

**SYSTEM/3 DISK RPG II
5702-RG1****PURPOSE**

IBM System/3 Disk RPG II is a program product that operates under control of the System Control Programming. It is disk resident on the IBM 5444 Disk Storage Drive, and in addition to the functions provided by the Card RPG II, the Disk RPG II facilitates reading and writing disk records and updating existing disk files using card and disk input/output. A directly attached IBM 3741 Data Station is supported for input or output at compile or execution time. Disk RPG II can be used on IBM System/3 mdl 8.

DESCRIPTION

The 1442 is supported as an I/O device, and for reading RPG II source statements or data. Disk RPG II permits punching 256 characters (see GX20-1703) and packed decimal on the 1442.

The recording techniques used by all disk file organizations permit multiple records to be read or written with a single I/O instruction. Unlike previous data management techniques, System/3 disk files can be written or read using different blocking factors in different programs. This facility allows the user to process single records when a program uses a large amount of storage or to use as much core as available in processing multiple records to increase throughput.

Any of the disk data files created by System/3 object programs can be processed by any program on the System/3 which uses disk system management to access the files and has compatible disk storage.

The access methods supported are as follows:

1. Sequential
 - a) Consecutive processing - including updating in place.
 - b) Random processing - by relative record number including updating but excluding file loading.
2. Indexed
 - a) Random processing - by key.
 - b) Consecutive processing - by key including file loading.

Unlike previous indexed file organizations, the keys and data may be in a different physical sequence; i.e., the most active records may be placed in the front of the file with the index in sequence by item number.
3. Direct
 - a) Random Processing - by relative record number, including updating and file loading. The open routine on the file load clears the data area on disk.
 - b) Consecutive processing.

Standard System/3 disk labels are mandatory on all disk files. Non-standard labels cannot be used except as data records within the file.

In addition to the extensions to RPG implemented in the System/3 Card RPG II, Disk RPG II has the following language extensions:

- a) Chain Operation Code - User control of direct processing by key or relative record number through the calculation specifications. This facility can be used for chaining from one record to another record in the same file and user generation of the key or relative record number through program logic.
- b) Automatic Overlay - When a program generates too much object code for the stated machine size, the Disk RPG II Compiler will generate overlays to fit. Not all programs - even with overlays - can fit into the stated machine size. In any event, programs cannot be compiled that would exceed 64K without overlays.
- c) AND/OR - Relationships on calculation specifications.
- d) Square root operation code in calculation specifications.
- e) Display Operation Code - The ability to display messages on and accept data from the 5471 Printer-Keyboard.
- f) Spread card processing is provided for within RPG II.
- g) Output from the Disk RPG II Compiler may be loaded into the object program library or punched into cards or written on diskette for subsequent loading.
- h) Support for nonstandard (RPQ and OEM) devices is included. The user must provide a suitable I/O routine (object program) to support the nonstandard device. The remainder of the program written in RPG II will be linked with the user's I/O routine during program compilation.
- i) MOVEA operation code - provides the ability to move a field to an array or an array to a field. The move is left-justified and can begin at any element of the array. This gives the user the ability to access a field on a byte-by-byte basis.
- j) SETLL operation code - allows the user to set limits during calculations for processing indexed files within limits.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirement: For source program compilation - an IBM System/3 model 10 which includes an IBM 5410 Processing Unit mdl

A13 (12K bytes), an IBM 5424 MFCU mdl A1 or an IBM 1442 Card Read Punch mdl 6, an IBM 5203 Printer mdl 1 or an IBM 1403 Printer mdl 2 and an IBM 5444 Disk Storage Drive mdl 1.

The object program generated by the Disk RPG II Compiler supports, in addition, all capacities of the IBM 5203 and 1403 Printers, IBM 5424 MFCU, 1442 mdl 7, 3741 Data Station/Programmable Workstation directly attached, 5444 Disk Storage Drive, 5445/5448 Disk Storage (see Disk RPG II 5445 Disk Storage Drive feature), 3410/3411 Magnetic Tape Subsystem (see Disk RPG II Magnetic Tape Feature), and 5410 Processing Unit of 12K bytes and above.

For source program compilation on a model 8 - an IBM 5408 Processing Unit mdl A14 (16K bytes), an IBM 5203 Printer, an IBM 5444 Disk Storage Drive mdl A1, and either an IBM 3741 Data Station/Programmable Workstation directly attached or an IBM 5471 Printer-Keyboard.

The object program generated by the Disk RPG II Compiler on the mdl 8 supports, in addition, all the capabilities of the IBM 5203 Printer, 3741 Data Station/Programmable Work Station directly attached, 5444 Disk Storage Drives, 5448 Disk Storage (see "Disk RPG II 5445 Disk Storage Drive Feature"), 3410/3411 Magnetic Tape Subsystems (see "Disk RPG II Magnetic Tape Feature"), and 5408 Processing Unit of 16K bytes and above.

SOFTWARE REQUIREMENTS

5702-SC1. For 3741 support, 5702-SC1 feature #6066/#6067 is required.

DOCUMENTATION
(available from Mechanicsburg)

RPG II Reference Manual (SC21-7504) ... RPG II Additional Topics Programmer's Guide (GC21-7567) ... Disk Concepts and Planning Guide (GC21-7571) ... RPG II Disk File Processing Programmer's Guide (GC21-7566) ... Introduction to RPG II (GC21-7514) ... System/3 Bibliography (GC20-8080).

**DISK RPG II TELECOMMUNICATIONS FEATURE
FEATURES #6000 and #6002****PURPOSE**

This feature is applicable to IBM System/3 mdl 8. The Disk RPG II Telecommunications feature provides the user with the capability of sending or receiving binary synchronous data over voice grade or high speed*** communications lines. This support is achieved through the use of an RPG II Telecommunications Specifications Sheet, and the addition of BSCA (Binary Synchronous Communications Adapter) as a device entry on the RPG II File Description Specification. This RPG II support permits System/3 to function in one of the following communication modes:

Receive only ... Receive with conversational reply*** ... Transmit only ... Transmit with conversational reply*** ... Alternate transmit and receive file.****

DESCRIPTION

The following RPG II language features are supported for communications:

Input, Output and Combined Files ... Demand Files for Transmit and Receive ... Blocking and Deblocking of Records ... Dual I/O Areas.

These BSCA features, options, and capabilities are supported by the feature:

Manual call ... Manual answer ... Auto-call ... Auto-answer ... Medium speed ... High speed ... Station selection ... EBCDIC data transparency ... Intermediate block checking ... EBCDIC or ASCII data and data link control characters. File translation of ASCII data can be accomplished by proper use of the file translate extension of RPG II.

System/3 with a BSCA supported by the RPG II Telecommunications feature can communicate with the following systems:

- Another System/3 with BSCA, program supported by RPG II Telecommunications feature.
- A System/32 with BSCA, program-supported by RPG II.
- A System/34 equipped with a Communications Adapter, program-supported by RPG II and Assembler.
- A System/360 mdl 20 with BSCA, program-supported by BSCA IOCS.
- S/360 mdl 22 or larger, S/370
- A 2770 Data Communication System.
- A 2780 Data Transmission Terminal.
- A 3741-2 Data Station/3741-4 Programmable Workstation.
- A 5110 Computer System supported as a 3741 mdl 2 or 4.
- A 5231 mdl 2 with BSCA (#2074). Receive mode only. Supported as a 3741 mdl 2 or 4.
- A 5280 Distributed Data System
- A Series/1 - Refer to Series/1 pages for appropriate features.



PROGRAM PRODUCTS

S/3 Disk RPG II (cont'd)

- A 6670 Information Distributor (as a 2770)
- A System/7 with BSCA (#2074)

This program provides the support to use System/3 in the following telecommunications networks:

Point-to-Point switched ... Point-to-Point nonswitched ...
Multipoint (as a tributary station).

System/3 with BSCA is a compatible member of the IBM BSC family of terminals. It can be intermixed with other BSC terminals (System/360 mdl 20, 1130, 1800, 5280, System/32, System/34, 2770, 2780, 3741-2, 3741-4, 3780 and 2715 mdl 2) on a multipoint line when operating as a tributary station with a central System/360 or System/370 computer* using DOS or OS BTAM. It can also share the same phone number at the central System/360 or System/370 computer* with other BSC terminals (System/360 or System/370 computers**, System/360 mdl 20, 1130, 1800, System/32, System/34, 2780, 2770, 3780, 3741-2, 3741-4 and 6670 (as a 2770), 2715 Model 2).

* System/360 mdls 22, 25 and 30 DOS, mdls 40, 50, 65, 67 (in 65 mode), and 75 with DOS and OS, and mdls 85, 91 and 195 with OS; System/370 mdls 135, 145 and 155 using DOS or OS, and mdl 165 using OS when operating in Basic Compatibility Mode.

** System/360 mdl 22 with DOS, mdls 25 and 30 with BOS/BPS or DOS/360, mdls 40, 50, 65, 67 (in 65 mode), and 75 with BOS/BPS, DOS or OS/360 and mdls 85, 91 and 195 with OS/360, System/370 mdl 135, 145 and 155 with DOS and OS, and mdl 165 with OS when operating in Basic Compatibility Mode.

*** Not supported in communication with System/32, System/34, 5280, 2770, 2780, 3741-2 or 3741-4.

**** Transmit interspersed with Receive is not supported in communication with 2770, 2780, 3741-2 or 3741-4.

† Operator Identification Card Reader feature (#5450) and the Expanded Communications/Multipoint Data Link Control feature (#1685) on 3741-2, -4 are not supported.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirement: For source compilation: same as Disk RPG II (5702-RG1).

For object program execution: Mdl 10 - an IBM 5410 Processing Unit with a BSCA (Feature #2074) ... Mdl 8 - an IBM 5408 Processing Unit with either the ICA (feature #4645) or the BSCA (feature #2074).

SOFTWARE REQUIREMENTS

5702-SC1; 5702-RG1.

DOCUMENTATION

(available from Mechanicsburg)

RPG II Telecommunications Reference Manual (SC21-7507) ...
System/3 Bibliography (GC20-8080).

DISK RPG II 5445 DISK STORAGE DRIVE FEATURE
FEATURE #6012, #6014

PURPOSE

This feature supports the 5448 on both the mdl 8 and mdl 10, but supports the 5445 on the mdl 10 only. The feature allows RPG II users to process data files on the 5445/5448 Disk Storage Drive.

DESCRIPTION

The File Description Specifications define the control information and device entry of the 5445/5448 Disk Storage Drive to the RPG II compiler.

This feature supports the 5445/5448 Disk Storage Drive for data files only. The same capability for data file storage and retrieval is provided for the 5445/5448 as is provided for the 5444. The file organizations supported by Disk RPG II are: Sequential, Direct, and Indexed.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: For compilation on the mdl 8, the same requirements as Disk RPG II (5702-RG1). For object program execution, an IBM 5448 Disk Storage Drive is required.

For compilation on the mdl 10, the same requirements as Disk RPG II (5702-RG1). For object program execution, an IBM 5445 or 5448 Disk Storage Drive is required.

SOFTWARE REQUIREMENTS

5702-RG1; 5702-SC1; 5702-SC1 feature #6022/#6023 (5445 Support) or 5702-SC1 feature #6074 (5448 Support).

Note: For users of 5448 Disk Storage Drive, specify feature #6014 for 200-cylinder 5444 disk cartridge distribution.

DISK RPG II MAGNETIC TAPE FEATURE
FEATURE #6016 or #6018

PURPOSE

This feature is applicable to IBM System/3 mdl 8. The Disk RPG II Magnetic Tape Feature provides the user with RPG II support to process data or record address files on magnetic tape. Records may be fixed or variable length and may be either blocked or unblocked. Minimum record or block length is 18 bytes; the maximum is 9,999 bytes.

The File Description Specifications define the control information and device entry of Magnetic Tape to the RPG II compiler.

The feature supports consecutive input and output files. The files may be recorded in either EBCDIC or ASCII code.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirement: For source compilation: For both the mdl 8 and mdl 10 - the same requirements for compilation as Disk RPG II (5702-RG1). For object program execution: In addition to what is required for compilation, one or more units of the IBM 3410/3411 Magnetic Tape Subsystem are required.

SOFTWARE REQUIREMENTS

5702-RG1; 5702-SC1; 5702-SC1 feature #6024/#6025.

DOCUMENTATION

(available from Mechanicsburg)

IBM System/3 Magnetic Tape Planning Manual (GC21-5040) ...
System/3 Bibliography (GC20-8080).

Note: For users of 5448 Disk Storage Drive, specify feature #6014 for 200-cylinder 5440 disk cartridge distribution.

SYSTEM/3 MODEL 10 RPG II AUTO-REPORT FEATURE
FEATURE #6028, #6029

PURPOSE

This feature is applicable to System/3 mdl 8. The RPG II Auto-Report feature enhances the RPG II language by providing functions which eliminate much of the preparation and coding work normally done by the user when producing an application program in RPG II. It is specifically designed to facilitate report preparation.

DESCRIPTION

The Auto-Report program executes as a preprocessor to the RPG II compiler which is a prerequisite for the feature. The input to the program is RPG II source statements and new Auto-Report statements. Auto-Report produces a diagnostic listing, replaces the Auto-Report statements with generated or copied RPG II source statements and calls the RPG II compiler for execution.

Features: Coding of applications in RPG II is made easier by the following Auto-Report functions.

- Page Headings - the user need supply only the report title. Auto-Report generates skipping, spacing, horizontal alignment and date and page number constants. Page overflow is considered and the heading conditioned to print on the top of each page.
- Simplified Output Specifications - A single output field specification can result in Auto Report generated statement to:
 - indicate printing with editing,
 - place column heading over the data fields,
 - control spacing,
 - control horizontal alignment of data,
 - define total fields and calculation specifications to accumulate totals by control levels (total rolling)
 - flag total lines with asterisk indication.
- COPY - The COPY statement provides the ability to copy RPG II source statements from a disk library into the RPG II source program. Some values on the copied specifications may be modified for the resulting compilation.
- Source Program - The Auto-Report program passes control directly to the RPG II compiler to cause compilation of the expanded source program. In addition, users may elect to punch the source program so that they can make modifications which tailor the program more closely to their requirements. They can also elect to catalog to the Source Library a copy of the source program for later compilation.

The Auto-Report functions may be specified for one printer file in any RPG II program. Any RPG II specifications not related to the selected printer file and any RPG II statements for the printer file but not

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requesting Auto-Report functions, are passed to the RPG II compiler as a part of the source program.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: Same as for RPG II.

This feature is applicable for the mdl 8 and has the same requirements as Disk RPG II.

SOFTWARE REQUIREMENTS

5702-RG1; 5702-SC1.

DOCUMENTATION

(available from Mechanicsburg)

Disk System RPG II Auto-Report Feature General Information Manual (GC21-7563) ... RPG II Auto-Report Reference Manual (SC21-5057) System/3 Bibliography (GC20-8080).

**RPG II 3270 DISPLAY CONTROL FEATURE
FEATURE #6070****PURPOSE**

The RPG II 3270 Display Control feature provides telecommunications services for local or remote 3270 devices. This program is automatically linked into the RPG II application program via the SPECIAL file exit capability on the RPG II File Description Specification Sheet. Neither the Assembler nor the RPG II Telecommunications feature is required.

DESCRIPTION

The following services are provided by the 3270 Display Control feature:

- RPG II access to 3270 Display System terminals attached via the Local Communications Adapter (mdl 10), the Local Display Adapter, or Integrated Communications Adapter (mdl 8) or BSCA (mdls 8 and 10).
- Automatic buffering and queuing of terminal data
- A display formatting interface which permits the support of 3270 devices with coding in RPG II.
- Complete line control procedures are provided.
- Up to 18 terminals may be controlled (up to 12 can be attached via the Local Display Adapter on the mdl 8).
- Two subroutines are provided. SUBR13 allows an RPG II program to support the 3270 Information Display System without using CCP. Using SUBR14, an existing program using the 3270 Display Control Feature may be converted to execute under control of CCP by replacing SUBR13 references with SUBR14 references in the RPG II source program. The user must then make any adjustments required by CCP and recompile the program.
- Provides the capability of coding one or more applications within one program. No task switching is provided.

Terminals Supported: The following terminals and communications facilities are supported under the RPG II 3270 Display Control feature:

With the Local Communications Adapter (mdl 10)

- One 3275 Display Station and Control
- One 3271 Display Control Unit (mdl 1 or 2) with:
 - 3277 Display Station (mdl 1 or 2)
 - 3284 Printer (mdl 1 or 2)
 - 3286 Printer (mdl 1 or 2)
 - 3288 Printer (mdl 2)

With the Local Display Adapter (mdl 8)

- 3277 Display Station (mdl 1 or 2)
- 3284 Printer (mdl 1 or 2)
- 3286 Printer (mdl 1 or 2)
- 3288 Printer (mdl 2)

Note: A maximum of 12 terminals may be attached via the Local Display Adapter.

With the Integrated Communications Adapter (mdl 8)

- One 3275 Display Station and Control, or
- One 3271 Display Control Unit (mdl 1 or 2), with:
 - 3277 Display Station (mdl 1 or 2)
 - 3284 Printer (mdl 1 or 2)
 - 3286 Printer (mdl 1 or 2)
 - 3288 Printer (mdl 2)

With the Binary Synchronous Communications Adapter (mdls 8 and 10)

- 3275 Display Station and Control, or
- 3271 Display Control Unit (mdl 1 or 2), with:

- 3277 Display Station (mdl 1 or 2)
- 3284 Printer (mdl 1 or 2)
- 3286 Printer (mdl 1 or 2)
- 3288 Printer (mdl 2)

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS****Minimum System Requirements**

Model 8...The RPG II 3270 Display Control feature requires an IBM System/3 mdl 8 which includes an IBM 5408 Processing Unit mdl A16 (32K bytes)...An IBM 5444 A02 Disk Storage Drive...An IBM 5203 Printer...An IBM 5471 Printer-Keyboard or 3741 Data Station directly attached...An Integrated Communications Adapter, Local Display Adapter, or Binary Synchronous Communications Adapter...and one of the devices listed under "Terminals Supported".

Model 10...The RPG II 3270 Display Control feature requires an IBM System/3 mdl 10 which includes an IBM 5410 Processing Unit mdl A16 (32K bytes)...An IBM 5444 mdl 2 Disk Storage Drive...An IBM 5203 or 1403 Printer...An IBM 5424 MFCU or 1442 Card Read Punch...A Local Communications Adapter or Binary Synchronous Communications Adapter...and one of the devices listed under "Terminals Supported".

Using SUBR13, approximately 10K-13.5K bytes is added to the size of the object program; using SUBR14, 4.25K-5.25K bytes is added. The actual amount of resident overhead is determined by the user options selected, and that size can be increased to approximately 15K if the trace options are additionally selected when using SUBR13.

SOFTWARE REQUIREMENTS

5702-SC1, 5702-SC1 feature #6021, 5702-SC1 feature #6031 and 5702-RG1.

COMPATIBILITY

The System/3 mdl 8/10 RPG II 3270 Display Control feature is functionally compatible with the System/3 mdl 12 and System/3 mdl 15 RPG II 3270 Display Control feature.

DOCUMENTATION

(available from Mechanicsburg)

IBM RPG II 3270 Display Control Feature Reference and Logic Manual (SC21-5161) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index



PROGRAM PRODUCTS

**SYSTEM/3 DISK SORT PROGRAM
5702-SM1****PURPOSE**

The IBM System/3 model 10 Disk Sort Program will sort any disk file organization supported by System/3 in ascending or descending sequence. This includes Indexed, Direct, and Sequential files.

DESCRIPTION

The files must be located on a 5444 Disk Storage Drive. The sort program will also accept fixed length records from magnetic tape files created by tape sequential access methods supported by System/3 data management. Output of the sort program may be created on either magnetic tape or disk. The sort program can select desired records from the input file to be included or excluded from the sort. Recognition of individual records can be based on:

- 1) Record code
- 2) Relation of a field to a constant
- 3) Relation of two fields in a record
- 4) Any relationship in a series (ORing)
- 5) All relationships in a series (ANDing)
- 6) Multiples of the above test in any combinations.

Control fields may be in a different location in records within the file.

Output from the sort program will be in three formats:

- 1) Tags - A file of three-byte binary relative record numbers in the sequence specified by the user.
- 2) Tagalong - A file of records containing the sort control fields and/or the data fields the user has specified. By using this option, the user can select only the data he needs from his input file to be included in the output. By specifying the entire input record as a tagalong field, the user can, in effect, accomplish a record sort.
- 3) Summary Tagalong - Records containing identical control fields are combined by summarizing (totaling) specified fields into one record.

Specification of record selection, sort parameters and tagalong data fields is accomplished by simple, RPG-like coding sheets that are similar to those used by the MFCU sort program.

Sort control card diagnostics and messages are printed on either the 5203 or 1403 Printers or the 5471 Printer-Keyboard, depending on which has been assigned to the system's logging function via the operator control language. If the logging function has been 'turned off,' the sort printed output will be suppressed.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirement: An IBM System/3 model 10 which includes an IBM 5410 Processing Unit model A13 (12K bytes), an IBM 5424 MFCU model A1 or an IBM 1442 Card Read Punch model 6, an IBM 5203 Printer model 1 or an IBM 1403 Printer model 2 and an IBM 5444 Disk Storage Drive model 1.

For use on IBM System/3 model 8 - an IBM 5408 Processing Unit model A14 (16K bytes), an IBM 5203 Printer, an IBM 5444 Disk Storage Drive model A1, and either an IBM 3741 Data Station directly attached or an IBM 5471 Printer-Keyboard.

SOFTWARE REQUIREMENTS

5702-SC1; for tape support, 5702-SC1 feature #6024/#6025 is also required.

DOCUMENTATION

(available from Mechanicsburg)

Disk Sort Reference Manual (SC21-7522) ... System/3 Bibliography (GC20-8080).

**DISK SORT 5445 DISK STORAGE DRIVE FEATURE
(Feature #6008/#6010)****PURPOSE**

This feature enables the user to sort all disk file organizations supported for System/3 in either ascending or descending sequence. This feature supports the 5448 on both the System/3 model 8 and model 10, but supports the 5445 on the model 10 only.

All functions available to the Disk System user through the Disk Sort Program (5702-SM1) are provided.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirement: For the IBM Model 8 - the same requirements as the Disk Sort Program (5702-SM1) for the model 8, plus the IBM 5448 Disk Storage Drive (the 5448 requires a 5444 model A2 as a prerequisite).

For the IBM Model 10 - the same requirements as the Disk Sort Program (5702-SM1) for the model 10, plus the IBM 5445 or 5448 Disk Storage Drive (the 5448 requires a 5444 model 2 or A2 as a prerequisite).

SOFTWARE REQUIREMENTS

5702-SM1; 5702-SC1; 5702-SC1 feature #6022/#6023 (5445 Support) or 5702-SC1 feature #6074 (5448 Support).

Note: For users of 5448 Disk Storage Drive, specify feature #6010 for 200-cylinder 5440 disk cartridge distribution.

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 DISK RESIDENT MAGNETIC TAPE SORT
5702-SM2****PURPOSE**

The IBM System/3 Disk Resident Magnetic Tape Sort program sorts fixed length, blocked and unblocked files residing on Magnetic Tape. The sort requires a system with a minimum of 12K bytes of core and three magnetic tape drives. Up to four magnetic tape drives may be utilized by the sort program. The file may be recorded in either EBCDIC or ASCII code, and may reside on multiple tape reels. (This feature is applicable to System/3 model 8.)

DESCRIPTION

The sort program can select desired records from the input file to be included or excluded from the sort. Recognition of individual records can be based on:

- Record code
- Relation of a field to a constant
- Relation of two fields in a record
- Any relationship in a series (ORing)
- All relationships in a series (ANDing)
- Multiples of the above test in any combinations

Control fields may be in a different location in records within the file.

Output from the sort program is in the following format:

A file of records containing the sort control fields and the data fields the user has specified. The user need select only the data he needs from his input to be included in the output. By specifying the entire input record as a tagalong field, the user can, in effect, accomplish a record sort.

Specification of record selection, sort parameters and tagalong data fields is accomplished by simple, RPG-like coding sheets that are similar to those used by the Disk Sort program, 5702-SM1. The addroot and summary sort capabilities of the Disk Sort are not supported in the Magnetic Tape Sort programs.

Sort control card diagnostics and messages are printed on the system output device.

Checkpoint/Restart is supported but does not require the SCP feature (5702-SC1, feature #6026/#6027). The maximum block or record size for input or output is 9,999 bytes. Input and output files may be multi-volume, but work files for the sort can be single volume files only.

To utilize all of the functions of this program, at least three 9-track work tapes must be available. If one or more of the work tapes is 7-track, then only those sort functions that relate to the standard System/3 64-character set (EBCDIC) are supported. As a result, sorts of packed decimal data, of signed numeric data, or on zones are not allowed in these 7-track configurations.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: In addition to the minimum system requirements for 5702-SM1, an IBM System/3 model 8 or model 10 requires three magnetic tape drives. (When operating using DPF, a minimum program level of 8K is required).

SOFTWARE REQUIREMENTS

5702-SC1; 5702-SC1, feature #6024/#6025.

DOCUMENTATION

(available from Mechanicsburg)

Tape Sort Program Reference Manual (SC21-7572). ... *System/3 Bibliography* (GC20-8080).

TERMS and CONDITIONS: See PP Index



PROGRAM PRODUCTS

**SYSTEM/3 DISK RESIDENT CARD UTILITIES
5702-UT1**

PURPOSE

The following IBM System/3 Card System Utilities may be ordered as disk resident on an IBM 5444 Disk Storage Drive. Their function is the same as their card system equivalents:

- MFCU Sort/Collate
- 96-Column List
- Reproduce/Interpret
- Data Recording
- Data Verifying
- 80-96 Conversion Program.

(This feature not applicable to IBM System/3 model 8.)

DESCRIPTION

The Model 10 Gangpunch program is available only for the disk system and provides the following capabilities:

- Interspersed master-card gangpunching: The master and detail cards are intermixed in the primary file.
- Count-controlled gangpunching: A fixed or variable counter may be used to punch a specified number of detail cards. The master card is in the secondary file and the detail cards are in the primary file.
- Match master cards and detail cards on a control field and punch into the detail card if a match occurs: The master card is in the secondary file and the detail card is in the primary file.
- The following functions may be performed with any of the major types of gangpunching described above: Offset gangpunching ... gangpunching consecutive numbers into detail cards ... gangpunching a constant into detail cards ... card interpretation (entire card or only what is punched) ... selection of a single type of master card from many master cards ... selection of a single type of detail card from many detail cards.
- For count-controlled and match fields processing, MFCU2 is used for input and MFCU1 is used for output. For interspersed processing, MFCU1 is used for both input and output.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirement: An IBM System/3 model 10 which includes an IBM 5410 Processing Unit model A13 (12K bytes), an IBM 5424 MFCU model A1, an IBM 5203 Printer model 1 or 1403 Printer model 2 and an IBM 5444 Disk Storage Drive model 1.

An IBM 5475 Data Entry Keyboard is required if the Data Recording and/or Data Verifying programs are utilized.

An IBM 1442 Card Read Punch model 6 is required, in addition to the IBM 5424 MFCU, if the 80-96 Conversion program is utilized.

SOFTWARE REQUIREMENTS: 5702-SC1.

DOCUMENTATION

(available from Mechanicsburg)

Sort Collate and Card Utilities Reference Manual (SC21-7529) ... System/3 80-96 Conversion Program and RPG Support for the 1442 Card Read Punch (SC21-7518) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 UTILITY PROGRAM FOR
1255 MAGNETIC CHARACTER READER
5702-UT2****PURPOSE**

This IBM System/3 utility program provides the disk oriented IBM System/3 model 10 user control of document processing on the IBM 1255 Magnetic Character Reader. It provides a means of reading MICR-encoded documents from the 1255, accumulating document totals and amount field totals for each pocket, and placing the data from the documents on output disk and printer files. The program is designed to fulfill the basic requirements of the "ON-US" data capture run required for all Demand Deposit Application programming. (This program is applicable to the IBM System/3 model 8.)

DESCRIPTION

The program reads fields from the documents as specified by the user and then, based on decisions indicated by the user, it will stacker select these documents into user-specified pockets. If requested, Modulus 10 and 11 checking will be performed. Then, after each document has been read and stacker selected, the utility will print user-specified fields from that document. Fixed-length records will also be created and placed on disk file (5444 or 5445 or 5448) or a tape file (3410 or 3411, 9-track only).

An additional facility provided by the program is the accumulation of document totals and amount field totals and then printing these at end of job. Subtotals may be printed at any time as indicated by the user during program execution.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Configuration: Utility Program for the IBM 1255 Magnetic Character Reader will operate on a minimum configuration IBM System/3 model 10 which includes an IBM 5410 Processing Unit (12K bytes) with a Serial I/O Channel (#7081), an IBM 5424 MFCU (250 cpm read and 60 cpm punch and print), an IBM 5203 Printer (96 print positions and 100 lpm), or an IBM 1403 Printer (132 print positions and 600 lpm), an IBM 5444 Disk Storage Drive (2.45 million bytes) and an IBM 1255 Magnetic Character Reader. The minimum main storage required to support a system including an IBM 5445 or 5448 Disk Storage Drive or IBM 3410/3411 Magnetic Tape Subsystem is 16K bytes.

For use on IBM System/3 model 8 - an IBM 5408 Processing Unit model A14 (16K bytes), an IBM 5203 Printer, an IBM 5444 Disk Storage Drive model A1, and either an IBM 3741 Data Station directly attached or an IBM 5471 Printer-Keyboard. In addition, a Serial I/O Channel and an IBM 1255 Magnetic Character Reader is required.

SOFTWARE REQUIREMENTS

5702-SC1. For IBM 5445 support, 5702-SC1 feature #6022/#6023 is also required (model 10 only). For IBM 5448 support, 5702-SC1 feature #6074 (model 10 only - IBM 5448 mutually exclusive with SIOC on model 8). For tape support, 5702-SC1 feature #6024/#6025.

DOCUMENTATION

(available from Mechanicsburg)

Utility Program For IBM 1255 Magnetic Character Reader Reference Manual (SC21-7521) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index



PROGRAM PRODUCTS

**JOB ANALYSIS SYSTEM/3 (JAS/3)
5702-XP1**

PURPOSE

IBM Job Analysis System/3 (JAS/3) provides a powerful tool to aid management in fulfilling its responsibilities in the planning, supervising, and controlling of project-oriented work by the critical path method. It is designed to be a high performance system with features which make it easily usable by non-technical personnel.

JAS/3 operates under the System/3 Disk System Control Programs 5702-SC1 or 5703-SC1, 5704-SC1, 5704-SC2, or 5705-SC1. Depending on core availability, JAS/3 has a processing capacity of from 180 to 736 activities or work items and relationships per subnet depending on core size.

HIGHLIGHTS

Front-to-back interfacing of up to 10 subnets to form a network with up to 7,000 activities ... multiple networks per master file ... multiple calendars (each subnet in a network can have its own calendar) ... every relationship can have a lag ... multiple starts and ends (explicit or implicit) ... reports easily modifiable via control cards ... progress reporting specifying actual start date and/or remaining duration ... three types of schedule dates ... nine levels of milestones ... Direct Access Master File ... free-form data input.

Use: To use JAS/3, the customer must describe the activities which constitute the project network. This data is punched into cards or diskettes, for entry into the System/3 or can be entered directly from the keyboard. Processing and report requests can also be entered in either fashion.

CUSTOMER RESPONSIBILITIES

All users should be familiar with the various features of this system before attempting to use it for actual project control. Users will need a knowledge of the fundamentals of the critical path technique before they can prepare input.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum Configuration

System	Unit	Storage Size	Reader/Punch	Disk	Printer	Control Unit
5415	A17	48K	5424 MFCU or 2560 MFCM or 1442 or 3741 Dir. Attach Attach	5444 Mod1	1403	5421
5415	B17	48K	5424 MFCU or 2560 MFCM or 1442 or 3741 Dir. Attach	3340	1403	5421
5415	D19	96K	5424 MFCU or 1442 or 2560 or 3741 Dir. Attach	3340	1403	5421
5412	B16	32K	5424 MFCU or 1442 Card Read Punch 3741 Dir. Attach	3340 Mod C2	1403 or 5203	5421
5410	A13	12K	5424 MFCU or 1442 Mod 6 or 3741 Dir. Attach	5444 Mod 1	1403 or 5203	5421
5408	A14	16K	3741 Dir. Attach Keyboard	5444 Mod 1	5203	
5406	B3	12K		5444 Mod 1 or	5213 2222	

Additional Supported Devices:

5415			5444 and 5445s 2501 and 3340, 3344			
5410			5471 Printer/ 5475 Keyboard	2(5444s) 5445		
5408				2(5444s)		
5406			5496 3741 Dir. Attach	2(5444s)	Only Left Carriage on Dual 132 Chr. Mar.	

Note: JAS/3 Does Not Support Spooling.

SOFTWARE REQUIREMENTS

JAS/3 is written in System/3 Basic Assembler language and operates under the IBM System/3 Disk System Control Program. On a system with Dual Programming feature, JAS/3 must run in Program Level 1.

DOCUMENTATION

(available from Mechanicsburg)

General Information Manual (GH20-1085) ... Program Description and Operations Manual (SH20-1176).

TERMS and CONDITIONS: See PP Index

SYSTEM/3 DATA/3
5702-XX1, 5704-XX1, 5704-XX3, and 5705-XX1

PURPOSE

This program product provides users of IBM System/3 models 8, 10 Disk, 12 and 15 with a terminal-oriented data entry, inquiry, and file maintenance system. The specific functions it provides are data entry, data entry with master file input, inquiry, and inquiry with update.

HIGHLIGHTS

- Uses a program definition and a data definition form. Both are designed for ease-of-use with forms already familiar to the user.
- Easy to install and use via RPG-like forms and fill-in-the-blanks type prompting.
- DATA/3 generated programs do not require a dedicated system; that is, another program - batch or CCP - can be executed in the other program level or partition.
- DATA/3 generated programs can be executed under control of CCP.
- Places control and responsibility for data integrity at the data source.
- Offers up to four separate program security checks. Two are available in the DATA/3 generated programs; two additional checks are available when running under CCP.
- Requires no knowledge of programming languages by the terminal operator.
- Provides standard checking functions.

DESCRIPTION

Data Entry: Allows the operator to enter data on either a field or a record basis. It creates a single output file which can contain multiple record types depending on the application. Output files can be sequential, indexed, or direct. During data entry, the operator can page forward or backward through the entry screens. The definition of the output record format controls the program's flow by insuring that the proper input, edit, and output record display format operations are performed. If a field fails to pass a validity check, the field in error is intensified, indicating a correction must be made by the operator.

Data Entry with Master File Input: Allows the operator to extract information from up to eight existing master files and combine this information with data entered at the terminal. This combined data is displayed, verified or overridden by the operator, and incorporated into the output data file. Output files can be sequential or indexed, and, as above, the operator can page forward and backward through the entry screens during data entry.

Inquiry: This function allows access to records in a disk file by using a record key. When there are several inquiry screen format displays used by the program, the operator can switch from display to display. The program may also specify 'ease-of-reading' editing for numeric fields.

Inquiry with Update: This function provides file maintenance capability. When a record is accessed by key and displayed at the terminal, the operator can change the appropriate fields and direct the program to replace the record on disk with the new information. Data integrity is preserved by having user specify at program definition time which fields may be altered (unprotected) and which displayed fields may not be altered (protected). Records may also be added by the operator at the terminal.

Use: DATA/3 can be used in a wide variety of applications where a need exists for online data entry, data inquiry and file maintenance.

It is particularly suited for customer service ... order entry ... inventory and production control ... stockholder records ... credit control.

CUSTOMER RESPONSIBILITIES

Customizing DATA/3 to their specific needs. This will include the initial specification of the data files that DATA/3 generated programs will interface with. A data definition form is available.

Program definition forms are available for use when a program is to be generated using the DATA/3 facilities. These forms enable users to specify program name, security, data file interfaces, 3270 screen formats and field editing requirements of their various programs.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

The minimum configuration for IBM System/3 model 10 Disk System is IBM 5410 Processing Unit - 24K for Non-CCP or 32K for CCP ... IBM 5444 Disk Storage Drive model 2 ... IBM 5424 Multi-function Card Unit or 1442 Card Read Punch ... IBM 5203 Printer or 1403 Printer ... Local Communications Adapter (LCA) or Binary Synchronous Communications Adapter (BSCA) ... IBM 3270 Information Display System (minimum one display station). Programming Requirements include ... model 10 Disk System Control Programming (5702-SC1, Release 12 or later; or Release 13 if the Display Adapter is to be used) ... BSCA Multiline/Multipoint feature (5702-SC1, feature #6030/#6031), ...

Macros feature (5702-SC1, feature #6020/#6021) ... Overlay Linkage Editor and Checkpoint/Restart feature (5702-SC1 feature #6026/#6027) ... RPG II Compiler (5702-RG1).

The minimum configuration for the IBM System/3 model 8 is IBM 5408 Processing Unit model A16 (32K bytes) ... IBM 5444 Disk Storage Drive model A2 ... IBM 5203 Printer ... IBM 5471 Printer-Keyboard or 3741 Data Station/Programmable Workstation directly attached ... Integrated Communications Adapter (ICA) or Binary Synchronous Communications Adapter (BSCA) or the Local Display Adapter ... IBM 3270 Information Display System (minimum one display station). Programming Requirements same as IBM System/3 model 10.

The minimum configuration for IBM System/3 model 12 is IBM 5412 Processing Unit B16 (32K) ... IBM 5424 MFCU or 1442 Card Read Punch or 3741 Data Station/Programmable Workstation directly attached ... IBM 5203 or 1403 Printer ... IBM 3340 DASF ... Integrated Communications Adapter (ICA) or Binary Synchronous Communications Adapter (BSCA) or Local Display Adapter ... IBM 3270 Information Display System (minimum one display station). Programming requirements include ... IBM model 12 System Control Programming (5705-SC1) ... RPG II Compiler (5705-RG1).

The minimum configuration for IBM System/3 model 15 is the same as for model 15 SCP, but in addition, the following are required: IBM 3270 Information Display System (minimum one display station) ... Local Communications Adapter (LCA) or BSCA or Display Adapter (FC4601); or the model 15D, the BSCC is supported by DATA/3, but only under CCP. Programming requirements for 5704-XX1 include the SCP (5704-SC1 Release 3 or later; or Release 4 if the Display Adapter is to be used) and RPG II Compiler (5704-RG1). Programming requirements for 5704-XX3 include the SCP (5704-SC2) and RPG II Compiler (5704-RG2).

Additional devices supported include additional 5444 or 5445 disks, 5448 disks, 3340 disks, 3344 disks, and multiple terminals (including printers) on the 3270 Information Display System. (Program Function Keys 1-5 are required on the 3270 terminals.) The Data Entry Keyboard is recommended on the 3270 terminals.

SOFTWARE REQUIREMENTS

DATA/3 generated programs are compiled and executed like any other RPG II program. The generated programs operate under control of the System/3 System Control Programming (SCP) as follows:

SYSTEM/3	DATA/3	SCP
Models 8 and 10	5702-XX1	5702-SC1
Model 12	5705-XX1	5705-SC1
Model 15	5704-XX1	5704-SC1
Model 15	5704-XX3	5704-SC2

DOCUMENTATION

(available from Mechanicsburg)

DATA/3 Reference Manual (SC21-5102) *S/3 Bibliography* (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 DISK FORTRAN IV
5703-FO1**

PURPOSE

IBM System/3 Disk FORTRAN IV processes programs written in the IBM System/3 FORTRAN language, producing output suitable for execution with the IBM System/3 model 6 System Control Programming (5703-SC1). (This program is not used with the model 4).

HIGHLIGHTS

The System/3 FORTRAN language contains those features defined in American National Standard Basic FORTRAN, X3.10.1966; language extensions supported by IBM 1130 Basic FORTRAN; and additional features and capabilities previously available only with certain IBM Full FORTRAN compilers. These features include:

- The DEBUG facility, which enables the user to locate errors in a FORTRAN source program. By use of four basic statements, the debug facility provides for tracing flow within a program and between programs, and for checking the validity of subscripts.
- The IMPLICIT statement, which enables the user to specify the type (including length) of all variables, arrays, and user-supplied functions whose name begins with a particular letter.
- Length specification for INTEGER and REAL type statements, which allows the explicit specification of the INTEGER*2, INTEGER*4, REAL*4, and REAL*8 (double precision) data types.
- The relational IF statement, which is used to direct the transfer of control after the evaluation of relational expressions.
- List-directed input/output, which permits reading and writing of formatted data without a FORMAT statement.
- The GENERIC statement, which enables the user to specify a single name for a FORTRAN built-in or library function having several names. Depending on argument type, the correct function is selected by the compiler with each appearance of the name.
- IBM FORTRAN language extensions INVOKE, PROGRAM and GLOBAL, which allow FORTRAN main programs to be loaded successively into main storage and executed, while permitting these programs to share a common data area. These language extensions provide function equivalent to 1130 FORTRAN CALL LINK.
- Names of up to six characters for variables, arrays, functions, and subroutines.

DESCRIPTION

The System/3 Disk FORTRAN IV library contains mathematical and service subprograms required during execution to perform arithmetic operations, input and output constant conversion and input/output control.

System/3 Disk FORTRAN IV is supplemented by a Commercial Subroutine Package which is equivalent in function to the 1130 Commercial Subroutine Package with the exception that I/O routines for the model 6 version are not provided. Therefore, FORTRAN I/O must be used for model 6 device support.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Configuration: For compilation and execution, a System/3 model 6 with a minimum of 12K bytes of main storage is required. Disk FORTRAN IV requires a minimum of 9K bytes of main storage for compilation - exclusive of control program requirements.

- 1 - IBM 5406 Central Processing Unit (model B03)
- 1 - IBM 5444 Disk Drive (model 1)
- 1 - IBM 5213 Printer (model 1) or 2222 Printer (model 1)

Additional Device Support

IBM 5406 Central Processing Unit (model B04) ... IBM 5213 Printer models 2 or 3 ... IBM 2222 Printer model 2 ... IBM 5444 Disk models 2 or 3 ... IBM 5496 Online Data Recorder with IBM System/3 model 6 attachment feature ... IBM 129 Online Data Recorder with card I/O attachment feature (supported as IBM 5496). FORTRAN supports the IBM 3741 directly attached as an input or output device for compilation only.

Prerequisite: EC 571595 is required for all IBM System/3 model 6 CPUs on which System/3 FORTRAN will be run.

SOFTWARE REQUIREMENTS

5703-SC1; 5703-SC1 feature #6010/#6011.

COMPATIBILITY

System/3 Disk FORTRAN IV source programs for System/3 model 6 are compatible with the System/3 Disk FORTRAN IV for System/3 model 10 except for changes required to accommodate differences in attached I/O. The System/3 Disk FORTRAN IV compiler accepts source programs written in the IBM System/360 Basic FORTRAN IV language, which encompasses American National Standard Basic FORTRAN as defined in X3.10.1966. The compiler also accepts source programs written in the IBM 1130 Basic FORTRAN language with minor modifications.

PERFORMANCE

The System/3 Disk FORTRAN IV will compile and execute approximately 100 source statements on a 12K system with increased capacity on a 16K system.

The System/3 Disk FORTRAN will compile and execute in 9K of main storage, exclusive of control program requirements. Object time performance is dependent on program type, size, I/O functions performed and other factors pertinent to program execution speed.

DOCUMENTATION

(available from Mechanicsburg)

FORTRAN Reference Manual (SC28-6874) ... FORTRAN Commercial Subroutines (SC28-6875). ... S/3 Bibliography (GC20-8080).

Multiple Program Requests: Program Products and System Control Programming type 5703 (System/3 model 4 or 6) which are ordered from PID for shipment at the same time will be shipped to the user stacked on a 5440 disk cartridge (or equivalent)* under the following conditions:

1. The scheduled ship date, seven-digit customer number and CPU number must be the same for all programs ordered.
2. All of the program feature orders must specify the same cylinder size (100 cyl or 200 cyl). (Note: Model 4 uses only 200-cylinder disks).
3. The total storage requirements of the programs ordered must not exceed the number of available cylinders indicated by the specify number (100 or 200 cylinders).*
4. The announcement of availability must indicate that the program can be stacked.

* More than one disk cartridge may be required.

Action Required: Sufficient lead time is necessary to facilitate the proper coordination of System Control Programming and program products shipped from PID, and the system installation date. The following procedures must be followed:

- System Control Programming and program products are shipped from PID on 5440 Disk Cartridge. A cartridge may either be supplied by the user or it may be ordered from IBM.
- Orders may be submitted directly to PID for 5440 disk cartridges to be used for program deliveries.
- Orders will be scheduled for shipment from PID the Friday of the second week following AAS order entry, unless a later scheduled ship date is requested. Customer disks must arrive at PID the Tuesday before the Friday scheduled date.
- The branch must verify that System Control Programming and program products are on order and scheduled for shipment from PID to ensure their arrival concurrent with systems delivery.
- When rescheduling a system, the branch must also ensure that associated System Control Programming, program products, and disks are also properly rescheduled.

Failure to adhere to the above procedures can result in late shipment of programs and late installations.

System/3 Model 4 Program Products Minimum System Requirements

Program Products	5404	5213	5447	SCP
				5703-SC1
RPG II	X	X	X	X
Disk Sort Program	X	X	X	X
CCP/Disk Sort	X	X	X	X
Conversational Utilities	X	X	X	X

PROGRAM PRODUCTS

S/3 Disk FORTRAN IV (cont'd)

System/3 Model 6 Program Products Minimum System Requirements

Program Products	5406		5213	5444	SCP
	8K	12K			5703-SC1
Model 6 RPG II	X		X	X	X
Model 6 Sort	X		X	X	X
Model 6 Conversational Utility Programs					
-Keyboard Data Entry	X		X	X	X
-Keyboard Source Entry	X		X	X	X
-Data Interchange Utility	X		X	X	X
1255 Magnetic Character Reader Utility (plus 1255)		X	X	X	X
System/3 BASIC	X		X	X	
Disk FORTRAN IV		X	X	X	X

Note: To support the 3741 directly attached or 2265, a minimum of 12K 5406 is required.

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 HEALTH, WELFARE AND PENSION FUND
SYSTEM (5703-N11)****PURPOSE**

The IBM System/3 Health, Welfare and Pension Fund System meets basic contribution accounting requirements for jointly administered Health, Welfare and Pension Funds. In addition, member, contribution, and claims information is maintained for improved management analysis and control. The program is designed for the System/3 model 6.

The compact System/3 model 6 offers for the first time all the benefits of a stored program system to a large number of smaller funds, while avoiding significant facility problems. The Health, Welfare and Pension Fund System program product provides a comprehensive, easily installed package which assumes minimum tailoring and no permanent user programming capability.

HIGHLIGHTS

- Contribution accounting including prelisting for both hourly and flat rate contribution funds
- Notification of employer contribution shortage
- Member contribution/history file
- Claim history file
- Historic employer contribution file
- Computer prepared claim and pension checks
- Inquiry facility for all primary files
- Full maintenance of all system files
- Data for typical eligibility determination
- Utilization of the low cost System/3 model 6
- Control of all files, complete audit trail

Use: The Health, Welfare and Pension Fund will use this system for contribution accounting, pension and claim check preparation, to provide data for eligibility determination and for analysis and control of its operation.

CUSTOMER RESPONSIBILITIES

A thorough knowledge and understanding of both current contribution accounting procedures and controls and of the program product contribution accounting and controls ... any modification for unique requirements ... generation of system control program and program product ... coding and capture of required files and tables ... assignment of employer account numbers, claim codes, contract codes ... establishing individual audit requirements ... providing for manual supervision of controls and the integration of controls into the reporting framework used by the fund.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS****Minimum Machine Configuration**

Description	Type	M/SF
Processing Unit (12K)	5406	B3
Printer Attachment		3902
Printer (132 positions)	5213	2
Disk Storage (2.45 M bytes)	5444	1

The file storage requirements will vary greatly from fund to fund based upon such factors as number of members, collection cycle, and claim rate characteristics. Additional information can be found in the *General Information Manual*. Please contact your Regional Insurance Industry Marketing representative or the Insurance System Center, Princeton, New Jersey, for further assistance.

Reconstruction from machine-readable media will require the purchase of additional 5440 Disk Cartridges.

SOFTWARE REQUIREMENTS

The Health, Welfare and Pension Fund system is written in RPG II and operates under the control of the IBM System/3 model 6 System Control Program (5703-SC1).

All files are indexed disk.

Required Program Products - System/3 Model 6

- RPG II (5703-RG1)
- Conversational Utilities (5703-UT1)
- Disk Sort (5703-SM1)

DOCUMENTATION

(available from Mechanicsburg)

General Information Manual (GH20-1189)

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 6 RPG II
5703-RG1**

PURPOSE

IBM System/3 model 6 RPG II is a program product that operates under control of the System Control Programming. It is disk resident, and in addition to the functions provided by the S/3 Disk RPG II (5702-RG1), the S/3 model 6 RPG II supports operator keyboard console and other unique devices, as indicated below.

DESCRIPTION

The recording techniques used by all disk file organizations permit multiple records to be read or written with a single I/O instruction. Unlike previous data management techniques, System/3 disk files can be written or read using different blocking factors in different programs. This facility allows the user to process single records when a program uses a large amount of storage or to use as much core as available in processing multiple records to increase throughput.

System/3 Model 6 RPG II supports three types of file organization - Sequential, Indexed, and Direct. Direct files are addressed by relative record number; records may be loaded or retrieved by specifying the number of the record in the file.

The access methods supported are as follows:

1. Sequential
 - a) Consecutive processing - including updating in place.
 - b) Random processing - by relative record number including updating but excluding file loading.
2. Indexed
 - a) Random processing - by key.
 - b) Sequential processing - by key including file loading. Unlike previous indexed file organizations, the keys and data may be in a different physical sequence; i.e., the most active records may be placed in the front of the file with the index in sequence by item number.
3. Direct
 - a) Random processing - by relative record number, including updating and file loading. The open routine on the file load clears the data area on disk.
 - b) Consecutive processing.

Standard S/3 disk labels are mandatory on all disk files. Non-standard labels cannot be used except as data records within the file.

When a program generates too much object code for the specified size, the compiler will generate overlays. Not all programs - even with overlays - can fit into the stated machine size. In any event, programs cannot be compiled that would exceed 64K without overlays.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

System Configuration: An IBM System/3 model 4 workstation system includes: IBM 5404 Processing Unit model A18 (64K bytes) ... IBM 5447 Disk Storage and Control ... IBM 5213 Printer ... IBM 3277 Display Station model 1 ... at least one locally attached terminal. (Note: The 3277 is supported only by CCP; RPG II does not use the 3277.) A minimum IBM System/3 model 6 configuration includes: IBM 5406 Processing Unit model B2 (8K bytes) ... IBM 5444 Disk Storage Drive ... IBM 5213 or 2222 Printer.

Devices Supported: The following devices and features are supported by RPG II object programs:

Mdl 4	Mdl 6	Description
	X	129 Card Data Recorder mdl 1, 2 or 3
	X	2222 Printer mdl 1 or 2 (including Ledger Card Device and second tractor)
	X	2265 Display Station mdl 2 (5406-B3 or B4 is required)
	X	3741 Data Station mdl 1 or 2 directly attached
	X	3741 Programmable Workstation mdl 3 or 4 directly attached
	X	5213 Printer mdl 1, 2 or 3
X		5213 Printer mdl 3
X		5404 Processing Unit mdl A18
	X	5406 Processing Unit mdl B2, B3 or B4
	X	5444 Disk Storage Drive mdl 1, 2, 3
X		5447 Disk Storage and Control mdl A1 or A2
	X	5496 Data Recorder mdl 1

SOFTWARE REQUIREMENTS

5703-SC1 for IBM 3741 support, 5703-SC1 feature #6026/#6027 is required.

COMPATIBILITY

System/3 model 6 RPG II is source language compatible with RPG II for other System/3 models, except for differences due to different hardware.

Disk data files created by disk system management are compatible across System/3 models.

DOCUMENTATION
(available from Mechanicsburg)

System/3 Models 4 and 6 RPG II Reference Manual (SC21-7517) ... Introduction to RPG II (GC21-7514) ... RPG II Additional Topics Programmer's Guide (GC21-7567) ... RPG II Disk File Processing Programmer's Guide (GC21-7566) ... Disk Concepts and Planning Guide (GC21-7571) ... S/3 Bibliography (GC20-8080).

RPG II TELECOMMUNICATIONS FEATURE
(Feature #6000 or #6002)

PURPOSE

The RPG II Telecommunications feature provides the user with the capability of sending or receiving binary synchronous data over voice grade or high speed communications lines. This support is achieved through the use of an RPG II Telecommunications Specification Sheet, and the addition of BSCA (Binary Synchronous Communications Adapter) as a device entry on the RPG II File Description Specification. This RPG II support permits System/3 to function in one of the following communication modes:

- Receive only
- Receive with conversational reply***
- Transmit only
- Transmit with conversational reply***
- Alternate transmit and receive file****

DESCRIPTION

The RPG II language features supported for communications are:

Input, Output and Combined Files ... Demand Files for Transmit and Receive ... Blocking and Deblocking of Records ... Dual I/O Areas.

These BSCA features, options, and capabilities are supported by the feature:

Manual call ... Manual answer ... Auto-call ... Auto-answer ... Medium speed ... High speed ... Station selection ... EBCDIC data transparency ... Intermediate block checking ... EBCDIC or ASCII data and data link control characters. File translation of ASCII data can be accomplished by proper use of the file translate extension of RPG II.

System/3 with a BSCA supported by the RPG II Telecommunications feature can communicate with the following systems:

Another System/3 with BSCA, program-supported by RPG II Telecommunications feature.

A System/32 with BSCA (#2074), program-supported by RPG II.

A System/34 equipped with a Communications Adapter, program-supported by RPG II and Assembler.

A System/360 model 20 with BSCA, program-supported by BSCA IOCS.

A System/360 (or System/370 when operating in Basic Compatibility mode) program-supported by DOS BTAM, OS BTAM, or OS TCAM*.

A 2770 Data Communication System.

A 2780 Data Transmission Terminal.

A 3741-2 Data Station.†

A 3741-4 Programmable Work Station.†

A 5110 Computer System supported as a 3741 model 2 or 4.

A 5230 Data Collection System with BSCA (#2074). Receive mode only. Supported as a 3741 model 2 or 4.

A 5280 Distributed Data System with Communications Adapter (#2500).

A Series/1 - Refer to Series/1 pages for appropriate features.

A 6670 Information Distributor (as a 2770).

A System/7 with (#2074)

This program provides the support to use System/3 in the following telecommunications networks:

Point-to-Point switched ... Point-to-Point nonswitched ... Multipoint (as a tributary station).

System/3 with BSCA is a compatible member of the IBM BSC family of terminals. It can be intermixed with other BSC terminals (System/360 model 20, 5280, System/32, System/34, 1130, 1800, 2770, 2780 and 2715 model 2, 3780, 3741-2) on a multipoint line when operating as a tributary station with a central System/360 or System/370 computer* using DOS or OS BTAM. It can also share the

S/3 Mdl 6 RPG II (cont'd)

same phone number at the central System/360 or System/370 computer* with other BSC terminals (System/360 or System/370 computers**, System/360 model 20, System/32, System/34, 5280, 1130, 1800, 2780, 2770 and 2715 model 2, 6670 (as a 2770), 3780 , 3741-2, -4).

* System/360 models 22, 25 and 30 with DOS/360, models 40, 50, 65, 67 (in 65 mode), and 75 with DOS/360 and OS/360 and models 85, 91 and 195 with OS/360. System/370 models 135, 145 and 155 with DOS and OS and model 165 with OS when operating in Basic Compatibility mode.

** System/360 models 22, 25 and 30 with BOS/BPS or DOS/360, models 40, 50, 65, 67 (in 65 mode), and 75 with BOS/BPS, DOS or OS/360 and models 85, 91 and 195 with OS/360. System/370 models 135, 145 and 155 with DOS and OS and model 165 with OS when operating in Basic Compatibility mode.

*** Not supported in communications with System/32, System/34, 2770, 2780 and 3741-2, -4.

**** Transmit interspersed with Receive is not supported in communication with 2770, 2780 or 3741-2, -4.

† Operator Identification Card Reader feature (#5450) and the Expanded Communications/Multipoint Data Link Control feature (#1685) on 3741-2, 4 are not supported.

The functions and specifications for the System/3 model 6 RPG II Telecommunications feature are identical to those of the System/3 model 10 Disk RPG II Telecommunications feature.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

This program can be used on the IBM System/3 model 4 or model 6. Minimum requirements are the same as for RPG II (5703-RG1).

For object program execution - the Binary Synchronous Communications Adapter (#2074) is required. For System/3 model 6, an IBM 5406 model B3 or B4 is required to support communications with an IBM 2770 or 2780.

SOFTWARE REQUIREMENTS

5703-RG1; 5703-SC1

DOCUMENTATION

(available from Mechanicsburg)

RPG II Telecommunications Programming Reference Manual (GC21-7507). ... System/3 Bibliography (GC20-8080).

RPG II AUTO-REPORT FEATURES

(Features #6008, #6009)

PURPOSE

The RPG II Auto-Report feature enhances the RPG II language by providing functions which eliminate much of the preparation and coding work normally done by the user when producing an application program in RPG II. It is specifically designed to facilitate report preparation.

The IBM System/3 Auto-Report program executes as a preprocessor to the RPG II compiler which is a prerequisite for this feature. The input to the program is RPG II source statements and Auto-Report statements. Auto-Report produces a diagnostic listing, replaces the Auto-Report statements with generated or copied RPG II source statements and calls the RPG II compiler for execution.

DESCRIPTION

Coding of applications in RPG II is made easier by the following Auto-Report functions.

- Page Headings - The user need supply only the report title. Auto-Report generates skipping, spacing, horizontal alignment and date and page number constants. Page overflow is considered and the heading conditioned to print on the top of each page.
- Simplified Output Specifications - A single output field specification can result in Auto-Report generated statements to:
 - Indicate printing with editing
 - Place column heading over the data fields
 - Control spacing
 - Control horizontal alignment of data
 - Define total fields and calculation specifications to accumulate totals by control levels (total rolling),
 - Flag total lines with asterisk indication.
- COPY - The COPY statement provides the ability to copy RPG II source statements from a disk library into the RPG II source program. Some values on the copies specifications may be modified for the resulting compilation.
- Source Program - The Auto Report program passes control directly to the RPG II compiler to cause compilation of the expanded source program. In addition, the user may elect to catalog to disk a copy

of the source program so that he can make modifications which tailor the program more closely to his requirements.

The Auto-Report functions may be specified for one printer file in any RPG II program. Any RPG II specifications not related to the selected printer file and any RPG II statements for the printer file but not requesting Auto-Report functions, are passed to the RPG II compiler as a part of the source program.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

System Configuration: This program can be used on the IBM System/3 model 4 or model 6. Minimum requirements are the same as for RPG II (5703-RG1).

SOFTWARE REQUIREMENTS

5703-RG1; 5703-SC1.

DOCUMENTATION

(available from Mechanicsburg)

RPG II Auto-Report Reference Manual (SC21-5057) ... System/3 Bibliography (GC20-8080)

RPG II 3270 DISPLAY CONTROL FEATURE

(Feature #6030 - Model 4 only)

PURPOSE

The RPG II 3270 Display Control feature provides telecommunications services on the IBM model 4 for local or remote IBM 3270 devices. This program is automatically linked into the RPG II application program via the SPECIAL file exit capability on the RPG II File Description Specification Sheet. The RPG II Telecommunications feature is not required.

DESCRIPTION

The following services are provided by the RPG II 3270 Display Control feature:

- RPG II access to 3270 Display System terminals attached to the CPU or the Binary Synchronous Communications Adapter.
- Automatic buffering and queuing of terminal data.
- A display formatting interface which permits the support of 3270 devices with coding in RPG II.
- Complete line control procedures are provided.
- Up to 18 terminals may be controlled (up to 5 can be attached to the CPU).
- Two subroutines are provided. SUBR13 allows an RPG II program to support the 3270 Information Display System without using CCP. Using SUBR14, an existing program using the 3270 Display Control feature may be converted to execute under control of CCP by replacing SUBR13 references with SUBR14 references in the RPG II source program. The user must only then make any adjustments required by CCP and recompile the program.
- Provides the capability of coding one or more applicatons within one program. No task switching is provided.

Terminals Supported: The following terminals and Communication facilities are supported by the RPG II 3270 Display Control feature:

With the Binary Synchronous Communications Adapter

- 3275 Display Station and Control
- 3271 Display Control Unit (models 1 or 2) with:
 - 3277 Display Stations (models 1 or 2)
 - 3284 Printer (models 1 or 2)
 - 3286 Printer (models 1 or 2)
 - 3288 Printer (model 2)

Directly to CPU

- 3277 Display Stations (models 1 or 2)
- 3284 Printer (models 1 or 2)
- 3286 Printer (models 1 or 2)
- 3288 Printer (model 2)

Note: A maximum of 5 terminals may be attached to the CPU.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements

The RPG II IBM 3270 Display Control feature requires an IBM System/3 model 4 which includes an IBM 5404 Processing Unit model A18 (64K bytes)...an IBM 5447 Disk Storage and Control ... an IBM 5213 model 3 Printer...and one of the devices listed under "Terminals Supported".

Using SUBR13, approximately 10.25K-13.75K bytes is added to the size of the object program; using SUBR14, 4.25K-5.25K bytes is

S/3 Mdl 6 RPG II (cont'd)

added. The actual amount of resident overhead is determined by the user options selected, and that size can be increased to approximately 15K if the trace options are optionally selected when using SUBR13.

SOFTWARE REQUIREMENTS

5703-SC1, 5703-RG1

DOCUMENTATION

(available from Mechanicsburg)

IBM RPG II 3270 Display Control Feature Reference and Logic Manual (SC21-5161) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 6 DISK SORT PROGRAM
5703-SM1**

PURPOSE

This IBM System/3 model 6 disk sort program sorts any disk file organization supported by IBM System/3 disk systems management in ascending or descending sequence. This includes Indexed, Direct, and Sequential files. The sort program can select desired records from the input file to be included or excluded from the sort. Recognition of individual records can be based on:

- 1) Record code
- 2) Relation of a field to a constant
- 3) Relation of two fields in a record
- 4) Any relationship in a series (ORing)
- 5) All relationships in a series (ANDing)
- 6) Multiples of the above tests in any combinations.

DESCRIPTION

Control fields can be in a different location in records within the file.

Output from the sort program will be in one of three formats:

- 1) Tags - A file of 3-byte binary relative record numbers in the sequence specified by the user.
- 2) Tagalong - A file of records containing the sort control fields and/or the data fields the user has specified. By using this option, the user can select only the data he needs from his input file to be included in the output. By specifying the entire input record as a tagalong field, the user can, in effect, accomplish a record sort.
- 3) Summary Tagalong - Records containing identical control fields are combined by summarizing (totaling) specified fields into one record.

Specification of record selection, sort parameters and tagalong data fields is accomplished by simple, RPG-like coding sheets.

The functions and syntax of specification statements for the System/3 model 6 Disk Sort program are identical with those of the System/3 model 10 Disk Sort. An output data file created by the System/3 model 6 Disk Sort can be processed by any System/3 program which uses disk system management to access the file.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

An IBM System/3 model 4 workstation system includes: IBM 5404 Processing Unit model A18 (64K bytes) ... IBM 5447 Disk Storage and Control ... IBM 5213 Printer ... IBM 3277 Display Station model 1 ... at least one locally attached terminal. (Note: The IBM 3277 is supported only by CCP; the Disk Sort Program does not use the 3277.)

The minimum System/3 model 6 configuration includes: IBM 5406 Processing Unit model B2 (8K bytes) ... IBM 5444 Disk Storage Drive ... IBM 5213 or 2222 Printer.

Devices Supported

The following devices are supported by the Disk Sort program:

Model 4	Model 6	Description
	X	129 Card Data Recorder model 1, 2 or 3
	X	2222 Printer model 1 or 2
	X	2265 Display Station model 2 (5406 model B3 or B4 is required)
	X	3741 Data Station model 1 or 2 directly attached
	X	3741 Programmable Workstation model 3 or 4 directly attached
	X	5213 Printer model 1, 2 or 3
X		5213 Printer model 3
X		5404 Processing Unit model A18
	X	5406 Processing Unit model B2, B3 or B4
	X	5444 Disk Storage Drive model 1, 2 or 3
X		5447 Disk Storage and Control model A1 or A2
	X	5496 Data Recorder model 1

For Sort Specification input: IBM 129, 3741, 5444, 5447, 5496, or operator keyboardconsole.

For input, work and output files: IBM 5444, 5447

For diagnostics and messages: IBM 2222, 2265, 5213

SOFTWARE REQUIREMENTS

5703-SC1. For IBM 3741 support, 5703-SC1 feature #6026/#6027 is required.

DOCUMENTATION

(available from Mechanicsburg)

Disk Sort Reference Manual (SC21-7522) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

**CCP/DISK SORT PROGRAM (Model 4 Only)
5703-SM2****PURPOSE**

This program is functionally compatible with the IBM System/3 model 6 Disk Sort program (5703-SM1). With the CCP/Disk Sort program, however, the user can generate an object module which can be executed as a task under control of the Communications Control program (CCP) (5703-SC1 feature #6033), or as a program in batch (non-CCP) mode.

This program requires 12K bytes of main storage (exclusive of control program requirements) for both generation and execution, and automatic allocation of sort work files is not supported.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

An IBM System/3 model 4 workstation system includes: IBM 5404 Processing Unit model A18 (64K bytes) ... IBM 5447 Disk Storage and Control model A1 or A2 ... IBM 5213 Printer model 3 ... IBM 3277 Display Station model 1 ... at least one locally attached terminal. (Note: The IBM 3277 is supported only by CCP).

SOFTWARE REQUIREMENTS

5703-SC1; 5703-SC1 feature #6011. For execution under CCP: 5703-SC1 feature #6033.

DOCUMENTATION

(available from Mechanicsburg)

Disk Sort Reference Manual (GC21-7522) ... *S/3 Bibliography* (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 6 CONVERSATIONAL UTILITY PROGRAMS
5703-UT1****PURPOSE**

There are three IBM System/3 Conversational Utility programs that are disk resident and operate under control of the SCP:

The Keyboard Data Entry program allows the user to key data directly onto the disk. It will format records according to user specifications and output an indexed disk file which can later be processed by a user RPG II program or the Sort program. Additional functions of the program include the ability to correct records and take hash or control totals.

The Keyboard Source Entry program allows the user to key source statements (RPG II) or procedures directly from the keyboard to the source library on disk. The source statements may be in the form of RPG II source programs, format records for the Keyboard Data Entry program, Utility control statements, etc. The disk library is in a format which is acceptable to the system and to the RPG II compiler. Additional features include the ability to correct source statements.

The Data Interchange Utility allows the user to convert disk data files created by disk system management (such as RPG II - produced data files) into BASIC data files, and vice versa. The files are not converted in place; instead, a new file is created. The user must specify the format of his RPG II records and the fields to be converted. The final output will be acceptable to the new system.

(Note: The Data Interchange Utility is not used with the model 4). Data files created by the System/3 model 6 Conversational Utilities can be processed by any System/3 program which uses disk system management to access the files. The exception is that data files that are converted by the Data Interchange Utility (DIU) program to System/3 BASIC format are accessible only by System/3 BASIC and by DIU.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

An IBM System/3 model 4 workstation system includes: IBM 5404 Processing Unit model A18 (64K bytes) ... IBM 5447 Disk Storage and Control ... IBM 5213 Printer ... IBM 3277 Display Station model 1 ... at least one locally attached terminal. (Note: The IBM 3277 is supported only by CCP; the Conversational Utilities do not use the 3277.)

A minimum IBM System/3 model 6 configuration includes: IBM 5406 Processing Unit model B2 (8K bytes) ... IBM 5444 Disk Storage Drive ... IBM 5213 or 2222 Printer.

SOFTWARE REQUIREMENTS

5703-SC1.

DOCUMENTATION

(available from Mechanicsburg)

System/3 Model 4 and 6 Conversational Utilities Reference Manual (SC21-7528) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index



PROGRAM PRODUCTS

**SYSTEM/3 UTILITY PROGRAM FOR
1255 MAGNETIC CHARACTER READER
5703-UT2**

PURPOSE

This utility program allows the IBM System/3 model 6 user to control document processing on the IBM 1255 Magnetic Character Reader. It provides a means of reading MICR-encoded documents from the 1255, accumulating document totals and amount field totals for each stacker, and placing the data from the documents on output disk and printer files. The program is designed to fulfill the basic requirements of the "ON-US" data capture run required for all Demand Deposit Application programming.

The program will read fields from the documents as specified by the user and then, based on decisions indicated by the user, it will stacker select these documents into user-specified stackers. If requested, Modulus 10 or 11 checking will be performed. Then after each document has been read and stacker selected, the utility will print user-specified fields from that document. Fixed-length disk records will also be created and placed on a disk file.

An additional facility provided by the program is the printing of document totals and amount field totals at end of job. Subtotals may be printed during program execution at times selected by the user.

The utility program is functionally compatible with System/3 model 10 Disk System Utility program for 1255 Magnetic Character Reader.

(This program is not used with the model 4.)

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

This program requires an IBM 5406 Processing Unit model B3 or B4 with a Serial I/O Channel (#7081) ... IBM 5444 Disk Storage Drive model 1, 2 or 3 ... IBM 5213 Printer model 1, 2 or 3 or IBM 2222 Printer model 1 or 2 ... and IBM 1255 Magnetic Character Reader model 1, 2 or 3.

SOFTWARE REQUIREMENTS: 5703-SC1.

DOCUMENTATION

(available from Mechanicsburg)

1255 Utility Reference Manual (SC21-7527) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

STAT/BASIC FOR SYSTEM/3 MODEL 6 5703-XA1

PURPOSE

STAT/BASIC is an interactive program encompassing the most commonly used statistical techniques for the analysis of numerical data. The program operates on an IBM System/3 model 6.

STAT/BASIC is designed to meet the needs of the statistician, engineer, researcher or business analyst. It helps in using the computer directly for statistical analyses. A statistically-oriented user should have no difficulty in quickly learning the capabilities of the program. The interactive mode of the package allows a non-data processing-oriented user to use the program with ease, with a minimum of training.

Direct use on the System/3 model 6 provides the user with fast results. Because of the interactive nature of STAT/BASIC, the user can sit at the keyboard and see the results of his analyses as they are developed. Delays and some of the sources of error familiar in batch processing are eliminated with STAT/BASIC.

DESCRIPTION

STAT/BASIC consists of 40 procedures, written in the BASIC language, providing a wide range of capabilities under the following categories:

- Data Generation - Read ... Print Edit ... Transformation.
- Elementary Statistics - Cross Tabulation ... Histogram ... Tally ... Moments ... T-test ... Chi-square.
- Regression and Correlation Analysis - Correlation ... Simple Regression ... Stepwise Regression ... Multiple Regression ... Polynomial Regression.
- Multivariate Analysis - Discriminant Analysis ... Canonical Correlation ... Factor Analysis Part 1 ... Factor Analysis Part 2.
- Analysis of Variance - One-way Analysis of Variance ... Factorial Design.
- Nonparametric Statistics - Kendall Rank Correlation ... Sign Test ... Wilcoxon's Matched-pairs Signed-ranks Test ... Cochran Q Test ... Friedman Two-way Analysis of Variance ... Mann-Whitney U Test ... Kendall Coefficient of Concordance ... Biserial Correlation ... Point-biserial Correlation ... Tetrachoric Correlation ... Phi Coefficient.
- Time Series Analysis - Moving Average ... Seasonal Analysis ... Cyclical Analysis ... Auto-covariance and Auto-correlation ... Cross-covariance and Cross-correlation ... Triple Exponential Smoothing.
- Biostatistics - Survival Rate ... Probit Analysis.

On a System/3 model 6, the maximum size of a data matrix that can be processed is 300 rows (observations) by 30 columns (variables).

Exceptions are:

- For the edit and transformation programs, this limitation of 300 rows and 30 columns applies, but the number of rows (N) times the number of columns (M) must not exceed 3500 ($N \times M \leq 3500$).
- For the chi-square and Kendall coefficient of concordance programs, the maximum size of a data matrix is 100 rows by 30 columns.

HIGHLIGHTS

- A comprehensive set of statistical procedures.
- A user with a knowledge of statistics can learn the program capabilities with a minimum of effort.
- Interactive mode simplifies usage.
- Calculations performed in short or long precision.
- Extensive error checking with correction facilities.
- Instructional messages clarify procedures or options available.

Use: The user may utilize any of the STAT/BASIC programs through the console keyboard with System/3 model 6. The user first types a few systems commands and the name of the desired statistical program. Following a Ready indication, STAT/BASIC guides the user through his problem by typing out procedural instructions. Alternate courses of action or options are usually in the form of questions, which the user answers by typing the appropriate replies.

CUSTOMER RESPONSIBILITIES

The STAT/BASIC programs are distributed in machine-readable form for loading into the user system. Once stored, it is available to any member of the organization authorized to use the system.

If confidential information is to be stored in the library, the user must take appropriate steps to safeguard against unauthorized access.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

The size of the user area required to run the STAT/BASIC procedures is a function of the number of statements in an individual procedure and the amount of data processed in short and long precision.

All procedures, with the exception of the transformation procedure, can be executed in short precision in a user area of 40,000 bytes with a symbol table size of 9,000 bytes.

All procedures, with the exception of the transformation procedure, can be executed in long precision in a user area of 50,000 bytes with a symbol table size of 16,300 bytes. The transformation procedure cannot be executed in long precision; it can be executed in short precision in a user area of 50,000 bytes with a symbol table size of 10,800 bytes.

IBM System/3 Model 6 ... The minimum system is the same as that required for System/3 BASIC, specifically IBM 5406 Processing Unit model B2 (8K) ... one IBM 5444 Disk Storage Drive model 1 ... one IBM 5213 Printer model 1.

SOFTWARE REQUIREMENTS

STAT/BASIC is written in BASIC. To run the program on an IBM System/3 model 6 requires the System/3 BASIC (5703-XM1) program product.

DOCUMENTATION

(available from Mechanicsburg)

General Information Manual (GH20-1027).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 BASIC
5703-XM1****PURPOSE**

IBM System/3 BASIC is a stand-alone, total facility interactive programming system. BASIC enables the user to enter BASIC statements, commands, utilities, BASIC data, and Desk Calculator (DCALC) instructions all in a completely interactive environment.

DESCRIPTION

System programs, source programs, and data files are stored on disk for direct accessibility. The system uses a virtual memory concept to allow the user to compile and execute large programs that otherwise would not fit into main storage.

System/3 BASIC, besides having a complete interactive interface to the user through the operator keyboard console, also provides the ability for continuous execution of stacked jobs without operator intervention.

Input to the System/3 BASIC is in the form of commands, data, or BASIC statements from either the keyboard console or from cards. Output is to the printer and/or to the 2265 model 2 Display Station. The disk is an input or output device as well as temporary and permanent storage for all forms of user data or programs.

DCALC (Desk Calculator) is a function of BASIC allowing the user to use the system as a large, highly sophisticated electronic desk calculator. No user knowledge of programming is necessary to put DCALC to its full use.

DCALC will give the user the ability to add, subtract, multiply, divide, and compute powers, roots, trigonometric functions, etc. Special procedures can be defined and stored into DCALC for future use. All of the functional routines (built-in functions) within BASIC are available to the DCALC user, except for the DET function.

The user has full control over his BASIC program with the command language. Commands are analyzed and result in the requested action being performed immediately upon the system. These commands allow the user intervention before, during, and after BASIC program execution.

A set of utilities are included in System/3 BASIC to allow for system generation and disk pack usage. The utilities give disk copy, file allocation, configuration, analysis, initialization, and track assignment capabilities to the user.

PERFORMANCE

The BASIC compiler can compile a 500-statement BASIC source program in 30 to 35 seconds. The BASIC program can be listed at a rate of approximately 60 statements-per-minute on the 5213 model 1 Printer (assuming the average statement is 40 characters long).

DCALC will respond to any user input within two seconds.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: The minimum system configuration for System/3 BASIC, DCALC, and the utilities is: An IBM 5406 Processing Unit model B2 (8K bytes), an IBM 5213 Printer model 1 or an IBM 2222 Printer model 1 and an IBM 5444 Disk Storage Drive model 1.

Additional units and features supported are: IBM 5406 Processing Unit models B3 (12K bytes) and B4 (16K bytes), IBM 5213 Printer models 2 and 3, IBM 2222 Printer model 2, IBM 5496 Data Recorder with System/3 model 6 Attachment feature, IBM 129 Card Data Recorder with System/3 model 6 Card Input/Output feature, additional capacities of the IBM 5444 Disk Storage Drive, and the IBM 2265 model 2 Display Station. (Support of the 2265 requires a minimum of 12K bytes of main storage and the eight additional command keys.)

Note: A co-resident system requires a minimum of 4.90 million bytes of 5444 disk storage for operation.

System/3 BASIC is not supported on the model 4.

SOFTWARE REQUIREMENTS: None.

DOCUMENTATION

(available from Mechanicsburg)

BASIC Reference Manual (GC34-0001) ... BASIC Operator's Guide (GC34-0003) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index



MATH/BASIC for SYSTEM/3 MODEL 6 5703-XM2

PURPOSE

IBM System/3 MATH/BASIC is a set of conversational routines for the solution of the most frequently encountered mathematical problems in science and industry. The library operates on an IBM System/3 model 6.

MATH/BASIC is designed to meet the needs of the engineer and scientist. The conversational features of MATH/BASIC allow a non-data processing-oriented user to use the programs with a minimum of training.

HIGHLIGHTS

- A comprehensive set of mathematical routines.
- Calculations in short and long precision.
- Control of operation in the case of ill-conditioned problems and error messages.
- Ease-of-use due to conversational mode.

DESCRIPTION

MATH/BASIC consists of 44 routines providing computing capabilities in the following areas:

Linear equations, matrix eigenvalue problem.
Zeros of polynomials, zeros and minima of functions.
Quadrature/differentiation
Interpolation, approximation and smoothing.
Ordinary differential equations.
Discrete Fourier transform.
Special functions.
Linear programming.

Use: The user can utilize any of the MATH/BASIC routines through a System/3 model 6 console keyboard.

The user first enters a few systems commands and the name of the desired MATH/BASIC routine. Following a READY indication, MATH/BASIC guides the user through his problem by printing procedural instructions. Alternate courses of action or options are described usually in the form of questions, which the user answers by entering the appropriate replies.

CUSTOMER RESPONSIBILITIES

The MATH/BASIC program is distributed in machine-readable form for loading into the user's system. Once stored, it is available to any member of the organization authorized to use the system.

If confidential information is to be stored in the library, the user must take appropriate steps to safeguard against unauthorized access.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

The minimum configuration for the IBM System/3 model 6 is the same as that required for System/3 BASIC, that is, one IBM 5406 Processing Unit model B2 (8K) ... one IBM 5444 Disk Storage Drive model 1 ... one IBM 5213 Printer model 1.

SOFTWARE REQUIREMENTS

MATH/BASIC is written in the BASIC language. To run the program on an IBM System/3 model 6 requires the System/3 BASIC (5703-XM1).

DOCUMENTATION (available from Mechanicsburg)

General Information Manual (GH20-1128) .

TERMS and CONDITIONS: See PP Index

**BUSINESS ANALYSIS/BASIC FOR
SYSTEM/3 MODEL 6
5703-XM3****PURPOSE**

Business Analysis/BASIC is a comprehensive set of interactive routines for use on the IBM System/3 model 6.

It consists of 30 routines written in the BASIC language, providing the problem-solver professional with procedures for data generation and maintenance, spread sheet analysis, investment analysis, break-even or cost-volume-profit analysis, depreciation analysis, and time series analysis. The program is designed so that a detailed knowledge of programming is not required.

DESCRIPTION

Business Analysis/BASIC includes 30 interactive routines for assisting the problem-solver in exercising the following functions:

- Spread Sheet Analysis:
 - Spread Sheet data file creation and update
 - Spread Sheet report formatting
- Investment Analysis:
 - Return-on-Investment computation
 - Discounted Cash Flow analysis
 - Loan analysis (multiple and single)
 - Lease vs Purchase analysis
 - Make vs Buy analysis
- Break-Even Analysis:
 - Break-even with definite assumptions
 - Break-even with probabilistic assumptions
- Depreciation Analysis:
 - Straight line depreciation
 - Sum-of-years digits depreciation
 - Declining balance depreciation
 - Equipment units depreciation
- Time Series Analysis:
 - Compound growth rate projection
 - Moving average
 - Seasonal analysis
 - Cyclical analysis
 - Autocovariance and Autocorrelation
 - Crosscovariance and Crosscorrelation
 - Exponential Smoothing
 - Simple Regression
- Graphic Presentation:
 - Histograms
 - Exponential Smoothing Plots
- Routine and File Indexing:
 - Business Analysis/BASIC routine index
 - User-created data file log
- Data Generation and Maintenance:
 - Create and update data files
 - Select and rearrange records in data files and spread sheet data files
 - Resequence records in data files and spread sheet data files
 - Print data files

HIGHLIGHTS

- Comprehensive set of analytical routines to assist the user in examining investment alternatives and in preparing financial plans.
- Spread sheet analysis capability for report creation and update.
- Interactive features include instructional messages, flexible control of calculations, extensive error checking, and data editing.

Use: The professional analyst can utilize any of the Business Analysis/BASIC routines through the System/3 model 6 console keyboard.

The user first enters a few systems commands (LOGON, EDIT, etc.) and the name of the desired Business Analysis/BASIC routine. Following a READY indication, the Business Analysis/BASIC routine guides the user through his problem by typing out procedural instructions. Alternative courses of action or options are presented in the form of questions, which the user answers by entering the appropriate replies.

CUSTOMER RESPONSIBILITIES

The user must have the necessary computer configuration as described below. The user will also need the associated program product for his system as mentioned under "Programming Systems".

Business Analysis/BASIC program is distributed in machine-readable form for loading into the user's system. Once stored, it is available to any member of the organization authorized to use the system.

If the user has confidential information to be stored in disk files, it will be his responsibility to take appropriate steps to safeguard against unauthorized access.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

The minimum configuration for the System/3 model 6 is the same as that required for IBM System/3 BASIC, that is, one IBM 5406 Processing Unit model B2 (8K), one IBM 5444 Storage Drive model 1, and one IBM 5213 Printer model 1.

SOFTWARE REQUIREMENTS

Business Analysis/BASIC is written in the BASIC language. To run the program on an IBM System/3 model 6 requires System/3 BASIC (5703-XM1).

DOCUMENTATION

(available from Mechanicsburg)

General Information Manual (GH20-1175) ... Promotional Flyer (G520-2527).

TERMS and CONDITIONS: See PP Index



PROGRAM PRODUCTS

SYSTEM/3 MODEL 15 BASIC ASSEMBLER
5704-AS1; 5704-AS2

PURPOSE

The IBM System/3 model 15 Basic Assembler program is a program product that processes source programs written in the Basic Assembler language, and produces executable object programs. The program is disk resident on an IBM 5444 Disk Storage Drive or 3340 Direct Access Storage Facility or 3344 Direct Access Storage (5704-AS2 only). 5704-AS1 is used with SCP 5704-SC1, and 5704-AS2 is used with SCP 5704-SC2.

DESCRIPTION

The Basic Assembler language is a symbolic programming language used to write programs. Some of the features provided by the program and its language are:

- Mnemonic Operation Codes
- Symbolic Referencing of Storage Addresses
- Automatic Storage Assignment
- Address Displacement Calculation
- Convenient Data Representation
- Operand Field Expressions
- Source Identification - Sequence Fields
- Assembler Instructions
- Source Program Listing
- Cross-Reference Listing
- Error Checking and Diagnostic Messages

The Basic Assembler may be used for assembly of relocatable subroutines for use with model 15 RPG II, COBOL, or FORTRAN. The subroutines, written in the Basic Assembler language, are coded by the user and separately assembled. The process of program linking is accomplished during compilation of the RPG II, COBOL, or FORTRAN source programs by means of the Overlay Linkage Editor.

Source input to the Assembler can be from the system input device (card reader, 3741 directly attached, or 3277 keyboard), from a source library, or from a source file generated by the macro processor. Work files for the Assembler can be on either a 5444 or 5445 Disk Storage Drive, or a 3340 Direct Access Storage Facility or 3344 Direct Access Storage. The Overlay Linkage Editor may be used to generate executable object programs.

Model 15 Basic Assembler Device Support

	Source Assembly	Object Execution
5444 Disk Storage Drive (5704-AS1 only) model A2 or A3	Yes	Yes
5445 Disk Storage (5704-AS1 only) model 1, 2 or 3	Yes	Yes
3340 Direct Access Storage Facility model A2, B1 or B2	Yes	Yes
3344 Direct Access Storage (5704-AS2 only) model B2	Yes	Yes
3410/3411 Magnetic Tape Unit model 1, 2, or 3	No	Yes
1403 Printer model 2, 5, or N1	Yes	Yes
3277 Display Station model 1	Yes**	Yes
5424 MFCU model A1 or A2	Yes	Yes
2560 MFCM model A1 or A2	Yes	Yes
1442 Card Read Punch model 6 or 7	Yes	Yes
2501 Card Reader model A1 or A2	Yes	Yes
3284 Printer model 1	Yes	Yes
1255 MCR model 1, 2 or 3	No	Yes
3881 OMR model 1	No	Yes
3741 (directly attached) model 1, 2, 3 or 4	Yes	Yes
BSCA, 1 or 2 lines, LCA, or DA	No	Yes
Main Storage Requirements		
5704-AS1	10-48K	up to 48K
5704-AS2	10-48K	up to 56K*

- * Object program size can be up to 56K, depending on the CCP, spool and configuration options selected during system generation.
- ** Assembler and system halts are logged on the 3277. Source statements may be entered from the keyboard.

Stand-Alone Programs: The Basic Assembler can be used to create a stand-alone program. The object program is punched into cards. Program loading is performed with an initial program loader through the alternate IPL device (MFCU, MFCM, or 1442). Stand-alone programs are coded entirely by the user with no dependence on other programming support.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: The same as for SCP* (5704-SC1 for 5704-AS1; 5704-SC2 for 5704-AS2).

- * Note: The IBM 1403 printer should be equipped with the Universal Character Set feature and a PN (60-character set) interchangeable train cartridge. A 48-character set (for example, HN or AN arrangement) can be used with the Assembler; however, the user must be willing to accept substitute characters.

SOFTWARE REQUIREMENTS

5704-SC1 for 5704-AS1; 5704-SC2 for 5704-AS2.

COMPATIBILITY

System/3 model 15 Basic Assembler is functionally equivalent to the Basic Assembler programs on other System/3 models. Four mnemonics are unique to model 15: Load CPU (LCP), Store CPU (SCP), Command CPU (CCP), and Supervisor Call (SVC). When converting from another System/3 model, there may be changes required in macro statements.

DOCUMENTATION

(available from Mechanicsburg)

Assembler Reference Manual (SC21-7509) ... Components Reference Manual (GA21-9236) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP index

**SYSTEM/3 MODEL 15
SUBSET ANS COBOL COMPILER AND LIBRARY
5704-CB1; 5704-CB2**

PURPOSE

Model 15 COBOL is a program product that operates under control of the IBM System/3 model 15 System Control Programming. 5704-CB1 is used with SCP 5704-SC1, and 5704-CB2 is used with SCP 5704-SC2. The compiler and library are disk resident on the IBM 5444 Disk Storage Drive or 3340 Direct Access Storage Facility or 3344 Direct Access Storage (5704-CB2 only). The compiler requires as input a COBOL source language program and produces as output, by means of the system's Overlay Linkage Editor, a System/3 machine language object program, either cataloged in an object library, punched into 80- or 96-column cards, or written onto a diskette.

System/3 COBOL supports Grade 1 Braille for both compiler listings and object program printed output. Minimum requirements include a 132-print position printer with 8 lines/inch spacing (1403 Printer); the compiler requires a 14K partition in order to produce Braille listings. A user-provided elastic strip is attached over the printer hammers to produce the Braille characters.

Source input to the compiler can be from the system input device (card reader, 3741 directly attached, or 3277 keyboard) or from a source library. Work files for the compiler can be on any 5444 or 5445 Disk Storage Drive or on a 3340 Direct Access Storage Facility or 3344 Direct Access Storage (5704-CB2 only). The Overlay Linkage Editor is used to generate object programs.

American National Standard COBOL Considerations

The U.S. Industry standard for COBOL is American National Standard (ANS) COBOL, X3.23-1968, was approved by the American National Standards Institute (ANSI) on August 23, 1968. The following functional processing modules of the ANSI standard are included in the System/3 model 15 Compiler.

1 Nucleus	1, 2
1 Sequential Access	1, 2
1 Random Access	0, 2
1 Library	0, 2
2 Table Handling	1, 3
1 Segmentation	0, 2

The first digit above represents the level of the modules included in the compiler; the second digit represents the lowest level in the American National Standards Institute Standard (0 implies that the module may be completely missing from the standard compilers). The third digit represents the highest level in the ANSI standard.

The international standard for COBOL is ISO Recommendation Number 1989, which was approved by ISO (International Organization for Standardization) in 1972. System/3 model 15 COBOL bears the same relation to the ISO standard as to the ANSI standard, inasmuch as the two standards are identical in technical content.

Additions: In addition to the standard language, the following additional features are provided:

- Extensions to the modules of American National Standard COBOL listed above, comprising:
 - Certain language elements which are defined in higher levels of the American National Standard COBOL than those listed.
 - Certain language elements defined by the CODASYL Programming Language Committee but not yet included by ANSI in American National Standard COBOL.
 - IBM-developed extensions consistent with those supported by the System/360 and 370 OS and DOS ANS COBOL compilers and 1130 ANS COBOL compiler.
- ROLLOUT/ROLLIN support allows a COBOL object program to be interrupted during execution. This is provided by invocation of a supplied program via a CALL statement (CALL "CBROLL"). ROLLOUT/ROLLIN is not supported in 5704-CB2.
- The interval timer is supported for time-of-day functions. This is provided by invocation of a supplied (SCP) subroutine via a CALL 'CFTOD' statement.

Support of 3277 Display Station: A model 15 COBOL object program supports the 3277 as a destination device for the DISPLAY and ACCEPT commands. Record lengths of 1 to 120 characters may be processed by ACCEPT, and records of 1 to 107 characters may be processed by DISPLAY. The 78-key Operator Console Keyboard is used for data input.

Disk File Support: The access methods supported for 5444, 5445, 3340 and 3344 are the same as those supported by other System/3 COBOL compilers, and are as follows:

Sequential Organization

- Consecutive Processing - including updating in place.
- Random Processing - by relative record number including updating but excluding file loading.

Indexed Organization

- Random Processing - by key.
- Sequential Processing - by key including file loading.

Direct Organization

- Random Processing - by relative recording number, including updating and file loading.
- Consecutive Processing.

Standard System/3 disk labels are mandatory for all disk files. Non-standard labels cannot be used except for data records within the file.

Record size can range from 1 byte to 32K bytes, and records may be processed as blocked or unblocked. Logical records may span physical disk sectors, tracks or cylinders.

Multi-volume indexed files are supported.

Tape File Support: The access methods supported for the 3410/3411 Magnetic Tape Subsystem are the same as those supported by other System/3 COBOL compilers. COBOL object programs can process data on magnetic tape; highlights include:

- Consecutive input or output files
- 1 - 4 tape drives
- Fixed length records, blocked or unblocked
- Variable length records, blocked or unblocked
- Record size from 18 to 32,768 bytes
- Block size from 18 to 32,768 bytes
- IBM Standard Labels, ANSI labels, no labels
- Option for two I/O areas
- 9-track, 800/1600 bpi
- 7-track, 200/556/800 bpi
- Single volume or multi-volume files
- Single file or multi-file volumes
- Recording format: EBCDIC (7- or 9-track) or ASCII (9-track only)

Printer Support: COBOL supports the 1403 as follows: Space 0, 1, 2, or 3 before or after printing a line; skip to line number before or after printing a line; overflow detection.

COBOL supports the 3284 Printer the same way it does the 1403, except that space 0 after print is not allowed.

Card I/O Support: Model 15 COBOL supports the MFCU, MFCM, 1442, and 2501 as follows:

	MFCU	MFCM*	1442	2501
Read	Yes	Yes	Yes	Yes
Punch	Yes	Yes	Yes	No
Card Print	Yes	Yes	No	No
Stacker Select (punch only)	Yes	Yes	Yes	No
Associated file	Yes	Yes	No	No
Character set (EBCDIC)	64	256	256	256

* MFCM support is similar to MFCU support; six lines of card printing is possible on the MFCM (optional feature on model A1 only).

Diskette Support: Data can be read from a diskette using ACCEPT verb. In addition, for 5704-CB2 only, a directly-attached 3741 can be specified as an input or output device in the ASSIGN clause of the SELECT statement.

PROGRAM PRODUCTS

Subset ANS COBOL Compiler and Library (cont'd)

Model 15 COBOL Device Support

	Compilation	Execution
5444 Disk Storage Drive (5704-CB1 only) model A2 or A3	Yes	Yes
5445 Disk Storage (5704-CB1 only) model 1, 2 or 3	Yes	Yes
3340 Direct Access Storage Facility model A2, B1, or B2	Yes	Yes
3344 Direct Access Storage (5704-CB2 only) model B2	Yes	Yes
3410/3411 Magnetic Tape Unit model 1, 2, or 3	No	Yes
1403 Printer model 2, 5, or N1	Yes	Yes
3277 Display Station model 1	Yes*	Yes
5424 MFCU model A1 or A2	Yes	Yes
2560 MFCM model A1 or A2	Yes	Yes
1442 Card Read Punch model 6 or 7	Yes	Yes
2501 Card Reader model A1 or A2	Yes	Yes
3284 Printer model 1	Yes	Yes
1255 MCR model 1, 2 or 3	No	No
3881 OMR model 1	No	No
3741 (directly attached) model 1, 2, 3 or 4	Yes	Yes**
BSCA, 1 or 2 lines, LCA, or DA	No	No
Main Storage Requirements		
5704-CB1	12-48K	8-48K
5704-CB2	12-48K	8-56K***

* COBOL and system halts are logged on the 3277. Source statements may be entered from the keyboard.

** 5704-CB2 only. See "Diskette Support".

*** Object program size can be up to 56K, depending on the CCP, spool and configuration options selected during system generation.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: Same as for SCP (5704-SC1 for 5704-CB1; 5704-SC2 for 5704-CB2). For the IBM 1403 Printer, the HN print arrangement is recommended.

SOFTWARE REQUIREMENTS

5704-SC1 for 5704-CB1; 5704-SC2 for 5704-CB2.

COMPATIBILITY

- System/3 COBOL is upward compatible with the DOS and OS ANS COBOL compilers and is a superset of 1130 ANS COBOL providing growth from 1130 through System/3 to System/360 and 370. ROLLOUT support is unique to model 15 COBOL.
- Migration to and from System/3 COBOL requires little source program conversion to effect the transition. Certain 1130 library routines are not included in the System/3 COBOL library, i.e., CALLED subprograms.
- System/3 model 15 COBOL is source language compatible with COBOL on other System/3 models, except for differences due to different hardware. A COBOL source program can be recompiled by a model 15 COBOL compiler without changes to the source program (assuming the same I/O). The resulting object program can be executed under control of the appropriate model 15 SCP and will produce output identical to that on the previous system (assuming equivalent I/O devices and data).
- Any of the disk data files created by any System/3 program using disk system management (e.g., RPG II, Sort and COBOL) can be processed by any System/3 program which uses disk system management to access the file. Scratch files (RETAIN-S) created on other System/3 models are not accessible on the model 15. Files on magnetic tape are similarly compatible between the System/3 models, except only the model 15 supports multi-file tape volumes.

The directly-attached 3741 Data Station or Programmable Workstation is supported only in 5704-CB2.

DOCUMENTATION

(available from Mechanicsburg)

COBOL Reference Manual (GC28-6452) ... Disk Concepts and Planning Guide (GC21-7571). ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 15 DISK FORTRAN IV
5704-FO1; 5704-FO2**

PURPOSE

Model 15 FORTRAN IV is a program product that operates under control of the IBM System/3 model 15 SCP. 5704-FO1 is used with SCP 5704-SC1; 5704-FO2 is used with SCP 5704-SC2. The compiler and library are disk resident on the IBM 5444 Disk Storage Drive or the IBM 3340 Direct Access Storage Facility or IBM 3344 Direct Access Storage (5704-FO2 only). The compiler requires as input a FORTRAN source language program and produces as output, by means of the system's Overlay Linkage Editor, a System/3 machine language object program, either cataloged in an object library or punched into 80- or 96-column cards or written onto a diskette. A source program listing, diagnostic messages and main storage map can be requested.

DESCRIPTION

Source input to the compiler can be from the system input device (card reader, 3741 directly attached, or 3277 keyboard) or from the source library. Work files for the compiler can be on any 5444 or 5445 Disk Storage Drive or on 3340 Direct Access Storage Facility or on the 3344 Direct Access Storage. The Overlay Linkage Editor is used to generate object programs.

The model 15 FORTRAN IV language is identical to the FORTRAN IV language for other System/3 models. It contains those features defined in American National Standard Basic FORTRAN, X3.10-1966 and additional language features and capabilities previously available only with certain IBM Full FORTRAN IV Compilers.

The model 15 FORTRAN IV Library contains mathematical and service subroutines required during execution to perform arithmetic operations, input and output conversion, and input and output control.

The model 15 FORTRAN IV Library also includes a Commercial Subroutine Package which is equivalent in function to the 1130 Commercial Subroutine Package insofar as is meaningful in terms of System/3 model 15 devices and data management.

The interval timer is supported for time-of-day functions. This is provided by a supplied SCP subroutine, CFTOD.

Support of 3277 Display Station: A model 15 FORTRAN object program can support the 3277 in either a split-screen or full-screen mode. Using a split-screen, an input file (up to 125 bytes) and/or an output file (up to 125 bytes) can be specified. In full-screen mode, 279 bytes can be read or written. The Operator Console Keyboard is used for data input.

Disk File Support: The access methods supported for 5444, 5445, 3340 and 3344 are the same as those supported by FORTRAN on other System/3 models, and are as follows:

Sequential I/O

Consecutive processing of formatted or unformatted records is supported. Record size of formatted records can range from 1 to 256 bytes. Record size of unformatted records can range from 1 to 32,767 bytes.

Direct Access I/O

Random processing is by relative record number; consecutive processing can also be performed. Record size can range from 1 to 32,767 bytes, formatted or unformatted.

Standard System/3 disk labels are mandatory for all disk files. Non-standard labels cannot be used except as data records within the file.

Indexed files are not supported.

Tape File Support: The access methods supported for the 3410/3411 Magnetic Tape Subsystem are the same as those supported by FORTRAN for other System/3 models. FORTRAN object programs can process data on magnetic tape; highlights include:

- Consecutive input or output files
- 1 - 4 tape drives
- Formatted or unformatted records
- Record size from 18 to 32,767 bytes
- Block size from 18 to 32,767 bytes
- IBM Standard Labels, ANSI Labels, no labels
- 9-track, 800/1600 bpi
- 7-track, 200/556/800 bpi
- Single volume or multi-volume files
- Single file or multi-file volumes
- Recording format: EBCDIC (7- or 9-track) or ASCII (9-track only)

Printer Support: The FORTRAN language supports the 1403 as follows: Space 0, 1, or 2 before or after printing a line ... skip to line 1 before or after printing a line ... overflow detection. Commercial Subroutines support the 1403 as follows: Space immediately 0, 1, 2, or 3 lines ... skip immediately to a specified line number.

FORTRAN supports the 3284 Printer the same way it does the 1403, except that space 0 after print is not allowed.

Card I/O Support: The model 15 FORTRAN supports the MFCU, MFCM, 1442, and 2501 as follows:

	MFCU	MFCM*	1442	2501
Read	Yes	Yes	Yes	Yes
Punch	Yes	Yes	Yes	No
Card Print	Yes	Yes	No	No
Stacker Select**	No	No	No	No
Combined File***	No	No	No	No
Character set (EBCDIC)	64	256	256	256

* MFCM support is similar to MFCU support; six lines of card printing is possible on the MFCM (optional feature on model A1 only).

** Commercial Subroutines support stacker selection of cards from the secondary hopper of the MFCU or MFCM.

*** When using the Commercial Subroutines, the MFCU2, MFCM2, or 1442 may be defined as both input and output.

Diskette Support: 5704-FO1 supports the 3741 directly attached as an input or output device for compilation only. 5704-FO2, in addition to compilation, supports the 3741 as an input/output device during object program execution.

Model 15 FORTRAN Device Support

	Compilation	Execution
5444 Disk Storage Drive (5704-FO1 only) model A2 or A3	Yes	Yes
5445 Disk Storage (5704-FO1 only) model 1, 2 or 3	Yes	Yes
3340 Direct Access Storage Facility model A2, B1, or B2	Yes	Yes
3344 Direct Access Storage (5704-FO2 only) model B2	Yes	Yes
3410/3411 Magnetic Tape Unit model 1, 2, or 3	No	Yes
1403 Printer model 2, 5, or N1	Yes	Yes
3277 Display Station model 1	Yes*	Yes
5424 MFCU model A1 or A2	Yes	Yes
2560 MFCM model A1 or A2	Yes	Yes
1442 Card Read Punch model 6 or 7	Yes	Yes
2501 Card Reader model A1 or A2	Yes	Yes
3284 Printer model 1	Yes	Yes
1255 MCR model 1, 2 or 3	No	No
3881 OMR model 1	No	No
3741 (directly attached) model 1, 2, 3, or 4	Yes	Yes***
BSCA, 1 or 2 lines, LCA or DA	No	No
Main Storage Requirements 5704-FO1	10-48K	8-48K
5704-FO2	10-48K	8-56K**

* FORTRAN and system halts are logged on the 3277. Source statements may be entered from the keyboard.

** Object program size can be up to 56K, depending on the CCP, spool and configuration options selected during system generation.

*** 5704-FO2 only; see "Diskette Support".

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: Same as for SCP (5704-SC1 for 5704-FO1; 5704-SC2 for 5704-FO2).

SOFTWARE REQUIREMENTS

5704-SC1 for 5704-FO1; 5704-SC2 for 5704-FO2.

COMPATIBILITY

System/3 Model 15 FORTRAN IV is source language compatible with FORTRAN IV on other System/3 models. A FORTRAN IV source program can be recompiled by a model 15 FORTRAN IV compiler without changes to the source program (assuming the same I/O). The resulting object program can be executed under control of the appropriate model 15 SCP and will produce output identical to that on the previous system (assuming equivalent I/O devices and data).

The FORTRAN IV compiler accepts source programs written in the IBM System/360 Basic FORTRAN IV language, which encompasses American National Standard Basic FORTRAN as defined in X3.10-1966. The compiler also accepts source programs written in the IBM 1130 Basic FORTRAN IV language with minor modifications.



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PROGRAM PRODUCTS

System/3 Mdl 15 Disk FORTRAN IV (cont'd)

DOCUMENTATION

(available from Mechanicsburg)

FORTRAN IV Reference Manual (SC28-6874) ... FORTRAN IV Commercial Subroutines (SC28-6875) ... Disk Concepts and Planning Guide (GC21-7571) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 15 RPG II
5704-RG1; 5704-RG2**

PURPOSE

Model 15 RPG II is a program product that operates under control of the System/3 model 15 System Control Programming. 5704-RG1 is used with SCP 5704-SC1, and 5704-RG2 is used with SCP 5704-SC2. RPG II is disk resident on the 5444 Disk Storage Drive or 3340 Direct Access Storage Facility or 3344 Direct Access Storage (5704-RG2 only). It requires as input an RPG II source language program and produces as output a System/3 model 15 machine language object program, either cataloged in an object library or punched into 80- or 96-column cards, or written onto a diskette. A source program listing, diagnostic messages, and a main storage map can be requested.

DESCRIPTION

To use the RPG II compiler, the user supplies information about the job to be processed. The job can be described on specification sheets prior to entering the source statements into the system. The specification sheets are: Auto-Report, Control Card and File Description, Extension and Line Counter, Telecommunications, Input, Calculation and Output-Format.

Source input to the compiler can be from the system input device (card reader, 3741 directly attached, or 3277 keyboard) or from a source library. Work files for the compiler can be on either a 5444 or 5445 Disk Storage Drive, or on a 3340 Direct Access Storage Facility or 3344 Direct Access Storage (5704-RG2 only). The Overlay Linkage Editor, invoked by the compiler, is used to generate overlays, executable object programs, etc. (On other System/3 models, RPG II uses its own linkage editor rather than the system's Overlay Linkage Editor.) The user can request non-link-edited output from the model 15 RPG II compiler, allowing modification of the control statements prior to the execution of the Overlay Linkage Editor.

In addition to the functions provided by S/3 model 10 Disk RPG II, model 15 RPG II provides the following capabilities:

- Model 15 RPG II includes the following support that is available as separate features in some of the other System/3 models: Telecommunications, Auto-Report, 5445 and Tape support.
- Support of 3340 Direct Access Storage Facility, 2560 MFCM, 2501 Card Reader, 3284 Printer, 1255 Magnetic Character Reader, and 3277 Display Station (with operator console keyboard).
- Support of 3344 Direct Access Storage (5704-RG2 only).
- Support of interval timer for time-of-day function.
- Device Independent Data Management - a sequential file is defined whose assignment to a device can be specified by an OCL FILE statement when the object program is executed. The sequential file can be input (2501, 1442, MFCU, MFCM, 3741 directly attached, 5444, 5445, 3340, 3344 or 3410/3411) or output (1403, 3284, 1442, MFCU, 3741 directly attached, MFCM, 5444, 5445, 3340, 3344 or 3410/3411) but not update, add or combined. Specifications unique to a particular device, such as space, skip, and stacker select are not allowed for this kind of file.
- Additional index space - for 5444, 5445, 3340 or 3344 indexed files, an optional File Description Specification entry, INDEX, permits additional main storage to be used to accommodate more sectors of file index. This is advantageous when sequentially processing indexed files.

Note: 5704-RG2 supports an 'external buffers' option and does not support B-type inquiry programs.

Auto-Report: RPG II Auto-Report enhances the RPG II language by providing functions which eliminate much of the preparation and coding work normally done by the user. It is specifically designed to facilitate report preparation.

Auto-Report executes as a preprocessor to the RPG II Compiler. The input is RPG II source statements and Auto-Report statements. Auto-Report produces a diagnostic listing, replaces the Auto-Report statements with generated or copied RPG II source statements and calls the RPG II compiler for execution.

Support of 3277 Display Station: The 3277 is an integral part of the system and is used as the system console. A model 15 RPG II object program can access the 3277 as an input file (up to 120 bytes), as an output file (up to 120 bytes), as an update file (up to 279 bytes), or as a display file (up to 35 bytes). The 78-key Operator Console Keyboard is used for data input. The program function keys 1-9 can be tested by means of a supplied subroutine, SUBR89.

Disk File Support: The access methods supported for 5444, 5445, 3340 and 3344 are the same as those supported by other System/3 RPG II compilers, and are as follows:

Sequential Organization

- Consecutive Processing - including updating in place.
- Random Processing - by relative record number including updating

but excluding file loading.

Indexed Organization

- Random processing - by key.
- Sequential processing - by key including file loading.

Direct Organization

- Random Processing - by relative record number, including updating and file loading.
- Consecutive Processing

Standard System/3 disk labels are mandatory for all disk files. Non-standard labels cannot be used except as data records within the file.

Record size can range from 1 to 9,999 bytes, and records can be processed as blocked or unblocked. Logical records may span physical disk sectors, tracks or cylinders.

Tape File Support: The access methods supported for the 3410/3411 Magnetic Tape Subsystem are the same as those supported by other System/3 RPG II compilers. RPG II object programs can process data or record address files on magnetic tape. Highlights of tape support include:

- Consecutive input or output files
- 1 - 4 tape drives
- Fixed length records, blocked or unblocked
- Variable length records, blocked or unblocked
- Record size from 18 to 9,999 bytes
- Block size from 18 to 9,999 bytes
- IBM Standard Labels, ANSI Labels, no labels
- Option for two I/O areas
- 9-track, 800/1600 bpi
- 7-track, 200/556/800 bpi
- Single volume or multi-volume files
- Single file or multi-file volumes
- Recording format: EBCDIC or ASCII
- Program options to Rewind or Rewind/Unload at end of job.

Printer Support: RPG II supports the 1403 Printer as follows: Space 0, 1, 2, or 3 before or after printing a line; skip to line number before or after printing a line; overflow detection; first page forms alignment.

RPG II supports the 3284 Printer the same way it does the 1403, except that space 0 after print is not allowed.

Card I/O Support: RPG II supports the MFCU, MFCM, 1442, and 2501 as follows:

	MFCU	MFCM	1442	2501
Read	Yes	Yes	Yes	Yes
Punch	Yes	Yes	Yes	No
Card Print	Yes	Yes	No	No
Stacker Select	Yes	Yes	Yes	No
Combined File	Yes	Yes	Yes	No
Character set (EBCDIC)	64	256	256	256

RPG II support of the MFCM is identical to the System/360 model 20 RPG support, except for certain situations involving stacker selection and combined files.

Card input or output files for which stacker selection is not specified may be double buffered.

Diskette Support: RPG II supports the 3741 directly attached as an input or output device through device independent data management or standard data management.

Telecommunications Support: The first and/or second Binary Synchronous Communications Adapter (BSCA) and the Local Communications Adapter are supported through the use of the RPG II Telecommunications Specifications and the addition of BSCA as a device entry on the RPG II File Description Specification. (The Display Adapter and the BSCC are not supported by the RPG II Telecommunications support.) The support is identical to that provided by other System/3 Telecommunications features, and it includes:

- Modes: Receive only ... Receive with conversational reply*** ... Transmit only ... Transmit with conversational reply*** ... Alternate transmit and receive file.***
- *** Not supported in communication with 2770 and 2780, 6670 (as a 2770).

RPG II language features supported: Input, Output and Combined files ... demand files for Transmit and Receive ... Blocking and deblocking of records ... Dual I/O areas.

BSCA features, options, and capabilities supported: Manual call ... manual answer ... Auto-call ... Auto-answer ... Medium Speed ... High Speed ... Station Selection ... EBCDIC data transparency ... intermediate block checking ... EBCDIC or ASCII data and data link control characters. File translation of ASCII data can be accomplished by proper use of the file translation facility of RPG II.

System/3 Model 15 RPG II (cont'd)

For additional information, see the description of the model 10 Disk RPG II Telecommunications feature (5702-RG1, feature #6000/#6002).

Communication with the 5231 model 2 is in Receive mode only. The 5231 model 2 is supported as a 3741 model 2 or 4.

System/3 Model 15 RPG II Device Support

	Compilation	Execution
5444 Disk Storage Drive (5704-RG1 only) model A2 or A3	Yes	Yes
5445 Disk Storage (5704-RG1 only) model 1, 2 or 3	Yes	Yes
3340 Direct Access Storage Facility model A2,B1, or B2	Yes	Yes
3344 Direct Access Storage (5704-RG2 only) model B2	Yes	Yes
3410/3411 Magnetic Tape Unit model 1, 2, or 3	No	Yes
1403 Printer model 2, 5, or N1	Yes	Yes
3277 Display Station model 1	Yes*	Yes
5424 MFCU model A1 or A2	Yes	Yes
2560 MFCM model A1 or A2	Yes	Yes
1442 Card Read Punch model 6 or 7	Yes	Yes
2501 Card Reader model A1 or A2	Yes	Yes
3284 Printer model 1	Yes	Yes
1255 MCR model 1, 2 or 3	No	Yes****
3881 OMR model 1	No	Yes****
3741 (directly attached) model 1, 2, 3 or 4	Yes	Yes
BSCA, 1 or 2 lines, LCA, or DA	No	Yes**
Main Storage Requirements 5704-RG1	10-48K	8-48K***
5704-RG2	10-48K	8-56K*****

* RPG II and system halts are logged on the 3277. Source statements may be entered from the keyboard.

** For a list of terminals supported, see the model 5 SCP pages.

*** When a program generates object code that exceeds the partition size as specified, overlays will be generated to fit. Not all programs - even with overlays - can fit into the stated partition size.

**** Requires SCP subroutine; RPG II SPECIAL exit is used.

***** The discussion of overlays above (***) also applies to 5704-RG2. In addition, object program size can be up to 56K, depending on the CCP, spool and configuration options selected during system generation.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: Same as for model 15 SCP (5704-SC1 for 5704-RG1; 5704-SC2 for 5704-RG2).

SOFTWARE REQUIREMENTS

5704-SC1 for 5704-RG1; 5704-SC2 for 5704-RG2.

COMPATIBILITY

Programs: System/3 model 15 RPG II is source language compatible with RPG II on other System/3 models, except for differences due to different hardware. An RPG II source program can be recompiled by a model 15 RPG II compiler, without changes to the source program (assuming the same I/O). The resulting object program can be executed under control of the appropriate model 15 SCP and will produce output identical to that on the previous system (assuming equivalent I/O devices and data). The System/3 inline inquiry subroutine (SUBR95) is not supported by model 15 RPG II, but the program function keys 1-9 can be tested by using a different subroutine, SUBR89.

Data: Any of the disk data files created by any System/3 program using disk system management (e.g., RPG II, Sort, and COBOL) can be processed by any System/3 program which uses disk system management to access the file. Scratch files (RETAIN-S) created on other System/3 models are not accessible on the model 15. Files on magnetic tape are similarly compatible between System 3 models, except only the model 15 supports multifile tape volumes.

DOCUMENTATION

(available from Mechanicsburg)

Introduction to RPG II (GC21-7514) ... RPG II Reference Manual (SC21-7504) ... RPG II Additional Topics Programmer's Guide (GC21-7567) ... RPG II Disk File Processing Programmer's Guide (GC21-7566) ... RPG II Auto-Report General Information (GC21-7563) ... Auto-Report Reference Manual (SC21-5057) ... RPG II Telecommunications Programming Reference Manual (SC21-7507) ... Disk Concepts and Planning Guide (GC21-7571). ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

RPG II 3270 DISPLAY CONTROL FEATURE

Feature #6005/#6006

PURPOSE

The RPG II 3270 Display Control feature provides telecommunications services for local or remote 3270 devices. The program can be automatically linked into the RPG II application program via the SPECIAL file exit capability on the RPG II File Description Specification Sheet. Neither the Assembler nor the RPG II Telecommunications feature is required.

DESCRIPTION

The following services are provided by the 3270 Display Control Feature:

- RPG II access to 3270 Display System Terminals attached via the Display Adapter (DA), the Local Communications Adapter (LCA), or the Binary Synchronous Communications Adapter (BSCA).
- Automatic buffering and queuing of terminal data
- A display formatting interface which permits the support of 3270 devices with coding in RPG II
- Complete line control procedures are provided
- Up to 18 terminals may be supported
- Provides the capability of coding one or more applications within one program. No task switching is provided.
- Two subroutines are provided. SUBR13 allows an RPG II program to support 3270s without using CCP. SUBR14 provides upward compatibility with CCP, requiring only program recompilation, assuming the RPG II program meets the CCP requirements.

Terminals Supported

The following terminals and communications facilities are supported under the RPG II 3270 Display Control Feature:

With the Display Adapter

- 3277 Display Station (model 1 or 2)
- 3284 Printer (model 1 or 2)
- 3286 Printer (model 1 or 2)
- 3288 Line Printer (model 2)

With the Local Communications Adapter (LCA) or Binary Synchronous Communications Adapter (BSCA)

- 3275 Display Station and Control, or
- 3271 Display Control Unit (model 1 or 2), with:

- 3277 Display Station (model 1 or 2)
- 3284 Printer (model 1 or 2)
- 3286 Printer (model 1 or 2)
- 3288 Line Printer (model 2)

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Note: The RPG II 3270 Display Control feature is not supported under SCP 5704-SC2 (model 15D).

Minimum System Requirements: In addition to the minimum system requirements of the SCP (5704-SC1), the RPG II 3270 Display Control feature requires one of the following: Display Adapter (DA), the Local Communications Adapter (LCA), or the Binary Synchronous Communications Adapter (BSCA), plus one of the devices listed under "Terminals Supported".

Using SUBR13, approximately 10K-12K bytes are added to the size of the object program. Using SUBR14, approximately 4.3K bytes are added to the size of the object program.

SOFTWARE REQUIREMENTS

5704-SC1; 5704-RG1



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PP 5704-RG1.3
Mar 83
Major Revision

PROGRAM PRODUCTS

System/3 Model 15 RPG II (cont'd)

COMPATIBILITY

The RPG II 3270 Display Control Feature is functionally compatible with the System/3 model 8/10 and System/3 model 12 RPG II 3270 Display Control feature.

DOCUMENTATION

(available from Mechanicsburg)

System/3 RPG II 3270 Display Control Feature Reference and Logic Manual (SC21-5161) ... System/3 Bibliography (GC20-8080).



PROGRAM PRODUCTS

**SYSTEM/3 MODEL 15 DISK SORT
5704-SM1; 5704-SM9****PURPOSE**

The IBM System/3 model 15 Disk Sort program is a program product that sorts a file into ascending or descending sequence. It is resident on an IBM 5444 Disk Storage Drive or an IBM 3340 Direct Access Storage Facility or IBM 3344 Direct Access Storage (5704-SM9 only). 5704-SM1 is used with SCP 5704-SC1, and 5704-SM9 is used with SCP 5704-SC2.

DESCRIPTION

Input file: From 1 to 8 files may be input to the Disk Sort Program. These files may be on 5444 or 5445 Disk Storage drives, 3340 Direct Access Storage Facility, 3344 Direct Access Storage, 3410/3411 Magnetic Tape Subsystem, card reader, or 3741 directly attached. A disk input file can have sequential, indexed or direct organization. For a disk file, the input record size can be from 1 to 9,999 bytes. A tape input file can have fixed length records, either blocked or unblocked; variable length tape records are not supported. The maximum input tape record or block size is 9,999 bytes, and the minimum is 18 bytes. Input tape files can be 9-track 800/1600 bpi or 7-track 200/556/800 bpi. The tape file can be recorded in either EBCDIC or ASCII code. Input can be either a single volume file or a multi-volume file. For a diskette input file, the record size can be only 96 bytes.

Work file: A work file can be resident on a 5444 or 5445 Disk Storage Drive, or on a 3340 Direct Access Storage Facility or 3344 Direct Access Storage. Work space can be specified by the user or can be automatically allocated by the program. Directed auto-allocate references to units D3 or D4 on the 3344 Direct Access Storage is interpreted to mean any of the four logical volumes on the drive.

Output file: The output file can be resident on a 5444 or 5445 Disk Storage Drive, or on a 3340 Direct Access Storage Facility or on 3344 Direct Access Storage, or on a unit of the 3410/3411 Magnetic Tape Subsystem. A disk output file can have sequential organization only. Characteristics of tape output files are the same as for tape input files, described above. The maximum output record size for disk or tape is 4,096 bytes. Output of the program will be in one of three formats: Tag (ADDROUT), tag-along, or summary tag-along.

Features

- Records can be selected or omitted, and reformatted.
- Specified records may be forced ahead of others.
- An alternate collating sequence can be specified.
- Control fields can be in different locations in the records.
- The total length of the control fields can be from 1 to 256 bytes; there is no other limit on the number of control fields.
- Control fields can be sorted in ascending or descending sequence, or mixed (some ascending and some descending).
- Control fields can be sorted using only the digit or zone portion of the character. The fields can be packed or unpacked decimal, or character formats.
- Records containing identical control fields can be combined by summarizing specified fields into one record.

Use: Specifications are described on a simple, RPG-like coding sheet. These specifications are entered into the system using the system input device (card reader, 3741 directly attached, or 3277 keyboard), or they can be stored in the source library on disk. Sort control card diagnostics and messages may be displayed on the system logging device (CRT, 1403 or 3284). The program can be executed in a multi-programming environment and requires from 8K to 48K bytes of main storage, exclusive of SCP requirements.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: Same as for SCP (5704-SC1 for 5704-SM1; 5704-SC2 for 5704-SM9).

SOFTWARE REQUIREMENTS

5704-SC1 for 5704-SM1; 5704-SC2 for 5704-SM9.

COMPATIBILITY

The System/3 model 15 Disk Sort program is compatible with the Disk Sort programs used on other System/3 models.

DOCUMENTATION

(available from Mechanicsburg)

Disk Sort Reference Manual (SC21-7522). ... *System/3 Bibliography* (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 15 MAGNETIC TAPE SORT
5704-SM2; 5704-SM8****PURPOSE**

The IBM System/3 model 15 Magnetic Tape Sort Program is a program product that sorts a tape file into ascending or descending sequence. It is resident on an IBM 5444 Disk Storage Drive or an IBM 3340 Direct Access Storage Facility or IBM 3344 Direct Access Storage (5704-SM8 only). 5704-SM2 is used with SCP 5704-SC1, and 5704-SM8 is used with SCP 5704-SC2. A configuration that includes three or four tape units is required.

Input file: The input file resides on any unit of the 3410/3411 Magnetic Tape Subsystem. The input file can have fixed length records, either blocked or unblocked. (Variable length records are not supported). The maximum input record or block size is 9,999 bytes. The minimum input record or block size is 18 bytes. Input tape files can be 9-track 800/1600 bpi or 7-track 200/556/800 bpi. The file can be recorded in either EBCDIC (7- or 9-track) or ASCII (9-track only) code. Input can be either a single volume file or a multi-volume file.

Work files: Three work tapes are required: A fourth can be utilized, if available. Work tapes can be either 7- or 9-track (see restrictions below). Work tapes must be single volume only (not multi-volume).

Output file: The output file resides on any unit of the 3410/3411 Magnetic Tape Subsystem. Characteristics of tape output files are the same as for tape input files, described above. Output is a file of records containing the sort control fields and/or the data fields the user has specified. (The tag (ADDRROUT) and summary tag-along sort capabilities of the Disk Sort are not supported in the Tape Sort.)

Restrictions: To utilize all of the functions of this program, at least three 9-track work tapes must be available. If one or more of the work tapes is 7-track, then only those sort functions that relate to the standard System/3 64-character set (EBCDIC) are supported. As a result, sorts of binary data, packed or unpacked decimal data or sorts on zones are not allowed in these 7-track configurations.

Features

- Records can be selected or omitted, and reformatted.
- Specified records may be forced ahead of others.
- An alternate collating sequence can be specified.
- A checkpoint/restart facility is supported.
- Control fields can be in different locations in the records.
- The total length of the control fields can be from 1 to 256 bytes; there is no other limit on the number of control fields.
- Control fields can be sorted using only the digit or zone portion of the character. The fields can be packed or unpacked decimal, or character formats.
- Control fields can be sorted in ascending or descending sequence, or mixed (some ascending and some descending).

Use: Specifications are described on a simple, RPG-like coding sheet. These specifications are entered into the system using the system input device (card reader, 3741 directly attached, or 3277 keyboard), or they can be stored in the source library on disk. Sort control card diagnostics and messages may be displayed on the system logging device (CRT, 1403 or 3284). The program can be executed in a multiprogramming environment and requires 8K to 48K bytes of main storage, exclusive of SCP requirements.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: Same as for SCP (5704-SC1 for 5704-SM2; 5704-SC2 for 5704-SM8). In addition, at least three tape drives of the 3410/3411 Magnetic Tape Subsystem are required.

SOFTWARE REQUIREMENTS

5704-SC1 for 5704-SM2; 5704-SC2 for 5704-SM8.

COMPATIBILITY

The model 15 Magnetic Tape Sort Program is functionally compatible with the Disk Resident Magnetic Sort Programs for other System/3 models.

DOCUMENTATION
(available from Mechanicsburg)

Tape Sort Reference Manual (SC21-7572). ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index



PROGRAM PRODUCTS

**SYSTEM/3 MODEL 15 CCP/DISK SORT
5704-SM7**

PURPOSE

The IBM System/3 model 15 CCP/Disk Sort program is a program product that is used to sort a file into ascending or descending sequence. It is resident on an IBM 3340 Direct Access Storage Facility or IBM 3344 Direct Access Storage. 5704-SM7 is used with SCP 5704-SC2.

With the CCP/Disk Sort program, the user can generate an object module which can be executed as a task under control of the Communications Control Program (CCP) (5704-SC2, feature #6011/#6012), or as a program under control of the SCP in a non-CCP partition.

All Disk Sort functions are available in the CCP/Disk Sort program, including tag, tag-along and summary tag-along sorts, with the following exceptions or requirements:

- For generation, only 12K bytes of main storage is used.
- For the size of the generated program, 12K to 48K can be. However, CCP does not allow a program greater than 32K.
- Only disk input files can be specified. (From 1 to 8 input files may be used.)
- Deferred mount of the output file is not supported, and the output file cannot be written over the input file.
- Automatic work file allocation is not supported.
- Work record lengths cannot be less than 3 bytes.

Use: To use this program, two steps are necessary:

- **Generation:** Using information from OCL FILE statements (for input, work and output files) and sort specifications, this program generates an object module which is cataloged into the object library. Generation is done in a non-CCP partition.
- **Execution:** The CCP system or terminal operator calls the generated object program by entering the name of the program, similar to calling any other program under CCP control. A generated program can be loaded in a batch partition by the system operator.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: Same as for SCP (5704-SC2).

SOFTWARE REQUIREMENTS

5704-SC2.

DOCUMENTATION

(available from Mechanicsburg)

Disk Sort Reference Manual (SC21-7522) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 15
DISK RESIDENT CARD UTILITIES
5704-UT1; 5704-UT3**

PURPOSE

This IBM System/3 program product is resident on an IBM 5444 Disk Storage Drive or an IBM 3340 Direct Access Storage Facility or IBM 3344 Direct Access Storage (5704-UT3 only). 5704-UT1 is used with SCP 5704-SC1 and 5704-UT3 is used with SCP 5704-SC2. It provides the following programs that support 80- or 96-column card files: Sort/Collate, List, Reproduce/Interpret, and Gangpunch. (The following programs are not provided in 5704-UT1 or 5704-UT3 but are available in the model 10 Utilities, 5701-UT1 and 5702-UT1: Data Recording, Data Verifying and 80-96 Conversion Program.)

DOCUMENTATION
(available from Mechanicsburg)

Sort/Collate and Card Utilities Reference Manual (SC21-7529) ... S/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index.

DESCRIPTION

Sort/Collate Program - Functionally identical to the model 10 Sort/Collate Program (see 5701-UT1), the model 15 program also supports the 2560 MFCM.

List Program - Functionally identical to the model 10 96-column List Program (see 5701-UT1), the model 15 program supports input from 5424 MFCU, 2560 MFCM, 1442 Card Read Punch, or 2501 Card Reader. Printed output is directed to the 1403 or 3284 Printer.

Reproduce/Interpret Program - Functionally identical to the model 10 Reproduce/Interpret Program (see 5701-UT1), the model 15 program supports:

- MFCU-1 input and MFCU-2 output, or
- MFCM-1 input and MFCM-2 output, or
- 2501 input and 1442 output.

Gangpunch Program - The model 15 Gangpunch Program provides the following capabilities:

- Interspersed master-card gangpunching: The master and detail cards are intermixed in the primary file.
- Count-controlled gangpunching: A fixed or variable counter may be used to punch a specified number of detail cards. The master card is in the secondary file and the detail cards are in the primary file.
- Match master cards and detail cards on a control field and punch into the detail card if a match occurs: The master card is in the secondary file and the detail card is in the primary file.
- The following functions may be performed with any of the major types of gangpunching described above: Offset gangpunching ... gangpunching consecutive numbers into detail cards ... gangpunching a constant into detail cards ... card interpretation (entire card or only what is punched) ... selection of a single type of master card from many master cards ... selection of a single type of detail card from many detail cards.

The Gangpunch Program supports the following devices:

- For count-controlled and match fields processing
 - MFCU2 input and MFCU1 output, or
 - MFCM2 input and MFCM1 output, or
 - 2501 input and 1442 output.
- For interspersed processing
 - MFCU1 input and output, or
 - MFCM1 input and output, or
 - 1442 input and output.

Use: The programs described above can be executed in a multiprogramming environment and require main storage, exclusive of SCP requirements, as follows: (Note: The minimum partition size is 8K.)

Sort/Collate	8K*
List Program	3K
Reproduce/Interpret	6K
Gangpunch	6K

Additional main storage is used, if available.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: Same as for SCP (5704-SC1 for 5704-UT1; 5704-SC2 for 5704-UT3). The devices required for the particular program (described above) must be available.

SOFTWARE REQUIREMENTS

5704-SC1 for 5704-UT1; 5704-SC2 for 5704-UT3.

COMPATIBILITY

The model 15 Disk Resident Card Utilities that have model 10 equivalents are functionally compatible to the model 10 versions. Operation of the programs is different due to the model 15 system/operator interface.



PROGRAM PRODUCTS

SYSTEM/3 MODEL 12 BASIC ASSEMBLER
5705-AS1

PURPOSE

The IBM System/3 model 12 Basic Assembler program is a program product that processes source programs written in the Basic Assembler language and produces executable object programs. The program is disk resident in a simulation area on the 3340 Direct Access Storage Facility (DASF) and operates under control of the model 12 SCP.

The Basic Assembler language is a symbolic programming language used to write programs. Some of the features provided by the program and its language are:

- Mnemonic Operation Codes
- Symbolic Referencing of Storage Addresses
- Automatic Storage Assignment
- Address Displacement Calculation
- Convenient Data Representation
- Operand Field Expressions
- Source Identification--Sequence Fields
- Assembler Instructions
- Source Program Listing
- Cross-Reference Listing
- Error Checking and Diagnostic Messages

The Basic Assembler can be used to create a stand-alone program. The object program is punched into cards. Program loading is performed with an initial program loader through the 5424 MFCU or the 1442 Card Read Punch. Stand-alone programs are coded entirely by the user with no dependence on other programming support.

The Basic Assembler may also be used for assembly of relocatable subroutines for use with model 12 RPG II, COBOL, or FORTRAN. The subroutines, written in the Basic Assembler language, are coded by the user and separately assembled. The process of program linking is accomplished during compilation of the RPG II source program or by means of the Overlay Linkage Editor, in the case of COBOL or FORTRAN.

Source input into the Assembler can be from the system input device (card reader, 3741 directly attached, or 5471 keyboard), from a source library, or from a source file generated by the Macro Processor. Work files for the Assembler are on the simulation area of a 3340. The Overlay Linkage Editor is used to generate executable object programs.

Model 12 Basic Assembler Device Support

	Source Assembly	Object Execution
3340 Direct Access Storage Facility model C2	Yes	Yes
3410/3411 Magnetic Tape Unit, model 1, 2 or 3	No	Yes
5203 Printer, model 1, 2 or 3	Yes	Yes
1403 Printer, model 2, 5 or N1	Yes	Yes
5424 MFCU, model A1 or A2	Yes	Yes
1442 Card Read Punch, model 6 or 7	Yes	Yes
5471 Printer-Keyboard, model 1	Yes	Yes
1255 MCR, model 1, 2 or 3	No	Yes
3881 OMR, model 1	No	Yes
3741 Data Station/Programmable Workstation, model 1, 2, 3 or 4 (directly attached)	Yes	Yes
BSCA, 1 or 2 lines, ICA, or Local Display Adapter	No	Yes
Main Storage Requirements Program Level Size)	10-56K*	Up to 64K*

* The maximum program level is 64K less supervisor requirements.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: An IBM System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K) ... and an IBM 5424 MFCU or an IBM 1442 Card Read Punch or an IBM directly-attached 3741 Data Station/Programmable Workstation ... and an IBM 5203 or 1403 Printer* ... and an IBM 3340 DASF.

* Note: The 5203 or 1403 printer should be equipped with the Universal Character Set feature and a PN (60-character set) print chain/train arrangement. A 48-character set (for example, HN or LC arrangement) can be used with the Assembler; however, the user must be willing to accept substitute characters.

SOFTWARE REQUIREMENTS

5705-SC1.

COMPATIBILITY

The model 12 Basic Assembler program is source language compatible with the model 10 Basic Assembler program. Macro instructions used in model 10 programs (model 10 Macros feature of the SCP) may have to be changed before re-assembling with the model 12 Assembler.

DOCUMENTATION

(available from Mechanicsburg)

System/3 Basic Assembler Reference Manual (SC21-7509) ...
System/3 Basic Assembler Program Product Specifications (GC21-5079) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

PROGRAM PRODUCTS

**SYSTEM/3 MODEL 12 SUBSET
ANS COBOL COMPILER AND LIBRARY
5705-CB1)**

PURPOSE

IBM System/3 model 12 COBOL is a program product that operates under control of the System/3 model 12 System Control Programming. The compiler and library are disk resident in a simulation area on the 3340 Direct Access Storage Facility (DASF). The compiler requires as input a COBOL source language program and produces as output, by means of the System/3 Overlay Linkage Editor, a System/3 machine language object program, either cataloged in an object library, punched into 80- or 96-column cards, or written onto a diskette. A source program listing, diagnostic messages and a main storage map can be requested.

DESCRIPTION

System/3 COBOL supports Grade 1 Braille for both compiler listings and object program printed output. Minimum requirements include a 132-position printer (5203 or 1403) with 8 lines/inch spacing. A user-provided elastic strip is attached over the printer hammers to produce the Braille characters. The compiler requires a 14K program level in order to produce Braille listings.

Source input to the compiler can be from the system input device (card reader, 3741 directly attached, or 5471 keyboard) or from a source library. Work files for the compiler are in a simulation area of a 3340 Direct Access Storage Facility. The Overlay Linkage Editor is used to generate object programs.

American National Standard COBOL Considerations: The U.S. Industry standard for COBOL is American National Standard COBOL, X3.23-1968, which was approved by the American National Standards Institute (ANSI) on August 23, 1968. The following functional processing modules of the ANSI standard are included in the System/3 model 12 compiler.

1 Nucleus	1, 2
1 Sequential Access	1, 2
1 Random Access	0, 2
1 Library	0, 2
2 Table Handling	1, 3
1 Segmentation	0, 2

The first digit above represents the level of the modules included in the compiler; the second digit represents the lowest level in the American National Standards Institute Standard (0 implies that the module may be completely missing from the standard compilers).

The third digit represents the highest level in the ANSI standard.

The international standard for COBOL is ISO Recommendation Number 1989, which was approved by ISO (International Organization for Standardization) in 1972. System/3 model 12 COBOL bears the same relation to the ISO standard as to the ANSI standard, inasmuch as the two standards are identical in technical content.

Additions: In addition to the standard language, the following additional features are provided:

- Extensions to the modules of American National Standard COBOL listed above, comprising
 - Certain language elements which are defined in higher levels of the American National Standard COBOL than those listed.
 - Certain language elements defined by the CODASYL Programming Language Committee but not yet included by ANSI in American National Standard COBOL.
 - IBM-developed extensions consistent with those supported by the System/360 and 370 OS and DOS ANS COBOL compilers and 1130 ANS COBOL compiler.

Disk File Support: The access methods supported for the 3340 are the same as those supported by System/3 model 10 COBOL and are as follows:

Sequential

- Consecutive Processing - including updating in place.
- Random Processing - by relative record number including updating but excluding file loading.

Indexed (main data area only)

- Random Processing - by key.
- Sequential Processing - by key including file loading.

Direct

- Random Processing—by relative record number, including updating and file loading.
- Consecutive Processing.

Standard System/3 disk labels are mandatory for all disk files. Non-standard labels cannot be used except for data records within the file.

Record size can range from 1 to 32K bytes, and records may be processed as blocked or unblocked. Logical records may span physical disk sectors, tracks or cylinders.

Multi-volume sequential files are supported on the 3340 main data area. Offline multi-volume files are only supported on Drive 2 of the 3340. Neither multi-volume nor indexed files are supported on the simulation areas of the 3340.

Tape File Support: The access methods supported for the 3410/3411 Magnetic Tape Subsystem are the same as those supported by System/3 model 10 COBOL. COBOL object programs can process data on magnetic tape; highlights include:

- Consecutive input or output files
- 1-4 tape drives
- Fixed length records, blocked or unblocked
- Variable length records, blocked or unblocked
- Record size from 18 to 32,768 bytes
- Block size from 18 to 32,768 bytes
- IBM Standard Labels, ANSI labels, no labels
- Option for two I/O areas
- 9-track, 800/1600 bpi
- 7-track, 200/556/800 bpi
- Single volume or multivolume files
- Recording format: EBCDIC (7- or 9-track) or ASCII (9-track only)

Printer Support: COBOL supports the 5203 and 1403 as follows: Space 0, 1, 2, or 3 before or after printing a line; skip to line number before or after printing a line; overflow detection.

Card I/O Support: Model 12 COBOL supports the MFCU and 1442 as follows:

	MFCU	1442
Read	Yes	Yes
Punch	Yes	Yes
Card Print	Yes	No
Stacker Select (punch only)	Yes	Yes
Associated File	Yes	No
Character Set (EBCDIC)	64	256

Diskette Support: COBOL supports the 3741 directly attached as an input or output device for compilation. For object programs, the 3741 is supported only by using the ACCEPT statement.

Model 12 COBOL Device Support

	Compilation	Execution
3340 Direct Access Storage Facility model C2	Yes	Yes
3410/3411 Magnetic Tape Unit model 1, 2 or 3	No	Yes
5203 Printer, model 1, 2 or 3	Yes	Yes
1403 Printer, model 2, 5 or N1	Yes	Yes
5424 MFCU, model A1 or A2	Yes	Yes
1442 Card Read Punch model 6 or 7	Yes	Yes
5471 Printer-Keyboard, model 1	Yes	Yes*
1255 MCR, model 1, 2 or 3	No	No
3881 OMR, model 1	No	No
3741 Data Station/Programmable Workstation model 1, 2, 3 or 4 (directly attached)	Yes	Yes*
BSCA, 1 or 2 lines, ICA, or Local Display Adapter	No	No
Main Storage Requirements (Program Level Size)	12-56K	8-56K

* This device is supported only by using the DISPLAY or ACCEPT statement.

** The maximum program level is 64K less supervisor requirements.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: For source compilation - An IBM System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K) ... and an IBM 5424 MFCU or an IBM 1442 Card Read Punch or a directly-attached IBM 3741 Data Station/Programmable Workstation ... and an IBM 5203 or 1403 Printer (the HN print arrangement is recommended) ... and a 3340 DASF.

SOFTWARE REQUIREMENTS

5705-SC1.



PROGRAM PRODUCTS

**System/3 Mdl 12 Subset ANS COBOL
Compiler and Library (cont'd)**

COMPATIBILITY

- System/3 COBOL is upward compatible with the DOS and OS ANS COBOL compilers and is a superset of 1130 ANS COBOL providing growth from 1130 through System/3 to System/360 and 370.
- Migration to and from System/3 COBOL requires little source program conversion to effect the transition. Certain 1130 library routines are not included in the System/3 COBOL library, e.g., CALLED subprograms.
- System/3 model 12 COBOL is source language compatible with System/3 model 10 COBOL, with language differences due to differences in I/O. A System/3 model 10 COBOL source program can be re-compiled on System/3 model 12, without changes to the source, and be executed under control of System/3 model 12 SCP - assuming the same I/O. (Note: A 5444 is equivalent to a simulation area on the 3340; indexed and multi-volume files are supported in the main data areas only; split cylinder files are not supported.)

DOCUMENTATION

(available from Mechanicsburg)

*System/3 Subset ANS COBOL Reference Manual (GC28-6452) ...
System/3 Subset ANS COBOL Program Product Specification
(GC28-6462) ... System/3 Bibliography (GC20-8080).*

TERMS and CONDITIONS: See PP Index

PROGRAM PRODUCTS

**SYSTEM/3 MODEL 12 DISK FORTRAN IV
5705-FO1**

PURPOSE

System/3 model 12 FORTRAN IV is a program product that operates under control of the System/3 model 12 SCP. The compiler and library are disk resident in a simulation area on the 3340 Direct Access Storage Facility (DASF). The compiler requires as input a FORTRAN source language program and produces as output, by means of the system's Overlay Linkage Editor, a System/3 machine language object program, either cataloged in an object library, punched into 80- or 96-column cards, or written onto a diskette. A source program listing, diagnostic messages and a main storage map may be requested.

DESCRIPTION

Source input to the compiler can be from the system input device (card reader, 3741 directly attached, or 5471 keyboard) or from a source library. Work files for the compiler are in a simulation area of the 3340 Direct Access Storage Facility. The Overlay Linkage Editor is used to generate object programs.

The model 12 FORTRAN IV language is identical to the System/3 model 6 or 10 FORTRAN IV language. It contains those features defined in American National Standard Basic FORTRAN, X3.10-1966 and additional language features and capabilities previously available only with certain Full FORTRAN IV Compilers.

The model 12 FORTRAN IV Library contains mathematical and service subroutines required during execution to perform arithmetic operations, input and output conversion, and input and output control.

The model 12 FORTRAN IV Library also includes a Commercial Subroutine Package which is equivalent in function to the 1130 Commercial Subroutine Package insofar as is meaningful in terms of System/3 model 12 devices and data management.

Disk File Support: The access methods supported for the 3340 are the same as those supported by System/3 model 10 FORTRAN, and are as follows:

Sequential I/O

Consecutive processing of formatted or unformatted records is supported. Record size of formatted records can range from 1 to 256 bytes.

Record size of unformatted records can range from 1 to 32,767 bytes.

Direct Access I/O

Random processing is by relative record number; consecutive processing can also be performed. Record size can range from 1 to 32,767 bytes, formatted or unformatted.

Standard System/3 disk labels are mandatory for all disk files. Non-standard labels cannot be used except as data records within the file.

Indexed files are not supported.

Tape File Support: The access methods supported for the 3410/3411 Magnetic Tape Subsystem are the same as those supported by System/3 model 10 FORTRAN. FORTRAN object programs can process data on magnetic tape; highlights of tape support include:

- Consecutive input or output files
- 1-4 tape drives
- Formatted or unformatted records
- Record size from 18 to 32,767 bytes
- Block size from 18 to 32,767 bytes
- IBM Standard Labels, ANSI Labels, no labels
- 9-track, 800/1600 bpi
- 7-track, 200/556/800 bpi
- Single volume files
- Multivolume files
- Recording format: EBCDIC (7- or 9-track) or ASCII (9-track only)

Printer Support: The FORTRAN language supports the 5203 and 1403 as follows: Space 0, 1, or 2 before or after printing a line ... skip to line 1 before or after printing a line ... overflow detection. Commercial Subroutines support the 5203 and 1403 as follows: Space immediately 0, 1, 2 or 3 lines ... skip immediately to a specified line number.

Card I/O Support: The Model 12 FORTRAN supports the MFCU and 1442 as follows:

	MFCU	1442
Read	Yes	Yes
Punch	Yes	Yes
Card Print	Yes	No
Stacker Select*	No	No
Combined File**	No	No
Character set (EBCDIC)	64	256

* Commercial Subroutines support stacker selection of cards from the 1442 and from the secondary hopper of the MFCU.

** Through use of the Commercial Subroutines, the MFCU or 1442 can support a combined file.

Diskette Support: FORTRAN supports the 3741 directly attached as an input or output device for compilation only.

Model 12 FORTRAN Device Support

	Compilation	Execution
3340 Direct Access Storage Facility model C2	Yes	Yes
3410/3411 Magnetic Tape Unit model 1, 2 or 3	No	Yes
5203 Printer, model 1, 2 or 3	Yes	Yes
1403 Printer, model 2, 5 or N1	Yes	Yes
5424 MFCU, model A1 or A2	Yes	Yes
1442 Card Read Punch, model 6 or 7	Yes	Yes
5471 Printer-Keyboard, model 1	Yes	Yes
1255 MCR, model 1, 2 or 3	No	No
3881 OMR, model 1	No	No
3741 Data Station/Programmable Workstation model 1, 2, 3 or 4 (directly attached)	Yes	No
BSCA, 1 or 2 lines, ICA, or Local Display Adapter	No	No
Main Storage Requirements Program Level Size)	9-56K*	8-56K*

* The maximum program level is 64K less supervisor requirements

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: For source compilation - A System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K) ... and an IBM 5424 MFCU or an IBM 1442 Card Read Punch or a directly-attached IBM 3741 Data Station/Programmable Workstation ... and an IBM 5203 or 1403 Printer ... and an IBM 3340 DASF.

SOFTWARE REQUIREMENTS

5705-SC1.

COMPATIBILITY

System/3 model 12 Disk FORTRAN IV source programs are compatible with System/3 Disk FORTRAN IV for System 3 model 6, 8 or 10 except for changes required to accommodate differences in attached I/O. The model 12 FORTRAN compiler accepts source programs written in the IBM System/360 Basic FORTRAN IV language, which encompasses American National Standard Basic FORTRAN as defined in X3.10-1966. The compiler also accepts source programs written in the IBM 1130 Basic FORTRAN IV language with minor modifications.

DOCUMENTATION

(available from Mechanicsburg)

System/3 FORTRAN IV Reference Manual (SC28-6874) ... System/3 FORTRAN IV Commercial Subroutines (SC28-6875) ... System/3 FORTRAN IV Program Product Specifications (GC28-6880) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

DATA COLLECTION SYSTEM SUPPORT FOR SYSTEM/3 5705-M31

PURPOSE

The IBM 5230 Data Collection System Support for System/3 program product provides the manufacturer with a convenient, practical means of preparing shop floor data for processing by a user-provided management accounting system. Data collected by the IBM 5230 Data Collection System is edited, consolidated, and formatted on the System/3 for such applications as payroll accounting, inventory management, and production control. By the customer making simple changes in the output formats of both program products, IBM 5230 Data Collections System Support for System/3 can provide input to and use turnaround documents from the System/3 Shop Loading and Control program product (5702-M51).

DESCRIPTION

The 5230 Data Collection System Support for System/3 program product provides two phases of operations: A 5230 personalization phase and a data conversion phase.

The 5230 personalization phase provides a menu of actions from which the user selects those that best fit the operation. Using the menu selections and loop definitions for up to three 5231 controllers with up to four loop each, this phase creates the personalization records required to personalize the 5230 Data Collection System.

The data conversion phase prepares the data received from the 5230 Data Collection System for processing by the user-provided applications. The data can be accepted through the data communications facilities, the 96-column cards, the 80-column cards, or the diskette offered as output options by the 5230 Data Collection System. (Input from 80-column cards or diskette requires minor changes to source).

Both material transactions and labor transactions are prepared by the program product. The material transactions are edited, listed, formatted and stored for later processing by the user-provided inventory management and production control applications. Labor transactions are expanded, edited, checked for accuracy and adjusted for break and lunch times and lunch and shift start-stop time variances. Time and attendance totals are checked against job time totals with warning messages printed for differences that exceed user-prescribed limits. The elapsed time for time and attendance and job time is calculated. Job time applied to overlapping jobs is apportioned to the jobs. A correction procedure is included to allow for changing incorrect labor records. The results of the labor transaction processing are stored for later processing by the user-provided payroll and production control applications.

Reports are printed, at the user's option, for material transactions and for labor transactions. The material transactions report is a single listing. Labor transactions reports provide labor-related information suitable for management review and checking by foremen for correctness.

A *Program Reference Manual* provides installation and planning information such as input and output formats, a description of the processing, control and audit information, and a discussion of the sample problem.

An *Operations Guide* specifies the procedures that must be followed to make any necessary modifications, to compile and include the program in the system library, and to prepare data for the program. A discussion of operating procedures and messages is also included.

HIGHLIGHTS

- Provides needed input to user-provided applications
 - Elapsed time calculation for payroll
 - Material receipt and issue data for inventory management
 - Job elapsed time and location data for production control
- Management reports generated as a byproduct of data entry
 - Jobs started checked against time and attendance record
 - Transaction records checked for complete and accurate entry
- Provides for automatic generation of machine-readable data
 - Uses punched-card turnaround documents from user-supplied applications
 - Reduces transcription errors
 - Eliminates timekeeper calculation of elapsed time

CUSTOMER RESPONSIBILITIES

IBM will provide assistance in many areas pertaining to the installation of IBM program products. However, the responsibility for providing accurate ordering information, personnel selection and training, installation, and continued day to day operation lies solely with the customer. Activities, within these areas of customer responsibility, are defined to include, but not be limited to, the following:

Personnel selection and training ... the customer is responsible for selecting at least one person who will be responsible for supervising the installation and at least one person to assume the duties of an operator.

The customer is also responsible for the coordination and education of the various user departments affected by the installation.

Installation ... the customer is responsible for installation of the product. Installation activities include:

- Establishing an installation plan and schedule consistent with the requirements and availability of customer personnel
- Entering control data and compiling the program
- Copying the delivered disk cartridges for backup purposes
- Creation of the badge file and verification of the data
- Modification of existing programs to interface to the program product

Day-to-day system operation ... the customer is responsible for the day to day operation of the system and the results derived from its operation. The customer is also responsible for maintaining controls and audit trails consistent with good business practices and for the security and safekeeping of all machine-readable material and documents which are related to, and/or resulting from, the operation of the system.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

The IBM 5230 Data Collection System Support will execute on any model of the System/3 meeting the following minimum configuration:

System/3 Model 8

- IBM 5408 with 16K of primary storage
- IBM 3741 Data Station directly attached
- IBM 5444 model A1 Disk Storage Drive
- IBM 5203 Printer with 132 print positions and PN or GN print character arrangement

System/3 Model 10

- IBM 5410 with 16K of primary storage
- IBM 5444 model 1 or A1 Disk Storage Drive
- IBM 5424 Multifunction Card Unit
- IBM 5203 Printer with 132 print positions and PN or GN print character arrangement

System/3 Model 12

- IBM 5412 with 32K of primary storage
- IBM 3340 model C2 Direct Access Storage Facility
- IBM 5424 Multifunction Card Unit or IBM 3741 Data Station directly attached
- IBM 5203 Printer with 132 print positions and PN or GN print character arrangement

System/3 Model 15

- IBM 5415 with 48K of primary storage
- IBM 5444 model A2 Disk Storage drive
- IBM 5424 Multifunction Card Unit or IBM 3741 Data Station directly attached
- IBM 3277 Systems Console
- IBM 5421 Printer Control Unit
- IBM 1403 Printer with 132 print positions and PN or GN print character arrangement

If the data communications features of 5230 Data Collection System Support for the System/3 are to be used, the Binary Synchronous Communications Adapter, the Local Communications Adapter, or the Integrated Communications Adapter must be added to the minimum configuration. The processing unit must contain the appropriate expansion and attachments features if required.

SOFTWARE REQUIREMENTS

The IBM 5230 System Support for System/3 is written in RPG II programming language and executes under control of the System/3 System Control Program. The System/3 Disk Sort program is also required for execution of the program. The System/3 RPG II compiler is required for tailoring and compiling the Data Collection System Support for System/3. The program numbers applicable to the different system models are given below.

For System/3 Models 8 and 10

System Control Program	5702-SC1
Disk Sort Program	5702-SM1
RPG II Compiler	5702-RG1

If data communications is used, the RPG II Compiler must have either feature #6000 or feature #6002 installed.

For System/3 Model 12

System Control Program	5705-SC1
Disk Sort Program	5705-SM1
RPG II Compiler	5705-RG1



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PROGRAM PRODUCTS

Data Collection System Support for System/3 (cont'd)

For System/3 Model 15

System Control Program	5704-SC1
Disk Sort Program	5704-SM1
RPG II Compiler	5704-RG1

DOCUMENTATION

(available from Mechanicsburg)

IBM 5230 Data Collection System Support for System/3 General Information Manual (GH30-0204) ... Facts Flyer (G580-0073) ... Data Collection Application Workbook (GH20-0203) ... Executive Guide (G580-0072) ... IBM 5230 Data Collection User's Guide (GA34-0040).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 12 RPG II
5705-RG1**

PURPOSE

IBM System/3 model 12 RPG II is a program product that operates under control of the System/3 model 12 System Control Programming. RPG II is disk resident in a simulation area on the 3340 Direct Access Storage Facility (DASF). It requires as input an RPG II source language program and produces as output a System/3 model 12 machine language object program, either cataloged in an object library or punched into 80- or 96-column cards, or written onto a diskette. A source program listing, diagnostic messages, and a main storage map can be requested.

To use the RPG II compiler, the user supplies information about the job to be processed. The job can be described on specification sheets prior to entering the source statements into the system. The specification sheets are: Auto Report, Control Card and File Description, Extension and Line Counter, Telecommunications, Input, Calculation and Output-Format.

Source Input to the compiler can be from the system input device (card reader, 3741 directly attached, or 5471 keyboard) or from a source library. Work files for the compiler are on a simulation area of a 3340 data module.

In addition to the functions provided by System/3 model 10 Disk RPG II, model 12 RPG II provides the following capabilities:

- Support of 3340 Direct Access Storage Facility.
- Included as standard functions of the model 12 RPG II, the following support that is available as separately priced features in model 6 and/or 10 RPG II: Telecommunications, Auto Report, and Magnetic Tape support.

Disk File Support: The access methods supported for the 3340 are the same as those supported by System/3 model 10 Disk RPG II and are as follows:

Sequential

- Consecutive Processing - including updating in place.
- Random Processing - by relative record number including updating but excluding file loading.

Indexed (main data area only)

- Random processing - by key.
- Sequential processing - by key including file loading.

Direct

- Random Processing - by relative record number, including updating and file loading.
- Consecutive Processing.

Standard System/3 disk labels are mandatory for all disk files. Non-standard labels cannot be used (except as data records within the file).

Record size can range from 1 to 9,999 bytes, and records can be processed as blocked or unblocked. Logical records may span physical disk sectors, tracks or cylinders.

Tape File Support: The access methods supported for the 3410/3411 Magnetic Tape Subsystem are the same as those supported by System/3 model 10 Disk RPG II. RPG II object programs can process data or record address files on magnetic tape. Highlights of tape support include:

- Consecutive input or output files
- 1-4 tape drives
- Fixed length records, blocked or unblocked
- Variable length records, blocked or unblocked
- Record size from 18 to 9,999 bytes
- Block size from 18 to 9,999 bytes
- IBM Standard Labels, ANSI Labels, no labels
- Option for two I/O areas
- 9-track, 800/1600 bpi
- 7-track, 200/556/800 bpi
- Single volume or multi-volume files
- Recording format: EBCDIC (7-or 9-track) or ASCII (9-track only)
- Program options to Rewind or Rewind/Unload at end of job

Printer Support: RPG II supports the 5203 and 1403 Printer as follows: Space 0, 1, 2 or 3 before or after printing a line; skip to line number before or after printing a line; overflow detection; first page forms alignment. The 5203 dual feed carriage is supported.

Card I/O Support: RPG II supports the MFCU and 1442 as follows:

	MFCU	1442
Read	Yes	Yes
Punch	Yes	Yes
Card Print	Yes	No
Stacker Select	Yes	Yes
Combined File	Yes	Yes
Character set (EBCDIC)	64	256

Diskette Support: A directly-attached 3741 is supported as a unit record input/output device for RPG II object programs.

Model 12 RPG II Device Support

	Compilation	Execution
3340 Direct Access Storage Facility, model C2	Yes	Yes
3410/3411 Magnetic Tape Unit, models 1, 2 or 3	No	Yes
5203 Printer, model 1, 2 or 3	Yes	Yes
1403 Printer, model 2, 5, or N1	Yes	Yes
5424 MFCU, model A1 or A2	Yes	Yes
1442 Card Read Punch, model 6 or 7	Yes	Yes
5471 Printer-Keyboard, model 1	Yes	Yes
1255 MCR, model 1, 2 or 3	No	Yes**
3881 OMR, model 1	No	Yes**
3741 Data Station/Programmable Workstation model 1, 2, 3 or 4 (directly attached)	Yes	Yes
BSCA, 1 or 2 lines, ICA, or Local Display Adapter	No	Yes
Main Storage Requirements (Program Level Size)	8-56K*	8-56K*

- * The maximum program level is 64K less supervisor requirements.
- ** Requires SCP subroutine; RPG II SPECIAL exit is used.

Auto Report: Model 12 RPG II Auto Report is functionally identical to the S/3 model 10 Disk RPG II Auto Report feature. Auto Report enhances the RPG II language by providing functions which eliminate much of the preparation and coding work normally done by the user. It is specifically designed to facilitate report preparation.

Auto Report executes as a preprocessor to the RPG II Compiler. The input is RPG II source statements and Auto Report statements. Auto Report produces a diagnostic listing, replaces the Auto Report statements with generated or copied RPG II source statements and calls the RPG II Compiler for execution.

Telecommunications Support: Support of the Binary Synchronous Communications Adapter (BSCA), and the Integrated Communications Adapter (ICA) is achieved through use of the RPG II Telecommunications Specifications Sheet and the addition of BSCA as a device entry on the RPG II File Description Specification. The support is identical to that provided by System/3 model 6 and 10 RPG II Telecommunications features, and includes:

Communication modes: Receive only ... Receive with conversational reply* ... Transmit only ... Transmit with conversational reply* ... Alternate transmit and receive file. (*Not supported in communication with System 32, System/34, 2770, 2780, 3741-2, and 3741-4 or a 5110 Computer System supported as a 3741 model 2 or 4.)

Communication with the 5231 model 2 is in Receive mode only. The 5231 model 2 is supported as a 3741 model 2 or 4.

RPG II language features supported: Input, Output, and Combined files ... Demand files for Transmit and Receive ... Blocking and deblocking of records ... Dual I/O areas.

BSCA and ICA features, options and capabilities supported: Manual Call ... Manual answer ... Auto-call (BSCA only) ... Auto-Answer ... Medium speed ... High speed (BSCA only) ... Station selection ... EBCDIC data transparency ... intermediate block checking ... EBCDIC or ASCII data and data link control characters. File translation of ASCII data can be accomplished by proper use of the file translation facility of RPG II.

For additional information, see the description of the model 10 Disk RPG II Telecommunications feature (5702-RG1; feature #6000/#6002).

COMPATIBILITY

System/3 model 12 RPG II is source language compatible with the System/3 model 10 Disk RPG II (5702-RG1) and System/3 model 6 RPG II (5703-RG1) except for differences due to different hardware. A System/3 model 6 or 10 Disk RPG II source program can be re-compiled on System/3 model 12, without changes to the source, and be executed under control of System/3 model 12 SCP - assuming the same I/O. (Note: 5444 is equivalent to a 5444 simulation area on the 3340; indexed and multi-volume files are supported in the main data areas only; split cylinder files are not supported; shared I/O areas are not supported.)

System/3 Model 12 RPG II (cont'd)**SPECIFIED OPERATING ENVIRONMENT****HARDWARE REQUIREMENTS**

Minimum System Requirements: For source program compilation - An IBM System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K) ... and an IBM 5424 MFCU or an IBM 1442 Card Read Punch or directly-attached IBM 3741 Data Station/Programmable Workstation ... and an IBM 5203 or 1403 Printer ... and an IBM 3340 DASF.

SOFTWARE REQUIREMENTS

5705-SC1.

DOCUMENTATION

(available from Mechanicsburg)

Introduction to RPG II (GC21-7514) ... System/3 RPG Reference Manual (SC21-7504) ... System/3 RPG II Auto Report General Information (GC21-7563) ... System/3 PRG II Auto Report Reference Manual (SC21-5057) ... System/3 RPG II Telecommunications Reference Manual (SC21-7507) ... System/3 RPG II Program Product Specifications (GC21-5081) ... System/3 RPG II Additional Topics Programmer's Guide (GC21-7577) ... System/3 RPG II Disk File Processing Programmer's Guide (GC21-7566) ... System/3 Bibliography (GC20-8080).

RPG II 3270 DISPLAY CONTROL FEATURE

Feature #6003/#6004

PURPOSE

The RPG II 3270 Display Control feature provides telecommunications services for local or remote 3270 devices. The program is automatically linked into the RPG II application program via the SPECIAL file exit capability on the RPG II File Description Specification Sheet. Neither the Assembler nor the RPG II Telecommunications feature is required.

DESCRIPTION

The following services are provided by the Display Control feature:

- RPG II access to 3270 Display System Terminals attached via the Local Display Adapter, the Integrated Communications Adapter (ICA), or the Binary Synchronous Communications Adapter (BSCA).
- Automatic buffering and queuing of terminal data
- A display formatting interface which permits the support of 3270 devices with coding in RPG II
- Complete line control procedures are provided
- Up to 18 terminals may be controlled (up to 12 can be attached via the Local Display Adapter)
- Provides the capability of coding one or more applications within one program. No task switching is provided.
- Two subroutines are provided. SUBR13 allows an RPG II program to support 3270s without using CCP. SUBR14 provides upward compatibility with CCP, requiring only program recompilation, assuming the RPG II program meets the CCP requirements.

Terminals Supported: The following terminals and communications facilities are supported under the RPG II 3270 Display Control feature:

With the Local Display Adapter

- 3277 Display Station (model 1 or 2)
- 3284 Printer (model 1 or 2)
- 3286 Printer (model 1 or 2)
- 3288 Printer (model 2)

Note: A maximum of 12 terminals may be attached via the Local Display Adapter.

With the Integrated Communications Adapter (ICA) or the Binary Synchronous Communications Adapter (BSCA).

- 3275 Display Station and Control, or
- 3271 Display Control Unit (model 1 or 2), with:
 - 3277 Display Station (model 1 or 2)
 - 3284 Printer (model 1 or 2)
 - 3286 Printer (model 1 or 2)
 - 3288 Printer (model 2)

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: The RPG II 3270 Display Control feature requires an IBM System/3 model 12 which includes, as a minimum, an IBM 5412 Processing Unit model B16 (32K bytes) ... an IBM 3340 model C2 DASF ... an IBM 5203 or 1403 Printer ... an IBM 5424 MFCU or an IBM 1442 Card Read Punch or a directly-attached 3741 Data Station/Programmable Workstation ... a Local Display Adapter or an Integrated Communications Adapter or a Binary Synchronous Communications Adapter and one of the devices listed under "Terminals Supported".

Using SUBR13, approximately 10K-12K bytes are added to the size of the object program. Using SUB14, approximately 4.3K bytes are added to the size of the object program.

SOFTWARE REQUIREMENTS

5705-SC1, 5705-RG1.

COMPATIBILITY

The System/3 model 12 RPG II 3270 Display Control feature is functionally compatible with the System/3 model 8/10 and System/3 model 15 RPG II 3270 Display Control feature.

DOCUMENTATION

(available from Mechanicsburg)

IBM RPG II 3270 Display Control Feature Reference and Logic Manual (SC21-5161) ... System/3 Bibliography (GC20-8080).

Programming Service Classification: A.

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 12 DISK SORT
5705-SM1****PURPOSE**

The IBM System/3 model 12 Disk Sort program is a program product that sorts a file into ascending or descending sequence. The program is resident in a simulation area on the 3340 Direct Access Storage Facility (DASF) and operates under control of the model 12 SCP.

DESCRIPTION

Input files - Multiple input files are supported - up to eight input files from disk and/or tape. An input file can be resident on a 3340 DASF or on a unit of the 3410/3411 Magnetic Tape subsystem. A disk file can have sequential, indexed or direct organization. For a disk file, the input record size can be from 1 to 9,999 bytes. A tape input file can have fixed length records, either blocked or unblocked; variable length tape records are not supported. The maximum input tape record or block size is 9,999 bytes, and the minimum is 18 bytes. Input tape files can be 9-track 800/1600 bpi or 7-track 200/556/800 bpi. The tape file can be recorded in either EBCDIC or ASCII code. Input can be either a single volume file or a multi-volume file.

Work file - A work file can be resident on a simulation area or main data area of a 3340 DASF. Work space can be specified by the user or can be automatically allocated by the program.

Output file - The output file can be resident on a 3340 DASF or on a unit of the 3410/3411 Magnetic Tape Subsystem. A disk output file can have sequential organization only. Characteristics of tape output files are the same as for tape input files, described above. The maximum output record size for disk or tape is 4,096 bytes. Output of the program will be one of three formats: Tag (ADDRROUT), tag-along, or summary tag-along.

Features

- Records can be selected or omitted, and reformatted.
- Specified records may be forced ahead of others.
- An alternate collating sequence can be specified.
- Control fields can be in different locations in the records.
- The total length of the control fields can be from 1 to 256 bytes; there is no other limit on the number of control fields.
- Control fields can be sorted in ascending or descending sequence, or mixed (some ascending and some descending).
- Control fields can be sorted using only the digit or zone portion of the character. The fields can be packed or unpacked decimal, or character formats.
- Records containing identical control fields can be combined by summarizing specified fields into one record.

Use: Specifications are described on a simple, RPG-like coding sheet. These specifications are entered into the system using the system input device, or they can be stored in the source library on disk. Sort control statement diagnostics and messages may be displayed on the system logging device.

The program can be executed in a dual programming environment and uses from 8K to 56K bytes of main storage, exclusive of SCP requirements.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: An IBM System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K), and an IBM 5424 MFCU or an IBM 1442 Card Read Punch or a directly-attached IBM 3741 Data Station/Programmable Workstation, and an IBM 5203 or 1403 Printer and an IBM 3340 DASF.

SOFTWARE REQUIREMENTS

5705-SC1. (See SCP pages.)

COMPATIBILITY

The model 12 Disk Sort program is source language compatible with the Disk Sort programs for the System/3 models 6, 8 and 10.

DOCUMENTATION

(available from Mechanicsburg)

System/3 Disk Sort Reference Manual (SC21-7522) ... System/3 Disk Sort Program Product Specifications (GC21-5083) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 MODEL 12 MAGNETIC TAPE SORT
5705-SM2****PURPOSE**

The IBM System/3 model 12 Magnetic Tape Sort program is a program product that sorts a tape file into ascending or descending sequence. It is resident in a simulation area on the 3340 Direct Access Storage Facility (DASF) and operates under control of the model 12 SCP. A configuration that includes three or four tape units is required. The program is functionally identical to the System/3 model 10 Disk Resident Magnetic Tape Sort program (5702-SM2).

Input files - The input file resides on any unit of the 3410/3411 Magnetic Tape Subsystem. The input file can have fixed length records, either blocked or unblocked. (Variable length records are not supported.) The maximum input record or block size is 9,999 bytes. The minimum input record or block size is 18 bytes. Input tape files can be 9-track 800/1600 bpi or 7-track 200/556/800 bpi. The file can be recorded in either EBCDIC (7- or 9-track) or ASCII (9-track only) code. Input can be either a single volume file or a multivolume file.

Work files - Three work tapes are required; a fourth can be utilized, if available. Work tapes can be either 7- or 9-track (see restrictions below). Work tapes must be single volume only (not multivolume).

Output file - The output file resides on any unit of the 3410/3411 Magnetic Tape Subsystem. Characteristics of tape output files are the same as for tape input files, described above. Output is a file of records containing the sort control fields and/or the data fields the user has specified. (The tag [ADDROUT] and summary tag-along sort capabilities of the Disk Sort are not supported in the Tape Sort.)

Restrictions: To utilize all of the functions of this program, at least three 9-track work tapes must be available. If one or more of the work tapes is 7-track, then only those sort functions that relate to the standard System/3 64-character set (EBCDIC) are supported. As a result, sorts of binary data, packed or unpacked decimal data or sorts on zones are not allowed in these 7-track configurations.

Features

- Records can be selected or omitted, and reformatted.
- Specified records may be forced ahead of others
- An alternate collating sequence can be specified.
- A checkpoint/restart facility is supported.
- Control fields can be in different locations in the records.
- The total length of the control fields can be from 1 to 256 bytes; there is no other limit on the number of control fields.
- Control fields can be sorted using only the digit or zone portion of the character. The fields can be packed or unpacked decimal, or character formats.
- Control fields can be sorted in ascending or descending sequence or mixed (some ascending and some descending).

Use: Specifications are described on a simple, RPG-like coding sheet. These specifications are entered into the system using the system input device, or they can be stored in the source library on disk. Sort control statement diagnostics and messages may be displayed on the system logging device. The program can be executed in a dual programming environment and requires 8K to 55K bytes of main storage, exclusive of SCP requirements.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: An IBM System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K), and an IBM 5424 MFCU or an IBM 1442 Card Read Punch or a directly-attached IBM 3741 Data Station/Programmable Workstation, and an IBM 5203 or 1403 Printer, and an IBM 3340 DASF. At least three tape drives of the IBM 3410/3411 Magnetic Tape Subsystem are required.

SOFTWARE REQUIREMENTS

5705-SC1₂ (See SCP pages.)

COMPATIBILITY

The model 12 Magnetic Tape Sort program is functionally compatible with the Disk Resident Magnetic Tape Sort program for System/3 model 8 and System/3 model 10.

DOCUMENTATION

(available from Mechanicsburg)

System/3 Tape Sort Reference Manual (SC21-7572) ... System/3 Magnetic Tape Program Planning Manual (GC21-5040) ... System/3 Tape Sort Program Products Specifications (GC21-5138) ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index



PROGRAM PRODUCTS

**SYSTEM/3 MODEL 12 DISK RESIDENT CARD UTILITIES
5705-UT1**

PURPOSE

This IBM System/3 program product is resident in a simulation area on the 3340 Direct Access Storage Facility (DASF) and operates under control of the model 12 SCP. The following programs are provided: Sort/Collate, List, Reproduce/Interpret, and Gangpunch. (The following programs, included in the model 10 Utilities, 5701-UT1 and 5702-UT1, are not available for the model 12: Data Recording, Data Verifying, and 80-96 Conversion program.)

DESCRIPTION

Sort/Collate Program - Functionally compatible with the model 10 Sort/Collate program (see 5701-UT1). The model 12 program supports the 5424 MFCU only.

List Program - Functionally compatible with the model 10 96-column List program (see 5701-UT1). The model 12 program supports input from 5424 MFCU, 1442 Card Read Punch, or the directly-attached 3741.

Reproduce/Interpret Program - Functionally compatible with the model 10 Reproduce/Interpret program (see 5701-UT1). The model 12 program supports the 5424 MFCU only.

Gangpunch Program - Functionally compatible with the model 10 Gangpunch program (see 5702-UT1). The model 12 program supports the 5424 MFCU.

Use: Each program described above can be executed in an 8K program level in a dual program environment.

SPECIFIED OPERATING ENVIRONMENT

HARDWARE REQUIREMENTS

Minimum System Requirements: An IBM System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K), and an IBM 5203 or 1403 Printer, and an IBM 3340 DASF, and the device required for the particular program described above (IBM 5424 MFCU, 1442 Card Read Punch, or a directly-attached IBM 3741 Data Station/Programmable Workstation).

SOFTWARE REQUIREMENTS

5705-SC1. (See SCP pages.)

COMPATIBILITY

The model 12 Disk Resident Card Utilities that have model 10 equivalents are functionally compatible to the model 10 versions.

DOCUMENTATION

(available from Mechanicsburg)

System/3 Sort/Collate and Card Utilities Reference Manual SC21-7529 ... *System/3 Disk Resident Card Utilities Program Product Specifications* (GC21-7535) ... *System/3 Bibliography* (GC20-8080).

TERMS and CONDITIONS: See PP Index

**SYSTEM/3 UTILITY PROGRAM FOR
1255 MAGNETIC CHARACTER READER
5705-UT2****PURPOSE**

This utility program provides the System/3 model 12 user control of document processing on the IBM 1255 Magnetic Character Reader. It provides a means of reading MICR encoded documents from the 1255, accumulating document totals and amount field totals for each pocket, and placing the data from the documents on output disk or tape and printer files. The program is designed to fulfill the basic requirements of the "ON-US" data capture run required for all Demand Deposit Application Programming.

DESCRIPTION

The program reads fields from the documents as specified by the user and then, based on decisions indicated by the user, it will stacker select these documents into user-specified pockets. If requested, Modulus 10 or 11 checking will be performed. Then after each document has been read and stacker selected, the utility will print user-specified fields from that document. Fixed-length disk records will also be created and placed on a disk file or a tape file (3410 or 3411 9-track only).

An additional facility provided by the program is the accumulation of document totals and amount field totals and then printing these at end of job. Subtotals may be printed at any time as indicated by the user during program execution.

Use: The utility requires at least 10K bytes of main storage when disk output is requested and 12K bytes of main storage when tape output is requested (exclusive of SCP requirements). The program will operate in a dual program environment.

SPECIFIED OPERATING ENVIRONMENT**HARDWARE REQUIREMENTS**

Minimum System Requirements: An IBM System/3 model 12 which includes an IBM 5412 Processing Unit model B16 (32K) with a Serial I/O Channel (#7081), and an IBM 5424 MFCU or a directly-attached IBM 3741 Data Station/Programmable Workstation, and an IBM 5203 or 1403 Printer, and an IBM 3340 DASD, and an IBM 1255 Magnetic Character Reader, model 1, 2 or 3.

SOFTWARE REQUIREMENTS

5705-SC1. (See SCP pages.)

COMPATIBILITY

The model 12 Utility Program for the 1255 MCR is functionally compatible to the model 10 version.

DOCUMENTATION

(available from Mechanicsburg)

System/3 Models 10 and 12 Utility Programs for the 1255 MCR Reference Manual (SC21-7521) ... System/3 1255 Utility Program Product Specifications (GC21-5030). ... System/3 Bibliography (GC20-8080).

TERMS and CONDITIONS: See PP Index