SERIES 60 (LEVEL 66 & 66/DPS)
CONFIGURATION GUIDE

FOR INTERNAL USE ONLY

SUBJECT
Information for Configuring the Level 66 Processor, IOM, and System Control Unit

ORDER NUMBER
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Honeywell
PREFACE

This guide provides nearly complete freestanding information for configuring any portion of a Level 66 system except for terminals. Do not use it until you have read the preceding hardware outlines.

Included are the Level 66 systems as modified by announcements of June and September, 1976, and the 66/DPS systems announced in January, 1978.

All configuring rules are given on the basis of use of 4K bit MOS memory chips with 16 pins. Shipment of this memory began in Third Quarter, 1977. Prior 4K bit MOS chips had 22 pins. The 16-pin chip increases the quantity of memory which can be included in cabinets which contain memory.

The guide is constructed to be as self-teaching as possible and to provide for configuring both initial system orders and subsequent add-ons.

Material in this guide dealing with Level 66 mainframes consists primarily of a set of charts and brief summaries which are designed to be largely self-explanatory. The charts provide a foundation based on definitions and fundamental rules. By following the appropriate flowcharts, step charts, and tables you will be able quickly and easily to configure any initial system order or add-on order accurately.

This material is divided into gross functional sections. Be sure to read the Table of Contents before using the configuration material. The Table will show you the pattern of approach used in configuring.

Section I summarizes key general rules and policies which govern configuration of Level 66 systems. Included also are key definitions, some of which are standard or official and others which are unofficial, used only in this material. Before doing any configuring you should always review Section I.

Section II provides a master flowchart which identifies the sequence and components to be considered in configuring mainframes. Detach this flowchart and keep it in view while you use it to access other portions of this material in order to configure easily, completely, and accurately.
The flowchart has page numbers for various sections to refer to for configuration of the component at each level of the flowchart.

Section III explains how to order a whole mainframe initially, where there are no optional replications (like modules) in the mainframe. It guides you to various pages and tables which define the CPS (central processing system) or base type numbers for each possible Level 66 model and mainframe packaging (ICU-based and freestanding).

Section IV covers the aspects for configuring the components needed within each IOM. These components relate to physical IOM channels for peripheral subsystems, the assignment of logical channels (data paths) for each physical channel, and the assignment of the scratchpad feature called DRE (data rate expansion).

Section V provides for configuring optional mainframe functional components - processors, IOMs, SCUs. Use this section for both the initial order and for additional orders which involve these components.

Section VI handles the cases for expanding the size of memory on an installed system.

Sections VII and VIII relate to the simple tasks of configuring motor generator/control sets and console subsystems respectively.

Section IX gives examples of various mainframe configurations. Use these in conjunction with the master flowchart from Section II to get some practice in configuring for virtually every combination possible in mainframes.

Sections X and above deal with individual types of peripheral subsystems and peripheral switches. Included also is configuration of all FNP.
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SECTION I
General Policies and Definitions

A. Model Restrictions for Level 66 Balanced Multidimensional Family

1. These are indicated for those models where special restrictions apply. Restrictions shown are based on USISG policies. Other organizations may have different policies. All systems are governed by the peripheral subsystem maximums and minimums in Section I. C.

2. 66/05

a. 18 physical IOM channel spaces standard. No additional provided.

b. Magnetic tape -- maximum of one single-channel or dual-channel MTP with 8 tape units of Ø410, Ø412/Ø411 type. No other tape units are allowed.

c. Disk -- maximum of one single-channel MSP with maximum of 8 spindles - MSU0402/0451/0500 units.

d. Unit record -- maximum of one URP and 4 unit record devices.

e. FNP -- INP ("integrated" network processor) is included with CPS6058 version only, and used only for that version. It is supplementable by DN616/6624/6632/6670. The INP cannot be deleted from the system. An upgrade kit, DCK6604 is available which removes the 8 line limitation. GRTS required in INP. CPS6050 does not include any FNP.

f. Only ICU-based type of mainframe is available.

g. See also Section I. E. for replication options.

B. Model Restrictions for Level 66 Time Sharing Biased Multidimensional Family
SECTION I
General Policies and Definitions

1. These are indicated for those models where special restrictions apply. All systems are governed by the peripheral subsystem maximums and minimums in Section I.C.

2. 66/07
   a. 18 physical IOM channel board spaces maximum (and standard).
   b. Magnetic tape -- maximum of one single-channel MTP with 8 tape units of 0410,0412/0411 type. No other tape units are allowed. No dual-channel MTP allowed.
   c. Disk -- maximum of two MSPs and system total of two simultaneous disk channels and 8 MSU0402 or MSU0451 or 4 MSU0500 disk units or mixtures, to a total of 8 spindles.
   d. Unit record -- maximum of one URP and 4 unit record devices.
   e. FNP -- maximum of one DN6616 or DN6624 or DN6632 or DN6670.
   f. Only the ICU-based type of mainframe is available.
   g. Maximum of one DHP0701.
   h. Software release 3/1 or later required.
   i. See also Section I.E. for replication options.

3. 66/17
   a. 18 physical IOM channel board spaces in IOM.
   b. FNP -- maximum of one DN6624 or DN6632 or DN6616 or DN6670.
SECTION I
General Policies and Definitions

c. Software release 3/I or later required.
d. See also Section I. E. for replication options.

4. 66/27

a. 18 physical IOM channel board spaces in IOM.
b. FNP -- maximum of one DN6624 or DN6632 or DN6670 or DN6616.
c. Software release 3/I or later required.
d. See also Section I.E. for replication options.

C. Minimum and Maximum Peripheral Subsystems per Level 66 System

1. Lower speed peripheral subsystems.

<table>
<thead>
<tr>
<th>Subsystem</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. System console (CSU6004)</td>
<td>1</td>
<td>1 (4)</td>
</tr>
<tr>
<td>b. System control center (CSU6005)</td>
<td>1 (1)</td>
<td>1 (4)</td>
</tr>
<tr>
<td>c. Card reader or card reader/punch</td>
<td>1</td>
<td>As needed (5)</td>
</tr>
<tr>
<td>d. Card punch</td>
<td>Ø</td>
<td>As needed (5)</td>
</tr>
<tr>
<td>e. Printer</td>
<td>1</td>
<td>As needed (5)</td>
</tr>
<tr>
<td>f. DHP0700/0701</td>
<td>Ø</td>
<td>1-3 (2) (4)</td>
</tr>
<tr>
<td>g. FNP (3)</td>
<td>Ø</td>
<td>4 or 8 (4/JS)</td>
</tr>
</tbody>
</table>

Footnotes:

1) Every system must contain at least one console subsystem. GCOS supports a maximum of 4 consoles (5 console CRT screens). See console discussion in Peripherals outline.
SECTION I
General Policies and Definitions

2) A DHP0700 may have up to 4 document handlers running simultaneously. A DHP0701 may run one or two simultaneously. Depending on Level 66 model and memory size, and amount of work done per document by DHP, it may be possible to use up to 3 per Level 66 system (3 DHPs), and a maximum of 9 document handlers simultaneously.

3) Depends on memory size of Level 66 system.

4) Maximum of one DHP0700 or DHP0701 on 66/07/05.

5) Maximum of 4 unit record devices and one URP in 66/05/07.

2. Higher speed peripherals.

<table>
<thead>
<tr>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Magnetic tapes</td>
<td>1-3 (1) As needed (2)</td>
</tr>
<tr>
<td>b. Disk storage</td>
<td>About 40-50 million char (3)</td>
</tr>
<tr>
<td></td>
<td>As needed (2)(4)</td>
</tr>
</tbody>
</table>

Footnotes:

1) Check with your GCOS technical support people. One tape unit is normally used for the GCOS Statistical Collection File. Other tape units may be needed for the GCOS system journal file used by FMS for file recovery, for DM-IV/TP or TDS or TPS journals, etc. At software release installation time the availability of a minimum of only one tape unit complicates the System Edit process. Two or three (better three) tape units make the System Edit process easier and simpler. If three tape units are not available for System Edit process an appreciable quantity of disk scratch space must be available.
SECTION I
General Policies and Definitions

2) On 66/05 the maximum is one tape and one disk subsystem with 8 tape units and 8 disk spindles respectively. On 66/07 the maximum is 8 tape units, and 8 disk spindles with one or two disk channels.

3) Check with your GCOS technical support people. This figure does not provide for any user data files or user temporary files. It represents the recommended minimum of GCOS residence, GCOS scratch files, SYSOUT file space and the minimum for other Phoenix-supported software.

4) You must provide space for GCOS System Scheduler, NPS execution modules, NPS journal files, NPS checkpoint dump areas, and user files. We feel that there should be at least 110MC or 75MB of mass storage total in a Level 66 system to allow space for system software and work files, plus the minimum space for user files in a large disk-oriented system such as Level 66.
SECTION I
General Policies and Definitions

D. Key Mainframe Definitions

1. For non-DPS models.
   a. Base CPS Systems -- non-DPS

This is the configuration which is the heart of each mainframe. It is obtained by use of the CPS number shown on the pertinent Base Mainframe Configurator chart for the model you want to order. The base CPS system type number is the first type number you write on your initial order. All additions at the time of the initial order or after the system has been installed are made to the base CPS system. Base CPS system is also known as base system, or basic system or base mainframe.

Each CPS number gives you a complete mainframe as shown:

One processor, one SCU with a base quantity of memory, one IOM, plus one Central Processor Addressing feature or port (CPA) in base processor and one IOM Addressing feature or port (MXA) in base IOM. Components in base CPS system do not have individual type numbers.
SECTION I
General Policies and Definitions

b. Net Base System -- non-DPS

This is the base CPS system plus the second SCU which is required but not included when the system has 768KW/3072KB or 1024KW/4096KB of memory. With the second SCU there must also be one CPA6001 (Central Processor Addressing feature or port) and one MXA6001 (IOM Addressing feature or port). The CPA and MXA are necessary to connect the base processor and base IOM to each extra SCU. Note - when you use the appropriate Base Mainframe Configurator chart for the model and memory size you want, the net base system requirements are included in the type number shown. Note -- the term "net base system" is not an official term and is used only in this guide for purposes of clarifying configuring rules.
SECTION I
General Policies and Definitions

2. For DPS Systems.
   a. Base CPS System for DPS -- This is the configuration which is the heart of each basic mainframe. It is obtained by use of the CPS6650 number shown in Section III.D. The base CPS system type number is the first type number you write on your initial order. All additions at the time of the initial order or after the system has been installed are made to the base CPS system. Base CPS system is also known as base system, or basic system, or base mainframe.

Components of each CPS 6650 system for any DPS model:

The 66/DPS CPS number gives you a complete mainframe as shown:

Two processors, one SCU with a base quantity of memory, one IOM, plus two Central Processor Addressing features or ports (CPA) in base processor and one IOM Addressing feature or port (MXA) in base IOM. Components in base CPS system do not have individual type numbers.
b. Net Base System for DPS -- This is the base CPS system plus the second SCU which is required but not included when the system has more than 1024KW/4096KB of memory. Note -- the term "net base system" is not an official term and is used only in this guide for purposes of clarifying configuring rules.

Components of each net base system for any DPS model:

Each MXC6004 includes all CPAs and MXAs as needed for all processors and IOMs ordered or already installed.
SECTION I
General Policies and Definitions

E. Summary of Mainframe Replication Options

1. Non-DPS systems replication options.

<table>
<thead>
<tr>
<th>Model and Total Memory</th>
<th>Maximum Selective Processors</th>
<th>Maximum Selective IOMs</th>
<th>SCUs. See also Section F Below</th>
<th>Tandem Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>66/05</td>
<td>1</td>
<td>None</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>66/07</td>
<td>1</td>
<td>None</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>66/10</td>
<td>1</td>
<td>1</td>
<td>ICU  FS</td>
<td>Yes, 2 CPS systems or module by module</td>
</tr>
<tr>
<td>96-512KW</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>513-1024KW (FS)</td>
<td></td>
<td></td>
<td>2</td>
<td>- 1</td>
</tr>
<tr>
<td>66/17</td>
<td>1</td>
<td>1</td>
<td>ICU  FS</td>
<td>Yes, 2 CPS systems or module by module</td>
</tr>
<tr>
<td>96-512KW</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>513-1024KW (FS)</td>
<td></td>
<td></td>
<td>2</td>
<td>- 1</td>
</tr>
<tr>
<td>66/20</td>
<td>1</td>
<td>1</td>
<td>ICU  FS</td>
<td>Yes, 2 CPS systems or module by module</td>
</tr>
<tr>
<td>128-512KW</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>513-1024KW (FS)</td>
<td></td>
<td></td>
<td>2</td>
<td>- 1</td>
</tr>
<tr>
<td>66/27</td>
<td>1</td>
<td>1</td>
<td>ICU  FS</td>
<td>Yes, 2 CPS systems or module by module</td>
</tr>
<tr>
<td>128-512KW</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>513-1024KW (FS)</td>
<td></td>
<td></td>
<td>2</td>
<td>- 1</td>
</tr>
<tr>
<td>66/40</td>
<td>1</td>
<td>1</td>
<td>ICU  FS</td>
<td>Yes, 2 CPS systems or module by module</td>
</tr>
<tr>
<td>128-512KW</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>513-1024KW (FS)</td>
<td></td>
<td></td>
<td>2</td>
<td>- 1</td>
</tr>
<tr>
<td>66/60</td>
<td>1 (ICU)</td>
<td>1 (ICU)</td>
<td>ICU  FS</td>
<td>Yes, 2 CPS systems or module by module</td>
</tr>
<tr>
<td>192-512KW</td>
<td></td>
<td></td>
<td>3 (FS)</td>
<td>1</td>
</tr>
<tr>
<td>513-1024KW (FS)</td>
<td></td>
<td></td>
<td>2</td>
<td>1-3</td>
</tr>
<tr>
<td>66/80</td>
<td>1 (ICU)</td>
<td>1 (ICU)</td>
<td>ICU  FS</td>
<td>Yes, 2 CPS systems or module by module</td>
</tr>
<tr>
<td>256-512KW</td>
<td></td>
<td></td>
<td>3 (FS)</td>
<td>1</td>
</tr>
<tr>
<td>513-1024KW (FS)</td>
<td></td>
<td></td>
<td>2</td>
<td>1-3</td>
</tr>
</tbody>
</table>
SECTION I  
General Policies and Definitions

2. DPS systems replication options.

<table>
<thead>
<tr>
<th>Model and Total Memory</th>
<th>Maximum Selective Processors</th>
<th>Maximum Selective IOMs</th>
<th>SCUs. See also F below.</th>
<th>Tandem Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPS - 1</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>Yes, module by module</td>
</tr>
<tr>
<td>1024-4096KB</td>
<td></td>
<td></td>
<td>2</td>
<td>1-3</td>
</tr>
<tr>
<td>4097-8192KB</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>DPS - 2</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>Yes, module by module</td>
</tr>
<tr>
<td>1024-4096KB</td>
<td></td>
<td></td>
<td>2</td>
<td>1-3</td>
</tr>
<tr>
<td>4097-8192KB</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>DPS - 3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>Yes, module by module</td>
</tr>
<tr>
<td>(1=DPS-4, 2=DPS-5)</td>
<td></td>
<td></td>
<td>2</td>
<td>1-3</td>
</tr>
<tr>
<td>1024-4096KB</td>
<td></td>
<td></td>
<td>1</td>
<td>1-2</td>
</tr>
<tr>
<td>4097-8192KB</td>
<td></td>
<td></td>
<td>2</td>
<td>1-2</td>
</tr>
</tbody>
</table>
SECTION I
General Policies and Definitions

3. System controller quantities per system.

<table>
<thead>
<tr>
<th>System Total Memory</th>
<th>66/05/07 REQ</th>
<th>OPT</th>
<th>66/10/17 REQ</th>
<th>OPT</th>
<th>66/20/27 REQ</th>
<th>OPT</th>
<th>DPS REQ</th>
<th>OPT</th>
</tr>
</thead>
<tbody>
<tr>
<td>384KB/96KW</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>512KB/128KW</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>768KB/192KW</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1-2</td>
<td>1</td>
<td>1-2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1024KB/256KW</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1-3</td>
<td>1</td>
<td>1-3</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>1536KB/384KW</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1-3</td>
<td>1</td>
<td>1-3</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>2048KB/512KW</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1-3</td>
<td>1</td>
<td>1-3</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>3072KB/768KW(a)</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>1-2</td>
<td>2</td>
<td>1-2</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>4096KB/1024KW(a)</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>1-2</td>
<td>2</td>
<td>1-2</td>
<td>1-3</td>
<td></td>
</tr>
<tr>
<td>6144KB/1536KW</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2-2</td>
<td></td>
</tr>
<tr>
<td>8192KB/2048KW</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2-2</td>
<td></td>
</tr>
</tbody>
</table>

REQ = Quantity of SCUs required to support system total memory size. Main frame CPS number includes one SCU.

OPT = Optional extra SCUs addable selectively. Always freestanding.

\(a\) = Applies to freestanding versions. Maximum of 2 SCUs in any system containing an ICU.
SECTION II
Master Flowcharts for Mainframe Configuring

A. Initial System Order for Non-DPS Systems

Choose Model and Memory Size

Check Model Restrictions

L66 ICU or Freestanding Based?

Check Peripherals Min/Max

Con-5

Con-8

ICU

Choose CPS No. For Model and Memory Size

Choose CPS No. For Model and Memory Size

Con-23

Con-22

Tandem System?

Do A, B, C Modularly or, Buy 2nd CPS

Con-15

See Next Page

Optional Processor?

Order Processor and Crossbar(s)

Optional SCU?

Order SCU and Crossbars

A

B

Con-53

Con-53

Con-53

Con-53

Con-53

3

1
SECTION II
Master Flowcharts for Mainframe Configuring

From Prior Page

1

Determine No. of Physical I/O Channels

If 2 or more IOMs, Split Channels Across IOMs

Check Channel Spaces Required Vs Those Provided

Enough?

Channel Spaces Option?

Assign Logical Channels

Order Option

Assign DRE

Select Motor/Generator Set

Configure Peripherals, FNPs, Consoles

Order DRE Option, Assign DRE

This portion of flowchart applies to both DPS and non-DPS systems and covers the four levels of configuring involved within all IOMs.

CON-33

CON-37

CON-39

CON-40

CON-51

CON-52

CON-39

Y

N

N

N

N

Y

N

2

2

2

3

See Prior Page

REGROUP!
SECTION II
Master Flowcharts for Mainframe Configuring

B. Initial System Order For DPS Systems

- Determine Performance Levels, Memory Size
- Get Order
- Check Peripherals Min/Max

- Order DPS Basic Main Frame

- Order CMA as Necessary for Desired Memory Size
- Order Performance Enhancement(s) as Necessary for Performance Levels Desired

- Tandem Main Frame Desired?
  - Y: Do A, B, C, D Below
  - N: BCD Option Required?
    - Y: Order BCD Option
    - N: If DPS-3, Want Another Processor?
      - Y: Order Companion Processor, and Related BCD Options if Required
        - N: Additional SCU

- Additional SCU

- If yes at B, means a 3rd or 4th processor, since 2 processors are included in base main frame

- Additional IOM?
  - Y: Order IOM
  - N: See prior page

- See this page

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SECTION III
Initial Order for Base Mainframe - Configurator Tables

A. ICU Contents Block Diagram - Not for DPS

ICU Cabinet

a For 66/60/80, and 66/40 with MXP6004 Channel Expansion feature, the SCU will be in an external cabinet in systems with 384/512KW. The ICU cabinet will hold first 256KW, the external cabinet will hold the rest. SCU is still powered via ICU.

b MSP0605 on 66/05 only

c "Integrated" versions are optional. Every system must have URP and MSP
## SECTION III
Initial Order for Base Mainframe - Configurator Tables

### B. Non-DPS ICU-Based Systems (No FNP included except CPS6058)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CENTRAL SYSTEM IDENTIFIER</th>
<th>BASIC MEMORY SIZE</th>
<th>REQUIRED FOR INDICATED MEMORY INCREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>66/05</td>
<td>CPS6050</td>
<td>96KW/384KB</td>
<td>CMM6000a CMM6001 CMM6002 CMM6003 CMM6004</td>
</tr>
<tr>
<td>66/05</td>
<td>CPS6058 d</td>
<td>96KW/384KB</td>
<td>CMM6003 CMM6004</td>
</tr>
<tr>
<td>66/07</td>
<td>CPS6070</td>
<td>96KW/384KB</td>
<td>CMM6003 CMM6004</td>
</tr>
<tr>
<td>66/10</td>
<td>CPS6110</td>
<td>96KW/384KB</td>
<td>c c</td>
</tr>
<tr>
<td>66/17</td>
<td>CPS6170</td>
<td>96KW/384KB</td>
<td></td>
</tr>
<tr>
<td>66/20</td>
<td>CPS6210</td>
<td>128KW/512KB</td>
<td></td>
</tr>
<tr>
<td>66/27</td>
<td>CPS6270</td>
<td>128KW/512KB</td>
<td></td>
</tr>
<tr>
<td>66/40</td>
<td>CPS6410</td>
<td>128KW/512KB</td>
<td></td>
</tr>
<tr>
<td>66/60</td>
<td>CPS6610</td>
<td>192KW/768KB</td>
<td>CMM6010b CMM6011 CMM6012</td>
</tr>
<tr>
<td>66/80</td>
<td>CPS6810</td>
<td>256KW/1024KB</td>
<td>CMA6011 CMA6012</td>
</tr>
</tbody>
</table>

a. CMM6000 is available only with Models 66/05, 66/07, 66/10 and 66/17 (which start at 96KW/384KB)
b. CMM6010 is available only with Model 66/60 (which starts at 192KW/768KB)
c. 66/60/80, and 66/40 systems with MXF6004 Channel Expansion, will have an external cabinet for the SCU. ICU contains first 256KW, SCU cabinet the remainder.
d. Includes "integrated FNP". A DN6616/6624/6632/6670 may be used in addition

**Procedure:**

1. Select Model, and list appropriate CPS number or Central System Identifier.
2. Select the Memory Increment column containing a maximum size corresponding to total desired memory.
3. List the type numbers contained in that column, plus the type numbers contained in all appropriate columns to the left of the selected Memory Increment column.

**Note 1.** An IOM Data Rate Expansion feature (DRE) is included within each CPS number. (Any additional IOMs do not include this feature but one DRE is required)

**Note 2.** K in memory size indicates a value of 1024. Maximum memory in any system containing an ICU is 512KW/2048KB, whether tandem or not
SECTION III
Initial Order for Base Mainframe - Configurator Tables

C. Non-DPS freestanding systems (No FNP included)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CENTRAL SYSTEM IDENTIFIER</th>
<th>BASIC MEMORY SIZE</th>
<th>REQUIRED FOR INDICATED MEMORY INCREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>96KW-</td>
</tr>
<tr>
<td>66/10</td>
<td>CPS6120</td>
<td>96KW/384KB</td>
<td>CMH6000</td>
</tr>
<tr>
<td>66/17</td>
<td>CPS6180</td>
<td>96KW/384KB</td>
<td>CMH6000</td>
</tr>
<tr>
<td>66/20</td>
<td>CPS6220</td>
<td>128KW/512KB</td>
<td>CMH6000</td>
</tr>
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<td>66/27</td>
<td>CPS6280</td>
<td>128KW/512KB</td>
<td>CMH6000</td>
</tr>
<tr>
<td>66/40</td>
<td>CPS6420</td>
<td>128KW/512KB</td>
<td>CMH6000</td>
</tr>
<tr>
<td>66/60</td>
<td>CPS6620</td>
<td>192KW/768KB</td>
<td>CMH6010</td>
</tr>
<tr>
<td>66/80</td>
<td>CPS6820</td>
<td>256KW/1024KB</td>
<td>CMH6010</td>
</tr>
<tr>
<td>66/80</td>
<td>CPS6821</td>
<td>256KW/1024KB</td>
<td>CMH6010</td>
</tr>
<tr>
<td></td>
<td>(1.15 X CPS6820)</td>
<td></td>
<td>CMH6010</td>
</tr>
<tr>
<td>66/80</td>
<td>CPK6815</td>
<td></td>
<td>CMH6010</td>
</tr>
<tr>
<td></td>
<td>(Note 3)</td>
<td></td>
<td>CMH6010</td>
</tr>
</tbody>
</table>

a CMH6000 is available only with Models 66/10 and 66/17 (which start at 96KW/384KB)
b CMH6010 is available only with Model 66/60 (which starts at 192KW/768KB)

Procedure:
1. Select Model, and list appropriate CPS number or Central System Identifier.
2. Select the Memory Increment column containing a maximum size corresponding to total desired memory.
3. List the type numbers contained in that column, plus the type numbers contained in all appropriate columns to the left of the selected Memory Increment column.

Note 1. K in memory size indicates a value of 1024. Maximum memory in any totally freestanding system is 1024KW/4096KB, whether tandem or not. Maximum in one SCU is 512KW
Note 2. An IOM Data Rate Expansion feature (DRE) is included within each CPS Number. (Any additional IOMs do not include this feature but one DRE is required)
Note 3. CPK6815 is kit to upgrade purchased CPS6820 system performance 1.15 times. A kit is required for each processor.
SECTION III
Initial Order for Base Mainframe - Configurator Tables

D. DPS Systems

1. Base Mainframe (Note 1)

![Diagram of Base DPS CPS6650]

- Application Processor 1
- Memory 256KW/1024KB
- INP 32KW/64KB
  See Next Page

- Application Processor 2
- SCU
- IOM
  Note 3

See Next Page
SECTION III
Initial Order for Base Mainframe - Configurator Tables

2. Memory Expansion Options (Note 6)

<table>
<thead>
<tr>
<th>Memory Increment</th>
<th>Marketing Identifier</th>
<th>Order 2nd SCU</th>
</tr>
</thead>
<tbody>
<tr>
<td>256-384 KWords</td>
<td>CMM6021</td>
<td>MXC6004</td>
</tr>
<tr>
<td>1024-1536 KBytes</td>
<td></td>
<td>UNLESS ALREADY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>INSTALLED</td>
</tr>
<tr>
<td>384-512 KWords</td>
<td>CMM6022</td>
<td></td>
</tr>
<tr>
<td>1536-2048 KBytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>512-768 KWords</td>
<td>CMM6052</td>
<td></td>
</tr>
<tr>
<td>2048-3072 KBytes</td>
<td>CMA6052</td>
<td></td>
</tr>
<tr>
<td>768-1024 KWords</td>
<td>CMM6053</td>
<td></td>
</tr>
<tr>
<td>3072-4096 KBytes</td>
<td>CMA6053</td>
<td></td>
</tr>
<tr>
<td>1024-1280 KWords</td>
<td>CMM6054</td>
<td></td>
</tr>
<tr>
<td>4096-5120 KBytes</td>
<td>CMA6054</td>
<td></td>
</tr>
<tr>
<td>1280-1536 KWords</td>
<td>CMM6055</td>
<td></td>
</tr>
<tr>
<td>5120-6144 KBytes</td>
<td>CMA6055</td>
<td></td>
</tr>
<tr>
<td>1536-1792 KWords</td>
<td>CMM6056</td>
<td></td>
</tr>
<tr>
<td>6144-7168 KBytes</td>
<td>CMA6056</td>
<td></td>
</tr>
<tr>
<td>1792-2048 KWords</td>
<td>CMM6057</td>
<td></td>
</tr>
<tr>
<td>7168-8192 KBytes</td>
<td>CMA6057</td>
<td></td>
</tr>
<tr>
<td>2048-2560 KWords</td>
<td>CMM6058</td>
<td></td>
</tr>
<tr>
<td>8192-1024 KBytes</td>
<td>CMA6058</td>
<td></td>
</tr>
<tr>
<td>2560-3072 KWords</td>
<td>CMM6059</td>
<td></td>
</tr>
<tr>
<td>10240-12288 KBytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3072-3584 KWords</td>
<td>CMM6060</td>
<td></td>
</tr>
<tr>
<td>12288-14336 KBytes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3584-4096 KWords</td>
<td>CMM6061</td>
<td></td>
</tr>
<tr>
<td>14336-16384 KBytes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ORDER 3rd SCU MXC6004
UNLESS ALREADY INSTALLED

ORDER 4th SCU MXC6004
SECTION III
Initial Order for Base Mainframe - Configurator Tables

3. Processor Incremental Performance Enhancements

CPK6654
Creates
DPS-2

CPK6658
Creates
DPS-3

Requires CPK6654

CPK6662
Companion
Processor
Attachment

1 Required above
DPS-3

a. For DPS-4 -- add 1 companion processor (CPK6666) and
1 CPK6662 to DPS-1. Maximum 1 CPK6662 per DPS.
b. For DPS-5 -- add 2 companion processors (CPK6666,
CPK6667), and 1 CPK6662 to DPS-3; or 1 companion processor (CPK6667)
to DPS-4. Maximum 1 CPK6662 per DPS.

4. Additional Processors, SCUs, IOMs (Note 5)

CPK6666 (3rd Processor)
CPK6667 (4th Processor) MXC6004

Companion
Processors
(Note 8)

Maximum 2

CPK6666 gives
DPS-4 performance

CPK6667 requires
CPK6666, gives
DPS-5 performance

SCU
(Note 8)

Maximum 3

1 required if
memory exceeds
1024KW/4096KB

MXU6002

IOM
Notes 3, 8
URPO602 Note 4

Maximum 3 IOMs

21 DH92. Rev. 0
SECTION III
Initial Order for Base Mainframe - Configurator Tables

5. BCD options (See Section XXI)

CPF6650
Base BCD Option
- Equips both base processors

CPF6651
Companion BCD Option
- Required in each companion processor (CPK6666, CPK6667) when base DPS (CPS6650) is equipped with base BCD option (CPF6650)

6. Additional Communication Network Processors (ANPs) (Note 7)

DCU6651
ANP
32KW/64KB
Maximum 3

DCE6651
Performance Enhancement. 75% Increment
- Maximum 1
- Requires DCM6651

DCM6651
First Memory Increment
64KB to 128KB
- Required for NPS use

DCM6652
Second Memory Increment
128KB to 192KB
- Requires DCM6651
- Requires DCE6651
SECTION III
Initial Order for Base Mainframe - Configurator Tables

7. Notes

1) CPS6650 must always be ordered to provide base mainframe. Includes all components shown in box with dotted outline. This is base mainframe for entire DPS range of performance levels - DPS-1, 2, 3, 4, 5. DPS2,3 levels are obtained by addition of cumulative performance enhancements as shown. DPS-4,5 can be obtained only if DPS-3 is configured. DPS-1,2,3,4,5 designations do not imply relative performance levels, i.e., DPS-2 is not twice as fast as DPS-1. All mainframe components are freestanding, except that base processors are packaged in one cabinet, and memory to the maximum of 1024KW/4096KB per SCU is contained in the SCU cabinet. Each processor, SCU, IOM has own power supply.

2) At least one motor/generator set is required but is not included in base main price. See Section VII.

3) For each IOM there are components which must be configured and considerations which apply within the IOM. See Section IV.

4) Every system must have at least one URP subsystem. There is the choice of using a unit record processor URP0602 within an IOM cabinet, sharing IOM power supply, or using a freestanding URP0600 which has own power supply. Use of URP0602 affects physical I/O channel capacity of IOM.

5) A minimum tandem mainframe consists of two processors, two SCUs, and two IOMs. The base mainframe (CPS6650) always gives you two processors. Additional SCU and IOM must be separately configured.
SECTION III
Initial Order for Base Mainframe - Configurator Tables

6) Use the memory expansion table to configure memory beyond the base size (256KW/1024KB) on initial order or for memory size upgrade on an installed system. Each row represents a specific increment. Choose all increments necessary to reach a given total size of memory from any starting size. Remember that a second system controller must be used to support memory size greater than 1024KW/4096KB.

7) To complete the configuring of 66/DPS INP/ANP communications processor, refer to Section XX. "Configuring Level 6-Based FNPs (Not DN6600-1)".

8) All necessary ports to connect all processors and all IOMs to all SCUs are included in the price of the add-on components. You do not configure them in DPS systems.
SECTION IV
Configuring Within IOM

A. Objectives of This Section

1. To show how you determine the number of physical I/O channels required for the peripheral subsystems you wish for your system.

2. To show how, by using the information from #1 above, you determine the quantity of 12" x 12" circuit boards required to contain the electronic logic for the number and type of physical I/O channels you desire. Also, in this section you will determine whether there are sufficient channel board spaces available on a standard basis or via option in the Level 66 system you wish to configure.

3. To show how, by using the information from #1 above, you determine how many logical channels or data paths must be assigned for the quantity of physical I/O channels you wish. We will also explain the role of logical channels, indicate how many may be assigned optionally beyond the quantity required, and how they are physically assigned.

4. To show how, by using the information from #3 above, you determine how to assign the scratchpad capabilities furnished by the data rate expansion (DRE) feature. We will also cover the role of DRE feature, how it is obtained, and how it is physically assigned to appropriate logical channels.

B. Steps for Configuring Within IOM in ICU

1. There is no type number. This IOM is part of ICU in ICU-packaged base CPS systems. These steps apply to all ICU-oriented models.
SECTION IV
Configuring Within IOM

Block Diagram of IOM in ICU:

ICU Cabinet

Power Supply

To Base SCU

To Additional SCU

Base MXA

MXA6001

24 Logical Channels/Paths Included

DRE (Data Rate Expansion). One included. Assignable to up to 16 Logical Channels

Base IOM

9 More I/O Board Spaces. MXF6004, 66/40 only

I/O Channels Board Spaces (Board Slots)
18-------66/10/17/20/27/40/05/07
27-------66/60/80

To Multiple Peripheral Device Processors
SECTION IV
Configuring Within IOM

2. Determine the quantity of physical I/O channels your planned mix of peripheral subsystems will require. See Section D.

3. Determine how many 12" x 12" circuit boards will be required based on Step 2, and how many are furnished and can be added optionally, if any, for the Level 66 model you are configuring. See Section E.

4. Determine how many logical channels or data paths must be assigned, from the built-in complement of 24, for the quantity of physical I/O channels from Step 2. Determine how many more you wish to assign optionally, if any. See Section F.

5. Determine to how many, and which, logical channels assigned in Step 4 you wish to assign the scratchpad capability which is furnished by DRE feature (data rate expansion). See Section G.

C. Steps for Configuring Within Freestanding IOM

1. Base IOM (freestanding systems) has no type number. All IOMs configured selectively beyond base IOM, whether in ICU-packaged or freestanding systems, are freestanding. This chart applies to all freestanding IOMs.

   a. Freestanding IOMs may be obtained in 3 ways ——

   1) One is included in base CPS number of freestanding systems.

   2) One or more may be ordered optionally on your initial order along with the CPS components. One more is maximum of 66/40, and 66/60/80 ICU versions; up to 3 more on 66/60/80 freestanding versions, and DPS systems.

   3) One or more may be ordered optionally as add-on components after your system has been installed. Limits are the same as in 2) above.
SECTION IV
Configuring Within IOM

b. Each freestanding IOM, whether optional or included in CPS number, has its own power supply.

c. No ports for connection to SCUs on non-DPS systems are included in the price of optional IOMs, but a port (MXA6001 addressing feature) must be configured for each SCU in the system for non-DPS models. Does not apply to DPS models.

d. Block diagram of freestanding IOM.

---

To Base SCU

Base MXA

To Additional SCUs

MXA6001 (non-DPS)

---

24 Logical Channels/Paths Included

DRE (Data Rate Expansion). Assignable to up to 16 Logical Channels

- DRE in Base IOM
- One required in Optional IOMs
- One optional in Base and Optional IOMs

DRE MXF6002
DRE MXF6002

---

Integrated URP0602

Base IOM - No Type Number.

MXU6001 for Optional IOMs in non-DPS, MXU6002 in DPS cases.

19 More I/O Board Spaces. MXF6005, 66/40/60/80

Board Spaces (Board Slots) for Physical I/O Channels

35-------66/10 up

---

Power Supply
SECTION IV
Configuring Within IOM

2. Determine the quantity of physical I/O channels your planned mix of peripheral subsystems will require. See Section D.

3. Determine how many spaces for 12" x 12" circuit boards will be required based on Step 2, and how many spaces are furnished and can be added optionally, if any, for the Level 66 model you are configuring. See Section E.

4. Determine how many logical channels or data paths must be assigned, from the built-in complement of 24, for the quantity of physical I/O channels from Step 2. Determine how many more you wish to assign optionally, if any. See Section F.

5. Determine to how many, and which, logical channels assigned in Step 4 you wish to assign the scratchpad capability which is furnished by DRE feature (data rate expansion). See Section G.

D. Determining the Quantity of Physical I/O Channels Required For Your Peripheral Subsystems Mix

1. Use the table in Section 3 below or use table in Section 4 below.
   a. Remember that MSP0602/0603 can be configured with or without MSU0500 spindles. If MSU0500 is not used there can be one or two MSPs per subsystem, each with one or two prime channels, and each prime channel can be equipped with a switched channel path feature to terminate in an IOM physical channel.
   b. If MSU0500 spindles are included, with or without MSU0402/0451 spindles, MSPs cannot be configured with two prime channels.
   c. There can be one or two MSPs per subsystem, unless the subsystem includes MSU0500 spindles. Such subsystems can have up to 4 MSPs. Each MSP has one prime channel which can optionally be equipped with a switched channel path feature to terminate in an IOM physical channel.
SECTION IV
Configuring Within IOM

2. Explanation of use of each column in table in Section 3 below

a. Make a separate calculation for each subsystem of each type. There may be different options used on each.

b. This represents the prime IOM channel always included in price of each subsystem device processor. Note that CS6005 System Control Center price includes two prime channels.

c. This represents those device processors where a second prime channel can be configured. In case of MTP, MSP0602/0603 when no MSU0500 is configured, both channels can operate simultaneously. In case of DN6624/6632/6670 and DPS INP/ANP and DHP700/0701, the second prime channel is non-simultaneous, acting as a backup to the first, and not effective until after a GCOS warm restart or reboot has occurred.

d. This represents the fact that the path from a prime channel can be switched to two different IOM channels. The switch can be either electronic, controlled transparently by GCOS and contained in the device processor (URP, MTP, MSP0602/0603), or can be an external, manually controlled peripheral switch. See Section XVI.

e. Indicates the two cases where a switched path feature can be applied to a second prime channel. This switch could be electronic or manual as discussed in above.

f. This column indicates the maximum possible number of physical I/O channels in an IOM for one subsystem of a type. It is the sum of, plus , where these are applicable and actually configured.
SECTION IV
Configuring Within IOM

g. You fill in this number. Remember that you use one repetition of each row for each subsystem of a given type. There could easily be different maximums for each subsystem when multiple subsystems of same type are used.

h. Multiply for each row (and each subsystem of same type) the figure in times the sum of , plus as applicable and as actually configured.

i. Multiply the figure per subsystem of each type in times the figure in . Add the figures in all rows for all subsystems and place that figure in . Now go to Section E below to see if the Level 66 model you are bidding has sufficient spaces for the required number of physical channel circuit boards.
SECTION IV
Configuring Within IOM

3. Table of physical I/O channels required in IOM

<table>
<thead>
<tr>
<th>Sub-System</th>
<th>Standard Prime Channel</th>
<th>Optional Prime Channel</th>
<th>Optional Switched Path-Std Prime Channel</th>
<th>Optional Switched Path-Opt Prime Channel</th>
<th>Max IOM Channels This Sub-System</th>
<th>No. Sub-Systems This Type</th>
<th>Total Physical Channels Required in IOM</th>
<th>Channel Boards Per Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>URP</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td></td>
<td>3</td>
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<tr>
<td>MTP</td>
<td>1</td>
<td>1a</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
<td>3</td>
<td></td>
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<tr>
<td>MSP0602/0603 w/o MSU0500</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td></td>
<td>3</td>
<td></td>
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<tr>
<td>MSP0602/0603 with MSU0500</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td></td>
<td>3</td>
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<tr>
<td>MSP0605 (66/05)</td>
<td>1</td>
<td>1c</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>CSU6001</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1d</td>
<td></td>
<td>1d</td>
<td></td>
</tr>
<tr>
<td>CSU6002</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td></td>
<td>2e</td>
<td></td>
</tr>
<tr>
<td>Int</td>
<td>FNP - CPS6058</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>DN6616/6624/6632/6670</td>
<td>1b</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>DHP0700/0701</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td></td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

a Required, not optional, when more than 8 tape units will be in subsystem
b Not permitted on DN6616
c Would be possible only by use of manual switch
d If used in system with 384KW/1536KB or more, add 1 more board per channel (2 boards total per subsystem)
e If used in system with 384KW/1536KB or more, add .5 more board per channel (3 boards total per subsystem)
SECTION IV
Configuring Within IOM

4. Alternate table for determining quantity of physical channels required in IOM (channel terminations). See Page 37.

a. Each peripheral processor includes one physical IOM channel in its price except two for CSU6005 System Control Center console subsystem.

b. Additional simultaneous channels can be added to MTP, and MSP (if no MSU0500 spindles configured).

c. Software-switched non-simultaneous channel features can be added to URP, MTP, MSP channels.
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d. Each □ represents physical channel (termination) in IOM, each requiring 1-3 circuit boards to carry the channel logic.

(1) 2 boards if more than 256KW/1024KB in system
(2) 1.5 boards if more than 256KW/1024KB in system

E. Determining How Many Spaces are Available Per IOM for the 12" x 12" Channel Logic Boards for Physical I/O Channels

1. Spaces needed for carrying electronic logic boards for the required number of physical channels based on Section D above.

2. Refer to the table below. Once you have configured two or three systems you will probably be able to come directly to this table for determining both the channel spaces available and the quantity required for each physical channel, bypassing Section D above. In any event, before you use the table below you must know the number of physical I/O channels you need for each subsystem, i.e., channel terminations needed in IOM.

3. The table gives you the information necessary to determine how many peripheral subsystems can be configured in a Level 66 system.

4. If you cannot configure the desired number of peripheral subsystems and their complement of physical channels and switched paths, consider these alternatives:
SECTION IV
Configuring Within IOM

a. Bid a second IOM if the Level 66 model permits and the prospect will allow it.
b. Use fewer simultaneous channels and/or switched paths.
c. Use fewer subsystems of same type.
d. Use fewer subsystems.
e. Use different mix of subsystems.
f. Change the Level 66 model you are bidding.
g. In case of a freestanding IOM use URP0600 (freestanding) instead of URP0602 (in IOM cabinet).

5. Don't forget the impact when the total memory size is greater than 256KW/1024KB. Know your prospect/customer growth plans. Don't be surprised yourself, and even worse, don't let the prospect/customer be surprised.

6. Determine next the logical channels or data paths which must be assigned to each physical channel and switched path, and the quantity which may optionally be assigned. See Section F below.
7. IOM Physical I/O Channel Board Spaces Allocation

Table -- This table shows the number of circuit boards required for each physical channel termination in IOM. Use this table to determine how many peripheral subsystems can be configured per Level 66 IOM. Prime channel is physical channel in device processor price, and physical channel addable optionally to run simultaneously with first, except for FNP.

<table>
<thead>
<tr>
<th>Model</th>
<th>Available Spaces for Boards</th>
<th>Boards Required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basic</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INTEGRATED</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IOM in IOM</td>
<td>66/07/05</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>66/10/17</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>66/20/27</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>66/40</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>66/60</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>66/80</td>
<td>27</td>
</tr>
<tr>
<td>FREESTANDING</td>
<td>66/10/17</td>
<td>35</td>
</tr>
<tr>
<td>IOM</td>
<td>66/20/27</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/40</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/60</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/80</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/DPS</td>
<td>35</td>
</tr>
<tr>
<td>FREESTANDING</td>
<td>66/10/17</td>
<td>35</td>
</tr>
<tr>
<td>WITH INT. URP</td>
<td>66/20/27</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/40</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/60</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/80</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>66/DPS</td>
<td>35</td>
</tr>
</tbody>
</table>

- Add 3 spaces required for each switched or other non-simultaneous channel path used
- CSF6004 must be ordered
- Add 1 space required for each additional IOM prime channel connected (via DIA)
- This column represents the number of prime channels to be configured in the subsystem. See Section D to determine number of physical channels required.
SECTION IV
Configuring Within IOM

F. Determining Logical Channel Assignments

1. Rules for assignment of IOM logical channels to physical channels

   a. Every physical channel must be assigned one logical channel or data path. URP, MTP, MSP may use more than one logical channel per physical channel, as explained below.

   b. Logical channels are related to physical channels by wiring and logic chips on the pertinent IOM logic boards. Assignment is established on-site by the field engineer according to the mix of required and optional logical channels you specify.

   c. A table showing the assignment of logical to physical channels and of physical channels to peripherals is given to GCOS at system startup time. Accordingly, GCOS always knows what logical channels to use (thus physical channels) to reach a given device processor, console, FNP, or document handler processor.

      1) In effect GCOS "sees" the peripherals it wants to reach via the logical channels.

      2) The logical channel concept provides a link to slave program buffer areas (their size and locations). Without such a link the transfer path to/from memory could not be established. Review the IOM outline for the principle used, involving secondary mailboxes and connect channel mailbox.

2. Why assign more than one IOM logical channel to a physical channel?

   a. Use of multiple non-simultaneous logical channels or data paths per physical channel is our approach to the IBM concept of block multiplexing (BMX) type of channel. We both use similar principles with different nomenclature.
b. Use of multiple logical channels per physical channel allows multiple places to which GCOS can send or can queue I/O commands.

1) As long as a logical channel is available GCOS can send the next I/O command to a given subsystem, even though the physical channel is busy with data transfers for a prior operation initiated through another logical channel. Otherwise, with a single logical channel, the physical and logical channel would be tied up during the data transfer and interrupt sequence, preventing the overlapped stacking of the next I/O command by GCOS. GCOS would have to wait for an opportunity to gain access to the single channel.

2) The intended effect here is potentially greater subsystem throughput by using the physical channel more efficiently, stacking commands in front of the subsystem at any time as long as a logical channel is available.

3) Looking at it another way, the use of more than one logical channel per physical channel (block multiplexing) allows multiple I/O operations to be in some stage of execution concurrently. There can be as many concurrent stages as logical channels assigned to the subsystem involved. In the URP, e.g., there could be as many as 7 card reading/card punching/line printing operations simultaneously, using one physical channel.

c. Summary of potential benefits of assigning more than one logical channel to a physical channel.

1) Greater subsystem throughput.

2) Use of fewer physical channels.
SECTION IV  
Configuring Within IOM

3) Larger number of I/O operations in some stage of execution concurrently.

4) Better use of physical channels.

5) Combines with rotational position sensing (RPS) in disk subsystems to increase subsystem throughput further.

d. See the two charts below on Physical Channel and Logical Channel concepts in Section 4.

3. Subsystems allowing multiple logical channels per physical channel

a. In Unit Record Processor (URP) subsystems there must be one and only one logical channel assigned to each unit record device connected to URP. A specific logical channel is assigned to each device.

1) URP can handle up to 7 unit record devices.

2) URP, in combination with its channel and 1-7 logical channels in IOM, performs a block (unit record) multiplexing function, allowing up to 7 devices to run simultaneously. URP buffers a full physical record from/for each device and assigns each record to the IOM physical channel as soon as last record has transferred. Each unit record device must be permanently preassigned to a logical channel to be used by GCOS in issuing commands to it. The logical channel controls the transfer into memory into/from the proper buffer area for the device concerned.

b. In Magnetic Tape Processor (MTP) subsystems a second logical channel may optionally be assigned to each physical channel.
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1) NOTE - the customer may assign more logical channels optionally if he has them available. The figures for optional channels above are based on those found sufficient for the usual customer site. Conceivably, a system with a large number of tape drives, a planned high multiprogramming depth (MPD) and heavy tape I/O activity might benefit from assigning more logical channels.

2) The value of the second logical channel for each physical channel is that it allows GCOS to send a new command to an open logical channel, even though the physical channel may be transferring data under command of another logical channel assigned to the subsystem. As soon as the first operation terminates a second could be initiated immediately from the command standing by in the second logical channel. GCOS could then send another command to the first logical channel, which is now open again, etc. If only one logical channel is used, GCOS cannot have any next command standing by when a command is already in operation.

This can potentially increase subsystem throughput appreciably.

c. Disk subsystems

1) A normal useful maximum of logical channels for a mass store subsystem is 8 regardless of the number of physical channels or MSPs in the particular subsystem. This figure includes the required logical channel per physical channel used in the subsystem involved.

2) MSP and disk spindles obtain automatic latency reduction via rotational position sensing and block multiplexing of the physical channel(s) involved. Both features can increase subsystem throughput and should always be used, at least on single-channel subsystems. They depend on multiple logical channels per subsystem.
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Configuring Within IOM

3) The number of logical channels assigned for a subsystem should not normally exceed the number of spindles in the subsystem. There is little or no gain with a greater number of logical channels.

4) The number of logical channels assigned also should not be greater than the average anticipated multiprogramming depth (MPD). MPD would in general determine the average maximum possible I/O command queue size, thus dictating the usable number of logical channels.

5) The greatest benefit from multiple logical channels occurs on single-channel MSP. With two-channel subsystems commands tend to be serviced almost as soon as they are delivered to the subsystem in most cases. As a result there is not as much chance to have command queues build up, thus there is less relative effect from multiple logical channels in a dual-channel subsystem case. Dual-channel systems will probably give greater throughput in all cases, especially where the subsystem includes more than four or five disk units.

d. See tables in Section 5 below for determining required and optional logical channels.
SECTION IV
Configuring Within IOM

4. Physical/logical channel concepts
   a. Multiple logical channels/paths per physical channel
b. Linkage to slave program to complete the data transfer path
SECTION IV
Configuring Within IOM

5. IOM logical channel/data path assignment - tape and disk subsystems

a. Single-channel MTP (1x8) or single-channel MSP subsystem

(1) IOC=I/O command holding place. Combination of IOCs forms a command stack or queue

(2) In MTP (1x8) useful normal maximum number of optional logical channels is one

(2) In MSP case the useful normal maximum number of optional logical channels is 3, but up to 7 might be useful
SECTION IV
Configuring Within IOM

b. Dual-channel MTP (2x16) or dual-channel MSP or multi-MSP subsystem

(1) IOC=I/O command holding place. Combination of IOCs forms command stack or queue

(2) In dual-channel MSP the useful normal maximum of optional logical channels is 2, one per physical channel, but up to 3 more on each might be useful. Useful usual maximum logical channels for any disk subsystem, for 1-4 channels, 1-4 MSPs, is 8 including required logical channels
SECTION IV
Configuring Within IOM

6. Logical channel assignments for Document Handler Processors/FNPs and Consoles

Memory in Level 66

Buffer Area

Buffer Area

Buffer Area

What GCOS sees

IOC (2)

IOC (2)

IOC (2)

IOC (2)

(1) = 1 Logical Channel Required, No Optionals

(2) = I/O Command Holding Place

IOM

Physical Channel

Physical Channels

Physical Channel

System Console CSU6004

System Control Center CSU6005

DHP0700/0701, Any FNP
SECTION IV
Configuring Within IOM

7. Logical channel assignments for Unit Record Processor subsystem

Note - For Card Reader/Punch CCU0401 logical channel must be assigned (one)

- Card Reader Buffer Area
- Card Punch Buffer Area
- Printer Buffer Area

What GCOS sees

1. One Logical Channel Required Per Unit Record Device. Maximum is 7. No Optionals
2. I/O Command Holding Place

URP Physical Channel

CR
CP

URP 060X

PR

DH92. Rev. 0
8. Summary Table of IOM physical and logical channels/paths per peripheral subsystem

Use this as a convenient summary table to know how many physical and logical channels are required for a subsystem. It also shows how many more logical channels might optionally be assigned up to a normal useful subsystem maximum. 24 logical channels provided per IOM.

<table>
<thead>
<tr>
<th>PERIPHERAL SUBSYSTEM DEVICE PROCESSOR</th>
<th>PHYSICAL CHANNEL TYPE</th>
<th>PHYSICAL CHANNELS REQUIRED (^\text{b})</th>
<th>LOGICAL CHANNELS REQUIRED (^\text{d})</th>
<th>SUBSYSTEM TOTAL USEFUL LOGICAL CHANNELS</th>
</tr>
</thead>
<tbody>
<tr>
<td>URP (PLUS 1-7 UNIT RECORD DEVICES)</td>
<td>PSI</td>
<td>1 PER DEVICE (^\text{c})</td>
<td>SAME</td>
<td></td>
</tr>
<tr>
<td>MSP/MSU 0402/0451 (1x32) (2x16)</td>
<td>PSI</td>
<td>1</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>MSP/MSU 0500</td>
<td>PSI</td>
<td>1 per MSP</td>
<td>1 per MSP</td>
<td>8</td>
</tr>
<tr>
<td>MTP (1x8) (2x16)</td>
<td>PSI</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>SYSTEM CONSOLE CSU6001</td>
<td>SPECIAL</td>
<td>1</td>
<td>SAME</td>
<td></td>
</tr>
<tr>
<td>SYSTEM CONTROL CENTER CSU6002</td>
<td>SPECIAL</td>
<td>2</td>
<td>SAME</td>
<td></td>
</tr>
<tr>
<td>Any FNP</td>
<td>DIRECT</td>
<td>1</td>
<td>SAME</td>
<td></td>
</tr>
<tr>
<td>DHP0700/0701 DOC HDLR PROC</td>
<td>DIRECT</td>
<td>1</td>
<td>SAME</td>
<td></td>
</tr>
<tr>
<td>CPU (^\text{a})</td>
<td>GFI</td>
<td>1</td>
<td>SAME</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) This type of channel is used for certain peripherals from G400 and Series 600 purchased systems where these are allowed in certain cases on Level 66. Applies to such users who move to Level 66 main frame while retaining certain of their present peripherals. See Section I.C.

\(^b\) Each device processor includes one physical IOM channel in its price, except SCC CSU6602 which includes two

\(^c\) CCU0401 Card Reader/Punch considered one device

\(^d\) Don't forget that URP, MTP, MSP allow for switched path feature to be added to each physical channel. Each termination must be allotted separate logical channel(s), the same quantity for each termination.
SECTION IV
Configuring Within IOM

G. Determining DRE (Date Rate Expansion) Requirements and Assignments

Use of DRE scratchpad storage feature

1. One DRE feature is standard in each base IOM, i.e., the IOM included in base CPS system. The base IOM in freestanding system can have one more DRE (MXF6002). Optional (thus freestanding) IOMs do not come with a DRE but one must be ordered. A second can also be ordered for freestanding IOMs.

Each DRE feature will be assigned by your field engineer to up to 16 logical channels, based on the assignments that you define to him. There are 24 logical channels per IOM.

2. DRE scratchpad assignment must be used on the involved logical channels when:
   a. FNP is used.
   b. Disk spindles are used.
   c. Peripheral with transfer rate greater than 500KC/355KB is configured on a physical channel.
   d. Combined data transfer rates of all I/O subsystems planned to be in operation simultaneously on the IOM exceed 1.3 million characters per second or 870 thousand bytes per second.

3. DRE assignment rules
   a. Assign a DRE facility to each logical channel on a basis of transfer rates in descending speed. Each logical channel used for subsystems below must have a DRE facility assigned to it, including logical channels used in switched non-simultaneous physical channel cases.
SECTION IV
Configuring Within IOM

b. Assignment priorities for DRE facilities in descending order.

1) FNP.

2) DHP.

3) Disk (or tape if its transfer rate is higher).

4) Tape.

4. DRE scratchpad assignment is recommended on the involved logical channels when:

a. 4 or more physical channels are to be used simultaneously for any disk and/or magnetic tape combination.

b. I/O channel traffic will be heavy. The DRE feature significantly cuts memory accesses by each logical channel assigned to it, by as much as 3 to 1. This frees memory cycles for use by processor or IOM.

5. When do you need more than one DRE?

a. Permitted only on freestanding IOM.

b. Determine your total logical channel assignments to physical channels using Section F.8.

1) If the combined FNP, DHP, disk and tape logical channel requirements exceed 16, order another MXF6002.

2) If you have unused scratchpad capacity left assign it to other logical channels to the limit of 24 logical channels in the order of descending transfer rates of the peripherals.
SECTION V
Configuring Non-DPS Optional Processors, SCUs, IOMs - Initially or as Upgrades

A. Non-DPS Processor and IOM Addressing Feature Rules

Prior to starting your mainframe configuring, draw a simple block diagram of the mainframe you want showing all modules and addressing features.

1. Remember the simple rule that every processor and IOM must be ported (have an addressing feature) for every SCU. Processors and IOMs not included in base CPS system do not come equipped with addressing features. Base processor and base IOM come equipped with an addressing feature only for the base SCU.

2. As you write down on your order the type numbers required based on the mainframe and model that you want, check off that component on the target mainframe you block diagrammed in Step 1 above. You will save yourself problems from incorrect, incomplete, excessive ordering of type numbers.

3. Check your block diagram against the configurator below in Section B.5. Remember that the base CPS system components have no individual type numbers. Every component added beyond the base CPS system has a specific type number which must be used on any order. In ordering optional processors the type number always starts with the "CPU" alphabetic prefix.

   a. Now use Section B below.

B. Steps for Configuring Non-DPS Optional Processors, IOMs, SCUs

1. Use steps 2-5 below in sequence based on the Configurator for Adding Optional Mainframe Modules below. For optional configuring, where permitted, of processors beyond the base CPS processor, and/or IOMs beyond the base CPS IOM, and/or SCUs (beyond the quantity required for the memory size, i.e., beyond the net base system), see Section I.D.1. See also Section I.E.1 for summary of replication options.
SECTION V
Configuring Non-DPS Optional Processors, SCUs, IOMs - Initially or as Upgrades

2. Optional Processors -- For each such processor, order one CPA600L (Central Processor Addressing feature or port) for each required SCU (net base system) in the configuration. If a processor is being added to an installed system, order a CPA600L for each SCU in installed system.

   a. Find the appropriate type number for the additional processor (CPU6xxx) in this table --

<table>
<thead>
<tr>
<th>System</th>
<th>CPU</th>
<th>System</th>
<th>CPU</th>
<th>System</th>
<th>CPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>66/07</td>
<td>CPU6007</td>
<td>66/05</td>
<td>CPU6005</td>
<td>66/40</td>
<td>CPU6401</td>
</tr>
<tr>
<td>66/17</td>
<td>CPU6107</td>
<td>66/10</td>
<td>CPU6101</td>
<td>66/60</td>
<td>CPU6601</td>
</tr>
<tr>
<td>66/27</td>
<td>CPU6207</td>
<td>66/20</td>
<td>CPU6201</td>
<td>66/80</td>
<td>CPU6801</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>66/80</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CPU6802</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(for CPS6820)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CPU6802</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(for CPS6821)</td>
</tr>
</tbody>
</table>

   b. Configuring optional processor involves only two type numbers, one for appropriate processor and one for processor addressing port feature(s).

   c. Ability to configure optional processors on a standard basis begins with 66/05, for which one may be configured. All ICU versions may have one more, 66/60/80 freestanding versions may have 3 more, other non-DPS freestanding systems may have one more.

   d. All optional processors are freestanding components.

   e. Each freestanding processor, whether optional or included in base CPS number of freestanding systems, has its own power supply.

   f. No ports for connection to SCUs are included in price of optional processors.
SECTION V
Configuring Non-DPS Optional Processors, SCUs, IOMs - Initially or as Upgrades

3. Optional IOMs -- For each such IOM (MXU6001), order a quantity of MXA6001 (IOM addressing feature or port) for each required SCU (net base system) in the configuration. If an IOM is being added to an installed system, order a MXA6001 for each SCU in the installed system. Consult also Section IV for configuring rules within each IOM.

4. Optional SCUs -- For each such SCU (MXC6001) beyond the quantity required (net base system) for the memory size, order as many CPA6001 Central Processor Addressing features as the total processors in the configuration, including any processors ordered in Step 2 above. Order also as many MXA6001 IOM addressing features as there are IOMs in the system, including any IOMs ordered under Step 3 above. Don't forget to count the IOM in any ICU included in the system.

a. Configuring optional SCUs involves only three type numbers, one for the SCU itself, and one each for processor and IOM addressing port features to connect IOM and processor to extra SCU. An SCU must be ordered for each 512KW/2048KB of memory (net base system). In some models SCUs can be ordered optionally beyond the required number.

b. All optional SCUs are free-standing components. Likewise, all SCUs other than base SCU in ICU-based mainframe are free-standing. Where an ICU-based system is equipped with 27 I/O channel board spaces (66/60/80, or 66/40 with MXF6004) the SCU will be in an external cabinet along with the memory beyond 256KW/1024KB. The external SCU still shares power supply in ICU.

c. All free-standing or external SCU cabinets can contain up to 512KW/2048KB of memory, also ICU cabinets with 18 I/O channel board spaces.
SECTION V
Configuring Non-DPS Optional Processors, SCUs, IOMs - Initially or as Upgrades

d. Each free-standing SCU, whether optional or required, has its own power supply, except as noted in b. above. The power supply is also used for the memory contained in the SCU cabinet.

e. Each free-standing SCU provides up to 8 active module ports for connecting processors and IOMs. Processors and IOMs in turn must contain an addressing port feature for each SCU in system.

f. Maximum number of SCUs for any free-standing mainframe is four, or two in any system containing an ICU.
SECTION V
Configuring Non-DPS Optional Processors, SCUs, IOMs - Initially or as Upgrades

5. Configurator for Adding Optional Mainframe Modules - Non-DPS Systems

<table>
<thead>
<tr>
<th>Base CPS System</th>
<th>CPU6xxx&lt;sup&gt;a&lt;/sup&gt;</th>
<th>CPU6xxx&lt;sup&gt;b&lt;/sup&gt;</th>
<th>CPU6xxx&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Processor</td>
<td>6005 6401 6007</td>
<td>6601 6801</td>
<td>6601 6801</td>
</tr>
<tr>
<td>c CPA6001</td>
<td>6101 6601 6107</td>
<td>d CPA6001</td>
<td>d CPA6001</td>
</tr>
<tr>
<td>c CPA6001</td>
<td>6201 6802 6207</td>
<td>d CPA6001</td>
<td>d CPA6001</td>
</tr>
<tr>
<td>Base SCU</td>
<td>MXC6001</td>
<td>MXC6001</td>
<td>MXC6001</td>
</tr>
<tr>
<td>c MXA6001</td>
<td>d MXA6001</td>
<td>d MXA6001</td>
<td>d MXA6001</td>
</tr>
<tr>
<td>Base IOM</td>
<td>MXU6001</td>
<td>MXU6001&lt;sup&gt;b&lt;/sup&gt;</td>
<td>MXU6001&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

<sup>a</sup> CPU 6801 applies to 66/80 CPS6819, CPS6820. CPU6802 applies to 66/80 CPS6821

<sup>b</sup> Only freestanding 66/60 and 66/80 systems can have 3 or 4 processors and/or IOMs

<sup>c</sup> One required for each SCU beyond base SCU

<sup>d</sup> One required for each SCU in the system along with the extra processor (CPU6xxx) and/or extra IOM (MXU6001)
SECTION VI
Configuring Non-DPS Memory Additions/Upgrades

A. Steps for Memory Additions/Upgrades to Installed Non-DPS Systems

1. Refer to the Memory Upgrade Configurator (MUC) charts on following pages. The MUCs relate only to upgrading (increasing) the amount of memory on an installed system. MUC data is based on a system with one processor and one IOM.

2. In the appropriate MUC find the Level 66 model to which you are adding more memory. Begin with the square that represents the first add-on quantity of memory, and read straight across through as many squares as necessary to give you the new total memory size you want. Use all the type numbers (marketing identifiers) in each square required for the total new memory size. For example, to increase a 66/10 from 128KW/512KB to 256KW/1024KB, order the hardware listed in the square for the 128KW to 192KW column plus the square for the 192 to 256KW column.

3. When your memory upgrade or add-on crosses a 512KW/2048KB boundary on the MUC (marked by the triangle at the top), you must also configure an SCU, plus CPA6001 and MXA6001 to link the SCU to the base processor and base IOM in the installed system. However, your installed system may already have at least the required number of SCUs (via use of optional SCUs) for the total memory size to which your system is being upgraded. If so, disregard the MXC6001/CPA6001/MXA6001 combination.

4. For each additional processor already installed beyond the base processor, order another CPA6001 for any SCU that you are ordering because of Step 3 above. For each additional IOM already installed beyond the base IOM, order another MXA6001 for any SCU that you are ordering because of Step 3 above.
## SECTION VI
Configuring Non-DPS Memory Additions/Upgrades

### B. Non-DPS Memory Upgrade Configurator

#### 1. Part 1

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CPS NO.</th>
<th>CPS NO.</th>
<th>From 96K to 128K</th>
<th>From 128K to 192K</th>
<th>From 192K to 256K</th>
<th>From 256K to 384K</th>
<th>From 384K to 512K</th>
<th>From 512K to 768K</th>
<th>From 768K to 1024K</th>
</tr>
</thead>
<tbody>
<tr>
<td>66/05 or 66/07</td>
<td>CPS6050</td>
<td>CPS6058</td>
<td>CPS6070</td>
<td>CM6000</td>
<td>CM6001</td>
<td>CM6002</td>
<td>CM6003</td>
<td>CM6004</td>
<td>CM6004</td>
</tr>
<tr>
<td>66/10 or 66/17</td>
<td>CPS6110</td>
<td>CPS6170</td>
<td></td>
<td>CM6000</td>
<td>CM6001</td>
<td>CM6002</td>
<td>CM6003</td>
<td>CM6004</td>
<td>CM6004</td>
</tr>
<tr>
<td>66/10 or 66/17</td>
<td>CPS6120</td>
<td>CPS6180</td>
<td></td>
<td>CM6000</td>
<td>CM6001</td>
<td>CM6002</td>
<td>CM6003</td>
<td>CM6004</td>
<td>CM6004</td>
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<td></td>
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<td></td>
<td>CM6003</td>
<td>CM6004</td>
<td>CM6005</td>
<td>CM6006</td>
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<td>CM6006</td>
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<td>CM6003</td>
<td>CM6004</td>
<td>CM6005</td>
<td>CM6006</td>
<td>CM6005</td>
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<td>CM6003</td>
<td>CM6004</td>
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<td>CM6006</td>
<td>CM6005</td>
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<td>CM6004</td>
<td>CM6005</td>
<td>CM6006</td>
<td>CM6005</td>
<td>CM6006</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CM6003</td>
<td>CM6004</td>
<td>CM6005</td>
<td>CM6006</td>
<td>CM6005</td>
<td>CM6006</td>
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<td></td>
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<td></td>
<td></td>
<td>CM6003</td>
<td>CM6004</td>
<td>CM6005</td>
<td>CM6006</td>
<td>CM6005</td>
<td>CM6006</td>
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<tr>
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<td>CM6003</td>
<td>CM6004</td>
<td>CM6005</td>
<td>CM6006</td>
<td>CM6005</td>
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<td>CM6003</td>
<td>CM6004</td>
<td>CM6005</td>
<td>CM6006</td>
<td>CM6005</td>
<td>CM6006</td>
</tr>
</tbody>
</table>

(1) Add squares cumulatively
(2) See Steps 3, 4, on prior page
SECTION VI
Configuring Non-DPS Memory Additions/Upgrades

Non-DPS Memory Upgrade Configurator (continued)

2. Part 2

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CPS NO.</th>
<th>CPS NO.</th>
<th>From 96KW to 128KW</th>
<th>From 128KW to 192KW</th>
<th>From 192KW to 256KW</th>
<th>From 256KW to 384KW</th>
<th>From 384KW to 512KW</th>
<th>From 512KW to 768KW</th>
<th>From 768KW to 1024KW</th>
</tr>
</thead>
<tbody>
<tr>
<td>66/60</td>
<td>CPS6610</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CPS6620</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>66/80</td>
<td>CPS6810</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>CPS6820</td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CPS6821</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(1) Add contents of each square horizontally for a given total memory size for a given model

(2) See Steps 3, 4 of Section VI A
SECTION VII
Configuring Motor Generator and Control Sets

A. Type numbers -- MGS6001, 6002, 6004, 6005

B. At least one set must be ordered for each Level 66 system. In some cases two may be desirable, depending on electrical supply quality, and size of system. If two are ordered, typical use would be to have one for the mainframe, one for the peripherals.

C. These are used in applying power in an orderly fashion and in regulating the electrical quality fed to the hardware. They level out voltage variations and compensate for power interruptions for a brief period. The length of period is affected by the load imposed by your configuration. Check your field engineer for specific figures.

D. You determine which model to order in the following way:

1. Decide on your complete system configuration - mainframe and peripherals, and FNPs, DHPs, consoles.

2. Refer your configuration to your pertinent branch field engineer. He will use his data on the KVA load applied by each component in your configuration. Adding the individual KVA loads gives a total figure which determines which MGS type number to order. Do not skimp on the MGS to use. Talk over with your field engineer the need or desirability of using two units in the specific customer case. The price of these units is insignificant in the typical total system price but they serve a very important function in helping maintain the Level 66 system in an available condition. If you find the Level 66 Automated Marketing Configurator is satisfactory for your purpose, it will provide you with the KVA load for the system you have specified.

3. The sets are heavy, bulky, noisy and unattractive. Frequently they are installed away from people in order to avoid noise and appearance problems. For this reason it is undesirable to bid a minimal MGS. Your customer will grow. Give him some growth leeway before an MGS swap would be involved.
SECTION VIII
Configuring Consoles -
Rules For Console Subsystems

A. System Control Center (SCC) subsystem (CSU6005)

1. CSU6005 is closely similar to, but replaces, the CSU6002 version previously used. Primary difference is use of our new dot matrix serial printer in place of TN300 printer, and optional print speed increase to 120 cps. CSU6002 can be field modified to provide for an increased printing speed to 120 cps.

2. Block diagram

```
CSF6002
23" Remote Slave Screen 1
23" Remote Slave Screen 2
CSF6002

12" Screen
12" Screen
Base SCC-CSU6005

To 2 IOM Channels (Standard)

Serial Printer
30 cps standard, 120 cps optional

Channels to IOM are not switchable
```

3. Type number list

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
<th>Required or Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU6005</td>
<td>Base System Control Center with power supply, 2 12&quot; CRT screens, 1 30 cps</td>
<td>At least one CSU6005 or CSU6004 console subsystem is required</td>
</tr>
<tr>
<td></td>
<td>serial printer, 2 Level 66 IOM channels, operator control/indicator panel,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>64-key keyboard</td>
<td></td>
</tr>
<tr>
<td>CSF6002</td>
<td>Remote 23&quot; CRT remote slave screen. Carries same display as 12&quot; screen to</td>
<td>Option</td>
</tr>
<tr>
<td></td>
<td>which it is cabled. Maximum 2 per CSU6005</td>
<td></td>
</tr>
<tr>
<td>CSF60023</td>
<td>Exchange of 30 cps printer for 120 cps printer. Applies to CSU6002, CSU6005</td>
<td>Option</td>
</tr>
</tbody>
</table>
SECTION VII
Configuring Consoles -
Rules For Console Subsystems

CSK0002  Field modification kit for CSU6002 to
permit increase of printer speed to
120 cps. Required use with CSF6003
on CSU6002

CSF6004  Console Memory Addressing feature.
Required for each console (CSU6005,
CSU6002) in a Level 66 system when
memory exceeds 256KW/1024KB. A
no-charge feature

B. System console subsystem (CSU6004)

1. CSU6004 is closely similar to, but replaces, the
CSU6001 version previously used. Primary difference
is use of our new dot matrix serial printer in place
of TN300 printer, and optional speed increase to 120
cps. CSU6001 can be field modified to provide for an
increased printing speed to 120-cps.

2. Block diagram

```
CSF6001
| 23" Remote |
| CRT Slave |
| Screen    |
                  
Base
Console -
CSU6004

To IOM Channel (Standard)

Serial
Printer

30 cps standard,
120 cps optional

Channel to IOM is not switchable

3. Type number list for System Console CSU6004

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
<th>Required or Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSU6004</td>
<td>Base System Console with power supply, 30 cps serial printer, operator control/indicator panel, 64-key keyboard</td>
<td>At least one CSU6004 or CSU6005 console subsystem required</td>
</tr>
<tr>
<td>CSF6001</td>
<td>Remote 23&quot; CRT slave screen. Reflects line being typed on key-</td>
<td>Option</td>
</tr>
</tbody>
</table>

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SECTION VIII
Configuring Consoles -
Rules For Console Subsystems

board and printer. Maximum 1 per
CSU6004

CSF6023  Exchange of 30-cps printer for 120- Option
cps printer. Applies to CSU6001,
CSU6004

CSK0001  Field modification kit for CSU6001
to permit increase of printer speed
to 120 cps. Required use with CSF6023
on CSU6001

CSF6004  Console Memory Addressing feature.
Required for each console (CSU6004,
CSU6001) in a Level 66 system when
memory exceeds 256KW/1024KB. A
no-charge feature

C. Number of console subsystems per Level 66 system

1. Two CSU6005, or 1 CSU6005 and 3 CSU6004, or 4
CSU6004. Maximum of 5 CRT screens in any combination
per system. Where five CRT screens are used one must
be used for VIDEO. If more than one CSU6005 is used,
VIDEO is displayed once, on the master console
subsystem.

2. In large systems which have multiple devices
requiring operator file mounting/dismounting, it is
desirable to have more than one console subsystem.
One would be the master console subsystem for the
system operator, at least one more would be placed in
the center of the area involving file mount/dismount
peripherals (tapes, disks, printers), or perhaps in
the tape/disk library, or both.

GCOS automatically separates messages and sends only
file mount/dismount messages to peripheral area
consoles and only system messages to the master
console, and tape reel/disk pack requests to library
area.
SECTION IX
Mainframe Configuration
Examples - Initial Orders and Additions

A. Initial Mainframe Order -- Examples

1. Customer wants 66/05 system with 192KW/768KB

   1 CPS6058 (with INP) or 1 CPS6050 (no INP)
   1 CMM6000  96 to 128KW/384 to 512KB
   1 CMM6001  128 to 192KW/512 to 768KB

2. Customer wants 2-processor, 1-IOM 66/20 ICU type with 384KW/1536KB

   1 CPS6210
   1 CMM6001  128 to 192KW/512 to 768KB
   1 CMM6002  192 to 256KW/768 to 1024KB
   1 CMM6003  256 to 384KW/1024 to 1536KB
   1 CMA6003

   1 CPU6201 Extra 66/20 processor, FS
   1 CPA6001 Extra processor and IOM
   1 MXA6001 addressing for base SCU

3. Customer wants tandem 66/20FS with 384KW/1536KB

   1 CPS6210
   1 CMM6001  128 to 192KW First CPS, 256KW/1024KB

   1 CMM6002  192 to 256KW

--------

   1 CPS6210 2nd CPS, 128KW/512KB
--------

   2 CPA6001 2 processor and 2 IOM addressing
   2 MXA6001 features, 1 for each SCU

State on your order that you want a tandem system and give all cable lengths

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SECTION IX
Mainframe Configuration
Examples - Initial Orders and Additions

4. Customer wants DPS-2 system with 512KW/2048KB memory and a second (optional) SCU

1 CPS6650  Base mainframe with 256KW/1024KB
1 CPK6652  DPS-1 to DPS-2
1 CMM6021  256 to 384KW/1024 to 1536KB
1 CMM6022  384 to 512KW/1536 to 2048KB
1 MXC6004  2nd SCU with all processor and IOM addressing features (ports)

5. Customer wants DPS-4 system with 768KW/3072KB memory and a tandem configuration. He will use some of our Management Sciences applications software (presently BCD mode). Use example 4 above and add

1 CPK6658  DPS-2 to DPS-3
1 CPK6662  3rd processor
1 CPK6666  and attachment for DPS-3 to DPS-4
1 CMM6013  512 to 768KW/2048
1 CMA6013  to 3072KB
1 CPF6650  BCD options for base processors
1 CPF6651  and 3rd processor
1 MXU6002  2nd IOM

B. Additions to Mainframe Orders -- Examples

1. Customer has a 1-processor, 1-IOM 66/05 installed with 192KW/768KB. Wants memory upgrade to 256KW/1024KB

1 CMM6002  192 to 256KW/768 to 1024KB
SECTION IX  
Mainframe Configuration  
Examples - Initial Orders and Additions

2. Customer has 2-processor, 1-SCU, I-IOM ICU 66/20 installed with 384KW/1536KB. Wants memory upgrade to 768KW/3072KB (thus another, required, SCU)
   1 CMM6013  512 to 768KW/2048 to 3072KB
   1 CMA6013

   1 MXC6001  Second, required, SCU plus its addressing features to base
   1 CPA6001  processor and IOM
   1 MXA6001

3. Customer has DPS-1 installed with 384KW/1536KB. Wants a second (optional) SCU and memory upgrade to 512KW/2048KB. Also wants to upgrade performance of his INP
   1 MXC6004  2nd SCU with all addressing features (ports) for base processors and IOM
   1 CMM6022  384 to 512KW/1536 to 2048KB
   1 DCE6651  INP performance upgrade
   1 DCM6651  INP 64KB to 128KB required to use DCE6651

4. Customer has a 1-processor, 1-IOM 66/20FS installed with 256KW/1024KB and 2 SCUs (1 optional). Wants to make it a tandem system at same memory size
   1 CPU6201  2nd processor
   2 CPA6001  Addressing features to connect 2nd processor to 2 existing SCUs

   1 MXU6001  2nd IOM
   2 MXA6001  Addressing features to connect 2nd IOM to 2 existing SCUs
SECTION X
Configuring Unit Record Subsystems
Examples - Initial Orders and Additions

A. Required Configuration Elements Per Unit Record Subsystem

1. URP (unit record processor) - choose one of three models.

2. URA (unit record addressing) - for each unit record unit/device, select the specific URA for that unit/device.

3. Card reader - at least one card reading device must be in each Level 66 system.

4. Printer - at least one high-speed printer must be present in each Level 66 system.
B. Summary table of URP subsystem

<table>
<thead>
<tr>
<th>DEVICE</th>
<th>MODEL</th>
<th>PHYSICAL CHANNEL</th>
<th>LOGICAL CHANNELS</th>
<th>MAX NUMBER PER URP</th>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>URP</td>
<td>URP0600 (Freestanding)</td>
<td>1 PSI (Included (1 or more/IOM))</td>
<td>1-7 (1 per Unit Record Device)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>URP0601 (In ICU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1/ICU)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>URP0602 (In freestanding IOM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1/IOM)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Card Reader</td>
<td>CRU1050</td>
<td></td>
<td>1-2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1050 cpm</td>
<td></td>
</tr>
<tr>
<td>Card Punch</td>
<td>PCU0121</td>
<td></td>
<td>1-2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>100-400 cpm</td>
<td></td>
</tr>
<tr>
<td>Card Reader Punch</td>
<td>CCU0401</td>
<td></td>
<td>1-2&lt;sup&gt;a&lt;/sup&gt;</td>
<td>CR 400 cpm CP 100-400 cpm</td>
<td></td>
</tr>
<tr>
<td>Printers</td>
<td>PRU1100 (Drum)</td>
<td></td>
<td>1-3&lt;sup&gt;a&lt;/sup&gt;</td>
<td>To 1100 1pm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PRU1200 (Belt)</td>
<td></td>
<td></td>
<td>To 1200 1pm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PRU1600 (Belt)</td>
<td></td>
<td></td>
<td>To 1600 1pm</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Maximum number of unit record devices per URP is 7 except that limit is 4 on 66/05/07. Maximums may be chosen from combinations shown immediately below.

2 CRU1050
2 PCU0121
2 CCU0401 (Each counts as 1 CR and 1 CP)
3 printers (Maximum of 2 PRU1200 printers per URP)
SECTION X
Configuring Unit Record Subsystems
Examples - Initial Orders and Additions

C. URP Subsystem Configurator - Rules For Use

1. Complement of devices is a user option as to quantities, except that every Level 66 system must contain at least one card reader and one printer.

2. Every unit record device in URP subsystem must be configured with a specific unit record adapter or addressing feature (URA).

3. Options are identified by dotted lines or boxes. In general options are priced features beyond the standard complement included in basic URP or device price.
SECTION X
Configuring Unit Record Subsystems
Examples - Initial Orders and Additions

4. You must show on your order any pertinent item with a type number.

<table>
<thead>
<tr>
<th>Basic 4-URA Adapter</th>
<th>URF0040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handles 4 URAs in Any Combination (4 Devices)</td>
<td>Handles 3 More URAs in Any Combination</td>
</tr>
<tr>
<td>URA Space</td>
<td>URA Space</td>
</tr>
</tbody>
</table>

- To IOM Physical Channels
- URF0041 Switchable Channel (Non-Simultaneous)
- Order 1 URF0040 to Handle Over 4 Devices or if Printer Types are Mixed (i.e., Drum and Belt)

---

<table>
<thead>
<tr>
<th>URA0050</th>
<th>PCU0121</th>
<th>CRU0150</th>
<th>PRU1100</th>
<th>PRU0022</th>
</tr>
</thead>
<tbody>
<tr>
<td>URA0052</td>
<td>CRF0003</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- URA0053 | URA0054 | URA0055 | URA0050 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>URA1200</td>
<td>PRU1600</td>
<td>CCU0401</td>
<td>PRF0022</td>
</tr>
</tbody>
</table>

- PRBOXXX
## SECTION X
Configuring Unit Record Subsystems
Examples - Initial Orders and Additions

### D. Summary of Type Numbers Related to URP Subsystem

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>URP0600</td>
<td>Freestanding URP</td>
<td>All URPs include 1 IOM Channel</td>
</tr>
<tr>
<td>URP0601</td>
<td>URP in ICU</td>
<td>Not for DPS</td>
</tr>
<tr>
<td>URP0602</td>
<td>URP in Freestanding IOM</td>
<td></td>
</tr>
<tr>
<td>URF0040</td>
<td>Unit Record Addressing (URA) Expansion</td>
<td>Handles up to 3 more intermixed URAs beyond standard maximum of 4. Required if more than 4 devices are configured or drum and belt printers are mixed</td>
</tr>
<tr>
<td>URF0041</td>
<td>Software-Switchable URP Channel Path</td>
<td>Includes PSI IOM Channel for switched channel path termination</td>
</tr>
<tr>
<td>PCU0121</td>
<td>100-400 cpm Card Punch</td>
<td>1 Required Per PCU0121</td>
</tr>
<tr>
<td>URA0050</td>
<td>Unit Record Addressing for PCU0121</td>
<td></td>
</tr>
<tr>
<td>CRU1050</td>
<td>1050 cpm Card Reader</td>
<td>1 Required Per CRU1050</td>
</tr>
<tr>
<td>URA0052</td>
<td>Unit Record Addressing for CRU1050</td>
<td>No software support</td>
</tr>
<tr>
<td>CRF0003</td>
<td>51-Column Card Feature for CRU1050</td>
<td></td>
</tr>
<tr>
<td>CCU0401</td>
<td>Card Reader/Punch Unit</td>
<td></td>
</tr>
<tr>
<td>URA0050</td>
<td>Unit Record Addressing for CCU0401</td>
<td>1 Required Per CCU0401</td>
</tr>
<tr>
<td>PRU1100</td>
<td>Drum Printer, to 1100 lpm</td>
<td>1 Required per PRU1100</td>
</tr>
<tr>
<td>URA0053</td>
<td>Unit Record Addressing for PRU1100</td>
<td></td>
</tr>
<tr>
<td>PRU1200</td>
<td>Belt Printer, to 1200 lpm</td>
<td>1 Required Per PRU1200</td>
</tr>
<tr>
<td>URA0054</td>
<td>Unit Record Addressing for PRU1200</td>
<td></td>
</tr>
<tr>
<td>PRK1216</td>
<td>PRU1200 to PRU1600 Upgrade Kit</td>
<td></td>
</tr>
</tbody>
</table>

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SECTION X
Configuring Unit Record Subsystems
Examples - Initial Orders and Additions

PRU1600  Belt Printer, to 1600 lpm
URA0055  Unit Record Addressing for PRU1600   1 Required Per PRU1600
PRF0022  Expansion of PRU1200/1600 from 136 to 160 Print Columns
PRB0506  64-character BCD Belt
PRB0501  64-character Belt, IBM 1403 print set
PRB0513  64-character ASCII Belt
PRB0524  64-character Belt, with OCR-A/B numeric font
PRB0532  Puerto Rico Belt, 64-characters, 407 font
PRB0549  64-character Belt, with OCR-A alphanumeric font
PRB0600  96-character ASCII Belt
PRB0703  64-character Belt, 200/0 char. set, OCR-B numeric font

E. Example of URP configuring

1. Assume you want a URP subsystem with a card reader, card punch, one 1100 lpm printer and one 1600 lpm printer. The 1600 lpm printer is to have both 64-character (BCD) and 96-character (ASCII) printing capability. The URP is to be integrated within the mainframe ICU.

2. You would order as follows:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Type No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>URP0601</td>
<td>Basic URP Integrated in ICU</td>
</tr>
<tr>
<td>1</td>
<td>CRU1050</td>
<td>Card Reader</td>
</tr>
<tr>
<td>1</td>
<td>URA0052</td>
<td>Unit Reader Addressing for CRU1050</td>
</tr>
<tr>
<td>1</td>
<td>PCU0121</td>
<td>Card Punch</td>
</tr>
<tr>
<td>1</td>
<td>URA0050</td>
<td>Unit Record Addressing for PCU0121</td>
</tr>
<tr>
<td>1</td>
<td>PRU1100</td>
<td>Drum Printer</td>
</tr>
<tr>
<td>1</td>
<td>URA0053</td>
<td>Unit Record Addressing for PRU1100</td>
</tr>
<tr>
<td>1</td>
<td>PRU1600</td>
<td>Belt Printer</td>
</tr>
<tr>
<td>1</td>
<td>URA0055</td>
<td>Unit Record Addressing for PRU1600</td>
</tr>
<tr>
<td>1</td>
<td>URF0040</td>
<td>Additional Device Ports (since there are Mixed Printer Types)</td>
</tr>
<tr>
<td>1</td>
<td>PRB0500</td>
<td>64-Char BCD Belt for PRU1600</td>
</tr>
<tr>
<td>1</td>
<td>PRB0600</td>
<td>96-Char ASCII Belt for PRU1600</td>
</tr>
</tbody>
</table>
SECTION XI
Configuring Magnetic Tape Subsystems
Examples - Initial Orders and Additions

A. Required configuration elements

1. MTP (magnetic tape processor)

2. MTU (magnetic tape unit)
   a. Note - with the announcement of the cluster-priced MTU0412 there is ambiguity in the term "tape unit", since MTU0412 price includes 2 separate cabinets and is simply a price cluster, not a physically packaged cluster. In this tape configuration material the term "tape unit" will be used to mean a single tape cabinet with provisions for reading/writing on one tape reel.

   b. Multiples of any MTU type number can be used in any combination except for MTU0411, which must be used only with MTU0412.

   c. MTU0400 is used outside U.S. and Canada in place of MTU0410/0412/0411. It has same characteristics as MTU0410/0412/0411 in table below except that MTU0400 provides automatic threading of tape reel, push-on reels, and optional tape cartridge feature.

   d. Must be a minimum of 1-3 tape units per Level 66 system. Review Section I.C. for minimum and maximum peripherals.

3. MTU density feature
   a. Every tape unit must be equipped with only one density feature from the MTU features table below. Density features are upgradable on-site by Field Engineering.

   b. Each tape unit when equipped with the desired density feature has one 7-track read/write head or one 9-track read/write head, not both. MTU0600 is for 9-track operation only.
SECTION XI
Configuring Magnetic Tape Subsystems
Examples - Initial Orders and Additions

c. See table in Section F.2. below

4. MTA (magnetic tape addressing) - one per 4 tape
units, two for first 8 units in case of dual-channel
MTP. See table in Section E.2. below

5. Second prime IOM physical channel (MTF1042) -
required if more than 8 tape units will be configured
in a tape subsystem, otherwise it is optional.

B. Table of tape unit characteristics

<table>
<thead>
<tr>
<th></th>
<th>MTU 0410</th>
<th>MTU0500</th>
<th>MTU0610</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0410</td>
<td>0412</td>
<td>0411</td>
</tr>
<tr>
<td>Automatic threading</td>
<td>Semi</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Inches/second forward speed</td>
<td>75</td>
<td>125</td>
<td>200</td>
</tr>
<tr>
<td>Cartridge load option</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Rewind speed (inches/second)</td>
<td>450</td>
<td>500</td>
<td>640</td>
</tr>
<tr>
<td>Power windows</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>NRZI or PE recording (PE for 1600 bpi)</td>
<td>Both</td>
<td>Both</td>
<td>Both</td>
</tr>
<tr>
<td>7-track operation</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Inter-record gap</td>
<td>.75 in</td>
<td>.75 in</td>
<td>NA</td>
</tr>
<tr>
<td>200 bpi-character rate</td>
<td>15KC</td>
<td>25KC</td>
<td>NA</td>
</tr>
<tr>
<td>556 bpi-character rate</td>
<td>41.7KC</td>
<td>69.5KC</td>
<td>NA</td>
</tr>
<tr>
<td>800 bpi-character rate</td>
<td>60KC</td>
<td>100KC</td>
<td>NA</td>
</tr>
<tr>
<td>9-track operation</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Inter-Record Gap</td>
<td>.6 in</td>
<td>.6 in</td>
<td>.6 in</td>
</tr>
<tr>
<td>200 bpi-byte/character rate</td>
<td>15KB/20KC</td>
<td>25KB/33.3KC</td>
<td>NA</td>
</tr>
<tr>
<td>556 bpi-byte/character rate</td>
<td>41.7KB/55.5KC</td>
<td>69.5KB/92.4KC</td>
<td>NA</td>
</tr>
</tbody>
</table>

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SECTION XI
Configuring Magnetic Tape Subsystems
Examples - Initial Orders and Additions

800 bpi-byte/character rate
600KB/80KC 1000KB/130KC 1600KB/213KC

1600 bpi-byte/character rate
1200KB/1600KC 2000KB/266KC 3200KB/426KC

C. Configurator for Single-Channel MTP (1 x 8 subsystem)

```
<table>
<thead>
<tr>
<th></th>
<th>MTF0601</th>
</tr>
</thead>
<tbody>
<tr>
<td>MT1045</td>
<td>MTF1046</td>
</tr>
</tbody>
</table>
```

MTF1040
Switchable
Channel Path With
One IOM Channel

To IOM Channels

Basic MTP Channel with One
IOM Channel Included

MTA1042
2nd MTA
if needed

See Table in Section E.2 below.

Select Density Feature
(Required) Per Tape Unit.
See Table in Section F.2 below.
SECTION XI
Configuring Magnetic Tape Subsystems
Examples - Initial Orders and Additions

D. Configurator for Dual-Channel MTP (2 x 16 subsystem)

Second channel (MTF1042) is required if more than 8 units are used in a subsystem.

[Diagram showing configurations and density selection options]

Select Density (Required) Per Tape Unit.
See Table in Section F.2 below.
E. Magnetic Tape Processor (MTP) Components

1. List of Device Processor (MTP) Type Numbers

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
<th>Required</th>
<th>Optional</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTP0601</td>
<td>Basic Tape Processor - Handles to 8 tape units (1x8) or to 16 with MTF1042 (2x16). Includes IOM physical channel</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MTF1040</td>
<td>Switchable Non-simultaneous Channel. Makes a MTP channel software-switchable. Includes IOM physical channel for termination of switched channel path</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MTF1042</td>
<td>Dual Simultaneous Channel (device processor channel) for MTP0601. Includes IOM Channel</td>
<td>Required to support more than 8 units. Optional otherwise.</td>
<td></td>
</tr>
<tr>
<td>MTA1042</td>
<td>Magnetic Tape Addressing Adapter for MTP0601</td>
<td>1 per 4 MTUs(1)</td>
<td></td>
</tr>
<tr>
<td>(3) MTF1045</td>
<td>ASCII Code in Tape to/from 6-bit BCD Code Translator (9-track tape)</td>
<td>X (2)</td>
<td></td>
</tr>
<tr>
<td>(3) MTF1046</td>
<td>Unpacked EBCDIC Code in Tape to/from 6-bit BCD Code Translator (9-track tape)</td>
<td>X (2)</td>
<td></td>
</tr>
<tr>
<td>(3) MTF1047</td>
<td>Unpacked EBCDIC Code in Tape to/from ASCII Code Translator (9-track tape)</td>
<td>X (2)</td>
<td></td>
</tr>
<tr>
<td>(3) MTF1015</td>
<td>Tape Interchange Feature for H200/0 Tapes (7-track/9-track tape). Required to use H200/0 tapes with CM66 (emulator), also to use COBOL-74 UFAS with 200/0 tapes</td>
<td>X (2)</td>
<td></td>
</tr>
</tbody>
</table>
SECTION XI
Configuring Magnetic Tape Subsystems
Examples - Initial Orders and Additions

Footnotes

(1) 2 required for first 8 tape units if MTF 1042 is
configured, i.e., you are configuring a dual
simultaneous channel MTP. See MTA table on
next page.

(2) 2 required if you are configuring a dual
simultaneous channel MTP

(3) May all be present in same MTP. No software
support for these except MTF1015

2. Table showing quantities of required magnetic tape
unit addressing adapters (MTA1042). Each MTA1042
interfaces to up to 4 tape units and to a device
processor channel. Two MTAs are required for the
first 8 tape units in a dual simultaneous channel
MTP.

MTA Table

<table>
<thead>
<tr>
<th>No. of Tape Units on MTP</th>
<th>MTP0601</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1x8 MTP</td>
</tr>
<tr>
<td></td>
<td>No. of MTAs</td>
</tr>
<tr>
<td>1-4</td>
<td>1</td>
</tr>
<tr>
<td>5-8</td>
<td>2</td>
</tr>
<tr>
<td>9-12</td>
<td>-</td>
</tr>
<tr>
<td>13-16</td>
<td>-</td>
</tr>
</tbody>
</table>
SECTION XI
Configuring Magnetic Tape Subsystems
Examples - Initial Orders and Additions

F. Magnetic Tape Unit Components

1. List of tape unit type numbers. After selecting a tape unit you must select a tape density feature from the features table in Section F.2. below. Density feature establishes transfer rate.

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTU0400</td>
<td>75 ips, 15KC to 160KC, 15KB to 120KB. Not usable in U.S. and Canada</td>
</tr>
<tr>
<td>MTU0410</td>
<td>75 ips, 15KC to 160KC, 15KB to 120KB. More expensive than MTU0412/0411 but with identical characteristics</td>
</tr>
<tr>
<td>MTU0412</td>
<td>Same characteristics as MTU0410. MTU0412 is available only as a 2-unit cluster (2 cabinets). Your lowest price per tape unit is provided by MTU0412</td>
</tr>
<tr>
<td>MTU0411</td>
<td>Same characteristics as MTU0410 but available only when MTU0412 has also been configured. A single tape unit</td>
</tr>
<tr>
<td>MTU0500</td>
<td>125 ips, 25KC to 266KC, 25KB to 200KB</td>
</tr>
<tr>
<td>MTU0610</td>
<td>200 ips, 213.3KC or 426.6KC, 160KB or 320KB. 9-track operations only</td>
</tr>
</tbody>
</table>
SECTION XI
Configuring Magnetic Tape Subsystems
Examples - Initial Orders and Additions

2. Table of MTU density and other features and type numbers.

Every tape unit must have only one density feature. Not more than one type of 7-track density feature and one type of 9-track density feature per Level 66 system. For MTU0412, select two density features since there are two tape units. Density feature establishes transfer rate.

<table>
<thead>
<tr>
<th>MTU0410/0412/0411/0400</th>
<th>MTU0500</th>
<th>MTU0610</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 inches per second</td>
<td>125 inches per second</td>
<td>200 inches per second</td>
</tr>
<tr>
<td>MTF0116: 7-track density, 556/800 bpi</td>
<td>MTF0016: 7-track density, 556/800 bpi</td>
<td>MTF0618: Cartridge Load, factory installed option</td>
</tr>
<tr>
<td>MTF0112: 9-track density, 800/1600 bpi</td>
<td>MTF0012: 9-track density, 800/1600 bpi</td>
<td></td>
</tr>
<tr>
<td>aMTF0117: 9-track density, 800/1600 bpi</td>
<td>MTF0017: 9-track density, 200/556/800/1600 bpi</td>
<td></td>
</tr>
<tr>
<td>aMTF0118: 8-track density, 556/800 bpi</td>
<td>MTF0018: Cartridge Load, factory installed option</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MTF0019: Cartridge Load, field installed option</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MTF0020: Optional High Altitude Adapter, for altitudes 4000-7500 ft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MTF0021: Optional High Altitude Adapter, field installed for altitudes 4000-7500 ft.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MTF0022: Optional DC Power-On Meter, factory installed only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MTF0023: Optional Tape Movement Meter, factory installed only</td>
<td></td>
</tr>
</tbody>
</table>

a For MTU0412/0411 only. Others are for MTU0400 only.
### G. Magnetic Tape Subsystem Configuring Example

A 66/10 prospect wants a 2x6 MTP with 6 9-track units at the lowest possible price. The answer is to use 3 MTU0412 clusters (2 units each). You would order as follows:

<table>
<thead>
<tr>
<th>Qty</th>
<th>Type Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>MTP0601</td>
<td>Magnetic tape processor with one IOM channel</td>
</tr>
<tr>
<td>1</td>
<td>MTF1042</td>
<td>Second simultaneous channel for MTP. Includes one IOM channel</td>
</tr>
<tr>
<td>2</td>
<td>MTA1042</td>
<td>Magnetic tape addressing features or ports on MTP. Each handles 4 tape units</td>
</tr>
<tr>
<td>3</td>
<td>MTU0412</td>
<td>6 units, 2 units per cluster</td>
</tr>
<tr>
<td>6</td>
<td>MTF0117</td>
<td>9-track density feature, 800/1600 bpi, one per tape unit</td>
</tr>
</tbody>
</table>
SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/Ø5

A. Required configuration elements

1. Note - DO NOT USE THIS SECTION FOR 66/Ø5 SYSTEMS. SEE SECTION XIII.A.

2. MSP06Ø2/06Ø3 (mass store processor) - choose one or more MSPs consistent with packaging of Level 66 mainframe (ICU-oriented or freestanding), with number of simultaneous channels desired and with type of disk spindle used. Every Level 66 system must include a mass storage subsystem. See Section I.C. for minimum and maximum peripherals complement. See also Section I.B. for 66/Ø7 restrictions. MSP06Ø2 cannot be used in DPS systems because they have no ICU.

3. Disk device adapter (MSFlØXX) - choose one consistent with MSU04Ø2/0451 spindles or one consistent with MSU05Ø0 spindles, whichever spindle type is used. If MSU05Ø0 is mixed with other spindle types, both device adapter types must be in each MSP used with the subsystem. These features supply the proper "personality" for the MSP to interface to each spindle type.

4. MSA1ØXX (device addressing) - choose one for each four spindles of MSU0451 or MSU04Ø2 type and one for each four MSU05Ø0 spindles (2 units).

5. MSU0XXX (mass store unit) - with announcement of MSU05Ø0 an ambiguity was introduced in use of word "unit". Prior to MSU05Ø0 a unit was equal to a spindle, but an MSU05Ø0 (unit) provides for 2 spindles. In this disk configuration section "spindle" will be used as the unambiguous term for the device which contains one disk reading/writing pack or module.

6. RPS (rotational position sensing) feature - one per spindle. MSU05Ø0 includes RPS feature for each spindle.
7. Dual access spindle feature - required per spindle when two channels are crossbarred in the mass store subsystem. This feature provides an access path to each spindle from each channel. No more than 2 MSP channels can be used to access any given spindle.

8. Two-MSP crossbar feature - required when two MSPs are to be used to reach the same set of spindles.

9. Delta link to FNP.
   a. Required when NPS is used in FNP.
   b. See Section K below for delta configuration considerations.

B. MSP Components and Type Numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Required or Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSP0602</td>
<td>MSP in ICU, with one standard MSP channel and one IOM physical channel included. Max of one per ICU. Standard channel can be used with MSU0500/0402/0451 disk spindles. Maximum of 8 MSU0500 (16 spindles) or 16 MSU0402/0451 disk spindles and 8 MSU0500 disk units (16 spindles) in one subsystem. If MSU0500 spindles are not used, a second simultaneous prime channel (MSF1028) can be included. If MSU0500 spindles are included, two-channel simultaneity can only be achieved by use of 2 MSPs and the 2-MSP crossbar feature (MSF1036)</td>
<td>Either or MSP0603 required. Neither can be used on 66/05 system. MSP0602 not usable on DPS systems</td>
</tr>
<tr>
<td>MSP0603</td>
<td>Freestanding MSP with one standard MSP channel and one IOM physical channel included. Must be used in DPS systems. Standard channel can be used with MSU0500/0402/0451 disk units. Maximum of 4 MSPs in one subsystem. Maximum of 8 MSU0500 (16 spindles) or 16 MSU0402/0451 disk spindles and 8 MSU0500 disk units (16 spindles) in one subsystem. If MSU0500 spindles are not used, a second</td>
<td></td>
</tr>
</tbody>
</table>
SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/05

simultaneous prime channel (MSF1028) can be included. If MSU0500 spindles are included, two-channel simultaneity can only be achieved by use of 2 MSPs and the 2-MSP crossbar feature (MSF1036)

MSA1027

MSU0402/0451 device addressing capability

MSA1029

MSU0500 device addressing capability

One required for each 4 MSU0402/0451 spindles for each MSP in a subsystem. Two required for each 4 spindles on a MSP equipped with MSF1028

MSF1019

Software-switchable channel. Can be used to switch a prime channel between two IOM channels or between an IOM channel and an FNP (for delta link). Includes IOM channel termination

One per MSP for each 2 MSU0500 units (4 spindles)

MSF1024

Device adapter for MSU0500 when MSU0500 units configured

MSF1026

Non-simultaneous switched standard MSP channel. Software-switchable channel, makes MSP channel switchable to two IOM physical channels. Use MSF1026 where it is desired to switch between two IOM channels when MSU0500 spindles are in

Option in MSP only if no MSU0500 spindles in subsystem. To obtain delta link when MSU0500 spindles are included MSF1027 must be used for link to FNP and MSF1026 to switch prime MSP channel between 2 IOM channels

One required per MSP

Option.
subsystem, otherwise use MSF1019. Can not be used to link to FNP for delta configuration. (MSF1027 required).

MSF1027

Additional non-simultaneous MSP channel. Used only to terminate to FNP to provide NPS delta link to disk. Can not run simultaneously with standard MSP channel. Provides a path to MSU0402/0451/0500 spindles.

MSF1028

Dual simultaneous channel in same MSP

Required if NPS used with the disk subsystem and the subsystem includes MSU0500 spindles

MSF1033

Spindle expansion for MSU0402/0451

Option only if no MSU0500 spindles used. Max of 16 MSU0402/0451 spindles

MSF1035

Device adapter for MSU0402/0451 when such spindles exist in subsystem

Required when more than 16 MSU0402/0451 spindles used

MSF1036

Dual-MSP crossbarring

One required per MSP

C. Disk Unit/Spindle Components and Type Numbers

MSU0500

Disk unit with 2 spindles. Non-removable disk modules. Includes rotational position sensing (RPS) feature per spindle

At least one required if non-removable storage wanted
MSF0011

Dual access spindle feature for MSU0500

One required for each MSU0500 disk unit (2 spindles) when 2 MSPs are crossbarred to MSU0500 units in subsystem.

MUS0402

Removable-pack disk unit. 1 spindle

MSU0402 or MSU0451 required if removable storage wanted.

MSU0451

Removable-pack disk unit. 1 spindle. Same essentially as MSU0402 except with double capacity.

MSF0007

RPS feature for MSU0451/0402

Required per MSU0402/0451 disk spindle on all but 66/05 systems.

MSF0006

Dual access spindle feature for MSU0402/0451

One per MSU0402/0451 spindle in two-MSP subsystems. Allows crossbarring a channel from each of 2 MSPs for non-simultaneous access to a disk unit. Also required if a 2-channel MSP is used (no MSU0500 spindles).
SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/05

D. Configurator for One Single-Channel MSP Without Use of MSU0500 Spindles (1 x 32 subsystem)

1. Block diagram.

Note - 66/07 is limited to 8 spindles per system
SECTION XII  
Configuring Mass Storage Subsystems  
Not For Use On 66/05  

2. Configuration Table for Single-Channel MSP and Removable Pack Spindles (no MSU0500)  

Maximum of 8 spindles for 66/07 system  

<table>
<thead>
<tr>
<th>MSU0402/MSU0451</th>
<th>MSF0007 RPS</th>
<th>MSF1035 Device Adapter</th>
<th>MSA1027 Device Addressing</th>
<th>MSF1019 Switch Channel</th>
<th>One Optional</th>
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SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/05

E. Configurator for One dual-Channel MSP Without Use of MSU0500 Spindles (2 x 16 subsystem)

1. Block diagram

   Maximum of 8 spindles per system on 66/07

```
To IOM or FNP
  MSF 1019

To IOM
  MSF 1028

To IOM

MSF1019 non-simultaneous switched channel path and included IOM channel

Standard MSP Channel   Optional MSP Prime Channel

Base MSP0602 (ICU) or MSP0603 (FS)

MSF1035 Device Adapter

Required for use with MSU0402/0451

Device Addressing feature - 2 for each 4 spindles

MSF0007 RPS required

MSU0402/0451 spindles to maximum of 16

MSF0006 Dual Access spindle feature
```
SECTION XII  
Configuring Mass Storage Subsystems  
Not For Use On 66/05

2. Configuration Table for One Dual-Channel MSP and Removable Pack Spindles (no MSU0500)

<table>
<thead>
<tr>
<th>MSU0402/ MSU0451</th>
<th>MSF0007 RFS</th>
<th>MSF0006 Dual Spindle Access</th>
<th>MSF1035 Device Adapter</th>
<th>MSA1027 Device Addressing</th>
<th>MSF1028 Dual Channel</th>
<th>MSF1019 Switch Channel</th>
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Note - Maximum of 8 spindles per system on 66/07
SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/05

F. Configurator for 2-MSP Subsystem Without Use of MSU0500 Spindles (2x32 or 4x32 subsystem)

1. Block diagram

For 66/07 system the maximum is one 2x8 subsystem, i.e., with single prime channel per MSP.

![Diagram of 2-MSP Subsystem]

*27 = MSA1027 (for 4 spindles)

Note - any one MSP/IOM channel connects to 16 spindles. Channels A or A₁ and C or C₁ connect to same 16, B or B₁ and D or D₁ to the other 16. Each MSP connects to all 32 spindles

Note - 1-2 MSF1019 or 1-2 MSF1028 may be connected to a FNP instead of IOM. FNP includes 1 channel to terminate MSF1019 or 1 MSF1028 in DN6624/6632/6670

θ Each symbol represents up to 4 spindles

For maximum 4x32 subsystem order:

- 2 MSPs (max of 1 MSP0602 per ICU)
- 2 MSF1028
- 16 MSA1027
- 32 MSU0402/0451 (can be intermixed)
- 32 MSF0006
- 2 MSF1035
- 0-4 MSF1019 (as desired)
- 32 MSF0007

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SECTION XII
Configuring Mass Storage Subsystems
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2. Configuration Table for 2-MSP Subsystem and Removable Pack spindles (no MSU05000). Table could be used for a 2x32 or 4x32 subsystem. Maximum for 66/Ø7 system is one 2x8 subsystem, i.e., with single prime channel per MSP.

<table>
<thead>
<tr>
<th>MSU0402/MSU0451</th>
<th>MSF0007 RPS</th>
<th>MSF0006 Dual Access</th>
<th>MSF1035 Adapter</th>
<th>MSA1027 Addressing</th>
<th>MSF1028 Dual Channel</th>
<th>MSF1019 Switch Channel</th>
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</table>

Note - MSF1036 2-MSP Crossbar feature must be ordered when no MSF1028 is ordered
SECTION XII
Configuring Mass Storage Subsystems
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G. Configurator For One Single-Channel MSP With Use of
MSU0500 Spindles Only (1x15 units, 1x30 spindles)

1. Block diagram

For 66/07 maximum number of units is 4 (8 spindles) per system.
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2. Configuration Table For One Single-Channel MSP With Only MSUØ500 Spindles (1x8 units or 1x16 Spindles)

For 66/Ø7 the maximum number of units is 4 (8 spindles) per system.

<table>
<thead>
<tr>
<th>MSP 0602 (ICU)</th>
<th>MSU0500 Units/Spindles</th>
<th>MSF1024 Device Adapters</th>
<th>MSA1029 Device Addressing</th>
<th>MSF1026 Switched Channel</th>
<th>MSF1027 FNP Channel</th>
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<tr>
<td></td>
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<tr>
<td>or MSP 0603 (FS)</td>
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<td>Required for use of NPS</td>
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H. Configurator For 2-MSP Subsystem With Use of MSU0500 Spindles Only (2x8 units, 2x16 spindles). Gives dual-channel simultaneity

1. Block diagram

   a. See discussion Section K for delta link considerations

   b. Maximum number of units on 66/07 is 4 (8 spindles) per system.
SECTION XII
Configuring Mass Storage Subsystems
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2. Configuration Table for 2-MSP Subsystem With MSU0500 Spindles Only (2x8 units, 2x16 spindles)
   a. See discussion in Section K for delta link considerations.
   b. Maximum number of units on 66/07 is 4 (8 spindles) per system.

<table>
<thead>
<tr>
<th>MSU0500 Units/Spindles</th>
<th>MSP0011 Dual Access</th>
<th>MSF1024 Adapter</th>
<th>MSA1029 Addressing</th>
<th>MSF1026 Sw. IOM Channel</th>
<th>MSF1027 FNP Channel</th>
<th>MSF1036 Crossbar</th>
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<td>One or Two Optional</td>
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<td>One or Two Optional</td>
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</table>
SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/05

I. Configurator for One Single-Channel MSP With Mixed
MSU0402/0451/0500 Spindles

1. Block diagram

Maximum number of spindles on 66/07 is 8 per system.

```plaintext
To FNP Channel
Optional, non-
simultaneous with
standard MSP channel

MSF1027 FNP
Channel
Base MSP0602 (ICU)
or MSP0603 (PS)
MSF1024 Device Adapter
MSF1035 Device Adapter
MSA1027 Device
Addressing
1 required per
4 MSU0402/0451
spindles

To IOM Channels

MSF1026 non-simultaneous
switched channel path
with IOM channel included

Standard MSP
Channel
Required for MSU0500
Required for MSU0402/
0451

MSA1029 Device
Addressing
1 required per 2
MSU0500 units (4
spindles)

MSU
0402/
0451
16 Spindles Maximum

MSU
0402/
0451

MSU
0500
2 Spindles
8 Units/16 Spindles Maximum

MSU
0500
2 Spindles
```
2. Configuration Table for One Single-Channel MSP With Mixed MSU0402/0451/0500 Spindles (1x32). Limit is 16 MSU0402/0451 spindles and 8 MSU0500 units (16 spindles).

Maximum number of spindles for 66/07 is 8 per system

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<th>MSP0602 (ICU) or MSP0603 (FS)</th>
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</thead>
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<td>Spindle</td>
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J. Configurator For 2-MSP Subsystem With Mixed MSU0402/0451/0500 Spindles

1. Block diagram

See Section K for delta link considerations
2. Configuration Table for 2-MSP Subsystem With MSU0402/0451/0500 Spindles

a. See Section K for delta link considerations.

b. For 66/07 system the maximum is one 2x8 subsystem, with a single channel per MSP.

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</table>

D. Access = Dual access spindle feature
K. Delta Link Considerations

1. Delta link to MSP required in NPS environment.

2. Possible delta link configurations.
   a. Single MSP with no MSU0500 spindles.

   1-32 Spindles
      |__________________________|
      | MSP
      |__________________________|
      | L66
      |__________________________|
      | FNP

   Lower cost, higher contention approach
   MSP0602/0603/0605 (Max of 8 spindles for MSP0605)
   MSF1019 Non-simultaneous Switched Channel Path

   DN6616 - By Option
   DN6624  (DCF6043)
   DN6632
   DN6670, DPS INF/ANP - By Option
   (DCF6601)
SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/05

High simultaneity, higher simultaneity for GCOS, backup access to MSP by DN

Note - Since NPS cannot support more than one MSP channel at a time, the failure of the one channel declared at NPS bootload time would require a new NPS bootload. In the second bootload the alternate channel would be declared as effective. Bootload time of NPS is about one minute or less.
b. Single MSP with MSU0500 spindles in the subsystem, solely, or mixed with MSU0402/0451 spindles.

---

1-32 Spindles

MSP

Lower cost, higher contention approach

MSP0602/0603/0605 (Max of 8 spindles on MSP0605)

MSF1027 Non-simultaneous channel to FNP

L66

FNP

DN6616 - By option DCF6043
DN6624/6632
DN6670, DPS INP/ANP - By option DCF6601
c. Dual-MSP, dual-channel subsystem with no MSU0500 spindles.

1) The path declared at NPS bootload time for NPS access to disk would be to MSP1 via the MSF1019 switched path feature. NPS cannot support two disk channels following any given bootload. If GCOS and NPS share same spindle, the GCOS SMS (shared mass storage) feature must be used. In such case both NPS and GCOS must use certain tables which are protected by lock byte (gating) provisions in the firmware loaded into MSP declared as the prime MSP. If there is a failure in MSP1 or in the switched path to FNP from MSP1, the lock byte firmware must be loaded into MSP2. A new NPS bootload must be executed to define the backup path to MSP2 as the path to be used by NPS.

2) In normal operation this approach gives GCOS the benefits of dual-channel simultaneity when NPS is not using the path to MSP1. On the other hand, in a high volume NPS/high volume GCOS environment it has the potential for high contention to MSP1.
SECTION XII
Configuring Mass Storage Subsystems
Not For Use On 66/05

d. Dual-MSP, 2-channel subsystem with MSU0500
spindles exclusively (not recommended) or mixed
with MSU0402/0451 spindles.

This configuration has identical approach to
the one immediately prior except that the
switched paths are furnished by MSF1027 instead
of MSF1019.

\[\text{Diagram:}
\begin{align*}
\text{1-32 Spindles} & \quad \text{2-MSP Crossbar} \\
\text{MSP1} & \quad \text{MSP2} \\
\text{L66} & \quad \text{FNP} \\
\text{Backup} & \\
\text{DN6670 with 2 DCF6601} & \quad \text{DN6632 with 1 DCF6043} & \quad \text{DPS INP/ANP with 2 DCF6601}
\end{align*}\]
SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

A. Required Configuration Elements

1. MSP0605 - every Level 66 system must include a mass storage subsystem. See Sections I.A. and I.C. for 66/05 model restrictions and minimum/maximum peripheral complements for Level 66 systems.

2. Device adapter (MSF10XX) - choose one consistent with MSU0402/0451 spindles or one consistent with MSU0500 spindles, whichever type is used. If MSU0402/0451 and MSU0500 are mixed in the subsystems, both adapters must be in MSP. These features supply the proper "personality" for the MSP to interface to each spindle type.

3. MSA10XX (device addressing) - choose one for each four MSU0402/0451 spindles and one for each four MSU0500 spindles (2 units).

4. MSU0XXX (mass store unit) - with announcement of MSU0500 an ambiguity was introduced in use of word "unit." Prior to MSU0500 a "unit" was equal to a spindle, but an MSU0500 (unit) provides 2 spindles. In this configuration section "spindle" will be used as the unambiguous term for the device which contains one disk reading/writing pack or module.

5. RPS (rotational position sensing) feature. MSU0500 includes feature per spindle. MSU0402/0451 provide for RPS as an optional feature for 66/05.

6. Delta link to FNP required when NPS is used. Remember that 66/05 CPS6058 system price includes an FNP which cannot be used with NPS and provides for no delta link. A CPS6058 system to use NPS would need to be supplemented with a DN6616/6624/6632/6670, all of which can use the delta link (by option on DN6616 and DN6670)
### SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

#### B. MSP components and type numbers

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
<th>Required or Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSP0605</td>
<td>MSP in ICU, with one MSP channel and one IOM physical channel included. No dual-channel capability. No dual-MSP capability. No switchable IOM channel capability. A &quot;universal&quot; MSP---can handle to 8 spindles of MSU0402 or MSU0451 or MSU0500 type, or mixes.</td>
<td>MSP0605 must be used.</td>
</tr>
<tr>
<td>MSA1027</td>
<td>MSU0402/0451 device address capability</td>
<td>One required for each 4 units (4 spindles)</td>
</tr>
<tr>
<td>MSA1029</td>
<td>MSU0500 device addressing capability</td>
<td>One required for each 2 units (4 spindles)</td>
</tr>
<tr>
<td>MSF1027</td>
<td>Additional non-simultaneous channel in MSP to allow NPS delta link to disk. For CPS6058 version of 66/05, must terminate in a supplemental FNP, since the 66/05 integrated FNP does not support a disk channel.</td>
<td>Option</td>
</tr>
<tr>
<td>MSF1037</td>
<td>Device adapter for MSU0500</td>
<td>One required if MSU0500 units used</td>
</tr>
<tr>
<td>MSF1038</td>
<td>Device adapter for MSU0451/0402</td>
<td>One required if MSU0451/0402 units used</td>
</tr>
</tbody>
</table>
SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

MSF6005

Upgrade kit to MSP0602. See Section XII for MSP0602

Needed when 66/05 is upgraded. Use MSP0602 adapters and addressing features as necessary
C. Disk spindle components and type numbers

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
<th>Required or Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSF0007</td>
<td>Rotational position sensing for MSU0402/0451</td>
<td>Option - 1 per spindle when used</td>
</tr>
<tr>
<td>MSU0402</td>
<td>Removable-pack disk unit. 1 spindle</td>
<td>Two spindles of some type are required as normal minimum per subsystem. May be freely intermixed with MSU0451 and MSU0500 disk spindles</td>
</tr>
<tr>
<td>MSU0451</td>
<td>Removable-pack disk unit. 1 spindle. Same essentially as MSU0402 except with doubled capacity</td>
<td>Ditto</td>
</tr>
<tr>
<td>MSU0500</td>
<td>Fixed-module disk unit. 2 spindles. Includes rotational position sensing (RPS) feature</td>
<td>Ditto</td>
</tr>
</tbody>
</table>
SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

D. Configurator for One Single-Channel MSP0605 Without Use of MSU0500 Spindles (1 X 8 subsystem)

1. Block diagram

```
To FNP Channel  | To IOM Channel included with MSP0605
----------------|-----------------------------------------
MSP0605
      | MSF1027 Optional FNP Channel  | Standard MSP Channel
      |                           | MSF1038 Device Adapter
      |                           | MSA1027 Device Addressing
      |                           | Required if MSU0451/0402 used
      |                           | One per 4 MSU0402/0451 disk units
      |                           | MSF0007 RPS optional
      |                           | Maximum 8 units (8 spindles)
```

MSU 0402/0451  MSU 0402/0451
SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

2. Configurator for One Single-Channel MSP0605 With Use of MSU0402/0451 Spindles Only (1 X 8 subsystem)

<table>
<thead>
<tr>
<th>MSP0605</th>
<th>MSU0402/ MSU0451</th>
<th>MSF1038 DEVICE ADAPTER</th>
<th>MSA1027 DEVICE ADDRESSING</th>
<th>MSF0007 RPS — OPTION</th>
<th>MSF1027 FNP CHANNEL</th>
</tr>
</thead>
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<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1 OPTIONAL</td>
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</table>
SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

E. Configurator for One Single-Channel MSP0605 With Use of
MSU0500 Spindles Only (1 X 8 subsystem)

1. Block diagram

2. Configuration Table for One Single-Channel MSP0605
With Use of MSU0500 Spindles Only (1 X 8 subsystem)
SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

F. Configurator for One Single-Channel MSP0605 With Mixed MSU0402/0451/0500 Spindles (1 X 8 subsystem)

1. Block diagram

![Block Diagram]

MSF0007 RPS
Optional on MSU0402/0451 Spindles

One per 4 MSU0402/0451 units
One per 2 MSU0500 units (4 spindles)

To FNP Channel To IOM channel included with MSP0605

MSF1027 Optional FNP Channel

MSF1038 Device Adapter

MSF1037 Device Adapter

MSA1027 Device Addressing

MSA1029 Device Addressing

Required if MSU0451/0402 used
Required for MSU0500

Maximum of 8 Spindles

112 DH92. Rev. 0
SECTION XIII
Configuring Mass Storage Subsystems
on 66/05 Only

2. Configuration Table for One Single-Channel MSP0605
With Mixed MSU0402/0451/0500 Spindles (1 X 8
subsystem)

<table>
<thead>
<tr>
<th>MSU0402/MSU0451 (2 Spindles Each)</th>
<th>MSU0500/ADAPTER 500</th>
<th>MSF1037/ADAPTER 402/451</th>
<th>MSA1027 ADDRESSING 402/451</th>
<th>MSA1029 ADDRESSING 500</th>
<th>MSF0007 RPS OPTION</th>
<th>MSF1027 FNP CHANNEL</th>
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<td>1 - 2</td>
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<td>1 PER MSU0402/0451/O500 SPINDLE</td>
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<td>2 - 4</td>
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<td>1</td>
<td>1</td>
<td>1 PER MSU0402/0451/O500 SPINDLE</td>
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<td>2 - 4</td>
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<td>1 OPTIONAL</td>
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SECTION XIV
Mass Storage Configuration
Examples

A. Configuring Example for Mass Storage for 66/07 Up (not 66/05)

66/20 ICU-oriented prospect wants a 2-MSP subsystem, each MSP with a single prime channel. Each MSP is to communicate with a DN6670 FNP which will be using NPS. Prospect will start with 10 MSU0451 spindles and 5 MSU0500 units (10 spindles).

1  MSP0602  MSP in ICU for lowest price
1  MSP0603  2nd MSP. Cannot be in ICU
10 MSU0451  10 spindles
10 MSF0007  RPS per MSU0451 spindle
10 MSF0006  Dual access spindle feature per MSU0451 spindle
2  MSF1035  Device adapter per MSP for MSU0451
6  MSA1027  Device addressing for MSU0451, 3 per MSP for
10 spindles crossbarred to 2 MSPs
5  MSU0500  10 spindles, 5 units
5  MSF0011  Dual access spindle feature per MSU0500 unit
             (2 spindles)
2  MSF1024  Device adapter per MSP for MSU0500
6  MSA1029  Device addressing for MSU0500, 3 per MSP for
10 spindles/5 units crossbarred. Each MSA1029
addresses 2 units/4 spindles per MSP, thus
6 MSA1029 needed
2  MSF1027  Non-simultaneous channel to FNP from each MSP.
             Only one effective from a given FNP/NPS
             bootload (starting) operation. See Section XIII.K.
1  MSF1036  2-MSP crossbar

B. Configuring example for mass storage for 66/05

66/05 (CPS6058) prospect wants 4 MSU0402 spindles
and 2 MSU0500 spindles (1 unit). Prospect will use GRTS.

1  MSP0605  4 spindles
4  MSU0402  RPS per spindle, optional
1  MSF0007  Device adapter for MSU0402
1  MSF1038  Device addressing for 4 MSU0402 spindles
1  MSU0500  2 spindles, 1 unit
1  MSF1037  Device adapter for MSU0500
1  MSA1029  Device addressing for 1 MSU0500 unit (2 spindles)
SECTION XV
Document Handler Subsystems

A. Configuring DHP0700/0701 Document Handling Processors

1. DHP0700
   a. Block diagram

   [Diagram showing the configuration of DHP0700 with various components and connections]

- Level 66 IOM
- Channel included in DHP0700 price
- Optional DCF6041
- DIA
- Tape Cassette Unit included
- TCU
- Document Handler Channels, 1 per DHU
- DHF 6001/6003
- 1-4 DHF6004 optional
- Control Console Included
- Document Handler Control Console

1-6 DHU1600/0800. Maximum of 4 concurrently
SECTION XV
Document Handler Subsystems

b. List of DHP0700 type numbers and their functions

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHP0700</td>
<td>Base DHP number. Corresponds roughly to base CPS number for Level 66 mainframe. One must be ordered for each DHP0700 subsystem. Price includes TTY33 type of DHP subsystem control console and its adapter, tape cassette unit and its adapter for offline test and diagnostic operations by Field Engineering, direct interface adapter channel (DIA) for connection to a Level 66 IOM channel, and the Level 66 IOM physical channel itself. Maximum of 3 DHP0700 or DHP0701 or combination per Level 66 system. On 66/05/07 the maximum is one. NOTE - each DHP counts as an FNP in determining the maximum (4) FNPs allowed on a Level 66 system. Use of one DHP, e.g., means a maximum of 3 FNPs.</td>
</tr>
<tr>
<td>DHF6003</td>
<td>Document handler channel. One DHF6003 is required for each DHU0803/0814 handler. Maximum of 6 DHF6003 or DHF6001 or combined document handler channels can be configured. Maximum of 4 channels in any combination (4 document handlers) operational concurrently in one DHP.</td>
</tr>
<tr>
<td>DHF6001</td>
<td>Document handler channel. One DHF6001 is required for each DHU1600 handler. Maximum of 6 DHF6001 or DHF6003 or combined document handler channels can be configured. Maximum of 4 channels in any combination (4 document handlers) operational concurrently in one DHP.</td>
</tr>
<tr>
<td>DHF6004</td>
<td>Document handler control console and its adapter. At least one required. One is recommended for each one or two document handlers running concurrently. Maximum of four. Used by document handler operator for a variety of purposes, including DES software interfaces - initialization of entry run for a DHU, requesting pertinent pocket selection file from Level 66, stopping a DHU, taking a DHU offline, etc.</td>
</tr>
<tr>
<td>DCF6041</td>
<td>Additional DHP0700 direct interface adapter channel (DIA) and channel in Level 66 IOM. One DIA is included in DHP0700 price. Second DIA used</td>
</tr>
</tbody>
</table>
SECTION XV
Document Handler Subsystems

where it is desired to connect DHP0700 to a second Level 66 IOM or second channel in first IOM as a backup provision. At startup time one of the two is designated as logically connected and is used for communication between DHP0700 and Level 66 mainframe.
SECTION XV
Document Handler Subsystems

2. DHP0701

   a. Block diagram

   MSP -> Level 66 IOM
   MSP -> TCU
   TCU -> Optional DCF6043
   TCU -> Optional DCF6041

   PSA
   DIA
   1 GPCB
   DHA Addressing
   DHA6002
   1 DHU 1600
   1 DHU 0800

   DHP0701
   Control Console
   Included

   DHP6004
   1-2 Document Handler Control Consoles

   DHP6001
   or
   DHP6003
   1-2 DHU:
   1 DHU1600 + 1 DHU0800
   2 DHU0800
   1 DHU1600 or 1 DHU0800

   GPCB
   DCU6202
   1-16 LIUs

   1-14 Lines (GRTS-I + 1-2 DHUs) or 1-32 Lines (GRTS or NPS, no DHUs)
b. List of DHP0701 type numbers and their functions

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHP0701</td>
<td>Base DHP number. Corresponds roughly to base CPS number for Level 66 mainframe. One must be ordered for each DHP0701 subsystem. Price includes TTY33 type of DHP subsystem control console and its adapter, tape cassette unit and its adapter for offline test and diagnostic operations by Field Engineering, direct interface adapter (DIA) for connection to a Level 66 IOM channel, and the Level 66 physical IOM channel itself. Maximum of 3 DHP0701 or DHP0700 or combination on one Level 66 system. On 66/07 the maximum is one DHP. DHP0701 also includes device addressing features for one DHU1600 and one DHU0803 or DHU0814. NOTE - one DHP counts as an FNP in determining the maximum (4) FNPs allowed on a Level 66 system. Use of one DHP, e.g., means a maximum of 3 FNPs</td>
</tr>
<tr>
<td>DHA6002</td>
<td>Device handler addressing. One must be ordered when no DHU1600 is configured and two DHU0803 or DHU0814 or combination are to be used</td>
</tr>
<tr>
<td>DHF6003</td>
<td>Document handler channel. One DHF6003 is required for each DHU0803 or DHU0814. Maximum of two DHUs may be connected and running - 1 DHU1600 plus DHU0803 or DHU0814, or 2 DHU0803 or 2 DHU0814, or one DHU0803 and one DHU0814</td>
</tr>
<tr>
<td>DHF6001</td>
<td>Document handler channel. One DHF6001 required for DHU1600. See DHF6003 above for allowed quantities of channel types and DHU types</td>
</tr>
<tr>
<td>DHF6004</td>
<td>Document handler control console and its adapter. See description under DHF6004 for DHP0700 above</td>
</tr>
<tr>
<td>DCP6041</td>
<td>Additional direct interface adapter (DIA). See description under DCP6041 for DHP0700 above</td>
</tr>
<tr>
<td>DCP6043</td>
<td>Peripheral subsystem adapter. Provides a DHP channel for terminating a mass store processor (MSP) channel, to establish a direct link to disk for DHP0701. Required if NPS is to be used in DHP0701. NPS cannot be used during the period</td>
</tr>
</tbody>
</table>
SECTION XV
Document Handler Subsystems

when document handler operation is desired. DES (Document Entry System) software interfaces only to GRTS-I.

General Purpose Communications Base. Required when DHP0701 is to be used with up to 14 communications lines with GRTS or NPS. Maximum of one per DHP0701. GRTS-I must be used for concurrent document handling and data communications.

When used for concurrent communications and document handling a maximum of 12 asynchronous lines up to 1,200 bps each and 2 synchronous or asynchronous lines at up to 9,600 bps each can be used. If DHP0701 is used for communications alone, either in NPS or GRTS mode, up to 32 lines can be configured as if for a GPCB in a DN6632 FNP.

Usual line interface units (LIU) for GPCB must be configured for the communication lines. Use the DN6632 FNP configurator portion of this outline to configure the GPCB. Don't forget to configure an asynchronous speed adapter (ASA) (DCF6001 or DCF6002) even though no asynchronous-only LIUs will be used (DCF6010, DCF6011). See Section XVIII.

B. Configuring DHU1600 and DHU0800 Document Handlers

1. DHU1600 family
   a. Come in 4 models which differ only in number of pockets included. Any model can be expanded in the field to the maximum of 32 pockets.
   b. List of required type numbers and their functions

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHU1604</td>
<td>Document Reader-Sorter, Four-Pocket, 1625 dpm</td>
</tr>
<tr>
<td>DHU1608</td>
<td>Document Reader-Sorter, Eight-Pocket, 1625 dpm</td>
</tr>
<tr>
<td>DHU1612</td>
<td>Document Reader-Sorter, 12-Pocket, 1625 dpm</td>
</tr>
<tr>
<td>DHU1616</td>
<td>Document Reader-Sorter, 16 Pocket, 1625 dpm</td>
</tr>
</tbody>
</table>

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c. List of options and their functions

DHF1630 Multilevel E-13b Recognition. E-13b MICR characters and symbols located along the bottom edge of the documents are read via a multitrack recognition read head. One only must be configured.

DHF1603 Endorser. Provides the ability to endorse documents on the back side in one of three 3/8-inch bands. A 3-digit consecutive batch number is provided. Band location must be specified on order.

DHF1604 Expansion Unit. Permits the attachment of 1-4 additional 4-pocket expansion modules, DHF1605, on the sixteen-pocket DHU1616

DHF1605 Expansion Module. A single 4-pocket expansion module, for DHU1616 pocket expansion. Maximum of four allowed. Requires DHF1604

DHF1606 Mobile Carrier. Holds one storage document tray

DHF1607 Short Document Read. Enables the handling of 51-column-size MICR documents (applies to sorting in first four pockets). Short documents are handled at the rate of 1700 documents per minute. Presence of this option slows processing of normal-size documents

DHF1609 Batch Ticket Detector. Halts the reader upon detection of a 2x5-inch black band and signals for external control

DHF1610 Resettable Item Counter. A 6-digit resettable counter that totals the number of documents read.

DHF1611 Basic Offline Sort. Provides the ability to process two sort fields with a maximum of 12 digits per field.

DHF1612 Expanded Offline Field Sort. An additional 12-digit field sort. A maximum of six additional field sorts can be added to the basic offline sort configuration.
SECTION XV
Document Handler Subsystems

DHF1613 (1) Digit Override. A rotary switch that allows a document to be sorted to an override pocket if a preselected digit (or two digits) appears in a sorted digit position(s).

DHF1614 (1) Digit Edit. Document will be sorted to a regular pocket if a preselected digit (or two digits) appears in a sorted digit position. All other documents go to a "designated" pocket.

DHF1615 (1) Zero Kill. Document will be sorted to a designated "zero kill" pocket if the digit position contains a zero and all digits to the left are zeros.

DHF1616 (1) Field Override. Document will be sorted to an override pocket if a preselected 8-digit consecutive code appears in the field.

DHF1617 (1) Field Edit. Document will be sorted to a regular pocket if an 8-digit preset code appears in the field.

DHF1618 (1) No-Field/No-Digit Outsort. Document will be sorted to a specific pocket if the field being sorted is not present or to another pocket if no digit appears in the sorting position.

DHF1619 Stacker Overflow. Enables documents which are intended for the last offline pocket (maximum of 16) to be routed to available adjacent overflow pockets.

DHF1620 Valid Character Check. This feature checks the "readability" of each MICR character and symbol in the field that is being sorted.

DHF1621 Extended Sort Control. Provides an operator-settable control panel that extends the capability of the edit and override functions.

DHF1622 8-Pocket Offline Sort. Provides capability to fine sort documents on DHU1608.

(1) Of these six optional features, up to three can be installed in any one document handler.
d. DHU1600 configuring

The items fully enclosed in balloons and boxes must be ordered. Others are optional for the DHU160X models shown.
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Document Handler Subsystems

DHU1600 configurators (continued)

Basic 8-pocket handler

DHF6001  
DHF608
DHF1630  
DHF1603
DHF1606
DHF1607
DHF1609
DHF1610
DHF1612
DHF1613
DHF1614
DHF1615
DHF1616
DHF1617
DHF1618
DHF1619
DHF1620
DHF1621

Basic 12-pocket handler

DHF6001  
DHF612
DHF1630  
DHF1603
DHF1606
DHF1607
DHF1609
DHF1610
DHF1611
DHF1612
DHF1613
DHF1614
DHF1615
DHF1616
DHF1617
DHF1618
DHF1619
DHF1620
DHF1621

Basic 16-pocket handler

DHF6001  
DHF1616
DHF1630  
DHF1603
DHF1604
DHF1606
DHF1617
DHF1609
DHF1610
DHF1611
DHF1612
DHF1613
DHF1614
DHF1615
DHF1616
DHF1617
DHF1618
DHF1619
DHF1620
DHF1621

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2. Summary of DHU600/800 document sizes and character/mark recognition feature.

<table>
<thead>
<tr>
<th>Handler</th>
<th>Pockets (Documents per minute maximum)</th>
<th>Speed</th>
<th>Document Size (inches)</th>
<th>Recognition Features</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Length</td>
<td>Width</td>
<td>Thickness</td>
</tr>
<tr>
<td>DHU0803</td>
<td>3</td>
<td>830</td>
<td>4.85-8.75</td>
<td>2.85-4.25</td>
</tr>
<tr>
<td>DHU0814</td>
<td>14</td>
<td>8 (6&quot; Doc.)</td>
<td>5.75-9.75</td>
<td>2.5-4.25</td>
</tr>
<tr>
<td>DHU1604</td>
<td>4</td>
<td>1620</td>
<td>5.75-9.75</td>
<td>2.5-4.25</td>
</tr>
<tr>
<td>DHU1608</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHU1612</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DHU1616</td>
<td>16</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a 1000 dpm and 1200 dpm can be ordered by RPQ Must have 1000 dpm option to grow to 1200 dpm

3. DHU0800 family

a. Comes in 2 models which differ only in number of pockets included. Document reading capability is not included but must be ordered.

b. Each model provides for MICR, OCR and OMR capability.

1) MICR font can be read magnetically and/or optically.

2) OCR font can be alphanumerical or numeric, depending upon font type.
SECTION XV
Document Handler Subsystems

a) Numeric-only OCR documents can have up to 3 numeric fonts on up to 2 lines. In any one pass 2 of the three fonts can be read.

b) Documents containing a single line of OCR data can be read on the basis of program-controlled selecting up to two or four separate fields on the line for reading. Selection is made as the program is loaded into the DHP070X and initialized. Applicable feature is called Autoload Data Format Control.

c) Several types of font support are available.

3) OMR is obtainable for either 10-level or 12-level marking. 12-level is IBM-type, 10-level is CIIHB-type.

c. Read zones per DHU0800.

1) Each DHU is divided into 3 read zones -- one for MICR font reading (magnetically), one for mark reading or punched hole reading (OMR), one for optical character recognition (OCR).

2) OCR zone provides for two read stations.
SECTION XV
Document Handler Subsystems

3) It is considered that there are four read stations along the document transport path, designated R1, R2, R3, R4. Ability for reading at each station depends on whether the pertinent read feature has been configured. The figure below shows the read zones and stations, together with the type numbers configurable to give document reading capability.

![Diagram showing read stations R1 to R4 with MICR, OMR, and OCR zones and equipment models.

Transport Path

R1
MICR ZONE
DHFO801(EI3b)
OR
DHFO802 (CMC7)

R2
OMR ZONE
DHFO805(CIIHB)
OR
DHFO806 (IBM)

R3
OCR ZONE
DHFO803
OR
DHF0804 (OCR-A)

R4
OCR ZONE
DHF0803
OR
DHF0804 (OCR-Α)

Alpha-
numeric

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4) Depending on the options configured it is possible to have all four read stations active during the pass of documents in some kinds of operations.

5) Up to 72 characters of data can be read from a document. If OMR is used, up to 31 columns of OMR data can be read but each column counts as two characters in the limit of 72 characters. Also, if an MICR-font field is to be read both magnetically and optically the field is counted as two fields in the 72-character limit. The limit of 72 characters read must be carefully considered in designing your applications.

d. List of DHU0800 required type numbers and their functions.

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHU0803</td>
<td>3-pocket document handler. No font reading capability included but at least one font or mark reading feature must be configured.</td>
</tr>
<tr>
<td>DHU0814</td>
<td>14-pocket document handler. No font reading capability included but at least one font or mark reading feature must be configured. No offline document sorting capability is included but is available optionally.</td>
</tr>
</tbody>
</table>

Required options -- at least one must be selected. Up to 3 can be configured --

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHF0801</td>
<td>MICR font reading magnetically. For El3b font (U.S.A.). Occupies read zone 1 and read station R1.</td>
</tr>
<tr>
<td>DHF0802</td>
<td>Same as DHF0801 but applies to CMC7 font</td>
</tr>
<tr>
<td>DHF0805</td>
<td>Optical mark/punch reading. Occupies OMR zone as read station R2. For CIIHB 10-level format.</td>
</tr>
<tr>
<td>DHF0806</td>
<td>Same as DHF0805 but applies to IBM 12-level format.</td>
</tr>
<tr>
<td>DHF0803</td>
<td>OCR recognition, numeric only. If configured, DHF0804 cannot be configured. Occupies OCR zone</td>
</tr>
</tbody>
</table>
SECTION XV
Document Handler Subsystems

as read station R3. Specify one to three fonts from the following choices:

DHF0850  OCR-A Numeric, Sizes I, IV
DHF0851  OCR-B Numeric and Symbols
DHF0852  OCR-B Numeric and Characters
DHF0854  7B Numeric
DHF0856  12F Numeric
DHF0855  E13b Numeric (to allow MICR font to be read optically)
DHF0853  407-1 numeric

DHF0804  OCR-A recognition, alphanumeric font, Size 1. If configured, DHF0803 cannot be configured.

e. List of other DHU0800 options and their functions.

DHF0810  Second Line OCR. Provides ability to read two lines of OCR on a single document pass. Requires DHF0803 or DHF0804. This provides OCR read station R4. It will read only the font selected for R3 (via DHF0803 or DHF0804).

DHF0820  Offline Fine Sort for MICR font. For use with DHU0814, this option provides the ability to fine sort documents encoded in E13b font per the ABA (American Bankers Association) check format. If sorting is to be of MICR font read magnetically, you must also configure DHF0801. If sorting is to be of E13b font read optically (OCR A or OCR B), you must also configure either DHF0803 or DHF0804. If you wish to sort MICR font on an optical reading basis, DHF0803 must be configured. There is no offline fine sorting for OMR data (R2) or for OCR data read at R4.

DHF0821  Same as DHF0820 but applies to CMC7 font. No optical reading of CMC7 font.

DHF0822  Offline Fine Sort for OCR font. For use with DHU0814. Requires DHF0803 or DHF0804. No offline fine sort for OMR data (R2) or OCR data read at R4.

DHF0830  Multiple Digit Special Outsort. For use with the DHU0814, this option provides the capability of out-sorting documents with a pre-selected code or range of codes in a given data field. Selection
SECTION XV
Document Handler Subsystems

is made on the basis of ten unique digits or two selections can be made on the basis of five unique digits. Requires DHF0820.

DHF0840 Autoload Data Format Control—MICR. Provides the ability for the DHP program to precondition the DHU0803 or DHU0814 with MICR capability to read up to two separate field locations within a single line of print. Requires DHF0801.

DHF0841 Autoload Data Format Control Line 1—OCR. Provides the ability for the DHP program to precondition the DHU0803 or DHU0814 with OCR capability to read up to two separate field locations within a single line of print. Maximum of 2 DHF0841s allowed.

DHF0842 Autoload Data Format Control Line 2—OCR. Same function as DHF0841 but for a second OCR line. Requires DHF0810. Maximum of 2 DHF0842s allowed.
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Document Handler Subsystems

f. Configurator for DHU0803

DHF6003

And/Or

R1

DHF0801 (E13b)
or
DHF0802 (CMC7)

And/Or

R3

DHF0803 OCR Numeric

Or

R4

DHF0810 2nd line OCR

DHF0841 Autoload OCR

Max. of 2

DHF0840 Autoload MICR

DHF0842 Autoload OCR

Max. of 2

DHF0850 OCR-A, 1 or 4

DHF0851 OCR-B + Sym

DHF0852 OCR-B + Char

DHF0853 407-1

DHF0854 7B

DHF0855 E13b

DHF0856 12F

Document Handler Channel in DHP0700/0701

R2

DHF0804 OCR-A A/N

DHF0805 (OMR-10)
or
DHF0806 (OMR-12)

Must Order 1-3

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Document Handler Subsystems

g. Configurator for DHU0814

1) Use configurator for DHU0803

2) Added options for DHU0814

  DHF0820
  DHF0821    See Descriptions
  DHF0822    on prior pages
  DHF0830

4. DHP0700 Configuring Example

Prospect is a bank interested in your CHECS software. You plan to bid a DHP0700 supporting two DHU1612s and a DHU0803. Each DHU1612 will read MICR documents only and is to be used also for offline sorts on 1-2 fields and to have zero-kill capability. The DHU0803 will be used for turnaround applications involving OCR-B numeric documents with OCR-B-plus-characters font feature on one line.

1 DHP0700  Base DHP
1 DHP6003  Document handler channel for DHU0803
2 DHP6001  Document handler channels for 2 DHU0612s

- - - - - -

2 DHU1612  2 MICR sorter-reader for CHECS
2 DHF1630  El3b font recognition for 2 DHU1612
2 DHF1611  Basic offline sort for DHU1612, for 1-2 fields
2 DHF1615  Zero-kill feature for 2 DHU1612

- - - - - -

1 DHU0803  Document handler for turnaround application
1 DHF0803  OCR recognition for R3
1 DHF0852  OCR-B plus characters font handling
1 DHP6004  Document handler control console

5. DHP0701 Configuring Example

Prospect is interested in a small 66/10 and wants to run an OCR application and 1 DHU involving sorting of OCR-A size 1 numeric font documents. To minimize costs the prospect plans to use the DHP0701 for communications as well. He will start with two 300 bps asynchronous lines using our dot matrix teleprinter terminals and two 2400 bps synchronous lines for VIP7705R terminals. VIP terminals use ASCII code. See Section XVIII for configuring the GPCB for communications.
## SECTION XV
Document Handler Subsystems

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHP0701</td>
<td>Base DHP</td>
</tr>
<tr>
<td>DHF6003</td>
<td>DHU0814 channel in DHP</td>
</tr>
<tr>
<td>DHU0814</td>
<td>Document handler</td>
</tr>
<tr>
<td>DHF0803</td>
<td>OCR recognition, R3</td>
</tr>
<tr>
<td>DHF0850</td>
<td>OCR-A size 1 font handling</td>
</tr>
<tr>
<td>DHF0822</td>
<td>Offline fine sorting for DHU0814</td>
</tr>
<tr>
<td>DCU6202</td>
<td>GPCB for communications</td>
</tr>
<tr>
<td>DCF6001</td>
<td>ASA for 300-bps lines on DCF6010</td>
</tr>
<tr>
<td>DCF6010</td>
<td>Asynchronous-only LIU for 2 300-bps T-300-lines</td>
</tr>
<tr>
<td>DCF6013</td>
<td>Synchronous-only LIU for 2 2400-bps VIP lines</td>
</tr>
</tbody>
</table>
SECTION XVI
Configuring Manual Peripheral Switch Subsystems

A. List of Type Numbers and Their Functions

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSU0200</td>
<td>Switch console and power supply. Includes one physical PSI channel (URP/MTP/MSP) in IOM and one PSF0511</td>
<td>Every manual switch subsystem must include only one switch console, either PSU0200 or PSU0201. Each console handles up to 16 switch units</td>
</tr>
<tr>
<td>PSU0201</td>
<td>Switch console and power supply. Same as PSU0200 except that no IOM channel is included. Includes one PSF0511</td>
<td></td>
</tr>
<tr>
<td>PSF0511</td>
<td>Manual switch unit to switch a device to one of two device processors, or to select one of two devices to switch to a device processor. Does not include a channel in IOM. Usable with URP and MTP devices only. Could also be used to switch a PSI channel in IOM between 2 device processors - URP, MTP or MSP</td>
<td>Each console includes one. May be mixed with PSF0512 to maximum of 16 switch units per console</td>
</tr>
<tr>
<td>PSF0512</td>
<td>Manual switch unit to switch a device processor to one of two IOM PSI type physical channels. Includes one IOM PSI channel. Usable with URP, MTP, MSP only</td>
<td>May be mixed with PSF0511 to maximum of 16 switch units per console</td>
</tr>
</tbody>
</table>
SECTION XVI
Configuring Manual Peripheral Switch Subsystems

B. Configurator for PSU0200 Manual Peripheral Switch Subsystem

```
<table>
<thead>
<tr>
<th>Standard</th>
<th>To 15 More Optional Switch Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>aIOM Channel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[a] [a] IOM Channels in</td>
</tr>
<tr>
<td></td>
<td>PSF0512 Price</td>
</tr>
</tbody>
</table>

PSU0200
Console, Power Supply

PSF 0511
PSF 0512
PSF 0512
PSF 0512
PSF 0512
PSF 0512
```
SECTION XVI
Configuring Manual Peripheral Switch Subsystems

C. Configurator for PSU0201 Manual Peripheral Switch Subsystem

--- Diagram ---

Standard   To 15 More Optional Switch Units

[Diagram showing PSU0201, PSF0511, PSF0512, and PSF0512 connection]

3 channel spaces (board slots) required in the IOM. See Section IV.E.
D. Examples of Use of Manual Peripheral Switches

1. Example 1 - to switch a peripheral device between two device processors. Could use, for example, to switch a tape unit between two MTPs or a card reader between two URPs.

   The reverse approach could also be used, i.e., to select one of two devices to connect a device processor.

   *Interfaces included in each switch unit*
SECTION XVI
Configuring Manual Peripheral Switch Subsystems

2. Example 2 - to switch a device processor between two physical IOM PSI channels. Could use, for example, to switch an MTP between two physical IOM PSI channels.

The reverse approach could also be used, i.e., to select one of two device processors to connect to an IOM PSI channel. Since only one IOM channel is required, and one each would have been included in the prices of the device processors, PSU0201 would be the lower priced approach. PSU0201 price does not include an IOM channel, which would be superfluous in this case.

---

May be on same IOM, different IOM in same system or in different systems. One IOM channel comes with the device processor, one with PSF0511 which is included in PSU0200 price

\[ a \text{ Interfaces included in each switch unit} \]
SECTION XVI
Configuring Manual Peripheral Switch Subsystems

3. Example 3 - to switch a device between two device processors and to switch a device processor between two IOM physical channels.

In this example you would order one PSF0511 switch unit in addition to the PSU0200 console, which includes one PSF0511. Note that this example could be handled by configuring a PSU0201 console and one PSF0512 switch unit at a slightly higher cost.

---

Memory

IOM PSI Channel

IOM PSI Channel

Device Processor

Device Processor

PSU0200 Console

PSF 0511

PSF 0511

Device Processor

Device

a Interfaces included in switch unit
SECTION XVII
Generics of Data Communications
Front-end Network Processors (FNPs)

A. Generic Data Communications World Components

Block diagram of typical components

1. Terminal
2. Modem
3. Modem
4. ACU
5. Modem
6. LIU 1 or More
7. GPCB 1 or More
8. Base
9. FNP
10. Overall FNP
11. Terminal
12. Direct Connect
13. Modem
14. Modem

a. Provided only in DN6624/6632
b. In-plant connection. Also obtainable by current loop interface terminals.

B. Summary of functions of generic components and their potential configuration effects.

1. Based on block diagram above.
2. A conceptual approach at this point. Actual sequence of considerations may vary from that shown on block diagram.
SECTION XVII
Generics of Data Communications
Front-end Network Processors (FNPs)

1 Terminal selection is one of the fundamental components which exerts a major configuring effect. Some terminal considerations affecting configuring:

   a. Terminal type - batch, keyboard (CRT or hard copy or both). May affect the choice of line interface unit (LIU) and communications base used in the FNP.

   b. Terminal operating speed in bits per second or baud rate or characters per second. Determines minimum line speed and modem speed to be selected.

   c. FDX (full-duplex) or HDX (half-duplex) operation of the line and terminal. May affect choice of modem, line type, LIU type.

   d. Synchronous or asynchronous physical transmission technique. Affects modem type, and choice of LIU and communications base in FNP.

   e. Code set used. May affect LIU choice in FNP.

   f. Line discipline or link protocol used by terminal. May affect LIU and communications base choices in FNP, may determine whether synchronous or asynchronous transmission technique is to be used. BSC (Binary Synchronous Communications) protocol, e.g., requires a specific BSC-oriented LIU if the BSC CRC (Cyclic Redundancy Check) feature is to be used. HDLC protocol also requires a specific LIU. May affect choice of modem used.

2 Modem selection is directly affected by terminal selection and line speed. Modem stands for modulator-demodulator, a device for transforming signals between the line and the device at the end of the line. Other generic names -- data set, digital subset, subset, coupler.
SECTION XVII
Generics of Data Communications
Front-end Network Processors (FNPs)

g. Most commonly there will need to be a modem (or equivalent device), at each end of a line obtained from a public carrier company. Thus modem costs can become significant.

h. Some terminals use a current loop type of interface. These do not use modems. At the LIU end a special connection is required in the LIU, which we include.

i. Modems are often either for synchronous or asynchronous transmission. In synchronous operation the modem at each end furnishes timing signals to keep each end of the line in synchronism with the other. If modem used does not provide timing signals in synchronous transmission cases, a timing device must be attached to terminal and also be a feature of the LIU used.

3 Communication line considerations are multiple. This paragraph refers to "line" in the sense of links provided directly or indirectly by public service carriers, such as telephone companies. Such companies are also known as common carriers. In 13 we will show "in-plant" type links or lines which do not involve public service carriers and do not require modems. Some line considerations affecting configuring are:

j. Whether 2-wire or 4-wire lines are used. May affect modem choice or whether a modem is used.

k. Whether public lines are used (also known as dialed, switched or dial-up lines) or private lines are used (also known as leased or direct lines). Private lines do not involve dialing. There is in effect a permanent path established. May affect modem choice and modem attachments such as ACU (automatic calling unit).

l. If private lines are involved, there are various levels of line conditioning available from the telephone company to regulate line quality - noise level, error probability, etc. Level of conditioning chosen does not affect modem type or other considerations normally.
SECTION XVII
Generics of Data Communications
Front-end Network Processors (FNPs)

m. Whether line is to be used on half-duplex (HDX) two-way alternate (TWA) basis, or full-duplex (FDX) basis. FDX lines can be used on either a TWA basis or two-way simultaneous basis (TWS). May affect modem type.

n. Whether line is used for both data and voice transmission, called DUV (data under voice). Normally the use of such transmission does not affect the modem or LIU choice.

Modems when used must normally be used at each end. Modems at ends of a line must be carefully matched in their characteristics. Some modems support ACU (automatic calling unit) feature. This requires an LIU with matching feature. ACU capability allows the FNP NPS software to "dial" the telephone number of a terminal and to send output to the terminal if the terminal is in operational condition. Eliminates need for programmer to keep asking about status of his job as to whether output is ready.

Line interface unit (LIU) is contained within a communication base which in turn is in an FNP. LIU is a generic term used in this material and not found in published Honeywell FNP or Level 66 material. There is a specific Honeywell name for LIUs used in our GPCB (general purpose communications base) and a different name for LIUs used in our ACBs (asynchronous communications bases).

LIU is a termination point or connection point into our FNP for a line. The path for a given line through an LIU is often called a channel, sometimes a subchannel.

There are multiple types of LIUs, some very general, some specialized. Some LIUs interface one line each, some two lines each, some 3 or 4 lines each.

LIUs divide grossly into those that connect only in the ACB and those that connect only into the GPCB. LIUs are not included in the base FNP price, but LIUs must be configured. Every line must terminate at an LIU, regardless of the type of line, whether by common carrier or in-plant connection.
SECTION XVII
Generics of Data Communications
Front-end Network Processors (FNPs)

7 GPCB (general purpose communications base) provides common service logic for a mixture of LIUs, the number of LIUs varying with the FNP model.

GPCB is completely general in its capabilities. Any line speed, code set, link protocol, transmission technique that is supported by our FNP hardware is supported by GPCB.

ACB (asynchronous communications base) provides common service logic for up to 24 lines (ACB1) or 52 lines (ACB2). Only asynchronous lines at up to 300 bps lines can be terminated into ACB. Only original models of DN6624 and DN6632 provide ACB.

8 Base FNP. Maximum of 4 FNPs per Level 66 system, depending on Level 66 model and configuration.

9 Link to Level 66 mainframe is provided by a DIA (direct interface adapter) included in base price of every FNP. The DIA also includes a physical channel in the Level 66 IOM. The link allows use as a front-end (processor) to the information processor (Level 66).

10 Link to mass store processor is required in NPS environment. The channel logic to receive the MSP channel is included in base price of DN6624 and DN6632 FNPs. It is available as an option on DN6616/6670 and DPS INP/ANP. Not available on 66/05 CPS6058 INP.

11 Modem Bypass. Used for in-plant connection. No line furnished by a common carrier. Modem bypass units perform same basic function as modems.

Cable length restrictions exist between two successive bypass units but additional units can be inserted into the line to act as repeaters or signal strengtheners. In-plant connection approach is considerably lower in long-term cost versus use of modems and common carrier lines.

12 Direct Connect. Another way to use in-plant connection. Line or cable length is much shorter than with use of Modem Bypass approach. Direct connect features cannot be repeated in a line. Current loop approach is another form of in-plant connection for distances up to 1000 cable feet.
An in-plant line established by a cable. No involvement of a common carrier. Connection line must not, by law, cross a public boundary, otherwise the line must be furnished by a (regulated) common carrier company, directly or indirectly. Advantage -- lower costs. Disadvantage -- no access to telephone network, no way to dial another destination.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNP s

A. Required Components

1. Base FNP -- DCP66XX.

2. One or more line interface units (LIUs).
   a. Every line must terminate in an LIU, via any line from a common carrier or an in-plant connection.
   b. Every LIU represents electronic logic on circuit boards for which space is provided in slots in a communication base - GPCB or ACB type. Every LIU thus connects to a GPCB or ACB. Lines terminated in ACB cannot run at more than 300 bps each.

3. One or more in-plant connection features if lines are not furnished by common carrier companies. In-plant connection is by use of modem bypass or direct features. Each must connect to an appropriate LIU. Depending on the terminal and distance, current loop interface LIUs can be used, with no need for specific direct connect or modem bypass features.

4. If required quantity of lines to be connected cannot be handled by the standard quantity of communication base(s) furnished, configure more GPCBs and/or ACBs as required. Requires DN6632.
SECTION XVIII
Configuring Original DN6616/6624/6632 PNPs

B. Block Diagram of Original DN6616/6624/6632 PNPs - all optional type numbers are in dotted form.

<table>
<thead>
<tr>
<th>DN6616 - DCP6616</th>
<th>Added Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN6624 - DCP6624</td>
<td>None</td>
</tr>
<tr>
<td>DN6632 - DCP6632</td>
<td>To 32KW - DCM0001</td>
</tr>
<tr>
<td></td>
<td>To 64KW - DCM0002</td>
</tr>
<tr>
<td></td>
<td>To 128KW - DCM0003</td>
</tr>
</tbody>
</table>

Console Adapter and Console

Tape Cassette and Adapter

Interval Timer | PSA Channel for Link to MSP - DN6624/6632
---|---

Direct Interface Adapter (DIA) Link to Level 66 IOM

2nd PSA Channel for DN6632 - DCF6043

PSA Channel for DN6616 - DCF6043

Base GPCB. Up to 32 Lines via up to 16 LIUs - DN6624/6632. 1-8 Lines via up to 4 LIUs - DN6616

Second GPCB | DN6632 Only
---|---

Third GPCB | DN6632 Only

ACB1 - DN6624/6632 Only. Up to 24 Lines Via up to 6 LIUs

1-5 ACB2 (DCU6201) - DN6632 Only. Each up to 52 Lines via up to 13 LIUs each

CMA - DN6632 Only.

DCF6030

2nd DIA - DN6624/6632 Only.

DCF6041

Upgrade kits to raise DN6616 to DN6624 or DN6632 capability or to raise DN6624 to DN6632 capability. Section XVIII, H, J
C. Original DN6616/6624/6632 Architecture and FNP IOM Adapter Spaces

1. Block diagram - showing maximum capability of DN6632. DN6616 and DN6624 have subsets of this capability in their basic configuration.

NOTE - If you attempt to configure a DN6632 with all possible options in addition to standard complement of features connected along I/O bus, the total would be 17 adapter connections. The limit of adapter connections, however, is 16.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

2. FNP IOM Adapter Spaces

<table>
<thead>
<tr>
<th>FNP</th>
<th>Standard Complement</th>
<th>Spaces for Standard Complement</th>
<th>Extra Spaces Available</th>
<th>Options Available</th>
<th>Spaces Needed By Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN616</td>
<td>DIA Cassette</td>
<td>5</td>
<td>3</td>
<td>PSA Channel-DCF6043</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Console 1 GPCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN6624</td>
<td>DIA Cassette</td>
<td>9</td>
<td>2</td>
<td>CMA-DCF6030</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Console 1 GPCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 ACB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 PSA</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DN6632</td>
<td>DIA Cassette</td>
<td>10</td>
<td>11</td>
<td>CMA-DCF6030</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Console 2 GPCB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 ACB</td>
<td></td>
<td></td>
<td>2nd DIA-DCF6041</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1 PSA</td>
<td></td>
<td></td>
<td>1-5 ACB-DCF6041</td>
<td>1 each</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3rd GPCB-DCF602</td>
<td>1 each</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2nd PSA Channel DCF6043</td>
<td>3</td>
</tr>
</tbody>
</table>

NOTE - If you attempt a DN6632 with all possible options in addition to standard complement of features connected along I/O bus, the total would be 17 adapter connection. The limit of adapter connections, however, is 16.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNP

D. Configurator Flowcharts for Original DN6616/6624/6632 FNP

1. Base FNP and GPCB.

![Diagram of Base FNP and GPCB flowchart]

- **Base FNP**
  - DCP6616-DN6616
  - DCP6624-DN6624
  - DCP6632-DN6632

- **See Adapter Spaces Limits**

- **GEF**
  - DN6632 only.
  - To 16 LIUs, To 32 lines
  - DN6616.
  - To 4 LIUs, To 8 lines

- **LIUs Any Mix**
  - To 4 in DN6616
  - To 16 in DN6624/6632

- **Multi Function**
  - DCF6011
  - DCF6051
  - DCF6057
  - DCF6064
  - DCF6065
  - DCF6066

- **Footnotes:**
  - a "as Available" status
  - b HDLC Protocol
  - c BSC Protocol

- **Synchronous Only**
  - DCF6013/6014/6040
  - b DCF6050/6053/6054/6058/6059/6019
  - DCF6052
  - c DCF6055/6061/6062/6063/6015
  - DCF6056
  - DCF6060

- **Asynchronous Only**
  - DCF6010
  - DCF6011

- **ASA**
  - Asynchronous Speed Adapter
  - Must be one (only) per GPCB
  - DCF6001
  - DCF6002

- **Note**
  - Speeds defined by ASA chosen. Section K
  - Bit Rate Options
  - Maximum one per ASA
  - DCF6003-6009
  - DCF6038
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

2. For ACB (Asynchronous Communication Base)

Base FNP
DCP6624-DN6624
DCP6632-DN6632

See Adapter
Spaces
Limits
See Section
XVIII. C

ACB

ACB1

1 Standard

ACB2

Note
DCU6201.
Up to 5 in
DCP6632
only, 1 Adapter
space each

LIUs.
Any Mix
To 6 in ACB1
Speed determined by ASA
To 13 each ACB2

ASA

Asynchronous Speed
Adapter. Must be
one (only) per ACB

DCF 6026
3 lines each

DCF 6027

DCF 6028
4 lines each

DCF 6029

See Section
XVIII-G if modem bypass
or direct connect used

See Section
XVIII. K

See Section
XVIII. K

DCF6022

DCF6023

DCF6024

DCF6025

4 line
speeds
supported
by each.

Determine maximum lines
connectable on each ACB, based
on line limits and character
spaces per line in ACB multi-
plexer message frame

See Section
XVIII. F

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SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

E. Configurator Flowchart for Original DN6616/6624/6632
(continued) - for other options

Base FNP
DCP6616 - DN6616
DCP6624 - DN6624
DCP6632 - DN6632

Other Options -- Configurator Flowchart

Configure from choices below up to limit of adapter spaces available. See DN66XX architecture and adapter spaces in Section C.2. above.

Capability Upgrade Kits -- See Section H below.

DN6616
3 Spaces Available

PSA Channel
DCF6043 3 Spaces

DN6624
2 Spaces Available

DCF6030
1 Space

CMA

DN6624/6632
only. Maximum of 1

DCF6041
2 Spaces

DIA

DN6624/6632
Only. 1 Maximum

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SECTION XVIII
Configuring Original DN6616/6624/6632 PNPs

F. ACB Line Connectability Determination - Original DN6624/6632

1. Number of lines which an ACB can terminate is determined by the ACB type (ACB1 or ACB2) and the line speed.

2. Every 100 ms (equal to interval from character to character on a 110 bps/10 cps line) ACB automatically composes a message frame containing 52 character spaces. The number of character spaces which must be allocated to a line is a direct function of the line speed, i.e., how many characters that line can deliver in a 1000-ms period:

```
Message Frame - 52 character spaces

   1  2  3  4  5  6  7  8  9  ------  51  52

3 spaces per line at 200 or 300 bps per line
2 spaces per line at 134.5 or 150 bps per line
1 space per line at 50, 75, 100, or 110 bps per line
Each ACU (automatic calling unit) takes one space
```

3. Determining Line Mix Capacity of an ACB
   a. Determine total character spaces required for the number and speed.
      1) Maximum character spaces - 52
      2) Maximum number of lines - 24 (ACB1) or 52 (ACB2)
   b. Whichever limit is reached first controls the actual number of lines configurable.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

c. You can configure various line speed mixes up to 300 bps to use all 52 character spaces so long as you do not exceed the line limit.

d. Example 1 - 24 110-bps lines could be configured on ACB1, using only 24 character spaces.

e. Example 2 - 24 150-bps lines could be configured on ACB1, using only 48 character spaces.

f. Example 3 - 24 300 bps lines could not be configured on ACB1 because 72 character spaces would be required against the limit of 52. 17 300-bps lines and one 110 bps lines could be configured on ACB1, for example, using all 52 character spaces.

4. Time-division multiplexer aspects affect configuring by limiting the number of lines configurable on an ACB as a function of mix of line speeds involved.

5. NPS or GRTS does the demultiplexing on input from ACB (separating characters into their respective buffer areas, in memory, one for each line). On output NPS or GRTS does the combining (multiplexing), composing data frames with mixed characters to send to the ACB

6. NPS or GRTS thus builds up input messages for each line by demultiplexing the incoming frames from ACB. It does the opposite on outgoing messages to terminals.

7. There is no program interrupt of FNP on message completion in case of ACB lines. The ACB itself causes an interrupt every 100 ms, the time interval between frames.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

8. Additional aspects of ACB as a time-division multiplexer.

A time division or character space (8-bits each) containing a character

If no actual data character arrives at a given time division, a fill
character is inserted automatically by hardware for that time division

Each time division is dedicated to a given line. Depending on its speed
each line is allotted 1, 2, or 3 character spaces (time divisions), for
the 1, 2 or 3 characters which could arrive on that line within the
frame time

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>-----------------</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td>50</td>
<td>51</td>
<td>52</td>
</tr>
</tbody>
</table>

Data Message Portion of full Frame

52 time divisions. One frame sent automatically every
100 ms, whether or not any data has arrived from
terminals or from FNP.

Full ACB message frame actually has 59 time divisions

59 time slots

S S S S T&D STX 52 Data Time-Divisions FCC

Synchronization characters

Frame Check Character
SECTION XVIII
Configuring Original DN6616/6624/6632 FNsPs

9. How many lines may use one ACB simultaneously?
   a. A function of the line speed, thus how long it
takes for the bits to arrive to form one
character.
   b. For example, one ACB with DCF6025 ASA handles up
to 52 110 bps terminals, or up to 26 terminals
operating at 134.5 bps/150 bps, or up to 17
terminals operating at 300 bps, or combinations
of these terminals and speeds.
   c. The frame time is 100 ms.
   d. 10 cps asynchronous terminals (TTY 33/35) = 100
ms/character = 1 character arriving per line in
one frame time, thus up to 52 such terminals
simultaneously. One time division allocated per
line.
   e. 15 cps asynchronous terminals (TTY
37/T-300/IBM2741/DATEL) - 66.7 ms/ character =
1.5 characters arriving per line in one frame
time, thus up to 26 such terminals
simultaneously. 2 time divisions allocated per
line.
   f. 30 cps asynchronous terminals (T-300) = 33.3
ms/character = 3 characters arriving per line in
one frame time, thus up to 17 such terminals
simultaneously, 3 time divisions allocated.
G. Block Diagram of Communication Line Connection Possibilities for Original DN6616/6624/6632

Line Connection Possibilities

<table>
<thead>
<tr>
<th>In-Plant Connections</th>
<th>Public Carrier Connections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Connect or Current Loop</td>
<td>Modem Bypass Option</td>
</tr>
<tr>
<td>Cable</td>
<td>Cable</td>
</tr>
<tr>
<td>Terminal Subsystem</td>
<td>Terminal Subsystem</td>
</tr>
</tbody>
</table>

\(^a\) 2500 cable feet between successive modem bypass features. Multiple bypasses can be used.

Mixtures of approaches A, B, C can be used in a multiline LIU, one approach per line.

See next page for LIUs usable with in-plant connections.
H. In-plant Line Connection Features for Original DN6616/6624/6632

1. Use this chart for Direct Connect and Modem Bypass features options. It shows the applicable LIUs to which those in-plant connection features can be attached. Identify on your order the terminal to be used with each feature.

2. Terminals using 20 ma current loop interfaces cable-connect to current loop-oriented LIUs.

---

**Appropriate LIUs in GPCB, ACB**

<table>
<thead>
<tr>
<th>Synchronous</th>
<th>Asynchronous</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>GDCF6012</td>
<td>DCF6010</td>
</tr>
<tr>
<td>GDCF6013</td>
<td>DCF6017</td>
</tr>
<tr>
<td>PDCF6014</td>
<td>PDCF6018</td>
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<td>PDCF6015</td>
<td>DCF6064</td>
</tr>
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<td>CDCF6017</td>
<td>CDCF6051</td>
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<td>CDCF6057</td>
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<td>UDCF6065</td>
</tr>
<tr>
<td>UDCF6066</td>
<td>UDCF6066</td>
</tr>
</tbody>
</table>

---

**Terminal Subsystem**

- **Direct Connect Feature**
  - Per Line Involved
  - Cable Length Determined By Subsystem Controller

- **Modem Bypass**
  - Minimum 2 Modem Bypass
  - Features Per Line Involved
  - Maximum 2500 Cable Feet Between 2 Successive Bypass Units

---

<table>
<thead>
<tr>
<th>Synchronous</th>
<th>Asynchronous</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>G</td>
</tr>
<tr>
<td>GDCF6012</td>
<td>DCF6010</td>
</tr>
<tr>
<td>GDCF6013</td>
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<tr>
<td>UDCF6066</td>
<td>UDCF6066</td>
</tr>
</tbody>
</table>

---

**Terminal Subsystem**

- **Direct Connect Feature**
  - Per Line Involved
  - Cable Length Determined By Subsystem Controller

- **Modem Bypass**
  - Minimum 2 Modem Bypass
  - Features Per Line Involved
  - Maximum 2500 Cable Feet Between 2 Successive Bypass Units

---

a. No ACU Support
b. Not for speed greater than 9,600 bps
c. Maximum speed 1,800 bps

---

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SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

I. Upgrade Configuration Flowchart for Original DN6616/6624/6632

1. Installed DN6616 can be upgraded on-site to a base DN6624 or DN6632 capability level.

2. Installed DN6624 can be upgraded on-site to a base DN6632 capability.

3. Installed DN6632 can be upgraded on-site with extended memory capacity.

4. Any installed FNP of DN6616/6624/6632 type can be upgraded on-site to the maximum DN6632 capability.

5. All upgrades are achieved via standard upgrade kits.

6. All above FNPs retain original DN66XX identity after being upgraded. A DN6616 raised to maximum DN6632 capability is still a DN6616, for example.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

7. Upgrade kit sequence flowchart for all possible upgrades of original DN6616/6624/6632.

1) Note -- Each box with DN66XX in it implies the full capability is present for the DN66XX model shown. Each DN66XX retains its original designation even though upgraded to capability of a higher model.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

8. Refer also to Section C above for DN66XX architecture and adapter spaces allotments. DN6624 and DN6632 or FNPs raised to the equivalent of DN6624 or DN6632 cannot have an adapter spaces complement which exceeds that for an actual DN6624 or DN6632.

J. Configuring for Dual-FNP Fail-Soft System

1. For NPS environment. See discussion in ASP Outline on Data Communication Hardware - FNPs and Communications Software - NPS and GRTS.

   Applies only to Original DN6632 currently. Original DN6624 does not offer enough memory to support current NPS versions.

2. Required components.
   a. CMA (Computer Monitor Adapter) -- One for each of the two FNPs. Type number is DCF6030.
   b. LTD (Line Transfer Device) -- One required for each 15 LEFs.
   c. LEF (Line Expansion Function) -- Select at least one. Choose type apropos to line switching function and type of line wanted.

3. Check your total configuration for each FNP to ensure that the CMA configuring does not exceed the available extra FNP IOM adapter spaces allowance. See Section XVIII.C.

4. Schematic of LTD and LEFs

![Diagram of LTD and LEFs]

FIGURE 4
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

5. Roles and Types of Line Expansion Functions (LEF)

a. Five models - 3 used to switch a group of lines (modems) between 2 communication bases, 2 used to select between two sets of lines to switch to one communications base.

b. LEF schematics -

1-6 modems or 1-24 current level lines

ACB or GPCB

DCF6032/ DCF6036

ACB or GPCB

1-6 Modems

ACB or GPCB

1-6 Modems

DCF6032 is for 1-6 asynchronous lines without supervisory channels. Lines switched between 2 communications bases. DCF6036 is for switching up to 24 2-wire current interface lines.

For 1-6 asynchronous lines without supervisory channels. Lines switched between 2 sets of modems and a communications base.

1-4 modems

ACB or GPCB

DCF6034

ACB or GPCB

1-4 Modems

ACB or GPCB

1-4 Modems

DCF6035

For 1-4 synchronous or asynchronous lines, with/without supervisory channels. Lines switched between 1-4 modems and 2 communications bases.

For 1-4 synchronous or asynchronous lines with/without supervisory channels. Lines switched between 2 sets of modems and a communications base.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

c. Except in case of current loop lines a direct
connect feature of appropriate type (asynchronous
or synchronous) or modem bypass (asynchronous or
synchronous) may be used in place of a modem.

K. List of Type Numbers and Their Functions for Original
   DN6616/6624/6632

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Base DN6600 FNP (1 or more ASAs required as shown later in this section)</td>
</tr>
<tr>
<td>DCP6616</td>
<td>DN6616 with 24KW/48KB memory, supervisory console and adapter, tape cassette unit and adapter, interval timer, DIA link to Level 66 IOM channel, one abbreviated GPCB equipped to handle 1-4 LIUs for maximum of 4-8 lines. No LIUs included. Memory size insufficient for NPS.</td>
</tr>
<tr>
<td>DCP6624</td>
<td>Same as DCP6616 plus PSA channel for direct link to MSP, one full GPCB equipped to handle 1-16 LIUs for a maximum of 16-32 lines, one ACB1 equipped to handle 1-6 LIUs for a maximum of 18/24 lines. No LIUs included. 24KW/48KB memory insufficient for NPS. 32KW/64KB maximum memory of DN6624 is marginal for NPS 2/H or NT1. Not usable for NPS NT2 or later, or DP1 (DPS).</td>
</tr>
<tr>
<td>DCP6632</td>
<td>Same as DCP6616 but with 32KW/64KB memory plus PSA channel for direct link to MSP, 2 full GPCBs each equipped to handle 1-16 LIUs for a maximum of 16-32 lines each, one ACB1 equipped to handle 1-6 LIUs for a maximum of 18-24 lines. No LIUs included. 32KW/64KB base memory is marginal for NPS 2/H or NT1. NT2/NT3/DP1(DPS) require 64KW/128KB minimum. Maximum useful memory for NPS on DN6632 is 96KW/192KB.</td>
</tr>
</tbody>
</table>
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

2. Memory Expansion Kits - limit of one each

**DCM0001**  Upgrade on-site to raise DCP6624 from 24KW/48KB to 32KW/64KB. Also to raise DN6616 to 32KW size with DCK6603 as prerequisite.

**DCM0002**  Extension or first upgrade on-site to raise FNP memory size from 32KW/64KB to 64KW/128KB. For DCP6632. Also for DCP6616/6624 which have been upgraded to 32KW/64KB.

**DCM0003**  Extension or second upgrade on-site to raise FNP from 64KW/128KB to 128KW/256KB. Cannot be installed without DCM0002.

3. Capability Upgrades

**DCK6603**  Upgrade DCP6616 on-site to standard capability of DCP6624. DCF6043 must also be ordered.

**DCK6601**  Upgrade on-site from DCP6624 having 24KW/48KB memory to 32KW/64KB and with full capability content of standard DCP6632. Can also be applied to DCP6616 with DCK6603 as prerequisite.

**DCK6602**  For DCP6624 or DCP6616, both with DCM0001 as prerequisite. If DCP6616, DCK6603 also a prerequisite. Upgrade on-site to full capability content of standard DCP6632.

4. Special Options to Base FNP other than GPCB, ACB - Where DCP6624/6632 are indicated in the following type numbers it is understood that the feature applies also to DCP6616 or DCP6624 upgraded to equivalent standard DCP6624 or DCP6632 capability.

**DCF6030**  CMA (computer monitor adapter) for DCP6624 or DCP6632. Used as watchdog timer in dual (redundant) FNP standby configuration in NPS environment. One required for each of the paired FNPs. DCP6624 does not provide enough memory to support current NPS versions.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

DCF6031 LTD (line transfer device) for DCP6624 or DCP6632. Used in dual (redundant) FNP standby configuration in NPS environment. Supports mix of up to 15 LEFs (DCF6032, DCF6033, DCF6034, DCF6035, DCF6036) for maximum of about 90 lines. Multiple LTDs can be used in a chained fashion.

DCF6032 LEF (line expansion function) for DCP6624 or DCP6632. Used in dual (redundant) FNP standby configuration in NPS environment. Switches 1-6 asynchronous lines without supervisory channels between two ACBs or GPCBs. Cannot be used for current level terminals.

DCF6033 LEF same as DCF6032 above except that it switches 1-6 asynchronous lines from GPCB or ACB between two sets of modems or asynchronous Direct Connect features (DCF6020) or Modem Bypass features (DCF6927).

DCF6034 LEF same as DCF6032 above except that it switches 1-4 asynchronous or synchronous lines, with or without supervisory channels, between two GPCBs or ACBs. Cannot be used with current level terminals.

DCF6035 LEF same as DCF6032 above except that it switches 1-4 asynchronous or synchronous lines, with or without supervisory channels, from GPCB or ACB between two sets of modems or asynchronous Direct Connect features (DCF6020) or synchronous Direct Connect features (DCF6021) or asynchronous Modem Bypass features (DCF6927) or synchronous Modem Bypass features (DCF6927).

DCF6036 LEF same as DCF6032 above except that it switches 1-24 asynchronous lines from current level terminals between 2 ACBs or 2 GPCBs or mixed ACB and GPCB.

DCF6041 DIA (direct interface adapter) for DCP6624 or DCP6632. Provides link to a second Level 66 IOM or second IOM physical channel. Price includes IOM channel. Remember that each FNP includes one DIA on standard basis. DCF6041 uses two adapter spaces in FNP IOM. If used on DCP6624 no other options to base FNP can be configured.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

DCF6043  PSA (peripheral subsystem interface adapter) for DCP6616. Provides channel in DCP6616 for direct link to MSP. Required if NPS is used. Can also be used to provide a second PSA for DN6632. No NPS support of 2 PSAs concurrently. New NPS bootload required. See Section XII.K.

5. GPCB options (LIUs in GPCB are known officially as CCIs - communication channel interfaces).

DCU6202  Third GPCB in DCP6632. Equipped to handle 1-16 LIUs for a maximum of 16-32 lines. No LIUs are included but must be configured for all line terminations.

6. Multi-function LIUs - at least one should be configured, if possible, per PNP for greatest flexibility.

DCF6051  Terminates 2 lines. EIARS232C interface. Any code 5-8 bits. HDX or FDX. Synchronous (to 9600 bits per second) or asynchronous (to 2400 bits per second). Either line can be used either way. On "As Available" status.

DCF6057  Same as DCF6051 except ACU is included to support one of the two data lines. ACU support requires NPS. On "As Available" status.

DCF6064  Terminates 2 lines. EIARS232C interface. Any code 5-8 bits. HDX or FDX. Synchronous to 9,600 bps or isochronous to 9,600 bps. Asynchronous to 2,400 bps. Each line can run at different speed and with different transmission technique - synchronous, asynchronous, isochronous. Isochronous allows use of standard synchronous modems with asynchronous terminals above 2,400 bps.

DCF6065  Same as DCF6064 except provides Military Standard 188C interface.

DCF6066  Same as DCF6066 except that ACU is included to support one of the lines. ACU support requires NPS.
7. GPCB Synchronous-only LIUs.

**DCF6013**  
Terminates 2 lines at up to 9,600 bits per second each. Each line can run at different speed. EIA RS232C interface. ASCII code. HDX or FDX. For Honeywell VIP, RCI, MMI link protocols and various others.

**DCF6014**  
Same as DCF6013 but includes ACU for one line. ACU support requires NPS. On "As Available" status.

**DCF6015**  
Terminates 1 line at up to 9,600 bits per second. For BSC link protocol with use of CRC (Cyclic redundancy check). CRC hardware included in DCF6015. EIA RS232C interface. ASCII or EBCDIC code, transparent or non-transparent mode. HDX or FDX.

**DCF6019**  
Terminates 1 line at up to 9,600 bits per second. Honeywell logical HDLC link protocol. Software support via NPS NT2 and DPl(DPS), and GRTS-II, lQ79. Any code. Bit-oriented protocol. EIA RS232C interface. HDX or FDX.

**DCF6040**  
Terminates 2 lines at up to 9,600 bits per second. Military standard 188C interface. HDX or FDX. Any code 5-8 bits. On "As Available" status.

**DCF6050**  
Terminates 1 line at up to 9,600 bits per second. Honeywell logical HDLC link protocol. Software support via NPS NT2 and DPl (DPS), and GRTS-II, lQ79. Any code. Bit-oriented protocol. Military standard 188C interface.

**DCF6052**  
Terminates 2 lines. One line can run at up to 50,000 bits per second (wideband line). Second line can run at up to 9,600 bits per second, EIA RS232C interface. Any code 5-8 bits. HDX or FDX. Type 301 or 303 modems or equivalent for wideband line.

**DCF6053**  
Same as DCF6019, for Honeywell logical HDLC link protocol, but includes ACU support. ACU support requires NPS. HDLC software support by NPS NT2 and DPl (DPS), and GRTS-II, lQ79.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

DCF6054 Terminates 1 line at up to 50,000 bits per second, wideband line. Honeywell logical HDLC link protocol. Software support via NPS NT2 and DPL (DPS), and GRTS-II, 1Q79.

DCF6055 Terminates 1 line at up to 50,000 bits per second, wideband line. BSC link protocol. CRC Cyclic Redundancy Check hardware included. ASCII or EDCDIC code, transparent or non-transparent mode. HDX or FDX.

DCF6056 Terminates 2 lines. Military standard 188C interface. One line at up to 50,000 bits per second, wideband line. Second line at up to 9,600 bits per second. HDX or FDX. Any code 5-8 bits.

DCF6058 Terminates 1 line at up to 50,000 bits per second. Honeywell logical HDLC link protocol. HDX or FDX. HDLC software support via NPS NT2 or DPL (DPS), and GRTS-II, 1Q79. V.35 interface, CCITT standard, analogous to EIA interface in U.S.

DCF6059 Terminates 1 line at up to 50,000 bits per second. Wideband line, military standard 188C interface. Honeywell logical HDLC link protocol. Software support via NPS NT2 and DPL (DPS), and GRTS-II, 1Q79.

DCF6060 Terminates 2 lines. One line at up to 50,000 bits per second, wideband line, V.35 interface. One line at up to 9,600 bits per second, EIA RS232C interface.

DCF6061 Terminates 1 line at up to 50,000 bits per second, wideband line, V.35 interface.

DCF6062 Same as DCF6015, for BSC link protocol, except ACU support is included. ACU support requires NPS.

DCF6063 Terminates 1 line at up to 9,600 bits per second. Military standard 188C interface. BSC link protocol.
SECTION XVIII
Configuring Original DN616/6624/6632 FNP's

8. GPCB ASA and Bit Rate Options Related to ASAs.

**DCF6001**
ASA (asynchronous speed adapter). Provides standard support for 7 specific asynchronous line speeds - 110, 134.5, 150, 300, 1050, 1200, 1800 bits per second. Supports one more speed by means of one optional bit rate option below. One ASA, DCF6001 or DCF6002, must be configured in every GPCB regardless of whether asynchronous lines are connected. Only one ASA per GPCB. Asynchronous lines can run only at one of the ASA-supported speeds. GRTS/NPS software version used defines the acceptable speed for each asynchronous line.

Note - ASA does not terminate or interface lines, LIUs do that. ASA provides the mix of speeds at which lines connected to the asynchronous type LIUs can run.

**DCF6002**
ASA (asynchronous speed adapter). Same as DCF6001 except that it provides standard support for 6 specific asynchronous line speeds - 50, 110, 200, 300, 600, 1200 bits per second. DCF6002 intended for European use since in U.S.A. we do not have 50 or 200 bits per second speeds. See DCF6001 description also.

**DCF6003**
Bit rate option for ASA for 50 bits per second asynchronous lines. Supports only 5-bit code.

**DCF6004**
Bit rate option for ASA for 75 bits per second asynchronous lines. Supports only 5-bit code.

**DCF6005**
Bit rate option for ASA for 134.5 bits per second asynchronous lines.

**DCF6006**
Bit rate option for ASA for 200 bits per second asynchronous lines.

**DCF6007**
Bit rate option for ASA for 600 bits per second asynchronous lines.

**DCF6008**
Bit rate option for ASA for 1,050 bits per second asynchronous lines.

**DCF6009**
Bit rate option for ASA for 1,800 bits per second asynchronous lines.
SECTION XVIII
Configuring Original DN616/6624/6632 FNPs

DCP6038  Bit rate option for ASA for 2,400 bits per second asynchronous lines.

9.  GPCB Asynchronous-only LIUs

DCF6010  Terminates 2 lines at speeds limited by ASA DCF6001 or DCF6002. Each line can run at different speed. Any code 5-8 bits. EIA RS232C interface. HDX or FDX. On "As Available" status.

DCF6011  Terminates 2 lines at speeds limited by ASA DCF6001 or DCF6002. Each line can run at different speed. Any code 5-8 bits. HDX or FDX. 20 milliampere current loop interface. No modem used.

DCF6039  Same as DCF6010 except Military Standard 188C interface. On "As Available" status.

10.  ACB2 Option

DCU6201  ACB2 for DCP6632 only. 1-5 DCU6201 ACBs can be configured. Each is equipped to handle 1-13 LIUs for a maximum per ACB2 of 17-52 lines. Each must be equipped with one ASA from list below.

11.  ACB ASAs (asynchronous speed adapters) - for DCP6624/6632 only. Every Asynchronous Communications Base (ACB) must be equipped with one (only) ASA regardless of whether asynchronous lines are used on ACB. Remember that ASAs do not terminate or interface any lines to ACB1 or ACB2. Only ACB LIUs chosen from ACB LIUs section below do that.

DCF6022  Provides support for 4 specific asynchronous line speeds - 50, 75, 100, 200 bits per second - for ACB LIUs listed in LIUs section below. Lines connected to appropriate LIUs can run at any mix of these 4 speeds.

DCF6024  Same as DCF6022 except that the line speeds supported are 75, 110, 150, 300 bits per second.

DCF6025  Same as DCF6022 except that the line speeds supported are 110, 134.5, 150, 300 bits per second.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

DCF6023 Same as DCF6022 except that the line speeds supported are 50, 75, 110, 200 bits per second.

12. ACB LIUs (ACB LIUs are known officially as asynchronous channel groups)

DCF6026 Terminates 3 asynchronous lines at line speeds limited by the ACB ASA configured. Each line can run at different speed. Includes ACU (automatic calling unit) for one line. EIA RS232C interface. Any code 5-8 bits. HDX or FDX. 103A, 103E, 103F or 113 type modems or equivalent. ACU support requires NPS.

DCF6027 Same as DCF6026 except that 4 asynchronous lines are terminated and no ACU is included.

DCF6028 Terminates 4 asynchronous lines at speeds limited by the ACB ASA configured. Each line can run at different speed. HDX or FDX. Any code 5-8 bits. 20-milliampere current level interface. No modem used. For in-plant cable connection.

DCF6029 Terminates 4 asynchronous lines at speeds limited by ACB ASA configured. Military Standard 188C interface. Each line can run at different speed. HDX or FDX.

13. Options for in-plant Line Connections (that is without use of public carrier company lines). See Terminals For All Levels Bulletins 10 (1/6/78) and 14 (3/17/78) for cabling considerations.

DCF6020 Direct Connect feature for connection to asynchronous LIU for one line (cable). Length determined by maximum cable length from the terminal subsystem. One per line. Cannot be used with current level LIUs. No inherent speed limit.

DCF6021 Same as DCF6020 except for synchronous LIU. Maximum 9,600 bps.

DCF6927 Universal Modem Bypass feature for connection to one asynchronous or synchronous line (cable). A Level 6 feature usable into FNP LIUs. Minimum of two per line, one at FNP and, other at terminal.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

end. Maximum cable distance between two successive bypasses is 2500 cable feet. Intermediate bypasses can be used as line signal repeaters or strengtheners. Check your Level 6 technical support people for maximum cable lengths and maximum number of bypasses usable at satisfactory line noise levels. Speed to 9,600 bits per second. Cannot be used with current level LIUs. Can also be used with keyboard terminals.

Note: Current loop interface terminals cable-connect directly to a current loop-oriented LIU (DCF6011 on GPCB, DCF6028 on ACB). Up to 1000 cable feet.

L. Optimizing Price of Original DN6616/6624/6632 That You Propose

1. Due to great modularity of these FNPs you have various ways to configure for the same set of line requirements. Some configuration approaches will price out less than others. Pricing at lowest cost may be one of the optimization objectives you may have. FNPs can be configured to optimize toward lowest price or toward maximum terminals connectivity or toward line type flexibility or toward protection in case of GPCB/ACB failure (DN6632).

   a. Always examine carefully the line requirements as to quantity, speed, code requirements, terminal type.

   b. Don't be satisfied with just one pricing. Try one or two others to be sure you offer your prospect his maximum performance for lowest possible price, using some of the hints given below.

2. Hints on configuring these FNPs to minimize price for line requirements.
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

a. In GPCB try to use the LIUs which supply 2 lines each. They give lower costs per line at the loss of some generality.

b. Start with the built-in ACB1 (in DN6624 or DN6632) first in trying to satisfy all your asynchronous line requirements for speeds of 300 bps or less.

1) If built-in ACB1 capacity is not enough, then start using the built-in GPCB.

2) In configuring ACBs (either built-in ACB1, or optional ACB2 in DN6632) configure first your lowest speed requirements if you have a mix of asynchronous low-speed requirements not greater than 300 bps. This is due to the fact that varying numbers of ACB character spaces are used depending on line speed (1-3 spaces each).

Example: Assume prospect plans 30 TTY lines at 110 bps each and 15 T-300 lines at 300 bps each. You are considering a DN6624 in response. Remember that ACB1 provides max of 24 lines or 52 time divisions (character spaces), whichever limit is reached first.

Solution A - if you configure the 15 T-300 lines first:

- 15 x 3 time divisions = 45, leaving 7 unused
- 24 lines max minus 15 = 9 lines left for 9 TTYs x 1 time division = 9 time divisions required but only 7 are left; therefore, we could configure only 7 TTY lines on the ACB1
- We have used only 22 of the maximum 24 lines on ACB1 and all 52 time divisions. This means we will need to configure 23 remaining TTY lines on the built-in GPCB

Solution B - if you configure the lowest speed line requirements first (the TTY lines):

- 24 TTY lines x 1 time division = 24, leaving 28 unused
- We have used the maximum 24 lines on ACB1 here also but we will need to configure only 21 lines on GPCB
SECTION XVIII
Configuring Original DN6616/6624/6632 FNPs

c. If you find that you must configure one or more optional communications bases and your requirements are for mixed speeds, including some above 300 bps, you will need to configure at least an extra GPCB. Since GPCB can, however, handle low speed and higher speed lines, do not configure an ACB2 for low speed lines until you exhaust the line capacity of your additional GPCB. To configure both an optional GPCB and optional ACB arbitrarily in this case would mean paying the price of two communications bases unnecessarily. While the price per line is lower in ACB2 than GPCB, the cumulative difference would not be enough to offset the price of the ACB2 itself. ACB2 is for DN6632 only.

M. Configuring Example

Prospect wants original DN6624 for 10 asynchronous lines (5 at 300 bps, 5 at 1200 bps) using ASCII code. Also wants 10 synchronous lines at 2400 bps each (5 using ASCII, 5 using EBCDIC and BSC link protocol). Will use GRTS. Wants to minimize his costs:

1 DCP6624 Base DN6624, 24KW/48KB

-----

1 DCP6025 ACB ASA including 300-bps line speed support
2 DCP6027 LIUs for 5 300-bps asynchronous lines, with 3 lines of growth left in 2nd LIU

-----

1 DCP6001 GPCB ASA for asynchronous-only LIUs. Includes 1200-bps asynchronous line speed support
3 DCP6010 LIUs for 5 1200-bps asynchronous lines with one line of growth in 3rd LIU. ASCII code
3 DCP6013 LIUs for 5 2400-bps synchronous lines, ASCII, with one line of growth on 3rd LIU
5 DCP6015 LIUs for 5 2400-bps BSC lines, EBCDIC

-----

11 LIU spaces used of 16 available in GPCB. In ACB1 we used 5
of possible 24 lines and $5 \times 3 = 15$ of 52 possible character spaces (time divisions)
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

A. Relation to original DN6616/6624/6632

The original FNPs were based on DN355 technology. The new FNPs are based on Level 6 technology.

1. Are known collectively also as DN6600-1 series, are not available for DPS systems.

2. Will run under GRTS-I, GRTS-II or NPS. Some minor modifications have been made to the hardware that affect GRTS software. If your customer has modified his GRTS software or has written his own communications supervisor, you should review the hardware changes to ensure that they have no undue effect on customer's software. Contact Steve Wales, 8-341-7008 if clarification is needed.

3. Apply to all orders and contracts for DN6616/6624/6632 after 8/15/78.
   a. Have same price and performance.
   b. New FNPs have smaller floor space.
   c. New FNPs have different cabinetry (Level 6 minirack).
   d. New DN6632 has maximum (and standard) capacity of 88 lines versus (theoretically) 352 on old DN6632.
   e. New DN6616/6624 can be upgraded onsite to functionality and line connection capacity of new DN6632, retaining their starting serial and model numbers.

4. Most type numbers (marketing identifiers) are same between original and new DN FNPs.

CMA (Computer Monitor Adapter) is not presently available, thus new DN FNPs do not support the dual-FNP fail-soft configuration.
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

5. Original DN FNPs cannot be upgraded to the new versions, but both versions can be used on same Level 66 system.

B. Required components

1. Base FNP - DCP66XX.

2. One or more line interface units (LIUs).
   a. Every line must terminate in an LIU, via any line from a common carrier or an in-plant connection.
   b. Each LIU represents a Level 6 type daughter board occupying one quarter or one half a GPCB (Level 6 type mother board).
   c. Line connectivity is determined by the size of LIU boards (quarter or half) required (for line speed, transmission type, protocol) and the quantity of GPCBs included in FNP price (1, 7, 11). Depending on their type, LIUs can support one or two lines each.

3. One or more in-plant connection features if lines are not furnished by common carrier companies. In-plant connection is by use of specific direct connect or modem bypass features. Each must connect to an appropriate LIU. Depending on the terminal and distance, current loop interface LIUs can be used, with no need for specific direct connect or modem bypass features.
C. Block Diagram of New DN6616/DN6624/DN6632 FNPs -- all optional type numbers are in dotted form.

<table>
<thead>
<tr>
<th>Base Memory</th>
<th>Added Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN6616 - 24KW/48KB</td>
<td>None</td>
</tr>
<tr>
<td>DN6624 - 24KW/48KB</td>
<td>To 32KW - DCM0001</td>
</tr>
<tr>
<td>DN6632 - 32KW/64KB</td>
<td>To 64KW - DCM0002</td>
</tr>
<tr>
<td></td>
<td>To 128KW - DCM0003</td>
</tr>
</tbody>
</table>

Console Adapter and Console

Diskette and Adapter - For FE

Interval Timer | PSA Channel for Channel from MSP - DN6624/DN6632

Direct Interface Adapter
(DIA) Link to Level 66 IOM

2nd PSA Channel for DN6632
DCF6043 - 2nd MSP Link

PSA Channel for MSP Link
DN6616 - DCF6043

GPCBs - All Included

DN6616 - 1 GPCB, To 4 LIUs, To 8 Lines
DN6624 - 7 GPCBs, To 28 LIUs, To 56 Lines
DN6632 - 11 GPCBs, to 44 LIUs, To 88 Lines

LIUs As Required
Must Be Configured

2nd DIA - DN6624/DN6632
Only. DCF6041

Upgrade kits to raise DN6616 to DN6624
or DN6632 capability or to raise DN6624
to DN6632 capability. See Section XVIII. H
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

D. Configurator Flowcharts for New DN6616/6624/6632

1. For options other than interfacing communication lines. See also Section E below

See Section XIX. E

Base FNP
DCP6616 - 48KB
DCP6624 - 48KB
DCP6632 - 64KB

FNP
Console-
Standard

PSA
Channel

2nd Direct
Interface
Adapter (DIA)

Memory
Expansion

- DCF6043
  - For DN6616
    (First MSP
    Link)
  - For DN6632
    (2nd MSP
    Link)
  See Section
  XII. K
  - Max 1

Capability
Upgrade
Kits

- DCF6041
  - For DN6624/
    6632
  - For 2nd (Non-
    simultaneous)
    Link to IOM
  - Max 1

- DN6624.
  DCM0001.
  Raises to
  32KW/64KB.
  NPS Requires.
  Max 1

- DN6632.
  DCM0002.
  Raises to 64KW/
  128KB
  Max 1

- DN6632.
  DCM0003.
  Requires DCM0002.
  Raises to 128KW/
  256KB
  Max 1

- To Raise New
  DN6616/6624
  to new DN6624/
  6632 Capability
  Levels
  - See Section XVIII. H
2. For Standard and Optional Configuring of Communication Lines. See also Section E below.

LIUs. None Standard. Must be Ordered. All Lines Must Connect to LIUs. Maximum 4 LIUs per GPCB.

Footnotes:

a BSC Protocol
b ACU Counts as LIU!
c Broadband Speed
d BSC, Broadband Speed
e HDLC Protocol
f CCITT V.35 Interface
g Current Loop Interface

In-plant Line Connection Options to Above LIUs, Other Than By Current Loop LIUs. See Next Two Pages.

---

a 2500 cable feet between successive modem bypass features. Multiple bypasses can be used.

Mixtures of approaches A, B, C can be used in a multiline LIU, one approach per line.

See next page for LIUs usable with in-plant connections.
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

4. In-plant Line Connection Features for New DN6616/6624/6632 FNPs

a. Use this chart for Direct Connect and Modem Bypass features options. It shows the applicable LIUs to which those in-plant connection features can be attached. Identify terminal to be used with each such feature on your order.

b. Terminals using 20 ma current loop interfaces cable-connect to current loop-oriented LIUs.

---

**Appropriate LIUs**

<table>
<thead>
<tr>
<th>Synchronous</th>
<th>Asynchronous</th>
<th>Synchronous</th>
<th>Asynchronous</th>
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<tbody>
<tr>
<td>G</td>
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<td>U</td>
<td>U</td>
</tr>
</tbody>
</table>

---

1. Direct Connect Feature
   Per Line Involved. Cable Length Determined By Subsystem Controller

---

Modem Bypass
DCF6927

Minimum 2 Modem Bypass Features Per Line Involved.
Maximum 2500 Cable Feet Between 2 Successive Bypass Units

---

a. No support of ACU
b. Not for speeds above 9,600 bps
c. Maximum speed 1,800 bps
d. Maximum speed 9,600 bps

---

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Configuring New DN6616/6624/6632 (DN6600-1)

5. GPCB (or Channel Interface Base in official terminology) throughput load factor calculations and LIU board packaging.
   a. Refer to Section XX.E before using the tables on next two pages.
   b. Maximum load factor per GPCB (CIB) is 99.
   c. Note on Table 1 that DCF6014 and DCF6015 LIUs support ACU (Automatic Call Unit) and that each LIU requires two quarter boards. ACU logic occupies a quarter board separate from the LIU quarter board. ACU supports one line for automatic callout. ACU support requires NPS in FNP. The ACU board must be on same GPCB (mother board) as the LIU board.
   d. Note that on Table 2 the DCF6060 LIU requires two quarter boards. One quarter board is for the V.35 wideband line, second quarter board is for one EIA synchronous line at up to 9,600 bps.
   e. Figures in parentheses after description of LIU indicate the number of lines terminated by the LIU.
### TABLE 1

**DN6600-1 LOAD FACTOR TABLE**

**SYNCHRONOUS AND ASYNCHRONOUS**

<table>
<thead>
<tr>
<th>LIU</th>
<th>LIU DESCRIPTION</th>
<th>TO 2400 BPS</th>
<th></th>
<th>TO 4800 BPS</th>
<th></th>
<th>TO 9600 BPS</th>
<th></th>
<th>LIU BOARD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF6010</td>
<td>Dual Asynch, EIA RS232C (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
<td>4.5</td>
<td>8.2</td>
<td>1/4</td>
</tr>
<tr>
<td>DCF6011</td>
<td>Dual Asynch, Current Interface (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
<td>4.5</td>
<td>8.2</td>
<td>1/4</td>
</tr>
<tr>
<td>DCF6017</td>
<td>MIL 188C, Synchronous (1)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
<td>4.5</td>
<td>8.2</td>
<td>1/4</td>
</tr>
<tr>
<td>DCF6013</td>
<td>Dual Synch, EIA RS232C (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
<td>4.5</td>
<td>8.2</td>
<td>1/4</td>
</tr>
<tr>
<td>DCF6014</td>
<td>Dual Synch, EIA RS232C, with Auto Call (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
<td>4.5</td>
<td>8.2</td>
<td>2-1/4</td>
</tr>
<tr>
<td>DCF6015</td>
<td>Bysynchronous Channel (1)</td>
<td>2.5</td>
<td></td>
<td>5.1</td>
<td></td>
<td>10.1</td>
<td></td>
<td>1/4</td>
</tr>
<tr>
<td>DCF6019</td>
<td>HDLC to 9600 bps (1)</td>
<td>2.2(FDX) a</td>
<td>2.2(FDX)</td>
<td>4.4(FDX) a</td>
<td>4.4(FDX)</td>
<td>8.8(FDX) a</td>
<td>8.8(FDX)</td>
<td>1/4</td>
</tr>
<tr>
<td>DCF6050</td>
<td>MIL 188C, HDLC, to 9600 bps (1)</td>
<td>2.2(FDX) a</td>
<td>2.2(FDX)</td>
<td>4.4(FDX) a</td>
<td>4.4(FDX)</td>
<td>8.8(FDX) a</td>
<td>8.8(FDX)</td>
<td>1/4</td>
</tr>
<tr>
<td>DCF6053</td>
<td>HDLC, EIA, to 9600 bps, with Auto Call (1)</td>
<td>2.2(FDX) a</td>
<td>2.2(FDX)</td>
<td>4.4(FDX) a</td>
<td>4.4(FDX)</td>
<td>8.8(FDX) a</td>
<td>8.8(FDX)</td>
<td>2-1/4</td>
</tr>
<tr>
<td>DCF6062</td>
<td>Bysynch to 9600, with Auto Call (1)</td>
<td>2.5</td>
<td>2.5</td>
<td>5.1</td>
<td>5.1</td>
<td>10.1</td>
<td>10.1</td>
<td>2-1/4</td>
</tr>
<tr>
<td>DCF6039</td>
<td>Dual Asynch MIL STD (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
<td>4.5</td>
<td>8.2</td>
<td>1/4</td>
</tr>
</tbody>
</table>

**TOTAL LOAD FACTOR PER GPCB-------99 OR LESS**

**Notes:**

Factors are for half-duplex or FDX transmission TWA (Two-Way Alternate) per line unless otherwise stated.

- **a** FDX indicated in Table means TWS (Two Way Simultaneous) use of the FDX line. If TWS is not needed, divide the factor shown in half.

- **b** The Character Control Table is a software table used by both NPS and GRTS to distinguish control of, e.g., function key characters. This enables the user of the terminal to specify that certain keys are to perform particular system functions. Example: a control -J might be set to mean "back space the cursor to the beginning of line".

---

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SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

TABLE 2
DN6600-1 LOAD FACTOR TABLE
WIDEBAND

<table>
<thead>
<tr>
<th>LIU</th>
<th>LIU DESCRIPTION</th>
<th>TO 19.2K BPS</th>
<th>TO 40K BPS</th>
<th>TO 56K BPS</th>
<th>LIU BOARD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO CCT</td>
<td>CCT&lt;sup&gt;b&lt;/sup&gt;</td>
<td>NO CCT</td>
<td>CCT&lt;sup&gt;b&lt;/sup&gt;</td>
<td>NO CCT</td>
</tr>
<tr>
<td>DCF6016</td>
<td>11.9</td>
<td>18.7</td>
<td>25</td>
<td>39.3</td>
<td>35.0</td>
</tr>
<tr>
<td>DCF6048</td>
<td>11.9</td>
<td>18.7</td>
<td>25</td>
<td>39.3</td>
<td>35.0</td>
</tr>
<tr>
<td>DCF6054</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>40.0(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>DCF6055</td>
<td>23.8</td>
<td>23.8</td>
<td>50.0</td>
<td>50.0</td>
<td>70.0</td>
</tr>
<tr>
<td>DCF6058</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>40.0(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>DCF6060</td>
<td>11.9</td>
<td>18.7</td>
<td>25</td>
<td>39.3</td>
<td>35.0</td>
</tr>
<tr>
<td></td>
<td>TOTAL LOAD FACTOR PER GPCB ----</td>
<td>99 OR LESS</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES:

Factors are for half-duplex or FDX transmission TWA (Two Way Alternate) per line unless otherwise stated.

<sup>a</sup> FDX indicated in Table means TWS (Two Way Simultaneous) use of the FDX line. If TWS is not needed, divide the factor shown in half.

<sup>b</sup> The Character Control Table is a software table used by both NPS and GRTS to distinguish control of, e.g., function key characters. This enables the user of the terminal to specify that certain keys are to perform particular system functions. Example: a control "J" might be set to mean "back space the cursor to the beginning of line".

<sup>c</sup> One Channel is for the V.35 wideband line and the second channel is for an EIA synchronous line at up to 9600 bps. Load factors shown are for the V.35 wideband line. Use the factors for DCF6013 for the EIA synchronous line.
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Configuring New DN6616/6624/6632 (DN6600-1)

E. List of Type Numbers and Their Functions for New DN6616/6624/6632

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Base DN6600 FNP</td>
<td></td>
</tr>
<tr>
<td>DCP6616</td>
<td>DN6616 with 24KW/48KB memory, supervisory console and adapter, diskette unit and adapter, interval timer, DIA link to Level 66 IOM channel, one GPCB equipped to handle 1-4 LIUs for maximum of 4-8 lines. No LIUs included. 24KW/48KB memory size (standard and maximum) is insufficient for NPS.</td>
</tr>
<tr>
<td>DCP6624</td>
<td>Same as DCP6616 plus PSA channel for interfacing to disk channel from MSP, 7 GPCBs equipped to handle 1-4 LIUs each for a maximum FNP total of 56 lines. No LIUs included. 24KW/48KB memory size is insufficient for NPS. 32KW/64KB maximum memory is marginal for NPS 2/H and NT1, insufficient for NT2, NT3, DP1 (DPS).</td>
</tr>
<tr>
<td>DCP6632</td>
<td>Same as DCP6616 but with 32KW/64KB memory plus PSA channel for interfacing to disk channel from MSP, 11 GPCBs each equipped to handle 1-4 LIUs for a maximum FNP total of 88 lines. No LIUs included. 32KW/64KB base memory size is marginal for NPS 2/H and NT1. 64KW/128KB memory size required for NPS NT2, NT3, DP1(DPS). Maximum useful memory size for NT2, NT3 is 96KW/192KB on DN6632.</td>
</tr>
</tbody>
</table>

2. Memory Expansion Kits - limit of one each (see also XVIII.H).

| DCM0001 | Upgrade on-site to raise DCP6624 from 24KW/48KB to 32KW/64KB. Also to raise DN6616 to 32KW size with DCK6603 as prerequisite. |
| DCM0002 | Extension or first upgrade on-site to raise FNP memory size from 32KW/64KB to 64KW/128KB. For DCP6632. Also for DCP6616/6624 which have been upgraded to 32KW/64KB. |
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

DCM0003 Extension or second upgrade on-site to raise FNP from 64KW/128KB to 128KW/256KB. Cannot be installed without DCM0002.

3. Capability Upgrades (See also XVIII.H)

DCK6603 Upgrade new DCP6616 on-site to standard capability of new DCP6624. DCP6043 must also be ordered.

DCK6601 Upgrade on-site from new DCP6624 having 24KW/48KB memory to 32KW/64KB and with full capability content of standard new DCP6632. Can also be applied to DCP6616 with DCK6603 as prerequisite.

DCK6602 For new DCP6624 or new DCP6616, both with DCM0001 as prerequisite. If DCP6616, DCK6603 also a prerequisite. Upgrade on-site to full capability content of standard new DCP6632.

DCF6041 DIA (direct interface adapter) for DCP6624 or DCP6632. Provides link to a second Level 66 IOM or second IOM physical channel. Price includes IOM channel. Remember that each FNP includes one DIA on standard basis. Use of DCP6041 provides a backup connection to Level 66, effective only after a warm start following malfunction of standard DIA.

DCF6043 PSA (peripheral subsystem interface adapter) for DCP6616. Provides a termination point for the physical channel connection from MSP. Required if NPS is used. Can also be used to provide a second PSA for DN6632. No NPS support of 2 PSAs concurrently. New NPS bootload required. See Section XII.K.

4. GPCB Synchronous-only LIUs

DCF6013 Terminates 2 lines at up to 9,600 bits per second each. Each line can run at different speed. EIA RS232C interface. ASCII code. HDX or FDX. For Honeywell VIP, RCI, MMI link protocols and various others. Lines can run at different speeds.
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

DCF6014  Same as DCF6013 but includes ACU support for one line. ACU support requires NPS. ACU occupies space equal to a quarter board LIU, thus counts as an LIU in limit of 1-4 LIUs per GPCB.

DCF6015  Terminates 1 line at up to 9,600 bits per second. For BSC link protocol with use of CRC (Cyclic redundancy check). CRC hardware included in DCF6015. EIA RS232C interface. ASCII or EBCDIC code, transparent or non-transparent mode. HDX or FDX.

DCF6016  Terminates 1 line at up to 56,000 bits per second. HDX or FDX.

DCF6019  Terminates 1 line up to 9,600 bits per second. Honeywell logical HDLC link protocol. Software support via NPS NT2 and DPl(DPS), and GRTS-II, 1Q79. Any code. Bit-oriented protocol. EIA RS232C interface. HDX or FDX.

DCF6050  Terminates 1 line at up to 9,600 bits per second. Honeywell logical HDLC link protocol. Software support via NPS NT2 and DPl(DPS), and GRTS-II, 1Q79. Any code. Bit-oriented protocol. Military standard 188C interface.

DCF6053  Same as DCF6019, for Honeywell logical HDLC link protocol, but includes ACU support. ACU support requires NPS. HDLC software support by NPS NT2 and DPl (DPS), and GRTS-II, 1Q79. ACU occupies space equal to a quarter board LIU, thus counts as an LIU in limit of 1-4 LIUs per GPCB.

DCF6054  Terminates 1 line at up to 56,000 bits per second, wideband line. Honeywell logical HDLC link protocol. Software support via NPS NT2 and DPl(DPS), and GRTS-II, 1Q79.

DCF6055  Terminates 1 line at up to 56,000 bits per second, wideband line. BSC link protocol. CRC Cyclic Redundancy Check hardware included. ASCII or EDCDIC code, transparent or non-transparent mode. HDX or FDX.

DCF6058  Terminates 1 line at up to 56,000 bits per second. Honeywell logical HDLC link protocol. HDX or FDX. HDLC software support via NPS NT2 or
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

DP1(DPS), and GRTS-II, 1Q79. V.35 interface, CCITT standard, analogous to EIA interface in U.S.

DCF6060
Terminates 2 lines. One line at up to 56,000 bits per second, wideband line, V.35 interface. One synchronous line at up to 9,600 bits per second, EIA RS232C interface.

DCF6062
Same as DCF6015, for BSC link protocol, except ACU support is included. ACU support requires NPS. ACU occupies space equal to a quarter board LIU, thus counts as an LIU in limit of 1-4 LIUs per GPCB.

DCF6067
Terminates one line at up to 9,600 bits per second. Military standard 188C interface. HDX or FDX. Any code 5-8 bits.

5. GPCB Asynchronous-only LIUs

DCF6010
Terminates 2 lines at up to 9,600 bits per second. Each line can run at different speed. Any code 5-8 bits. EIA RS232C interface. HDX or FDX.

DCF6011
Terminates 2 lines at up to 9,600 bits per second. Each line can run at different speed. Any code 5-8 bits. HDX or FDX. 20 milliampere current loop interface. No modem used.

DCF6039
Same as DCF6010 except Military Standard 188C interface.

6. Options for In-plant Line Connections (that is, without use of public carrier company lines). See Terminals For All Levels Bulletins 10 (1/6/78) and 14 (3/17/78) for cabling considerations.

DCF6020
Direct Connect feature for connection to asynchronous LIU for one line (cable). Length determined by maximum cable length from the terminal subsystem. One per line. Cannot be used with current loop LIUs. No inherent speed limit.

DCF6021
Same as DCF6020 except for synchronous LIU. Maximum 9,600 bps.
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

DCF6927 Universal Modem Bypass feature for connection to one asynchronous or synchronous line (cable). A Level 6 feature usable into FNP LIUs. Minimum of two per line, one at FNP end, other at terminal end. Maximum cable distance between two successive bypasses is 2500 cable feet. Intermediate bypasses can be used as line signal repeaters or strengtheners. Check your Level 6 technical support people for maximum cable lengths and maximum number of bypasses usable at satisfactory line noise levels. Speed to 9,600 bits per second. Cannot be used with current loop LIUs. Can also be used with keyboard terminals.

Note: Current loop interface terminals cable-connect directly to a current loop-oriented LIU (DCF6011). Up to 1000 cable feet.

F. Configuration example for new DN FNP.

Prospect wants DN6624 for 10 asynchronous lines (5 at 300 bps, 5 at 1,200 bps) using ASCII code. Also wants 5 synchronous lines at 2,400 bps for VIP terminals, 3 synchronous lines at 2,400 bps for BSC terminals, 3 synchronous lines for HDLC FDX, TWS links to Level 6 systems at 4,800 bps. Prospect will use NPS. Wants ACU support for one BSC line and one HDLC line.

1 DCP6624 Base FNP, 24KW/48KB
1 DCM0001 Memory increase to 32KW/48KB, minimum for NPS use
5 DCF6010 LIUs for 10 asynchronous lines
2 DCF6015 LIUs for 1 BSC protocol line, no ACU support
1 DCF6062 LIU for 1 BSC protocol line, ACU support
2 DCF6019 LIUs for 2 HDLC protocol lines, no ACU support
1 DCF6053 LIU for 1 HDLC protocol line, ACU support
3 DCF6013 LIUs for 5 VIP synchronous lines
SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

1. GPCB/LIU (mother/daughter) board allotments assumed are shown below. CCT use also assumed, where it is applicable.

2. Board space and throughput (load factor) calculations, based on distribution of quarter boards assumed as shown below. Maximum load factor per GPCB (CIB) is 99.
# SECTION XIX
Configuring New DN6616/6624/6632 (DN6600-1)

<table>
<thead>
<tr>
<th>Board</th>
<th>Load Factor Calculation</th>
<th>Total Load Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(1) 8 lines (up to 1200 bps) x 2.0</td>
<td>16.0 ok</td>
</tr>
<tr>
<td>2</td>
<td>(1) 2 lines (up to 1200 bps) x 2.0</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>(2) 1 line (up to 2400 bps) x 2.5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>(3) 1 line (up to 2400 bps) x 2.5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>(4) No load factor for ACU</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>(2) 1 line (up to 2400 bps) x 2.5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>(5) 2 lines (up to 2400 bps) x 4.4 (FDX)</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>(6) 2 lines (up to 2400 bps) x 2.0</td>
<td>4.0</td>
</tr>
<tr>
<td>4</td>
<td>(7) 1 line (up to 4800 bps) x 4.4 (FDX)</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>(8) No load factor for ACU</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(6) 2 lines (up to 2400 bps) x 2.0</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>(9) 1 line (up to 2400 bps) x 2.0</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>(Last DCF6013 carries only one line due to odd number of VIP lines)</td>
<td>10.4 ok</td>
</tr>
</tbody>
</table>
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

A. Required Configuration Components

1. Base FNP
   a. INP = "Integrated FNP" -- no separate type number. Is included in price and standard components for base CPS system for 66/05 - CPS6058, and for all 66/DPS systems.
   b. DN6670 - DCP6678
   c. ANP - Additional network processor for 66/DPS system. Type number - DCU6651.

2. Console -- required but not included under base type number or price except for 66/DPS systems.
   a. In case of DN6670 there are two consoles available. One is for the GRTS environment. One is for the heavier duty environment of NPS.
   b. DPS INP/ANP console is the heavier duty device.
   c. During 1978-1979 time period it is the plan for new shipments to use the teleprinter from our dot matrix series of terminals as FNP consoles. This is a heavy duty printer.

3. One or more line interface units (LIUs)
   a. Every line (sometimes called a subchannel or channel) must terminate in an LIU from any common carrier or any in-plant connection.
   b. Every LIU represents electronic logic on circuit boards for which space is provided in "slots" in a general purpose type of communication base (GPCB), also known in Level 6-based FNPs as a channel interface base (CIB).
SECTION XX
Configuring Level 6-Based PNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

4. Sufficient quantity of GPCBs of appropriate type to connect the quantity of LIUs needed to support the desired number of lines. INP for 66/05 CPS6058 and DN6670 include a standard component of GPCB(s). Additional GPCBs can be configured on DN6670, if needed. DPS INP/ANP models do not include any GPCBs in base price, but one or more GPCBs must be configured in order to provide for the LIUs needed to connect the lines to INP/ANP.

5. One or more in-plant connection features if lines are not furnished by common carrier companies. In-plant connection is by use of modem bypass or direct connect features. Each must connect to an appropriate LIU.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

B. Block Diagrams of Level 6-based FNPs -- options are shown in dotted lines

1. "Integrated FNP" for CPS6058 version of 66/05

[Diagram of system components]

- Memory - 24KW/48KB
- System Support Controller
- Interval Timer
- Direct Interface Adapter (DIA)
- 1 GPCB (Channel Interface Base) - 1-8 Lines Via 1-4 LIUs
- Level 66 IOM
- Dir Ch
- DCK 6604 UPGRADE KIT TO DCP 6616/DCP 6616-1
- One to Four Line Interface Units (LIUs) To Be Configured

Communication Lines by
Common Carrier or In-plant Connection. Maximum
of 4-8 Lines

a DCF6608 console system must be ordered.
Not included in FNP price
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

2. DN6670 block diagram

DCP6678

Base Memory
64KW/128KB

DCM6003
64KW/128KB
Max of 3

System Support Controller

Interval Timer

Direct Interface Adapter (DIA)

2nd Direct Interface Adapter (DIA) DCF6602

PSA Channel for Link to MSP for NPS - Max of 2 DCF6601

6 GPCBs (Channel) Interface Bases) for 1-8 Lines
Each Via 1-4 LIUs Each.

1-6 Optional GPCBs DCF6607

Line Interface Units.
1-4 per GPCB, for 1-8 Lines. Maximum of 48 LIUs per DN6670

Communication Lines by Common Carrier or In-plant Connections.
Maximum of 48-96 Lines

TTY 33 Console
DCF6608

GRTS

Or

Heavy Duty Console
DCF6606

NPS

Diskette

Level 66 IOM(s)

Ch Ch Ch

MSP

a DCF6608 or DCF6606 must be ordered. No console included in FNP price
SECTION XX
Configuring Level 6-Based FNP (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

3. Block diagram for 66/DPS INP/ANP

GRTS-II or NPS/DP1 (or later release) required.
GRTS-I not permitted

<table>
<thead>
<tr>
<th>INP or ANP (DCU6651)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Memory</td>
</tr>
<tr>
<td>32KW/64KB</td>
</tr>
<tr>
<td>To 128KB DCM6651</td>
</tr>
<tr>
<td>To 192KB DCM6652</td>
</tr>
</tbody>
</table>

System Support Controller

Interval Timer

Direct Interface Adapter (DIA)

2nd Direct Interface Adapter (DIA) DCF6602

<table>
<thead>
<tr>
<th>Performance Enhancement</th>
<th>Peripheral Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF6601 for DCE6651</td>
<td>NPS Link to MSP.</td>
</tr>
<tr>
<td>Requires DCM6651</td>
<td>Maximum 2. See Section XII.K</td>
</tr>
</tbody>
</table>

GPCBs (CIBs)
1-12 Permitted. Minimum of 1 required. Each handles 1-4 LIUs.

Line Interface Units
1-4 per GPCB, for 1-8 lines per GPCB. At least one LIU required. Maximum of 48 LIUs and 96 lines per INP/ANP

Communication Lines by Common Carrier or In-Plant Connections

Required to use NPS
Requires DCM6651 and DCE6651

Heavy Duty Console Standard

Diskette

Level 66 IOM(s)
Ch Ch Ch

MSP

None included in base price. Both GPCB(s) and LIU(s) must be configured.
C. Configurator Flowcharts for Level 6-based FNPs

1. For "Integrated FNP" in CPS6058 version of 66/05

---

Footnotes:

a BSC Protocol
b Broadband
c BSC, Broadband
d HDLC Protocol
e CCITT V.35 Interface
f Current Loop Interface
g Can be upgraded to DN6616 VIA DCK6604
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

2. For DN6670 and 66/DPS INP/ANP
   a. For options other than interfacing communication lines. See also Section D below.

   Base FNP
   DN6670-128KB
   INP/ANP-64KB
   See Section XX.C.

   PSA Channel
   DCF6601.
   Link to
   MSP Channel.
   Required for
   NPS. Max
   of 2. See
   Section XII.K

   2nd Direct
   Interface
   Adapter
   (DIA)

   DN6670
   Memory
   Expansion
   DCM0003.
   64KW/128KB.
   Max of 3
   DCM003
   Applies only
   to DN6670

   DPS INP/ANP
   Performance
   Enhancement
   DCE6651
   Max of 1
   Increases Base
   Processor Performance
   75%
   Requires DCM6651
   Requires DCM6651

   DPS INP/ANP
   Memory
   Expansion
   DCM6651
   64KB to
   128KB
   DCM6651
   Required
   for NPS
   DCM6652
   128KB to
   192KB.
   Requires
   DCE6651
b. For standard and optional configuring of communication lines on DN6670. See Section D below

Footnotes:

a BSC Protocol
b Broadband
c BSC, Broadband
d HDLC Protocol
e CCITT V.35 Interface
f Current Loop Interface
c. For standard and optional configuring of communication lines on 66/DPS INP/ANP.

- After tentative configuring, check GPCB board throughput, Section E
- Base FNP INP/ANP (DCU6651)
  - 32KW/64KB
  - Console Included
- Minimum of 1 GPCB Required.
  - None Included
- Maximum of 12 GPCBs per INP/ANP. All types Mixable
- Automatic Call Unit (ACU)
  - DCF6613. Support requires NPS
- GPCB - DCF6607
  - 1-4 LIUs.
  - Any Mix
  - Each ACU DCF6613 Counts as 1 LIU

- Synchronous LIUs
  - See Section D
  - DCF6611 (2 Lines)
  - DCF6614 (1 Line)
  - DCF6618a (2 Lines)
  - DCF6619b (1 Line)
  - DCF6621c (1 Line)
  - DCF6627e (1 Line)
- Asynchronous LIUs
  - See Section D
  - DCF6616b (1 Line)
  - DCF6617d (1 Line)
  - DCF6622b,d (1 Line)
  - DCF6623d,e (1 Line)
  - DCF6629b (1 Line)
  - DCF66204 (1 Line)

Footnotes:
- a BSC Protocol
- b Broadband
- c BSC, Broadband
- d HDLC Protocol
- e CCITT V.35 Interface
- f Current Loop Interface

In-plant Connection Options to Above LIUs, Other Than By Current Loop LIUs.
  - See Section C
3. In-plant connection features (other than current loop interface) for connecting terminals on in-plant cables.
   
a. Use this chart for Direct Connect and Modem Bypass features options. It shows the applicable LIUs to which such in-plant connection features can be attached. Identify terminal to be used with each feature on your order.
   
b. Terminals using 20 ma current loop interfaces cable-connect to current loop-oriented LIUs.

<table>
<thead>
<tr>
<th>Synchronous</th>
<th>Asynchronous</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF6611</td>
<td>DCF6612</td>
</tr>
<tr>
<td>DCF6614</td>
<td>DCF6615</td>
</tr>
<tr>
<td>DCF6617</td>
<td></td>
</tr>
<tr>
<td>DCF6618</td>
<td></td>
</tr>
<tr>
<td>DCF6620</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Synchronous</th>
<th>Asynchronous</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCF6611</td>
<td>DCF6612</td>
</tr>
<tr>
<td>DCF6614</td>
<td>DCF6615</td>
</tr>
<tr>
<td>DCF6617</td>
<td></td>
</tr>
<tr>
<td>DCF6618</td>
<td></td>
</tr>
<tr>
<td>DCF6620</td>
<td></td>
</tr>
</tbody>
</table>

No support of ACU by in-plant connection features

a Maximum speed 9,600 bps
b Maximum speed 1,800 bps
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

D. List of all Level 6-based FNP-related type numbers and their functions - for 66/05 INP, DN6670 and 66/DPS INP/ANP except as shown.

1. Base FNP

Type Number Description

66/05 INP  No type number. Included with 66/05 CPS6058 version. A freestanding FNP with 24KW/48KB memory, diskette for Field Engineering use, interval timer, DIA link to Level 66 IOM channel and the IOM channel, one abbreviated GPCB (channel interface base) equipped to handle 1-4 LIUs for maximum of 8 lines. No LIUs included. ACU feature DCF6613 counts as one LIU. NPS cannot be used. (See DCK6604 upgrade kit below.)

DCP6678  DN6670 with 64KW/128KB memory, diskette for Field Engineering use, interval timer, DIA link to Level 66 IOM channel and the IOM channel, 6 GPCBs equipped to handle 1-4 LIUs each of any type except HDLC. Can be equipped with up to 6 more GPCBs - DCF6605 or DCF6609 or DCF6607 or combination. No LIUs included. ACU feature DCF6613 counts as one LIU. 32KW/64KB is marginal for NPS 2/H or NT1. NPS NT2, NT3, DP1(DPS) require 64KW/128KB minimum memory size. Maximum useful memory size for NPS NT2, NT3, DP1(DPS) is 128KW/256KB.

66/DPS INP  No type number. Included with 66/DPS base system CPS6650. A freestanding FNP with 32KW/64KB memory, diskette for Field Engineering use, interval timer, DIA link to Level 66 IOM channel and the IOM channel. No GPCB (channel interface base) is included but at least one must be configured. Maximum of 12 GPCBs can be configured - DCF6605 or DCF6609 or DCF6607 or combination. No LIU is included but at least one must be configured. ACU feature DCF6613 counts as one LIU. 32KW/64KB is marginal for NPS 2/H or NT1. NPS NT2, NT3, DP1(DPS) require 64KW/128KB minimum memory size. Maximum useful memory size for NPS NT2, NT3, DP1(DPS) is 128KW/256KB.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

2. Model 66/05 (CPS6058) INP Upgrade

DCK6604 Upgrade kit to remove the eight line connection limitation from the CPS6058 (INP) and upgrade it to DCP6616/DCP6616-1 functionality. All upgrade kits and available options for DCP6616/DCP6616-1 can be connected to grow functionality up through DCP6632/DCP6632-1. (See Section XIX, Configuring New DN6616/6624/6632 for available options.)

3. Adding More FNPs

DCU6651 Additional Network Processor (ANP) for use with 66/DPS system. Supplements INP included in 66/DPS base price. Maximum of 3 DCU6651, for maximum of 4 network processors per DPS system. Description otherwise is identical to 66/DPS INP above.

4. Performance Enhancement for 66/DPS INP/ANP

DCE6651 Performance enhancement for any 66/DPS INP or ANP. Increases INP/ANP processor performance by 75%. Requires DCM 6651 Memory Increment below. Can be added to one network processor or all.

5. Memory Expansion

DCM0003 64KW/128KB increment for DCP6678 (DN6670). Can be ordered initially or installed on-site as upgrade. Maximum of 3.

DCM6651 Memory Increment for 66/DPS INP/ANP. Raises base memory from 32KW/64KB to 64KW/128KB. Maximum of one. Order initially or as upgrade. Required for NPS.

DCM6652 Memory Increment for 66/DPS INP/ANP. Raises memory from 64KW/128KB to 96KW/192KB. Requires DCM6651 and DCE6651. Maximum of one. Order initially or as upgrade.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

6. General Purpose Communications Bases (GPCB), also known as communications channel interface bases.

**DCF6605**
Handles 1-4 LIUs of any type except those servicing BSC (binary synchronous communications) protocol. BSC LIUs are handled by DCF6609 and DCF6607 below. ACU DCF6613 counts as one LIU.

**DCF6607**
Handles 1-4 LIUs of any type. Preferred to use of DCF6605 and DCF6609 though slightly more expensive. ACU DCF6613 counts as one LIU.

**DCF6609**
Handles 1-4 LIUs of any type except those servicing HDLC (high level data link control) protocol. HDLC LIUs are handled by DCF6605 and DCF6607 above. ACU DCF6613 counts as one LIU.

7. Asynchronous Line Interface Units (LIUs)

**DCF6610**
Terminates 2 asynchronous lines at up to 9,600 bps each. Current loop interface, 20 milliamps, for in-plant connections. HDX or FDX. Any code 5-8 bits. No modem used. Level 66 FNP software not quality assured for asynchronous speeds above 2,400 bps. See Terminals For All Levels Bulletins 10 (1/6/78) and 14 (3/17/78) for current loop cabling information.

**DCF6612**
Terminates 2 asynchronous lines at up to 9,600 bps each. Each line can run at different speed. EIA RS232C interface. HDX or FDX. Any code 5-8 bits. 1 or 2 stop bits per character for 6, 7, 8-bit codes; 1 or 1.5 stop bits per character for 5-bit codes. For Dataphone 103, 113, 202 or equivalent modem or modem bypass or direct connect. Level 66 FNP software not quality assured for asynchronous speeds above 2,400 bps.

**DCF6615**
Same as DCF6612 above except that interface is Military Standard 188C.
8. Synchronous Line Interface Units (LIUs)

DCF6611 Terminates 2 synchronous lines at up to 9,600 bps each. Each line can run at different speed. EIA RS232C interface. ASCII code. HDX or FDX. For Dataphone 201, 203, 208 or equivalent modem or modem bypass or direct connect.

DCF6614 Terminates 1 synchronous line at up to 9,600 bps. Military Standard 188C interface. HDX or FDX. ASCII code.

DCF6616 Same as DCF6619 below except that interface is Military Standard 188C.

DCF6617 Same as DCF6620 below except that interface is Military Standard 188C.

DCF6618 Terminates 2 synchronous lines at up to 9,600 bps each, running under BSC protocol. ASCII or EBCDIC code, transparent or non-transparent mode. Each line can run at different speed. EIA RS232C interface. HDX or FDX.

DCF6619 Terminates one line in broadband (wideband) synchronous range, up to 56,000 bps. Telpak interface. Any code 5-8 bits. HDX or FDX. Type 301 or 303 modems or equivalent.

DCF6620 Terminates one line at up to 9,600 second. For Honeywell HDLC link protocol. Software support via NPS NT2 or DP1(DPS), or GRTS-II, 1079. Any code. Bit-oriented protocol. EIA RS232C interface. HDX or FDX.

DCF6621 Terminates 2 lines running under BSC protocol at up to 56,000 bps. ASCII or EBCDIC code, transparent or non-transparent mode. Any code 5-8 bits.

DCF6622 Terminates one line in broadband (wideband) range at up to 56,000 bps. Honeywell HDLC link protocol. Software support via NPS NT2 or DP1(DPS), or GRTS-II, 1079. Any code. Bit-oriented protocol. HDX or FDX.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

DCF6623 Terminates one line at up to 56,000 bps. Honeywell HDLC link protocol. Software support via NPS NT2 or DPL(DPS), or GRTS-I1,1Q79. For CCITT V.35 interface, similar to EIARS232C, any code 5-8 bits. HDX or FDX.

DCF6627 Terminates one line in broadband (wideband) range at up to 56,000 bits per second. For CCITT V.35 interface, similar to EIARS232C interface, any code 5-8 bits. HDX or FDX.

9. Automatic Call Unit (ACU)

DCF6613 Provides ability to perform automatic call-out on 2 lines. DCF6613 does not include any line termination capability itself, but it counts as one LIU in the LIU complement allowed on any GPCB. Thus when used this feature cuts the line connectivity maximum of a GPCB by two lines. The call-out capability of DCF6613 applies to lines terminated by some LIU external to DCF6613. Requires NPS.

10. Delta link Mass Storage (MSP) required to use NPS

DCF6601 Peripheral interface adapter for receiving delta link channel/cable from MSP. Maximum of two (see Section XII.K) Cannot use with 66/05. CPS6058 INP

11. Additional Channel/Cable From FNP to Level 66 IOM Channel

DCF6602 Direct interface adapter (DIA). Includes channel in IOM. Maximum of one. Cannot be used in 66/05 CPS6058 INP. Base FNP always includes one DIA in its price. Second DIA cannot run simultaneously with first. A new GCOS warm start is needed to define the second IOM channel as the new path to reach the FNP.
12. In-plant Connection Options to Connect to LIUs above
(See Terminals For All Levels Bulletins 10 (1/6/78)
and 14 (3/17/78) for cabling considerations)

DCF6624 Direct connect feature for connection to
asynchronous LIU for one line (cable). Length of
cable determined by maximum cable length of
terminal subsystem. One per line (cable). No
inherent speed limit.

DCF6625 Same as DCF6624 except for synchronous LIU.
Maximum speed 9,600 bps.

DCF6927 Universal Modem Bypass feature for connection to
one synchronous or asynchronous line (cable). A
Level 6 feature usable into FNP LIUs. Minimum of
two per line, one at FNP end, other at terminal
end. Maximum cable length between 2 successive
bypass units is 2500 feet. Intermediate bypass
units can be used as line signal repeaters or
strengtheners. Check your Level 6 technical
support people for maximum cable lengths and
maximum number of bypass units in a line at
satisfactory line noise levels. Speed to 9,600
bps. Cannot be used with current loop LIUs.

Note: Current loop-oriented terminals
cable-connect directly to a current loop-oriented
LIU. Up to 1000 cable feet.

13. Console Subsystems for Level 6-based FNPs

a. For 66/05 CPS6058 INP and DN6670 (DCP6678) no
console is included in FNP price but a console
must be ordered for each such FNP:

1) DCF6606 - heavy duty console required for use
with NPS. Applies to DN6670 since "Integrated
FNP" with CPS6058 66/05 does not support NPS.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

2) DCF6608 - light duty TTY33 console for use with GRTS on DN6670 or 66/05 CPS6058 "Integrated FNP".

b. For 66/DPS INP/ANP a heavy duty console of the DCF6606 type is included with each and need not be ordered.

c. In 1978-1979 it is the plan on new installations to use our dot matrix type teleprinter/keyboard terminals as FNP consoles. Will not be terminal as such and will not use an LIU.

E. GPCB (or Channel Interface Board in official terminology) throughout calculations (load factors) and LIU board packaging tables

1. Configurability of LIUs is affected by two facts:

a. The fact that each GPCB is a mother board (IC board) in Level 6 type circuit packaging. Each mother board supplies common power and common logic to 1-4 daughter boards packaged on top of the mother board. Daughter boards represent specific tailored functions, serviced as a group of 1-4 by a mother board (GPCB in FNP case).

1) In Level 6-based FNPs the LIUs are daughter boards, either quarter boards or half boards, depending on the specific functionality each LIU supplies.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

2) Capacity of each GPCB (mother board) is either four quarter-board daughters, two half-board daughters, or two quarter-board daughters and one half-board daughter as illustrated below:

```
+-----------+-----------+-----------+
| GPCB Board | GPCB Board | GPCB Board |
| LIU 1/4    | LIU 1/4   | LIU 1/2   |
| LIU 1/4    | LIU 1/4   | LIU 1/2   |
| Daughter   |           |           |
| Boards     |           |           |
```

b. The fact that each GPCB (mother board) has a throughput limit (more accurately called load limit) for the bit stream(s) from lines serviced by its cluster of LIU daughter boards. Throughput of a GPCB is expressed as the sum of load factors related to its LIU daughter boards.

Maximum permissible throughput (load) factor for any GPCB (mother board) is 99. Any combination of LIU daughter boards can be used on a GPCB mother board if the LIU daughter boards fit, and if their cumulative throughput factors do not exceed 99.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

2. To determine both the fit and throughput factors use the table below.

a. Note that there is a column for cases where the software will use the Character Control Table (CCT) feature. The table is tied to hardware. Its use exerts some overhead which increases the timing load placed on the affected GPCB mother board. If you don't know in your preliminary configuring whether CCT will be used, assume it will to give your worst case protection. It is used in supporting certain link protocols, such as BSC, and for other uses.

b. Note that especially where broadband (wideband) speeds are used (second part of table below) the actual number of GPCBs required can be affected by both the half-board LIUs involved and/or the high value of their throughput factors.

c. Remember that several of the LIUs interface two lines each. Each line exerts its own throughput factor which must be taken into account.

d. Maximum load factor for each GPCB is 99.

e. Figures in parentheses indicate number of lines terminated by the LIU.
### Throughput Load Factors per Line

<table>
<thead>
<tr>
<th>LIU</th>
<th>LIU Description</th>
<th>To 2400 BPS</th>
<th>To 4800 BPS</th>
<th>9600 BPS</th>
<th>LIU Board Size</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NO CCT</td>
<td>CCT&lt;sup&gt;b&lt;/sup&gt;</td>
<td>NO CCT</td>
<td>CCT&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>DCF6612</td>
<td>Dual Asynch, EIA RS232C (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
</tr>
<tr>
<td>DCF6610</td>
<td>Dual Asynch, Current Interface (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
</tr>
<tr>
<td>DCF6614</td>
<td>MIL 188C, Synchronous (1)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
</tr>
<tr>
<td>DCF6611</td>
<td>Dual Synch, EIA RS232C (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
</tr>
<tr>
<td>DCF6618</td>
<td>Bisynchronous Channels (2)</td>
<td>2.5</td>
<td>2.5</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>DCF6620</td>
<td>HDLC to 9600 BPS (1)</td>
<td>2.2(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.2(FDX)</td>
<td>4.4(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.4(FDX)</td>
</tr>
<tr>
<td>DCF6617</td>
<td>MIL 188C, HDLC, to 9600 bps (1)</td>
<td>2.2(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.2(FDX)</td>
<td>4.4(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.4(FDX)</td>
</tr>
<tr>
<td>DCF6613</td>
<td>ACU for 2 lines. Not an LIU itself</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>DCF6615</td>
<td>Dual Asynch MIL STD (2)</td>
<td>1.1</td>
<td>2.0</td>
<td>2.3</td>
<td>4.1</td>
</tr>
</tbody>
</table>

**Notes:**

Factors are for half-duplex or FDX transmission TWA (Two-Way Alternate) per line unless otherwise stated.

- **a** FDX indicated in Table means TWS (Two Way Simultaneous) use of the FDX line. If TWS is not needed, divide the factor shown in half.

- **b** The Character Control Table is a software table used by both HPS and GRTS to distinguish control of, e.g., function key characters. This enables the user of the terminal to specify that certain keys are to perform particular system functions. Example: a control -J might be set to mean "back space the cursor to the beginning of line".

---

TOTAL LOAD FACTOR PER GPCB ---- 99 OR LESS

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## SECTION XX
Configuring Level 6-Based PNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

**66/05 INP, DN6670, DPS INP/ANP LOAD FACTOR TABLE 2**
**WIDEBAND**

### THROUGHPUT LOAD FACTORS PER LINE

<table>
<thead>
<tr>
<th>LIU</th>
<th>LIU DESCRIPTION</th>
<th>TO 19.2K BPS</th>
<th>TO 40K BPS</th>
<th>TO 56K BPS</th>
<th>LIU BOARD SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>NO CCT</td>
<td>CCT&lt;sub&gt;b&lt;/sub&gt;</td>
<td>NO CCT</td>
<td>CCT&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>DCF6619</td>
<td>Wideband Channel, 19.2 - 56.0 K bps (1)</td>
<td>11.9</td>
<td>18.7</td>
<td>25</td>
<td>39.3</td>
</tr>
<tr>
<td>DCF6616</td>
<td>MIL-188 Wideband Channel (1)</td>
<td>11.9</td>
<td>18.7</td>
<td>25</td>
<td>39.3</td>
</tr>
<tr>
<td>DCF6622</td>
<td>HDLC Widesband Channel (1)</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>DCF6621</td>
<td>Bisynch Widesband Channel (1)</td>
<td>23.8</td>
<td>23.8</td>
<td>50.0</td>
<td>70.0</td>
</tr>
<tr>
<td>DCF6623</td>
<td>HDLC, V.35 (1)</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>13.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>28.6(FDX)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>DCF6627</td>
<td>V.35 (1)</td>
<td>11.9</td>
<td>18.7</td>
<td>25</td>
<td>39.3</td>
</tr>
<tr>
<td>DCF6613</td>
<td>ACU for 2 Lines. Not an LIU</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**TOTAL LOAD FACTOR PER GPCB** --- 99 OR LESS

**NOTES:**

- Factors are for half-duplex or FDX transmission TWA (Two Way Alternate) per line unless otherwise stated.

- FDX indicated in Table means TWS (Two Way Simultaneous) use of the FDX line. If TWS is not needed, divide the factor shown in half.

- The Character Control Table is a software table used by both NPS and GRTS to distinguish control of, e.g., function key characters. This enables the user of the terminal to specify that certain keys are to perform particular system functions. Example: a control -J might be set to mean "back space the cursor to the beginning of line".
F. Configuration Examples for Level 6-based FNP (not DN6600-1)

1. "Integrated FNP" with 66/05 (CPS6058)

Prospect wants to use 6 lines. Two lines will serve our TWUL005 ASCII keyboard terminals running asynchronously at 1,200 bits per second. Two lines will serve VIP7760 ASCII terminals running synchronously at 2,400 bits per second. Two lines will serve BSC-oriented remote batch terminals at up to 2,400 bits per second. The TWUL005 terminals will be in-plant, about 2,000 feet from the FNP. No common carrier lines will be used for them.

<table>
<thead>
<tr>
<th>Qty</th>
<th>Type NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCF6608</td>
<td>Console device required</td>
</tr>
<tr>
<td>1</td>
<td>DCF6612</td>
<td>Asynchronous LIU for TWUL005 terminals</td>
</tr>
<tr>
<td>4</td>
<td>DCF6927</td>
<td>Modem bypass units for two TWUL005 lines. Cable length assumed not greater than 2,500 feet</td>
</tr>
<tr>
<td>1</td>
<td>DCF6611</td>
<td>Synchronous LIU for VIP7760 terminals</td>
</tr>
<tr>
<td>1</td>
<td>DCF6618</td>
<td>BSC LIU for remote batch terminals</td>
</tr>
</tbody>
</table>

2. DN6670 Configuration Sample

Prospect for 66/20 will use GRTS and wants 20 lines as follows:

5 lines for VIP7200 terminals, asynchronous, to 2,000 bits per second, ASCII code
5 lines for TWUL003, asynchronous, to 300 bits per second, ASCII code
2 lines for Level 6 HASP Multileaving Facility terminals, BSC protocol, to 4,800 bits per second, EBCDIC code
2 lines for BSC terminals, synchronous, to 2,000 bits per second, EBCDIC code
4 lines for VIP terminals, synchronous, to 2,000 bits per second, ASCII code
2 lines for HDLC-oriented Level 6 RBF (remote batch facility) terminals, synchronous, to 2,400 bits per second.
SECTION XX
Configuring Level 6-Based FNPs (Not DN6600-1)
66/05 INP, DN6670, DPS INP/ANP

<table>
<thead>
<tr>
<th>Qty</th>
<th>Type NO.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCP6670</td>
<td>Base FNP</td>
</tr>
<tr>
<td>1</td>
<td>DCF6608</td>
<td>Console for GRTS-type load</td>
</tr>
<tr>
<td>5</td>
<td>DCF6612</td>
<td>LIUs for 10 asynchronous lines</td>
</tr>
<tr>
<td>3</td>
<td>DCF6611</td>
<td>LIUs for 2 RBF lines and 4 VIP terminals, all synchronous</td>
</tr>
<tr>
<td>1</td>
<td>DCF6618</td>
<td>LIU for 2 lines for BSC HASP workstation terminals</td>
</tr>
<tr>
<td>1</td>
<td>DCF6607</td>
<td>GPCB to handle HDLC lines. Built-in GPCBs do not handle HDLC</td>
</tr>
<tr>
<td>1</td>
<td>DCF6620</td>
<td>LIUs for 2 HDLC-oriented RBF terminals</td>
</tr>
</tbody>
</table>

3. 66/DPS INP Configuration Example

Prospect will use NPS and wants 50 lines as follows:

- 10 lines for VIP7200 terminals, asynchronous, to 2,000 bits per second, ASCII code
- 5 lines for TWU1003 terminals, asynchronous, to 300 bits per second, ASCII code
- 3 lines for Level 6 RBF (remote batch facility) terminals, synchronous, to 4,800 bits per second, ASCII code, HDLC protocol
- 10 lines for BSC CRT terminals, synchronous, to 2,000 bits per second, EBCDIC code
- 22 lines for VIP terminals, synchronous, to 2,000 per second, ASCII code

<table>
<thead>
<tr>
<th>Qty.</th>
<th>Type No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DCF6601</td>
<td>Peripheral interface adapter for delta link to MSP for NPS use</td>
</tr>
<tr>
<td>7</td>
<td>DCF6007</td>
<td>GPCBs (channel interface bases) for LIUs.</td>
</tr>
<tr>
<td>11</td>
<td>DCF6611</td>
<td>LIUs for 22 VIP synchronous lines</td>
</tr>
<tr>
<td>8</td>
<td>DCF6612</td>
<td>LIUs for 15 asynchronous lines</td>
</tr>
<tr>
<td>5</td>
<td>DCF6618</td>
<td>LIUs for 10 lines, BSC protocol</td>
</tr>
<tr>
<td>3</td>
<td>DCF6620</td>
<td>LIUs for 3 RBF lines, HDLC protocol</td>
</tr>
</tbody>
</table>
To determine if 7 GPCBs (DCF6007) will be sufficient based on throughput factor calculations described in Section E above, assume distribution is as follows and that CCT table will be used. Remember that maximum throughput factor (load factor) is 99 per GPCB (CIB)

<table>
<thead>
<tr>
<th>GPCB</th>
<th>LIUs</th>
<th>Load Factor</th>
<th>Total GPCB Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4-DCF6611</td>
<td>8x2.0</td>
<td>16.0=ok</td>
</tr>
<tr>
<td>2</td>
<td>4-DCF6611</td>
<td>8x2.0</td>
<td>16.0=ok</td>
</tr>
<tr>
<td>3</td>
<td>3-DCF6611</td>
<td>6x2.0=12.0</td>
<td>16.0=ok</td>
</tr>
<tr>
<td></td>
<td>1-DCF6612</td>
<td>2x2.0=4.0</td>
<td>16.0=ok</td>
</tr>
<tr>
<td>4</td>
<td>4-DCF6612</td>
<td>8x2.0</td>
<td>16.0=ok</td>
</tr>
<tr>
<td>5</td>
<td>3-DCF6612</td>
<td>5x2.0=10.0</td>
<td>15.0=ok</td>
</tr>
<tr>
<td></td>
<td>1-DCF6618</td>
<td>2x2.5=5.0</td>
<td>20.0=ok</td>
</tr>
<tr>
<td>6</td>
<td>4-DCF6618</td>
<td>8x2.5</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>3-DCF6620</td>
<td>3x4.4 (FDX)</td>
<td>13.2=ok</td>
</tr>
</tbody>
</table>
SECTION XXI
Summary of DPS/Non-DPS Software Aspects
Preliminary, Subject to Change and Correction

A. Based in part on OTL66 Bulletin 185, 3/3/78

B. 66/DPS models reflect Honeywell's continuing moves toward hardware and software oriented and optimized toward the ASCII mode operation.

C. 66/DPS models are basically ASCII mode machines. ASCII-mode software is that for which ASCII is the native character set, which uses UFAS ASCII file types, and where the files/records are byte-oriented. In general, the ASCII-oriented software is that associated with COBOL-74, I-D-S/II, DM-IV, new FORTRAN/I-D-S/II (Aberdeen).

Non-DPS systems execute both ASCII mode and BCD mode programs and system software.

D. If a software item does not fall into the ASCII-oriented category, it is considered as operating in BCD mode. For some such software the BCD hardware option is not required, as in the case of the operating system itself (GCOS III); in other cases the BCD option is required. In general, BCD-oriented software is that associated with GMAP, COBOL-58, I-D-S/I, JOVIAL, FORTRAN-Y (original FORTRAN), ALGOL.

1. Examples of BCD-oriented software which is bundled and does not require BCD option --- GCOS (SR 4/J S), time-sharing, BASIC compiler, GMAP assembler, Sort/Merge, TPE-I (BCD version). With regard to time-sharing, a general rule is that if software executes in the time-sharing swap area it will not require BCD option, though it may still be an unbundled software item. The original FORTRAN (FORTRAN-Y) compiler, which can run in time-sharing swap area or in batch area of memory, requires use of the BCD option.

2. At present most applications software is BCD-oriented and requires the BCD option in DPS systems. The showing of applications software in the table below with regard to DPS systems is for general guidance only. For definitive information on requirements of applications software for BCD option, and for plans regarding our conversion of such packages to ASCII mode, please consult the Industry Marketing Market Manager for the industry concerned.
SECTION XXI
Summary of DPS/Non-DPS Software Aspects
Preliminary, Subject to Change and Correction

E. Table Showing DPS and Non-DPS Systems and Relationship to ASCII/BCD Mode Software

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Title</th>
<th>ASCII, BCD Mode</th>
<th>DPS, Non-DPS</th>
<th>Priced</th>
<th>DPS-BCD Option Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>SES6100</td>
<td>GCOS SR4/J: HCM, Allocators, System Scheduler, System I/O, Test and Diagnostic Routines (TOLTS, HEALS, Offline), GFRC, FMS, SMS, GMAP, BMC, Sort/Merge, GFRC File Utilities, System Editors, Loaders/Linkers, UPAS</td>
<td>Varies</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SEP6101</td>
<td>(1) Time-sharing (TSE)</td>
<td></td>
<td></td>
<td>No (Now)</td>
<td></td>
</tr>
<tr>
<td>SEL6103</td>
<td>(1) BASIC Compiler (1) Present versions not priced but future enhanced versions will be</td>
<td></td>
<td></td>
<td>No (Now)</td>
<td></td>
</tr>
</tbody>
</table>

OTHER SYSTEM SOFTWARE

<table>
<thead>
<tr>
<th>Type No.</th>
<th>Title</th>
<th>ASCII</th>
<th>Both</th>
<th>Priced</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEU6101</td>
<td>File Generations (ADF2)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>SEJ6001</td>
<td>TPE-II (TPS, COBOL- 68 TPAPs)(TPE-II not released yet)</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>TPE-II (TPS, COBOL- 74 TPAPs)(TPE-II not released yet)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>SES6102</td>
<td>TPE-I (TPS, COBOL- 68 TPAPs)</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>SFP6001</td>
<td>TDS</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SEP6001</td>
<td>TDS/T-S Load Generator</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>SEU6001</td>
<td>HONEYEDIT</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>AES0019</td>
<td>T-S Library</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>SEL6018</td>
<td>TEX</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>SEL6019</td>
<td>TEX Library</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>AES0010</td>
<td>Concordance</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>----</td>
<td>T-S Text Editor</td>
<td>ASCII</td>
<td>Both</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>SEU6003</td>
<td>Peripheral</td>
<td>Both</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
### Resource Monitor

| SEU6004 | Tape Testing | Both | Both | Yes | No |
| SEU6005 | Mass Storage | Both | Both | Yes | No |

#### System Languages

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</thead>
<tbody>
<tr>
<td>COBOL-68 Compiler</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>FORTRAN (Y-old)</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>ALGOL Compiler</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>JOVIAL Compiler</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>COBOL-74 Compiler</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>FORTRAN/I-D-S/II</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>PL/1 Compiler</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>RPG II</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>LISP/66</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>PASCAL</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Compiler B</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>APL/66</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>APL/66 Level II</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
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#### Data Management

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<tbody>
<tr>
<td>DM-IV Basic (Data Manager I-D-S/II)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DM-IV TP</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DM-IV QRP</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DM-IV PLP</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DM-IV Full Pkg</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>DM-IV Coexistence-TDS, I-D-S/I, I-D-S/II COBOL-74</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Subschema Translator</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>I-D-S/II FORTRAN Subschema Translator (Use with FORTRAN/ I-D-S/II DML)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>MDQS-II</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>MDQS-IV</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>I-D-S/I</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>I-D-S DQS</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
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</tbody>
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SECTION XXI
Summary of DPS/Non-DPS Software Aspects
Preliminary, Subject to Change and Correction

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>SED6001</td>
<td>dataBASIC</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>66/TOTAL Central</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
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</table>

Conversion Aids

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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAPS-68/74</td>
<td>BCD</td>
<td>Both</td>
<td>No</td>
<td>No(1)</td>
</tr>
<tr>
<td></td>
<td>SPLICE,BAL-to-COBOL,RPG-to-COBOL,EASYGO,ESTIMATE,CPS,All Others</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

(l) No, if used in object form, yes if source used

Application P'ackages

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<tr>
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<tbody>
<tr>
<td></td>
<td>Manufacturing -</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMF0034</td>
<td>IMS(I-D-S/I)</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>AEM0003</td>
<td>PSC(I-D-S/I)</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
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<td>AMF0061</td>
<td>IMS(I-D-S/II)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>AMF0062</td>
<td>IMS(I-D-S/II)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>AMF0063</td>
<td>IMS(I-D-S/II)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>AMF0065</td>
<td>PSC(I-D-S/II)</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>AFS0035</td>
<td>APT/56</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>AFS0036</td>
<td>APT/56</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td></td>
<td>Distribution -</td>
<td></td>
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<tr>
<td>AED0001</td>
<td>SOPS</td>
<td>BCD</td>
<td>Both</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>AFD0001</td>
<td>PROFIT/66</td>
<td>ASCII</td>
<td>Both</td>
<td>Yes</td>
<td>No</td>
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<tbody>
<tr>
<td></td>
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Balancing

Health Care -

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Education -

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SECTION XXI
Summary of DPS/Non-DPS Software Aspects
Preliminary, Subject to Change and Correction

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Management Sciences -

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<td>T-S Library</td>
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<td>AES0022</td>
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<td>AES0023</td>
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<td>AES0013</td>
<td>ASTRA II</td>
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<td>AES0021</td>
<td>BMD-P</td>
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<td>AES0012</td>
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<td>AES0020</td>
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Financial Management -

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<td>AEP0004</td>
<td>Payroll Tax Rtn</td>
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<td>AEP0001</td>
<td>Accounts Rec</td>
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<td>AEP0002</td>
<td>Accounts Pay</td>
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<td>AEP0003</td>
<td>General Ledger</td>
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Miscellaneous -

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<tr>
<td>UDA, FDA, ARI or Referral Vendors AS Sources</td>
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Networking Software

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<tr>
<td>AES0002</td>
<td>GRTS-I</td>
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<td>Both(2)</td>
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<td>GRTS-II Basic System (1Q79)</td>
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<td>SEC003</td>
<td>GRTS-II HDLC Support</td>
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</table>
SECTION XXI
Summary of DPS/Non-DPS Software Aspects
Preliminary, Subject to Change and Correction

SEC6004  NPS DP1 (128KB
FNP Required)
Basic System

SEC6005  NPS DP1 HDLC
Support

----
NPS NT2 (64KB
FNP Required)
Basic System

SEC6005  NPS NT2 HDLC
Support

SEC6002  Host File Transceiver for Level
6 PTF

SEL6015  Host Resident
Level 6 Remote
Program Dev
System (RPDS)
Includes Assembler, Macro Preprocessor and linkers

SEL6016  Host Resident
Level 6 FORTRAN
Cross-compiler.
Requires SEL6015

SEL6017  Host Resident
Level 6
COBOL-74 Cross-
Compiler.
Requires SEL6015

(1) Not pertinent. Software runs in FNP

(2) Permitted in DPS or bridged DPS-like case only to provide interface to Document Entry System. (DES portion of CHECS) to run document handlers