Release 4 and 5 combined may now be ordered. This combined release adds several components to OS/360 which supply extensive new capability. Release 5, BDAM Extensions and DEVTYPE Macro, was originally scheduled for September 30, 1966. Release 4, PL/I F, was originally scheduled for August 31, 1966.

- BDAM ... added functions and flexibility for this access method.
- DEVTYPE Macro ... permits assembler language programmers to maximize performance according to the I/O device actually in use.
- PL/I F (44K) ... is the first release of the new language processor which provides many powerful facilities.
- PL/I F Subroutine Library.

The maintenance release incorporated within Releases 4 and 5 can be ordered independently, if necessary. The maintenance release gives a user who has locally modified the Operating System a method of incorporating maintenance changes. All users should order replacement Release 4/5 for ease of updating, rather than the maintenance release, unless they require the selective updating facility offered by the maintenance release. Both the replacement release and the maintenance release will require a system generation run. Ordering the full replacement release does not mean that PL/I must be included in the generated system, because the system generation process allows full selectivity. All OS/360 users must order either Release 4/5 or the maintenance release to update their system to the latest level and facilitate program maintenance through APAR service. The maintenance release for Operating System Release 3 will be available only through September 2, 1966.

Features of Release 4/5 are:

- BDAM Extensions -- Provides for multivolume data sets, dynamic buffering, extended search and the CHECK Macro.
- DEVTYPE -- Allows the assembler programmer to request information (via programming) relating to the characteristics of I/O devices in use, allowing a programmed selection of blocking and other factors that will optimize performance.
- PL/I F (360S-NL-511) and Library (360S-LM-512) -- The first release of the compiler provides many new and significant facilities in a single high level language, such as:
  - ability to describe and process many data types including fixed and floating decimal, fixed and floating binary, and character and bit strings.
  - powerful editing and data conversion facilities.
  - data structures for alphanumeric information.
  - powerful debugging tools which include a balanced selection of documentation options.
  - FORTRAN-like Input/Output.

The initial release provides the basic PL/I language features which will enable the user to develop experience in the use of PL/I. This release of PL/I is oriented toward scientific type applications since the key commercial language feature of Record I/O is in a subsequent release. Subsequent releases will extend this widely accepted language which was developed in cooperation with the SHARE and GUIDE user organizations. A detailed description of the follow-on features is contained in Appendix H of the IBM System/360 Operating System PL/I (F) Programmer’s Guide, C28-6594.

The initial version of the compiler has been tested in customer environments. Customer usage has proven the convenience and usefulness of many PL/I features, including stream Input/Output, powerful indexing and looping facilities, array arithmetic, language diagnostics and debugging aids. In many cases programs have required only two or three compilations to identify all source program language errors. Customers have found the language easy to learn, easy to code, easy to debug, and self-documenting.

IBM’s intent continues to be to develop PL/I as a useful language for a wide range of applications. PL/I has been and will continue to be developed with the cooperation of our users. Subsequent releases will add to the function of the language. Changes to the language and the compiler implementations will be made where necessary to enable PL/I to meet its goal of comprehensive excellence.

Performance Considerations

The performance of PL/I F is affected by many factors, including the compiler design, the compilation options selected, the source program statements and options, the configuration of System/360, and the nature of the application. The compiler design utilizes "in core" techniques. The source statements are read and maintained in main storage. The compilation or translation is performed by loading "phases" of the compiler which process the stored statements. Each phase performs a particular part of the translation until the entire source program has been transformed. The source statement type determines which phases are required for translation. Phases not required for translation are bypassed and compilation rates are increased. Thus, the characteristics of the source program directly affect the compilation rate.

In addition, the compiler design provides very effective storage management. A "spill" feature is included which permits compilation of large programs in a minimum space. When additional storage is available greatly improved compilation rates are attained. However, if a compilation requires use of the "spill" feature, compilation speed is reduced.

The PL/I F compiler provides a large number of options which assist in program testing. Some of the options included with this release are an assembler-like object program listing, a cross reference listing, and a source program listing. Each option selected requires the processing of additional compiler phases with a corresponding reduction in compile performance. However, the availability of these options significantly reduces the time and expense of testing and maintenance and affects the total cost of the programming process.

In PL/I, as with all high level languages, compile and execute performance is highly dependent upon the coding techniques of the programmer. The Programmer's Guide indicates certain preferred coding techniques. Some general coding guidelines are:

1. Segmentation of a program requires a certain overhead for housekeeping. Excessive segmentation can result in wasted storage space with a corresponding increase in object time execution.
2. Writing arithmetic statements which use mixed data types can require an excessive number of conversions to be executed.
3. Use of ON units causes generation of additional code. Careless use within frequently executed sections of a program can cause a severe degradation in performance.

Consideration of the above factors has a direct and significant bearing on performance. The preliminary performance information in the following table is summarized from sample testing. The figures are stated as ranges to indicate the wide fluctuations an installation may obtain when using the compiler.
Data Management  
TNL N28-2131*  
Linkage Editor  
TNLs N28-2129 and N28-2130  
PL/I (F) Programmer's Guide  
C28-6594*  
PL/I (F) Subroutine Library  
C28-6590*  
PL/I Graphic Programming Services for  
2250 Display Unit 1  
C27-6921  
Graphic Programming Services for  
2260 Display Station (Local)  
C27-6925

The following items will also be shipped by PID when the related component is ordered: Program Material List ... Starter Operating System Guide ... Sample Problem Write-ups for Update Analysis and Recover/Replace (Utilities), Sort, Assembler (E and F), FORTRAN (E), COBOL (E), Express Graphics and PL/I (F).

When ordering OS/360, the requester will receive the entire collection of machine readable program components.

The following program components are required. To order these components submit one Program Request Card for the Primary Control Program, 360S-Cl-505.

1. All programs using BDAM will have to be reassembled when using Release 4/5. This is due to source language parameter changes resulting from the CHECK macro requirements.

2. To include the PL/I F on a two-drive system, the user must perform a processor and library generation following the operating system generation. This is due to limited work area during generation. (See Starter Guide and System Generation Manual for specific details.)

3. Due to the phase loading arrangement of the PL/I F compiler, there is a requirement for about 550,000 bytes of storage in the library. The decision to place PL/I near the beginning, middle or end of the LINKLIB for best overall system performance must be determined based on the frequency of PL/I usage. Some installation may choose to place PL/I in a JOBLIB rather than LINKLIB. PL/I compiler location is one of many factors which systems programmers should consider when evaluating compilation time.

Miscellaneous Notes on Release 4/5

For those installations preparing for Operating System/360 on 2301, the system generation configuration and source language changes resulting from the CHECK macro requirements. The starter system address assignments for the 2301 are 1CO or 2CO. Distribution of the system from PID will continue to be on magnetic tape or 1316 Disk Pack, but will contain the added capability of generating system from PID will continue to be on magnetic tape or 1316 Disk Pack, but will contain the added capability of generating OS/360 (new or replacement) is on two 2400' reels of magnetic tape, 9-track at 800 bpi (Data Conversion feature required) or two 2400' reels of magnetic tape, 9-track at 800 cpi (Data Conversion feature required).

The requester may select any additional program components from the following list. However, to selectively control the distribution of documentation and maintenance material, the requester must individually list any of the following additional components on the reverse side of the order card for 360S-Cl-505.

1. Basic Direct Access Method  
   360S-Cl-505

2. Linkage Editor  
   360S-Cl-505

3. Program Material List  
   360S-Cl-505

4. Sort/Merge  
   360S-Cl-505

5. FORTRAN E**  
   360S-Cl-505

6. FORTRAN E Library  
   360S-Cl-505

7. COBOL**  
   360S-Cl-505

8. COBOL E Library  
   360S-Cl-505

9. PL/I F**  
   360S-Cl-505

10. PL/I Subroutine Library  
    360S-Cl-505

11. Express Graphics  
    360S-Cl-505

Note for Future Users of 2301

For those installations preparing for Operating System/360 on 2301, the minimum system configuration remains the same as the current configuration for 2311 except for the addition of the 2301 system. If used to order a replacement system, the user should indicate on the back of the prepunched order card for 360S-Cl-505.

The requester may forward or order magnetic tapes or forward disk packs consisting of combined Release 4/5 documentation and maintenance material, the requester must individually list any of the following additional components on the reverse side of the order card for 360S-Cl-505.

Program Material: The following SRL publications appropriate to the component ordered will be shipped by PID with each initial order. Some of these SRLs are new publications which obsolete previous editions. Additional copies of the SRLs are available from Mechanicsburg, "IBM Operating System/360 Starter Operating System Guide," will be included in the release.

SRL Publications

Job Control Language  
TNLs N28-2126 and N28-2128  
C28-6539-1

Operator's Guide  
TNLs N28-2139 and N28-2166*  
C28-6540-1

Control Program Services  
TNLs N28-2120 and N28-2121*  
C28-6541-1

System Programmer's Guide  
TNLs N28-2145 and N28-2157  
C28-6550

Storage Estimates  
TNLs N28-2138 and N28-2170*  
C28-6551-1

System Generation  
TNLs N28-2136, N28-2152* and N28-2164  
C28-6554

Control Program Messages & Completion Codes  
TNLs N28-2116 and N28-2144  
C28-6608

Maintenance  
TNL N28-2160*  
C27-6918

Utility Programs  
TNLs N28-2133 and N28-2156  
C28-6586-1

Sort/Merge  
C28-6586-1

Assembler (E and F) Programmer's Guide  
C28-6543-2

Assembler E Programmer's Guide  
C26-3756

TNL N28-2140*  
C28-6595*

FORTRAN IV (E) Programmer's Guide  
C28-6603

FORTRAN IV (E) Library Subprograms  
C28-6596

COBOL (E) Programmer's Guide  
C24-5029

*For compilation only, excluding time for job scheduling.

The preliminary performance information above is based on a very small sample.

There are very few programs available which are purely of a PL/I based design. This is due to the brief but dynamic period during which the PL/I language specifications have been available. Experience indicates that PL/I programs are usually significantly smaller than comparable FORTRAN programs. Therefore, smaller source programs should be assumed when evaluating compilation time.
[A] **BPS/360 Report Program Generator (Tape)**

PID is now distributing Modification Level 1 to all users of BPS/360 Report Program Generator (Tape), 360F-RG-201. In addition to including corrections for miscellaneous program errors, the modification incorporates the following significant changes:

- The 2520 Model B1 Card Read Punch, and/or Models B2 and B3 Card Punches are now supported. This support allows use of the 2520 Model B1 Card Read Punch to satisfy minimum system requirements for a card reader and/or card punch, except that simultaneous card reading and punching cannot be done. This support also allows use of the 2520 Models B2 and/or B3 to satisfy minimum system requirements for a card punch.

Note: For proper functioning of the device support routines, the 2520 (all models) must have Engineering Changes 811839 and 811842 installed.

- The 10CFG and JBCTL macros have been changed to include byte multiplexing capability for all byte mode devices. The 10CFG parameter MPX = n (n = 1 to 255) causes generation of the proper coding in the assembled supervisor. When the MPX entry is not zero, queue numbers are assigned to each different device attached to the multiplex channel if none of these devices is a magnetic tape or disk drive.

- A new macro, ZBPCL, has been added to the system. The purpose of this macro is to provide a means of recording the maintenance level of each phase and macro included in the system. The ZBPCL macro contains no program functions. It is intended primarily for use in programming analysis, and will be updated with each successive modification level distributed.

New SRL publications available with this modification level are:

- **TNL N24-5083 to System/360 Basic Programming Support Basic Tape System (8K Tape)**, C24-3391-1.

Note: C24-3354-4 has been distributed to all registered users of 360P-AS-091.

[B] **BPS/360 Basic Tape System (8K)**

PID is now distributing Modification Level 7 to all users of the BPS/360 Basic Tape System (8K), 360P-AS-091. In addition to providing corrections for miscellaneous program errors, the modification incorporates the following significant changes:

- The 2520 Model B1 Card Read Punch, and/or Models B2 and B3 Card Punches are now supported. This support allows use of the 2520 Model B1 Card Read Punch to satisfy minimum system requirements for a card reader and/or punch, except that simultaneous card reading and punching cannot be done. This support also allows use of the 2520 Models B2 and/or B3 to satisfy minimum system requirements for a card punch.

Note: For proper functioning of the device support routines, the 2520 (all models) must have Engineering Changes 811839 and 811842 installed.

- The 10CFG and JBCTL macros have been changed to include byte multiplexing capability for all byte mode devices. The 10CFG parameter MPX = n (n = 1 to 255) causes generation of the proper coding in the assembled supervisor. When the MPX entry is not zero, queue numbers are assigned to each different device attached to the multiplex channel if none of these devices is a magnetic tape or disk drive.

- A new macro, ZBPCL, has been added to the system. The purpose of this macro is to provide a means of recording the maintenance level of each phase and macro included in the system. The ZBPCL macro contains no program functions. It is intended primarily for use in programming analysis, and will be updated with each successive modification level distributed.

New SRL publications available with this modification level are:

- **TNL N24-5083 to System/360 Basic Programming Support Basic Tape System (8K Tape)**, C24-3391-1.

Note: C24-3354-4 has been distributed to all registered users of 360P-AS-091.

[C] **IBM System/360 Disk Operating System**

**Amendment to P66-45 Item A.**

- Page 3 The title Sort/Merge (Disk/Tape) should be changed to Sort/Merge (Disk).
- Page 3 Under COBOL, 360N-CB-452, delete the last sentence of the last paragraph and add: The COBOL compiler design point is 14K of core storage. For this reason, a 32K system is required for compilation of COBOL programs.

Note: Sales Manual Page P 360.22 will be revised.

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**Distribution:** All Areas  
**Release Date:** August 25, 1966  
**P66-580 Corresponding IBM Letter # P66-73**
The 1410/7010 Simulator Program (360C-SI-754) is now available. It is a stand-alone System/360 program that enables programs that have been operating on a 1410/7010 to be executed on a System/360 without a suitable configuration. By providing program "compatibility", the simulator relieves reprogramming and scheduling problems, and can eliminate the need to convert infrequently used programs.

The simulator produces correct results only for programs that work properly on the original system, and may produce incorrect results for time-dependent programs.

The System/360 must be equipped with the devices needed to service the simulator, as well as those required to provide a configuration corresponding to that of the original system.

The simulator requires:
- One 1052 Printer-Keyboard.
- One device for program input.
- One device for simulator control information input.
- One corresponding device for each simulated device.

In some cases, the program input, control, and simulated-device functions can be handled by the same device.

Performance under simulation depends largely on the balance of CPU and I/O operations.

Throughput: Estimates of performance under simulation are shown below as ranges of throughput ratios for a number of typical programs. A ratio greater than 1.0 means that simulation on System/360 is estimated to be faster than execution on the original system. These estimates are based on the following assumptions:
- The tape units used for simulation have at least the same data transfer rate in bytes as those of the simulated system in characters.
- The termination conditions of tape read/write operations are normal.

The throughput ratios are:

<table>
<thead>
<tr>
<th>Current System</th>
<th>System/360 Model 40</th>
<th>System/360 Model 50</th>
<th>System/360 Model 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>1410</td>
<td>.20-.35</td>
<td>.40-.70</td>
<td>.55-.85</td>
</tr>
<tr>
<td>7010</td>
<td>.25-.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Factors that increase simulation throughput:
- Programs which are I/O bound on 1410/7010.
- I/O data in simulator internal format with odd parity alternate mode.

Factors that decrease simulation throughput:
- Programs which are process bound on 1410/7010.
- I/O data not in simulator internal format.

The 1410/7010 simulator handles all standard features and the following optional features of the simulated system:
- Floating point arithmetic.
- Interprogram overlap (§3730).
- Priority processing (§5620).
- Inverted Print-Edit (comma-period).
- One to four channels.

The main restrictions and limitations are the following:
- 1401 compatibility is not simulated.

### System Requirements:

The simulator operates with the Standard Instruction set and the Decimal Arithmetic Instruction. Main storage requirements depend on the 1410 or 7010 core storage being simulated as follows:

<table>
<thead>
<tr>
<th>1410 Core Storage (Characters)</th>
<th>7010 Core Storage (Characters)</th>
<th>System/360 Main Storage (bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10,000</td>
<td></td>
<td>65,536 (Model F)</td>
</tr>
<tr>
<td>20,000</td>
<td></td>
<td>65,536 (Model F)</td>
</tr>
<tr>
<td>40,000</td>
<td>40,000</td>
<td>131,072 (Model G)</td>
</tr>
<tr>
<td>60,000</td>
<td>60,000</td>
<td>131,072 (Model G)</td>
</tr>
<tr>
<td>80,000</td>
<td>80,000</td>
<td>131,072 (Model G)</td>
</tr>
<tr>
<td>(2 channels)</td>
<td>(4 Channels)</td>
<td>262,144 (Model H)</td>
</tr>
<tr>
<td>80,000</td>
<td></td>
<td>262,144 (Model H)</td>
</tr>
<tr>
<td>100,000</td>
<td></td>
<td>262,144 (Model H)</td>
</tr>
</tbody>
</table>

A System/360 device corresponding to each 1410/7010 device to be simulated is required as follows:

- 1410/7010 Device
- 1415 Console
- 1402 Card Read Punch
- 1442 Card Reader
- 1403 Printer
- 729 Magnetic Tape Unit

Note: 2400 series tape units models 4, 5, and 6 cannot be used.

- Simulation of the 1402 Card Read Punch, Model 2, with 51-column Interchangeable Read Feed feature (§150) requires a 2540 Card Read Punch with 51-column Interchangeable Read Feed feature (§151).

- Simulation of the 1402 Card Read Punch, Model 2, with Read and Punch Column Binary feature (§6025) requires
Any 2400-series Magnetic Tape Unit used to read or write 7-track tapes must be equipped with the 7-track Compatibility feature (#7125) and a 7-track Read/Write Head (#4557). The 7-track Compatibility feature must be installed on the associated tape control unit. Information on simulation limitations and performances under simulation can be found in the SRL publication, IBM System/360 Conversion Aids: The 1410/7010 Simulator for IBM System/360, C28-6528-1, and in the Programming section of the DP Sales Manual.


Basic Program Material:

Documentation - Program Material List.


Machine Readable: 9 track DTR or 7 track DTR (Data Conversion feature required) containing: Common Programs, SIM 10, PREP 10, UPDATE 10, SYSINEND, SAMPLE PROGRAM.

NOTE: When ordering this program, the requester must indicate whether a 9-track or 7-track DTR is required. If not specified, 9-track DTR will be supplied.

DTR will be supplied by the Program Information Department - no tape submittal is required.

The Simulator requires:

- One 1052 Printer-Keyboard.
- One System/360 device for program input.
- One System/360 device for simulator control information input.
- One corresponding System/360 device for each simulated 7080 device.

If the Simulator Program is to be loaded from a magnetic tape unit equipped with the 7-track Read Write Head (#4557); the 7-track Compatibility feature (#7125) and the Data Conversion feature (#3228 or #3236) must be installed on the associated tape control unit. After the program has been loaded, this System/360 device is available for simulating a 7080 corresponding device. (See below.) For each 7080 device simulated, one of the System/360 devices shown in the following table is also required. In some cases, the program input, control information input, and simulated 7080 device functions can be handled by the same System/360 device.

### 7080 Device

#### System/360 Device

| 7153 Console Control Unit, Model 1 | 1052 Printer-Keyboard (any model compatible with the system) |
| 7502 Console Card Reader, Model 1 | 2540 Card Read Punch, Model 1 |
| 1442 Card Read Punch, Model N1 | 2501 Card Reader, Model B1 |
| 2520 Card Read Punch, Model B1 |

729 Magnetic Tape Units (any model) (7- or 9-track)

729 Magnetic Tape Units (any model) (7- or 9-track)

(Note that Models 4, 5, and 6 of the 2400 series tape units cannot be used.)

Information on simulation limitations and performance under simulation can be found in the SRL publication, IBM System/360 Conversion Aids: The 7080 Simulator for IBM System/360, C28-6531-1, and in the Programming section of the DP Sales Manual.


To order the Simulator Program, refer to page P-1 of the Programming section of the DP Sales Manual.

Program Material:

Documentation - Program Material List.


Machine Readable: 7080 Simulator Object Program containing: Common Programs, SIM80, PREP80, and the Sample Program may be obtained on one 9-track DTR or one 7-track DTR. When ordering, the requester must indicate whether 9-track or 7-track DTR is required. If not specified, 9-track DTR will be forwarded.

Note: DTRs will be supplied by the Program Information Department. No tape submittal is required.

These simulator programs are low usage item and should only be used in situations where their availability is essential. They should not be ordered for experimentation. These programs do add a level of complexity to the installation due to the basic process of simulating one computer on another. Field engineering assistance must be specifically arranged with the FE Branch.

G. R. Williamson
Director of DP Marketing
CONTENTS

BPS/360 Copy and Restore Utility Programs... change in availability date to two programs, and the addition of the Disk-to-Disk Program. [A]

Change of Commitment

The BPS/360 Copy Disk-to-Card and Restore Card-to-Disk utility programs announced in P66-56 are being modified to include a restart facility. This requires a change in availability date from August 31, 1966 to October 15, 1966. All affected customers must be notified immediately.

Announcement

A new BPS/360 Copy and Restore utility program, Disk-to-Disk, will be provided in addition to those announced in P66-56. It will perform the same functions announced in P66-56, with the exception that there will be no intermediate storage medium (card or tape) used. Availability -- August 31, 1966.

Minimum System Requirements: An 8K System/360... one Card Reader... two 2311 Disk Drives... one Printer or 1052 Printer-Keyboard for logging and error messages.

Supported devices include... 1442, 2501, 2520, 2540... 1403, 1443, 1404 (continuous forms only)... extra core storage is used to increase the maximum blocks per track read.

Note to World Trade Readers

This letter is a reprint of an IBM Programming Announcement made in the USA. The following changes, when appropriate, should be applied to the text for WTC use.

1. All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.

2. Advance copies of the form numbered publications mentioned in the above either have been shipped (with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania) or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.

3. When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a prepunched request card in their Area.

4. If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

5. All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.

6. Any reference made to DPD Departments as sources of information or for manuals etc. should be understood to mean the comparable WT Department.

G. R. Williamson
Director of DP Marketing

Distribution: All Areas

Release Date: August 26, 1966

P66-582 Corresponding IBM Letter # P66-75
[A] BPS/360 2311 Copy and Restore Utility Programs

Version 1 of two BPS/360 2311 Copy and Restore utility programs are now available. They are:

- **Copy Disk to Tape and Restore Tape to Disk, 360P-UT-061**
  This program consists of two separate decks, one to copy a disk onto one or more tapes; and the other to restore a disk from the previous tapes. The program will copy and restore a disk in one of two ways:
    - **Copy and Restore Volume** - with this option one entire disk pack is copied and restored, including RO, IPL Records, data records, VOLUME LABELs, and the VTDC.
    - **Copy and Restore File** - with this option, one data file may be copied and restored. The file may consist of more than one volume. ROs are copied for the area occupied by the file, and IPL Records may be optionally copied.

  The program assigns I/O areas based on the size of core storage, I/O overlap is performed if core storage is equal to or greater than 16K and channel assignment permits. The restored records occupy areas of the 2311 identical to the original file.

- **Copy Disk-to-Disk, 360P-UT-072**
  This program consists of one deck that copies one disk to another. It performs the identical functions of 360P-UT-061, with the exception that there is no intermediate storage medium used. Two disk drives are required; files may not be copied from one area to another on the same pack.

  **Performance:** The performance figures below are based on the following machine configurations:
  - 8K System/360 Model 30.
  - 2540 Card Read/Punch.

  For 360P-UT-061, a printer (as described in Minimum System Requirements), one 2311 Disk Drive and one 2400 series 9-track magnetic tape drive (96KOC), both attached to the Selector Channel.

  For 360P-UT-072, two 2311 Disk Drives, both attached to the selector channel.

  The figures are also based upon processing a 1316 Disk Pack on which each track contains 9 data records of 300 bytes each.

  **360P-UT-061**
  Copy Disk to Tape requires approximately 4 minutes if no errors occur.
  Restore Tape to Disk requires approximately 5.5 minutes if no errors occur.

  **360P-UT-072**
  Approximately 4 minutes are required to copy disk to disk if no errors occur.

  **Usage Considerations**
  - **No Record ID (count field) may be repeated on a track,**
    RO must be written according to IBM standards, (K_L = 0, D_L = 8)
  - **No ID (count field) other than RO may contain a record number indication of zero.**

  A file copied to tape on a machine size of 16K or greater cannot be restored to disk on a machine smaller than 16K.

  1316 Disk Packs must have been initialized with standard home addresses, ROs and a Volume label, according to IBM standards. The disk pack may have been used between initialization and restoring a file from tape.

  **Minimum System Requirements**
  - 8,192 bytes of main storage.
  - A card reader (1442, 2501, 2520 model B1, or 2540) for program loading and control cards.

  **Appropriate input/output devices:**
  - For 360P-UT-061 at least one 2311 and one 2400 series tape drive (if 7-track tape the Data Conversion Feature must be present).

[1] BPS/360 2311 Copy and Restore Utility Programs...two programs now available from IBM. [A]
1130 Commercial Subroutine Package (1130-SE-25X)...an application program now available. [B]
1130 Scientific Subroutine Package (1130-SC-25X)...shipments to begin the week ending September 16. [C]

For 360P-UT-072 two 2311's, one for input and one for output.

An IBM 1403, 1443, 1445 or 1404 (continuous forms only) printer or an IBM 1052 console printer for program logging and diagnostic messages.

**Engineering Change Level Requirements:** These programs have the same Engineering Change Level requirements as IBM System/360 Disk Operating System. These can be found on page 4 of Programming Announcement Letter P66-45, as amended by P66-73.


For additional information concerning the BPS/360 2311 Copy and Restore utility programs, refer to P66-56 and P66-75.

**Basic Program Material:**

- **Copy Disk to Tape and Restore Tape to Disk, 360P-UT-061**
  - Documentation: Program Material List
  - Machine Readable Material: One 9-track DTR or one 7-track DTR (Data Conversion feature required) containing the Assembled Decks for Copy Disk to Tape and Restore Tape to Disk.
  - Documentation: Program Material List
  - Machine Readable Material: The copy Disk to Disk Assembled Deck is available on one 9-track DTR, or one 7-track DTR (Data Conversion feature required) or in card form.

**Copy Disk-to-Disk, 360P-UT-072**

- **Documentation:** Program Material List
  - Machine Readable Material: The copy Disk to Disk Assembled Deck is available on one 9-track DTR, or one 7-track DTR (Data Conversion feature required) or in card form.

When ordering the requester must specify whether 9-track or 7-track DTR is required. If not specified, 9-track DTR will be forwarded.

**Note:** DTRs will be supplied by the Program Information Department -- no tape submittal is required.

[B] IBM 1130 Commercial Subroutine Package

The 1130 Commercial Subroutine Package (1130-SE-25X) is now available. It provides the scientific user with added capabilities for handling functions and techniques common to commercial programming. This set of eight subroutines is callable by the FORTRAN programmer in a similar manner to such standard functions as sine, cosine, square root, etc.

**Description:** These FORTRAN written subroutines (one is in Assembler Language) are independent of input and output. They will provide the scientific 1130 user with flexibility to add limited commercial applications such as payroll, cost accounting, and many others.

**Features:**
- Variable length alphanumeric move
- Variable length alphanumeric compare
Variables length conversion from EBCDIC to floating-point
Variables length conversion from floating-point to EBCDIC
Zone manipulation
Fill an area with a specified character
Stacker select

Programming Systems: Stacker select is programmed in 1130 Assembler language, all other routines are programmed in 1130 FORTRAN. The internal format of data is one character per word.

Minimum System Requirements: For operation - An 1131 Model 1B or 2B ... 1442 Card Read Punch Model 6 or 7. In addition, the Console Printer, 1134 Paper Tape Reader, 1055 Paper Tape Punch and 1132 Printer are supported.

For compilation and assembly only, the minimum 1130 FORTRAN card system requirements are sufficient.

Basic Program Material:
- Documentation -- Application Description, H20-0221 ...
- Application Directory, H20-0241 ...
- Machine Readable -- Source Decks and Sample Problem Decks.

Reference Material: "IBM 1130 FORTRAN" (C26-5933).

For further information contact the Systems Marketing Technique Development Department Product Programs, DPD HQ.

IBM 1130 Scientific Subroutine Package

The IBM Scientific Subroutine Package (1130-CM-02X) for operation under the IBM 1130 Disk Monitor FORTRAN Compiler (1130-0S-001) may now be ordered. Shipments will begin the week ending September 16.

This program previously announced as available in August 1966 for operation under the IBM 1130 Card FORTRAN Compiler (1130-F0-001), will be available in December 1966.

SSP/1130 contains all of the subroutines presently available in SSP/360 (360A-CM-03X). It replaces the 1130 MATHPAK and will permit all of the computational functions originally specified in 1130 MATHPAK Announcement (P65-5).

Description: SSP/1130 is a collection of 121 FORTRAN subroutines which provide a major addition to those built into FORTRAN. They are input/output-free, computational building blocks that can be combined with a user's input, output, or computational routines to meet his individual needs. The package has widespread application to the solution of problems in research, development, and design, in both science and engineering, wherever FORTRAN is used.

Individual subroutines, or a combination of them, can be used to carry out the following functions:

In statistics -- analysis of variance (factorial design) ... correlation analysis ... multiple linear regression ... polynomial regression ... canonical correlation ... factor analysis (principal components, varimax) ... discriminant analysis (many groups) ... time series analysis ... data screening and analysis ... non-parametric tests.

In matrix manipulation -- inversion ... eigenvalues and eigenvectors (real symmetric case) ... simultaneous linear algebraic equations ... transposition ... matrix arithmetic (addition, product, etc.) ... partitioning ... tabulation and sorting of rows or columns ... elementary operations on rows or columns.

In other mathematical areas -- integration of given or tabulated functions ... integration of up to six first order differential equations ... Fourier analysis of given or tabulated functions ... Bessel and modified Bessel function evaluation ... gamma function evaluation ... Legendre function evaluation ... elliptic, exponential, sine, cosine, Fresnel Integrals ... finding real roots of a given function ... finding real and complex roots of real polynomial equations ... polynomial arithmetic (addition, division, etc.) ... polynomial evaluation, integration, differentiation.

Features:
- all subroutines are written in FORTRAN.
- many matrix manipulation subroutines handle symmetric and diagonal matrices (stored in economical, compressed formats) as well as general matrices.
- the use of important subroutines (or groups of them) is illustrated in the program documentation by sample main programs with input/output.
- all subroutines are documented uniformly.

Use: As a library of subroutines, SSP/1130 allows the user to select those functions which he needs, while not being burdened with unneeded routines.

Programming Systems: The subroutines will compile and execute with the IBM 1130 Disk Monitor FORTRAN Compiler (1130-0S-001).

Machine Configuration: The machine configuration necessary to run SSP/1130 is dependent upon the use that is to be made of the package. Each of the subroutines is I/O free, compiles to less than 1,200 words of core, and is, therefore, configuration independent. However, many of the routines are intended to be used in conjunction with other subroutines or to solve problems using large arrays of data. For this reason, many of the subroutines are not useful with less than 8K words of core.

The following items should be taken into consideration when deciding upon the applicability of the package to a particular machine configuration:

1. The size of problem which may be executed on a given 1130 depends upon the number of subroutines used, the size of the compiled subroutines, the size of the compiled main program, the size of the control program and the data storage requirements.

2. SSP/1130 will be distributed in card form only.

3. The sample programs for SSP/1130 illustrate the same functions as the SSP/360 sample programs. Three of the sample programs, canonical correlation, discriminant analysis and factor analysis, use the overlay facilities of the 1130 Disk Monitor Programming System (*LOCAL) and therefore require a disk system and 8K words of core. The remaining sample programs do not require disk but do require 8K words of core.

Special Sales Information: The Slide Presentation (V20-0120) for SSP/360 (360A-CM-03X) may be useful in selected sales situations. It should be noted that although the calling sequences of the subroutines are identical to those in SSP/360, there have been some modifications to the subroutines and sample programs. The difference in integer word length of the IBM 1130 and System/360 FORTRANS affects SSP subroutines RANDU and GAUSS.

In SSP/360, $2^{29}$ random numbers are produced by RANDU before the cycle repeats. In SSP/1130, this figure is $2^{13}$. Because GAUSS uses RANDU, GAUSS also has a shorter cycle length. The sample programs for SSP/1130 have different I/O and FORMAT statements. In addition, the maximum data capacity has been reduced to fit into the 1130's 8K words of core.

Basic Program Material:
- Documentation -- Application Directory, Application Description (H20-0225); Programmer's Manual (H20-0252).

Machine Readable -- Source program cards and sample program cards.

Optional Program Material: Systems Manual containing flowcharts for all subroutines in the package.

Reference Material: IBM 1130 FORTRAN Language (C26-5933).

For further information contact your District or Regional Scientific Marketing Representative.

G. R. Williamson
Director of DP Marketing
Components for OS/360 have been modified as follows:

### Additional Features

The RPG scheduled for March 15, 1967 now includes the facilities for both Direct and Index Sequential Access Methods, and the ability to update in place and create new data sets.

### Withdrawn Items

Support for these features is withdrawn:

1. The combined BISAM/QISAM facility and ISAM support of the Record Overflow feature.
2. Data Set Control facilities for additional User Volume Labels.
3. COBOL E Extended Source Program Library facility. (This facility will be available in the first release of COBOL F.)

Customers affected by these changes should be notified promptly.

Version 2 of BPS/360 Report Program Generator (Card), 360P-RG-200, is now available. In addition to incorporating corrections for miscellaneous program errors, Version 2 provides additional support:

- Sterling Subroutines.
  - The 2520 Card Read Punch Model B1 may now be used to satisfy minimum system requirements for a card reader and/or card punch, and the 2520 Card Punch Models B2 and/or B3 to satisfy such requirements for a card punch. The 2520 cannot be used for a combined file.

The BPS/360 Report Program Generator (Card) is a program language and a processor program that is used to produce machine language object programs. The object programs will be used primarily to produce business reports, but the reports may range from a simple card-to-printer listing to a complete report that incorporates numerous calculations and editing.

Some of the capabilities of the language are:

- The object program can obtain data records from as many as three card-input files.
- The object program can match records in as many as three card files to govern processing of the report.
- Input records may be checked for sequence.
- The object program can search tables, and it can use data found in the tables to produce the report.
- Calculations may be performed on data taken from input records or RPG literals.
- The program can branch to a subroutine that has been written in a language other than RPG, perform calculations, and return to the RPG program.
- The report can be produced on as many as three printer or punch files.

### Machine Requirements

To generate an RPG object program, the following are the minimum machine requirements — 8K bytes of main storage (up to 32K bytes of main storage may be utilized) ... card reader ... card punch (if object program card deck is desired) ... printer (if diagnostics are desired) ... Standard Instruction Set ... Decimal Arithmetic Feature.

To execute an RPG object program, the following are required — 8K bytes of main storage (up to 32K bytes of main storage may be utilized) ... Standard Instruction Set ... Decimal Arithmetic Feature ... I/O units as required by the object program.

The following card I/O devices and printers are supported — 1442 Card Read Punch ... 2501 Card Reader ... 2520 Card Read Punch, Model B1 ... 2520 Card Punch ... 2500 Card Punch, Model B1 ... 2540 Card Read Punch, Model 1 ... 1403 Printer ... 1404 Printer* ... 1443 Printer ... 1052 Printer-Keyboard.**

**The 1404 Printer may be utilized for continuous forms operations only.

The 1052 may be used only as an output logging device.

Up to three card input devices and up to three card output devices or printers may be used in any combination.

The object program requires at least one card input device and one card output or printer device.

### Basic Program Material:

#### Documentation
- Program Material List ...
- Sample Problem Description.
- System/360 BPS Specifications, RPG - Card, C24-3374-1, and TNL N24-5052 ...

#### Machine Readable
- RPG Non-Relocatable Assembled Deck and Sample Problem Source Program may be obtained on one 9-track DTR, or one 7-track DTR (Data Conversion feature required), or in card form.

When ordering this program, the requester must indicate whether 9-track DTR, 7-track DTR, or a card deck is required. If mode of shipment is not indicated, 9-track DTR will be forwarded.

**Note:** Current users will not receive the new version automatically. Instead, they will receive a prepunched Program Request Card and a letter announcing the new version and instructing them to order it through the local IBM Branch Office.

DTNs will be supplied by the Program Information Department - no tape submission is required.
Note to World Trade Readers

This letter is a reprint of an IBM Programming Announcement made in the USA. The following changes, when appropriate, should be applied to the text for WTC use.

1. All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.

2. Advance copies of the form numbered publications mentioned in the above either have been shipped (with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania) or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.

3. When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a prepunched request card in their Area.

4. If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

5. All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.

6. Any reference made to DPD Departments as sources of information or for manuals etc., should be understood to mean the comparable WT Department.
A major DOS/360 modification (System Release 4) providing corrections for miscellaneous APAR reported program errors is now available from PID. The change levels of the program components associated with the modification are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Change Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Control and Basic IOCS</td>
<td>360N-CL-453 1-2</td>
</tr>
<tr>
<td>Consecutive Disk IOCS</td>
<td>360N-I0-455 1-1</td>
</tr>
<tr>
<td>Consecutive Tape IOCS</td>
<td>360N-IT-456 1-1</td>
</tr>
<tr>
<td>COBOL</td>
<td>360N-CH-452 1-1</td>
</tr>
<tr>
<td>COBOL DASD Macros</td>
<td>360N-CM-468 1-1</td>
</tr>
<tr>
<td>FORTRAN IV</td>
<td>360N-FO-451 1-2</td>
</tr>
<tr>
<td>Report Program Generator</td>
<td>360N-RG-450 1-1</td>
</tr>
</tbody>
</table>

Each DOS/360 customer presently on maintenance has been sent a letter highlighting the changes incorporated by the modification, along with detailed ordering procedures and a punched order card for the Control Program, 360N-CL-453. To receive the updated system, your customer has been instructed to secure Branch Office approval on the order card and forward a full width tested magnetic tape or 1316 Disk Pack to PID.

The updated tape or disk pack returned to your customer will contain all DOS/360 components. However, updated documentation will be provided only for those components for which your customer is now receiving maintenance.

If your customer wishes components beyond those which were originally ordered, an additional IBM Request Card must be submitted for each one. This card(s) must also be approved by the branch office and should accompany the punched order card for the Control Program.

Your customers should be encouraged to order this major modification immediately, since subsequent change levels will be based upon it.

The remaining components of DOS/360 are not affected by this modification. They are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Change Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct Access Method</td>
<td>360N-I0-454 1-0</td>
</tr>
<tr>
<td>ISFM</td>
<td>360N-I0-457 1-0</td>
</tr>
<tr>
<td>Consecutive Paper Tape IOCS</td>
<td>360N-I0-458 1-0</td>
</tr>
<tr>
<td>Group 1 Utilities-Un, RECD/Disk</td>
<td>360N-UP-461 1-0</td>
</tr>
<tr>
<td>Group 2 Utilities-Tape</td>
<td>360N-UT-462 1-0</td>
</tr>
<tr>
<td>Group 3 Utilities-Data Cell</td>
<td>360N-UT-463 1-0</td>
</tr>
<tr>
<td>Sort/Merge-Disk</td>
<td>360N-SM-450 1-0</td>
</tr>
<tr>
<td>Sort/Merge-Tape</td>
<td>360N-SM-469 1-0</td>
</tr>
<tr>
<td>Assembler (Basic Modules)</td>
<td>360N-AS-465 1-0</td>
</tr>
<tr>
<td>Assembler (DMP Modules)</td>
<td>360N-AS-466 1-0</td>
</tr>
<tr>
<td>Assembler (TFM Modules)</td>
<td>360N-AS-467 1-0</td>
</tr>
<tr>
<td>Autotest</td>
<td>360N-PT-459 1-x</td>
</tr>
</tbody>
</table>

**System Release 4 incorporates no functional improvements or capabilities, nor does it provide additional hardware support.**

To be available from PID January 13, 1967 (See P66-82).
The 1410/7010 Emulator Program is a stand-alone program which replaces the Emulator Function: executes 1410/7010 programs on a System/360 Model 40. The Emulator Program uses both standard System/360 instructions and special instructions provided by the Compatibility Feature. Combined, the Emulator Program and the Compatibility Feature are referred to as an Emulator. Currently operating non-time-dependent 1410/7010 programs can be executed by the Emulator without modification, although certain special and custom features are not emulated.

By eliminating the requirement to convert all 1410/7010 programs before installing System/360, the Emulator allows the user to apply most of his programming resources towards developing new applications and redesigning existing applications to take full advantage of System/360 facilities. Use of the Emulator also allows immediate production runs of new programs, after they have been loaded, the load device, except for the 2311, is available as a 1410/7010 corresponding device.

The average internal speed of the Emulator (excluding I/O and Edit instructions) is approximately twice that of the 1410. Throughput performance depends on the mixture of instructions and the comparative performance of I/O devices. However, throughput for most jobs will be equal to or better than 1410 system throughput. Timing information which may be used to estimate throughput is presented in the user manual, System/360 Conversion Aids; The 1410/7010 Emulator Program for System/360 Model 40, C28-6563.

Note: The specified performance can be attained for disk systems only if Engineering Change Level 411140 is installed on 2841 Storage Control Units. Throughput with lower level 2841s may be reduced for disk systems only if Engineering Change Level 413140 is installed on 2841 Storage Control Units.
Input/Output Feature Correspondence is as follows:
1410/7010 Feature  Model 40 Feature
1402 51-Column Inter-
changeable 2540 51-Column Interchangeable
Read Punch, Feature #4151
Features #1013, #4130

Reference Material: The following reference
publications are available through the IBM Branch
Office -- System/360 System Summary, A22-6810 ...
System/360 Principles of Operation, A22-6821 ...
System/360 Basic Programming Support, Basic Utilities,

Basic Program Material:
Documentation -- program material list ... operating instructions for sample program.

SRL Publications -- System/360 Conversion Aids: The 1410/7010 Emulator Program for System/360
Model 40, C28-6563-2, and TNL N27-1247 ...
System/360 Basic Programming Support, Operating
Guide for Basic Assembler and Utilities, C28-
6557-2, and TNL N24-5136.

Machine Readable -- one distribution tape reel ...
... 2501 Card Reader
... 2502 Card Read Punch
... 2520 Card Read Punch*
... 2520 Card Read Punch
... 2540 Card Read Punch
... 2540 Card Read Punch
... 2870 Multiplexer Channel.

A variety of System/360 input/output devices may be
used to emulate the 7040 series devices if the
System/360 devices satisfy certain requirements.
System/360 card read-punch units must be equipped with
the Card Image Feature if the equivalent 7040 device
has the Column Binary Feature. All tape drives used
for 7-track tapes must be equipped with the 7-track
Compatibility Feature.

Below are the System/360 units that may be used to
emulate 7040 series units; however, as stated
previously, certain of these units are not presently
supported in this version of the Emulator.

7040 Units  System/360 Units
129 Tape Unit  2400 series Tape Unit
7330 Tape Unit
1402 Card Reader  2540 Card Read Punch
1442 Card Read Punch*
2501 Card Reader
2520 Card Read Punch*
1403 Printer Console  1052 Printer-Keyboard**
1449 Printer
1443 Printer**
1402 Card Punch  2540 Card Read Punch
1442 Card Read Punch*
2520 Card Read Punch*
1622 Card Punch  2520 Card Read Punch
2520 Card Punch

* The 1442 and the 2520 can be used to emulate either
the 1402 reader or punch, but not both at the same
time.
** The 1052, 1403, and the 1443 can be used to emulate
the printer or the typewriter, but not both at the same
time.

Input/output devices are required for Emulator-Program
residence, control-information input, message output,
and console functions. Following are the System/360
units that may be used for each of the above-mentioned functions.

1410/7010 Feature  Model 40 Feature
1402 51-Column Inter-
changeable 2540 51-Column Interchangeable
Read Punch, Feature #4151
Features #1013, #4130

Reference Material: The following reference
publications are available through the IBM Branch
Office -- System/360 System Summary, A22-6810 ...
System/360 Principles of Operation, A22-6821 ...
System/360 Basic Programming Support, Basic Utilities,

Basic Program Material:
Documentation -- program material list ... operating instructions for sample program.

SRL Publications -- System/360 Conversion Aids: The 1410/7010 Emulator Program for System/360
Model 40, C28-6563-2, and TNL N27-1247 ...
System/360 Basic Programming Support, Operating
Guide for Basic Assembler and Utilities, C28-
6557-2, and TNL N24-5136.

Machine Readable -- one distribution tape reel ...
... 2501 Card Reader
... 2502 Card Read Punch
... 2520 Card Read Punch*
Emulator Function | Units
---|---
Emulator-Program Residence | 2400 series Tape Units*
Control-Information Input | 1052 Printer-Keyboard
| 2400 series Tape Unit*
| 2540 Card Read Punch
| 1442 Card Read Punch
| 2501 Card Reader
| 2520 Card Read Punch
Message Output | 1052 Printer-Keyboard
| 1403 Printer
| 1443 Printer
| 2400 series Tape Unit
Console Functions | 1052 Printer-Keyboard

*If 7-track, the Data Conversion Feature is required.

Note: These units need not be in addition to the units previously mentioned above. Also, the 1052 may concurrently perform more than one Emulator function.


Engineering Change Considerations

1. Engineering Change number 705256 with Requests for Engineering Action number 14492 is a prerequisite for use with the 7040/7044 Emulator Program.

2. The Interval time updating accuracy may be affected unless Engineering Change number 705234 is installed.

Note: The above items apply only to System/360 Model 65s shipped prior to October 1, 1966. Installations that require any of these Engineering Changes should notify Field Engineering Technical Operations, Kingston, N. Y.

Restriction: In most cases, memory protect traps are delayed for one 7040 instruction cycle. This restriction will be removed the second quarter of 1967.

Basic Program Material:

Documentation -- program material list.


Machine Readable -- 7040 Emulator Object Program, Initialization Deck, Sample Program and the Emulator Initialization Object Program may be obtained on one 9-track or 7-track DTR (Data Conversion feature required).

When ordering, the requester must specify whether 9-track or 7-track DTR is required. If not specified, 9-track DTR will be forwarded.

Note to World Trade Readers

This letter is a reprint of an IBM Programming Announcement made in the USA. The following changes, when appropriate, should be applied to the text for WTC use.

[1] All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.

[2] Advance copies of the form numbered publications mentioned in the above either have been shipped (with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania) or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.

[3] When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a prepunched request card in their Area.

[4] If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

[5] All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.

[6] Any reference made to DPO Departments as sources of information or for manuals etc. should be understood to mean the comparable WT Department.
The 1130 Type Composition Program (1130-DP-04X) and the 1130 TCP 8-Channel Paper Tape Skeleton Monitor Program (1130-DP-06X) may now be ordered. Delivery is scheduled to begin the week ending December 2. 1130-DP-04X should be ordered for card systems. Both 1130-DP-04X and the 1130-DP-06X must be ordered for 8-Channel paper tape systems.

The 1130 Type Composition Program extends the speed and flexibility of a digital computer into the composing rooms of the printing industry. Type compositions can use this program to provide significant time savings in transcoding textual material into a form required by linecasting machines for setting type.

Description: The program is designed to allow computer acceptance of perforated paper tape, containing the copy to appear in print and instructions pertaining to a desired printing format, from which a tape suitable for controlling the operations of a linecasting machine is produced and allocated to the proper point in the composing room. The output tape contains the original copy in the form of properly justified lines arranged according to the stylistic and graphic requirements described by the user with the format instructions. The programs are capable of producing justified lines in any format within the inherent limitations of the linecasting machine.

Features:

- Printer-oriented format control language which does not require extensive knowledge of type composition techniques.
- Controllable stylistic control limited only by inherent limitations of linecasting machine.
- Consistent graphic quality.
- 1130 Disk Storage offers automatic access to a large number of type fonts and hyphenation exception words.
- Up to 16 input readers and 16 output punches can be accommodated on the system.
- Program controlled polling of input readers.
- Program controlled selection of output punch based on font and column width required permits automatic allocation of output tapes.
- Extensive error detection and recovery procedures.
- Systems Installation Workbook and several utility programs to aid the user in gathering and loading information concerning user's operation.

Use: Printing organizations that use paper tape operated linecasting machines in composing type are potential users of this program. Tape perforator operators will now prepare tape for input to the computer instead of the linecasting machine. Since the computer assumes the burden of all justification decisions, hyphenation decisions, and the insertion of proper linecasting machine control functions, the operators can now concentrate on speed and accuracy of copy perforation with resulting benefits in total type composition speed.

Customer Responsibilities: To produce a functioning system the user must gather and incorporate into the system detailed linecaster descriptions and factors relating to the user's method of operation and stylistic requirements. A Systems Installation Workbook has been provided to enable the user to gather the required information in a systematic and complete fashion. A series of utility programs are provided for loading this data into the system in the required form. The workbook and utility programs greatly increase the speed and ease with which the user produces a functioning system.

Customers that use 8-channel paper tape systems must load and/or assemble their programs and installation dependent data on a system equipped with a card reader and a disk drive following system generation procedures specified for the card system (1130-DP-04X). The system's cartridge is then transferred to the customer's paper tape oriented system for operation, using the 8-channel paper tape Skeleton Monitor (1130-DP-06X) for system initialization.

Programming Systems: 1130 Assembler Language

Minimum Systems Requirements:

For the 1130-DP-04X -- An 1131 Processor Model 2B with 2315 Disk Cartridge ... 1442 Card Read Punch Model 6 or 7 ... Type-setting RPQs listed below.

Additional RPQs may now be ordered. Delivery is scheduled to begin the week ending December 2. 1130-DP-04X should be ordered for card systems. Both 1130-DP-04X and the 1130-DP-06X must be ordered for 8-Channel paper tape systems.

For the 1130-DP-06X -- An 1131 Processor Model 2B with 2315 Disk Cartridge ... 1134 Paper Tape Reader ... 1055 Paper Tape Punch ... Typesetting RPQs listed below.

1130-DP-04X and 1130-DP-06X Typesetting RPQs

The following RPQs for user-provided 6-channel advanced feed hole paper tape readers (PTRs)* and paper tape punches (PTPs)* are required.

- RPQ 834398 Basic interface (required to attach any number of PTRs and PTPs).
- RPQ 834399 Paper Tape Attachment (required to attach any number of PTRs and PTPs).

For more than one PTR and PTP --

- RPQ 834400 Interface Expander (required to attach PTR numbers 2 through 8 and/or PTP numbers 2 through 8).
- RPQ E36610 Second Interface Expander (required to attach PTR numbers 9 through 16 and/or PTP numbers 9 through 16).
- RPQ 834401 Additional PTR Interface (one required for each PTR numbers 2 through 16).
- RPQ 834402 Additional PTP Interface (one required for each PTP numbers 2 through 16).

*A maximum of sixteen PTRs and sixteen PTPs may be attached.

Basic Program Material for 1130-DP-04X

- 24 Core Image card decks ...
- 1 Relocateable Card Deck ...
- Hyphenation Exception Words Card Deck ...
- Application Directory ...
- Application Description Manual, H20-0189 ...
- Programmers Manual, H20-0287 ...
- Operators Manual, H20-0288 ...
- Systems Manual, H20-0289 ...

Basic Program Material for 1130-DP-06X

- 1 Core Image Paper tape ...
- Application Directory

Note: When ordering 1130-DP-06X, the user must also order the Basic Program material for 1130-DP-04X.

Optional Program Material for both 1130-DP-04X & 1130-DP-06X

The Optional Material is common to both 1130-DP-04X and 1130-DP-06X and consists of: 18 Source Card Decks available on a 9- or 7-track (Data Conversion feature required) 2400' magnetic tape.

For further information contact the Regional Printing and Publishing Industry Representative.

Correction to P66-99

For the 1130-DP-04X -- An 1131 Processor Model 2B with 2315 Disk Cartridge ... 1442 Card Read Punch Model 6 or 7 ...

Additional ordering instructions.

The following statement was omitted from P66-104, Item (A), Current users will receive a pre punched request card and a letter instructing them to order Version 3 (360C-EU-728) through the branch office. This pre punched Program Request Card must be used to order the program.
Note to World Trade Readers

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[4] If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

[5] All references made to the Program Information Department [PID] should be understood to mean the appropriate WT Program Library.

[6] Any reference made to DPD Departments as sources of information or for manuals etc. should be understood to mean the comparable WT Department.
CONTENTS

BPS/360 800/1600 BPI 2400 Series Tape Unit Support ... availability change. IA

System/360 Tape Overlap Emulator for Model 30 with 1401/1440/1460 Compatibility Feature ... EC requirements. IB

DOS/360 Sort/Merge - Tape (Disk Resident) ... TNL clarification. IC

Note to World Trade Readers

This letter is a reprint of an IBM Programming Announcement made in the USA. The following changes, when appropriate, should be applied to the text for WT use.

(1) All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.

(2) Advance copies of the form numbered publications mentioned in the above or other have been shipped with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.

(3) When a new version of a program is announced current users must order it; they will not receive it automatically or will they necessarily receive a prepunched request card in their Area.

(4) If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

(5) All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.

(6) Any reference made to DPD Departments as sources of information or for manuals etc., should be understood to mean the comparable WT Department.

Distribution: All Areas
Release Date: November 22, 1966
P66-616 Corresponding IBM Letter #P66-108
System/360 Data Conversion and Label Processing Subroutines, Version 2

System/360 Data Conversion and Label Processing Subroutines, Version 2 (360A-SE-23X), supersedes Version 1 announced in P66-89 and is now available. Shipments will begin the week of December 12. These subroutines enable the user to process current system tape and card files on the System/360. Version 2 contains the same subroutines as Version 1 for operation under T0S/360 or DOS/360, plus additional routines for operation under OS/360.

Description: The Data Conversion and Label Processing Subroutines, Version 2, provide character translation from one character set to another character set. They also provide conversion for floating point, binary, zoned decimal, packed decimal and double digit numbers. Conversion subroutines operate on current system number representations to produce System/360 number representations and also perform the reverse conversion, i.e., System/360 representations to current system representations. The label processing subroutines perform reading and checking of current system standard IBM labels. They will also generate and write current system standard IBM labels.

Data files from the following current systems may be processed:

`1401, 1440, 1460, 1410, 7010
1620
705, 7080
7070, 7072, 7074
7040, 7044, 7090, 7094`

Features:

- Allows user to continue to process current systems files alone or mixed with System/360 files on a System/360.
- Provides facility for file interchange between current system and System/360.

Use: Typical use of these subroutines might involve the gradual conversion of a large current system application to the System/360, wherein one or more data files must be shared between the two computers.

The data conversion subroutines may be called by Assembly Language, COBOL, or FORTRAN call statements. The label processing subroutines are implemented for usage on the non-standard label exits of T0S/360 and DOS/360 Logical I0CS, and the non-standard label exit of OS/360.

Customer Responsibilities: Reading and writing are responsibilities of the user (with the exception of label processing) since the data and character transformation performed by these subroutines is done with data as it appears in storage.

Programming Systems: The subroutines are written in either System/360 Assembly Language or E Level COBOL. The subroutines may be assembled or compiled and entered into the T0S/360 or DOS/360 or OS/360 subroutine library.

Minimum System Requirements: The minimum system requirements are the same as the minimum system configuration for the operating system that is used. The label processing subroutines require at least one 2400 Magnetic Tape Unit with the 7-track compatibility feature, and the floating point subroutines require the floating point instruction set. The label routines require the decimal arithmetic feature.

Program Material:

Basic

Application Directory ... Program Reference Manual (H20-0319) contains Application Description, User's and Operator's Information, ... the source and object decks may be obtained on one 9-track or one 7-track DTR (Data Conversion feature required).

Note: DTRs will be supplied by the PID; no tape submittal is required.

Optional

One 9-track or 7-track tape containing listings and flowcharts. The requester may forward or order magnetic tape in accordance with the current ordering procedures as described in the DP Sales Activity Section of the IBM Branch Office Manual.

Current users of System/360 Data Conversion and Label Processing Subroutines, Version 1, will receive a prepunched request card and a letter announcing the availability of Version 2 instructing them to order it through the branch office. Current users must use this prepunched program request card to order Version 2.

Orders for basic documentation only for this program will not be accepted at PID. Form number manuals should be ordered through the normal publication distribution channels.

For further information contact Systems Marketing Technique Development, DPD HQ.

Data Conversion Utility III, Version 2 supersedes Version 1 announced in P66-89. It operates under T0S/360 and DOS/360 and contains the same routines as Version 1, plus additional routines which will provide output onto System/360 DASD units when operating under DOS/360.

The Data Conversion Utility III program accommodates the three general considerations in data conversions:

1. The physical characteristics of the I/O device (i.e., 7-track tape format, delta mode change character).
2. Current IBM systems software standards (i.e., labels, padding characters, checkpoint records, etc.).
3. Optimization of data representation (i.e., floating point, binary packed decimal, etc.).

Description: Data Conversion Utility III is a set of interdependent macro definitions which may be generated in a variety of ways to create specific data conversion programs that meet the exact requirements of the user's data set. The program is divided into two steps:

Step 1: Assembling and generating a program

The parameters of the macro statements are used to specify the characteristics of the user's data file to be converted and the form of the converted output. The macro statements are then assembled and the resulting object modules are then combined to form a data conversion processing task in loadable form.

The specific data conversion required on a data set is indicated by macro parameters as follows:

**INPUT**

Specific description of the current IBM system input data set. (record form, type of tape labels, record length, block length...).

**MOVE/TRANSFORM**

Relative location, size, and type of input field and its corresponding output field's relative location, size, and type.

**OUTPUT**

Specific description of the System/360 output data set (record form ... ).
USER Specifies exits in the program that are to be activated and the name of the user's task to which the program is to pass control when the exit is taken.

Step 2: Performing the Data Conversion
The second step can execute the following four functions as originally specified in the macro statements:

1. **Input of Current IBM System Data**
   - IBM standard label checking (80, 84, and 120 character labels)
   - Checkpoint elimination
   - BCD fixed length tape records (with or without padding)
   - BCD variable length tape records (14XX/7080)
   - 7070/7074 Tape fcm 1, 2, 3
   - 7040/7090 Binary or mixed mode tape
   - 1620/14XX DASD cards
   - Card data files
   - Code conversion of dual special characters

2. **Performing Move/Transform String Operations**
   - The Move/Transform Strings can be used for multiple record types or to combine multiple records from the input data set into one output data record.

3. **Output to System/360 Data Sets**
   - Fixed length tape records (7- or 9-track)
   - Fixed length DASD records
   - Variable length tape records (7- or 9-track)
   - Variable length DASD records

4. **Executing User Modules**
   - User routines as required (e.g., non-standard tape labels ...).
   - User exits are provided for such situations as non-standard current system labels on input. When user tasks are indicated, the user task(s) and the data conversion program will reside in storage together.

**Features:**
- The IBM System/360 users are provided a facility to reduce substantially the difficulties, time, and cost of performing the required data conversions.
- Allows greater flexibility for scheduling user manpower in new application areas where potential savings can be made.
- Encourages the user to write his IBM System/360 application programs using record organization and data formats which are optimum for the IBM System/360.
- Encourages the user to readily change his data storage media.
- Designed for ease of user implementation.
- Designed to allow the user to tailor the program to his individual needs through user exits and modular program organization.

**Use:** The Data Conversion Utility III, Version 2, runs under control of TOS/360 or DOS/360. The program can be used for the permanent conversion of current IBM system data sets into System/360 data sets and can also be used to obtain "live" test data from current IBM systems for use in testing System/360 application programs. Since input data may be on 7- or 9-track tape, customers whose initial conversion to System/360 is planned around emulation will be able to use the Data Conversion Utility III program to convert their even parity, BCD 9-track emulator data sets when they convert their programs to System/360.

**Customer Responsibilities:** The macro definitions which make up the Data Conversion Utility III program package must be cataloged in the user's Source Statement Library. The user then writes the necessary DCU III macro statements (and user routines if required) to specify the desired data conversion program.

**Programming Systems:** The IBM System/360 Data Conversion Utility III program is written in TOS/360 and DOS/360 Macro Language as described in C24-3414. It is designed to run under control of TOS/360 or DOS/360.

The following Utility programs will be required to prepare the supplied program materials: for TOS/360 users, 360M-UT-403 ... for DOS/360 users, 360N-UT-462.

**Machine Configuration:** An IBM System/360, Model D30 (16K), with the Decimal Arithmetic Feature,

The TOS/360, DOS/360 requirements of devices for system operation and program assembly are necessary for generating a data conversion utility program. The created data conversion program requires the necessary devices for system operation, and in addition, input/output devices as required for the data sets are needed as follows:

- One 2400 series tape drive for the input data set.
- One 2400 series tape drive for the output data set.
- One DASD device for the output data set.

**Note:** 2400 series tape drives can be 9-track unless they interface with 729 tape drives, in which case the 7-track head and 7-track feature are required.

**Program Material:**

**Documentation:**

**Machine Readable:**
- Control cards and macro definition cards may be obtained on one 9-track or 7-track DTR (Data Conversion feature required). Indicate whether 9-track or 7-track is required. If not specified, 9-track DTR will be forward.
- DTR will be supplied by the Program Information Department; no tape smittal is required.

Current users of Data Conversion Utility III, Version 1, receive a pre-punched request card and a letter announcing the availability of Version 2 instructing them to order it through the branch office. Current users must use this pre-punched program request card to order Version 2.

**Reference Material:**
- Application Description, H20-0194-1 -- now available from Distribution Center...
- Systems Manual, Y20-0042 -- availability from Distribution Center to be announced in a Publication Release Letter.

Orders for basic documentation only for this program will not be accepted at PID. Form numbered manuals should be ordered through the normal publication distribution channels.

For further information contact Systems Marketing Technique Development, DPD HQ.
Programming Announcements

IBM World Trade Data Processing

(A) System/360 Emulators

Emulator programs support for phase encoded magnetic tape drives will be provided according to the following schedule:

<table>
<thead>
<tr>
<th>Model</th>
<th>2401</th>
<th>2402</th>
<th>2403</th>
<th>2404</th>
<th>2803/2804</th>
<th>2415</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1401/1440/1460 Mdl 30*</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>2/15/67</td>
</tr>
<tr>
<td>1401/1460 Mdl 40</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Available</td>
</tr>
<tr>
<td>1410/7010 Mdl 40**</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>Available</td>
</tr>
<tr>
<td>1410/7010 Mdl 50</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>C</td>
<td>X</td>
<td>X</td>
<td>12/30/66</td>
</tr>
<tr>
<td>7070/7074 Mdl 50</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>C</td>
<td>X</td>
<td>X</td>
<td>12/15/66</td>
</tr>
<tr>
<td>7040/7044 Mdl 65</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>***</td>
<td>2/15/67</td>
</tr>
<tr>
<td>7070/7074 Mdl 65</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>C</td>
<td>X</td>
<td>***</td>
<td>12/15/66</td>
</tr>
<tr>
<td>7080 Mdl 65</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>***</td>
<td>12/30/66</td>
</tr>
<tr>
<td>709/7090/7094 7094II Mdl 65 X X X X X *** 2/15/67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Model 6 tape drives cannot be used by the compatibility feature.
** Model 6 tape drives can be used on selector channels 1 and 2, but not both simultaneously.
*** Support will be announced at a later date.
C Currently supported

These emulator programs support include support for the following magnetic tape unit and tape control unit features:

- Dual Density (#3471, #3472)
- 9-track Compatibility (#5320, #5321)
- 7- and 9-track Compatibility (#7135, #7136)
- Mode Compatibility (#5121, #5122)

[B] IBM 1130 Type Composition Program

Correction to P66-107, item [A].

The Application Description Manual (H20-0139-1) is not Basic Program Material. This manual should be listed as Reference Material (available from the IBM Distribution Center, Mechanicsburg). Also, the form number listed for the Systems Manual (H20-0289) is incorrect and should read ... Systems Manual Volume I, Y20-0040 and Volume II, Y20-0041.

[C] BOS/360

The 2400 Magnetic Tape Dual Density (800-1600 bpi) support for BOS/360 will be available December 9 instead of November 30. This delay is caused by the heavy workload involved in final processing.

Customers affected must be notified.

Note to World Trade Readers

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1. All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.

2. Advance copies of the form numbered publications mentioned in the above either have been shipped (with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania) or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.

3. When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a prepunched request card in their Area.

4. If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

5. All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.

6. Any reference made to DPD Departments as sources of information or for manuals etc. should be understood to mean the comparable WT Department.
[A] IBM BPS/360 Autotest (Tape)

Version 2 of BPS/360 Autotest (Tape), 360P-PT-045, is now available. It incorporates the following improvement:

2400 Series Magnetic Tape Units, Models 4, 5, and 6, are now supported in the Supervisor and Job Control used for building the Autotest System Tape, and in Job Control on the Autotest System Tape.

The program description and minimum system requirements in prior announcements (P65-32, P66-19, and P66-56) are still current.

Program Material

Documentation - Program Material List

Orders for the basic documentation only will not be accepted for this program at PID. Form numbered manuals should be ordered through Mechanicsburg.


Machine Readable - Program Decks and Sample Decks may be obtained on one 9-track or 7-track DTR (Data Conversion feature required).

When ordering the requester must indicate whether a 9-track or 7-track DTR is required. If not specified, a 9-track DTR will be forwarded.

Current users will not receive the new version automatically. Instead, they will receive a preordered order card and a letter announcing the new version and instructing them to order it through the branch office.

DTR's will be supplied by PID - no tape submittal is required.

[B] BPS/360 Multiple Utility

PID is now distributing Modification Level 2 of Version 2 of the BPS/360 Multiple Utility, 360P-UT-055.

This modification includes the following improvements:

2400 Series Magnetic Tape Units, Models 4, 5, and 6 may now be used as input and/or output devices. The Job Control phase of the program recognizes a fourth operand in the ASSGN card for 9-track assignments. This operand causes tapes to be set to either 800 or 1600 bpi. The two possible operands are X'C8' to generate 800 bpi tapes or X'C0' to generate 1600 bpi tapes. If no fourth operand is specified, X'C8' (800 bpi) is assumed. For input tapes and with Models 4, 5, or 6 without the Dual Density feature, a Not Capable bit is set if a tape other than 1600 bpi is read. This bit is diagnosed by the program and the tape rewound and unloaded.

New publications that go with the modification to the user are:


The availability of Version 2 was announced in P66-6. Other references are P66-33 and P66-100.

[C] System/360 Operating System (0S/360)

Additional information and an availability date for SORT checkpoint was not provided during November as planned. Technical data and schedules are being developed and new availability dates will be provided.

Customers affected by this notice must be notified promptly.

CONTENTS

BPS/360 Autotest (Tape), 360P-PT-045 ... Version 2 available. [A]
BPS/360 Multiple Utility, 360P-UT-055 ... Modification 2 being distributed. [B]
System/360 Operating System (0S/360) ... additional information on SORT checkpoint. [C]
System/360 Basic Programming Support Basic Tape System, 360P-AS-091 ... Modification 9 being distributed. [D]
BPS/360 Sort/Merge Programs, 360P-SM-043-044 ... Modification 4 being distributed. [E]
1130 Continuous System Modeling Program, 1130-CX-13X ... application program now available. [F]

[D] System/360 Basic Programming Support Basic Tape System

Modification Level 9 of the Basic Programming Support, Basic Tape System, 360P-AS-091, is now being distributed by PID. In addition to providing corrections for PAR reported errors, it includes:

800/1600 BPI Dual Density Support for 2400 Series Magnetic Tape Units

The initial release of 800/1600 BPI Dual Density Support is included in the Modification Level. All tape files presently recorded in 800 BPI can be run without alteration on drives having the Dual Density feature. The density to be used for a particular Magnetic Tape Unit will be determined by the "Device" operand of the //ASSGN card for that Magnetic Tape Unit. C8 will be used to indicate 800 bpi, and C0 will indicate 1600 bpi. If the "Device" operand is omitted from the //ASSGN card, a density of 800 bpi will be assumed. See page 25 of System/360 Basic Programming Support, Basic Tape System Programmers Guide, C24-3354-4, as modified by TNL N24-5163.

Minimum System Requirements: In addition to the minimum system requirements listed on page 5 of System/360 Basic Programming Support, Basic Tape System Programmers Guide, C24-3354, as modified by TNL N24-5119, at least one of the following is required: 2401 or 2402 Magnetic Tape Unit, Model 4, 5, or 6, and 2803 or 2804 Tape Control, Model 2 ... 2403 Magnetic Tape Unit and Control, Model 4, 5, or 6 ... 2415 Magnetic Tape Unit and Control, Model 4, 5, or 6.

Basic Program Material

Documentation - Program Material List and Sample Problem Operation Instructions.

Orders for the basic documentation only will not be accepted for this program at PID. Form numbered manuals should be ordered through Mechanicsburg.


Machine Readable - 8K Assembler, ISCS/System Control available on a 9-track DTR.

DTR's will be supplied by PID - no tape submittal is required.

The material associated with this modification is currently forwarded to all current users.
BPS/360 Sort/Merge Programs

PID is now distributing Modification Level 4 of Version 3 to all registered users of the following programs:

BPS/360 Sort/Merge (1-Channel), 360P-SM-043
BPS/360 Sort/Merge (2-Channel), 360P-SM-044

Each modification incorporates support for 2400 Series Magnetic Tape Units, Models 4, 5, and 6 (1600 bpi), including the Dual Density Special Feature. Corrections for miscellaneous APAR reported errors are also included.

New publications that go with the modification to the user are:
1. TNL N21-5028 to IBM System/360 Basic Programming Support, Sort/Merge Program Specification, C24-3320-5
2. TNL N21-5029 to IBM System/360 Basic Programming Support, Sort/Merge Program Operating Guide, C24-3413-1

The availability of Version 3 of each program was announced in P66-43. Other references are P66-65 and P66-102.

1130 Continuous System Modeling Program (1130 CSMP)

This application program (1130-CX-13X) is now available. It provides engineers and scientists with a simple, but versatile tool for solving dynamic system simulation problems. For many problems, this program obviates the need to use an analog computer facility.

Description: The 1130 CSMP is a "digital analog simulator" program using a block-oriented input language in which the functional blocks represent the elements and organization of an analog computer. A total of 25 standard functional blocks plus the ability to define special functions are provided. The continuous system model may be developed and tested, and results observed in an on-line interactive mode by means of the console keyboard and output devices. The simplicity of the language statements enables a user to rapidly gain proficiency with the program and facilitates modification of the model via the console. In addition, the beginner is provided instructional comments via the console printer that can be suppressed as experience is gained. Simplicity and flexibility are the foremost characteristics of the program.

Features: 1130 CSMP is an adaptation of the PACTOLUS program for the IBM 1620 with additional features, increased versatility, and greater operating ease. The computing speed of the 1130 makes feasible the simulation of more complex processes and provides a greater degree of man-machine interaction. Among the features of 1130 CSMP are:
- Suppressible operating instructions for the beginner via the console printer.
- Diagnostic comments for on-line correction of errors.
- Ability to associate symbolic labels with functional blocks.
- Ability to interrupt a run, enter modifications, and proceed.
- Optional output of an updated problem deck.

Customer Responsibilities: A basic knowledge of the techniques of block modeling common to engineering and scientific practice is required. The 1130 CSMP Application Description Manual provides an introduction to these techniques. The user must perform the following functions in using 1130 CSMP:
1. Develop a block diagram using the elements of 1130 CSMP
2. Translate the diagram into corresponding 1130 CSMP statements
3. Prepare a punched card deck containing input data or alternatively enter such data from the console keyboard
4. Experiment with the simulation configuration and integration interval to assure meaningful results
5. Modify the simulation, using the on-line interaction feature of the program, to achieve the objectives of the simulation study

Sales Information: The 1130 CSMP may be classified as a "general differential equation solver". Application areas include engineering design and analysis, physical science and bio-medical research, and technical education. Interested customers may be found in the aerospace, consultant, manufacturing, federal, medical, process and education areas. 1130 CSMP has particular appeal to technical personnel lacking computer experience. The program should be considered wherever dynamic, continuous physical processes are investigated. It should be brought to the attention of potential customers considering acquisition or enlargement of small analog computer facilities.

Use: CSMP is furnished in the form of FORTRAN source decks to be compiled and stored on the 2315 Disk Cartridge used with the 1131 Model 2B CPU. The program operates entirely under control of the 1130 Monitor System. The user is required to have only a minimum knowledge of the computer system.

Programming Systems: FORTRAN is used as the source language under the 1130 Monitor Version 1. Knowledge of FORTRAN is required only if the user desires to augment the complement of functional elements.

System Requirements: 1131 Model 2B (8k core and disk), 1442 Card Read Punch. The 1627 Plotter is optional but highly desirable for this application. The 1131 should be at or above Engineering Change Level 415-740D.

Program Material:
- Machine Readable -- Source Decks and Sample Problem Deck will be distributed in card form.

Orders for basic documentation only will not be accepted at PID for this program. Form numbered manuals should be ordered through Mechanicsburg.


For further information contact your Regional Manager of Scientific Marketing or your Industry Marketing Representative.

Note to World Trade Readers

This letter is a reprint of an IBM Programming Announcement and was mailed concurrently to USA and WT offices. The following changes, when appropriate, should be applied to the text for WT use.
(1) All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.
(2) Advance copies of the form numbered publications mentioned in the above either have been shipped (with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania) or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.
(3) When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a prepunched request card in their Area.
(4) If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.
(5) All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.
(6) Any reference made to DPD Departments as sources of information or for manuals etc. should be understood to mean the comparable WT Department.
[A] System/360 Mortgage Loan

The System/360 Mortgage Loan program, announced in P66-8 for availability IQ 67, has been rescheduled for availability in September 1967. Customers affected by this change should be notified immediately. For further information contact your Regional Finance Industry Marketing Representative.

(B) System/360 On Line Teller, 32K Capability

The System/360 On Line Teller, 32K Capability, announced in P66-49 for availability November 1966, has been rescheduled for availability in February 1967. Features and specifications remain otherwise unchanged.

The following related programs will not be available on the dates previously announced. The status of these programs will be announced in January 1967.

3. Savings Transaction Routines, availability to have been announced in December 1966.

Customers affected by these changes should be notified immediately. For further information contact your Regional Finance Industry Marketing Representative.

(C) 1130 Statistical System

The 1130 Statistical System, as described in P65-5 and announced in P66-49 for 4Q 66 availability, has been rescheduled for availability in March 1967.

Customers affected by this change should be notified immediately. The IBM 1130 Scientific Subroutines Package, currently available, will continue to serve as an interim system for some customers. For further information contact your Regional Manager of Scientific Marketing.

(D) BPS/360 Card and Tape Utility Programs

A letter announcing retroactive support for 2400 Series Magnetic Tape Units, Models 4, 5, and 6, as input and/or output devices is now being distributed to registered users of the following programs. There is no machine readable material associated with this announcement.

These programs include the support at the version and modification levels shown:

<table>
<thead>
<tr>
<th>Version</th>
<th>Mod. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Card-to-Tape</td>
<td>3 1</td>
</tr>
<tr>
<td>Tape-to-Printer</td>
<td>3 1</td>
</tr>
<tr>
<td>Tape-to-Card</td>
<td>3 1</td>
</tr>
<tr>
<td>Tape-to-Tape</td>
<td>3 1</td>
</tr>
<tr>
<td>Initialize Tape</td>
<td>3 1</td>
</tr>
<tr>
<td>Tape Compare</td>
<td>1 1</td>
</tr>
</tbody>
</table>

For those programs which may generate output tapes (Card-to-Tape, Tape to Tape and Initialize Tape), a fourth operand may be set in the ASSGN card for 9-track assignments. This operand causes tapes to be set to either 800 or 1600 bpi. The two possible operands are X'C8' to generate 800 bpi tapes or X'CO' to generate 1600 bpi tapes. If no fourth operand is specified, X'C8' (800 bpi) is assumed.

The following restriction is placed on all tape read operations for each program:

If a tape which is not 9-track 1600 bpi is read from a 1600 bpi only tape drive (without dual density feature) the error may not be diagnosed or may be diagnosed improperly.

The publication that will go to the user with this release is:


The availability of the BPS/360 Tape Compare was announced in P66-10 (amended by P66-11), Modification Level 1 in P66-90. The availability of Version 3 of the remaining programs was announced in P66-87.

(E) BPS/360 DASD Utility Programs

The modification levels indicated below are now being distributed to registered users:

<table>
<thead>
<tr>
<th>Version</th>
<th>Mod. Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk to Tape</td>
<td>3 2</td>
</tr>
<tr>
<td>Tape to Disk</td>
<td>3 2</td>
</tr>
</tbody>
</table>

These modifications include the following improvements:

1. 2400 Series Magnetic Tape Units, Models 4, 5, and 6 may now be used as input and/or output devices. The Job Control phase of each program recognizes a fourth operand in the ASSGN card for 9-track assignments. This operand causes tapes to be set to either 800 or 1600 bpi. The two possible operands are X'C8' to generate 800 bpi tapes or X'CO' to generate 1600 bpi tapes. If no fourth operand is specified, X'C8' (800 bpi) is assumed. For input tapes and with Models 4, 5, or 6 without the Dual-Density feature, a Not Capable bit is set if a tape other than 1600 bpi is read. This bit is diagnosed by the programs and the tape rewound and unloaded.

2. The supervisor phase of 360P-UT-066, Tape to Disk, has been corrected to insure detection of Track-In-Error information during tape read error recovery procedures.

The new publications that will be distributed, under separate cover, to users of these modifications are: TNLs N21-5038 and 5032 to IBM System/360 Basic Programming Support DASD Utility Programs - Operating Guide, C24-5027-1 and C24-5027-2.

The availability of Version 3 of each program was announced in P66-91 (amended by P66-100).
A major B0S/360 modification (System Release 10) is now available from PID. The change levels of the program components associated with the modification are:

<table>
<thead>
<tr>
<th>Program Component</th>
<th>Change Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Control Program</td>
<td>360B-CL-302 1-9</td>
</tr>
<tr>
<td>ISFMS Macros</td>
<td>360B-I0-304 1-7</td>
</tr>
<tr>
<td>RPG</td>
<td>360B-RG-307 1-4</td>
</tr>
<tr>
<td>Sort/Merge</td>
<td>360B-SM-308 1-6</td>
</tr>
<tr>
<td>Assembler</td>
<td>360B-AS-309 1-7</td>
</tr>
<tr>
<td>Direct Access Macros</td>
<td>360B-I0-305 1-4</td>
</tr>
</tbody>
</table>

In addition to providing corrections for miscellaneous reported program errors, the modification includes:

**800/1600 BPI Dual Density Support for 2400 Series Magnetic Tape Units**

All tape files presently recorded in 800 bpi can be run without alteration on drives having the Dual Density feature. The density to be used for a particular Magnetic Tape Unit is determined by the "Device Specifications" operand of the //ASSGN card for that Magnetic Tape Unit. C8 indicates 800 bpi, and CO indicates 1600 bpi. If the "Device Specifications" operand is omitted from the //ASSGN card, a density of 800 bpi is assumed.

Minimum System Requirements: In addition to the previously announced minimum system requirements, at least one of the following is required:

- 2401 or 2402 Magnetic Tape Unit, Model 4, 5, or 6, and 2803 or 2804 Tape Control, Model 2.
- 2403 Magnetic Tape Unit and Control, Model 4, 5, or 6.
- 2415 Magnetic Tape Unit and Control, Model 4, 5, or 6.


Each B0S/360 user presently on maintenance has been sent a letter highlighting the changes incorporated by the modification, along with detailed ordering procedures and a prepunched order card for the Control Program, 360B-CL-302. To receive the updated system, your customer has been instructed to secure branch office approval on the order card and forward a full width tested magnetic tape or 1316 Disk Pack to PID.

The updated tape or disk pack returned to your customer will contain all B0S/360 components. However, updated documentation will be provided only for those components for which your customer is now receiving maintenance. If your customers require components beyond those which were originally ordered, each additional component should be indicated on the back of the prepunched order card.

Your customers should be encouraged to order this major modification immediately, since subsequent change levels will be based upon it.

Signed:

John Fahey
Director of DP Marketing
The control programs provide the following advantages:
- reduced card handling
- automatic job-to-job transition
- selective retrieval of programs from the system tape
- ability to expand core storage through program overlays
- ease of operation
- tape drive assignment object time.

The service programs consist of the Load System Tape Program ... Copy System Tape Program ... Linkage Editor Program ... Library Management Programs (i.e., Core-Image Maintenance Program, Macro Maintenance Program, and Directory Service Program)

The principal functions of these programs are:
- Load System Tape Program -- builds a system tape of IBM and/or user written programs
- Copy System Tape Program -- to copy the system tape, e.g., from a 7-track to a 9-track tape
- Linkage Editor Program -- to link separately assembled program sections and/or subroutines into a single program and to relocate programs so that they can be executed without new assembly.
- Core-Image Maintenance Program -- to add or delete IBM and/or user-written programs to or from the program library of the system tape
- Macro Maintenance Program -- to add or delete IBM and/or user-written macros to or from the macro library of the system tape
- Directory Service Program -- to print the contents of the core-image directory and/or macro directory of the system tape

Additional Requirements:
For the control programs for a tape-resident system and for the following service programs, Load System Tape, Copy System Tape, and Directory Service: One 2415 Magnetic Tape Unit Model 1 or 2, 3, or 6 with three 9-track read/write heads, or -- if one or two heads are 7-track -- the Data Conversion feature, and a Printer (1403 Model 2, 7, or N1 or 2203 Model A1), which is required if it is desired to print diagnostic messages and program listings.

For the Linkage Editor Program: One card punch (2520 Model A1) or one Printer (1403 Model 2, 7, or N1 or 2203 Model A1) for printing diagnostic messages, logging of Job Control Cards, displaying contents of directories, etc.

The following programs are collectively referred to as the Model 20 Tape Programming System (TPS).

The control programs are the following:
- Initial Program Loader for Tape-Resident System
- Basic Monitor Program of Tape-Resident System
- Initial Program Loader for Card-Resident System
- Basic Monitor Program of Card-Resident System
- Job Control Programs of Card-Resident System
- Job Control Programs of Tape-Resident System
- Load System Tape Program
- Copy System Tape Program
- Directory Service Program
- Core-Image Maintenance Program
- Macro Maintenance Program
- Linkage Editor Program

Features: Two types of control programs are available, one type is used with programs contained in cards and the other with programs on tape in core image format.

Each contains the following three programs: Initial Program Loader ...
Basic Monitor Program ...
Job Control Program.

Minimum System Requirements: The minimum system requirements for the use of Model 20 TPS Control and Service Programs are as follows:

Basic Requirements:
A 2020 Central Processing Unit Model C2 ... One card reader (2501 Model A1 or C2, 2520 Model A1, or 2560 Model A1), a card punching unit (2520 Model A1-A3, 2560 Model A1, or 1442 Model 5), or a 2415 Magnetic Tape Unit Model 1 or 4 with two 9-track read/write heads or -- if one or two heads are 7-track -- the Data Conversion feature, and a Printer (1403 Model 2, 7, or N1 or 2203 Model A1), which is required if it is desired to print diagnostic messages and program listings.

For the following service programs, Core Image Maintenance, Macro Maintenance, and Linkage Editor: One 2415 Magnetic Tape Unit Model 1 or 4 ... One of the two tape drives must contain a 9-track read/write head. If the second head is 7-track, the Data Conversion feature is required.

For the following service programs, Load System Tape, Copy System Tape, and Directory Service: One 2415 Magnetic Tape Unit Model 1 or 4 ... One of the two tape drives must contain a 9-track read/write head. If the second head is 7-track, the Data Conversion feature is required.

For the Linkage Editor Program: One card punch (2520 Model A1-A3, 2560 Model A1, or 1442 Model 5) if output is on cards.

Execution of user's problem programs:
1 Magnetic Tape Drive 2415 with a 9-track read/write head. This magnetic tape drive is not required, if the user's programs are executed under supervision of the control programs for a card-resident system.
Purpose: The TPS RPG facilitates the preparation of programs to write reports, punched cards, perform file maintenance operations, read and write tape records, and update existing tape files involving card and magnetic tape input/output.

Use: The user furnishes the generator with specification cards describing the input, necessary calculations, desired output, file description, and extension.

Features: The TPS RPG is tape-resident and has compile-and-run capability, with the option of having the machine-language program punched into cards or written on tape. If 8K bytes of core storage are available for program generation only, the TPS RPG can process a total of 17 files (input, output, combined, and table files) and tables in any combination. If the core capacity is 12K bytes, or more, the number of files and tables is not limited by program generation. In all cases, however, the maximum number of files that can be matched with each other is three. The tape records can be fixed or variable, blocked or unblocked. Tape label checking and creation conform to IBM System/360 standards. Non-standard labels are bypassed. An exit is provided to allow the processing of user labels.


Minimum System Requirements:
For program generation — A 2020 Central Processing Unit Model C2 ... One 2415 Magnetic Tape Unit Model 1 or 4 with one 9-track magnetic read/write head. If the second head is 7-track, the Data Conversion feature is required ... One card reader (2501 Model A1 or A2, 2520 Model A1, or 2560 Model A1), One Printer (2203 Model A1), One Printer (2203 Model A1, or 1403 Model 2, 7, or N1) if printing of diagnostic messages is specified ... One card punch (2520 Model A1-A3, 2560 Model A1, or 1442 Model 5) if punching is specified.

For program execution — A 2020 Central Processing Unit Model C2 and I/O devices as specified by the user.

ID| TPS Assembler Program 360U-AS-149

Purpose: The Model 20 TPS Assembler provides a powerful language for machine-oriented programming. It has facilities to write user macro definitions for repetitive routines and provisions to use the I/O and Basic Monitor macros supplied by IBM.

Use: Source programs written in either Model 20 Assembler or Model 20 Basic Assembler language and punched into cards are processed by the Assembler program to produce machine language programs. Output is punched into cards or written on tape in relocatable or absolute format.

Features: The language is a major extension of the Model 20 Basic Assembler language. It permits symbols of up to 8 characters, literals, control section definition, and various auxiliary functions. A macro language is provided to write macro definitions for generation of multiple machine or Assembler instructions. User-defined macro instructions, as well as IBM-supplied macro instructions, are retrieved from the macro library section of the system tape during the generation phase. The Assembler Program is tape resident, i.e., it must be part of the program library section of the system tape when used.

Control cards are used to supply necessary information for assembler options. The output text is in either absolute or relocatable format. Diagnostics are performed on all source statements. An optional listing identifies coding errors by means of error messages.


Minimum System Requirements:
For program generation — A 2020 Central Processing Unit Model C2 ... One IBM 2415 Magnetic Tape Unit Model 2 or 5 ... One card reader (2501 Model A1 or A2, 2520 Model A1, or 2560 Model A1) ... One Printer (1403 Model 2, 7, or N1, or 2203 Model A1) ... One card punch (2520 Model A1-A3, 2560 Model A1, or 1442 Model 5) if punching is specified.

Three tape drives are used, a fourth is optional and provides the ability to process literals or to put the object program on tape.

One tape drive must have a 9-track read/write head. If the others are 7-track, the Data Conversion feature is required.

For program execution — Requirements depend on user's program. The

ID| TPS Utility Programs

Purpose: By providing generalized routines, the tape utility programs reduce the need for repetitive programming of certain operations that are performed frequently. The programs assist the user in the day-to-day operation of his installation by providing for the transfer of data from one medium to another. The tape utility programs consist of the following five separate programs:

| Tape-to-Tape | 360U-UT-131 |
| Tape-to-Card | 360U-UT-132 |
| Card-to-Tape | 360U-UT-133 |
| Tape-to-Printer | 360U-UT-134 |
| Initialize Tape | 360U-UT-135 |

Use: A Utility Modifier Card, provided for the input and output file, allows the user to specify the blocking factor, record length, control fields, etc. A Field Selection Card furnishes information to the program for transferring fields from an input record to the same or a different relative position of the output record and for simultaneously converting the data to a different format. Header cards can be used to provide titles for the pages of printed output.

Features: Except for the Initialize Tape Utility Program, the tape utilities provide for the transfer from an input medium to an output medium, with the following options: copy, reblock, field select, and reblock and field select. Printer output can be in a byte-for-byte representation of the information in core storage (display) or in an audited listing of the information in core storage (list). The Initialize Utility Program can be used to write volume labels on tape reels.

Tape input and/or output files can be:
1. contained in more than one reel, or
2. selected from or placed on a reel containing more than one file.
Sequence numbering of output cards and sequence checking for input cards are available.

Tape label checking conforms to established IBM System/360 standards, and non-standard labels are bypassed. An exit is provided to allow processing of additional standard labels from the user and processing of sterilization fields.

The tape utility programs run under supervision of the control programs for either a card-resident system or a tape-resident system.

**Performance Data:** See the SRL publication IBM System/360 Model 20, Tape Programming System, Performance Estimates (C24-9010-0).

**Minimum System Requirements:** When using the control programs for the card-resident system: A 2020 Central Processing Unit Model B2 ... One card reader (2501 Model A1 or A2, 2520 Model A1, or 2560 Model A1) ... One 2415 Magnetic Tape Unit Model 1 or 4.

When using the control programs for the tape-resident system: A 2020 Central Processing Unit Model C2 ... One card reader (2501 Model A1 or A2, 2520 Model A1, or 2560 Model A1) ... One 2415 Magnetic Tape Unit Model 1 or 4.

For error and diagnostic messages and for the Tape-to-Printer Utility Program: One 2415 Magnetic Tape Unit Model 1 or 4 with at least one 9-track read/write head. The Tape-to-Tape Utility Program requires a 2415 Model 2 or 5.

For the tape-to-card utility program: One 2203 Model A1 or 1403 Model 2, 7, or N1 Printer.

For the tape-to-card utility program: One card punch (2520 Model A1-A3, 2560 Model A1, or 1442 Model 5).

**TPS Sort/Merge Program 3600-SM-150**

**Purpose:** The Sort/Merge program allows the Model 20 tape user to sort tape files into ascending and/or descending sequence and to merge pre-sequenced tape files.

**Use:** For object program execution, the operator supplies the required control information in form of control cards.

**Features:** The TPS Sort/Merge program sorts binary data (including alphanumeric characters), fixed-point integers, packed or unpacked decimal numbers contained in blocked or unblocked records of fixed or variable length in an ascending and/or descending order. It also merges pre-sequenced files (2-5 files). Operations are performed according to control data contained in up to 12 fields of each record, with a maximum length of 256 bytes for all control fields. When merging, the sequence of files is checked. The program provides for exits to user-written routines as well as for checkpoints and restarts. Tape input and output files can be:

1. contained in more than one reel, or
2. selected from or written on a reel containing more than one file.

**Performance Data:** See SRL publication IBM System/360 Model 20, Tape Programming System, Performance Estimates (C24-9010-0).

**Minimum System Requirements:** A 2020 Central Processing Unit Model C2 ... One 2501 Model A1 or A2 Card Reader, 2520 Model A1 Card Reader Punch, or 2560 Model A1 MFCM ... One 1403 Model 2, 7, or N1 or 2203 Model A1 Printer for printing of error and diagnostic messages ... One 2415 Model 2 or 5 Magnetic Tape Unit. At least three tape drives are required for the program itself. A fourth tape drive is required, if the program is run from the system tape.

**Restrictions on Tape Drive Configurations:**

With 9-track input tapes and/or 7-track input tapes, that were created with the Data Conversion feature turned on, output tapes must be 9-track tapes and/or 7-track tapes with the Data Conversion feature turned on. For sorting, 9-track work tapes must be used.

With 7-track input tapes, that were created with the Data Conversion feature turned off, output tapes can be either 9-track or 7-track tapes. For sorting, work tapes may be either 9-track or 7-track.

All 7-track tapes used in a given sort or merge operation must have the same characteristics. For example, if the translate capability of the compatibility special feature is used when 7-track input tapes are created, it must be used with all 7-track work or output tapes.

Files of variable-length records to be sorted or merged must be created on 9-track tapes or on 7-track tapes with the Data Conversion special feature turned on. Therefore, per the above, 9-track work tapes must be used when sorting variable-length records.

Checkpoint records will be written only on 9-track work tapes or 7-track work tapes with the Data Conversion feature.

**Distribution Packaging**

**Basic Program Material**

**Documentation:** A Program Material List and an attachment to users will be provided in answer to each request. In addition, the appropriate SRL publications are provided as listed below:

<table>
<thead>
<tr>
<th>Command</th>
<th>Publication Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Assembler (Tape), 3600U-AS-130</td>
<td>C26-3602-2 &amp; TNL N24-9009</td>
</tr>
</tbody>
</table>

**TPS Control and Service**

**TPL for Card-Resident System, 3600U-CL-136**

**TPS Report Program Generator, 3600U-RG-148**

**TPS Utilities**

<table>
<thead>
<tr>
<th>Command</th>
<th>Publication Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape-to-Tape, 3600-U-UT-131</td>
<td></td>
</tr>
<tr>
<td>Tape-to-Card, 3600-U-UT-132</td>
<td></td>
</tr>
<tr>
<td>Card-to-Tape, 3600-U-UT-133</td>
<td></td>
</tr>
<tr>
<td>Tape-to-Printer, 3600-U-UT-134</td>
<td></td>
</tr>
<tr>
<td>Initialize Tape, 3600-U-UT-135</td>
<td></td>
</tr>
<tr>
<td>IBM System/360 Model 20, Tape Programming System Utility Programs</td>
<td>C26-3808-1</td>
</tr>
<tr>
<td>Card-Resident Utility Programs, Operating Procedures</td>
<td>C26-3809-0</td>
</tr>
<tr>
<td>Operating Procedures</td>
<td>C24-9009-0</td>
</tr>
<tr>
<td>Performance Estimates</td>
<td>C24-9010-0</td>
</tr>
</tbody>
</table>
Users having a Model 20 Tape System with at least 8K core storage and two tape drives may select any of the programs below.

This configuration allows the user to build a system tape from cards, changes to the system tape must be made by the creation of a new system tape from the updated card files of all programs included in the system tape. The TPS Report Program Generator runs from the system tape only. The TPS Utility Programs run under supervision of the control programs for both the card or tape-resident system. Since the TPS Tape-to-Tape Utility Program that runs under a system tape requires the use of a system tape, the user of a system with two tape drives must use this program only under supervision of the control programs for a card-resident system.

P66-627

TPS Assembler Program
Core-Image Maintenance Program
Linkage Editor Program
Macro Maintenance Program
TPS Sort/Merge Program
TPS Input/Output and Basic Monitor Program
Macro Definitions

For distribution purposes, all of these programs and those from paragraphs 1 and 2 will be packaged on one 9-track (800 or 1600 bpi) DTR. The DTR contains a retrieval program which punches the program material into cards...

Ordering Instructions

To order Model 20 Tape Support Programs use the Program Order Card (120-1102-11). Insert "360U" in the program number block on the front of the card. On the reverse side include the program number of each component for which the customer requires program documentation and maintenance. For those programs selected only from paragraph 1, indicate whether 7-track (800 bpi) or 9-track (800 or 1600 bpi) DTRs are required. If not specified, 9-track DTRs copied at 500 bpi will be supplied. DTRs are supplied by PID - no tape submittal is required.

Maintenance

IBM will update the programs specifically identified on the program order card (120-1102-1), by distribution of corrected phases or macros either in card or DTR form. When DTR is used, the modifications would be packaged according to the principle described for complete program distribution.

Note to Work! Trade Readers

This letter is a reprint of an IBM Programming Announcement and was mailed concurrently to USA and WT offices. The following changes, when appropriate, should be applied to the text for WT use:

1. All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.

2. Advance copies of the form numbered publications mentioned in the above either have been shipped with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.

3. When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a preprinted request card in their area.

4. If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

5. All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.

6. Any reference made to DPD Departments as sources of information or for manuals etc. should be understood to mean the comparable WT Department.
The MVT Control Program (Multiprogramming with a Variable Number of Tasks (Option 4) and Priority Scheduling), with QTAM and BTAM will be available 2Q 67.

MVT offers for the first time in Operating System/360:

- Priority Scheduling of jobs submitted from single or multiple job streams.
- Concurrent scheduling and execution of up to 15 separately protected jobs.
- System controlled concurrent transcription of system input and output data.
- System Restart that assists operational recovery after system failure or normal power down.
- JOB STEP timing.
- The "ATTACH" facility for asynchronous sub-tasking within a Job Step.

Multiprogramming with a Variable Number of Tasks (MVT)

MVT Supervisor (Option 4)*

The following functions are added to those available with the Primary Supervisor of the 08/360 Primary Control Program (PCP):

- Concurrent control of a variable number of tasks.
- Dynamic attaching and synchronization of sub-tasks.
- Task dispatching on the basis of priorities which may be changed by the task itself during execution.
- Scatter loading of relocatable programs within an assigned main storage region.
- Asynchronous overlay supervision.
- Multiple transient areas that can increase the performance of the system when non-resident SVC routines are required.
- Shared Modules - a directory of modules currently residing in main storage together with information describing their use and attributes so that, if their attributes permit, the modules may be shared within a job step. Across Job Step sharing is controlled by a separate directory of modules selected by the user for inclusion in the resident portion of the control program.
- Job Step main storage protection.
- Provision for conditional requests for resources as well as control of data set sharing among jobs. (ENQ/DEQ).
- Telecommunications Access Methods (WTAM and QTAM).
- System Restart - When a new IPL is required because of system failure or continuation after normal power down, facilities are provided to recover jobs that were in the input queue that have not been initiated and output data sets that have not yet completed transcription by an Output Writer. For jobs that were in process, output for the steps in process as well as output for completed Job Steps is retained in the output queue for later transcription upon restart. Each job that was being processed by an Output Writer is re-enqueued at the beginning of the data set being processed. In addition, the name of each job that was being processed by each Reader/Interpreter and each job in process of execution are listed for the operator.

Protection against loss of job steps that were in job step execution will be provided through the problem programmer's use of Job Step Checkpoint/Restart facilities, when such facilities are added to the system.

The following features are planned for subsequent announcements:

- Checkpoint/Restart.
- Rollout/Rollin - Allows one job to obtain additional main storage by displacing the contents of one or more regions occupied by lower priority jobs. The rolled out region(s) are returned to their original locations in main storage when the job step requiring the extra main storage releases them.
- Disk SYSIN allows disk to be used as a source for a Reader/Interpreter.
- Disk SYSPUT allows disk to be the output device for a SYSPUT Writer. (Disk is used as the input device for all SYSPUT writers).

**MVT Priority Scheduler**

The MVT Scheduler provides a work queue, and jobs in the work queue are initiated in priority sequence. The Priority Scheduler permits multiple job initiation, one or more readers and one or more writers. The following functions are included:

- Asynchronous reading and writing of job input/output data. Blocked input and output are permitted.
- Reading and interpreting control statements using features of the job control language.
- System log.
- Allocation of input/output devices.
- Job step timing.
- Alternate and composite console.
- Channel separation and affinity requests which allow for channel usage to be optimized by balancing the channel requirements of one data set with those of other data sets in the same job step.

Note:

1. Automatic Volume Recognition is not provided for MVT. In a priority scheduling system, the operator cannot predict the order in which jobs will be run and therefore does not know which job to set up next.
2. ALGOL, Assembler E and COBOL E will not be tested with MVT prior to its first release. There is no known upward incompatibility concerning these products. They will be supported at a later time after adequate testing has been accomplished.
3. The single special job initiator is not included in MVT, since single-job initiation is provided as a subset of the more flexible operator-controlled MVT initiators. As a result, projected mount and non-setup job execution, which were only planned for the
special single job initiator, are not a part of MVT support. Work is in process to improve the operational characteristics of the Operating System. An announcement of new facilities in the area of Operator/System interaction will be provided as soon as a firm implementation plan exists.

4. The STAE Macro, as defined in the Control Program Services SRL, C28-6541, is withdrawn for MVT. Similar function is provided by the ETXR parameter of the ATTACH Macro. Parameter 16 is no longer valid.

5. The use of remote terminals for input job streams or output from writers, as described on Sales Manual Pages P360.1 and Note 1 on P10 is withdrawn.

Control Programs

| Multiprogramming with a variable number of tasks with Priority Scheduler (MVT) | 2067 |
| Checkpoint/Restart | **** |
| Rollout/Reinlin | **** |
| Disk SYSIN/SYSOUT |  |

Access Methods

| Telecommunications - Basic | 2067 |
| Telecommunications - Queued | 2067 |

### MVT Preliminary Main Storage Requirements

A partial set of main storage requirements is provided for OS/360 MVT. Main storage requirements for two example configurations are explained for your guidance. Some component sizes used in the examples are also provided so that the examples may be modified to more closely fit the needs of individual users.

Complete storage estimates will be distributed in SRL form subsequently. Those storage estimates relating to MVT options contained in the SRL, Operating System/360 Storage Estimates, C28-6551 are obsolete and no longer valid.

#### Example 1

System/360 Models with 256K bytes of main storage.

I/O Devices assumed in the Nucleus estimate:
- eight 2400 Tape Drives
- six 2311 Disk Storage Drives
- one 2540 Card Read Punch
- one 1403 Printer

OS/360 MVT Components:
- Supervisor nucleus with two transient areas
- System Queue Space for control block information
- Master Scheduler
- A Link Pack area that includes space for the complete BSAM-QSAM routines.
- One Reader/Interpreter
- Three Output Writers.

The total resident main storage requirement for the above components is approximately 198K bytes.

#### Example 2

System/360 models with 512K or more bytes of main storage. (A typical system).

I/O Devices assumed in the Nucleus estimate:
- twelve 2400 Tape Drives
- eight 2311 Disk Storage Drives
- one 2301 Drum Storage
- one 2540 Card Read Punch
- three 1403 Printers.

OS/360 MVT Components:
- Supervisor nucleus with eight transient areas
- System Queue Space for control block information
- Master Scheduler
- A Link Pack area that includes space for the complete BSAM-QSAM routines.
- One Reader/Interpreter
- Three Output Writers.

The total resident main storage requirement for the above components is approximately 198K bytes.

#### Input Reader/Interpreters:

Reader/Interpreters may operate either partially resident or non-resident. Non-resident Reader/Interpreters (Example 1) require a 40K byte region when running. This space is available for problem program usage when the reader is stopped.

Example 2 includes 40K bytes in the total resident main storage requirements, since it is assumed that this size system would have sufficient input data to require a Reader/Interpreter full time.

Part of the Reader/Interpreter may be made resident in the Link Pack area to reduce main storage requirements when more than one full time Reader/Interpreter is required. In this case the following main storage requirements apply:

- Link Pack area requirement for reader 30K bytes
- Approximate Region space for each Reader/Interpreter 12K bytes
- One Output Writer (i.e. 2 Reader/Interpreters - 54K bytes; 3 Reader/Interpreters - 66K bytes, etc.)

#### Output Writers:

Approximate Region space for each Output Writer (allowing up to 4K bytes to impact buffers) 14K bytes

#### Initiator/Terminator:

The Initiator/Terminator requires a Region size of 44 to 60K bytes, depending on input buffering selected for performance, to initiate job steps and the same space is required at termination time. This space is available to the job step after initiation.

System/360 Operating System Multiprogramming with a Variable Number of Tasks (MVT), Preliminary Functional Description, Y20-0063, will be available in early January, 1967.
### System/360 BPS FORTRAN IV (Tape)

Version 3 of BPS/360 FORTRAN (Tape) System, 360P-FO-031, is available from PID. It includes (1) corrections for APARs, (2) addition of I/O support, with full error recovery facilities, for the 2520 Card Read Punch, which may be used for Read only, Punch only or combined Read Punch operations, the 2520 Card Punch, and the 2501 Card Reader, (3) improved object time output conversion routines in order to increase object time printer speed,* and (4) addition of I/O support for 2400 Series Magnetic Tape Units, Models 4, 5, and 6. An addition has been made to the device assignment option of the SET control card: For Models 4, 5, and 6 with the Dual Density feature, b*adr(2400L) indicates 800 bpi, and b*adr(2400) indicates 1600 bpi. For Models 4, 5, and 6 without the Dual Density feature, b*adr(2400) must be specified.

*This increase in object time printer speed is in addition to the increase previously provided by Modification Level 2 of Version 2 (see P66-43).

BPS/360 FORTRAN (Tape) System comprises a compiler (including library subroutines), a loader, and an editor.

**BPS FORTRAN Tape Compiler** - The Compiler is an eight-phase program which translates programs written in the FORTRAN IV language into relocatable object programs. A source program listing along with error indicators and a storage map of the variables, external references, and constants are provided on request.

A compile-and-go feature is provided. The job to be performed may consist of source program(s), previously compiled object program(s), or a combination of the two. Also provided are control card capabilities which enable the user to change device assignments at edit, compiler, or object time.

**Loader** - The FORTRAN Loader is a two-phase relocating loader that can load separately compiled programs into storage and complete the linkage between them. This loader will also load previously compiled object program(s), or a combination of the two. Also provided are control card capabilities which enable the user to change device assignments at edit, compiler, or object time.

**Editor** - The FORTRAN Editor enables library subroutines to be deleted, added, or changed, as well as proprietary changes to the Compiler and Editor itself.

### Minimum System Requirements

A System/360 with a Scientific Instruction Set and 16K or more bytes of main storage and the following minimum I/O units: one or any combination of the following devices that provides for card reading and punching: 1442 Card Read Punch, 2501 Card Reader, 2520 Card Read Punch, 2520 Card Punch, 2540 Card Read Punch ... 1403 or 1443 Printer ... three 2400 Series Magnetic Tape Units, either 9-track or 7-track with the Data Conversion and 7-track Compatibility features ... an optional 2400 Series Magnetic Tape Unit for compile-and-go ... an optional 1052 Printer Keyboard.

#### Machine Configuration

<table>
<thead>
<tr>
<th>SYSIN</th>
<th>Punch</th>
<th>Print</th>
<th>Work Files</th>
<th>Go File</th>
<th>Object Workfiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>2501</td>
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<td>X</td>
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<tr>
<td>2400</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

### Reference Publications:

System/360 Principles of Operation, A22-6821 ... FORTRAN General Information.
[C] IBM 1130 Numerical Surface Techniques and Contour Map Plotting

This program, announced in P66-47 for February 1967 availability, will not be available on that schedule. Its availability will be announced in a subsequent letter to be released in February 1967.

Customers affected by this change must be notified immediately.

For further information contact your Petroleum Industry Representative.

[360 Emulators]

Correction to P66-115, Item [C].

Tape Overlap Emulator for Model 30 with 1401/1440/1460 Compatibility Feature program number should be 360C-EU-097 instead of 360C-EU-074.

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3. When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a prepunched request card in their Area.

4. If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.

5. All references made to the Program Information Department [PID] should be understood to mean the appropriate WT Program Library.

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7. Communications facilities or services may be required which are not offered in all WT countries. In case of any doubt as to the availability of suitable communications facilities, the country Teleprocessing Coordinator should be consulted.

8. All references made to Engineering Changes required for programs should be verified with the local CE Branch Office. Although E/C requirements are identical for WT and IBM, E/C availability dates and shipping schedules may differ.
[A] System/360 Basic Programming Support (BPS/360)

A letter announcing support for 2400 Series Magnetic Tape Units, Models 4, 5, and 6, as input and/or output devices is now being distributed to registered users of the following programs. There is no machine readable material associated with this announcement.

These programs include the support at the version and modification levels shown:

<table>
<thead>
<tr>
<th>Version and Modification Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Assembler</td>
</tr>
<tr>
<td>Absolute Loader</td>
</tr>
<tr>
<td>Dump Program</td>
</tr>
<tr>
<td>Relocating Loader</td>
</tr>
</tbody>
</table>

TNL N24-5183 to System/360 Basic Programming Support Basic Utilities, C28-6505-3, and System/360 Basic Programming Support Operating Guide for Basic Assembler and Utilities, C28-6557-3, are being sent to all registered users.

[B] System/360 Basic Programming Support (BPS/360)

The BPS/360 modification levels below are now being distributed to registered users:

<table>
<thead>
<tr>
<th>Version and Modification Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input/Output 1412/1419</td>
</tr>
<tr>
<td>Input/Output 1418/1428</td>
</tr>
<tr>
<td>Input/Output 1231 N1</td>
</tr>
<tr>
<td>Rpt Prgm Generator (Tape)</td>
</tr>
<tr>
<td>Copy Disk to Tape and</td>
</tr>
<tr>
<td>Restore Tape to Disk</td>
</tr>
<tr>
<td>Copy Data Cell to Tape and</td>
</tr>
<tr>
<td>Restore Tape to Data Cell</td>
</tr>
</tbody>
</table>

Each modification incorporates support for 2400 Series Magnetic Tape Units, Models 4, 5, and 6, with or without the Dual Density feature. All tape files presently recorded in 800 bpi can be run without alteration on drives having the Dual Density feature. For details refer to the current SRL publications.

SRL Publications -- The following SRLs have been distributed to current users:

360P-IO-058


360P-IO-058

TNLs N24-5079 and N24-5158 to System/360 Basic Programming Support Input/Output 1412/1419, C24-3198-2


360P-UT-061 or 360P-UT-071

System/360 Basic Programming Support DASD Utility Programs - Specifications, C24-3363-4

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8. All references made to Engineering Changes required for programs should be verified with the local CE Branch Office. Although E/C requirements are identical for WT and IBM, E/C availability dates and shipping schedules may differ.
OS/360 will provide the FORTRAN user with two additional compilers on January 18, 1967: 1) A FORTRAN IV G which will be usable with 128K or more of main storage, and 2) FORTRAN IV H which was previously available on a limited basis.

The G compiler offers users with 128K or more of main storage fast compile time with partially optimized execution time.

FORTRAN IV H compiler has the capability of producing highly efficient object code exceeding that obtained by the more traditional register and branching optimization techniques.

OS/360 FORTRAN IV G *

The OS/360 FORTRAN IV H compiler currently in the sales manual is at the G design level and will be called OS/360 FORTRAN IV G. Programming pages P9, P 360.4, and P 360.5 of the sales manual (December 1966 Revision) will be updated to reflect this change.

The minimum main storage requirement is approximately 80K bytes for 400 source statements.

FORTRAN IV G provides extensions to the language beyond USASI FORTRAN including --

Support of direct access storage (BSAM and BOAAM).

Ability to replace the H FORMAT specification by enclosing apostrophes.

The T-specification, permitting printed output to begin at any print position.

IMPLICIT statement allowing extended implicit classification by first character of a name.

An extended type statement, including length specification.

G-convension, extended to cover all numeric and logical data types.

Multiple entry points to sub-programs, and non-standard returns from subroutines.

Arrays of up to seven dimensions.

PAUSE statement extended to permit output of messages.

NAMELIST statement permitting input/output and conversion without an explicit I/O list and FORMAT statement.

Extended subscripts.

Hexadecimal constants and FORMAT code.

Debugging Features.

OS/360 FORTRAN IV H *

This compiler has been available as FORTRAN IV H (2.6), 360Y-FO-001, on a limited basis since June 1966. It will be available as a Type I release 1/18/67 under a new number. *

The H compiler offers the user the ability to improve object code efficiency by employing one of three options. OPT = 0 produces the fastest compile time with minimal optimization in object code. OPT = 1 increases compile time slightly, but optimizes branching and register usage in the object code produced. OPT = 2 further increases compile time, but produces a high efficiency object code. The H compiler requires approximately 200K bytes of main storage for 350-500 source statements.

FORTRAN IV H differs from FORTRAN IV G in that it does not handle direct access devices and it does not have the debug facility.

OS/360 FORTRAN IV Library, 360S-LM-501

The FORTRAN library contains relocatable subprograms which can be called by FORTRAN object programs. This library includes subprograms for logarithmic, exponential, trigonometric and other mathematical functions. This library serves FORTRAN IV E, G, and H.

The IBM FORTRAN IV language is compatible with and encompasses the United States of America Standards Institute (USASI), formerly the American Standards Association (ASA), FORTRAN including its mathematical subroutine provisions.

*Program number to be announced.
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IB**

IBM World Trade

Data Processing

P66-632

Programming Announcements

Release Date: December 29, 1966

(A) IBM DOS/360 Autotest

Autotest under DOS/360 had been scheduled for delivery 1/13/67. It has now been rescheduled to 2/17/67.

Customers affected by this change should be notified immediately.

(B) IBM System/360 FLOWCHART

This application program (360A-SE-22X) may now be ordered. Shipments will begin the week of January 9, 1967.

System/360 FLOWCHART is a program for generating printed program flowcharts from statements written in a specially designed input language. Only a general understanding of flowcharting is needed by the user of this program. It can be used readily by non-programmers as well as programmers. The input language is easy to learn, simple to use, and will describe flowcharts for any system.

Advantages: System/360 FLOWCHART will help you and your customers by:

1. Providing an easy-to-use method of producing flowcharts.
2. Reducing total program effort by minimizing the time required for producing and maintaining necessary program documentation.
3. Facilitating program maintenance in a dynamic environment by providing a cross-reference listing which gives all references to a block shape.
4. Providing wide flexibility for drawing flowcharts to specific user requirements.
5. Providing flowchart uniformity.

Although the input language has been simplified considerably and is entirely different, the output format is similar to the 7070/74 Autocraft program.

Description: The program uses data processing methods to facilitate the production of program flowcharts and certain other graphic information. The user prepares the original input in System/360 FLOWCHART language. This language is very simple and is machine independent. It can be used to prepare flowcharts for any system. The computer processes this input to produce a file of charts on the 1403 Printer.

If a flowchart is to be produced, it will: describe the type of blocks, symbolically direct non-sequential flow, and supply any other information desired, such as labels, exit conditions, text within blocks, etc., The language can also be used to describe lines other than flowlines and any other textual information.

The flowchart pages, each of which can have up to 50 blocks, are planned automatically by System/360 FLOWCHART. Flowlines are drawn where possible, and where they cannot be drawn, connectors are generated.

All block shapes used in System/360 FLOWCHART are combinations of printer characters to approximate conventional flowchart symbols. An option is provided so that either the Autocraft Symbols or the Flowchart Symbols for Information Processing (X3.5-1966) as approved by the United States of America Standards Institute can be specified.

There are six basic operator types for input; one is required for every statement. They are:

1. Headings, used to generate new headings and page numbers.
2. Block-shape operators to designate the type of block desired.
3. Branching or flowline control, to designate conditions and symbolic line destinations when the flow is non-sequential.
4. Spacing, used to skip blocks or columns or eject a page.
5. Comment and Draw operators to add comments and lines.
6. End of Job operator, which is required.

Features:

- Ease in preparation of input data which may be in free or fixed format
- Automatic page planning facilities
- Direction of branch flowlines by symbolic reference
- Stripping any block to indicate subroutines
- Automatic footnoting of overflow block text
- Up to three lines (of 120 characters each) of header information
- Automatic or user designated pagination of printed charts
- Automatic dating of charts
- Sequenced label table listing
- Cross-reference listing
- Diagnostic listing of input with error flags
- High quality output with powerful line searching abilities
- On and off-page connectors generated automatically
- Automatic branch table generation
- Reduced key punching requirements
- Easy flowchart modification
- Autocraft symbols or the Flowchart Symbols for Information Processing (X3.5-1966) as approved by the United States of America Standards Institute can be specified
- Unrestricted placement of lines or comments at any location

Programming Systems: The program will operate in conjunction with the IBM Disk Operating System/360 (DOS/360) and is used to produce flowcharts. The source language is DOS/360 Assembly language and uses the EBCDIC character set.

Minimum System Requirements: System/360 Model 330 (32K) with standard instruction set ... two 2311 Disk Storage Drives (one for systems residence and one for work file) ... one 2540 Card Read Punch ... one 1052 Printer-Keyboard ... one 1403 Printer with 132 Print Positions using the PN or QN chain arrangement (PL/I).

[Note: If a PN or QN chain is not available, the following delimiter characters may either not print or else print as different characters: Symbolic errors]

Optional Devices: One 2400 series tape drive for System/360 FLOW-CHART language input; one 2400 series tape drive for output.

Distribution: All Areas

Published by DP Sales Publishing Services, WTHQ

CONTENTS

DOS/360 Autotest ... rescheduled. [A]
System/360 Flowchart ... application program that may now be ordered. [B]
System/360 Demand Deposit Accounting ... 1412 MICR Reader Sorter ... Disk Availability. [C]

Published by DP Sales Publishing Services, WTHQ

P66-632 Corresponding IBM Letter #P66-123
Basic Program Material:
If only the form numbered manuals (basic documentation) supporting this program are required, they should be ordered through the normal publication distribution channels and not from PID*.

Machine Readable -- Consisting of object modules, sample catalog control cards, job control cards, and sample problem cards may be obtained in card form or on one 9-track or 7-track (Data Conversion feature required) DTR.
If not specified, a 9-track DTR will be forwarded. The DTR will be supplied by PID; no tape submittal is required.

Optional Program Material:
Documentation -- Systems Manual Y20-0062
Machine Readable -- Source cards, assembly listings and flowcharts may be ordered on one 9- or 7-track (Data Conversion feature required) tape. One 800 lpi 2400' reel of tape must be submitted to PID for this material.

Reference Material: Application Description (H20-0199-D*).
Please contact Systems Marketing Techniques Development, DPD HQ, for further information.
* Do not order from Mechanicsburg until availability is announced in a PRL.

IC) IBM System/360 Demand Deposit Accounting

1412 MICR Reader-Sorter

Programming Announcement Letter P66-103 released the DDA program 360A-FB-15X and stated that a problem existed in operating the programs with the IBM 1412 MICR Reader-Sorter. The correction to this problem will be available in March 1967.

Until this correction is made available, you are advised of the following requirement for program support of the 1412. The user must operate without programmed self-checking of account number. However, self-checking be required by the user, the 1412 must be equipped with the self-check special feature #7061 for Modulus 10 technique or #7062 for Modulus 11 technique.

Disk Availability
The program, currently available on magnetic tape, is now also available on disk pack.
Submitted disks must be IBM 1316 Disk Packs, vented hub model. One disk pack per order is required.
All other information in P66-103 is still in effect.

---

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All other information in P66-103 is still in effect.

---

John Fahey
Director of DP Marketing
The Linear Programming capability of Mathematical Programming System/360 (360A-C0-14X) may now be ordered. Shipments will begin the week ending January 6, 1967. MPS combines the best features of current IBM linear programming systems plus significant new capabilities such as:

- A dynamic storage allocation algorithm to utilize the System/360 memory and input/output devices most efficiently during problem solution.
- An improved inversion technique which improves accuracy and reduces solution time.
- A maximum problem size of 4,095 rows.

**Description:** Linear Programming is a Mathematical Programming technique for determining the optimum solution to a system of linear inequalities. This solution may be an optimum allocation of resources (capital, raw materials, manpower, etc.) to specified activities (investments, products, jobs) to obtain a particular objective (minimum expense, maximum profit) when there are alternate uses for these resources. Linear programming plays an important role in such areas as materials allocation, ingredient blending, (feed, flour, gasoline, etc.), production scheduling, distribution, and shipping.

**Use:** This programming system operates under control of the IBM Operating System/360. It consists of a number of routines called procedures, stored on the Program Library Residence device of Operating System/360. Only those procedures currently being executed are brought into main storage. The particular procedures to be executed are under the supervision of a control program prepared by the user. This control program is composed of statements which specify to the system the desired procedures to be executed. The sequence of these statements defines a solution strategy for solving a particular linear programming problem.

**Features:**

- The system utilizes the Revised Simplex Method (product form of inverse) with bounded variables and range constraints.
- A highly efficient inversion technique using a triangularization method permits inversions to be made frequently, thus increasing the speed of succeeding iterations and maintaining a high degree of accuracy.
- A multiple pricing method, adjusted for problem size and amount of available storage, reduces the amount of file processing and increases solution speed.
- Dynamic storage allocation provides for maximum utilization of available System/360 components.
- Maximum problem size is 4,095 rows.
- Conditional control statements permit alternate solution strategies to be implemented depending upon the conditions which arise during solution.
- Interrupt facilities provide the means for pre-planning alternate strategies in the event of off-normal conditions.
- Simultaneous parametric programming on both the right-hand side and objective function may be utilized.
- Parametric programming on matrix rows or columns.
- Modular design makes it easy to add, modify, replace or delete functions as new requirements develop.
- Provision for converting input data from the 7040/44, 1620-1311, and 1400-1311 Linear Programming Systems is provided.

**Programming Systems:** OS/360, Release 7. MPS/360 is written in the OS/360 Assembler language. It uses the BSAM and EXCP Data Access Methods of OS/360.

**Machine Configuration:** MPS/360 requires a S/360 with at least 65,536 bytes, the Standard and Decimal instruction sets, the Floating Point option, and, if the system output is a printer, it must have 132 columns of 44K bytes must be available for MPS/360 program and data storage. This version of MPS/360 supports the 2400 Series Magnetic Tape Units Models 1, 2, and 3 and the 2311 Disk Storage Drive.

The problem size (number of rows) which MPS/360 solves is directly dependent upon the size of memory available for data. The total amount of core storage used by MPS/360 is divided into two parts, program storage and data storage. The size of the MPS/360 program is approximately 29,800 bytes with a slight variation because of the number and type of I/O devices used to solve a given problem. The amount of storage available for data varies depending on the following factors:

- S/360 CPU size
- Size of resident OS/360
- In a multi-task operating system, the size of core currently being used by other tasks
- The user-specified amount of data core available to MPS/360 for the current run

The design of MPS/360 allows the user to solve problems much larger than the designed norm (to be defined later), but with a reduction of efficiency. This conscious design goal of the system allows the user to solve "in house" those few problems which exceed his normal requirements. However, it is recommended that the System/360 CPU size be selected using the designed norm problem size rather than the maximum problem size.

The number of data storage bytes available to MPS/360 may be obtained by subtracting from the S/360 CPU size:

- a. Size of resident OS/360
- b. Amount of core, if any, being currently used by other tasks
- c. 29,800 (approximate program size of MPS/360)

Figure 1 represents the maximum and the designed norm problem size which may be solved with the indicated number of data bytes. The Application Description Manual (H20-0136-1) provides the equations necessary to evaluate the maximum problem for a given number of data bytes. MPS/360 requires a minimum number of utility files for the permanent and temporary storage of data. However, if available and specified by the user, the system will utilize a set of optional files to provide additional flexibility or more efficient problem solution. A file is a collection of related data stored and retrieved in a sequential fashion. A file may be stored on a part of a direct access device (2311) or a single reel of tape. Figure 2 contains the files required by MPS/360.

Note the system input, output, punch and system residence file have been excluded from this table. Figure 3 contains the optional files which if present will be utilized by MPS/360.

---

**Figure 1**

<table>
<thead>
<tr>
<th>Bytes</th>
<th>Rows</th>
<th>Maximum</th>
<th>Designed</th>
<th>Norm</th>
</tr>
</thead>
<tbody>
<tr>
<td>17,300</td>
<td>82,500</td>
<td>213,000</td>
<td>475,000</td>
<td>992,000</td>
</tr>
<tr>
<td>Maximum</td>
<td>305</td>
<td>2,120</td>
<td>4,095</td>
<td>4,095</td>
</tr>
<tr>
<td>Designed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norm</td>
<td>≤ 200</td>
<td>200-700</td>
<td>1600</td>
<td>3500</td>
</tr>
</tbody>
</table>

"Designed Norm" is the problem size MPS/360 was designed to solve normally on the specified number of data bytes.
FIGURE 2

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYSMLCP (1)</td>
<td>Contains the machine language control produced</td>
</tr>
<tr>
<td></td>
<td>by the compiler.</td>
</tr>
<tr>
<td>MATRIX1 (3)</td>
<td>Contains, in internal form, the LP matrix</td>
</tr>
<tr>
<td>ETA (2)</td>
<td>Contains, in internal form, the product form</td>
</tr>
<tr>
<td></td>
<td>of the inverse.</td>
</tr>
<tr>
<td>SCRATCH1 (3)</td>
<td>Used for temporary data storage.</td>
</tr>
<tr>
<td>SCRATCH2 (3)</td>
<td>Used for temporary data storage.</td>
</tr>
<tr>
<td>PROFILE (2)</td>
<td>Contains a machine independent representation</td>
</tr>
<tr>
<td></td>
<td>of the LP model.</td>
</tr>
</tbody>
</table>

FIGURE 3

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OLDOPFILE (2)</td>
<td>Contains a machine independent representation</td>
</tr>
<tr>
<td></td>
<td>of a problem which is to be REVISED or COPYed.</td>
</tr>
<tr>
<td>MATRIX2-4 (3)</td>
<td>Up to four devices may be specified for the</td>
</tr>
<tr>
<td></td>
<td>storage of the LP model (they should be on</td>
</tr>
<tr>
<td></td>
<td>separate channels).</td>
</tr>
<tr>
<td>ETA 2-4 (3)</td>
<td>Up to four devices may be specified for the</td>
</tr>
<tr>
<td></td>
<td>storage of the product form of the inverse</td>
</tr>
<tr>
<td></td>
<td>(they should be on separate channels).</td>
</tr>
<tr>
<td>MPSRCRA (1)</td>
<td>Used by the post-optimal procedures when only</td>
</tr>
<tr>
<td></td>
<td>4 work regions (minimum) have been SETUP.</td>
</tr>
<tr>
<td>SYSABS</td>
<td>A high-speed printer which may be used to monitor</td>
</tr>
<tr>
<td></td>
<td>the LP solution.</td>
</tr>
</tbody>
</table>

(1) - Must be a direct access device.
(2) - If 2400 series tape unit, it must be 9-track.
(3) - If 2400 series tape unit and 7-track, it must have Data Convert feature.

Basic Program Material:


If only the form numbered manuals supporting this program are required, order them from the IBM Distribution Center in Mechanicsburg.

Machine Readable Material -- The relocatable load modules, message descriptions and sample problem deck may be obtained on one reel of 9-track tape or one reel of 7-track tape (Data Conversion feature required) or one IBM 1316 Disk Pack. Each of these volumes will also contain the optional source card images.

Optional Program Material:

Consists of one 9-track tape containing program flowcharts and one 9-track DTR (DTR will be supplied by PID; no tape submittal is required) containing a flowchart print program.

Note: Application Description Manual (H20-0136-1) and Systems Manual (Y20-0065)* may be obtained only from the IBM Distribution Center in Mechanicsburg.

Reference Material: "Introduction to Linear Programming" (E20-0171).
... Application Manuals -- "Aluminum Alloy Blending" (E20-0127), "Electric Arc Furnace Steelmaking" (E20-0147), "Feed Manufacturing" (E20-0148), "Ice Cream Blending" (E20-0156), "Blast Furnace Burdening" (E20-0160), "Cotton Blending" (E20-0164), and "Gasoline Blending" (E20-0168).

Note: The MARVEL Language Processor portion of MPS availability will be announced in a subsequent letter.

For further information please contact your Regional Manager of Scientific Marketing Manager.

B1 Remote Access Computing System (RAX) for System/360

Additional information on the Remote Access Computing System (RAX), previously referred to as RACS in P66-40 is now available. This announcement provides:

1. Details of announced and new RAX capabilities
2. Configuration specifications
3. The availability of the RAX System Description Manual

The RAX program will be available in June 1967.
P66-40 is now superseded by this announcement. Additionally, the maximum number of 1050 Data Communications Terminals that may be attached to the minimum system (64K) will be 30 instead of 14 previously announced. All customers affected by this change should be notified immediately.

Description: RAX is a time shared, remote computing system for System/360 Models 30, 40, and 50 with standard features. Compilation and time-sliced execution is provided for BPS FORTRAN IV and Basic Assembler Language jobs from remote terminals simultaneously with similar operations at the computer site.

Features: The following significant capabilities are available with RAX:

- A maximum of 63 terminals can be used with RAX. This allows any combination of up to 60 - 1050 Data Communications Terminals and up to 8 - 2260 Display Stations to make up the total of 63. A 256K byte memory (Processing Unit Model HI) is required to support the maximum number of terminals.
- SAVE and PURGE terminal commands will reference programs by name and security lock code. This will allow for usage of library programs by reference to its name, with unauthorized deletion or modification prevented by the security code.
- A restart capability will provide for automatic resumption of a job after recovery from systems error. Indication of the last input line accepted and a repeat of some output lines will occur.
- The 2260 Display Stations will allow entry of up to 12 lines at one time into the system. Updating on the 2260 will feature an eight line per page display through the program with alterations allowed on the original 8 lines and additions made in lines 9-12.
- Three memory configurations on System/360 will be supported. They are the minimum 64K, the 128K, and the maximum sized 256K byte configurations.
- Object program execution storage will be 28K bytes for the minimum memory system and 64K bytes for the 128K and 256K byte systems.
- By means of the \$INCLUDE terminal command a user will be able to insert into his job stream at compile time a previously stored data or source program module.
- To highlight the man machine interactive nature of modern computing techniques used in RAX the system will now allow conversational interaction between the user and application program at execution time by addressing the terminal as an input/output unit.
- Program storage will be efficiently contained on up to 7 library disk files.
- Basic Assembler Language jobs can now be entered and executed from the terminals as well as from the card reader, however, all input/output must be done in FORTRAN. Execution of privileged user instructions will not be allowed by RAX.
- A /DISPLAY command will allow total or partial review of a user's input or library files.

Use: Sustained access to a System/360 from remote locations enables engineers, scientists, and other users to realize fast turnaround and reduced problem-solution time for their computational problems. FORTRAN programmers can compile, modify, and execute programs from their remote terminals, while non-computer oriented users are using programs previously saved in the RAX library. Familiarity with the RAX terminal command language and the operation of his terminal device enable the user to exploit the computational power of the System/360.

Customer Responsibilities: A customer using RAX must take the following steps prior to installation to insure that the use of the system will be satisfactory.
1. The customer must be responsible for ordering and installing satisfactorily all the communications equipment required.

2. Appropriate training must be given to users on the terminal command language, the programming languages, and terminal operations.

3. It is desirable that a systems programmer become familiar with the internal operations of the system. This knowledge will increase customer satisfaction in the environment of a complex remote computing and remote computing terminal system.

Sales Information: Most System/360 Model 30, 40, or 50 customers and prospects are potential prospects for RAX.

- RAX can constitute the entire justification for a system in engineering research firms, in universities, or in engineering departments of large firms.
- RAX provides justification for upgrading and adding equipment for customers who want to provide access to a computing service for their scientific and technical personnel.

RAX enables IBM customers to acquaint themselves with remote computing time-sharing systems. A small additional investment permits batch-oriented installations to evaluate the benefits of this emerging system concept for their own operations.

Programming System: RAX is written in BPS Basic Assembler Language.

Minimum Machine Requirements: System/360 Model 30F with one Selectoral Channel, Interval Timer, Storage Protection, Decimal Arithmetic, Floating Point Arithmetic features; 1052 Printer-Keyboard Model B as a system console, 3540 Card Read Punch, 4031 Printer Model 2, 3, 7, or 11, two 2311 Disk Storage Drives; for attaching 1050 Data Communication Terminals EITHER a 2702 Transmission Control with Terminal Control - Type I (TC1T5), Selective Speed (#6848), and appropriate line adapters OR a 2701 Data Adapter Unit with Terminal Adapter - Type I (#6465 or #6466) and appropriate line adapter for each line (up to 4). Up to 10 - 1050 Data Communication Terminals may be attached to the minimum configuration.

Systems Generation: Distribution of the RAX program will be on tape. RAX users must have access to a tape configuration on which to punch the object and source program decks.

1050 Terminal Configuration: The minimum IBM 1050 Data Communication Terminal consists of: one IBM 1051 Control Unit Model 2 with the First Printer Attachment feature (#4048), and one IBM 1052 Printer-Keyboard Model 2. The 1052 Printing Element used by RAX is Data I font (#9750 or #9756). The following table of special features for the various 1050 components indicates features that can be used with RAX (Code A); features that can be attached but are not utilized by the system (Code B); and features that must not be attached to a RAX terminal (Code C). Features required if the component is present are indicated by code AR.

### 1051 Control Unit (Model 1 or 2 only) Feature Code

- Card Punch Attach. 1635 B
- 1st Printer Attach. 4408 AR
- 1st Punch Attach. 4410 B
- 1st Reader Attach. 4411 A
- 2nd Printer Attach. 6381 B
- 2nd Punch Attach. 6383 B
- 2nd Reader Attach. 6384 B
- Auto Fill Chg. Gen. 1287 B
- Auto Ribbon Shift & Line Feed Select 1295 B
- Audible Alarm 1307 B
- Automatic EOB 1313 B
- CPU Attachment 3130 C
- Forms Stand Stacker 4450 B
- 1447 Attachment 4461 C
- Home Comp. Recntn. 4605 B
- Home Correction 4607 B
- Home Loop Input 4606 B
- Component Intlk. 4664 (4647, 4691, 4692, 4693, 4694, 4790) A

### 1052 Printer-Keyboard (Model 1 or 2 only) Feature Code

- Accelerated Carrier Return 1006 B
- Auto EOB 1313 B
- Forms Feed Control 4452 B
- Home Loop Input 4606 B
- Component Interlock 5465 B
- Open Line Detection 5465 B

### 1055 Paper Tape Punch, Model 1 Feature Code

For systems larger than 64K, support is provided for IBM 1050 Data Communication Terminals and/or 2260 Display Stations. Additionally, work file capability and expanded program save features are available with the larger configurations. The IBM 2260 Display Station must have an Alphanumeric Keyboard feature and be connected to a directly attached 2848 Display Control Model 3 with the Non-Destructive Cursor feature. One 2848 Model 3 with up to eight 2260 Display Stations is supported.

The 128K byte core system (Processing unit model G) will support a maximum of 30 - 1050s and 2 - 2260s. A tradeoff on core storage will allow one 2260 to replace 3 - 1050s and vice versa. For purposes of calculating the mix of terminal lines entering the system, 600 bytes of memory are required for each 1050 terminal and 1800 bytes per 2260 terminal after the basic I/O routines are incorporated.

### Maximum Support Configuration: System/360 Model 50 with 2 Selectoral Channels, Interval Timer, Storage Protection, Decimal Arithmetic, Floating Point Arithmetic, 1052 Printer-Keyboard Model 7, 2540 Card Read Punch, 1403 Printer Model 2, 3, 7 or 11, 8 - 2311 Disk Storage Drives, 2 - 2702 Transmission Controls, 60 - 1050 Data Communications Terminals, 1 - 2848 Model 3 Display Control with Non-Destructive Cursor feature and 8 - 2260 Display Stations with the Alphanumeric keyboard feature (with a maximum of 63 - 1050's and 2260's combined). 4 - 2400 tape drives.

Reference Material: RAX System Description Manual (H20-0266-0), IBM System/360 Basic Programming Support FORTRAN I, C28-6629, and BPS Basic Assembler Language, C28-6503, describes the languages implemented under RAX.

For further information contact your Regional Manager of Scientific Marketing.
<table>
<thead>
<tr>
<th>Note to World Trade Readers</th>
</tr>
</thead>
<tbody>
<tr>
<td>This letter is a reprint of an IBM Programming Announcement and was mailed concurrently to USA and WT offices. The following changes, when appropriate, should be applied to the text for WT use.</td>
</tr>
<tr>
<td>1. All programs announced as available have been shipped to the appropriate WT Program Libraries. Programs and associated material may be ordered as indicated on pages 13 through 17, Programming Section, WT DP Sales Manual.</td>
</tr>
<tr>
<td>2. Advance copies of the form numbered publications mentioned in the above either have been shipped (with additional copies available from the IBM Distribution Center, Mechanicsburg, Pennsylvania) or will be shipped when available. In the case of the latter, availability will be announced in the Weekly DP Marketing Publications Release Letter.</td>
</tr>
<tr>
<td>3. When a new version of a program is announced current users must order it; they will not receive it automatically nor will they necessarily receive a prepunched request card in their Area.</td>
</tr>
<tr>
<td>4. If DTR distribution is indicated in the above, program distribution media may be different in your area based on local conditions.</td>
</tr>
<tr>
<td>5. All references made to the Program Information Department (PID) should be understood to mean the appropriate WT Program Library.</td>
</tr>
<tr>
<td>6. Any reference made to DPD Departments as sources of information or for manuals etc. should be understood to mean the comparable WT Department.</td>
</tr>
<tr>
<td>7. Communications facilities or services may be required which are not offered in all WT countries. In case of any doubt as to the availability of suitable communications facilities, the country Teleprocessing Coordinator should be consulted.</td>
</tr>
<tr>
<td>8. All references made to Engineering Changes required for programs should be verified with the local CE Branch Office. Although E/C requirements are identical for WT and IBM, E/C availability dates and shipping schedules may differ.</td>
</tr>
</tbody>
</table>
1130 COGO (1130-EC-02X) may now be ordered. Shipment will begin the week ending January 13, 1967. The Local Origin option in 1130 COGO is temporarily restricted and should not be used. Release Date: December 30, 1966 P66-634 Corresponding

**CONTENTS**

1130 Civil Engineering Coordinate Geometry (COGO) (1130-EC-02X) ... an application program that may now be ordered. [A]

1130 Scientific Subroutine Package (1130-CM-02X) ... an application program that can now operate under both the 1130 FORTRAN Compilers. [B]

*Do not order until availability is announced in a PRL.

---

**Optional Program Material:**

IBM 1130 Scientific Subroutine Package

The IBM Scientific Subroutine Package (1130-CM-02X) can now operate under both the IBM 1130 FORTRAN Compilers (1130-05-001 and 1130-FO-001). This program was previously released in August 1966 for operation under the IBM 1130 Disk Monitor FORTRAN Compiler (1130-05-001) only.

Note: A programmer's note will accompany the transmittal letter to future program recipients to advise them of a malfunction which occurs under certain circumstances when SSP/1130 is used with the Card FORTRAN Compiler, 1130-FO-001. The two SSP/1130 sample problems which encounter this error operate correctly with the 1130 Disk Monitor. Work is continuing to isolate and remove the difficulty.

This announcement supersedes P66-76, and changes to it are bracketed.

SSP/1130 contains all of the subroutines presently available in SSP/360 (360A-CM-03X). It replaces the 1130 MATHPAK (1130-FP-001) only.

**Description:** SSP/1130 is a collection of 121 FORTRAN subroutines which provide a major addition to those built into FORTRAN. They are input/output-free, computational building blocks that can be combined with a user's input, output, or computational routines to meet his individual needs. The package has widespread application to the solution of problems in research, development, and design, in both science and engineering, wherever FORTRAN is used.

Individual subroutines, or a combination of them, can be used to carry out the following functions:

- In statistics — analysis of variance (factorial design) ... correlation analysis ... multiple linear regression ... polynomial regression ... canonical correlation ... factor analysis (principal components, varimax) ... discriminant analysis (many groups) ... time series analysis ... data screening and analysis ... non-parametric tests.
- In matrix manipulation — inversion ... eigenvalues and eigen vectors (real symmetric case) ... simultaneous linear algebraic equations ... transposition ... matrix arithmetic (addition, product, etc.) ... partitioning ... tabulation and sorting of rows or columns ... elementary operations on rows or columns.
- In other mathematical areas — integration of given or tabulated functions ... integration of up to six first order differential equations ... Fourier analysis of given or tabulated functions ... Bessel and modified Bessel function evaluation ... gamma function evaluation ...
Features:
- all subroutines are free of input/output statements.
- subroutines do not contain permanent maximum dimensions for the data arrays named in their calling sequences.
- all subroutines are written in FORTRAN.
- many matrix manipulation subroutines handle symmetric and diagonal matrices (stored in economical, compressed formats) as well as general matrices.
- the use of important subroutines (or groups of them) is illustrated in the program documentation by sample main programs with input/output.
- all subroutines are documented uniformly.

Use: As a library of subroutines, SSP/1130 allows the user to select those functions which he needs, while not being burdened with unneeded routines.

Programming Systems: The subroutines will compile and execute with the IBM 1130 Disk Monitor FORTRAN Compiler (1130-0S-001) and the IBM 1130 Card FORTRAN Compiler (1130-F0-001).

Machine Configuration: The machine configuration necessary to run SSP/1130 is dependent upon the use that is to be made of the package. Each of the subroutines is I/O free, compiles to less than 1,200 words of core, and is, therefore, configuration independent. However, many of the routines are intended to be used in conjunction with other subroutines or to solve problems using large arrays of data. For this reason, many of the subroutines are not useful with less than 8K words of core.

The following items should be taken into consideration when deciding upon the applicability of the package to a particular machine configuration:

1. The size of problem which may be executed on a given 1130 depends upon the number of subroutines used, the size of the compiled subroutines, the size of the compiled main program, the size of the control program and the data storage requirements.

2. SSP/1130 will be distributed in card form only.

3. The sample programs for SSP/1130 illustrate the same functions as the SSP/360 sample programs. Three of the sample programs, canonical correlation, discriminant analysis and factor analysis, use the overlay facilities of the 1130 Disk Monitor Programming System (*LOCAL) and, therefore, require a disk system and 8K words of core. The remaining sample programs do not require disk, but do require 8K words of core.

Special Sales Information: The slide presentation (V20-0120) for SSP/360 (360A-CM-03X) may be useful in selected sales situations. It should be noted that although the calling sequences of the subroutines are identical to those in SSP/360, there have been some modifications to the subroutines and sample programs. The difference in integer word length of the IBM 1130 and System/360 FORTRANs affects SSP subroutines RANDU and GAUSS.

In SSP/360, 2^39 random numbers are produced by RANDU before the cycle repeats. In SSP/1130, this figure is 2^31. Because GAUSS uses RANDU, GAUSS also has a shorter cycle length. The sample programs for SSP/1130 have different I/O and FORMAT statements. In addition, the maximum data capacity has been reduced to fit into the 1130's 8K words of core.

Basic Program Material:
- Machine Readable -- Source program cards and sample program cards.
The basic 1410/7010 configuration being emulated may include 10 disk modules on each of three channels, ten tape units on each of three channels, unit record equipment on channel 1, and the 1415 Console Printer. The Emulator appears to the 1410/7010 as if the 729 Magnetic Tape Unit were available as a 1410/7010 corresponding device. (See side 2).

Note: The specified performance can be attained for disk systems only if E4131410 is installed on 2841 Disk Storage Units. Throughput with lower level 2841's may be reduced by as much as two-thirds.

The average internal speed of the Emulator (excluding I/O and Edit Instructions) is approximately 3 times that of the 1410. Throughput performance depends on the mixture of instructions and the comparative performance of I/O devices. With equivalent I/O devices, throughput for most jobs which are not I/O bound will be approximately that of the 7010 system or up to 2 times 1410 system throughput; I/O bound jobs will run at approximately the same speed as on the emulated system. Timing information which may be used to estimate throughput is presented in the SRL publication, System/360 Conversion Aids: The 1410/7010 Emulator Program, as a loadable file, on 2302 Disk Storage or on a 2311 Disk Storage Drive.

The program is available in card-image form on a 7- or 9-track Distribution Tape Reel. Loading of the Emulator Program, as distributed by PID, must be from card or tape. Subsequent loading can be from card, tape, or disk.

Instructions are supported for the following systems:
- 1403 Printer, Mdl. 2, or 3
- 729 Magnetic Tape Units
- 7330 Magnetic Tape Unit
- 1422 Card Reader, Mdl. 3
- 1442 Card Reader, Mdl. Bl or B2
- 1442 Bl Card Reader
- 2302 Disk Storage
- 2311 Disk Storage Drive
- 2401, 2402, 2403, or 2415 Magnetic Tape Units, Mdl. 1, 2, 3, 4, 5, or 6, or 2044 Tape Units, Mdl. 1, 2, or 3; 7- or 9-track
- 2501 Card Reader
- 2520 Card Reader or Punch, Mdl. Bl or B2
- 2540 Card Reader or Punch
- 2541 Printers, Mdl. 1, 2, or 3
- 1052 Printer-Keyboard, Mdl. 7
- 1052 Printer Adapter

If the Emulator Program is to be loaded from a magnetic tape unit equipped with the 7-track Read-Write Head (#9557), the 7-track Compatibility Feature (#7125, #7126, #7127), and the Data Conversion feature (#3228 or #3236) must be installed on the associated Control Unit. After the Emulator Program has been loaded, the load device, except for the 2311, is available as a 1410/7010 corresponding device. (See below).
Emulated punched card data processing equipment must previously have been assigned to 1410/7010 Channel 1. Input/Output Feature Correspondence is as follows:

1410/7010 Feature | Model 50 Feature
--- | ---
1402 51-column Interchangeable Read Feed | 2540 51-column Interchangeable Read Feed, Read Feed, feature #4151


Engineering Change Levels: The following EC levels are required for proper functioning of the System/360 Mdl 50 1410/7010 Emulator Program — EC 257246 on the 1410/7010 Compatibility Feature ... EC 730966 and 730969 on the 2804 Tape Control Unit Mdl 2 ... EC 730966 on the 2403 Tape Control Units Mdls 4, 5, and 6 ... and EC 730969 on the 2804 Tape Control Unit Mdl 2.

Note: Installations that require any of these Requests for Engineering Actions should notify Field Engineering Technical Operations, Poughkeepsie, New York.

Basic Program Material

Documentation -- Program Material List ... Sample Problem Operating Instructions.


If only the form numbered manuals are required, order them through the IBM Distribution Center, Mechanicsburg -- not from PID.

Machine Readable -- Absolute Loader, Emulator Object Deck, Sample Problem and Disk Loader available on one 9-track or one 7-track DTR (Data Conversion feature required).

Current users will not receive the new version automatically. Instead, they will receive a prepunched program order card and a letter announcing the new version and instructing them to order it through the branch office.

DTRs are supplied by PID -- no tape submittal is required.

[C] System/360 Model 20 Universal Character Set

System/360 Model 20 Universal Character Set - Utility Program, 360T-UT-108, is available. It provides for loading the 240-byte UCS buffer with any 8-bit codes that are to correspond to the 240 graphic positions on the printer chain/train.

Use: The user furnishes the utility program with specification cards, four of which contain the 240 characters to be loaded into the UCS buffer.

Features: The UCS Utility Program is a stand-alone program. It supports the folding and dualing capability. After the buffer has been loaded, a set of lines representing the chain/train image is printed. This allows visual verification that the chain or train graphics, and their positions, match the desired character codes.

Performance Data: To load and execute the program takes less than one minute.

Minimum System and EC Level Requirements: A Processing Unit 2020 Model B2 (EC Level at least 12100), with Universal Character Set ... Adapter ... A Card Reader (2501 Model A1 or A2, 2520 Model A1 or 2560 Model A1) ... A Printer 1403 Model 2 or N1 with Universal Character Set feature.


Basic Program Material

Documentation -- Program Material List.

SRL Publications -- System/360 Model 20, Basic Utility Programs, Functions and Operating Procedures, C26-3604-2, and a TNL N24-9012.

If only the form numbered manuals are required, order them through the IBM Distribution Center, Mechanicsburg -- not from PID.

Machine Readable -- Object Deck available in card form.