terminal on an automatic recognition line is not completely configured until it becomes active. At that time, the Communications Supervisor (CS) compares the determined characteristics against the characteristics you have defined for each terminal configured on the line. CS uses the first terminal definition that matches to finish configuring the terminal. CCP then services the terminal devices according to the finished configuration.

Only a terminal that completely matches all declared values can use the line. It must operate with the characteristics you declare for any required or optional parameters in your terminal definition, or the terminal user must change those characteristics to match. If you declare AUTOREC instead of values for all of the automatically recognized parameters, then any terminal will match the terminal definition.

If you declare values instead of AUTOREC for some of the automatically recognized parameters, then any terminal that successfully accesses the line and has characteristics matching the declared values will match your terminal definition. If you declare values instead of AUTOREC for all of the automatically recognized parameters, then only a terminal with automatically recognized characteristics that are the same as your values will match the terminal definition.

You can specify more than one terminal definition for terminals of each protocol (each TIP type) on an automatic recognition line. Each definition should vary from the others in one of the automatically recognized characteristics; unless differences exist, CS will not use any definition other than the first one. If you specify terminals of more than one protocol, only terminals of one TIP type can access the line at the same time.

Using automatic recognition increases the number of terminals that potentially can use the line. You can configure a switchable line for automatic recognition with more logical terminals than the physical terminals that simultaneously can access it. However, only one physical HASP, mode 4A protocol, or bisynchronous terminal can access the line at a given time.

You can configure a mode 4 line for automatic recognition without specifying cluster addresses on TERMINAL statements or terminal addresses on DEVICE statements. Only one physical mode 4C protocol terminal with a given cluster address can access the line at a given time, and only one device with a given terminal address can be configured at a given time.

For example, the statement

**LN3F: LINE PORT=10,TYPE=51,AUTO,**

defines a switchable (dialup), synchronous line (on NPUF in SVLnet, figure 2-1 of section 2) for automatic recognition of any synchronous protocol terminals. The line is identified as LN3F, connects to the NPU at port 10, and is enabled by default at network initiation.
If the automatic recognition form of the statement

```
LN3F: LINE PORT=10,LTYPE=S1,TIPTYPE=MODE4,AUTO.
```

were used instead, only mode 4 terminals could use the line.

As an example of a fixed-configuration line, the statement

```
LN2E: LINE PORT=10,LTYPE=S3,TIPTYPE=HASP.
```

defines a hardwired (dedicated), enabled, synchronous line for multileaving workstation terminals, accessing the NPU (NPUE in SVLnet) through port 10.

All of the terminals capable of accessing this switchable line would have to be completely and explicitly configured on their TERMINAL and DEVICE statements. However, the characteristics of the terminal can be automatically recognized by the MODE4 TIP.

**GROUP STATEMENT PARAMETERS**

You can use the GROUP statement in place of the LINE statement when you want to repeat a line definition a specified number of times.

NDLP creates identical line, terminal, and device definitions (except for port number, line name, and device name) the number of times specified by the NI parameter. NDLP generates unique port numbers by incrementing the previously defined port number by one. NDLP generates unique line and device element names by adding the LINE's port number in two-digit hexadecimal form to the one-to five-character specified root element name.

The format of the GROUP statement is shown in figure 6-2. Table 6-1 shows permitted line type values for the LTYPE parameter.

Using the GROUP statement can reduce the number of definitions you must provide in your NDL program without reducing the number of definitions provided in the network configuration file. An example of GROUP statement use is shown in figure 6-3.

You use the AUTO parameter to define a communication line as having a fixed or an automatic recognition configuration. You can use either of these configuration types for a dialup line or for a dedicated (hardwired) line.

Auto-recognition of 3270 terminals is not performed. For this reason, dial-up 3270 terminals must dial into synchronous ports that support only 3270s. The line definition for a 3270 terminal must include all cluster and terminal addresses that can connect to the port.

If you define a fixed-configuration line by omitting AUTO or specifying AUTO=NO, you must know and specify certain characteristics of the terminals and devices that will use it. Only terminals and devices with the specified characteristics can use that line.

The characteristics of a fixed-configuration line depend on the communication protocol used by the line. These characteristics are:

- CCP Terminal Interface Program type (GROUP statement TIPTYPE parameter)
- SubTIPtype (TERMDREV or TERMDEV statement STIP parameter)

---

table: | Group | Port | Ltype | Tiptype |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP</td>
<td>PORT=port,LTYPE=type,TIPTYPE=tiptype,AUTO=yn13,DI=y23,AL=acclev,INDISC=yn33,</td>
<td>port</td>
<td>Ltype</td>
</tr>
<tr>
<td></td>
<td>[RC=yn43,P90=fv90,...,P99=fv99,NI=iter,</td>
<td></td>
<td>A reserved word value that identifies the type of communication line adapter/modem/circuit combination that is used on this line. This word must be supplied; there is no default value.</td>
</tr>
<tr>
<td></td>
<td>RC=yn43,P90=fv90,...,P99=fv99,NI=iter,</td>
<td></td>
<td>The legal words for this value declaration are described in table 6-1.</td>
</tr>
<tr>
<td></td>
<td>]</td>
<td></td>
<td>BSC Binary synchronous protocol TIP is required.</td>
</tr>
<tr>
<td>Parameter</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>yn1</strong></td>
<td>An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of protocol and subTIPtype by CCP whenever a terminal is connected to the line. When AUTO or AUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, CCP attempts to determine as many addressing parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO is omitted or AUTO=NO is specified, CCP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal. AUTO cannot be specified for lines with TIPTYPE=3270.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>yn2</strong></td>
<td>An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this communication line at network initiation. When DI or DI=YES is specified, the line is disabled at network initiation and cannot be used until the HOP or NOP enables it. If DI is omitted or DI=NO is specified, the line is given an initial status of enabled unless the NOP or HOP specifies otherwise.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>accelev</strong></td>
<td>The decimal access level limit ((0 \leq \text{accelev} \leq 7)) for the line. The lowest access level is 0 (unclassified), the highest is 7. If AL is omitted or AL=NONE is specified, no access level limit is associated with the line (equivalent to specifying AL=0).</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>yn3</strong></td>
<td>An optional reserved word value (YES or NO) which specifies whether the Immediate Disconnect feature is enabled for this line. When IMDISC or IMDISC=YES is specified, any terminal on the line is disconnected immediately after the terminal has logged out (disconnected) from the host. When IMDISC is omitted or IMDISC=NO is specified, a terminal on the line is disconnected only after a two minute timer expires.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>yn4</strong></td>
<td>An optional reserved word value (YES or NO) which specifies whether the reconfiguration indicator is enabled for this line. When RC or RC=YES is specified, the terminal characteristics are reset to their original NDL values (or to a default if no NDL values were specified) when the terminal disconnects from a host. When RC is omitted or RC=NO is specified, the reconfiguration indicator is not enabled for this line.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>fv9i</strong></td>
<td>The hexadecimal field value ((0 \leq \text{fv9i} \leq \text{FF})) to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this line. The released version of the CDC-written MODE4, HASP, BSC, and 3270 TIPs do not use any of these ten field number/field value pairs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>iter</strong></td>
<td>The decimal number ((1 \leq \text{iter} \leq 254)) of iterations of this line definition and of all TERMINAL, TERMDEV, or DEVICE statements following this GROUP statement. This parameter is optional; the default is 1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 6-2. Synchronous GROUP Statement Format (Sheet 2 of 2)**

Cluster addresses (TERMINAL or TERMDEV statement CA parameter; required for mode 4 and 3270 protocol lines only). Hardwired fixed-configuration lines can support multiple mode 4 terminals.

Code and character set (TERMINAL or TERMDEV statement CSET parameter)

Terminal address (TERMDEV or DEVICE statement TA parameter; required for mode 4, BSC, and 3270 protocol lines only)

Device stream number (DEVICE statement STREAM parameter; required for HASP protocol lines only)

Device type (TERMDEV or DEVICE statement DT parameter)

Number of devices (implied from number of TERMDEV or DEVICE statements)

If you define an automatic recognition line by specifying AUTO or AUTO=YES, CCP determines these characteristics when a terminal becomes active on the line. This allows more flexible access to the network.

For mode 4 protocol terminals, CCP determines the automatic recognition information from the first codes it receives when the terminal becomes active. For HASP terminals, CCP requires one of the following:

The protocol signon block must contain a /*CONFIG card image with the same configuration ordinal and device number information as the definition you create for that terminal.

A /*CONFIG card image must be the first input from the terminal. This card must contain the same configuration ordinal and device number information as the definition you create for that terminal.

For bisynchronous terminals, CCP requires that a /*CONFIG card image be the first input from the terminal. This card must contain the same configuration ordinal and device number information as the definition you create for that terminal.

A terminal on an automatic recognition line is not completely configured until it becomes active. At that time, the Communications Supervisor (CS) compares the determined characteristics against the
The following set of statements:

```
LN3F: GROUP, PORT=OA, LTYPE=S2,
    TIPTYPE=MODE4, NI=2.
TERMINAL, STIP=M4A, TC=200UT, CA=70.
DEV: DEVICE, DT=CON, TA=60.
DEV: DEVICE, DT=L, TA=60.
DEV: DEVICE, DT=CR, TA=60.
```

is interpreted by the NDL processor as if it had been written:

```
LN3FOA: LINE, PORT=OA, LTYPE=S2,
    TIPTYPE=MODE4.
TERMINAL, STIP=M4A, TC=200UT, CA=70.
DEV: DEVICE, DT=CON, TA=60.
DEV: DEVICE, DT=L, TA=60.
DEV: DEVICE, DT=CR, TA=60.
LN3FOB: LINE, PORT=OB, LTYPE=S2,
    TIPTYPE=MODE4.
TERMINAL, STIP=M4A, TC=200UT, CA=70.
DEV: DEVICE, DT=CON, TA=60.
DEV: DEVICE, DT=L, TA=60.
DEV: DEVICE, DT=CR, TA=60.
```

Figure 6-3. Synchronous GROUP Statement Expansion

characteristics you have defined for each terminal configured on the line. CS uses the first terminal definition that matches to finish configuring the terminal. CCP then services the terminal devices according to the finished configuration.

Only a terminal that completely matches all declared values can use the line. It must operate with the characteristics you declare for any required or optional parameters in your terminal definition, or the terminal user must change the characteristics to match. If you declare AUTOREC instead of values for all of the automatically recognized parameters, then any terminal will match the terminal definition.

If you declare values instead of AUTOREC for some of the automatically recognized parameters, then any terminal that successfully accesses the line and has characteristics matching the declared values will match your terminal definition. If you declare values instead of AUTOREC for all of the automatically recognized parameters, then only a terminal with automatically recognized characteristics that are the same as your values will match the terminal definition.

You can specify more than one terminal definition for terminals of each protocol (each TIP type) on an automatic recognition line. Each definition should vary from the others in one of the automatically recognized characteristics; unless differences exist, CS will not use any definition other than the first one. If you specify terminals of more than one protocol, only terminals of one TIP type can access the line at the same time.

Using automatic recognition increases the number of terminals that potentially can use the line. You can configure a switchable line for automatic recognition with more logical terminals than the physical terminals that simultaneously can access it. However, only one physical HASP, mode 4A protocol, or bisynchronous terminal can access the line at a given time.

You can configure a mode 4 line for automatic recognition without specifying cluster addresses on TERMINAL statements or terminal addresses on DEVICE statements. Only one physical mode 4C protocol terminal with a given cluster address can access the line at a given time, and only one device with a given terminal address can be configured at a given time.

For example, the statement

```
LN3F: GROUP, PORT=OA, LTYPE=S1, AUTO, NI=2.
```

defines two switchable (dialup) synchronous lines (not shown in figure 2-1 of section 2) for automatic recognition of synchronous protocol terminals. The lines are identified as LN3FOA and LN3FOB, connect to the NPU at ports OA and OB, and are enabled by default at network initiation.

If the automatic recognition form of the statement

```
LN3F: GROUP, PORT=OA, LTYPE=S1, TIPTYPE=MODE4, AUTO, NI=2.
```

were used instead, only mode 4 terminals could use the lines.

As an example of a fixed-configuration line pair, the statement

```
LN2E: GROUP, PORT=OA, LTYPE=S3, TIPTYPE=HASP, NI=2.
```

defines two hardwired (dedicated), enabled, synchronous lines for multileaving workstation terminals, accessing the NPU through ports OA and OB.

All of the terminals capable of accessing these switchable lines would have to be completely and explicitly configured on the TERMINAL and DEVICE statements following the GROUP statement. However, the characteristics of the terminal can be automatically recognized by the MODE4 TIP.

**MODE 4 TERMINAL DEFINITIONS**

On a mode 4 communication line, a terminal definition is different from a device definition. A mode 4 terminal consists of one or more devices; terminal and device are not synonymous. Within the network, a mode 4 terminal is a cluster controller; this is synonymous with a mode 4A site (equipment controller) or with a mode 4G station.

If you defined the communication line as a fixed definition line, you can declare up to 16 TERMINAL or TERMINDEV statements for the line (if it is a multiple-drop mode 4 line). If you defined the
line as an automatic recognition line, you can declare up to 255 TERMINAL or TERMDEV statements for the line. Only one can be connected at a time.

You must provide one TERMINAL or TERMDEV statement for each terminal that can access the communication line simultaneously. Figures 6-4 and 6-5 present the formats of these statements for terminals on mode 4 protocol synchronous lines.

**TERMINAL**

```
[STIP=stiptyp, TC=trmclas,]
[ CSET=charset, CA=clsadr,]
[ RIC=yn1, EOFF=yn2].
```

Parameters are described in the text.

---

For console devices:

```
device: TERMINDEV[,STIP=stiptyp,TC=trmclas,CSET=charset,CA=clsadr,RIC=yn1,DT=CON,]
[TA=taddr, ABL=abl, DBZ=downsize, UZ=upsize, DBL=downlim, UBL=upblim, XBZ=xmitsize,]
[AUTOCON=yn2], PRIC=yn3, DIC=yn4, HN=node, HDC=yn5, LK=yn6, B1=b1, EL0=elo, B2=b2, CN=cn,]
[CT=ct, PG=pg, PL=pl, PW=pw, EOFF=yn7, P90=fv90, ..., P99=fv99].
```

For site-defined devices:

```
device: TERMINDEV[,STIP=stiptyp, TC=trmclas, CSET=charset, CA=clsadr, RIC=yn1, JDT=DT12[,,]
[SMDT=sudt, TA=taddr, ABL=abl, DBZ=downsize, UZ=upsize, DBL=downlim, UBL=upblim, XBZ=xmitsize,]
[XBZ=xmitsize, DO=devord, AUTOCON=yn2], PRIC=yn3, DIC=yn4, HN=node, HDC=yn5, LK=yn6,]
[B1=b1, B2=b2, CN=cn, CT=ct, PG=pg, PL=pl, PW=pw, EOFF=yn7, P90=fv90, ..., P99=fv99].
```

---

**STIP PARAMETER**

The STIP parameter specifies the subcategory of the TIP type (the subTIPtype) required to support the terminal definition. This parameter is optional if the TC parameter specifies a CDC-defined terminal class. If STIP is omitted, the TC parameter must be specified and cannot be CCP or TC28 through TC31.

When you declare a value for STIP, it must be one of the following reserved words:

- **AUTOREC** Indicates that CCP should use the subTIPtype appropriate for the terminal class (valid only if TC is specified); using this value is equivalent to omitting the parameter.
- **M4A** Identifies a synchronous terminal that uses the mode 4A protocol variant.
- **M4C** Identifies a synchronous terminal that uses the mode 4C protocol variant.

If you use the AUTOREC value or omit the STIP parameter, the default is selected according to the terminal class declared. The defaults are:

<table>
<thead>
<tr>
<th>TC</th>
<th>STIP</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>200UT</td>
<td>M4A</td>
<td>734</td>
</tr>
<tr>
<td>711</td>
<td>M4C</td>
<td>714</td>
</tr>
<tr>
<td>714</td>
<td>M4C</td>
<td>714X</td>
</tr>
</tbody>
</table>

---

device The element name of the terminal device being defined. This name can be one through seven characters long. The first character must be a letter, the other characters can be letters or digits. If this statement is used within the set following a GROUP statement, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

---

Figure 6-4. TERMINAL Statement Format for Communication Lines of TIPTYPE=MODE4

6-7
TC PARAMETER

The TC parameter specifies the terminal class appropriate for terminal connections. Supported terminals are grouped into terminal classes, according to their hardware characteristics.

Each CDC-defined terminal class has the default characteristics associated with an archetype terminal. Each CDC-defined terminal class has a range of possible characteristics. These ranges determine the values allowed for parameters you specify on the TERMINAL or TERMDEV statements.

Because the network cannot recognize differences among some terminal classes, a default terminal class exists for each subcategory of the TIP type (the subTIPtype, defined by the STIP parameter of the TERMINAL or TERMDEV statement). These defaults can be used when you declare a STIP parameter.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes, with the following exceptions: you can use TC28, TC29, TC30, and TC31 to identify site-defined terminal classes with no default characteristics, corresponding to reserved Network Access Method (NAM) terminal class numbers.

Because the characteristics of terminals in site-defined classes are unknown, TERMINAL, TERMDEV, or DEVICE statement parameter value ranges are checked against those valid for the STIP value specified. Any value declared for a terminal or device parameter is valid if the parameter and value conform to requirements for that STIP value.

The TC parameter is optional unless the STIP parameter is omitted. If TC is specified as CCP or as TC 28 through TC31, the STIP parameter must be specified. If TC is omitted, the STIP parameter must be specified. If STIP is omitted, the TC parameter must be specified and cannot have the value CCP or TC28 through TC31.

If the STIP value of M4A is declared or used, the following reserved words are valid values for the TC parameter:

<table>
<thead>
<tr>
<th>Value</th>
<th>Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCP</td>
<td>Identifies a terminal with the NAM internal terminal class number of 31.</td>
</tr>
<tr>
<td>M4A</td>
<td>Identifies a terminal compatible with the CDC 200 User Terminal.</td>
</tr>
<tr>
<td>M4C</td>
<td>Identifies a terminal compatible with the CDC 714-10/20 series terminal.</td>
</tr>
</tbody>
</table>

If the STIP value of M4C is declared or used, the following reserved words are valid values for the TC parameter:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC28</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 28.</td>
</tr>
<tr>
<td>TC29</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 29.</td>
</tr>
<tr>
<td>TC30</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 30.</td>
</tr>
<tr>
<td>TC31</td>
<td>Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 31.</td>
</tr>
</tbody>
</table>

CA PARAMETER

The CA parameter specifies the hardware cluster address for all the devices accessing the line through one terminal. When the line is configured for automatic recognition of terminals, this parameter is optional; otherwise it is required.

When you define terminals on a fixed-configuration line, you must specify a unique value of the CA parameter for each terminal that can use the line. There is no default value for a cluster address.

If you supply this parameter for an automatic recognition line, the value need not be unique for each terminal defined on the line but must be unique for each terminal that simultaneously accesses the line. The network software performs an additional match while identifying the terminal in the configuration file; any terminal accessing the line must use a cluster address you specify or it cannot use the network.
The CA parameter can have the following values:

**AUTOREC**

Indicates that CCP should determine the cluster address during automatic recognition of the terminal (valid only if the AUTO parameter is used in the corresponding LINE or GROUP statement); using this value is equivalent to omitting the parameter.

70 thru 7F

Indicates the hexadecimal cluster address of the terminal you are defining.

If you specify the value of AUTOREC, terminals with any cluster address valid for mode 4 terminals can access the network.

**CSET PARAMETER**

The CSET parameter specifies the code set of the terminal and character set of its console. This parameter is optional.

When you declare a value for CSET, it must be one of the following reserved words. For terminals in classes 200UT, 734, and TC28 through TC31, it can be:

- **ASCII** ASCII code set. Some mode 4A terminals have selectable code sets but a fixed console character set; the character set can be ASCII or the CDC External BCD set.
- **AUTOREC** Indicates that CCP should use the code and character set appropriate for the terminal class or determined by automatic recognition; using this value is equivalent to omitting the parameter.
- **BCD** CDC External BCD code set. Some mode 4A terminals have selectable code sets but a fixed console character set; the character set can be ASCII or the CDC External BCD set.
- **CSET15** Site-defined code and character set, identified within the network software as character set number 15.

For terminals in classes 711, 714, and 714X, the CSET value can be:

- **ASCII** ASCII code and character set.
- **AUTOREC** Indicates that CCP should use the code and character set appropriate for the terminal class or determined by automatic recognition; using this value is equivalent to omitting the parameter.
- **CSET15** Site-defined code and character set, identified within the network software as character set number 15.

Once established, the default cannot be changed.

**EOF PARAMETER**

The EOF parameter indicates whether the MODE 4 TIP sends an end-of-file indicator to line printer devices to mark the position in the data where an end-of-file was read from disk. The end-of-file indicator is an ESC V sequence.

Possible values for this parameter are:

- **NO** Indicates that an end-of-file indicator is not sent by the MODE 4 TIP to line printer devices.
- **YES** Indicates that an end-of-file indicator is sent by the MODE 4 TIP to line printer devices.

If you omit the EOF parameter, the default value of NO is used.

**RIC PARAMETER**

The RIC parameter indicates whether the terminal has restricted interactive capabilities. This parameter is optional.

A terminal can have restricted interactive capabilities for many reasons; for example, perhaps no console device actually exists and interactive dialog must occur through a pair of batch devices.

The effect this parameter has depends on the application program the terminal uses. For example, RBF does not output the READY prompt and does not require a GO command to enable any defined passive devices when RIC is specified.

Possible values for this parameter are:

- **NO** Indicates that the terminal has full interactive capabilities.
- **YES** Indicates that the terminal has limited interactive capabilities.

If you omit the RIC parameter, the default value of NO is used.

**MODE 4 DEVICE DEFINITIONS**

On a mode 4 communication line, a device definition is different from a terminal definition. A mode 4 terminal consists of one or more devices; terminal and device are not synonymous. Within the network, a mode 4 device is synonymous with a mode 4A station or with a mode 4C device.
You must provide one TERMDEV or DEVICE statement for each device that accesses the communication line through the terminal you are defining. If you use a TERMDEV statement, you cannot use a DEVICE statement for the same terminal. Figures 6-5 and 6-6 present the formats of these statements for devices on mode 4 protocol synchronous lines.

You can declare up to three DEVICE statements if the line uses a STIP value of N4A, or up to 15 DEVICE statements if the line uses a STIP value of N4C. Mode 4A terminals can have up to three DEVICE statements for site-defined device types, or one DEVICE statement for each of the following CDC-defined device types:

- Card reader
- Console
- Line printer

Mode 4C terminals can have up to 15 DEVICE statements for site-defined device types, or up to 15 DEVICE statements for CDC-defined console devices, or up to seven DEVICE statements for CDC-defined line printer devices.

The following TERMDEV and DEVICE parameters provide device definition for the terminal:

- ABL
- DO
- PW
- AUTOCON
- DT
- P90 through P99
- B1
- ELO
- SDT
- B2
- HD
- TA
- CN
- HN
- UBL
- CT
- LZ
- UBZ
- DBL
- PG
- XBZ
- DBZ
- PL
- DI
- PRI

The DT parameter is described first because it affects the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

For console devices:

device: DEVICE, DT=CON, TA=trmaddr, ABL=abl, DBZ=dwnlsiz, UBL=upbsize, DBL=dwnblim,

[D=upblim, XBZ=amtitsiz, AUTOCON [=yn1], PRI [=yn2], DI [=yn3], HN=node, HD [=yn4], LK=yn5,]
[B1=b1, B2=b2, CN=cn, CT=ct, ELO=elo, PG=pg, PL=pl, PW=pw,]
[P90=fv90, ..., P99=fv99].

For card readers:

device: DEVICE, DT=CRC, TA=trmaddr, DBZ=dwnlsiz, UBL=upbsize, DBL=dwnblim,

[UBL=upblim, XBZ=amtitsiz, AUTOCON [=yn1], PRI [=yn2], DI [=yn3], HN=node, HD [=yn4], LK=yn5,]
[B1=b1, B2=b2, CN=cn, CT=ct, ELO=elo, PG=pg, PL=pl, PW=pw,]
[P90=fv90, ..., P99=fv99].

For line printers:

device: DEVICE, DT=LPC, SDT=subdt, TA=trmaddr, DBZ=dwnlsiz, DBL=dwnblim, UBL=upblim,

[UBL=upblim, XBZ=amtitsiz, DO=devord, PRI [=yn1], DI [=yn2], PW=pw, PL=pl, P90=fv90, ..., P99=fv99].

For site-defined devices:

device: DEVICE, DT=DT12F, SDT=subdt, TA=trmaddr, ABL=abl, DBZ=dwnlsiz, UBL=upbsize,

[UBL=upblim, XBZ=amtitsiz, DO=devord, AUTOCON [=yn1],]
[UBL=upblim, XBZ=amtitsiz, B1=devord, AUTOCON [=yn1],]
[UBL=upblim, XBZ=amtitsiz, PRI [=yn3], HN=node, HD [=yn4], LK=yn5, B1=b1, B2=b2, CN=cn, CT=ct, PG=pg,]
[PL=pl, PW=pw, P90=fv90, ..., P99=fv99].

device

The element name of the terminal device being defined. This name can be 1 through 7 characters long; the first character must be a letter, the other characters can be letters or digits. If this statement is used within the set following a GROUP statement, the device name cannot be longer than 5 characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

Figure 6-6. DEVICE Statement Format for Communication Lines of TIPTYPE=MODE4
DT PARAMETER

The DT parameter specifies the device type being defined. You can declare either a CDC-defined device type or a site-defined device type.

If you specify a CDC-defined device type, the other device definition parameters on the DEVICE or TERMDEV statement:

- Are required by the NDL processor where indicated in the text
- Have the predefined default shown in the text
- Have the predefined ranges shown in the text
- Are checked for uniqueness and compatibility

If you specify a site-defined device type, the other device definition parameters on the DEVICE statement:

- Are not required by the NDL processor
- Have no predefined default
- Are not checked for uniqueness
- Are not checked for compatibility with other parameters on the same statement

When you specify the DT parameter, the following values are valid:

- CON Identifies a CDC-defined console device.
- CR Identifies a CDC-defined card reader device.
- LP Identifies a CDC-defined line printer device.
- DT12 Identifies a site-defined device with no predefined characteristics, using the device type number 12 within NAM.

If you omit the DT parameter, the value of CON is used.

ABL PARAMETER

The application block limit (ABL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between an application program and this terminal. The value you choose should keep the terminal busy for 2 seconds by maintaining that number of outstanding blocks of the size specified by the DBZ parameter.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). The ABL parameter has the following range of values:

\[ 1 \leq abl \leq 7 \]

The value you declare should be greater than or equal to the downline block limit (DBL parameter value) of the terminal. Maximum line usage can be obtained by setting both DBZ and DBL so that 1 second of data is queued by CCP.

For console devices (DT of CON), the host queues abl - dbl blocks; the NPU queues dbl blocks. An ABL value significantly larger than the DBL value causes NAM to use more host memory but can reduce the number of times an application program is rolled out.

The default value for this parameter is 2 (DT of CON only).

AUTOCON PARAMETER

The AUTOCON parameter is a stand-alone keyword that determines whether CCP should automatically connect the console device and any associated batch devices to the selected host node. This parameter is valid only for console devices.

If all logical links terminating in the NPU being defined are to the same host (all HNAME values are equal), and the NDL processor provides a default host node, then the NDL processor also sets AUTOCON unless AUTOCON=NO is specified.

This parameter and its values are optional. You can specify either of the following values:

- NO Indicates that CCP should not attempt automatic connection.
- YES Indicates that CCP should attempt automatic connection.

If you omit the AUTOCON parameter, the default value of NO is used for a DT of CON. If you specify this parameter without a value, the value of YES is used.

B1 PARAMETER

The B1 parameter specifies the character to be used as a user break 1 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 1 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 1 message as a job step interrupt from the terminal user.
This parameter is optional; it is allowed only for devices of DT-CON or DT-DE12. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:
- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or OD (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

Any value that you declare or use by default for the Bl, CN, or CT parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the Bl parameter or specify the value CCP, the default value is used (DT of CON only).

The default value depends on the value declared or used for the STIP parameter. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>Bl Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A</td>
<td>3A</td>
<td></td>
</tr>
<tr>
<td>M4C</td>
<td>3A</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>B2 Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>M4C</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

B2 PARAMETER

The B2 parameter specifies the character to be used as a user break 2 indicator. When the terminal user enters this character as the only character on a line, CCF discards the block of data being transmitted to the terminal and sends a user break 2 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 2 message as a job step termination from the terminal user.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:
- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or OD (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the B2 parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the STIP parameter. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>B2 Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>M4C</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

CN PARAMETER

The CN parameter specifies the character to be used to abort (cancel) an input message. When the terminal user enters this character as the last character on a line, the network software discards the last message transmitted from the terminal.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:
- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or OD (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)
Any value that you declare or use by default for the Bl, B2, or CT parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CN parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the STIP parameter. The defaults are:

<table>
<thead>
<tr>
<th>STIP</th>
<th>CN</th>
<th>ASCII</th>
<th>Value</th>
<th>Value Used</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>M4C</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

CT PARAMETER

The CT parameter specifies the character to be used as a flag for a terminal definition command. When the terminal user enters this character as the first character on a line, CCP interprets the line as a command. Among other functions, CCP supports terminal definition commands to determine or change the values you have established for the following parameters:

<table>
<thead>
<tr>
<th>B1</th>
<th>CT</th>
<th>FL</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>HN</td>
<td>PW</td>
</tr>
<tr>
<td>CN</td>
<td>PG</td>
<td>TC</td>
</tr>
</tbody>
</table>

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or OD (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

Any value that you declare or use by default for the Bl, B2, or CN parameters

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CT parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the STIP parameter. The defaults are:

<table>
<thead>
<tr>
<th>STIP</th>
<th>CT</th>
<th>ASCII</th>
<th>Value</th>
<th>Value Used</th>
<th>Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>M4C</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

DBL PARAMETER

The downline block limit (DBL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between the host computer and this terminal. The value you choose determines how many blocks of data the NPU queues from the total number of outstanding blocks (ABL parameter value) of the size specified by the DBZ parameter.

This parameter is optional. The DBL parameter has the following value range:

\[ 1 \leq \text{dbl} \leq 7 \]

The value you declare should be less than or equal to the application block limit (ABL parameter value) of the terminal. Maximum line usage can be obtained by setting both DBZ and DBL so that 1 second of data is queued by CCP.

For console devices (DT of CON), the host queues abl - dbl blocks; the NPU queues dbl blocks. Small DBL values use less NPU memory but cause slower data transfers.

For batch devices, the NPU queues all downline blocks. No ABL value exists, so the DBL value alone determines the impact of block queueing on NPU and host resources. Large DBL values rapidly use up NPU memory; small DBL values may not keep the terminal busy.

If you omit the DBL parameter, a default value is used. Default values depend on the device type and the terminal class. The default values are:

<table>
<thead>
<tr>
<th>Terminal Class</th>
<th>DT Value</th>
<th>DBL Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>200UT and 734</td>
<td>CON</td>
<td>2</td>
</tr>
<tr>
<td>711, 714, 714X</td>
<td>CR</td>
<td>2</td>
</tr>
<tr>
<td>200UT and 734</td>
<td>CON</td>
<td>2</td>
</tr>
<tr>
<td>714 and 714X</td>
<td>LP</td>
<td>1</td>
</tr>
</tbody>
</table>

For terminals in classes 200UT and 734, a DBL value of 2 is recommended for printers (DT of LP) on lines that support speeds above 9600 bits per second.
**DBZ PARAMETER**

The downline block size (DBZ) parameter specifies the maximum number of character bytes each downline block can contain. The value you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host. Larger DBZ values cause fewer disk accesses by the host. This value can be used by the application programs to divide downline messages into blocks.

This parameter is optional; it is allowed for all device types except card readers (DT of CR). The DBZ parameter has the following range of values:

\[ 1 \leq \text{dbz} \leq 2043 \]

The value you declare should be chosen together with the value used for the DBL parameter. For batch devices (DT of LP), you should use a value that is a multiple of 640 characters (one physical record unit). If dbz is not a multiple of 640 for passive devices, NDL rounds the value you supply to the next even multiple, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ 1 \leq \text{dbz} \leq 640 ]</td>
<td>640</td>
</tr>
<tr>
<td>[ 641 \leq \text{dbz} \leq 1280 ]</td>
<td>1280</td>
</tr>
<tr>
<td>[ 1281 \leq \text{dbz} \leq 2043 ]</td>
<td>1920</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it adjusts the DBZ value that you specify.

If you omit the DBZ parameter, a default value is used. Default values depend on the the STIP value declared or used and the device type. The default values are:

<table>
<thead>
<tr>
<th>STIP</th>
<th>DT</th>
<th>DBZ Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A</td>
<td>CON</td>
<td>1040</td>
<td></td>
</tr>
<tr>
<td>M4A</td>
<td>LP</td>
<td>640</td>
<td></td>
</tr>
<tr>
<td>M4C</td>
<td>CON</td>
<td>1280</td>
<td></td>
</tr>
<tr>
<td>M4C</td>
<td>LP</td>
<td>640</td>
<td></td>
</tr>
</tbody>
</table>

These defaults optimize use of the default value for the DBL parameter.

**DI PARAMETER**

The DI parameter is a stand-alone keyword that specifies a device as initially enabled or disabled. An enabled device is configured and serviced as soon as the communication line becomes active. A disabled device is neither configured nor serviced when the line becomes active.

If you initially disable the device, a host or NPU operator can change the device status to enabled. This change can be made only when the line becomes active (when a call is received on a dialup line, or when communications are established on a hard-wired line).

This parameter is optional. If you specify the DI parameter, you must use one of the following values:

- **NO** Indicates that the device is initially enabled.
- **YES** Indicates that the device is initially disabled.

If you specify the DI parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

**DO PARAMETER**

The DO parameter specifies the device ordinal of the device within the terminal. This device ordinal provides a unique identifier to an application program for the device when more than one device of the same type is part of the terminal.

This parameter is allowed for line printers (DT of LP) or site-defined devices (DT of DT12) with a STIP value of M4C only. The DO parameter is optional if only one device of the same type is part of the terminal; otherwise, a unique value is required for each device you define.

If you specify this parameter, you must use a value in the range:

\[ 1 \leq \text{devord} \leq 7 \]

If you omit this parameter when it is optional, the default value of 1 is used.

**ELO PARAMETER**

The ELO parameter indicates the event that identifies an end-of-line condition (an end-of-logical line or message-forwarding signal). During input, a message is transmitted upline as soon as an end-of-line code (or message-forwarding code sequence) or an end-of-block condition is detected.

When some devices perform input, they use code sequences or events to indicate the end-of-line and end-of-block conditions. The ELO parameter allows you to set the end-of-line indicator to one of these sequences or events.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default condition appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **EB** Indicates that the current end-of-block character code or code sequence for the terminal class should be the end-of-line condition indicator. This value causes any default end-of-line codes or code sequences to be sent upline as data within a single message.
If you omit this parameter or specify the value
CCP, the end-of-line condition indicator is the
normal end-of-line sequence for the device (DT of
CON only).

The value of this parameter reverts to the default
value when the terminal class is changed from the
console or changed by the application program. The
application program or the terminal user can change
any value that you specify.

**HD PARAMETER**

The HD parameter controls whether or not the full
host availability display (HAD) is presented to the
terminal user. This parameter is optional and is
valid only for console devices.

If you specify this parameter, you must use one of
the following values:

- **NO** Indicates that the full host availa-
  bility display is not presented to the
terminal user. The terminal user
  receives only the host status message
  and the prompt message.

- **YES** Indicates that the host availability
display should be presented to the
terminal user.

If you omit this parameter and only a single host
is defined, the default value of NO is used. If
you omit this parameter and multiple hosts are
defined, the default value of YES is used.

The value of this parameter does not change when
the terminal class is changed from the console or
changed by the application program. The application
program or the terminal user can also change the
value you specify.

**HN PARAMETER**

The HN parameter identifies the node number of the
host that a console device and any associated batch
devices are to be connected to.

This parameter is optional and is valid only for
console devices. If you declare this parameter,
you must use one of the following values:

- **NONE** Indicates that no node number is specified.

  This has the same effect as not declaring
  the parameter. A value of NONE cannot be
  declared if AUTOCON is also specified and
  there are logical links to more than one
  host terminating in the NPU being defined.

  \[ 1 \leq \text{hn} \leq 255 \]

  Indicates the node number of the host that
  the console device and any associated batch
devices are to be connected to.

The value declared for the HN parameter must be the
same as the NODE value in a COUPLER statement
within the same network definition. If all the
COUPLER statements for all the logical links to the
NPU being defined have equal HNAME parameters, the
NDL processor provides a default host node. The
default host node is the last coupler specified.

If the HN parameter is not specified, the terminal
user must select a host before a connection can be
made. If the AUTOCON parameter is specified, then
the HN parameter must also be specified.

The value of this parameter does not change when
the terminal class is changed from the console.
The terminal user can change the value you specify.

**LK PARAMETER**

The LK parameter specifies whether unsolicited
messages from the NPU or host operator can appear
at the terminal. This parameter is optional; it is
allowed only for console devices and site-defined
devices (DT of CON or DT of DT12).

If you declare this parameter, you must specify one
of the following values:

- **CCP** Indicates that CCP should use the
default choice appropriate for the
  terminal class; using this value is
equivalent to omitting the parameter.

- **NO** Indicates that unsolicited messages
  should be delivered to the terminal as
  soon as received by CCP.

- **YES** Indicates that unsolicited messages
  should be discarded (locked out).

If you omit this parameter or specify the value
CCP, the default value of NO is used (DT of CON
only). The terminal user or the application
program can change any value that you specify.

**PG PARAMETER**

The PG parameter specifies whether CCP should wait
at each output page boundary for terminal user
acknowledgment before it displays the next page of
data. In certain situations, page waiting can
occur other than at page boundaries; CCP produces a
prompting message (OVER...) when this type of page
Waiting occurs. The user's response to page waiting
is entry of a line, usually empty.

CCP views a new page as beginning at the start of
each downline message. CCP calculates the length
of a page from the current values of the page width
and page length (see PW and PL Parameter descrip-
tions). If the page width is infinite (PW=0), a
page consists of one line less than the number of
logical lines specified as the page length. If the
page width is finite (PW is nonzero), a page con-
sists of one line less than the number of physical
lines specified by the page length; CCP calculates
the number of physical lines by dividing each
logical line into units less than or equal to the
page width.
This parameter is optional; it is allowed only for console devices and site-defined devices (DT of CON or DT of DT12). If you specify this parameter, you must use one of the following reserved values:

- **CCP** Indicates that CCP should use the default setting appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **NO** Indicates that page waiting should not occur.

- **YES** Indicates that page waiting should occur.

When you specify PG=YES, you should also specify a nonzero value for the PL parameter. CCP cannot perform page waiting at the boundaries of infinitely long pages (PL=0).

If you omit the PG parameter or specify a value of CCP, the default value of YES is used.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

### PL PARAMETER

The PL parameter specifies the number of physical lines per page of output for the device. If the device is configured for page waiting (PG parameter), any message containing more lines of output than the page length will be interrupted by CCP for a page waiting response from the terminal user. The interruption occurs after line pi - 1 is output.

This parameter is optional; it is allowed for console devices, remote batch line printers, and site-defined devices only (DT of CON, DT of LP, or DT of DT12). If you specify the PL parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **0** Indicates an infinite page length. An infinite page length means that no page waiting occurs.

- **8 ≤ pl ≤ 255** Indicates the number of physical lines per page.

If you omit this parameter or specify a value of CCP, a default value is used (DT of CON only). The default value depends on the terminal class. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>PL Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>200UT</td>
<td>13</td>
</tr>
<tr>
<td>734</td>
<td>13</td>
</tr>
<tr>
<td>711</td>
<td>16</td>
</tr>
<tr>
<td>714</td>
<td>16</td>
</tr>
<tr>
<td>714X</td>
<td>16</td>
</tr>
</tbody>
</table>

The NDL default value of the PL parameter for DT of LP is 64.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

### PRI PARAMETER

The PRI parameter is a stand-alone keyword that indicates whether data to or from the device is to have traffic priority over that to or from other devices in the network. Data to or from a device that does not have traffic priority is suspended to relieve network congestion before data to or from terminals with traffic priority is suspended. Interactive devices should usually be given traffic priority over batch devices.

This parameter is optional. If you specify the PRI parameter, you must use one of the following values:

- **NO** Indicates that the device should not have data traffic priority.

- **YES** Indicates that the device should have data traffic priority.

If you declare this parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

### PW PARAMETER

The PW parameter defines the number of characters per physical line of input or output for this device. This physical line length is also called the page width.

For console devices, output lines longer than pw characters are not divided but are counted as more than one line for page width calculations. If the PW value for the device is inappropriate, loss of visual fidelity can occur; the application program might divide the data into lines that are too short or too long for the screen's capacity, instead of allowing the terminal to wrap lines when needed.

This parameter is optional. If you specify the PW parameter, the value you can use depends on the device type and the terminal class. The following values are allowed for console devices and site-
defined devices (DT of CON or DT of DT12) in terminal classes 200UT, 734, 711, 714, and 714X, and for all devices in terminal classes TC28 through TC31:

**CCP**

Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.

0

Indicates that the device has an infinite page width. An infinite page width means that physical line length has no effect on output formatting.

50 \( \leq \) pw \( \leq \) 255

Indicates that the device can support physical lines no longer than the indicated value.

The following values are allowed for line printers (DT of LP) in terminal classes 200UT, 734, 714, and 714X:

**CCP**

Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.

50 \( \leq \) pw \( \leq \) 255

Indicates that the device can support physical lines no longer than the indicated value.

For line printers, pw provides RBF with an indication of the character bytes that can comprise a physical record of output (the number of characters in a printer line).

If you omit this parameter or specify the value CCP, a default value is used. The default value depends on the device type. Default values are:

<table>
<thead>
<tr>
<th>DT Value</th>
<th>PW Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>80</td>
</tr>
<tr>
<td>LP</td>
<td>136</td>
</tr>
</tbody>
</table>

The value of this parameter for the console reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program can change any value you specify for any device; the terminal user can change any value you specify for the console.

**P90 THROUGH P99 PARAMETERS**

These ten parameters indicate the hexadecimal field value to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this device. The released version of the CDC-written MODE4 TIP does not use any of these ten field number/field value pairs.

These parameters are optional. If you specify a value, it must be within the following range:

\[ 0 \leq fv91 \leq FF \]

If you omit these parameters, there are no default values.

**SDT PARAMETER**

The SDT parameter specifies the subdevice type of the device you are defining. The subdevice type is the set of external characteristics of interest to the network software. This parameter is optional and valid only for devices with DT values of LP and DT12. The recognized reserved word values you can use and the defaults depend on the value you specify or use for the DT parameter.

If a DT value of LP is used, the following values are allowed definitions of a printer character set:

- **A6** Indicates that the device uses 64 ASCII characters.
- **A9** Indicates that the device uses 95 ASCII characters.
- **B6** Indicates that the device uses the 64-character CDC scientific (BCD) character set.
- **CCP** Indicates that CCP should use the default appropriate for the device; using this value is equivalent to omitting the parameter.

If a DT value of CR is used, the following values are allowed definitions of subdevice types:

- **SDT12** Indicates a site-defined subdevice type that uses the subdevice type number 12.
- **SDT13** Indicates a site-defined subdevice type that uses the subdevice type number 13.
- **SDT14** Indicates a site-defined subdevice type that uses the subdevice type number 14.
- **SDT15** Indicates a site-defined subdevice type that uses the subdevice type number 15.

If you omit the SDT parameter or specify the value CCP, the default value of A6 is used.

If a DT value of CR is used, the following values are allowed definitions of subdevice types:

- **SDT12** Indicates a site-defined subdevice type that uses the subdevice type number 12.
- **SDT13** Indicates a site-defined subdevice type that uses the subdevice type number 13.
- **SDT14** Indicates a site-defined subdevice type that uses the subdevice type number 14.
- **SDT15** Indicates a site-defined subdevice type that uses the subdevice type number 15.
If a DT value of DT12 is used, the following values are allowed definitions of subdevice type:

A6 Indicates that the device uses 64 ASCII characters.
A9 Indicates that the device uses 95 ASCII characters.
B6 Indicates that the device uses the 64-character CDC scientific (BCD) character set.
SDT12 Indicates a site-defined subdevice type that uses the subdevice type number 12.
SDT13 Indicates a site-defined subdevice type that uses the subdevice type number 13.
SDT14 Indicates a site-defined subdevice type that uses the subdevice type number 14.
SDT15 Indicates a site-defined subdevice type that uses the subdevice type number 15.

26 Indicates that the device uses the 026 punch pattern set.
29 Indicates that the device uses the 029 punch pattern set.
6BIT Indicates that the device uses a 6-bit byte for binary instruction codes.
8BIT Indicates that the device uses an 8-bit byte for binary instruction codes.

If you omit the SDT parameter, no default exists.

**UBL PARAMETER**

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and DBL parameters.

You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input message blocks and if you choose a UBL value smaller than this number, the application program becomes dead-locked (it waits for blocks of data that CCP is forced to discard because the block limit has been reached for upline queuing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.

This parameter is optional. The UBL parameter has the following range of values:

\[ 1 \leq \text{UBL} \leq 31 \]

If you omit the UBL parameter, a default value is used. The default value is 7.

The value you specify can be changed by the application program for consoles.

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline block can contain. CCP divides each message from the terminal into blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host.

You should choose a value that allows most of the logical lines entered by the device to fit into a single block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional; it is allowed for all device types except line printers (DT of LP). The UBZ parameter has the following range of values for console devices (DT of CON):

\[ 0 \leq \text{UBZ} \leq 2000 \]

The range for batch devices (DT of CR) is:

\[ 1 \leq \text{UBZ} < 2043 \]

The range for site-defined devices (DT of DT12) is:

\[ 0 \leq \text{UBZ} \leq 2043 \]

If you specify 0 for a console device, CCP sends an upline block whenever it receives 100 characters.
The value you declare should be chosen together with the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes. For console devices (DT of CON), rounding occurs as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 ≤ ubz ≤ 100</td>
<td>100</td>
</tr>
<tr>
<td>101 ≤ ubz ≤ 200</td>
<td>200</td>
</tr>
<tr>
<td>1901 ≤ ubz ≤ 2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

For batch devices (DT of CR), you should use a value that is a multiple of 640 characters (one physical record unit). If ubz is not a multiple of 640 for passive devices, NDL rounds the value you supply to the next even multiple, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ≤ ubz ≤ 640</td>
<td>640</td>
</tr>
<tr>
<td>641 ≤ ubz ≤ 1280</td>
<td>1280</td>
</tr>
<tr>
<td>1281 ≤ ubz ≤ 2043</td>
<td>2040</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it adjusts the UBZ value that you specify.

If you omit the UBZ parameter, a default value is used. Default values depend on the device type. The defaults are:

<table>
<thead>
<tr>
<th>DT</th>
<th>UBZ Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>CR</td>
<td>640</td>
<td>640</td>
</tr>
</tbody>
</table>

These defaults optimize use of the default value for the UBL parameter. These default values are the recommended values.

For the Message Control System (MCS), the upline block size must be set to 0.

The application program can change the value you specify. The terminal user can change the value for consoles within the following range:

0 ≤ ubz ≤ 200

**XBZ PARAMETER**

The transmission block size (XBZ) parameter specifies the maximum number of character bytes each block sent to the terminal can contain. CCP divides downline blocks as necessary to create a block of the specified number of characters.

The transmission block size for a mode 4 console device should be the same as the number of characters that fit on its screen. A mode 4A console normally has a screen that is 80 characters by 13 lines; a mode 4C console normally has a screen that is 80 characters by 16 lines. The value you use should be less than or equal to the size of any buffer memory within the terminal.

This parameter is optional. The XBZ parameter has the following range of values:

200 ≤ xbz ≤ 2043

If you omit the XBZ parameter, a default value is used. Default values depend on the STIP value declared or used, the terminal class declared or used, and the device type. The defaults for console devices (DT of CON) in terminal classes 200UT, 734, 711, 714, and 714X are:

<table>
<thead>
<tr>
<th>STIP</th>
<th>Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>M4A</td>
<td>1040</td>
<td>1040</td>
</tr>
<tr>
<td>M4C</td>
<td>1280</td>
<td>1280</td>
</tr>
</tbody>
</table>

The defaults for batch devices (DT of LP) are:

<table>
<thead>
<tr>
<th>TC</th>
<th>XBZ Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>200UT</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>734</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>714</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td>714X</td>
<td>1280</td>
<td>1280</td>
</tr>
</tbody>
</table>

These default values are based on the buffer sizes of the archetype terminals and should not be increased unless the devices used have larger buffers.

The application program can change the value you specify. The terminal user can change the value for consoles.

**HASP TERMINAL DEFINITIONS**

On a synchronous communication line, a terminal definition is different from a device definition. A synchronous terminal consists of one or more devices; terminal and device are not synonymous. In a CDC network, a terminal is equivalent to a HASP workstation.

If you defined the communication line as a fixed definition line, you can declare only one TERMINAL or TERMDEV statement for the line. If you defined the line as an automatic recognition line, you can declare up to 255 TERMINAL or TERMDEV statements for the line.

You must provide at least one TERMINAL or TERMDEV statement. Figures 6-7 and 6-8 present the formats of these statements for terminals on CDC-defined HASP protocol synchronous lines. The following parameters provide the terminal definition for the line:

<table>
<thead>
<tr>
<th>CO</th>
<th>STIP</th>
<th>CSET</th>
<th>TC</th>
<th>RIC</th>
</tr>
</thead>
</table>
The STIP and TC parameters are described first because they are related and affect the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

### STIP PARAMETER

The STIP parameter specifies the subTIPtype required to support the terminal definition. This parameter is optional if the TC parameter specifies a CDC-defined terminal class. If STIP is omitted, the TC parameter must be specified and cannot be CCP or TC28 through TC31.

When you declare a value for STIP, it must be one of the following reserved words:

- **AUTOREC**: Specifies that CCP should use the subTIPtype appropriate for the terminal (valid only if TC is specified); using this value is equivalent to omitting the parameter.
- **POST**: Identifies a HASP terminal that only supports postprint format control.

### TC PARAMETER

The TC parameter specifies the terminal class appropriate for the terminal. Supported devices are grouped into terminal classes, according to their hardware characteristics.

Each CDC-defined terminal class has the default characteristics associated with an archetype terminal. Each CDC-defined terminal class has a range of possible characteristics. These ranges determine the values allowed for parameters you specify on the TERMDEV or DEVICE statements.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes, with the following exceptions: you can use TC28, TC29, TC30, and TC31 to identify site-defined terminal classes with no default characteristics, corresponding to reserved Network Access Method (NAM) terminal class numbers.

Because the network cannot recognize differences among some terminal classes, a default terminal class exists for each subcategory of the TIP type (the subTIPtype, defined by the STIP parameter of the TERMINAL or TERMDEV statement); these defaults can be used when you declare a STIP parameter.

---

**For console devices:**

```
device: TERMINAL,STIP=stiptyp,TC=trmcIas,CSET=charset,RIC=yn1,CO=conord,DT=C0N,ABL=ab1,

[DBZ=dwnsiz,U0Z=upbsize,DBL=dwnblim,UBL=upblim,X02=xmtisz,AUTOCON=yn2],

[PRI=yn3,DI=yn41,HN=node,HD=yn51,LK=yn6,B1=b1,B2=b2,CN=cn,CT=ct,PW=pw,]

[P90=fv90,....,P99=fv999].
```

**For site-defined devices:**

```
device: TERMINAL,[STIP=stiptyp,TC=trmcIas,CSET=charset,RIC=yn1,CO=conord,DT=DT12C,]

[SDT=stdt,ABL=abl,DBZ=dwnsiz,U0Z=upbsize,DBL=dwnblim,UBL=upblim,X02=xmtisz,]

[DO=dvord,STREAM=streamno,AUTOCON=yn2,PRI=yn3,DI=yn41,HN=node,HD=yn51,LK=yn6,]

[B1=b1,B2=b2,CN=cn,CT=ct,PW=pw,P90=fv90,...,P99=fv999].
```

**device**

The element name of the terminal device being defined. This name can be one through seven characters long. The first character must be a letter; the other characters can be letters or digits. If this statement is used within the set following a GROUP statement, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.
Because the characteristics of terminals in site-defined classes are unknown, TERMINAL, TERMDIV, or DEVICE statement parameter value ranges are checked against the STIP value specified. Any value declared for a terminal or device parameter is valid if the parameter and value conform to requirements for that subTIPtype.

The following reserved words are valid values for the TC parameter:

- **CCP** Specifies that CCP is to provide the default terminal class appropriate for the subTIPtype; using this value is equivalent to omitting the parameter.
- **HASP** Identifies a HASP terminal that only supports preprinting format control.
- **HPRE** Identifies a HASP terminal that supports preprinting format control.
- **TC28** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 28.
- **TC29** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 29.
- **TC30** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 30.
- **TC31** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 31.

If the TC parameter is omitted, the STIP parameter must be specified. If TC is specified as CCP or TC28 through TC31, STIP must be specified. If STIP is omitted, the TC parameter must be specified and cannot have the values CCP or TC28 through TC31.

If the TC parameter is specified with a value of TC28, TC29, TC30, or TC31, then CCP must also be modified to accept these values. If the appropriate support code for TC28, TC29, TC30, or TC31 is not added to CCP, these values will be considered invalid by CCP.

If you omit the TC parameter or specify the value CCP, the default is selected according to the STIP value declared. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>TC Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>POST</td>
<td>HASP</td>
</tr>
<tr>
<td>PRE</td>
<td>HPRE</td>
</tr>
</tbody>
</table>

**CO PARAMETER**

The CO parameter specifies the configuration ordinal for the terminal. When the line is configured for automatic recognition of terminals, this parameter is optional; otherwise it is not allowed.

The terminal user can enter the configuration ordinal during automatic recognition. This allows the user to select the appropriate set of terminal and device definitions among several you supply for the line.

If you supply this parameter for an automatic recognition line, the value must be unique for each terminal that can use the line. The network software checks this value while identifying a terminal in the configuration file; any terminal accessing the line must supply the configuration ordinal you specify or it cannot use the network.

The CO parameter can have the following values:

- **AUTOREC**

  Indicates that CCP should use any configuration ordinal transmitted during automatic recognition of the terminal (valid only if the AUTO parameter is specified); using this value is equivalent to omitting the parameter.

  \[1 \leq \text{conord} \leq 255\]

  Indicates the decimal configuration ordinal of the terminal you are defining.

If you specify the value AUTOREC, CCP accepts any configuration ordinal valid for HASP terminals.

**CSET PARAMETER**

The CSET parameter specifies the code and character set of the terminal. This parameter is optional.

When you declare a value for CSET, it must be one of the following reserved words:

- **AUTOREC**

  The default code set for the terminal class or that is determined during automatic recognition of the terminal device is used; using this value is equivalent to omitting the parameter.

- **CSET15**

  Site-defined code and character set, identified within the network software as character set number 15.

- **EBCDIC**

  Indicates the IBM Extended Binary Coded Decimal Interchange Code set and character set.

If you specify CSET for a terminal on an automatic recognition line, the network software performs an additional match while identifying the terminal in the configuration file. If you omit CSET, no additional match is performed for an automatic recognition line and the recognized value is used for fixed-configuration lines.

The default depends on the TC value declared or used. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>CSET Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASP</td>
<td>EBCDIC</td>
</tr>
<tr>
<td>HPRE</td>
<td>EBCDIC</td>
</tr>
</tbody>
</table>

Once established, the default value cannot be changed.

**RIC PARAMETER**

The RIC parameter indicates whether the terminal has restricted interactive capabilities. This parameter is optional.
A terminal can have restricted interactive capabilities for many reasons; for example, perhaps no console device actually exists and interactive dialog must occur through a pair of batch devices.

The effect this parameter has depends on the application program the terminal uses. For example, EBF does not output the READY prompt and does not require a GO command to enable any defined passive devices when RIC is specified.

Possible values for this parameter are:

- **NO**: Indicates that the terminal has full interactive capabilities.
- **YES**: Indicates that the terminal has limited interactive capabilities.

If you omit the RIC parameter, the default value of **YES** is used.

### HASP DEVICE DEFINITIONS

On a HASP communication line, a device definition is different from a terminal definition. A HASP terminal consists of one or more devices; terminal and device are not synonymous. In a CDC network, a device is equivalent to an equipment input or output stream within a HASP workstation.

You must provide one **TERMDEV** or **DEVICE** statement for each device that accesses the communication line through the terminal you are defining. If you use a **TERMDEV** statement, you cannot use a **DEVICE** statement for the same terminal. Figures 6-8 and 6-9 present the formats of these statements for devices on HASP protocol lines.

---

**For console devices:**

```plaintext
device: DEVICE, DT=CON, ABL=abl, DBZ=dwnlsize, UBIZ=upbsize, DBL=dwnblim, UBL=upblim, ...
[XBZ=xmitsiz, AUTOCON [yn1], PRI=yn2, DI=[yn3], HN=node, HD=yn4, LK=yn5, ...]
[B1=b1, B2=b2, CN=cn, CT=ct, PW=pw, P90=fv90, ..., P99=fv99).
```

**For card punches and plotters (DT of CP or PL):**

```plaintext
device: DEVICE, DT=devtypC, SDT=sdtypC, DBZ=dwnlsize, UBIZ=upbsize, DBL=dwnblim, UBL=upblim, ...
[XBZ=xmitsiz, DO=devord, STREAM=streamno, PRI=yn1, DI=yn2, PW=pw, ...
[P90=fv90, ..., P99=fv99].
```

**For card readers:**

```plaintext
device: DEVICE, DT=CRC, SDT=sdtypC, DBZ=dwnlsize, UBIZ=upbsize, DBL=dwnblim, UBL=upblim, DO=devord, ...
[XBZ=xmitsiz, DO=devord, STREAM=streamno, PRI=yn1, DI=yn2, PW=pw, ...
P90=fv90, ..., P99=fv99].
```

**For line printers:**

```plaintext
device: DEVICE, DT=LPC, SDT=sdtypC, DBZ=dwnlsize, UBIZ=upbsize, DBL=dwnblim, UBL=upblim, XBZ=xmitsiz, ...
[DO=devord, STREAM=streamno, PRI=yn1, DI=yn2, PW=pw, P90=fv90, ..., P99=fv99].
```

**For site-defined devices:**

```plaintext
device: DEVICE, DT=DT12C, SDT=sdtypC, ABL=abl, DBZ=dwnlsize, UBIZ=upbsize, DBL=dwnblim, ...
[UBL=upblim, XBZ=xmitsiz, DO=devord, STREAM=streamno, AUTOCON [yn1], PRI=yn2, ...]
[DI=yn3, HN=node, HD=yn4, LK=yn5, B1=b1, B2=b2, CN=cn, CT=ct, PW=pw, P90=fv90, ..., P99=fv99].
```

**device**

The element name of the terminal device being defined. This name can be one through five characters long. The first character must be a letter; the other characters can be letters or digits. If this statement is used within the set following a **GROUP** statement, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

---

Figure 6-9. DEVICE Statement Format for Communication Lines of TIPTYPE=HASP
For each terminal you define, you can declare up to 22 DEVICE statements. HASP terminals can have up to 22 DEVICE statements for site-defined device types, or one DEVICE statement for a CDC-defined console device and up to seven DEVICE statements each for CDC-defined line printer, card reader, and card punch or plotter devices.

The following DEVICE and TERMDEV parameters provide the device definition for the terminal:

LP Identifies a CDC-defined line printer device.

If you omit the DT parameter, the value of CON is used.

ABL PARAMETER

The application block limit (ABL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between an application program and this terminal. The value you choose should keep the terminal busy for 2 seconds by maintaining that number of outstanding blocks of the size specified by the DBZ parameter.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). The ABL parameter has the following range of values:

$$1 \leq abl \leq 7$$

The value you declare should be greater than or equal to the downline block limit (DBL parameter value) of the terminal. For console devices (DT of CON), the host queues abl - dbl blocks; the NPU queues dbl blocks. An ABL value significantly larger than the DBL value causes NAM to use more host memory but can reduce the number of times an application program is rolled out.

The default value for this parameter is 2 (DT of CON only).

AUTOCON PARAMETER

The AUTOCON parameter is a stand-alone keyword that determines whether CCP should automatically connect the console device and any associated batch devices to the selected host node. This parameter is valid only for console devices.

If all logical links terminating in the NPU being defined are to the same host (all HNAME values are equal), and the NDL processor provides a default host node, then the NDL processor also sets AUTOCON unless AUTOCON=NO is specified.

This parameter and its values are optional. You can specify either of the following values:

- NO Indicates that CCP should not attempt automatic connection.
- YES Indicates that CCP should attempt automatic connection.

If you omit the AUTOCON parameter, the default value of NO is used for a DT of CON. If you specify this parameter without a value, the value of YES is used.

B1 PARAMETER

The B1 parameter specifies the character to be used as a user break 1 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 1 message upline to the connected application program.
The effect this parameter has depends on the application program. For example, IAF interprets the user break 1 message as a job step interrupt from the terminal user.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:
- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or 0D (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

Any value that you declare or use by default for the BI, CN, or CT parameters

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the BI parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the TC parameter. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>BI Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASP</td>
<td>3A</td>
<td></td>
</tr>
<tr>
<td>HPRE</td>
<td>3A</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

CN PARAMETER

The CN parameter specifies the character to be used to abort (cancel) an input message. When the terminal user enters this character as the last character on a line, the network software discards the message when it is transmitted from the terminal.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:
- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or 0D (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

Any value that you declare or use by default for the BI, B2, or CT parameters

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the B2 parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the TC parameter. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>B2 Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASP</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>HPRE</td>
<td>29</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

B2 PARAMETER

The B2 parameter specifies the character to be used as a user break 2 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 2 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 2 message as a job step termination from the terminal user.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).
Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CN parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the TC parameter. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>CN Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASP</td>
<td>28</td>
<td>(</td>
</tr>
<tr>
<td>HPRE</td>
<td>28</td>
<td>(</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

**CT PARAMETER**

The CT parameter specifies the character to be used as a flag for a terminal definition command. When the terminal user enters this character as the first character on a line, CCP interprets the line as a command. Among other functions, CCP supports terminal definition commands to determine or change one of the values you have established for the following parameters:

- **B1, B2, CN, CT, HN, PW, TC**

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

Any value that you declare or use by default for the B1, B2, or CN parameters

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CT parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the TC parameter. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>CT Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASP</td>
<td>25</td>
<td>z</td>
</tr>
<tr>
<td>HPRE</td>
<td>25</td>
<td>z</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

**DBL PARAMETER**

The downline block limit (DBL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between the host computer and this terminal. The value you choose determines how many blocks of data the NPU queues from the total number of outstanding blocks (ABL parameter value) of the size specified by the DBZ parameter.

This parameter is optional. The DBL parameter has the following value range:

\[ 1 \leq \text{dbl} \leq 7 \]

The value you declare should be less than or equal to the application block limit (ABL parameter value) of the terminal. Maximum line usage can be obtained by setting both DBZ and DBL so that 1 second of data is queued by CCP.

For console devices (DT of CON), the host queues abl - dbl blocks; the NPU queues dbl blocks. Small DBL values use less NPU memory but cause slower data transfers.

For batch devices, the NPU queues all downline blocks. No ABL value exists, so the DBL value alone determines the impact of block queueing on NPU resources. Large DBL values rapidly use up NPU memory; small DBL values may not keep the device busy.

If you omit the DBL parameter, a default value is used. The default values depend on the device type. The default values are:

<table>
<thead>
<tr>
<th>DT Value</th>
<th>DBL Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>2</td>
</tr>
<tr>
<td>CR</td>
<td>2</td>
</tr>
<tr>
<td>CP</td>
<td>1</td>
</tr>
<tr>
<td>LP</td>
<td>1</td>
</tr>
<tr>
<td>PL</td>
<td>1</td>
</tr>
</tbody>
</table>

For card punches, line printers, and plotters (DT of CP, LP, and PL) using lines of 19200 bits per second, a DBL value of 2 is recommended; for these batch devices using lines of 56000 bits per second, a DBL value of 5 is recommended.

**DBZ PARAMETER**

The downline block size (DBZ) parameter specifies the maximum number of character bytes each downline block can contain. The value you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host. Larger DBZ values cause fewer disk accesses by the host. This value can be used by the application programs to divide downline messages into blocks.
This parameter is optional; it is allowed for all device types except card readers (DT of CR). The DBZ parameter has the following range of values:

\[ 1 \leq \text{dbz} \leq 2043 \]

The value you declare should be chosen together with the value used for the DBL parameter. Maximum line usage can be obtained by setting both DBZ and DBL so that 1 second of data is queued by CCP.

For batch devices (DT of CP, FL, or LP), you should use a value that is a multiple of 640 characters (one physical record unit). If dbz is not a multiple of 640 for passive devices, NDL rounds the value you supply to the next even multiple, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ 1 \leq \text{dbz} \leq 640 ]</td>
<td>640</td>
</tr>
<tr>
<td>[ 641 \leq \text{dbz} \leq 1280 ]</td>
<td>1280</td>
</tr>
<tr>
<td>[ 1281 \leq \text{dbz} \leq 2043 ]</td>
<td>1920</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it adjusts the DBZ value that you specify.

For consoles (DT of CON) using lines at 19200 bits per second or higher speeds, a DBZ value of 800 is recommended.

If you omit the DBZ parameter, a default value is used. Default values depend on the device type. The defaults are:

<table>
<thead>
<tr>
<th>DT</th>
<th>DBZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>400</td>
</tr>
<tr>
<td>CF</td>
<td>640</td>
</tr>
<tr>
<td>LP</td>
<td>640</td>
</tr>
<tr>
<td>FL</td>
<td>640</td>
</tr>
</tbody>
</table>

These defaults optimize use of the default values for the DBL parameter.

### DI PARAMETER

The DI parameter is a stand-alone keyword that specifies a device as initially enabled or disabled. An enabled device is configured and serviced as soon as the communication line becomes active. A disabled device is neither configured nor serviced when the line becomes active.

If you initially disable the device, a host or NPU operator can change the device status to enabled. This change can be made only when the line becomes active (when a call is received on a dialup line, or when communications are established on a hardwired line).

This parameter is optional. If you specify the DI parameter, you must use one of the following values:

- **NO** Indicates that the device is initially enabled.
- **YES** Indicates that the device is initially disabled.

If you specify the DI parameter without a value, the value of **YES** is used. If you omit this parameter, the default value of **NO** is used.

### DO PARAMETER

The DO parameter specifies the device ordinal of the device within the terminal. This device ordinal provides a unique identifier to an application program for the device when more than one device of the same type is part of the terminal.

This parameter is allowed for batch devices (DT of CR, CF, LP, or PL) or site-defined devices (DT of DT12) only. The DO parameter is optional if only one device of the same type is part of the terminal; otherwise, a unique value is required for each device you define.

If you specify this parameter, you must use a value in the range:

\[ 1 \leq \text{devord} \leq 7 \]

If you omit this parameter when it is optional, the default value of **1** is used.

### HD PARAMETER

The HD parameter controls whether or not the full host availability display (HAD) is presented to the terminal user. This parameter is optional and is valid only for console devices.

If you specify this parameter, you must use one of the following values:

- **NO** Indicates that the full host availability display is not presented to the terminal user. The terminal user receives only the host status message and the prompt message.
- **YES** Indicates that the host availability display should be presented to the terminal user.

If you omit this parameter and only a single host is defined, the default value of **NO** is used. If you omit this parameter and multiple hosts are defined, the default value of **YES** is used.

The value of this parameter does not change when the terminal class is changed from the console. The application program or the terminal user can also change the value you specify.

### HN PARAMETER

The HN parameter identifies the node number of the host that a console device and any associated batch devices are connected to unless another path is selected by the terminal user.

This parameter is optional and is valid only for console devices. If you declare this parameter, you must use one of the following values:

- **NONE**
Indicates that no node number is specified. This has the same effect as not declaring the parameter. A value of NONE cannot be declared if AUTOCON is also specified and there are logical links to more than one host terminating in the NPU being defined.

1 ≤ hn ≤ 255
Indicates the node number of the host that the console device and any associated batch devices are to be connected to.

The value declared for the HN parameter must be the same as the NODE value in a COUPLER statement within the same network definition. If all the COUPLER statements for all the logical links to the NPU being defined have equal HNAME parameters, the NDL processor provides a default host node. The default host node is the last coupler specified. If the HN parameter is not specified, the terminal user must select a host before a connection can be made. If the AUTOCON parameter is specified, then the HN parameter must also be specified.

The value of this parameter does not change when the terminal class is changed from the console. The terminal user can change the value you specify.

LK PARAMETER

The LK parameter specifies whether unsolicited messages from the NPU or host operator can appear at the terminal. This parameter is optional; it is allowed only for console devices and site-defined devices (DT of CON or DT of DT12).

If you declare this parameter, you must specify one of the following values:

CCP  Indicates that CCP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
NO   Indicates that unsolicited messages should be delivered to the terminal as soon as received by CCP.
YES  Indicates that unsolicited messages should be discarded (locked out).

If you omit this parameter or specify the value CCP, the default value of NO is used (DT of CON only).

PRI PARAMETER

The PRI parameter is a stand-alone keyword that indicates whether data to or from the device is to have traffic priority over that to or from other devices in the network. Data to or from a device that does not have traffic priority is suspended to relieve network congestion before data to or from terminals with traffic priority is suspended. Interactive devices should usually be given traffic priority over batch devices.

This parameter is optional. If you specify the PRI parameter, you must use one of the following values:

NO   Indicates that the device should not have data traffic priority.
YES  Indicates that the device should have data traffic priority.

If you declare this parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

PW PARAMETER

The PW parameter defines the number of characters per physical line of input or output for this device. This physical line length is also called the page width.

For console devices, output lines longer than pw characters might be divided into lines of pw or fewer characters each by the host application program. If the PW value for the device is inappropriate, loss of visual fidelity can occur. This happens if the application program divides the data into lines that are too short or too long for the screen's capacity, instead of allowing the terminal to wrap lines when needed.

For batch devices, pw tells CCP how many character bytes comprise a physical record of output (the number of bytes in a plotter record, or the number of characters in a printer line, or columns in a punch card).

This parameter is optional. The values you can specify depend on the terminal class and the device type. The following values are allowed for console devices and site-defined devices (DT of CON and DT of DT12) in all terminal classes and for all devices in site-defined terminal classes:

CCP  Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.
0    Indicates that the device has an infinite page width. An infinite page width means that physical line length has no effect on output formatting.
50 ≤ pw ≤ 255
Indicates that the device can support physical lines no longer than the indicated value.

The following values are allowed for line printers (DT of LP) in terminal classes HASP and HFRE:

CCP  Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.
If you omit this parameter or specify the value CCP, a default value is used. The default value depends on the terminal class and device type. Default values for console devices and plotters (DT of CON or FL) are:

<table>
<thead>
<tr>
<th>TC</th>
<th>PW</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASP</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>HPRE</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

Default values for line printers (DT of LP) in terminal classes HPRE and HASP are:

<table>
<thead>
<tr>
<th>TC</th>
<th>PW</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASP</td>
<td>120</td>
<td></td>
</tr>
<tr>
<td>HPRE</td>
<td>120</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value you specify for console devices; the application program can change any value you specify for batch devices.

**P90 THROUGH P99 PARAMETERS**

These ten parameters indicate the hexadecimal field value to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this device. The released version of the CDC-written HASP TIP does not use any of these ten field number/field value pairs.

These parameters are optional. If you specify a value, it must be within the following range:

\[ 0 \leq \text{fv}_{9i} \leq \text{FF} \]

If you omit these parameters, there are no default values.

**SDT PARAMETER**

The SDT parameter specifies the subdevice type of the device you are defining. The subdevice type is the set of external characteristics of interest to the network software. This parameter is optional and valid only for devices with DT values of CR, LP, FL, and DT12. The recognized reserved word values you can use and the defaults depend on the value you specify or use for the DT parameter.

If a DT value of LP is used, the following values are allowed definitions of a printer character set:

- **A6**: Indicates that the device uses 64 ASCII characters.
- **A9**: Indicates that the device uses 95 ASCII characters.
- **B6**: Indicates that the device uses the 64-character CDC scientific (BCD) character set.
- **CCP**: Indicates that CCP should use the default appropriate for the device; using this value is equivalent to omitting the parameter.
- **SDT12**: Indicates a site-defined subdevice type that uses the subdevice type number 12.
- **SDT13**: Indicates a site-defined subdevice type that uses the subdevice type number 13.
- **SDT14**: Indicates a site-defined subdevice type that uses the subdevice type number 14.
- **SDT15**: Indicates a site-defined subdevice type that uses the subdevice type number 15.

If you omit the SDT parameter or specify the value CCP, the default value of A6 is used.

If a DT value of CR is used, the following values are allowed definitions of a card reader punch pattern set:

- **CCP**: Indicates that CCP should use the default appropriate for the device; using this value is equivalent to omitting the parameter.
- **SDT12**: Indicates a site-defined subdevice type that uses the subdevice type number 12.
- **SDT13**: Indicates a site-defined subdevice type that uses the subdevice type number 13.
- **SDT14**: Indicates a site-defined subdevice type that uses the subdevice type number 14.
- **SDT15**: Indicates a site-defined subdevice type that uses the subdevice type number 15.
- **26**: Indicates that the default punch pattern at the beginning of each job deck is the 026 pattern set.
- **29**: Indicates that the default punch pattern at the beginning of each job deck is the 029 pattern set.

If you omit the SDT parameter or specify the value CCP, the default value of 29 is used.

If a DT value of CP is used, the following values are allowed definitions of subdevice type:

- **SDT12**: Indicates a site-defined subdevice type that uses the subdevice type number 12.
If a DT value of PL is used, the following values are allowed definitions of a plotter instruction byte size:

- **CCP** Indicates that CCP should use the default appropriate for the device; using this value is equivalent to omitting the parameter.
- **SDT12** Indicates a site-defined subdevice type that uses the subdevice type number 12.
- **SDT13** Indicates a site-defined subdevice type that uses the subdevice type number 13.
- **SDT14** Indicates a site-defined subdevice type that uses the subdevice type number 14.
- **SDT15** Indicates a site-defined subdevice type that uses the subdevice type number 15.
- **6BIT** Indicates that the device uses a 6-bit byte for each instruction.
- **8BIT** Indicates that the device uses an 8-bit byte for each instruction.

If you omit the SDT parameter, no default exists.

### STREAM PARAMETER

The STREAM parameter defines the stream number used within the terminal to address data to or from the device. This stream number must be unique for each device of the same type within the terminal. If the terminal has plotters, the stream number for each plotter must be unique among all plotters and card punches within the terminal.

The STREAM parameter is allowed for batch devices (DT of CP, CR, LP, and PL) or site-defined devices (DT of DT12) only. This parameter is required for batch devices on fixed-configuration lines and optional for devices on automatic recognition lines.

If you specify this parameter, you must use one of the following values:

- **AUTOREC**
  Specifies that the stream number is to be determined by the network software when automatic recognition of the terminal occurs (valid only if the LINE or GROUP statement contains the AUTO parameter); using this value is equivalent to omitting the parameter.

  \[1 \leq \text{streamno} \leq 7\]

  Indicates the stream number associated with the device within the terminal.

If you omit this parameter or specify the value **AUTOREC**, the stream number determined during automatic recognition of the line is used.

### UBL PARAMETER

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and DBL parameters.

You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input messages and if you choose a UBL value smaller than this number, the application program becomes deadlocked (it waits for blocks of data that CCP is forced to discard because the block limit has been reached for upline queuing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.
This parameter is optional. The UBL parameter has the following range of values:

\[ 1 \leq \text{ubl} \leq 31 \]

If you omit the UBL parameter, a default value is used (except for site-defined devices). The default value is 7.

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline block can contain. CCP divides each message from the terminal into blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host.

You should choose a value that allows most of the logical lines entered by the device to fit into a single block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional; it is allowed for all device types except line printers, card punches, and plotters (DT of LP, CP, or PL). The UBZ parameter has the following value range for console devices (DT of CON):

\[ 0 \leq \text{ubz} \leq 2000 \]

For site-defined devices (DT of DT12), the range is:

\[ 0 \leq \text{ubz} \leq 2043 \]

For batch devices (DT of CR), the range is:

\[ 1 \leq \text{ubz} \leq 2043 \]

If you specify 0 for a console device, CCP sends an upline block whenever it receives 100 characters.

The value you declare should be chosen after considering the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes. For console devices (DT of CON), rounding occurs as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 \leq \text{ubz} \leq 100</td>
<td>100</td>
</tr>
<tr>
<td>101 \leq \text{ubz} \leq 200</td>
<td>200</td>
</tr>
<tr>
<td>\vdots</td>
<td>\vdots</td>
</tr>
<tr>
<td>1901 \leq \text{ubz} \leq 2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

For batch devices (DT of CR), you should use a value that is a multiple of 640 characters (one physical record unit). If ubz is not a multiple of 640 for passive devices, NDL rounds the value you supply to the next even multiple, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 \leq \text{ubz} \leq 640</td>
<td>640</td>
</tr>
<tr>
<td>641 \leq \text{ubz} \leq 1280</td>
<td>1280</td>
</tr>
<tr>
<td>1281 \leq \text{ubz} \leq 2043</td>
<td>1920</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it adjusts the UBZ value that you specify.

If you omit the UBZ parameter, a default value is used. Default values depend on the device type. The defaults are:

<table>
<thead>
<tr>
<th>DT</th>
<th>UBZ Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>100</td>
</tr>
<tr>
<td>CR</td>
<td>640</td>
</tr>
</tbody>
</table>

These defaults optimize use of the default values for the UBL parameter. These default values are the recommended values with two exceptions. The first exception is for card readers using lines at 9600 b/s. In this case, a UBZ value of 1280 is recommended. The second exception is for card readers using lines at speeds above 9600 b/s. In this case, a UBZ value of 1920 is recommended.

For the Message Control System (MCS), the upline block size must be set to 0.

The value you specify can be changed by the application program for consoles. The terminal user can change the value within the following range:

\[ 0 \leq \text{ubz} \leq 200 \]

**XBZ PARAMETER**

The transmission block size (XBZ) parameter specifies the maximum number of character bytes each block sent to the terminal can contain. CCP divides downline network data blocks as necessary to create a transmission block of the specified number of characters.

The transmission block size for a HASP console is normally 400. This value is used for terminals on lines of 9600 bits per second or less. For line speeds higher than 9600 bits per second, the terminal's buffer size is often increased to 800, so the XBZ value used should also be 800. You should always choose a value less than or equal to the size of any buffer memory within the terminal.

This parameter is optional. The XBZ parameter has the following value range:

\[ 200 \leq \text{xbz} \leq 2043 \]

If you omit the XBZ parameter, a default value of 400 is used. This default value is based on the buffer sizes of the archetype terminals and should not be increased unless the devices used have larger buffers.

The value you specify can be changed by the application program for consoles.
SDT13 Indicates a site-defined subdevice type that uses the subdevice type number 13.

SDT14 Indicates a site-defined subdevice type that uses the subdevice type number 14.

SDT15 Indicates a site-defined subdevice type that uses the subdevice type number 15.

If a DT value of PL is used, the following values are allowed definitions of a plotter instruction byte size:

CCP Indicates that CCP should use the default appropriate for the device; using this value is equivalent to omitting the parameter.

SDT12 Indicates a site-defined subdevice type that uses the subdevice type number 12.

SDT13 Indicates a site-defined subdevice type that uses the subdevice type number 13.

SDT14 Indicates a site-defined subdevice type that uses the subdevice type number 14.

SDT15 Indicates a site-defined subdevice type that uses the subdevice type number 15.

6BIT Indicates that the device uses a 6-bit byte for each instruction.

8BIT Indicates that the device uses an 8-bit byte for each instruction.

If you omit the SDT parameter, no default exists.

STREAM PARAMETER

The STREAM parameter defines the stream number used within the terminal to address data to or from the device. This stream number must be unique for each device of the same type within the terminal. If the terminal has plotters, the stream number for each plotter must be unique among all plotters and card punches within the terminal.

The STREAM parameter is allowed for batch devices (DT of CP, CR, LP, and PL) or site-defined devices (DT of DT12) only. This parameter is required for batch devices on fixed-configuration lines and optional for devices on automatic recognition lines.

If you specify this parameter, you must use one of the following values:

AUTOREC

Specifies that the stream number is to be determined by the network software when automatic recognition of the terminal occurs (valid only if the LINE or GROUP statement contains the AUTO parameter); using this value is equivalent to omitting the parameter.

1 ≤ streamno ≤ 7

Indicates the stream number associated with the device within the terminal.

If you omit this parameter or specify the value AUTOREC, the stream number determined during automatic recognition of the line is used.

UBL PARAMETER

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and DBL parameters.

You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input messages and if you choose a UBL value smaller than this number, the application program becomes deadlocked (it waits for blocks of data that CCP is forced to discard because the block limit has been reached for upline queuing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.
This parameter is optional. The UBL parameter has the following range of values:

\[ 1 \leq \text{ubl} \leq 31 \]

If you omit the UBL parameter, a default value is used (except for site-defined devices). The default value is 7.

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline block can contain. CCP divides each message from the terminal into blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host.

You should choose a value that allows most of the logical lines entered by the device to fit into a single block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional; it is allowed for all device types except line printers, card punches, and plotters (DT of LP, CP, or PL). The UBZ parameter has the following value range for console devices (DT of CON):

\[ 0 \leq \text{ubz} \leq 2000 \]

For site-defined devices (DT of DT12), the range is:

\[ 0 \leq \text{ubz} \leq 2043 \]

For batch devices (DT of CR), the range is:

\[ 1 \leq \text{ubz} \leq 2043 \]

If you specify 0 for a console device, CCP sends an upline block whenever it receives 100 characters.

The value you declare should be chosen after considering the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes. For console devices (DT of CON), rounding occurs as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 \leq \text{ubz} \leq 100</td>
<td>100</td>
</tr>
<tr>
<td>101 \leq \text{ubz} \leq 200</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1901 \leq \text{ubz} \leq 2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

For batch devices (DT of CR), you should use a value that is a multiple of 640 characters (one physical record unit). If ubz is not a multiple of 640 for passive devices, NDL rounds the value you supply to the next even multiple, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 \leq \text{ubz} \leq 640</td>
<td>640</td>
</tr>
<tr>
<td>641 \leq \text{ubz} \leq 1280</td>
<td>1280</td>
</tr>
<tr>
<td>1281 \leq \text{ubz} \leq 2043</td>
<td>1920</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it adjusts the UBZ value that you specify.

If you omit the UBZ parameter, a default value is used. Default values depend on the device type. The defaults are:

<table>
<thead>
<tr>
<th>DT</th>
<th>UBZ Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>CR</td>
<td>640</td>
<td>640</td>
</tr>
</tbody>
</table>

These defaults optimize use of the default values for the UBL parameter. These default values are the recommended values with two exceptions. The first exception is for card readers using lines at 9600 b/s. In this case, a UBZ value of 1280 is recommended. The second exception is for card readers using lines at speeds above 9600 b/s. In this case, a UBZ value of 1920 is recommended.

For the Message Control System (MCS), the upline block size must be set to 0.

The value you specify can be changed by the application program for consoles. The terminal user can change the value within the following range:

\[ 0 \leq \text{ubz} \leq 200 \]

**XBZ PARAMETER**

The transmission block size (XBZ) parameter specifies the maximum number of character bytes each block sent to the terminal can contain. CCP divides downline network data blocks as necessary to create a transmission block of the specified number of characters.

The transmission block size for a HASP console is normally 400. This value is used for terminals on lines of 9600 bits per second or less. For line speeds higher than 9600 bits per second, the terminal's buffer size is often increased to 800, so the XBZ value used should also be 800. You should always choose a value less than or equal to the size of any buffer memory within the terminal.

This parameter is optional. The XBZ parameter has the following value range:

\[ 200 \leq \text{xbz} \leq 2043 \]

If you omit the XBZ parameter, a default value of 400 is used. This default value is based on the buffer sizes of the archetype terminals and should not be increased unless the devices used have larger buffers.

The value you specify can be changed by the application program for consoles.
BISYNCHRONOUS TERMINAL DEFINITIONS

On a bisynchronous communication line, a terminal definition is different from a device definition. A bisynchronous terminal consists of one or more devices and might not have a console; terminal and device are not synonymous.

If you defined the communication line as a fixed-configuration line, you can declare only one TERMINAL or TERMDEV statement for the line. If you defined the line as an automatic recognition line, you can declare up to 255 TERMINAL or TERMDEV statements for the line; only one terminal can access the line at a given time.

You must provide one TERMINAL or TERMDEV statement for each terminal that can access the communication line. If you use a TERMDEV statement, you cannot use a DEVICE statement for the same terminal. Figures 6-10 and 6-11 present the formats of these statements for terminals on bisynchronous protocol lines.

The following TERMDEV and DEVICE parameters provide the terminal definition for the line:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCF</td>
<td>RIC</td>
</tr>
<tr>
<td>CO</td>
<td>STIP</td>
</tr>
<tr>
<td>CSET</td>
<td>TC</td>
</tr>
<tr>
<td>MREC</td>
<td></td>
</tr>
</tbody>
</table>

The STIP and TC parameters are described first because they are related and affect the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

STIP PARAMETER

The STIP parameter specifies the subTIPtype required to support the terminal definition. This parameter is optional if the TC parameter specifies a CDC-defined terminal class. If STIP is omitted, the TC parameter must be specified and cannot be CCP or TC28 through TC31.

When you declare a value for STIP, it must be one of the following reserved words:

- **AUTOREC**: Specifies that the subTIPtype is to be determined by the network software when automatic recognition of the terminal occurs (valid only if TC is specified); using this value is equivalent to omitting the parameter.
- **2780**: Indicates that the terminal uses the 2780 protocol variant.
- **3780**: Indicates that the terminal uses the 3780 protocol variant.

**For console devices:**

device: TERMDEV,[,STIP=stiptyp,TC=trmclas,CSET=charset,RIC=yn1,CO=conord,BCF=[yn2],MREC=mrec].

For site-defined devices:

device: TERMDEV,[,STIP=stiptyp,TC=trmclas,CSET=charset,RIC=yn1,CO=conord,BCF=[yn2],MREC=mrec].

All other parameters are described in the text.

Figure 6-10. TERMINAL Statement Format for Communication Lines of TIPTYPE=BSC

Figure 6-11. TERMDEV Statement Format for Communication Lines of TIPTYPE=BSC
If you use the AUTOREC value or omit the STIP parameter, the default is selected according to the terminal class declared. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>STIP Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>2780</td>
<td>2780</td>
<td>2780</td>
</tr>
<tr>
<td>3780</td>
<td>3780</td>
<td>3780</td>
</tr>
</tbody>
</table>

**TC PARAMETER**

The TC parameter specifies the terminal class appropriate for the terminal. Supported devices are grouped into terminal classes, according to their hardware characteristics.

Each CDC-defined terminal class has the default characteristics associated with an archetype terminal. Each CDC-defined terminal class has a range of possible characteristics. These ranges determine the values allowed for parameters you specify on the TERMDEV or DEVICE statements.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes, with the following exceptions: you can use TC28, TC29, TC30, and TC31 to identify site-defined terminal classes with no default characteristics, corresponding to reserved Network Access Method (NAM) terminal class numbers.

Because the network cannot recognize differences among some terminal classes, a default terminal class exists for each subcategory of the TIP type (the subTIPtype, defined by the STIP parameter of the TERMINAL or TERMDEV statement); these defaults can be used when you declare a STIP parameter.

Because the characteristics of terminals in site-defined classes are unknown, TERMINAL, TERMDEV, or DEVICE statement parameter value ranges are checked against those valid for the STIP value specified. Any value declared for a terminal or device parameter is valid if the parameter and value conform to requirements for that subTIPtype.

The following reserved words are valid values for the TC parameter:

- **CCP** Specifies that CCP is to provide the default terminal class appropriate for the subTIPtype; using this value is equivalent to omitting the parameter.

- **TC28** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 28.

- **TC29** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 29.

- **TC30** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 30.

- **TC31** Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 31.

- **2780** Identifies a terminal that is compatible with the IBM 2780.

- **3780** Identifies a terminal that is compatible with the IBM 3780.

If the TC parameter is specified as CCP or TC28 through TC31, the STIP parameter must be specified. If the TC parameter is omitted, the STIP parameter must be specified. If STIP is omitted, the TC parameter must be specified and cannot have the value CCP or TC28 through TC31.

If the TC parameter is specified with a value of TC28, TC29, TC30, or TC31, then CCP must also be modified to accept these values. If the appropriate support code for TC28, TC29, TC30, or TC31 is not added to CCP, these values will be considered invalid by CCP.

If you omit the TC parameter or specify the value CCP, the default is selected according to the STIP value declared. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>TC Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>2780</td>
<td>2780</td>
<td>2780</td>
</tr>
<tr>
<td>3780</td>
<td>3780</td>
<td>3780</td>
</tr>
</tbody>
</table>

**BCF PARAMETER**

The BCF parameter indicates whether the terminal supports compression of blanks in upline and downline data. Blank compression consists of deleting blanks that occur in multiples and replacing each multiple with a code set sequence that represents the number deleted.

When the network software compresses blanks in downline data, it does so for all devices within the terminal. When the network software receives a compressed blank sequence in upline data from any device within the terminal, it expands the data by replacing each sequence with the appropriate number of blanks.

This stand-alone parameter is optional and allowed only for terminals in classes 2780 and TC28 through TC30. If you specify this parameter, you must use one of the following values:

- **NO** Indicates that the terminal does not compress blanks in its input and cannot process compressed blanks received as output.

- **YES** Indicates that the terminal compresses blanks in its input and can process compressed blanks received as output.
If you specify this parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used (TC of 2780 only).

**CO PARAMETER**

The CO parameter specifies the configuration ordinal for the terminal. When the line is configured for automatic recognition of terminals, this parameter is optional; otherwise it is not allowed.

The terminal user can enter the configuration ordinal during automatic recognition. This allows the user to select the appropriate set of terminal and device definitions among several you supply for the line.

If you supply this parameter for an automatic recognition line, the value must be unique for each terminal that can use the line. The network software checks this value while identifying the terminal from the configuration file. Any terminal accessing the line must supply a configuration ordinal you specify or it cannot use the network.

The CO parameter can have the following values:

- **AUTOREC**
  - Indicates that CCP should determine the configuration ordinal during automatic recognition of the terminal (valid only if the AUTO parameter is specified); using this value is equivalent to omitting the parameter.

- **1 ≤ conord ≤ 255**
  - Indicates the decimal configuration ordinal of the terminal you are defining.

If you specify the value AUTOREC, CCP accepts any configuration ordinal valid for bisynchronous terminals.

**CSET PARAMETER**

The CSET parameter specifies the code and character set of the terminal. This parameter is optional.

When you declare a value for CSET, it must be one of the following reserved words. For terminals in classes TC28 through TC31, it can be:

- **AUTOREC**
  - Indicates that CCP should use the code set appropriate for the terminal class or determined by automatic recognition; using this value is equivalent to omitting the parameter.

- **CSET15**
  - Site-defined code and character set, identified within the network software as character set number 15.

- **EBCDIC**
  - Indicates the IBM Extended Binary Coded Decimal Interchange Code set and character set.

If you specify CSET for a terminal on an automatic recognition line, the network software performs an additional match while identifying the terminal in the configuration file. If you omit CSET, no additional match is performed for automatic recognition lines and the recognized value is used.

For fixed-configuration lines, the default is selected according to the TC value declared or used. The defaults are:

<table>
<thead>
<tr>
<th>TC</th>
<th>CSET</th>
</tr>
</thead>
<tbody>
<tr>
<td>2780</td>
<td>EBCDIC</td>
</tr>
<tr>
<td>3780</td>
<td>EBCDIC</td>
</tr>
</tbody>
</table>

Once established, the default cannot be changed.

**MREC PARAMETER**

The MREC parameter indicates the maximum number of records that each device within the terminal can receive in each transmission block. This number determines how the network software blocks data into a transmission block for output.

This parameter is optional and allowed for terminal classes 2780 or TC28 through TC31 only. If you specify this parameter, you must use one of the following values:

- **CCP**
  - Indicates that CCP should use the default number appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **1 ≤ mrec ≤ 7**
  - Indicates the number of records required by the terminal in each block exchanged with the network.

If you omit this parameter or specify the value CCP, the default value of 2 is used. This default supports the standard version of the 2780 protocol.

**RIC PARAMETER**

The RIC parameter indicates whether the terminal has restricted interactive capabilities. A terminal can have restricted interactive capabilities for many reasons; for example, perhaps no console device actually exists and interactive dialog must occur through a pair of batch devices.

The effect this parameter has depends on the application program the terminal uses. For example, RBF does not output the READY prompt and does not require a GO command to enable any defined passive devices when RIC is specified.

This parameter is optional. Possible values are:

- **NO**
  - Indicates that the terminal has full interactive capabilities.

- **YES**
  - Indicates that the terminal has limited interactive capabilities.

If you omit the RIC parameter, the default value of YES is used.
BISYNCHRONOUS DEVICE DEFINITIONS

On a bisynchronous communication line, a device definition is different from a terminal definition. A bisynchronous terminal consists of one or more devices; terminal and device are not synonymous.

You must provide one TERMDEV or DEVICE statement for each device that accesses the communication line through the terminal you are defining. If you use a TERMDEV statement, you cannot use a DEVICE statement for the same terminal. Figures 6-11 and 6-12 present the formats of these statements for devices on bisynchronous protocol lines.

For each terminal you define, you can declare up to four DEVICE statements. Bisynchronous terminals can have up to four DEVICE statements for site-defined device types, or one DEVICE statement each for a CDC-defined console, line printer, card reader, or card punch device.

If a terminal does not have a console, you must define a dummy console device for it. The network software requires a console to exist in all terminal definitions so that batch devices can be logged in.

The following parameters provide the definition for devices within the terminal:

- ABL
- DT
- SDT
- AUTOCON
- HD
- TA
- CT
- HN
- DBL
- PRI
- DBZ
- PW
- XBZ
- DI
- P90 through P9

The DT parameter is described first because it affects the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

For console devices:

device: DEVICE,DT=CON,ABL=abl,DBZ=dwnlsiz,UBZ=upbsize,DBL=dwnblim,UBL=upblim,XBZ=xmitsiz]
[AUTOCON=yn13,PRI=yn23,DI=yn33,HN=node,HD=yn43,CT=ct,PW=pw,P90=fv90,...,P99=fv99].

For card readers:

device: DEVICE,DT=CRC,SDT=subdt,UBZ=upbsize,DBL=dwnblim,UBL=upblim,PRI=yn13,]
[DI=yn23,PW=pw,P90=fv90,...,P99=fv99].

For card punches:

device: DEVICE,DT=CPC,TA=trmaddr,DBZ=dwnlsiz,DBL=dwnblim,UBL=upblim,XBZ=xmitsiz,]
[PRI=yn13,DI=yn23,PW=pw,P90=fv90,...,P99=fv99].

For line printers:

device: DEVICE,DT=LPC,SDT=subdt,TA=trmaddr,DBZ=dwnlsiz,DBL=dwnblim,UBL=upblim,XBZ=xmitsiz,]
[PRI=yn13,DI=yn23,PW=pw,P90=fv90,...,P99=fv99].

For site-defined devices:

device: DEVICE,DT=DT12,SDT=subdt,TA=trmaddr,ABL=abl,DBZ=dwnlsiz,DBL=dwnblim,UBL=upblim,XBZ=xmitsiz,]
[UBL=upblim,XBZ=xmitsiz,AUTOCON=yn13,PRI=yn23,DI=yn33,HN=node,HD=yn43,]
[CT=ct,PW=pw,P90=fv90,...,P99=fv99].

device The element name of the terminal device being defined. This name can be one through seven characters long. The first character must be a letter; the other characters can be letters or digits. If this statement is used within the set following a GROUP statement, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

Figure 6-12. DEVICE Statement Format for Communication Lines of TIPTYPE=BSC
DT PARAMETER

The DT parameter specifies the device type being defined. You can declare either a CDC-defined device type or a site-defined device type.

If you specify a CDC-defined device type, the other device definition parameters on the DEVICE or TERMDEV statement:

- Are required by the NDL processor where indicated in the text
- Have the predefined default shown in the text
- Have the predefined ranges shown in the text
- Are checked for uniqueness and compatibility

If you specify a site-defined device type, the other device definition parameters on the DEVICE statement:

- Are not required by the NDL processor
- Have no predefined default
- Are not checked for uniqueness
- Are not checked for compatibility with other parameters on the same statement

When you specify the DT parameter, the following values are valid:

- **CON**: Identifies a CDC-defined console device.
- **CP**: Identifies a CDC-defined card punch device.
- **CR**: Identifies a CDC-defined card reader device.
- **DT12**: Identifies a site-defined device with no predefined characteristics, using the device type number 12 within NAM.
- **LP**: Identifies a CDC-defined line printer device.

If you omit the DT parameter, the value of CON is used.

ABL PARAMETER

The application block limit (ABL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between an application program and this terminal. The value you choose should keep the terminal busy for 2 seconds by maintaining that number of outstanding blocks of the size specified by the DBZ parameter.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). The ABL parameter has the following range of values:

\[ 1 \leq \text{abl} \leq 7 \]

The value you declare should be greater than or equal to the downline block limit (DBL parameter value) of the terminal. For console devices (DT of CON), the host queues abl - dbl blocks; the NPU queues dbl blocks. An ABL value significantly larger than the DBL value causes NAM to use more host memory but can reduce the number of times an application program is rolled out.

The default value for this parameter is 2 (DT of CON only).

AUTOCON PARAMETER

The AUTOCON parameter is a stand-alone keyword that determines whether CCP should automatically connect the console device and any associated batch devices to the selected or defaulted host node. This parameter is valid only for console devices.

If all logical links terminating in the NPU being defined are to the same host (all HNAME values are equal), and the NDL processor provides a default host node, then the NDL processor also sets AUTOCON unless AUTOCON=NO is specified.

This parameter and its values are optional. You can specify either of the following values:

- **NO**: Indicates that CCP should not attempt automatic connection.
- **YES**: Indicates that CCP should attempt automatic connection.

If you omit the AUTOCON parameter, the default value of NO is used for a DT of CON. If you specify this parameter without a value, the value of YES is used.

CT PARAMETER

The CT parameter specifies the character to be used as a flag for a terminal definition command. When the terminal user enters this character as the first character on a line, CCP interprets the line as a command. Among other functions, CCP supports terminal definition commands to determine or change the values you have established for the following parameters:

- **CT**: The character used as a flag.
- **HN**: Host name.
- **PW**: Password.
- **TC**: Terminal control.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).
You cannot use any of the following values:
00, 01, or 02 (characters NUL, SOH, or STX)
3D, 7F, or 20 (characters =, DEL, or space)
30 through 39 (characters 0 through 9)
41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CT parameter or specify the value CCP, the default value is used (DT of CON only). The default value depends on the value declared or used for the TC parameter. The defaults are:

<table>
<thead>
<tr>
<th>TC Value</th>
<th>CT Value Used</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>2780</td>
<td>25</td>
<td>X</td>
</tr>
<tr>
<td>3780</td>
<td>25</td>
<td>%</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value you specify.

### DBL PARAMETER

The downline block limit (DBL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between the host computer and this terminal. The value you choose determines how many blocks of data the NPU queues from the total number of outstanding blocks (ABL parameter value) of the size specified by the DBZ parameter.

This parameter is optional. The DBL parameter has the following range of values:

$$1 \leq \text{dbl} \leq 7$$

The value you declare should be less than or equal to the application block limit (ABL parameter value) of the terminal. For console devices (DT of CON), the host queues abl - dbl blocks; the NPU queues dbl blocks. Small DBL values use less NPU memory but cause slower data transfers.

For batch devices, the NPU queues all downline blocks. No ABL value exists, so the DBL value alone determines the impact of block queuing on NPU and host resources. Large DBL values rapidly use up NPU memory; small DBL values may not keep the device busy.

If you omit the DBL parameter, a default value is used. Default values depend on the device type. The defaults are:

<table>
<thead>
<tr>
<th>DT Value</th>
<th>DBL Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>2</td>
</tr>
<tr>
<td>CR</td>
<td>2</td>
</tr>
<tr>
<td>CP</td>
<td>1</td>
</tr>
<tr>
<td>LP</td>
<td>1</td>
</tr>
</tbody>
</table>

For card punches and line printers using lines at speeds above 9600 bits per second, a DBL value of 2 is recommended.

### DBZ PARAMETER

The downline block size (DBZ) parameter specifies the maximum number of character bytes each downline block can contain. The value you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host. Larger DBZ values cause fewer disk accesses by the host. This value can be used by the application programs to divide downline messages into blocks.

This parameter is optional; it is allowed for all device types except card readers (DT of CR). The DBZ parameter has the following range of values:

$$1 \leq \text{dbz} \leq 2043$$

The value you declare should be chosen together with the value used for the DBL parameter. For batch devices (DT of CP or LP), you should use a value that is a multiple of 640 characters (one physical record unit). If dbz is not a multiple of 640 for passive devices, NDL rounds the value you supply to the next even multiple, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1 \leq \text{dbz} \leq 640$</td>
<td>640</td>
</tr>
<tr>
<td>$641 \leq \text{dbz} \leq 1280$</td>
<td>1280</td>
</tr>
<tr>
<td>$1281 \leq \text{dbz} \leq 2043$</td>
<td>1920</td>
</tr>
</tbody>
</table>

If you omit the DBZ parameter, a default value is used. Default values depend on the STIP value declared or used and the device type. The defaults are:

<table>
<thead>
<tr>
<th>STIP Value</th>
<th>DT Value</th>
<th>DBZ Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>2780</td>
<td>CON</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>2780</td>
<td>CP</td>
<td>640</td>
<td></td>
</tr>
<tr>
<td>2780</td>
<td>LP</td>
<td>640</td>
<td></td>
</tr>
<tr>
<td>3780</td>
<td>CON</td>
<td>512</td>
<td></td>
</tr>
<tr>
<td>3780</td>
<td>CP</td>
<td>640</td>
<td></td>
</tr>
<tr>
<td>3780</td>
<td>LP</td>
<td>640</td>
<td></td>
</tr>
</tbody>
</table>

These defaults optimize use of the default values for the DBL parameter.

### DI PARAMETER

The DI parameter is a stand-alone keyword that specifies a device as initially enabled or disabled. An enabled device is configured and serviced as soon as the communication line becomes active. A disabled device is neither configured nor serviced when the line becomes active.

If you initially disable the device, a host or NPU operator can change the device status to enabled. This change can be made only when the line becomes active (when a call is received on a dialup line, or when communications are established on a hard-wired line).
This parameter is optional. If you specify the DI parameter, you must use one of the following values:

- **NO** Indicates that the device is initially enabled.
- **YES** Indicates that the device is initially disabled.

If you specify the DI parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

### HD Parameter

The HD parameter controls whether or not the full host availability display (HAD) is presented to the terminal user. This parameter is optional and is valid only for console devices.

If you specify this parameter, you must use one of the following values:

- **NO** Indicates that the full host availability display is not presented to the terminal user. The terminal user receives only the host status message and the prompt message.
- **YES** Indicates that the host availability display should be presented to the terminal user.

If you omit this parameter and only a single host is defined, the default value of NO is used. If you omit this parameter and multiple hosts are defined, the default value of YES is used.

The value of this parameter does not change when the terminal class is changed from the console. The terminal user can change the value you specify.

### HN Parameter

The HN parameter identifies the node number of the host that a console device and any associated batch devices are connected to unless another path is selected by the terminal user.

This parameter is optional and is valid only for console devices. If you declare this parameter, you must use one of the following values:

- **NONE** Indicates that no node number is specified. This has the same effect as not declaring the parameter. A value of NONE cannot be declared if AUTOCON is also specified and there are logical links to more than one host terminating in the NPU being defined.

- **1 ≤ hn ≤ 255** Indicates the node number of the host that the console device and any associated batch devices are to be connected to.

The value declared for the HN parameter must be the same as the NODE value in a COUPLER statement within the same network definition. If all the COUPLER statements for all the logical links to the NPU being defined have equal HNAME parameters, the NDL processor provides a default host node. The default host node is the last coupler specified. If the HN parameter is not specified, the terminal user must select a host before a connection can be made. If the AUTOCON parameter is specified, then the HN parameter must also be specified.

The value of this parameter does not change when the terminal class is changed from the console. The terminal user can change the value you specify.

### PRI Parameter

The PRI parameter is a stand-alone keyword that indicates whether data to or from the device is to have traffic priority over that to or from other devices in the network. Data to or from a device that does not have traffic priority is suspended to relieve network congestion before data to or from terminals with traffic priority is suspended. Interactive devices should usually be given traffic priority over batch devices.

This parameter is optional. If you specify the PRI parameter, you must use one of the following values:

- **NO** Indicates that the device should not have data traffic priority.
- **YES** Indicates that the device should have data traffic priority.

If you declare this parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

### PW Parameter

The PW parameter defines the number of characters per physical line of output for this device. This physical line length is also called the page width.

For console devices (DT of CON) with a printer defined as the output mechanism (OP of PR), output lines longer than pw characters are divided into lines of pw or fewer characters each.

This parameter is optional. The values you can use depend on the terminal class and the device type. The following values are allowed for console devices and site-defined devices (DT of CON or DT of DT12) in terminal classes 2780 and 3780 and for all devices in terminal classes TC28 through TC31:

- **CCP** Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **0** Indicates that the device has an infinite page width. An infinite page width means that physical line length has no effect on output formatting.
The following values are allowed for line printers (DT of LP) in terminal classes 2780 and 3780:

**CCP**
- Indicates that CCP should use the default value for the terminal class; using this value is equivalent to omitting the parameter.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program can change any value you specify; the terminal user can change any value you specify for a console.

### P90 THROUGH P99 PARAMETERS

These ten parameters indicate the hexadecimal field value to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this device. The released version of the CDC-written BSC TIP does not use any of these ten field number/field value pairs.

These parameters are optional. If you specify a value, it must be within the following range:

$$0 \leq f_{9i} \leq 255$$

If you omit these parameters, there are no default values.

### SDT PARAMETER

The SDT parameter specifies the subdevice type of the device you are defining. The subdevice type is the set of external characteristics of interest to the network software. This parameter is optional and valid for devices with DT values of CR, LP, and DT12. The recognized reserved word values you can use and the defaults depend on the value you specify or use for the DT parameter.

If a DT value of LP is used, the following values are allowed definitions of a printer character set:

- **A6** Indicates that the device uses 64 ASCII characters.
- **A9** Indicates that the device uses 95 ASCII characters.
- **B6** Indicates that the device uses the 64-character CDC scientific (BCD) character set.
- **CCP** Indicates that CCP should use the default appropriate for the device; using this value is equivalent to omitting the parameter.

If you omit the SDT parameter or specify the value CCP, the default value of A6 is used.

If a DT value of CR is used, the following values are allowed definitions of a card reader punch pattern set:

- **CCP** Indicates that CCP should use the default appropriate for the device; using this value is equivalent to omitting the parameter.

If you omit the SDT parameter or specify the value CCP, the default value of 29 is used.

If a DT value of CP is used, the following values are allowed definitions of subdevice type:

- **SDT12** Indicates a site-defined subdevice type that uses the subdevice type number 12.
- **SDT13** Indicates a site-defined subdevice type that uses the subdevice type number 13.
- **SDT14** Indicates a site-defined subdevice type that uses the subdevice type number 14.
- **SDT15** Indicates a site-defined subdevice type that uses the subdevice type number 15.

If you omit the SDT parameter or specify the value CCP, the default value of 29 is used.

If a DT value of CP is used, the following values are allowed definitions of subdevice type:

- **SDT12** Indicates a site-defined subdevice type that uses the subdevice type number 12.
SDT13 Indicates a site-defined subdevice type that uses the subdevice type number 13.

SDT14 Indicates a site-defined subdevice type that uses the subdevice type number 14.

SDT15 Indicates a site-defined subdevice type that uses the subdevice type number 15.

If a DT value of DT12 is used, the following values are allowed definitions of subdevice type:

A6 Indicates that the device uses 64 ASCII characters.

A9 Indicates that the device uses 95 ASCII characters.

B6 Indicates that the device uses the 64-character CDC scientific (BCD) character set.

26 Indicates that the device uses the 026 pattern set.

29 Indicates that the device uses the 029 pattern set.

6BIT Indicates that the device uses a 6-bit byte for binary instruction codes.

8BIT Indicates that the device uses an 8-bit byte for binary instruction codes.

If you omit the SDT parameter, no default exists.

**TA PARAMETER**

The TA parameter defines the addressing code of the card punch device within the terminal. This parameter must match the code actually used by the terminal as a flag for the routing of output data to a card punch.

The TA parameter is optional for terminals on automatic recognition lines but required for terminals on fixed-configuration lines. This parameter is valid only for card punches and site-defined devices (DT of CP or DT of DT12) in terminal classes 3780 and TC28 through TC31.

If you specify this parameter, you must use one of the following values:

**AUTOREC** Indicates that CCP should determine the addressing code during automatic recognition of the terminal (valid only if the AUTO parameter is used in the corresponding LINE or GROUP statement); using this value is equivalent to omitting the parameter.

2 Indicates that the addressing code is the equivalent of the ASCII DC2 character.

3 Indicates that the addressing code is the equivalent of the ASCII DC3 character.

If you omit this parameter or specify the value AUTOREC, the value determined by automatic recognition of the line is used.

**UBL PARAMETER**

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and DBL parameters.

You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input messages and if you choose a UBL value smaller than this number, the application program becomes deadlocked (it waits for blocks of data that CCP is forced to discard because the block limit has been reached for upline queuing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.

This parameter is optional. The UBL parameter has the following range of values:

1 ≤ ubl ≤ 31

If you omit the UBL parameter, a default value is used (except for site-defined devices). The default value is 7.

The value you specify can be changed by the application program for consoles.

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline network data block can contain. CCP divides each message from the terminal into blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host.

You should choose a value that allows most of the logical lines entered by the device to fit into a single block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional; it is allowed for all device types except line printers and card punches (DT of LP or CP). The UBZ parameter has the following range of values for console devices (DT of CON):

0 ≤ ubz ≤ 2000

For site-defined devices (DT of DT12), the range is:

0 ≤ ubz ≤ 2043

For batch devices (DT of CR), the range is:

1 ≤ ubz ≤ 2043

If you specify 0 for a console device, CCP sends an upline block whenever it receives 100 characters.
The value you declare should be chosen after considering the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes. For console devices (DT of CON), rounding occurs as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used in File</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 ≤ ubz ≤ 100</td>
<td>100</td>
</tr>
<tr>
<td>101 ≤ ubz ≤ 200</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1901 ≤ ubz ≤ 2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

For batch devices (DT of CR), you should use a value that is a multiple of 640 characters (one physical record unit). If ubz is not a multiple of 640 for passive devices, NDL rounds the value you supply to the next even multiple, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used in File</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 ≤ ubz ≤ 640</td>
<td>640</td>
</tr>
<tr>
<td>641 ≤ ubz ≤ 1280</td>
<td>1280</td>
</tr>
<tr>
<td>1281 ≤ ubz ≤ 2043</td>
<td>1920</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it alters the value you supply.

If you omit the UBZ parameter, a default value is used. Default values depend on the device type. The defaults are:

<table>
<thead>
<tr>
<th>DT</th>
<th>UBZ</th>
<th>Value Used in File</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>CR</td>
<td>640</td>
<td></td>
</tr>
</tbody>
</table>

These defaults optimize use of the default values for the UBL parameter. The default values are the recommended values with two exceptions. The first exception is for card readers using lines at 9600 b/s. In this case, a UBZ value of 1280 is the recommended value. The second exception is for card readers using lines at speeds above 9600 b/s. In this case, a UBZ value of 1920 is recommended.

For the Message Control System (MCS), the upline block size must be set to 0.

The application program can change the value you specify. The terminal user can change the value for consoles within the following range:

0 ≤ ubz ≤ 200

**XBZ PARAMETER**

The transmission block size (XBZ) parameter specifies the maximum number of character bytes each block sent to the terminal can contain. CCP divides downline network data blocks as necessary to create a transmission block of the specified number of characters.

The transmission block size for a dummy console device should be less than or equal to the XBZ value declared or used for its line printer. A bisynchronous terminal normally does not have a console; the console device configured as part of the terminal is actually a special input/output mode for the card reader and line printer. The value you choose must be less than or equal to the size of any buffer memory within the terminal.

This parameter is optional. The XBZ parameter has the following range of values:

200 ≤ xbz ≤ 2043

If you omit the XBZ parameter, a default value is used. Default values depend on the STIP value declared or used. The defaults (DT of CON, CP, and LP only) are:

<table>
<thead>
<tr>
<th>STIP</th>
<th>XBZ</th>
<th>Value Used in File</th>
</tr>
</thead>
<tbody>
<tr>
<td>2780</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>3780</td>
<td>512</td>
<td></td>
</tr>
</tbody>
</table>

These default values are based on the buffer sizes of the archetype terminals and should not be increased unless the devices used have larger buffers.

The value you specify can be changed by the application program for consoles.

**3270 TERMINAL DEFINITIONS**

On a 3270 communication line, a terminal definition is different from a device definition. A 3270 terminal consists of one or more devices; terminal and device are not synonymous.

The 3270 communication line can only be defined as a fixed-configuration line. You can declare up to 32 TERMINAL or TERMDEV statements for the line.

You must provide one TERMINAL or TERMDEV statement for each terminal that can access the communication line. If you use a TERMDEV statement, you cannot use a DEVICE statement for the same terminal. Figures 6-13 and 6-14 present the formats of these statements for terminals on 3270 protocol lines.

The following TERMINAL and TERMDEV parameters provide the terminal definition for the line.

<table>
<thead>
<tr>
<th>CA</th>
<th>CSET</th>
<th>RIC</th>
<th>TC</th>
</tr>
</thead>
</table>

The TC parameter is described first because it affects the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

**TC PARAMETER**

The TC parameter specifies the terminal class appropriate for the terminal. Supported devices are grouped into terminal classes, according to their hardware characteristics.
Figure 6-13. TERMINAL Statement Format for Communication Lines of TIPTYPE=3270

For console devices:

device: TERMINAL, TC=trmclas, CSET=charset, RIC=yn1, DT=CON, TA=trmaddr,
[ABL=abl, DBZ=dwnlsiz, UBL=upbmls, DBL=dwnbl1ra, UBL=upbmla,
[AUTOCON=yn2, PRIC=yn3, DI[=yn4, HN=node, HD[=yn5, LK=yn6, B1=b1, B2=b2, CN=cn,
[CT=ct, PG=pg, PL=pl, PW=pw]]

For site-defined devices:

device: TERMINAL, TC=trmclas, CSET=charset, RIC=yn1, DT=OT12C, SDT=subdt,
[TA=trmaddr, ABL=abl, DBZ=dwnlsiz, UBL=upbmls, DBL=dwnbl1ra, UBL=upbmla,
[AUTOCON=yn2, PRIC=yn3, DI[=yn4, HN=node, HD[=yn5, LK=yn6, B1=b1,
[DB2=b2, CN=cn, CT=ct, PG=pg, PL=pl, PW=pw]]

device The element name of the terminal device being defined. This name can be one through seven characters long. The first character must be a letter, the other characters can be letters or digits. If this statement is used within the set following a GROUP statement, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

Figure 6-14. TERMDEV Statement Format for Communication Lines of TIPTYPE=3270

Each CDC-defined terminal class has the default characteristics associated with an archetype terminal. Each CDC-defined terminal class has a range of possible characteristics. These ranges determine the values allowed for parameters you specify on the TERMDEV or DEVICE statements.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes.

The TC parameter is required. When you declare a value for TC, it must be the following reserved word:

3270 Identifies a terminal that is compatible with the IBM 3270.

CA PARAMETER

The CA parameter specifies the hardware cluster address for all the devices accessing the line through one terminal. This parameter is required. You must specify a unique value of the CA parameter for each terminal that can use the line. There is no default value for a cluster address.

The CA parameter can have the following range of values:

0 through 1F

Indicates the hexadecimal cluster address of the terminal you are defining.

Cluster addresses are mapped to the following polling addresses:

<table>
<thead>
<tr>
<th>CA Value</th>
<th>EBCDIC</th>
<th>CA Value</th>
<th>EBCDIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>00</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>1</td>
<td>01</td>
<td>11</td>
<td>61</td>
</tr>
<tr>
<td>2</td>
<td>02</td>
<td>12</td>
<td>62</td>
</tr>
<tr>
<td>3</td>
<td>03</td>
<td>13</td>
<td>63</td>
</tr>
<tr>
<td>4</td>
<td>04</td>
<td>14</td>
<td>64</td>
</tr>
<tr>
<td>5</td>
<td>05</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td>6</td>
<td>06</td>
<td>16</td>
<td>66</td>
</tr>
<tr>
<td>7</td>
<td>07</td>
<td>17</td>
<td>67</td>
</tr>
<tr>
<td>8</td>
<td>08</td>
<td>18</td>
<td>68</td>
</tr>
<tr>
<td>9</td>
<td>09</td>
<td>19</td>
<td>69</td>
</tr>
<tr>
<td>10</td>
<td>0A</td>
<td>20</td>
<td>51</td>
</tr>
<tr>
<td>11</td>
<td>0B</td>
<td>21</td>
<td>52</td>
</tr>
<tr>
<td>12</td>
<td>0C</td>
<td>22</td>
<td>53</td>
</tr>
<tr>
<td>13</td>
<td>0D</td>
<td>23</td>
<td>54</td>
</tr>
<tr>
<td>14</td>
<td>0E</td>
<td>24</td>
<td>55</td>
</tr>
<tr>
<td>15</td>
<td>0F</td>
<td>25</td>
<td>56</td>
</tr>
</tbody>
</table>

60480000 P 6-41
CSET PARAMETER

The CSET parameter specifies the code and character set of the terminal. This parameter is optional.

When you declare a value for CSET, it must be the following reserved word:

EBCDIC Indicates the IBM Extended Binary Coded Decimal Interchange Code set and character set.

RIC PARAMETER

The RIC parameter indicates whether the terminal has restricted interactive capabilities. A terminal can have restricted interactive capabilities for many reasons; for example, perhaps no console device actually exists and interactive dialog must occur through a pair of batch devices.

The effect this parameter has depends on the application program the terminal uses. For example, RR8 does not output the READY prompt and does not require a GO command to enable any defined passive devices when RIC is specified.

This parameter is optional. Possible values are:

NO Indicates that the terminal has full interactive capabilities.

YES Indicates that the terminal has limited interactive capabilities.

If you omit the RIC parameter, the default value of NO is used.

3270 DEVICE DEFINITIONS

On a 3270 communication line, a device definition is different from a terminal definition. A 3270 terminal consists of one or more devices; terminal and device are not synonymous.

You must provide one TERMDEV or DEVICE statement for each device that accesses the communication line through the terminal you are defining. If you use a TERMDEV statement, you cannot use a DEVICE statement for the same terminal. Figures 6-14 and 6-15 present the formats of these statements for terminals on 3270 protocol lines.

For each terminal you define, you can declare up to 32 DEVICE statements. 3270 terminals can have up to 32 DEVICE statements for CDC-defined console devices or up to 7 DEVICE statements for CDC-defined line printer devices.

The following TERMINAL and DEVICE parameters provide device definitions for the terminal:

- ABL
- DBL
- LK
- TA
- AUTOCON
- DBZ
- PG
- UBL
- B1
- DI
- PL
- UBZ
- B2
- DT
- PRI
- CN
- HD
- PW
- CT
- HN
- SDT

For console devices:

device: DEVICE,DT=CON,TA=trmaddr,ABL=abl,DBZ=dwnltsiz,UBZ=upbsize,DBL=dwnblim,]

[UBL=upblim,AUTOCON=[yn13],PRI=[yn23],DI=[yn33],HN=node,HD=[yn43],]

[LK=yn5,B1=bn1,B2=bn2,CN=cn,CT=ct,PG=pg,PL=pl,PW=pw].

For line printers:

device: DEVICE,DT=LPC,SDT=subdt,TA=trmaddr,ABL=abl,DBZ=dwnltsiz,UBL=upblim,]

[PRI=[yn13],DI=[yn23],PW=pw].

For site-defined devices:

device: DEVICE,DT=DTC,SDT=subdt,TA=trmaddr,ABL=abl,DBZ=dwnltsiz,UBZ=upbsize,]

[UBL=upblim,AUTOCON=[yn13],PRI=[yn23],DI=[yn33],]

[HN=node,HD=[yn43],LK=yn5,B1=bn1,B2=bn2,CN=cn,CT=ct,PG=pg,PL=pl,PW=pw].

device The element name of the terminal device being defined. This name can be one through seven characters long; the first character must be a letter, the other characters can be letters or digits. If this statement is used within the set following a GROUP statement, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

Figure 6-15. DEVICE Statement Format for Communication Lines of TIP-Type=S270
The DT parameter is described first because it affects the validity, ranges, and defaults of the other parameters. The other parameters are described in alphabetical order.

**DT PARAMETER**

The DT parameter specifies the device type being defined. You can declare either a CDC-defined device type or a site-defined device type.

If you specify a CDC-defined device type, the other device definition parameters on the DEVICE or TERMDEV statement:

- Are required by the NDL processor where indicated in the text
- Have the predefined default shown in the text
- Have the predefined ranges shown in the text
- Are checked for uniqueness and compatibility

If you specify a site-defined device type, the other device definition parameters on the DEVICE statement:

- Are not required by the NDL processor
- Have no predefined default
- Are not checked for uniqueness
- Are not checked for compatibility with other parameters on the same statement

When you specify the DT parameter, the following values are valid:

- **CON** Identifies a CDC-defined console device.
- **LP** Identifies a CDC-defined line printer device.
- **DT12** Identifies a site-defined device with no predefined characteristics, using the device type number 12 within NAM.

If you omit the DT parameter, the value of CON is used.

**ABL PARAMETER**

The application block limit (ABL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between an application program and this terminal. The value you choose should keep the terminal busy for 2 seconds by maintaining that number of outstanding blocks of the size specified by the DBZ parameter.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). The ABL parameter has the following range of values:

\[ 1 \leq \text{abl} \leq 7 \]

The value you declare should be greater than or equal to the downline block limit (DBL parameter value) of the terminal. Maximum line usage can be obtained by setting both DBZ and DBL so that 1 second of data is queued by CCP.

For console devices (DT of CON), the host queues abl - dbl blocks; the NPU queues dbl blocks. An ABL value significantly larger than the DBL value causes NAM to use more host memory but can reduce the number of times an application program is rolled out.

The default value for this parameter is 2 (DT of CON only).

**AUTOCON PARAMETER**

The AUTOCON parameter is a stand-alone keyword that determines whether CCP should automatically connect the console device and any associated batch devices to the selected host node. This parameter is valid only for console devices.

If all logical links terminating in the NPU being defined are to the same host (all HNAME values are equal), and the NDL processor provides a default host node, then the NDL processor also sets AUTOCON unless AUTOCON=NO is specified.

This parameter and its values are optional. You can specify either of the following values:

- **NO** Indicates that CCP does not attempt automatic connection.
- **YES** Indicates that CCP attempts automatic connection.

If you omit the AUTOCON parameter, the default value of NO is used for a DT of CON. If you specify this parameter without a value, the value of YES is used.

**B1 PARAMETER**

The B1 parameter specifies the character to be used as a user break 1 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 1 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 1 message as a job step interrupt from the terminal user.

This parameter is optional; it is allowed only for devices of DT=CON or DT=DT12. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).
You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or 0D (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the B1, CN, or CT parameters.

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the B1 parameter or specify the value CCP, the default value is used (DT of CON only). The default value is:

<table>
<thead>
<tr>
<th>B1 Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>3270</td>
<td>3A</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

**B2 PARAMETER**

The B2 parameter specifies the character to be used as a user break 2 indicator. When the terminal user enters this character as the only character on a line, CCP discards the block of data being transmitted to the terminal and sends a user break 2 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAF interprets the user break 2 message as a job step termination from the terminal user.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or 0D (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the B1, B2, or CT parameters.

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the B2 parameter or specify the value CCP, the default value is used (DT of CON only). The default value is:

<table>
<thead>
<tr>
<th>B2 Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>3270</td>
<td>29</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

**CN PARAMETER**

The CN parameter specifies the character to be used to abort (cancel) an input message. When the terminal user enters this character as the last character on a line, the network software discards the last message transmitted from the terminal.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, 0A, or 0D (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

Any value that you declare or use by default for the B1, B2, or CT parameters.

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CN parameter or specify the value CCP, the default value is used (DT of CON only). The default value is:

<table>
<thead>
<tr>
<th>CN Value</th>
<th>ASCII Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>3270</td>
<td>28</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.
CT PARAMETER

The CT parameter specifies the character to be used as a flag for a terminal definition command. When the terminal user enters this character as the first character on a line, CCP interprets the line as a command. Among other functions, CCP supports terminal definition commands to determine or change the values you have established for the following parameters:

- B1
- B2
- CN
- CT
- PL
- PW
- HN
- PG
- TC

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (Table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 04, OA, or OD (characters EOT, LF, or CR)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)
- Any value that you declare or use by default for the B1, B2, or CN parameters.

Because the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set. If you omit the CT parameter or specify the value CCP, the default value is used (DT of CON only). The default value is:

<table>
<thead>
<tr>
<th>TC</th>
<th>CT</th>
<th>ASCII</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>Value Used</td>
<td>Character</td>
</tr>
<tr>
<td>3270</td>
<td>25</td>
<td>%</td>
</tr>
</tbody>
</table>

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

DBL PARAMETER

The downline block limit (DBL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between the host computer and this terminal. The value you choose determines how many blocks of data the NPU queues from the total number of outstanding blocks (ABL parameter value) of the size specified by the DBZ parameter.

This parameter is optional. The DBL parameter has the following value range:

\[1 \leq \text{dbl} \leq 7\]
DI PARAMETER

The DI parameter is a stand-alone keyword that specifies a device as initially enabled or disabled. An enabled device is configured and serviced as soon as the communication line becomes active. A disabled device is neither configured nor serviced when the line becomes active.

If you initially disable the device, a host or NPU operator can change the device status to enabled. This change can be made only when the line becomes active (when a call is received on a dialup line, or when communications are established on a hardwired line).

This parameter is optional. If you specify the DI parameter, you must use one of the following values:

NO Indicates that the device is initially enabled.

YES Indicates that the device is initially disabled.

If you specify the DI parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

HD PARAMETER

The HD parameter controls whether or not the full host availability display (HAD) is presented to the terminal user. This parameter is optional and is valid only for console devices.

If you specify this parameter, you must use one of the following values:

NO Indicates that the full host availability display is not presented to the terminal user. The terminal user receives only the host status message and the prompt message.

YES Indicates that the host availability display is presented to the terminal user.

If you omit this parameter and only a single host is defined, the default value of NO is used. If you omit this parameter and multiple hosts are defined, the default value of YES is used.

The value of this parameter does not change when the terminal class is changed from the console. The terminal user can change the value you specify.

HN PARAMETER

The HN parameter identifies the node number of the host that a console device and any associated batch devices are connected to unless another path is selected by the terminal user.

The HN parameter is optional and is valid only for console devices. If you declare this parameter, you must use one of the following values:

NONE Indicates that no node number is specified. This has the same effect as not declaring the parameter. A value of NONE cannot be declared if AUTOCON is also specified and there are logical links to more than one host terminating in the NPU being defined.

1 ≤ hn ≤ 255 Indicates the node number of the host that the console device and any associated batch devices are to be connected to.

The value declared for the HN parameter must be the same as the NODE value in a COUPLER statement within the same network definition. If all the COUPLER statements for all the logical links to the NPU being defined have equal HNAME parameters, the NDL processor provides a default host node. The default host node is the last coupler specified. If the HN parameter is not specified, the terminal user must select a host before a connection can be made. If the AUTOCON parameter is specified, then the HN parameter must also be specified.

The value of this parameter does not change when the terminal class is changed from the console. The terminal user can change the value you specify.

LK PARAMETER

The LK parameter specifies whether unsolicited messages from the NPU or host operator can appear at the terminal. This parameter is optional; it is allowed only for console devices and site-defined devices (DT of CON or DT of DT12).

If you declare this parameter, you must specify one of the following values:

CCP Indicates that CCP uses the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.

NO Indicates that unsolicited messages are delivered to the terminal as soon as received by CCP.

YES Indicates that unsolicited messages are discarded (locked out).

If you omit this parameter or specify the value CCP, the default value of NO is used (DT of CON only). The terminal user or the application program can change any value that you specify.

PG PARAMETER

The PG parameter specifies whether CCP waits at each output page boundary for terminal user acknowledgment before it displays the next page of data. In certain situations, page waiting can occur other than at page boundaries; CCP produces a prompting message (OVER...) when this type of page waiting occurs. The user's response to page waiting is entry of a line, usually empty.

CCP views a new page as beginning at the start of each downline message. CCP calculates the length of a page from the current values of the page width
and page length (see PW and PL Parameter descriptions). If the page width is infinite (PW=0), a page consists of one line less than the number of logical lines specified as the page length. If the page width is finite (PW is nonzero), a page consists of one line less than the number of physical lines specified by the page length; CCP calculates the number of physical lines by dividing each logical line into units less than or equal to the page width.

This parameter is optional; it is allowed only for console devices and site-defined devices (DT of CON or DT of DT12). If you specify this parameter, you must use one of the following reserved values:

- **CCP** Indicates that CCP uses the default setting appropriate for the terminal class; using this parameter is equivalent to omitting the parameter.
- **NO** Indicates that page waiting does not occur.
- **YES** Indicates that page waiting occurs.

When you specify PG=YES, you should also specify a nonzero value for the PL parameter. CCP cannot perform page waiting at the boundaries of infinitely long pages (PL=0).

If you omit the PG parameter or specify a value of CCP, the default value of YES is used.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program or the terminal user can change any value that you specify.

**PL PARAMETER**

The PL parameter specifies the number of physical lines per page of output for the device. If the device is configured for page waiting (PG parameter), any message containing more lines of output than the page length is interrupted by CCP for a page waiting response from the terminal user. The interruption occurs after line \( p_l - 1 \) is output.

This parameter is optional; it is allowed for console devices, remote batch line printers, and site-defined devices only (DT of CON, DT of LP, or DT of DT12). If you specify the PL parameter, you must use one of the following values:

- **CCP** Indicates that CCP uses the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[
8 \leq pl \leq 255
\]

Indicates the number of physical lines per page.

If you omit this parameter or specify a value of CCP, a default value is used (DT of CON only). The default value is 24. The default value for DT of LP is 64.

The value of this parameter reverts to the default value when the terminal class is changed from the console or changed by the application program. The terminal user or the application program can change any value that you specify.

**PRI PARAMETER**

The PRI parameter is a stand-alone keyword that indicates whether data to or from the device is to have traffic priority over that to or from other devices in the network. Data to or from a device that does not have traffic priority is suspended to relieve network congestion before data to or from terminals with traffic priority is suspended. Interactive devices should usually be given traffic priority over batch devices.

This parameter is optional. If you specify the PRI parameter, you must use one of the following values:

- **NO** Indicates that the device does not have data traffic priority.
- **YES** Indicates that the device has data traffic priority.

If you declare this parameter without a value, the value of YES is used. If you omit this parameter, the default value of NO is used.

**PW PARAMETER**

The PW parameter defines the number of characters per physical line of input or output for this device. This physical line length is also called the page width.

For console devices, output lines longer than pw characters are not divided but are counted as more than one line for page width calculations. If the PW value for the device is inappropriate, loss of visual fidelity can occur; the application program might divide the data into lines that are too short or too long for the screen’s capacity, instead of allowing the terminal to wrap lines when needed.

This parameter is optional. If you specify the PW parameter, the value you can use depends on the device type. The following values are allowed for console devices (DT of CON):

- **CCP** Indicates that CCP uses the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[
20 \leq pw \leq 255
\]

Indicates that the device can support physical lines no longer than the indicated decimal value.
The following values are allowed for line printer (DT of LP):

CCP

Indicates that CCP uses the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.

$50 \leq \text{pw} \leq 255$

Indicates that the device can support physical lines no longer than the indicated value.

For line printers, pw provides RBF with an indication of the character bytes that can comprise a physical record of output (the number of characters in a printer line).

If you omit this parameter or specify the value CCP, a default value is used. The default value depends on the device type. Default values are:

<table>
<thead>
<tr>
<th>DT</th>
<th>Value</th>
<th>Value Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>CON</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>LP</td>
<td>132</td>
<td></td>
</tr>
</tbody>
</table>

The value of this parameter for the console reverts to the default value when the terminal class is changed from the console or changed by the application program. The application program can change any value you specify for any device; the terminal user can change any value you specify for the console.

**SDT PARAMETER**

The SDT parameter specifies the subdevice type of the device you are defining. The subdevice type is the set of external characteristics of interest to the network software. This parameter is optional and valid only for devices with DT values of LP and DT12. The recognized reserved word values you can use and the defaults depend on the value you specify or use for the DT parameter.

If a DT value of LP is used, the following values are allowed definitions of a printer character set:

A6 Indicates that the device uses 64 ASCII characters.

A9 Indicates that the device uses 95 ASCII characters.

B6 Indicates that the device uses the 64-character CDC scientific (BCD) character set.

CCP Indicates that CCP uses the default appropriate for the device; using this value is equivalent to omitting the parameter.

SDT12 Indicates a site-defined subdevice type that uses the subdevice type number 12.

SDT13 Indicates a site-defined subdevice type that uses the subdevice type number 13.

SDT14 Indicates a site-defined subdevice type that uses the subdevice type number 14.

SDT15 Indicates a site-defined subdevice type that uses the subdevice type number 15.

If you omit the SDT parameter, no default exists.

**TA PARAMETER**

The TA parameter defines the terminal address of the device within the terminal cluster. This parameter must match the code actually used to communicate with the device.

The TA parameter is required and can have the following range of values:

$0 \text{ through } 1F$

Indicates the hexadecimal terminal address of the terminal you are defining.

If you omit the TA parameter, the default value of 0 is used.

**UBL PARAMETER**

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and DBL parameters.
You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input messages and if you choose a UBL value smaller than this number, the application program becomes deadlocked (it waits for blocks of data that CCP is forced to discard because the block limit has been reached for upline queuing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.

This parameter is optional. The UBL parameter has the following range of values:

\[ 1 \leq \text{ubl} \leq 31 \]

If you omit the UBL parameter, a default value is used. The default value is 7.

The value you specify can be changed by the application program for consoles.

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline block can contain. CCP divides each message from the terminal into blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host.

You should choose a value that allows most of the logical lines entered by the device to fit into a single block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional; it is allowed only for console devices or site-defined devices (DT of CON or DT of DT12). The UBZ parameter has the following range of values for console devices (DT of CON):

\[ 0 \leq \text{ubz} \leq 2000 \]

The range for site-defined devices (DT of DT12) is:

\[ 0 \leq \text{ubz} \leq 2043 \]

If you specify 0 for a console device, CCP sends an upline block whenever it receives 100 characters.

The value you declare should be chosen together with the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes. For console devices (DT of CON), rounding occurs as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used in File</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 \leq \text{ubz} \leq 100</td>
<td>100</td>
</tr>
<tr>
<td>101 \leq \text{ubz} \leq 200</td>
<td>200</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it adjusts the UBZ value that you specify.

If you omit the UBZ parameter, a default value is used. The default is 100 (DT of of CON only). The default optimizes use of the default value for the UBL parameter. The default value is the recommended value.

For the Message Control System (MCS), the upline block size must be set to 0.

The application program can change any value you specify. The terminal user can change the value within the following range:

\[ 0 \leq \text{ubz} \leq 200 \]

**BUFFERING OF DATA**

It is desirable to maintain double buffering of data for each connection in the network. By using double buffering data will always be available to be sent over the communications line. Setting the ABL parameter to 2 and the DBL parameter to 1 will generally result in double buffering.

CCP buffer usage is optimized when downline block size follows the following relationship:

\[ \text{DBZ} = 113 + n \times 118 \]

where \( n \) is an integer and \( n + 1 \) is the number of buffers required in CCP to hold the block. This relationship is of most use for application programs that can control the size of the downline blocks they send to the network. Since it is necessary for a block to contain an integral number of logical lines, the lower bound of DBZ should not be smaller than the largest allowable PW for a device.

Default values for the ABL, DBL, and DBZ parameters are listed in table 6-2.

<table>
<thead>
<tr>
<th>Line Speed</th>
<th>ABL</th>
<th>DBL</th>
<th>DBZ</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>1</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>300</td>
<td>1</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>600</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>1200</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>2400</td>
<td>2</td>
<td>1</td>
<td>230</td>
</tr>
<tr>
<td>4800</td>
<td>2</td>
<td>1</td>
<td>460</td>
</tr>
<tr>
<td>9600</td>
<td>2</td>
<td>1</td>
<td>940</td>
</tr>
</tbody>
</table>
The parameters required and the values allowed on the GROUP, LINE, TERMINAL, TERMDEV, and DEVICE statements depend upon the line protocol used. This section describes the form of a statement applicable to site-defined protocol lines.

Control Data supplies Terminal Interface Programs (TIPs) for six communication protocols; the Network Definition Language provides support for additional site-written TIPs supporting other protocols. Such TIPs are identified by a TIPTYPE of TT12 through TT14 on LINE or GROUP statements in the network configuration file.

Because operating requirements and characteristics of site-written TIPs cannot be anticipated, NDL permits almost any combination of TERMINAL, TERMDEV, or DEVICE statement parameters for such TIPs. The rules for using these parameters are described in this section. Parameters are described in terms of their significance to CDC-written TIPs; these descriptions might not accurately portray the significance of a given parameter to site-written TIP.

**RULES FOR DEFINITIONS**

The NDL processor checks TERMINAL, DEVICE, or TERMDEV statement parameters for validity using the following rules:

- Any parameter specified is legal.
- No parameter is required.
- Default values are not supplied for any parameters.
- Any value declared for a parameter is legal, provided the value is within the range of values or reserved words that NDL recognizes for that keyword when the keyword is used for terminals or devices on lines of CDC-defined protocols.

Declared values for optional parameters are not checked for uniqueness where uniqueness is required for lines of CDC-defined protocols.

Declared values are not checked for compatibility where compatibility is required for lines of CDC-defined protocols.

**LINE DEFINITION**

You configure terminals on a site-defined protocol communication line with the following statements:

- One LINE or GROUP statement that defines the line
- One TERMINAL or TERMDEV statement for each terminal on the line
- One DEVICE statement for each device accessing the line through a given terminal (a TERMDEV statement can be used if the terminal has only one device)

No dependencies exist among the parameter values declared on LINE, GROUP, TERMINAL, TERMDEV, and DEVICE statements except for those related to automatic recognition.

**LINE STATEMENT PARAMETERS**

Each LINE statement defines one communication line between a terminal and the NPU. There must be a LINE or GROUP statement defining each CLA port on the NPU that supports terminal access.

Figure 7-1 shows the format of the LINE statement and the valid parameter values for site-defined communication lines. Table 7-1 shows permitted line type values for the LTYPE parameter.
**ltype** A reserved word value that identifies the type of communication line adapter/modem/circuit combination that is used on this line. This word must be supplied; there is no default value. The values allowed for this declaration are described in table 7-1.

**tiptype** A reserved word value that identifies the type of Terminal Interface Program protocol required for the terminals on this line. This word is required; there is no default value. The values allowed for this declaration are:

- **TT12** Site-written TIP that uses a TIP number of 12 for identification within the network software is required.
- **TT13** Site-written TIP that uses a TIP number of 13 for identification within the network software is required.
- **TT14** Site-written TIP that uses a TIP number of 14 for identification within the network software is required.

**yn1** An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of low line speeds (110 through 2400 bits per second) and/or recognition of protocol type by the TIP whenever a terminal is connected to the line. When AUTO or AUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, the TIP attempts to determine as many definition parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO and XAUTO are omitted or if AUTO=NO or XAUTO=NO is specified, the TIP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal.

**yn2** An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of high line speeds (600 through 9600 bits per second) and/or recognition of protocol type by the TIP whenever a terminal is connected to the line. When XAUTO or XAUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, the TIP attempts to determine as many definition parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO and XAUTO are omitted or if AUTO=NO or XAUTO=NO is specified, the TIP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL and DEVICE or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal.

**arspeed** An optional reserved word value (YES or NO) that indicates whether the user can change the line speed by using the AR TIP command.

**yn3** An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this communication line at network initiation. When DI or DI=YES is specified, the line is disabled at network initiation and cannot be used until the NOP or NOP enables it. If DI is omitted or DI=NO is specified, the line is given an initial status of enabled unless the NOP or NOP specifies otherwise.

**yn4** An optional reserved word value (YES or NO) which specifies whether the Immediate Disconnect feature is enabled for this line. When IMDISC or IMDISC=YES is specified, any terminal on the line is disconnected immediately after the terminal has logged out (disconnected) from the host. When IMDISC is omitted or IMDISC=NO is specified, a terminal on the line is disconnected only after a two minute timer expires.

**lcn** The logical channel number (0 ≤ lcn ≤ 255) which corresponds to the lowest numbered channel that a DTE CCP can use to make an outgoing application-to-application call. If CCP is a DCE, it corresponds to the highest numbered virtual circuit CCP can use to make outgoing application-to-application calls. When lcn is not specified, no default exists.

**lspeed** The baud rate used by the modems or devices accessing this line. This parameter can only be used to configure asynchronous lines (LTYPE of A1, A2, or A6). When the line is configured for automatic recognition (AUTO is declared), this parameter cannot be used. This parameter is optional when an asynchronous line is not configured for automatic recognition of terminals; the following values are recognized:

- 110
- 134
- 150
- 300
- 600
- 1200
- 2400
- 4800
- 9600
- 19200
- 38400

When lspeed is not declared for an asynchronous line configured without automatic recognition, no default exists.
The maximum decimal number (16 ≤ dfl ≤ 1024) of 8-bit characters or octets in an X.25 data packet.

frame The frame window (1 ≤ frame ≤ 7); the maximum number of outstanding unacknowledged packets between the network processing unit and the X.25 network (this is the K parameter defined by the X.25 protocol standard).

timer The decimal retransmission timing period (1 ≤ timer ≤ 25500) in milliseconds; the time that must elapse before retransmission of an unacknowledged X.25 data frame is attempted (this is the T1 parameter defined by the X.25 protocol standard). NDLP rounds the value specified for timer to the next multiple of 100.

count The decimal retransmission count (1 ≤ count ≤ 15); the number of times retransmission of an unacknowledged X.25 data frame is attempted (this is the N2 parameter defined by the X.25 protocol standard).

svcirc The decimal number (0 ≤ svcirc ≤ 255) of available switched virtual circuits (SVC) for this line. The parameter must be identical to the number of switched virtual circuits contracted from the packet switching network and must conform to the following rules:

- The total number of virtual circuits defined (by the NCIR parameter on the TERMINAL or TERMDEV statement) for each STIP must be ≤ svcirc.
- The total number of virtual circuit definitions must be ≤ 255; svcirc + number of permanent virtual circuit (PVC) definitions ≤ 255.

psn A reserved word value identifying the packet switching network to which the line is connected. The following values are recognized:

- C0SN Packet switching network is compatible with the commercial CDSN network.
- C120 Packet switching network is compatible with the CYBER 120.
- DATAPAC Packet switching network is compatible with the commercial DATAPAC network.
- PSN253 Site-defined packet switching network type, identified by the number 253 within the network software.
- PSN254 Site-defined packet switching network type, identified by the number 254 within the network software.
- PSN255 Site-defined packet switching network type, identified by the number 255 within the network software.
- TELNET Packet switching network is compatible with the commercial TELNET network.
- TRNSPAC Packet switching network is compatible with the commercial TRANSPAC network.
- TYMNET Packet switching network is compatible with the commercial TYMNET network.
- UNINET Packet switching network is compatible with the commercial UNINET network.

yn5 An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter tells the TIP what role to play in an X.25 protocol. If DCE or DCE=YES is specified, the TIP must act as data circuit terminating equipment (DCE). If DCE is omitted or DCE=NO is specified, the TIP must act as data terminal equipment (DTE) protocol.

locadr The decimal address (0 ≤ locadr ≤ 99) assigned to the local end of the X.25 link. This value specifies the address by which the X.25 protocol identifies calls to and from the connected NPU. The value declared should be the calling DTE address for outgoing call requests when DCE=YES is specified.

accev The decimal access level limit (0 ≤ accev ≤ 7) for the line. The lowest access level is 0 (unclassified), the highest is 7. If AL is omitted or AL=NONE is specified, no access level limit is associated with the line (equivalent to specifying AL=0).

yn6 An optional reserved word value (YES or NO) which specifies whether the reconfiguration indicator is enabled for this line. When RC or RC=YES is specified, the terminal characteristics are reset to their original NDL values (or to a default if no NDL values were specified) when the terminal disconnects from a host. When RC is omitted or RC=NO is specified, the reconfiguration indicator is not enabled for this line.

fv9i The hexadecimal field value (0 ≤ fv9i ≤ FF) to use for the corresponding field number within the Terminal Interface Program configuration information transmitted for this line.

Figure 7-1. Site-Defined Protocol LINE Statement Format (Sheet 3 of 3)
<table>
<thead>
<tr>
<th>LTYPE Value</th>
<th>Transmission Mode</th>
<th>Transmission Operation</th>
<th>Circuit Type</th>
<th>Modem Type†</th>
<th>CLA Type</th>
<th>Maximum Speed, Bits per Second</th>
<th>Carrier Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>SI</td>
<td>Synchronous</td>
<td>Half-duplex</td>
<td>Switched (Dialup)</td>
<td>RS232C, Bell 201A/208B compatible</td>
<td>2560-1</td>
<td>4800</td>
<td>Controlled</td>
</tr>
<tr>
<td>S2</td>
<td>Synchronous</td>
<td>Full-duplex but operating half-duplex</td>
<td>Dedicated (Hardwired)</td>
<td>RS232C, Bell 201B/208A compatible Bell 301/303 compatible V.35 Standard compatible</td>
<td>2560-2</td>
<td>50000 (HASP only)</td>
<td>Controlled</td>
</tr>
<tr>
<td>S3</td>
<td>Synchronous</td>
<td>Full-duplex</td>
<td>Dedicated (Hardwired)</td>
<td>RS232C, Bell 201B/208A compatible Bell 301/303 compatible V.35 Standard compatible</td>
<td>2560-3</td>
<td>56000 (HASP only)</td>
<td>Constant</td>
</tr>
<tr>
<td>S4</td>
<td>Synchronous</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
</tr>
<tr>
<td></td>
<td>(For site-defined use)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A1</td>
<td>Asynchronous</td>
<td>Full-duplex</td>
<td>Switched (Dialup)</td>
<td>RS232C, Bell 103E/113/212A compatible</td>
<td>2561-1</td>
<td>9600</td>
<td>Constant</td>
</tr>
<tr>
<td>A2</td>
<td>Asynchronous</td>
<td>Full-duplex</td>
<td>Dedicated (Hardwired)</td>
<td>RS232C, Bell 103E/113/212A compatible</td>
<td>2561-1</td>
<td>9600</td>
<td>Constant</td>
</tr>
<tr>
<td>A6</td>
<td>Asynchronous</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
</tr>
<tr>
<td></td>
<td>(For site-defined use)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1</td>
<td>Bit-oriented synchronous HDLC</td>
<td>Full-duplex</td>
<td>Dedicated (Hardwired)</td>
<td>RS232C, Bell 201B compatible V.35 Standard compatible</td>
<td>2563-1</td>
<td>19200</td>
<td>Constant</td>
</tr>
<tr>
<td>H2</td>
<td>HDLC</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
<td>Unassigned</td>
</tr>
<tr>
<td></td>
<td>(For site-defined use)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

†Modem types supported by each type of CLA may differ.
You use the AUTO or XAUTO parameter to define a communication line as having a fixed or an automatic recognition configuration. You can use either of these configuration types for a dialup line or for a dedicated (hardwired) line.

If you define a fixed-configuration line by omitting AUTO and XAUTO or by specifying AUTO=NO or XAUTO=NO, you must know and specify certain characteristics of the terminals and devices that will use it. Only terminals and devices with the specified characteristics can use that line.

If you define an automatic recognition line by specifying AUTO, XAUTO, AUTO=YES, or XAUTO=YES, your site-written TIP determines these characteristics when a terminal becomes active on the line. This allows more flexible access to the network.

A terminal on an automatic recognition line is not completely configured until it becomes active. At that time, the Communications Supervisor (CS) compares the determined characteristics against the characteristics you have defined for each terminal configured on the line. CS uses the first terminal definition with the closest match to finish configuring the terminal. Your site-written TIP then services the terminal devices according to the finished configuration.

Only a terminal that completely matches all declared values can use the line. It must operate with the characteristics you declare for any required or optional parameters in your terminal definition, or the terminal user must change those characteristics to match. If you declare AUTOREC instead of values for all of the automatically recognized parameters, then any terminal will match the terminal definition.

If you declare values instead of AUTOREC for some of the automatically recognized parameters, then any terminal that successfully accesses the line and has characteristics matching the declared values will match your terminal definition. If you declare values instead of AUTOREC for all of the automatically recognized parameters, then only a terminal with automatically recognized characteristics that are the same as your values will match the terminal definition.

You can specify more than one terminal definition on an automatic recognition line. Each definition should vary from the others in one of the automatically recognized characteristics; unless differences exist, CS will not use any definition other than the first one.

Using automatic recognition increases the number of terminal devices that potentially can use the line. You can configure a switchable line for automatic recognition with more logical terminal devices than the physical terminal devices that simultaneously can access it; only one physical device can access the line at a time.

For example, the statement

```
LN3F: LINE PORT=0A, TIPTYPE=TT12, LTYPE=S4, AUTO.
```

defines a switchable (dialup), synchronous line (not in the SVLnet example, figure 2-1 in section D 2) for automatic recognition of any synchronous protocol terminals. The line is identified as LN3F, connects to the NPU at port 0A, and is enabled by default at network initiation.

If the fixed-configuration form of the statement

```
LN3F: LINE PORT=0A, LTYPE=S4, TIPTYPE=TT12.
```

were used instead, all of the terminals capable of accessing this switchable line would have to be completely and explicitly configured on their TERMINAL and DEVICE statements.

As another example of a fixed-configuration line, the statement

```
LN2E: LINE PORT=0A, LTYPE=S4, TIPTYPE=TT14.
```

defines a hardwired (dedicated), enabled, synchronous line for multilevel workstation terminals, accessing the NPU (also not shown in SVLnet) through port 0A.

The following LINE statements are not equivalent:

```
LN1A: LINE PORT=9, LTYPE=A6, TIPTYPE=TT13, LSPEED=300.
LN1A: LINE PORT=9, LTYPE=A6, TIPTYPE=TT13.
```

Both statements define a switchable, enabled, fixed-configuration asynchronous line accessing the NPU (not shown in SVLnet) through port 9. The first line is configured to support modems at 300 baud; the second line has an unknown baud rate, probably determined by the hardware. All terminals accessing this line must be explicitly configured because the line is not configured for automatic recognition.

**GROUP STATEMENT PARAMETERS**

You can use the GROUP statement in place of the LINE statement when you want to repeat a line definition a specified number of times.

```
NDLP creates identical line, terminal, and device definitions (except for port number, line name, and device name) the number of times specified by the NI parameter. NDLP generates unique port numbers by incrementing the previously defined port number by one. NDLP generates unique line and device element names by adding the LINE's port number in two-digit hexadecimal form to the one- to five-character root element name that you specify.

Figure 7-2 shows the format of the GROUP statement and the valid parameter values for site-defined communication lines. Table 7-1 shows permitted line type values for the LTYPE parameter.
The root name to use for generating the element names assigned to the communication lines and devices being defined. This name, which cannot be longer than five characters, must result in element names that are unique within the network division currently being described. This name is required; there is no default value.

The hexadecimal number (1 ≤ port ≤ FE) of the port to which the first of these communication lines connects on the NPU currently being defined. Within an NDL program, the port number is independent of the number of ports on the NPU; for example, a 128-port NPU can have a port numbered FE (254 decimal). However, we strongly recommend that you assign port numbers consecutively, starting with 1. All values declared for PORT parameters must be unique within the current network definition of each NPU. The value specified for port cannot be the same as the number declared for a port in any LINE or TRUNK statement (or within any other GROUP statement expansion) for this NPU, and cannot be lower than the highest port number used by a trunk. This number is required; there is no default value.

A reserved word value that identifies the type of communication line adapter/modem/circuit combination that is used on this line. This word must be supplied; there is no default value. The values allowed for this declaration are described in table 7-1.

A reserved word value that identifies the type of Terminal Interface Program protocol required for the terminals on this line. This word is required; there is no default value. The values allowed for this declaration are:

- TT12 Site-written TIP that uses a TIP number of 12 for identification within the network software is required.
- TT13 Site-written TIP that uses a TIP number of 13 for identification within the network software is required.
- TT14 Site-written TIP that uses a TIP number of 14 for identification within the network software is required.

An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of low line speeds (110 through 2400 bits per second) and/or recognition of protocol type by the TIP whenever a terminal is connected to the line. When AUTO or AUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, the TIP attempts to determine as many definition parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO and XAUTO are omitted or if AUTO=NO or XAUTO=NO is specified, the TIP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL or TERMINAL statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal.

An optional reserved word value (YES or NO) for an optional stand-alone keyword. This parameter specifies whether this communication line is configured for automatic recognition of high line speeds (600 through 9600 bits per second) and/or recognition of protocol type by the TIP whenever a terminal is connected to the line. When XAUTO or XAUTO=YES is specified, the line is configured for automatic recognition. When automatic recognition is performed, the TIP attempts to determine as many definition parameters as possible at the time the line becomes active; recognized parameters are compared against parameters specified in the network definition file to identify the terminal accessing the line. If AUTO and XAUTO are omitted or if AUTO=NO or XAUTO=NO is specified, the TIP is not allowed to perform automatic recognition for the line; the line has a fixed configuration, and each TERMINAL and DEVICE or TERMDEV statement associated with this line must explicitly declare all addressing and protocol parameters legal for that terminal.

An optional reserved word value (YES or NO) that indicates whether the user can change the line speed by using the AR TIP command.

An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this communication line at network initiation. When DI or DI=YES is specified, the line is disabled at network initiation and cannot be used until the NOP or NOP enables it. If DI is omitted or DI=NO is specified, the line is given an initial status of enabled unless the NOP or NOP specifies otherwise.
An optional reserved word value (YES or NO) which specifies whether the Immediate Disconnect feature is enabled for this line. When IMDISC or IMDISC=YES is specified, any terminal on the line is disconnected immediately after the terminal has logged out (disconnected) from the host. When IMDISC is omitted or IMDISC=NO is specified, a terminal on the line is disconnected only after a two minute timer expires.

The logical channel number (0 ≤ lcn ≤ 255) which corresponds to the lowest numbered channel that a DTE CCP can use to make an outgoing application-to-application call. If CCP is a DCE, it corresponds to the highest numbered virtual circuit CCP can use to make outgoing application-to-application calls. When lcn is not specified, no default exists.

The baud rate used by the modems or devices accessing this line. This parameter can only be used to configure asynchronous lines (LTYPE of A1, A2, or A6). When the line is configured for automatic recognition (AUTO is declared), this parameter cannot be used. This parameter is optional when an asynchronous line is not configured for automatic recognition of terminals; the following values are allowed:

|   110 |   134 |   150 |   300 |   600 |  1200 |  2400 |  4800 |  9600 | 19200 | 38400 |

When lspeed is not declared for an asynchronous line configured without automatic recognition, no default exists.

The maximum decimal number (16 ≤ df1 ≤ 1024) of 8-bit characters or octets in an X.25 data packet.

The frame window (1 ≤ frame ≤ 7); the maximum number of outstanding unacknowledged packets between the network processing unit and the X.25 network (this is the K parameter defined by the X.25 protocol standard).

The decimal retransmission timing period (1 ≤ timer ≤ 25500) in milliseconds; the time that must elapse before retransmission of an unacknowledged X.25 data frame is attempted (this is the T1 parameter defined by the X.25 protocol standard). NDLP rounds the value specified for timer to the next multiple of 100.

The decimal retransmission count (1 ≤ count ≤ 15); the number of times retransmission of an unacknowledged X.25 data frame is attempted (this is the N2 parameter defined by the X.25 protocol standard).

The decimal number (0 ≤ svcirc ≤ 255) of available switched virtual circuits (SVC) for this line. The parameter must be identical to the number of switched virtual circuits contracted from the packet switching network and must conform to the following rules:

- The total number of virtual circuits defined (by the NCIR parameter on the TERMINAL or TERMDEV statement) for each STIP must be ≤ svcirc.
- The total number of virtual circuit definitions must be ≤ 255; svcirc + number of permanent virtual circuit (PVC) definitions ≤ 255.

A reserved word value identifying the packet switching network to which the line is connected. The following values are recognized:

- **CDSN**: Packet switching network is compatible with the commercial CDSN network.
- **DATAPAC**: Packet switching network is compatible with the commercial DATAPAC network.
- **PSN253**: Site-defined packet switching network type, identified by the number 253 within the network software.
- **PSN254**: Site-defined packet switching network type, identified by the number 254 within the network software.
- **PSN255**: Site-defined packet switching network type, identified by the number 255 within the network software.
- **TELENET**: Packet switching network is compatible with the commercial TELENET network.
- **TRNSPAC**: Packet switching network is compatible with the commercial TRANSPAC network.

Figure 7-2. Site-Defined Protocol GROUP Statement Format (Sheet 2 of 3)
You use the AUTO or XAUTO parameter to define a communication line as having a fixed or an automatic recognition configuration. You can use either of these configuration types for a dialup line or for a dedicated (hardwired) line.

If you define a fixed-configuration line by omitting AUTO and XAUTO or by specifying AUTO=NO or XAUTO=NO, you must know and specify certain characteristics of the line, and of the terminals and devices that will use it. Only terminals and devices with the specified characteristics can use that line.

If you define an automatic recognition line by specifying AUTO, XAUTO, XAUTO=YES, or AUTO=YES, your site-written TIP determines these characteristics when a terminal becomes active on the line. This allows more flexible access to the network.

A terminal on an automatic recognition line is not completely configured until it becomes active. At that time, the Communications Supervisor (CS) compares the determined characteristics against the characteristics you have defined for each terminal configured on the line. CS uses the first terminal definition with the closest match to finish configuring the terminal. Your site-written TIP then services the terminal devices according to the finished configuration.

Only a terminal that completely matches all declared values can use the line. It must operate with the characteristics you declare for any required or optional parameters in your terminal definition, or the terminal user must change the characteristics to match. If you declare AUTOREC instead of values for all of the automatically recognized parameters, then any terminal will match the terminal definition.

If you declare values instead of AUTOREC for some of the automatically recognized parameters, then any terminal that successfully accesses the line and has characteristics matching the declared values will match your terminal definition. If you declare values instead of AUTOREC for all of the automatically recognized parameters, then only a terminal with automatically recognized characteristics that are the same as your values will match the terminal definition.

You can specify more than one terminal definition on an automatic recognition line. Each definition should vary from the others in one of the automatically recognized characteristics. Unless differences exist, CS will not use any definition other than the first one.

Using automatic recognition increases the number of terminal devices that potentially can use the line. You can configure a switchable line for automatic recognition with more logical terminal devices than the physical terminal devices that simultaneously can access it; only one physical device can access the line at a time.
The following set of statements:

```
LN3F: GROUP, PORT=0A, LTYPE=S4,
      TIPTYPE=TT12, NI=2.
      TERMINAL, STIP=M4A, TC=200UT, CA=70.
      DEVO: DEVICE, DT=CON, TA=60.
      DEVL: DEVICE, DT= LP, TA=60.
      DEVC: DEVICE, DT=CR, TA=60.

LN1A: GROUP, PORT=9, LTYPE=A6,
      TIPTYPE=TT13, LSPEED=300, NI=5.
      DEVA: TERMDEV, TC=713, PRI.
```

is interpreted by the NDL processor as if it had been written:

```
LN3FOA: LINE, PORT=0A, LTYPE=S4,
        TIPTYPE=TT12.
        TERMINAL, STIP=M4A, TC=200UT, CA=70.
        DEVOA: DEVICE, DT=CON, TA=60.
        DEVLOA: DEVICE, DT= LP, TA=60.
        DEVC0A: DEVICE, DT=CR, TA=60.

LN1AO9: LINE, PORT=9, LTYPE=A6,
        TIPTYPE=TT13, LSPEED=300.
        DEVA09: TERMDEV, TC=713, PRI=YES.

LN1AOA: LINE, PORT=0A, LTYPE=A6,
        TIPTYPE=TT13, LSPEED=300.
        DEVA0A: TERMDEV, TC=713, PRI=YES.

LN1AOB: LINE, PORT=OB, LTYPE=A6,
        TIPTYPE=TT13, LSPEED=300.
        DEVA0B: TERMDEV, TC=713, PRI=YES.

LN1AOC: LINE, PORT=0C, LTYPE=A6,
        TIPTYPE=TT13, LSPEED=300.
        DEVA0C: TERMDEV, TC=713, PRI=YES.

LN1AOD: LINE, PORT=0D, LTYPE=A6,
        TIPTYPE=TT13, LSPEED=300.
        DEVA0D: TERMDEV, TC=713, PRI=YES.
```

TERMINAL DEFINITIONS

You can declare up to 255 TERMINAL or TERMDEV statements for a communication line. You must provide one TERMINAL or TERMDEV statement for each terminal that can access the line. If you use a TERMDEV statement, you cannot use a DEVICE statement for the same terminal. Figures 7-4 and 7-5 present the formats of these statements for terminals on lines supported by site-written TIPs.

```
TERMINAL [{,STIP=stiptyp,TC=trmclas,}]

[CSET=charset,TSPEED=trmsped,]
[CA=clsadr,RIC=yn1,]
[CO=conord,BCF=yn2,]
[N2741=encir,C0LLECTC=yn3,]
[NCIR=rec,EOF=yn4].
```

Parameters are described in the text.

Figure 7-4. TERMINAL Statement Format for Site-Defined Communication Line Protocols

The following TERMINAL and TERMDEV parameters provide the terminal definition for the line:

```
BCF
CA
CO
COLLECT
CSET
EOF
MREC
NCIR
```

The STIP and TC parameters are described first because they are described in that order in sections 4 through 6. The other parameters are described in alphabetical order.

STIP PARAMETER

The STIP parameter specifies the subTIPtype required to support the terminal definition. This parameter is optional. When you declare a value for STIP, it must be one of the following reserved words:

```
AUTOREC
M4A
M4C
N2741
```

AUTOREC Specifies that the subTIPtype is to be determined by your site-written TIP when automatic recognition of the terminal occurs (valid only if TC is specified); using this value is equivalent to omitting the parameter.

M4A Identifies a synchronous terminal that uses CDC Mode 4A protocol.

M4C Identifies a synchronous terminal that uses CDC Mode 4C protocol.

N2741 Identifies an asynchronous terminal that does not use IBM 2741 protocol.
device: TERMDEV,STIP=stiptyp,TC=trmclas,CSET=charset,TSPEED=trmsped,CA=clsadr,RIC=yn1,3
[CO=conord,BCF=yn23,NCIR=numcir,PAD=string,NEN=encir,]  
[COLLECT=yn3,DT=devtyp,SDT=subdt,TA=trmaddr,ABL=abl,BZ=dwnlsiz,UBZ=upbsize,]  
[DDBL=dwnblim,UBL=xmitsiz,DO=devord,STREAM=streamno,AUTOCONC=yn4,3]  
[CC0=conord,BCFC=yn23,MREC=rec,UB=upb,UZ=upbsize,]  
[CCL=cm,CT=ct,DLC=dlc,DLT0=dlto,DLX=dlx,EBX=ebx,EBR=eb,EB1=b1,B2=b2,CI=ci,]  
[CPC=pa,PG=pg,PL=pl,PW=pw,EOS=yn10,RTS=yn11,MCI=mc,MLI=mi,P90=fv90,...,P99=fv993.]  

device The element name of the terminal device being defined. This name can be one through seven characters long. The first character must be a letter; the other characters can be letters or digits. If this statement is used within the set following a GROUP statement or as a switched virtual circuit definition, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

Figure 7-5. TERMDEV Statement Format for Site-Defined Communication Line Protocols

<table>
<thead>
<tr>
<th>Pad</th>
<th>Identifies a terminal that is connected via the asynchronous stop-start (X.29) packet assembly/disassembly protocol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post</td>
<td>Identifies a synchronous terminal that supports only postprinting format control and IBM HASP protocol.</td>
</tr>
<tr>
<td>Pre</td>
<td>Identifies a synchronous terminal that supports preprinting format control and IBM HASP protocol.</td>
</tr>
<tr>
<td>User</td>
<td>Identifies an asynchronous terminal using a site-defined form of X.25 packet protocol.</td>
</tr>
<tr>
<td>Xaa</td>
<td>Identifies the application-to-application X.25 subTIP.</td>
</tr>
<tr>
<td>2741</td>
<td>Identifies an asynchronous terminal that uses IBM 2741 protocol.</td>
</tr>
<tr>
<td>2780</td>
<td>Identifies a bisynchronous terminal that uses IBM 2780 protocol.</td>
</tr>
<tr>
<td>3780</td>
<td>Identifies a bisynchronous terminal that uses IBM 3780 protocol.</td>
</tr>
</tbody>
</table>

If you omit the STIP parameter, the default is unknown and possibly undefined.

**TC PARAMETER**

The TC parameter specifies the terminal class appropriate for the device. Supported devices are grouped into terminal classes, according to their hardware characteristics.

No default values exist for the characteristics associated with an archetype terminal on a communication line with a site-defined protocol. Each CDC-defined terminal class has a range of possible values for the characteristics associated with an archetype terminal. These ranges determine the values available for you to specify on the TERMDEV or DEVICE statements. A site-defined terminal class has no predefined range; any value recognized for one of the CDC-defined terminal classes is valid for any site-defined terminal class.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes, with the following exceptions:

- **HASP** and **HPRE** each identify the communication protocol used by a terminal as the archetype.
- **TCP** specifies that TCP is to provide the terminal class appropriate for the sub-TIPtype; using this value is equivalent to omitting the parameter.
- **HASP** identifies a terminal or device compatible with the postprint variant of IBM HASP protocol.
- **HPRE** identifies a terminal or device compatible with the preprint variant of IBM HASP protocol.
- **H2000** identifies a terminal device compatible with Hazeltine 2000 series equipment emulating a teletypewriter.
- **M33** identifies a terminal device compatible with Teletype Model 30 series equipment.

If you omit the STIP parameter, the default is unknown and possibly undefined.

**TC PARAMETER**

The TC parameter specifies the terminal class appropriate for the device. Supported devices are grouped into terminal classes, according to their hardware characteristics.

No default values exist for the characteristics associated with an archetype terminal on a communication line with a site-defined protocol. Each CDC-defined terminal class has a range of possible values for the characteristics associated with an archetype terminal. These ranges determine the values available for you to specify on the TERMDEV or DEVICE statements. A site-defined terminal class has no predefined range; any value recognized for one of the CDC-defined terminal classes is valid for any site-defined terminal class.

The mnemonics identifying the terminal classes are derived from the identification of the archetype terminals defining the classes, with the following exceptions:

- **HASP** and **HPRE** each identify the communication protocol used by a terminal as the archetype.
- **TCP** specifies that TCP is to provide the terminal class appropriate for the sub-TIPtype; using this value is equivalent to omitting the parameter.
- **HASP** identifies a terminal or device compatible with the postprint variant of IBM HASP protocol.
- **HPRE** identifies a terminal or device compatible with the preprint variant of IBM HASP protocol.
- **H2000** identifies a terminal device compatible with Hazeltine 2000 series equipment emulating a teletypewriter.
- **M33** identifies a terminal device compatible with Teletype Model 30 series equipment.

If you omit the STIP parameter, the default is unknown and possibly undefined.
M40 Identifies a terminal device compatible with Teletype Model 40-2 equipment.

TC28 Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 28.

TC29 Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 29.

TC30 Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 30.

TC31 Identifies a site-defined archetype terminal that uses the NAM internal terminal class number of 31.

T4014 Identifies a terminal device compatible with Tektronix 4014 series equipment emulating a teletypewriter.

X364 Identifies a terminal device compatible with the ANSI X3.64 standard (DEC VT100 or CDC 722-30).

200UT Identifies a terminal or device compatible with the CDC 200 User Terminal.

711 Identifies a terminal or device compatible with the CDC 711 series terminal that uses the 4C variant of the Mode 4 protocol.

713 Identifies a terminal device compatible with CDC Model 713, 722-10, 751, 752, or 756 series equipment.

714 Identifies a terminal or device compatible with the CDC 714-10/20 series terminal that uses the 4C variant of the Mode 4 protocol.

714X Identifies a terminal or device compatible with the CDC 714-30 series terminal that uses the 4C variant of the Mode 4 protocol.

721 Identifies a terminal device compatible with CDC Model 721 equipment.

734 Identifies a terminal or device compatible with the CDC 734 series terminal that uses the 4A variant of the Mode 4 protocol.

2741 Identifies a terminal device compatible with IBM 2741 equipment.

2740 Identifies a bisynchronous terminal using the IBM 2740 protocol.

3270 Identifies a terminal that is compatible with the IBM 3270.

3780 Identifies a bisynchronous terminal using the IBM 3780 protocol.

If you omit the TC parameter, the default is unknown and possibly undefined.

BCF PARAMETER

The BCF parameter indicates whether the terminal supports compression of blanks in upline and downline data. Blank compression consists of deleting blanks that occur in multiples and replacing each multiple with a code set sequence that represents the number deleted.

When the network software compresses blanks in downline data, it does so for all devices within the terminal. When the network software receives a compressed blank sequence in upline data from any device within the terminal, it expands the data by replacing each sequence with the appropriate number of blanks.

This stand-alone parameter is optional. If you specify this parameter, you can use one of the following values:

- **NO** Indicates that the terminal does not compress blanks in its input and cannot process compressed blanks received as output.

- **YES** Indicates that the terminal compresses blanks in its input and can process compressed blanks received as output.

If you specify this parameter without a value, the value of **YES** is used. If you omit this parameter, the default is unknown and possibly undefined.

CA PARAMETER

The CA parameter specifies the hardware cluster address for all the devices accessing the line through one terminal. There is no default value for a cluster address.

If you supply this parameter for an automatic recognition line, the value need not be unique for each terminal on the line. If you supply this parameter for a fixed-configuration line, the value should be unique for each terminal on the line. The network software performs an additional match while identifying the terminal in the configuration file. Any terminal accessing the line must use a cluster address you specify or it cannot use the network.

The CA parameter can have the following value:

- **AUTOREC**

  Indicates that your site-written TIP should determine any needed cluster address during automatic recognition of the terminal (valid only if the AUTO or XAUTO parameter is used in the corresponding LINE or GROUP statement); using this value is equivalent to omitting the parameter.

If you specify the value of AUTOREC, your site-written TIP accepts any cluster address it recognizes. If you omit the CA parameter, the default is unknown and possibly undefined.
CO PARAMETER

The CO parameter specifies the configuration ordinal for all the devices accessing the line through one terminal. If you supply this parameter for an automatic recognition line, the value should be unique for each terminal that can use the line. The network software performs an additional match while identifying the terminal in the configuration file. Any terminal accessing the line must use a configuration ordinal you specify or it cannot use the network.

The CO parameter can have the following values:

- **AUTOREC**
  - Indicates that your site-written TIP should determine the configuration ordinal during automatic recognition of the terminal (valid only if the AUTO or XAUTO parameter is used in the corresponding LINE or GROUP statement); using this value is equivalent to omitting the parameter.
  - $1 \leq \text{conord} \leq 255$
  - Indicates the decimal configuration ordinal of the terminal you are defining.

If you specify the value of AUTOREC, your site-written TIP accepts any configuration ordinal it recognizes. If you omit the CO parameter, the default value is unknown and possibly undefined.

COLLECT PARAMETER

The COLLECT parameter specifies whether your site-written TIP accepts charges for incoming calls from X.25 terminals connected through a packet assembly/disassembly service. This stand-alone parameter is optional.

The COLLECT parameter can have the following values:

- **NO**
  - Your site rejects any incoming call when the X.25 network indicates that charges will occur.

- **YES**
  - Your site accepts charges from the X.25 network.

If you specify the COLLECT parameter without a value, the value of YES is used. If you omit the COLLECT parameter, the default value is unknown and possibly undefined.

CSET PARAMETER

The CSET parameter specifies the code and character set of the terminal. This parameter is optional. When you declare a value for CSET, it must be one of the following reserved words:

- **APLBP**
  - ASCII code set with bit-pairing APL character set.

- **APLT**
  - ASCII code set with typewriter-pairing character set.

- **ASCII**
  - ASCII code and character set, or ASCII code and a different character set (some terminals permit other character sets with this code set).

- **AUTOREC**
  - The default code set for the terminal class or that is determined during automatic recognition of the terminal device; using this value is equivalent to omitting the parameter.

- **BCD**
  - CDC External BCD code set with external BCD character set or 63-character ASCII subset (some terminals permit either character set with this code set).

- **CORAPL**
  - IBM Correspondence code set with APL character set.

- **CORRES**
  - IBM Correspondence code and character set.

- **CSET15**
  - Site-defined code and character set, identified within the network software as character set number 15.

- **EBCD**
  - IBM Extended BCD code and character set.

- **EBCDAPL**
  - IBM Extended BCD code set with APL character set.

- **EBCDIC**
  - IBM Extended Binary Coded Decimal Interchange Code and character set.

If you specify CSET for a device on an automatic recognition line, the network software can perform an additional match while identifying the terminal in the configuration file. If you omit CSET, no additional match is performed for automatic recognition lines and the default is unknown and possibly undefined for fixed-configuration lines.

EOF PARAMETER

The EOF parameter indicates whether an end-of-file indicator is sent to line printer devices to mark the position in the data where an end-of-file was read from disk. The end-of-file indicator is an ESC V sequence.

Possible values for this parameter are:

- **NO**
  - Indicates that an end-of-file indicator is not sent to line printer devices.

- **YES**
  - Indicates that an end-of-file indicator is sent to line printer devices.

If you omit this parameter, the default is unknown and possibly undefined.

MREC PARAMETER

The MREC parameter indicates the maximum number of records that each device within the terminal can receive in each transmission block. This number determines how the network software blocks data into a transmission block for output.
This parameter is optional. If you specify this parameter, you must use one of the following values:

**CCP**
Indicates that your site-written TIP should use the default number appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[1 \leq \text{mrec} \leq 7\]
Indicates the number of records required by the terminal in each block exchanged with the network.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**RIC PARAMETER**
The RIC parameter indicates whether the terminal has restricted interactive capabilities. This parameter is optional.

A terminal can have restricted interactive capabilities for many reasons; for example, perhaps no console device actually exists and interactive dialog must occur through a site-defined device.

The effect this parameter has depends on the application program the terminal uses. For example, RBF does not output the READY prompt and does not require a GO command to enable any defined passive devices when RIC is specified.

Possible values for this parameter are:

- **NO** Indicates that the terminal has full interactive capabilities.
- **YES** Indicates that the terminal has limited interactive capabilities.

If you omit the RIC parameter, the default is unknown and possibly undefined.

**NCIR PARAMETER**
The NCIR parameter specifies the decimal number of X.25 virtual circuits of the same subTIPtype you are defining. This parameter should be used only for switched virtual circuit terminal definitions.

If you specify this parameter, the value you use should be less than or equal to the NSVC value declared or used on the corresponding LINE statement. The NCIR parameter has the following range of values:

\[1 \leq \text{numcir} \leq 255\]

If you omit this parameter, the default is unknown and possibly undefined.

**NEN PARAMETER**
The NEN parameter specifies the decimal number of X.25 virtual circuits of the same subTIPtype that are initially enabled. This parameter is optional; it is usually used only for switched virtual circuit terminal definitions.

If you specify this parameter, the value you use should be less than or equal to the NCIR value declared or used on the same TERMINAL or TERMDEV statement. The NEN parameter has the following range of values:

\[1 \leq \text{encir} \leq 255\]

If you omit this parameter, the default is unknown and possibly undefined.

**TSPEED PARAMETER**
The TSPEED parameter specifies the baud rate of the terminal. This parameter is optional.

If you specify a TSPEED value, the network software can perform an additional match while identifying the terminal in the configuration file. Any terminal accessing the communication line using the speed you specify might match the terminal definition.

If **AUTO** is specified, the TSPEED parameter can have the following values:

\[110, 134, 150, 300, 600, 1200, 2400\]
**AUTOREC**

If **XAUTO** is specified, the TSPEED parameter can have the following values:

\[600, 1200, 2400, 4800, 9600\]
**AUTOREC**

If you omit the TSPEED parameter or use the value **AUTOREC**, your site-written TIP determines the baud rate when it performs automatic recognition for the terminal (a CDC-defined TIP accepts any rate valid for the communication line).

**W PARAMETER**
The W parameter specifies the X.25 packet level window size for the virtual circuit you are defining. This parameter is optional.

The packet level window is the maximum number of unacknowledged packets your site-written TIP can send before it suspends further output to the terminal using the virtual circuit. This parameter has the following range of values:

\[1 \leq \text{pacwndw} \leq 7\]

If you omit the W parameter, the default is unknown and possibly undefined.
DEVICE DEFINITIONS

You must provide one TERMDEV or DEVICE statement for each device that can access the communication line through the terminal. If you use a TERMDEV statement, you cannot use a DEVICE statement for the same terminal.

Each TERMINAL statement can have 255 DEVICE statements. Figures 7-5 and 7-6 present the formats of the TERMDEV and DEVICE statements for terminals on site-defined protocol lines.

The following TERMDEV and DEVICE parameters provide the device definition for a terminal:

<table>
<thead>
<tr>
<th>AB</th>
<th>DT</th>
<th>PA</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABL</td>
<td>EBO</td>
<td>PG</td>
</tr>
<tr>
<td>AUTOCON</td>
<td>EBR</td>
<td>PL</td>
</tr>
<tr>
<td>BR</td>
<td>EBX</td>
<td>PRI</td>
</tr>
<tr>
<td>BS</td>
<td>ELO</td>
<td>PW</td>
</tr>
<tr>
<td>BI</td>
<td>ELR</td>
<td>P90 through P99</td>
</tr>
<tr>
<td>B2</td>
<td>ELX</td>
<td>RTS</td>
</tr>
<tr>
<td>CI</td>
<td>EP</td>
<td>SDT</td>
</tr>
<tr>
<td>CN</td>
<td>HD</td>
<td>STREAM</td>
</tr>
<tr>
<td>CP</td>
<td>HN</td>
<td>TA</td>
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<tr>
<td>CT</td>
<td>IC</td>
<td>UBL</td>
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<tr>
<td>DBL</td>
<td>IN</td>
<td>UBJ</td>
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<tr>
<td>DBZ</td>
<td>LI</td>
<td>XBZ</td>
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<tr>
<td>DI</td>
<td>LK</td>
<td>XLC</td>
</tr>
<tr>
<td>DLC</td>
<td>MCI</td>
<td>XLT0</td>
</tr>
<tr>
<td>DLTO</td>
<td>MLI</td>
<td>XLX</td>
</tr>
<tr>
<td>DLX</td>
<td>OC</td>
<td>XLY</td>
</tr>
<tr>
<td>DO</td>
<td>OP</td>
<td></td>
</tr>
</tbody>
</table>

The DT parameter is described first because it is described first in sections 4 through 6. The other parameters are described in alphabetical order.

DT PARAMETER

The DT parameter specifies the device type being defined. You can declare either a CDC-defined device type or a site-defined device type.

This parameter is optional. When you specify the DT parameter, the following values are valid:

- **AP**: Identifies an application-to-application connection.
- **CON**: Identifies a CDC-defined console device.
- **CP**: Identifies a CDC-defined card punch.
- **CR**: Identifies a CDC-defined card reader.
- **DT12**: Identifies a site-defined device with no predefined characteristics, using the device type number 12 within NAM.
- **LP**: Identifies a CDC-defined line printer.
- **PL**: Identifies a CDC-defined plotter.

If you omit the DT parameter, the default is unknown and possibly undefined.

AB PARAMETER

The AB parameter specifies the character to be used to abort an output block. When the terminal user enters this character as the only character on a line, your site-written TIP should discard the block of data being transmitted to the terminal.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

device: DEVICE[d,t=devtype,SDT=sdtype,TA=trmaddr,ABL=abl,DBZ=dwnlsiz,UBZ=upbsize,] | [DBL=dwnblsiz,UBL=upblsiz,XB=xmitsiz,DO=devord,STREAM=streamno,AUTOCON=yn1] | [PRI[yn2],DI[yn3],HN=node,HDC=yn4],LK=yn5,AB=abl,BR=br,CP=cp,BS=bs,B1=b1,B2=b2,CI=ci2,] | [CN=cn,CT=ct,DLC=dlic,DLTO=dlt0,DLX=dlx,EBX=ebx,EBR=ebr,EBO=eb0,ELX=elx,ELR=elr,] | [ELO=e0,EP=ep,XLC=xlc,XLT0=xlt0,XLY=xly,IC=ic,IN=in,LI=li,OP=op,] | [OC=oc,PA=pa,PG=pg,PL=pl,PW=pw,RTS=[yn6],MCI=mci,MLI=m1,P90=fv90,...,P99=fv99].

The element name of the terminal device being defined. This name can be one through seven characters long. The first character must be a letter; the other characters can be letters or digits. If this statement is used within the set following a GROUP statement or as a switched virtual circuit definition, the device name cannot be longer than five characters. This is the name used by the host or NPU operator to monitor and control the device. This name is required; there is no default value.

All other parameters are described in the text.

Figure 7-6. DEVICE Statement Format for Site-Defined Communication Line Protocols
If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the AB parameter or specify the value CCP, the default is unknown and possibly undefined.

ABL PARAMETER

The application block limit (ABL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between an application program and this terminal. The value you choose should keep the terminal busy for 2 seconds by maintaining that number of outstanding blocks of the size specified by the DBZ parameter.

This parameter is optional. The ABL parameter has the following range of values:

\[ 1 \leq \text{abl} \leq 7 \]

The value you declare should be greater than or equal to the downline block limit (DBL parameter value) of the terminal. The host queues abl - dbl blocks; the NPU queues dbl blocks. An ABL value significantly larger than the DBL value causes NAM to use more host memory.

If you omit the ABL parameter, the default value is unknown and possibly undefined.

AUTOCON PARAMETER

The AUTOCON parameter is a stand-alone keyword that determines whether the TIP should automatically connect the console device and any associated batch devices to the selected host node. This parameter is valid only for console devices.

If all logical links terminating in the NPU being defined are to the same host (all HNAME values are equal), and the NDL processor provides a default host node, then the NDL processor also sets AUTOCON unless AUTOCON=NO is specified.

This parameter and its values are optional. You can specify either of the following values:

NO Indicates that the TIP should not attempt automatic connection.

YES Indicates that the TIP should attempt automatic connection.

If you specify this parameter without a value, the value of YES is used. If you omit this parameter, the default is unknown and possibly undefined.

BR PARAMETER

The BR parameter determines whether your site-written TIP associates data control functions with the pressing of the break function key. The break function key is usually labeled BREAK, ATTN, INTER, INTERRUPT, or something similar.

If the break function key is not associated with data control, pressing the break function key only interrupts output. After input is completed, output probably resumes at the next character.

If the break function key is associated with data control, the following probably occurs when the terminal user presses the break function key:

If output is in progress, the TIP discards all output queued for the device.

If output is in progress or the terminal is idle, the TIP sends a user break 1 message upline (the function also associated with the character defined by the BI parameter).

After input occurs, output resumes with the next block transmitted from the host.

The BR parameter is optional. If you specify this parameter, the following values are recognized:

CCP Indicates that the TIP should perform the default action appropriate for the terminal class. Using this value is equivalent to omitting the parameter.

NO Indicates that the break function key has no control functions.

YES Indicates that the break function key has control functions.

If you omit the BR parameter or specify the value CCP, the default is unknown and possibly undefined.

BS PARAMETER

The BS parameter specifies the character to be used for the single-character deletion function. When the terminal user enters this character, your site-written TIP discards the preceding character transmitted by the device (unless the character has already been sent to the host). The character code used for the deletion function does not produce a physical backspace at the device unless the device also recognizes the code for that function.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

00, 01, or 02 (characters NUL, SOH, or STX)
3D, 7F, or 20 (characters *, DEL, or space)
30 through 39 (characters 0 through 9)
41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the BS parameter or specify the value CCP, the default is unknown and possibly undefined.
B1 PARAMETER

The B1 parameter specifies the character to be used as a user break 1 indicator. When the terminal user enters this character as the only character on a line, your site-written TIP discards the block of data being transmitted to the terminal and sends a user break 1 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAP interprets the user break 1 message as a job step interrupt from the terminal user.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the B1 parameter or specify the value CCP, the default value is unknown and possibly undefined.

B2 PARAMETER

The B2 parameter specifies the character to be used as a user break 2 indicator. When the terminal user enters this character as the only character on a line, your site-written TIP discards the block of data being transmitted to the terminal and sends a user break 2 message upline to the connected application program.

The effect this parameter has depends on the application program. For example, IAP interprets the user break 2 message as a job step interrupt from the terminal user.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the B2 parameter or specify the value CCP, the default value is unknown and possibly undefined.
EOT, or the end-of-packet indicator. The end-of-line and end-of-block characters are the current values of the ELX and ELB parameters.

The cursor positioning response used is probably determined by the current setting of the ELR and EBR parameters. The usual response moves the cursor to the beginning (left margin) of the next line on the screen; this is equivalent to a carriage return and linefeed operation.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that your site-written TIP should use the default setting appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that no cursor positioning response should occur.
- **YES** Indicates that the cursor should be repositioned.

If you omit this parameter or specify the value of CCP, the default value is unknown and possibly undefined.

### CT PARAMETER

The CT parameter specifies the character to be used as a flag for a terminal definition command. When the terminal user enters this character on a line, your site-written TIP should interpret the line as a command. Among other functions performed by CDC-written TIPS, commands are provided to determine or change the values you have established for the following parameters:

- **AB**
- **CI**
- **DLTO**
- **EP**
- **OC**
- **PW**
- **XLY**
- **BR**
- **CN**
- **DLX**
- **HN**
- **OP**
- **TC**
- **BS**
- **CP**
- **EBR**
- **IC**
- **PA**
- **XLC**
- **B1**
- **CT**
- **EBX**
- **IN**
- **PG**
- **XLT0**
- **B2**
- **DLC**
- **ELX**
- **LT**
- **PL**
- **XLX**

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters ~, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetic characters A through Z or a through z)

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit the CT parameter or specify the value CCP, the default value is unknown and possibly undefined.

### DBL PARAMETER

The downline block limit (DBL) parameter specifies the number of downline blocks that can be outstanding (unacknowledged) between the host computer and this terminal. The value you choose determines how many blocks of data the NPU queues from the total number of outstanding blocks (ABL parameter value) of the site specified by the DBZ parameter.

This parameter is optional. The DBL parameter has the following value range:

\[ 1 \leq \text{dbl} \leq 7 \]

The value you declare should be less than or equal to the application block limit (ABL parameter value) of the terminal. The host queues abl - dbl blocks; the NPU queues dbl blocks. Small DBL values use less NPU memory but cause slower data transfers.

If you omit the DBL parameter, the default value is unknown and possibly undefined.

### DBZ PARAMETER

The downline block size (DBZ) parameter specifies the maximum number of character bytes each downline block can contain. The value you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host. Larger DBZ values cause fewer disk accesses by the host. This value can be used by the application programs to divide downline messages into blocks.

This parameter is optional. The DBZ parameter has the following value range:

\[ 1 \leq \text{dbz} \leq 2043 \]

The value you declare should be chosen together with the value used for the DBL parameter.

If you omit the DBZ parameter, the default value is unknown and possibly undefined.

### DI PARAMETER

The DI parameter is a stand-alone keyword that specifies whether a device is initially enabled or disabled. An enabled device is configured and serviced as soon as the communication line becomes active. A disabled device is neither configured nor serviced when the line becomes active.

If you initially disable the device, a host or NPU operator can change the device status to enabled. This change can be made only when the line becomes active (when a call is received on a dialup line, or when communications are established on a hard-wired line).
This parameter is optional. If you specify the DI parameter, you must use one of the following values:

- **NO** Indicates that the device is initially enabled.
- **YES** Indicates that the device is initially disabled.

If you specify the DI parameter without a value, the default value of YES is used. If you omit this parameter, the default is unknown and possibly undefined.

**DLC PARAMETER**

The DLC parameter indicates the maximum number of characters that can be input in each single-message transparent mode upline message from this device. After the terminal user or the application program changes the device's input mode to transparent from normalized, your site-written TIP forwards a message block to the application and changes back from transparent mode to normalized mode when the device transmits the indicated number of characters.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that the TIP should use the default number of characters appropriate for the terminal class; using this value is equivalent to omitting the parameter.

1 \( \leq \) dlx \( \leq \) 4095

Indicates the maximum decimal number of characters that the terminal can transmit as a single transparent mode message.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**DLX PARAMETER**

The DLX parameter indicates the hexadecimal value of the character code that should end input of a single-message transparent mode message from the device. After the terminal user or the application program changes the device's input mode to transparent from normalized, your site-written TIP forwards a message block to the application and changes back from transparent mode to normalized mode when the device transmits this character.

You should select transparent mode input delimiters with care. The character code you declare as the DLX value must be the code of a character that the physical device can input. If the delimiter is a character that cannot be input (either because of device hardware limitations or because of the PA parameter value declared for the device), then the Terminal Interface Program cannot terminate transparent mode input and the device will be trapped in that mode of operation once it has begun.

This parameter is optional. The value that is valid for a given character depends on the character code set used by the terminal. You can use the following values:

- **CCP** Indicates that the TIP should use the default character code appropriate for the terminal class; using this value is equivalent to omitting the parameter.

0 \( \leq \) dlx \( \leq \) FF

Indicates the hexadecimal code that ends single message transparent input.

Values above 7F should not be used unless the PA parameter value of N or I is used. Codes above 7F might not be seen by the TIP unless the eighth (parity) bit of each input byte is defined as data.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**DLTO PARAMETER**

The DLTO parameter specifies whether a 200- to 400-millisecond timeout on the communication line ends single message transparent mode input. After the terminal user or the application program changes the device's input mode to transparent from normalized, your site-written TIP forwards a message block to the application and changes back from transparent mode to normalized mode when the device stops transmitting for the indicated timeout period.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that the TIP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that a timeout does not end transparent mode input.
- **YES** Indicates that transparent mode input ends when a timeout occurs.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**DO PARAMETER**

The DO parameter specifies the device ordinal of the device within the terminal. This device ordinal provides a unique identifier to an application program for the device when more than one device of the same type is part of the terminal.

This parameter is optional. However, the Remote Batch Facility requires a device ordinal for each passive device. Passive devices with a terminal class of 200UT or 734 implicitly have device ordinals of 1. For passive terminals with a TC value of 714 or 714X, the device ordinal must be unique if the device communicates with RBF. (An implicit default value of 1 exists when there is only one device of each type owned by the same owning console.) The DO parameter is the only device definition parameter with this uniqueness requirement.
If you specify this parameter, you must use a value in the range:

$$1 \leq \text{devord} \leq 7$$

If you omit this parameter, the default is unknown and possibly undefined.

**EBO PARAMETER**

The EBO parameter indicates the event that identifies an end-of-block condition. During input, messages are transmitted upline as soon as an end-of-line code (or message-forwarding code sequence) or an end-of-block condition is detected.

When some devices perform input, they use code sequences or events to indicate the end-of-line and end-of-block conditions. (For example, the end-of-block sequence from a mode 4 device is ESC A.) Code sequences and events cannot be declared as values for the EBO parameter. The EBO parameter allows you to set the end-of-block condition to one of these code sequences or events.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that your site-written TIP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **EL** Indicates that the default end-of-line character code or code sequence for the terminal class should be the end-of-block condition indicator. This value causes the network to treat a single input message the same as a multiplemessage block (output to the terminal can occur after each input message, instead of after all messages in a block).

If you omit this parameter or specify the value CCP, the end-of-block condition indicator is probably the value declared for the EBX parameter. If no value is declared for the EBX parameter, the end-of-block condition might be undefined.

**EBR PARAMETER**

The EBR parameter indicates the appropriate cursor positioning response whenever a block of input ends. A block of input ends when your site-written TIP detects the currently defined end-of-block condition, which is either a character code or the end-of-packet sequence. The end-of-block condition is determined by the EBO or EBX parameter value. Whether cursor positioning occurs probably is determined by the CP parameter value.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that the TIP should perform the default response appropriate for the terminal class; using this value is equivalent to omitting the parameter.

**ELO PARAMETER**

The ELO parameter indicates the event that identifies an end-of-line condition (an end-of-logical line or message-forwarding signal). During input, a message is transmitted upline as soon as an end-of-line code (or message-forwarding code sequence) or an end-of-block condition is detected.

When some devices perform input, they use code sequences or events to indicate the end-of-line and end-of-block conditions. Code sequences and events cannot be declared as values for the ELX parameter. The ELO parameter allows you to set the end-of-line indicator to one of these sequences or events.

If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphanumeric characters A through Z or a through z)

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.
This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that the TIP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **EB**: Indicates that the current end-of-block character code or code sequence for the terminal class should be the end-of-line condition indicator. This value causes any default end-of-line codes or code sequences to be sent upline as data within a single message.

If you omit this parameter or specify the value CCP, the end-of-line condition indicator probably is the value declared for the ELX parameter. If no value is declared for the ELX parameter, the end-of-line condition indicator is unknown and might be undefined.

### ELR Parameter

The ELR parameter indicates the appropriate cursor positioning response whenever a message (logical line) of input ends. A logical line of input ends when your site-written TIP receives the currently defined end-of-line character (ELX parameter value). Whether cursor positioning occurs probably is determined by the CP parameter value.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that the TIP should perform the default response appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **CL**: Indicates that the TIP should perform a carriage return and linefeed operation (move the cursor left and down to the beginning of the next physical line).
- **CR**: Indicates that the TIP should perform a carriage return operation (move the cursor left to the beginning of the current physical line).
- **LF**: Indicates that the TIP should perform a linefeed operation (move the cursor down to the next physical line).
- **NO**: Indicates that the TIP should not reposition the cursor.

If you omit this parameter or specify the value CCP, the default is unknown and might be undefined.

### ELX Parameter

The ELX parameter identifies the character code that ends a message (logical line) from the device. When your site-written TIP detects this code in input, it should forward the message upline.

This parameter is optional. If you specify a value, it must be either the reserved word CCP or a hexadecimal value for the 7-bit ASCII code that represents the character to be used (table A-2 in appendix A lists all of the codes in the 7-bit ASCII code set).

You cannot use any of the following values:

- 00, 01, or 02 (characters NUL, SOH, or STX)
- 3D, 7F, or 20 (characters =, DEL, or space)
- 30 through 39 (characters 0 through 9)
- 41 through 5A or 61 through 7A (alphabetical characters A through Z or a through z)

If the terminal does not use an ASCII character set, you should choose a character that has a unique translation to a character in the 7-bit ASCII code set.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

### EP Parameter

The echoplex (EP) parameter causes or prevents the echoing of input characters back to the output mechanism of the device. Echoplexing is normally required when the device operates in full-duplex mode and no echoing is performed by hardware between the device input hardware and your site-written TIP.

This parameter is optional. If you specify the EP parameter, you must use one of the following values:

- **CCP**: Indicates that the TIP should echo input if that is the appropriate default action for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that the TIP should not echo input characters.
- **YES**: Indicates that the TIP should echo input characters.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

### HD Parameter

The HD parameter specifies whether or not the full host availability display (HAD) is presented to the terminal user. This parameter is optional and is valid only for console devices.

If you specify this parameter, you must use one of the following values:

- **NO**: Indicates that the full host availability display is not presented to the terminal user. The terminal user receives only the host status message and the prompt message.
- **YES**: Indicates that the full host availability display is presented to the terminal user.

If you omit this parameter, the default is unknown and possibly undefined.

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HN PARAMETER

The HN parameter identifies the node number of the host that a console device and any associated batch devices are connected to unless another path is selected by the terminal user.

This parameter is optional and is valid only for console devices. If you declare this parameter, you must use one of the following values:

**NONE**
Indicates that no node number is specified. This has the same effect as not declaring the parameter. A value of NONE cannot be declared if AUTOCON is also specified and there are logical links to more than one host terminating in the NPU being defined.

\[1 \leq \text{hn} \leq 255\]
Indicates the node number of the host that the console device and any associated batch devices are to be connected to.

The value declared for the HN parameter must be the same as the NODE value in a COUPLER statement within the same network definition. If all the COUPLER statements for all the logical links to the NPU being defined have equal HNAME parameters, the NDL processor provides a default host node. The default host node is the last coupler specified. If the HN parameter is not specified, the terminal user must select a host before a connection can be made. If the AUTOCON parameter is specified, then the HN parameter must also be specified.

IC PARAMETER

The IC parameter specifies whether or not the input mechanism of the device supports an ASCII DC3 code (X-OFF character) as a signal to stop input and an ASCII DC1 code (X-ON character) as a signal to resume input. Your site-written TIP transmits these codes to control input flow when the device can support them.

This parameter allows you to configure a device so that input from an intelligent terminal such as a personal computer or from a cassette mechanism can be interrupted and restarted as needed without terminal user intervention. The TIP sometimes needs to suspend input because the volume of network traffic has temporarily used all available storage space.

You should be careful that this parameter is appropriately defined for the device hardware that actually uses the line. These codes are used for many purposes by device manufacturers; receiving either code can have effects other than resuming or stopping input.

This parameter is optional. If you specify this parameter, you must use one of the following values:

**CCP**
Indicates that the TIP should use the default appropriate for the terminal class; using this value is equivalent to omitting the parameter.

**NONE**
Indicates that the TIP cannot use X-ON and X-OFF characters to control input.

**YES**
Indicates that the TIP can use X-ON and X-OFF characters to control input.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

IN PARAMETER

The IN parameter identifies the input mechanism and the input message blocking of the device. (Terminal users might have a similar command that also defines whether input is in transparent mode or normalized mode; you cannot configure a device to begin accessing the network in transparent mode.)

As the input device, you can specify either:

- The keyboard
- The paper tape reader

As the input transmission mode, you can specify either:

- **Normalized line mode (one message or logical line per block)**
- **Normalized block mode (one or more logical lines collected into a block before it is transmitted. Cursor positioning at linefeed and end-of-line is not performed and output is not sent until end-of-block is reached.)**

This parameter is optional. Possible values are:

- **BK**
  Indicates keyboard input in block mode.
- **CCP**
  Indicates that the TIP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **KB**
  Indicates keyboard input in line mode.
- **PT**
  Indicates paper tape input in block mode (an X-OFF character functions as a fixed end-of-block condition indicator).

When the IN value is set to PT, your TIP should send an ASCII DC1 code (X-ON character) to start the paper tape reader, if the device supports that interpretation of the code. The X-ON code is issued after the end of a message is output to the device and the message empties the TIP's output queue for the device.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

LI PARAMETER

The LI parameter specifies the number of idle characters to insert in the downline data after a linefeed code. The number of idle characters inserted must be sufficient to provide the time needed by the terminal to physically move the carriage of the device to its next line for output.
This parameter is optional. If you declare this parameter, you must use the reserved word CCP or a value in the following range:

\[ 0 \leq I \leq 127 \]

If you omit the LI parameter or specify the value CCP, the default is unknown and possibly undefined.

**LK PARAMETER**

The LK parameter specifies whether unsolicited messages from the NPU or host operator can appear at the terminal. This parameter is optional.

If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that your site-written TIP should use the default mode appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that unsolicited messages should be delivered to the terminal as soon as received by your site-written TIP.
- **YES**: Indicates that unsolicited messages should be discarded (locked out).

If you omit this parameter or specify the value CCP, the default value is unknown and possibly undefined.

**MCI PARAMETER**

The MCI parameter specifies the delay after a carriage return is output. This delay is in 4-millisecond increments. This value is used by CCP to compute the number of idle characters output.

This parameter is optional. The MCI parameter has the following value range:

\[ 0 \leq \text{mci} \leq 250 \]

If you omit the MCI parameter, the default value is unknown and possibly undefined.

**MLI PARAMETER**

The MLI parameter specifies the delay after a line feed is output. This delay is in 4-millisecond increments. This value is used by CCP to compute the number of idle characters output.

This parameter is optional. The MLI parameter has the following value range:

\[ 0 \leq \text{mli} \leq 250 \]

If you omit the MLI parameter, the default value is unknown and possibly undefined.

**OC PARAMETER**

The OC parameter specifies whether or not the output mechanism of the device sends an ASCII DC3 code (X-OFF character) as a signal for your site-written TIP to interrupt output and an ASCII DC1 code (X-ON character) as a signal for the TIP to resume output. The TIP might accept these codes for control of output flow by devices that must periodically interrupt output to perform such functions as emptying buffers to offline storage devices. DC1 and DC3 codes used in this manner are probably discarded by the TIP.

You should only use this parameter when the device actually using the line requires it. The DC1 and DC3 codes can be sent for many purposes by terminal users; either code in input might be intended as data for the host application program.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP**: Indicates that the TIP should use the default appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO**: Indicates that the TIP should ignore X-ON and X-OFF characters in input; output control by the device is unnecessary.
- **YES**: Indicates that the TIP should recognize X-ON and X-OFF characters in input as output control by the device.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**OP PARAMETER**

The OP parameter identifies the output mechanism, page width processing requirement, and page length processing requirement of the device. Your site-written TIP might support these output mechanisms:

- A console screen
- A hardcopy mechanism, such as a printer
- A paper tape punch

The TIP might perform one of these processing actions when a finite page width is reached:

- Inserts the codes appropriate to return the cursor or carriage to the beginning of the next physical line.
- Inserts no codes, which performs no action.

If the device has a page width of 0, the second choice is probably used. Refer to the PW Parameter description.
Your site-written TIP might perform one of these processing actions when a finite page length is reached:

- Inserts the codes appropriate to cause the cursor or carriage to move to the next page (clear screen, formfeed, and so forth).
- Inserts no codes, which performs no action.

If the device has a page length of 0, the second choice is probably used. Refer to the PL Parameter description.

This parameter is optional. If you specify the OP parameter, you must use one of the following values:

- **CCP**: Indicates that the TIP should use the default options appropriate for the terminal class; using this value is equivalent to omitting the parameter.

- **DI**: Indicates that the console display screen, as used, no codes should be inserted when page width is reached (the device does its own line folding), and codes should be inserted when page length is reached.

- **PR**: Indicates that a hardcopy printer is used, codes should be inserted when page width is reached (the device does not do its own line folding), and codes should be inserted when page length is reached.

- **PT**: Indicates that a paper tape punch is used, lines should be folded, but codes should not be inserted when page length is reached, and page wait is not effective.

When the OP value is set to PT, your TIP might send an ASCII DC1 code (X-OFF character) at the end of the message with postprint format control.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**PA PARAMETER**

The **PA** parameter indicates the processing your site-written TIP should perform for the parity bit within each character byte of upline or downline data. The TIP might process the parity bit of all upline character codes in one of five ways:

- Ignores the input byte parity bit and sets it to zero after input. Converts the byte to an ASCII code if the device is operating in normalized mode, then forwards the byte upline to the application program. This is called zero parity processing.

- Checks the input byte parity bit to ensure that it is set to zero or one, as necessary to give the byte an even number of bits; odd settings are indicated to the receiving application program as parity errors. Sets the parity bit to zero after input, converts the byte to an ASCII code if the device is operating in normalized mode, then forwards the byte upline to the application program. This is called even parity processing.

Checks the input byte parity bit to ensure that it is set to zero or one, as necessary to give the byte an even number of bits; odd settings are indicated to the receiving application program as parity errors. Sets the parity bit to zero after input, converts the byte to an ASCII code if the device is operating in normalized mode, then forwards the byte upline to the application program. This is called zero parity processing.

Ignores the input byte parity bit. If the device is operating in normalized mode, sets the parity bit to zero, converts the byte to an ASCII code, and then forwards the byte upline to the application program. If the device is operating in transparent mode, forwards the 8 bits unchanged to the application (for devices that send 8-bit bytes, this allows the application program to receive bit 7 as data). This is called no parity processing.

Ignores the input byte parity bit. If the device is operating in normalized mode, sets the parity bit to zero, converts the byte to an ASCII code, and then forwards the byte upline to the application program. If the device is operating in transparent mode, ignore the parity bit when checking for transparent mode input delimiters. Forward the 8 bits unchanged to the application in the same way as for no parity. This is called ignore parity processing.

The TIP might also process the upper bit (bit 7) of all downline character code bytes in one of four ways:

- If the device is operating in normalized mode, the TIP converts the lower seven bits of the byte, if necessary, to the code set used by the device. The parity bit in the output byte is set to zero, regardless of the setting of bit 7 in the downline byte. This is called zero parity processing.

- If the device is operating in normalized mode, the TIP converts the lower seven bits of the byte, if necessary, to the code set used by the device. The parity bit in the output byte is set to zero or one, as necessary to give the byte an even number of set bits; the setting of bit 7 in the downline byte is ignored. This is called even parity processing.

- If the device is operating in normalized mode, the TIP converts the lower seven bits of the byte, if necessary, to the code set used by the device. The parity bit in the output byte is set to zero or one, as necessary to give the byte an odd number of set bits; the setting of bit 7 in the downline byte is ignored. This is called odd parity processing.

- If the device is operating in normalized mode, the TIP converts the lower seven bits of the byte, if necessary, to the code set used by the device. The parity bit in the output byte is set to zero, regardless of the setting of bit 7 in the downline byte. This is called no parity processing.
You can specify one of these input and output processing options to match the parity bit input processing performed by the device and the output processing expected by it. If the device will operate in transparent mode, you must specify either the no parity or the ignore parity option for an application program and the device to exchange hexadecimal codes with values between 7F and FF (using bit 7 as data).

No parity and ignore parity processing differ only in the way that a transparent input delimiter is recognized. For both PA=N and PA=I, all 8 bits are treated as data during transparent input and output. For PA=N, a transparent input delimiter is recognized when the 8-bit byte input from the device matches the 8-bit byte specified as the delimiter. For PA=I, a transparent input delimiter is recognized when the bottom 7 bits of the byte input from the device match the bottom 7 bits of the specified delimiter; the parity bit is ignored.

This parameter is optional. If you specify the PA parameter, you must use one of the following values:

- **CCP** Indicates that the TIP performs the parity processing appropriate as a default for the terminal class; using this value is equivalent to omitting the parameter.
- **E** Indicates that the TIP should perform even parity processing for both input and output bytes.
- **I** Indicates that the TIP performs ignore parity processing for both input and output bytes.
- **N** Indicates that the TIP should perform no parity processing for both input and output bytes.
- **O** Indicates that the TIP should perform odd parity processing for both input and output bytes.
- **Z** Indicates that the TIP should perform zero parity processing for both input and output bytes.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**PG PARAMETER**

The PG parameter specifies whether your site-written TIP should wait at each output page boundary for terminal user acknowledgment before it displays the next page of data. In certain situations, page waiting can occur other than at page boundaries; the TIP might produce a prompting message (OVER..) when this type of page waiting occurs. The user's response to page waiting is entry of a line, usually empty.

The TIP probably views a new page as beginning at the start of each downline message. The TIP calculates the length of a page from the current values of the page width and page length (see PW and PL Parameter descriptions). If the page width is infinite (PW=0), a page consists of one line less than the number of logical lines specified as the page length. If the page width is finite (PW is nonzero), a page consists of one line less than the number of physical lines specified by the page length; the TIP calculates the number of physical lines by dividing each logical line into units less than or equal to the page width.

This parameter is optional. If you specify this parameter, you must use one of the following values:

- **CCP** Indicates that the TIP should use the default setting appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **NO** Indicates that page waiting should not occur.
- **YES** Indicates that page waiting should occur.

When you specify PG=YES, you should also specify a nonzero value for the PL parameter. A TIP cannot perform page waiting at the boundaries of infinitely long pages (PL=0).

If you omit the PG parameter or specify a value of CCP, the default is unknown and possibly undefined.

**PL PARAMETER**

The PL parameter specifies the number of physical lines per page of output for the device. If the device is configured for page waiting (PG parameter), any message containing more lines of output than the page length should be interrupted by your site-written TIP for a page waiting response from the terminal user. The interruption probably occurs after line pl - 1 is output. If the device uses a hardcopy output mechanism (OP of PR, such as is normal for terminal classes 2741 or M33), your site-written TIP should insert form feed codes at page length boundaries.

This parameter is optional. If you specify the PL parameter, you must use one of the following values:

- **CCP** Indicates that the TIP should use the default page length appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **0** Indicates an infinite page length. An infinite page length means that no page waiting occurs and no form-feed codes are inserted.
- **8 ≤ pl ≤ 255** Indicates the number of physical lines per page.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.
PRI PARAMETER

The PRI parameter is a stand-alone keyword that indicates whether data to or from the device is to have traffic priority over that to or from other devices in the network. Data to or from a device that does not have traffic priority is suspended to relieve network congestion before data to or from terminals with traffic priority is suspended. Interactive terminals should usually be given traffic priority over batch devices.

This parameter is optional. If you specify the PRI parameter, you must use one of the following values:

- **NO** Indicates that the device should not have data traffic priority.
- **YES** Indicates that the device should have data traffic priority.

If you declare this parameter without a value, the value of YES is used. If you omit this parameter, the default is unknown and possibly undefined.

PW PARAMETER

The PW parameter defines the number of characters per physical line of output for this device. This physical line length is also called the page width.

For console devices (DT of CON) with a printer defined as the output mechanism (OP of PR), output lines longer than pw characters are divided into lines of pw or fewer characters each. For console devices with a display defined as the output mechanism (OP of DI), output lines longer than pw characters are not divided but are counted as more than one line for page length calculations; if the PW value for a device is inappropriate, loss of visual fidelity can occur (the application program might divide the data into lines that are too short or too long for the screen's capacity, instead of allowing the terminal to wrap lines when needed).

This parameter is optional. If you specify the PW parameter, you must use one of the following values:

- **CCP** Indicates that CCP should use the default value appropriate for the terminal class; using this value is equivalent to omitting the parameter.
- **0** Indicates that the device has an infinite page width. An infinite page width probably means that physical line length has no effect on output formatting.
- **20 ≤ pw ≤ 255** Indicates that the device can support physical lines no longer than the indicated decimal value.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

P90 THROUGH P99 PARAMETERS

These ten parameters indicate the hexadecimal field value to use for the corresponding field number within configuration information transmitted for this device to your site-written Terminal Interface Program. Released versions of the CDC-written TIPs do not use these ten field number/field value pairs.

These parameters are optional. If you specify a value, it must be within the following range:

- **0 ≤ fv91 ≤ FF**

If you omit these parameters, there are no default values.

RTS PARAMETER

The RTS parameter specifies whether RTS input flow control is in effect on the line.

If this parameter is selected, CCP drops the RS-232C Request to Send (RTS) signal when it needs to regulate input flow on a line. When CCP can again receive input on the line, it will raise the RTS signal and the flow of input resumes.

RTS input flow control can be used to regulate input if and only if the following two conditions are satisfied. The sending device (for example, the terminal connected to CCP) must be able to recognize one of the RS-232C signals as a sign to stop and start transmission of data. In addition, the connection between the NPU and the terminal must be wired such that RTS from CCP is received as the signal recognized by the terminal, most commonly Clear to Send (CTS).

This parameter is optional; it is valid for only asynchronous devices. If you specify the RTS parameter, you must use one of the following values:

- **NO** Indicates that the RTS signal is not raised or dropped to effect input flow control.
- **YES** Indicates that the RTS signal is raised and dropped to effect input flow control.

If you omit this parameter, the default is unknown and possibly undefined.

SDT PARAMETER

The SDT parameter specifies the subdevice type of the device you are defining. The subdevice type is the set of external characteristics of interest to the network software. This parameter is optional.

The following values are allowed definitions of a printer character set:

- **A6** Indicates that the device uses 64 ASCII characters.
- **A9** Indicates that the device uses 95 ASCII characters.
- **B6** Indicates that the device uses the 64-character CDC scientific (BCD) character set.
This parameter is optional. If you specify this parameter, you must use one of the following values:

**STREAM PARAMETER**

The STREAM parameter defines the stream number used within the terminal to address data to or from the device. This stream number should be unique for each device of the same type within the terminal. If the terminal has plotters, the stream number for each plotter should be unique among all plotters and card punches within the terminal.

This parameter is optional. If you specify this parameter, you must use one of the following values:

**AUTOREC**

Specifies that the stream number is to be determined by your site-written TIP when automatic recognition of the terminal occurs (valid only if the corresponding LINE or GROUP statement contains the AUTO parameter); using this value is equivalent to omitting the parameter.

1 ≤ streamno ≤ 7

Indicates the stream number associated with the device within the terminal.

If you omit this parameter or specify the value AUTOREC, the stream number determined during automatic recognition of the line is used.

**TA PARAMETER**

The TA parameter defines the terminal address of the device within the terminal device cluster.

The TA parameter is optional.

If you specify this parameter, you must use the following value:

**AUTOREC**

Indicates that your site-written TIP should determine the terminal address code during automatic recognition of the terminal (valid only if the AUTO parameter is used in the corresponding LINE or GROUP statement); using this value is equivalent to omitting the parameter.

If you omit this parameter or specify the value AUTOREC, the value determined by automatic recognition of the line is used.

**UBL PARAMETER**

The upline block limit (UBL) parameter specifies the number of upline blocks that can be outstanding (unacknowledged) between this terminal and an application program. The value you choose is independent of the ABL and DBL parameters.

You should choose a value that is larger than the maximum number of logical lines the terminal user can enter before output from the application program in the host must occur. A fixed number of input messages might have significance to an application program. If such an application does not perform output until receiving that number of input messages and if you choose a UBL value smaller than this number, the application program becomes dead-locked (it waits for blocks of data that the TIP might discard because the block limit has been reached for upline queuing). If the device must receive output before it can begin additional input, the device also becomes deadlocked by this situation.

This parameter is optional. The UBL parameter has the following range of values:

1 ≤ ubl ≤ 31

If you omit the UBL parameter, the default is unknown and possibly undefined.

**UBZ PARAMETER**

The upline block size (UBZ) parameter specifies the maximum number of character bytes each upline block can contain. The TIP probably divides each message from the terminal into blocks of the size you choose. The size you choose affects how much memory is needed to store the outstanding (unacknowledged) blocks of data in the NPU and the host.
You should choose a value that allows most of the logical lines entered by the device to fit into a single block so that messages need not be divided into multiple network blocks. You should also choose a value that can be efficiently manipulated by the host application program.

This parameter is optional. The UBZ parameter has the following range of values:

\[ 0 \leq ubz \leq 2043 \]

If you specify 0, your site-written TIP should send an upline block whenever it receives 100 characters, or it detects a linefeed code, or when the page width is reached.

The value you declare should be chosen together with the value used for the UBL parameter. The NDL processor rounds the value you supply to the next multiple of 100 bytes, as follows:

<table>
<thead>
<tr>
<th>Value Supplied</th>
<th>Value Used in File</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 \leq ubz \leq 100</td>
<td>100</td>
</tr>
<tr>
<td>101 \leq ubz \leq 200</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>1901 \leq ubz \leq 2000</td>
<td>2000</td>
</tr>
</tbody>
</table>

The NDL processor issues an informative message if it alters the value you specify.

For the Message Control System (MCS), the upline block size must be set to 0.

If you omit the UBZ parameter, the default is unknown and possibly undefined.

**XBZ PARAMETER**

The transmission block size (XBZ) parameter specifies the maximum number of character bytes each block sent to the terminal can contain. Your site-written TIP divides downline blocks as necessary to create a block of the specified number of characters. The value you choose should be less than or equal to the size of any buffer memory within the terminal.

This parameter is optional. The XBZ parameter has the following range of values:

\[ 200 \leq xbz \leq 2043 \]

If you omit the XBZ parameter, the default is unknown and possibly undefined.

**XLC PARAMETER**

The XLC parameter indicates the maximum number of characters that can be input in each message of multiple-message transparent mode input from this device. After the terminal user or the application program changes the device's input mode to transparent from normalized, the following occurs. When the device transmits the given number of characters, a message block is forwarded to the application and the device remains in transparent mode.

This parameter is optional. You can use the following values:

- **CCP**
  - Indicates that the TIP should use the default number appropriate for the terminal class; using this value is equivalent to omitting the parameter.
  
- **1 \leq xlc \leq 4095**
  - Indicates the maximum decimal number of characters that the terminal can transmit as one multiple-message transparent mode message.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**XLTO PARAMETER**

The XLTO parameter specifies whether a 200- to 400-millisecond timeout on the communication line ends multiple-message transparent mode input. After the terminal user or the application program changes the device's input mode to transparent from normalized, your site-written TIP probably forwards a message block to the application and changes back from transparent mode to normalized mode when the device stops transmitting for the indicated timeout period.

This parameter is optional. If you specify the XLTO parameter, you can use one of the following values:

- **CCP**
  - Indicates that the TIP should use the default choice appropriate for the terminal class; using this value is equivalent to omitting the parameter.
  
- **NO**
  - Indicates that a timeout does not end transparent mode input.
  
- **YES**
  - Indicates that transparent mode input ends when a timeout occurs.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

**XLX PARAMETER**

The XLX parameter indicates the hexadecimal value of the character code that should cause upline transmission of a message in multiple-message transparent mode. If this character code is also used as the value for the XLY parameter and is input twice in succession, the device will be put back in normalized input mode as determined by the IN parameter.
This parameter is optional. The value that is valid for a given character depends on the character code set used by the terminal. You can use the following values:

**CCP**

Indicates that the TIP should use the default character code appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[ 0 \leq xly \leq FF \]

Indicates the hexadecimal code that ends each message within multiple-message transparent input.

Values above 7F should not be used unless the PA parameter value of N or I is used. Codes above 7F might not be seen by the TIP unless the eighth (parity) bit of each input byte is defined as data.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

### XLY PARAMETER

The XLY parameter indicates the hexadecimal value of the character code that should end multiple-message transparent mode operation. After the terminal user or the application program changes the device’s input mode from normalized to transparent, your site-written TIP probably changes back from transparent mode to normalized mode when the device transmits this character. This character code probably does not change the device’s input mode if the code is also used as the value for the XIX parameter (unless it is input twice in succession).

You should select transparent mode input delimiters with care. The character code you declare as the XLY value must be the code of a character that the physical device can input. If the delimiter you declare is a character that cannot be input (either because of device hardware limitations or because of the PA parameter value declared for the device), then the Terminal Interface Program cannot terminate transparent mode input and the device will be trapped in that mode of operation once it has begun.

This parameter is optional. The value that is valid for a given character depends on the character code set used by the terminal. You can use one of the following values:

**CCP**

Indicates that the TIP should use the default character code appropriate for the terminal class; using this value is equivalent to omitting the parameter.

\[ 0 \leq xly \leq FF \]

Indicates the hexadecimal code that ends multiple-message transparent input.

Values above 7F should not be used unless the PA parameter value of N or I is used. Codes above 7F might not be seen by the TIP unless the eighth (parity) bit of each input byte is defined as data.

If you omit this parameter or specify the value CCP, the default is unknown and possibly undefined.

### BUFFERING OF DATA

Sections 4 through 6 end with data buffering guidelines based on experience with CDC-written TIPs supporting CDC-defined devices in CDC-defined terminal classes. Those guidelines presume CDC-defined line types and CDC-written host application programs.
The local division describes those components of
the network for which the Network Validation Facil-
ity in a host computer provides access control.
These components are network application programs,
device users, and directions for making and receiv-
ing application-to-application connections. These
components are considered local to that host.

You can omit the local division from an NDL program
if a new local configuration file is not needed.
If no local configuration file exists for a host,
you must create one, even if it is empty. There
must be one LCF for each host in the network.

One local configuration file is created for each
local division in your program. You can have more
than one division so that you can create local con-
figuration files for more than one host or alternate
files for each host.

Only the local division of an NDL program applies
to CDCNET networks.

**LFILE STATEMENT**

The LFILE statement names the local configuration
file to be created. It must be the first statement,
other than a COMMENT statement, in the local
division. LFILE can be the only statement in the
division if a file must be created but no local
configuration requirements exist.

The NOS local file name specified in the LFILE
statement should not be the same as that of another
local file assigned to your job. The local con-
figuration file is described in more detail in section 9.

The format of the LFILE statement is shown in figure
8-1. An example of a valid NFIL statement is

```
LOCFILE: LFILE.
```

This statement creates a local configuration file
with the NOS local file name LOCFILE.

```
lfile: LFILE.
```

**USER STATEMENT**

The USER statement can provide the login parameter
values required by the Network Validation Facility
(NVF) for a console and any associated batch devices
when a terminal becomes active. This statement can
also restrict access by a device to more than one
network application program. The USER statement
has the format shown in figure 8-2.

You can supply some or all of the login information
(except a password value), so that the console user
need not enter a value in response to each login
prompt. NVF prompts the user for any values that
you do not supply and omits prompts for values that
you do supply. No prompt for password occurs when
you supply a user name.

If you supply a mandatory value (MFAM, MUSER, or
MAPPL parameter), the user is not prompted for an
alternative. The user cannot override any supplied
mandatory value and cannot specify a password.

If you supply a default value (DFAM, or DUSER
parameter), the user is prompted for an alternative.
The user can override any supplied default value
can specify a password.

If you specify a primary value (PFAM, PUSER, or
PAPPL parameter), the user is not prompted for an alternative.
However, the user can override the supplied value.

The device names specified should match device names
in the DEVICE or TERMDEV statements for the NCF
being used by the network. When GROUP statements
are used in the NCF, you must supply the NDL-
generated device names. The NDL processor does not
diagnose unmatched names; if no match exists, the
USER statement has no effect.

The following USER statement restricts access to a
single network application program, without login
dialog:

```
DEVA09: USER, MFAM=0, MUSER=NHP7600, MAPPL=IAF.
```

This statement causes all users of the console
called DEVA09 to be automatically logged into IAF
using the NOS system default family name and the
user name NHP7600. No password validation occurs
during this automatic login, and IAF is the only
network application program that DEVA09 is permitted
to access.

The following USER statement supplies unrestricted
access to a single network application program:

```
DEVA09: USER, DFAM=0, DUSER=NHP7600, PAPPL=IAF.
```
device: USER[,MFAM=manafam,MUSER=manausr,MAPPL=manappl,DFAM=deftfam,DUSER=deftusr,PFAM=pfam,]

[PUSER=puser,PAPPL=primapp].

device The element name of the terminal device for which the information is being specified. This name should be an element name specified on or generated by NDL for a TERMDEV or DEVICE statement in the network division that creates the network configuration file for the network using this local configuration file.

manafam The mandatory family name to use during automatic login of the device user. If MFAM is supplied, the user is never prompted for entry of a family name. If MFAM=NONE is specified, the NOS system default family name is used; if MFAM is omitted or MFAM=NONE is specified, the user is always prompted for entry of a family name. Valid values for manafam are determined by each site. This parameter cannot be specified if the DFAM or PFAM parameter is specified.

manausr The mandatory user name to use during automatic login of the device user. If MUSER is supplied, the user is never prompted for entry of a user name or password; if MUSER is omitted or MUSER=NONE is specified, the user is always prompted for entry of a user name and password. Valid values for manausr are determined by each site. This parameter cannot be specified if the DUSER or PUSER parameter is specified.

manappl The mandatory application name to use during automatic login of the device user. If MAPPL is supplied, the user is never prompted for entry of an application program name; NVF connects the device to this program as soon as access validation is completed. If MAPPL is omitted or MAPPL=NONE is specified, the user is always prompted for entry of an application program name. The name must be that of an application program in the NOS common deck COMTNAP for the host using this local configuration file, or the value CS if the user is a network or diagnostic operator.

deftfam The default family name to use during login of the device user. If DFAM is supplied, the user can enter a null line in response to the family name prompt; if DFAM=0 is specified, the NOS system default family name is used; if DFAM is omitted or DFAM=NONE is specified, the user must respond to the family name prompt with a valid, nonblank entry. The value specified can be overridden if the user enters a nonblank line. Valid values for deftfam are determined by each site. This parameter cannot be specified if the MFAM or PFAM parameter is specified.

deftusr The default user name to use for the device during login. If DUSER is specified, the device user can enter a null line in response to the user name prompt; if such an entry occurs, the user is not prompted for a password; if DUSER is omitted or DUSER=NONE is specified, the device user must respond to the user name and password prompts with valid, nonblank entries. The value specified can be overridden if the user enters a nonblank line. This parameter cannot be specified if the MFAM or PFAM parameter is specified.

pfam The primary auto-login family name. If PFAM is specified, the terminal user is not prompted for a family name on the first login attempt. This parameter cannot be specified if MFAM or DFAM is specified.
puser The primary auto-login user name. If PUSER is specified, the terminal user is not prompted for a user name on the first login attempt. This parameter cannot be specified if MFAM or DUSER is specified.
primapp The default (primary login) application name to use during initial login of the device user. If PAPPL is supplied, the user is not prompted for entry of an application program name during the first login attempt after connection to the host occurs; NVF connects the device to this program as soon as access validation is completed. If PAPPL is omitted or PAPPL=NONE is specified, the user must respond to the application program name prompt with a valid, nonblank entry. The name must be that of an application program in the NOS common deck COMTNAP for the host using this local configuration file, or the value CS if the user is a network or diagnostic operator. The value specified is overridden if the user enters a nonblank line.

Figure 8-2. USER Statement Format
This statement causes all users of the console called DEVA09 to be logged into IAF using the NOS system default family name and the user name NHP7600 by simply responding to each NVF prompt with an empty input line (usually generated by pressing the carriage return key). Password validation occurs during this login only if a user volunteers a value. IAF is the first but not the only network application program that DEVA09 is permitted to access.

The following USER statement configures a remote batch console and its related devices for access to RBF. The console is prompted only for family name and user name; the terminal operator can respond to both prompts with empty input lines. Connection to RBF is automatic:

DEVA09: USER,DFAM=0,DUSER=NHP3456,PAPPL=RBF.

The network configuration defined for systems containing Centronics 533/536 and/or Hitachi 585 printers must include definitions for these printers. A USER statement is required to define each of these printers.

devicex: USER MFAM=family,MUSER=PRINTxy, MAPPL=PSU,

where xy is a number between 01 and 12, devicex is the name of the printer specified in the Network Configuration File (533/536 printers only), and family is the name of the family containing the user name PRINTxy.

PSU recognizes printers by the user name they log in with at the time they connect to PSU. Therefore, the printers must be defined under the user name PRINTxy to connect to the network. The user name PRINTxy must be validated for PSU.

**APPL STATEMENT**

The APPL statement defines special requirements for access to or execution of a network application program. APPL statements are not required for any CDC-written or site-written application program unless one of these requirements exists.

The format of the APPL statement is shown in figure 8-3. All APPL statement parameters apply to applications whether they are connected to CCP or CDCNET networks.

The CDC-written application programs are:

- Network Log Server (NETLS)
- Network Operator Facility (NOF)
- Network File Server (NETFS)
- Initialize MDI Server (INITMDI)
- Network Log Termination Utility (NLTERM)
- Interactive Facility (IAF)
- Interactive Transfer Facility (ITF)
- Message Control System (MCS)
- NOS/VE Interactive Facility (VEIAF)
- PLATO NAM Interface (PLATO)

Printer Support Utility (PSU)
Permanent File Transfer Initiator (PTF)
Permanent File Transfer Server (PTFS)
Queue File Transfer Initiator (QTF)
Queue File Transfer Server (QTFS)
Remote Batch Facility (RBF)
Transaction Facility (TAF)
Terminal Verification Facility (TVF)

Of these, the applications RBF, PTF, PTFS, QTF, QTFS, and TAF require special privileges as follows:

RBF: APPL,UID,PRU.
PTF: APPL,PRU,NETXFR,RS,MCXOPIYS=3.
PTFS: APPL,PRU,NETXFR,RS,MCXOPIYS=15
QTF: APPL,PRU,NETXFR,RS,MCXOPIYS=3.
QTFS: APPL,PRU,NETXFR,RS,MCXOPIYS=15.
TAF: APPL,UID.

These statements can be used regardless of whether the corresponding programs are installed in the host.

You could also define CDC-written programs with the statements:

IAF: APPL,PRIV.
MCS: APPL,PRIV.
PLATO: APPL,PRIV.
RBF: APPL,PRIV,UID,PRU.
TAF: APPL,PRIV,UID.
TVF: APPL.
PTF: APPL,PRIV,PRU,NETXFR,RS,MCXOPIYS=3.
PTFS: APPL,PRIV,PRU,NETXFR,RS,MCXOPIYS=15.
QTF: APPL,PRIV,PRU,NETXFR,RS,MCXOPIYS=3.
QTFS: APPL,PRIV,PRU,NETXFR,RS,MCXOPIYS=15.

These programs can execute without being defined as privileged, but this set of statements defines them that way to improve site security. Any program attempting to access the network (NETON) as one of these five programs but not meeting the entry point requirement is denied access. TVF must not have PRIV or PRIV=YES associated with it in an APPL statement.

The CDC-written application programs, NETLS, NETOU, NETFS, and NLTERM are defined with the statements:

NETLS: APPL,RS,PRIV.
NETOU: APPL,KDSP,RS,PRIV.
NETFS: APPL,KDSP,RS,PRIV.
NLTERM: APPL,KDSP.

To avoid possible problems with the integrity of the network and with validated users’ ability to access CDC-written network application programs, you should not allow use of the following names for site-written network application programs:

ALL IAF MLTF NS PTFS TCF
BYE INITMDI NETLS NUL QTF TVF
CS ITP NETLS NVF QTFS VEIAF
DOP LOGIN NETOS PFU RBF
FTS LOGOUT NETTU PLATO RNF
PTFS MCS NLTERM PSU SCF
HELLO MHF NOF PTF TAF

8-3
service: APPLC,UIDC=yn13,PRIVC=yn23,DIC=yn33,KDSPC=yn43,PRUC=yn53,NETXFRC=yn63,RSC=yn73,3

CMXC0PYS=mxcopys3.

service The element name of the application program being configured as a network resource. This must be the name used by the program in its Network Access Method NETON statement and is the name terminal users must specify when logging in to it. If mxcopys = 1, this name can contain up to seven letters and digits starting with a letter. If mxcopys > 1, then this name can contain a maximum of five characters. This name cannot assume the following reserved application names: ALL, BYE, CS, HELLO, LOGIN, LOGOUT, NS, NUL, or NVF.

yn1 An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter indicates whether the application program requires users to have unique identification. If UID or UID=YES is specified, only one terminal with a given user index and family name combination will be allowed connection with the application at a time. If UID is omitted or UID=NO is specified, more than one terminal at a time can be connected with the same combination of user index and family name.

yn2 An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter identifies whether the application program must have privileged application status to access the network. If PRIV or PRIV=YES is specified, the program cannot connect to the network unless it contains an SSJ= entry point. If PRIV is omitted or PRIV=NO is specified, the program can access the network whether or not it contains an SSJ= entry point.

yn3 An optional reserved word value (YES or NO) for an optional stand-alone keyword; this parameter specifies the status assigned to this program at network initiation. When DI or DI=YES is specified, the program is disabled at network initiation and cannot connect to the network until the HOP enables it. If DI is omitted or DI=NO is specified, the program is given an initial status of enabled unless the HOP specifies otherwise.

yn4 An optional reserved word value (YES or NO) which specifies whether the application program is allowed to use the NAM K-display. If KDSP or KDSP=YES is specified, the application is allowed to use the NAM K-display. If KDSP is omitted or KDSP=NO is specified, the application is not allowed to use the NAM K-display. KDSP is not supported for non-CDC applications.

yn5 An optional reserved word value (YES or NO) which specifies whether the application program is allowed to use the NAM PRU feature. If PRU or PRU=YES is specified, the application is allowed to use the NAM PRU feature. If PRU is omitted or PRU=NO is specified, the application is not allowed to use the NAM PRU feature. This parameter must be specified for the CDC supported applications RBF, QTF, PTF, QTFS, and PTFS. PRU is not supported for non-CDC applications.

yn6 An optional reserved word value (YES or NO) which specifies whether the application program is allowed to use the NAM file transfer capability NETXFRC. If NETXFRC or NETXFRC=YES is specified, the application is allowed to use NETXFRC. If NETXFRC is omitted or NETXFRC=NO is specified, the application is not allowed to use NETXFRC. This parameter must be specified for the CDC supported applications QTF, PTF, QTFS, and PTFS. NETXFRC is not supported for non-CDC applications.

yn7 An optional reserved word value (YES or NO) which specifies whether the application program is allowed to use the request startable capability. If the application is capable of supporting up to n number of connections (n is a parameter which the application program supplies to NAM), then if the RS parameter is specified, the first and each multiple of n+1st connection request to the application start up a new copy of the application, up to mxcopys number of applications. For each request startable application, a permanent file must be provided having the same user name that NAM is run under. The name of this file should be ZZxxxxx, where xxxxx is the first five characters of the application name.

mxcopys The maximum number of copies (1 £ mxcopys £ 15) of the application that can be simultaneously active on the host. If mxcopys is not specified, the default value of 1 is used. This parameter must be specified for the CDC-supported applications PTF, PTFS, QTF, and QTFS.

Figure 8-3. APPL Statement Format
Each valid user name in the NOS validation file (VALIDUS) has an internal identification value called a user index. Normally, each user name has a unique user index; however, it is possible for several user names to be assigned the same user index value.

The Network Validation Facility program checks the user index value currently associated with the terminal each time the terminal attempts connection to the network application program. If you used the unique identifier (UID) parameter for the program and another terminal with that index value is already connected to the program, the terminal requesting access receives a message indicating that the network application program is busy.

You should specify the UID parameter for RBF and TAF. These application programs route output files according to the combinations of user name and family name associated with the terminals they service. RBF and TAF output cannot be properly routed unless only one interactive terminal at a time with a given user name and family name combination is connected to the program.

If a network application program written by your site can support only one terminal with a given user name and family name login combination at a time, you should specify the UID parameter for it as well. Terminals capable of using the program can then use the same user name and family name combination for access to it without simultaneous access ever occurring.

If an application program should be available to terminal users only at certain times of the day, you can specify that it be initially disabled; the host operator can then enable it at the appropriate time. Unless an application program is enabled, it cannot access the network and a terminal cannot successfully log in to it. For example, suppose a program called TEST is configured by the statement

```
TEST: APPL.DI.
```

TEST logically exists as a network resource within the host computer but cannot successfully access the network (NETON) or be accessed by a terminal user until the host operator enables it and it is initiated. You will probably want to configure your site-written application programs this way until they are thoroughly debugged.

Any application program defined in the local configuration file must also be identified with the same name in the operating system common deck COMTNAP. COMTNAP is used by NVP to validate terminal user login sequences. Bits in the access word for each user name correspond to site-written application programs in COMTNAP; other bits correspond to CDC-supplied application programs.

When NVP is given a program name during the login procedure, it searches COMTNAP for that name. The entry for the name tells which bit in the access word must be set for access to the program to be permitted. More than one program in COMTNAP can specify the same access word bit, so there is no formal limit on the number of application programs that are network resources. However, you must take care that the correct access word bit is set for all user names that should have permission to access a given application program.

For example, a network definition with separately named copies of the same application program is legal. In this case, the COMTNAP entries for all of the copies can specify the same access word bit. Each access word bit would then identify a superset or class of application programs, rather than a separate program.

COMTNAP and access word use are described in further detail in the NOS Version 2 Installation Handbook.

**OUTCALL STATEMENT**

The OUTCALL statement is specified for each path to each application that is to be used for application-to-application connection requests from application programs in the host being defined. The OUTCALL statement has the format shown in figure 8-4.

If more than one path exists between the calling host and the destination host, you should use multiple OUTCALL statements. Multiple OUTCALL statements should be specified in order according to the priority of paths.

OUTCALL statements are used to define call request data for calls between:

- Two applications in a single host
- Two applications in adjacent hosts sharing a front-end
- Two applications in hosts connected by a trunk
- Two applications in hosts separated by an X.25 PSN or X.25 line

The OUTCALL statement identifies the following information:

- Addressing information used for calling an application program in another host or in the same host.
- Validation information used by NVP to verify that the requesting application program is allowed to make an OUTCALL request.
- Flow control information for the calling application and the network software to use on the application-to-application connection.
- The optional user facilities to be used for the connection (for connections via X.25 links).
- Optional call user data to be passed to a remote foreign host.
- Physical identifiers for which the NOS LID/PID table needs to be dynamically updated by NAM.

The call user data is limited to 128 bytes by NHP. Four bytes are required for the protocol identifier which is always present. This leaves 124 bytes for the SERVICE, DOMAIN, and UDATA parameters. Parameter length validation for the above parameters is done by processing the parameters in the order, SERVICE, DOMAIN, and UDATA while maintaining a cumulative count of the number of bytes entered into the call user data field. If the value specified for a parameter results in the total call user data length exceeding 128 bytes, that parameter value is declared in error.
OUTCALL, NAME1=name1, NAME2=pidname, NETOSD=path, NODE=srcnode, DNODE=dstnode

ACCLEV=aclev, PRI=yn1, DBL=dwnblim, ABL=dwnlsiz

HOST=dsthost, HOST=srchost, PORT=portnum, WS=windsiz, DPLS=dpls

DTEA=dtea, UBL=upblim, UBS=upbsize, FAC1=faccode, ..., FAC31=faccode

PRID=protid, SERVICE=service, DOMAIN=domain, UDATA=udata

name1  One of two keywords used to specify the OUTCALL block identifier. Name1 is required and can be from one to seven letters and digits only. A calling application program must specify both a name1 and a name2 to identify an OUTCALL block for use in establishing the connection to the called application program. Name 1 does not need to be specified for application programs that specify their own OUTCALL parameters. If the destination host application program is a CDC CYBER application program, the name1 parameter can specify the called application name. If name1 is not the application name on the CDC CYBER, the application name must be specified in the udata field.

name2  The second of two keywords used to specify the OUTCALL block identifier. Name2 is required (if PID is not specified) and can be from one to three letters and digits only. A calling application program must either explicitly or implicitly specify name2 unless an interhost application-to-application connection is required. This identifies an OUTCALL block for use in establishing the connection to the called application program. If the destination host application program is a CDC CYBER application program, the name2 parameter can specify the remote host identifier, which can be the remote host's machine identification.

pidname  If this keyword is specified, it serves the same purpose as if name2 were specified. In addition, it causes NAM to indicate network service availability in the NOS LID/PID table. For the applications PTFx/QTFx, the PID form of the NAME2 parameter must be used. The PID form must also be used for an application that supplies its own OUTCALL parameters. When the PID is specified, it must also be specified in the LDCMid file for this host. Pidname can be from one to three letters and digits long.

path  The network types and destination host that compose the application-to-application path. Inclusion of this parameter allows NDL to determine appropriate default values for other OUTCALL parameters. You can specify any of the following values:

<table>
<thead>
<tr>
<th>Value</th>
<th>Originating Network</th>
<th>Destination Network</th>
<th>Destination Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPO</td>
<td>CCP</td>
<td>CCP</td>
<td>NOS</td>
</tr>
<tr>
<td>PDD</td>
<td>CCP</td>
<td>CDCNET</td>
<td>NOS</td>
</tr>
<tr>
<td>DPO</td>
<td>CDCNET</td>
<td>CCP</td>
<td>NOS</td>
</tr>
<tr>
<td>DDO</td>
<td>CDCNET</td>
<td>CDCNET</td>
<td>NOS</td>
</tr>
<tr>
<td>PDV</td>
<td>CCP</td>
<td>CDCNET</td>
<td>NOS/VE</td>
</tr>
<tr>
<td>DDV</td>
<td>CDCNET</td>
<td>CDCNET</td>
<td>NOS/VE</td>
</tr>
<tr>
<td>PAA</td>
<td>CCP</td>
<td>AOS/VS</td>
<td>AOS/VS</td>
</tr>
<tr>
<td>DAA</td>
<td>CDCNET</td>
<td>AOS/VS</td>
<td>AOS/VS</td>
</tr>
<tr>
<td>PFF</td>
<td>CCP</td>
<td>FOREIGN</td>
<td>FOREIGN</td>
</tr>
<tr>
<td>DFF</td>
<td>CDCNET</td>
<td>FOREIGN</td>
<td>FOREIGN</td>
</tr>
</tbody>
</table>

If path is not specified, the default value of PPO is used.

srcnode  The decimal number (0 ≤ srcnode ≤ 255) specifying the source node of the logical link over which the application-to-application connection is made. The SNODE parameter should match the NODE value in a COUPLER statement used by the calling host as defined in the corresponding NCF. If srcnode is not specified, the default value of 0 is used for application-to-application connections within a single host.

dstnode  The decimal node number (0 ≤ dstnode ≤ 255) specifying the destination node of the logical link over which the application-to-application connection is to be made. For application-to-application connections over a host-to-host logical link, this value is equal to the DHOST value and a coupler node number of the destination host. For application-to-application connections over a X.25 link, this value is equal to the node number of the NPU that accesses the PSN or direct X.25 link. If the pid form of defining name2 is used, a change of status for the logical link implied by snode and dnode causes a dynamic update of the logical identifiers (LIDs) associated with the corresponding physical link.
identifier (PID). For application-to-application connections over X.25, the logical link terminates at the NPU so the status of the PID is governed by the status of this logical link regardless of the actual availability of the PID. If dstnode is not specified, the default value of 0 is used for application-to-application connections within the same host.

accev The decimal access level of the user (0 ≤ accev ≤ 15) required to make an application-to-application connection using the OUTCALL definition. If accev is not specified, any user or application program can make connections with the OUTCALL specification. If accev is not specified, the default value of 0 is used. The user's access level is specified by using the AL parameter in the USER statement while creating the NOS validation file (see the NOS administration reference manual).

yn1 The stand-alone keyword value (YES or NO) for an optional stand-alone keyword. This parameter indicates whether data to the device is to have traffic priority over that to other devices in the network. Data to a device that does not have traffic priority is suspended to relieve network congestion before data to terminals with traffic priority is suspended. If PRI or PRI=YES is specified, the device has data traffic priority. If PRI is omitted or PRI=NO is specified, the device does not have data traffic priority.

dwnblim The downline block limit. This parameter specifies the maximum number (1 ≤ dwnblim ≤ 7) of downline blocks that the calling host NAM is allowed to have outstanding (unacknowledged). If dwnblim is not specified, the default value of 2 is used.

abl The application block limit. This parameter specifies the maximum number (1 ≤ abl ≤ 7) of blocks that the calling application program is allowed to have outstanding (unacknowledged). If abl is not specified, the default value of 2 is used.

dwnlsize The downline block size. This parameter specifies the maximum number (1 ≤ dwnlsize ≤ 2043) of bytes that the calling application program can send in a block. If dwnlsize is not specified, the default value of 255 is used.

dsthost The address of the remote host (from 0 to FF) to which the application-to-application connection is being made. For intrahost or application-to-application connections over a host-to-host logical link, this value (if specified) should be equal to the DNODE value. For application-to-application connections over a X.25 link, this value is the hexadecimal address of the remote host or the destination host coupler for a CDC CYBER host. Dsthost is invalid when the destination operating system is NOS/VE (use the SERVICE parameter).

srchost The logical identifier (1 to 6 hexadecimal digits) of the calling host. If the OUTCALL statement is to an application in a CDC CYBER/NAM host, it must be the ASCII code equivalent of the identifier you want passed to the receiving application. If srchost is not specified, the default is the three ASCII character equivalent of the SNODE value, right-justified and zero-filled.

portnum The hexadecimal port number (1 ≤ portnum ≤ FE) on the interface NPU connected to the PSN or direct X.25 link over which the connection is to be made. This parameter has no meaning for trunk connections. If portnum is omitted, the default value of 0 is used.

windsiz The window size to be used by CCP for this connection for the send direction. This parameter specifies the decimal number (1 ≤ windsiz ≤ 7) of outstanding packets allowed for a host-to-NPU logical link connection. The value specified for windsiz cannot exceed the maximum configured for the port. This parameter has no meaning for trunk connections. If windsiz is omitted, the default value of 2 is used.

dpls The data packet length for the send direction. This parameter specifies the maximum number of data octets (8-bit bytes) that an X.25 packet for a called DTE can contain in the send direction. This parameter applies only to X.25 connections. The valid range of values for dpls is: 16, 32, 64, 128, 256, 512, and 1024. Values other than allowed values are translated to the next higher value, and values greater than 1024 cause an error message at NDL generation time. The value specified for dpls cannot exceed the maximum configured for the port. If dpls is omitted, the default value of 128 is used.

dtea The PSN address of the remote PSN DTE interface with access to the destination host or application. This parameter is equivalent to the X.25 called DTE address. The valid range of values is 1 to 15 decimal digits. There is no default value. This parameter must be specified for X.25 application-to-application connections.
The upline block limit. This parameter specifies the maximum number (1 ≤ upblim ≤ 31) of blocks that the NPU can have outstanding (unacknowledged) to the calling host. This parameter is meaningful only for X.25 connections. If upblim is not specified, the default value of 2 is used.

The upline block size divided by 100. This parameter specifies the maximum number (1 ≤ upsize ≤ 20) of bytes that the NPU can send to the calling host in a non-PRU data block. This parameter is only used for X.25 links. If upsize is not specified, the default value of 2 is used.

The optional user group facility code and parameter definition. This parameter (of a possible set of parameters from FAC1 to FAC31) specifies the hexadecimal digit coding of a facility code and accompanying parameters. The range of valid values for each faccode is 4 to 12 hexadecimal digits. Any number of FAC parameters can be specified as long as the total number of hex digits is not greater than 63 octets (126 hexadecimal digits). The coding of the parameters depends on the type of PSN and/or destination facility definition and requirements. You should refer to the appropriate user facility definition before coding this parameter. Optional user facilities to specify the window size, data packet length, and throughput class must correspond to the WS and BPLS parameter settings, respectively. There is no default value; if faccode is not specified, no facilities are generated. However, some packet-switching networks, such as TELNET, insert facility codes by default in the call request packet sent to the destination mainframe. Contact your PSN vendor to see what, if any, facility codes will be inserted. If the PSN does insert facility codes, then these must be specified on a corresponding INCALL statement at the destination host. Otherwise, NWF will reject the incoming call because of a facilities mismatch between the sender and receiver.

The protocol identification. This parameter specifies bytes 1 to 3 of the X.25 call user data field of the call request. This parameter tells the PSN or remote node of a direct X.25 link how the call user data is to be used. All X.25 connections to applications on remote hosts must have a PRID that signifies the call user data is to be transparent to the PSN and transferred as is. If the call user data is to be used for some other purpose by the PSN or remote receiving node, you should refer to the specific PSN specification for the exact coding of the PRID. Byte 4 of the protid is used internally by NAM and is set to zero when sent to the PSN. A maximum of 6 hexadecimal digits can be specified. The digits are encoded left-justified with zero-fill. If the parameter is not specified prior to the first UDATA definition, the following default hexadecimal values are used:

```
<table>
<thead>
<tr>
<th>Destination</th>
<th>Operating System</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOS</td>
<td></td>
<td>C10000</td>
</tr>
<tr>
<td>NOS/VE</td>
<td></td>
<td>C20000</td>
</tr>
<tr>
<td>AOS/VS</td>
<td></td>
<td>C00000</td>
</tr>
</tbody>
</table>
```

The protid definition is intended to be used only for PSN logical link connections to foreign hosts. For connections between CDC CYBER mainframe applications, the default setting of the protocol identification provides sufficient information to establish the connection.

The title of an addressable service in the CDCNET network. The parameter value is defined as a LIST of elements of NOS/VE type NAME. NOS/VE type NAME is a string of 1 to 31 alphanumeric characters, including underscore, dollar, pound, and commercial at, $, #, @, respectively. Elements of the list are separated by a period. This is a required parameter when the destination operating system is NOS/VE. Service is required if the destination operating system is NOS/VE.

The value specified for the SERVICE parameter is entered into the call-user-data. The total number of bytes added to the call-user-data resulting from specification of the SERVICE, DOMAIN, and UDATA parameters cannot exceed 124. The call-user-data field is assembled by entering the value specified for the parameters in the order listed above. If the size of a parameter value being entered results in the cumulative limit of 124 bytes being exceeded, that parameter is declared in error.

Figure 8-4. OUTCALL Statement Format (Sheet 3 of 5)
domain

The search domain. The parameter value is defined as a LIST of elements of NOS/VE type NAME. NOS/VE type NAME is a string of 1 to 31 alphanumeric characters, including underscore, dollar, pound, and commercial at, _, $, #, @, respectively. Elements of the list are separated by a period. If domain is not specified, the default value is a null domain field (empty string). The SERVICE parameter is required if DOMAIN is specified.

The value specified for the DOMAIN parameter is entered into the call-user-data. The total number of bytes added to the call-user-data resulting from specification of the SERVICE, DOMAIN, and UDATA parameters cannot exceed 124. The call-user-data field is assembled by entering the value specified for the parameters in the order listed above. If the size of a parameter value being entered results in the cumulative limit of 124 bytes being exceeded, that parameter is declared in error.

udata

The call-user-data parameter. This parameter allows specification of 1 to 124 8-bit bytes to be included in the call-user-data field of the connection request defined by the OUTCALL statement (the call request packet for connections over an X.25 network).

The data can be specified as a string of hexadecimal digits, or as an ASCII character string. ASCII character strings must be enclosed in double quotes, and hexadecimal and ASCII strings can be freely intermixed. Each ASCII character specified defines one byte of call-user-data, and each pair of hexadecimal digits specified defines one byte of call-user-data.

For an application-to-application connection using a PSN, the call-user-data, which includes the four-byte protocol id field, is limited to 16 bytes unless the PSN supports the Fast Select facility. Even if the PSN supports the Fast Select facility, bytes 17 through 128 are not passed to the destination host or application unless the destination subscribes to the Fast Select acceptance facility and the application supports the facility.

The value specified or defaulted for the NETOSD parameter invokes certain defaults for the call-user-data if the UDATA parameter is not specified.

If unspecified and the destination operating system is NOS, the call-user-data following the protocol id is formatted as follows:

\[ \text{sssddaaaaaaa} \]

```
sss  The 3-ASCII character SHOST value, if specified, or the 3-ASCII character string equivalent of the SNOKE value, right-justified and zero-filled

dd  The 2-ASCII character string equivalent of the DHOST value, right-justified and zero-filled

aaaaaa  The 7-ASCII character string equivalent of the NAME1 value, left-justified and blank character filled
```

For example, if SHOST=303031 (or SNOKE=01 without an SHOST specification), DHOST=03, and NAME1=APPLABC are defined without a UDATA specification, the call user data generated by default would be the protocol identifier (C100000016), and SHOST(303031), DHOST(30331c) and NAME1 (4150504c41424343). To make the OUTCALL request to another CDC CYBER host resident application by means of a host-to-NPU logical link, the DHOST value would have to specify the destination host coupler node number.

If unspecified and the destination operating system is NOS/VE, the call-user-data following the protocol id is formatted as follows:

The ASCII character equivalent of the SERVICE parameter value is entered. If the DOMAIN parameter is specified, an ASCII US (Unit Separator) character is entered after the SERVICE parameter value, followed by the ASCII character equivalent of the DOMAIN parameter value.

Figure 8-4. OUTCALL Statement Format (Sheet 4 of 5)
If specified and the destination operating system is NOS/VE, the call-user-data following the protocol id is formatted as follows:

The ASCII character equivalent of the SERVICE parameter value is entered. If the DOMAIN parameter is specified, an ASCII US (Unit Separator) character is entered after the SERVICE parameter value, followed by the ASCII character equivalent of the DOMAIN parameter value. An ASCII US character is then entered, followed by the value specified for the UDATA parameter. If the DOMAIN parameter is not specified, two ASCII US characters are entered after the SERVICE parameter to indicate a null DOMAIN, followed by the value specified for the UDATA parameter.

The total number of bytes added to the call-user-data resulting from specification of the SERVICE, DOMAIN, and UDATA parameters cannot exceed 124. The call-user-data field is assembled by entering the value specified for the parameters in the order listed above. If the size of a parameter value being entered results in the cumulative limit of 124 bytes being exceeded, then that parameter is declared in error.

If unspecified and the destination operating system is AOS/VS, the call-user-data following the protocol id is formatted as follows:

The ASCII character equivalent of the NAME1 parameter is entered.

Figure 8-4. OUTCALL Statement Format (Sheet 5 of 5)

INCALL STATEMENT

The INCALL statement is specified for each possible path to an application of the host being defined on which application-to-application connections can be received. The INCALL statement has the format shown in figure 8-5.

When a connection request is received by a host, NVF searches the LCF for a matching INCALL statement based on the path from which the request came. There can be several INCALL statements for a single application. One reason for this is that there can be several paths to access the host or application, which necessitates different definitions regarding physical addresses, validation, and the flow control parameter. Another reason for this is that there can be different facilities available to different requesting applications or users.

INCALL statements are used to accept calls from an application:

- In the same host
- In an adjacent host
- In a remote host connected by a trunk
- In a remote CDC CYBER 170 or foreign host connected by an X.25 PSN or X.25 direct link

The INCALL statement specifies the following information:

- Addressing information from which requests are permitted.
- Flow control parameters to be used by the requested host.

The family or user name to be used by the requesting application or user.

The name of the application program to which this connection should be made.

The available facilities that are permitted for connections using this INCALL statement.

Sites which use a CDCNET network to support their terminal connections need supporting INCALL statements. Specifying the INCALL statement for a CDCNET network is required for internal system usage.

The following INCALL statement parameters apply to all CDCNET connections:

- ABL
- DBZ
- SNODE
- UNAME
- ANAME
- FAM
- UBL
- DBL
- SHOST
- UBZ

The following INCALL statement parameters apply only to internal CDCNET network connections:

- DPLS
- PORT
- FAC
- WS

You should define the following INCALL statements for the CDCNET applications NETLS, NETOU, NETFS, and NLTTERM.

- INCALL, FAM=0, UNAME=NETUSER, ANAME=NETLS, ABL=2, DBZ=2043
- INCALL, FAM=0, UNAME=NETUSER, ANAME=NETOU, ABL=2, DBZ=2043
- INCALL, FAM=0, UNAME=NETUSER, ANAME=NETFS, ABL=7, DBZ=2043
- INCALL, FAM=0, UNAME=NETUSER, ANAME=NLTTERM, ABL=2, DBZ=2043
INCALL, FAM=famname, UNAME=usernam, ANAME=appname[, SNODE=srcnode]
[,, DNODE=dstnode, PRI=yn, DBL=dwnblim, ABL=abl, DBZ=dwnlsiz]
[,, WS=sndsiz, WR=recsiz, DPLS=dpsl, DPLR=dplr, SHOST=srchost, UBL=upblim, UBSZ=upbsize]
[,, PORT=portnum, DTEA=dtea, COLLECT, FASTSEL, FAC1=faccode, ..., FAC31=faccode3]

famname  The family name under which the connection is validated. This name can be any valid one-
through seven-character family name. This parameter is required and there is no default
value. The use of this parameter does not depend on the type of network (CCP or CDCNET)
used to reach the application.

usernam  The user name under which the connection is validated. This name can be any valid one-
through seven-character user name and can contain letters, digits, and asterisks. This
parameter is required and there is no default value. The use of this parameter does not
depend on the type of network (CCP or CDCNET) used to reach the application.

appname  The requested application program name. This name must match the AAAAAAA field of the call
user data of the call request packet. This parameter can be from one through seven ASCII
characters left-justified and blank-filled. This parameter is required and there is no
default value. The use of this parameter does not depend on the type of network used (CCP
or CDCNET) used to reach the application.

srcnode  The decimal node number (0 £ srcnode £ 255) of the source node of the logical link over
which the application-to-application Connection request originated. For
application-to-application connections over a host-to-host logical link, this is the coupler
node number of the remote CDC CYBER host. For X.25 application-to-application connections,
this is the node number of the NPU that interfaces to the PSN or direct X.25 link over which
the application-to-application connection request was received. If srcnode is not
specified, the default value of 0 is used. If the srcnode value specified is 0, the SNODE
parameter is not used to match incoming requests to an INCALL block.

dstnode  The decimal number (0 £ dstnode £ 255) of the destination node of the logical link over
which the application-to-application connection is received. If dstnode is not specified,
the default value of 0 is used for application-to-application connections to the same host.
If the dnode value specified is 0, the dnode parameter is not used to match incoming
requests to an INCALL block. For CDCNET networks, this is the node number of the local
mainframe interface.

yn1  The stand-alone keyword value (YES or NO) for an optional stand-alone keyword. This
parameter indicates whether connection data from the calling host has traffic priority over
data to other devices in the network. Data on a connection that does not have traffic
priority is suspended to relieve network congestion before data on connections with traffic
priority is suspended. If PRI or PRI=YES is specified, the connection has data traffic
priority. If PRI is omitted or PRI=N0 is specified, the connection does not have data
traffic priority. This parameter is not meaningful for CDCNET networks.

dwnblim  The downline block limit. This parameter specifies the maximum number (1 £ dwnblim £ 31) of
downline blocks that NAM in the called host can have outstanding (unacknowledged). If
dwnblim is not specified, the default value of 2 is used. The use of this parameter does not
depend on the type of network (CCP or CDCNET) used to reach the destination.

abl  The application block limit. This parameter specifies the maximum number (1 £ abl £ 7) of
blocks that the called application program can have outstanding (unacknowledged). If
abl is not specified, the default value of 2 is used. The use of this parameter does not
depend on the type of network (CCP or CDCNET) used to reach the destination.

dwnlsiz  The downline block size. This parameter specifies the maximum number (1 £ dwnlsiz £ 2043)
of bytes that the called application program can send in a block. If dwnlsiz is not
specified, the default value of 255 is used. The use of this parameter does not depend on
the type of network (CCP or CDCNET) used to reach the destination.

sndsiz  The window size to be used by CCP for the send direction for this connection. This
parameter specifies the decimal value (1 £ sndsiz £ 7) of the number of outstanding packets
allowed for the outbound direction of an X.25 connection. The value specified for sndsiz
cannot exceed the maximum configured for the port. This parameter has no meaning for
host-to-host logical link connections. If sndsiz is omitted, the default value of 2 is used.

Figure 8-5. INCALL Statement Format (Sheet 1 of 2)
recsiz  The window size to be used by CCP for the receive direction for this connection. This parameter specifies the decimal value (1 ≤ recsiz ≤ 7) of the number of outstanding packets allowed for the inbound direction of an X.25 connection. The value specified for recsiz cannot exceed the maximum configured for the port. This parameter has no meaning for host-to-host logical link connections. If recsiz is omitted, the default value of 2 is used.

dpls  The data packet length for the send direction. This parameter specifies the maximum number of data octets (8-bit bytes) that an X.25 packet to the called DTE can contain. The value specified for dpls cannot exceed the value configured for the port. If dpls is omitted, the default value of 128 is used. This parameter applies only to X.25 connections. The valid ranges of values for dpls is 16, 32, 64, 128, 256, 512, and 1024. Values other than allowed values are translated to the next higher value, and values greater than 1024 cause an error at NDL generation time.

dplr  The data packet length for the receive direction. This parameter specifies the maximum number of data octets (8-bit bytes) that an X.25 packet from the called DTE can contain. This parameter applies only to X.25 connections. The valid ranges of values for dplr is 16, 32, 64, 128, 512, and 1024. Values other than the allowed values are translated to the next higher value, and values greater than 1024 cause an error at NDL generation time. The value specified for dplr cannot exceed the value configured for the port. If dplr is omitted, the default value of 128 is used.

srchost  The source host identifier (1 to 6 hexadecimal digits) of where the call request was originated. This value serves as the identifier of the calling host and must correspond to ASCII codes. If srchost is not specified, the default value is the ASCII string equivalent of 000. If srchost is set to 0 or not specified, this parameter is not used to match incoming requests to INCALL blocks. This parameter must be 0 for CDCNET connections.

upblim  The upline block limit. This parameter specifies the maximum number (1 ≤ upblim ≤ 7) of blocks that the NPU can have outstanding (unacknowledged) to the called host. This parameter is meaningful only to X.25 connections. If upblim is not specified, the default value of 2 is used.

upbsize  The upline block size divided by 100. This parameter specifies the maximum number (1 ≤ upbsize ≤ 20) of bytes that the local NPU can send in a non-PRU data block to the called host. If upbsize is not specified, the default value of 2 is used.

portnum  The hexadecimal port number (1 ≤ portnum ≤ FE) on the PSN access NPU through which the application-to-application connection request is received. This parameter is used for matching an incoming request to an INCALL block for only those requests received over an X.25 link. If this parameter is not specified, the check will not include this parameter. This parameter must be 0 for CDCNET connections.

dtea  The PSN address of the calling DTEA. The valid range of values is 1 to 15 decimal digits. This parameter is not applicable to application-to-application connections over host-to-host logical links. The default value of this parameter is 0. If DTEA is not specified, then DTEA is not used to match incoming call requests to the INCALL block.

COLLECT  The reverse charge facility indicator. If this parameter is specified, the reverse charge facility is supported for this connection and all charges for the connection are accepted. This parameter is applicable only for host-to-NPU logical link connections.

FASTSEL  The fast select facility indicator. If this parameter is specified, the fast select facility is supported for this connection. This parameter is applicable only for host-to-NPU logical link connections.

faccode  The facility code and parameter definition for a single facility field. This parameter (of a possible set of parameters from FAC1 to FAC31) specifies the hexadecimal digit coding of a facility and accompanying parameters. This parameter specifies the facilities (other than WR, WS, DPLR, DPLS, COLLECT, or FASTSEL) that are accepted on the incoming call request. The range of values for each faccode is 4 to 12 hexadecimal digits. There is no default value; if faccode is not specified, no facilities are accepted. This means that if the PSN has inserted facility codes by default, regardless of whether or not facility codes were declared on the OUTCALL statement, then NVF will reject the incoming call request because of facilities mismatch between sender and receiver. This parameter must be 0 for CDCNET connections.

---

Figure 8-5. INCALL Statement Format (Sheet 2 of 2)
FILE STRUCTURE AND CONTENT

This section describes the logical structure and content of the major NOS local files handled by the NDL processor. The NDL processor can create one or more additional scratch files during processing (local file names ZZZZZU1 through ZZZZZU5). These scratch files are not significant to you as an NDL programmer and are not described. Files not directly handled by the NDL processor, such as the NPU load file and VALIDUx, are described in the NOS Version 2 Installation Handbook and the NOS Version 2 Analysis Handbook.

The NDL processor handles four major types of local files:

- The input file
- Network configuration files
- Local configuration files
- The job listing file

The NDL processor also always produces a dayfile on file OUTPUT, indicating the error processing performed during execution. If no errors were encountered, a message indicating this is placed in the dayfile (see appendix B).

INPUT FILE

All file creation jobs (described in section 10) require an input file for the NDL processor. The input file contains all NDL statements required for the creation of the network definition files being generated (see section 1). The input file name is either INPUT, COMPIL, or a valid file name that you supply in the NDLP command. The input file is a sequential file of 80- or 90-character records, terminated by an end-of-record indicator. This file is processed using the operating system input/output macros.

NETWORK CONFIGURATION FILE

One network configuration file is created from each network division in the input file. This file contains information from the following NDL statements relating to the physical and logical configuration of elements:

- \( NFLE \)
- \( SPLNK \)
- \( COPLKR \)
- \( NPU \)
- \( TRNK \)
- \( \\)LOGLINK

The network configuration file is constructed by the NDL processor. It is accessed by the Network Supervisor and the Communications Supervisor as a mass storage, direct access, random permanent file.

When the NDL processor finishes execution, any network configuration file it created remains attached to the job as a NOS local file. Postprocessing disposition of this file is your responsibility, using operating system commands. If one or more files without fatal errors were produced, you should make them direct access permanent files. These permanent files must have either file names known to the host operator or the default file names used in the procedure files that initiate network operation. Section 10 outlines the mechanism for naming the network configuration files; the operating system installation handbook describes the initiation procedure files.

When a network defined by a network configuration file is operating, the file is dedicated to that network. Another network configuration file cannot be substituted for the one being used, nor can the network configuration file in use be modified. The NDL processor can create a new network configuration file at any time, regardless of whether or not the network is operating. Once a network configuration file exists, it can be used the next time the network is initialized.

Each network configuration file contains records of several types. Only two types are of direct interest to you:

- The header record, which contains file identification and verification information, and information from the TITLE statement.
- The file index record, which contains a duplicate of the header record.

The file index record is the last record of a properly constructed file. This index record contains the validation information needed by the Network and Communication Supervisors to ensure that all NPU's are loaded according to the information in the same network configuration file. It also contains the system clock time when the file was created and the number and Programming System Report (PSR) level of the NDLP version that created the file. The time and date from the header record are not written as part of the page headers when the file is listed. The index record also contains a bit that indicates whether the file was created without fatal errors. If the NDL processor detects any fatal errors during creation of the file, it does not set that bit; the supervisory programs cannot use such a file, and the NDL processor cannot produce a file summary listing for it.

When the Network Supervisor accesses an old network configuration file at network initiation, it attempts to read the index record. If the index record does not meet network-wide compatibility criteria, the Network Supervisor requests another network configuration file from the host operator. The Network Supervisor also compares its code level with that found in the network configuration file index record. If the code levels are not the same, an informative message is sent to the host operator.
The NDL processor attempts to read the index record when it accesses an old network configuration file during a file inspection job (see section 10). If the index record does not have the validation bit set, the NDL processor issues a dayfile message (see appendix B). The processor will not read invalid files during file inspection jobs.

The formatted content of the other records is not significant to you. These records are described in the internal documentation of the network software.

**LOCAL CONFIGURATION FILE**

One local configuration file is created from each local division in the input file. It contains information from the following statements relating to the physical and logical configuration of the service elements of the network:

APPL INCALL LFILE OUTCALL USER

The local configuration file is constructed by the NDL processor. It is accessed by the Network Validation Facility as a mass storage, direct access, random permanent file.

When the NDL processor finishes execution, any local configuration file it created remains attached to the job as a NOS local file. Postprocessing disposition of this file is the NDL programmer's responsibility, using operating system commands. If one or more files without fatal errors were produced, you should make them direct access permanent files. These permanent files must have file names known to the host operator or the default file names used in the procedure files that initiate network operation. Section 10 outlines the mechanism for naming the local configuration files; the operating system installation handbook describes the initiation procedure files.

When a network accessed according to a local configuration file is operating, the file is dedicated to that network. Another local configuration file cannot be substituted for the one being used, nor can the local configuration file in use be modified. The NDL processor can create a new local configuration file at any time, regardless of whether or not the network is operating. Once a local configuration file exists, it can be used the next time the network is initialized.

Each local configuration file contains records of several types. Only two of these are of direct interest to you:

- The file header record, which contains information from the TITLE statement.
- The validation record, which contains a duplicate of the header record and information similar to that in the network configuration file index record.

The validation record is the last record of a properly constructed file. This index record contains the system clock time when the file was created and the number and Programming System Report (PSR) level of the NDLP version that created the file. The time and date from the header record are not written as part of the page headers when the file is listed. The index record also contains a bit that indicates whether the file was created without fatal errors. If the NDL processor detects any fatal errors during creation of the file, it does not set that bit; the Network Validation Facility cannot use such a file, and the NDL processor cannot produce a file summary listing for it.

When the Network Validation Facility accesses an old local configuration file at network initiation, it attempts to read the index record. If the index record indicates that the file is invalid, the Network Validation Facility requests another local configuration file from the host operator.

When the NDL processor accesses an old local configuration file during a file inspection job, the processor attempts to read the validation record. If the validation record indicates that the file contains errors, the NDL processor issues a dayfile message and aborts the job. (See section 10 and appendix B.)

The formatted content of the other records is not significant to you. These records are described in the internal documentation of the network software.

**JOB LISTING FILE**

The NDL processor creates the job listing file by reading the other local files created. The job listing file contains any or all of the listing options described in section 10 and illustrated in section 11 and appendix B. The job listing file name is either OUTPUT or a NOS local file name that you have supplied in the NDLP command. If a job listing file name of zero is supplied, no job listing file is created.

This file is a sequential file of 137-character records, intended for output on a line printer. The file is created using the operating system input/output macros.
This section describes the logical structure of jobs using the NDL processor. The form such jobs have when they are input to the operating system for execution depends on whether the jobs are NDL programs creating new network definition files, or are commands intended to inspect existing network definition files.

All jobs using the NDL processor contain a command portion. File creation programs can contain an additional program portion as the input file (see section 9) and can contain data portions not related to NDL program processing. File inspection jobs do not contain a program portion but can contain data portions unrelated to NDL processor use.

**COMMAND PORTION**

The command portion of any job using the NDL processor begins with job name and NOS USER commands and can contain any command valid for the operating system. The commands required in this portion depend upon whether file creation or file inspection is performed.

**FILE CREATION**

The command portion of an NDL program job must contain the program execution command shown in figure 10-1. This program execution command causes the loading of the NDL processor from the system library.

The parameters in the NDLP program execution command are order-independent. If an option is desired, the keyword character and equals sign must be specified explicitly; a command of the following form is not valid:

```
NDLP(TAPE1,TAPE2, SF)
```

The significance of parentheses and embedded blanks depends on the operating system conventions used. Commas are not used to positionally identify omitted parameters; a command of the following form, therefore, is also invalid:

```
NDLP(,,L=SF)
```

**NDLP(I=ifn,L=ofn,LO=list)**

- **ifn** The name of the local file containing the input source statements. If you omit the I parameter, the default name of INPUT is used. If you specify just the keyword character I but omit a file name, the default name of COMPILE is used.

- **ofn** The name of the local file to receive any listable output of the NDL program. This file name must meet operating system file name constraints. If you omit the L parameter, the default name of OUTPUT is used. If you specify L=0 (zero), no listings are created unless a fatal error is detected; if a fatal error is found, an error summary listing is written on file OUTPUT.

- **list** A list of one through four characters specifying the types of listing output you want the NDL processor to create. If you omit the LO parameter or specify just the keyword characters LO=, the default values indicated below are used. You can specify list values in any order. If you specify either default, the other default is suppressed. The list values can be:
  - **N** Indicates a normal source listing; N is a default value. This source listing contains all NDL statements as they were read from the input file. Each statement is prefixed with an NDL processor-generated sequence number; three asterisks precede a statement containing an error, and the letter D precedes a statement containing a defname identifier (see Special-Purpose Statements in section 2).
  - **D** Indicates a defname listing; this is a default value. This listing contains each defname and its associated value declarations from all DEFINE statements used in one division of the NDL program; the NDL processor creates separate listings for each division.
  - **S** Indicates an expanded source listing. This listing has the same format as a normal source listing; however, where a defname appears in the normal listing, the associated character string appears in the expanded listing.
  - **F** Indicates a file content summary listing. This listing consists of the title, type, and summarized content information for each of the validated network definition files produced by the NDL processor. Files containing fatal compilation errors are not listed.

**Figure 10-1. NDLP File Creation Command Format**
The following sample program execution commands are all valid:

 NDLP.
 Produces the defname and normal source listings by default.

 NDLP(LO=SF)
 Does not produce either default listing but produces both the expanded source listing and the file content summary listing.

 NDLP(L=0)
 Creates the network definition files but produces no listings. (If a fatal error is detected, the file OUTPUT contains a list of the diagnostic messages.)

 NDLP(LO=NSF)
 Produces all four listings.

 NDLP(I, LO=N)
 Reads its input from the file called COMPilee and produces only the normal source listing; specification of only one of the listing default values always suppresses the other default.

 The following sample program execution commands are all valid:

 NDLP.
 Produces the defname and normal source listings by default.

 NDLP(LO=SF)
 Does not produce either default listing but produces both the expanded source listing and the file content summary listing.

 NDLP(L=0)
 Creates the network definition files but produces no listings. (If a fatal error is detected, the file OUTPUT contains a list of the diagnostic messages.)

 NDLP(LO=NSF)
 Produces all four listings.

 NDLP(I, LO=N)
 Reads its input from the file called COMPilee and produces only the normal source listing; specification of only one of the listing default values always suppresses the other default.

 The command portion should also contain a NOS DEFINE command to make the NOS local files created by the NDL processor direct access permanent files. This command must precede the NDLP command. The Network Supervisor, Communications Supervisor, and Network Validation Facility attach the network definition files using the permanent file names specified in the NAM startup procedure master file.

 The command portion should also contain a NOS DEFINE command to make the NOS local files created by the NDL processor direct access permanent files. This command must precede the NDLP command. The Network Supervisor, Communications Supervisor, and Network Validation Facility attach the network definition files using the permanent file names specified in the NAM startup procedure master file.

 The DEFINE command should have the first form shown in figure 10-2 if the files specified are to be used as the network definition files attached by the released version of the NAM startup master file during network initialization. If these default permanent file names (NCFFILE and LCFFILE) are not used, any unique names can be specified as permanent file names for lfn1 and lfn2. When more than one network or local configuration file is created by the NDL program, only one set can be given the default permanent file names.

 Any number of local or network configuration files can be made permanent files with appropriate alternative forms of the DEFINE command. Refer to the NOS 2 Reference Set, Volume 3, System Commands, for details.

 The command portion can also contain an EXIT command and subsequent commands, if error exit processing of the job is desired. When NDL processor execution ends abnormally, job processing control transfers to any EXIT command present. The command portion is terminated by an EOR indicator, such as a multipunched card with 7/8/9 in column 1, or with /EORnn if submitted through a multileaving station.

 FILE INSPECTION

 NDL processor file inspection is limited to producing file content summary listings for files containing no fatal errors. File inspection jobs contain the form of the NDL processor command shown in figure 10-3. If the files to be inspected are not already local, the NDLP command must be preceded by a NOS ATTACH command valid for the two files concerned. The NDL processor can only list one local configuration file and one network configuration file for each NDLP command used. A file inspection job can be combined with a file creation job, but each portion requires a separate NDLP command of the appropriate type.

 Figure 10-4 illustrates a possible combined inspection and creation run. The files are examined first, and file summaries are produced.

 The parameters in the NDLP inspection command are order-independent. If an option is desired, the keyword character or characters must be specified explicitly; a statement of the following form is not valid:

 NDLP(TAPE1,TSTLCF,TSTNCF)

 The significance of parentheses and embedded blanks depends on the operating system conventions used. Commas are not used to positionally identify omitted parameters; a command of the following form is, therefore, also invalid:

 NDLP(,,NF=TSTNCF)

 If you omit all parameters from the parameter list, a dayfile error diagnostic can occur. The following command form is not valid for file inspection jobs:

 NDLP.
NDLP(L=ofn,LF=lfn1,NF=lfn2)

ofn The name of the local file to receive any listable output of the NDL program. This file name must meet operating system file name constraints. If you omit the L parameter, the default name of OUTPUT is used.

lfn1 The local file name of the local configuration file for which you want a content summary listing. This value must be the name assigned to the permanent file form of the local configuration file in a preceding ATTACH statement or the local file name assigned in an LFILE statement in a preceding file creation portion of the job. This name is required; there is no default value. If you do not want a local configuration file content listing, omit the LF parameter.

lfn2 The local file name of the network configuration file for which you want a content summary listing. This value must be the name assigned to the permanent file form of the network configuration file in a preceding ATTACH statement or the local file name assigned in an NFILE statement in a preceding file creation portion of the job. This name is required; there is no default value. If you do not want a network configuration file content listing, omit the NF parameter.

The following inspection control statements are all valid:

NDLP(LF=STLCPF,NF=STNCPF)
Produces content summary listings of one local configuration file and one network configuration file.

NDLP(LF=STLCPF)
Produces a content summary listing of one local configuration file.

NDLP(LF=STLCPF,L=TAPE1)
Writes one local configuration file content summary listing on file TAPE1.

The command portion can contain an EXIT command and subsequent commands, if you desire error exit processing. When NDL processor execution ends abnormally, job processing control transfers to any EXIT command present.

The command portion is ended by a card with 7/8/9 multipunched in column 1, by a card with /*EORn punched in columns 1 through 7 if submitted through a 2780, 3780, or HASP workstation, or by an EOR indicator.

PROGRAM AND DATA PORTIONS

This portion of an NDL program's job structure contains only the language statements described in sections 3 and 4. The NDL processor makes no provision for subroutines, subprograms, or processes written in compiler or assembly languages and intended to be run as part of an NDL program.

Job file Contents:

NDLP.
USER,USERNAM,PASSWOR.
CHARGE,CHARGENO,PROJECTNO.
ATTACH,PUBSCNF=NCFFILE,PUBLSLCF=LCCFILE.
NDLP,LF=PUBLSLCF,NF=PUBLSCNF.
RETURN,*,
DEFINE,PUBLSCNF,PUBLSLCF.
ATTACH,COMPILE.
NDLP,L,LO=NO.
End-of-record
End-of-information

COMPILE File Contents:

NDL source program statements from section 11

End-of-record
End-of-information.

because the NDL processor assumes that this statement indicates a file creation job.

The following inspection control statements are all valid:

NDLP(LF=STLCPF,NF=STNCPF)
Produces content summary listings of one local configuration file and one network configuration file.

NDLP(LF=STLCPF)
Produces a content summary listing of one local configuration file.

NDLP(LF=STLCPF,L=TAPE1)
Writes one local configuration file content summary listing on file TAPE1.

The command portion can contain an EXIT command and subsequent commands, if you desire error exit processing. When NDL processor execution ends abnormally, job processing control transfers to any EXIT command present.

The command portion is ended by a card with 7/8/9 multipunched in column 1, by a card with /*EORn punched in columns 1 through 7 if submitted through a 2780, 3780, or HASP workstation, or by an EOR indicator.

PROGRAM AND DATA PORTIONS

This portion of an NDL program's job structure contains only the language statements described in sections 3 and 4. The NDL processor makes no provision for subroutines, subprograms, or processes written in compiler or assembly languages and intended to be run as part of an NDL program.
Each program or data portion is ended by an EOR indicator, such as a multipunched card with 7/8/9 in column 1, or with /*EORnn in columns 1 through 7 if submitted through a 2780, 3780, or HASP workstation. If the job contains commands for postprocessing of the network definition files, subsequent data portions can be specified to provide directives.

The job is terminated by an end-of-information indicator, such as a card with 6/7/8/9 multipunched in column 1, or with /*EOI in columns 1 through 4 if submitted through a 2780, 3780, or HASP workstation. If the job contains only one program or data portion, you can omit the EOR indicator terminating that portion.
This section contains a debugged sample NDL file creation program and the listings produced when it is executed by the NDL processor. The dayfile listing is not shown.

PROGRAM INPUT

The input for this sample NDL program is submitted as a batch job under NOS. The job is structured to contain the command portion shown in figure 11-1 and a program portion (containing all of the NDL program statements listed in figure 11-2).

PROGRAM OUTPUT

The NDLP command in the input command portion of the job requests the NDL processor to produce all four possible types of output listing (figures 11-2 through 11-9). The normal source listing is shown in figures 11-2 and 11-6; the defname listing is shown in figures 11-3 and 11-7; the expanded source listing is given in figures 11-4 and 11-8; and the file content summary listing appears as figures 11-5 and 11-9. The time and date shown at the top of each listing page are the same as the time and date stored in the file header records of the network definition files produced by the program.

If errors are detected in the program, a multipage error summary is produced in the format described in appendix B. Dayfile messages are produced whether errors occur or not; these are also described in appendix B. Because the sample program contains no fatal errors, no error summary listing is shown.

If the DEFINE statement summary option (defname listing, chosen by LO=D) has been specified in the NDLP command but no DEFINE statements occur in the NDL program, a summary containing the following message is produced:

NO DEFINE COMMANDS ENCOUNTERED

A complete file creation job output listing with all options would be produced in the following order for each division:

Normal source listing
Error summary listing with columns to indicate line number, error code, error text, and keyword or value involved (only if errors occurred).
DEFINE statement summary (defname listing)
Expanded source listing
Network definition file summary (only if no fatal errors occurred).

NETWORK CONFIGURED

Figure 11-10 is a block diagram of the physical network configured by the NDL program shown in figures 11-1 through 11-9. The logical network configuration the program produces is shown in figure 11-11.

The NDL processor does not access the operating system equipment status table (EST). The EST entries in figure 11-10 are shown as background for interpreting the listing. The CCP build entries appear in the figure for the same reason; the NDL processor does not access or process the NPU load file in any manner.

No attempt is made in figure 11-10 to show the full parameterization of each configured terminal. Parameterization values other than defaults are indicated. Note that trunk TRNK2 is enabled in figure 11-10, while the corresponding logical link, LINK4, is disabled in figure 11-11. Shading in figure 11-11 shows the relationships between the local configuration file USER statements and the network configuration file DEVICE and TERMDEV statements.

ND99.
USER(LORI,PASWRD)
CHARGE(0059,7346219)
DEFINE(PUBSNCF=NCF,PUBSLCF=LCF)
NDLP(L0=F)
End-of-record

Figure 11-1. Sample Program Commands
COMMENT TEST CASE ND09.
COMMENT NAM 1 NDL REFERENCE MANUAL POSITIVE TEST SAMPLE, SECTION 11.
COMMENT NO ERRORS EXPECTED.

***********************************************************************
* THE FOLLOWING DIVISION CREATES A NETWORK DIVISION LOCAL FILE:      *
***********************************************************************

PUBSNCF: NFILE.

TITLE,PUBSNCF (NDL REF MAN SAMPLE PROGRAM).

***********************************************************************
* NOTE THAT BLANK LINES ARE PERMITTED.                                *
***********************************************************************

***********************************************************************
* HERE ARE ALL OF THE DEFINE STATEMENTS TO BE EXPANDED FOR            *
* DEFINITIONS IN THIS DIVISION:                                       *
***********************************************************************

COMMENT THIS DEFINES DEDICATED ASYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES.
LDAAUTO: DEFINE, LTYPE=A2, TIPTYPE=ASYNC, AUTO=YES.

COMMENT THIS DEFINES DEDICATED ASYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES FOR MODE 4 ONLY; IT IS NOT USED IN THIS        *
* NETWORK DEFINITION.
LDSAUTO: DEFINE, LTYPE=S1, TIPTYPE=MODE4.

COMMENT THIS DEFINES DIAL-UP ASYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES.
LSAAUTO: DEFINE, LTYPE=A1, TIPTYPE=ASYNC, AUTO=YES.

COMMENT THIS DEFINES DIAL-UP SYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES FOR MODE 4 ONLY; IT IS NOT USED IN THIS        *
* NETWORK DEFINITION.
LSSAUTO: DEFINE, LTYPE=S2, TIPTYPE=MODE4.

***********************************************************************
* THIS 2550 IS CONFIGURED AS A FRONT-END NPU WITH A TERMINAL NODE    *
* OF 3.                                                               *

NPA2550: NPU, NODE=3, VARIANT=N2L, DMP=YES.

COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:  *
SUPLINK, LLNAME=LINK1.

COMMENT THIS NPU HAS ONE COUPLER THAT SERVES AS THE HOST END
* FOR TWO LOGICAL LINKS. ONE LOGICAL LINK STARTS IN
* THIS NPU, THE OTHER STARTS IN A REMOTE NPU.
CPLR1: COUPLER, NODE=1, HNAME=SYS173, LOC=PRIMARY.
LINK1: LOGLINK, NCNAME=NPA2550.
LINK2: LOGLINK, NCNAME=NPB2551.

Figure 11-2. Normal Source Listing, Network Division (Sheet 1 of 6)
HERE ARE ALL OF THE COMMUNICATION LINES FOR THIS NPU:

* THIS SYNCHRONOUS LINE SERVICES DIAL-UP MODE 4 WORK STATIONS
* AND IS CONFIGURED FOR AUTOMATIC RECOGNITION. AS CONFIGURED,
* THE LINE CAN SERVICE HASP, 2780, 3780, OR MODE 4A TERMINALS
* AND MODE 4C DEVICES, BUT ONLY MODE 4A AND 4C TERMINALS ARE
* CONFIGURED FOR SUCCESSFUL AUTOMATIC RECOGNITION.

**NPALN1:** LINE, PORT=2, LTYPE=S1, AUTO.

TERMINAL, STIP=M4A, TC=200UT, CSET=BCD, CA=AUTOREC, RIC=NO.
UT200A1: DEVICE, DT=CON, TA=AUTOREC, HN=1, AUTOCON=YES, DI=NO.
UT200A2: DEVICE, DT=CR, TA=AUTOREC, DI=NO.

COMMENT NOTE THAT THE TERMINAL IS A BCD CODE SET, BUT THE PRINTER
* HAS A 64-CHARACTER ASCII PRINT TRAIN (SDT):

UT200A3: DEVICE, DT=LP, SDT=A6, TA=AUTOREC, DI=NO.

COMMENT EVEN THOUGH THIS TERMINAL IS REALLY A 734, IT IS CONFIGURED
* AS IF IT WERE A 200 USER TERMINAL; TC DEFAULTS (CCP) TO TERM
* CLASS USED FOR 200 USER TERMINALS. THIS CONFIGURATION IS
* AUTOMATICALLY RECOGNIZED AS DISTINCT FROM THAT OF THE
* PREVIOUS DEFINITION ONLY BECAUSE OF ITS CHARACTER SET VALUE.

TERMINAL, STIP=M4A, TC=CCP, CSET=ASCII, CA=AUTOREC.
UT200B4: DEVICE, DT=CON, TA=AUTOREC, HN=1, AUTOCON=YES, DI=NO.
UT200B5: DEVICE, DT=CR.
UT200B6: DEVICE, DT=LP, SDT=A6, TA=AUTOREC, DI=NO.

COMMENT INSTEAD OF THE FOLLOWING TWO STATEMENTS, A SINGLE TERMDEV
* STATEMENT COULD HAVE BEEN USED FOR THIS MODE 4C CONSOLE.

TERMINAL, STIP=M4C, TC=CCP, CSET=ASCII, CA=AUTOREC.

COMMENT DEFAULT DEVICE TYPE IS CONSOLE (CON); ADMINISTRATIVE OPERATOR
* MESSAGES ARE LOCKED OUT (LK PARAMETER).

BATCH3: DEVICE, HN=1, AUTOCON, LK=YES.

COMMENT THIS SYNCHRONOUS LINE SERVICES HASP WORKSTATIONS AND IS
* CONFIGURED FOR AUTOMATIC RECOGNITION. AS CONFIGURED, THE
* LINE CAN SERVICE HASP, 2780, 3780, OR MODE 4A TERMINALS AND
* MODE 4C DEVICES, BUT ONLY HASP DEVICES ARE CONFIGURED FOR
* SUCCESSFUL AUTOMATIC RECOGNITION.

**NPALN2:** LINE, PORT=3, LTYPE=S3, AUTO.

COMMENT TC COULD BE OMITTED OR SPECIFIED AS TC=CCP FOR THE SAME
* RESULT IN THE FOLLOWING:

TERMINAL, STIP=PRE, TC=PRE.
HASPCON: DEVICE, PRI=YES, HN=1, AUTOCON.
HASPCP1: DEVICE, DT=CP, DO=1.
HASPL1: DEVICE, DT=PL, SDT=8BIT, DO=2.
HASPCR1: DEVICE, DT=CR, SDT=26, DO=1.
HASPCR3: DEVICE, DT=CR, SDT=26, DO=2.
HASPLP1: DEVICE, DT=LP, SDT=A9, DO=1.

Figure 11-2. Normal Source Listing, Network Division (Sheet 2 of 6)
COMMENT THE FOLLOWING IS A 029 CARD READER BY DEFAULT.
HASPCR2: DEVICE, DT=CR, DO=3.

COMMENT THE FOLLOWING IS A 64-CHARACTER ASCII PRINTER BY DEFAULT.
HASLP2: DEVICE, DT=LP, DO=2.

COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE CONFIGURED FOR
* AUTOMATIC RECOGNITION; THE DEFINITION IS EXPANDED FROM A
* DEFINE STATEMENT.

D NPALN3: LINE, PORT=4, LSAAUTO.

COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPewriter-COMPATIBLE
* DEVICE CAPABLE OF X-ON/X-OFF CONTROL OF INPUT OPERATIONS.

HQRTTY1: TERMDEV, STIP=N2741, TSPEED=110, IC=YES.

COMMENT THE FOLLOWING IS A 2741-COMPATIBLE APL CHARACTER SET DEVICE.

HQRTTY2: TERMDEV, STIP=2741, TSPEED=134, CSET=EBCDAPL.

************************************************************************
* THIS 2551 IS CONFIGURED AS A REMOTE NPU WITH A TERMINAL NODE OF 4.
* IT REQUIRES AN OPERATOR COMMAND TO BEGIN SERVICING COMMUNICATION
* LINES AFTER LOADING; IT IS NOT DUMPED BEFORE EACH LOAD (DMP=NO)
* IS THE DEFAULT).

NPB2551: NPU, NODE=4, VARIANT=N5F, OPGO=YES.

COMMENT THERE ARE TWO POSSIBLE SUPERVISION PATHS FOR THIS NPU. IN ORDER
* OF PRIORITY OF USE, THEY ARE:

SUPLINK, LLNAME=LINK2.
SUPLINK, LLNAME=LINK4.

COMMENT THE FOLLOWING IS A DEDICATED ASYNCHRONOUS LINE CONFIGURED
* FOR AUTOMATIC RECOGNITION; THE DEFINITION IS EXPANDED FROM
* A DEFINE STATEMENT.

D NPBLN1: LINE, PORT=3, LSAAUTO.

COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPewriter-COMPATIBLE
* DEVICE, BUT IS CONFIGURED TO BE A HAZELTINE 2000.

ARHTTY1: TERMDEV, TC=H2000, TSPEED=AUTOREC.

COMMENT THE FOLLOWING IS A 2741-COMPATIBLE DEVICE.

ARHTTY2: TERMDEV, STIP=2741, TSPEED=134, CSET=CORRES.

************************************************************************
* THIS 2550 IS CONFIGURED AS A FRONT-END (LOCAL) NPU WITH A TERMINAL
* MODE OF 5. IT IS NOT DUMPED AFTER BEING LOADED.

NPC2550: NPU, NODE=5, VARIANT=N3L, DMP=NO.

COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:

SUPLINK, LLNAME=LINK3.

Figure 11-2. Normal Source Listing, Network Division (Sheet 3 of 6)
184  COMMENT THIS NPU HAS ONE COUPLER THAT SERVES AS THE HOST END
185  * FOR THREE LOGICAL LINKS. ONE LOGICAL LINK STARTS IN THIS
186  NPU, THE OTHER TWO START IN REMOTE NPUS.
187
188  CPLR2: COUPLER, NODE=2, HNAME=SYS173, LOC=PRIMARY.
189  LINK3: LOGLINK, NCNAME=NPC2550.
190  LINK5: LOGLINK, NCNAME=NPD2550.
191  LINK4: LOGLINK, NCNAME=NPD2551, DI=YES. *THIS LOGICAL LINK
192  * CAN BE USED IF THE COUPLER CONNECTED TO NPA2550 IS DOWN.
193
194  COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN
195  * AUTOMATIC RECOGNITION CONFIGURATION.
196
197  D NPCLN1: LINE, PORT=3, LSAUTO.
198  COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPETWRITER-COMPATIBLE
199  * DEVICE, BUT IS CONFIGURED TO BE A MODEL 40 TELETYPE.
200  SVLTTY1: TERMDEV, TC=M40, TSPEED=1200, HN=2, AUTOCON.
201
202  COMMENT THE FOLLOWING IS A CDC 713 DEVICE.
203  SVLTTY2: TERMDEV, TSPEED=300, TC=713, HN=2, AUTOCON.
204
205  ************************************************************************
206  * THIS SELF-LOADING NPU IS CONFIGURED AS A REMOTE NPU WITH A TERMINAL
207  * NODE OF 6. AN OPERATOR COMMAND IS REQUIRED TO BEGIN SERVICING LINES
208  * (YES IS IMPLICIT VALUE FOR THE OPGO PARAMETER). THE DUMMY PICB NAME OF
209  * "SELF" IS USED, AND DUMPING IS DISABLED BECAUSE RELOADING THROUGH A
210  * NEIGHBOR NODE IS NOT POSSIBLE.
211
212  NPD2550: NPU, NODE=6, VARIANT=SELF, OPGO, DMP=NO.
213
214  COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:
215  SUPLINK, LLNAME=LINK5.
216
217  COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN AUTOMATIC
218  RECOGNITION CONFIGURATION.
219  D NPDLN1: LINE, PORT=3, LSAUTO.
220  COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPETWRITER-COMPATIBLE
221  * DEVICE.
222  STATTTY1: TERMDEV, STIP=N2741, HN=2, AUTOCON=YES.
223
224  COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN AUTOMATIC
225  RECOGNITION CONFIGURATION.
226  D NPDLN2: LINE, PORT=2, LSAUTO.
227  COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPETWRITER-COMPATIBLE
228  * DEVICE, BUT IS CONFIGURED TO BE A MODEL 37 TELETYPE.
229  STATTTY2: TERMDEV, TSPEED=150, TC=M33, PRI.
230
231  COMMENT THE FOLLOWING IS A DEDICATED ASYNCHRONOUS LINE WITH AN
232  * AUTOMATIC RECOGNITION CONFIGURATION.
233  D NPDLN3: LINE, PORT=4, LDAUTO.
234
235  Figure 11-2. Normal Source Listing, Network Division (Sheet 4 of 6)
COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPewriter-COMPAtIBLE DEVICE.

STATTY3: TERMDEV, STIP=N2741, HN=2, AUTOCON=YES.

************************************************************************
COMMENT THIS 2550 IS CONFIGURED AS A FRONT-END WITH A TERMINAL NODE OF 7.

NPE2550: NPU, NODE=7, VARIANT=N7F, DMP=YES.

COMMENT THERE ARE TWO POSSIBLE SUPERVISION PATHS FOR THIS NPU.
* THEY ARE:
SUPLINK, LLNAME=LINK6.
SUPLINK, LLNAME=LINK8.

COMMENT THIS NPU HAS TWO COUPLERS THAT SERVE AS THE HOST END FOR THREE LOGICAL LINKS.

CPLR3: COUPLER, NODE=8, HNAME=HOST3, LOC=PRIMARY.
LINK6: LOGLINK, NCNAME=NPE2550.
LINK7: LOGLINK, NCNAME=CPLR4.

CPLR4: COUPLER, NODE=9, HNAME=SYS173, LOC=SECOND.
LINK8: LOGLINK, NCNAME=NPE2550.

COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN AUTOMATIC RECOGNITION CONFIGURATION.

D NPELM1: LINE, PORT=2, LSAAUTO.

COMMENT THE FOLLOWING IS A MODEL 40 TELETYPE.
TTY1: TERMDEV, TC=M40, TSPeed=1200, HN=8, AUTOCON.

COMMENT THE FOLLOWING IS A COMMUNICATION LINE BETWEEN THE X.25 PACKET-SWITCHING NETWORK AND NPE2550.

NPELM2: LINE, PORT=4, LTYPE=H1, TITYPE=X25, DFL=16, FRAME=1, RTIME=200, PSN=CDSN, NSVC=1.

COMMENT THE FOLLOWING IS A CDC 713 DEVICE.

M713A: TERMDEV, STIP=PAD, TC=713.

************************************************************************
COMMENT THIS 2550 IS CONFIGURED AS A FRONT-END WITH A TERMINAL NODE OF 10.
COMMENT THIS NPU IS CONNECTED BY A X.25 PACKET-SWITCHING NETWORK TO THE NPU NPE2550.

NPF2550: NPU, NODE=10, VARIANT=N6F, DMP=YES.

COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:
SUPLINK, LLNAME=LINK9.

COMMENT THIS NPU HAS ONE COUPLER THAT SERVES AS THE HOST END FOR ONE LOGICAL LINE WHICH STARTS IN THIS NPU.

CPLR5: COUPLER, NODE=11, HNAME=HOST2, LOC=PRIMARY.
LINK9: LOGLINK, NCNAME=NPF2550.

Figure 11-2. Normal Source Listing, Network Division (Sheet 5 of 6)

NPFLN1: LINE, PORT=3, LTYPE=H1, TIPTYPE=X25, DFL=16, FRAME=1,
        RTIME=200, PSN=CSN, NSVC=1.

COMMENT THE FOLLOWING IS A MODEL 40 TELETYPewriter.

TTY2: TERMDEV, STIP=PAD, TC=M40.

**********************************************************************
COMMENT THE FOLLOWING ARE ALL OF THE TRUNK COMMUNICATION LINES IN THIS NETWORK.

COMMENT THIS TRUNK CARRIES ONLY INTERACTIVE TRAFFIC, AND USES THE DEFAULT FRAME SIZE OF 1050 CHARACTER BYTES:

TRNK1: TRUNK, N1=NPA2550, P1=1, N2=NPB2551, P2=1, NLOAD1=YES,
        NLOAD2=YES, DI=NO.

COMMENT NOTE THAT THIS TRUNK IS ENABLED, EVEN THOUGH THE CORRESPONDING LOGICAL LINK IS DISABLED.

TRNK2: TRUNK, N1=NPC2550, P1=1, N2=NPB2551, P2=2, NLOAD1=YES,
        NLOAD2=YES, FRAME=1050, DI=NO.

COMMENT THIS SELF-LOADING NPU CANNOT BE LOADED BY ITS NEIGHBOR NODE AND CANNOT LOAD ITS NEIGHBOR NODE.

TRNK3: TRUNK, N1=NPC2550, P1=2, N2=NPDAEG, P2=1, NLOAD1=YES,
        NLOAD2=YES, FRAME=1050, DI=YES.

COMMENT THIS IS THE END OF THE NETWORK DIVISION.

**********************************************************************

DEFINE NAME DEFINE CONTENTS
LDAAUTO LTYPE=A2, TIPTYPE=ASYNC, AUTO=YES.
LDSAUTO LTYPE=S1, TIPTYPE=MODE4.
LSAAUTO LTYPE=A1, TIPTYPE=ASYNC, AUTO=YES.
LSSAUTO LTYPE=S2, TIPTYPE=MODE4.

**********************************************************************

THE FOLLOWING DIVISION CREATES A LOCAL DIVISION LOCAL FILE:

**********************************************************************

Figure 11-2. Normal Source Listing, Network Division (Sheet 6 of 6)
Figure 11-3. DEFINE Statement Summary Listing, Network Division
COMMENT TEST CASE ND99.
COMMENT NAME ND REFERENCE MANUAL POSITIVE TEST SAMPLE, SECTION 11.
COMMENT NO ERRORS EXPECTED.

* THE FOLLOWING DIVISION CREATES A NETWORK DIVISION LOCAL FILE:

PUBSNCF: NFILE.

TITLE, PUBSNCF (NDL REF MAN SAMPLE PROGRAM).

* NOTE THAT BLANK LINES ARE PERMITTED.

* HERE ARE ALL OF THE DEFINE STATEMENTS TO BE EXPANDED FOR
* DEFINITIONS IN THIS DIVISION:

COMMENT THIS DEFINES DEDICATED ASYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES.

LDAAUTO: DEFINE, LTYPE=A2, TIPTYPE=ASYNC, AUTO=NO.

COMMENT THIS DEFINES DEDICATED ASYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES FOR MODE 4 ONLY; IT IS NOT USED IN THIS
* NETWORK DEFINITION.

LDAUTO: DEFINE, LTYPE=S1, TIPTYPE=MODE4.

COMMENT THIS DEFINES DIAL-UP ASYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES.

LSAAUTO: DEFINE, LTYPE=A1, TIPTYPE=ASYNC, AUTO=NO.

COMMENT THIS DEFINES DIAL-UP SYNCHRONOUS AUTOMATICALLY RECOGNIZED
* COMMUNICATION LINES FOR MODE 4 ONLY; IT IS NOT USED IN THIS
* NETWORK DEFINITION.

LSAUTC: DEFINE, LTYPE=S2, TIPTYPE=MODE4.

* THIS 2550 IS CONFIGURED AS A FRONT-END NPU WITH A TERMINAL NODE
* OF 3.

NPA2550: NPU, NODE=3, VARIANT=N2L, DMP=YES.

COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:

SUPLINK, LLNAME=LINK1.

COMMENT THIS NPU HAS ONE COUPLER THAT SERVES AS THE HOST END
* FOR TWO LOGICAL LINKS. ONE LOGICAL LINK STARTS IN
* THIS NPU, THE OTHER STARTS IN A REMOTE NPU.

CPLR1: COUPLER, NODE=1, HNAME=SYS173, LOC=PRIMARY.

LINK1: LOGLINK, NCNAME=NPA2550.

LINK2: LOGLINK, NCNAME=NPB2551.

Figure 11-4. Expanded Source Listing, Network Division (Sheet 1 of 6)
COMMENT HERE ARE ALL OF THE COMMUNICATION LINES FOR THIS NPU:

* THIS SYNCHRONOUS LINE SERVICES DIAL-UP MODE 4 WORKSTATIONS
* AND IS CONFIGURED FOR AUTOMATIC RECOGNITION. AS CONFIGURED,
* THE LINE CAN SERVICE HASP, 2780, 3780, OR MODE 4A TERMINALS
* AND MODE 4C DEVICES, BUT ONLY MODE 4A AND 4C TERMINALS ARE
* CONFIGURED FOR SUCCESSFUL AUTOMATIC RECOGNITION.

NPALN1: LINE, PORT=2, LTYPE=S1, AUTO.

TERMINAL, STIP=M4A, TC=200UT, CSET=BCD, CA=AUTOREC, RIC=NO.
UT200A1: DEVICE, DT=CON, TA=AUTOREC, HN=1, AUTOCON=YES,
         DI=NO.
UT200A2: DEVICE, DT=CR, TA=AUTOREC, DI=NO.

COMMENT NOTE THAT THE TERMINAL IS A BCD CODE SET, BUT THE PRINTER
* HAS A 64-CHARACTER ASCII PRINT TRAIN (SDT):

UT200A3: DEVICE, DT=LP, SDT=A6, TA=AUTOREC, DI=NO.

COMMENT EVEN THOUGH THIS TERMINAL IS REALLY A 734, IT IS CONFIGURED
* AS IF IT WERE A 200 USER TERMINAL; TC DEFAULTS (CCP) TO TERM
* CLASS USED FOR 200 USER TERMINALS. THIS CONFIGURATION IS
* AUTOMATICALLY RECOGNIZED AS DISTINCT FROM THAT OF THE
* PREVIOUS DEFINITION ONLY BECAUSE OF ITS CHARACTER SET VALUE.

TERMINAL, STIP=M4A, TC=CCP, CSET=ASCII, CA=AUTOREC.
UT200B4: DEVICE, DT=CON, TA=AUTOREC, HN=1, AUTOCON=YES,
         DI=NO.
UT200B5: DEVICE, DT=CR.
UT200B6: DEVICE, DT=LP, SDT=A6, TA=AUTOREC, DI=NO.

COMMENT INSTEAD OF THE FOLLOWING TWO STATEMENTS, A SINGLE TERMINAL
* STATEMENT COULD HAVE BEEN USED FOR THIS MODE 4C CONSOLE.

TERMINAL, STIP=M4C, TC=CCP, CSET=ASCII, CA=AUTOREC.

COMMENT DEFAULT DEVICE TYPE IS CONSOLE (CON); ADMINISTRATIVE OPERATOR
* MESSAGES ARE LOCKED OUT (LK PARAMETER).

BATCH3: DEVICE, HN=1, AUTOCON, LK=YES.

COMMENT THIS SYNCHRONOUS LINE SERVICES HASP WORKSTATIONS AND IS
* CONFIGURED FOR AUTOMATIC RECOGNITION. AS CONFIGURED, THE
* LINE CAN SERVICE HASP, 2780, 3780, OR MODE 4A TERMINALS AND
* MODE 4C DEVICES, BUT ONLY HASP DEVICES ARE CONFIGURED FOR
* SUCCESSFUL AUTOMATIC RECOGNITION.

NPALN2: LINE, PORT=5, LTYPE=S3, AUTO.

COMMENT TC COULD BE OMITTED OR SPECIFIED AS TC=CCP FOR THE SAME
* RESULT IN THE FOLLOWING:

TERMINAL, STIP=PRE, TC=HPRE.

HASPCON: DEVICE, PRI=YES, HN=1, AUTOCON.
HASPPC1: DEVICE, DT=CP, D0=1.
HASPLPC1: DEVICE, DT=PL, SDT=8BIT, D0=2.
HASPRC1: DEVICE, DT=CR, SDT=26, D0=1.
HASPRC2: DEVICE, DT=CR, SDT=26, D0=2.
HASPLP1: DEVICE, DT=LP, SDT=A9, D0=1.

Figure 11-4. Expanded Source Listing, Network Division (Sheet 2 of 6)
COMMENT THE FOLLOWING IS AN 029 CARD READER BY DEFAULT.

HASPCR2: DEVICE, DT=CR, DO=5.

COMMENT THE FOLLOWING IS A 64-CHARACTER ASCII PRINTER BY DEFAULT.

HASPLP2: DEVICE, DT=LP, DO=2.

COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE CONFIGURED FOR AUTOMATIC RECOGNITION; THE DEFINITION IS EXPANDED FROM A DEFINE STATEMENT.

D NPALN3: LINE, PORT=4, LTYPE=A1, TIPTYPE=ASYNC, AUTO=YES.

COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPEWRITER-COMPATIBLE DEVICE CAPABLE OF X-ON/X-OFF CONTROL OF INPUT OPERATIONS.

HQTTY1: TERMDEV, STIP=N2741, TSPEED=110, IC=YES.

COMMENT THE FOLLOWING IS A 2741-COMPATIBLE APL CHARACTER SET DEVICE.

HQTTY2: TERMDEV, STIP=2741, TSPEED=134, CSET=EBCDAPL.

************************************************************************

* THIS 2551 IS CONFIGURED AS A REMOTE NPU WITH A TERMINAL NODE OF 4.
* IT REQUIRES AN OPERATOR COMMAND TO BEGIN SERVICING COMMUNICATION LINES AFTER LOADING; IT IS NOT DUMPED BEFORE EACH LOAD (DMP=NO) IS THE DEFAULT).

NPB2551: NPU, NODE=4, VARIANT=N5F, OPGO=YES.

COMMENT THERE ARE TWO POSSIBLE SUPERVISION PATHS FOR THIS NPU. IN ORDER OF PRIORITY OF USE, THEY ARE:

SUPLINK, LLNAME=LINK2.
SUPLINK, LLNAME=LINK4.

COMMENT THE FOLLOWING IS A DEDICATED ASYNCHRONOUS LINE CONFIGURED FOR AUTOMATIC RECOGNITION; THE DEFINITION IS EXPANDED FROM A DEFINE STATEMENT.

D NPBLN1: LINE, PORT=3, LTYPE=A2, TIPTYPE=ASYNC, AUTO=YES.

COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPEWRITER-COMPATIBLE DEVICE, BUT IS CONFIGURED TO BE A HAZELTINE 2000.

ARHTTY1: TERMDEV, TC=H2000, TSPEED=AUTOREC.

COMMENT THE FOLLOWING IS A 2741-COMPATIBLE DEVICE.

ARHTTY2: TERMDEV, STIP=2741, TSPEED=134, CSET=CORRES.

************************************************************************

* THIS 2550 IS CONFIGURED AS A FRONT-END (LOCAL) NPU WITH A TERMINAL MODE OF 5. IT IS NOT DUMPED AFTER BEING LOADED.

NPC2550: NPU, NODE=5, VARIANT=N3L, DMP=NO.

COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:

SUPLINK, LLNAME=LINK3.
COMMENT THIS NPU HAS ONE COUPLER THAT SERVES AS THE HOST END
* FOR THREE LOGICAL LINKS. ONE LOGICAL LINK STARTS IN THIS NPU, THE OTHER TWO START IN REMOTE NPUS.

CPLR2: COUPLER, NODE=2, HNAME=SYS173, LOC=PRIMARY.

LINK3: LOGLINK, NCNAME=NPC2550.
LINK5: LOGLINK, NCNAME=NPAEG.
LINK4: LOGLINK, NCNAME=NPB2551, DI=YES. *THIS LOGICAL LINK CAN BE USED IF THE COUPLER CONNECTED TO NPA2550 IS DOWN.

COMMENT THIS FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN AUTOMATIC RECOGNITION CONFIGURATION.

NPCLN1: LINE, PORT=3, LTYPE=A1, TIPTYPE=ASYNC, AUTO=NO.

COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPEWRITER-COMPATIBLE DEVICE, BUT IS CONFIGURED TO BE A MODEL 40 TELETYPE.
SVLTTY1: TERMDEV, TC=M40, TSPEED=1200, HN=2, AUTOCON.

COMMENT THE FOLLOWING IS A CDC 713 DEVICE.

NPDAEG: NPU, NODE=6, VARIANT=SELF, OPGO, DMP=NO.

COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:
SUPLINK, LLNAME=LINK5.

COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN AUTOMATIC RECOGNITION CONFIGURATION.

NPDLN1: LINE, PORT=3, LTYPE=A1, TIPTYPE=ASYNC, AUTO=NO.

COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPEWRITER-COMPATIBLE DEVICE.
STATTY1: TERMDEV, STIP=N2741, HN=2, AUTOCON=YES.

COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN AUTOMATIC RECOGNITION CONFIGURATION.

NPDLN2: LINE, PORT=2, LTYPE=A1, TIPTYPE=ASYNC, AUTO=NO.

COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPEWRITER-COMPATIBLE DEVICE, BUT IS CONFIGURED TO BE A MODEL 37 TELETYPE.
STATTY2: TERMDEV, TSPEED=150, TC=M33, PRI.

COMMENT THE FOLLOWING IS A DEDICATED ASYNCHRONOUS LINE WITH AN AUTOMATIC RECOGNITION CONFIGURATION.

NPDLN3: LINE, PORT=4, LTYPE=A2, TIPTYPE=ASYNC, AUTO=NO.

Figure 11-4. Expanded Source Listing, Network Division (Sheet 4 of 6)
COMMENT THE FOLLOWING TERMINAL COULD BE ANY TELETYPewriter-COMPATIBLE DEVICE.

STATTY3: TERMDEV, STIP=N2741, HN=2, AUTOCON=YES.

************************************************************************

COMMENT THIS 2550 IS CONFIGURED AS A FRONT-END WITH A TERMINAL NODE OF 7.

NPE2550: NPU, NODE=7, VARIANT=N7F, DMP=YES.

COMMENT THERE ARE TWO POSSIBLE SUPERVISION PATHS FOR THIS NPU.

* THEY ARE:

SUPLINK, LLNAME=LINK6.
SUPLINK, LLNAME=LINK8.

COMMENT THIS NPU HAS TWO COUPLERS THAT SERVE AS THE HOST END FOR THREE LOGICAL LINKS.

CPLR3: COUPLER, NODE=8, HNAME=HOST3, LOC=PRIMARY.
LINK6: LOGLINK, NCNAME=NPE2550.
LINK7: LOGLINK, NCNAME=CPLR4.

CPLR4: COUPLER, NODE=9, HNAME=SYS173, LOC=SECOND.
LINK8: LOGLINK, NCNAME=NPE2550.

COMMENT THE FOLLOWING IS A DIAL-UP ASYNCHRONOUS LINE WITH AN AUTOMATIC RECOGNITION CONFIGURATION.

NPENL1: LINE, PORT=2, LTYPE=ASYNC, AUT0=YES.

COMMENT THE FOLLOWING IS A MODEL 40 TELETYPewriter.

TTY1: TERMDEV, TC=W40, TSPEED=1200, HN=8, AUTOCON.

COMMENT THE FOLLOWING IS A COMMUNICATION LINE BETWEEN THE X.25 PACKET-SWITCHING NETWORK AND NPE2550.

NPENL2: LINE, PORT=4, LTYPE=X25, TIPTYPE=ASYNC, AUT0=YES.

COMMENT THE FOLLOWING IS A CDC 713 DEVICE.

M713A: TERMDEV, STIP=PAD, TC=713.

************************************************************************

COMMENT THIS 2550 IS CONFIGURED AS A FRONT-END WITH A TERMINAL NODE OF 10.

NPF2550: NPU, NODE=10, VARIANT=N6F, DMP=YES.

COMMENT THERE IS ONE POSSIBLE SUPERVISION PATH FOR THIS NPU. IT IS:

SUPLINK, LLNAME=LINK9.

COMMENT THIS NPU HAS ONE COUPLER THAT SERVES AS THE HOST END FOR ONE LOGICAL LINE WHICH STARTS IN THIS NPU.

CPLR5: COUPLER, NODE=11, HNAME=HOST2, LOC=PRIMARY.
LINK9: LOGLINK, NCNAME=NPF2550.

Figure 11-4. Expanded Source Listing, Network Division (Sheet 5 of 6)
COMMENT THE FOLLOWING IS A COMMUNICATION LINE BETWEEN THE X.25
* PACKET-SWITCHING NETWORK AND THE NPU NPF2550.

NPFLN1: LINE, PORT=3, LTYPE=H1, TIPTYPE=X25, DFL=16, FRAME=1,
        RTIME=200, PSN=CDSN, NSVC=1.

COMMENT THE FOLLOWING IS A MODEL 40 TELETYPewriter.

TTY2: TERMDEV, STIP=PAD, TC=M40.

************************************************************************
* HERE ARE ALL OF THE TRUNK COMMUNICATION LINES IN THIS NETWORK.

COMMENT THIS TRUNK CARRIES ONLY INTERACTIVE TRAFFIC, AND USES THE
* DEFAULT FRAME SIZE OF 1050 CHARACTER BYTES:

TRNK1: TRUNK, N1=NPA2550, P1=1, N2=NPB2551, P2=1, N0LOAD1=YES,
        N0LOAD2=YES, DI=NO.

COMMENT NOTE THAT THIS TRUNK IS ENABLED, EVEN THOUGH THE CORRESPONDING
* LOGICAL LINK IS DISABLED.

TRNK2: TRUNK, N1=NPC2550, P1=1, N2=NPB2551, P2=2, N0LOAD1=YES,
        N0LOAD2=YES, FRAME=1050, DI=NO.

COMMENT THIS SELF-LOADING NPU CANNOT BE LOADED BY ITS NEIGHBOR NODE
* AND CANNOT LOAD ITS NEIGHBOR NODE.

TRNK3: TRUNK, N1=NPC2550, P1=2, N2=NPDAG, P2=1, N0LOAD1=YES,
        N0LOAD2=YES, FRAME=1050, DI=YES.

COMMENT THIS IS THE END OF THE NETWORK DIVISION.

************************************************************************
* THE FOLLOWING DIVISION CREATES A LOCAL DIVISION LOCAL FILE:

************************************************************************

Figure 11-4. Expanded Source Listing, Network Division (Sheet 6 of 6)
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Figure 11-5. File Summary Listing, Network Division for File PUBSNCF (Sheet 1 of 9)
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<td>NPC2550</td>
<td>2</td>
<td>1</td>
<td>YES</td>
<td>YES</td>
<td>DI</td>
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<td></td>
</tr>
</tbody>
</table>

**COUPLER**

**NAME**

**NODE**

**HCNAME**

**LOC**

**CPLR2**

| 2 | SYS173 | PRIMARY |

**LOGLINK**

**NAME**

**NCNAME**

**STATUS**

| LINK3 | NPC2550 | EN |
| LINK4 | NPB2551 | DI |
| LINK5 | NPDAEG | EN |

**LINE**

**NAME**

**PORT/ LTYPE**

**AUTO/ TIPTYPE/ DI**

**LSPEED/ DFL/ FRAME/ RTIME/ RCOUNT/ NSVC/ LCN**

<table>
<thead>
<tr>
<th>IMDISC RC</th>
<th>XAUTO PSN NPVC AL ARSPEED DTEA</th>
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</thead>
<tbody>
<tr>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

**TERMINAL**

**STIP/ TC**

**CSET**

**TSPEED**

**CA**

**RIC**

**CO**

**BCF**

**MREC**

**W CTYP**

**NCIR**

**NEN**

**EOF**

**COLLECT**

**PAD**

**N2741**

**M40**

<table>
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<tr>
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**DEVICE**

**NAME**


**SVLTTY1**

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<tr>
<th>CON</th>
<th>1</th>
<th>230</th>
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<td>230</td>
<td>1</td>
<td>100</td>
<td>NO</td>
<td>NO</td>
<td></td>
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**TERMINAL**

**STIP/ TC**

**CSET**

**TSPEED**

**CA**

**RIC**

**CO**

**BCF**

**MREC**

**W CTYP**

**NCIR**

**NEN**

**EOF**

**COLLECT**

**PAD**

**N2741**

**713**

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**DEVICE**

**NAME**


**SVLTTY2**

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<tbody>
<tr>
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Figure 11-5. File Summary Listing, Network Division for File PUBSNCF (Sheet 5 of 9)
## TIPTYPES USED FOR THIS NPU

**ASYNC**

<table>
<thead>
<tr>
<th>NPU</th>
<th>NAME</th>
<th>NODE</th>
<th>VARIANT</th>
<th>OPGO</th>
<th>DMP</th>
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<tr>
<td>NPU</td>
<td>NPDAEG</td>
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<td>SELF</td>
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**SUPLINK**

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<tr>
<th>LLNAME</th>
<th>LINK5</th>
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**TRUNK**

<table>
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<tr>
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<th>N2</th>
<th>P1</th>
<th>P2</th>
<th>NOLOAD1</th>
<th>NOLOAD2</th>
<th>STATUS</th>
<th>FRAME</th>
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<td>TRNK3</td>
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**LINE**

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<tr>
<th>NAME</th>
<th>PORT/ LTYPE</th>
<th>AUTO/ TIPTYPE/ DI</th>
<th>LSPEED/ DFL/ FRAME/ RTIME/ RCOUNT/ NSVC/ LCN</th>
<th>XAUTO</th>
<th>PSN</th>
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<td>NPDLN1</td>
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**TERMINAL**

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<th>CO</th>
<th>BCF</th>
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<th>CTYP</th>
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<th>NEN</th>
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<tr>
<td>PAD N2741</td>
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<td></td>
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**DEVICE**

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<tr>
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<th></th>
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<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
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<td>STATTY1</td>
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<td>230</td>
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<td>NO</td>
<td>EN</td>
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**LINE**

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<tr>
<th>NAME</th>
<th>PORT/ LTYPE</th>
<th>AUTO/ TIPTYPE/ DI</th>
<th>LSPEED/ DFL/ FRAME/ RTIME/ RCOUNT/ NSVC/ LCN</th>
<th>XAUTO</th>
<th>PSN</th>
<th>NPVC</th>
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<td>NPDLN2</td>
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**TERMINAL**

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<th>CSET</th>
<th>TSPEED</th>
<th>CA</th>
<th>RIC</th>
<th>CO</th>
<th>BCF</th>
<th>MREC</th>
<th>W</th>
<th>CTYP</th>
<th>NCIR</th>
<th>NEN</th>
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<tr>
<td>PAD N2741</td>
<td>M33</td>
<td>150</td>
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Figure 11-5. File Summary Listing, Network Division for File PUBSNCF (Sheet 6 of 9)
### Device Name Summary

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<tr>
<td>STATTY2 CON</td>
<td>1 230 7 2 YES 230 1 100 NO YES</td>
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<tr>
<td>LINE NAME PORT/ LTYPE AUTO/ TIPTYPE/ DI LSPED/ DFL/ FRAME/ RTIME/ RCOUNT/ NSVC/ LCN IMDISC RC XAUTO PSN NPVC AL ARSPEED DTEA</td>
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<tr>
<td>NPD LN3 4 A2 YES ASYNC NO NO 0 YES</td>
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<tr>
<td>TERMINAL</td>
<td>STIP/ TC CSET TSPEED CA RIC CO BCF MREC W CTYP NCIR NEN EOF COLLECT</td>
</tr>
<tr>
<td>PAD N2741 1 NO</td>
<td></td>
</tr>
<tr>
<td>STATTY3 CON</td>
<td>1 230 7 2 YES 230 1 100 NO NO</td>
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</tbody>
</table>

### Tiptypes Used for This NPU

**Async**

<table>
<thead>
<tr>
<th>NPU NAME</th>
<th>NODE</th>
<th>VARIANT</th>
<th>OPGO</th>
<th>DMP</th>
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<tr>
<td>NPE2550</td>
<td>7</td>
<td>N7F</td>
<td>NO</td>
<td>YES</td>
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</tbody>
</table>

### Suplink

- LLNAME
- LINK6
- LINK8

### Coupler

- NAME CPLR3 NODE 8 HOST3 PRIMARY
- NAME CPLR4 NODE 9 SYS173 SECOND

---

*Figure 11-5. File Summary Listing, Network Division for File PUBSNCF (Sheet 7 of 9)*
<table>
<thead>
<tr>
<th>LOGLINK NAME</th>
<th>NCNAME</th>
<th>STATUS</th>
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<tbody>
<tr>
<td>LINE NAME</td>
<td>PORT/ LTYPE</td>
<td>AUTO/ TIPTYPE/ DI</td>
</tr>
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<td>NPE2550</td>
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**TERMINAL**

**STIP/ TC**

**CSET**

**TSPEED**

**CA**

**RIC**

**CO**

**BCF**

**MREC**

**W**

**CTYP**

**NCIR**

**NEN**

**EOF**

**COLLECT**

**PAD**

**N2741**

**M40**

**1200**

**NO**

**DEVICE NAME**


**XBB/ DBZ/ USB/ STREAM/ DO/ HD PRI/ BS/ B2/ CN/ DLX/ DLTO/ IN/ OP/ PA/ PW/ STAT/ MCI**

**MLI**

**RTS**

**XYL**

**MC**

**FA**

**ELO**

**ELX**

**ELR**

**EBO**

**EBX**

**EBR**

**CP**

**IC**

**OC**

**LK**

**TTY1**

**CON**

**1**

**230**

**7**

**8**

**YES**

**230**

**100**

**YES**

**NO**

**EN**

<table>
<thead>
<tr>
<th>LINE NAME</th>
<th>PORT/ LTYPE</th>
<th>AUTO/ TIPTYPE/ DI</th>
<th>LSPEED/ DFL/ FRAME/ RTIME/ RCOUNT/ NSVC/ LCN</th>
<th>IMDISC RC</th>
<th>XAUTO</th>
<th>PSN</th>
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<td>4</td>
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<td>2</td>
<td>15</td>
<td>1</td>
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**TERMINAL**

**STIP/ TC**

**CSET**

**TSPEED**

**CA**

**RIC**

**CO**

**BCF**

**MREC**

**W**

**CTYP**

**NCIR**

**NEN**

**EOF**

**COLLECT**

**PAD**

**713**

**ASCI**

**NO**

**2**

**SVC**

**1**

**1**

**DEVICE NAME**


**XBB/ DBZ/ USB/ STREAM/ DO/ HD PRI/ BS/ B2/ CN/ DLX/ DLTO/ IN/ OP/ PA/ PW/ STAT/ MCI**

**MLI**

**RTS**

**XYL**

**MC**

**FA**

**ELO**

**ELX**

**ELR**

**EBO**

**EBX**

**EBR**

**CP**

**IC**

**OC**

**LK**

**M713A**

**CON**

**2**

**225**

**7**

**NO**

**2**

**100**

**YES**

**NO**

**EN**

Figure 11-5. File Summary Listing, Network Division for File PUBSNCF (Sheet 8 of 9)
TIPTYPES USED FOR THIS NPU

ASYNC  X25

NPU  NAME  NODE  VARIANT  OPGO  DMP
NPFL250  10  N6F  NO  YES

SUPLINK  LLNAME  LINK9

COUPLER  NAME  NODE  HNAME  LOC
CPL25  11  HOST2  PRIMARY

LOGLINK  NAME  NCNAME  STATUS
LINK9  NPFL250  EN

LINE  NAME  PORT/ LTYPE  AUTO/ TIPTYPE/ DISC  LM/ DF/ RTIME/ RCOUNT/ NSVC/
       LCN  RC  AUTO  PSN  NPVC  AL  ARSPEED  DTEA
NPFLN1  3  H1  NO  X25  NO  4  1  2  15  1
       0  NO  NO  CSN  0  0  NO

TERMINAL  STIP/ TC  CSET  TSPEED  CA  RIC  CO  BCF  MREC  W  CTYP  NCIR  NEN  EOF  COLLECT
PAD  MDA  ASCII  NO  2  SVC  1  1

MCI  MLI  RTS  XLY  MC  FA  EL0  ELX  ELR  EBO  EBR  EBR  CP  IC  OC  LK

TTY20  CON  2  257  7  11  YES
       2  100  NO  NO

TIPTYPES USED FOR THIS NPU

X25

MAXIMUM NODE NUMBER USED
11

UNUSED NODE NUMBERS

ALL NODE NUMBERS LESS THAN 11 HAVE BEEN USED

Figure 11-5. File Summary Listing, Network Division for File PUBSNCF (Sheet 9 of 9)
DEFINE
PUBLSCF: LFILE.

   TITLE, PUBLSCF (NDL REF MAN SAMPLE PROGRAM).

**********************************************************************
* HERE ARE ALL OF THE APPLICATION PROGRAMS INSTALLED AT THIS SITE. *
* EACH HAS AN APPL STATEMENT JUST FOR DOCUMENTATION PURPOSES; ONLY *
* THE STATEMENTS FOR RBF, TAF, AND RMV2 ARE NECESSARY.             *
* THE PRIVILEGED RESTRICTION IS NOT REQUIRED FOR THE OTHERS.        *

RBF: APPL, PRIV=YES, UID=YES, DI=NO.
IAF: APPL, PRIV=YES, UID=NO, DI=NO.
TAF: APPL, PRIV=YES, UID=YES, DI=NO.
MCS: APPL, PRIV=YES, UID=NO, DI=NO.

COMMENT THE FOLLOWING IS A SITE-DEFINED NETWORK APPLICATION PROGRAM
* AND IS NOT IN THE SYSTEM LIBRARY:

RMV2: APPL, DI=YES. * RMV2 IS INITIALLY DISABLED.

**********************************************************************
* HERE ARE ALL OF THE DEVICES REQUIRING AN AUTOMATIC OR MANDATORY *
* LOGIN CONFIGURATION.                                             *
* ALL USER NAMES ARE KNOWN TO BE VALID FOR THIS HOST.              *
* THE DEFAULT FAMILY NAME IS SVLSYS. SVLFAM2 IS ALSO KNOWN TO BE VALID. *

COMMENT THIS TERMINAL HAS DEFAULTS FOR ALL LOGIN PARAMETERS; USERS
* ARE STILL PROMPTED FOR EACH PARAMETER EXCEPT PASSWORD:

HASPCON: USER, DFAM=SVLFAM2, DUSER=HASPUSR, PAPPL=RBF.

COMMENT THIS TERMINAL HAS ONLY MANDATORY LOGIN PARAMETERS; USERS
* ARE NOT PROMPTED FOR ANY PARAMETERS AND ONLY RBF IS
* ACCESSIBLE FROM THIS TERMINAL:

BATCH3: USER, MFAM=0, MUSER=RBFUSER, MAPPL=RBF.

COMMENT THIS TERMINAL IS ALLOWED ACCESS TO SEVERAL FILE DEVICE
* FAMILIES AND THEREFORE MUST INDICATE A FAMILY NAME.
* THE USER NAME CAN BE DEFAULTED, AND ACCESS IS ONLY
* PERMITTED TO RBF.

UT200A1: USER, DFAM=NULL, DUSER=USERRBF, MAPPL=RBF.

COMMENT THIS TERMINAL IS ALLOWED ACCESS TO SEVERAL FILE DEVICE
* FAMILIES BUT NEED NOT INDICATE A FAMILY NAME; FAMILY
* NAME AND THE USERNAME CAN BE DEFAULTED. ACCESS IS
* PERMITTED ONLY TO RMV2.

UT200B4: USER, DFAM=0, DUSER=USERRBF, MAPPL=RMV2.

COMMENT THIS DEVICE IS ALLOWED ACCESS TO ANY APPLICATION PROGRAM,
* BUT CAN ONLY LOG INTO ONE WITH A FIXED FAMILY NAME AND
* USER NAME.

HQRTTY1: USER, MFAM=0, MUSER=USER8.

COMMENT THE USER OF THIS DEVICE MUST PROVIDE ALL LOGIN PARAMETERS
* EXCEPT THE LAST ONE, FOR WHICH A DEFAULT EXISTS.

Figure 11-6. Normal Source Listing, Local Division (1 of 2)
HQRTTY2: USER, DFAM=NONE, DUSER=NONE, PAPPL=IAF.

COMMENT THIS DEVICE IS ALLOWED ACCESS TO ANY APPLICATION PROGRAM,
* BUT CAN ONLY LOG INTO ONE WITH A FIXED USER NAME AND IS
* PROMPTED FOR FAMILY NAME.

ARHTTY1: USER, MFAM=NONE, MUSER=USER20, MAPPL=NONE.

COMMENT THIS TERMINAL IS CONFIGURED FOR LOGIN DIALOG COMPATIBLE
* WITH EARLIER VERSIONS OF NETWORK PRODUCTS.

ARHTTY2: USER, DFAM=O.

COMMENT THIS TERMINAL IS CONFIGURED FOR LOGIN DIALOG THAT PERMITS
* ALL PARAMETERS TO BE ENTERED, BUT PROVIDES ONLY ONE DEFAULT:

SVLTTY1: USER, DFAM=NONE, DUSER=USER30, PAPPL=NONE.

COMMENT THIS TERMINAL IS CONFIGURED FOR LOGIN DIALOG THAT PERMITS
* ALL PARAMETERS TO BE ENTERED, BUT PROVIDES TWO DEFAULTS:

SVLTTY2: USER, DFAM=NONE, DUSER=USER40, PAPPL=IAF.

COMMENT ALL OTHER TERMINALS ARE CONFIGURED BY OMISSION, SUCH THAT
* THEIR USERS MUST ENTER ALL FOUR LOGIN PARAMETERS.

************************************************************************
* END OF LOCAL DIVISION, END OF LOCAL DEFINITION, AND END OF NETWORK
* DEFINITION.
************************************************************************
END.

Figure 11-6. Normal Source Listing, Local Division (2 of 2)

NO DEFINE COMMANDS ENCOUNTERED

Figure 11-7. DEFINE Statement Summary Listing, Local Division
**DEFINE**

**PUBLCLF: LFILE.**

**TITLE,PUBLCF (NDL REF MAN SAMPLE PROGRAM).**

***********************************************************************
* HERE ARE ALL OF THE APPLICATION PROGRAMS INSTALLED AT THIS SITE.  *
* EACH HAS AN APPL STATEMENT JUST FOR DOCUMENTATION PURPOSES; ONLY  *
* THE STATEMENTS FOR RBF, TAF, AND RMV2 ARE NECESSARY.  *
* THE PRIVILEGED RESTRICTION IS NOT REQUIRED FOR THE OTHERS.  *

**RBF:** APPL, PRIV=YES, UID=YES, DI=NO.

**IAF:** APPL, PRIV=YES, UID=NO, DI=NO.

**TAF:** APPL, PRIV=YES, UID=YES, DI=NO.

**MCS:** APPL, PRIV=YES, UID=NO, DI=NO.

**TVF:** APPL, PRIV=NO, UID=NO, DI=NO.

COMMENT THE FOLLOWING IS A SITE-DEFINED NETWORK APPLICATION PROGRAM  *
* AND IS NOT IN THE SYSTEM LIBRARY:

**RMV2:** APPL, DI=YES.  * RMV2 IS INITIALLY DISABLED.

***********************************************************************
* HERE ARE ALL OF THE DEVICES REQUIRING AN AUTOMATIC OR MANDATORY  *
* LOGIN CONFIGURATION.  *
* ALL USER NAMES ARE KNOWN TO BE VALID FOR THIS HOST.  *
* THE DEFAULT FAMILY NAME IS SVLSYS.  SVLFAM2 IS ALSO KNOWN TO BE VALID.

COMMENT THIS TERMINAL HAS DEFAULTS FOR ALL LOGIN PARAMETERS; USERS  *
* ARE STILL PROMPTED FOR EACH PARAMETER EXCEPT PASSWORD:

**HASPCON:** USER, DFAM=SVLFAM2, DUSER=HASPUSR, MAPPL=RBF.

COMMENT THIS TERMINAL HAS ONLY MANDATORY LOGIN PARAMETERS; USERS  *
* ARE NOT PROMPTED FOR ANY PARAMETERS AND ONLY RBF IS  *
* ACCESSIBLE FROM THIS TERMINAL:

**BATCH3:** USER, MFAM=O, MUSER=RBFUSER, MAPPL=RBF.

COMMENT THIS TERMINAL IS ALLOWED ACCESS TO SEVERAL FILE DEVICE  *
* FAMILIES AND THEREFORE MUST INDICATE A FAMILY NAME.  *
* THE USER NAME CAN BE DEFAULTED, AND ACCESS IS ONLY  *
* PERMITTED TO RBF:

**UT200A1:** USER, DFAM=NONE, DUSER=USERRBF, MAPPL=RBF.

COMMENT THIS TERMINAL IS ALLOWED ACCESS TO SEVERAL FILE DEVICE  *
* FAMILIES BUT NEED NOT INDICATE A FAMILY NAME; FAMILY  *
* NAME AND THE USERNAME CAN BE DEFAULTED.  ACCESS IS  *
* PERMITTED ONLY TO RMV2:

**UT200B4:** USER, DFAM=O, DUSER=USERRBF, MAPPL=RMV2.

COMMENT THIS DEVICE IS ALLOWED ACCESS TO ANY APPLICATION PROGRAM,  *
* BUT CAN ONLY LOG INTO ONE WITH A FIXED FAMILY NAME AND  *
* USER NAME.

**HORMATY1:** USER, MFAM=O, MUSER=USER8.

COMMENT THE USER OF THIS DEVICE MUST PROVIDE ALL LOGIN PARAMETERS  *
* EXCEPT THE LAST ONE, FOR WHICH A DEFAULT EXISTS.

**HORMATY2:** USER, DFAM=NONE, DUSER=NONE, MAPPL=IAF.

COMMENT THIS DEVICE IS ALLOWED ACCESS TO ANY APPLICATION PROGRAM,  *
* BUT CAN ONLY LOG INTO ONE WITH A FIXED USER NAME AND IS  *
* PROMPTED FOR FAMILY NAME.

**Figure 11-8. Expanded Source Listing, Local Division (Sheet 1 of 2)***
ARHTTY1: USER, MFAM=NONE, MUSER=USER20, MAPPL=None.
COMMENT THIS TERMINAL IS CONFIGURED FOR LOGIN DIALOG COMPATIBLE
* WITH EARLIER VERSIONS OF NETWORK PRODUCTS.
ARHTTY2: USER, DFAM=0.
COMMENT THIS TERMINAL IS CONFIGURED FOR LOGIN DIALOG THAT PERMITS
* ALL PARAMETERS TO BE ENTERED, BUT PROVIDES ONLY ONE DEFAULT:
SVLTTY1: USER, DFAM=NONE, DUSER=USER30, PAPPL=None.
COMMENT THIS TERMINAL IS CONFIGURED FOR LOGIN DIALOG THAT PERMITS
* ALL PARAMETERS TO BE ENTERED, BUT PROVIDES TWO DEFAULTS:
SVLTTY2: USER, DFAM=NONE, DUSER=USER40, PAPPL=IAF.
COMMENT ALL OTHER TERMINALS ARE CONFIGURED BY OMISSION, SUCH THAT
* THEIR USERS MUST ENTER ALL FOUR LOGIN PARAMETERS.
***********************************************************************
* END OF LOCAL DIVISION, END OF LOCAL DEFINITION, AND END OF NETWORK
* DEFINITION.
***********************************************************************
END.

Figure 11-8. Expanded Source Listing, Local Division (Sheet 2 of 2)

<table>
<thead>
<tr>
<th>VALID LCF CREATED</th>
<th>06.58.11 85/08/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCF FILE NAME</td>
<td>PUBS LCF</td>
</tr>
<tr>
<td>APPL</td>
<td></td>
</tr>
<tr>
<td>NAME</td>
<td>PRIV</td>
</tr>
<tr>
<td>RBF</td>
<td>YES</td>
</tr>
<tr>
<td>IAF</td>
<td>YES</td>
</tr>
<tr>
<td>TAF</td>
<td>YES</td>
</tr>
<tr>
<td>MCS</td>
<td>YES</td>
</tr>
<tr>
<td>TVF</td>
<td>NO</td>
</tr>
<tr>
<td>RMV2</td>
<td>NO</td>
</tr>
<tr>
<td>USER</td>
<td>NAME</td>
</tr>
<tr>
<td>HASP CON</td>
<td>SVLFAM2</td>
</tr>
<tr>
<td>BATCH3</td>
<td>0</td>
</tr>
<tr>
<td>UT200A1</td>
<td>0</td>
</tr>
<tr>
<td>UT200B4</td>
<td>0</td>
</tr>
<tr>
<td>HQRTTY1</td>
<td>0</td>
</tr>
<tr>
<td>HQRTTY2</td>
<td>0</td>
</tr>
<tr>
<td>ARHTTY1</td>
<td>0</td>
</tr>
<tr>
<td>ARHTTY2</td>
<td>0</td>
</tr>
<tr>
<td>SVLTTY1</td>
<td>0</td>
</tr>
</tbody>
</table>

Figure 11-9. File Summary Listing, Local Division for File PUBS LCF
Figure 11-10. Physical Configuration of Network PUBSNET
Figure 11-11. Logical Configuration of Network PUBSNET

?,?,?,? indicates log-in parameters required in an abbreviated sequence of family name, user name, password, application name
CHARACTER DATA INPUT, OUTPUT, AND CENTRAL MEMORY REPRESENTATION

This appendix describes the code and character sets used by the operating system local batch device driver programs, magnetic tape driver programs, and network terminal communication products. This appendix does not describe how other products associate certain graphic or control characters with specific binary code values for collating or syntax processing purposes. The main text of this manual describes such associations that are relevant to the reader.

CHARACTER SETS AND CODE SETS

A character set differs from a code set. A character set is a set of graphic and/or control character symbols. A code set is a numbering system used to represent each character within a character set. Characters exist outside the computer system and communication network; codes are received, stored, retrieved, and transmitted within the computer system and network.

When this manual refers to the ASCII 128-character set or the 7-bit ASCII code set, it is referring to the character set and code set defined as the American National Standard Code for Information Interchange (ASCII, ANSI Standard X3.4-1977). References in this manual to an ASCII character set or an ASCII code set do not necessarily apply to the 128-character, 7-bit ASCII code set.

GRAPHIC AND CONTROL CHARACTERS

A graphic character can be displayed or printed. Examples of graphic characters are the characters A through Z, a blank, and the digits 0 through 9. A control character is not a graphic character; a control character initiates, modifies, or stops a control operation. An example of a control character is the backspace character, which moves the terminal carriage or cursor back one space. Although a control character is not a graphic character, some terminals use a graphic representation for control characters.

CODED AND BINARY CHARACTER DATA

Character codes can be interpreted as coded character data or as binary character data. Coded character data is converted by default from one code set representation to another as it enters or leaves the computer system; for example, data received from a terminal or sent to a magnetic tape unit is converted. Binary character data is not converted as it enters or leaves the system. Character codes are not converted when moved within the system; for example, data transferred to or from mass storage is not converted.

The distinction between coded character data and binary character data is important when reading or punching cards and when reading or writing magnetic tape. Only coded character data can be properly reproduced as characters on a line printer. Only binary character data can properly represent characters on a punched card when the data cannot be stored as display code.

The distinction between binary character data and characters represented by binary data (such as peripheral equipment instruction codes) is also important. Only binary noncharacter data can properly reproduce characters on a plotter.

CHARACTER SET TABLES

The character set tables in this appendix are designed so that the user can find the character represented by a code (such as in a dump) or find the code that represents a character. To find the character represented by a code, the user looks up the code in the column listing the appropriate code set and then finds the character on that line in the column listing the appropriate character set. To find the code that represents a character, the user looks up the character and then finds the code on the same line in the appropriate column.

NETWORK OPERATING SYSTEM

NOS supports the following character sets:

- CDC graphic 64-character set
- CDC graphic 63-character set
- ASCII graphic 64-character set
- ASCII graphic 63-character set
- ASCII graphic 95-character set
- ASCII 128-character set

Each installation must select either a 64-character set or a 63-character set. The differences between the codes of a 63-character set and the codes of a 64-character set are described under Character Set Anomalies. Any reference in this appendix to a 64-character set implies either a 63- or 64-character set unless otherwise stated.

NOS supports the following code sets to represent its character sets in central memory:

- 6-bit display code
- 12-bit ASCII code
- 6/12-bit display code
The 6-bit display code is a set of octal codes from 00 to 77, inclusive.

The 12-bit ASCII code is the ASCII 7-bit code right-justified in a 12-bit byte. The bits are numbered from the right starting with 0; bits 0 through 6 contain the ASCII code, bits 7 through 10 contain zeros, and bit 11 distinguishes the 12-bit ASCII 0000 code from the 12-bit 0000 end-of-line byte. The octal values for the 12-bit codes are 0001 through 0177 and 4000.

The 6/12-bit display code is a combination of 6-bit codes and 12-bit codes. The octal values for the 6-bit codes are 00 through 77, excluding 74 and 76. (The interpretation of the 00 and 63 codes is described under Character Set Anomalies in this appendix.) The octal 12-bit codes begin with either 74 or 76 and are followed by a 6-bit code. Thus, 74 and 76 are escape codes and are never used as 6-bit codes within the 6/12-bit display code set. The octal values of the 12-bit codes are: 7401, 7402, 7404, 7407, and 7601 through 7677. The other 12-bit codes, 74xx and 7600, are undefined.

CHARACTER SET ANOMALIES

The operating system input/output software and some products interpret two codes differently when the installation selects a 63-character set rather than a 64-character set. If a site uses a 63-character set: the colon (:) graphic character is always represented by a 6-bit display code value of 63 octal; display code 00 is undefined (it has no associated graphic or punched card code); the percent (%) graphic does not exist, and translations produce a space (55 octal).

However, if the site uses a 64-character set, output of an octal 7404 6/12-bit display code or a 6-bit display code value of 00 produces a colon. In ASCII mode, a colon can be input only as a 7404 6/12-bit display code. Undefined 6/12-bit display codes in output files produce unpredictable results and should be avoided.

Two consecutive 6-bit display code values of 00 can be confused with the 12-bit 0000 end-of-line byte and should be avoided.

Translation of 7-bit or 12-bit ASCII to 6-bit display code causes character folding from the 128-character ASCII set to the 63- or 64-character ASCII subset, with the special character substitutions shown in figure A-1.

INTERACTIVE TERMINAL USERS

NOS supports display consoles and teletypewriters that use code sets other than 7-bit ASCII codes for communication or use graphics other than those defined in an ASCII character set. Data exchanged with such terminals is translated as described under Terminal Transmission Modes in this appendix. The following description applies only to terminals that use 7-bit ASCII codes and the ASCII character set.

ASCII Data Exchange Modes

Table A-1 shows the character sets and code sets available to an Interactive Facility (IAF) user. Table A-2 shows the octal and hexadecimal 7-bit ASCII code for each ASCII character, and can be used to convert codes from octal to hexadecimal. (Certain Terminal Interface Program commands require hexadecimal specification of a 7-bit ASCII code.)

IAF supports both normalized mode and transparent mode transmissions through the network. These transmission modes are described under Terminal Transmission Modes in this appendix. Refer to the NOS Version 2 Reference Set, Volume 3 System Commands, for additional information.

IAF treats normalized mode transmissions as coded character data; IAF converts these transmissions to or from either 6-bit or 12-bit display code.

IAF treats transparent mode transmissions as binary character data. Transparent mode input or output uses 12-bit bytes, with bit 11 always set to 1; for ASCII terminals, transparent mode input and output occurs in the 12-bit ASCII code shown in table A-1, but the leftmost digit is 4 instead of 0.

When the NORMAL command is in effect, IAF assumes that the ASCII graphic 64-character set is used and translates all input and output to or from display code. When the ASCII command is in effect, IAF assumes that the ASCII 128-character set is used and translates all input and output to or from 6/12-bit display code.

The IAF user can convert a 6/12-bit display code file to a 12-bit ASCII code file using the NOS FCOPY control statement. The resulting 12-bit ASCII file can be routed to a line printer but the file cannot be output through IAF.

<table>
<thead>
<tr>
<th>12-Bit ASCII (Octal)</th>
<th>6-Bit Display Code (Octal)</th>
<th>12-Bit ASCII (Octal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0140 (')</td>
<td>76 (8)</td>
<td>0100 (8)</td>
</tr>
<tr>
<td>0173 ($)</td>
<td>61 ($)</td>
<td>0133 ($)</td>
</tr>
<tr>
<td>0174 ($)</td>
<td>75 ($)</td>
<td>0134 ($)</td>
</tr>
<tr>
<td>0175 ($)</td>
<td>62 ($)</td>
<td>0135 ($)</td>
</tr>
<tr>
<td>0176 (')</td>
<td>76 ($)</td>
<td>0136 ($)</td>
</tr>
</tbody>
</table>

Figure A-1. ASCII Character Folding
Terminal Transmission Modes

Coded character data can be exchanged with a conversational terminal in two transmission modes. These two modes, normalized mode and transparent mode, correspond to the types of character code editing and translation performed by the network software during input and output operations.

The terminal operator can change the input transmission mode using a terminal definition command (sometimes called a Terminal Interface Program command). The application program providing the terminal facility service can change the input or output transmission mode.

Normalized Mode Transmissions

Normalized mode is the initial and default mode used for both input and output transmissions. The network software translates normalized mode data to or from the transmission code used by the terminal into or from the 7-bit ASCII code shown in table A-2. (Tables A-1 and A-3 through A-7 are provided for use while coding an application program to run under the operating system; they do not describe character transmissions through the network.)

Translation of a specific terminal transmission code to or from a specific 7-bit ASCII code depends on the terminal class in which the network software places the terminal.

The following paragraphs summarize the general case for normalized mode data code translations. This generalized description uses table A-2.

The reader can extend this generalized description by using the other tables to determine character set mapping for functions initiated from a terminal. For example, the description under Terminal Output Character Subsets can be used to predict whether a lowercase ASCII character stored in 6/12-bit display code can appear on an EBCDIC or external BCD terminal; if an ASCII character passes through the network represented in 7-bit ASCII as character mode data, it probably can be represented on an EBCDIC terminal, but it is always transformed to an uppercase character on a mode 4A ASCII terminal.

Table A-2 contains the ASCII 128-character set supported by the network software. The ASCII 96-character subset in the rightmost six columns minus the deletion character (Del) comprises the graphic 95-character subset; the Del is not a graphic character, although some terminals graphically represent it. The graphic 64-character subset comprises the middle four columns. Only the characters in this 64-character subset have 6-bit display code equivalents.

Terminals that support an ASCII graphic 64-character subset actually use a subset of up to 96 characters, consisting of the graphic 64-character subset and the control characters of columns 1 and 2; often, the Del character in column 7 is included.

Terminals that support an ASCII graphic 95-character or 96-character subset actually might use all 128 characters.

The hexadecimal value of the 7-bit code for each character in table A-2 consists of the character's column number in the table, followed by its row number. For example, N is in row E of column 4, so its hexadecimal value is 4E. The octal value for the code when it is right-justified in an 8-bit byte appears beneath the character graphic or mnemonic. The binary value of the code consists of the bit values shown, placed in the order given by the subscripts for the letter b; for example, N is 1001110.

Tables A-8 through A-19 show the normalized mode translations performed for each terminal class. The parity shown in the terminal transmission codes is the parity used as a default for the terminal class. The parity setting actually used by a terminal can be identified to the network software through a TIP command.

Tables A-8 through A-19 contain the graphic and control characters associated with the transmission codes used by the terminal because of the terminal class and code set in use. The network ASCII graphic and control characters shown are those of the standard ASCII character set associated with the ASCII transmission codes of table A-2.

Terminal Output Character Subsets — Although the network supports the ASCII 128-character set, some terminals restrict output to a smaller character set. This restriction is supported by replacing the control characters in columns 0 and 1 of table A-2 with blanks to produce the ASCII graphic 95-character subset, and replacing the characters in columns 6 and 7 with the corresponding characters from columns 4 and 5, respectively, to produce the ASCII graphic 64-character subset.

Terminal Input Character Subsets and Supersets — Although the network supports the ASCII 128-character set, some terminals restrict input to a smaller character set or permit input of a larger character set. A character input from a device using a character set other than ASCII is converted to an equivalent ASCII character; terminal characters without ASCII character equivalents are represented by the ASCII code for a space.

Site-written terminal-servicing facility programs can also cause input or output character replacement, conversion, or deletion by exchanging data with the network in 6-bit display code.

Input Restrictions — The network software automatically deletes codes associated with terminal communication protocols or terminal hardware functions. These codes usually represent the cancel, backspace, linefeed, carriage return, and deletion characters. If paper tape support is requested, the device control 3 code also is deleted. Some of these code deletions can be suppressed by using the full-ASCII and special editing options (refer to the FA and SE terminal definition parameters in the NOS Version 2 Reference Set, Volume 3, System Commands).

Output Restrictions — All codes sent by an application program are transmitted to the terminal. However, the 12-bit ASCII code 0037 (octal), the 6/12-bit display code 7677 (octal), and the 7-bit ASCII code 1F (hexadecimal) should be avoided in character mode output. The network software interprets the unit separator character represented by these codes as an end-of-line indicator. The processing of application program-supplied unit separators causes incorrect formatting of output and can cause loss of other output characters.
Input Parity Processing — The network software does not preserve the parity of the terminal transmission code in the corresponding ASCII code. An ASCII code received by the terminal-servicing facility program always contains zero as its eighth bit.

Output Parity Processing — The network software provides the parity bit setting appropriate for the terminal being serviced, even when the software is translating from ASCII character codes with zero parity bit settings.

Transparent Mode Transmissions

Transparent mode is selected separately for input and output transmissions.

During transparent mode input, the parity bit is stripped from each terminal transmission code (unless the N or I parity option has been selected by a terminal definition command), and the transmission code is placed in an 8-bit byte without translation to 7-bit ASCII code. Line transmission protocol characters are deleted from mode 4 terminal input. When the 8-bit bytes arrive in the host computer, a terminal servicing facility program can right-justify the bytes within a 12-bit byte.

During transparent mode output, processing similar to that performed for input occurs. When the host computer transmits 12-bit bytes, the leftmost 4 bits (bits 11 through 8) are discarded. The code in each 8-bit byte received by the network software is not translated. The parity bit appropriate for the terminal class is altered as indicated by the parity option in effect for the terminal. The codes are then transmitted to the terminal in bytes of a length appropriate for the terminal class. Line transmission protocol characters are inserted into mode 4 terminal output.

LOCAL BATCH USERS

Table A-3 lists the CDC graphic 64-character set, the ASCII graphic 64-character set, and the ASCII graphic 95-character set available on local batch devices. This table also lists the code sets and card keypunch codes (026 and 029) that represent the characters.

The 64-character sets use 6-bit display code as their code set; the 95-character set uses 12-bit ASCII code. The 95-character set is composed of all the characters in the ASCII 128-character set that can be printed at a line printer (refer to Line Printer Output). Only 12-bit ASCII code files can be printed using the graphic ASCII 95-character set. The 95-character set is represented by the octal 12-bit ASCII codes 0040 through 0176. An octal 12-bit ASCII code outside of the range 0040 through 0176 represents an unprintable character.

To print a 6/12-bit display code file, the user must convert the file to 12-bit ASCII code. The NOS FCOPY control statement is used for this conversion.

Punched Card Input and Output

A character represented by multiple punches in a single column has its punch pattern identified by numbers and hyphens. For example, the punches representing an exclamation point are identified as 11-0; this notation means both rows 11 and 0 are punched in the same column.

A multiple punch pattern that represents something other than a character is identified by numbers and slashes. For example, the punches representing the end of an input file are identified as 6/7/8/9; this notation means rows 6 through 9 are punched in the same column.

Coded character data is exchanged with card readers or card punches according to the translations shown in table A-3. As indicated in the table, other card keypunch codes are available for input of the ASCII and CDC characters [ ] and }. NOS cannot read or punch the 95-character set as coded character data.

Each site chooses either 026 or 029 as its default keypunch code. NOS begins reading an input deck in the default code (regardless of the character set

Line Printer Output

The printer train used on the line printer to which a file is sent determines which batch character set is printed. The following CDC print trains match the batch character sets in table A-3:

<table>
<thead>
<tr>
<th>Character Set</th>
<th>Print Train</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC graphic 64-character set</td>
<td>596-1</td>
</tr>
<tr>
<td>ASCII graphic 64-character set</td>
<td>596-5</td>
</tr>
<tr>
<td>ASCII graphic 95-character set</td>
<td>596-6</td>
</tr>
</tbody>
</table>

The characters of the default 596-1 print train are listed in the table A-3 column labeled CDC Graphic (64-Character Set); the 596-5 print train characters are listed in the table A-3 column labeled ASCII Graphic (64-Character Set); and the 596-6 print train characters are listed in the table A-3 column labeled ASCII Graphic (95-Character Set).

If an unprintable character exists in a line, NOS marks the condition by printing the number sign (#) in the first printable column of the line. A space replaces the unprintable character within the line.

When a transmission error occurs during the printing of a line, NOS makes up to five attempts to reprint the line. The CDC graphic print train prints a concatenation symbol (--) in the first column of the repeated line following a line containing errors. The ASCII print trains print an underline (__) instead of the concatenation symbol.

After the fifth attempt, the setting of sense switch one for the batch input and output control point determines further processing. NOS either rewinds the file and returns it to the print queue, or ignores the transmission errors.
in use). The user can specify the alternate key-
punch code by punching a 26 or 29 in columns 79 and 80 of any job card, 6/7/9 card, or 7/8/9 card. The specified translation continues throughout the job unless the alternate keypunch code translation is specified on a subsequent 6/7/9 or 7/8/9 card.

A 5/7/9 card with a punch in column 1 changes keypunch code translation if the card is read immediately before or after a 7/8/9 card. A space (no punch) in column 2 indicates 026 translation mode; a 9 punch in column 2 indicates 029 translation mode. The specified translation remains in effect until a similar 5/7/9 card or a 7/8/9 card is encountered, or the job ends.

The 5/7/9 card also allows literal input when 4/5/6/7/8/9 is punched in column 2. Literal input can be used to read 80-column binary character data within a punched card deck of coded character data.

Literal cards are stored with each column represented in a 12-bit byte (a row 12 punch is represented by a 1 in bit 11, row 11 by a 1 in bit 10, row 0 by a 1 in bit 9, and rows 1 through 9 by 1's in bits 8 through 0 of the byte), using 16 central memory words per card. Literal input cards are read until another 5/7/9 card with 4/5/6/7/8/9 punched in column 2 is read. The next card can specify a new conversion mode.

If the card following the 5/7/9, 6/7/9, or 7/8/9 card has a 7 and a 9 punched in column 1, the section of the job deck following it contains system binary cards (as described in the NOS Version 2 Reference Set, Volume 3, System Commands).

REMOTE BATCH USERS

Remote batch console input and output is restricted to character mode transmission. Character mode is described under Terminal Transmission Modes in this appendix.

The abilities to select alternate keypunch code translations, to read binary cards, to output plotter files, and to print lowercase characters depend upon the remote terminal equipment. Remote batch terminal support under NOS is described in the Remote Batch Facility (RBF) reference manual.

MAGNETIC TAPE USERS

The character and code sets used for reading and writing magnetic tapes depend on whether coded or binary data is read or written and on whether the tape is 7-track or 9-track.

Coded Data Exchanges

Coded character data copied to mass storage from magnetic tape is stored in a 63- or 64-character 6-bit display code. The operating system magnetic tape driver program converts the data from 6-bit external BCD code when reading a coded 7-track tape and from 7-bit ASCII or 8-bit EBCDIC code (as specified on the tape assignment statement) when reading a coded 9-track tape.

To read and write lowercase character 7-bit ASCII or 8-bit EBCDIC codes or to read and write control codes, the user must assign a 7-track or 9-track tape in binary mode.

Seven-Track Tape Input and Output

Table A-4 shows the code and character set conversions between 6-bit external BCD and 6-bit display code for 7-track tapes. Because only 63 characters can be represented in 7-track even parity, one of the 64 display codes is lost in conversion to and from external BCD code.

Figure A-2 shows the differences in 7-track tape conversion that depend on whether the system uses the 63-character or 64-character set. The ASCII character for the specified character code is shown in parentheses. The output arrows show how the 6-bit display code changes when it is written on tape in external BCD. The input arrows show how the external BCD code changes when the tape is read and converted to display code.

Coded character data to be copied from mass storage to magnetic tape is assumed to be stored in a 63- or 64-character 6-bit display code. The operating system magnetic tape driver program converts the data to 6-bit external BCD code when writing a coded 7-track tape and to 7-bit ASCII or 8-bit EBCDIC code (as specified on the tape assignment statement) when writing a coded 9-track tape.

Table A-5 lists the conversions between the 7-bit ASCII code used on the tape and the 6-bit display code used within the system. Table A-6 lists the conversions between the 8-bit EBCDIC code used on the tape and the 6-bit display code used within the system.

When an ASCII or EBCDIC code representing a lowercase character is read from a 9-track magnetic tape, it is converted to its uppercase character.

Figure A-2. Magnetic Tape Code Conversions
6-bit display code equivalent. Any EBCDIC code not listed in table A-6 is converted to display code 55 (octal) and becomes a space. Any code between 80 (hexadecimal) and PF (hexadecimal) read from an ASCII tape is converted to display code 00.

Binary Character Data Exchanges

Binary character data exchanged between central memory files and magnetic tape is transferred as a string of bytes without conversion of the byte contents. The grouping of the bytes and the number of bits in each byte depend on whether 7-track or 9-track tape is being used.

Seven-Track Tape Input and Output

Each binary data character code written to or read from 7-track magnetic tape is assumed to be stored in a 6-bit byte, such as the system uses for 63- or 64-character 6-bit display code. Seven-bit ASCII and 8-bit EBCDIC codes can only be read from or written to 7-track magnetic tape as binary character data if each code is stored within a 12-bit byte as if it were two character codes.

Nine-Track Tape Input and Output

Each binary data character code exchanged between central memory files and 9-track magnetic tape is assumed to be stored in an 8-bit or 12-bit byte. During such binary data transfers, the 6/12-bit display codes and 12-bit ASCII codes shown in table A-1, the 7-bit ASCII codes shown in table A-2, or the 8-bit hexadecimal EBCDIC codes shown in table A-7 can be read or written. The 7-bit ASCII codes and 8-bit EBCDIC codes can be exchanged either in an unformatted form or right-justified within a zero-filled 12-bit byte of memory.

When 9-track tape is written, every pair of 12-bit memory bytes becomes three 8-bit tape bytes; when 9-track tape is read, every three 8-bit tape bytes become a pair of 12-bit memory bytes. Because of the 12-bit byte pairs, codes not packed into 12-bit bytes are exchanged in their unpacked form, while codes packed in 12-bit bytes are exchanged in packed form.

When an odd number of central memory words is read or written, the lower four bits of the last 8-bit byte (bits 0 through 3 of the last word) are not used. For example, three central memory words are written on tape as 22 8-bit bytes (7.5 pairs of 12-bit bytes) and the remaining four bits are ignored.

CODE CONVERSION AIDS

Table A-7 contains the octal values of each 8-bit EBCDIC code right-justified in a 12-bit byte with zero fill. This 12-bit EBCDIC code can be produced or read using the FORM and 8-Bit Subroutines utilities.
<table>
<thead>
<tr>
<th>Character Sets</th>
<th>ASCII Character (128-Character Set)</th>
<th>ASCII Graphic (64-Character Set)</th>
<th>Octal 6-Bit Display Code</th>
<th>Octal 6/12-Bit Display Code</th>
<th>Octal 12-Bit ASCII Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>: colon††</td>
<td></td>
<td></td>
<td>00††</td>
<td>00††</td>
<td>00††</td>
</tr>
<tr>
<td>A</td>
<td>A</td>
<td></td>
<td>01</td>
<td>01</td>
<td>0101</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td></td>
<td>02</td>
<td>02</td>
<td>0102</td>
</tr>
<tr>
<td>C</td>
<td>C</td>
<td></td>
<td>03</td>
<td>03</td>
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<td>06</td>
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<td>0110</td>
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†The graphic 95-character subset does not include DEL; refer to Terminal Transmission Modes in the text.

LEGEND:

Numbers under characters are the octal values for the 7-bit character codes used within the network.
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**Note:** Double '†' indicates characters not available through card keypunch.
### TABLE A-3. LOCAL BATCH DEVICE CHARACTER SETS (Contd)

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†Available only on NOS.

††Character or code interpretation depends on context. Refer to Character Set Anomalies in the text.

†††Available for input only, on NOS.

§Available for input only, on NOS/BE or SCOPE 2.
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<td>11</td>
</tr>
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<td>72</td>
<td>&lt; less than</td>
<td>72</td>
</tr>
<tr>
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<td>73</td>
<td>. period</td>
<td>57</td>
</tr>
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<td>\ reverse slant</td>
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</tr>
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<td>67</td>
<td>76</td>
<td>^ caret</td>
<td>76</td>
</tr>
</tbody>
</table>

†As the text explains, conversion of these codes depends on whether the tape is read or written.
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<th>Character and Code Conversion††</th>
<th>6-Bit Display Code†††</th>
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<tr>
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<td>07</td>
</tr>
<tr>
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<td>02</td>
</tr>
<tr>
<td>23</td>
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</tr>
<tr>
<td>24</td>
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<td>04</td>
</tr>
<tr>
<td>25</td>
<td>% percent sign§</td>
<td>05</td>
</tr>
<tr>
<td>26</td>
<td>&amp; ampersand</td>
<td>06</td>
</tr>
<tr>
<td>27</td>
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<td>07</td>
</tr>
<tr>
<td>28</td>
<td>( opening parenthesis</td>
<td>08</td>
</tr>
<tr>
<td>29</td>
<td>) closing parenthesis</td>
<td>09</td>
</tr>
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<tr>
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<td>+ plus</td>
<td>0B</td>
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<tr>
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<td>0D</td>
</tr>
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<td>0E</td>
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</tr>
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<td>3D</td>
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<tr>
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<td>1E</td>
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### TABLE A-5. ASCII 9-TRACK CODED TAPE CONVERSION (Contd)

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<th>Character and Code Conversion††</th>
<th>6-Bit Display Code†††</th>
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<td>68</td>
</tr>
<tr>
<td>49</td>
<td>I</td>
<td>69</td>
</tr>
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<td>6A</td>
</tr>
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<td>4B</td>
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<td>L</td>
<td>6C</td>
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<td>71</td>
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<tr>
<td>52</td>
<td>R</td>
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<tr>
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</tr>
<tr>
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<td>7F</td>
</tr>
</tbody>
</table>

†When these characters are copied from or to a tape, the characters remain the same and the code changes from or to ASCII to or from display code.

††These characters do not exist in display code. When the characters are copied from a tape, each ASCII character is changed to an alternate display code character. The corresponding codes are also changed. Example: When the system copies a lowercase a, 61 (hexadecimal), from tape, it writes an uppercase A, 01 (octal).

†††A display code space always translates to an ASCII space.

§Character or code interpretation depends on context. Refer to Character Set Anomalies in the text.
<table>
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<tr>
<th>Code Conversion</th>
<th>Character</th>
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<th>Character</th>
<th>Code (Hex)</th>
<th>Character</th>
<th>ASCII Character</th>
<th>Code (Octal)</th>
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<td>00</td>
<td>space</td>
<td>55</td>
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</tr>
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<td>° cent sign</td>
<td>1C</td>
<td>IFS</td>
<td>0E</td>
<td>° period</td>
<td>61</td>
<td></td>
</tr>
<tr>
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<td>0E</td>
<td>SO</td>
<td>0B</td>
<td>. period</td>
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</tr>
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<td>&lt; less than</td>
<td>72</td>
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</tr>
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</tr>
<tr>
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<td>0B</td>
<td>VT</td>
<td>16</td>
<td>+ plus</td>
<td>45</td>
<td></td>
</tr>
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<td>/ vertical line</td>
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<td>&amp; ampersand</td>
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<td>^ caret</td>
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<td>- hyphen (minus)</td>
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<td>IRS</td>
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<td>IUS</td>
<td>1F</td>
<td>? question mark</td>
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</tr>
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<td>79</td>
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<td>74</td>
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</tr>
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A-16

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### TABLE A-6. EBCDIC 9-TRACK CODED TAPE CONVERSION (Contd)

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<th>ASCII Character</th>
<th>Code (Octal)</th>
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</table>

†When these characters are copied from or to a tape, the characters remain the same (except EBCDIC codes 4A (hexadecimal), 4F (hexadecimal), 5A (hexadecimal), and 5F (hexadecimal)) and the code changes from or to EBCDIC to or from display code.

††These characters do not exist in display code. When the characters are copied from a tape, each EBCDIC character is changed to an alternate display code character. The corresponding codes are also changed. Example: When the system copies a lowercase a, 81 (hexadecimal), from tape, it writes an uppercase A, 01 (octal).

†††A display code space always translates to an EBCDIC space.

$Character or code interpretation depends on context. Refer to Character Set Anomalies in the text.
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†Graphic characters shown are those used on the IBM System/370 standard (PN) print train. Other devices support subsets or variations of this character graphic set.
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†Graphic characters shown are those used on the IBM System/370 standard (PN) print train. Other devices support subsets or variations of this character graphic set.

‡‡Not used for output to line printers. Translation to a space (100 octal) occurs.

‡‡‡Shown with zero parity (eighth or uppermost bit is always zero).
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TABLE A-9. CHARACTER CODE TRANSLATIONS, ASCII CHARACTER SET CONSOLES
IN TERMINAL CLASSES 1 THROUGH 3 AND 5 THROUGH 8 (M33, 713, 721, X3.64, H2000, T4014, M40) (Contd)

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<td>377</td>
<td>DEL or RUBOUT</td>
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<td>7F</td>
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<td>delete</td>
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</table>

† Shown with even parity, which is the default for these terminal classes (unless PA=N, an application
program receives the same code as in normalized mode).

†† A circle around a character indicates that the character key is pressed in conjunction with a CTL, CTRL,
CTRL, or CONTROL key to generate the code.

††† Shown with zero parity (eighth or uppermost bit is always zero).
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<td>012</td>
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**TABLE A-10. CHARACTER CODE TRANSLATIONS, APL TYPEWRITER-PACING CONSOLES IN TERMINAL CLASSES 1 THROUGH 3 AND 5 THROUGH 8 (M33, 713, 721, X3.64, H2000, T4014, M40)**
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TABLE A-10. CHARACTER CODE TRANSLATIONS, APL TYPEWRITER-PARING CONSOLES IN TERMINAL CLASSES 1 THROUGH 3 AND 5 THROUGH 8 (M33, 713, 721, X3.64, H2000, T4014, M40) (Contd)
### Table A-10. Character Code Translations, APL Typewriter-Paring Consoles in Terminal Classes 1 Through 3 and 5 Through 8 (M33, 713, 721, X3.64, H2000, T4014, M40) (Contd)

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†Shown with even parity, which is the default for these terminal classes (unless PA=N, an application program receives the same code as in normalized mode).

††A circle around a character indicates that the character key is pressed in conjunction with a CTL, CTRL, CNTRL, or CONTROL key to generate the code.

†††Shown with zero parity (eighth or uppermost bit is always zero).
## TABLE A-11. CHARACTER CODE TRANSLATIONS, APL BIT-PARING CONSOLES IN TERMINAL CLASSES 1 THROUGH 3 AND 5 THROUGH 8 (M33, 713, 721, X3.64, H2000, T4014, AND M40)

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TABLE A-11. CHARACTER CODE TRANSLATIONS, APL BIT-PARING CONSOLES IN TERMINAL
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†Shown with even parity, which is the default for these terminal classes (unless PA=N, an application program receives the same code as in normalized mode).

††A circle around a character indicates that the character key is pressed in conjunction with a CTL, CTRL, CNTRL, or CONTROL key to generate the code.

††††Shown with zero parity (eighth or uppermost bit is always zero).
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†Escape codes are not listed.

††Shown with odd parity, the only possible parity selection for these terminal classes. ASCII control codes 000 through 040g (without parity) are removed from input during complete editing; codes 01g and 03g (SOH and ETX, without parity) are preserved as data in full-ASCII mode, as are escape code sequences.

†††Shown with zero parity (eighth or uppermost bit is always zero). During output, codes 000 through 010g are converted to code 040g (blank); codes 012g, 015g, and 037g (LF, CR, and US) are removed. Codes for lowercase ASCII characters sent to the console are converted to the codes for the equivalent uppercase characters supported by the terminal, as shown.
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</table>
| **DO** | 320 | ^ or ➝ or blank | ➝ or blank | 5E, 136, | 7E, 176 | | ^

†Escape codes and control codes are not listed.

††Shown with odd parity, the only possible parity selection for these terminal classes.

†††Shown with zero parity (eighth or uppermost bit is always zero). During output, codes 000 through 037g are converted to code 320g (blank). Codes for lowercase ASCII characters sent to the console are converted to the codes for the equivalent uppercase characters supported by the terminal, as shown.

§Input and output of this symbol is not possible on some terminals. BCD transmission conventions support the rubout symbol as an internal terminal memory parity error indicator instead. The ASCII codes 136g and 176g are output as a blank.
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<th>Octal Code†</th>
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<th>Control Character††</th>
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TABLE A-14. CHARACTER CODE TRANSLATIONS, CONSOLES AND LINE PRINTERS IN TERMINAL CLASSES 11, 12 AND 13 (711, 714, AND 714X) (Contd)
### Table A-14. Character Code Translations, Consoles and Line Printers in Terminal Classes 11, 12 and 13 (711, 714, and 714X) (Contd)

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<th>Terminal ASCII (Transparent Mode Use)</th>
<th>Network ASCII (Normalized Mode Use)</th>
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<td><strong>Octal Code</strong></td>
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↑↑↑Shown with zero parity (eighth or uppermost bit is always zero).

↑↑↑↑Converted to a space (040g) during complete editing.
### TABLE A-15. ASCII CHARACTER CODE TRANSLATIONS, EBCD CONSOLES IN TERMINAL CLASS 4 (2741)

<table>
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<th>Hex. Code</th>
<th>Octal Code</th>
<th>EBCD Graphic</th>
<th>Control Character</th>
<th>Network ASCII (Normalized Mode Use)</th>
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<td>5F or 2D</td>
<td>137 or 053</td>
</tr>
<tr>
<td>002</td>
<td>002</td>
<td>^ or -</td>
<td>21 or 40</td>
<td>140 or 100</td>
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### TABLE A-16. APL CHARACTER CODE TRANSLATIONS, EBCD CONSOLES IN TERMINAL CLASS 4 (2741)

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<th>Control Character</th>
<th>Network ASCII (Normalized Mode Use)</th>
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<td>^ or -</td>
<td>21 or 40</td>
<td>140 or 100</td>
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</table>

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Note: The tables contain character code translations and their corresponding graphical representations or control characters for ASCII and APL characters on EBCD consoles in Terminal Class 4 (2741). The codes and their interpretations are specific to the normalized mode use of each system.
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†Shown with odd parity; odd parity is the default for this terminal class.

‡Each input line is assumed to begin in lowercase. Input characters are translated to lowercase ASCII characters unless prefixed by the UCS code. Once a case shift occurs, it remains in effect until another case shift code is received, the page width is reached, or the line is transmitted to the host computer. During output, case is preserved by insertion of case shift codes where needed.

§Shown with zero parity (eighth or uppermost bit is always zero).

$Not transmitted to the host computer after translation during input.

§§Output translation only.
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<td>cancel, end of media, substitute, escape file separator, group separator, record separator, or unit separator</td>
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††shown with odd parity; odd parity is the default for this terminal class.

§§Each input line is assumed to begin in lowercase. Input characters are translated to lowercase ASCII characters unless prefixed by the UCS code. Once a case shift occurs, it remains in effect until another case shift code is received, the page width is reached, or the line is transmitted to the host computer. During output, case is preserved by insertion of case shift codes where needed.

§§shown with zero parity (eighth or uppermost bit is always zero).

§§Not transmitted to the host computer after translation during input.

§§Output translation only.
# Table A-17: ASCII Character Code Translations, Correspondence Code Consoles in Terminal Class 4 (2741)

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<td>026</td>
</tr>
<tr>
<td>1A</td>
<td>032</td>
</tr>
<tr>
<td>1F</td>
<td>037</td>
</tr>
<tr>
<td>23</td>
<td>043</td>
</tr>
<tr>
<td>26</td>
<td>046</td>
</tr>
<tr>
<td>2A</td>
<td>052</td>
</tr>
<tr>
<td>2F</td>
<td>057</td>
</tr>
<tr>
<td>32</td>
<td>062</td>
</tr>
<tr>
<td>37</td>
<td>067</td>
</tr>
<tr>
<td>3E</td>
<td>076</td>
</tr>
<tr>
<td>43</td>
<td>103</td>
</tr>
<tr>
<td>46</td>
<td>106</td>
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<tr>
<td>4A</td>
<td>112</td>
</tr>
<tr>
<td>4F</td>
<td>117</td>
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<tr>
<td>52</td>
<td>122</td>
</tr>
<tr>
<td>56</td>
<td>127</td>
</tr>
<tr>
<td>58</td>
<td>130</td>
</tr>
<tr>
<td>5D</td>
<td>135</td>
</tr>
<tr>
<td>61</td>
<td>141</td>
</tr>
<tr>
<td>64</td>
<td>144</td>
</tr>
<tr>
<td>68</td>
<td>150</td>
</tr>
<tr>
<td>6D</td>
<td>155</td>
</tr>
<tr>
<td>70</td>
<td>160</td>
</tr>
<tr>
<td>75</td>
<td>165</td>
</tr>
</tbody>
</table>

* TABLE A-17. ASCII CHARACTER CODE TRANSLATIONS, CORRESPONDENCE CODE CONSOLES IN TERMINAL CLASS 4 (2741) *
<table>
<thead>
<tr>
<th>Terminal Correspondence Code</th>
<th>Network ASCII (Normalized Mode Use)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hex.</td>
<td>Octal</td>
</tr>
<tr>
<td>Code</td>
<td>Code</td>
</tr>
<tr>
<td>76</td>
<td>166</td>
</tr>
<tr>
<td>79</td>
<td>171</td>
</tr>
<tr>
<td>7A</td>
<td>172</td>
</tr>
<tr>
<td>7C</td>
<td>174</td>
</tr>
<tr>
<td>7D</td>
<td>177</td>
</tr>
<tr>
<td>00</td>
<td>000</td>
</tr>
<tr>
<td>00</td>
<td>000</td>
</tr>
<tr>
<td>00</td>
<td>000</td>
</tr>
<tr>
<td>00</td>
<td>000</td>
</tr>
<tr>
<td>00</td>
<td>000</td>
</tr>
<tr>
<td>3D</td>
<td>075</td>
</tr>
<tr>
<td>3D</td>
<td>075</td>
</tr>
<tr>
<td>3D</td>
<td>075</td>
</tr>
<tr>
<td>3D</td>
<td>075</td>
</tr>
</tbody>
</table>
| 3D | 075 | IL or IDLE or NULL | | 07 | 007 | | \\
| 3D | 075 | IL or IDLE or NULL | | 0B or 0C | 013 or 014 | | vertical tabulate |
| 3D | 075 | IL or IDLE or NULL | | 10 | 020 | | or form feed |
| 3D | 075 | IL or IDLE or NULL | | 12 | 022 | | data link escape |
| 3D | 075 | IL or IDLE or NULL | | 14 thru 16 | 024 thru 026 | | device control 2 |
| 3D | 075 | IL or IDLE or NULL | | | 026 | | device control 4, |
| 3D | 075 | | | | | | negative acknowledge, |
| 3D | 075 | IL or IDLE or NULL | | 18 thru 1F | 030 thru 037 | | or synchronize |
| 3D | 075 | | | | | | cancel, end of media, |
| 3D | 075 | IL or IDLE or NULL | | | | | substitute, |
| 3D | 075 | | | | | | file separator, |
| 3D | 075 | IL or IDLE or NULL | | | | | group separator, |
| 3D | 075 | | | | | | record separator, |
| 3D | 075 | IL or IDLE or NULL | | | | | or unit separator |

†Shown with odd parity; odd parity is the default for this terminal class.

††Each input line is assumed to begin in lowercase. Input characters are translated to lowercase ASCII characters unless prefixed by the UCS code. Once a case shift occurs, it remains in effect until another case shift code is received, the page width is reached, or the line is transmitted to the host computer. During output, case is preserved by insertion of case shift codes where needed.

†††Shown with zero parity (eighth or uppermost bit is always zero).

§Not transmitted to the host computer after translation during input.

§§Output translation only.
### TABLE A-18. APL CHARACTER CODE TRANSLATIONS, CORRESPONDENCE

#### CODE CONSOLES IN TERMINAL CLASS 4 (2741)

<table>
<thead>
<tr>
<th>Terminal Correspondence Code</th>
<th>Network ASCII (Normalized Mode Use)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hex Code†</td>
<td>Octal Code†</td>
</tr>
<tr>
<td>01</td>
<td>001</td>
</tr>
<tr>
<td>02</td>
<td>002</td>
</tr>
<tr>
<td>04</td>
<td>004</td>
</tr>
<tr>
<td>07</td>
<td>007</td>
</tr>
<tr>
<td>08</td>
<td>010</td>
</tr>
<tr>
<td>08</td>
<td>013</td>
</tr>
<tr>
<td>0D</td>
<td>015</td>
</tr>
<tr>
<td>0E</td>
<td>016</td>
</tr>
<tr>
<td>10</td>
<td>020</td>
</tr>
<tr>
<td>13</td>
<td>023</td>
</tr>
<tr>
<td>15</td>
<td>025</td>
</tr>
<tr>
<td>16</td>
<td>026</td>
</tr>
<tr>
<td>19</td>
<td>031</td>
</tr>
<tr>
<td>1A</td>
<td>032</td>
</tr>
<tr>
<td>1C</td>
<td>034</td>
</tr>
<tr>
<td>1F</td>
<td>037</td>
</tr>
<tr>
<td>20</td>
<td>040</td>
</tr>
<tr>
<td>23</td>
<td>043</td>
</tr>
<tr>
<td>25</td>
<td>045</td>
</tr>
<tr>
<td>26</td>
<td>046</td>
</tr>
<tr>
<td>29</td>
<td>051</td>
</tr>
<tr>
<td>2A</td>
<td>052</td>
</tr>
<tr>
<td>2C</td>
<td>054</td>
</tr>
<tr>
<td>2F</td>
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</tr>
<tr>
<td>31</td>
<td>061</td>
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<td>37</td>
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<td>3D</td>
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<td>3E</td>
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<tr>
<td>4A</td>
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<td>4F</td>
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<td>73</td>
<td>163</td>
</tr>
<tr>
<td>75</td>
<td>165</td>
</tr>
</tbody>
</table>
### TABLE A-18. APL CHARACTER CODE TRANSLATIONS, CORRESPONDENCE CODE CONSOLES IN TERMINAL CLASS 4 (2741) (Contd)

<table>
<thead>
<tr>
<th>Terminal Correspondence Code</th>
<th>Network ASCII (Normalized Mode Use)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hex Code†</td>
<td>Octal Code†</td>
</tr>
<tr>
<td>76</td>
<td>166</td>
</tr>
<tr>
<td>79</td>
<td>171</td>
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<tr>
<td>7A</td>
<td>172</td>
</tr>
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<td>7C</td>
<td>174</td>
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<td>075</td>
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<td>075</td>
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<td>075</td>
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<td>3D</td>
<td>075</td>
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<tr>
<td>3D</td>
<td>075</td>
</tr>
<tr>
<td>3D</td>
<td>075</td>
</tr>
<tr>
<td>3D</td>
<td>075</td>
</tr>
</tbody>
</table>

†Shown with odd parity; odd parity is the default for this terminal class. (Unless PA=N, the application program receives the same code as in normalized mode.)

††Each input line is assumed to begin in lowercase. Input characters are translated to lowercase ASCII characters unless prefixed by the UCS code. Once a case shift occurs, it remains in effect until another case shift code is received, the page width is reached, or the line is transmitted to the host computer. During output, case is preserved by insertion of case shift codes where needed.

†††Shown with zero parity (eighth or uppermost bit is always zero).

§Not transmitted to the host computer after translation during input.

§§Output translation only.

---

60480000 L
### TABLE A-19. FULL ASCII NORMALIZED MODE APL CHARACTER SET

<table>
<thead>
<tr>
<th>Bits</th>
<th>ROW</th>
<th>COLUMN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>b7</td>
<td>b6</td>
<td>b5</td>
</tr>
</tbody>
</table>

- **128-Character Set**
- **96-Character Subset**
- **64-Character Subset**

#### JANUS

- **NUL**
- **DLE**
- **SP**
- **0**
- **1**
- **2**
- **3**
- **4**
- **5**
- **6**
- **7**

####仲裁

- **000**
- **020**
- **040**
- **060**
- **080**
- **100**
- **120**
- **140**
- **160**

- **001**
- **021**
- **041**
- **061**
- **081**
- **101**
- **121**
- **141**
- **161**

- **002**
- **022**
- **042**
- **062**
- **082**
- **102**
- **122**
- **142**
- **162**

- **003**
- **023**
- **043**
- **063**
- **083**
- **103**
- **123**
- **143**
- **163**

- **004**
- **024**
- **044**
- **064**
- **084**
- **104**
- **124**
- **144**
- **164**

- **005**
- **025**
- **045**
- **065**
- **085**
- **105**
- **125**
- **145**
- **165**

- **006**
- **026**
- **046**
- **066**
- **086**
- **106**
- **126**
- **146**
- **166**

- **007**
- **027**
- **047**
- **067**
- **087**
- **107**
- **127**
- **147**
- **167**

- **008**
- **028**
- **048**
- **068**
- **088**
- **108**
- **128**
- **148**
- **168**

- **009**
- **029**
- **049**
- **069**
- **089**
- **109**
- **129**
- **149**
- **169**

- **010**
- **030**
- **050**
- **070**
- **090**
- **110**
- **130**
- **150**
- **170**

- **011**
- **031**
- **051**
- **071**
- **091**
- **111**
- **131**
- **151**
- **171**

- **012**
- **032**
- **052**
- **072**
- **092**
- **112**
- **132**
- **152**
- **172**

- **013**
- **033**
- **053**
- **073**
- **093**
- **113**
- **133**
- **153**
- **173**

- **014**
- **034**
- **054**
- **074**
- **094**
- **114**
- **134**
- **154**
- **174**

- **015**
- **035**
- **055**
- **075**
- **095**
- **115**
- **135**
- **155**
- **175**

- **016**
- **036**
- **056**
- **076**
- **096**
- **116**
- **136**
- **156**
- **176**

- **017**
- **037**
- **057**
- **077**
- **097**
- **117**
- **137**
- **157**
- **177**

---

†The graphic 95-character subset does not include DEL; refer to Terminal Transmission Modes in the text.

**LEGEND:**

- Numbers under characters are the octal values for the 7-bit character codes used within the network.
Two levels of error processing occur during an NDL processor run:

Compilation diagnostic processing

File access and dayfile message processing

The diagnostic processing performed during the run is documented by the error summary listing produced as part of the listing output file. The NDL job's output file contains an error summary list only if errors were detected. If you suppress listing file generation (by using the L=0 command option), the output file contains an error summary list only if fatal errors were detected; suppressing generation of the listing file suppresses all warning diagnostics.

If any error is detected, the NDL processor produces one of the diagnostic messages described in the following subsection. Statement processing is complete if feasible. If a fatal error is detected, no valid network definition files or file content summary listings are created, and the NDL processor aborts the job. After such an abort, control of the job transfers to the EXIT area in the command portion of the job image.

Informative messages are always placed in the job dayfile. In certain instances, a diagnostic-free job can be aborted because of file access problems; these cases also produce job dayfile messages. The dayfile messages are explained at the end of this appendix.

DIAGNOSTIC MESSAGES

The Network Definition Language job's error summary lists all errors that occurred in the program with a cross-reference to the line number of the statement unit in the source listing where the error occurred; the decimal line numbers are assigned sequentially from 1 through 100000. If the condition was a syntax error, the character position (column) within the statement unit is also given.

Some errors are general in nature and cannot be associated with a specific line number. General errors are indicated by the word NONE in the line number column.

Table B-1 explains the error codes used on the error summary. A set of three asterisks precedes each statement unit in the source listing on which the NDL processor performed a diagnostic function.

Occurrence of fatal errors listed in table B-1 does not necessarily terminate statement scanning, and additional errors in the same statement can be detected.

Occurrence of some errors does terminate statement scanning, so additional undetected errors beyond the one flagged can exist in any given statement. This prevents a cascade effect in the errors detected in case of the inadvertent omission of a parameter, keyword, or separator.

When a cascade of errors occurs for a single statement, and many of the error diagnostics issued for the statement do not seem to apply to it, the number of characters permitted in a statement unit has probably been exceeded. If the diagnosed statement runs to more than 72 meaningful characters (or if the preceding statement exceeds 72 meaningful characters) and is not divided into valid statement units, the NDL processor misinterprets the resulting character stream and can diagnose nonexistent errors.

Use of the keywords TIPTYPE, TC, and DT can cause partial or complete suspension of diagnostic processing for their respective LINE, GROUP, TERMINAL, DEVICE, or TERMDEV statements when a site-defined value is used as a parameter declaration. Occurrence of the following reserved words as valid declarations causes the NDL processor to suspend diagnostic checking of all parameters on the same statement that have values dependent on the site-defined parameter:

TT12 through TT14
TC28 through TC31
DT12

Parameters not dependent on the site-defined parameter receive normal diagnostic checking. For example:

A line with a TIPTYPE of MODE4 can have a terminal with a TC of TC30 and a DT of DT12, but still must have CA and TA values as part of its configuration.

A line with a TIPTYPE of TT12 can have a terminal with a TC of HASP as long as all parameters useable for terminals of any terminal class are correctly declared.

The NDL processor cannot perform all normal checks for completeness of definition in LINE, GROUP, TERMINAL, DEVICE, and TERMDEV statements if site-defined parameter values are present.

JOB DAYFILE MESSAGES

All of the informative and file access error messages produced in the dayfile for the job are listed in table B-2.
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Severity</th>
<th>Message</th>
<th>Significance</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fatal</td>
<td>DUPLICATE LABEL/ELEMENT-NAME.</td>
<td>The element-name fields of at least two statements contain the character string on the flagged statement (check defname identifiers also).</td>
<td>Change one character in at least one field.</td>
</tr>
<tr>
<td>2</td>
<td>Fatal</td>
<td>INVALID STATEMENT NAME.</td>
<td>The statement name is not one of the reserved NDL statement-name words.</td>
<td>Check for a typographical error, then review section 2.</td>
</tr>
<tr>
<td>3</td>
<td>Fatal</td>
<td>INVALID STATEMENT DECLARATION.</td>
<td>A keyword is misspelled or misplaced, or a defname identifier cannot be expanded properly.</td>
<td>Check appendixes D and E.</td>
</tr>
<tr>
<td>4</td>
<td>Fatal</td>
<td>MISSING COLON AFTER ELEMENT NAME.</td>
<td>Self-explanatory.</td>
<td>Change and rerun the job.</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Fatal</td>
<td>UNKNOWN KEYWORD OR DELIMITER.</td>
<td>A keyword is misspelled or a DEFINE statement is missing.</td>
<td>Change and rerun the job.</td>
</tr>
<tr>
<td>7</td>
<td>Fatal</td>
<td>EQUAL NOT ASSOCIATED WITH KEYWORD.</td>
<td>Misplaced or misused defname identifier, or typographical error.</td>
<td>Check the statement format in sections 2 through 8.</td>
</tr>
<tr>
<td>8</td>
<td>Fatal</td>
<td>PUNCTUATION ERROR.</td>
<td>An extra colon or other special character is present, or a required separator is missing.</td>
<td>Check the statement format in section 2.</td>
</tr>
<tr>
<td>9</td>
<td>Fatal</td>
<td>INVALID KEYWORD.</td>
<td>The keyword shown in the column to the left of the message cannot be used in this type of statement.</td>
<td>Check the statement format in sections 2 through 8.</td>
</tr>
<tr>
<td>10</td>
<td>Fatal</td>
<td>INVALID VALUE.</td>
<td>The value shown in the column to the left of the message cannot be used for the keyword you have associated it with.</td>
<td>Check the statement format in sections 2 through 8.</td>
</tr>
<tr>
<td>11</td>
<td>Fatal</td>
<td>NO PERIOD FOUND BEFORE ASTERISK.</td>
<td>The NDL processor cannot tell if the asterisk begins a comment or is an incorrect parameter declaration.</td>
<td>Insert a period or correct the declaration.</td>
</tr>
<tr>
<td>12</td>
<td>Fatal</td>
<td>NESTED DEFINE.</td>
<td>A DEFINE statement identifier cannot be used within another DEFINE statement.</td>
<td>Remove the identifier and rerun the job.</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Fatal</td>
<td>STATEMENT OUT OF SEQUENCE.</td>
<td>The required hierarchy was violated.</td>
<td>Check figure 2-4.</td>
</tr>
<tr>
<td>15</td>
<td>Fatal</td>
<td>REQUIRED LABEL MISSING.</td>
<td>The element name field is empty when a name is needed.</td>
<td>Change and rerun the job.</td>
</tr>
<tr>
<td>16</td>
<td>Fatal</td>
<td>DEFINE-NAME CANNOT BE A RESERVED WORD.</td>
<td>The defname identifier you used is one of the reserved words disallowed in appendix D.</td>
<td>Change and rerun the job.</td>
</tr>
<tr>
<td>17</td>
<td>Warning</td>
<td>LABEL NOT REQUIRED FOR THIS STMT — IGNORED.</td>
<td>The contents of the element name field are not needed.</td>
<td>None.</td>
</tr>
<tr>
<td>18</td>
<td>Fatal</td>
<td>ELEMENT-NAME IS TOO LONG.</td>
<td>The element name field contains a value more than seven characters long.</td>
<td>Change and rerun the job.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Severity</td>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
<tr>
<td>------------</td>
<td>-----------</td>
<td>---------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>19</td>
<td>Fatal</td>
<td>NO KEYWORD ASSOCIATED WITH VALUE.</td>
<td>Either an equals sign is missing, an extra separator is present, or the keyword was omitted.</td>
<td>Fix the statement and rerun the job.</td>
</tr>
<tr>
<td>20</td>
<td>Fatal</td>
<td>CONSECUTIVE COMMAS NOT ALLOWED.</td>
<td>Probably a typographical error; a parameter might be missing.</td>
<td>Delete the extra comma or insert the missing parameter.</td>
</tr>
<tr>
<td>21</td>
<td>Fatal</td>
<td>MISSING -END-STATEMENT.</td>
<td>The NDL processor cannot tell if your input file is complete.</td>
<td>Check that the file is undamaged; if so, add an END statement.</td>
</tr>
<tr>
<td>22</td>
<td>Fatal</td>
<td>FIRST CHARACTER AFTER PERIOD NOT AN ASTERISK.</td>
<td>The NDL processor cannot tell if you have misplaced sequence number field information or placed comments on the statement.</td>
<td>Insert an asterisk or reformat the statement and rerun the job.</td>
</tr>
<tr>
<td>23</td>
<td>Fatal</td>
<td>ELEMENT-NAME MUST BEGIN WITH A LETTER.</td>
<td>Self-explanatory.</td>
<td>Change and rerun the job.</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Fatal</td>
<td>MISSING NFILE/LFILE STMT -- MUST BE 1ST IN DIV.</td>
<td>Each division of an NDL program begins at an NFILE or LFILE statement; at least one must be present.</td>
<td>Check statement placement or insert the required statement.</td>
</tr>
<tr>
<td>26</td>
<td></td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Fatal</td>
<td>NAME GENERATION SUPPRESSED, -NCIR- TOO LARGE.</td>
<td>The device names for switched circuits on an X.25 line are generated by adding the NCIR value to the element name root you specified; this cannot be done because the NCIR value is invalid.</td>
<td>Fix the NCIR value and rerun the job.</td>
</tr>
<tr>
<td>28</td>
<td>Fatal</td>
<td>GROUP NOT ALLOWED FOR X.25 LINES.</td>
<td>You cannot use a GROUP statement with this TIPTYPE value.</td>
<td>Replace the GROUP statement with a LINE statement; add LINE, TERMINAL, DEVICE, and TERMDEV statements if needed.</td>
</tr>
<tr>
<td>29</td>
<td>Fatal</td>
<td>KEYWORD NOT ALLOWED ON THIS STATEMENT.</td>
<td>Self-explanatory.</td>
<td>Check any TIPTYPE value associated with the statement.</td>
</tr>
<tr>
<td>30</td>
<td>Fatal</td>
<td>MISSING VALUE.</td>
<td>The keyword shown in the column to the left of this message is not a stand-alone keyword; either a value is missing or a separator is misplaced.</td>
<td>Add a value or delete the keyword and rerun the job.</td>
</tr>
<tr>
<td>31</td>
<td>Fatal</td>
<td>NAME GENERATION SUPPRESSED, ROOT NAME TOO LONG.</td>
<td>The element name of a line or device configured through a GROUP statement cannot be longer than five characters.</td>
<td>Shorten the name on the identified GROUP, DEVICE, or TERMDEV statement.</td>
</tr>
<tr>
<td>32</td>
<td>Fatal</td>
<td>NAME GENERATION SUPPRESSED, NO PORT FOR GROUP.</td>
<td>A valid port number is needed to use as the end of each element name for a line or device configured through a GROUP statement.</td>
<td>Add a valid PORT parameter to the GROUP statement and rerun the job.</td>
</tr>
<tr>
<td>33</td>
<td>Warning</td>
<td>PREVIOUSLY DEFINED TITLE OVER-WRITTEN.</td>
<td>You have more than one TITLE statement in the same division.</td>
<td>Check that an NFILE or LFILE statement is not missing.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Severity</td>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
<tr>
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<td>----------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>34</td>
<td>Warning</td>
<td>STORED ONLY FIRST 45 CHAR — IGNORED REST.</td>
<td>You cannot put more than 45 characters into the title field of a file summary listing; the TITLE statement contains more than 45.</td>
<td>None.</td>
</tr>
<tr>
<td>35</td>
<td>Warning</td>
<td>SUPERFLUOUS DATA AFTER END STMT, IGNORED.</td>
<td>The END statement might be misplaced; if so, your definition is incomplete.</td>
<td>Check statement placement; move the END statement if necessary.</td>
</tr>
<tr>
<td>36</td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>Fatal</td>
<td>NAME GENERATION SUPPRESSED, NI TOO LARGE.</td>
<td>The GROUP statement is not valid; you are defining too many elements with one set of statements.</td>
<td>Change the NI value and add more statement groups if needed.</td>
</tr>
<tr>
<td>38</td>
<td>Fatal</td>
<td>NAME GENERATION SUPPRESSED, PORT TOO LARGE.</td>
<td>A valid port number is needed to use as the end of each element name for a line or device configured through a GROUP statement.</td>
<td>Change the PORT parameter on the GROUP statement and rerun the job.</td>
</tr>
<tr>
<td>39</td>
<td>Warning</td>
<td>DUPPLICATE DECLARATION, OVERRIDES PREVIOUS ONE.</td>
<td>Self-explanatory; if this condition was not intended, you have defined the same characteristic twice.</td>
<td>Check the statement.</td>
</tr>
<tr>
<td>40</td>
<td>Warning</td>
<td>POSSIBLE MISSING STMT(S) PRECEDING THIS ONE.</td>
<td>The NDL processor expected to find other statements before this one.</td>
<td>Check statement placement.</td>
</tr>
<tr>
<td>41</td>
<td>Warning</td>
<td>CONSOLE EXPECTED HERE TO OWN PASSIVE DEVICES</td>
<td>Console definition is required as an owning console before a set of passive devices can be used.</td>
<td>Introduce a console device definition before the set of passive devices.</td>
</tr>
<tr>
<td>42 thru 99</td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td>Fatal</td>
<td>VALUE OUT OF RANGE.</td>
<td>The parameter shown in the column to the left of this message cannot have the value you specified.</td>
<td>Change and rerun the job.</td>
</tr>
<tr>
<td>101</td>
<td>Fatal</td>
<td>KEYWORD NOT ALLOWED WITH CTYP SPECIFIED.</td>
<td>Either the CTYP value is incorrect, or you cannot declare this characteristic for a circuit of this type.</td>
<td>Change the statement and rerun the job.</td>
</tr>
<tr>
<td>102</td>
<td>Fatal</td>
<td>DUPLICATE PORT NUMBER.</td>
<td>Every line and trunk on an NPU must have a unique port number; the number specified appears in a previous LINE, TRUNK, or GROUP statement.</td>
<td>Change one of the port numbers to a correct value.</td>
</tr>
<tr>
<td>103</td>
<td>Fatal</td>
<td>REQUIRED PARAMETER MISSING.</td>
<td>Self-explanatory.</td>
<td>Refer to the statement format in sections 2 through 8.</td>
</tr>
<tr>
<td>104</td>
<td>Fatal</td>
<td>TIPTYPE NOT COMPATIBLE WITH LTYPE.</td>
<td>You have defined a line with physical characteristics that cannot be supported by the software servicing it; either the TIPTYPE value is wrong, or the LTYPE value is wrong.</td>
<td>Check for DEFINE statement identifier misplacement; change the incorrect value and rerun the job.</td>
</tr>
<tr>
<td>105</td>
<td>Fatal</td>
<td>LSPEED VALID FOR ASYNC NON-AUTO-REC LINES ONLY.</td>
<td>Self-explanatory; you cannot define a fixed speed for an automatic recognition line.</td>
<td>Remove the AUTO or XAUTO parameter, or the LSPEED parameter.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Severity</td>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
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</tr>
<tr>
<td>106</td>
<td>Fatal</td>
<td>PARAMETER NOT ALLOWED WITH TIPTYPE SPECIFIED.</td>
<td>You cannot define an element using the chosen protocol as having the characteristic indicated by the keyword in the column to the left of this message.</td>
<td>Check that the TIPTYPE value is correct; if so, delete the invalid parameter.</td>
</tr>
<tr>
<td>107</td>
<td>Fatal</td>
<td>PARAMETER NOT VALID ON FIXED CONFIG LINES.</td>
<td>Self-explanatory.</td>
<td>The LINE or GROUP statement might be missing the AUTO or XAUTO parameter.</td>
</tr>
<tr>
<td>108</td>
<td>Fatal</td>
<td>PARAMETER VALID ON 2780 TERMINALS ONLY.</td>
<td>Either you have declared a characteristic this device cannot have, or the TC or STIP value is incorrect.</td>
<td>Change the incorrect TC or STIP value, or delete the invalid parameter.</td>
</tr>
<tr>
<td>109</td>
<td>Fatal</td>
<td>DUPLICATE CLUSTER ADDRESS.</td>
<td>The CA value must be unique for each terminal on a fixed configuration line; the value used appears in a previous TERMINAL or TERMDEV statement for the same line.</td>
<td>Change the parameter and rerun the job.</td>
</tr>
<tr>
<td>110</td>
<td>Fatal</td>
<td>PARAMETER NOT VALID WITH TC SPECIFIED.</td>
<td>Either the TC value is wrong, or you have declared a characteristic this device cannot have.</td>
<td>Change the incorrect TC value, or delete the invalid parameter indicated by the keyword in the column to the left of this message.</td>
</tr>
<tr>
<td>111</td>
<td>Fatal</td>
<td>VALUE NOT VALID WITH STIP SPECIFIED.</td>
<td>The keyword is permitted but the value you have used cannot be supported by the subcategory specified within the TIP.</td>
<td>Change the value and rerun the job.</td>
</tr>
<tr>
<td>112</td>
<td>Fatal</td>
<td>VALUE NOT VALID WITH TIPTYPE SPECIFIED.</td>
<td>The keyword is permitted but the value you have used cannot be supported by the software specified.</td>
<td>Change the value and rerun the job.</td>
</tr>
<tr>
<td>113</td>
<td>Fatal</td>
<td>-AUTOREC- NOT VALID ON FIXED CONFIG LINES.</td>
<td>Self-explanatory.</td>
<td>Check if the AUTO or XAUTO parameter is needed and missing; if not, delete the indicated parameter or specify a valid value.</td>
</tr>
<tr>
<td>114</td>
<td>Fatal</td>
<td>ALL PVC-S MUST BE SPECIFIED BEFORE ANY SVC-S.</td>
<td>A TERMINAL or TERMDEV statement might be misplaced; otherwise, the CTYP value might be wrong.</td>
<td>Change statement placement or the CTYP value, as appropriate.</td>
</tr>
<tr>
<td>115</td>
<td>Fatal</td>
<td>MAXIMUM NUMBER OF TERMINALS EXCEEDED FOR THE LINE.</td>
<td>The number of terminals allowed depends on the TIPTYPE and on whether the line is fixed configuration or automatic recognition.</td>
<td>Refer to sections 4 through 7; add LINE or GROUP statements as needed.</td>
</tr>
<tr>
<td>116</td>
<td>Fatal</td>
<td>MAX NUMBER OF DEVICES EXCEEDED FOR TERMINAL.</td>
<td>The number of devices allowed depends on the subTIPTYPE and on whether the line is fixed configuration or automatic recognition.</td>
<td>Refer to sections 4 through 7; delete the unsupportable TERMDEV or DEVICE statements.</td>
</tr>
<tr>
<td>117</td>
<td>Fatal</td>
<td>STIP OR TC MUST BE SPECIFIED.</td>
<td>You omitted both parameters; one or the other is needed.</td>
<td>Add either parameter.</td>
</tr>
<tr>
<td>118</td>
<td>Fatal</td>
<td>NEN VALUE MUST BE LESS THAN OR EQUAL TO NCIR.</td>
<td>You cannot enable more switched virtual circuits than you have defined; NCIR might be too small.</td>
<td>Change the incorrect parameter and rerun the job.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Severity</td>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
<tr>
<td>------------</td>
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<td>---------</td>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>119</td>
<td>Fatal</td>
<td>PARAMETER VALUE NOT A VALID NPU NAME.</td>
<td>The value you gave for the keyword in the column to the left of this message is not used as an element name in an NPU statement within the current network division.</td>
<td>Check the spelling of the name; perhaps an NPU statement is missing.</td>
</tr>
<tr>
<td>120</td>
<td>Fatal</td>
<td>DUPLICATE LOGICAL LINK DEFINITION.</td>
<td>You declared a previous LOGLINK statement with the same NNAME value and host node number.</td>
<td>Correct the name or remove the extra LOGLINK statement.</td>
</tr>
<tr>
<td>121</td>
<td>Fatal</td>
<td>NCNAME NOT A VALID COUPLER OR NPU NAME.</td>
<td>You did not supply a COUPLER or NPU statement in this network division with this value as an element name.</td>
<td>Check the spelling; if correct, a statement is missing.</td>
</tr>
<tr>
<td>122</td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>123</td>
<td>Fatal</td>
<td>MAXIMUM NUMBER OF COUPLERS EXCEEDED (2 PER NPU).</td>
<td>You have three or more COUPLER statements for the same NPU statement.</td>
<td>Delete the extra statement and rerun the job.</td>
</tr>
<tr>
<td>124</td>
<td>Fatal</td>
<td>DUPLICATE LOC VALUE.</td>
<td>The LOC value shown in the column to the left of this message appears in a previous COUPLER statement for this NPU; one of the values is wrong.</td>
<td>Change the incorrect statement and rerun the job.</td>
</tr>
<tr>
<td>125</td>
<td>Fatal</td>
<td>DUPLICATE NODE NUMBER.</td>
<td>Node numbers must be unique within the network; the number flagged has already been assigned to an element.</td>
<td>Change one of the node numbers and rerun the job.</td>
</tr>
<tr>
<td>126</td>
<td>Fatal</td>
<td>REQUIRED SUPLINK STATEMENT MISSING.</td>
<td>No supervision path exists for this NPU; one must be defined.</td>
<td>Add a SUPLINK statement and rerun the job.</td>
</tr>
<tr>
<td>127</td>
<td>Fatal</td>
<td>NO LOGICAL LINKS DEFINED TO THIS NPU.</td>
<td>A front-end NPU must have a logical link to its coupler; a remote NPU must have at least one link to a coupler in a front-end NPU.</td>
<td>Add a LOGLINK statement and rerun the job.</td>
</tr>
<tr>
<td>128</td>
<td>Fatal</td>
<td>LOGLINK (LLNAME) DOES NOT TERMINATE AT THIS NPU.</td>
<td>The logical link specified as the LLNAME value does not terminate in the same NPU as the supervisory link defined by this SUPLINK statement.</td>
<td>Check LLNAME value spelling; if correct, the LOGLINK statement NCNAME value is wrong. Fix the incorrect value.</td>
</tr>
<tr>
<td>129</td>
<td>Fatal</td>
<td>LLNAME VALUE NOT A VALID LOGICAL LINK NAME.</td>
<td>You specified an element name that is too long, or contains a character other than a letter or a digit, or does not begin with a letter.</td>
<td>Change the name and rerun the job.</td>
</tr>
<tr>
<td>130</td>
<td>Fatal</td>
<td>DUPLICATE TRUNK DEFINITION.</td>
<td>Either you specified the same port number for two trunks, or you have defined two trunks between one pair of NPUs.</td>
<td>Change a port number value or delete one TRUNK statement and rerun the job.</td>
</tr>
<tr>
<td>131</td>
<td>Fatal</td>
<td>PARAMETER NOT ALLOWED FOR 2741 TERMINALS.</td>
<td>Self-explanatory; either the STIP value or TC value is wrong, or the device cannot have the specified characteristic.</td>
<td>Change the STIP or TC value, or remove the parameter and rerun the job.</td>
</tr>
<tr>
<td>132</td>
<td>Fatal</td>
<td>AB, CN, B1, B2, CT, BS, EB, EL MUST ALL BE UNIQUE.</td>
<td>The parameter shown in the column to the left of the message has a value declared or used for another of these parameters.</td>
<td>Change one of the parameter values and rerun the job.</td>
</tr>
<tr>
<td>133</td>
<td>Fatal</td>
<td>PARAMETER NOT ALLOWED WITH DT SPECIFIED.</td>
<td>The parameter shown in the column to the left of the message has an inappropriate keyword, or the DT value is wrong.</td>
<td>Remove the parameter, change the keyword, or change the DT value.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Severity</td>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
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<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>134</td>
<td>Fatal</td>
<td>PARAMETER NOT ALLOWED FOR M4A TERMINALS.</td>
<td>Either the STIP value is wrong, or the terminal cannot have the characteristic shown in the column to the left of the message.</td>
<td>Remove this parameter or change the STIP value.</td>
</tr>
<tr>
<td>135</td>
<td>Fatal</td>
<td>PARAMETER NOT ALLOWED WITH STIP/TC SPECIFIED.</td>
<td>Either the STIP value is wrong, or the TC value is wrong, or the terminal cannot have the characteristic shown in the column to the left of the message.</td>
<td>Remove this parameter or change the incorrect value.</td>
</tr>
<tr>
<td>136</td>
<td>Fatal</td>
<td>INCORRECT HN VALUE.</td>
<td>The host node number does not match with any host node number.</td>
<td>Check if HN is the same as the node number on a coupler statement.</td>
</tr>
<tr>
<td>137</td>
<td>Warning</td>
<td>ROUNDED TO NEXT RECOMMENDED VALUE (PARAM/VALUE).</td>
<td>The value you declared was not directly used. The value used and the parameter keyword are shown.</td>
<td>Refer to the text in section 6 or 7.</td>
</tr>
<tr>
<td>138</td>
<td>Fatal</td>
<td>VALUE NOT ALLOWED WITH DT SPECIFIED.</td>
<td>Either the value shown for the keyword is wrong, or the DT value is wrong.</td>
<td>Remove this parameter or change the incorrect value.</td>
</tr>
<tr>
<td>139</td>
<td>Fatal</td>
<td>-DO- VALUE IS NOT UNIQUE FOR DEVICE TYPE.</td>
<td>Device ordinals must be unique for all DEVICE statements with the DT value used within this terminal; one of the following is wrong: the DO value shown, the DO value on a previous DEVICE statement, or the DT value used.</td>
<td>Change the incorrect statement value and rerun the job.</td>
</tr>
<tr>
<td>140</td>
<td>Fatal</td>
<td>PL AND CP STREAM VALUES ARE NOT UNIQUE.</td>
<td>Two DEVICE statements with the indicated DT values have the same STREAM parameter value; either one of the DT values is wrong, or one of the STREAM values is wrong.</td>
<td>Change the incorrect parameter value and rerun the job.</td>
</tr>
<tr>
<td>141</td>
<td>Fatal</td>
<td>STREAM VALUE IS NOT UNIQUE FOR DEVICE TYPE.</td>
<td>Two DEVICE statements with the same DT value have the same STREAM parameter value; either one of the DT values is wrong, or one of the STREAM values is wrong.</td>
<td>Change the incorrect parameter value and rerun the job.</td>
</tr>
<tr>
<td>142</td>
<td>Fatal</td>
<td>MAXIMUM NUMBER OF DEVICES EXCEEDED.</td>
<td>The number of device statements allowed for a terminal or line depends on the protocol and whether the line is automatic recognition or fixed configuration.</td>
<td>Refer to the text of sections 4 through 7.</td>
</tr>
<tr>
<td>143</td>
<td>Fatal</td>
<td>-TA- VALUE IS NOT UNIQUE.</td>
<td>The TA value on this statement appears on another DEVICE statement specified for this terminal; one of the values is wrong.</td>
<td>Change the incorrect statement parameter value and rerun the job.</td>
</tr>
<tr>
<td>144</td>
<td>Fatal</td>
<td>CANNOT SPECIFY BOTH MFAM AND DFAM.</td>
<td>A default family name or a mandatory one can be specified, but not both.</td>
<td>Remove either parameter.</td>
</tr>
<tr>
<td>145</td>
<td>Fatal</td>
<td>VALUE FOR MUSER AND DUSER CANNOT BE ZERO.</td>
<td>Self-explanatory; no system user name default exists.</td>
<td>Remove the parameter or specify the value NONE.</td>
</tr>
<tr>
<td>146</td>
<td>Fatal</td>
<td>CANNOT SPECIFY BOTH MUSER AND DUSER.</td>
<td>A default user name or a mandatory one can be specified, but not both.</td>
<td>Remove either parameter.</td>
</tr>
<tr>
<td>147</td>
<td>Fatal</td>
<td>MAPPL OR PAPPL CANNOT BE A RESERVED APPL NAME.</td>
<td>You specified one of the programs disallowed in section 8.</td>
<td>Remove the parameter or change the value to a different name.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Severity</td>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
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<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
</tr>
<tr>
<td>148</td>
<td>Fatal</td>
<td>CANNOT SPECIFY BOTH MAPPL AND PAPPL.</td>
<td>A primary application or a mandatory one can be specified, but not both.</td>
<td>Remove either parameter.</td>
</tr>
<tr>
<td>149</td>
<td>Fatal</td>
<td>APPLICATION NAME - SPECIFIED IS A RESERVED NAME.</td>
<td>You have tried to declare an APPL statement with an element name disallowed in section 8.</td>
<td>Remove the statement or change the element name.</td>
</tr>
<tr>
<td>150</td>
<td>Fatal</td>
<td>NCIR MUST BE LESS THAN OR EQUAL TO NSVC.</td>
<td>Self-explanatory; one of values is incorrect.</td>
<td>Change the incorrect value.</td>
</tr>
<tr>
<td>151</td>
<td>Fatal</td>
<td>BOTH ENDS OF TRUNK CONNECTED TO SAME NPU.</td>
<td>One of the NPU name values is wrong.</td>
<td>Change the incorrect parameter.</td>
</tr>
<tr>
<td>152</td>
<td>Fatal</td>
<td>MUTUALLY EXCLUSIVE PARAMETER(S) HAVE BEEN USED.</td>
<td>Dxxx and Xxxx parameters (named in the column to the left of the message) cannot appear in the same statement.</td>
<td>Review the statement description and delete inappropriate parameters.</td>
</tr>
<tr>
<td>153</td>
<td>Fatal</td>
<td>TOTAL LENGTH OF FAC EXCEEDS MAX (124 HEX DIGITS).</td>
<td>There can be any number of FAC parameters specified as long as the total number of hexadecimal digits does not exceed 124.</td>
<td>Decrease the number of FACS or the number of hexadecimal digits for one or more FACS.</td>
</tr>
<tr>
<td>154</td>
<td>Fatal</td>
<td>THIS LOGICAL LINK DOES NOT SPAN OVER ONE TRUNK.</td>
<td>No physical path exists for the link you defined; a TRUNK statement is missing or the NPU name is wrong.</td>
<td>Change the NPU name or add a TRUNK statement if the line actually exists; if not, delete this statement.</td>
</tr>
<tr>
<td>155</td>
<td>Fatal</td>
<td>NO CONSOLES DEFINED ON THIS TERMINAL.</td>
<td>The protocol for this line requires at least one console device per terminal.</td>
<td>Add a DEVICE statement or check for an incorrect DT value on an existing one.</td>
</tr>
<tr>
<td>156</td>
<td>Fatal</td>
<td>DTEA NOT ALLOWED WHEN DCE IS NOT SPECIFIED.</td>
<td>Either the DCE parameter is missing, a NO value for it should be YES, or the DTEA parameter is not needed.</td>
<td>Add a DCE=NO parameter or delete the DTEA parameter.</td>
</tr>
<tr>
<td>157</td>
<td>Fatal</td>
<td>ILLEGAL PORT ASSIGNMENT ON THIS NODE ID SHOWN.</td>
<td>One end of the trunk statement is defined to use a port number that is not sequentially assigned with other trunks on the NPU indicated in the column to the left of this message.</td>
<td>Check the NPU element name; if correct, check the PORT parameter values of all TRUNK statements; change one of the values.</td>
</tr>
<tr>
<td>158</td>
<td>Fatal</td>
<td>ILLEGAL VALUE AS A CONTROL CHARACTER.</td>
<td>The value is not allowed for the parameter indicated in the column to the left of this message. Some ASCII character code values are invalid for characters that affect terminal functions.</td>
<td>Check the range given for the parameter in sections 4 through 7; change the value to one within the range indicated in the text.</td>
</tr>
<tr>
<td>159</td>
<td>Warning</td>
<td>MAXIMUM NUMBER OF USER STATEMENTS EXCEEDED.</td>
<td>Your input file contains more than 1023 USER statements. The 1024th and subsequent statements are ignored.</td>
<td>Unneeded USER statements should be eliminated.</td>
</tr>
<tr>
<td>160</td>
<td>Fatal</td>
<td>STIP IS REQUIRED WHEN TC IS OF TYPE USER.</td>
<td>A CDC-written TIP cannot determine which subTIPtype is appropriate for the line because no terminal class characteristics were known when the TIP was written.</td>
<td>Add a STIP parameter with a value valid for the TIP.</td>
</tr>
</tbody>
</table>

TABLE B-1. NDL PROCESSOR DIAGNOSTIC MESSAGES (Contd)
### TABLE B-1. NDL PROCESSOR DIAGNOSTIC MESSAGES (Contd)

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Severity</th>
<th>Message</th>
<th>Significance</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>161</td>
<td>Warning</td>
<td>MISSING PARAMETERS FOR USER DEFINED TIPTYPE.</td>
<td>The CDC-written version of the network software requires values for the parameters listed in the column to the left of this message.</td>
<td>If the network software has not been modified to supply an internal default value, you should add the parameter to the statement.</td>
</tr>
<tr>
<td>162</td>
<td>Fatal</td>
<td>TSPEED INCOMPATIBLE FOR THIS AUTOREC INDICATOR.</td>
<td>Low TSPEED cannot be used with the XAUTO parameter, or high TSPEED cannot be used with the AUTO parameter.</td>
<td>Change the TSPEED or the AUTOREC indicator to be compatible.</td>
</tr>
<tr>
<td>163</td>
<td>Warning</td>
<td>VALUE OUT OF RANGE.</td>
<td>The value specified for the AL parameter is not within the range of 0 through 7.</td>
<td>Change the value specified for the AL parameter.</td>
</tr>
<tr>
<td>164</td>
<td>Fatal</td>
<td>ILLEGAL FORMAT FOR UDATA DEFINITION.</td>
<td>The format specified for the UDATA parameter is not correct.</td>
<td>Correct the Format.</td>
</tr>
<tr>
<td>165</td>
<td>Fatal</td>
<td>TOO MANY BYTES FOR UDATA DEFINITION.</td>
<td>The total number of digits must not exceed 256.</td>
<td>Correct the UDATA definition.</td>
</tr>
<tr>
<td>166 thru 999</td>
<td></td>
<td>Reserved for CDC use.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE B-2. NDL PROCESSOR DAYFILE MESSAGES

<table>
<thead>
<tr>
<th>Message</th>
<th>Significance</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABRT FROM xxxx - BAD NCF FILE RECORD.</td>
<td>Procedure NDLLIST located an NCF record with the wrong format. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>Regenerate NCF by running NDLP on the same source program. If the problem still exists, follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ABRT FROM xxxx - CANT READ LIN RECORDS.</td>
<td>Procedure NDLLIST located an error in the line record format during an I/O transfer of that record. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>Regenerate NCF by running NDLP on the same source program. If the problem still exists, follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ABRT FROM xxxx - CANT READ NCF RECDS.</td>
<td>Procedure NDLLIST located an error in an NCF record format during an I/O transfer of that record. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>Regenerate NCF by running NDLP on the same source program. If the problem still exists, follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ABRT FROM xxxx - FN VAL NOT DEVICE FN.</td>
<td>Procedure NDLLIST located a device parameter with an FN value outside the range allocated for device FNs. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>This indicates a design error. Follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ABRT FROM xxxx - FN VAL NOT LINE FN.</td>
<td>Procedure NDLLIST located a line parameter with an FN value outside the range allocated for line FNs. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>This indicates a design error. Follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>--------</td>
</tr>
<tr>
<td>ABRT FROM xxxx - FN VAL NOT TERM FN.</td>
<td>Procedure NDLLIST located a term parameter with an FN value outside the range allocated for term FNs. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>This indicates a design error. Follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ABRT FROM xxxx - INVALID RECORD TYPE.</td>
<td>Procedure NDLLIST located an invalid record type. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>Regenerate LCF/NCF by using NDLP. If the problem still exists, follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ABRT FROM xxxx - NO SUCH RECORD TYPE.</td>
<td>Procedure NDLLIST located an unrecognizable record type. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>Regenerate LCF/NCF by using NDLP. If the problem still exists, follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ABRT FROM xxxx - READ ERROR.</td>
<td>Procedure NDLLIST located a read error in NCF/LCF. The name of the procedure from which the ABORT message was generated is indicated by xxxx.</td>
<td>Regenerate LCF/NCF by using NDLP. If the problem still exists, follow the site-defined procedure for software errors.</td>
</tr>
<tr>
<td>ERROR IN LCF -- SUMMARY SUPPRESSED.</td>
<td>The NDL processor opened an existing local configuration file, but this file did not contain a valid file flag (see section 9). This message is also issued at the end of a file creation job when fatal errors were detected during processing.</td>
<td>The unverifiable file should be recreated or a different file used for NDL processor input.</td>
</tr>
<tr>
<td>ERROR IN NCF -- SUMMARY SUPPRESSED.</td>
<td>The NDL processor opened an existing network configuration file, but this file did not contain a valid file flag (see section 9). This message is also issued at the end of a file creation job when fatal errors were detected during processing.</td>
<td>The unverifiable file should be recreated or a different file used for NDL processor input.</td>
</tr>
<tr>
<td>INPUT FILE EMPTY.</td>
<td>The NDL processor attempted to open the file specified for job input but could not find any information.</td>
<td>Check job structure or verify contents of the input file. Rerun the job.</td>
</tr>
<tr>
<td>INSUFFICIENT FIELD LENGTH.</td>
<td>The NDL processor requires additional central memory to completely process all input statements that cause table generation. Excessive use of the DEFINE statement can cause the processor to need additional table space.</td>
<td>Remove as many NDL DEFINE statements as possible from the input file, or add an RFL statement to the command portion of the job and rerun the job.</td>
</tr>
<tr>
<td>INVALID CONTROL CARD OPTION.</td>
<td>The NDLP command used by the job contains a format or syntax error.</td>
<td>Correct the command and rerun the job.</td>
</tr>
<tr>
<td>NDLP COMPLETE.</td>
<td>The NDL processor has finished all possible work on its input and ended its execution.</td>
<td>Informative only.</td>
</tr>
<tr>
<td>Message</td>
<td>Significance</td>
<td>Action</td>
</tr>
<tr>
<td>---------</td>
<td>--------------</td>
<td>--------</td>
</tr>
<tr>
<td>lfn - NO ERRORS ENCOUNTERED.</td>
<td>A properly validated network definition file has been created or listed by the NDL processor and given the indicated local file name.</td>
<td>Informative only.</td>
</tr>
<tr>
<td>lfn - mmm ERRORS AND nn WARNINGS.</td>
<td>If mmm is not zero, the indicated number of fatal diagnostic message errors are described in the error summary listing produced by the NDL processor as part of the listing output file. A nonzero value for mmm indicates that any network definition file created by the job from the named division does not contain a valid file flag. If nn is not zero, the indicated number of nonfatal diagnostic message errors are described in the error summary listing. A nonzero value for nn does not affect the valid file flag of any network definition file created by the job.</td>
<td>Correct the NDL statements input and rerun the job if mmm is not zero.</td>
</tr>
</tbody>
</table>
This glossary defines terms unique to the description of the software presented in this manual. It does not contain terms defined in the American National Standard X3/TR-1 -- 77, American National Dictionary for Information Processing, unless those terms are used with a different meaning within this manual.

This glossary also contains terms whose interpretation within this manual is intended to be more constrained or different from that commonly made. Some terms used in other manuals for the network software are included for the reader's convenience when reconciling terminology.

Acknowledgment, Block
A message returned to the sender confirming the delivery of one or more messages or blocks.

Application Connection Number (ACN)
A number assigned by the Communications Supervisor program to identify a particular logical connection within an application program.

Application Interface Program (AIP)
A group of routines that reside in the application program's field length to translate and buffer communication between the application program and the network.

Application Name (ANAME)
Up to seven 6-bit display code letters or digits (the first must be a letter) used to identify an application program. It is used by another application program or by a terminal operator when connection to the application is requested.

Application Program
A program resident in a host computer that uses the Network Access Method and provides an information storage, retrieval, and/or processing service to a remote user via the data communication network.

Archetype Terminal
The specific terminal equipment possessing all of the device attributes used as defaults for the parameterization of one terminal class. Each terminal class has a corresponding archetype terminal.

Auto-Loading
The process whereby a non-CDC network processing unit is loaded before joining the network. From the viewpoint of the Network Supervisor, the NPU loads itself automatically.

Automatic Login
The process whereby one or more of the Network Validation Facility login dialog parameters is supplied to NVF from the local configuration file. Parameters supplied through automatic login configuration of a terminal suppress prompting for the corresponding dialog entries and can override any entries made from the terminal.

Automatic Recognition
The process whereby the Terminal Interface Program identifies characteristics of a terminal when the terminal's communication line becomes active. The Terminal Interface Program determines these characteristics by various methods for lines configured for automatic recognition. The Communications Supervisor then matches these parameters against the descriptions of specific terminals in the network configuration file; the terminal with the closest match to the empirically determined parameters is automatically recognized as the terminal on the communication line.

Batch Device
See Passive Device.

Block
An arbitrary grouping of data bytes, transmitted as a single entity; blocks are formed and reformed by various software within the network, and by device hardware during input. See also Transmission Block, Downline Block, and Upline Block.

Block Limit
The number of message blocks that can be awaiting delivery at any one time in either the host-to-NPU direction or the NPU-to-host direction for a single terminal or terminal device.

CDCNET
See Control Data Distributed Communications Network.

Character
Unless otherwise specified, references to characters in this manual are to CDC 6-bit display-coded characters.

Cluster
Mode 4 devices grouped by a common cluster address.

Cluster Address
The hardware address of a cluster. This term is used in several ways within mode 4 communications documentation, as shown in table C-1.

Communication Element
Any entity that constitutes a point of input to, or output from, the data communication network. This includes terminal devices, communication lines, and application programs.

Communication Line
A complete communication circuit between a terminal and its network processing unit.

Communications Control Program
A portion of the network software that resides in a 255x series network processing unit. This software can include such routines as the Terminal Interface Program.
### Table C-1. Mode 4 Nomenclature Equivalence

<table>
<thead>
<tr>
<th>Networks Nomenclature</th>
<th>Mode 4A Nomenclature</th>
<th>Mode 4C Nomenclature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network processing unit</td>
<td>Data source</td>
<td>Control station</td>
</tr>
<tr>
<td>Cluster address</td>
<td>Site address</td>
<td>Station address</td>
</tr>
<tr>
<td>Cluster controller</td>
<td>Equipment controller</td>
<td>Station</td>
</tr>
<tr>
<td>Terminal address</td>
<td>Station address</td>
<td>Device address</td>
</tr>
<tr>
<td>Terminal</td>
<td>Equipment controller</td>
<td>Station</td>
</tr>
<tr>
<td>Device</td>
<td>Equipment</td>
<td>Device</td>
</tr>
</tbody>
</table>

**Communications Supervisor**

A portion of the network software, written as an application program. The Communications Supervisor coordinates the network-oriented activities of its host computer and all of that host’s communication elements.

**Console**

See Interactive Device.

**Constant Carrier**

A communication line with a transmission carrier signal that remains on continuously; failure is reported if the carrier signal received remains off for a period of time that equals or exceeds a failure verification period.

**Contention Terminal**

When a terminal can input at the discretion of the terminal user and has an input rate that cannot be controlled directly; contrast with Controlled Terminal. Asynchronous terminals are contention terminals.

**Control Data Distributed Communications Network (CDCNET)**

The collection of compatible hardware and software products offered by Control Data Corporation to interconnect computer resources into distributed communications networks.

**Controlled Carrier**

A communication line with a transmission carrier signal that is raised and lowered with each block transmitted; failure is reported if the carrier signal received does not fluctuate in a similar fashion.

**Controlled Terminal**

A terminal that places data on a communication line only in response to a poll. The maximum input rate for such a terminal can be controlled by controlling the polling rate. Mode 4 devices are controlled.

**Coupler**

A hardware module that resides in a front-end network processing unit and links the network processing unit to a host computer.

**Data**

Any portion of a message created by the source, exclusive of any information used to accomplish transmission of such a message.

**Dedicated Line**

A communication line that is permanently connected between a terminal and a network processing unit. Contrast with Switched Line.

**DEFINE**

An NDL statement that provides the macro-like capability of substituting an identifier in coding for a more complex entity. When the coding is processed, the identifier is interpreted as if it had been replaced by the complex entity. Also, a NOS command that creates permanent files.

**Destination**

The device or application program designated to receive the message.

**Destination Node**

The NPU node that directly interfaces to the destination of a data message block.

**Device**

A portion or all of a terminal. This term is used in various ways within mode 4 communications documentation, as shown in table C-1.

**Direct Access File**

In the context of NOS permanent files, a file that is accessed and modified directly.

**Downline**

The direction of output flow, from host to device.

**Downline Block**

A group of one or more logical lines (messages) transmitted from a host application program as a single unit.

**Echoplex**

The process of returning received characters on a full-duplex line. Not all terminals on full-duplex communication lines are capable of echoplex operation.

**Frame**

A block of data sent across a high-speed data link. The frame is the basic communication unit used in trunk (NPU-to-NPU) communications and provides high-data density in bit-serial format over data-grade lines, as well as data assurance.
Front-End NPU -  
A network processing unit linked directly to a host computer through a coupler.

Full Duplex -  
Two-way simultaneous transmission on a communication line.

Half Duplex -  
Two-way alternating transmission on a communication line.

Host -  
A computer that executes application programs.

Host Availability Display (HAD) -  
A terminal display that lists all the paths the terminal user can currently use to gain access to a host. The terminal user can control this display by using the HD command. Using the HN command sets or changes the path through which the terminal is connected to the host. The HAD is seen by the terminal user immediately after entering HD or HD=Y, when first connecting to an NPU, or when logging out from the host.

Host Node -  
The node ID number of the NPU coupler that directly interfaces with a host computer.

Host Operator (HOP) -  
The administrative operator who manages the communication elements of the network within the local computer system by communicating with the Communications Supervisor in the host computer. Contrast with NPU operator. The host operator is an administrative operator within the network and is always the host computer's operating system operator.

Input -  
Information flowing upline from terminal to host computer.

Interactive Device -  
Any device capable of conducting both input and output, making it capable of dialog with the Network Validation Facility. Also known as a console-type device. Contrast with passive device.

Label -  
The value declared as the element-name field of an NDL statement.

Level -  
For logical records, an octal number 0 through 17 in the system-supplied 48-bit marker that terminates a short or zero-length PRU. In input decks, an octal number specified on 7/8/9 or /*EOR cards.

Line -  
A connection between an NPU and a terminal or a group of terminals.

Local Computer System -  
That portion of a network associated with one copy of the Communications Supervisor and controlled by a host operator.

Local Configuration File -  
A file in the host computer system, containing information on the access requirements and restrictions of application programs or users of that host. The file contains a list of the application programs available for execution in the host computer, and the devices that require special login processing to access it. This is a NOS direct access permanent file.

Local NPU -  
An NPU that is connected to the host via a coupler. Synonymous with Front-End NPU. Contrast with Remote NPU.

Logical Connection -  
A logical message path established between two application programs or between a network device and an application program. Until terminated, the logical connection allows messages to pass between the two entities.

Logical Line -  
A single logical message transmitted between two application programs or between a network device and an application program. A logical line can contain several physical lines.

Logical Link -  
The portion of a logical connection defined by host node and terminal node ID numbers.

Logical Record -  
Under NOS, a data grouping that consists of one or more PRUs terminated by a short PRU or zero-length PRU. Equivalent to a system-logical-record under NOS/BE.

Macromemory -  
The portion of 255x Series network processing unit memory that contains code involved in data communication such as the Terminal Interface Program.

Message -  
A logical unit of information, as processed by an application program; equivalent to a logical line. When transmitted over a network, a message can consist of one or more network data blocks.

Micromemory -  
The portion of 255x Series network processing unit memory that contains code defining the unit to itself.

Mode 4 -  
A communication line transmission protocol that requires the polling of sources for input to the data communication network. Control Data supports two types of mode 4 equipment, mode 4A and mode 4C. Mode 4A equipment is polled through the hardware address of the console device, regardless of how many devices interface to the network. Mode 4C equipment is polled through separate hardware addresses, depending on the point each device uses to interface with the network.
Neighbor Node -
The node ID number associated with an NPU at
one end of a trunk by the NPU at the other end
of the trunk. The neighbor node can be the
same as a terminal node.

Network Access Method (NAM) -
A software package that provides a generalised
method of using a communication network for
switching, buffering, queuing, and transmitting
data.

Network Configuration File -
A network definition file in the host computer,
containing information on the network elements
and permissible linkages between them. The
status of the elements described in this file
is modified by the host or NPU operator in the
course of managing the network through the
Communications Supervisor. This is a NOS
direct access permanent file.

Network Definition File -
Either of the two types of NDL program output
files that determine the configuration of the
network. This can be a network configuration
file or a local configuration file.

Network Definition Language (NDL) -
The compiler-level language used to define the
network configuration file and local configura-
tion file contents.

Network Definition Language Processor (NDL Proc-
essor) -
The network software module that processes an
NDL program as an off-line batch job to create
the network definition files and other NDL
program output.

Network Element -
Any configurable entity supervised by the
Communications Supervisor or loaded by the
Network Supervisor. A network element consists
of any entity in the total computer and termi-

nal network; this term is often applied to the
data communication network entities comprising
the NPUS and their linkages.

Network Processing Unit (NPU) -
The collection of hardware and software that
switches, buffers, and transmits data between
terminals and host computers.

Network Supervisor -
A portion of the network software, written as a
NAM application program. The Network Super-
visor loads all NPUS in the communication
network that cannot load themselves.

Node -
A network element that creates, absorbs,
switches, and/or buffers message blocks.

Normalized Mode -
The initial transmission mode of all console
devices in the network. In normalized mode,
the Terminal Interface Program performs limited
line editing functions on input, converts all
terminal character codes to 7-bit ASCII codes,
and performs upline blocking based on input of
end-of-line and end-of-block codes. Normalized
mode output is treated in the opposite manner;
ASCII codes received from the host are con-
verted to terminal character codes and codes to
reposition and control the output mechanism and
are inserted at appropriate places in the
output data.

NPU Load File -
The permanent file within the host computer
system that contains variants of the CCP soft-
ware appropriate for loading into the network's
255x Series NPUS; created by the NPU load file
generator and used by the Network Supervisor.

NPU Operator (NOP) -
The administrative operator who manages the
hardware, linkages, and other network elements
of the data communication network by communi-
cating with the Communications Supervisor in a
host computer. Contrast with host operator.
The host operator can also be an NPU operator,
but the NPU operator need not be the operating
system operator for the host computer.

Output -
Information flowing downline from host to
device.

Owning Console -
The interactive device associated with a given
passive device. The owning console enters
commands that control the operation of the passive
device and is always a device within
the same terminal.

Packet-Switching Network (PSN) -
A network that provides data communications
service between various terminals and computer
systems or networks.

Terminal interface to a PSN is defined by the
packet assembly/disassembly (PAD) access. PSN
interface with a NOS network is defined by the
X.25 protocol. Packet-switching networks are
sometimes called public data networks (PDNs).

PAD -
See X.25 Packet Assembler/Disassembler.

PAD SubTIP -
A subTIP of the X.25 TIP that allows
asynchronous ASCII terminals to communicate
over a packet-switching network.

Parameterization -
The process whereby all of the configurable
characteristics of a specific model of terminal
are reconciled with the characteristics of that
terminal's general terminal class. All char-
acteristics not specifically declared for a
given device are inferred from the terminal's
assigned terminal class. Characteristics can
be declared through the device definition in
the network configuration file, or by the
terminal user through dialog with the Terminal
Interface Program, or by an application program
servicing the device.

Passive Device -
Any device incapable of conducting both input
and output and therefore incapable of dialog
with the Network Validation Facility. Batch
unit record peripherals are typical examples of
passive devices. Also known as a nonconsole
device. Contrast with Interactive Device.
Peripheral Processor Unit (PPU) -
The hardware unit within the host computer that performs physical input and output through the computer's data channels.

Physical Line -
A string of data that is determined by the physical characteristics of the terminal (page width or line feed). Contrast with Logical Line, which is determined by a carriage return or other forwarding signal.

Physical Record Unit (PRU) -
Under NOS, the amount of information transmitted by a single physical operation of a specified device. The size of a PRU depends on the device:

<table>
<thead>
<tr>
<th>Device</th>
<th>Size in Number of 60-Bit Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass storage</td>
<td>64</td>
</tr>
<tr>
<td>Tape in SI format with binary data</td>
<td>512</td>
</tr>
<tr>
<td>Tape in I format</td>
<td>512</td>
</tr>
<tr>
<td>Tape in other format</td>
<td>Undefined</td>
</tr>
</tbody>
</table>

A PRU that is not full of user data is called a short PRU; a PRU that has a level terminator but no user data is called a zero-length PRU.

Port Number -
The hexadecimal number assigned to the communication line ports of an NPU; physically identified by a thumbwheel on a communications line adapter of the NPU.

Priority -
The condition when traffic through the network is maintained preferentially for one or more devices out of all devices producing network traffic. Devices with priority are the last devices for which network traffic is suspended when traffic must be temporarily stopped because the network is operating at capacity. Devices with priority do not otherwise receive any preferential treatment of their input or output.

Program Initiation Control Block (PICB) -
The identifier of a load module for the CCP software contained in the NPU load file; the PICB determines what variant of CCP is downline loaded into a given NPU by the Network Supervisor.

PRU Device -
Under NOS, a mass storage device or a tape in SI or I format, so called because records on these devices are written in PRUs.

Random File -
In the context of the NOS operating system, a file with the random bit set in the file environment table in which individual records are accessed by their relative PRU numbers.

Remote NPU -
A network processing unit linked indirectly to a host computer through another network processing unit.

Sequential -
A file organization in which records are stored in the order in which they are generated.

Short PRU -
A PRU that does not contain as much user data as the PRU can hold and that is terminated by a system terminator with a level number. Under NOS, a short PRU defines EOR.

Site -
All of the hosts and NPUs in a network under single administrative control. All of the NPUs belonging to a site must run the same release level of CCP. The NCFs used by the site must be built by the same level of NDLP as the release level of CCP.

Source -
The device or host computer program that created the message.

Source Node -
The node that interfaces directly to the source of a data message block.

Station -
A provider and/or recipient of data messages; usually synonymous with a terminal or a grouping of devices. This term is used in various ways within mode 4 communication documentation, as shown in table C-1.

Switched Line -
A communication line connected with one network processing unit but able to be connected to any one of several terminals via a switching mechanism, such as a dialed telephone line.

Terminal -
An entity, external to the communications network but connected to it via a communication line, that supplies input messages to, and/or accepts output messages from, an application program. A terminal can comprise only one device (interactive terminals) or several devices (batch terminals).

Terminal Address -
The hardware address of a mode 4 station. This term is used in various ways within mode 4 communication documentation, as shown in table C-1.

Terminal Class -
An NDLP parameter describing the physical attributes of a group of similar terminals, in terms of an archetype terminal for the group.

Terminal Interface Program (TIP) -
A portion of the Communications Control Program that provides an interface for terminals connected to a 235x Series network processing unit. The TIP performs character conversion to and from 7-bit ASCII, limited editing of the input and output stream, parity checking, and so forth.
Terminal Name -
A name of up to seven letters and digits known to the network and used to identify a device to the host or NPU operator.

Terminal Node -
The node ID number associated with an NPU that interfaces with a terminal.

Terminal User -
The person operating the controls of a device.

Transmission Block -
During input, a group of one or more logical lines (messages of one or more network data blocks) transmitted as a single unit; during output, a group of one or more physical lines transmitted as a single unit.

Transparent Mode -
A software feature provided by the Network Access Method and the network processing unit TIP. When transparent mode transmission occurs between an application program and a device, the Network Access Method does not convert data to or from display code, and the TIP does not completely edit the character stream to insert or remove terminal protocol control codes or convert the characters to or from 7-bit ASCII code. When no parity is in effect for the device and transparent mode transmission occurs, all 8 bits of the character byte can be used to represent characters in 256-character sets (such as EBCDIC).

Trunk -
The communication line connecting two network processing units.

Upline -
The direction of input flow from terminal to host computer.

Upline Block -
A group of data bytes representing a single physical line of input; a logical line (a single message) can consist of more than one upline network data block.

User Name -
The NOS validation file parameter entered by the terminal user during the Network Validation Facility login procedure.

X.25 Packet Assembler/Disassembler (PAD) -
The access mechanism used by an unintelligent asynchronous terminal to access a packet-switching network; the PAD is usually supplied by the packet-switching network. The PAD is defined by the CCITT Standard X.3, and the interfaces between the PAD and the terminal and the PAD and the NPU are defined in CCITT Standards X.29 and X.28.

Zero-Length PRU -
A PRU that contains system information but no user data. Under NOS, a zero-length PRU defines EOF.
The Network Definition Language contains two types of reserved words: statement names and keywords that control statement interpretation, and reserved words that define values. This appendix lists reserved words in both categories; words reserved for future implementation are also listed.

### RESERVED STATEMENT NAMES AND KEYWORDS

The NDL Processor interprets the following words as statement identifiers or as keywords within statements. You cannot use these words as DEFINE statement identifiers and should not use them as element names or as values for user-defined parameters:

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The NDL processor recognizes the following words as predefined values in parameter declarations. You should not use these words as DEFINE statement identifiers or as element names:

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APLTP
ASCII
ASYNC
AUTOREC
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A2
A6

A9
BCD
BK
BSC
B6
CCP
CDSN
CON
CORAFL
CORRES
CP
CR
C120
DATAPAC
DI
DT12
E
EB
EBCD
EBCDAPL
EBCDIC
EL
HASP
HPOST
HPRE
H1
H2
H2000
KB
LP
MODE4
M33
M4A
M4C
M40
N
NO
NONE
N2741
O
PAD
PL
POST
PR
PRI
PRIMARY
PSN253 thru PSN255
FT
FVC
SDT12
SDT13
SDT14
SDT15
SECOND
SVC
S1
S2
S3
S4
TC28 thru TC31
TELENET
TRNPSAC
TT12 thru TT14
TYMNET
T4014
UNINET
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FORMAL SYNTAX

The syntax of the Network Definition Language is formally described in Backus-Naur Form, as shown in figure E-1. This formal syntax is provided as background information only; the syntax used in coding an NDL program is described in sections 2 through 8.

The following list defines the terms of statement definition:

- <asterisk> : := *
- <asterisks> : := <asterisk> | <asterisks> <asterisk>
- <null> : := Ø
- <blank> : := < >
- <blanks> : := <blank> | <blanks> <blank>
- <nblanks> : := <blanks> | <null>
- <letter> : := A | B | ... | Z
- <digit> : := 0 | 1 | ... | 9 | A | ... | F
- <alpha> : := <letter> | <digit>
- <ID> : := <letter> | <ID> <digit>
- <number> : := <digit> | <number> <digit>
- <equals> : := =
- <comma> : := <nblanks> , <nblanks>
- <period> : := <nblanks> . <nblanks>
- <colon> : := :
- <separator> : := <comma> | <blanks>
- <username> : := <ID> | <ID> <asterisks> | <asterisks> <ID> | <username> <asterisks> | <asterisks> <username>
- <value> : := <number> | <ID> | <username>

The following list defines the content of statement definitions:

- <element-name> : := <ID> | <null>
- <statement-ID> : := <ID>
- <keyword> : := <ID>
- <keywords> : := <keyword> | <keywords> <keyword>
- <declaration> : := <keywords> | <keyword> <equals> <value>
- <declarations> : := <declaration> | <declarations> <separator> <declaration>
- <statement-end> : := <period>

The following defines the general form of an NDL statement:

<NDL-statement> : := <element-name> <colon> <nblanks> <statement-ID> <separator> <declarations> <statement-end>

Figure E-1. Formal Syntax of NDL in Backus-Naur Form
## STATEMENT SUMMARIES

This appendix summarizes the formats of all recognized NDL statements. Formats are presented in a manner similar to that used in sections 2 through 8, where the valid value declarations are described in detail. The following formats are listed alphabetically by statement name; default values are shown; they are underlined when no dependencies for the default value exist.

### APPL Statement

```
  service: APPL [ , PRIV [= { YES | NO } ] , UID [= { YES | NO } ] , DI [= { YES | NO } ] , KDSP [= { YES | NO } ] ,
  PRU [= { YES | NO } ] , NETXFR [= { YES | NO } ] , RS [= { YES | NO } ] , MXCOPY=mxcopy ] .
```

### COMMENT Statement

```
  { COMMENT } [ , string ] [ . ]
```

### COUPLER Statement

```
  coupler: COUPLER , NODE=node [ , HNAME=hostname , LOC={ PRIMARY | SECOND } ] .
```

### DEFINE Statement

```
  defname: DEFINE , value declaration [ , value declaration ] ... , [ value declaration ] .
```

### DEVICE Statement

```
  device: DEVICE [ , DT=devtyp , SDT=subdt , TA={ AUTOREC | trmaddr } , ABL=abl , DBZ=dwnlsiz , UBZ={ 100 | upbsize } ,
  DBL=dwnblim , UBL=upblim , XBR=xbrsize , DO={ 1 | devord } , STREAM={ AUTOREC | streamo } ,
  AUTOCON [= { YES | NO } ] , PRI [= { YES | NO } ] , DI [= { YES | NO } ] , HNAME=node , HD [= { YES | NO } ] , LK={ YES | NO | CCP } ,
  AB={ CCP | NO } , BR={ CCP | NO } , CF={ CCP | NO } , BS={ CCP | NO } , Bl={ CCP | NO } , B2={ CCP | NO } , CI={ CCP | NO } ,
  CH={ CCP | NO } , CT={ CCP | NO } , DCC={ CCP | NO } , DLTO={ CCP | NO } , DLX={ CCP | NO } , EBX={ CCP | NO } , EBXR={ CCP | NO } ,
  (continued on next page)
```

E-2

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60480000 S
END Statement

END.

GROUP Statement

group: GROUP, PORT=port, LTYPE=ltyle [ , TITYPE=tiptype, AUTO [=YES [ , ], XAUTO [=YES [ , ] , DI [=YES [ , ] , LSPEED=300 [ , ] ,
AL=aclev, ARSPEED=arspeed, IMDISC [=YES [ , ] , RC [=YES [ , ] ,
P90=fv90, ... , P99=fv99 [ ] .

INCALL Statement

INCALL, Fam=fammame, UNAME=usename, ANAME=appname [ , SNODE=srcnode,
DNOIDE=dstnode, PRI [=YES [ , ] , DBL=dwnblim, ABL=abl, DBZ=dwnlsiz,
WS=ndsiz, WR=rrecsiz, DPLS=dplsa, DPLR=dplr, SHOST=rsrchost, UBL=upblim, UBZ=upbsize,
PORT=portnum, DTEA=dtea, COLLECT, FASTSEL, FAC1=faccode, ... , FAC31=faccode ] .

FILE Statement

lfile: LFILE.

END Statement
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<th>LINE Statement</th>
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<tbody>
<tr>
<td>`line: LINE, PORT=port, LTYPE=ltype [ , TIPTYPE=tiptype, AUTO = {YES</td>
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<th>LOGLINK Statement</th>
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<td>`loglink: LOGLINK, NCNAME=ncname [ , DI = {YES</td>
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<tr>
<th>NPU Statement</th>
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<tbody>
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<td>`npu: NPU, NODE=node, VARIANT=picbname [ , OPGO = {YES</td>
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<table>
<thead>
<tr>
<th>OUTCALL Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>`OUTCALL, NAME1=namel, NAME2/PID=name2/pidname [ , NETOSD=path, SNODE=srcnode, DNODE=dstnode, ACCLEV=accllev, PRI = {YES</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUPLINK Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>SUPLINK, LLNAME=loglink .</code></td>
</tr>
</tbody>
</table>
TERMDEV Statement

device: TERMDEV \{ STIP=\{AUTOREC\} \} , TC=trmaclas , CSET=\{AUTOREC\} , TSPEED=\{AUTOREC\} , 4-7, 5-4, 5-22, 6-7, 6-20, 6-31, 6-41, 7-10
CA=\{AUTOREC\} \} , RIC=\{YES\} \} , CO=\{AUTOREC\} \} , BCF=\{YES\} \} , MREC=mrec , W=pacwndw , NCIR=numcirc , PAD=string , NEN=encirc , COLLECT =\{YES\} \} , DT=devtyp , SDT=subdt ,
TA=\{AUTOREC\} \} , ABL=abl , DBZ=dwnlsiz , UBZ=\{100\} \} , DBL=dwnblim , UBL=upblim , XBZ=xmitsiz ,
DO=\{1\} \} , STREAM=streamno , AUTOCON =\{YES\} \} , PRI =\{YES\} \} ,
DI =\{YES\} \} , HN=node , HD =\{YES\} \} , LK =\{YES\} \} , AB =\{CCP\} \} , BR =\{YES\} \} , CP =\{CCP\} \} ,
BS =\{CCP\} \} , BI =\{CCP\} \} , BZ =\{CCP\} \} , CI =\{CCP\} \} , CH =\{CCP\} \} , CT =\{CCP\} \} , DLC =\{CCP\} \} ,
DLTO =\{YES\} \} , DLX =\{CCP\} \} , EBX =\{CCP\} \} , EBR =\{CCP\} \} , EBO =\{CCP\} \} , ELX =\{CCP\} \} ,
ELO =\{YES\} \} \} , EP =\{YES\} \} , XLC =\{CCP\} \} , XLTO =\{YES\} \} , XLX =\{CCP\} \} ,
IN =\{PR\} \} \} , LI =\{CCP\} \} , OP =\{CCP\} \} \} , OC =\{YES\} \} \} , PA =\{YES\} \} \} ,
PW =\{CCP\} \} , EOF =\{YES\} \} , RTS =\{YES\} \} \} , MC1 =\{ac\} , MLI =\{ml\} , P90=fv90 , ... , P99=fv99 \} .

TERMINAL Statement

TERMINAL \{ , STIP=\{AUTOREC\} \} , TC=trmaclas , CSET=\{AUTOREC\} , TSPEED=\{AUTOREC\} , CA=\{AUTOREC\} \} , 4-7, 5-4, 5-21, 6-7, 6-20, 6-31, 6-41, 7-9
RI=\{YES\} \} , CO=\{AUTOREC\} \} , BCF=\{YES\} \} \} , MREC=mrec , W=pacwndw , CTYP=ctypno ,
NCIR=numcirc , PAD=string , EOF=\{YES\} \} , NEN=encirc , COLLECT =\{YES\} \} \} \} .

TITLE Statement

TITLE \{ , string \} .
TRUNK Statement

trunk: TRUNK, N1=npu1, N2=npu2, Pl=port1, P2=port2,

[ NOLOAD1 [= {YES} ], NOLOAD2 [= {YES} ], FRAME=frame, DI [= {YES} ] ].

USER Statement

device: USER [], MFAM= {manufam} \{NONE\}, MUSER= {manuser} \{NONE\}, MAPPL= {mappl} \{NONE\}, DFAM= {defafam} \{NONE\}, DUSER= {defuser} \{NONE\}, PFAM=pfam, PUSER=puser, PAPPL= {app} \{NONE\} ].
LIMITATIONS ON CONFIGURATIONS

The NDL processor allows you to configure more network elements than the released version of the CDC network software supports. There are no maximum allowed numbers of most NDL statements. The Network Definition Language can therefore be used to define configurations supported by site-written variants of the released network software.

The released version of the CDC network software requires upper limits on the number of elements configured for each host. These limits avoid excessive central memory usage by the network software. The limits consist of a maximum number of elements, as described in table F-1.

Other constraints are imposed by the types of elements in the network and by the method used to connect each site network to another. For example:

HASP terminals can have a maximum of 22 devices.
3780 terminals can have a maximum of four devices.

The number of devices that can access an X.25 network depends on the number of virtual circuits leased from the X.25 network.

Such constraints are mentioned in the main text where each of the NDL statements is described.

<table>
<thead>
<tr>
<th>Element</th>
<th>Maximum Number†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td>32130</td>
</tr>
<tr>
<td>Couplers</td>
<td>63</td>
</tr>
<tr>
<td>Hosts</td>
<td>63</td>
</tr>
<tr>
<td>NPUs</td>
<td>255</td>
</tr>
<tr>
<td>Terminals with simultaneous access</td>
<td>257985</td>
</tr>
<tr>
<td>Trunks per remote NPU to use for loading</td>
<td>4</td>
</tr>
<tr>
<td>Users</td>
<td>64449</td>
</tr>
</tbody>
</table>

†Minus the number of couplers; this maximum is determined by the range of allowed node numbers.

60480000 L
INDEX

AB parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-9
ABL parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
OUTCALL statement 8-6
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-9
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7, 5-22
TERMDEV statement 5-4, 5-22
ACCELEV parameter 8-6
Acknowledgement, block C-1
ACN (see Application Connection Number)
Administrative operator 1-4
AIP (see Application Interface Program)
AL parameter
Asynchronous protocol
GROUP statement 4-4
LINE statement 4-2
Multilevel security 1-17
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
Synchronous protocol
GROUP statement 6-4
LINE statement 6-2
X.25 protocol
LINE statement 5-2
ANAME (see Application Name)
APPL statement 2-5, 8-3
Application Connection Number (ACN) C-1
Application Interface Program (AIP) 1-2, C-1
Application Name (ANAME) 8-10, C-1
Application program C-1
Application-to-Ans application connection
Definitions 5-21
Interhost 1-17
Interhost X.25 1-18
Intrahost 1-16
Archetype terminal C-1
ARCSPEED parameter
Asynchronous protocol
GROUP statement 4-4
LINE statement 4-2
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
ASYNC TIP 4-1
Asynchronous line definition 4-1
Asynchronous protocol devices, lines, and terminals 4-1
Asynchronous protocol statements
DEVICE 4-10
GROUP 4-4
LINE 4-1
TERMDEV 4-7
TERMINAL 4-6
AUTO lines 4-1
Auto-loading C-1
AUTO parameter
Asynchronous protocol
GROUP statement 4-4
LINE statement 4-2
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
Synchronous protocol
GROUP statement 6-4
LINE statement 6-2
AUTOCON parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4
Automatic login C-1
Automatic recognition 2-1, C-1
Automatic recognition-dependent keywords 2-1
Automatic recognition line 4-1, 6-3, 7-1

Base system software 1-14
Basic network concepts 1-1
Batch device C-1
BCF parameter
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
Synchronous protocol
TERMDEV statement 6-31
TERMINAL statement 6-31
Bisynchronous TIP 6-31
Bisynchronous TIP statements
DEVICE statement 6-34
TERMDEV statement 6-31
TERMINAL statement 6-31
Block C-1
Block limit
Asynchronous protocol 4-24
Description C-1
Site-defined protocol 7-26
X.25 protocol 5-18
BR parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4
BS parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

BSC TIP 6-30
Buffering data
Asynchronous protocol 4-27
Site-defined protocol 7-28
Synchronous protocol 6-49
X.25 protocol 5-22

B1 parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-42
TERMDEV statement 6-7, 6-20, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

B2 parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-42
TERMDEV statement 6-7, 6-20, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

CA parameter
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
Synchronous protocol
TERMDEV statement 6-7, 6-41
TERMINAL statement 6-7, 6-41
CCP (see Communication Control Program)
CCP-default keywords 2-3
CDC-written application programs 8-3
CDCNET Device Interface Software 1-14
CDCNET network 1-13
Centronics 533/536 printers 4-4

Character C-1
Character set tables A-1

CI parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

Cluster C-1
Cluster address 6-41, C-1

CN parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-42
TERMDEV statement 6-7, 6-20, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

CO parameter
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
Synchronous protocol
TERMDEV statement 6-20, 6-31
TERMINAL statement 6-20, 6-31

COLLECT parameter
INCALL statement 8-10
Site-defined parameter
TERMDEV statement 7-10
TERMINAL statement 7-9
X.25 protocol
TERMDEV statement 5-4
TERMINAL statement 5-4
Command portion of program 10-1
Commands 10-1

COMMENT statement 2-7
Communication element C-1
Communication line 1-8, C-1
Communication line protocols
Asynchronous 4-1
Site-defined 7-1
Synchronous 6-1
X.25 5-1
Communications Control Program (CCP) 1-5, C-1
Communications Processor (CP) 1-4
Communications Supervisor (CS) 1-2, C-2
Configuration limitations F-1
Console C-2
Constant carrier C-2
Contestion terminal C-2
Controlled carrier C-2
Controlled terminal C-2
Coupler 1-4, 1-8, C-2
COUPLER statement 3-3

CP (see Communications Processor)

CP parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

CS (see Communication Supervisor)

CSET parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
Synchronous protocol
TERMDEV statement 6-7, 6-20, 6-31, 6-41
TERMINAL statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
TERMDEV statement 5-4, 5-21
TERMINAL statement 5-4, 5-21

CT parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Index-2
CT parameter (Contd)
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

Data C-2
Data block 1-9
Data blocking
Batch device input/output 1-11
Interactive device input 1-11
Link data 1-11
Terminal output 1-11
Data buffering
Asynchronous protocol 4-27
Site-defined protocol 7-28
Synchronous protocol 6-49
X.25 protocol 5-22
Data Circuit Equipment (DCE) 1-6
Data portion of program 10-3
Data structures and flow 1-9
Data Terminal Equipment (DTE) 1-6

DBL parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
INCALL statement 8-10
OUTCALL statement 8-6
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

DBZ parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
INCALL statement 8-10
OUTCALL statement 8-6
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

DCE parameter (see Data Circuit Equipment)

DFAM parameter 8-2
DFL parameter
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
X.25 protocol 5-2
DHOST parameter 8-6

DI parameter
APPL statement 8-4
Asynchronous protocol
DEVICE statement 4-10
GROUP statement 4-4
LINE statement 4-2
TERMDEV statement 4-7
LOGLINK statement 3-6
Site-defined protocol
DEVICE statement 7-14
GROUP statement 7-6
LINE statement 7-1
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
GROUP statement 6-4
LINE statement 6-2
TERMDEV statement 6-7, 6-20, 6-31, 6-41
TRUNK statement 3-6
X.25 protocol 5-2
LINE statement 5-2
Diagnostic messages B-1
Diagnostic Operator (DOP) 1-4
Direct access file C-2
Division hierarchy 2-5
Division statements 2-5
Divisions
Local 2-4
Network 2-4

DLC parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
DLC parameter (Contd)

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

DLTO parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

DLX parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

DMP parameter

Asynchronous protocol
DEVICE statement 7-14
TERMDEV statement 7-10

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

DNODE parameter

INCALL statement 8-10
OUTCALL statement 8-6

DO parameter

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

Synchronous protocol
DEVICE statement 6-10, 6-20
TERMDEV statement 6-7, 6-20

DOMAIN parameter 8-6

DOP (see Diagnostic Operator)

Downline

Block C-2
Data 1-9

Definition C-2

DPL parameter 8-10

DPLS parameter

INCALL statement 8-10
OUTCALL statement 8-6

DT parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

Synchronous protocol
DEVICE statement 6-11, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41

X.25 protocol
DEVICE statement 5-7, 5-22
TERMDEV statement 5-4, 5-22

DTE (see Data Terminal Equipment)

DTEA parameter

INCALL statement 8-10
OUTCALL statement 8-6

Site-defined protocol

GROUP statement 7-6
LINE statement 7-1

X.25 protocol

LINE statement 5-2

DUSER parameter 8-2

EBO parameter

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

EBR parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

EBX parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

Echoplex C-2

Element name 2-3

ELO parameter

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

Synchronous protocol
DEVICE statement 6-10, 6-20
TERMDEV statement 6-7, 6-20

ELR parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

ELX parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

END statement 2-8

End-Of-Information (EOI) 10-3
End-Of-Record (EOR) 10-3

EOF parameter

Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9

Synchronous protocol
TERMDEV statement 6-7
TERMINAL statement 6-7

EP parameter

Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7

Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10

X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

Index-4
Equipment Status Table (EST) 3-3
Error processing B-1
EST (see Equipment Status Table)
EXIT command statement 10-3
Explicit values 2-1

FAM parameter 8-10
FASTSEL parameter 8-10
File
  Creation 10-1
  Inspection 10-2
  Structure 10-1
fixed configuration line 6-3
Formal language syntax E-1
Frame C-2
FRAME parameter
  Site-defined protocol
    GROUP statement 7-6
    LINE statement 7-1
    TRUNK statement 3-7
    X.25 protocol
      LINE statement 5-2
  Front-end NPU 1-4, C-2
  Full duplex C-3
  Functional language syntax 2-1

Glossary C-1
GROUP statement
  Asynchronous protocol 4-4
  General definition 3-8
  Site-defined protocol 7-6
  Synchronous protocol 6-4

HAD (see Host Availability Display)
Half duplex C-3
Hardware network elements 1-2, 1-6
HASP TIP 6-19
HASP TIP statements
  DEVICE statement 6-22
  TERMDEV statement 6-20
  TERMINAL statement 6-20

HD parameter
Asynchronous protocol
  DEVICE statement 4-10
  TERMDEV statement 4-7
Site-defined protocol
  DEVICE statement 7-14
  TERMDEV statement 7-10
Synchronous protocol
  DEVICE statement 6-10, 6-22, 6-34, 6-42
  TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
  DEVICE statement 5-7
  TERMDEV statement 5-4

Hierarchy
  Divisions 2-5
  Statements 2-5

HIP (see Host Interface Program)
HN parameter
Asynchronous protocol
  DEVICE statement 4-10
  TERMDEV statement 4-7
Site-defined protocol
  DEVICE statement 7-14
  TERMDEV statement 7-10
Synchronous protocol
  DEVICE statement 6-10, 6-22, 6-34, 6-42
  TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
  DEVICE statement 5-7
  TERMDEV statement 5-4

IN parameter
  Asynchronous protocol
    DEVICE statement 4-10
    TERMDEV statement 4-7
  Site-defined protocol
    DEVICE statement 7-14
    TERMDEV statement 7-10
  X.25 protocol
    DEVICE statement 5-7
    TERMDEV statement 5-4

INCALL statement 8-9
Input C-3
Input to program 11-1
Interactive device C-3
Interactive Facility (IAF) 1-12, 8-3
Interactive Transfer Facility (ITF) 1-12, 8-3
Interface software and gateways 1-14
Initialize MDI Server (INITMDDI) 1-12, 8-3

Job dayfile messages B-9
Job listing file 1-1, 9-2
Job structure 10-1

KDSP parameter 8-4
Keywords
  Automatic-recognition dependent 2-1
  CCP-default 2-3
  No-default 2-3
  Stand-alone 2-4
  Value-required 2-1

Label C-3
Layer software 1-14
LCF (see Local Configuration File)
LCN parameter
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
X.25 protocol
LINE statement 5-2
Level C-3
LFILE statement 8-1
LI parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4
Limitations on configuration F-1
Line C-3
Line definition
Asynchronous protocol 4-1
Site-defined protocol 7-4
Synchronous protocol 6-1
X.25 protocol 5-1
Line protocols
Asynchronous 4-1
Site-defined 7-1
Synchronous 6-2
X.25 5-1
LINE statement
Asynchronous protocol 4-2
General definition 3-8
Site-defined protocol 7-1
Synchronous protocol 6-2
X.25 protocol 5-1
Link data blocking 1-11
Link Interface Program (LIP) 1-5
LIP (see Link Interface Program)
LK parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-42
TERMDEV statement 6-7, 6-20, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4
LLNAME parameter 3-3
LOC parameter 3-3
Local
Computer system C-3
Configuration File (LCF) 1-1, 9-2, C-3
Division statements
APPL 8-3
INCALL 8-9
LFILE 8-1
OUTCALL 8-5
USER 8-1
NPU C-3
Logical
Configuration of hosts 1-16
Configuration of terminals 1-16
Connection C-3
Line C-3
Link 1-15, C-3
Network elements 1-11
Record C-3
LOGLINK statement 3-4
LSPEED parameter
Asynchronous protocol
GROUP statement 4-4
LINE statement 4-2
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
LTYPE parameter
Asynchronous protocol
GROUP statement 4-4
LINE statement 4-2
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
Synchronous protocol
GROUP statement 6-4
LINE statement 6-2
X.25 protocol
LINE statement 5-2
Macromemory C-3
Mainframe Device Interface (MDI) 1-13
Mainframe Terminal Interface (MTI) 1-13
MAPPL parameter 8-2
MCI parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4
Message C-3
Message Control System (MCS) 1-12, 8-3
MFAM parameter 8-2
Micromemory C-3
MLI parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4
Mode 4 nomenclature equivalence C-2
Mode 4 TIP 6-6, C-3
Mode 4 TIP statements
DEVICE statement 6-10
TERMDEV statement 6-7
TERMINAL statement 6-7
MREC parameter
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
Synchronous protocol
TERMDEV statement 6-31
TERMINAL statement 6-31
Multilevel security 1-17
Multiple-host network 1-6
MUSER parameter 8-2
NCF parameter 8-4
NAME1 parameter 8-6
NAME2 parameter 8-6
NAM (see Network Access Method)
NCIR parameter
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
X.25 protocol
TERMDEV statement 5-4
TERMINAL statement 5-4
NCNAME parameter 3-6
NDI (see Network Device Interface)
NDL (see Network Definition Language)
NDL input file 9-1
NDL processor 1-1, C-4
NDLP (see Network Definition Language Processor)
NDLP command statement 10-1
Neighbor node C-4
NEN parameter
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
X.25 protocol
TERMDEV statement 5-4, 5-22
TERMINAL statement 5-4, 5-21
NETOSD parameter 8-6
Network Access Method (NAM) 1-2, C-4
Network Configuration File (NCF) 1-1, 9-1, C-4
Network data blocking
Batch device input or output 1-11
Interactive device input 1-11
Network definition file C-4
Network definition files
Local Configuration File (LCF) 1-1, 9-2
Network Configuration File (NCF) 1-1, 9-1
Network Definition Language (NDL) 1-1, 2-1, C-4
Network Definition Language Processor (NDLP) 1-1, C-4
Network definition structure 2-4
Network Device Interface (NDI) 1-13
Network division 3-1
Network division statements
COUPLER 3-3
DEVICE
Asynchronous protocol 4-10
General definition 3-8, 3-9
Site-defined protocol 7-14
Synchronous protocol 6-10, 6-22, 6-34, 6-42
X.25 protocol 5-7, 5-22
GROUP
Asynchronous protocol 4-4
General definition 3-8, 3-9
Site-defined protocol 7-6
Synchronous protocol 6-4
LINE
Asynchronous protocol 4-1
General definition 3-8
Site-defined protocol 7-1
Synchronous protocol 6-2
X.25 protocol 5-1
LOGLINK 3-1, 3-4
NFILE 3-1
NPU 3-1
SUPLINK 3-1, 3-3
TERMDEV
Asynchronous protocol 4-7
General definition 3-8, 3-9
Site-defined protocol 7-10
Synchronous protocol 6-7, 6-20, 6-31, 6-41
X.25 protocol 5-4
TERMINAL
Asynchronous protocol 4-7
General definition 3-8, 3-9
Site-defined protocol 7-9
Synchronous protocol 6-7, 6-20, 6-31, 6-41
X.25 protocol 5-4, 5-21
TRUNK 3-1, 3-6
Network element C-4
Network elements
Hardware 1-6
Logical 1-15
Software 1-9
Network File Server (NETFS) 1-12, 8-3
Network functional levels
Communications network 1-2
Computer network 1-2
Service network 1-2
Network Interface Program (NIP) 1-2
Network Log Server (NETLS) 1-12, 8-3
Network Log Termination Utility (NTERM) 1-12, 8-3
Network management software 1-15
Network node and link definition statements
COUPLER 3-1, 3-3
LOGLINK 3-1, 3-4
NPU 3-1, 3-2
SUPLINK 3-1, 3-3
TRUNK 3-1, 3-6
Network Operator Facility (NOF) 1-12, 8-3
Network Processing Unit (NPU) 1-2, 1-8, C-4
Network structure 2-4
Network Supervisor (NS) 1-2, C-4
Network Validation Facility (NVF) 1-2, 8-1
NETXFR parameter 8-4
NFILE statement 3-1
NI parameter
Asynchronous protocol
GROUP statement 4-4
Site-defined protocol
GROUP statement 7-6
Synchronous protocol
GROUP statement 6-4
NIP (see Network Interface Program)
Node 1-15, C-4
NODE parameter 3-2, 3-3
No-default keywords 2-3
NOLOAD1 parameter 3-7
NOLOAD2 parameter 3-7
NOP (see NPU Operator)
Normalised mode C-4
NOS/VE Interactive Facility (VEIAF) 1-12, 8-3
Notations xiii
NPU (see Network Processing Unit)
NPU load file C-4
NPU Operator (NOP) 1-4, C-4
NPU-resident software 1-12
NPU statement 3-1, 3-2
NS (see Network Supervisor)
NSVC parameter
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
X.25 protocol 5-1
LINE statement 5-2
NVF (see Network Validation Facility)
NI parameter 3-7
N2 parameter 3-7
OC parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4
Index-7
OP parameter
- Asynchronous protocol
  - DEVICE statement 4-10
  - TERMDEV statement 4-7
- Site-defined protocol
  - DEVICE statement 7-14
  - TERMDEV statement 7-10
- X.25 protocol
  - DEVICE statement 5-7
  - TERMDEV statement 5-4

OPGO parameter 3-2
OUTCALL statement 8-5
Output C-4
Output from program 11-1
Owning console C-4

PA parameter
- Asynchronous protocol
  - DEVICE statement 4-10
  - TERMDEV statement 4-7
- Site-defined protocol
  - DEVICE statement 7-14
  - TERMDEV statement 7-10
- X.25 protocol
  - DEVICE statement 5-7
  - TERMDEV statement 5-4
Packet Assembly/Disassembly (PAD) 1-5, 5-4, C-4
Packet-Switching Network (PSN) 1-5, C-4
PAD (see Packet Assembly/Disassembly)
PAD parameter
- Site-defined protocol
  - TERMDEV statement 7-10
  - TERMINAL statement 7-9
- X.25 protocol
  - TERMDEV statement 5-4
  - TERMINAL statement 5-4
PAD subTIP C-4
PAPPL parameter 8-2
Parameterization C-4

Parameters
- AB
  - Asynchronous protocol 4-7, 4-10
  - Site-defined protocol 7-10, 7-14
- ABL
  - Asynchronous protocol 4-7, 4-10, 4-11
  - OUTCALL statement 8-6
  - Site-defined protocol 7-10, 7-14, 7-15
  - Synchronous protocol 6-7, 6-10, 6-11, 6-20, 6-22, 6-23, 6-31, 6-34, 6-35, 6-41, 6-42, 6-43
  - X.25 protocol 5-4, 5-7
- ACCLEV 8-6
  - AL
    - Asynchronous protocol 4-2, 4-4
    - Site-defined protocol 7-1, 7-6
    - Synchronous protocol 6-2, 6-4
    - X.25 protocol 5-2
  - ANAME 8-10
    - ARSPEED
      - Asynchronous protocol 4-2, 4-4
      - Site-defined protocol 7-1, 7-6
    - AUTO
      - Asynchronous protocol 4-2, 4-4
      - Site-defined protocol 7-1, 7-6
      - Synchronous protocol 6-2, 6-4
  - AUTOCON
    - Asynchronous protocol 4-7, 4-10, 4-11
    - Site-defined protocol 7-10, 7-14, 7-15
    - Synchronous protocol 6-7, 6-10, 6-11, 6-20, 6-22, 6-23, 6-31, 6-34, 6-35, 6-41, 6-42, 6-43
    - X.25 protocol 5-4, 5-7, 5-8

BCF
- Site-defined protocol 7-9, 7-10
  - Synchronous protocol 6-31, 6-32

BR
- Asynchronous protocol 4-7, 4-10, 4-11
  - Site-defined protocol 7-10, 7-14, 7-15
  - X.25 protocol 5-4, 5-7, 5-8

BS
- Asynchronous protocol 4-7, 4-10, 4-11
  - Site-defined protocol 7-10, 7-14, 7-15
  - X.25 protocol 5-4, 5-7, 5-8

B1
- Asynchronous protocol 4-7, 4-10, 4-12
  - Site-defined protocol 7-10, 7-14, 7-16
  - Synchronous protocol 6-7, 6-10, 6-11, 6-20, 6-22, 6-23, 6-41, 6-42, 6-43
  - X.25 protocol 5-4, 5-7, 5-8

B2
- Asynchronous protocol 4-7, 4-10, 4-12
  - Site-defined protocol 7-10, 7-14, 7-16
  - Synchronous protocol 6-7, 6-10, 6-12, 6-20, 6-22, 6-24, 6-41, 6-42, 6-44
  - X.25 protocol 5-4, 5-7, 5-9

CA
- Site-defined protocol 7-9, 7-10, 7-11
  - Synchronous protocol 6-7, 6-8, 6-41

CI
- Asynchronous protocol 4-7, 4-10, 4-13
  - Site-defined protocol 7-10, 7-14, 7-16
  - X.25 protocol 5-4, 5-7, 5-9

CN
- Asynchronous protocol 4-7, 4-10, 4-13
  - Site-defined protocol 7-10, 7-14, 7-16
  - Synchronous protocol 6-7, 6-10, 6-12, 6-20, 6-22, 6-24, 6-41, 6-42, 6-44
  - X.25 protocol 5-4, 5-7, 5-9

CO
- Site-defined protocol 7-9, 7-10, 7-12
  - Synchronous protocol 6-20, 6-21, 6-31, 6-33

COLLECT
- INCALL statement 8-10
  - Site-defined protocol 7-9, 7-10, 7-12
  - X.25 protocol 5-4, 5-5

CP
- Asynchronous protocol 4-7, 4-10, 4-13
  - Site-defined protocol 7-10, 7-14, 7-16
  - X.25 protocol 5-4, 5-7, 5-10

CSET
- Asynchronous protocol 4-7, 4-8
  - Site-defined protocol 7-9, 7-10, 7-12
  - Synchronous protocol 6-7, 6-9, 6-20, 6-21, 6-31, 6-33, 6-41, 6-42
  - X.25 protocol 5-4, 5-5, 5-21, 5-22

CT
- Asynchronous protocol 4-7, 4-10, 4-14
  - Site-defined protocol 7-10, 7-14, 7-17
  - Synchronous protocol 6-7, 6-10, 6-13, 6-20, 6-22, 6-25, 6-31, 6-34, 6-35, 6-41, 6-42, 6-45
  - X.25 protocol 5-4, 5-5, 5-21, 5-22

DBL
- Asynchronous protocol 4-7, 4-10, 4-14
  - INCALL statement 8-10
  - OUTCALL statement 8-6
  - Site-defined protocol 7-10, 7-14, 7-17
  - Synchronous protocol 6-7, 6-10, 6-13, 6-20, 6-22, 6-25, 6-31, 6-34, 6-35, 6-41, 6-42, 6-45
  - X.25 protocol 5-4, 5-5, 5-21, 5-22

DBZ
- Asynchronous protocol 4-7, 4-10, 4-14
  - INCALL statement 8-10
Parameters (Contd)

DBZ (Contd)
OUTCALL statement 8-6
Site-defined protocol 7-10, 7-14, 7-17
Synchronous protocol 6-7, 6-10, 6-14, 6-20,
6-22, 6-25, 6-31, 6-34,
6-36, 6-41, 6-42, 6-45
X.25 protocol 5-4, 5-7, 5-11
DCE
Site-defined protocol 7-1, 7-6
X.25 protocol 5-2
DFAM 8-2
DFL
Site-defined protocol 7-1, 7-6
X.25 protocol 5-2
DHOST parameter 8-6
DI
APPL statement 8-4
Asynchronous protocol 4-2, 4-4, 4-7, 4-10,
4-15
LOGLINK statement 3-6
Site-defined protocol 7-1, 7-6, 7-10, 7-14,
7-17
Synchronous protocol 6-2, 6-4, 6-7, 6-10,
6-14, 6-20, 6-22, 6-26,
6-31, 6-34, 6-36, 6-41,
6-42, 6-45
TRUNK statement 3-7
X.25 protocol 5-2
DLC
Asynchronous protocol 4-7, 4-10, 4-15
Site-defined protocol 7-10, 7-14, 7-18
X.25 protocol 5-4, 5-7, 5-11
DLTO
Asynchronous protocol 4-7, 4-10, 4-15
Site-defined protocol 7-10, 7-14, 7-18
X.25 protocol 5-4, 5-7, 5-11
DLX
Asynchronous protocol 4-7, 4-10, 4-16
Site-defined protocol 7-10, 7-14, 7-18
X.25 protocol 5-4, 5-7, 5-11
DMP 3-2
DO
Site-defined protocol 7-10, 7-14, 7-18
Synchronous protocol 6-7, 6-10, 6-14, 6-20,
6-22, 6-26
DNODE
INCALL statement 8-10
OUTCALL statement 8-6
DOMAIN 8-6
DPLR 8-10
DPLS
INCALL statement 8-10
OUTCALL statement 8-6
DT
Asynchronous protocol 4-7, 4-10
Site-defined protocol 7-10, 7-14
Synchronous protocol 6-7, 6-10, 6-11, 6-20,
6-22, 6-23, 6-31, 6-34,
6-35, 6-41, 6-42, 6-43
X.25 protocol 5-4, 5-7, 5-22
DTEA
INCALL statement 8-10
OUTCALL statement 8-6
Site-defined protocol 7-1, 7-6
X.25 protocol 5-2
DUSER 8-2
EBG
Site-defined protocol 7-10, 7-14, 7-19
EBX
Asynchronous protocol 4-7, 4-10, 4-16
Site-defined protocol 7-10, 7-14, 7-19
X.25 protocol 5-4, 5-7, 5-12
EBX
Asynchronous protocol 4-7, 4-10, 4-16
Site-defined protocol 7-10, 7-14, 7-19
X.25 protocol 5-4, 5-7, 5-12
ELO
Site-defined protocol 7-10, 7-14, 7-19
Synchronous protocol 6-7, 6-10, 6-14
ELR
Asynchronous protocol 4-7, 4-10, 4-17
Site-defined protocol 7-10, 7-14, 7-20
X.25 protocol 5-4, 5-7, 5-12
ELX
Asynchronous protocol 4-7, 4-10, 4-17
Site-defined protocol 7-10, 7-14, 7-20
X.25 protocol 5-4, 5-7, 5-13
EOF
Site-defined protocol 7-9, 7-10, 7-12
Synchronous protocol 6-7, 6-9
EP
Asynchronous protocol 4-7, 4-10, 4-17
Site-defined protocol 7-10, 7-14, 7-20
X.25 protocol 5-4, 5-7, 5-13
FAM 8-10
FASTSEL 8-10
FRAME
Site-defined protocol 7-1, 7-6
TRUNK statement 3-7
X.25 protocol 5-2
HD
Asynchronous protocol 4-7, 4-10, 4-18
Site-defined protocol 7-10, 7-14, 7-20
Synchronous protocol 6-7, 6-10, 6-15, 6-20,
6-22, 6-26, 6-31, 6-34,
6-37, 6-41, 6-42, 6-46
X.25 protocol 5-4, 5-7, 5-13
HN
Asynchronous protocol 4-7, 4-10, 4-18
Site-defined protocol 7-10, 7-14, 7-21
Synchronous protocol 6-7, 6-10, 6-15, 6-20,
6-22, 6-26, 6-31, 6-34,
6-37, 6-41, 6-42, 6-46
X.25 protocol 5-4, 5-7, 5-13
HNAME 3-3
IC
Asynchronous protocol 4-7, 4-10, 4-18
Site-defined protocol 7-10, 7-14, 7-21
X.25 protocol 5-4, 5-7, 5-14
IMDISC
Asynchronous protocol 4-2, 4-4
Site-defined protocol 7-1, 7-6
Synchronous protocol 6-2, 6-4
X.25 protocol 5-2
IN
Asynchronous protocol 4-7, 4-10, 4-19
Site-defined protocol 7-10, 7-14, 7-21
X.25 protocol 5-4, 5-7, 5-14
KDSF 8-4
LCN
Site-defined protocol 7-1, 7-6
X.25 protocol 5-2
LI
Asynchronous protocol 4-7, 4-10, 4-19
Site-defined protocol 7-10, 7-14, 7-21
X.25 protocol 5-4, 5-7, 5-15
LK
Asynchronous protocol 4-7, 4-10, 4-19
Site-defined protocol 7-10, 7-14, 7-22
Synchronous protocol 6-7, 6-10, 6-15, 6-20,
6-22, 6-27, 6-41, 6-42, 6-46
X.25 protocol 5-4, 5-7, 5-15
LLNAME 3-3
LOC 3-3
Parameters (Contd)

**LSPEED**
- Asynchronous protocol 4-2, 4-4
- Site-defined protocol 7-1, 7-6

**LTYP**
- Asynchronous protocol 4-2, 4-4
- Site-defined protocol 7-1, 7-6
- Synchronous protocol 6-2, 6-4
- X.25 protocol 5-2

**MAPP** 8-2

**MCI**
- Asynchronous protocol 4-7, 4-10, 4-20
- Site-defined protocol 7-10, 7-14, 7-22
- X.25 protocol 5-4, 5-7, 5-15

**MAPPL** 8-2

**ML**
- Asynchronous protocol 4-7, 4-10, 4-20
- Site-defined protocol 7-10, 7-14, 7-22
- Synchronous protocol 6-31, 6-33

**MRec**
- Site-defined protocol 7-9, 7-10, 7-12
- Synchronous protocol 6-31, 6-33

**MO**
- Asynchronous protocol 4-7, 4-10, 4-20
- Site-defined protocol 7-10, 7-14, 7-22
- X.25 protocol 5-4, 5-7, 5-15

**NC**
- Asynchronous protocol 4-7, 4-10, 4-20
- Site-defined protocol 7-10, 7-14, 7-22
- Synchronous protocol 6-31, 6-33

**NCIR**
- Site-defined protocol 7-9, 7-10, 7-13
- X.25 protocol 5-4, 5-6, 5-21

**NCNAME** 3-6

**NCNAME**
- Site-defined protocol 7-9, 7-10, 7-13
- X.25 protocol 5-4, 5-6, 5-21, 5-22

**NETOSD** 8-6

**NETXR** 8-4

**NI** 4-4, 6-4, 7-6

**NODE** 3-2, 3-3

**NSVC** 5-2, 7-1, 7-6

**NI** 3-7

**N2** 3-7

**OC**
- Asynchronous protocol 4-7, 4-10, 4-20
- Site-defined protocol 7-10, 7-14, 7-22
- X.25 protocol 5-4, 5-7, 5-15

**OP**
- Asynchronous protocol 4-7, 4-10, 4-20
- Site-defined protocol 7-10, 7-14, 7-22
- X.25 protocol 5-4, 5-7, 5-16

**OPCO** 3-2

**PA**
- Asynchronous protocol 4-7, 4-10, 4-21
- Site-defined protocol 7-10, 7-14, 7-23
- X.25 protocol 5-4, 5-7, 5-16

**PAD**
- Site-defined protocol 7-9, 7-10, 7-13
- X.25 protocol 5-4, 5-6

**PAPPL** 8-2

**PFAM** 8-2

**PG**
- Asynchronous protocol 4-7, 4-10, 4-20
- Site-defined protocol 7-10, 7-14, 7-22
- Synchronous protocol 6-7, 6-10, 6-16, 6-20, 6-22, 6-27, 6-31, 6-34, 6-37, 6-41, 6-42, 6-47
- X.25 protocol 5-4, 5-7, 5-18

**PORT**
- Asynchronous protocol 4-2, 4-4
- INCALL statement 8-10
- OUTCALL statement 8-6
- Site-defined protocol 7-1, 7-6
- Synchronous protocol 6-2, 6-4
- X.25 protocol 5-2

**PRI**
- Asynchronous protocol 4-7, 4-10, 4-23
- INCALL statement 8-10
- OUTCALL statement 8-6
- Site-defined protocol 7-10, 7-14, 7-25
- Synchronous protocol 6-7, 6-10, 6-16, 6-20, 6-22, 6-27, 6-31, 6-34, 6-37, 6-41, 6-42, 6-47
- X.25 protocol 5-4, 5-7, 5-18

**PRID** 8-6

**PRIV** 8-4

**PRU** 8-4

**PSN**
- Site-defined protocol 7-1, 7-6
- X.25 protocol 5-2

**PRSER** 8-2

**PM**
- Asynchronous protocol 4-7, 4-10, 4-23
- Site-defined protocol 7-10, 7-14, 7-25
- Synchronous protocol 6-7, 6-10, 6-16, 6-20, 6-22, 6-27, 6-31, 6-34, 6-37, 6-41, 6-42, 6-47
- X.25 protocol 5-4, 5-7, 5-18

**P** 3-7

**P** 6-7

**P** 9-4 thru P99

**SERVICE** 8-6

**SHOST**
- INCALL statement 8-10
- OUTCALL statement 8-6

Index-10
### Parameters (Contd)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SNOE</strong></td>
<td>INCALL statement 8-10, OUTCALL statement 8-6</td>
</tr>
<tr>
<td><strong>STIP</strong></td>
<td>Asynchronous protocol 4-7, Site-defined protocol 7-9, 7-10, Synchronous protocol 6-7, 6-19, 6-20, 6-31, 6-32, X.25 protocol 5-4, 5-21, 5-22</td>
</tr>
<tr>
<td><strong>STREAM</strong></td>
<td>Site-defined protocol 7-10, 7-14, 7-26, Synchronous protocol 6-20, 6-22, 6-29</td>
</tr>
<tr>
<td><strong>TA</strong></td>
<td>Site-defined protocol 7-10, 7-14, 7-26, Synchronous protocol 6-7, 6-10, 6-18, 6-31, 6-34, 6-39, 6-41, 6-42, 6-48</td>
</tr>
<tr>
<td><strong>TC</strong></td>
<td>Asynchronous protocol 4-7, 4-8, Site-defined protocol 7-9, 7-10, Synchronous protocol 6-7, 6-8, 6-20, 6-31, 6-32, 6-40, 6-41, X.25 protocol 5-4, 5-5</td>
</tr>
<tr>
<td><strong>TITYPE</strong></td>
<td>Asynchronous protocol 4-2, 4-4, Site-defined protocol 7-1, 7-6, Synchronous protocol 6-2, 6-4, X.25 protocol 5-2</td>
</tr>
<tr>
<td><strong>TSP</strong></td>
<td>Asynchronous protocol 4-7, 4-8, Site-defined protocol 7-9, 7-10, Synchronous protocol 6-7, 6-8, 6-20, 6-31, 6-32, 6-40, 6-41, X.25 protocol 5-4, 5-5</td>
</tr>
<tr>
<td><strong>UBZ</strong></td>
<td>Asynchronous protocol 4-7, 4-10, 4-24, INCALL statement 8-10, OUTCALL statement 8-6, Site-defined protocol 7-10, 7-14, 7-26, Synchronous protocol 6-7, 6-10, 6-18, 6-20, 6-22, 6-29, 6-31, 6-34, 6-39, 6-41, 6-42, 6-48, X.25 protocol 5-4, 5-7, 5-18</td>
</tr>
<tr>
<td><strong>UZ</strong></td>
<td>Asynchronous protocol 4-7, 4-10, 4-24, INCALL statement 8-10, OUTCALL statement 8-6, Site-defined protocol 7-10, 7-14, 7-26, Synchronous protocol 6-7, 6-10, 6-18, 6-20, 6-22, 6-30, 6-31, 6-34, 6-39, 6-41, 6-42, 6-49, X.25 protocol 5-4, 5-7, 5-19</td>
</tr>
<tr>
<td><strong>VARIANT</strong></td>
<td>W SITE-defined protocol 7-9, 7-10, 7-13, X.25 protocol 5-4, 5-6</td>
</tr>
<tr>
<td><strong>W</strong></td>
<td>Site-defined protocol 7-9, 7-10, 7-13, X.25 protocol 5-4, 5-6</td>
</tr>
<tr>
<td><strong>WR</strong></td>
<td>INCALL statement 8-10, OUTCALL statement 8-6</td>
</tr>
<tr>
<td><strong>W</strong></td>
<td>INCALL statement 8-10, OUTCALL statement 8-6</td>
</tr>
<tr>
<td><strong>XAUTO</strong></td>
<td>Asynchronous protocol 4-2, 4-4, Site-defined protocol 7-1, 7-6</td>
</tr>
<tr>
<td><strong>XBO</strong></td>
<td>Asynchronous protocol 4-7, 4-10, 4-25, Site-defined protocol 7-10, 7-14, 7-27, Synchronous protocol 6-7, 6-10, 6-19, 6-20, 6-22, 6-30, 6-31, 6-34, 6-40</td>
</tr>
<tr>
<td><strong>XLC</strong></td>
<td>Asynchronous protocol 4-7, 4-10, 4-25, Site-defined protocol 7-10, 7-14, 7-27, X.25 protocol 5-4, 5-7, 5-19</td>
</tr>
</tbody>
</table>

**XLT0**
- Asynchronous protocol 4-7, 4-10, 4-25
- Site-defined protocol 7-10, 7-14, 7-27
- X.25 protocol 5-4, 5-7, 5-20

**XLX**
- Asynchronous protocol 4-7, 4-10, 4-26
- Site-defined protocol 7-10, 7-14, 7-27
- X.25 protocol 5-4, 5-7, 5-20

**XYL**
- Asynchronous protocol 4-7, 4-10, 4-26
- Site-defined protocol 7-10, 7-14, 7-28
- X.25 protocol 5-4, 5-7, 5-20

**Passive device** C-4
- **PDN** (see Public Data Network)
- **Peripheral Interface Program** (PIP) 1-2
- **Peripheral Processor Unit** (PPU) C-5
- **Permanent File Transfer Initiator** (PTFI) 1-12, 6-3
- **Permanent File Transfer Server** (PTFS) 1-12, 8-3

**PPM parameter** 8-2

**PG parameter**
- Asynchronous protocol
  - DEVICE statement 4-10
  - TERMDEV statement 4-7
- Site-defined protocol
  - DEVICE statement 7-14
  - TERMDEV statement 7-10
- Synchronous protocol
  - DEVICE statement 6-10, 6-42
  - TERMDEV statement 6-7, 6-41
- X.25 protocol
  - DEVICE statement 5-7
  - TERMDEV statement 5-4

**Physical line** C-5
- **Physical Record Unit** (PRU) 1-11, C-5
- **PICB** (see Program Interface Control Block)
- **PIP** (see Program Interface Program)

**PL parameter**
- Asynchronous protocol
  - DEVICE statement 4-10
  - TERMDEV statement 4-7
- Site-defined protocol
  - DEVICE statement 7-14
  - TERMDEV statement 7-10
- Synchronous protocol
  - DEVICE statement 6-10, 6-42
  - TERMDEV statement 6-7, 6-41
- X.25 protocol
  - DEVICE statement 5-7
  - TERMDEV statement 5-4

**PLAT0/NAM Interface - PNI (PLATO)** 1-12, 8-3
- **Port number** C-5

**PORT parameter**
- Asynchronous protocol
  - GROUP statement 4-4
  - LINE statement 4-2
  - INCALL statement 8-10
  - OUTCALL statement 8-6
  - Site-defined protocol
  - GROUP statement 7-6
  - LINE statement 7-1
  - Synchronous protocol
  - GROUP statement 6-4
  - LINE statement 6-2
  - X.25 protocol
  - LINE statement 5-2
- **PPU** (see Peripheral Processor Unit)

**PRI parameter**
- Asynchronous protocol
  - DEVICE statement 4-10
  - TERMDEV statement 4-7
  - INCALL statement 8-10
  - OUTCALL statement 8-6
PRI parameter (Contd)

Site-defined protocol
- DEVICE statement 7-14
- TERMDEV statement 7-10

Synchronous protocol
- DEVICE statement 6-10, 6-22, 6-34, 6-42
- TERMDEV statement 6-7, 6-20, 6-31, 6-41

X.25 protocol
- DEVICE statement 5-7
- TERMDEV statement 5-4

 forestry protocol 8-6

PRID parameter 8-6

Printer Support Utility (PSU) 1-12, 8-3

Priority C-5

PRIV parameter 8-4

Program Initiation Control Block (PICB) 1-4, C-5

Program input 11-1

Program output 11-1

Program portion of program 10-3

Protocol-dependent definition statements 3-6

Protocols
- Asynchronous 4-1
- Site-defined 7-1
- Synchronous 6-1
- X.25 5-1

BRU device C-5

BRU parameter 8-4

BRU (see Physical Record Unit)

PSW parameter

Site-defined protocol
- GROUP statement 7-6
- LINE statement 7-1
- X.25 5-2

LINE statement 5-2

PSW (see Packet-Switching Network)

PSU (see Printer Support Utility)

PFTFI (see Permanent File Transfer Initiator)

PTFS (see Permanent File Transfer Server)

Public Data Network (PDN) 1-5

PUSER parameter 8-2

FW parameter

Asynchronous protocol
- DEVICE statement 4-10
- TERMDEV statement 4-7

Site-defined protocol
- DEVICE statement 7-14
- TERMDEV statement 7-10

Synchronous protocol
- DEVICE statement 6-10, 6-22, 6-34, 6-42
- TERMDEV statement 6-7, 6-20, 6-31, 6-41

X.25 protocol
- DEVICE statement 5-7
- TERMDEV statement 5-4

PL parameter 3-7

P2 parameter 3-7

PRB thru P99 parameter

Asynchronous protocol
- DEVICE statement 4-10
- GROUP statement 4-4
- LINE statement 4-2
- TERMDEV statement 4-7

Site-defined protocol
- DEVICE statement 7-14
- GROUP statement 7-6
- LINE statement 7-1
- TERMDEV statement 7-10

Synchronous protocol
- DEVICE statement 6-10, 6-22, 6-34, 6-42
- GROUP statement 6-4
- LINE statement 6-2
- TERMDEV statement 6-7, 6-20, 6-31, 6-41

X.25 protocol
- DEVICE statement 5-7
- LINE statement 5-2
- TERMDEV statement 5-4

Queue File Transfer Initiator (QTFI) 1-12, 8-3

Queue File Transfer Server (QTFS) 1-12, 8-3

Random file C-5

RBF (see Remote Batch Facility)

RC parameter

Asynchronous protocol
- DEVICE statement 4-10
- TERMDEV statement 4-7
- TERMINAL statement 4-7
- SITE-defined protocol
- TERMDEV statement 7-10
- TERMINAL statement 7-9

Synchronous protocol
- TERMDEV statement 6-7, 6-20, 6-31, 6-41
- TERMINAL statement 6-7, 6-20, 6-31, 6-41

X.25 protocol
- TERMDEV statement 5-4
- TERMINAL statement 5-6

RCOUNT parameter

Site-defined protocol
- GROUP statement 7-6
- LINE statement 7-1

X.25 protocol
- LINE statement 5-2

Remote Batch Facility (RBF) 1-12, 8-3

Remote NPU 1-4, C-5

Reserved words D-1

RIG parameter

Asynchronous protocol
- TERMDEV statement 4-7
- TERMINAL statement 4-7

Site-defined protocol
- TERMDEV statement 7-10
- TERMINAL statement 7-9

Synchronous protocol
- TERMDEV statement 6-7, 6-20, 6-31, 6-41
- TERMINAL statement 6-7, 6-20, 6-31, 6-41

X.25 protocol
- TERMDEV statement 5-4
- TERMINAL statement 5-6

RS parameter 8-4

RTIME parameter

Site-defined protocol
- GROUP statement 7-6
- LINE statement 7-1

X.25 protocol
- LINE statement 5-2

RTS parameter

Asynchronous protocol
- DEVICE statement 4-10
- TERMDEV statement 4-7

Site-defined protocol
- DEVICE statement 7-14
- TERMDEV statement 7-10

Synchronous protocol
- DEVICE statement 6-10, 6-22, 6-34, 6-42
- TERMDEV statement 6-7, 6-20, 6-31, 6-41

Sample configured network 2-2

Sample program 11-1

SDT parameter

Site-defined protocol
- DEVICE statement 7-14
- TERMDEV statement 7-10

Synchronous protocol
- DEVICE statement 6-10, 6-22, 6-34, 6-42
- TERMDEV statement 6-7, 6-20, 6-31, 6-41

Sequential C-5

SERVICE parameter 8-6

Short PRU C-5

SHOST parameter

INCALL statement 8-10

OUTCALL statement 8-6

Simple network example 1-4

Site C-5

Site administrator 1-1

Site-defined line definition 7-1
Site-defined protocol devices, lines, and terminals 7-1

Site-defined protocol statements
DEVICE 7-14
GROUP 7-6
LINE 7-1
TERMDEV 7-10
TERMINAL 7-9

Site-written application programs 8-3

SNODE parameter
INCALL statement 8-10
OUTCALL statement 8-5
Software network elements 1-2, 1-9
Source C-5
Source node C-5

Special purpose statements
COMMENT 2-7
DEFINE 2-7
END 2-8
TITLE 2-5

Stand-alone keywords 2-4

Statement
Continuation 2-4
Hierarchy 2-5
Length 2-4
Syntax 2-3

Statements
APPL 8-3
COMMENT 2-7
COUPLER 3-3
DEFINE 2-7
DEVICE
Asynchronous protocol 4-10
General format 3-9
Site-defined protocol 7-14
Synchronous protocol 6-10, 6-22, 6-34, 6-42
X.25 protocol 5-7, 5-22
END 2-8
GROUP
Asynchronous protocol 4-4
General format 3-9
Site-defined protocol 7-6
Synchronous protocol 6-4
INCALL 8-9
LFILE 8-1
LINE
Asynchronous protocol 4-2
General format 3-8
Site-defined protocol 7-1
Synchronous protocol 6-2
X.25 protocol 5-1
LOGLINK 3-4
NFILE 3-1
NP U 3-2
OUTCALL 8-5
SUPLINK 3-3
TERMDEV
Asynchronous protocol 4-7
General format 3-9
Site-defined protocol 7-10
Synchronous protocol 6-7, 6-20, 6-31, 6-41
X.25 protocol 5-4, 5-22
TERMINAL 5-4
TERMDEV statement
Asynchronous protocol 4-7
General definition 3-9
Site-defined protocol 7-10
Synchronous protocol 6-7, 6-20, 6-31, 6-41
X.25 protocol 5-4, 5-22
Terminal 1-9, C-5
Terminal address C-5
Terminal class C-5
Terminal definition
Asynchronous protocol 4-6
Site-defined protocol 7-9
Synchronous protocol 6-5, 6-19, 6-31, 6-40
X.25 protocol 5-4, 5-22
Terminal Device Interface (TDI) 1-13
Terminal Interface Program (TIP) 1-5, C-5
Terminal name C-6
Terminal node 1-13, C-6
Terminal output data blocking 1-11
TERMINAL statement
Asynchronous protocol 4-7
General definition 3-9
Site-defined protocol 7-9
Synchronous protocol 6-20, 6-31, 6-41
X.25 protocol 5-4, 5-21

Terminal user C-6
Terminal Verification Facility (TVF) 1-12, 8-3
TIP (see Terminal Interface Program)

TIPTYPE parameter
Asynchronous protocol
GROUP statement 4-4
LINE statement 4-2
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1
Synchronous protocol
GROUP statement 6-4
LINE statement 6-2
X.25 protocol
LINE statement 5-2

TITLE statement 2-5
Transaction Facility (TAF) 1-12, 8-3
Transmission block C-6
Transparent mode C-6
Trunk 1-8, C-6
TRUNK statement 3-6
TSPEED parameter
Asynchronous protocol
TERMDEV statement 4-7
TERMINAL statement 4-7
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
TVF (see Terminal Verification Facility)

UBL parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
OUTCALL statement 8-6
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

XBZ parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41

XLC parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

UDP parameter 8-6
UID parameter 8-4
UNAME parameter 8-10

VALIDUz 1-2
Value declaration format 2-1
Value-required keywords 2-1
Variant 1-4
VARIANT parameter 3-2
VEIAF (see NOS/VE Interactive Facility)
Virtual circuit 1-6

W parameter
Site-defined protocol
TERMDEV statement 7-10
TERMINAL statement 7-9
X.25 protocol
TERMDEV statement 5-4
TERMINAL statement 5-4
WR parameter 8-10
WS parameter
INCALL statement 8-10
OUTCALL statement 8-6

XAUTO parameter
Asynchronous protocol
GROUP statement 4-4
LINE statement 4-2
Site-defined protocol
GROUP statement 7-6
LINE statement 7-1

XLC parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
Synchronous protocol
DEVICE statement 6-10, 6-22, 6-34, 6-42
TERMDEV statement 6-7, 6-20, 6-31, 6-41
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

XRE paramter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

XLX parameter
Asynchronous protocol
DEVICE statement 4-10
TERMDEV statement 4-7
Site-defined protocol
DEVICE statement 7-14
TERMDEV statement 7-10
X.25 protocol
DEVICE statement 5-7
TERMDEV statement 5-4

Index-14
XL parameter

Site-defined protocol
  DEVICE statement 7-14
  TERMDEV statement 7-10
X.25 protocol
  DEVICE statement 5-7
  TERMDEV statement 5-4

XLY parameter

Asynchronous protocol
  DEVICE statement 4-10
  TERMDEV statement 4-7
Site-defined protocol
  DEVICE statement 7-14
  TERMDEV statement 7-10
X.25 protocol
  DEVICE statement 5-7
  TERMDEV statement 5-4

X.25 line definition 5-1
X.25 Packet Assembler/Disassembler (PAD) C-6
X.25 protocol devices, lines, and terminals 5-1
X.25 TIP 5-1
X.25 protocol statements
  DEVICE 5-7, 5-22
  LINE 5-1
  TERMDEV 5-4, 5-22
  TERMINAL 5-4, 5-21

Zero-length PRU C-6

3270 TIP 6-40
3270 TIP statements
  DEVICE statement 6-42
  TERMDEV statement 6-41
  TERMINAL statement 6-41
COMMENT SHEET


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