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Systems

DOS/VS System Generation

Release 29

IBM

Second Edition (November 1973)

This edition, with Technical Newsletter GN33-8766, applies to Version 5 of the IBM Disk Operating System/Virtual Storage, DOS/VS, and to all subsequent versions and editions until otherwise indicated in new editions or technical newsletters. Changes are continually made to the information herein; before using this publication in connection with the operation of IBM systems, consult the IBM System/360 and System/370 Bibliography, GA22-6822 for the editions that are applicable and current.

Major changes and additions are:

- Support for the expanded (512 byte) buffer and space compress/expand feature for the IBM 2770.
- Page handling enhancements.
- Support of new devices (3203, 3340, 5203, and 5425)
- Support for the System/370 Model 115 CPU.

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Preface

The information in this publication is of particular interest to anyone responsible for the planning and/or implementation of system generation and maintenance for DOS/VS. This includes installation managers, system analysts, programmers, and machine operators.

Familiarity with the following system programs and facilities is invaluable when using this publication:

- the control programs (supervisor, job control, and IPL),
- the system service programs (linkage editor and librarian) and
- the Input/Output Control System (IOCS) logic modules.

The storage estimates given in this publication are within 15% of actual requirements.

MODULAR ORGANIZATION OF THIS MANUAL

This publication is in a modular format that enables you to discard unwanted modules and to insert system generation modules from program product documents. Thus, you can tailor your system generation document for your installation.

Although the pages are numbered consecutively throughout the book, each module is a self-contained document. A numbered tab on the right-hand edge of the page indicates the beginning of each new module. Each module has a Module Outline and, where length warrants, a Module Index.

The total publication has a General Contents and a General Index. These refer you to the individual module numbers. Figure numbers throughout the publication are in the form: Figure 1-3, where 1 is the module number and 3 is the figure number within the module.

Each module in this publication is a collection of information about a particular component or related topics. The modules, numbered from 1 to 23, are grouped as follows:

- Module 1: Planning and procedures information
- Module 2: Generating a version of POWER
- Module 3: Installation Verification Procedures (IVP)
- Modules 4-6: Emulator Programs
- Modules 7-16: I/O Components
- Module 17: VSAM
- Module 18: Assembler
- Module 19: System aids (OLTEP)
- Module 20: BTAM
- Module 21: QTAM
- Module 22: System Utilities
- Module 23: EREP

Prerequisites for a thorough understanding and for the effective use of this publication are:

DOS/VS System Management Guide, GC33-5371

DOS/VS System Control Statements, GC33-5376

DOS/VS Supervisor & I/O Macros, GC33-5373

DOS/VS Operating Procedures, GC33-5378

DOS/VS Messages, GC33-5379

DOS/VS System Utilities, GC33-5381

General Contents

Module 1: Planning and Procedures

Modular Outline

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Introduction

The object of DOS/VS system generation is to tailor the IBM-supplied system to the requirements of your installation. This tailoring process is accomplished by:

1. Planning system generation
2. Implementing the plan by performing a system generation (the subject of this book)
3. Testing the results by running the applicable Installation Verification Procedure (IVP) and/or sample problems.

Detailed planning is essential to efficient system generation. It minimizes the need to modify the system after it is generated. You may want to contact your IBM marketing representative to set up a system generation planning meeting. IBM field engineering would also attend the meeting to discuss the procedure to install the SCP (systems control programming). Generating a system includes:

- Tailoring the supervisor to the needs of your installation, which includes planning the options and estimating the size of the supervisor. This entails assessing the implications and effects of some of the major supervisor options, such as multiprogramming and POWER, on the operation of your system.
- Planning the libraries, that is planning the contents, organization and size of the system and/or private libraries.
- Generating a version of POWER (optional).
- Planning the Page Data Set.
- Emulator generation (optional).

These major planning considerations are described in detail in the DOS/VS System Management Guide, GC33-5371.

IBM supplies DOS/VS on either magnetic tape or on disk. These distributions are discussed in "Disk Operating System Distributions".

DOS/VS is shipped in three libraries:

The source statement library contains macro definitions in edited format. After the desired parameters have been chosen, the macros can be assembled. Any A-library macros carried over from previous releases must be edited before they can be used for assembly.

The relocatable library contains IBM programs that have not been assigned addresses for execution and assembled macros from the source statement library. These assembled macros perform input and output procedures for IBM-supplied programs. They constitute Logical IOCS modules that can also be used by problem programs, whenever applicable.

The core image library contains programs that are ready for execution. System control programs and system service programs are always shipped in the core image library. An assembler program is also provided for system generation and maintenance. The system control programs must always be part of the system. The librarian programs are

a key set to the system and should be carefully considered before ever removing them from the system.

A fourth system library, the procedure library is supported. The procedure library is designed to contain frequently used sets of job control and linkage editor control statements, as well as control statements for IBM-supplied service programs.

During system generation, you work with the IBM-supplied system, tailoring it to your individual needs by adding to and deleting from the IBM-supplied and your own private libraries (source statement, relocatable, and core image). Please note that the procedure library can only be a system library; the system does not support private procedure libraries.

PLANNING SUMMARY

The following considerations and decisions should be made before system generation:

- Select supervisor options by coding a set of supervisor macro instructions (see "Chapter 3: Planning the System" in DOS/VS System Management Guide, GC33-5371).
- Determine the programs to be in the core image and relocatable libraries of each operational pack.
- To utilize the serviceability aids recommended in DOS/VS Serviceability Aids and Debugging Procedures, GC33-5380, during system generation, include applicable aids from the following list in your DOS/VS system (section numbers refer to sections in that manual):

  a) Recovery Management Support (including Tape and Disk Error by Volume Statistics -- Section 2-F)

  b) Fetch/Load, I/O, GSVC and QTAM traces, and the Transient Dump (Problem Determination Serviceability Aids, PDAIDS -- Section 2-B)

  c) DUMPGEN (DOS/VS Stand-alone DUMP Generator, with formatting DUMP option -- Section 2-A)

  d) LVTOC and the Library Display Program (including the Access Method Services Utility Aids -- Section 2-C)

  e) Online Terminal Test (Teleprocessing Aids -- Section 2-F)

  f) LSERV (Label Cylinder Display Program -- Section 2-C)

  g) SDAIDS (System Debugging Aids -- Section 2-B)

- If the system supports private core image libraries (PCIL=YES specified in the FOPT macro) determine which programs are to be placed in the private core image library or libraries. Under such a system, the linkage editor executes in any partition. You can link-edit most IBM-supplied programs for execution in a foreground partition and place them in a private core image library assigned to that partition if enough core storage is available to execute the link-edited program. If desired, the version to execute in the background partition may be retained in the system core image library. It is not necessary to have different versions of a particular program, for execution in different partitions, if the supervisor is generated to include the relocating loader.

You must place the supervisor, (default name $$A$SUP1), in the system core image library. A supervisor cataloged to a private core image library cannot be used. If the requested phase is a $$R phase (MCAR/CCH transient), the system only searches the system core image directory. If the requested phase is a $$A or $$B phase (transient), the system first searches the system core image directory, then, if necessary, the private core image directory assigned to the partition; if the phase is not found, the system enters the wait state with an error message of 04W (X'04E6') in bytes 0 and 1 of low storage.

When you request other phases, the system searches both the system and private directories, if necessary. If the phase name starts with $, the system first searches the system core image directory and, if it does not find the phase, it then searches the directory of the private core image library, assigned to the partition. If the requested phase name does not begin with a $, the order is private core image directory, then system core image directory, unless SYS=YES is specified in the FETCH or LOAD macro in which case the system directory is always searched first.

To improve fetch/load performance in a multiprogramming system you can build a System Directory List (SDL), containing the names of and additional fetch/load information on frequently used transients and phases. The list is built as a result of the SET SDL=CREATE command and subsequent data statements (please note that these statements can also be provided through a cataloged procedure). The procedure library on the IBM distribution medium contains two such procedures, which are cataloged under the names of SDL and IKQVPSVA, respectively. Procedure SDL builds a system directory list for systems generated without VSAM support. Procedure IKQVPSVA builds a system directory list for items that include VSAM. Additions to or deletions from both these procedures can be made by using the PSERV program. The usage of this program is explained in the DOS/VS System Management Guide, GC33-5371.

- Determine which modules are to be deleted from the relocatable library of each operational pack. Deleting from the relocatable library allows for expansion of the system core image library to hold a greater number of components. Refer to the module for each component for its sizes.

- Also determine if the macro definitions used to build the supervisor and IOCS modules are to be deleted from the source statement library. Retaining the macros in the source statement library facilitates building a new supervisor and new IOCS modules.

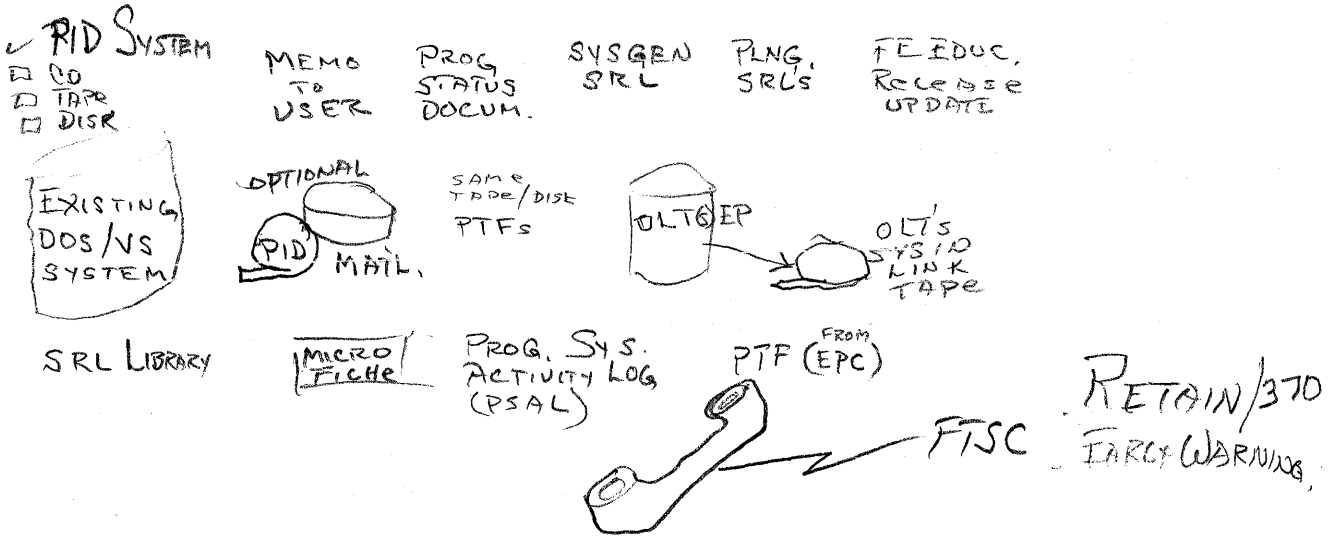
- With one disk drive you may prefer to maintain only enough room in the relocatable library of the operational pack to contain the modules for building the largest component in the system. This small relocatable library permits temporary insertion of any component in relocatable form. It can then be immediately link-edited into the system core image library and then deleted from the relocatable library. When the relocatable library is subsequently condensed, only the updated core image form of the component remains, thus conserving disk-storage capacity. Reducing the size of the relocatable library allows expansion of the system core image library. The expanded system core image library allows a greater number of components to be contained in a single systems volume.

- Copy and restore programs are necessary to transfer the resident system from tape to disk, from disk to tape, from disk to cards, and from cards to disk for maintenance and backup purposes.

- The procedures for the configurations shown in this publication assume the system packs to be initialized with the VTOC on cylinder 199, when using a 2314/2319, or on cylinder 403 when using a 3330. For the 3340 the VTOC is assumed to be on cylinder 347 for the 3348/35MB and on cylinder 695 for the 3348/70MB. The work packs are assumed to be initialized with the VTOC on cylinder zero or 199 (for a 2314/2319) or on cylinder 0 or 403 (for a 3330). For the 3340 the VTOC is assumed to be on either cylinder 0 or 347 for a 3348/35MB or on either cylinder 0 or 695 for a 3348/70MB.

MAPS AND LISTINGS PRODUCED DURING SYSTEM GENERATION

All linkage editor output on SYSLST from the system generation procedure and any future updates (including maps produced by the linkage editor) must be retained. These maps provide necessary information on the level of the system and the load address (relocation) of each component. Similarly, all assembly listings produced during system generation, in particular supervisor and POWER listings, should be retained. These maps and listings are used by the systems programmer and the customer engineer maintaining the system.



1. APAR
2. PTSC → RETAIN/370
3. RETAIN/360
4. EARLY WARNING Microfiche (WKLY)

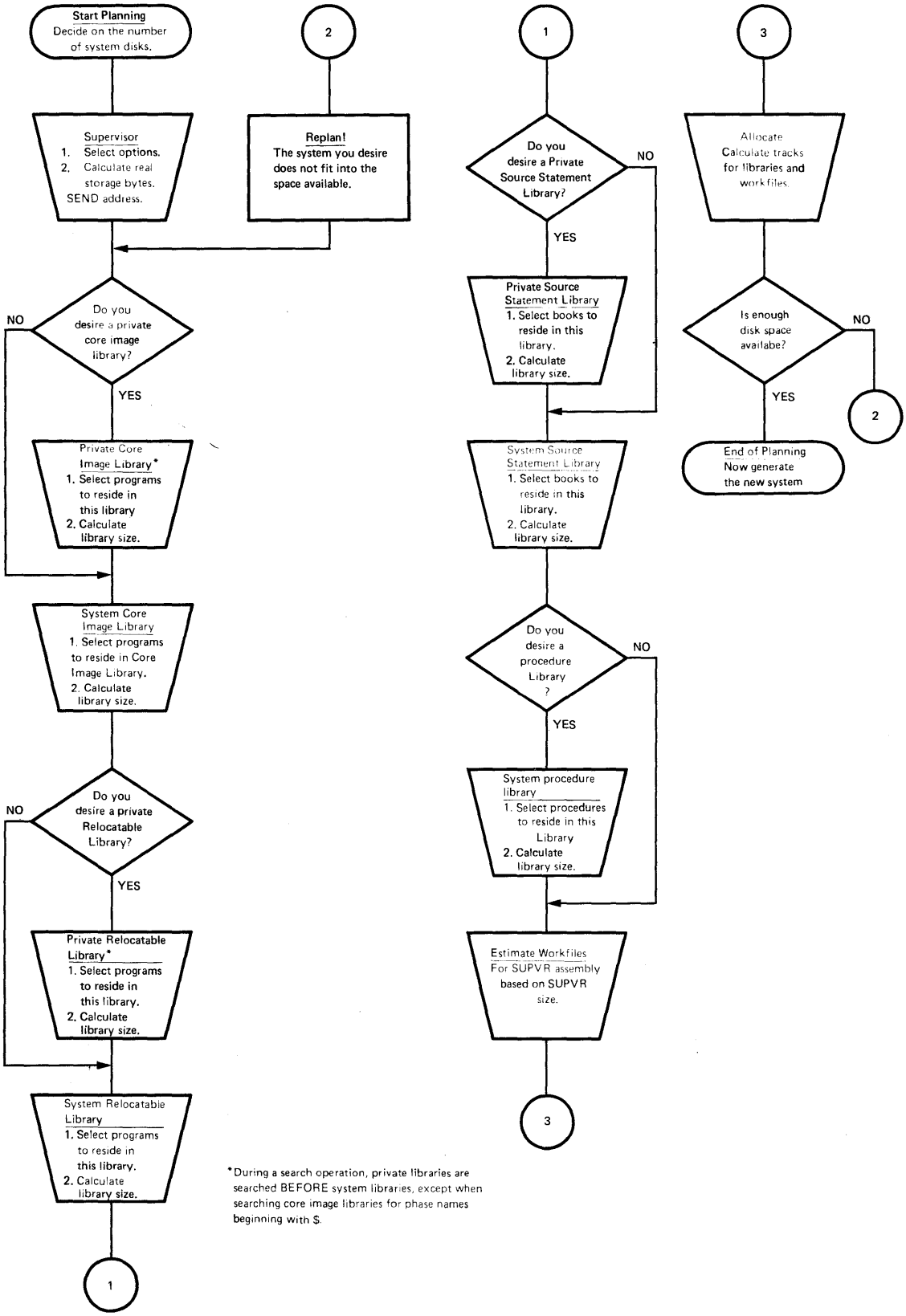


Figure 1-1. INTRODUCTION--Planning Summary

System Configuration

This section presents the minimum system configuration required to operate DOS/VS. The system control programs and basic IOCS must always be present to execute any other programs. In view of the many different possibilities of attaching I/O units to the CPU models supported, the minimum machine requirements for the Model 115 CPU and the Model 125 CPU are listed separately. The requirements for the CPU Models 135, 145, 155-II, and 158 are listed together.

MINIMUM MACHINE REQUIREMENTS - MODEL 115

A System/370 CPU Model 115.

Standard instruction set (See Note 1).

One Card Reader: 1442**, 2501**, 2520**, 2540**, 2560*, 2596**, 3505**, 3525**, or 5425*.

One Card Punch : 1442**, 2520**, 2540**, 2560*, 2596**, 3525**, or 5425* (See Note 2).

One Printer : 1403**, 1443**, 3203* (Model 1 or 2), or 5203* (with or without UCS) (See Note 2).

One Model 125 Integrated Display Operator Console, optionally with a 5213 Console Printer attached.

One 3340* Model A2 Disk Storage.

* These devices are natively attachable to the Model 115.

** These devices must be attached to the Model 115 via a multiplexer channel.

Notes:

1. Language translators may require extended instruction sets.

2. One 7- or 9-track 3410-3411 series magnetic tape unit, or a disk extent may be substituted for this device. If a 7-track tape unit is used, the data conversion feature is required, except when the unit is substituted for a printer.

MINIMUM MACHINE REQUIREMENTS - MODEL 125

A System/370 CPU Model 125.

Standard instruction set (See Note 1).

One Card Reader: 1442, 2501, 2520, 2540, 2560*, 3504*, 3505, 3525*, or 5425* (See Note 2).

One Card Punch : 1442, 2520, 2540, 2560*, 3525*, or 5425* (See Note 2).

One Printer : 1403**, 1443, or 3203* (Model 1 or 2) (See Note 2).

* These devices are natively attached. Attachment of Card Reader/Punch devices is as follows, either

One 3504, or
One 3504 and one 2560, or
One 3504 and one 3525, or
One 2560, or
One 3525, or
One 3504 and one 5425, or
One 5425.

** This device may either be natively attached, or be attached to a multiplexer channel.

One Model 125 Integrated Display Operator Console, optionally with a 5213 Console Printer attached.

One 3333 Model 1 Disk Storage, natively attached (two disk storage drives).

Notes:

1. Language translators may require extended instruction sets.

2. One 7- or 9-track 2400 or 3400 series magnetic tape unit, or a disk extent may be substituted for this device. If a 7-track tape unit is used, the data conversion feature is required, except when substituted for a printer.

MINIMUM MACHINE REQUIREMENTS - MODEL 135, 145, 155-II, CR 158

A System/370 CPU Model 135, 145, 155-II, or 158.

Standard instruction set (See Note 1).

One Card Reader: 1442, 2501, 2520, 2540, or 3505 (See Note 2).

One Card Punch : 1442, 2520, 2540, or 3525 (See Note 2).

One Printer : 1403, 1443, or 3211 (See Note 2).

One 3210/3215 Console Printer Keyboard, attached to the multiplexer channel.

One 2314* Direct Access Storage Facility, or

One 2319 Direct Access Storage Facility, natively attached or

One 3333 Disk Storage, Model 1, attached either natively or through a 3830-2 Storage Control Unit (See Note 3), or

One 3330 Disk Storage, Model 1 or 2*, attached through a 3830-1 Storage Control Unit (See Note 3), or

One 3340 Disk Storage, Model A2, attached through:

a) the Integrated File Adapter (IFA) on the System/370 Model 135, or
b) the Integrated Storage Control (ISC) on the System/370 Model 145, or
c) the 3830-2 Storage Control Unit on the System/370 Models 135 and 145.

*The minimum DOS/VS configuration requires two DASD spindles, or one DASD spindle and two magnetic tape drives. If the tape units are 7-track, the data conversion feature is required.

Notes:

1. Language translators may require extended instruction sets.

2. One 7- or 9-track 2400 or 3400 series magnetic tape unit, or a disk extent may be substituted for this device. If a 7-track tape unit is used, the data conversion feature is required, except when substituted for a printer. Neither the tape unit nor the disk extent can be substituted for the card reader as the communication device during system IPL time.

3. The 3333 Disk Storage (unless natively attached) and the 3330 Disk Storage, Model 1 or 2, require a high-speed selector channel.

4. Attaches to the integrated file adapter (IFA) on the Model 135, to the integrated storage control (ISC) on the Model 145, or to the 3830-2 storage control unit on Models 135 and 145.

MNOTES DURING SUPERVISOR ASSEMBLY

During supervisor assembly, the assembler may generate one or more MNOTEs. You may choose to ignore some by accepting the assumed values given in the MNOTEs. For others, you may have to interrupt procedures, modify one or more specifications in a macro or macros, and reassemble the supervisor.

Some general procedures for resolving MNOTEs are:

1. Go to the DIAGNOSTICS section at the end of the supervisor assembly listing; it includes references to the MNOTEs generated during assembly. Each MNOTE reference is in the form

   ```
   statement-number  IPK216   MNOTE GENERATED
   ```

2. Using the statement number, go back into the listing and examine each of the MNOTEs. A severity code precedes the message portion (the higher the code, the more severe the error). Each MNOTE is listed after the macro with which it is associated.

3. Determine the reason for the MNOTE. The MNOTE message indicates the parameter in question and usually provides a clue to the type of discrepancy. Some errors to look for are:

   - Misspelled items or mispunched numbers.
   - Parameters that are incompatible with other parameters in this or another macro.
   - Parameters that are outside the valid limits.

4. Make any necessary changes and reassemble. If you have no changes to make (in other words, the assumed values listed in the MNOTEs are acceptable), continue with the generation procedures. Some errors are so severe, however, that no object deck is generated, and you must correct one or more macros and reassemble before continuing.

SUPERVISOR SELECT

The Supervisor Select function enables you to select different tailored supervisors, cataloged in the core image library of your operational pack. Cataloging these supervisors can be accomplished by changing the PHASE card punched during supervisor assemblies. It is recommended to

name the most frequently used supervisor $$A$SUP1, since it is the default of the Supervisor Select function.

The desired supervisor is selected at IPL time in one of the following ways:

1. Depress the LOAD key on the CPU control panel; when the system enters the wait state depress the external interrupt key; the default supervisor $$A$SUP1 will then be selected.

2. Depress the LOAD key on the CPU control panel; when the system enters the wait state, depress the REQUEST key on the keyboard console typewriter. Message 0103A SPECIFY SUPERVISOR NAME is displayed. Type in the name of the desired supervisor or depress the END or ENTER key to select the default $$A$SUP1.

3. You can also select the desired supervisor by using the card reader (see chapter "DOS/VS Distribution Program Messages").

   Example:

   Change the PHASE card.

   PHASE $$A$SUPC,+0,NOAUTO

   Catalog the supervisor. When performing the IPL procedure, specify $$A$SUPC.

The Supervisor/Generation Macros

This section defines the thirteen macro instructions and their parameters required to generate an installation-tailored supervisor for DOS/VS.

RULES FOR USING SUPERVISOR GENERATION MACROS

1. The assumed value default for an omitted parameter is underlined in the following discussion. Wherever an alternate default is possible, both operands are underlined. Figure 1-4 shows the device type codes of the DOS/VS supported devices used for system generation.

2. Braces {} indicate that you must select one of the enclosed values.

3. Bracketed operands are optional, for example, [n].

4. Replace the letter n in a parameter with a decimal number.

5. The name field must be blank. The operation field always contains the mnemonic operation code. The operand field contains the parameters.

6. For any given macro, several parameters may be contained on one line. Separate each parameter with a comma. No embedded blanks are permitted. Continuation cards are permitted (nonblank character in column 72; the continue column is column 16).

7. In the expression X'cuu', replace cuu with the hexadecimal number for channel and unit.

8. The macros must be issued in the following sequence: SUPVR, CONFG, STDJC, FOPT, PIOCS, VSTAB, ALLOC, ALLOCR, IOTAB, DVCGEN, ASSGN, DPD, SEND.

9. The DVCGEN, ASSGN, ALLOC, ALLOCR, and DPD macros are not required. They are specified if input/output tables (DVCGEN) are being specified, if standard assignments (ASSGN) are being made if storage is allocated (ALLOC and ALLOCR), or if the page data set is defined at system generation time.

10. An END card and a /* card must follow the SEND macro instruction.

SUPVR

The Supervisor (SUPVR) macro instruction and its parameters define the system as disk resident with the ability to support certain desired functions, such as multiprogramming, MICR, or teleprocessing.

PARAMETERS FOR SUPVR

AP={NO|YES} Specify if multitasking support is desired. Multitasking allows the execution of more than one program within a partition. Specification of AP=YES is required if you want to use the ATTACH, DETACH, ENQ, and DEQ macros in your programs. WAITM=YES is forced by AP=YES. An invalid specification of AP causes YES to be forced. If AP=YES is specified and NPARTS is omitted or specified as 1, NPARTS=3 is forced.

ASCII={NO|YES} Specify if supervisor support of ASCII/EBCDIC translation tables is desired. ASCII=YES must be specified if support of ASCII tapes by magnetic tape IOCS is required.

CHAN={NO|YES}
(Models 115 and 125 only) This is an option for System/370 CPU Models 115 and 125 only. Do not specify this parameter for CPU Models 135 and upward. For these models, RMS error recording support is standard and specification of CHAN=YES will merely result in the generation of an MNOTE. If the MODEL parameter of the CONFG macro specifies 115 or 125, specification of CHAN=YES causes RMS error recording support to be generated. A specification of CHAN=YES is required if multiplexer channel-attached devices, tape units, or teleprocessing devices are present on your Model 115 or 125 CPU. Software recording is performed for channel-attached devices and for tape units only. If these devices are part of the system, a check is made at IPL time to see if RMS error recording support is provided; if it is not, the system enters a hard wait state. RMS=YES overrides a specification of CHAN.

ERRLOG={RDE|YES} Specify to include Reliability Data Extractor (RDE) recording in addition to normal RMS error recording. RDE causes recording of "End of Day" via the ROD operator command and of the cause of Initial Program Load (IPL). This provides additional data for installation and IBM evaluation of system performance. The RDE option does not require any additional real storage.

If RDE recording is desired for a Model 115 or 125 CPU, normal RMS error recording support must be generated by specifying CHAN=YES or RMS=YES.

Note: For reasons of compatibility with earlier DOS releases, ERRLOG=(YES,RDE) may still be specified. Specification of ERRLOG=YES has no effect since error recording is controlled by the MODEL= parameter or, for a Model 115 or 125, by CHAN= and RMS=. Specifying ERRLOG=(YES,RDE) is identical to specifying ERRLOG=RDE.

EU={NO / YES}

Specify EU=YES if you require mixed parity tape processing for the 14xx emulators and the tape preprocessor and tape postprocessor programs. EU=YES need not be specified to run these programs if mixed parity tape processing is not required.

ID

Note: For reasons of compatibility with earlier DOS releases, specification of EU=RELOC is accepted by the assembler as if EU=YES had been specified.

MCH={YES / NO}
(Models 115 or 125 only)

This is an option for CPU Models 115 and 125 only. Do not specify this parameter for CPU Models 135 and upward. For these models, support of the Machine Check Analysis Recorder and Channel Check Handler features is standard. If the MODEL parameter of the CONFG macro specifies 115 or 125, the default is YES if NPARTS>1; the default is NO if NPARTS=1. RMS=YES overrides a specification of MCH.

MICR={NO / 1419 / 1419D}

Specify if the supervisor is to support magnetic ink character readers or optical reader/sorters. If 1255/1259/1270/1275s are to be supported, indicate 1419. 1419D indicates Dual Address Adapter 1419/1275s only; 1419 support does not provide 1419D support. If 1419s or 1255/1270/1275s are attached to a multiplexer channel, the PIOCS parameter BPMX=YES is supported. However, burst mode and MICR devices cannot run concurrently on the same byte-multiplexer channel. A warning MNOTE to that effect is issued.

NPARTS={1 / 3 / n}

Specify the number of partitions to be supported. The maximum value of n is 5. For reasons of compatibility with earlier DOS releases, MPS=YES, NO, or BJF is also accepted by the assembler.

The default taken is 1 if:

The AP, MPS, POWER, and TP parameters are either not specified, or specified as NO.

The default taken is 3 if any of the following is specified:

AP=YES
MPS=YES
POWER=YES
TP=QTAM

If NPARTS is omitted or is specified as 1, specification of any of these parameters forces NPARTS=3.

PAGEIN={NO / n}

Specify that paging activity is to be controlled by the PAGEIN, RELPAG, and FCEPGOUT macros. These macros allow the programmer to

- request the advanced page-in of one or more pages (PAGEIN macro),
- release the contents of one or more pages (RELPAG macro), and
- request that one or more pages be given highest priority for page-out (FCEPGOUT macro).

(See DOS/VS Supervisor and I/O Macros, GC33-5373, for a complete description of these macros.)

The value n indicates the maximum number of page-in requests that can be queued at any one time for execution. Each PAGEIN macro issued in a program represents a page-in request. To obtain support for the three macros, the values specified for n must be 1 or larger.

PHO={NO / YES}

Specify if page exception handling overlap (PHO) is desired. PHO=YES allows control to be passed to a user routine while a page fault is being handled. Specification of PHO=YES is required if you want to use the SETPFA macro in your programs. (For more details see the DOS/VS System Management Guide, GC33-5371.) When PHO=YES is specified, PFIX=YES is forced.

POWER={NO / YES}

Specify if support for POWER is desired. If YES is specified, NPARTS=2, 3, 4, or 5 must be specified. If NPARTS is omitted or if NPARTS=1 is specified, a specification of POWER=YES causes NPARTS=3 to be generated.

RMS={NO / YES}
(Models 115 and 125 only)

This is an option for System/370 CPU Models 115 and 125 only. Do not specify this parameter for CPU Models 135 and upward. For these models, Recovery Management Support (RMS) is standard and a specification of RMS will merely result in the generation of an MNOTE. Specifying RMS=YES is equivalent to specifying both CHAN=YES and MCH=YES. RMS=YES overrides any specification of CHAN and/or MCH. If RMS=NO is specified, or if the parameter is omitted, the generation of RMS support is governed by specifying the CHAN and/or MCH parameters.

TP={NO / BTAM / QTAM / QTAMn}

Specify if teleprocessing support is desired and, if so, whether Basic (BTAM), or Queued (QTAM) Access Method is desired. When QTAM is specified, support for BTAM is also included. If BTAM runs in virtual mode, PFIX=YES is required. For QTAMn, n is the maximum number of QTAM message processing programs in the system at any one time. n may have any value from 2 to 12. (For multitasking, AP=YES must be specified.) If AP=NO and QTAMn are specified, n is forced to 2. If TP=QTAM and NPARTS=1 or is omitted, NPARTS=3 is forced.

CONFG

The configuration (CONFG) macro instruction and its parameters define the system configuration and can specify generation of optional supervisor services.

PARAMETERS FOR CONFG

FP={NO|YES}

Specify only if your CPU has the floating-point feature.

MODEL={115|125|135|145|155-II|158}

Specify the CPU Model number. Omission of this parameter or an invalid specification causes supervisor generation to be terminated. If MODEL=115 or 125, the generation of Recovery Management Support (MCAR/CCH and/or RMS error recording) is dependent on the specification of the RMS, CHAN, and MCH parameters of the SUPVR macro. For all other CPU models, RMS-support is standard.

Specify:

MODEL=115 for the IBM Model 3115 CPU
MODEL=125 for the IBM Model 3125 CPU
MODEL=135 for the IBM Model 3135 CPU
MODEL=145 for the IBM Model 3145 CPU
MODEL=155-II for the IBM Model 3155 CPU, Model II
MODEL=158 for the IBM Model 3158 CPU

Notes:

1. For reasons of compatibility with earlier DOS releases, specification of MODEL=155 is accepted by the assembler. Support for the Model 155-II CPU is generated.

2. When MODEL=125 is specified, support for the Display Operator Console and 3330 disk is always generated. When MODEL=115 is specified, support for the Display Operator Console and 3340 disk is always generated.

3. The storage protection and decimal features have been made standard. The Interval Timer is a standard System/370 hardware feature. If, however, you specify SP=, or DEC= (whether the operand is YES or NO), the assembler will accept your specification and merely react by generating an MNOTE, which need not be resolved. TIMER=YES is also acceptable but generates no code.

4. If you plan to run your generated system on more than one CPU model, you should specify the larger model number.

STDJC

The Standard Job Control (STDJC) macro instruction and its parameters specify the standard settings for job control. If the assumed options are all satisfactory, the only entry required is the STDJC macro instruction itself, without any parameters. These standard options except LINES and DATE can be temporarily overridden by an OPTION statement, LINES can be overridden by a SET command, DATE by a // DATE statement.

PARAMETERS FOR STDJC

ALIGN={YES|NO} Specify if the assembler is to align data on halfword or fullword boundaries, according to the type of instruction used.

ACANCEL={NO|YES} Specify if Job Control is to cancel jobs automatically (ACANCEL=YES) or to wait for operator intervention (ACANCEL=NC) after an unsuccessful attempt to assign a device.

CHARSET={48C|60C} Specify either the 48- or 60-character set for PL/I translator input on SYSIPT.

DATE={MDY|DMY} Specify the format of the date MDY=month/day/year. DMY=day/month/year.

DECK={YES|NO} Specify if language translators are to produce object modules on SYSPCH.

DUMP={YES|NO} Specify if a dump of the registers and virtual storage is to be written on SYSLST in case of an abnormal program end.

EDECK={NO|YES} Specify if the assembler is to create and punch edited macros on SYSPCH.

ERRS={YES|NO} Specify if compilers are to summarize all errors in source programs on SYSLST. Assembler and PL/I always assume ERRS=YES.

LINES={56|nn} Specify the number of lines per page on SYSLST. The minimum is 30; the maximum is 99.

LIST={YES|NO} Specify if language translators are to write source module listings and diagnostics on SYSLST.

LISTX={NO|YES} Specify if compilers are to write hexadecimal object module listings on SYSLST.

LOG={YES|NO} Specify for a listing of all control statements on SYSLST. LOG=NO suppresses the listing of all job control statements on SYSLST. Invalid statements

and commands will be listed on SYSLST if it is assigned.

SPARM={NO / YES} Specify if the &SYSPARM assembler system variable symbol is to be supported.

SYM={NO / YES} SYM=YES may be specified if the PL/I compiler is to produce a symbol and offset table listing on SYSLST, or if American National Standard COBOL is to produce a data division glossary.

XREF={YES / NO} Specify if the assembler is to write symbolic cross-reference lists on SYSLST, or if American National Standard COBOL is to produce a cross-reference listing.

FOPT

The Optional Features (FOPT) macro and its parameters specify additional optional features that can be included in the supervisor.

PARAMETERS FOR FOPT

AB={NO / YES} Specify if the abnormal termination exit function is to be supported. The abnormal termination exit, invoked via the STXIT AB macro, allows you to exit to a user's routine before an abnormal end-of-job causes a program to be canceled. Specify YES for American National Standard COBOL I/O error recovery. AB=YES is forced if VSAM=YES is specified in the SUPVR macro.

CBF={NO / n} Specify the number of I/O requests for the operator console to be buffered. Under the following conditions operator console I/O requests will not be buffered:

1. The actual record to be written does not exceed 80 characters.
2. Data or command chaining is not performed.
3. The CCB associated with this operation does not indicate the acceptance of unrecoverable I/O errors, posting at device end, or user error routines.
4. The CCB does not request sense information.

Console buffering does not apply to Model 115 or 125 Display Operator Console support. CBF=n is ignored if MODEL=115 or 125 or DOC=125D is specified.

Console buffering allows overlap of CPU processing with write operations to SYSLOG by satisfying the requestor's WAIT immediately, rather than at I/O completion time. When this option is selected,

the number of CHANQ entries should exceed the number of CBF entries so that the buffering process is not bound by the number of CHANQ entries. If the assumed option is taken for CHANQ and CBF is selected, the number of CHANQ entries is assumed to be six more than the CBF entry. Numbers 1 through 50 are valid, and one is assumed if the operand is invalid.

DASDFP={NO / (n1,n2[,2311 / ,2314 / ,3330 / ,3340 / ,2321])}

Specify if supervisory DASD file protection is desired where n_1,n_2 indicates the range of channels to which DASDs may be attached. File protection for the 2311, 2314, 2319, 3330, and 3340 is default. File protection for the 2321 must be specified and provides protection for all DASD devices. DASDFP prevents writing outside the extents of a file in case of program error. Extents are protected to the nearest cylinder except for 2321, where they are protected to the nearest head bank. This feature does not protect the file from being overwritten.

Notes:

1. No file protection is provided for the IBM 3540 Diskette Input/Output Unit.
2. The IOTAB parameter JIB=n allocates storage for DASDFP extents.
3. If a disk device type is specified by the third operand and this disagrees with the one as specified by the DISK parameter of the PIOCS macro, the value of this parameter will overrule the one specified by the third operand.

DOC={NO / 125D}

Specify if supervisor support for the Display Operator Console is to be generated. The default taken is dependent on the CPU model number as specified by the MODEL parameter of the CONFG macro. If MODEL=115 or MODEL=125 is specified, 125D is forced. The default is NO if the MODEL parameter specifies a System/370 CPU other than the Model 115 or 125. When Display Operator Console support is generated, support for 3210/3215 console printer keyboards is also generated. This allows your supervisor to run on both Model 115 and larger model numbers.

ECPREAL={NO / YES}

Specification of this parameter allows use of the VIRTAD macro, the REALAD macro, and of the EXCP macro with the REAL parameter. For good performance of the SORT/VS program, this option (ECPREAL=YES) should be specified. ECPREAL=YES forces PFIX=YES.

ERRQ={5 / 3 / n}

This parameter is optional. It is intended primarily for teleprocessing systems with a large number of communication lines or devices. It specifies the number of entries to be generated for the error queue. The default and minimum

number is 5 if the system is generated to support multiprogramming. The default and minimum number is 3 if multiprogramming is not supported. The maximum value of n is 25.

EVA={NO / (r,w)} Magnetic tape error volume analysis is supported (may be used with or without TEBV). When the number of temporary read errors that occurred exceeds the value of r, the operator is notified via a message on SYSLOG. The maximum value for r cannot exceed 254. EVA=(r,w) forces TAPE=7.

When the number of temporary write errors that occurred exceeds the value of w, the operator is notified via a message on SYSLOG. The maximum value for w cannot exceed 254.

After the operator message the system resets the temporary error count to zero and continues normal processing.

GETVIS={NO / YES} Specify YES if storage management support using the GETVIS and FREEVIS macro instructions is desired. GETVIS=YES is forced if VSAM=YES is specified in the SUPVR macro. GETVIS=YES forces RELLDR=YES.

IDRA={NO / YES} Specify IDRA=YES if the Independent Directory Read-in Area (IDRA) is desired. IDRA=YES allows the system to read the directory containing the location of the phase specified in a FETCH or LOAD into the IDRA instead of using the System Error Recovery Procedure transient area. Thus, with the IDRA feature, throughput may increase when an error recovery procedure is in progress. IDRA=YES is valid only if the NPARTS parameter in the SUPVR macro specifies more than one partition.

IT={NO / YES} Specify if the interval timer can be handled by problem programs. IT=YES generates timer support for all tasks in all partitions. It allows use of the STXIT IT and SETIME macros.

Note: For reasons of compatibility with earlier DOS releases, specification of IT=BG, F1, or F2 is accepted by the assembler. Timer support for all tasks in all partitions is generated as if IT=YES had been specified.

JA={NO / YES / (n_1,n_2,n_3,n_4,n_5)} Specify if Job Control Job Accounting Interface is to be supported.

JA=YES indicates support for each partition.

JA=(n_1,n_2,n_3,n_4,n_5) specifies additional support of SIO count for I/O devices, and JA=YES is generated. The values substituted for n_1, n_2, n_3, n_4, and n_5 indicate the number of I/O devices per partition for which SIOs are to be counted. The maximum value for n for any partition is 255; n_1

always specifies the number for the background partition.

The partitions to which n_2 through n^5 refer depend on the number of partitions in the system, as is shown below:

	n_2	n_3	n^4	n^5
2 partitions	F1			
3 partitions	F2	F1		
4 partitions	F3	F2	F1	
5 partitions	F4	F3	F2	F1

If no SIO count is required for a given partition, no value should be supplied. However, the operand delimiter (comma) must be submitted if other values follow.

For example, if NPARTS=5 and JA=(10,,3) are specified, SIO count is supported for:

10 I/O devices for the background partition
 0 I/O devices for the F4 partition
 3 I/O devices for the F3 partition
 0 I/O devices for the F2 partition
 0 I/O devices for the F1 partition

JALIOCS={ NO / (s,1) } Specify for support of user-written job accounting routines containing LIOCS, and LIOCS with label processing. If you specify JALIOCS=(s,1), JA=YES or (n_1,n_2,n_3,n^4,n^5) must be specified as well.

s and 1 reserve a user save area and a label area equal to their specifications (i.e., if s equals 25, then a 25-byte save area is reserved). s can be any decimal number in the range 0 - 1024. If s is omitted, or if JALIOCS=NO, a 16 byte user save area is still reserved in the supervisor if JA≠NO is specified. 1 can be any decimal number between 0 and 224.

OC={ NO / YES } Specify if operator-initiated communication is to be handled by problem programs. Allows use of the STXIT OC macro. If YES is specified, the facility is available to all partitions generated. YES is required if emulator program operator services are to be requested through the interrupt key. If RETAIN=YES or OLTEP=YES is specified, OC=YES is forced.

OLTEP={ YES / NO } Specify OLTEP=YES if the online testing function is desired. OLTEP=YES allows the online test executive program to execute. If OLTEP=YES, then RELLDR=YES and OC=YES are forced. Specification of RETAIN=YES forces OLTEP=YES to be generated.

PC={ NO / YES } Specify if user programs may use STXIT PC macros. QTAM, FORTRAN IV, COBOL-D, and PL/I require PC=YES.

PCIL={ NO / YES } Specify if private core image libraries are to be supported. These have the same format as the

system core image library on SYSRES. You may assign private core image libraries to any partition. If the linkage editor is to run in a foreground partition, a private core image library must be uniquely assigned to that partition. You may link-edit many IBM-supplied programs to run in a foreground partition and place them in a private core image library to be assigned to that partition. PCIL=NO forces PSLD=NO.

PD={NO / YES / n}

The PD parameter must be specified if the problem determination programs (EDAID) are desired. PD=YES specifies that a minimum PDAREA of 1,400 bytes is reserved for this function. Any amount between 1,400 (SDAIDs do not need a generated area) and 10,240 bytes may be specified for n.

PFIX={NO / YES}

Specify if the supervisor is to support the fixing and freeing of pages by means of the PFIX and PFREE macro instructions. PFIX=YES is forced if PHO=YES is specified in the SUPVR macro or if ECPREAL=YES is specified. PFIX=YES is required if you plan to execute BTAM programs in virtual mode.

PRTY=(partition name sequence)

Specify, by means of a partition name sequence, the desired dispatching priority for each partition. The partition specified first has the lowest priority, the partition specified last has the highest priority. Specify all the partitions for which support is generated by means of the NPARTS parameter of the SUPVR macro or by default.

The partition default pricrity is as follows:

Number of partitions	Default pricrity (low to high)
1	BG
2	BG,F1
3	BG,F2,F1
4	BG,F3,F2,F1
5	BG,F4,F3,F2,F1

PSLD={NO / n}

Specify the number of entries in the Private Second Level Directories. A directory is created for each partition, unless PCIL=NO. The minimum value for n is 5. PSLD=NO is assumed if the parameter is omitted or incorrectly specified. For good performance n should be equal to the largest number of actually used directory tracks of a private core image library. PCIL=NO forces PSLD=NO.

RELLDR={NO / YES}

Specify if the supervisor is to include the relocating loader. This facility allows programs to be loaded into partitions, independent of their link-edited addresses. RELLDR=YES is forced by VSAM=YES, GETVIS=YES, CLTEP=YES, or RETAIN=YES.

Note: If the supervisor is generated to include the relocating loader, the function can be suppressed at link-edit time by means of an 'ACTION NORELL' statement.

RETAIN={NO / YES} The RETAIN function is available on the Model 145 in the United States of America and Canada only. RETAIN is an OLTEP function that allows the OLTEP programs initiated from a remote location to be executed. RETAIN is a problem determination tool used by IBM. If this function is to be used, specify RETAIN=YES and include the IBM 2955 Retain Communications Device in the PUB table. External interruptions are required for RETAIN operation; therefore, if RETAIN=YES is specified, OC=YES, OLTEP=YES, and RELLDR=YES are forced.

SKSEP={NO / YES / n} Specify if SEEKs are to be separated from the remainder of channel programs. Seek separation allows other devices on the channel to be accessed (including other seeks) during the seek. YES indicates support for all DASD type devices specified by the DVCGEN macro at system generation time. n is the number of DASD devices to be supported and cannot be less than the number of DASD devices specified at system generation. The maximum is 254.

Note: If all DASD devices in your configuration have Disconnect Chaining (DCC) capability and if they are attached to block multiplex channels, channel overlap during SEEKs is more efficiently handled by Block Multiplex Channel Support (specify BLKMPX=YES in the PIOCS macro). In a mixed DASD configuration, that is a configuration consisting of DASDs with and without DCC capability, specify either SKSEP, or SKSEP and BLKMPX.

SLD={5 / n} Specify the number of entries in the Second Level Directory. The minimum value for n is 5. This is the default value if the parameter is omitted or incorrectly specified. For good performance n should be equal to the number of actually used directory tracks in the system core image library.

SYSFIL={NO / YES / (YES,n_1,n_2)} Specify if system input and system output files (SYSRDR, SYSIPT, SYSLST, SYSPCH) in any partition may be assigned to a disk device or an IBM 3540 Diskette I/O Unit, or, if support for the procedure library is desired. Specification of YES gives support for all disk devices and the IBM 3540 Diskette Input/Output Unit. In a configuration without tape, specification of SYSFIL=YES is required for system maintenance purposes. If the emulator program parameter SYSIO is specified with a value ranging from 200 through 233, a value must be specified for SYSFIL.

n_1 = residual capacity for beginning of operator notification when SYSLST assigned to disk. $100 \leq n_1 \leq 65535$. If n_1 is omitted, 1000 is assumed.

n_2 = residual capacity for beginning of operator notification when SYSPCH assigned to disk.

$100 \leq n_2 \leq 65535$. If n_2 is omitted, 1000 is assumed.

Notes:

1. If neither n_1 nor n_2 is specified, the operand need not be placed between parentheses ().
2. Neither n_1 nor n_2 may be specified if the logical units are assigned to an IBM 3540 Diskette Input/Output Unit.

TEB={NO / n} Specify if tape error statistics are to be accumulated and logged for the 2495 Tape Cartridge Reader, where n is the number of tape cartridge readers attached to the system. Choose a value of n that allows for possible future expansion of the system.

TEBV={IR / CR} Specify how tape statistics are to be automatically accumulated in the PUB2 table and logged on the SYSREC file. For all standard labeled tapes, tape statistics are accumulated by volume. For unlabeled or nonstandard labeled tapes two types of error recording are available:

- Combined Recording (CR)
- Individual Recording (IR)

When TEBV=CR is specified, the error statistics for all nonstandard and unlabeled tapes on a specific tape unit are accumulated until a standard labeled tape is mounted and opened on that unit. Then one recording of the statistics for the nonstandard, unlabeled tapes is made and the counters are reset in the PUB2 table.

Specify TEBV=IR to record tape error statistics on the SYSREC file and reset the PUB2 table counters at each OPEN for nonstandard and unlabeled tapes.

TOD={NO / YES} Specify if time of day clock support is desired. If YES is specified, GETIME macro support is provided. Every time a GETIME is issued, the date fields in the supervisor communication regions are updated, if necessary. TOD=NO forces ZONE=NO.

TRKHLD={NO / n} Specify if the track hold function is to be supported. Specification of TRKHLD generates support for the DASD Track Protection macros. When processing sequential disk workfiles or updates to direct-access files, specify if a hold is to be placed on the track of the record being read. The hold prevents anyone else that is using track hold from accessing that track. The maximum number of tracks that can be held at one time is 255. The default is 10 if n is an invalid parameter (nonnumeric or outside the range 1-255). The NPARTS parameter in the SUPVR macro must specify more than one partition if TRKHLD=n is specified.

Note: The track hold function is not supported for the IBM 3540 Diskette I/O Unit.

VSAM={NO|YES} Specify if support of the Virtual Storage Access Method (VSAM) is desired. YES is forced for GETVIS, AB, and RELLDR if VSAM=YES is specified.

WAITM={NO|YES} Specify if the multiple wait function is to be supported. This function allows you to use the WAITM macro to wait for one of a number of events to occur. WAITM=YES is forced if AP=YES.

ZONE={NO|(EAST,hh,mm)|(WEST,hh,mm)} For time of day clock support, specify the difference between Greenwich Mean Time (GMT) and local time in hours (hh) and minutes (mm). Specify EAST for areas to the east of the meridian of Greenwich, United Kingdom, or for areas whose time is in advance of GMT. Specify WEST for areas to the west of the meridian of Greenwich, United Kingdom, or for areas whose time is behind GMT. The value used in the ZONE parameter is used to obtain the local time-of-day. If the parameter is not specified, or incorrectly specified, or if TOD=NO is specified, ZONE=NO is forced. If the first operand is incorrectly specified, EAST is assumed.

You can change the zone value (default is GMT) every time you perform the IPL procedure, by specifying any zone value in the ZONE parameter of the SET control statement.

Notes:

1. Information on the macro instructions STXIT, EXIT, SETIME, and TTIMER is contained in the DOS/VS Supervisor and I/O Macros, GC33-5373.

2. The Physical Transient Overlap (PTO) feature and command chaining support for retry on I/O operations (CCHAIN), optional in earlier releases of DOS, have been made standard. If, however, you erroneously specify either PTO or CCHAIN (whether the operand is YES or NO), the assembler will accept your specification and react only by generating an MNOTE, which you need not resolve.

PIOCS

The Physical Input/Output Control System (PIOCS) macro instruction and its parameters define the configuration requirements to be supported by physical IOCS. If the assumed options are all satisfactory, the only entry required is the PIOCS macro itself, without any parameters.

PARAMETERS FOR PIOCS

BLKMPX={NO / YES} Specify if block multiplexer mode is to be supported for block multiplex channels. Block Multiplex Channel Support is useful in a configuration with DASD devices that have disconnect command chaining (DCC) capability and are attached to block multiplex channels: all 3330s, and 3340s fitted with the DCC hardware feature (DVCTYP=3340R specified in the DVCGEN macro or in the IPL ADD command), and the following buffered card and print devices: 2540, 1403, 3211.

Note: In a DASD configuration that consists of devices with DCC capability only, there is no need to specify SKSEP=YES or n in the FCPT macro as Block Multiplex Channel Support provides channel overlap during SEEKs in a more efficient way. Moreover, the code generated by a specification of SKSEP=YES is then bypassed if BLKMPX=YES is specified.

BMPX={NO / YES} Specify if burst mode devices are supported on a byte-multiplexer channel. If YES is specified, unbuffered (overrunnable) devices will not be allowed to execute I/O concurrently. If 1419s or 1255/1270/1275s are attached to the byte-multiplexer channel, BMPX=YES may be specified. However, burst mode and MICR devices cannot run concurrently on the same byte-multiplexer channel.

CHANSW={NO / RWTAU / TSWTCH} Specify if channel switching for tape control units is to be supported. For a 2404 or 2804, enter CHANSW=RWTAU. For a 2816 (with a 2403 or 2803) or a 3803 enter CHANSW=TSWTCH. If CHANSW=RWTAU or TSWTCH is specified and TAPE=NO is specified, TAPE=7 is forced. Channel switching allows a device to be addressed via two adjacent selector or block-multiplexer channels.

DISK={2311 / 2314 / 3330 / 3340 / (3330,3340)} Support for the IBM 2311, 2314/2319, and 2321 is default. Specification of DISK=3330 gives support for all attachable DASD devices, except the IBM 3340. Specification of DISK=3340 gives support for all attachable DASD devices except the IBM

3330. Specify DISK=(3330,3340) if support for both devices is desired.

Note: DISK=3340 is the only valid specification for the Model 115. Specification of DISK=2311 or 2314 is not valid for the Model 125. If MODEL=115 and DISK≠3340, DISK=3340 is forced. If MODEL=125 and DISK≠3330 or 3340, DISK=3330 is forced.

MRSLCH={NO / YES} Specify if MICR device is on the selector channel (can only be specified for the 1419 single address device).

TAPE={7 / 9 / NO} Specification of TAPE=7 generates support for both 7- and 9-track tape. TAPE=7 is forced by a specification of EVA=(r,w) and by CHANSW=RWTAU or TSWTCH. If MODEL=125 and TAPE=7, or 9, CHAN=YES must also be specified. In a configuration without tape, specification of SYSFIL=YES is required for system maintenance purposes.

Note: Selector channel support is standard in DOS/VS. The parameter SELCH=, used in prior DOS releases, is ignored.

VSTAB

The Virtual Storage Table and Buffer Build (VSTAB) macro instruction and its parameters define the size of the real and virtual address areas and of the Shared Virtual Area (SVA), and specify the number of buffers required for channel program translation. Tables, for mapping the real and virtual address areas, and buffers are generated within the supervisor area. The maximum value you can specify for VSIZE is 16,000K (16,777,216 bytes) minus the size specified for the real address area (RSIZE). Specification of this macro is required. The VSTAB macro is discussed in greater detail in the DOS/VS System Management Guide, GC33-5371.

PARAMETERS FOR VSTAB

VSTAB RSIZE={96K / nK} ,VSIZE={NPARTS*64K+SVA_size / nK} [,BUFSIZE=n],SVA={(64K,0K) / (nK,mK)}

RSIZE=nK Specify the size of the real address area, where n must be ≥ 64 and a multiple of 2. If an odd number is specified, a value of 1 is added to it. If the operand is omitted, a value of 96K is assumed. The value specified is used to build the tables that map the real address area and to define the beginning of the virtual address area. (End of real address area = beginning of virtual address area.)

If you select a value for RSIZE that is larger than the amount of real storage in the CPU model used for system generation (with an eye to also using your system on a CPU with larger real storage), the address area between the end of real storage and the beginning of virtual storage will not be used.

VSTAB RSIZE=512K,
VSIZE= 200K)
SVA=(200K, 40K)

SUPVR NPARTS=5,
PAGEIN=5, = TO NPARTS SPEC

If you select a value for RSIZE that is smaller than the actual amount of real storage in the CPU on which your system is to be used, any real storage beyond your RSIZE cannot be used, and a warning message is issued at IPL time (provided that you IPL from the console keyboard), informing you that a part of real storage is not used. If you IPL from the card reader, however, the message is suppressed.

VSIZE={NPARTS*64K / +SVA_Size_ / nK}

Specify the size of the virtual address area (which includes the Shared Virtual Area - SVA), where n must be at least 64 times the number of partitions specified by the NPARTS parameter and a multiple of 2, plus the size of the Shared Virtual Area (SVA). If an odd number is specified, a value of 1 is added to it. If the operand is omitted, a value of 64 times the number of partitions specified by the NPARTS parameter is assumed. The value specified is used to build the tables that map the virtual address area, to determine the size of the disk extent for the page data set, and to define the end of the virtual address area.

BUFSIZE=n

Specify the number of copy blocks (buffers with a length of 72 bytes) to be used by the Channel Program Translation routine. Specification of this parameter is optional. If the operand is omitted and the NPARTS parameter specifies a value greater than 1, a value of 30 is assumed. The default is 10 if NPARTS=1 is specified. The minimum value that can be specified, regardless of the NPARTS= specification is 10.

SVA={(64K,0K) / (nK,mK)}

nK specifies the size of the Shared Virtual Area (SVA); mK specifies the size of the system GETVIS area in the SVA. n must be at least 64 and a multiple of 2. m must be smaller than n and also a multiple of 2. If the operand is omitted or incorrectly specified, the default value is taken. If your system is generated to include VSAM support, specify SVA=(200K,0K).

Note: This parameter is only valid if the NPARTS parameter of the SUPVR macro specifies more than one partition (NPARTS=>1).

ALLOC

The Allocate (ALLOC) macro instruction defines the partitioning of the virtual address area in a multiprogramming system. Specification of this macro is optional because the operator can also allocate the virtual storage address area. It can only be specified with at least one parameter. Specify the size of the virtual foreground partitions only. The system computes the size of the virtual background partition by subtracting the total amount of virtual storage allocated to the virtual foreground partitions from the virtual address area as specified by the VSIZE parameter. When specifying the ALLOC macro, see to it that the size of the background area does not fall below 64K bytes. If the macro is omitted, the entire virtual address area is allocated to the virtual background partition and the size of each virtual foreground partition defined is set to zero. The ALLOC macro must not be used if NPARTS=1 is specified.

PARAMETERS FOR ALLOC

ALLOC F1=nK,F2=nK,F3=nK,F4=nK

The operands may be specified in any order. n must be a multiple of 2. If an odd number is specified, it is replaced by the next higher even number. The minimum value substituted for n may not be less than 64. A zero specification is accepted, however. Any specification from 1 through 63 is reset to zero.

If the sum of the sizes specified for all foreground partitions plus the SVA plus 64K exceeds the size as specified by the VSIZE parameter, the ALLOC macro is ignored by the assembler, which issues an MNOTE to that effect.

System-Used Areas

All partitions contain a partition save area for program name, interrupt status information, and registers, as well as a label save area for label processing if the LBLTYP job control statement is used. Both areas are at the beginning of the partition.

Save area length is 88 bytes, or 120 bytes if the floating-point feature (FP=YES) was specified in the CONFG macro.

Label area length is determined by the system according to the LBLTYP specification:

- TAPE (standard tape labels) = 80 bytes
- NSD (nn) (nonsequential disk) = 84 bytes plus 20 bytes per EXTENT statement
- Omitted = 0 bytes.

The size of each virtual partition must be large enough to contain both the program and the save areas.

ALLOCR

The Allocate Real Storage (ALLOCR) macro instruction allocates available real storage to your partitions (as defined by the NPARTS= parameter of the SUPVR macro).

In a multiprogramming system, available real storage is the real storage size of your CPU as specified by the RSIZE parameter of the VSTAB macro, less the size of your supervisor. In a single partition system (NPARTS=1) specification of the ALLOCR macro is not accepted. All available real storage is always allocated to the background real partition.

The ALLOCR macro instruction is optional, since available real storage can also be allocated or reallocated by means of the ALLOCR command. ALLOCR must be specified with at least one parameter. Specify the size of each real partition you desire (including the background partition). If a partition is omitted, it is allocated a real partition size of zero. All available real storage not allocated to real partitions is allocated to the Page Pool. Bear in mind that programs executing in virtual mode and using the PFIX macro instruction require an allocated real partition whose size is not less than the maximum number of pages concurrently fixed by PFIX.

All of available real storage may be allocated to real partitions with the exception of:

- 18K bytes minus the size of the smallest real partition if the smallest real partition is 18K bytes or less and PFIX=NO (plus 2K bytes if AP=YES). If the SDL (System Directory List) is active, however, the main page pool must be at least 4K bytes.
- 18K bytes if PFIX=YES (plus 2K bytes if AP=YES).
- 18K bytes if phases from the SVA are to be executed.

At IPL time, the partition allocation of real storage is checked to see if the above rules have been obeyed. If the allocation exceeds the maximum allowed, all real partitions are set to zero, and an operator message is issued. The operator can correct the problem with an ALLOCR command.

PARAMETERS FOR ALLOCR

```
ALLOCR BGR=nK,F4R=nK,F3R=nK,F2R=nK,F1R=nK
```

The operands may be specified in random order. n must be a multiple of 2. If an odd number is specified, it is replaced by the next higher even number. For each real partition allocated, the corresponding virtual partition must be allocated too, because the job control program runs in virtual mode.

System-Used Areas

The size of each active real partition must be large enough to contain both the program to be executed and the partition and label save areas (see the description of the ALLOC macro).

IOTAB

The Input/Output Tables (IOTAB) macro instruction and its parameters define the area for the necessary device tables for the system. If the assumed options are all satisfactory, the only entry required is the IOTAB macro itself without any parameters.

PARAMETERS FOR IOTAB

BGPGR={10 / n}

Specify the number of symbolic programmer logical units (SYS000-SYSnnn) assigned to the background partition. The minimum number is 10. The maximum depends on the number of partitions. See Note, which follows.

BSCLNS={1 / n}
(Models 115 and 125 only)

If the TP parameter in the SUPVR macro indicates teleprocessing support and the MODEL parameter of the CONFG macro specifies 115 or 125, this parameter specifies the number of BSC lines in the system. The value given must be in the range of 0 - 4 for the Model 115 and 0 - 6 for the Model 125.

CHANQ={10 / 8 / 6 / n}

Specify the maximum number of entries to be generated for the channel queue. If the parameter is omitted, the following defaults are taken:

	Default value
NPARTS=1-3:	6 plus value specified by CBF parameter.
NPARTS=4 :	8 plus value specified by CBF parameter.
NPARTS=5 :	10 plus value specified by CBF parameter.

The number of entries specified should exceed the total number of I/O requests you wish to accumulate simultaneously. The requests for I/O commands for all channels are stored in this queue and are not released from the queue until the I/O operation has completed. The maximum value generated is 255. (See the DOS/VS System Management Guide, GC33-5371, for a detailed discussion of this parameter.)

D2311=n
D2314=n
D2321=n
D2400=n
D3330=n
D3340=n
D3410=n
D3420=n
D3540=n
D3886=n

Specify, for each I/O device listed at the left, the number of drives that are attached to your system.

If the device is not specified, the system assumes that no devices of that type are attached. However, defaults other than zero are taken depending on the CPU Model specified and (for tape devices) whether PIOCS tape support is generated or not (see table below):

Default if	PIOCS Macro: TAPE= 7/9	CONFG Macro		
		MODEL=115	MODEL=125	MODEL=135, 145, 155-II, cr 158
D2314=2				X
D2400=4	X			X
D3330=2			X	
D3340=2		X		
D3410=2	X	X	X	

The number specified for each drive may be more than the actual number attached, but if the total number of devices specified exceeds the number of devices specified in the IODEV parameter, the latter number is upgraded (total number of devices specified by the Dxxxx parameters plus 5 for unit record devices).

F1PGR={5/n*}
F2PGR={5/n*}
F3PGR={5/n*}
F4PGR={5/n*}

Specify the number of symbolic programmer logical units (of the class SYSnnn) for the Foreground partitions. The minimum value for n is 5, while the maximum depends on the number of partitions (see Note).

*Note: For an unsupported partition n=0 is assumed. The maximum values for the sum of all n's are as follows:

	Number of partitions				
	1	2	3	4	5
Maximum value for sum of n's:	241	227	213	199	185

Note: The maximum number of programmer logical units you can assign to a specific partition is the maximum for the system minus the sum of the units assigned to all other partitions.

IODEV={10/n}

Specify the number of I/O devices and communication lines attached to the system. The maximum is 255. The minimum value is 6. Each unit requiring a DVCGEN or ADD entry must be included in n.

JIB={5/n}

Specify the number of JIBs (Job Information Blocks) for the system.

Requirements are:

1. One JIB for each logical unit temporarily reassigned by a // ASSGN statement that

differs from standard system assignment (that is, established at IPL time)

2. One JIB for each alternate logical unit assignment

3. One JIB for each open 2311, 2314, or 2319 extent with the DASD file-protect feature except for system input/output extents

4. Two JIBs for each open 2321, 3330, or 3340 extent with the DASD file-protect feature.

The minimum value generated is 5. The maximum is 255.

SSLNS={4 / n} (Models 115 and 125 only)

If the TP parameter in the SUPVR macro indicates teleprocessing support and the MODEL parameter of the CONFG macro specifies 115 or 125. this parameter specifies the number of Start/Stop lines in the system. The value given must be in the range 0-8 for the Model 115 and 0 - 16 for the Model 125.

DVCGEN

The Device Generation (DVCGEN) macro instruction and its parameters define the physical input and output units attached to the system. This macro instruction is optional. The DVCGEN macro is further discussed in the DOS/VS System Management Guide, GC33-5371.

PARAMETERS FOR DVCGEN

CHUN=X'cuu',DVCTYP=xxxxxx,CHANSW={NO / YES},MODE=X'ss'

CHUN=X'cuu' Specify the hexadecimal number of the channel and unit for the device. If channel switching is supported, c must indicate the lower channel.

DVCTYP=xxxxxx Specify the device type. Figure 1-4 contains the codes for each IBM-supported device.

CHANSW={NO / YES} Specify if the device is attached to more than one channel on one system, that is

a. 2 selector channels
b. 2 block multiplexer channels, or
c. 1 selector channel and 1 block multiplexer channel

Note: DOS/VS requires that the channels have consecutive addresses (for instance channels 1 and 2).

This parameter indicates if the device can be switched (IBM 2816 (with a 2403, 2803, or 3803), 2804 or 2404 available).

MODE={ X'ss' / X'ssss' / X'ssssss' }

1. 2400T9. MODE specifies the tape mode. X'C0' is the default value. For 800 bpi 9-track single density, specifying X'C8' saves time during tape OPEN.

2. 3410T9. MODE specifies the tape mode. X'C0' is the default value.

3. 3420T9. MODE specifies the tape mode. X'C0' is the default value.

4. 2400T7 or 3420T7. MODE specifies the tape mode. X'90' is the default value.

5. 2702. MODE designates the SADxxx command.

   X'00' SAD0 (default)
   X'01' SAD1
   X'02' SAD2
   X'03' SAD3

   See "IPL Control and ASSGN Statements for System Generation" for other values of ss.

6. 2260 (Local) and 3270 (Local). MODE specifies the 1053, 3284, or 3286 printer when CHUN=X'cuu' refers to a 1053 attached to a 2848, a 3284 attached to a 3272, or a 3286 attached to a 3272, respectively. The operand must be entered as MODE=X'01'.

7. 1419/1255/1259/1270/1275. MODE designates the external interrupt bit associated with magnetic ink character readers or optical reader/sorters. The mode X'01' through X'20' corresponds to external interrupt PSWs bits 26 through 31, respectively. For dual address adapter 1419, this parameter is needed for both 1419P and 1419S.

   X'01' Device attached to external line 7.
   X'02' Device attached to external line 6.
   X'04' Device attached to external line 5.
   X'08' Device attached to external line 4.
   X'10' Device attached to external line 3.
   X'20' Device attached to external line 2.

8. 1018. MODE specifies whether the error-correction feature is present or not. X'00' feature not present (default value). X'01' feature is present.

9. 2703. For the IBM Models 115 and 125 with the Integrated Communications Adapter, MODE=x'ss', MODE=X'ssss', or MODE=X'ssssss' specifies the line mode setting for a Start/Stop or BSC line if the TP parameter in the SUPVR macro indicates teleprocessing support and the MODEL parameter in the CONFG macro specifies 115 or 125. If a one or two byte value is specified, the specified value is right-justified and padded with zeros on the left to fill the three bytes. Thus, to specify a single-byte value for a Start/Stop line

that requires only one byte, you must supply a three-byte value, the leftmost byte of which contains the requested mode settings. The line mode setting and its default settings are discussed in System/370 Model 125 Functional Characteristics, GA33-1506 and in System/370 Model 115 Functional Characteristics, GA33-1510.

10. 3705. MODE specifies the type of channel adapter. No default is assumed.
X'01' Type 1 channel adapter
X'02' Type 2 channel adapter
If the MODE parameter is omitted or incorrectly specified, the assembler issues an MNOTE.

RULES FOR USING DVCGEN

1. A separate DVCGEN macro instruction is required for each device. For a 2314, 2319, 3330, or 3340 each individual unit needs a DVCGEN card.

2. The total number must not exceed the total number of devices specified in the IODEV parameter of the IOTAB macro.

3. DVCGEN macros must be specified in ascending channel address sequence.

4. Switchable units attached to more than one channel, that is

   a. 2 selector channels

   b. 2 block multiplexer channels, or

   c. 1 selector channel and 1 block multiplexer channel,

   must be defined only once on the lowest channel by which they are addressable. They cannot be redefined as nonswitchable units on the higher channel.

5. The sequence of the DVCGEN cards determines the position of the devices in the PUB table. SYSRES should be the first DVCGEN card if it is to have the highest software priority for that channel. Switchable units must be the last devices specified for each channel and must be on consecutive channels.

6. The specifications of these macros can be altered at IPL by ADD and DEL statements.

7. IBM 3210/3215 Console Printer-Keyboards that are not online but were defined by DVCGEN statements must be deleted by DEL statements when performing IPL from the card reader.

ASSGN

The Assign (ASSGN) macro instruction and its parameters assign symbolic device names (LUBs) to physical I/O devices (PUBs). A separate macro instruction is required for each symbolic device name with a standard system generation assignment. This macro instruction is optional,

however, since the assignments can also be made after IPL. If the assignment is made at system generation time, the system uses it as a default assignment.

PARAMETERS FOR ASSGN

SYSnnn,X'cuu' [,BG / ,F1 / ,F2 / ,F3 / ,F4] [,H1 / ,H2]

Symbolic name may be any of the following system logical units or programmer logical units:

SYSRDR SYSLST SYSREC
SYSIPT SYSLOG SYSRLB
SYSPCH SYSLNK SYSSLB
SYSCAT
SYS000-SYS240(1-partition system)
SYS000-SYS221(2-partition system)
SYS000-SYS202(3-partition system)
SYS000-SYS193(4-partition system)
SYS000-SYS164(5-partition system)

X'cuu' is the hexadecimal number of the channel* and unit to which the symbolic device is attached. A separate macro is required for each standard assignment desired.

*must be the lower of two channel numbers if channel switching is supported.

BG, F1, F2, F3, or F4 specifies the partition to which the assignment is being made. The ASSGN macro is ignored if a specification is entered for a partition not defined by the NPARTS parameter of the SUPVR macro, or not defined by default if the NPARTS parameter was not specified. If the parameter is omitted, while the next parameter is specified, indicate the omission by separating the last and the next parameters by means of two commas.

H1 or H2 specifies the desired input hopper to be used for an IBM 2560 or 5425. If both hoppers are to be used, they must be separately assigned to the same partition by means of two ASSGN macros. If the operand is omitted H1 is assumed.

Note: H2 may only be assigned to SYSRDR, SYSIPT, or SYSPCH. H2 must not be specified if the IBM 2560 or 5425 is assigned to a partition supported by POWER.

Making a standard foreground assignment at system generation time is equivalent to making a permanent assignment after IPL. When you unbatch a foreground partition, temporary assignments are released.

System I/O units (SYSRDR, SYSIPT, SYSLST, or SYSPCH) that are assigned to a tape, a 3540 Diskette, or DASD when the system is generated are unassigned by IPL. An unassigned device can cause a job to be canceled.

Notes:

- During system generation, conflicting assignments (ASSGN macro specifications made in the supervisor assembly) across partitions are not checked.
- If SYSLOG is assigned to a foreground partition, it must also be assigned in the background partition.
- Compile, link-edit, and go in a foreground partition is allowed only if a private core image library is supported and available. Therefore, SYSLNK must be assigned to a foreground partition if PCIL=YES has been specified and NPARTS>1. Note that the assignment can also be made at execution time.

DPD

The Define Page Data Set (DPD) macro instruction and its parameters define the page data set (SYSVIS) that is to hold the virtual address area. Specification of this macro is optional, since the data set can also be defined after IPL by means of the DPD command. It provides information about the channel and unit number of the paging device, disk starting address of the SYSVIS extent and the volume serial number.

If the macro is omitted or incorrectly specified, the page data set must be defined at IPL time by means of the DPD command (see the DOS/VS System Management Guide, GC33-5371). This command can also be used to override the information supplied by the DPD macro, until the next IPL.

The IPL routines open the page data set, check its extent limits, create label information for inclusion in the VTOC, and assign the symbolic name of SYSVIS to the page data set.

Note: The ASSGN statement or command cannot be used to assign or re-assign SYSVIS.

PARAMETERS FOR DPD

```
DPD UNIT=X'cuu',CYL=nnn,VOLID=xxxxxx
```

UNIT=X'cuu' Specify (in hexadecimal notation) the channel and unit number of the device that is to contain the page data set. (If UNIT is specified, then CYL must also be specified.)

CYL=nnn Specify the number of the cylinder where the page data set is to begin. The upper limit of the extent is computed by the system on the basis of the information supplied in the VSIZE parameter of the VSTAB macro. The assembler issues an MNOTE indicating the required number of tracks. (If CYL is specified, UNIT must also be specified.)

VOLID=xxxxxx This parameter is optional. It specifies the volume serial number of the disk pack and is used for label checking. If the parameter is not specified in either the DPD macro or the DPD command, the volume serial number is not checked.

SEND(n)

The Supervisor End (SEND) macro instruction indicates the address of the problem program area (PPBEG). PPBEG is always on a 2K boundary and coincides with the address at the end of the supervisor (EOSSP). Regardless of whether the SEND macro is specified with or without the n parameter, the generated supervisor is always fully storage-protected.

Choose a value for n only if you want to reserve extra space within the supervisor area for future expansion, or for other purposes described below. If a value for n is selected which is larger than the size of the generated code, extra space is reserved between the end of the supervisor nucleus (NUCEND) and the beginning of the transient area (SYSEND) (see Figure 1-2). The system will not claim the extra space, not even for additional CCW translation copy buffers. However, if n is not specified, any extra space between the end of the supervisor and the next 2K boundary, is used for these buffers. If the space reserved is sufficient for a future expansion of the supervisor, you will thereby avoid having to relink-edit non-relocatable programs, link-edited for the real background partition. In the meantime, you may use the extra space to expand the Problem Program Determination Aids (PDAIDS) area.

If your supervisor includes the relocating loader, no relink-editing is required for programs that were link-edited relocatable for a real partition. Moreover, because the address of the virtual background area is independent of the supervisor end address, expansion of the supervisor never involves relink-editing of programs that are link-edited for a virtual partition.

Note: The DOS/VS assembler requires an END and a /* statement following the SEND macro.

PARAMETERS FOR SEND

n Specify the desired address (PPBEG) of the real address area for use by programs other than the supervisor. Depending on the value selected for n, the assembler takes the following actions:

n specified?	n=multiple of 2048	n≥size of generated supervisor?	Assembler action taken
YES	YES	YES	Specification is accepted.
YES	NO	YES	Address specified is stepped up to next higher 2K boundary.
YES	YES	NO	Address specified replaced by generated supervisor end address (PPBEG).
YES	NO	NO	
NO	-	-	Address of PPBEG established on 2K boundary.

Figure 1-2. Supervisor End Address Computation on the Basis of Different SEND Macro Specifications

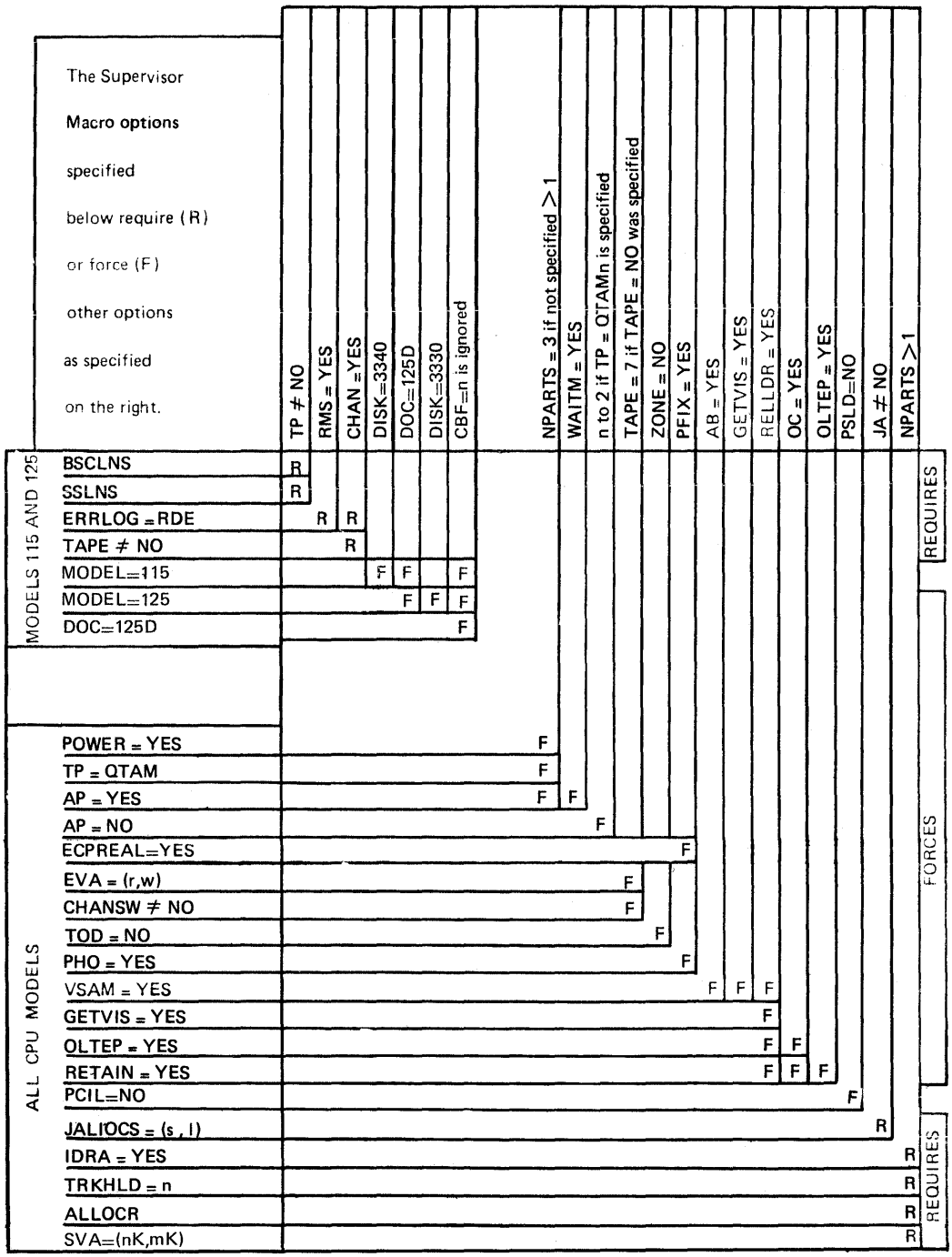


Figure 1-3. SUPERVISOR--Macro Instructions

Card Code	Actual IBM Device	Dev. Type X'nn'	Device Type
7770	7770 Audio Response Unit	D3	Audio Response Units
2501	2501 Card Reader	10	Card Readers
2540R	2540 Card Reader	11	
3505	3505 Card Reader	12	
3504	3504 Card Reader	12	
2540P	2540 Card Punch	21	Card Punches
2520B2	2520B2 Card Punch	20	
1442N2	1442N2 Card Punch	22	
2520B3	2520B3 Card Punch	20	
3525P	3525 Card Punch	23	
1442N1	1442N1 Card Read Punch	30	Card Read Punches
2520B1	2520B1 Card Read Punch	31	
2560	2560 Multy - Function Card Machine	33	
2596	2596 Card Read Punch	30	
3525 RP	3525 Card Punch (with optional read feature)	23	
5425	5425 Multifunction Card Unit	34	
2311	2311 Disk Storage Device	60	DASD
2314	2314 Direct Access Storage Facility	62	
2314	2319 Disk Storage Facility	62	
2321	2321 Data Cell Drive	61	
3330	3330 Disk Storage - 1, 3330 - 2, or 3333 - 1	63	
3340R	3340 Disk Storage with DCC feature (with or without 3340 Data Module, Model 35)	69	
3340R	3340 Disk Storage with DCC feature (with or without 3340 Data Module, Model 70)	6A	
3340	3340 Disk Storage without DCC feature (with or without 3340 Data Module, Model 35)	69	
3340	3340 Disk Storage without DCC feature (with or without 3340 Data Module, Model 70)	6A	
3540	3540 Diskette Input/Output unit	80	Diskette Storage Device
2955	2955 Data Adapter Unit	D7	Data Link for RETAIN
125 D	Model 125 Integrated Display Operator Console	B2	Display Operator Console
125 DP	Model 125 Integrated Display Operator Console with 5213 Console printer attached	B2	
2260	2260 Display Station	C0	Display Stations
3277 (local 3270)	3277 Display Station; MODE operand need not be entered	B0	
3277B (local 3270)	3277 Display Station; attached in Burst Mode to a multiplexer channel. MODE operand need not be entered	B0	
2400T9	9 - track Magnetic Tape Units } 2400 - series	50	Magnetic Tape Devices
2400T7	7 - track Magnetic Tape Units } 2400 - series	50	

Figure 1-4. SUPERVISOR--Device Code (Part 1 of 2)

Card Code	Actual IBM Device	Dev. Type X'nn'	Device Type
3410T9	9 - track 3410 Magnetic Tape Units	53	Magnetic Tape Devices
3410T7	7 - track 3410 Magnetic Tape Units	53	
3420T9	9 - track 3420 Magnetic Tape Units	52	
3420T7	7 - track 3420 Magnetic Tape Units	52	
1419	1255 Magnetic Character Reader	72	MICR - Magnetic Ink Character Recognition Devices
1419	1259 Magnetic Character Reader	72	
1419	1419 Magnetic Character Reader	72	
1419P	1419 Dual Address Adapter Primary Control Unit	73	
1419S	1419 Dual Address Adapter Secondary Control Unit	74	
1419	1270 Optical Reader Sorter	72	Optical Readers
1419P	1275 Optical Reader Sorter	73	
1287	1287 Optical Reader	77	
1288	1288 Optical Page Reader	77	
3881	3881 Optical Mark Reader	11	
3886	3886 Optical Character Reader	7C	
1018	1018 Paper Tape Punch with 2826 Control Unit Model 1	79	Paper Tape Punches
1017	1017 Paper Tape Reader with 2826 Control Unit Model 1	78	Paper Tape Readers
2671	2671 Paper Tape Reader	70	
1403	1403 Printer	40	Printers
1403U	1403 Printer with UCS feature	42	
1443	1443 Printer	41	
2260 (Local)	1053 Printer with 2848 Control Unit MODE operand must be entered as X'01'	C0	
3203	3203 Printer	4A	
3211	3211 Printer	43	
3277 (Local 3270)	3284 or 3286 Printer with 3272 Control Unit, MODE operand must be entered as X'01'	B0	
3277B (Local 3270)	3284 or 3286 Printer with 3272 Control Unit, attached in Burst Mode to a multiplexer channel. MODE operand must be entered as X'01'	B0	
5203	5203 Printer	4C	
5203U	5203 Printer with UCS feature	4D	
1050A	3210, 3215 Console Printer Keyboards	00	Printer Keybord
2495TC	2495 Tape Cartridge Reader	51	Tape Cartridge Reader
2701	2701/2715 Data Adapter Unit	D0	Teleprocessing lines A = SAD0 command when enabling the line B = SAD1 command when enabling the line C = SAD2 Command when enabling the line D = SAD3 command when enabling the line
2702 A/B/C/D	2702 Transmission Control Unit	D1	
2703	2703 Transmission Control Unit	D2	
2703	3704/3705 Communications Controller in Emulation Mode	D2	
2703	Model 125 or 135 Integrated Communications Adapter	D2	
UNSP	Unsupported Device	FF	Unsupported No burst mode on multiplexer channel
UNSPB	Unsupported Device	FF	Unsupported with burst mode on multiplexer channel

Figure 1-4. SUPERVISOR--Device Code (Part 2 of 2)

Supervisor Element	Generation Operand	NPARTS=1	Multiprogramming				Comments
			NPARTS=2	NPARTS=3	NPARTS=4	NPARTS=5	
SUPVR (Required Routines — Basic Size) SVC Interruption Handling System Loader (FETCH and LOAD) Minimum I/O Units Control Tables (LUBs, PUBs, and JIBs) General Entry and Exit Routines System Communication Region Partition Communication Regions Transient Areas End of Job Step Byte Multiplexer and Selector Channel Support Storage Protection CCW Translation Page Management 2311/2314 Disk Error Recovery		20984	26448	26984	27544	28096	Based on MODEL=115 or MODEL=125
Optional Routines							
Multitasking	AP=YES	N.A.	4704	4488	4264	4048	1) Forces WAITM=YES 2) Forces NPARTS=3 if NPARTS omitted or specified as 1
ASCII/EBCDIC Translation Tables	ASCII=YES	512	512	512	512	512	
RMSR-support for Channel-attached devices, tape units, or TP-devices used with a Model 115 or 125	CHAN=YES	912	960	960	960	960	If RMS=YES or MCH=YES is also specified, add the value given for RMS instead.
Reliability Data Extractor Error Recording (IPL, EOD)	ERRLOG=RDE	0	0	0	0	0	For Model 115 or 125, CHAN=YES or RMS=YES is required
14xx Emulators	EU=YES	200	224	224	224	224	
Model 115/125 MCAR/CCH support	MCH=YES	4576	4568	4568	4568	4568	If RMS=YES or CHAN=YES is also specified, add the value given for RMS instead
Magnetic Ink Character Reader	MICR=1419 (for 1255/1259/1270/1275s see Note 1)	912	1160	1160	1160	1160	
	MICR=1419D (Dual Address Adapter 1419/1275s)	1024	1,024	1,024	1,024	1,024	
Page Handling	PAGEIN=n (n must be ≥1)	1408 + 8n	1592 + 8n	1592 + 8n	1592 + 8n	1592 + 8n	
Page Exception Handling Overlap	PHO=YES	616	656	648	672	672	Forces PFIX=YES
POWER	POWER=YES	N.A.	312	312	312	312	Forces NPARTS=3,if NPARTS omitted or specified as 1
RMS support (RMSR plus MCA/CCH) for Model 115 and 125	RMS=YES or CHAN=YES and MCH=YES	5440	5480	5480	5480	5480	Do not include any values for CHAN=YES and for MCH=YES
Teleprocessing	TP=BTAM	560	544	544	544	544	TP=QTAM forces NPARTS=3 if NPARTS is omitted or specified as 1
	TP=QTAM	NA	1072	1072	1072	1072	
	TP=QTAMn (see Note 2)	NA	1032	1032	1032	1032	

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 1 of 8)

Supervisor Element	Generation Operand	Multiprogramming NPARTS=1	NPARTS=2	NPARTS=3	NPARTS=4	NPARTS=5	
CONFG (configuration Options)							
Floating Point Feature	FP=YES (default)	0	72	72	72	72	
Model 115	MODEL=115	0	0	0	0	0	Forces Disk=3340 and DOC=125D
Model 125 (see Note 7)	MODEL=125	0	0	0	0	0	Forces Disk=3330 (if neither 3330 nor are specified) and DOC=125D
Model 135	MODEL=135	5440	5480	5480	5480	5480	RMS support
Model 145	MODEL=145	5992	6032	6032	6032	6032	RMS support
Model 155-II	MODEL=155-II	6312	6352	6352	6352	6352	RMS support
Model 158	MODEL=158	6312	6352	6352	6352	6352	RMS support
STDJC (Standard Job Control Settings)							
Support of &SYSPARM Assembler System Variable Symbol	SPARM=YES	8	16	24	32	40	other STDJC options require no storage
FOPT (Functional Supervisor Options)							
Abnormal Termination	AB=YES						
	without AP=YES	400	408	416	424	432	Forced by VSAM=YES
	with AP=YES	N.A.	554	554	554	554	
Console Buffering	CBF=n (see Note 5)	224 + 104n					Does not apply to Models 115 and 125
DASD File Protection	DASDFP=(n1, n2, 2311/2314)	328 + 24 (n2 – N1)					
	DASDFP=(n1, n2, 2321)	424 + 24 (n2 – n1)					
	DASDFP=(n1, n2, 3330)	376 + 24 (n2 – n1)					
	DASDFP=(n1, n2, 3340)	384 + 24 (n2 – n1)					
Model 115/125 Display Operator Console	DOC=125D	2816	2832	2832	2832	2832	Forced by MODEL=115 and 125
Error Queuing	ERRQ=n	44(n–3	44(n–5)	44(n–5)	44(n–5)	44(n–5)	0 if default used
Error Volume Analysis	EVA=(r, w)	0	0	0	0	0	Forces TAPE=7
Virtual Storage Management Support	GETVIS=YES	1152	1152	1152	1152	1152	Forced by VSAM=YES; Forces RELLDR=YES
Independent Directory Read/In Area	IDRA=YES	N.A.	192	192	192	192	Valid only if NPARTS` 1
Interval Timer	IT=YES	456	888	896	920	928	If OC=YES, refer to OC, if PC=YES, ref PC
Job Accounting Interface	JA=YES	512	704	832	880	1104	
	JA=(n1,n2,n3,n4,n5)	600 + 8(n1)	792 8(n1 + n2)	920 8(n1 + n2 + n3)	1060 8(n1 + n2 + n3 + n4)	1192 +	8(n1 + n2 + n3 + n4 + n5)
	JALIOCS=(s, l) (see Note 3)	Value from JA plus (s + l) – 16					

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 2 of 8)

Supervisor Element	Generation Operand	NPARTS=1	Multiprogramming				Comments
			NPARTS=2	NPARTS=3	NPARTS=4	NPARTS=5	
FOPT (continued) User Channel Program Translation	ECPREAL- YES	352	352	352	352	352	
Problem Program Handling of External Interruptions	OC=YES	256	256	264	272	280	Forced by RETAIN=YES and OLTEP=YES
	Including IT=YES	520	960	976	1008	1024	
	Including IT=YES when AP=YES	NA	1216	1224	1232	1240	Does not include any AP storage requirements
	Including IT=YES and PC=YES	568	1016	1040	1080	1104	
On Line Testing	OLTEP=YES (default)	208	312	320	312	312	Forces RELLDR=YES and OC=YES Forced by RETAIN=YES
Support of User Program Check Routines	PC=YES	256	256	264	272	280	
	when AP=YES	NA	384	384	384	384	Does not include any AP storage requirements
	Including IT=YES	504	944	960	992	1008	
	Including OC=YES	320	328	344	360	376	
	Including IT=YES when AP=YES	NA	1320	1320	1320	1320	Does not include any AP storage requirements
Private Core Image library Support	PCIL=YES	192	216	232	256	272	
Problem Determination Programs (PDAIDS)	PD=n	n + 168	n + 168	n + 168	n + 168	n + 168	
	PD=YES	1568	1568	1568	1568	1568	
Page fixing	PFIX=YES	1632	1944	1952	1968	1976	Forced by PHO=YES
Partition Dispatching Priority	PRTY=partition name and sequence	NA	0	0	0	0	
Private Second Level Directories	PSLD=n	8n	16n	24n	32n	40n	
Relocating Loader	RELLDR=YES	504	504	504	504	504	Forced by GETVIS=YES, OLTEP=YES and VSAM=YES
RETAIN-Remote Initiation of OLTEP programs	RETAIN=YES	96	112	112	112	112	Forces OC=YES and OLTEP=YES
Seek Separation	SKSEP=YES, or n (see Note 4)	150 + 5n	150 + 5n	150 + 5n	150 + 5n	150 + 5n	
Second Level Directory	SLD=n	8n	8n	8n	8n	8n	
Disk System Input and Output Files	SYSFIL=YES	664	792	880	968	1056	Required if TAPE=NO
	SYSFIL=YES (n1, n2) (and DASDFP=(n1, n2, 2311)	952	24(n2-n1) + 1080	1176	1248	1336	
	(and DASDFP=(n1, n2, 2321)	1040	1176	1264	1344	1432	
	(and DASDFP=(n1, n2, 3330)	992	1128	1216	1296	1384	
	(and DASDFP=(n1, n2, 3340)	736	1136	1220	1304	1392	

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 3 of 8)

Supervisor Element	Generation Operand	Multiprogramming NPARTS=1	NPARTS=2	NPARTS=3	NPARTS=4	NPARTS=5	Comments
FOPT (Cont.)							
Tape Error Statistics—2495 Tape Cartridge Reader	TEB=n	36 + 6n	36 + 6n	36 + 6n	36 + 6n	36 + 6n	
Tape Error Statistics by Volume	TEBV=IR, or CR	0	0	0	0	0	
Time-of-Day Clock Support	TOD=YES	640	640	640	640	640	
Track Hold	TRKHLD=n (see Note 6)	NA	568+ 12n	568+ 12n	568+ 12n	568+ 12n	Valid only is NPARTS > 1
VSAM	VSAM=YES	384	400	408	392	392	Forces AB=YES, GETVIS=YES, and RELLDR=YES
Multiple Wait	WAITM=YES	64	64	64	64	64	Forced by AP=YES
Time Zone for Time of Day Clock Support	ZONE=NO (EAST,hh,mm) (WEST,hh,mm)	0	0	0	0	0	
PIOCS (Physical IOCS Support)	BLKMPX=YES	48	40	40	40	40	
Burst Mode on Byte Multiplexer Channel	BMPX = YES	136	120	120	120	120	
Channel Switching Tape Control	CHANSW=RWTAU, or TSWTCH	32	32	32	32	32	Forces TAPE=7
	DISK=2311,or 2314	0	0	0	0	0	Not valid if MODEL=115 or 125
	DISK=3330	672	672	672	672	672	Forced for Model 125
	DISK=3340	768	768	768	768	768	Forced for Model 115
	DISK=(3330, 3340)	880	880	880	880	880	
MICR Device on Selector Channel (1419 Single Address Device only)	MRSLCH=YES	40	40	40	40	40	
Tape Support	TAPE=7, or 9 (default)	528	520	520	520	520	TAPE=7 is forced by EVA=(r,w) and by CHANSW=RWTAU or TSWTCH. For Model 115 or 125 CHAN = YES is required.
VSTAB (Size of Real and Virtual Address Areas and CCW Translation space)	RSIZE=n_1K VSIZE=n_2K BUFSIZE=n (Required) (see Note 9)	Obtain value from table — Part 5 of this Figure. When PHO = YES or PFIX = YES, add $\frac{n1}{2}$, and subtract the number of bytes included in basic supervisor			This is for: NPARTS = 1 720 = 2 788 = 3 856 = 4 924 = 5 992		
		72(n−10)	72(n−30)	72(n−30)	72(n−30)	72(n−30)	0 if default used
	SVA=(nk,mk)	0	0	0	0	0	

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 4 of 8)

VSIZE (K bytes)	RSIZE (K bytes)												
	64	96	128	144	160	192	208	240	256	384	512	768	1024
64	456	–	–	–	–	–	–	–	–	–	–	–	–
96	524	652	–	–	–	–	–	–	–	–	–	–	–
128	524	720	848	–	–	–	–	–	–	–	–	–	–
192	592	788	916	1048	1112	1240	–	–	–	–	–	–	–
256	660	856	984	1116	1180	1308	1440	1568	1632	–	–	–	–
320	728	924	1052	1184	1248	1376	1508	1636	1700	–	–	–	–
384	796	992	1120	1252	1316	1444	1576	1704	1768	2416	–	–	–
448	864	1060	1188	1320	1384	1512	1644	1772	1836	2484	–	–	–
512	932	1128	1256	1388	1452	1580	1712	1840	1904	2552	3348	–	–
640	1068	1264	1392	1524	1588	1716	1848	1976	2040	2688	3548	–	–
704	1136	1332	1460	1592	1656	1784	1916	2044	2108	2820	3616	–	–
768	1204	1400	1528	1660	1724	1852	1984	2112	2176	2888	3684	4980	–
832	1272	1468	1596	1728	1792	1920	2116	2244	2308	2956	3752	5048	–
896	1340	1536	1664	1860	1924	2052	2184	2312	2376	3024	3820	5116	–
960	1408	1668	1796	1928	1992	2120	2252	2380	2444	3092	3888	5184	–
1024	1540	1736	1864	1996	2060	2188	2320	2448	2512	3160	3956	5252	6548
1280	1812	2008	2136	2268	2332	2460	2592	2720	2784	3432	4228	5524	6884
1536	2084	2280	2408	2540	2604	2732	2864	2992	3056	3704	4500	5860	7156
1792	2356	2552	2680	2812	2876	3004	3136	3264	3328	4040	4836	6132	7428
2048	2692	2888	3016	3148	3212	3340	3472	3600	3664	4312	5108	6404	7700
2304	2964	3160	3288	3420	3484	3612	3744	3872	3936	4584	5380	6676	8036
2560	3236	3432	3560	3692	3756	3884	4016	4144	4208	4856	5652	7012	8308
2816	3508	3704	3832	3964	4028	4156	4288	4416	4480	5192	5988	7284	8580
3072	3844	4040	4168	4300	4364	4492	4624	4752	4816	5464	6260	7556	8852
4096	4996	5192	5320	5452	5516	5644	5776	5904	5968	6616	7412	8708	10004
5120	6148	6344	6472	6604	6668	6796	6928	7056	7120	7768	8564	9860	11156
6144	7300	7496	7624	7756	7820	7948	8080	8208	8272	8920	9716	11012	12308
7178	8520	8648	8844	8908	8972	9168	9232	9360	9492	10140	10936	12232	13592
8192	9604	9800	9928	10060	10124	10252	10384	10512	10576	11224	12020	13316	14612
9216	10756	10952	11080	11212	11276	11404	11536	11664	11728	12376	13172	14468	15764
10240	11908	12104	12232	12364	12428	12556	12688	12816	12880	13528	15620	15620	16916
11264	13060	13256	13384	13516	13580	13708	13840	13968	14032	14680	15476	16772	18068
12288	14212	14408	14536	14668	14732	14860	14992	15120	15184	15832	16628	17924	19220
13312	15364	15560	15688	15820	15884	16012	16144	16272	16336	16984	17780	19076	20372
14336	16516	16712	16840	16972	17036	17164	17296	17424	17488	18136	18932	20228	21524
15360	17668	17864	17992	18124	18188	18316	18448	18576	18640	19288	20084	21380	22676
16384	18820	19016	19144	19276	19340	19468	19600	19728	19792	20440	21236	22532	23828

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 5 of 8)

Supervisor Element	Generation Operand		Multiprogramming				Comments
			NPARTS=2	NPARTS=3	NPARTS=4	NPARTS=5	
IOTAB (Input/Output Tables)							
Number of programmer logical units	BGPGR=n	2(n–10)	2(n–10)	2(n–10)	2(n–10)	2(n–10)	0 if default used
	F4PGR=n	2(n–5)	2(n–5)	2(n–5)	2(n–5)	2(n–5)	
	F3PGR=n	2(n–5)	2(n–5)	2(n–5)	2(n–5)	2(n–5)	
	F2PGR=n	2(n–5)	2(n–5)	2(n–5)	2(n–5)	2(n–5)	
	F1PGR=n	2(n–5)	2(n–5)	2(n–5)	2(n–5)	2(n–5)	
Number of Channel Queue Entries	CHANQ=n (see Note 5)	8(n–6)	8(n–6)	8(n–6)	8(n–8)	8(n–10)	
Amount of Extra Space reserved for the PUB Table (required for RMSR recording)	D2311=n1	12n1	24n1	24n1	24n1	24n1	For Models 115 or 125, these parameters are ignored if both CHAN=NO and RMS=NO in the SUPVR macro, or if both these parameters are omitted and, therefore, default to No.
	D2314=n2	12n2	24n2	24n2	24n2	24n2	
	D2321=n3	12n3	24n3	24n3	24n3	24n3	
	D3330=n4	20n4	32n4	32n4	32n4	32n4	
	D3340=n5	4n5	16n5	16n5	16n5	16n5	
	D2400=n6	48n6	60n6	60n6	60n6	60n6	
	D3410=n7	56n7	68n7	68n7	68n7	68n7	
	D3420=n8	56n8	68n8	68n8	68n8	68n7	
	D3540=n9	4n9	16n9	16n9	16n9	16n9	
	D3836=n10 (see Note 8)	14n10	26n10	26n10	26n10	26n10	
Number of I/O devices on system	IODEV=n	→	8(n–10)			→	For Models 115 and 125 without CHAN or RMS. 0 if default used for Model 135 and upward and for Model 115 or 125 with CHAN or RMS
		→	120 + 20(n–10)			→	
Number of Job Information Blocks	JIB=N	4(n–5)	4(n–5)	4(n–5)	4(n–5)	4(n–5)	
Number of Start/Stop Lines and Number of BSC Lines (Model 125 ICA Only)	SSLNS=n1, BSCLNS=2 (when TP=BTAM)	→	$4 + 4(n_1-4) + 4(n_2-1)$			→	

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 6 of 8)

Note 1. A 1255/1259/1270 is addressed as a single address adapter machine, i.e. MICR=1419.

Note 2. NPARTS=2–5 is required for TP=QTAMn. TP=QTAMn includes BTAM supervisor support.
If AP=YES when TP=QTAMn, then the quantity A must be added to the basic storage requirement for TP=QTAMn. A=44+ (n–2) 12, where n is the value elected for TP=QTAMn. (For multitasking, AP must equal YES.)

Note 3. If s is omitted or if its specification is invalid, then 16 bytes are reserved. If 1 is omitted or if it is invalid, 0 is assumed.

Note 4. When SKSEP=YES, n (in the formula) equals the number of DASD devices specified at system generation time. When SKSEP=n, n (in the formula) is the number of DASD devices supported as specified, but cannot be less than the number specified at system generation time.

Note 5. The selection of the CBF option results in extra channel queue usage. Consider this when requesting the number of CHANQ entries. Thus, specification of the CBF option and selection of the CHANQ default, results in the number of buffers specified being added to the CHANQ default, for which see below.

CHANQ default=6 if NPARTS=3
CHANQ default=8 if NPARTS=4
CHANQ default=10 if NPARTS=5

Only is the number of queue entries as specified by the CBF parameter plus the CHANQ default is larger than the number of entries actually specified by the CHANQ parameter, add $8n_2$, where n_2=CHANQ default + CBF specification – CHANQ specification (zero for negative).

example 1: CHANQ=30
CBF=4
NPARTS=4 (CHANQ default is 8)

Number of bytes reserved for CBF:216+104x4+8x0
(n_2=0 because CBF (4) + CHANQ default (8) is less than 30 (CHANQ specification)

example 2: CHANQ=10
CBF=4
NPARTS=4 (CHANQ default is 8)

Number of bytes reserved for CBF:216+104x4+8x2
(n_2=2 because CBF (4) + CHANQ default (8) minus CHANQ (10)=2).

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 7 of 8)

Note 6. Where n equals the maximum number of tracks (1–255) to be held at any given time by the entire system. The default is 10 if n is an invalid parameter (non-numeric or outside the range, 1–255).

Note 7. When MODEL=115 or 125 is specified, program support for the Display Operator Console is generated.

Note 8. In addition to the total number of bytes reserved for the tape and disk devices specified, an extra amount is reserved of 12B bytes, where B=the number of devices specified by the IODEV parameter minus the total number of devices specified by the Dxxxx parameters.
$(B=n-(n_1 + n_2 + n_3 + n_4 + n_5 + n_6 + n_7 + n_8)$.
The minimum value of B is 5, because of the fact that if the total number of devices specified by the Dxxxx parameters exceeds the number of devices specified by the IODEV parameter, the latter number is upgraded to 5 more (for unit record devices) than the number of devices specified by the Dxxxx parameters.

Note 9. Since the table (Part 5 of this figure) does not contain all possible VSIZE values, you may use the nearest larger value without significant error. The exact formula for calculating real storage requirements is as follows, where RSIZE=n1k and VSIZE=n2k:

$$4 \times n1 + 68 \times [\text{CEIL } \frac{n1+n2}{64}] + 64\ [\text{CEIL } (\frac{1}{16} \times \text{CEIL}(\frac{n1+n2}{64}))]$$

$$+ 148^*$$

* Add 148 only if RSIZE > 384K, otherwise + 0

For CEIL, in the formula, substitute the quotient of

$\frac{n1+n2}{64}$; fractions to be rounded off to the next higher integer.

Figure 1-5. Supervisor Real Storage Requirements--Bytes (Part 8 of 8)

Supervisor Real Storage Requirements

This section contains the data for estimating the size of the supervisor required for a generated system, that is, the amount of real storage needed at object time for the supervisor macro instructions.

The supervisor varies in size from system to system depending on the user-selected options and the machine configuration. All supervisor generation options are described earlier in this module under "The Supervisor Generation Macros".

The size of the supervisor is a determining factor for the amount of real storage available for problem program use. All real storage not allocated to the supervisor is available for use by programs running in virtual mode (the main page pool) and in real mode via specification of real partitions. For more details on the allocation of real partitions refer to the description of the ALLOCR macro instruction.

Figure 1-5 gives the real storage requirements for your supervisor, the size of which is determined by the options you specify (including default specifications) in the supervisor generation macro instructions. The basic supervisor (see sizes on the first line of data of Figure 1-5) is dependent on the number of partitions you require (SUPVR macro NPARTS=); however, it is independent of any other supervisor generation options.

To this basic size you must add the storage requirements for each selected option (see column "Generation Operand"). You must be careful to include the values for any options you have selected by default.

You must also include the storage requirements for any option you did not specify but which is forced by another option you did specify (see Figure 1-3 showing which options are forced or required). Thus, for example, the SUPVR macro operand for Page Exception Handling Overlap (PHO=YES) forces the FOPT macro operand PFIX=YES for page fixing. Therefore, if you specify PHO=YES, you must include the storage requirements of both PHO=YES and PFIX=YES.

The comments column of Figure 1-5 indicates when one option forces another option or is forced by another option. Certain options share common code and thus the mixture rather than the individual values must be considered in obtaining the total storage requirement. Thus, for example, the FOPT macro options IT=YES, PC=YES, and OC=YES share common code. Figure 1-5 provides for this by stating storage requirements for each option separately and in all combinations. If you have selected more than one of these options, select the combined requirement from the row which includes your combination.

The SEND macro instruction allows you to reserve additional storage for your supervisor. Refer to the description of the SEND macro instruction for further details.

Because of storage protection, the supervisor must always end on a 2K storage boundary. Supervisor generation always causes the total generated supervisor size to be rounded up to the nearest 2K boundary. Thus, a calculated supervisor end address of, say, 31,120 bytes, is rounded to 32K (32,768 bytes).

Some supervisor macro instructions do not affect your storage requirements because they merely supply information to be placed in storage occupied by other macro instructions. These macro instructions are not included in Figure 1-5. They are:

STDJC (all operands except SPARM=YES)
ALLOC
ALLOCR
DVCGEN
ASSGN
DPD

In summary, to calculate the size of your supervisor, add the values as indicated in Figure 1-5 for:

- Your base (determined by NPARTS=)
- The storage requirements for all options you specifically selected
- The storage requirements for those options you did not specify but that default to YES
- Storage requirements for all options you selected indirectly, that is options that were forced by other, specified, options
- Any additional storage you reserved via the SEND macro instruction.

Computing the Size of a Supervisor

As an example, assume a supervisor is generated using the macros shown in Figure 1-6. The size of this supervisor is determined as follows:

GENERATION OPERAND	REAL STORAGE REQUIREMENT (bytes)
SUPVR	
NPARTS=4	27,544
POWER=YES	312
PHO=YES	672
TP=BTAM	544
CONFG	
MODEL=135	5,480
FP=YES	72
STDJC	0
FOPT	
RELLDR=YES	504
VSAM=YES	392
IT=YES	
OC=YES	1,080
PC=YES	
SKSEP=YES	160
PCIL=YES	256
PFIX=YES	1,968
CBF=10	1,264
TRKHLD=10	688
SYSFIL=YES	
DASDFP=(1,1,3330)	1,296
TOD=YES	640
ZONE=(WEST,5)	0
GETVIS=YES	1,152
OLTEP=YES	312
AB=YES	424
PIOCS	
DISK=3330	672
TAPE=7	520
VSTAB	
RSIZE=240K	968
VSIZE=426K	
BUFSIZE=48	1,296
ALLOC	0
ALLOCR	0
IOTAB	
BGPGR=20	20
F1PGR=10	10
F2PGR=10	10
F3PGR=10	10
IODEV=15	220
JIB=45	160
D3330=2	64
D3410=4	272
CHANQ=32	192
Total Number of Bytes	49,174

Note: If entry for BGPGR is below minimum requirement, n=10 is assumed. The following MNOTE is obtained for an entry of less than 10.

```
BGPGR SPECIFICATION BELOW MINIMUM - "10" ASSUMED
```

```
// JOB SUPVR
// EXEC ASSEMBLY
         SUPVR NPARTS=4,POWER=YES,PHO=YES,TP=ETAM
         CONFG MODEL=135,FP=YES
         STDJC LISTX=YES,LINES=46,EDECK=YES
         FOPT RELLDR=YES,IT=YES,VSAM=YES,OC=YES,PC=YES,                X
               SKSEP=YES,PCIL=YES,CBF=10,TRKHLD=10,SYSFIL=YES,         X
               DASDFP=(1,1,3330),TOD=YES,ZONE=(WEST,5),PFIX=YES,       X
               AB=YES,OLTEP=YES
         PIOCS DISK=3330,TAPE=7
         VSTAB RSIZE=240K,VSIZE=426K,BUFSIZE=48
         ALLOC F1=128K,F2=64K,F3=128K
         ALLOCR BGR=60K,F1R=30K,F2R=30K
         IOTAB BGPGR=20,F1PGR=10,F2PGR=10,F3PGR=10,IODEV=15,JIB=45,    X
               CHANQ=32,D3330=2,D3410=4
         DVCGEN CHUN=X'00C',DVCTYP=2540R
         DVCGEN CHUN=X'00D',DVCTYP=2540P
         DVCGEN CHUN=X'00E',DVCTYP=3211
         DVCGEN CHUN=X'01F',DVCTYP=1050A
         DVCGEN CHUN=X'020',DVCTYP=2703
         DVCGEN CHUN=X'021',DVCTYP=2703
         DVCGEN CHUN=X'022',DVCTYP=2703
         DVCGEN CHUN=X'023',DVCTYP=2703
         DVCGEN CHUN=X'024',DVCTYP=2703
         DVCGEN CHUN=X'160',DVCTYP=3330
         DVCGEN CHUN=X'161',DVCTYP=3330
         DVCGEN CHUN=X'280',DVCTYP=3410T7
         DVCGEN CHUN=X'281',DVCTYP=3410T7
         DVCGEN CHUN=X'282',DVCTYP=3410T9
         DVCGEN CHUN=X'283',DVCTYP=3410T9
         ASSGN SYSRDR,X'00C'
         ASSGN SYSIPT,X'00C'
         ASSGN SYSPCH,X'00D'
         ASSGN SYSLST,X'00E'
         ASSGN SYSLOG,X'01F'
         ASSGN SYSLNK,X'160'
         ASSGN SYS001,X'160'
         ASSGN SYS002,X'160'
         ASSGN SYS003,X'160'
         ASSGN SYSREC,X'160'
         ASSGN SYSCAT,X'161'
         DPD CYL=200,UNIT=X'160',VOLID=111111
         SEND
 END
/*
/&
```

Figure 1-6. SUPERVISOR--Example for Computing the Size of a Supervisor

Planning an Operational Pack

An operational system is one used in day-to-day operations and contains one or more tailored supervisors, and libraries appropriate to each customer's particular combination of system programs and application programs. A system maintenance volume is one used primarily to facilitate changes to programs supplied by IBM. Application programs can also be added to a maintenance volume for ease of program maintenance.

Change Distributions are those changes supplied by IBM to the IBM-shipped volume.

Proper planning is the key to successful system generations. The time spent in planning can save you frustration and valuable time. Planning should reflect the initial, intermediate and ultimate capacity of the core image, relocatable, source statement, and procedure libraries. Enough workfile capacity must be available throughout system generation for assemblies and link-edit steps.

The module for each component should be used to determine its storage requirements. Figure 1-18 contains a summary of the library and partition requirements for all components shipped with DOS/VS. Adjust the requirements you derived from this figure for any program products (separately purchased components) you are including. Please also note that any Program Products supplied in A-macro format must be edited. The IBM-supplied system contains a 32K supervisor for the 2314/2319, 3330, and 3340 resident systems. This supervisor is described further in "Supervisor Nucleus -- 5745-SC-SUP".

STORAGE REQUIREMENTS FOR IBM-SUPPLIED DOS/VS PROGRAMS

Note that the partition save area is located at the beginning of each partition, thus reducing the partition size by the length of the save area.

Organization of a DOS/VS System Pack

The organization of the system pack is as follows:

Name	Start of Location
IPL Program	Track 0 of Cylinder 0.
System Volume Label	Track 0 of Cylinder 0.
System Directory	Track 1 of Cylinder 0.
Librarian Work Area	Tracks 2, 3, and 4 of Cylinder 0.
Transient Directory	Track 5 of Cylinder 0.
Open Routine Directory	Track 6 of Cylinder 0.
Library Routine Directory	Track 7 of Cylinder 0.
Foreground Program Directory	Track 8 of Cylinder 0.
Problem Program Phase Directory	Track 9 of Cylinder 0.

Core Image Directory	Track 10 of cylinder 0 on a 2314/2319, 3330, or 3340.
Core Image Library	Beginning of the first available track following the core image directory.
Relocatable Directory, Optional	Track 0 of the first available cylinder following the core image library.
Relocatable Library, Optional	Beginning of the first available track following the relocatable directory.
Source Statement Directory, Optional	Track 0 of the first available cylinder following the previous library.
Source Statement Library, Optional	Beginning of the first available track following the source statement directory.
Procedure Directory, Optional	Track 0 of the first available cylinder following the previous library.
Procedure Library, Optional	Beginning of the first available track following the procedure directory.
Label cylinder	First full cylinder after the last system library.
Volume Table of Contents	Location assigned by the user.

Note: The IPL procedure cannot be performed if either:

- the Transient Directory is located on a defective track while an alternate track has been assigned, or
- part of the Supervisor Nucleus in the core image library is located on an alternate track.

This is caused by the fact that the IPL bootstrap program does not contain any error recovery routines. Restrictions that had to be imposed on the size of this program did not allow the inclusion of any such routines.

Track

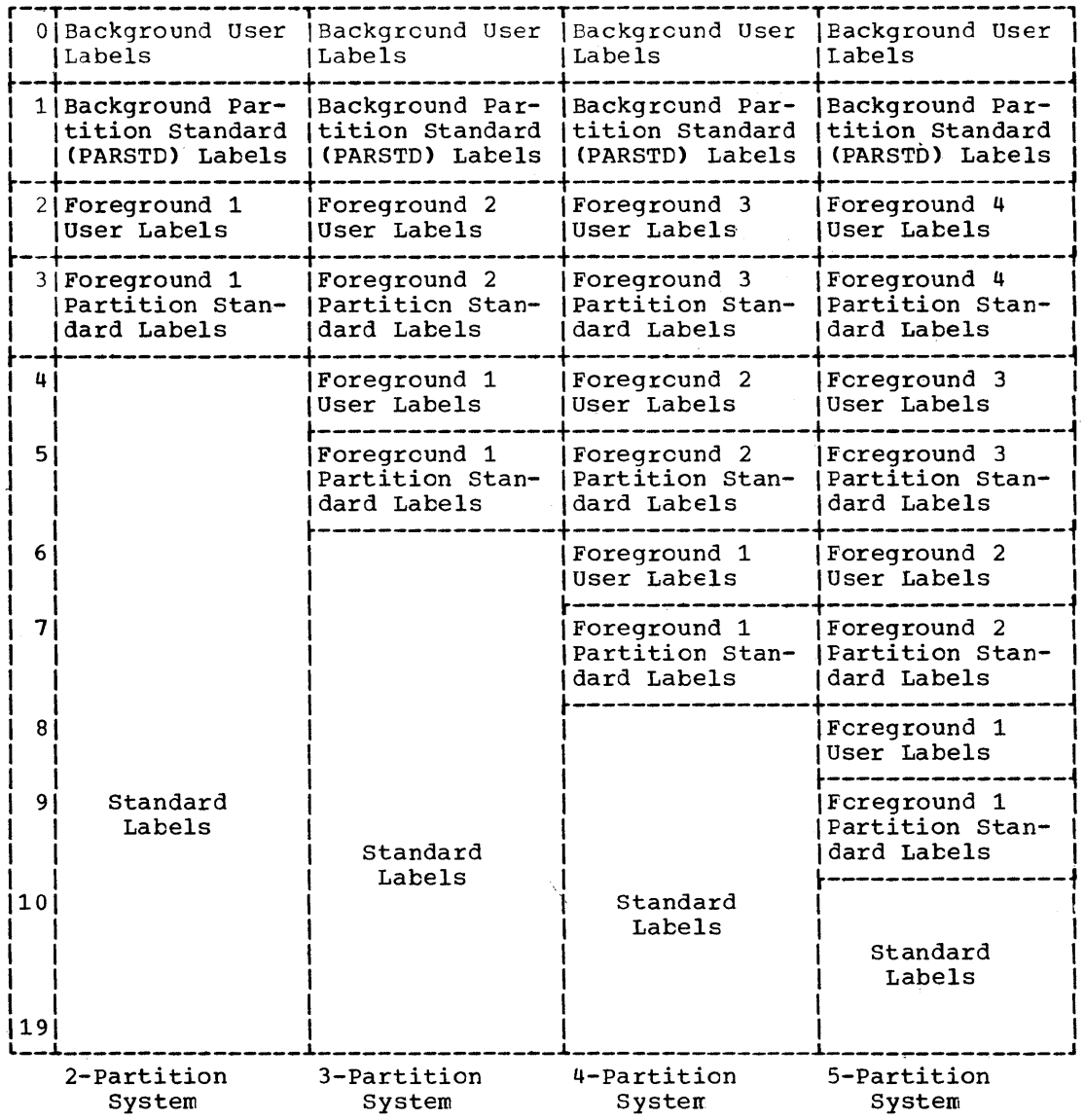


Figure 1-7. Label Cylinder Track Allocations for 2314/2319 Disk-Resident Systems

Allocating Library Sizes

When the size of an existing library is reduced, it may be important to know the minimum size library that can be allocated. Once the minimum size library is calculated, it should be increased to accommodate any problem programs to be included in the library. The size of IBM components can be determined by referring to the storage requirements given in Figure 1-17 and to appropriate documentation for any program products to be included.

The following explanation illustrates how to calculate the number of tracks required for a core image, relocatable, source statement, or procedure library. The formula for computing the size of a library is:

Library (size in tracks) = LBA/nn

where: library = either core image, relocatable, source statement, or procedure

LBA = the number of LIBRARY BLOCKS ACTIVE for the library of interest and is obtained from a DIRECTORY (SYSTEM or PRIVATE)

nn = LIBRARY LAST AVAILABLE ENTRY in the R (record) column

Using the sample STATUS REPORT that follows, an example of how to compute a library size is:

Relocatable Library = LBA/nn

where: LBA = 11,957
nn = 16, thus

$$\text{Relocatable Library} = \frac{11,957}{16} = 747.5 \text{ tracks}$$

The relocatable library size computed does not include the tracks allocated for the directory. The directory size must be added to the relocatable library size computed. Thus,

Relocatable Library Allocation = Relocatable Library + Directory Allocated Tracks

Therefore,

Relocatable Library Allocation = 747.5+10
= 757.5 Tracks

$$\text{For a 2314, cylinders} = \frac{\text{Library Size (Tracks)}}{20}$$

$$\text{For a 3330, cylinders} = \frac{\text{Library Size (Tracks)}}{19}$$

$$\text{For a 3340, cylinders} = \frac{\text{Library Size (Tracks)}}{12}$$

For this example,

$$\text{the Relocatable Library Allocation for a 3330} = \frac{757.5 \text{ Tracks}}{19}$$
$$= 39.9 \text{ or } 40 \text{ cylinders, rounded high}$$

STATUS REPORT TIME: 17.31 DATE: 10/08/73		STARTING ADDRESS C H R	NEXT ENTRY C H R E	LAST ENTRY C H R E	DIRECTORY ENTRIES ACTIVE	LIBRARY BLOCKS ALLOCTD	ACTIVE	DELETD	AVAIL	AUTO. COND. LIMIT	DIR.TRACKS OR LIBRARY CYLINDERS
SYSRES VOL.SER.R29RES											
CORE IMAGE	DIRECTORY	000 02 01	000 10 04	000 11 17	1402						10
	LIBRARY	000 12 01	043 18 06	054 19 06		6528	5201	0	1327	0	55
SYSRES VOL.SER.R29RES											
RELOCATABLE	DIRECTORY	055 00 01	055 04 07 02	055 09 17 19	1477						10
	LIBRARY	055 10 01	092 17 06	096 19 16		13280	11957	0	1323	0	42
SYSRES VOL.SER.R29RES											
SOURCE-STMT	DIRECTORY	097 00 01	097 01 24 05	097 09 27 09	500						10
	LIBRARY	097 10 01	195 07 19	196 19 27		53730	52857	0	873	0	100
SYSRES VOL.SER.R29RES											
PROCEDURE	DIRECTORY	197 00 01	197 00 03 09	197 04 27 09	24						5
	LIBRARY	197 05 01	197 11 38	197 19 40		595	272	0	323	0	1

SYSTEM DIRECTORY AND LIBRARY TRACK CAPACITIES

Figures 1-8 and 1-9 illustrate the DOS/VS system library directory and track capacities.

	Directory Entries Per Track			
Device	Core Image Library (Phases)	Relocatable Library (Modules)	Source Statement Library (Books)	Procedure Library (Procedures)
2311	135	N.A.	N.A.	N.A.
2314/ 2319	270	340	270	270
3330	468	560	440	440
3340	288	340	260	260

Figure 1-8. LIBRARIES--System Library Directory Capacities (Entries per Track)

	Core Image Library				Relocatable Library			Source Statement Library			Procedure Library		
Device	2311	2314/2319	3330	3340	2314/2319	3330	3340	2314/2319	3330	3340	2314/2319	3330	3340
Library Block Size(bytes)	1024	1024	1024	1024	322	322	322	160	160	160	80	80	80
Blocks per Track	3	6	11	7	16	28	17	27	44	26	40	61	34

Figure 1-9. LIBRARIES--System Library Track Capacities

Creating System Files

THE PAGE DATA SET

SYSVIS is the logical unit name of the data set that holds the virtual address area. It is created at IPL time from information provided by the system generation macro DPD and/or the IPL DPD command. The user specifies the beginning cylinder address and the system calculates the size of the disk extent which is a function of the VSIZE specification and the disk device type, as follows:

$$\frac{\text{VSIZE}}{2} = \text{number of pages (blocks of 2K bytes)}$$

Disk Device Type	Blocks per Cylinder
2314	60
3330	114
3340	36

The allocation requires full cylinders.

The IBM-supplied supervisor does not contain any DPD macro parameters. Therefore, when you IPL, you must enter all operands of the DPD command, including TYPE=F. The IBM-supplied supervisor has a VSIZE of 64K and consequently one cylinder on a 2314, 3330, or 3340 is required.

RECORDER FILE (SYSREC)

IJSYSRC is the filename of the recorder file that is used exclusively for output from the Recovery Management Support Recorder (RMSR) function. The data contained on IJSYSRC is edited and printed by the EREP program. The recorder file must be defined, using the file definition statements of the system after the first IPL procedure has been performed following supervisor replacement but before the first JOB card is read. The file is created after job control has read this JOB card.

The RMSR function makes several types of recordings on the recorder file, in chronological order. The file is made up of records that contain information relating to:

- MCAR
- CCH
- Unit Check
- Counter Overflow
- Tape Volume Statistics
- IPL/EOD
- Miscellaneous Data Recorder (2715 error records, 3211 buffer error records, 3330/3340 non unit-check records)

The IJSYSRC file is defined as a disk extent for an IBM 2314/2319, 3330, or 3340 disk device, and cannot be a split cylinder file. The file should not be defined on an extent which includes a defective or alternate track, because data may be lost. The file definition must be included in the standard label area.

CREATING AND USING THE RECORDER FILE

A minimum of ten tracks is required for the recorder file (SYSREC). The following file definition statements create the recorder file:

```
// OPTION STDLABEL
// DLBL IJSYSRC,'DOS/VS RECORDER FILE'
// EXTENT SYSREC,,,,nnnnn,nnnnn
     .
     .
/*
   ASSGN SYSREC,X'cuu'
   SET RF=CREATE
     .
     .
// JOB FIRST
     .
     .
     .
```

Note: The cards must be included in the standard label deck.

The recorder file is created when the first job statement (// JOB FIRST) is read.

These file definition statements must immediately follow the IPL procedure and precede the first job. We recommend that the file definition be permanently retained on the standard label track of the label cylinder. Thus, once the file is created, recording can proceed at the beginning of each day without operator intervention; that is, at IPL time the recorder file is opened and updating continues. When the system is to be shut down at the end of the day, issue the Record On Demand (ROD) command to record the statistical data and to ensure that no statistical data is lost. With RDE support, an EOD (End of Day) record is also written.

Note: The ROD command is not valid for recording teleprocessing statistical data. Refer to DOS/VS BTAM, GC27-6989, for teleprocessing procedures.

HARD-COPY FILE (MODELS 115 AND 125 ONLY)

IJSYSCN is the filename of the recorder file that is used exclusively for output of information from the message area of the Model 125 Integrated Display Operator Console. The symbolic device address of the hard-copy file is SYSREC.

The IJSYSCN file must be defined as a disk extent for an IBM 3330 or IBM 3340 disk device, and cannot be a split-cylinder file. It is to be created after the supervisor has been link-edited and cataloged. The following file definition statements create the hard-copy file:

```
   ASSGN SYSREC,X'cuu'
   SET HC=CREATE
// OPTION STDLABEL
// DLBL IJSYSCN,'DOS/VS HARD COPY FILE'
// EXTENT SYSREC,,,,nnnnn,nnnnn
     .
     .
/*
// JOB FIRST
     .
     .
```

The hard-copy file is created and opened when the first job statement (// JOB FIRST) is read.

The IPL commands that precede the first // JCB statement are not copied. After the file has been opened, the next available and last available records are determined and the standard IPL message DOS IPL COMPLETE is written to the hard-copy file.

When a new hard-copy file is created at IPL time, the records of the existing file are destroyed.

System Generation and Maintenance Procedures

Many techniques exist for generating and maintaining operational volumes. Each installation uses techniques dependent on its machine configuration and its selection of system and application programs. The techniques described here correspond to the following principal machine configurations relevant to system generation and maintenance:

1. One 2314/2319 direct access storage facility

2. One 3330 or 3340 disk storage.

The two examples given do not show the coding necessary to link-edit and delete all IBM-supplied components. They are meant only to be examples and must be tailored to meet your needs. Additional control statements required for linkage editing and deleting any IBM-supplied components are given in their respective sections.

DOS/VS System Distributions

Figure 1-10 illustrates the various distributions of DOS/VS. The procedures within this section ("System Generation and Maintenance Procedures") will guide you through your system generation.

Note: The label and extent information for disk distributions is found in Section 7 of the "Memorandum to Users".

The IBM Disk Operating System/Virtual Storage is supplied on one SYSRES file. This file contains the core image library, the relocatable library, and the source statement library.

SYSTEMS WITHOUT TAPE

IBM 2314-Only (and 2319-Only) Users

IBM 2314-only users receive the system on one 2316 disk pack. This pack is ready for your system generation procedure, but it is recommended that this pack be copied and retained for back-up.

IBM 3330-Only (and 3333-Only) Users

IBM 3330-only users receive the system on one 3336 disk pack. This pack is ready for your system generation procedure, but it is recommended that this pack be copied and retained for back-up.

IBM 3340-Only Users

IBM 3340-only users receive the system on a 3348 data module. This module is ready for your system generation procedure, but it is recommended that you copy the module and retain it for back-up.

TAPE USERS

The system is shipped on a reel of magnetic tape. The tape contains the entire SYSRES file and can be restored to a 2316, a 3336, or a 3348 disk volume. See "Restoring the IBM-Supplied System Tape to Disk" for the procedure to restore this tape. After the tape has been restored, retain it for back-up.

General System Generation Procedures

Each system generation job begins with a new IPL procedure, followed by the necessary DEL, ADD, SET, DPD, and ASSGN commands. Typically, each job consists of many job steps, including such programs as:

- CSERV (core image library service) to punch out (or write on magnetic tape, disk, or diskette) programs from the core image library.
- SSERV (source statement library service) to punch out (or write on magnetic tape, disk, or diskette) macro definitions.
- RSERV (relocatable library service) to punch out (or write on magnetic tape, disk, or diskette) the relocatable modules used to build IBM-supplied processor programs.
- PSERV (procedure library service) to display on SYSLST or to punch out (or write on magnetic tape, disk, or diskette) procedures from the procedure library.
- DSERV (directory service) to display on SYSLST the current contents of one or more library directories and their remaining library capacities. The directory display may be either an alphabetically sorted listing or a listing of the entries in the order they appear in the directory.

- LSERV (label cylinder display) to display (on SYSLST) the label cylinder located on SYSRES. SYSLST may be assigned to disk, tape, or printer.
- ESERV (de-editor program) to de-edit pre-edited macros from the E-sublibrary. It provides SYSLST and SYSPCH output of the original macros. It also provides an update facility for one macro per job step.
- MAINT (library maintenance) to delete and/or catalog library elements, and also to condense and reallocate library extents.
- CORGZ (copy or merge) to selectively copy or merge library entries from one disk pack to another disk pack. CORGZ allows larger or smaller allocations for each library of the new pack.

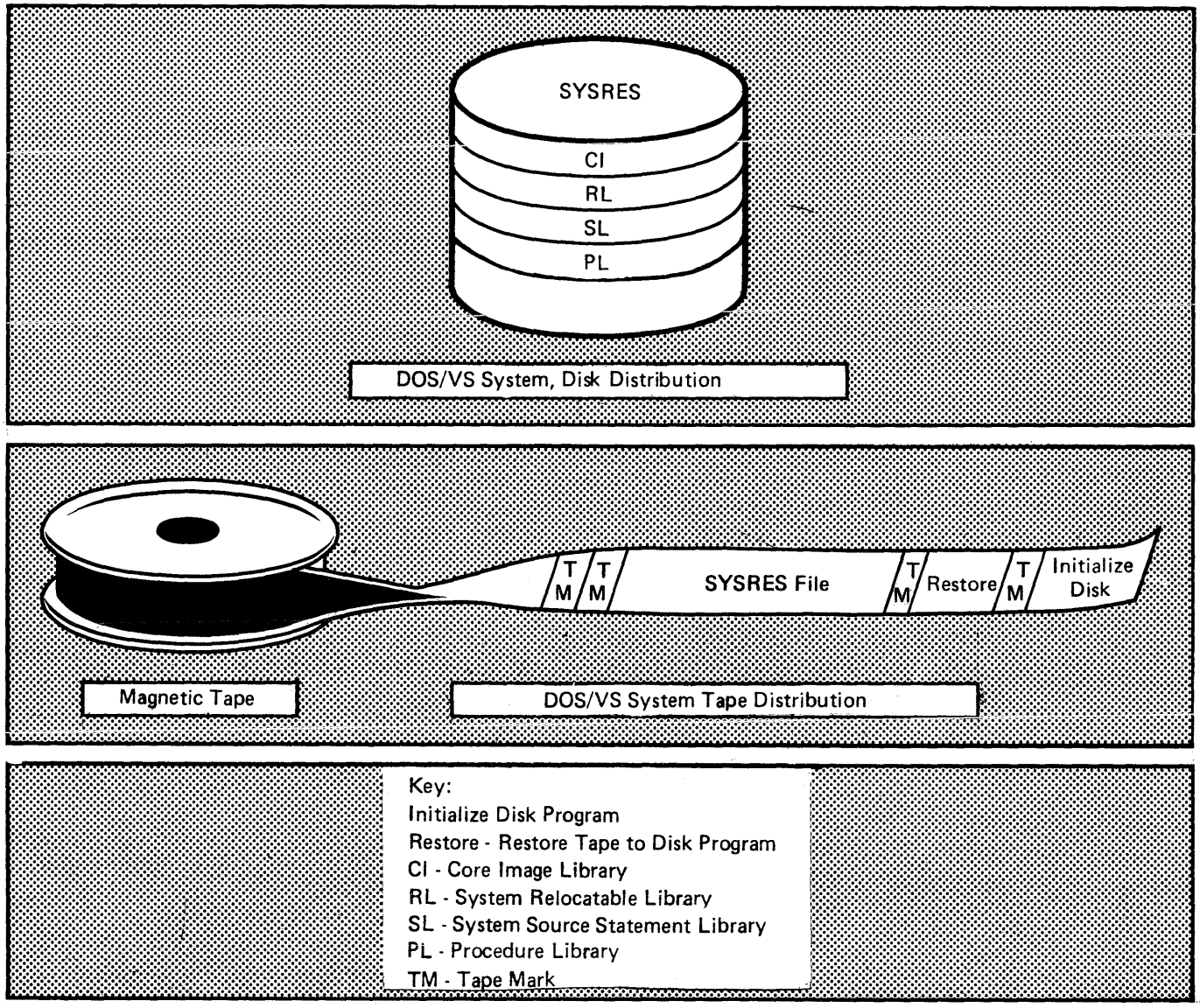


Figure 1-10. PROCEDURES--DOS/VS System Distributions

The sequence of job steps depends on the configuration available and the operational packs being built. Certain activities are common:

1. The general system generation procedure is:

   a. Initialize the disk pack that is to contain the system.

   b. For disk and tape, restore the IBM-supplied tape onto disk. For two disk drives and no tape drives, copy the IBM-supplied system to another disk to obtain back-up.

   c. Perform the IPL procedure from the restored disk and create the Page Data Set, the Recorder File and, if your CPU is a Model 115 or 125, the DOC Hard-Copy File.

   d. Create private libraries, if desired.

   e. Delete unwanted programs from the system (all libraries).

   f. Reallocate library sizes, if required.

   g. Set standard labels for system files and work files.

   h. Assemble supervisor into cards.

   i. Linkage edit and catalog supervisor and IBM components. (A supervisor cataloged to a private core image library can never be used because the IPL retrieval program searches only the system core image directory for phases beginning with $$.)

   j. Assemble IOCS modules.

   k. Catalog IOCS modules to the relocatable library.

   l. Delete supervisor and IOCS macros if not required.

   m. Perform Installation Verification Procedures.

2. The supervisor generation macro instructions must be keypunched to form a single source deck.

3. DELETR cards are selected or prepared for each relocatable library component that is not needed in the system. On a system with at least two disk drives, you can copy selectively rather than delete (DELETR). To copy selectively, prepare the librarian cards in the form: COPYR xxx.ALL.

4. DELETS E.xxxxxxxx cards are selected or prepared for each macro definition that is not needed in the system. IBM-supplied macro definitions appear in each component section. They appear in the general Index under "macros, IBM-supplied" with pointers to the correct module number(s). Certain low-usage macro definitions, such as supervisor generation macros, may be retained on a system maintenance pack, rather than on the operational pack. The books, Z.DELETECL, Z.DELETERL, Z.DELETESL and Z.LINKEDIT, can be retrieved through SSERV. These books contain the necessary statements to delete or link-edit selectively any components from the system. A pause card is read immediately before a deletion or link-edit job is performed. This allows you to press the END or ENTER key to perform the job or to type in CANCEL at the console printer keyboard to bypass that deletion or link-editing.

5. After a component is link-edited into the core image library, the relocatable library space used to build the component can be freed by deleting the modules and condensing the library. The delete book

Z.DELETERL can be used to perform this step. Prior to updating a component, however, the relocatable library of the pack must be rebuilt, by entering the appropriate modules either from cards, magnetic tape, or disk. On a system without magnetic tape this tradeoff must be carefully considered: disk tracks made available vs. speed and simplicity of component maintenance.

6. To use some compilers a certain collection of IOCS modules must be available in the relocatable library of each operational pack. These modules are preassembled and supplied in the relocatable library for the compilers that use them. Certain of these IOCS modules are link-edited into each compiler object program. These modules are generated using the following macro definitions supplied by IBM:

   CDMOD — Card Reader/Punch - 3881 Optical Mark Reader

   PRMOD — Printer

   MTMOD — Magnetic Tape

   SDMODxx — Sequential DASD. SDMOD consists of ten similar macro definitions: SDMODFI for sequential disk with fixed input, SDMODFO for sequential disk with fixed output, etc. A complete description of SDMODxx is contained in DOS/VS Supervisor and I/O Macros, GC33-5373.

   ISMOD — Index Sequential Access Method, DASD

   DAMOD — Direct Access Method, DASD

   DIMOD — Device Independent Module

   With assembler language you can assemble these IOCS functions directly into their application programs, or the IOCS modules can be assembled separately and cataloged into the relocatable library. Separate assembly of IOCS modules requires no additional real storage or additional execution overhead in speed. Those modules, shipped preassembled for IBM components, can also be used by any other program, if applicable. A separate assembly is preferable because:

   - Program assembly and reassembly time is minimized.
   - IBM supplied IOCS modules used by compilers may also be used by your application programs. Use of these modules reduces the assembly time of your application programs.
   - Use of preassembled IOCS modules facilitates program maintenance and standardization.
   - The xxMOD macro definitions just cited require a substantial number of cylinders in the source statement library.

   The corresponding generated modules ordinarily require fewer cylinders in the relocatable library. Thus, you may prefer to retain xxMOD macro definitions only on the system backup volume, cataloging a selection of generated modules onto each operational volume.

7. During each system generation and maintenance procedure, system libraries should be copied periodically on magnetic-tape reels, disks, or cards to provide backup in case of subsequent specification errors or machine errors.

8. Perform a DSERV, or check a system directory printout to determine the contents and sizes of the system libraries during system generation. This procedure enables you to determine that enough blocks remain for

link-edit and catalog procedures. A DSERV requires the following control statements:

```
// JOB DSERV
// EXEC DSERV
   DSPLYS ALL
/*
/&
```

A printout of the library status is provided automatically following a linkage edit with an OPTION CATAL specified or any // EXEC MAINT.

9. The initial system volume from IBM contains the volume serial number 111111. If the IBM-supplied volume is a tape, initialize the disk pack with the volume serial number before restoring the tape to the disk. The standard labels (DLBL and EXTENT statements) shown for the examples are adequate for system generation. The EXTENT statement, however, must be adjusted to reflect your volume serial number.

   To use the standard labels for configurations with two disks, SYSLNK, SYS001, SYS002, and SYS003 can be assigned to the second disk. The standard labels shown in the following discussions assume the VTOC to be on cylinder 199 of the residence volume (for a 2314/2319), on cylinder 403 (for a 3330), on cylinder 347 for the 3348, Model 35, or on cylinder 695 for the 3348, Model 70. Following system generation, adequate standard label assignments should be set to support the installation's requirements.

10. Standard labels (OPTION STDLABEL) are not defined for any file on the system distributed by IBM. A reply of delete to the following message destroys the system residence file unless it is encountered during a MAINT reallocation run:

```
DOS.SYSRES.FILE
4444A OVERLAP ON UNEXPIRED FILE
```

    The core image library allocations on the IBM-supplied volume(s) are not sufficient to contain all of the system components. The adequacy of allocations can be determined through the use of Figure 1-18.

    Refer to the section for each component for core image phase names, relocatable module names, and source statement macro names. Phases, modules, and macros are identified by component. Also included in the section for each component are those statements required for linkage editing and deleting.

Maintenance Procedures

The maintenance of DOS/VS libraries can be performed with the MERGE function of the CORGZ librarian program. The MERGE function allows complete libraries or selective library entries to be merged into existing libraries. When the MERGE function is used, space availability is always a consideration. The following discussions apply to all libraries.

REPLACING IDENTICAL ENTRIES USING MERGE FUNCTION

When transferring entries that have names identical to those of existing entries of a library, the old entry (phase, module, book, or procedure name) is deleted from the library's directory, and the new entry is added to the end of the library's directory. The phase, module, book, or procedure is added to the end of the library.

ADDING UNIQUE ENTRIES USING MERGE FUNCTION

When uniquely named entries (phase, module, book, or procedure name) are transferred to an existing library, the names of the entries are added to the end of the library's directory, and the phase, module, book, or procedure itself is added to the end of the library.

General Library Updating Techniques Using the Merge Function of the CORGZ Librarian Program

The techniques presented here apply to the examples given. They are intended as a guide and do not necessarily satisfy all requirements. The method that you apply to maintain the libraries depends upon the library structure, and the special requirements concerning the maintenance of your library.

COPYING SELECTIVELY TO MERGE LIBRARIES

When there are more entries desired in an existing library, it is faster to selectively copy (MERGE) to the library containing the greatest number of desired entries. Thus, the number of entries transferred and directory searches made are kept to a minimum to save time. If there is insufficient space in a library to accommodate additional entries, unwanted entries can be deleted, the library condensed, and the new entries then added to the library.

DELETING UNWANTED ENTRIES AND MERGING AN ENTIRE LIBRARY WITH ANOTHER LIBRARY

A second technique is to apply the IBM-supplied DELETERL or DELETESL book to delete all unwanted entries from a library and copy the entire library to another library, thus merging the two libraries. Using this technique requires that the library being copied to contains enough space to accommodate the entire library being copied. If there is insufficient space, the library being copied to can be condensed or reallocated.

COPYING SELECTIVELY, MERGING TWO LIBRARIES TO CREATE A THIRD LIBRARY

If there is insufficient space to accommodate a merge of two libraries, a third library can be created to contain selected entries from the two libraries being merged. This technique eliminates the need for condensing or reallocating an existing library. Note that this technique can be applied by using only two disk drives.

DELETING UNWANTED ENTRIES FROM TWO LIBRARIES AND MERGING BOTH LIBRARIES TO CREATE A THIRD LIBRARY

Another technique for merging two libraries is to delete unwanted entries from the two existing libraries, and merge the two libraries, in their entirety, by copying them to create a third library. Note that this technique can be applied by using only two disk drives.

DOS/VS Distribution Program Job Control Coding Specifications

Figure 1-12 provides job control information that is to be inserted in the program decks described in the sections "Processing the Distribution Tape" and "Creating a Back-Up of your Generated System Volume".

```
// DATE mm/dd/yy
     mm = 01-12
     dd = 01-31
     yy = 00-99
-------------------------------------------------------------------------
// ASSGN SYSxxx,x'cuu',dd[,X'ss']
   xxx = logical unit
   cuu = channel and unit of device

   • The channels used by the distribution program supervisor are:
          Multiplexer (channel 0)
          Selector 1 through 6

    dd = one of the following device type codes:

          C1-3210/3215 Console Printer-Keyboard
          CR-Display Operator Console

          D3-2314/2319 Disk Drive
          D4-3330 Disk Storage Models 1 and 2, or 3333 Disk Storage
          D5-3340 Disk Storage (35 megabyte data module)
          D6-3340 Disk Storage (70 megabyte data module)

          L1-1403/1404 Printer*
          L2-1443/1445 Printer*
          L3-3203, 3211, or 5203 Printer*

          R1-2540 Card Read-Punch (reading only)
          R2-2540 Using Punch-Read-Feed feature
          R3-1442 Card Read-Punch
          R4-2501 Card Reader
          R5-2520 Card Read-Punch
          R6-3505/3504 Card Reader
          R7-2560 MFCM or 5425 MFCU (read hopper 1)

          T1-2400 or 3400 7-track Tape
          T2-2400 or 3400 9-track Tape

    ss =  90 for 7-track tape unit
          C0 for 9-track tape 1600 BPI
          C8 for 9-track tape 800 BPI

  *For printers 1403, 3203, 3211, and 5203:
    ss =  7B - sense data checks
       =  73 - (default) block data checks (ignore)
-------------------------------------------------------------------------
// VTOC STRTADR=(cccchhh),EXTENT=(yy)
   cccchhh = cylinder and head number of starting address
        yy = number of tracks allotted to VTOC in decimal (1-20)
-------------------------------------------------------------------------
VOL1nnnnnn    nnnnnn = Volume Serial Number
```

Figure 1-12. PROCEDURES--Distribution Program Job Control Coding Specifications

Processing the Distribution Tape

The IBM-supplied system residence tape must be copied onto a disk pack before system generation can be performed. The pack that is to contain the system must be initialized with a volume label of 111111 and a volume table of contents (VTOC) at cylinder 199 (2314/2319), or cylinder 403 (if a 3330 Disk Storage is used). For the 3340, the VTOC is assumed to be on cylinder 347 for the 3348 Model 35 and on cylinder 695 for the 3348 Model 70. The Initialize Disk or Bypass Initialize Disk procedure is immediately followed by the Restore Distribution Tape to Disk procedure (see section "Restoring the IBM-supplied Distribution Tape to Disk"). If the disk pack that is to contain the system has already been initialized, proceed to the next section, entitled: "Bypassing the Initialize Disk Procedure".

Initializing the Disk

To initialize and restore the disk:

- Mount the distribution tape
- Ensure that the disk pack or data module is set for read and write operations:

  a) for the 3330, set the write protection switch to R/W
  b) for the 3340, use a read/write data module

- Place the following control cards in the card reader, in the sequence shown:

```
// JOB INTDSK
// ASSGN SYSLOG,X'cuu',dd
// DATE mm/dd/yy
// ASSGN SYSOPT,X'cuu',dd (disk) see Note 1.
// ASSGN SYS00n,X'cuu',dd (disk) see Note 2.
// LOG (optional)
// ASSGN SYSLST,X'cuu',dd (optional) see Note 6.
// EXEC
// UID nn see Note 3.
// VTOC STRTADR=(cccchhh),EXTENT=(yy) see Note 4.
VOL1nnnnnn see Note 5.
// END
// JOB DISRST
// ASSGN SYS005,X'cuu',dd      System residence file to be created
// ASSGN SYS006,X'cuu',dd,ss   Distribution tape
// EXEC
(for a description of the dd and ss fields see Figure 1-13)
```

Notes:

1. SYSOPT is required to specify the disk device to be initialized.

2. n = 2,3,4, or 5. SYS002 through SYS005 are optional to specify additional disk devices to be initialized.

3. Refer to DOS/VS System Utilities, GC33-5381, for a complete description of the UID control card.

   For 2314/2319, nn=:

   IR Previously flagged tracks are to retain their flags without surface analysis, or

IA Denotes surface analysis on all tracks. Generation of home address (HA) and R0 records, preformatting of IPL records, writing of volume label and VTOC, or

IS For packs that have already been initialized this entry can be used to change the volume label(s) and the VTOC location.

For the 3330 or 3340 Disk Storage, nn=:

IQ Quick initialization. No surface analysis. No home address generation, only standard R0 generation. IPL records are preformatted, volume labels and VTOC are written, or

IS See above.

4. For 2314/2319: ccccchhh=0199000 yy=1-20

For 3330: ccccchhh=0403000 yy=1-19

For 3348/35MB: ccccchhh=0347000 yy=1-12
For 3348/70MB: ccccchhh=0695000 yy=1-12

For each output disk specified (max. 5) a set of

```
// VTOC STRTADR=(ccccchhh),EXTENT=(yy)
VOL1nnnnnn
```

cards are to be added.

5. nnnnnn = Volume serial number (blanks are permitted)

Columns 42-51 are reserved for user's identification. A label control set consisting of a VTOC control card and a VOL1 control card is required for each pack assigned. The label control sets apply to the assignments in the order as specified in the job stream and not in strict numerical sequence.

- IPL from the tape unit that contains the distribution tape volume.
- When the wait state is entered, press START and EOF on the card reader.
- If messages S328I and S328A appear on SYSLOG, type DELETE and press INTERRUPT to delete unexpired files, one by one. Type DELETE ALL to delete all unexpired files at once.
- The message INITIALIZE DISK FUNCTIONS COMPLETED appears on SYSLOG when initialization is complete, after job control message S2F0I EOJ INTDSK. The DOS/VS system is then copied on the disk (Refer to the section entitled: "Restoring the IBM-supplied Distribution Tape to Disk").

6. If SYSLST is assigned, all messages and other output from the initialize disk phases to the communications device are also printed on SYSLST.

Bypassing the Initialize Disk Procedure

If the disk has previously been properly initialized, the Initialize Disk procedure can be omitted and the following procedure performed to bypass the initialize disk routine immediately followed by the procedure to restore the IBM-supplied distribution tape to disk:

- Mount and ready the distribution tape.
- Clear the card reader
- Set write protection switch to R/W (3330 only)
- Place the following control cards in the card reader in the sequence shown:

```
// JOB INTDSK
// ASSGN SYSLOG,X'cuu',dd
// LOG (optional)
// DATE mm/dd/yy
// FILES SYSIPT,1
// JOB DISRST
// ASSGN SYS005,X'cuu'dd      Newly created system residence file
// ASSGN SYS006,X'cuu'dd,ss   Distribution tape
```

  Note: For a description of the dd and ss fields see Figure 1-13.

- IPL from the tape unit that contains the distribution tape volume.
- When the wait state is entered, ready the card reader containing the control cards by pressing START and EOF.
- The tape forward-spaces past the initialization program and after job control message S2F0I EOJ INTDKS, the system automatically initiates the restore system function.

  S130A INTERVENTION REQ DEVICE=cuu
  GIVE REPLY, and/or END/ENTER and INTRPT key

  If this message is displayed, the card reader does not contain the required control cards to start the restore procedure. Check the cards in the hopper, complete them, ready the reader, then press END or ENTER and the Interrupt key.

Restoring the IBM-Supplied Distribution Tape to Disk

After initializing or bypassing the initialize program, the restore distribution tape procedure is performed straightaway.

The system issues the following two-part message:

S401D *** GIVE SYSTEM LIBRARY ALLOCATIONS *** (see Note)

CL=

Note: The allocations must be in the format ID=cyl(trk)

Default allocations for all four system libraries are obtained by pressing the END key (the ENTER key on a Model 125), immediately after the system displays or prints CL=, RL=, SL=, or PL=. The default values are SYSRES type dependent (2314/19, 3330, or 3340); they are listed in section 7 of the Memorandum to Users. After the END (or ENTER) key is pressed, the system displays the default allocations in message S403I ALLOC DEFAULTS TO X(Y).

If you need larger allocations, type them in immediately after the system prints (or displays) CL=, RL=, SL=, or PL=, then press the END or ENTER key. By so doing you override the default allocations.

CL=

Type in your system core image library allocation - cyl(trk) - then press the END (or ENTER) key. The system prints or displays:

RL=

Type in your system relocatable library allocation - cyl(trk) - and press the END (or ENTER) key. The system prints or displays:

SL=

Type in your system source statement library allocation - cyl(trk) - and press the END (or ENTER) key. The system prints or displays:

PL=

Type in your procedure library allocations - cyl(trk) - and press the END (or ENTER) key. The system prints or displays:

S409D TYPE GO IF ALLOCATION IS CORRECT

Type in GO and press the END (or ENTER) key or, if you want to change the allocations, just press the key without typing in GO, whereupon the system issues again the first (two-part) message. If you type in GO and press the END (or ENTER) key, the system successively issues the following procedural messages, provided that no errors are encountered:

S4101 FILE ID=xxx....xx (44x)

S411I EXTENT=CYL xxxTRKxx-CYLxxx TRKxx

S412I RESTORE OF SYSTEM CORE IMAGE LIBRARY IN PROGRESS

S417I RESTORE HAS BEEN SUCCESSFUL

S412I RESTORE OF SYSTEM RELOCATABLE LIBRARY IN PROGRESS

S417I RESTORE HAS BEEN SUCCESSFUL

S412I RESTORE OF SYSTEM SOURCE STATEMENT LIBRARY IN PROGRESS

S417I RESTORE HAS BEEN SUCCESSFUL

S412I RESTORE OF SYSTEM PROCEDURE LIBRARY IN PROGRESS

S417I RESTORE HAS BEEN SUCCESSFUL

S414I *** RESTORE COMPLETE ***

Besides procedural messages, error messages may be issued in the course of the library allocation procedure (see section "Restore Messages", which follows).

CREATING A BACK-UP OF YOUR GENERATED SYSTEM

At the end of system generation, you should copy your system volume in order to have back-up available. To do this, use the DOS/VS "Copy Disk or Data Cell to Tape" utility or, for 3330 and 3340 systems, the "Disk Volume - Fast Copy" utility. Both are part of 5745-SC-UTL, and are contained in the core image library.

Using the "Copy Disk or Data Cell to Tape" program, you can copy your system to tape in two ways:

- Copy volume (complete system pack)
- Copy file

The first method is the simpler of the two: all files on the system pack, plus any other data, are copied to tape(s). The second method needs specific file information for every file to be copied; moreover, only one file can be copied per tape volume. Generally speaking, the second method requires more tape volumes than the first.

Note: This tape is in a format accepted only by the DOS/VS utility RTPDK.

Copying a System Disk to Tape

1. Before the copy disk function can be performed, module IJWCDT must be link-edited and cataloged into the core image library, if this has not been done yet. Put the following cards in the card reader, in the sequence shown:

```
// JOB LINKEDIT COPY DISK UTILITY
// OPTION CATAL
 INCLUDE IJWCDT
// LBLTYP NSD(10)
// EXEC LNKEDT
/&
```

2. To copy your generated system:

   - Mount the system pack.
   - Mount the back-up tape on a tape drive and ready the device.
   - Place the following cards in the card reader, in the sequence shown:

```
// JOB COPY DISK VOLUME TO BACK-UP TAPE
// ASSGN SYS004,X'cuu'     DISK INPUT (VOLUME TO BE COPIED)    (Note 1)
// ASSGN SYS005,X'cuu'     TAPE OUTPUT (BACK-UP TAPE)
// ASSGN SYS003,UA
// UPSI 001
// EXEC CDKTP
// UCR {TV},A=(1504),E=({3340})      (Notes 2 and 3)
       {TF}           {3330}
                      {2314}
/&
```

Notes:

1. cuu denotes the channel and unit address.
2. The parameter A= in the UCR card specifies the most common physical record length of the area to be copied to obtain the best performance. (1504 is the maximum length of a record in the core image library.)
3. The entry E= in the UCR card specifies the device type of the disk storage device.

When the first tape volume is full, the following message will be issued:

```
BG 4140A NO ALTERN DRIVE ASSGN    UOUT    SYS005=cuu
```

The tape is rewound and unloaded by the system. As soon as a new tape volume is mounted and the drive is readied, reply as follows to continue the job:

```
newtap
```

Replacing a full tape volume by another tape may have to be done more than once. Not before the whole disk volume has been copied, will the system terminate the job with the message:

```
BG  EOJ COPY
```

provided the job name was indeed COPY.

Restoring the Back-Up Tape to Disk

If your DOS/VS system ever becomes defective, you must restore your back-up tape to a disk volume. In order to do this, first of all reload a disk pack with the IBM-supplied system tape so as to obtain a system under control of which the restore procedure can be executed.

Next, the following steps are to be performed:

1. Using the reloaded PID system, module IJWRTD must be link-edited and cataloged into the core image library. Use the following job control cards:

```
// JOB LINKEDIT RESTORE DISK UTILITY
// OPTION CATAL
  INCLUDE IJWRTD
// LBLTYP NSD(10)
// EXEC LNKEDT
/&
```

2. To restore your generated system:

   - Mount the back-up tape on a tape drive and ready the device.
   - Mount a disk pack (re-initialized if necessary) and ready the disk drive.
   - Place the following job control cards in the card reader, ready the reader, and start executing the job:

```
// JOB RESTORE BACK-UP TAPE TO DISK
// ASSGN SYS004,X'cuu'      BACK-UP TAPE              (Note 1)
// ASSGN SYS005,X'cuu'      OUTPUT DISK
// ASSGN SYS003,UA
// UPSI 1
// DLBL UOUT,'filename of the system residence file',99/365 (Note 2)
// EXTENT SYS005,,1,0,nnnnn,mmmmm   (Notes 3 and 4)
// EXEC RTPDK
/&
```

Notes:

1. cuu denotes the channel and unit address.
2. (filename of the system residence file) can be any name for this new system, for instance DOS.SYSRES.FILE. This name will be kept temporarily in the F1 label of the VTOC and will eventually be overwritten by the original filename of the copied system pack.

3. nnnnn=00001 denotes the relative track address of the lower limit of the SYSRES file which normally starts at cylinder 0, track 1.

4. mmmmm denotes the number of tracks occupied by the new file (Note 2). This number is not significant here, because all the back-up tapes will be restored regardless of this limit. When your copied system has been successfully restored, the original extent limits of the copied system are written in the system's F1 label in the VTOC.

If more than one back-up tape is involved, the following message will be issued after end-of-reel is detected:

```
BG 8001D  IS IT EOF
```

Reply by typing in n (for 'no'). The tape will be rewound and unloaded after which the second back-up tape volume can be mounted. Meanwhile the system will issue the following message:

```
BG 4140A   NO ALTERN DRIVE ASSGN   UIN   SYS004=cuu
```

After the tape drive with the newly mounted reel has been readied, reply by typing in:

```
newtap
```

The above procedure must be repeated for each tape volume to be restored. After the last tape has been restored, reply y (for 'yes') to the message

```
BG 8001D   IS IT EOF
```

upon which the system issues the final message

```
EOJ RESTORE
```

provided the jobname was indeed RESTORE.

3. As a last step, it is advisable to run a LVTOC job to check whether all files have been restored, and to keep track of the extents of the files. Before running this job, module IJWLTVB must be link-edited and cataloged into the core image library. Use the following job cards in the sequence shown:

```
// JOB LINKEDIT LVTOC UTILITY
// OPTION CATAL
  INCLUDE IJWLTVB
// LBLTYP NSD(10)
// EXEC LNKEDT
/&
// JOB LIST VTOC
// ASSGN SYS004,X'cuu'       SYSTEM DISK
// ASSGN SYS005,X'cuu'       PRINTER
// EXEC LVTOC
/&
```

CREATING A BACK-UP OF AND RESTORING A DISK/ONLY, 2-SPINDLE, 3330 OR 3340 DISK STORAGE SYSTEM USING THE FAST COPY DISK VOLUME UTILITY

In case your system is generated on a 2-spindle 3330 or 3340 Disk Storage in a disk-only configuration, it is obvious that no system utility operating under control of the DOS/VS supervisor can be used to perform the necessary backup and restore procedures.

For 3330 and 3340 backup, we suggest that you use the stand-alone version of the Fast Copy Disk Volume utility, as described in DOS/VS System Utilities, GC33-5381. This program is to be punched in cards, and will be especially useful in a 2-spindle environment when the SYSRES pack must be removed in order to mount a scratch pack for copying the data stored on the second disk spindle.

The stand-alone version of the Fast Copy Disk Volume utility is contained in the source statement library of the IBM-supplied system under the name Z.FASTCOPY. The SSERV program must be used to punch the utility program into cards.

Supervisor Messages

S100A INVALID RESPONSE, TRY AGAIN
GIVE REPLY, and/or END/ENTER and INTRPT KEY.

Cause: The operator has entered an invalid response to the previous message.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Verify the acceptable responses to the previous message and enter the desired choise, or
- Enter C or CANCEL to canel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

CCSW = aa bbbbbbbbbbbbbbbb CCB ADDR = cccccc
S101W PROGRAM CHECK, OLD PSW = dd d d dddd d d dddddd
HARD-STOP

Cause: Program check has occurred. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is the program old PSW.

System Action: The system enters the WAIT state.

Operator Action: In most cases the operator should obtain a storage dump and save the printer and console output for the IBM customer engineer. To restart the system, re-IPL.

S102W JOB xxxxxx CANCELED BY OPERATOR.
HARD-STOP

Cause: The operator has entered a response that has caused the program to be canceled.

System Action: The system enters the WAIT state.

Operator Action: To restart the system, re-IPL.

```
        CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
        SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S103W   NO ERP SUPPORT    DEVICE = cuu
          HARD-STOP
```

Cause: An error has been encountered on the indicated I/O device for which this version of the stand-alone supervisor does not support an error recovery procedure. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system enters the WAIT state.

Operator Action: To restart the system, re-IPL.

```
        CCSW = aa bbbbbbbbbbbbbbbb    CCB ADDR = cccccc
        SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S104W   CHANNEL ERROR DEVICE=cuu
          HARD-STOP
```

Cause: A channel error has occurred during an input/output operation on the indicated device. This is probably a hardware error. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system enters the WAIT state.

Operator Action: To restart the system, re-IPL. If the error persists, notify the IBM customer engineer.

```
S105A   IN REP CARD INVALID HEX CODE GROUP:  xxxxxx
          GIVE REPLY, and/or END/ENTER and INTRP KEY.
```

Cause: A REP card, containing the indicated invalid hexadecimal address or data between slashes (/), has been read by the loader routine in the supervisor.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Replace the incorrect card with a new REP card and resubmit it, followed by all remaining cards; then enter R or RETRY to continue processing, or
- Enter I or IGNORE to bypass the invalid REP card and continue processing, or

- Enter C or CANCEL to cancel the job.

After ENTERING your response, press the END/ENTER key and then the INTERRUPT key.

S1x0A INTERVENTION REQ DEVICE=cuu
GIVE REPLY, and/or END/ENTER and INTRPT KEY.

Cause: The device whose channel and unit designation is identified in the message, has been addressed by the program and is not in a ready status. The device type is indicated by the third character in the message number, as follows:

x = 1 - disk
2 - magnetic tape
3 - card
4 - printer
5 - console printer keyboard

If the last three characters of the message number are XOA, the system is unable to identify the device type.

System Action: The system waits for the operator response.

Operator Action:

- Ready the device to continue processing, or
- Enter C or CANCEL to cancel the job.

You should then press the END/ENTER key followed by the interrupt key.

CCSW = aa bbbbbbbbbbbbbbbb CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S1x1{W/A} EQUIPMENT CHECK DEVICE=cuu

HARD-STOP
GIVE REPLY, and/or END/ENTER and INTRPT KEY.

Cause: This is probably a hardware error. The indicated device may have an internal malfunction or may have dropped, possibly only momentarily, from the ready status during a data transfer operation. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

The device type is indicated by the third character in the message number, as follows:

x = 2 - magnetic tape
3 - card device
4 - printer
5 - console printer keyboard

System Action: If the suffix to the message number is W, the system enters the WAIT state. If the suffix is A, the system stops processing and waits for an operator response.

Operator Action: For a W suffix to the message number, re-IPL to restart the system. If the error persists, notify the IBM customer engineer. For an A suffix to the message number:

- Correct the condition which caused the error, ready the I/O device, and enter R or RETRY to continue processing.
- enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the interrupt key.

```
CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S1x2{W} BUSOUT CHECK   DEVICE=cuu
    {A}
  HARD-STOP
  GIVE REPLY and/or END/ENTER and INTRPT KEY.
```

Cause: A unit check, caused by a parity error, occurred on the indicated device. This is probably a hardware error. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

The device type is indicated by the third character in the message number, as follows:

x = 2 - magnetic tape
    3 - card device
    4 - printer
    5 - console printer keyboard

System Action: If the suffix to the message number is W, the system enters the WAIT state. If the suffix is A, the system stops processing and waits for an operator response.

Operator Action: For a W suffix to the message number, re-IPL to restart the system. If the error persists, notify the IBM customer engineer. For an A suffix to the message number:

- Perform any required manual recovery procedure for the particular I/O unit and ready the device. Enter R or Retry to continue processing.
- enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

CCSW = aa bbbbbbbbbbbbbbbb CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd

S1x3W COMMAND REJECT DEVICE=cuu
HARD-STOP

Cause: The specific channel command was rejected as being illegal for the device indicated by the channel and unit number. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

The device type is indicated by the third character in the message number, as follows:

x = 1 - disk
2 - magnetic tape
3 - card device
4 - printer
5 - console printer keyboard

System Action: The system enters the WAIT state.

Operator Action: In most cases the operator should obtain a storage dump and save the printer and console output for the IBM customer engineer. To restart the system, re-IPL.

CCSW = aa bbbbbbbbbbbbbbbb CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd

S1x4W OVERRUN DEVICE=cuu
HARD-STOP

aa is the last channel command code.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

The device type is indicated by the third character in the message number, as follows:

x = 2 - magnetic tape
3 - card device
4 - printer
5-console printer keyboard

System Action: The system enters the WAIT state.

Operator Action: To restart the system, re-IPL. If the error persists, notify the IBM customer engineer.

```
        CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
        SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S125A   LOAD POINT   DEVICE=cuu
          GIVE REPLY, and/or END/ENTER and INTRPT KEY.
```

Cause: Load point has been encountered on an input magnetic tape on the indicated channel and unit during execution of the error recovery procedure. This usually occurs during back spacing for a tape cleaning operation. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system stops processing and waits for an operator response.

Operator Action: Enter C or CANCEL to cancel the job. Then press the END/ENTER key and the interrupt key. Clean the tape drive, remount the tape, IPL and re-start the job.

```
        CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
        SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S1x6{W} DATA CHECK   DEVICE=cuu
    {A}
          HARD-STOP
          GIVE REPLY, and/or END/ENTER and INTRPT KEY.
```

Cause: An uncorrectable parity error or an invalid character has been detected during a data transfer operation on the indicated device. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

The device is indicated by the third character in the message number, as follows:

x = 2 - magnetic tape
    3 - card device
    4 - printer
    5 - console printer keyboard

System Action: If the suffix to the message number is W, the system enters the WAIT state. If the suffix is A, the system stops processing and waits for an operator response.

Operator Action: For a W suffix to the message number, re-IPL to restart the system. If the error persists, notify the IBM customer engineer. For an A suffix to the message number:

- Perform any required manual recovery procedure for the particular device (for example, repunch an input data card to

eliminate an invalid character) and ready the device. Enter R or RETRY to continue processing.

- Enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the interrupt key.

```
CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
SENSE=dddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S127A   NON COMPATIBILITY   DEVICE=cuu
          GIVE REPLY, and/or END/ENTER and INTRPT KEY.
```

Cause: Incompatibility has been detected between the magnetic tape characteristics specified in the ASSGN card for this device and those encountered on the indicated input tape. The incompatible characteristic could be density, parity or number of tracks. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Mount the correct tape and enter R or RETRY to continue processing, or
- Prepare a new ASSGN card that properly describes the characteristics of the tape to be processed. Enter C or CANCEL to cancel the job; re-IPL to restart the system and re-run the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key

```
CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
SENSE=dddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S128W   PERSIST WRITE ERROR   DEVICE=cuu
          HARD-STOP
```

Cause: A persistent write error has occurred on the indicated magnetic tape which the error recovery procedure cannot correct. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system enters the WAIT state.

Operator Action: Replace the magnetic tape which caused the error. Insure that cleaning procedures for the tape drives are being carried out. To restart the system, re-IPL. If the error recurs, notify the IBM customer engineer.

```
        CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
        SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S129W   WORD COUNT ZERO   DEVICE=cuu
          HARD-STOP
```

Cause: A magnetic tape hardware error has occurred on the indicated device. No data transfer occurred during the last tape operation. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system enters the WAIT state.

Operator Action: In most cases the operator should obtain a storage dump and save the printer and console output for the IBM customer engineer. To restart the system, re-IPL.

```
        CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
        SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S12BW   NOISE RECORD   DEVICE=cuu
          HARD-STOP
```

Cause: A record less than 12 characters in length has been encountered on the indicated magnetic tape. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system enters the WAIT state.

Operator Action: To restart the system, re-IPL. Insure that tape drive cleaning procedures are being carried out.

```
S12CA   FILE PROTECTED   DEVICE=cuu
          GIVE REPLY, and/or END/ENTER and INTRPT KEY.
```

Cause: A write command was issued to the indicated magnetic tape drive that contains a reel from which the file protect ring has been removed.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- A tape, with a file protect ring inserted, must be mounted on the tape drive; enter R or RETRY tc continue processing, cr
- Enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

```
CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S1xEW   DEVICE NOT ATTACHED   DEVICE=cuu
          HARD-STOP
```

Cause: The device corresponding to the channel and unit number addressed by the program is not available on the system, cr the device is switched to disabled mode. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

The device type is indicated by the third character in the message number, as follows:

x = 2 - magnetic tape
    3 - card device
    4 - printer
    5 - console printer keyboard

System Action: The system enters the WAIT state.

Operator Action: Correct the device assignment which addressed the invalid channel and unit number, or switch the device to enabled mode. To restart the system, re-IPL.

```
CCSW = aa bbbbbbbbbbbbbbbb   CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S11FW   PERMANENT ERROR   DEVICE=cuu
          HARD-STOP
```

Cause: A permanent hardware error has occurred during a disk I/C operation on the indicated device. The message displays the following information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

System Action: The system enters the WAIT state.

Operator Action: In most cases the operator should obtain a storage dump and save the printer and console cutput for the IBM customer engineer. To restart the system, re-IPL.

S11HA WRITE INHIBITED DEVICE ADDR=cuu
GIVE REPLY, and/cr END/ENTER and INTRPT KEY.

Cause: A write command was issued tc the indicated disk drive on which the write-inhibit switch is set to allow reading only.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Change the switch setting on the device to allow both reading and writing and enter R or RETRY (cr enter nc reply) tc continue processing.
- Enter C or CANCEL to cancel the jcb.

After entering your respcnse, press the END/ENTER key and then the INTERRUPT key.

CCSW = aa bbbbbbbbbbbbbbbb CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S11JW BAD TRCK CCCHH=ccchh DEVICE=cuu
HARD-STOP

Cause: A permanent disk read or write error has occurred on the indicated device. The message displays the fcllowing information, if available, in hexadecimal notation.

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

c...h is the defective cylinder and track number.

System Action: The system enters the WAIT state.

Operator Action: To restart the system, re-IPL. If the errcr at this physical address on the disk persists, the DOS/VS utility "Assign Alternate Track" should be run, permanently assigning an alternate track to replace the defective one.

CCSW = aa bbbbbbbbbbbbbbbb CCB ADDR = cccccc
SENSE=ddddddddddddddddddddddddddddddddddddddddddddddddddddddddd
S1xGW I/O ERROR DEVICE=cuu
HARD-STOP

Cause: An I/O error has occurred during an operation on the indicated device. It cannot be corrected by the error recovery procedure. The message displays the fcllowing information, if available, in hexadecimal notation:

aa is the last channel command code executed by the system.

b...b is the channel status word.

c...c is the address of the command control block.

d...d is up to 24 bytes of sense information.

The device type is indicated by the third character in the message number as follows:

x=1 - disk device
x=3 - card reader
x=5 - console printer keyboard

System Action: The system enters the WAIT state.

Operator Action: To restart the system, re-IPL. If the error persists, notify the IBM customer engineer.

Job Control Messages

S200D PAUSE
GIVE REPLY, and/or END/ENTER and INTRPT KEY.

Cause: A // PAUSE card has been read by job control.

System Action: The system stops processing after the // EXEC card has been read and waits for an operator response.

Operator Action: To resume processing, press the END/ENTER key and then the INTERRUPT key.

S210A DUPLICATE JOB CARD
GIVE REPLY, and/or END/ENTER and INTRPT KEY

Cause: Additional // JOB card(s) has been encountered without an intervening // EXEC card. (Only one // JOB card per job is allowed.)

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Enter I or IGNORE to cause the system to disregard the second JOB card and continue processing, or
- Enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

S220A MISSING JOB CARD
GIVE REPLY, and/or END/ENTER and INTRPT KEY.

Cause: The first control statement for each job must be the // JOB card. This statement was not found by the job control program at the point where it should have been encountered.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Resubmit the job control cards, placing the // JOB card ahead of the others; then enter R or RETRY (or do not enter any reply) to continue processing, or
- Enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

Note: The message will appear on the console printer keyboard only if an assignment for SYSLOG has been made by placing the appropriate REP card in the supervisor object deck. Otherwise, the system will not be able to display the message because the job control card assigning SYSLOG will not have been read.

S230A NO '// ' IN COL. 1-3
GIVE REPLY, and/or END/ENTER and INTRPT key.

Cause: Each job control card must begin with // in card columns 1 and 2 and a blank in column 3. The last statement read by the job control program does not have these characters in the first three columns.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Remove the card and replace it with a job control card in the correct format; then enter R or RETRY (or do not enter any reply) to continue job control processing, or
- Enter I or IGNORE to bypass the incorrect card and continue job control processing, or
- Enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

S240A INVALID CONTROL CARD
GIVE REPLY, and/or END/ENTER and INTRPT key.

Cause: Misspelled or missing operation field following the two slashes in the job control card.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Correct the error and re-submit the card and all the following cards; then enter R or RETRY to continue processing, or
- Enter I or IGNORE to cause the system to disregard the incorrect card and continue processing, or
- Enter C or CANCEL or cancel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

S250A MISSING DATE CARD
GIVE REPLY, and/or END/ENTER and INTRPT key.

Cause: After the IPL procedure, the DATE card must be included at some point between the // JOB and // EXEC cards. No DATE card was found.

System Action: The system stops processing and waits for an operator response.

Operator Response:

- Place the DATE and EXEC cards and all the fcllowing cards in the card reader; then press R or RETRY to continue processing, or
- Enter C or CANCEL to cancel the job.

After entering your response, press the END/ENTER key and then the INTERRUPT key.

S260A OPERAND n INVALID
GIVE REPLY, and/or END/ENTER and INTRPT key.

Cause: The number n, inserted into the message indicates the parameter which the job control program has analyzed to be in error.

System Action: The system stops processing and waits for an operator response.

Operator Action:

- Repunch the incorrect card and resubmit it, with the remaining unread job control cards; then enter R or RETRY to continue job control processing, or
- Enter I or IGNORE to cause job control to bypass and ignore the incorrect card and continue processing, or
- Enter C or CANCEL to cancel the job.

After entring your response, press the END/ENTER key and then the INTERRUPT key.

S2F0I EOJ jobname

Cause: Normal end-of-job was reached.

System Action: Job Control will attempt to read the next set of control cards from SYSRDR to initiate the next job.

Operator Action: None.

Initialize Disk Messages

S300A INVALID RESPONSE, TRY AGAIN

Cause: An invalid response to a previously displayed message.

System Action: The system waits for an operator response.

Operator Action:

- Select and enter a valid response to continue processing, or
- Enter C or CANCEL to cancel the job.

S302W JOB INTDSK CANCELED DUE TO PROGRAM REQUEST

Cause: Conflicting job specifications detected.

System Action: The system enters the wait state.

Operator Action: Check the previously displayed SYSLOG output to resolve the conflicting conditions, then re-IPL and rerun the job.

S310I CONTROL CARD ANALYSIS AND LABEL CHECKING

Cause: Identifies beginning of initialize disk function.

System Action: Processing continues.

Operator Response: None.

S311I UTILITY MODIFIER CARD

Cause: Identifies the control card parameters that follow this heading.

System Action: Processing continues.

Operator Action: None.

S312I MISSING UTILITY MODIFIER CARD

Cause: Utility modifier is missing.

System Action: The system displays message S302W, then cancels the job and enters the wait state.

Operator Action: Reload program with corrected control cards.

S313I INVALID FORMAT

Cause: Format is incorrect (either a parameter is missing or it is out of order).

System Action: The system displays message S302W, then cancels the job and enters the wait state.

Operator Action: Relcad program with corrected control cards.

S314I INVALID I (or C or R) PARAMETER

Cause: Parameter value is incorrect.

System Action: The system displays message S302W, then cancels the job and enters the wait state.

Operator Action: Reload program with corrected control cards.

S320I JOB CARD NOT INTDSK

Cause: Job name in job card is not INTDSK.

System Action: The system displays message S302W, then cancels the job and enters the wait state.

Operator Action: Reload program with corrected control cards.

S321I SYSOPT NOT DEFINED

Cause: SYSOPT has not been assigned.

System Action: The system displays message S302W, then cancels the job and enters the wait state.

Operator Action: Reload program with corrected control cards.

S322I SYSOPT(002,003, etc) NOT A VALID DISK DRIVE

Cause: Indicated symbolic unit is not a disk drive in JCL syntax.

System Action: The system displays message S302W, then cancels the job and enters the wait state.

Operator Action: Reload program with corrected control cards.

S323I X'cuu' NOT A VALID DISK DRIVE
PACK IS DELETED FROM FURTHER PROCESSING

Cause: Indicated disk drive is not IBM supported, or there is a wrong 'cuu' specification.

System Action: The system switches to the next drive, if assigned. If no other drive is assigned the job is canceled and the system enters the wait state.

Operator Action: Reload program with corrected control cards if the job is canceled; otherwise no action is required.

S324I DISK TYPE SPEC FOR SYS002 (003, 004, or 005) IS NOT EQUAL SYSOPT
PACK IS DELETED FROM FURTHER PROCESSING

Cause: Indicated symbolic unit differs from SYSOPT type as specified in JCL syntax.

System Action: Processing continues without this unit being used.

Operator Action: None.

S325I xxxx DISK TYPE ON X'cuu' WHILE yyyy EXPECTED
(E.G. xxxx=2314 and yyyy=3330)
PACK IS DELETED FROM FURTHER PROCESSING

Cause: Indicated disk drive differs from specification in job control language (JCL).

System Action: Processing continues without this unit being used.

Operator Action: None.

S326I NO VOL1 LABEL (or F4 LABEL or VTOC AREA) FOUND ON X'cuu'
'IS' OPTION INVALID

Cause: Pack on indicated drive is to be regarded as not being initialized, because no VOL1 label, F4 label, or VTOC was found.

System Action: The system displays message S302W, then enters the wait state.

Operator Action: Reload program after 'IS' option in utility modifier card has been changed.

S327I NO VTOC MATCH FOUND ON X'cuu'. 'IS' OPTION INVALID

Cause: Pack on indicated drive is to be regareded as not being initialized, because device constants do not match.

System Action: The system displays message S302W, then enters the wait state.

Operator Action: Reload program after 'IS' option in utility modifier card has been changed.

S328I UNEXPIRED FILE ON xxxx AT X'cuu':
S328A '(filename from F1 label)'.

Cause: Identified file is not yet expired.

System Action: The system waits for an operator response.

Operator Action:

- Type in DELETE and press INTERRUPT to delete file by file.
- Type in DELETE ALL to delete this and all other files.
- Type C or CANCEL to terminate the job (wait state).
- Type in BYPASS to stop processing this pack, and continue processing the next unit, if assigned.

After each of these replies, press END/ENTER, then press the interrupt key to continue processing.

S329I DATA CHECK IN COUNT FIELD, DEVICE=cuu

Cause: A data check occurred while reading a count field of a track on the indicated disk device. Probably a hardware error.

System Action: If other disk drives have been assigned, processing continues. A second message will be displayed, indicating the system action taken and possibly the operator action to be taken with regard to the drive on which the data check occurred.

Operator Action: None.

S330A READ ERROR F-4 LABEL OF OUTPUT-FILE, DEVICE=cuu

Cause: An error was detected while reading an output file format 4 label.

System Action: The system waits for an operator response.

Operator Action:

- Press END or ENTER, then press the interrupt key to continue processing, or
- Type C or CANCEL to terminate the job.

S331A NO F-4 RECORD FOUND OR END-OF-CYL, DEVICE=cuu

Cause: No F-4 label detected before end-of-cylinder was reached in the VTOC.

System Action: The system waits for an operator response.

Operator Action:

- Press END or ENTER, then press the interrupt key to continue processing, or
- Type C or CANCEL to terminate the job.

S332A READ ERROR VOL LABEL OF OUTPUT-FILE, DEVICE=cuu

Cause: An error was detected while reading an output file VOL label.

System Action: The system waits for an operator response.

Operator Action:

- Press END or ENTER, then press the interrupt key to continue processing, or
- Type C or CANCEL to terminate the job.

S333A NO VOLRECORD FOUND OR END-OF-CYL, DEVICE=cuu

Cause: No VOL label detected before end-of-cylinder was reached in the VTOC.

System Action: The system waits for an operator response.

Operator Action:

- Press END or ENTER, then press the interrupt key to continue processing, or
- Type C or CANCEL to terminate the job.

S334A READ ERROR VTOC SCAN OF OUTPUT-FILE, DEVICE=cuu

Cause: A read error occurred while searching the output file VTOC.

System Action: The system waits for an operator response.

Operator Action:

- Press END or ENTER, then press the interrupt key to continue processing, or
- Type C or CANCEL to terminate the job.

S335A NO VTOC RECORD FOUND OR END-OF-CYL, DEVICE=cuu

Cause: No output-file VTOC record(s) found before end-of-cylinder was reached.

System Action: The system waits for an operator response.

Operator Action:

- Press END or ENTER, then press the interrupt key to continue processing, or
- Type C or CANCEL to terminate the job.

S336I 'IS' OPTION INVALID

Cause: A condition is detected which is in conflict with the 'IS' option specified in the // UID control card.

System Action:

1. If the SYSOPT assignment is being processed the system cancels the job and enters the wait state.
2. The system starts processing another disk pack, if assigned.

Operator Action:

1. Resolve the conflicting condition, then re-IPL.
2. None.

S337I PERMANENT ERROR, DEVICE=cuu

Cause: An error occurred while reading from a 3330 or 3340 disk. A number of rereads have not resolved the error condition, which is probably caused by a hardware failure.

System Action: If other disk drives have been assigned, processing continues. A second message will be displayed, indicating the system action taken and possibly the operator action to be taken with regard to the drive on which the error occurred.

Operator Action: None.

S340I SURFACE ANALYSIS AND HA-RO GENERATION

Cause: Identifies the function of this phase (2314/19 only).

System Action: Processing continues.

Operator Action: None.

S341I NO SURFACE ANALYSIS, ONLY RO GENERATION

Cause: Identifies the function of this phase for the 3330 only.

System Action: Processing continues.

Operator Action: None.

S342I SYSOPT(002,003,etc.) IN PROCESS

Cause: Disk packs to be processed will be logged with their respective message, starting with SYSOPT.

System Action: Processing continues.

Operator Action: None.

S350I CYL xxx TRK xx (DECIMAL), IS
A DEFECTIVE ALT TRK, NO ALT TRK ASSINGED

Cause: Cylinder and track are identified by decimal characters. The track on the alternate cylinder is defective. An alternate is not assigned.

System Action: Processing continues.

Operator Action: None.

S351I CYL xxx TRK xx (DECIMAL) IS
DEFECTIVE, AN ALT TRK IS ASSIGNED

Cause: Main area of the track identified by cylinder and track number is defective, An alternate is assigned.

System Action: Processing continues.

Operator Action: None.

S352I CYL xxx TRK xx, (DECIMAL), IS
DEFECTIVE, AN ASSIGNED ALTERNATE TRK WAS DETECTED

Cause: Main area of the track identified by cylinder and track number is defective. An alternate track had already been assigned (3330 and 3340 only).

System Action: Processing Continues.

Operator Action: None.

S353I CYL xxx TRK xx (DECIMAL), IS
DEFECTIVE, ALT CYL IS FULL NO ALT TRK ASSIGNED
SYSxxx IS DELETED AFTER PROCESSING IS FINISHED

Cause: This defective track cannot be assigned an alternate track. The alternate cylinders are full.

System Action: No corrective action taken. Surface analysis (2314 only) and R0 generation are performed on the rest of the pack, then the pack will be deleted from further processing. Neither a VOL1 label nor a VTOC will be created. Use of this pack should be discontinued. Contact your IBM customer engineer or the branch office serving your area.

Operator Action: Replace the faulty pack with another disk pack, then re-IPL.

S354I CYL xxx TRK xx (DECIMAL), IS
HOME ADDRESS (HA) OR RECORD ZERO (R0) DEFECT.
SYSxxx IS DELETED AFTER PROCESSING IS FINISHED

Cause: Portion of the track where the home address or record zero resides is defective.

System Action: No corrective action taken. Surface analysis (2314 only) and R0 generation are performed on the rest of the pack, then the pack will be deleted form further processing. Neither a VOL1 label nor a VTOC will be created. Use of this pack should be discontinued. Contact your IBM customer engineer or the branch office serving your area.

Operator Action: Replace faulty pack with another disk pack, then re-IPL.

S355I CYL 000 TRK 00 (DECIMAL), IS
DEFECTIVE, NO ASSIGNED ALT TRK WAS DETECTED
SYSxxx IS DELETED AFTER PROCESSING IS FINISHED

Cause: Main area of the track identified by cylinder and track number is defective. No alternate track had been assigned (3330 only).

System Action: No corrective action taken. R0 generation is performed on the rest of the pack. After that processing the pack is terminated.

Operator Action: Replace the faulty pack with another disk pack, then re-IPL.

S356I CYL xxx TRK xx (DECIMAL), IS
DEFECTIVE, NO ASSIGNED ALT TRK WAS DETECTED
A STANDARD VTOC WILL BE CREATED ON SYSxxx

Cause: The main area of the track identified by cylinder and track number is defective. No alternate track has been assigned (3330 and 3340 only).

System Action: No corrective action is taken. R0 generation is completed on the rest of the pack (3330 and 3340). User VTOC specifications are neglected; a standard VTOC will be created later to minimize the occurrence of any errors (see message S381I).

Operator Action: This disk pack should be subjected to the DOS/VS "Assign Alternate Track" function, which cannot be run, however, until your generated DOS/VS system is available. Replace the pack and re-IPL.

S370I *VOL/VTOC LABLES CONTROL SET*

Cause: Identifies sets of VOL1 and VTOC cards.

System Action: Processing continues.

Operator Action: None.

S371I INITIALIZE DISK FUNCTIONS COMPLETED

Cause: Normal end of job has been reached.

System Action: The system initiates the next job (restore SYSRES).

Operator Action: None.

S372I SYSOPT (002, 003, etc.) DELETED

Cause: Identified disk pack is deleted form further processing.

System Action: Processing continues.

Operator Action: None.

S373A VTOC CARD MISSING OR INCORRECT

Cause: VTOC card is missing or is incorrect.

System Action: The system waits for an operator response.

Operator Action:

- Correct the // VTOC card in the volume label set (including VOLn cards).
- Place cards in the read hopper and ready the reader.
- Press END or ENTER and interrupt key to continue.

S374A INVALID VTOC ADDRESS OR INVALID EXTENT PARAMETER

Cause: Invalid VTOC start address or invalid (or missing) EXTENT parameter.

System Action: The system waits for an operator response.

Operator Action:

- Correct the // VTOC and the VOLn cards in the volume label set.
- Place the cards in the read hopper and ready the reader.
- Press END or ENTER, then press the interrupt key to continue.

S375A VTOC OVERFLOWS CYLINDER

Cause: Assigned VTOC area overflows the cylinder.

System Action: The system waits for an operator response.

Operator Action:

- Correct the // VTOC and the VOLn cards in the volume label set.
- Place the cards in the read hopper and ready the reader.
- Press END or ENTER, then press the interrupt key to continue.

S376A VOL1 CARD MISSING OR VOL1-n OUT OF SEQUENCE

Cause: VOL1 card is missing, an incorrect volume card was supplied, or VOL1 through VOLn are out of sequence.

System Action: The system waits for an operator response.

Operator Action:

- Correct the VOL label card in the volume label set (beginning with // VTOC card followed by VOLn cards).
- Place the cards in the read hopper and ready the reader.
- Press END or ENTER, then press the interrupt key to continue.

S377I VOL1 SERIAL FIELD CONTAINS BLANKS

Cause: VOL1 card has one or more blanks in the volume serial field.

System Action: Processing continues.

Operator Action: None.

S378A VTOC CARD OR END CARD OR VOL CARD ERROR

Cause: Wrong VTOC or END control card, or END card is missing (Proper format is either '// VTOC ' or '// END ' - probably a mispunch).

System Action: The system waits for an operator response.

Operator Action:

- Correct the cards in the volume label set (beginning with // VTOC card followed by VOLn cards).
- Place the cards in the read hopper and ready the reader.
- Press END or ENTER, then press the interrupt key to continue.

S379A VTOC CARD SETS UNEQUAL NUMBER OF ASSIGNED PACKS

Cause: VTOC card sets and the number of assigned packs do not match.

System Action: The system waits for an operator response.

Operator Action:

- Add another set of volume label cards (beginning with // VTOC card followed by VOLn cards).
- Place these cards in the reader hopper and ready the reader.
- Press END or ENTER, then press interrupt key to continue.

S380A PARAMETER DELIMITER ERROR

Cause: Comma or blank must follow the parameter.

System Action: The system waits for an operator response.

Operator Action:

- Correct the card(s) in the volume label set (beginning with // VTOC card followed by VOLn cards).
- Place the cards in the read hopper and ready the reader.
- Press END or ENTER, then press interrupt key to continue.

S381I USER'S VTOC OVERRULED DUE TO SEVERE ERROR(S)

Cause: During a previous step of the initialize disk prccedure a faulty track was detected (see message S356I) while no alternate track had been assigned.

System Action: A standard VTOC is created.

Operator Action: This pack should be subjected to the DOS/VS "Assign Alternate Track" function, which cannot be run, however, until your generated DOS/VS system is available.

S382A VOL NUMBER NOT NUMERIC

Cause: n in VOLn was not a numerical character.

System Action: The system waits for an operator response.

Operator Action:

- Replace the faulty VOL label card in the volume label set (the set starts with a // VTOC card, followed by VOLn cards).
- Place the cards in the read hopper and ready the card reader.
- Press END or ENTER, then press the interrupt key to continue.

S383I MAXIMUM EIGHT VOL CARDS ALLOWED, CARD SKIPPED

Cause: A VOL number higher than 8 detected in the volume label set.

System Action: The card in error is skipped, processing continues.

Operator Action: None.

S399D BAD PACKS FLAGGED, RECHECK THE RESTORE-DISK JCL

Cause: This message is displayed at the end of the initialize disk procedure to indicate that severe error conditions with respect to defective tracks were detected.

System Action: The system waits for an operator response.

Operator Action:

- Check the job control cards of the next job to be initiated (restore SYSRES).
- Change any disk assignments that refer to the bad packs.
- Place the corrected job control cards for the restore disk program in the read hopper and ready the card reader.
- Press END or ENTER, then press the interrupt key to start the restore disk program.

Restore Messages

S405I SYNTAX ERROR

Cause:

- Characters other than numerals (0-9) or parentheses specified in system library allocation, or
- More than 16 digits used for library or directory allocation.

System Action: Display of CL=, RL=, or SL= is repeated.

Operator Action: Type in correct allocation.

S406I ALLOCATION ERROR

Cause: Zero size specified for either a library or directory.

System Action: Display of CL=, RL=, or SL= is repeated.

Operator Action: Type in correct allocation.

S408I DIRECTORY EXCEEDS LIBRARY

Cause: The number of tracks allocated to a directory exceeds the total number of cylinders allocated to directory+library.

System Action: Display of CL=, RL=, or SL= is repeated.

Operator Action: Type in correct allocations.

S418I DIRECTORY IS FULL

Cause: The specified directory does not have enough space to catalog.

System Action: The job is canceled.

Operator Action: Resubmit the job and provide larger directory allocations.

S419I LIBRARY IS FULL

Cause: The specified library does not have enough space to catalog.

System Action: The job is canceled.

Operator Action: Resubmit the job and provide a larger library allocation.

S4202 EOV ENCOUNTERED
S421A MOUNT NEW TAPE AND GIVE EOB IF UNIT IS READY

Cause: End of volume was reached while reading from SYS006.

System Action: The system waits for another volume to be mounted and readied.

Operator Action: Mount another tape volume and press the END or ENTER key.

S422I WRONG TAPE VOLUME

Cause: Wrong volume sequence number encountered.

System Action: The tape is rewound and unloaded, then message S421A MOUNT NEW TAPE AND GIVE EOB IF UNIT IS READY is displayed.

Operator Action: Mount another tape volume and press the END or ENTER key.

S423I WRONG DESCRIPTOR, xxxx INSTEAD OF xxxx

Cause: A data check occurred on SYS006.

System Action: The job is canceled.

Operator Action: Rerun the job (the tape unit may need servicing).

S424I WRONG TAPE RECORD COMPONENT=xxxxxxxxxx

Cause: A data check occurred on SYS006.

System Action: The job is canceled.

Operator Action: Rerun the job (the tape unit may need servicing).

S425I BLOCK COUNT ERROR

Cause: A data check occurred on SYS006.

System Action: The job is canceled.

Operator Action: Rerun the job (the tape unit may need servicing).

S426I NO VOL1 LABEL FOUND

Cause: No VOL1 label was found at cylinder 0, head 0, record 3 of the disk device assigned to SYS005.

System Action: The job is canceled.

Operator Action:

- Check the device assignment for SYS005.
- Check whether the correct disk pack has been mounted.

If correction is necessary, rerun the restore program.
If no correction is necessary, initialize the disk and rerun the restore program.

S427I NO FORMAT 4 LABEL FOUND

Cause: Record found at address specified in VOL1 lable is not a Format 4 label.

System Action: The job is canceled.

Operator Action: Initialize the disk, then rerun the restore program.

S428I INVALID DEVICE TYPE

Cause: The device assigned to SYS005 is not a valid disk drive.

System Action: The job is canceled.

Operator Action: Repeat the restore procedure with a corrected assignment for SYS005.

429I EXTENT EXCEEDS PACK LIMITS

Cause: Total number of cylinders allocated exceeds capacity of disk pack.

System Action: Display of CL=, RL=, or SL= is repeated.

Operator Action: Type in correct allocations.

S430I OVERLAP ON VTOC

Cause: VTOC address was found to be too low.

System Action: The job is cancelled

Operator Action:

- Reinitialize the disk with the VTOC on a higher disk address, or
- Resubmit the job with smaller allocations.

S431I EQUAL FILE IN VTOC
44-byte file-id.
S432D TYPE DELETE OR GIVE A NEW FILE ID

Cause: The 44-byte file-id under which SYSRES is to be restored already exists as an unexpired Format 1 label in the VTOC.

System Action: The system waits for an operator response.

Operator Action:

- Type DELETE to delete the unexpired file, or
- Type a new file-id (both upper and lower case are accepted).

S433D TYPE GO IF FILE ID IS CORRECT

Cause: System response to previously displayed message.

System Action: The system waits for an operator response.

Operator Action:

- Type GO if file-id was entered correctly, or
- Press the END or ENTER key if it was not.

S434I OVERLAP ON UNEXPIRED FILE
44-byte file-id.
S435D TYPE CANCEL, DELETE OR RETRY

Cause: The extent card limits overlap the extent limits of an unexpired file.

System Action: The system waits for an operator response.

Operator Action:

- Type CANCEL to cancel the job, or

- Type DELETE to delete the unexpired file, or
- Type RETRY, then provide different allocations.

S436D INVALID RESPONSE

Cause: Operator response to previously displayed message is invalid.

System Action: The system waits for an operator response.

Operator Action: Type in correct response to previous message.

S437I NO LABEL SPACE IN VTOC FOR A NEW FILE LABEL

Cause: No space available in the VTOC to write a new label.

System Action: The job is canceled.

Operator Action: Initialize a disk pack with a larger VTOC, then copy the pack being processed onto that pack and rerun the job.

S438I JOB CANCELED

Cause: This message is displayed directly after a message which indicates the reason why abnormal end-of-job was reached.

System Action: The system enters the wait state.

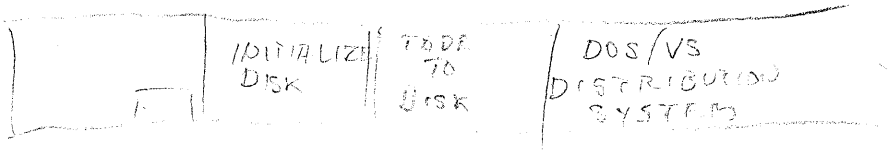
Operator Action: Resubmit the job, after having resolved the error condition(s).

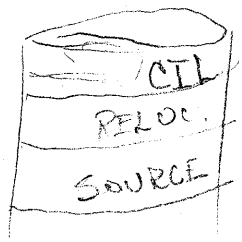
S439I END OF JOB

Cause: Normal end of job.

System Action: The system enters the wait state.

Operator Action: Proceed with the next step of your system generation.





IBM 2314 Direct Access Storage Facility Example

Figure 1-13 illustrates the general procedure to be followed by users with a 2314 available.

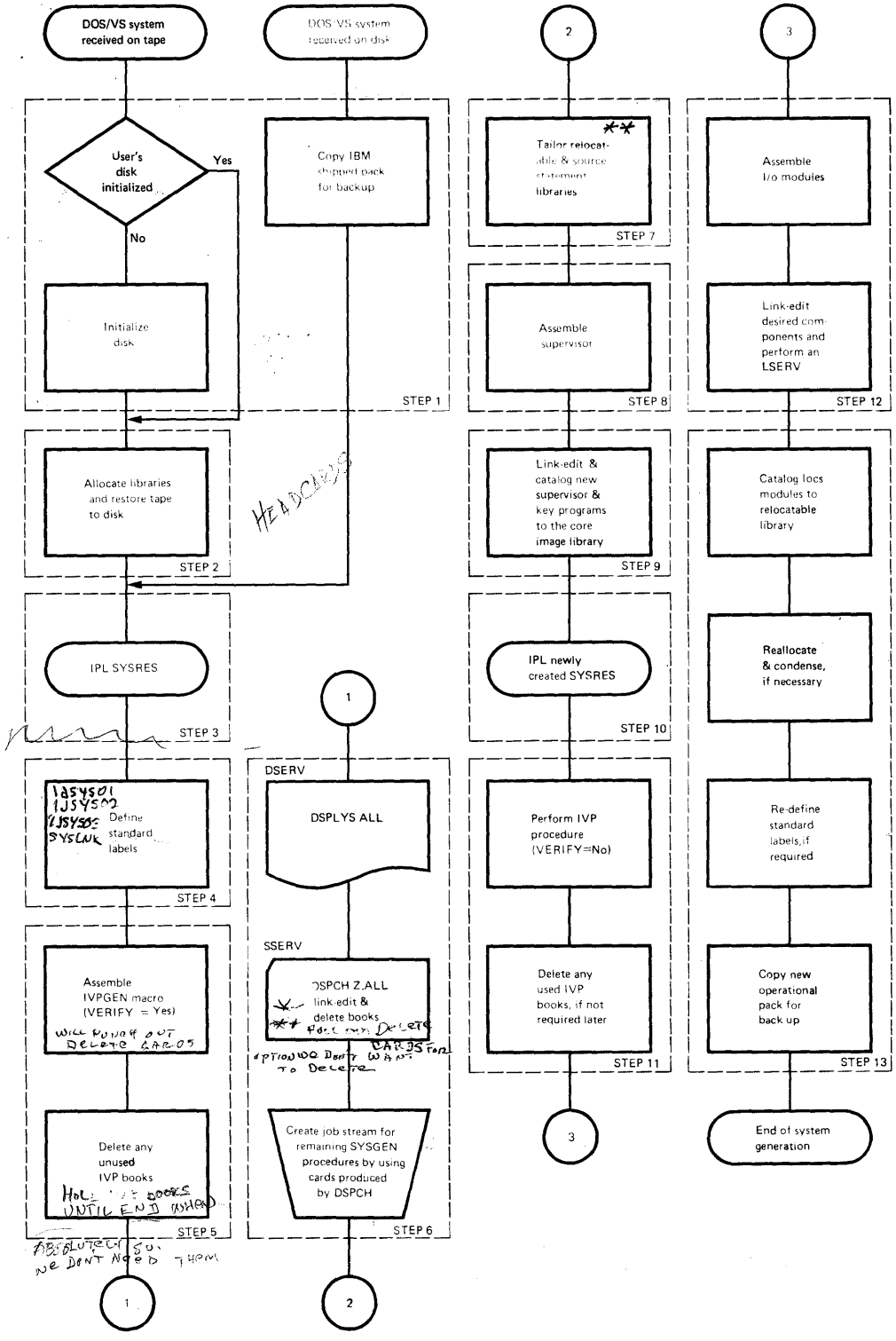


Figure 1-13. PROCEDURES--Overview of a 2314 System Generation

This example is one of the many possible methods for generating a system. Figure 1-14 illustrates the system configuration upon which the 2314 Example is based.

INPUT/OUTPUT DEVICE CONFIGURATION FOR 2314 EXAMPLE (SEE FIGURE 1-14)

Device	Channel	Unit	Use
3505	0	0C	Card Reader (SYSRDR, SYSIPT)
3525P	0	0D	Card Punch (SYSPCH)
3211	0	0E	Printer (SYSLST)
3210/3215	0	1F	Console Printer-Keyboard (SYSLOG)
2314	1	30	Disk (SYSRES, SYSLNK, SYSREC, SYS001, SYS002, SYS003)
3420T9	2	80	Magnetic Tape

2314 Example: Results of System Generation

When system generation is completed, the operational disk of the installation contains user selected components and programs in its core image library, together with the installation's tailored supervisor, job control, linkage editor, and librarian programs. The tape shipped by IBM is retained as backup tape. It is a self-loading tape capable of being restored on disk. Libraries contain all phases, modules, and macro definitions shipped from IBM. The core image library is built to contain those IBM programs chosen.

The core image, relocatable, and source statement libraries are condensed, and IOCS modules are assembled and cataloged to the relocatable library.

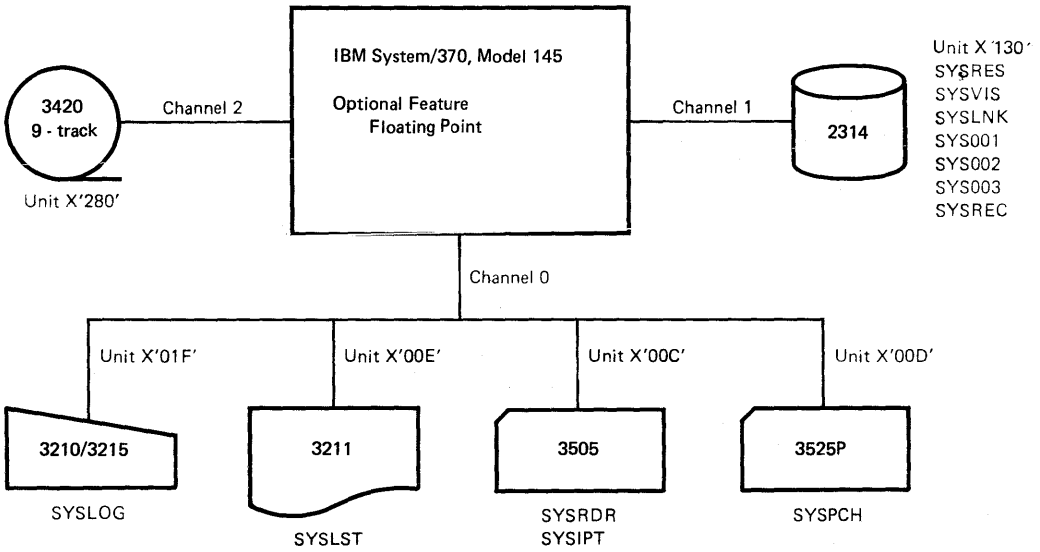


Figure 1-14. PROCEDURES--System Configuration for 2314 Example

IBM 2314/2319 NON-TAPE USERS

These users receive the 2314 system on a 2316 disk pack. This IBM-supplied pack consists of a core image library, a relocatable library, a source statement library, and a procedure library.

- Mount the IBM-supplied volume and proceed to Step 3.

IBM 2314/2319 AND TAPE USERS

These users with at least one tape unit available receive the 2314 system on magnetic tape (see Figure 1-10 for distributions). This IBM-supplied tape is capable of restoring the 2314 system to a 2316 disk pack. After the tape has been restored to the 2316 disk pack, the pack contains a core image library, a relocatable library, a source statement library, and a procedure library.

Step 1

Mount the IBM-supplied magnetic tape and a disk pack to which the tape is to be restored.

Before restoring the tape, you must take the necessary action to perform or bypass the initialize disk routine.

a. If the disk pack has not been initialized, the IBM-supplied volume, a self-loading tape, is capable of initializing the packs. Any volume serial number used in the EXTENT cards for the following steps must agree with the volume serial number of the disk pack.

   If initialization is required, mount a pack on unit 130. Mount the IBM-supplied tape on unit 280 (9-track drive). Place the following cards in the card reader. IPL from unit 280. When the system enters the wait state, press START and EOF on the card reader.

```
// JOB INITDSK
// ASSGN SYSLOG,X'01F',C1
// LOG (optional)
// ASSGN SYSLST,X'00E',L1 (optional)
// DATE 11/30/73
// ASSGN SYSOPT,X'130',D3
// EXEC
// UID IA
// VTOC STRTADR=(0199000),EXTENT=(20)
VOL1111111
// END
```

b. If the disk pack was previously initialized, the initialize disk routine can be bypassed. Any volume serial number used in the EXTENT cards for the following steps must agree with the volume serial number used when the packs were initialized.

   To bypass the initialize disk program on the IBM-supplied tape, mount the IBM-supplied tape on unit 280 (9-track drive), and mount an initialized disk on unit 130 (VTOC on CYL 199). If the VTOC is not on cylinder 199, you can get it there by using the 'IS' option (see section "Initializing the Disk"). Insert the following control cards in the reader. IPL from unit 280. When the system enters the wait state, press START and EOF on the card reader. The job is complete when message S130A (Intervention Required) is issued, to which you need not reply.

```
// JOB INITDSK
// ASSGN SYSLOG,X'01F',C1
// DATE 11/30/73
// FILES SYSIPT,1
```

Step 2

After step 1 is completed, you must restore the system from the self-loading tapes to the initialized pack.

Do not rewind unit 280. To restore the tape on disk, place the following cards in the reader. IPL from unit 280. When the system enters the wait state, press START and EOF on the card reader. See "Restore the IBM-Supplied System Tape to Disk" for operating procedures.

At this point you have the option to allocate library sizes that are larger than the default values. Choosing your own values rather than the default values may save you a time-consuming reallocation later in the procedure.

```
// JOB DISRST
// ASSGN SYSLOG,X'01F',C1
// DATE 11/30/73
// ASSGN SYS005,X'130',D3
// ASSGN SYS006,X'280',T2
// ASSGN SYSLST,X'00E',L1
// EXEC
```

Step 3

When the tape is restored, IPL from unit 130 to pass control to the DOS/VS supervisor. The IPL program will request a supervisor name. Depress the LOAD key on the CPU control panel; the system enters the wait state. The supervisor name can now be entered from the console printer-keyboard or read in from the card reader.

Using the Console Printer-Keyboard

Depress the REQUEST key on the console printer-keyboard;
Type in $$A$SUP1 or depress the END or ENTER key and the default $$A$SUP1 will be taken. The system enters the wait state to enable you to enter your I/O device specifications. This can be done by typing them in on the console printer-keyboard or by using the card reader, as in this example. Proceed to section "Entering your I/O Device Specifications".

Using the card reader

A card must be punched, beginning in column 1, containing the supervisor name $$A$SUP1. This card is to precede the IPL deck.
When the system enters the wait state, start the card reader by depresssing the START and EOF keys. After the first card has been read, stop the card reader.

Entering your I/O Device Specifications

The IBM-supplied supervisor contains no I/O device specifications. Therefore, you must provide IPL ADD commands for all I/O devices to be used and ASSGN commands or statements for all system and programmer I/O assignments required. How to use the IPL commands is described in Chapter

4: "Starting the System" of the DOS/VS System Management Guide. The formats of these commands are contained in DOS/VS System Control Statements and in DOS/VS Operating Procedures. When the system enters the wait state, press START and EOF on the card reader. The following cards are in the card reader (SYSRDR/SYSIPT):

```
ADD X'00C',3505
ADD X'00D',3525
ADD X'00E',3211
ADD X'01F',1050A
ADD X'130',2314
ADD X'280',3420T9
SET DATE=11/30/73,CLOCK=12/00/00 (see Note)
DPD TYPE=F,UNIT=X'130',CYL=190
ASSGN SYSLOG,X'01F'
LOG
ASSGN SYSRDR,X'00C'
ASSGN SYSIPT,X'00C'
ASSGN SYSPCH,X'00D'
ASSGN SYSLST,X'00E'
ASSGN SYS001,X'130'
ASSGN SYS002,X'130'
ASSGN SYS003,X'130'
ASSGN SYSLNK,X'130'
ASSGN SYSREC,X'130'
SET RF=CREATE
```

Note: The IBM-supplied supervisor does not contain the supervisor generation option TOD=YES. Refer to DOS/VS Operating Procedures, GC33-5378 for more information on IPL procedures.

For more information on the IPL DPD command and the job control SET command refer to the section entitled "Creating System Files".

Step 4

Define label information for SYSRES, SYSLNK, SYS001, SYS002, SYS003, and SYSREC.

```
// OPTION STDLABEL
// DLBL IJSYSRS,'DOS SYSRES.FILE',99/365,SD
// EXTENT SYSRES,nnnnnn,1,n,0001,nnnn
// DLBL IJSYSLN,'SYSTEM WORK FILE NO. 0',99/365,SD
// EXTENT SYSLNK,nnnnnn,1,n,nnnn,nnnn
// DLBL IJSYS01,'SYSTEM WORK FILE NO. 1',99/365,SD
// EXTENT SYS001,nnnnnn,1,n,nnnn,nnnn
// DLBL IJSYS02,'SYSTEM WORK FILE NO. 2',99/365,SD
// EXTENT SYS002,nnnnnn,1,n,nnnn,nnnn
// DLBL IJSYS03,'SYSTEM WORK FILE NO. 3',99/365,SD
// EXTENT SYS003,nnnnnn,1,n,nnnn,nnnn
// DLBL IJSYSRC,'SYSTEM RECORDER FILE',99/365,SD
// EXTENT SYSREC,nnnnnn,1,n,nnnn,nnnn
/&
```

Step 5

Perform a diagnostic assembly of the Installation Verification Procedure (IVP) by specifying VERIFY=YES in the IVPGEN macro. In the same run, a job can be generated to delete any unused IVP books from the system source statement library. Refer to Module 3: "Installation Verification Procedure" for a comprehensive description of the IVPGEN parameters.

```
// JOB IVP DIAGNOSTICS
// EXEC ASSEMBLY
 IVPGEN VERIFY=YES,[DELUNDS=YES,] selected IVPGEN parameters
 END
/*
// PAUSE remove last card punched; put deck before other cards in hopper
    (see note, which follows)
/&
```

Note: Omit the // PAUSE statement if no delete job is to be generated.

Step 6

Perform a sorted DSERV to display the directories for later reference. Four books in the source statement library should be punched out at this time (Z.LINKEDIT, Z.DELETECL, Z.DELETERL, and Z.DELETESL). They contain the necessary control statements to selectively linkage edit and delete all IBM components.

```
// JOB DSERV
// EXEC DSERV
 DSPLYS ALL
/*
// EXEC SSERV
 DSPCH Z.LINKEDIT,Z.DELETECL,Z.DELETERL,Z.DELETESL
/*
/&
```

Step 7

Delete never-to-be-used components from the relocatable and source statement libraries by using the three delete books punched out in the previous step.

```
// JOB DELETE
// EXEC MAINT
 DELETC (Unwanted Core Image Library Components)
 DELETR (Unwanted Relocatable Library Components)
 DELETS (Unwanted Source Statement Library Components)
/*
/&
```

Step 8

Assemble the installation tailored supervisor.

```
// JOB SUPVR
// EXEC ASSEMBLY
         SUPVR NPARTS=4,POWER=YES
         CONFG MODEL=145,FP=YES
         STDJC LISTX=YES,LINES=46
         FOPT RELLDR=YES,IT=YES,PC=YES,OC=YES,SKSEP=YES,CBF=10,        X
               AB=YES,DASDFP=(1,1,2314),SYSFIL=YES,TOD=YES,            X
               ZONE=(WEST,5)
         PIOCS
         VSTAB RSIZE=160K,VSIZE=480K
         ALLOC F1=64K,F2=64K,F3=128K
         ALLOCR F3R=22K,F2R=28K
         IOTAB JIB=20,F1PGR=8,F2PGR=8,IODEV=20,BGPGR=10,D2314=6,D3420=2
         DVCGEN CHUN=X'00C',DVCTYP=3505
         DVCGEN CHUN=X'00D',DVCTYP=3525P
         DVCGEN CHUN=X'00E',DVCTYP=3211
         DVCGEN CHUN=X'01F',DVCTYP=1050A
         DVCGEN CHUN=X'130',DVCTYP=2314
         DVCGEN CHUN=X'131',DVCTYP=2314
         DVCGEN CHUN=X'132',DVCTYP=2314
         DVCGEN CHUN=X'133',DVCTYP=2314
         DVCGEN CHUN=X'134',DVCTYP=2314
         DVCGEN CHUN=X'135',DVCTYP=2314
         DVCGEN CHUN=X'280',DVCTYP=3420T9
         DVCGEN CHUN=X'281',DVCTYP=3420T9
         ASSGN SYSRDR,X'00C'
         ASSGN SYSIPT,X'00C'
         ASSGN SYSPCH,X'00D'
         ASSGN SYSLST,X'00E'
         ASSGN SYSLOG,X'01F'
         ASSGN SYSLNK,X'130'
         ASSGN SYSREC,X'130'
         ASSGN SYS001,X'130'
         ASSGN SYS002,X'130'
         ASSGN SYS003,X'130'
         DPD CYL=194,UNIT=X'130',VOLID=111111
         SEND
 END
/*
* CHECK ASSEMBLY LISTING FOR ERRORS.  IF CORRECT
* REMOVE ASSEMBLED SUPERVISOR FROM SYSPCH.  INSERT IN READER
* FOLLOWING THE INCLUDE CARD OF JOB CATALSUP
// PAUSE TO CONTINUE PRESS END
/&
```

Step 9

Link-edit and catalog the assembled supervisor (object module from step 8) to the core image library. If the RSIZE value, specified by the VSTAB macro, is larger than the one used by the supervisor being replaced, certain key programs must also be link-edited and cataloged to the core image library in the same job step with the new supervisor. These key programs are the librarian programs CORGZ, RSERV, SSERV, and PSERV. The LINKEDIT deck punched out in step 6 contains all the necessary control statements to link-edit all IBM components shipped on the system.

Note: It may be necessary to reallocate because of the size of the programs (components) desired in the libraries. This may be accomplished by using the ALLOC statement of either the MAINT or CORGZ librarian programs.

```
// JOB CATALSUP
// OPTION CATAL
  ACTION CLEAR
 INCLUDE
 Supervisor object deck here.
/*
// EXEC LINKEDT
/&
```

Step 10

Re-IPL and format your new page data set, using the DPD command, including TYPE=F. Procedure SDL (System Directory List) or, for VSAM users procedure IKQVPSVA, is executed to improve performance (for more information on these procedures see the introduction to this manual). If you do not wish to retain a procedure library, you should punch the procedure into cards, using the PSERV program, and include the card deck in your IPL procedure.

Example:

```
ADD commands
SET DATE etc.
DPD options
SET SDL=CREATE
phase name
   .
   .
   .
/*
Assign commands
SET RF=CREATE
```

The procedures SDL and IKQVPSVA or the command SET SDL=CREATE must precede job control commands such as ASSGN. These procedures can only be executed in a multipartition environment (NPARTS>1).

When IPL is complete, enter the SET job control command. If you desire a recorder file different from the one that was allocated on your first IPL (step 3), include RF=CREATE in the SET command. For more information on these procedures, refer to the section entitled "Creating System Files".

```
// JOB CATALSRV
// OPTION CATAL
 INCLUDE IJBSL3          RSERV
// EXEC LNKEDT
 INCLUDE IJBSL4          SSERV
// EXEC LNKEDT
 INCLUDE IJBSL5          CORGZ
// EXEC LNKEDT
 INCLUDE IJBSL6          PSERV
// EXEC LNKEDT
 PHASE LSERV,+0
 INCLUDE IJBLSERV
// EXEC LNKEDT
// PAUSE CHECK SYSLST OUTPUT
/&
```

Link-edit and catalog any additional components desired to the core image library. See the appropriate module for each component for a complete list of control cards for the components to be cataloged.

Step 11

Perform an assembly of the Installation Verification Procedure. In contrast to Step 5 the IVPGEN macro must now be assembled with option VERIFY=NO (VERIFY=YES causes suppression of the generation of the IVP job stream). The output consists of a jobstream to execute the selected IVP functions. Output is on SYSPCH which can be a card punch, a tape drive, or a disk drive. You can also generate a job that deletes the IVP books that were used in the assembly. If you would choose to do this, however, bear in mind that it will be impossible to do a reassembly of the IVPGEN macro during this system generation.

Refer to Module 3 "Installation Verification Procedure" for a comprehensive description of the operating instructions for IVP.

```
// JOB IVP GENERATION
// EXEC ASSEMBLY
 IVPGEN VERIFY=NO,[DELUSED=YES,] selected IVPGEN parameters
 END
/*
// PAUSE remove last card; put deck before other cards in hopper
/&
```

Step 12

Perform all other necessary assemblies. The component assemblies should be performed as separate jobs. Bear in mind that A-library macros such as, for instance, program products supplied in A-macro format, must be edited before they can be assembled. For the information required to assemble Emulator Programs, refer to the Emulator Program manual listed in the Preface. You must be careful to keep all assemblies in order. Assemble all your required IOCS modules. By assigning SYSPCH to a tape or disk unit, the IOCS modules can be cataloged to the relocatable library without punching them on cards. The IOCS modules required by compilers, as defined in Module 7, "Compiler IOCS Modules", are supplied in the relocatable library by IBM.

Close the tape assigned to SYSPCH and reassign SYSPCH to its permanent assignment by using the CLOSE command. The assembly listings should be checked for errors before proceeding.

```
// JOB ASSEM
// OPTION DECK,LIST,LOG
// ASSGN SYSPCH,X'280'
// EXEC ASSEMBLY
   CDMOD RECFORM=FIXUNB,CTLCHR=ASA,TYPEFLE=OUTPUT,IOAREA2=YES,     X
                 DEVICE=3525,SEPASMB=YES
 END
/*
// EXEC ASSEMBLY
   MTMOD RECFORM=FIXUNB,READ=FORWARD,CKPTREC=YES,SEPASMB=YES
 END
/*
CLOSE SYSPCH,X'00D'
/&
* CHECK ASSEMBLY LISTINGS FOR ERRORS.  RELOAD 280 WITH SAME TAPE.
// PAUSE IF CORRECT PRESS END TO CONTINUE.
```

The multipart forms of the linkage editor maps and the supervisor listing will be required by your IBM customer engineer for maintenance purposes.

Before the next step is performed, perform an LSERV to display the label cylinder, check the linkage editor listings, and make all necessary corrections.

Step 13

Reload the tape that was assigned to SYSPCH in step 12 and assign it to SYSIPT. With this tape the MAINT program catalogs the IOCS modules to the relocatable library by the control card // EXEC MAINT.

```
// JOB CATALRLB
// ASSGN SYSIPT,X'280'
* CATALOG MODULES TO RELOCATABLE LIBRARY
// EXEC MAINT
/*
/&
```

When planning your compilers and cataloging them on the system, also plan the "procedures" to catalog for using the compilers in various partitions.

Example:

```
// JOB CATAL PROC
// EXEC MAINT
   CATALP F2RPGII
// JOB 124
// ASSGN SYS001,X'160'
// ASSGN SYS002,X'160'
// ASSGN SYS003,X'160'
ASSGN SYSCLB,UA
ASSGN SYSRLB,UA
ASSGN SYSSLB,UA
// OPTION LINK,LIST,NODECK
// EXEC RPGII
/+
```

Calling statements for frequently used DOS/VS service programs, sorts, and utilities should be cataloged at this time also.

Example:

```
// JOB CATAL PROC
// EXEC MAINT
   CATALP DITTO
// JOB DITTO
ASSGN SYS029,X'180'
ASSGN SYS028,X'181'
ASSGN SYSCLB,UA
// EXEC DITTO,REAL,SIZE=24K
/+
```

The basic SYSGEN is complete. You may set new standard labels, re-allocate library sizes by using the copy function (CORGZ), condense the libraries, and set automatic condense limits if required. Copy the operational pack for backup.

Note: A private core image library need not be on the same disk device type as SYSRES. However, this does not apply to other private libraries, which must reside on the same type of device as the SYSRES device.

IBM 3330/3340 Disk Storage Example

Figure 1-15 illustrates the general procedure to be followed by users with a 3330 or 3340 that is to be used as the system residence volume.

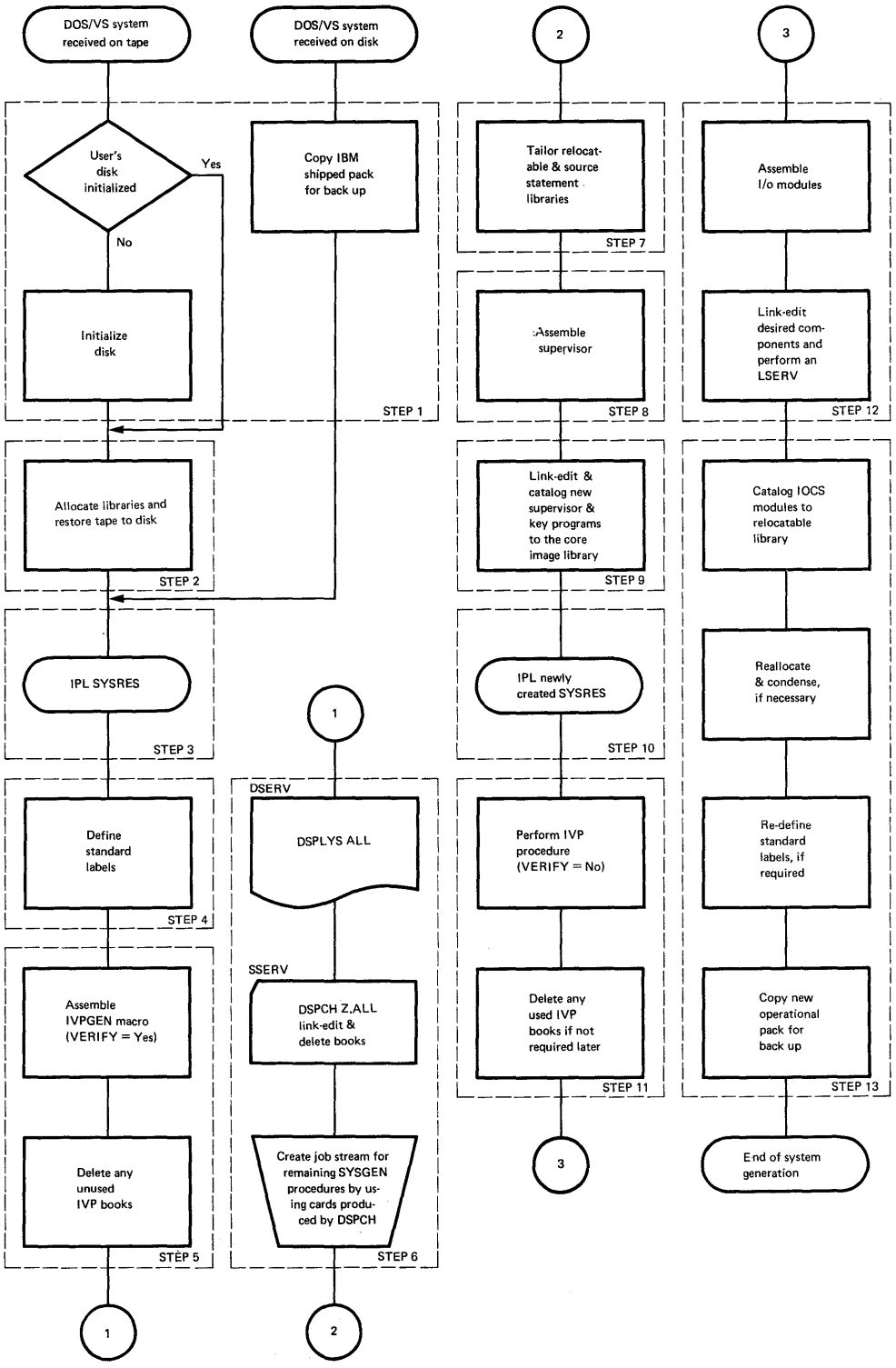


Figure 1-15. PROCEDURES--Overview of a System Generation for Residence on a 3330 or 3340 Disk Storage

This example is one of the many possible methods for generating a system. Figure 1-16 illustrates the system configuration upon which the 3330/3340 example is based.

INPUT/OUTPUT DEVICE CONFIGURATION FOR 3330/3340 EXAMPLE (FIGURE 1-16)

Device	Channel	Unit	Use
3505	0	0C	Card Reader (SYSRDR, SYSIPT)
3525P	0	0D	Card Punch (SYSPCH)
3211	0	0E	Printer (SYSLST)
3210/3215	0	1F	Console Printer-Keyboard (SYSLOG)
3330 or 3340	2	60	Disk (SYSRES, SYSLNK, SYSREC, SYS001, SYS002, SYS003)
3410T9	1	80	Magnetic Tape

3330/3340 Example: Results of System Generation

When system generation is completed, the operational disk of the installation contains user selected components and programs in its core image library, together with the installation's tailored supervisor, job control, linkage editor, and librarian programs. The tape shipped by IBM is retained as backup tape. It is a self-loading tape capable of being restored on disk. Libraries contain all modules and macro definitions shipped from IBM. The core image library is built to contain those IBM programs chosen.

The core image, relocatable, and source statement libraries are condensed, and IOCS modules are assembled and cataloged to the relocatable library.

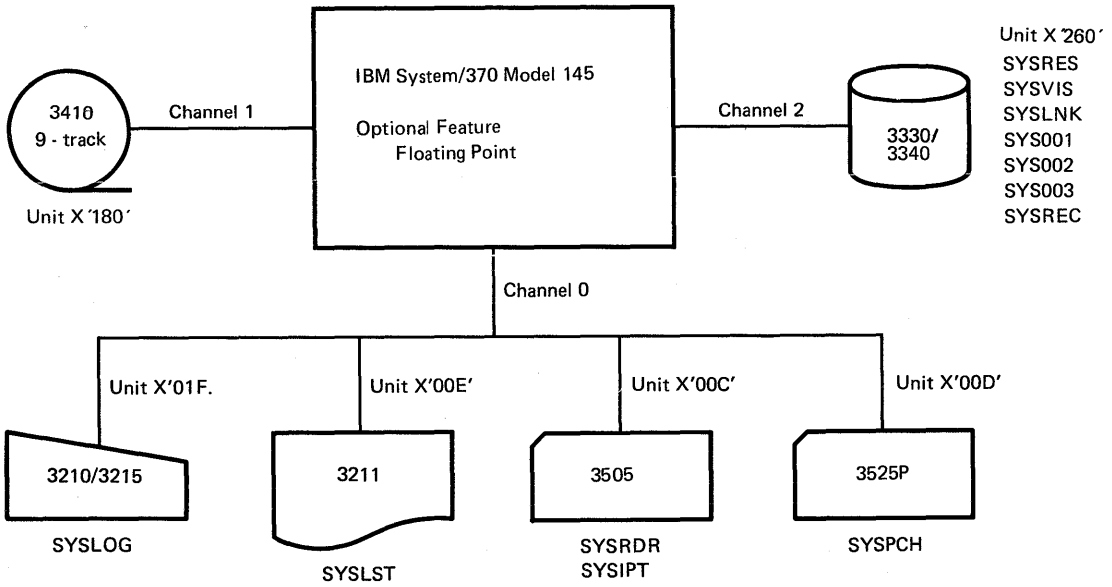


Figure 1-16. PROCEDURES--System Configuration for 3330/3340 Example

IBM 3330 Only Users

IBM 3330-only users receive the system on a 3336 disk pack. This IBM-supplied pack consists of a core image library, a relocatable library, a source statement library, and a procedure library.

- Mount the IBM-supplied volume and proceed to Step 3.

IBM 3340 Only Users

IBM 3340-only users receive the system on a 3348 data module. This module consists of a core image library, a relocatable library, a source statement library, and a procedure library.

- Mount the IBM-supplied volume and proceed to Step 3.

IBM 3330/3340 and Tape Users

IBM 3330/3340 and tape users receive the system on magnetic tape (see Figure 1-16 for distributions). This IBM-supplied tape is capable of restoring the system to a 3336 disk pack or to either a 3348 Model 35 data module or a 3348 Model 70 data module. After the tape has been restored, the pack or data module contains a core image library, a relocatable library, a source statement library, and a procedure library.

Before generating a system, you should have at least one initialized disk pack (VTOC on cylinder 403 for the 3336, on cylinder 347 for the 3348, Model 35, and on cylinder 695 for the 3348, Model 70).

Step 1

Mount the IBM-supplied magnetic tape and the disk volume to which the tape is to be restored.

Before restoring the tape, you must take the necessary action to perform the initialize disk routine or to bypass it.

a. If the disk volume has not been initialized, the IBM-supplied volume, a self-loading tape, is capable of initializing the volumes. The volume serial number used in the EXTENT cards for the following steps must agree with the volume serial number of the disk volume.

   If initialization is required, mount a volume on unit 260. Mount the IBM-supplied tape on unit 180 (9-track drive). Place the following cards in the card reader. IPL from unit 180. When the system enters the wait state, press START and EOF on the card reader.

```
// JOB INTDSK
// ASSGN SYSLOG,X'01F',C1
// DATE 11/30/73
// LOG (optional)
// ASSGN SYSLST,X'00E',L1 (optional)
// ASSGN SYSOPT,X'260',D4 (D5 or D6 if 3348)
// EXEC
// UID IQ
// VTOC STRTADR=(ccccccc),EXTENT=(tt) (See Note)
VOL1111111
// END
```

Note: ccccccc=0403000 for a 3336 disk pack
=0347000 for a 3348 data module, model 35
=0695000 for a 3348 data module, model 70
tt=19 for a 3336 disk pack
=12 for a 3348 data module, model 35
=12 for a 3348 data module, model 70

b. If the disk volume was previously initialized, the initialize disk routine can be bypassed. Any volume serial number used in the EXTENT cards for the following steps must agree with the volume serial number used when the volumes were initialized.

To bypass the initialize disk program on the IBM-supplied tape, mount the IBM-supplied tape on unit 180 (9-track drive), and mount an initialized disk on unit 260 (VTOC on CYL 403 for the 3336, cylinder 347 for the 3348, Model 35, and cylinder 695 for the 3348, Model 70). Insert the following control cards in the reader. ~~IPL from unit 180.~~ When the system enters the wait state, press START and EOF on the card reader. The job is complete when message S130A (Intervention Required) is issued to which you need not reply.

```
// JOB INTDSK
// ASSGN SYSLOG,X'01F',C1
// DATE 11/30/73
// ASSGN SYSIPT,X'180',T2
// FILES SYSIPT,1
```

Step 2

After step 1 is completed, you must restore the system from the self-loading tapes to the initialized pack.

Do not rewind unit 180. To restore the tape on disk, place the following cards in the reader. ~~IPL from unit 180~~. When the system enters the wait state, press START and EOF on the card reader. See "Restore the IBM-supplied System Tape to Disk" for operating procedures.

```
// JOB DISRST
// ASSGN SYSLOG,X'01F',C1
// DATE 11/30/73
// ASSGN SYS005,X'260',D4   } (D5 or D6 if a 3348
// ASSGN SYS006,X'180',T2   }  data module is used)
// ASSGN SYSLST,X'00E',L1
// EXEC
```

Step 3

When the tape is restored, IPL from unit 260 to pass control to the DOS/VS supervisor. The IPL program will request a supervisor name. Depress the LOAD key on the CPU control panel; the system enters the wait state. The supervisor name can now be entered from the console printer-keyboard or read in from the card reader.

Using the Console Printer-Keyboard

Depress the REQUEST key on the console printer-keyboard;
Type in $$A$SUP1 or depress the END or ENTER key and the default $$A$SUP1 will be taken. The system enters the wait state to enable you to enter your I/O device specifications. This can be done by typing them in on the console printer-keyboard, or by using the card reader, as in this example. Proceed to section "Entering your I/O Device Specifications".

Using the card reader

A card must be punched, beginning in column 1, containing the supervisor name $$A$SUP1. This card is to precede the IPL deck.
When the system enters the wait state, start the card reader by depressing the START and EOF keys. After the first card has been read, stop the card reader.

The IBM-supplied supervisor contains no I/O device specifications. Therefore, you must provide IPL ADD commands for all I/O devices to be used and ASSGN commands or statements for all system and programmer I/O assignments required. How to use the IPL commands is described in Chapter 4: "Starting the System" of the DOS/VS System Management Guide. The formats of these commands are contained in DOS/VS System Control Statements and in DOS/VS Operating Procedures. When the system enters the wait state, depress START and EOF on the card reader. The following cards are in the card reader (SYSRDR/SYSIPT):

```
ADD X'00C',3505
ADD X'00D',3525P
ADD X'00E',3211
ADD X'01F',1050A
ADD X'260',(device type)*
ADD X'180',3410T9
SET DATE=11/30/73,CLOCK=12/00/00 (See Note 1)
DPD TYPE=F,UNIT=X'260',CYL=390
ASSGN SYSLOG,X'01F'
LOG
ASSGN SYSRDR,X'00C'
ASSGN SYSIPT,X'00C'
ASSGN SYSPCH,X'00D'
ASSGN SYSLST,X'00E'
ASSGN SYS001,X'260'
ASSGN SYS002,X'260'
ASSGN SYS003,X'260'
ASSGN SYSLNK,X'260'
ASSGN SYSREC,X'260'
SET RF=CREATE (See Note 2)
```

*device type = 3330 or 3340

Notes:

1. The IBM-supplied supervisor does not contain the supervisor generation option TOD=YES. Refer to DOS/VS Operating Procedures, GC33-5378, for more information on IPL procedures.

2. If your CPU is a Model 115 or 125, the SET command must include the HC=CREATE operand.

For more information on the IPL DPD command and the job control SET command, refer to the section entitled "Creating System Files".

Step 4

Define label information for SYSRES, SYSLNK, SYSREC, SYS001, SYS002, and SYS003. In addition you may include any label information required for your installation.

```
// OPTION STDLABEL
// DLBL IJSYSRS,'DOS SYSRES.FILE',99/365,SD
// DLBL IJSYSLN,'SYSTEM WORK FILE NO. 0',99/365,SD
// EXTENT SYSLNK,nnnnnn,1,nnnnn,nnnn
// DLBL IJSYS01,'SYSTEM WORK FILE NO. 1',99/365,SD
// EXTENT SYS001,nnnnnn,1,nnnnn,nnnn
// DLBL IJSYS02,'SYSTEM WORK FILE NO. 2',99/365,SD
// EXTENT SYS002,nnnnnn,1,nnnnn,nnnn
// DLBL IJSYS03,'SYSTEM WORK FILE NO. 3',99/365,SD
// EXTENT SYS003,nnnnnn,1,nnnnn,nnnn
// DLBL IJSYSRC,'DOS RECORDER FILE',99/365,SD
// EXTENT SYSREC,nnnnnn,1,nnnnn,nnnn
// DLBL IJSYSCN,'HARDCOPY FILE',99/365,SD  } hard copy file for 370/115
// EXTENT SYSREC,nnnnnn,1,nnnnnn,nnnn      } or 370/125
/&
```

Step 5

Perform a diagnostic assembly on the Installation Verification Procedure (IVP) by specifying VERIFY=YES in the IVPGEN macro. In the same run a job can be generated to delete any unused IVP books from the system source statement library. Refer to Module 3: "Installation Verification Procedure" for a comprehensive description of the IVPGEN parameters.

```
// JOB IVP DIAGNOSTICS
// EXEC ASSEMBLY
 IVPGEN VERIFY=YES,[DELUNDS=YES,] selected IVPGEN parameters
 END
/*
// PAUSE remove last card punched; put deck before other cards
   in hopper (see note, which follows)
```

Note: Omit the // PAUSE statement if no delete job is to be generated.

Step 6

Perform a sorted DSERV to display the directories for later reference. Four books in the source statement library should be punched out at this time (Z.LINKEDIT, Z.DELETECL, Z.DELETERL, and Z.DELETESL). They contain the necessary control statements to selectively link-edit and delete all IBM components.

```
// JOB DSERV
// EXEC DSERV
 DSPLYS ALL
/*
// EXEC SSERV
 DSPCH Z.LINKEDIT,Z.DELETECL,Z.DELETERL,Z.DELETESL
/*
/&
```

Step 7

Delete components you will never use from the relocatable and source statement libraries by using the three delete books punched out in the previous step. You may consider condensing the libraries after this.

```
// JOB DELETE
// EXEC MAINT
 DELETC (Unwanted Core Image Library Components)
 DELETR (Unwanted Relocatable Library Components)
 DELETS (Unwanted Source Statement Library Components)
/*
/&
```

Step 8

Assemble the installation tailored supervisor.

```
// JOB SUPVR
// EXEC ASSEMBLY
         SUPVR NPARTS=3,POWER=YES,TP=BTAM
         CONFG MODEL=145,FP=YES
         STDJC LISTX=YES,LINES=46
         FOPT RELLDR=YES,PCIL=YES,PFIX=YES,IT=YES,PC=YES,OC=YES,       X
              SKSEP=YES,CBF=10,AB=YES,DASDFP=(2,2,3330),               X
              SYSFIL=YES,TOD=YES,ZONE=(WEST,5)
         PIOCS TAPE=9,DISK=3330
         VSTAB RSIZE=244K,VSIZE=426K,BUFSIZE=48
         ALLOC F1=160K,F2=64K
         ALLOCR BGR=60K,F1R=30K,F2R=30K
         IOTAB JIB=20,F1PGR=8,F2PGR=8,IODEV=20,BGPGR=10,D3330=2,D3410=1
         DVCGEN CHUN=X'00C',DVCTYP=3505
         DVCGEN CHUN=X'00D',DVCTYP=3525P
         DVCGEN CHUN=X'00E',DVCTYP=3211
         DVCGEN CHUN=X'020',DVCTYP=2701
         DVCGEN CHUN=X'021',DVCTYP=2701
         DVCGEN CHUN=X'01F',DVCTYP=1050A
         DVCGEN CHUN=X'180',DVCTYP=3410T9
         DVCGEN CHUN=X'260',DVCTYP=3330
         DVCGEN CHUN=X'261',DVCTYP=3330
         ASSGN SYSRDR,X'00C'
         ASSGN SYSIPT,X'00C'
         ASSGN SYSPCH,X'00D'
         ASSGN SYSLST,X'00E'
         ASSGN SYSLOG,X'01F'
         ASSGN SYSLNK,X'260'
         ASSGN SYS001,X'260'
         ASSGN SYS002,X'260'
         ASSGN SYS003,X'260'
         ASSGN SYSREC,X'260'
         DPD CYL=300,UNIT=X'260',VOLID=111111
         SEND
 END
/*
* CHECK ASSEMBLY LISTING FOR ERRORS.  IF CORRECT
* REMOVE ASSEMBLED SUPERVISOR FROM SYSPCH.  INSERT IN READER
* FOLLOWING THE INCLUDE CARD OF JOB CATALSUP
// PAUSE TO CONTINUE PRESS END
/&
```

Note: Where an IBM 3340 Disk Storage is to be used instead of an IBM 3330, substitute the following specifications in the above example:

```
FOPT DASDFP=(2,2,3340)
PIOCS DISK=3340
IOTAB D3340=2
DVCGEN DVCTYP=3340
```

Step 9

Link-edit and catalog the assembled supervisor (object module from step 8) to the core image library. If the RSIZE value, specified by the VSTAB macro, is larger than the one used by the supervisor being replaced, certain key programs must also be link-edited and cataloged to the core image library with the new supervisor. These key programs are the librarian programs CORGZ, RSERV, SSERV, and PSERV. The LINKEDIT deck punched out in step 6 contains all the necessary control statements to link-edit all IBM components shipped on the system. Do not

attempt any other operation from the time the supervisor and these preceding programs are cataloged until IPL time.

Note: It may be necessary to reallocate the size of the libraries because of the size of the programs (components) desired in the various libraries. This may be accomplished by using the ALLOC statement of either the MAINT or CORGZ librarian programs.

```
// JOB CATALSUP
// OPTION CATAL
 ACTION CLEAR
 INCLUDE
 Supervisor object deck here.
/*
// EXEC LNKEDT
/&
```

Step 10

Re-IPL and format your new page data set using the IPL DPD command including TYPE=F. Procedure SDL (System Directory List) or, for VSAM users procedure IKQVPSVA, is executed to improve performance (for more information on these procedures see the introduction to this manual). If you do not wish to retain a procedure library, you should punch the procedure into cards, using the PSERV program, and include the card deck in your IPL procedure.

Example:

```
ADD commands
SET DATE etc.
DPD options
SET SDL=CREATE
phase name
   .
   .
   .
/*
Assign commands
SET RF=CREATE
```

The procedures SDL and IKQVPSVA or the command SET SDL=CREATE must precede job control commands such as ASSGN. These procedures can only be executed in a multipartition environment (NPARTS>1).

```
// JOB CATALSRV
// OPTION CATAL
 INCLUDE IJBSL3      RSERV
// EXEC LNKEDT
 INCLUDE IJBSL4      SSERV
// EXEC LNKEDT
 INCLUDE IJBSL5      CORGZ
// EXEC LNKEDT
 INCLUDE IJBSL6      PSERV
// EXEC LNKEDT
 PHASE LSERV,+0
 INCLUDE IJBLSERV
// EXEC LNKEDT
// PAUSE CHECK SYSLST OUTPUT
/&
```

When IPL is complete, enter the SET job control command. If you desire a recorder file different from the one that was allocated on your first IPL (step 3), include RF=CREATE in the SET command.

If your CPU is a Model 115 or 125 and you desire a hard-copy file different from the one that was allocated on your first IPL (step 3), include HC=CREATE in the SET command. For more information on these procedures, refer to the section entitled "Creating System Files".

Link-edit and catalog any additional components desired to the core image library. See the appropriate module for each component for a complete list of control cards for the components to be cataloged.

Step 11

Perform an assembly of the Installation Verification Procedure. In contrast to Step 5 the IVPGEN macro must now be assembled with option VERIFY=NO (VERIFY=YES causes suppression of the generation of the IVP jobstream). The output consists of a jobstream to execute the selected IVP functions. Output is on SYSPCH which can be a card punch, a tape drive, or a disk drive. You can also generate a job that deletes the IVP books that were used in the assembly. If you choose to do this, however, bear in mind that it will be impossible to do a reassembly of the IVPGEN macro during this system generation. Refer to Module 3 "Installation Verification Procedure" for a comprehensive description of the operationg instructions for IVP.

```
// JOB IVP GENERATION
// EXEC ASSEMBLY
 IVPGEN VERIFY=NO,[DELUSED=YES,] selected IVPGEN parameters
 END
// PAUSE remove last card punched; put deck before other cards in hopper
/&
```

Step 12

Perform all other necessary assemblies. Bear in mind that A-library macros such as, for instance, program products supplied in A-macro format, must be edited before they can be assembled. The component assemblies should be performed as separate jobs. For the information required to assemble Emulator Programs, refer to the Emulator Program manual listed in the Preface. You must be careful to keep all assemblies in order. Assemble all your required IOCS modules. By assigning SYSPCH to a tape unit, the IOCS modules can be cataloged to the relocatable library without punching them in cards. The IOCS modules required by compilers, as defined in Module 7, "Compiler IOCS Modules", are supplied in the relocatable library by IBM.

Close the tape assigned to SYSPCH and reassign SYSPCH to its permanent assignment by using the CLOSE command. The assembly listings should be checked for errors before proceeding.

```
// JOB ASSEM
// OPTION DECK,LIST,LOG
// ASSGN SYSPCH,X'180'
// EXEC ASSEMBLY
   CDMOD RECFORM=FIXUNB,CTLCHR=ASA,TYPEFLE=OUTPUT,IOAREA2=YES,      X
                 DEVICE=3525,SEPASMB=YES
 END
/*
CLOSE SYSPCH,X'00D'
/&
* CHECK ASSEMBLY LISTINGS FOR ERRORS.  RELOAD 180 WITH SAME TAPE.
// PAUSE IF CORRECT PRESS END TO CONTINUE.
```

The multipart forms of the linkage editor maps and the supervisor listing will be required by your IBM customer engineer for maintenance purposes.

Before the next step is performed, check the linkage editor listings, and make all necessary corrections.

Step 13

Reload the tape that was assigned to SYSPCH in step 12 and assign it to SYSIPT. With this tape the MAINT program catalogs the IOCS modules to the relocatable library by the control card // EXEC MAINT.

```
// JOB CATALRLB
// ASSGN SYSIPT,X'180'
* CATALOG MODULES TO RELOCATABLE LIBRARY
// EXEC MAINT
/*
/&
```

The basic SYSGEN is complete. You may set new standard labels, re-allocate library sizes by using the copy function (CORGZ), condense the libraries, and set automatic condense limits if required. Copy the operational pack for back-up.

Component	IBM Program Number 5745-SC	Part Size Bytes	Core Image Library		Relocatable Library			Source Statement Library	
			Phases	Blocks	Prefix Modules		Blocks	Books	Blocks
Attention Routines, Initiators, Terminators & Dumps	AIT (Note 1)								
Standard System Dump			9*	11	IJB	10	58		
Translating System Dump			9*	11	IJB	10	59		
Attention Routines, Initiators, Terminators			33*	39					
Assembler & ESERV Programs.	ASM							2 (IVP)	44
Assembler	(Note 2)	20,480	19	120	IPKA	38	605		
ESERV		26,624	7	40	IPKV	10	213		
BTAM	BTM (Note 2)		52 27*	52 34	IJL	65	177	64	7842
Checkpoint/ Restart	CKR (Note 1)		12*	20				1	26
Direct Access (Disk) IOCS	DAM** (Note 2)		8*	9	IJI	24	190	3	1084
Diskette I/O Unit	DIO		20*	20				3	492
Disk ERP	DKE (Note 1)		6*	6				1	381
Display Operator Console Support	DOC (Note 1)		31* 1	31 5	IJB	1	21	6	212
Sequential Disk IOCS	DSK** (Note 2)		22*	22	IJG	39	213	11	5363
Emulators	EML								
1401/1440/1460 Emulator		21,000 (Note 5)	11* 8	11 16	IIQ	29	244	31 (Note 6)	5942
1410/7010 Emulator	(Note 2)	30,000 (Note 5)	10* 8	11 16	IIR	25	237	30 (Note 6)	3249
Model 20 Emulator	E20 (Note 2)		25* 7	40 7	IIS	72	495	22	2222
Environmental Recording, Editing, and Printing (EREP)	ERP (Note 2)	10240	1* 76	1 204	IJB	76	863	7	187

Figure 1-17. DOS/VS System Program Sizes (Part 1 of 4)

Component	IBM Program Number 5745-SC	Part Size Bytes	Core Image Library		Relocatable Library			Source Statement Library	
			Phases	Blocks	Prefix	Modules	Blocks	Books	Blocks
Compiler IOCS Modules	IOM (Note 2)		20*	22		226	1388		
ANS*** COBOL			Note: This program consists of a group of various preassembled IOCS modules used by American National Standard COBOL, PL/I, and COBOL The digits given here represent the number of modules used and the number of library blocks required by the various combinations of compilers desired.			138	991		
ANS*** COBOL & COBOL						163	1181		
ANS*** COBOL & PL/I						169	1100		
ANS*** COBOL, COBOL, & PL/I						189	1272		
COBOL						77	578		
COBOL &PL/I						107	698		
PL/I						70	412		
Required IOCS Modules						27	100		
IOCS (See Note 2)	IOX**		59*	59					
Card (Reader/Punch)					IJC	64	154	2	313
Console								1	73
Device Independent (DTFDI)					IJJ	4	18	2	206
Printers					IJD	23	52	2	196
Serial Devices	(Note 1)							1	51
PIOCS (DTFPH)								1	55
Imperative Macros								27	306
IPL and Buffer Load	IPL (Note 1)		9* 6	9 24	IJB	22	165		
Index Sequential Disk IOCS	ISM** (Note 2)		21*	28	IJH	36	621	6	2242
Job Control	JCL (Note 1)	14,336	3* 11	4 64	IJB	11	289		
Librarian	LBR	10,240							
CORGZ			9	42	IJB	10	152		
MAINT			11	41	IJB	19	291		
CSERV	(Note 1)		1	6	IJB	1	24		
DSERV (sorted)			8	16	IJB	2	57		
RSERV			1	7	IJB	2	29		
SSERV			1	8	IJB	2	37		
PSERV			1	5	IJB	1	23		
Linkage Editor	LNK (Note 1)	10,240	8	20	IJB	2	100		
Magnetic Character Reader IOCS	MCR** (Note 2)		4*	4				6	278

Figure 1-17. DOS/VS System Program Sizes (Part 2 of 4)

Component	IBM Program Number 5745-SC	Part Size Bytes	Core Image Library		Relocatable Library			Source Statement Library	
			Phases	Blocks	Prefix Modules		Blocks	Books	Blocks
Optical Character Reader IOCS	OCR**								
1287			2*	2				5	712
3886	(Note 2)		2*	2				6	357
OLTEP	OLT (Note 2)		2*	2	IJZ	50	400		
			47	81					
Configuration Data Sets				(Note 3)					
Online Tests (OLTs)				(Note 4)					
Problem Determination Aids	PDA								
PDAID		6,144	15	27	IJB	2	41		
			6*	8					
DUMPGEN		10,240	1	23	IJB	1	89		
LSERV	(Note 1)	8,192	1	8	IJB	1	19		
SDAID			4	25	IJB	4	64		
			2*	4					
Paper Tape IOCS	PTP** (Note 2)		3*	4				2	593
POWER	PWR (Note 2)		89	96	FGP	89	545	10	3117
			1*	1					
QTAM	QTAM (Note 2)		22*	34	IJL	109	393	78	2013
Recovery Management Support	RMS								
MCAR/CCH/RMSR			22	15					
	(Note 1)								
Supervisor Macros	SUP (Note 1)		3*	21					
Communication Macros								26	180
Generation Macros									
Basic								23	3,687
MICR								1	237
TP								7	181
Magnetic Tape IOCS	TAP** (Note 2)		18*	32	IJF	18	77	2	973
Tape ERP	TPE (Note 1)		1	4	IJB	1	16		
			10*	10					
VSAM	VSM (Note 2)		13*	14	IDC	12*	43	14	1399
			23	206	IGG	189	2009		
AMS			65	232	IIP				
					IKQ				

Figure 1-17. DOS/VS System Program Sizes (Part 3 of 4)

Component	IBM Program Number 5745-SC	Part Size Bytes	Core Image Library		Relocatable Library			Source Statement Library	
			Phases	Blocks	Prefix Modules		Blocks	Books	Blocks
System Utility Programs	UTL (Note 2)	10,240	39	171	IJW	56	837		
Assign Alternate Track Disk			5	41	IJW	6	90		
Assign Alternate Track Data Cell			5	26	IJW	6	69		
Clear Disk			3	7	IJW	4	34		
Clear Data Cell			3	7	IJW	4	32		
Copy Disk to Card			2	11	IJW	3	51		
Copy Disk to Disk			2	13	IJW	3	57		
Copy Disk or Data Cell to Tape			2	11	IJW	3	52		
Copy and Restore Diskette			1	19		1	71		
Deblock Utility			1	16	IJW	2	63		
Initialize Disk			4	25	IJW	5	108		
Initialize Data Cell			4	18	IJW	5	65		
Initialize Tape			1	5	IJW	2	22		
Restore Card to Disk			1	7	IJW	2	32		
Restore Tape to Disk or Data Cell			1	8	IJW	2	34		
VTOC Display			1	5	IJW	4	32		
Transients			1	1					
Distribution Program Supervisor (8K)	(Note 1)								
Fast Copy Disk Volume			2	49		4	56	1	212
Page Data Set Dump (PDSDM)			1	11	IJB	1	40		

Notes:
1. See subsequent sections for detailed information on this component.
2. See the relevant separate book module for a detailed information on this component.
3. This is the formula to calculate the number of core image library blocks necessary for the configuration data sets:

$$\frac{\text{number of devices on system} + 1}{6} = \text{number of blocks}$$

4. The number of core image library blocks required for the On Line Tests (OLTs) depends on the number of device types on the system and the number and size of the tests needed for these devices. This information is in the description that accompanies the tests.

* Transients
** See "Compiler IOCS Modules" for the preassembled module names and usage.
*** American National Standard

5. This is the minimum partition size for the smallest program being emulated. For more information about storage requirements, refer to the emulator publication.
6. 21 macros are common to the 1401/1440/1460 and the 1410/7010 emulators. These macros account for 1324 blocks. Hence the requirements for both emulators in a single system are 38 books and 644 blocks rather than the sum of the amounts shown for each emulator.

Figure 1-17. DOS/VS System Program Sizes (Part 4 of 4)

IOCS

SOURCE STATEMENT LIBRARY

The following macros are shipped in the source statement library.

Note: Module 7: "Compiler IOCS Modules", contains a list of preassembled modules required by system programs.

File Definition Macros

E.CDMOD
E.DIMOD
E.DTFBG
E.DTFCD
E.DTFCN

E.DTFDI
E.DTFEN
E.DTFPH
E.DTFPT
E.DTFSR
E.PRMOD

Imperative Macros

	Storage Bytes		
	Basic	For Literals (1)	For Variables
E.CCB	16-24		
E.CHECK	8	+4	Note 2.
E.CLOSE	10	+8	Note 3.
E.CLOSER	14+10 if any Reg. is specified	+8	Note 4.
E.CNTRL	10-18	+4	
E.ERET			
E.EXCP	2-6	+0-4	
E.FEOV	8-12	+4	
E.FEOVD			
E.FREE	8-12	+0-4	
E.GET	8	+4 per sym. name	Note 2.
E.LBRET	2		+2
E.NOTE	12	+4	
E.OPEN	10	+8	Note 3.
E.OPENR	14+10 if any Reg. is specified	+8	Note 4.
E.POINTR	8	+4 per sym. name	Note 2.
E.POINTS	8-12	+4	
E.POINTW	8	+4 per sym. name	Note 2.
E.PRTOV	8	+4 per sym. name	Note 2.
E.PUT	8-12	+4	Note 2.

E.READ	8-36 Note 5.	+4 per sym. name	Note 6.
E.RELEASE			
E.RELSE	8	+4 per sym. name	
E.SEOV	10	+8	+3
E.TRUNC	8-12	+0-4	
E.WAITF	8-12	+0-4	Note 3.
E.WRITE	8-26 Note 5.	+0-4	

Notes:

1. Include the storage requirement for literals only once if the literal is used by more than one macro instruction.

2. +4 per symbolic name, +2 per ordinary register notation, or +0 per special register notation.

3. +4 per filename or +8 per register.

4. +14 per filename or +8 per register.

5. 20 bytes are required for BTAM.

6. +38 No operands coded in register notation.

IOCS Macro Storage Requirements

The storage required by the imperative macros may be determined by using the preceding figures with Figures 1-18 through 1-22.

Note: Read-only modules are recommended for virtual programs (RDONLY=YES).

CDMOD (CARD MODULE)

			TYPEFLE								
			INPUT		OUTPUT					CMBND	
RECFORM	IOAREA2	WORKA	1442 2520 2540 2501 2596 3505 3525 3881	2560* 5425	1442 2596	2520	2540 3525	2560* or 5425		1442	2520 2540
								For Punch File	For Punch Interpret File		
FIXUNB	-	-	104	154	74	80	40	104	96	126	198
FIXUNB	-	YES	106	160	116	122	84	134	122	154	226
FIXUNB	YES	-	136	176	118	124	82	140	-	126	198
FIXUNB	YES	YES	138	186	132	138	96	150	-	154	226
UNDEF	-	-	-	-	112	110	73	125	-	-	-
UNDEF	-	YES	-	-	124	132	92	142	-	-	-
UNDEF	YES	-	-	-	128	130	90	148	-	-	-
UNDEF	YES	YES	-	-	140	146	104	154	-	-	-
VARUNB	-	-	-	-	126	132	94	142	-	-	-
VARUNB	-	YES	-	-	140	146	108	164	-	-	-
VARUNB	YES	-	-	-	154	160	118	166	-	-	-
VARUNB	YES	YES	-	-	156	162	120	176	-	-	-

*Additional space required for associated files:

FUNC=	TYPFLE	
	INPUT	OUTPUT
RP	48	56
RW	56	-
PW	-	48
RPW	92	64

Figure 1-18. CONTROL--CDMOD Storage Requirements (Part 1 of 3)

Notes:

1. CTLCHR=YES or ASA; depending upon record format, number of I/O areas, and/or work area specifications:

   For YES, a minimum of 8 to a maximum of 36 additional bytes are required.

For ASA, a minimum of 28 to a maximum of 65 additional bytes are required.

2. RDONLY=YES changes the size of the modules -50 to +50 bytes. In addition, the user's program must provide a 72-byte save area each time the module is reentered.

3. Parts 2 and 3 of Figure 1-19 shows the requirements for the other CDMOD options. The values selected must be added to the TYPEFLE value to determine the amount of storage needed.

CRDERR=RETRY	2520	2540
without IOAREA2 or WORKA	+73	+123
with either or both	+69	+119

Figure 1-18. CONTROL--CDMOD Storage Requirements (Part 2 of 3)

CONTROL=YES	1442	2540	2520	2560* or 5425	3505/3525**
INPUT	+26	+82	+30	+44	+94
OUTPUT without WORKA	+24	+20	+12	+36	+26
OUTPUT with WORKA	+24	+32	+12	+20	+38
CMBND without WORKA	+24	+20	+12	--	--
CMBND with WORKA	+32	+32	+12	--	--

Figure 1-18. CONTROL--CDMOD Storage Requirements (Part 3 of 3)
*CONTROL may not be specified for input files associated with punch files on the 2560 or 5425.
**CONTROL may not be specified for input files used as associated files on the 3525.

DTFCD (DEFINE THE FILE CARD)

TYPEFLE=INPUT requires 50 bytes. (72 bytes for single file for a 2560 or 5425, 56 bytes if ERROPT is specified for a 3505 or 3525, 82 bytes plus the length of the card buffer if ASOCFLE is specified for a 2560 cr 5425, 60 bytes if ASOCFLE is specified for a 3525.)

TYPEFLE=CMBND requires 84 bytes.

TYPEFLE=OUTPUT requires 48 bytes (64 bytes for single file for a 2560 cr 5425, 69 bytes plus the length of the card buffer if ASOCFLE is specified for a 2560 or 5425, 52 bytes if ASOCFLE is specified for a 3525, 152 bytes if FUNC=I is specified for a 2560 or 5425, 128 bytes if FUNC=I is specified for a 3525).

CRDERR=RETRY (2540 only) requires an additional 88 bytes.

DEVICE=2520 requires 8 additional bytes.

DIMOD (DEVICE INDEPENDENT SYSTEM UNITS MODULES)

TYPEFLE=	Basic Module	IOAREA2=YES
INPUT	454	+112
OUTPUT	903	+152

Note: RDONLY=YES changes the size of the module -70 to +70 bytes. In addition, the user's program must provide a 72-byte save area each time the module is reentered.

Figure 1-19. DIMOD Storage Requirements

DTFDI (DEFINE THE FILE DEVICE INDEPENDENT SYSTEM UNITS)

The table requirement is 240 bytes.

PRMOD (PRINTER MODULE)

RECFORM=	BASIC MODULE (Note 3)	WORKA=YES	IOAREA2=YES	PRINTOV (Note 4)	CTLCHR= ASA	CTLCHR= YES	CONTROL=YES (Note 5)	ERROPT=YES (Note 2)
FIXUNB	72	+6	+24	+34	+128		+40	+68
UNDEF	102	+22	+12	+34	+132	+4	+40	+68
VARUNB	136	+14	+12	+34	+124	-4	+40	+68

Note 1: RDONLY=YES changes the size of the module -50 to +50 bytes. In addition, the user's program must provide a 72-byte save area each time the module is reentered.

Note 2: If ERROPT=YES is specified, then DEVICE=3211 must also be specified. For a 3525 add 22 bytes, instead of 68, for ERROPT.

Note 3: For the 2560 and 5425, the sizes are 166 bytes for FIXUNB, 190 bytes for UNDEF, 206 bytes for VARUNB. For the 3525, add from 52 to 72 bytes to the size of the basic module, depending on the type of associated file specified.

Note 4: For the 3525 add from 34 to 58 bytes.

Note 5: For the 3525 add from 40 to 160 bytes.

Figure 1-20. CONTROL--PRMOD Storage Requirements

DTFPR (DEFINE THE FILE PRINTER)

The table requirement is 48 bytes or 52 bytes if ERROPT is specified for the 3211 printer or, if ASOCFLE is specified, for the 3525 card punch. For the 2560 the requirement is 72 bytes for a single file or 64 bytes for an associated file; for the 5425 the requirement is 56 bytes for either a single or an associated file.

DTFPH (DEFINE THE PHYSICAL IOCS)

Device	Size
Tape	104
DASD MOUNTED=ALL	40
DASD MOUNTED=SINGLE	84
3540 MOUNTED=SINGLE	84

Note: No module is required for this macro instruction.

Figure 1-21. CONTROL--DTFPH Storage Requirements

DTFCN (DEFINE THE FILE CONSOLE)

		TYPEFLE=		
RECFORM=	WORKA=	INPUT/OUTPUT	OUTPUT only	CMBND
FIXUNB	-	94	60	144
FIXUNB	YES	150	90	252
UNDEF	-	156	114	-
UNDEF	YES	262	168	-

Note: No module is required for this macro instruction.

Figure 1-22. CONTROL--DTFCN Storage Requirements

DTFSR (DEFINE THE FILE SERIAL DEVICE)

When a DTFSR is assembled, it generates both a table and a module. For example, if DTFSR is used for a printer, a table and a module are generated just as though DTFPR and PRMOD were used. To determine the storage requirements for DTFSR, add the table and the module requirements for the appropriate device type, such as 48 bytes (DTFPR) and n bytes (PRMOD) for a printer.

IPL & Buffer Load

IPL

CORE IMAGE LIBRARY

Transients

$$A$IPLA
$$A$IPL1
$$A$IPL2

Phases

$IPLRT2
$IPLRT3
$IPLRT4
$IPLRT5

RELOCATABLE LIBRARY

Module

IJBIPL

Link-Edit Statements

```
   INCLUDE IJBIPL
// EXEC LNKEDT
```

Buffer Load (3203 Printer)

CORE IMAGE LIBRARY

Transients (Required for IPL)

```
$$BFCB3
$$BUCB3
$$BUFLDR
$$BUFLD1
$$BUFLD2
```

Phases

```
SYSBUFLD
SYSBUFF1
```

RELOCATABLE LIBRARY

Modules

```
IJBSBUFF
IJBSBUF1
IJBTRAN
IJBTRGN
IJBTRPAN

IJBTRPHN
IJBTRPN
IJBTRQNC
IJBTRQN
IJBTRRN

IJBTRSN
IJBTRTN
IJBTRYN
IJBTRALA
```

Link-Edit Statements

```
   PHASE $$BUCB3,+0
   INCLUDE IJBTRxxx
// EXEC LNKEDT
```

where xxx is a two or three character identifier of the train type on your 3203 printer other than the AN supplied in the core image library.

```
   PHASE SYSBUFLD,+0
   INCLUDE IJBSBUFF
   PHASE IJBSBUFF1,+0
   INCLUDE IJBSBUF1
// EXEC LNKEDT
```

Buffer Load(3211 Printer)

CORE IMAGE LIBRARY

Transients (Required for IPL if 3211 is present)

```
$$BFCB
$$BUCB
$$BUFLDR
$$BUFLD1
$$BUFLD2
```

Modules

```
IJBSBUFF
IJBSBUF1
IJBTRA11
IJBTRG11
IJBTRH11
IJBTRP11
IJBTRT11
```

Link-Edit Statements

```
   PHASE $$BUCB,+0
   INCLUDE IJBTRxnn
// EXEC LNKEDT
```

where xnn is the train on your 3211 printer other than the A11 supplied in the core image library (transient $$BUCB).

```
   PHASE SYSBUFLD,+0
   INCLUDE IJBSBUFF
   PHASE SYSBUFF1,+0
   INCLUDE IJBSBUF1
// EXEC LNKEDT
```

Buffer Load (5203 Printer)

CORE IMAGE LIBRARY

Transients (Required for IPL)

$$BFCB5
$$BUCB5 (See Note)
$$BUFLDR
$$BUFLD1
$$BUFLD2

Note: This transient is not required for IPL when the UCS feature is not present.

Phases

SYSBUFLD
SYSBUFF1

RELOCATABLE LIBRARY

Modules

IJBSBUFF
IJBSBUF1
IJBTRHN
IJBTRLC
IJBTRGN
IJBTRPN

Link-Edit Statements

```
   PHASE $$BUCB5,+0
   INCLUDE IJBTRxx
// EXEC LNKEDT
```

WHERE XX IS THE TRAIN TYPE ON YOUR 5203U printer other than the LC suppled in the core image library.

```
   PHASE SYSBUFLD,+0
   INCLUDE IJBSBUFF
   PHASE SYSBUFF1,+0
   INCLUDE IJBSBUF1
// EXEC LNKEDT
```

Job Control

Transients

$$BJCOPT
$$BJCOP1
$$BLSTIO

CORE IMAGE LIBRARY

Phases

$JOBACCT *
$JOBCTLA
$JOBCTLB
$JOBCTLD
$JOBCTLE
$JOBCTLF
$JOBCTLG

$JOBCTLJ
$JOBCTLK
$JOBCTLM
$JOBCTLN *

* Required for Job Acccunting Interface

RELOCATABLE LIBRARY

Modules

$JOBACCT
IJBJC
IJBJCB
IJBJC1
IJBJC2
IJBJC3
IJBJC4
IJBJC5
IJBJC6
IJBJC7
IJBJC8 (Job Accounting Interface)
IJBJC9

Link-Edit Statements

```
   INCLUDE IJBJC
// EXEC LNKEDT
   INCLUDE $JOBACCT
// EXEC LNKEDT
```

Linkage Editor

CORE IMAGE LIBRARY

Phases

$LNKEDT	Initialize/overhead (Phase 1)
$LNKEDTA	Pass 2 processor (Phase 7)
$LNKEDTC	Catalog processor (Phase 8)
$LNKEDT0	12-2-9 processor, ESD only (Phase 2)
$LNKEDT2	12-2-9 processor, non-ESD (Phase 3)
$LNKEDT4	Control card processor (Phase 4)
$LNKEDT6	Control card processor (Phase 5)
$LNKEDT8	MAP processor (Phase 6)

RELOCATABLE LIBRARY

Modules

IJBLBI
IJBLE1

Link-Edit Statements

```
   INCLUDE IJBLE
// EXEC LNKEDT
```

WORKFILE REQUIREMENTS FOR LINKAGE EDITOR

This section contains information for determining the workfile requirements for the linkage editor and assembler when the workfile is on an IBM 2314/2319, 3330, or 3340.

Two workfiles are used by the linkage editor: SYSLNK for input, and SYS001 for a workfile.

The best overall performance for link-editing results from using two disks and one tape: SYSRES and SYSLNK each assigned to a separate disk drive, and SYS001 assigned to tape. When possible, SYSLNK should be assigned to the faster of the two disks because more I/O is performed on SYSLNK than on SYSRES. Because link-edit time is relatively small compared to assembler or compiler times, optimum assignments for assembling and link-editing (or compiling and link-editing) should be based on assembler or compiler conditions, not link-edit time. When making optimum workfile assignments, the major consideration should be compiler time. A savings in link-editing time is generally at the expense of compiler performance.

When built by a language processor, SYSLNK contains 39 card images per track on a 2314/2319, 60 on a 3330, and 34 on a 3340. When an object deck is used as input to the linkage editor, job control formats SYSLNK. In this case, SYSLNK contains 16 records per track on a 2314/2319, 28 on a 3330, and 17 on a 3340; ESD, TXT, and RLD cards are packed 4 per record while all other input cards are not packed (1 per record).

In a compile and link-edit situation, any allocation made for SYS001 for the compilation is more than sufficient as a workfile allocation for the linkage editor. However, when you must allocate SYS001, you can use the following information. The linkage editor workfile (SYS001) contains 21 records per track on a 2314/2319, 35 on a 3330, and 20 on a 3340. The total number of records (R) required for link-editing a program is equal to the following:

$$R = 1 + \left[\frac{X_1}{4}\right] + \left[\frac{X_2}{4}\right] + \cdots \left[\frac{X_n}{4}\right]$$

where = rounded high

$x_1, x_2, \ldots, x_n$ = number of RLD cards in each module to be processed by the linkage editor.

Librarian

The following are the librarian programs.

Note: Module IJBLBC (error message routine) is a common module used by more than one librarian program and also by the linkage editor.

CORGZ

CORE IMAGE LIBRARY

Phases

CORGZ
CORGZ1
CORGZ2
CORGZ3

```
CORGZ4
CORGZ5
CORGZ6
CORGZ7
CORGZ8
```

RELOCATABLE LIBRARY

Modules

```
IJBLBJ
IJBLBK
IJBLBS
IJBLBT
IJBLBU
IJBLBV
IJBLBW
IJBLBX
IJBLBY
IJBSL5
```

Link-Edit Statements

```
   INCLUDE IJBSL5
// EXEC LNKEDT
```

MAINT

CORE IMAGE LIBRARY

Phases

```
MAINT
MAINTA
MAINTCL
MAINTCN
MAINTDR
MAINTEJP
MAINTP2
MAINTR2
MAINTS2
MAINTUP
$MAINEOJ     Update program routine
```

RELOCATABLE LIBRARY

Modules

```
IJBLBA
IJBLBC
IJBLBD
IJBLBE
IJBLBF
IJBLBG
IJBLBH
IJBLBL
IJBLBM
IJBLBN
IJBLBQ

IJBLBZ
IJBMCS
IJBMDS
IJBMDU
IJBMIN

IJBMIO
IJBMUP
IJBSL2
```

Link-Edit Statements

```
   INCLUDE IJBSL2
// EXEC LNKEDT
```

CSERV

CORE IMAGE LIBRARY

Phase

```
CSERV
```

RELOCATABLE LIBRARY

Module

```
IJBLBP
```

Link-Edit Statements

```
   INCLUDE IJBLBP
// EXEC LNKEDT
```

DSERV

CORE IMAGE LIBRARY

Phases

```
DSERV
DSERV1
```

DSERV2
DSERV3
DSERV4
DSERV5
DSERV6
DSERV7

RELOCATABLE LIBRARY

Modules

IJBLBC
IJBSL1

Link-Edit Statements

```
   INCLUDE IJBSL1
// EXEC LNKEDT
```

PSERV

CORE IMAGE LIBRARY

Phase

PSERV

RELOCATABLE LIBRARY

Module

IJBSL6

Link-Edit Statements

```
   INCLUDE IJBSL6
// EXEC LNKEDT
```

RSERV

CORE IMAGE LIBRARY

Phase

RSERV

RELOCATABLE LIBRARY

Modules

IJBLBC
IJBSL3

Link-Edit Statements

```
   INCLUDE IJBSL3
// EXEC LNKEDT
```

SSERV

CORE IMAGE LIBRARY

Phase

SSERV

RELOCATABLE LIBRARY

Modules

IJBLBC
IJBSL4

Link-Edit Statements

```
   INCLUDE IJBSL4
// EXEC LNKEDT
```

Supervisor

CORE IMAGE LIBRARY

Phase

$$A$SUP1

SOURCE STATEMENT LIBRARY

Supervisor Communication Macros

	Real Storage Bytes Basic	For Literals (Note 1)	
E.ASYSCOM			
E.ATTACH	18-32	+0-4	(Note 2)
E.CALL	2-16	+0-4	(Note 2)
E.CANCEL	4-6	ALL+2	
E.CDLOAD	8-10	+0-8	
E.CHKPT	38-42		
E.CHNG			
E.COMRG	6		
E.DEQ	4-8	+0-4	
E.DEQB			
E.DETACH	2-6	+0-5	
E.DUMP	6	8	
E.ENQ	4-8	+0-4	
E.ENQB			
E.EOJ	2		
E.EXIT	2		
E.FCEPGOUT			
E.FETCH	2-10	+8-12	
E.FREEVIS	2-10		
E.GETIME	10-94	+0-8	
E.GETVIS	4-16		
E.JDUMP			
E.LOAD	2-10	+8-12	
E.MAPCCB			
E.MAPCOMR			
E.MAPPIB			
E.MAPRFTAB			
E.MVCOM	12-16	+0-4	
E.PAGEIN			
E.PDUMP	10-28	+0-16	
E.PFIX			
E.PFREE			
E.POST	4-8	+0-8	
E.RCB	8-10		
E.REALAD			
E.RELPAG			
E.RETURN	2-6		
E.RUNMODE			
E.SAVE	4		
E.SETIME	6-14	+0-8	
E.SETPFA			
E.STXIT	2-14	+4-12	
E.SYSCOM			
E.TECB	4		
E.VIRTAD			
E.WAIT	10-14	+0-4	
E.WAITM	8-12	+0-4	

Notes:

1. Include the storage requirement for literals only once if the literal is used by more than one macro instruction.
2. +4 bytes per operand for variables.

Supervisor Generation Macros

*Basic:

E.ALLOC
E.ALLOCR
E.ASSGN
E.BDYBOX
E.CONFG

E.DPD
E.DVCGEN
E.FOPT
E.IOINTER
E.IOTAB

E.MAPERPIB
E.MCRAS
E.MAPLOWC
E.MAPPUB2
E.PIOCS

E.SEND
E.SGAM
E.SGCCWT
E.SGDFCH
E.SGDSK

E.SGPMGR
E.SGSVC
E.SGTHAP
E.SMICR
E.STDJC

E.SUPVR
E.SYSIO
E.VSTAB

* For a detailed description of storage requirements, refer to Supervisor Storage Requirements.

Teleprocessing:

E.IJLQDSCT
E.IJLQTSVC

Note: These macros are part of the QTAM program but are required to generate a QTAM supervisor.

System Generation Macros

Z.DOSCHLV
Z.DELETECL
Z.DELETERL
Z.DELETESL
Z.LINKEDIT

MCAR/CCH

CORE IMAGE LIBRARY

Transients

$$ABERA1
$$ABERA2
$$ABERA3
$$ABERA4
$$ABERA5
$$ABERA6
$$ABERA7

$$ABERRJ
$$ABERRP
$$ABERRQ

$$BCCHHR	
$$RAST00	CCH and Initial MCAR analysis
$$RAST01	Channel and machine check record builder and recorder
$$RAST02	Channel check analysis
$$RAST03	EFL and MCAR analysis
$$RAST04	Unit record channel check ERP
$$RAST05	Unit record channel check ERP
$$RAST06	3505 and 3525 channel check handler ERP
$$RAST08	Machine check and channel check record writer
$$RAST09	Partition reallocation
$$RAST10	ERP message writer
$$RAST11	Message writer
$$RAST13	

Transients

Device Error Routines and OPEN/CLOSE Phases for DOS/VS

The following is a list of required system control and common IOCS transients. Type A transient routines (device error routines) have the prefix $$A. ($ is an alphabetic character in System/370.) Type B transient routines (OPEN, CLOSE, CHKPT, etc.) have the prefix $$B.

$$A$SUP1	Supervisor
$$ABERAA	Statistical counter update (tape)
$$ABERAB	Tape ERP
$$ABERAC	Tape ERP
$$ABERAD	Tape ERP
$$ABERAE	Tape ERP
$$ABERAF	Tape ERP
$$ABERAG	Tape ERP
$$ABERAH	Tape ERP
$$ABERAI	Tape ERP
$$ABERAN	3886 OCR ERP
$$ABERA1	RMSR
$$ABERA2	RMSR
$$ABERA3	RMSR
$$ABERA4	RMSR
$$ABERA5	RMSR
$$ABERA6	RMSR
$$ABERA7	RMSR
$$ABERP1	BTAM ERP
$$ABERP2	BTAM ERP
$$ABERP3	BTAM ERP
$$ABERP4	BTAM ERP
$$ABERP5	BTAM ERP
$$ABERP6	BTAM ERP
$$ABERP7	BTAM ERP
$$ABERP8	BTAM ERP
$$ABERP9	BTAM ERP
$$ABERRA	Error recovery monitor
$$ABERRB	Disk ERP
$$ABERRC	Setup 2560 restart information
$$ABERRD	2560/5425 ERP repositioning
$$ABERRE	Setup 5425 restart information
$$ABERRF	3211 ERP
$$ABERRG	3504/3505 Card reader and 3525 card punch ERP
$$ABERRH	2245 ERP
$$ABERRI	2495 tape cartridge reader ERP
$$ABERRJ	Statistical counter update (non-tape)
$$ABERRK	RMSR message writer
$$ABERRL	ERP message writer
$$ABERRM	ERP message writer
$$ABERRN	ERP message writer
$$ABERRO	ERP message writer
$$ABERRP	3211 RMSR
$$ABERRQ	3211 RMSR
$$ABERRS	MICR ERP
$$ABERRT	1287/1288 OCR ERP
$$ABERRU	1017/1018 Paper tape ERP
$$ABERRV	2671 Paper tape ERP
$$ABERRW	1052 Console printer keyboard ERP
$$ABERRY	Unit record ERP
$$ABERRZ	Physical attention routine
$$ABERR1	2311 Data cell ERP
$$ABERR2	2321 Data cell ERP
$$ABERR3	2321 Data cell ERP

$$ABERR4	2321 Data cell ERP
$$ABERR5	2321 Data cell ERP
$$ABERR7	3540 Diskette ERP
$$ABERZ1	Physical attention routine
$$BATTNA	Supervisor, program terminator
$$BATTNB	Supervisor, program terminator
$$BATTNC	Supervisor, initiator
$$BATTND	Supervisor, nonresident attention routine
$$BATTNE	Supervisor, nonresident attention routine
$$BATTNF	Supervisor, nonresident attention routine
$$BATTNG	Supervisor, nonresident attention routine
$$BATTNH	Supervisor, nonresident attention routine
$$BATTNQ	Supervisor, nonresident attention routine
$$BATTNR	Supervisor, nonresident attention routine
$$BATTNS	Supervisor, nonresident attention routine
$$BATTNT	Process ALTER statement
$$BATTNU	Process DSPLY statement
$$BATTNV	DUMP command processor
$$BATTNW	DUMP command processor
$$BATTNX	DUMP command print routine
$$BATTNY	Supervisor, nonresident attention routine
$$BATTNZ	Supervisor, nonresident attention routine
$$BATTN2	Display and change dispatching priority
$$BATTN3	SDAID termination routine
$$BATTN5	Storage dump of part of storage specified by two addresses
$$BCCPT1	System required tape open
$$BCEOV1	Monitor-EOV/EOF
$$BCHKPD	Disk-checkpoint
$$BCHKPE	Disk-checkpoint
$$BCHKPF	Disk-checkpoint
$$BCHKPT	Tape-checkpoint
$$BCHKP2	Tape-checkpoint
$$BCHK3G	Erase gap for logical files
$$BCIS0A	ISAM - CLOSE
$$BCLOSE	Close monitor
$$BCLOSP	Punch file close
$$BCLOS2	Close
$$BCMT01	Tape EOF/EOV input-forward
$$BCMT02	Tape CLOSE-alternate switching
$$BCMT03	Tape CLOSE input-backward
$$BCMT04	Tape EOV output-forward
$$BCMT05	Tape CLOSE
$$BCMT06	Tape CLOSE-workfiles
$$BCMT07	Tape-alternate switching
$$BDMPBC	Supervisor, program termination and system dump on tape/printer (part 2)
$$BDMPVA	Supervisor, program terminator, and SVA dump
$$BDRSTR	Disk restart phase
$$BDUMP	Supervisor, program terminator, and system dump monitor
$$BDUMPB	Supervisor, program terminator, and system dump on tape/printer (part 1)
$$BDUMPD	Supervisor, program terminator, and system dump on disk (part 1)
$$BDMPDC	Supervisor, program terminator, and system dump on disk (part 2)
$$BENDFF	ISAM -ENDFL (Load phase 2)
$$BENDFL	ISAM -ENDFL (Load phase 1)
$$BEOJ	Supervisor, program terminator

$$BEOJ1	Supervisor, program terminator
$$BEOJ2	Supervisor, program terminator
$$BEOJ2A	Supervisor, program terminator
$$BEOJ3	Supervisor, program terminator
$$BEOJ3A	Supervisor, program terminator
$$BEOJ4	Supervisor, program terminator
$$BEOJ5	Supervisor, program terminator
$$BEOJ7	Supervisor, program terminator
$$BERRTN	System required error recovery
$$BFCB	3211 FCB standard load
$$BFCB3	3203 FCB standard load
$$BFCB5	5203 FCB standard load
$$BILSVC	Supervisor, program terminator
$$BINDEX	Cylinder index in core (ISAM)
$$BJCOPT	Job Control, OPEN Tape routine
$$BJCOP1	Job Control, OPEN Tape routine
$$BJDUMP	JDUMP indicator
$$BLVTOC	List VTOC (2311, 2314/19, 3330, and 3340)
$$BLSTIO	System control
$$BMSGWR	Tape open/close
$$BMVKEY	Printlog utility status modifier
$$BOCPM1	System required message writer
$$BOCPM2	System required message writer
$$BOCPT1	System required OPEN for input tape (Phase 1)
$$BOCPT2	System required OPEN for unlabeled output tape
$$BOCPT3	System required OPEN for labeled output tape
$$BOCPT4	System required OPEN for input tape (Phase 2)
$$BOCP01	System required table, disk DTFs, OPEN Version II
$$BOCP02	System required table, nondisk DTFs, OPEN Version II
$$BOCP03	System required table, unit record, OPEN Version II
$$BOCP11	System required table, tape or disk system DTFs, OPEN Version I
$$BOCP12	System required table, tape system DTFs
$$BOCRTA	CRT task initialization, activation, and deactivation
$$BOCRTB	Hard-copy disk ERP
$$BOCRTC	Message analysis & message transfer to screen buffer
$$BOCRTD	Multi-line message transfer to screen buffer
$$BOCRTE	CRT ERP, part 1
$$BOCRTF	CRT ERP, part 2
$$BOCRTG	Redefine message status; output from buffer to screen
$$BOCRTH	Message writer screen to hard-copy file
$$BOCRTK	CRT task activator and operator input check routine
$$BOCRTL	Message deletion by means of K command
$$BOCRTM	Message deletion by means of cursor
$$BOCRTN	K-command handler status definition
$$BOCRTO	Screen line-number handler
$$BOCRTP	Restore function for release
$$BOCRTQ	Screen update
$$BOCRTR	Initialize read
$$BOCRTS	Read/command
$$BOCRTT	Move data
$$BOCRTU	Updating of wrap-around pointer in hard-copy file
$$BOCRTV	Cursor positioning in case of error
$$BOCRTW	Message writer
$$BOCRTX	Conversation handler
$$BOCRTY	Multi-line message handler
$$BOCRTZ	CRT root phase

$$BOCRT1	Redisplay - supervisor interface
$$BOCRT2	Redisplay - command analysis
$$BOCRT3	Redisplay - read messages from hard-copy file
$$BOCRT4	Redisplay - write to screen
$$BOCRT5	Redisplay - save/restore screen image
$$BOCRT6	Redisplay - command checking

Note: The DOC-support transients ($$BOCRTn) are automatically generated if MODEL=115 or 125 is specified in the CONFG macro. If DOC support is not desired, a DELET statement is required for each transient. If DOC support is required but one or more of the DOC-support transients have been deleted, the system enters a hard wait state.

$$BODACL	Close Routine-DA
$$BODAIN	Direct access input-OPEN (Input)
$$BODAI1	Open input-DA
$$BODAO1	Direct access-OPEN output Phase 1
$$BODAO2	Direct access-OPEN output Phase 2
$$BODAO3	Direct access OPEN-output Phase 3
$$BODAO4	Direct access OPEN-output Phase 4
$$BODAU1	Direct access-OPEN
$$BODIO1	Diskette OPEN-input Phase 1
$$BODIO2	Diskette OPEN-output Phase 3
$$BODIO3	Diskette OPEN-output Phase 4
$$BODIO4	Diskette CLOSE-input/output
$$BODIO5	Diskette OPEN-input Phase 3
$$BODIO6	Diskette OPEN-input Phase 4
$$BODIO7	Diskette OPEN-output Phase 5
$$BODIO8	Diskette OPEN-output Phase 6
$$BODMSG	Diskette Message Writer Phase 1
$$BODMS2	Diskette Message Writer Phase 2
$$BODQUE	Dequeue JIB's
$$BODSMO	Diskette security message writer
$$BODSMW	Message writer
$$BODSPO	Diskette VTOC Display Phase 2
$$BODSPV	Disk VTOC display routine
$$BODSPW	Disk VTOC display routine
$$BODUCP	Diskette DTFCP/DTFDI OPEN
$$BOFLPT	DASD file protect
$$BOIS01	ISAM - OPEN I/O Phase 1
$$BOIS02	ISAM - OPEN I/O Phase 2
$$BOIS03	ISAM - OPEN I/O Phase 3
$$BOIS04	ISAM - OPEN I/O Phase 4
$$BOIS05	ISAM - OPEN I/O Phase 5
$$BOIS06	ISAM - OPEN I/O Phase 6
$$BOIS07	ISAM - OPEN I/O Phase 7
$$BOIS08	ISAM - OPEN I/O Phase 8
$$BOIS09	Indexed sequential independent overflow area integrity
$$BOIS10	ISFMS - OPEN
$$BOMRCE	OPEN for CMR and RCE
$$BOMSG1	Message non-abort types
$$BOMSG2	Message writer - abort types
$$BOMSG3	Message writer
$$BOMSG4	Message writer
$$BOMSG5	Message writer

$$BOMSG6	Message writer
$$BOMSG7	Message writer (ASCII)
$$BOMT0M	Tape OPEN message
$$BOMT0W	Tape OPEN message
$$BOMT01	Tape OPEN input-forward-standard labels (Phase 1)
$$BOMT02	Tape OPEN input-backward-standard labels
$$BOMT03	Tape OPEN output forward-standard label
$$BOMT04	Tape OPEN output-standard labels
$$BOMT05	Tape OPEN I/O-forward/backward nonstandard/unlabeled
$$BOMT06	Tape OPEN workfiles
$$BOMT07	Tape OPEN input-forward-standard labels (Phase 2)
$$BONVOL	Tape rewriting
$$BOPEN	RMSR tape processor
$$BOPENC	OPENC
$$BOPEND	Disk OPEN volume ID handler
$$BOPENR	Relocation Phase 1
$$BOPEN1	Open monitor
$$BOPEN2	Open monitor
$$BOPIGN	Open monitor
$$BOPNLB	Locates system source statement library (for assembler, COBOL, MAINT, and SSERV) or procedure library (for PSERV)
$$BOPNR2	Relocation Phase 2
$$BOPNR3	Relocation Phase 3
$$BORTV1	ISAM Open
$$BORTV2	ISAM Open
$$BOSDC1	Sequential disk I/O - CLOSE
$$BOSDC2	Sequential disk-close
$$BOSDEV	DTFDA and DTFSD Forced End of Volume
$$BOSDI1	Sequential disk input - OPEN
$$BOSDI2	Sequential disk input - OPEN
$$BOSDI3	Sequential disk input - OPEN
$$BOSDI4	Sequential disk input - OPEN
$$BOSDO1	Sequential disk output Phase 1 - OPEN
$$BOSDO2	Sequential disk output Phase 2 - OPEN
$$BOSDO3	Sequential Disk output Phase 3 - OPEN
$$BOSDO4	Sequential disk output Phase 4 - OPEN
$$BOSDO5	Sequential disk output Phase 5 - OPEN
$$BOSDO6	Sequential disk open - Phase 6
$$BOSDO7	Sequential disk output - OPEN
$$BOSDO8	Sequential disk output - OPEN
$$BOSDO9	Sequential disk output - OPEN
$$BOSDW1	Sequential disk workfiles Phase 1 - OPEN
$$BOSDW2	Sequential disk workfiles Phase 2 - OPEN
$$BOSDW3	Sequential workfile Phase 3 - OPEN
$$BOSD00	Sequential disk OPEN - output Phase 0
$$BOSD01	Sequential disk OPEN - output Phase 1
$$BOSIGN	System open
$$BOUR01	Unit record-OPEN routine
$$BOVDMP	Disk VTOC dump
$$BOWDMP	Disk VTOC dump
$$BO2321	OPEN data cell
$$BPCHK	Supervisor - program terminator
$$BPDAID	Problem Determination
$$BPDUMP	PDUMP on SYSLST (part 1)

```
$$BPDMPC        PDUMP on SYSLST (part 2)
$$BPSW          Supervisor - program terminator

$$BRELSE        Device release
$$BRMSG1        Message writer CHKPT-RSTRT
$$BRMSG2        CHECKPOINT-RESTART message writer
$$BRSTRB        Tape Restart
$$BRSTRT        RESTART message writer - Phase 2

$$BRSTR2        Tape and DASD verify for restart
$$BRSTR3        DASD verify for restart
$$BRSTR4        Tape Reposition
$$BSDRUP        Suppress writing on recorder file
$$BSETFF        ISAM load Phase 2 of SETFL

$$BSETFG        ISAM load Phase 3 of SETFL
$$BSETFH        ISAM load Phase 4 of SETFL
$$BSETFL        ISAM load Phase 1 of SETFL
$$BSETL         ISMOD - SETL
$$BSETL1        ISMOD - SETL
$$BSYSWR        Supervisor, nonresident attention
$$BTERM         Supervisor, program terminator
$$BUCB          3203, 3211, and 5203 UCSB standard load
$$BUCB3         3203 UCSB standard load
$$BUCB5         5203 UCSB standard load
$$BUFLDR        3203, 3211, and 5203 FCB and UCSB IPL loader
$$BUFLD1        3203, 3211, and 5203 FCB IPL loader
$$BUFLD2        3211 FCB and UCSB IPL loader error routine
$$B3540I        Diskette OPEN-input Phase 1
$$B3540O        Diskette OPEN-output Phase 1
$$B3540O        Diskette OPEN-Phase 0
```

Attention Routines, Initiators, Terminators, and Dumps

Standard System Dump

CORE IMAGE LIBRARY

Transients

```
$$BDMPBC
$$BDMPVA
$$BDMPDC
$$BDUMP
$$BDUMPB
$$BDUMPD
$$BJDUMP
$$BPDMPC
$$BPDUMP
```

RELOCATABLE LIBRARY

```
IJBDMB *
IJBDMBST
IJBDMD *
IJBDMDST
IJBDMPMO *
IJBDMPVA *
IJBDUMPS
IJBJDMP *
IJBPDPMO *
IJBPDPST
```

*Modules common to Standard System Dump and Translating System Dump.

Link-Edit Statements

```
   INCLUDE IJBDUMPS
// EXEC LNKEDT
```

Translating System Dump

CORE IMAGE LIBRARY

Transients

```
$$BDMPBC
$$BDMPDC
$$BDUMP
$$BDMPVA
$$BDUMPB
$$BDUMPD
$$BJDUMP
```

$$BPDMPC
$$BPDUMP

RELOCATABLE LIBRARY

IJBDMB *
IJBDMBTR
IJBDMD *
IJBDMDTR
IJBDMPMO *
IJBDMPVA *
IJBDUMPT
IJBJDMP *
IJBPDPMO *
IJBPDPTR

*Modules common to Standard System Dump and Translating System Dump.

Link-Edit Statements

```
   INCLUDE IJBDUMPT
// EXEC LNKEDT
```

Attention Routines, Initiators, Terminators

CORE IMAGE LIBRARY

Transients

$$ABERRZ
$$ABERZ1
$$BATTNA
$$BATTNB
$$BATTNC
$$BATTND
$$BATTNE
$$BATTNF
$$BATTNG
$$BATTNH

$$BATTNQ
$$BATTNR
$$BATTNS
$$BATTNY
$$BATTNZ
$$BATTN2
$$BATTN3
$$BEOJ
$$BEOJS1
$$BEOJS2

$$BEOJ1
$$BEOJ2
$$BEOJ2A
$$BEOJ3
$$BEOJ3A
$$BEOJ4
$$BEOJ5
$$BECJ7
$$BILSVC
$$BPCHK

$$BPSW
$$BSYSWR
$$BTERM

Checpoint/Restart

CORE IMAGE LIBRARY

Transients

$$BCHKPD
$$BCHKPE
$$BCHKPF
$$BCHKPT
$$BCHKP2
$$BCHK3G
$$BRMSG1
$$BRMSG2
$$BRSTRT
$$BRSTR2
$$BRSTR3
$$BRSTR4

SOURCE STATEMENT LIBRARY

Macro

CHKPT

Disk Error Recovery Procedures (DKE)

CORE IMAGE LIBRARY

Transients

$$ABERRB
$$ABERR1
$$ABERR2
$$ABERR3
$$ABERR4
$$ABERR5

SOURCE STATEMENT LIBRARY

Macro

SGDSK

Display Operator Console Support

CORE IMAGE LIBRARY

Transients

```
$$BMVKEY
$$BOCRTA
$$BOCRTB
$$BOCRTC
$$BOCRTD

$$BOCRTE
$$BOCRTF
$$BOCRTG
$$BOCRTH
$$BOCRTK

$$BOCRTL
$$BOCRTM
$$BOCRTN
$$BOCRTO
$$BOCRTP

$$BOCRTQ
$$BOCRTR
$$BOCRTS
$$BOCRTT
$$BOCRTU

$$BOCRTV
$$BOCRTW
$$BOCRTX
$$BOCRTY
$$BOCRTZ

$$BOCRT1
$$BOCRT2
$$BOCRT3
$$BOCRT4
$$BOCRT5
$$BOCRT6
```

SOURCE STATEMENT LIBRARY

Macros

```
CRTAEX
CRTAWT
CRTGEN
CRTIO
CRTSAV
PUTR
```

PRINTLOG (Print the Hard-Copy File)

CORE IMAGE LIBRARY

Phase

```
PRINTLOG
```

RELOCATABLE LIBRARY

Module

```
IJBPRT
```

Link-Edit Statements

```
   INCLUDE IJBPRT
// EXEC LNKEDT
```

Tape Error Recovery Procedures (TPE)

CORE IMAGE LIBRARY

Transients

```
$$ABERAB
$$ABERAC
$$ABERAD
$$ABERAE
$$ABERAF

$$ABERAG
$$ABERAH
$$ABERAI
$$RAST07
$$RAST12
```

Phase

```
ESTVUT
```

RELOCATABLE LIBRARY

Module

```
IJBTESUT
```

Link-Edit Statements

```
   PHASE ESTVUT,+0
   INCLUDE IJBTESUT
// EXEC LNKEDT
```

Problem Determination Aids

PDAID

CORE IMAGE LIBRARY

Phases

```
PDAID
PDAIDFTT*
PDAIDFTP*
PDAIDFTW*
PDAIDGTT*
PDAIDGTP*
PDAIDGTW*

PDAIDITT*
PDAIDITP*
PDAIDITW*
PDAIDQTT*
PDAIDQTW*
PDAIDTDP*
PDAIDTDT*
PDLIST
```

*Only present in core-image library.

Transients

```
$$BATTNT
$$BATTNU
$$BATTNV
$$BATTNW
$$BATTNX
$$BPDAID
```

RELOCATABLE LIBRARY

Modules

```
IJBPDAID
IJBPDLST
```

DUMPGEN

CORE IMAGE LIBRARY

Phase

```
DUMPGEN
```

RELOCATABLE LIBRARY

Module

```
IJBDMPGN
```

Link-Edit Statements

```
   PHASE DUMPGEN,+0
   INCLUDE IJBDMPGN
/*
// EXEC LNKEDT
```

SDAID

CORE IMAGE LIBRARY

Phases

```
SDAID
SDAID2
SDPAR
ENDSD
```

Transients

```
$$BSDAID
$$BATTN5
```

RELOCATABLE LIBRARY

Modules

```
IJBSDAD1
IJBSDAD2
IJBSDEND
IJBSDPAR
```

Link-Edit Statements

```
// JOB
// OPTION CATAL
   INCLUDE IJBSDLNK
/*
// EXEC LNKEDT
/&
```

LSERV

CORE IMAGE LIBRARY

Phase

LSERV

RELOCATABLE LIBRARY

Module

IJBLSERV

Link-Edit Statements

```
   PHASE LSERV,+0
   INCLUDE IJBLSERV
/*
// EXEC LNKEDT
```

Supervisor Nucleus --5745-SC-SUP

Number of Phases	Number of Library Blocks
1	32

CONFIGURATION

Figure 1-24 represents the parameters and their specifications of the IBM-supplied supervisor.

Operation	Operand
SUPVR	NPARTS=1,CHAN=YES,RMS=NO
CONFG	MODEL=125
STDJC	
FOPT	OLTEP=NO,SYSFIL=YES
PIOCS	BMPX=YES,TAPE=7,DISK=(3330,3340)
VSTAB	RSIZE=96K,VSIZE=128K,SVA=(64K,0K)
IOTAB	JIB=14,D3420=2,D2314=2,D3330=2,D3340=2
SEND	X'8000'
END	

Figure 1-24. SUPERVISOR (32K)--IBM-Supplied Supervisor for DOS/VS

CORE IMAGE LIBRARY

Phase

$$A$SUP1

Module 2: Generating a Version of POWER --5745-SC-PWR

Modular Outline

Modular Index

The description of POWER generation contained on the following pages is intended for use by system support staff responsible for installing and maintaining the program as part of a DOS/VS system.

The section contains primarily reference material. You are, therefore, assumed to be familiar with the concepts and facilities of POWER as they are described in the following IBM DOS/VS manuals:

- IBM DOS/VS System Management Guide, GC33-5371
- IBM Introduction to DOS/VS, GC33-5370
- IBM DOS/VS Operating Procedures, GC33-5378
- IBM DOS/VS System Control Statements, GC33-5376
- IBM OS/VS and DOS/VS Assembler Language, GC33-4010
- IBM Guide to the DOS/VS Assembler, GC33-4024.

An understanding of the general logic of POWER may be of some help in planning an installation-tailored POWER version that will increase job throughput. The general logic of POWER is described in the DOS/VS POWER Logic manual, SY33-8565, in the section "Introduction" and "Method of Operation" and in the introductory paragraphs of the sections describing an execution processor or a print or punch writer routine (called a task in that manual).

The material in this module has been arranged in the following way:

- The section "Machine Requirements" describes the central system and the intermediate storage requirements for a POWER system with and without RJE (Remote Job Entry), as well as the terminals supported by RJE.
- The section "Programming Requirements" lists a number of special programming requirements for the generation of POWER.
- The section entitled "POWER Program Generation Parameters" discusses the POWER program generation parameters and describes the available options.
- The next two sections "Generating POWER without Remote Job Entry" and "Generating POWER with Remote Job Entry" give separate step-by-step accounts and examples of procedures for generating POWER without, and with, RJE support. The examples include disk and partition space requirements, supervisor prerequisites and assemblies of POWER systems.
- Generating the RJE components is described under "RJE Components Generation".

Machine Requirements

POWER operates on any IBM System/370 CPU with the minimum direct access storage devices required by DOS/VS. It resides in a real partition with a priority higher than that of the partitions it controls. POWER supports programs running in real and in virtual mode.

Generally, one IBM 2311 or 2314 disk pack, 100 cylinders on an IBM 3336 disk pack, or 200 cylinders on an IBM 3348 data module are sufficient for the POWER data files. All POWER files must be on like

units, for example, all on 2314 disk drives or all on 3330 disk drives. For the 3340, all extents of the DATAFIL must reside on the same type of 3348 data module. Multiple disk extents and multiple disk volumes are supported to a maximum of 5 extents for the DATAFIL file. POWER data files should not reside on a volume containing frequently used files.

POWER with RJE

To run POWER with Remote Job Entry (RJE) the following requirements must be met regarding central system and terminals.

CENTRAL SYSTEM

The central system must include:

- An IBM 2701 Data Adapter Unit (DAU) with Synchronous Data Adapter, Type II, equipped with EBCDIC code and transparency, or
- An IBM 2703 Transmission Control Unit (TCU) with Synchronous Base, Synchronous Terminal Control - EBCDIC and Synchronous Line Set, or
- For a Model 135 CPU, an Integrated Communications Adapter (ICA) with a Synchronous Data Adapter, Type II, equipped with half-duplex facility, EBCDIC code, and transparency.
- For a Model 115 or 125 CPU, an Integrated Communications Adapter (ICA) with one of the following:
  - Synchronous line group
  - Synchronous line low load
  - Synchronous line medium speed (with or without clock).

TERMINALS SUPPORTED

The POWER/RJE program can support up to five remote terminals of the type IBM 2770, 2780, or 3780:

IBM 2780 Data Transmission Terminal (Model 1 or 2)

This terminal can be connected to the central system by common carrier leased or switched facilities or privately owned communication facilities. The devices that are attachable to the IBM 2780 are described in Component Description: IBM 2780 Data Transmission Terminal, GA27-3005.

Required Features
- Terminal use - point-to-point
- EBCDIC transmission code
- Extended retry transmission
- Line termination
- Print line (120 or 144 characters)
- EBCDIC transparency.

Note: All punched output to a remote terminal is in transparent mode. If punched output is not a requirement, and if the user transmits in non-transparent mode only, the EBCDIC transparency feature on the 2770/2780 and transparency on the 2701 Data Adapter Unit, 2703 Transmission Control Unit, or Integrated Communications Adapter may be omitted.

Special Features - Supported

- Automatic answering
- Automatic turnaround (Model 2)
- Multiple record transmission

Special Features - Not Supported

- Multipoint line control
- Printer horizontal format control
- Selective character set
- Terminal identification.

IBM 2770 Data Communication System

This system may also be used as an RJE terminal. It can be connected to the central system by means of common carrier leased or switched facilities. The devices that are attachable to the IBM 2770 are described in System Components: IBM 2770 Data Communication System, GA27-3013.

I/O Units that may be Attached

- 545 Output Punch, Model 3 or 4 (output switch 2)
- 2203, Model A1 or A2, or 2213 Printer, Model 1 or 2 (output switch 1)
- 2502 Card Reader, Model A1 or A2 (input switch 2).

Note: A card reader and a printer are required, a card punch is optional.

I/O Units - Not Supported

- 50 Magnetic data inscriber
- 1017 Paper tape reader
- 1018 Paper tape punch
- 1255 Magnetic character reader
- 2265 Display station Model 2.

Required Features

- Terminal use - point-to-point
- EBCDIC transmission code
- Extended retry transmission
- WACK response (wait before transmit - positive acknowledgement)
- Line termination
- EBCDIC transparency.

Note: All punched output to a remote terminal is in transparent mode. If punched output is not a requirement, and if the user transmits in non-transparent mode only, the EBCDIC transparency feature on the 2770/2780 and transparency on the 2701 Data Adapter or Unit or Integrated Communications Adapter may be omitted.

Features - Supported

- Automatic answering
- Buffer expansion (256 or 512 bytes).

Features - Not Supported

- Multiple data link control
- Terminal identification.

Note on line mode settings for RJE terminals attached to a CPU Model 115 or 125: The bit settings of the line mode specification for a 2780 or 2770 POWER RJE terminal that is attached to a Model 115 or 125 CPU, are described in IBM System/370 Model 115 Functional Characteristics, GA33-1510, and in IBM System/370 Model 125 Functional Characteristics, GA33-1506, respectively.

IBM 3780 Data Communication Terminal

This terminal may also be used as an RJE terminal. It can be connected to the central system by means of common carrier leased or switched facilities. The devices that are attachable to the IBM 3780 are described in Component Information for the IBM 3780 Data Communications Terminal, GA27-3063.

The 3780 terminal consists of:

- A card reader
- A printer
- A terminal console
- (optionally) A 3781 card punch

Required Features

- EBCDIC transmission code
- Extended retry transmission
- WACK response (wait before transmit - positive acknowledgement)
- EBCDIC transparency

  Note: All punched output to a remote terminal is in transparent mode. If punched output is not a requirement, and if the user transmits in non-transparent mode only, the EBCDIC transparency feature on the 3780 and transparency on the 2701 or 2703 or on the Integrated Communications Adapter may be omitted.

Features - Supported

- Additional print positions
- Component select
- Punch attachment

Features - Not Supported

- Multiple data link control
- Component ID feature

Programming Requirements

For a DOS/VS system that is to include POWER, the following programming requirements must be met:

- The DOS/VS supervisor must be generated with POWER=YES in the supervisor generation macro SUPVR.
- The minimum real storage requirements for the POWER partition must be met (see "Storage Estimates for a minimum POWER Partition" in this section).
- A sufficient number of logical unit blocks (LUBs) must be generated for the POWER partition (see "LUBs for the POWER Partition").
- The physical unit block (PUB) table must be large enough to accommodate entries for POWER dummy devices (see "Generating a Version of POWER and "Using POWER" in the DOS/VS System Management Guide, GC33-5371, for dummy device assignment).
- POWER supports the unit-record devices described in section 5 of the manual Introduction to DOS/VS, GC33-5370. If POWER is to support the IBM 2560, 3525, or 5425, the considerations and restrictions described under "POWER Support for the IBM 2560, the IBM 3525, and 5425" must be observed.

Storage Estimates for a Minimum POWER Partition

The minimum sizes for the POWER partition with one partition supported are:

POWER Version	K Bytes
Writer Only Version	20
Reader/Writer Version	20
RJE (with one RJE Routine)	42

Depending on the POWER generation parameters chosen, however, additional real storage is required.

LUBS FOR THE POWER PARTITION

A sufficient number of LUB entries for programmer logical units SYS000 to SYSnnn must be generated for the POWER partition. The default value of 5 is usually not enough. The number of LUB entries may be calculated as follows:

```
n = 2 + d + u + v
```

where

```
n = number of LUB entries for the POWER partition
d = number of DATAFIL disk drives (see NUMDDKS)
u = number of POWER unit-record devices and/or tape units (see
    MAXCCB)
v = number of RJE lines (see MAXRJS)
```

For each partition supported by POWER, LUBs must be generated just as for a multiprogramming system without POWER.

POWER SUPPORT FOR THE IBM 2560, 3525, AND 5425

IBM 2560 and 5425

POWER supports the IBM 2560 and the IBM 5425 as a SYSRDR, SYSIPT, or SYSPCH device. If SYSPCH is assigned to the 2560 or the 5425, POWER supports;

- program-controlled stacker selection
- punch interpret
- card print
- punch/print

The 2560 and 5425 are subject to the following restrictions:

- POWER cannot perform any output functions on input cards (for instance, no read and punch into the same card).
- POWER ignores stacker selection for input cards.
- Read column binary is not supported.
- Hopper 1 is always used for input, hopper 2 for output. Therefore, the assignment for the dummy punch device has to be made in the form

```
ASSGN SYSPCH,X'cuu',H2
```

- POWER does not support read and punch functions simultaneously.

Note: Jobs with SYSIN assigned to a 5425 must contain an additional blank card before the /& card, regardless of the device type used to read in the job.

IBM 3525

POWER supports the basic read and punch functions of the IBM 3525 card reader. Punch interpret and punch/print are also supported, as well as the card print feature. If SYSPCH is assigned to the 3525, POWER supports the following functions:

- print
- punch/print (multi-line)
- automatic line positioning
- user-controlled line positioning
- print overflow

POWER does not support:

- optical mark read (OMR)
- read column eliminate (RCE)
- column binary card reading
- read and punch functions simultaneously.

POWER Program Generation Parameters

This part describes the parameters that create the POWER program.

There are four categories of POWER macro parameters:

1. QFILE and DATAFIL management:

   DBLK
   DISK
   D3540
   MAXJOBS
   NTRKGP
   NUMDDKS
   TRACKGP

2. Routine and job entry management:

   ACCOUNT
   ADDITR
   AUTOSTR
   JOBSEP
   LINETAB
   MAXBUFS
   MAXCCB
   MAXRW
   POWPART
   PRIORTY
   RDRCLOS
   READER
   SLI
   STDCARD
   STDLINE
   SUBLIB
   TAPE

3. Diagnostic parameter

   DIAG

4. RJE management parameters

   MAXRJS
   RETRY
   RJEND

QFILE AND DATAFIL FILE MANAGEMENT

If you intend to use more than one version of POWER (for example one with and one without RJE), you should make the QFILE and DATAFIL parameters as well as the POWPART parameter identical across your versions to avoid difficulties with extent allocations.

DBLK={1024 / n} This parameter specifies the block size of DATAFIL records and, consequently, the size of each data buffer (data buffers are used as I/O areas by the execution processors, reader/writer and RJE routines). n must be an integral multiple of eight not smaller than 288; the maximum is 3624 on a 2311, or 4000 on all other disk devices. If the QFILE record size determined by POWER (see MAXJOBS) is

greater than the value specified, DBIK is set to the QFILE record size. For small block sizes the following table shows the interdependencies of DBLK and the QFILE record size, which depends on the number (P) of partitions supported, and number of track groups (NTRKGP) that can be handled:

DBLK	Sufficient for p Partitions	Sufficient for NTRKGP up to
288	2	352
304	3	400
376	4	600
336	4	485
452	4	800
528*	4	1000
*Minium for 3211 printer support		

DISK={2311 / 2314 / 3330 / 3334}

Specifies the direct access device type for the ACCTFIL, QFILE, and DATAFIL files (specification of 2314 includes 2319). The QFILE and DATAFIL must be on devices of the same type, for example, all on 2314 or all on 3340. For a 3340 all extents of the DATAFIL must be on the same module type.

D3540={NO / INPUT}

This parameter specifies, by means of the INPUT operand, that the 3540 diskette I/O unit is to be supported as POWER input device.

MAXJOBS={110 / n}

This parameter specifies the maximum number of job entries POWER is able to manage at one time. n may be any number from 1 to 512. MAXJOBS determines the size of the QFILE, because MAXJOBS + 1 is the number of records in the QFILE. The size of a QFILE record (in bytes) is equal to the larger of the following two records:

a) 208 + 32 x p (size of QFILE master record)

b) 151 + 3 x ((NTRKGP + 7)/8) (size of QFILE JCT)

where: p= number of partitions supported
NTRKGP = number of track groups you want to handle

To determine how many QFILE records fit on one track, you have to know the physical charateristics of the disk type that is to contain the QFILE.

The following table gives examples of how many QFILE records may fit on one track of the various types of disk devices.

NTRKGP	500		1000	
No. of partitions supported	2	4	2	4
QFILE record size in bytes[1]	348	348	536	536
No. of records per track[2]:				
2311	11	11	6	6
2314	15	15	11	11
3330	27	27	19	19
3340	16	16	12	12

[1]rounded off, if necessary, to the next higher multiple of 8.

[2]For a description of track capacities, see the DOS/VS Data Management Guide, GC33-5372.

NTRKGP={240 / 200 / 190 / n} This parameter specifies the maximum number of track groups to be handled by POWER. n may be any number up to 1000. The default for a 2311 or a 2314 is 200; for a 3330 it is 190, and for a 3340 it is 240. If, for example, you specify NTRKGP=1000 and TRACKGP=10 (see the TRACKGP parameter) for a 2311, then 10,000 tracks or five full volumes may be used for DATAFIL. A maximum of five extents is accepted for the DATAFIL. If you want to use less disk space than specified during system generation, you can reduce the space to be handled by POWER with EXTENT cards.

NUMDDKS={1 / n} This parameter specifies the maximum number of disk volumes on which the DATAFIL may reside. n may be 1, 2, 3, 4, or 5. No matter what the NUMDDKS specification is, five extents will be handled, if present on the volume(s). It is, however, not necessary to use all disk volumes specified, nor is it necessary to have each disk extent on a different volume.

TRACKGP=n Specifies the number of tracks in a track group. A track group is the amount of disk space that POWER allocates for each job entry upon a request for space by any POWER routine. The following values may be substituted for n:

Device	Values
IBM 2311	1, 2, 5, or 10
IBM 2314/2319	1, 2, 4, 5, 10, or 20
IBM 3330	1, 2, 3, 6, 9, or 19
IBM 3340	1, 2, 3, 4, 6, or 12

The default is 10 for a 2311, 20 for a 2314/2319, and 1 for a 3330 or 3340.

For the 3330, the sizes of the individual track groups are as follows:

TRACKGP=	Size of Each Track Group cn One Cylinder
19	19
9	9, 10
6	6, 6, 7
3	3, 3, 3, 3, 3, 4
2	2, 2, 2, 2, 2, 2, 2, 2, 3
1	1, ..., 1

A job entry containing only twelve input records will use a full cylinder if DISK=2311 and TRACKGP=10. On the other hand, if five full 2311 disk volumes are required for the DATAFIL, then NTRKGP=1000 and TRACKGP=10 have to be specified to enable POWER to manage that much disk space.

ROUTINE AND JOB ENTRY MANAGEMENT

ACCOUNT={NO / YES} This parameter specifies that POWER is to maintain job accounting information. The information includes duration time, number of print records, number of punch records, etc. For each completed job entry one record of information is stored in the ACCTFIL.

ADDITR={10000 / n} This parameter specifies the additional number of lines to be printed or cards to be punched before a second message is issued. The first message is issued after STDCARD or STDLINE threshold values have been exceeded. ADDITR applies to either punch or print output, whereas STDLINE and STDCARD apply to print and punch output respectively. For ADDITR, n may be from 1 to 5 numeric characters.

AUTOSTR={NO / ([cuurdr],[nrdr],[cuuprt],[nprt],[cuupun],[nnpun])}

Allows you to specify that partition-independent reader/writer routines are to be started automatically by POWER when it is initiated (therefore, the term "autostart option").

It specifies the default values for the devices, the number of buffers and the pause code to be used in case the abbreviated S (start) command is used for reader and writer routines.

cuu specifies the I/O device for which the reader, print, and/or punch routine is to be started automatically.

n for the reader and print routine or the first n for the punch routine specifies the number of buffers (1 or 2) to be used. The second n for the punch routine specifies the pause code (0, 1, or 2). Omitted or zero indicates that the forms number specified in the * $$ PUN card is not to be displayed on SYSLOG. One (1) indicates that each forms number is to be displayed on SYSLOG and that the routine is to pause before processing each job entry. Two (2) indicates that every new forms number is to be displayed and-

that the routine is to pause before processing the job entry with the new forms number. If the second character is omitted, zero is assumed. The first character must not be omitted, if a pause code is desired.

The autostart options specified during system generation may be overridden by the S (start) command.

Examples of the AUTOSTR parameter:

1. Autostart for reader routine (00C) and print writer routine (00E); one buffer for the reader routine, two buffers for the print writer routine, and one buffer and pause code one (1) for the punch writer routine:

   AUTOSTR=(00C,1,00E,2,,11)

2. Autostart for reader routine; no buffer option:

   AUTOSTR=(00C)

3. No autostart; two buffers for each routine:

   AUTOSTR=(,2,,2,,2)

4. Autostart for all routines; no buffer option:

   AUTOSTR=(00C,,00E,,00D)

JOBSEP={NO / YES} Specifies that two separator pages are to precede the printed output of each job entry so that it is easier to split POWER job output.

LINETAB=(d0,d1,d2,d3,d4,d5,d6,d7,d8,d9,d10,d11,d12)

Describes the forms control tape or the forms control buffer of the dummy printers. The operands of the LINETAB parameter correspond to the punches in the forms control tape or to the channel positions in the forms control buffer which is used when the output is listed on the printer. With POWER the print output of your program is no longer present to handle the end-of-page condition when POWER writes the output on the printer. LINETAB enables POWER to calculate the next line on a page for all print operations, even in case of skip operations and to simulate channel 9 and channel 12 occurrences to allow the program to format end-of-page output correctly.

If LINETAB is specified, all values in the sublist must be specified. The values for d0 to d12 must be given in the form of two numeric characters.

With POWER, one channel can have only one punch per page, and the channel 12 punch must always be the last one on the page.

The values of the sublist are calculated as follows:

- d1 up to d12 must be 00 for each channel without punch or, for a channel with punch, must be the number of the line that contains a channel punch minus one.

- d0 specifies the number of lines on the page that follows the line with the channel 12 punch up to the end of the page.

The total number of lines on a page is:

```
d0 + d12 + 1
```

Consider the following example which is illustrated in Figure 2-1: Assume you want to start printing on line 5 with a heading, then skip to line 14 to continue printing up to the end of line 54. The corresponding LINETAB parameter would have to look as follows:

```
LINETAB=(12,04,13,00,00,00,00,00,00,00,00,53)
```

If LINETAB is not specified, channel skips and the channel 12 occurrence are handled during program execution as if

```
LINETAB=(10,00,05,10,15,20,25,30,35,40,45,50,55)
```

In this case, d1 corresponds to the first line of the page.

If LINETAB is omitted, LINETAB values cannot be established or changed with the '* $$ PRT' statement.

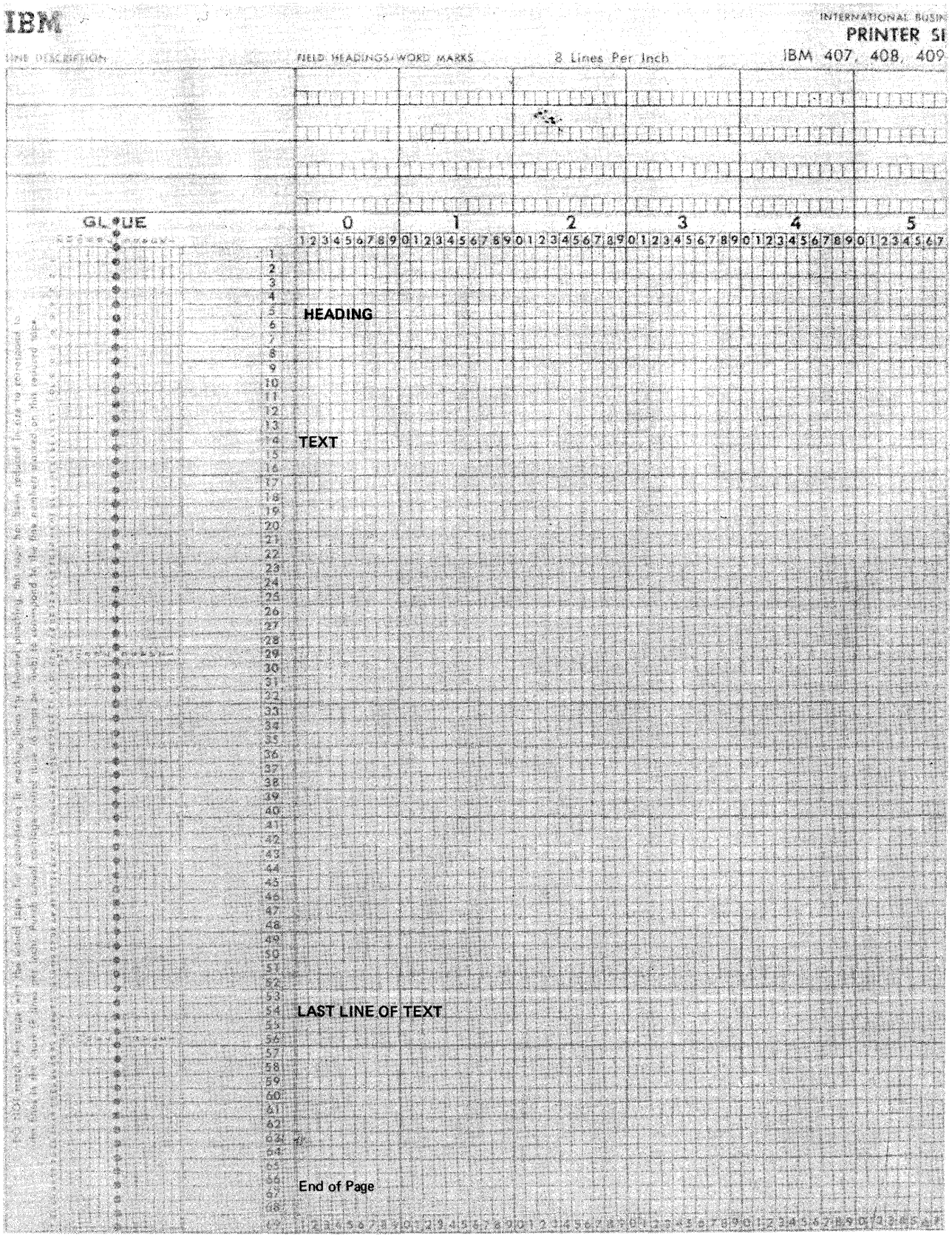


Figure 2-1. Forms Control Tape

MAXBUFS={7|n} Specifies the maximum number of data buffers that POWER may allocate for the handling of data. n can be up to 99; it is determined on the basis of the number of execution processors and of reader, writer, and RJE routines which may be active at one time, as shown in Figure 2-2.

For each partition Supported	Data Buffers		Program Buffers (See MAXRW)
	Minimum Required	Maximum	
Execution Processor in a Writer-Only System	2	4	-
Execution Processor in a Reader/Writer System	3	5	-
For each Print Writer, Punch Writer, and Reader Routine, depending on the Buffer Option specified in the S (start) Command or in the AUTOSTR Parameter[1]	1	2	1
RJE Routine	2	2	7 for first RJE routine 3 for end additional
3540 Reader Routine	1	*	2
One additional buffer is required for the handling of operator commands.			
[1]Two buffers can be specified.			

*Depends on the buffer size: sufficient to hold the contents of one 3540 Diskette track.

Figure 2-2. MAXBUFS Parameter

Assume a reader/writer system that services two partitions and supports one card reader, one punch, and one printer. The minimum number of data buffers required would be 10; the maximum 17. If less than the maximum is specified or if not enough real storage is available for the maximum number of buffers, the individual routines may compete for buffer space, reducing the performance of the system.

MAXCCB={3|n} The MAXCCB parameter specifies the maximum number of unit record and tape devices POWER may use at one time. n may be any number from 1 to 26. If no tape spooling is done (TAPE=NO), n should be as large as the MAXRW specification. One additional CCB is required for each tape device that POWER may use for output spooling.

MAXRW={3|N} This parameter specifies how many 1K-byte blocks of real storage are to be reserved for the reader and

writer routines. One block is necessary for each reader or writer routine that is to be active simultaneously. Two blocks are necessary for each reader routine that reads from a 3540 diskette reader. n may be any number up to 26. This parameter affects the values of MAXCCB and MAXBUFS. If the operator attempts to start a routine after the maximum is reached, the system will inform him that no more routines may be started.

POWPART=([BG][,F4][,F3][,F2][,F1])
The POWPART parameter specifies the partitions that POWER is to support. The partition into which POWER will be loaded at execution time must not be specified as one of the operands within the sublist. The priority of the partition in which POWER resides must be higher than any of the priorities of the POWER-supported partitions.

The partitions may be stated in any order. The first in the list, however, is the default partition for partition-independent reader routines. If no JECL is used or if the '* $$ JOB' statement does not contain the partition parameter, the reader routine places the job entry into the input queue of this default partition. If only one partition is specified in the list, the parentheses may be omitted.

If this parameter is omitted, the default taken is BG.

Note: If multitasking is performed in a partition supported by POWER, only the I/O requests issued by the main task are handled by POWER.

PRIORTY={NO / n} Specifies the default priority of a job entry when PRIORTY is not specified in the '* $$ JOB' statement. n maybe from 0 to 9, whereby 0 is the lowest and 9 is the highest priority.

If NO is specified, POWER treats job entries on a first in - first out basis.

RDRCLOS={PAUSE / EXIT} This parameter specifies the action the reader routine should take when end-of-file and end-of-job entry are encountered simultaneously. PAUSE causes the routine to wait for the operator to submit more input. EXIT causes the routine to terminate and release its buffers.

READER={YES / NO} This parameter specifies whether reader support is required. When YES is specified, a reader/writer version will be generated. When NO is specified, reader capability is not available; the result is a writer-only POWER version, which requires JECL.

SLI={NO / YES} SLI=YES allows you to include information from a private or system source statement library into a job entry. When source library inclusion is supported and a * $$ SLI statement is encountered in the job stream, POWER searches the private source statement library (if it has been assigned) and the system source statement library for the requested book and inserts it into the job stream. This parameter is not valid in a writer-only version.

STDCARD={720 / n} This parameter specifies the number of punch operations that are intercepted per job entry before a warning message is issued to the operator. n may be any number up to 99999. (See also ADDITR.)

STDLINE={10000 / n} This parameter specifies the number of print operations that are intercepted per job entry before a warning message is issued to the operator. n may be any number up to 99999. (See also ADDITR.)

SUBLIB={P / X} This parameter specifies the sub-library of the source statement library to be searched when the sub-library is not specified in the '* $$ SLI' statement.

TAPE={NO / YES} Specifies that tape spooling of output for single job entries is to be supported. If YES is specified, MAXCCB should be MAXRW plus the number of tape units that may be used concurrently for tape spooling.

DIAGNOSTIC SUPPORT PARAMETER DIAG

DIAG={NO / YES} Specifies the inclusion of an internal feature that records POWER events for debugging purposes.

RJE MANAGEMENT

RJE requires certain system resources which must be accounted for during POWER/RJE generation. Each RJE routine requires two data buffers. Therefore, the MAXBUFS generation parameter must include these RJE requirements.

MAXRJS={0 / n} This parameter specifies the maximum number of RJE routines which may be active concurrently. n may be from 0 to 5. If MAXRJS is 0 or is not specified, RJE is not generated. If the operator attempts to start an RJE routine after the maximum is reached, the system will reply that no more routines may be started. This operand does not affect the MAXRW specification.

RETRY={6 / n} This parameter specifies the number of retries (in intervals of 28 seconds) that may occur before an intervention required condition must be corrected at the terminal. If no corrective action is taken before the RETRY count is exhausted, the RJE routine detaches the terminal. Interrupted output will be saved; interrupted job entry input will not be entered into the POWER reader queue. On a switched line, the terminal will be disconnected. This feature permits other terminals to use the RJE facilities and prevents the RJE routine from being tied up. n may be any number from 3 to 20.

RJEND={NO / EXIT} This parameter specifies the action the RJE routine is to take when an RJEND statement is received from a terminal. EXIT specifies that the routine will terminate and free its buffers. NO specifies that the routine will wait for the next terminal call. With

terminals on lines that do not have the autoanswer feature, it may happen that a terminal does not disconnect properly. It is, therefore, recommended to specify RJEND=EXIT to permit the routine to terminate. In the meantime, the terminal operator can manually disconnect the terminal line.

Generating POWER without Remote Job Entry

This section describes the procedures for generating a version of POWER, without the RJE option. The procedure consists of six steps, which fall into two categories (see Figure 2-3).

- Steps 1 and 2 define the contents of your version of POWER.
- Steps 3 through 6 show how the program is assembled, cataloged, and link-edited.

Prior to step 1, ensure that your DOS/VS supervisor has been generated with POWER=YES and that sufficient logical unit blocks (LUBs) have been generated for the POWER partition.

Step 1

The aim of Step 1 is to determine the functions POWER is to include, to define the storage resources required, and to establish which POWER parameters and supervisor generation macros are affected.

- Determine what disk space the central installation can provide for POWER.
- Decide which partition POWER will occupy, what partitions it will support and how many reader and writer routines may be active at one time.
- Check the number of logical unit block (LUBs) available for the POWER partition. POWER requires one LUB (SYS001) for the QFILE, one for each DATAFIL module (SYS002, ...), and one for each active reader/writer routine. An extra LUB is required for each tape device that is to be used for tape spooling. The SYS000 LUB will be used by the POWER accounting file ACCTFIL. The smallest number of LUBs required for the POWER partition may be determined as follows:

  2 + NUMDDKS + MAXCCB

  The number of LUBs is specified in the BGPGR or FnPGR parameter of the IOTAB supervisor generation macro.
- For each partition supported by a reader/writer POWER system, three PUB entries must be reserved for dummy device addresses; for a writer-only system, two PUB entries must be reserved. This has to be covered in the IODEV parameter of the IOTAB macro.

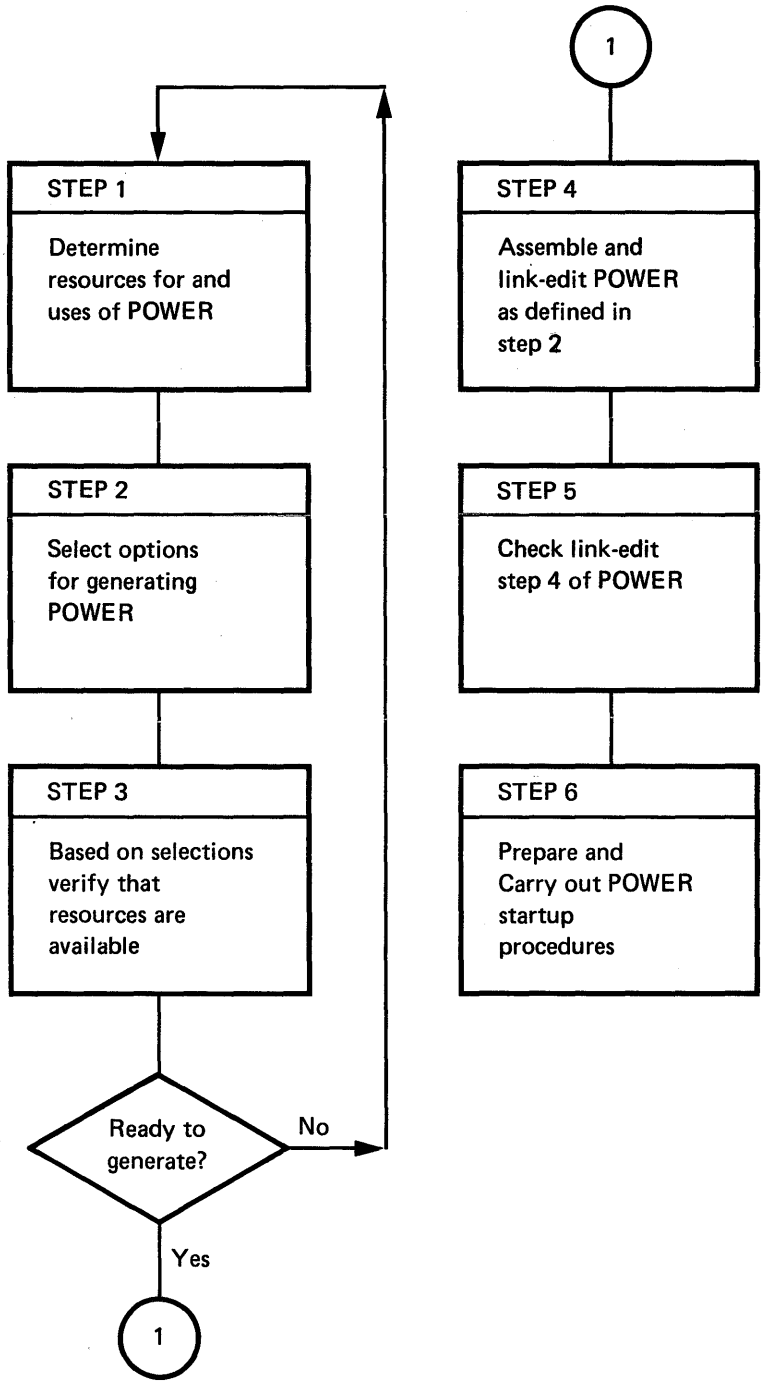


Figure 2-3. POWER Program Generation Steps

Step 2

Examine the POWER program generation parameters in detail. The particular requirements of your installation must now be translated into the POWER macro options that will define the POWER program (use a copy of Figure 2-4, which is provided to help you select the parameters you require).

Step 3

To this point nothing has been generated yet, but you have described in detail the contents of your POWER program. You must now verify that the available system resources (disk and partition space) meet the requirements of your POWER design.

For more detailed information on disk and partition size requirements, refer to the section "Generating a Version of POWER" in the DOS/VS System Management Guide, GC33-5371.

To estimate the size of your proposed POWER program, use the tables with the macro parameters which are shown in Figure 2-5. If there are no conflicts, between the requirements of your design and the resources available, you are ready to proceed to Step 4 and begin the final generation process. If there are conflicts, resolve them before proceeding. You may wish to return to Step 2 to reselect POWER macro operands, or even return to Step 1 for a restatement of resources and proposed use of the POWER system.

Step 4

Now assemble and link-edit the POWER macro with the operands selected in Step 2. In addition, link-edit the POWER overlay phases which are contained in your relocatable library and store them in the system core image library. (See Figure 2-6). The link-edited POWER macro together with the overlay phases constitute the POWER system.

Examples of how to assemble and link-edit a small writer-only POWER system and a small reader/writer POWER system are shown in Figure 2-9 and in Figure 2-11, respectively.

Step 5

Check the SYSLST output of Step 4 to verify that it has been completed successfully. The listings and the card deck should be saved for future reference.

Step 6

The POWER system should now be ready for use. Carry out the startup procedures described in DOS/VS Operating Procedures, GC33-5378, and run some test jobs to verify that the program has been installed successfully.

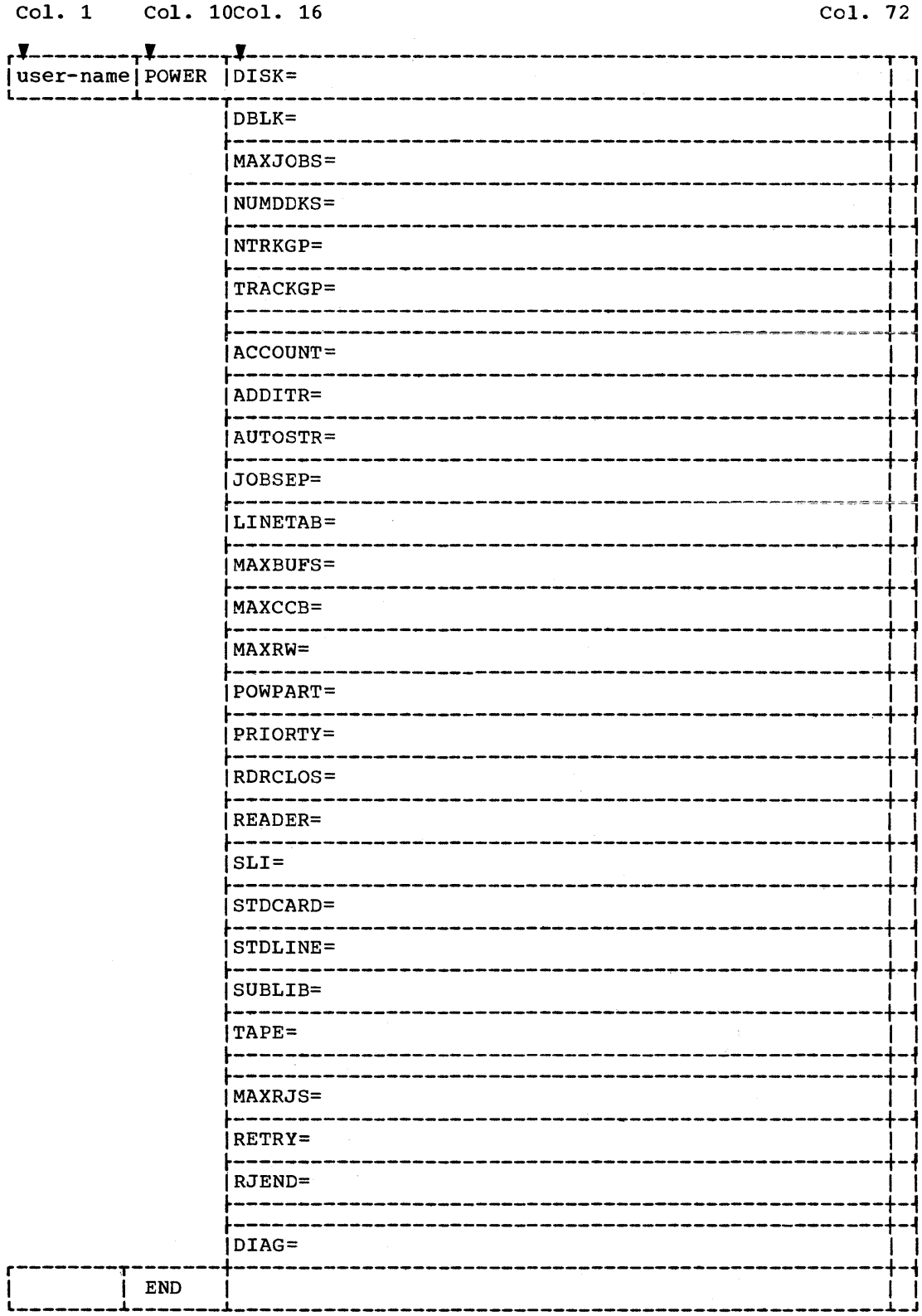


Figure 2-4. POWER Parameters

Parameter or Component	Bytes Required (Value cr Fcrmula) Reader=NO	Reader=YES	Parameter Option Default	Chcsen	Result in Bytes
DOS/VS Save Area	120		-	-	120
Console Command Processor	1,024		-	-	1,024
Basic POWER Code	12,400	13,800	READER= YES		
ACCOUNT=YES	200	240	NC		
AUTOSTR 1 Device 2 Devices 3 Devices	 36 60 84		-		
DBLK=d	see MAXBUFS		-	-	-
D3540=INPUT	-	164	-	-	164
LINETAB First Partition Each Additional Partition	 200 260		-		
MAXJOBS=n (ON DASD FILE)	n		110		
MAXBUFS=n DBLK=d	n * d		7 1,024		
MAXCCB=n	n * 36		3		
MAXRW=n	n * 1,024		3		
NTRKGP=n see Note	(5+n/8) * (1+3p)		NUMBER OF TRK GROUPS ON DISK 200		
NUMDDKS=n	n * 96		1		
PRIORTY≠NO	-	224	NO		
SLI First Partition Each Additional Partition	 - 	 1,600 340	 NO		
TAPE=YES	1,350		NO		
DIAG=YES	400		NO		
POWPART= see Note (partition,...)	(p-1) * 700		BG		
Total for POWER Without RJE=					

Note: p = number of partitions supported.

Figure 2-5. Parameters and Components Affecting the Size of the POWER Program (Part 1 of 2)

Parameter or Component	Bytes Required (Value or Formula) Reader=NO	Reader=YES	Parameter Option Default	Chosen	Result in Bytes
MAXRJS=n	(3 * n + 5)*1,024			0	
RJBTMOD					
BSCTST=NO,SWITCH=NO	11,300		-		
BSCTST=NO,SWITCH=YES	13,300		-		
BSCTST=YES,SWITCH=NO	15,100				
BSCTST=YES,SWITCH=YES	17,100				
RJBLKLST Number of Lines is n	24 + 16 * n		-		
RJUSERS Number of Entries is n	24 + 16 * n		-		
Total for POWER RJE					

Note: p = number of partitions supported.

Figure 2-5. Parameters and Components Affecting the Size of the POWER Program (Part 2 of 2)

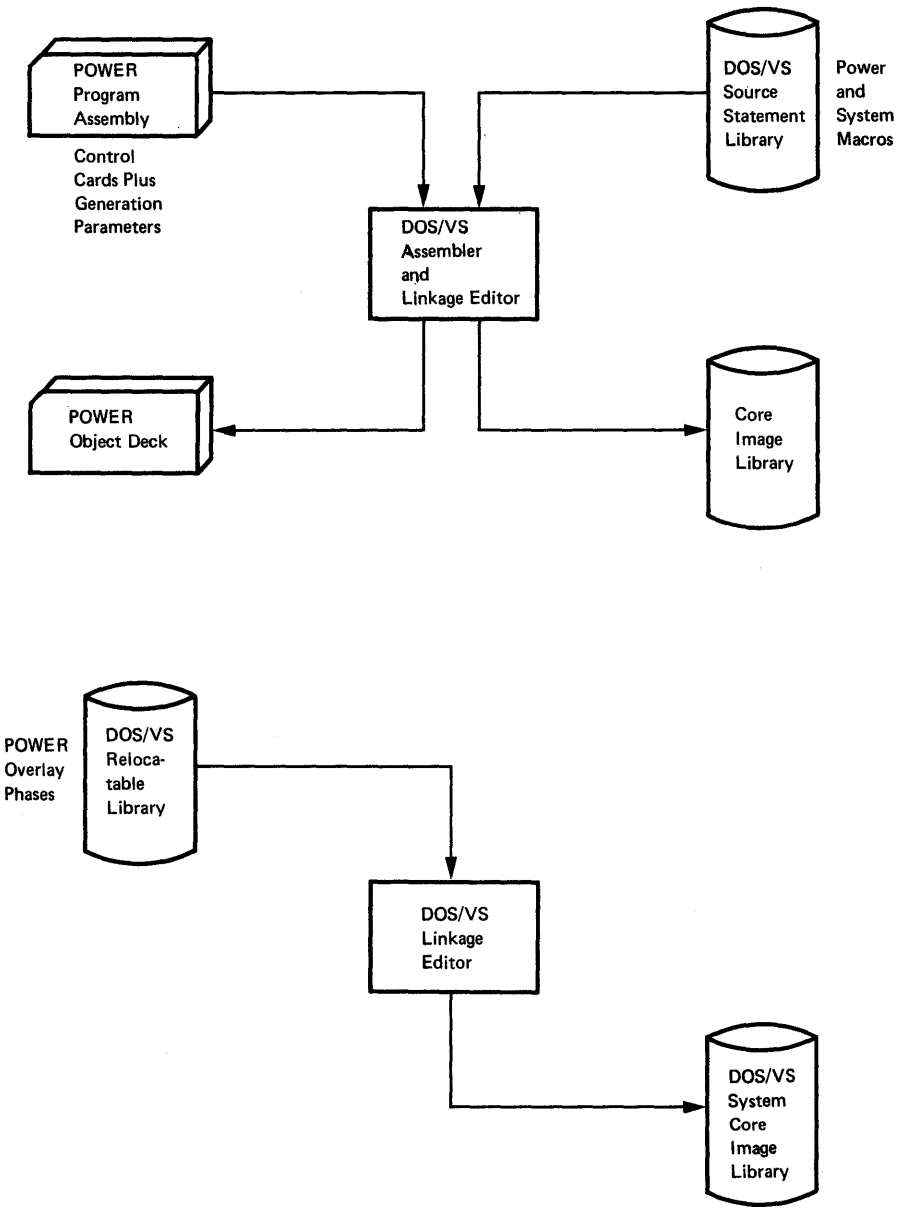


Figure 2-6. POWER Program Assembly and Link-Editing

GENERATING A SMALL WRITER-ONLY POWER SYSTEM

This part shows a small writer-only POWER system, POWER1, and its generation.

Disk Storage Requirements, Functions, and Supervisor Prerequisites

Two tracks for file QFILE, and 100 cylinders for the file DATAFILE, on one IBM 3330 disk pack are used.

POWER1 services one partition, the background, and supports one punch and one printer.

The supervisor under which POWER1 is to run must have been generated with POWER=YES.

For the POWER-resident partition, five LUB entries are required. For the POWER-supported partition, two PUB entries (one for the printer and one for the punch) must be reserved for dummy device addresses.

Figure 2-7 shows the parameter options for POWER1. The values chosen constitute a close to minimum POWER; only the parameters AUTOSTR and LINETAB could be omitted and the value of DBLK could be reduced to save real storage space.

For an explanation of the individual parameters and options, refer back to the part "POWER Program Generation Parameters".

Before assembling the POWER program, you can estimate its size. Figure 2-8 shows an application of the estimation table 2-5 for POWER1. It contains the parameters that affect the size of a POWER program and the formulas for calculating the space needed. Where applicable, the table also includes the default values for the individual options.

The options chosen for POWER1 are inserted under the heading "Parameter Options Chosen"; the resulting values are placed under "Result in Bytes".

The size of the partition needed to accommodate POWER1, a small writer-only system, is 18K bytes.

Assembling and Link-Editing POWER1

Figure 2-9 shows (a) how to assemble and link-edit the POWER macro and its selected operands and (b) how to link-edit the POWER overlay phases that are contained in the relocatable library. The link-edited POWER macro and the POWER overlay phases constitute POWER ready for execution. How POWER may be started is shown under "Start POWER".

The example is valid only for a supervisor generated with the relocating loader (RELLDR=YES). How to link-edit a POWER system for a supervisor without relocating loader is shown under "Link-Editing POWER for a Supervisor without Relocating Loader".

Col. 1	Col. 10	Col. 16	Col. 72
POWER1	POWER	DISK=3330,	*
		DBLK=528,	*
		MAXJCBS=50,	*
		NUMDDKS=1,	*
		NTRKGP=300,	*
		TRACKGP=6,	*
		ACCOUNT=/	
		ADDITR=/	
		AUTOSTR=(,,00E,1,00D,11),	*
		D3540=/	
		JOBSEP=NO,	*
		LINETAB=(10,00,05,10,15,20,25,30,35,40,45,50,55),	*
		MAXBUFS=5,	*
		MAXCCB=2,	*
		MAXRW=2,	*
		POWPART=BG,	*
		PRIORTY=/	
		RDRCLOS=/	
		READER=NO	
		SLI=/	
		STDCARD=/	
		STDLINE=/	
		SUBLIB=/	
		TAPE=/	
		MAXRJS=/	
		RETRY=/	
		RJEND=/	
		DIAG=/	
	END		

Figure 2-7. Parameter Options Chosen for a POWER1, or Small Writer-Only Version of POWER

Parameter or Component	Bytes Required (Value or Formula) Reader=NO	Reader=YES	Parameter Option Default	Chosen	Result in Bytes
DOS/VS Save Area	120		-	-	120
Console Command Processor	1,024		-	-	1,024
Basic POWER Code	12,400	13,800	READER= YES	NO	12,400
ACCOUNT=YES	200	240	NO	NO	-
AUTOSTR 1 Device 2 Devices 3 Devices	36 60 84		-	2 de-vices	60
DBLK=d	see MAXBUFS		-	-	-
LINETAB First Partition Each Additional PARTITION	200 260		-	1 part.	200
MAXJOBS=n	n		110	50	50
MAXBUFS=n DBLK=d	n * d		7 1,024	5 528	2,640
MAXCCB=n	n * 36		3	2	72
MAXRW=n	n * 1,024		3	2	2,048
NTRKGP=n see Note	(5+n/8) * (1+3p)		200	300	172
NUMDDKS=n	n * 96		1	1	96
PRIORTY≠NO	-	224	NO	NO	-
SLI First Partition Each Additional Partition	-	1,600 340	NO	NO	-
TAPE=YES	1,350		NO	NO	-
DIAG=YES	400		NO	NO	-
POWPART= see Note (partition,...)	(p-1) * 700		BG	BG	-
Total for POWER without RJE					18,882

Note: p = number of partitions supported.

Figure 2-8. Real Storage Estimates for a Small Writer-Only Version of POWER

GENERATING A SMALL READER/WRITER POWER SYSTEM

This part shows a small reader/writer POWER system, POWER2, and its generation.

Disk Storage Requirements, Functions, and Supervisor Prerequisites

Two tracks for the file QFILE, and 100 cylinders for the file DATAFILE, on one IBM 3330 disk pack are used, just as for POWER1.

POWER2 services one partition, the background, and supports one reader, one punch, and one printer. The supervisor under which POWER2 is to run must have been generated with POWER=YES.

For the POWER-resident partition, six LUB entries are required. For the background partition, three PUB entries (one for the reader, one for the punch, and one for the printer) must be reserved for dummy device addresses.

Figure 2-11 shows the parameter options chosen for POWER2. The values chosen constitute a close to minimum POWER; only the parameters AUTOSTR and LINETAB could be omitted and the value of DBLK could be reduced to save real storage space. For an explanation of the individual parameters, refer to "POWER Program Generation Parameters".

Real Storage Estimates for POWER2

Figure 2-10 contains the parameter options that affect the program size of POWER2 and the corresponding real storage requirements. The size of the real partition that is to contain POWER2 must be 22K bytes. See also "Total Size of the POWER Partition".

Assembling and Link-Editing POWER2

Figure 2-11 shows how to assemble and link-edit POWER2. Assembly and link-editing are the same as for POWER1, except that the POWER macro options are partly different.

This example, too, is valid only for a supervisor generated with the relocating loader (RELLDR=YES). How to link-edit a POWER system for a supervisor without relocating loader is shown under "Link-Editing POWER for a Supervisor Without Relocating Loader".

Figure 2-9. Assembling and Link-Editing a Small Writer-Only POWER System

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PROGRAM: Reader/Writer POWER System Assembly and Link-Edit | PUNCHING INSTRUCTIONS | GRAPHIC | PUNCH | PAGE | OF | CARD ELECTRO NUMBER *

PROGRAMMER | DATE

Name	Operation	Operand	Comments	Identification-Sequence
//	JOB	ASSEMBLE SMALL READER/WRITER POWER AND LINK IT RELOCATABLE		
//	OPTION	CATAL		
//	EXEC	ASSEMBLY		
POWER2	POWER	DISK=3330,		X
		DBLK=528,		X
		MAXJOBS=50,		X
		NUMDDKS=1,		X
		NTRKGP=200,		X
		TRACKGP=2,		X
		AUTOSTR=(00C,1,00E,1,00D,12),		X
		POWPART=BG,		X
		JOBSEP=NO,		X
		LINETAB=(10,00,05,10,15,20,25,30,35,40,45,50,55),		X
		MAXBUFS=7,		X
		MAXCCB=3,		X
		MAXRW=3,		X
		PRIORTY=NO,		X
		RDRCLOS=PAUSE		X
		READER=YES		
	END			
/*				
	ENTRY	INIT		
//	EXEC	LNKEDT		
/&				

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PROGRAM: Reader/Writer POWER System Assembly and Link-Edit | PUNCHING INSTRUCTIONS | GRAPHIC | PUNCH | PAGE 2 OF 2 | CARD ELECTRO NUMBER *

PROGRAMMER | DATE

Name	Operation	Operand	Comments	Identification-Sequence
//	JOB	LINK POWER OVERLAY PHASES INTO SYSTEM CORE IMAGE LIBRARY		
//	OPTION	CATAL		
	INCLUDE	POWEROBJ		
//	EXEC	LNKEDT		
/&				

Parameter or Component	Bytes Required (Value or Formula) Reader=NO	Reader=YES	Parameter Option Default	Chosen	Result in Bytes
DOS/VS Save Area	120		-	-	120
Console Command Processor	1,024		-	-	1,024
Basic POWER Code	12,400	13,800	READER= YES	YES	13,800
ACCOUNT=YES	200	240	NO	NO	-
AUTOSTR 1 Device 2 Devices 3 Devices	36 60 84		-	3 devices	84
DBLK=d	see MAXBUFS		-	-	-
LINETAB First Partition Each Additional PARTITION	200 260		-	1 part.	200
MAXJOBS=n	n		110	50	50
MAXBUFS=n DBLK=d	n * d		7 1,024	7 528	3,696
MAXCCB=n	n * 36		3	3	108
MAXRW=n	n * 1,024		3	3	3,072
NTRKGP=n see Note	(5+n/8) * (1+3p)		200	200	120
NUMDDKS=n	n * 96		1	1	96
PRIORTY≠NO	-	224	NO	NO	-
SLI First Partition Each Additional Partition	-	1,600 340	NO	NO	-
TAPE=YES	1,350		NO	NO	-
DIAG=YES	400		NO	NO	-
POWPART= see Note (partition,...)	(p-1) * 700		BG	BG	-
Total for POWER Without RJE=					22,370

Note: p = number of partitions supported.

Figure 2-10. Real Storage Estimates for a Small Reader/Writer Version of POWER

Figure 2-11. Assembling and Link-Editing a Small Reader/Writer Version of POWER

IBM

IBM System/360 Assembler Coding Form

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PROGRAM: Writer - Only POWER System Assembly and Link-Edit | PUNCHING INSTRUCTIONS | GRAPHIC | PUNCH | PAGE 1 OF 2 | CARD ELECTRO NUMBER *

PROGRAMMER | DATE

STATEMENT

Name	Operation	Operand	Comments	Identification-Sequence
//	JOB	ASSEMBLE SMALL WRITER-ONLY POWER AND LINK IT RELOCATABLE		
//	OPTION	CATAL		
//	OPTION	DECK		
//	EXEC	ASSEMBLY		
POWER1	POWER	DISK=3330,	x	
		DBLK=528,	x	
		MAXJOBS=50,	x	
		NUMDDKS=1,	x	
		NTRKSP=300,	x	
		TRACKSP=6,	x	
		AUTOSTR=(,,00E,1,00D,11),	x	
		POWPART=BG,	x	
		JOBSEP=NO,	x	
		LINETAB=(10,00,05,10,15,20,25,30,35,40,45,50,55),	x	
		MAXBUFS=5,	x	
		MAXCCB=2,	x	
		MAXRW=2,	x	
		READER=NO	x	
	END			
/*				
	ENTRY	INIT		
//	EXEC	LNKEDT		
/&				

IBM

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Printed in U.S.A.

PROGRAM: Writer - Only POWER System Assembly and Link-Edit | PUNCHING INSTRUCTIONS | GRAPHIC | PUNCH | PAGE 2 OF 2 | CARD ELECTRO NUMBER *

PROGRAMMER | DATE

STATEMENT

Name	Operation	Operand	Comments	Identification-Sequence
//	JOB	LINK POWER OVERLAY PHASES INTO SYSTEM CORE IMAGE LIBRARY		
//	OPTION	CATAL		
	INCLUDE	POWEROBJ		
//	EXEC	LNKEDT		
/&				

Generating POWER with Remote Job Entry (RJE)

POWER RJE is an extension of POWER without RJE. You should know how to generate POWER without RJE before reading this section.

The generation procedure for POWER with Remote Job Entry consists of 8 steps. The DOS/VS supervisor must have been generated with POWER=YES. Make sure that the central system and the telecommunications network meet the hardware specifications described in the first part of this section.

Steps 1 through 4 involve defining the contents of your POWER system and the central system resources that may be allocated to the POWER system. Steps 5 through 8 describe assembling, cataloging, and link-editing the system. You may find Figure 2-12 a helpful outline of the 8 steps.

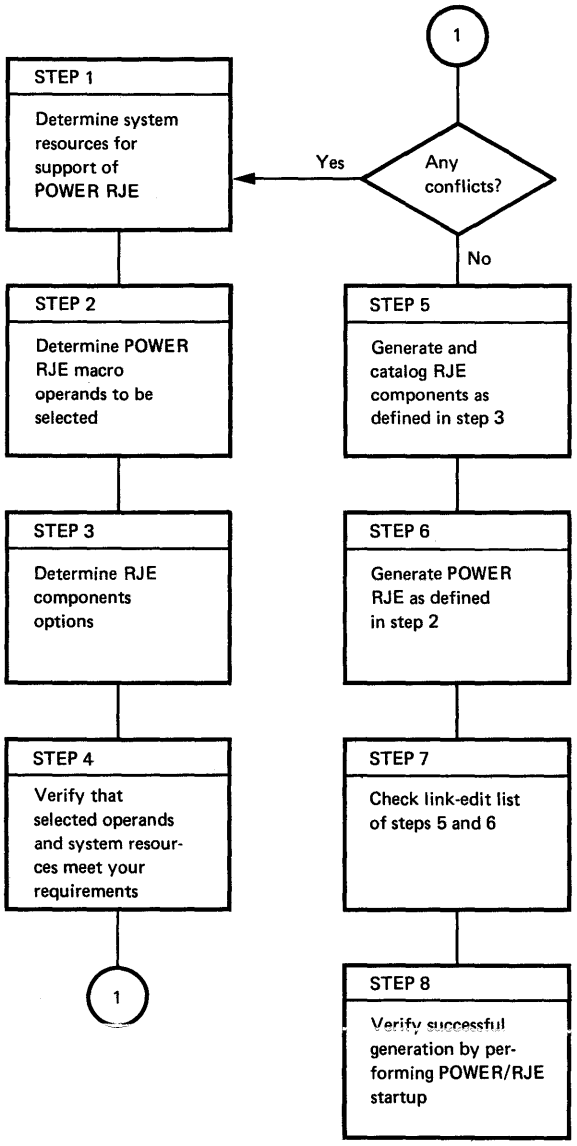

Figure 2-12. POWER RJE System Generation Steps

Step 1

Determine if your installation meets the programming requirements stated under "Programming Requirements" in this section. Determine what disk space has to be provided for POWER, which partition POWER will occupy, and how many LUBs and PUBs are needed. The smallest number of LUBs required for the POWER partition is:

```
2 + NUMDDKS + MAXCCB + MAXRJS
```

See the DOS/VS System Management Guide, GC33-5371, for POWER generation requirements.

Step 2

Examine in detail the section POWER Program Generation Parameters. The particular requirements of your installation must now be translated into the POWER macro options that define the POWER program (use a copy of Figure 2-4, which is provided to help you select the parameters you require).

Step 3

You must now describe the telecommunication system in terms of the RJE components explained under "RJE Components Generation". You should also establish user and terminal identification names for terminals and terminal users who will be authorized to use the RJE system. The required RJE block names will be dictated by the RJE blocks needed. However, you may also plan for expansion by using names of RJE blocks which may be added later. How the appropriate additional RJE blocks are later added to the system is discussed under "Modifying the RJE Block Name List and RJE Blocks".

Step 4

You have now described in detail what your POWER system will contain. You should now verify that the available system resources, disk and partition space are sufficient for the POWER system you have designed. Using the table shown in Figure 2-5, you can estimate the size of the proposed POWER RJE system. If there are no conflicts, proceed to step 5 and begin the final generation process. If there are conflicts, resolve them before proceeding. You may wish to return to Step 2 to reselect POWER macro operands or even return to Step 1 for a restatement of resources and proposed use of the POWER system.

Step 5

Assemble the RJE components listed below and catalog them into the relocatable library with the MAINT program:

```
RJBTMOD
RJBLKLST
RJUSERS
```

In addition, each RJEBLK should be assembled and link-edited at this time. Figure 2-13 and a review of the RJE component generation will help you to complete this step.

Check the assembly listings and the MAINT output to ensure successful execution of Step 5.

Step 6

You are now ready to assemble the POWER macro with the selected operands (see Figure 2-15). The output of this assembly has to be link-edited, that is, the modules RJBTMOD, RJBLKLST, and RJUSERS have to be linked together with the POWER module to obtain the resident part of POWER RJE.

At this time, the POWER and POWER RJE overlay phases have to be link-edited, too.

Step 7

Check the SYSLST output to verify that Steps 5 and 6 have been completed successfully. Save the listings and the card decks for possible future reference.

Step 8

The POWER RJE system should now be ready for use. Carry out the startup procedures described in DOS/VS Operating Procedures, GC33-5378, and run some test jobs to verify that the POWER system has been installed successfully.

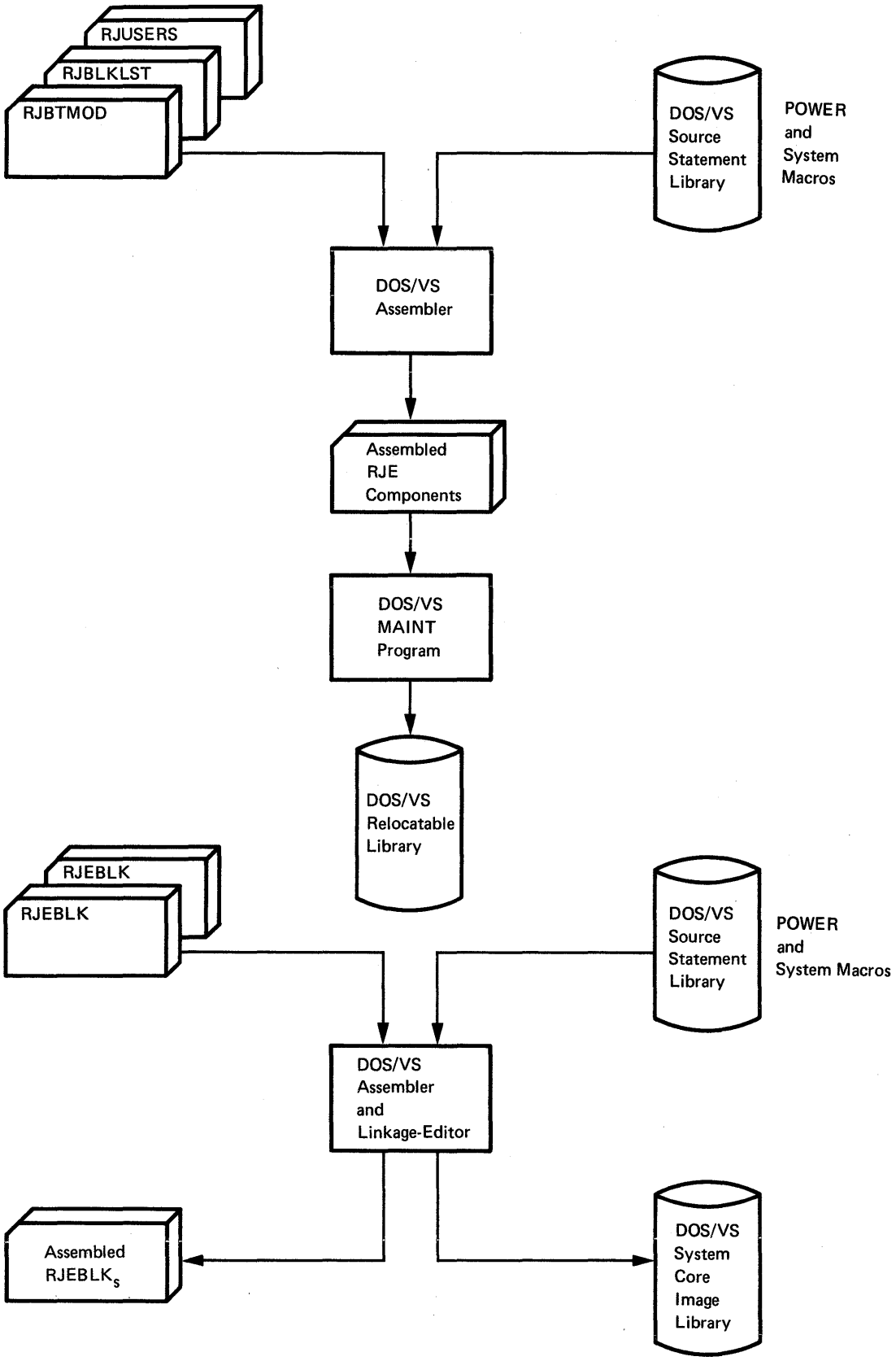

Figure 2-13. Generating the POWER RJE Components

RJE COMPONENTS GENERATION

POWER RJE generation produces five basic components:

- POWER program
- special BTMOD
- RJE blocks
- RJE block name list
- userid list.

The BTMOD, the RJE block name list, and the userid list must be placed into the DOS/VS relocatable library prior to link-editing POWER RJE (see Figure 2-13 and Figure 2-14).

The POWER program is generated by specifying the RJE operands in addition to the parameters for the central system requirements in the POWER macro. For a description of the RJE operands, see "RJE Management". The generation of the other components is described below.

Each component is assembled separately. Note that no embedded blanks are permitted in any operand or operand sublist.

BTMOD Generation

The BTMOD required for POWER RJE is generated by assembling the macro RJBTMOD, which must not be labeled. This BTMOD is always given the name RJBTMOD. RJBTMOD has two operands which are used to generate the BTMOD:

SWITCH={YES / NO} YES indicates that logic for switched lines is to be included in the BTAM module.

BSCTEST={YES / NO} YES specifies that logic for the BSC online terminal test is to be included in the BTAM module. Information on BTMOD and on-line testing is contained in DOS/VS Basic Telecommunications Method, GC27-6989.

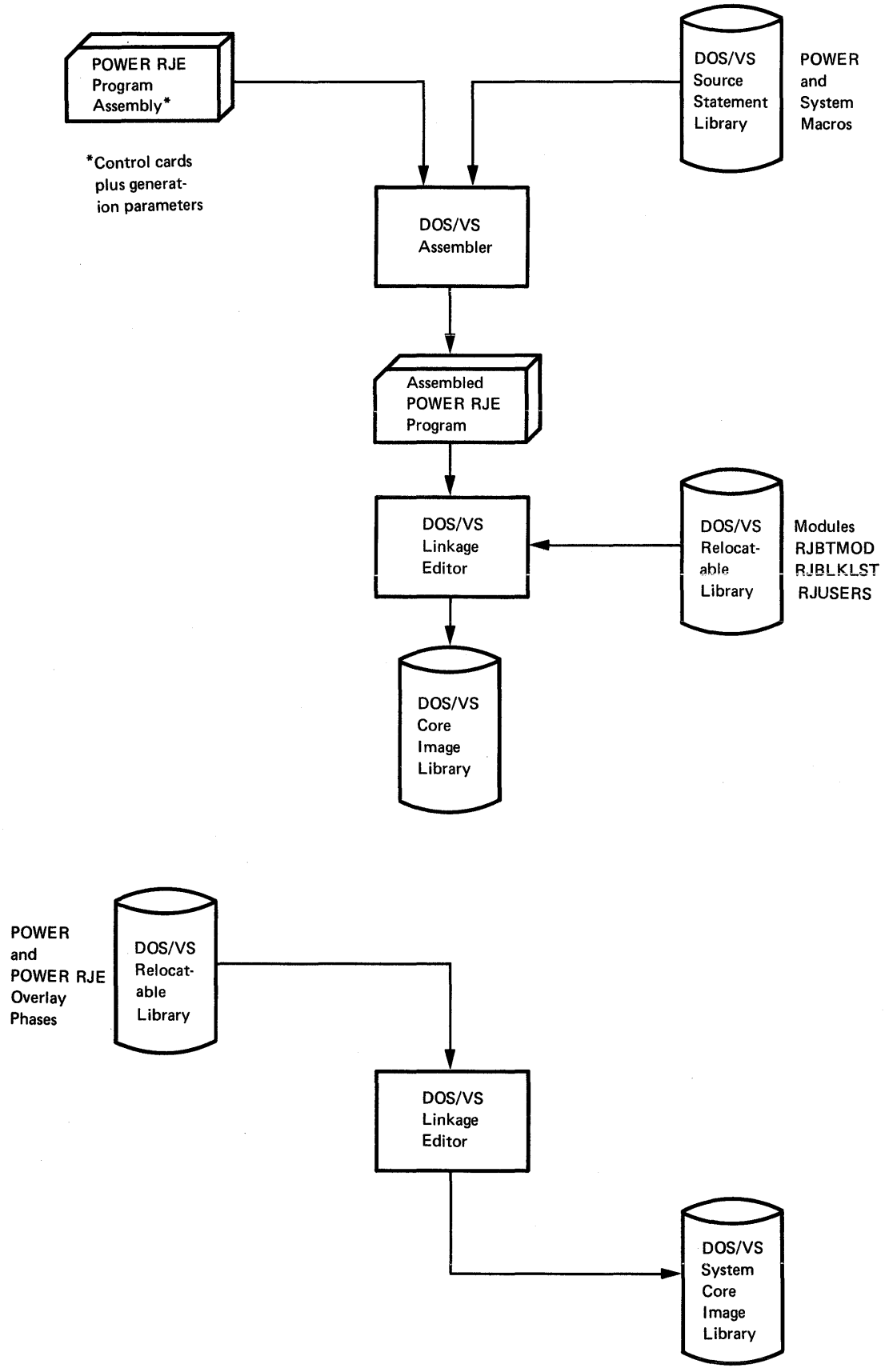

Figure 2-14. POWER RJE Program Assembly and Link-Editing

Default values are assumed for five additional BTMOD parameters as follows:

```
ERLOGIC=YES
CANCEL=NO
BSCS=YES
DECBEXT=NO
SEPASM=YES
```

The POWER RJE BTMOD can be generated as follows:

```
// JOB ASSEMBLE RJE BTMOD
// OPTION DECK
// EXEC ASSEMBLY
   RJBTMOD   BSCTEST=NO,SWITCH=YES
   END
/*
/&
```

The object deck will contain the proper CATALR statement for placing the RJE BTMOD in the relocatable library. With the following job you will place this deck into the relocatable library:

```
// JOB CATALOG RJE BTMOD INTO THE RELOCATABLE LIBRARY
// EXEC MAINT
   punched output from RJBTMOD assembly
/*
/&
```

RJE Block Generation

The RJE block defines the device-dependent characteristics of a teleprocessing line and contains the DECB, DTFBT, I/O area, and additional device-dependent characteristics required to access the terminal type on that line. The name for each RJE block is created in the following format:

Dcuutype

Where

cuu is the line address at the central installation, and

type specifies the terminal type in the following form:

```
2780 for a 2780 terminal
3780 for a 3780 terminal
2770 for a 2770 terminal - buffer size = 128
277A for a 2770 terminal - buffer size = 256
277B for a 2770 terminal - buffer size = 512
```

Example:

D0302770 is the RJE blockname when the line address is 030 and the terminal is a 2770 with buffer size = 128.

During RJE routine initiation, the DTFBT in the RJE block is assigned a logical unit number by POWER which is dynamically assigned to the PUB representing the specified line. Therefore, DOS/VS ASSGN statements are not required and line groups are not permitted.

An RJE block is generated by assembling the macro RJEBLK, which must not be labeled. RJEBLK is specified with the following operands, which are used to generate a DTFBT internal to the RJE block (For details on the

parameters TERMTST, CU, MODELST, and RETRY, refer to DOS/VS Basic Telecommunications Access Method, GC27-6989.

CHAN=cuu — cuu is the line address at the central installation and is specified as a three-digit hexadecimal number.

SWITCH={YES|NO} — YES indicates that the terminal is on a switched line. NO indicates that the terminal is on a non-switched line.

DEVICE={2780|2770|3780} — DEVICE specifies the type of terminal the RJE block is to support. 2780, 2770, or 3780 may be specified.

BUFSIZE={128|256|512} — BUFSIZE specifies the buffer size of a 2770 terminal.

TERMTST={YES|NO} — YES specifies that the DTFBT will contain the test activation code necessary to perform online terminal tests.

CU={2701|2703} — as specified for the DTFBT.

MODELST={4|5|6|7} — (see note below)

RETRY={7|n} — Retry count for the DTFBT. n may be any number from 0 through 15.

Each RJE block must be assembled separately to avoid duplicate labels.

The values specified for DEVICE and BUFSIZE may be changed from the terminal during POWER execution by specifying the necessary values in the RJSTART card.

Note: The MODELST operand of the DTFBT is used to set conditions in the SDA-II adapter of the 2701 at line initialization (open) time. The three conditions set are the EIB (error information byte) mode, dual communication interface, and dual code feature. The dual communication interface and dual code settings are determined by the 2701 hardware configuration. EIB or non-EIB mode may be selected by the EIB mode option. In EIB mode, an error-information byte is placed in storage by the 2701, following each unit separator (US) character, EIB character, or STX character.

The 80-byte card records from the 2780 (with multiple record transmission with transparency) that are placed in storage by the 2701 with EIB mode on, appear as:

DLE	STX	text 1 (80 bytes)	US	EIB	DLE	STX	text 2 (80 bytes)	US	EIB	DLE	STX	text 3 (80 bytes)	US	EIB	DLE	STX	text 4 (80 bytes)	EIB	EIB

DLE, STX, US, and EIB are one-byte characters.

Notice that the first byte of each successive record is 84 bytes from the first byte of the preceding record.

With non-EIB mode, records appear as follows:

```
|D|S|          | |D|D|          | |D|S|          | |D|S|          |E|
|L|T|text 1    |U|L|T|text 2    |U|L|T|text 3    |U|L|T|text 4    |I|
|E|X|(80 bytes)|S|E|X|(80 bytes)|S|E|X|(80 bytes)|S|E|X|(80 bytes)|B|
└─┴─┴──────────┴─┴─┴─┴──────────┴─┴─┴─┴──────────┴─┴─┴─┴──────────┴─┘
```

Here, only 83 bytes separate the first byte of each record from the first byte of the preceding record.

POWER RJE assumes that the EIB byte is present when the records are read by the 2701. For this reason MODELST must be specified as follows:

$$\text{MODELST=}\begin{pmatrix}4\\5\\6\\7\end{pmatrix}$$

A sample assembly and link jcb follows:

```
// JOB ASSEMBLE AND LINK RJE BLOCK FOR LINE 023, TERMINAL 2780
// OPTION DECK
// OPTION CATAL
// EXEC ASSEMBLY
   RJEBLK CHAN=023,SWITCH=NO,MODELST=(4)
   END
/*
// EXEC LNKEDT
/&
```

Note: Each RJEBLK must be link-edited separately. The two unresolved external symbols RJBTMOD and IJLDTIH will be resolved when the RJEBLK is initiated at RJE routine startup.

RJE Block Name List Generation

The RJE block name list must contain the name of each RJE block to be used. It is generated by assembling the macro RJBLKLST, which must not be labeled. RJBLKLST is specified with operands of the following format:

```
BNLSTn=(blockname[,blockname,blockname,....,blockname])
```

where blockname is the eight-character name generated for each RJE block and n is a numeric character from 1 through 8. The BNLSTn parameter may be specified in any order (for blockname format see "RJE Block Generation").

The maximum number of block names per parameter is 14. The maximum number of block names is 100. At least one BNLSTn parameter must be specified. If only one block name is specified, no parentheses are required.

The RJBLKLST macro expansion is a list containing the names of the RJE blocks specified. The POWER RJE initiation routine checks that each entry has a corresponding block in the core image library. Thus POWER RJE always obtains an up-to-date list of the RJE blocks available.

An example of a job to assemble an RJBLKLST follows:

```
// JOB ASSEMBLE RJBLKLST (LIST OF RJEBLK NAMES)
// OPTION DECK
// EXEC ASSEMBLY
   RJBLKLST  BNLST1=(D031277B),BNLST5=(D0312780,D0332780),       x
             BNLST4=(D0302780,D0322780,D0342780)
   END
/*
/&
```

The object deck produced by assembling RJBLKLST contains the proper CATALR statement for placing the RJBLKLST in the relocatable library by the following job:

```
// JOB CATALOG RJBLKLST (LIST OF RJEBLK NAMES)
// EXEC MAINT
   punched output from RJBLKLST assembly
/*
/&
```

Modifying the RJE Block Name List and RJE Blocks

The RJE block name list may require modification whenever RJE blocks are added to or removed from POWER

If you want to add to POWER an RJE block whose name is already contained in the RJBLKLST list, you have only to catalog the new RJEBLK object module into the core image library before you start POWER again; you need not re-link your POWER (see Figure 2-13).

If you want to delete an RJE block, delete the RJEBLK from the core image library. No RJE block should be deleted, however, while POWER is operational.

If you want to add an RJE block and the RJBLKLST list has to be updated accordingly, besides generating and linking the new RJEBLKS to the core image library, you have to re-link your POWER after you have cataloged the new RJBLKLST object module into the relocatable library (see Steps 5 and 6 in this part).

Userid List Generation

The userid list contains the user identification (userid) for all authorized RJE users. Termids are also contained in this list. Termids and userids are not distinguished in this list. The userid list is generated by assembling the macro RJUSERS, which must not be labeled. RJUSERS is specified with the following operands:

```
LISTn=(userid[,userid,userid,....,userid])
```

where n is a numeric character from 1 through 8.

userid may be from 1 to 8 alphameric characters; embedded blanks are not permitted. Use of "ALL" or "ALLUSERS" as a userid is not permitted.

The number of userids specified in a LISTn keyword parameter sublist is restricted to 128 characters (including parentheses and commas) per sublist. The maximum number of userids is 100. Duplicate userids are not

checked, and only the first of duplicate userids is used during POWER program execution.

The LISTn keyword parameters may be specified in any order. At least one LISTn keyword parameter must be specified.

An example of a job to assemble a user list follows:

```
// JOB ASSEMBLE RJUSERS(LIST OF VALID RJE USERS)
// OPTION DECK
// EXEC ASSEMBLY
   RJUSERS LIST1=(NEWYORK,CHICAGO,TULSA,ATLANTA),          x
           LIST5=(PAYROLL,TAXDEPT,ENGR),                   x
           LIST7=(SALES,HQ,FINANCE,DP),                    x
           LIST8=(WAREHS1,WAREHS2,WAREHS3),                x
           LIST3=(DIST1,DIST2,DIST3,DIST4)
   END
/*
/&
```

The object deck produced by assembling RJUSERS contains the proper CATALR statement for placing RJUSERS into the relocatable library by the following job:

```
// JOB CATALOG RJUSERS
// EXEC MAINT
   punched output from RJUSERS assembly
/*
/&
```

MODIFYING THE USERID LIST

Userids may be added to or deleted from the userid list with the LISTn parameter of the RJUSERS macro. The RJUSERS macro is then reassembled and placed into the relocatable library. Finally, POWER is again link-edited.

After changing the userid list, a cold start of POWER is necessary to update your message queue.

GENERATING A SMALL POWER RJE SYSTEM

This part shows a small version of POWER with RJE, POWER3, and its generation.

Disk Storage Requirements, Functions, and Supervisor Prerequisites

Four tracks for the file QFILE, and 100 cylinders for the file DATAFILE, on one IBM 3330 disk pack are used.

POWER3 services one partition, the background, and supports one reader, one printer, and one punch, as well as two 2780 terminals that may be accessed one at a time by eight users in two different locations.

The supervisor must have been generated with POWER=YES.

For the POWER-resident partition, seven LUB entries (2+NUMDDKS+MAXCCB+MAXRJS) are required. For the background partition, three PUB entries (one for the printer, one for the punch, and one for the reader) must be reserved for dummy device addresses.

Figure 2-15 shows the parameter options chosen for POWER3. The values chosen constitute a close to minimum POWER; only the parameters AUTOSTR and LINETAB could have been omitted.

For an explanation of the individual parameters, refer to 'POWER Program Generation Parameters'.

RJE Components and Their Generation

The RJE components required for POWER3 are:

- one RJE block for the two terminals
- one POWER RJE BTMOD
- one RJE block name list for the two RJE blocks
- the userid list for eight users in two locations.

Col. 1	Col. 10	Col. 16	Col. 72
user-name	POWER	DISK=3330,	*
		DBLK=528,	*
		MAXJOBS=100,	*
		NUMDDKS=1,	*
		NTRKGP=600,	*
		TRACKGP=3,	*
		ACCOUNT=/	
		ADDITR=/	
		AUTOSTR=(00C,1,00E,1,00D,12),	*
		D3540=/	
		JOBSEP=YES,	*
		LINETAB=(10,00,05,10,15,20,25,30,35,40,45,50,55),	*
		MAXBUFS=9,	*
		MAXCCB=3,	*
		MAXRW=3,	*
		POWPART=BG,	*
		PRIORTY=5,	*
		RDRCLOS=EXIT,	*
		READER=YES,	*
		SLI=NO,	*
		STDCARD=/	
		STDLINE=/	
		SUBLIB=/	
		TAPE=/	
		MAXRJS=1,	*
		RETRY=6,	*
		RJEND=NO	
		DIAG=/	
	END		

Figure 2-15. Parameter Option Chosen for a Small Version of POWER with RJE That Services One Partition and Supports One Terminal

The special BTMOD, the RJE block name list, and the userid list are assembled separately and then cataloged into the relocatable library (see Figure 2-13) from where they are fetched when POWER3 is assembled and link-edited (see Figure 2-14 and Figure 2-15).

RJE_BLOCK

The RJE blocks required for POWER3 are assembled and link-edited into the system core image library as follows (see also Figure 2-13):

```
// JOB ASSEMBLE RJEBLK AND LINK IT
// OPTION CATAL
// OPTION DECK
// EXEC ASSEMBLY
   RJEBLK CHAN=060,SWITCH=NO,MODELST=(4)
   END
/*
// EXEC LNKEDT
/&
```

The second RJEBLK macro (RJEBLK CHAN=061,SWITCH=NO,MODELST=(4), is assembled with the same card deck.

BTMOD

Assembling and cataloging of BTMOD for two 2780 terminals is as follows:

```
// JOB ASSEMBLE RJBTMOD
// OPTION DECK
// EXEC ASSEMBLY
   RJBTMOD BSCTEST=NO,SWITCH=NO
   END
/*
/&
// JOB CATALOG RJBTMOD INTO RELOCATABLE LIBRARY
// EXEC MAINT
        .
        .
   punched output from RJBTMOD assembly
        .
        .
/*
/&
```

RJE_BLOCK_NAME_LIST

Assembling and cataloging of the RJE block name list for POWER3 into the relocatable library is as follows:

```
// JOB ASSEMBLE RJBLKLST (LIST OF RJEBLK NAMES)
// OPTION DECK
// EXEC ASSEMBLY
   RJBLKLST BNLST1=(D0602780,D0612780)
   END
/*
/&

// JOB CATALOG RJBLKLST INTO RELOCATABLE LIBRARY
// EXEC MAINT
        .
        .
   punched output from RJBLKLST assembly
        .
        .
```

```
/*
/&
```

USERID LIST

The userid list for POWER3 contains eight userids and two termids. Assembly and cataloging of the userid list is shown below:

```
// JOB ASSEMBLE USERID (LIST OF ALL VALID RJE USERS)
// OPTION DECK
// EXEC ASSEMBLY
   RUSERS   LIST1=(CHICAGO,LONDON),                        x
            LIST2=(SMITH,JOHNSON,EDWARDS,                  x
            NEUHAUS,ERNST,MATSUMI,                         x
            WEBER,GILLOT)
   END
/*
/&


// JOB CATALOG USERID LIST
// EXEC MAINT
       .
       .
   punched output from RUSERS assembly
       .
       .
/*
/&
```

Real Storage Estimates for POWER3

Figure 2-16 contains the POWER parameters and the RJE components that affect the size of POWER3.

The size of the partition that is to contain POWER3 must be 42K bytes.

Assembling and Link-Editing POWER3

Figure 2-17 shows assembly and link-editing of POWER3 (see also Figure 2-14). The example is valid only for a supervisor with the relocating loader. How to link-edit a version of POWER for a supervisor without relocating loader is described under "Link-Editing POWER for a Supervisor Without Relocating Loader".

Parameter or Component	Bytes Required (Value or Formula) Reader=NO	Reader=YES	Parameter Option Default	Chosen	Result in Bytes
DOS/VS Save Area	120		-	-	120
Console Command Processor	1,024		-	-	1,024
Basic POWER Code	12,400	13,800	READER=YES	YES	13,800
ACCOUNT=YES	200	240	NO	NO	-
AUTOSTR 1 Device 2 Devices 3 Devices	36 60 84		-	3 devices	84
DBLK=d	see MAXBUFS		-	-	-
LINETAB First Partition Each Additional PARTITION	200 260		-	1 part.	200
MAXJOBS=n	n		110	100	100
MAXBUFS=n DBLK=d	n * d		7 1,024	9 528	4,752
MAXCCB=n	n * 36		3	3	108
MAXRW=n	n * 1,024		3	3	3,072
NTRKGP=n see Note	(5+n/8) * (1+3p)		200	600	320
NUMDDKS=n	n * 96		1	1	96
PRIORTY≠NO	-	224	NO	YES	224
SLI First Partition Each Additional Partition	-	1,600 340	NO	NO	-
TAPE=YES	1,350		NO	NO	-
DIAG=YES	400		NO	NO	-
POWPART= see Note (partition,...)	(p-1) * 700		BG	BG	-
Total for POWER Without RJE=					23,900

Note: p = number of partitions supported.

Figure 2-16. Real Storage Estimates for a Small Version of POWER with RJE (Part 1 of 2)

Parameter or Component	Bytes Required (Value or Formula) Reader=NO	Reader=YES	Parameter Option Default	Chosen	Result in Bytes
MAXRJS=n	(3 * n + 5)*1,024		0	1	8,192
RJBTMOD BSCTST=NO,SWITCH=NO BSCTST=NO,SWITCH=YES BSCTST=YES,SWITCH=NO BSCTST=YES,SWITCH=YES	11,100 13,300 15,100 17,100		- -	BSCTST =NO	11,100
RJBLKLST Number of Lines is n	24 + 16 * n		-	2	56
RJUSERS Number of Entries is n	24 + 16 * n		-	10	84
Total for POWER RJE					43,332

Note: p = number of partitions supported

Figure 2-16. Real Storage Estimates for a Small Version of POWER with RJE (Part 2 of 2)

Figure 2-17. Assembly and Link-Editing a Small Version of POWER with RJE

IBM System/360 Assembler Coding Form — X28-6509-3 U/M050 Printed in U.S.A.

PROGRAM: Assembling and Link-Editing A Small POWER RJE Program. PUNCHING INSTRUCTIONS: GRAPHIC / PUNCH PAGE 1 OF 2.
PROGRAMMER: DATE: CARD ELECTRO NUMBER: *

Name	Operation	Operand	Comments	Identification-Sequence
//	JOB	ASSEMBLE AND LINK-EDIT POWER RJE		
//	OPTION	CATAL		
//	OPTION	DECK		
POWER3	POWER	DISK=3330,		X
		DBLK=528,		X
		MAXJOBS=100,		X
		NUMDDKS=1,		X
		NTRKGP=600,		X
		TRACKGP=3,		X
		AUTOSTR=(00C,1,00E,1,00D,12),		X
		POWPART=B$,		X
		JOBSEP=YES,		X
		LINETAB=(10,00,05,10,15,20,25,30,35,40,45,50,55),		X
		MAXBUFS=9,		X
		MAXCCB=3,		X
		MAXRW=3,		X
		PRIORTY=5,		X
		RDRCLOS=EXIT,		X
		READER=YES,		X
		SLI=NO,		X
		MAXRJS=1,		X
		RETRY=6,		X
		RJEND=EXIT,		
	END			

IBM System/360 Assembler Coding Form — X28-6509-3 U/M050 Printed in U.S.A.

PROGRAM: Assembling and Link-Editing A Small POWER RJE Program PUNCHING INSTRUCTIONS: GRAPHIC / PUNCH PAGE 2 OF 2
PROGRAMMER: DATE: CARD ELECTRO NUMBER: *

Name	Operation	Operand	Comments	Identification-Sequence
/*				
	ENTRY	INIT		
//	EXEC	LNKEDT		
/&				
//	JOB	LINK POWER AND POWER RJE OVERLAY PHASES		
//	OPTION	CATAL		
	INCLUDE	POWEROBJ		
	INCLUDE	RJEOBJ		
//	EXEC	LNKEDT		
/&				

Local Testing of POWER/RJE

RESTRICTIONS

Successful installation of POWER RJE can be tested effectively only when a terminal is attached. However, a means for local testing has been provided for users who have a printer and an IBM 2540 Card read punch attached to the central installation. This type of local testing will test only the ability of an RJE routine to function in the POWER environment; teleprocessing communications will not be tested, and DOS/VS BTAM support will not be used in the test.

Instead, a printer and an IBM 2540 will be accessed by the IO2540 phase using PIOCS. This phase simulates, for the RJE routines, the operations performed by the IO27X0 phase which normally interfaces with the BTMOD to perform teleprocessing input and output. During the test, local readers and writers must not be active. The test may begin at any point during POWER operation, and normal POWER operation may be resumed after the test is completed. Because the test serves to test an RJE routine, only one routine can be activated during the test.

TEST STARTUP

The following DOS/VS job control statements should be included in the POWER partition initiation job control:

```
// ASSGN SYSPCH,X'cuu'
// ASSGN SYSLST,X'cuu'
```

SYSPCH must be assigned to the IBM 2540 card read punch, and SYSLST must be assigned to a printer. The card reader will be assigned dynamically by the RJE start command processor.

The POWER partition is started as specified in DOS/VS Operating Procedures, GC33-5378. No routine must be active at the beginning of the test. Supported partitions may continue processing.

To begin the test, the operator types the RJE option of the start command as follows:

```
S RJE,lineaddr,type,2540,cuu
```

Lineaddr and type have the same meaning during the test as they would when an RJE routine is being started. Lineaddr and type must specify a supported line and device type as they normally would. cuu specifies the address of the IBM 2540 card reader. For example, if 060 is a supported line in your POWER with RJE version, 2780 is the supported device type, and 00C is the IBM 2540 card reader, the command would be typed:

```
S, RJE,060,2780,2540,00C
```

If the lineaddr and device type are incorrect, the appropriate diagnostic messages will appear on the console typewriter as they would under nontest conditions. The 2540 positional operand indicates the request for local testing.

The card reader must be readied to begin the test. During the test, messages appear on the console typewriter for the same reasons as they would in a nontest environment, and DOS/VS Messages, GC33-5379, should be consulted.

When the indicated RJE routine has been started successfully, the normal message

1R24I line address device type HAS BEEN STARTED

will be issued.

TEST OPERATIONS

When the routine has completed initialization, a read will be executed to the IBM 2540 card reader. The RJE routine will expect input from the card reader to be in the same form that is required for an IBM 2780/2770/3780. All RJE printer output will be processed on a printer and all RJE punch output will be processed on the IBM 2540 card read punch.

During the test, supported partitions will operate in the normal way, processing job entries from the reader queue and placing output in the print and punch queues.

ENDING THE TEST

The RJE test may be ended at any time by typing the RJE option of the stop command for the RJE routine being tested. POWER/RJE will be restored for normal POWER and RJE operations. If an intervention-required condition exists at the IBM 2540 card reader, the reader must be readied by any card to complete termination of the test.

Total Size of the POWER Partition

To determine the size of the POWER partition, the assembly listing of the POWER-resident code may be useful. The listing contains the following labels valid for POWER without RJE:

PBO Represents the size of the POWER-resident code.

PROGEND Represents the size of the POWER-resident code plus all the program buffers specified.

MAXSIZE MAXSIZE+120 is the POWER partition size necessary for your POWER. If less space is available in the POWER partition, fewer datablocks are allocated during POWER initiation. This means that successful operation cannot be guaranteed.

MAXSIZE = PROGEND+DBLK*MAXBUFS

INITEND INITEND+120 is the size of the POWER program during its initiation. In case of small DBLK and MAXBUFS parameter values it can be greater than MAXSIZE. If it is greater than MAXSIZE, it determines the size of the POWER partition. For POWER RJE the storage required for RJBTMOD, RJBLKLST, and RJUSERS must be added. After successful POWER startup, the initiation code is overlaid by the program buffers and by the data buffers.

To obtain equivalent values for RJE, refer to the linkage editor output of your POWER link-edit run. Calculate the

difference of the addresses given in hexadecimal for FGPSPOOL and LOCORE and add the result to the values above. The difference is the space necessary for the RJBTMOD, RJBLKLST and USERID list.

Link-Editing POWER for a Supervisor without Relocating Loader

For a supervisor without relocating loader, the assembled POWER deck has to be link-edited as follows:

Remove the PHASE card from your object deck and prepare your own PHASE card with an absolute address. The absolute address must be the start address of the (real) POWER partition plus 120.

Then link-edit your object deck as follows (this example is valid for POWER1 as well as for POWER2):

```
// JOB LINK POWER ABSOLUTE
// OPTION CATAL
   PHASE POWERx,xxxxxx
       .          =absolute address of the (real) POWER partition +120

   assembled object deck with original PHASE CARD REMOVED
       .
/*
   ENTRY INIT
// EXEC LNKEDT
/&
```

Because the overlay phases of POWER are coded as self-relocatable, nc changes are required for these.

Start POWER

With the following set of control statements, you may start POWER1. The same statements are also valid for POWER2 and POWER3:

```
   BATCH F1 command from console
   ASSGN,SYSIN,X'00C' assignment from console
   ASSGN SYSLST,X'00E'
// JOB INITIATE POWER1 FROM CARD READER
// ASSGN SYS001,X'161' FOR QFILE ON 3330
// ASSGN SYS002,X'161' FOR DATAFIL ON 3330
// DLBL QFILE,'QFILE POWER',99/365,DA
// EXTENT SYS001,111111,1,0,19,2 (number of tracks =4 for POWER3)
// DLBL DATAFIL,'DATAFIL POWER',99/365,DA
// EXTENT SYS002,111111,1,0,38,1900
// EXEC POWER1,REAL
```

For more detailed information, refer to DOS/VS Operating Procedures, GC33-5378.

Note: If POWER is started with a procedure, do not include the // EXEC statement for POWER in the procedure. Type it in separately. Otherwise the procedure library cannot be updated as long as POWER is active.

POWER Phases and Macros

The names of the phases that make up the POWER program and that are delivered in the relocatable library, are listed in Figures 2-18 and 2-19. The size of the resident POWER program is variable. The maximum size of each overlay phase is 1024 bytes with the exception of phases FGPSPOLU, FGPSPOLV, FGPSPOLX, and FGPSPOLY, the maximum size of which is 2,048 bytes.

Phase Name	Function
Resident POWER Program	
FGPSPOOL or user-name	POWER supervisor execution processors POWER services
Overlay Phases	
FGPTYPN0	Console command processor
FGPTYPN1	Console command processor
FGPTYPS0	Console command processor
FGPTYPD0	Console command processor
FGPTYPD1	Console command processor
FGPTYPD2	Console command processor
FGPTYPR0	Console command processor
FGPTYPL0	Console command processor
FGPTYPL1	Console command processor
FGPTYPP0	Console command processor
FGPTYPA0	Console command processor
FGPTYPA1	Console command processor
FGPTYPA2	Console command processor
FGPTYPJ0	Console command processor
FGPTYPZ0	Console command processor
FGPTYPZ1	Console command processor
FGPTYPZ3	Console command processor
FGPTYPZ5	Console command processor
FGPSPOLT	Local print writer routine
FGPSPOL0	Local print writer routine
FGPSPOL1	Local print writer routine
FGPSPOL2	Local print writer routine
FGPSPOL3	Local print writer routine
FGPSPOLH	Local print writer routine
FGPSPOL9	Local print writer routine
FGPSPOLP	Local punch writer routine
FGPSPOL5	Local punch writer routine
FGPSPOL6	Local punch writer routine
FGPSPOL7	Local punch writer routine
FGPSPOL8	Local punch writer routine
FGPSPOLJ	Local punch writer routine
FGPSPOLY	Local punch writer routine
FGPSPOLZ	Local punch writer routine
FGPSPOLE	Tape writer
FGPSPOLF	Tape writer
FGPSPOLI	Tape writer
FGPSPOLM	Tape writer
FGPSPOLN	Tape writer
FGPSPOLR	Reader routine
FGPSPOLA	Reader routine
FGPSPOLB	Reader routine
FGPSPOLC	Reader routine
FGPSPOLD	Reader routine
FGPSPOLK	Reader routine
FGPSPOLL	Print writer routine
FGPSPOLO	Print writer routine
FGPSPOLQ	Punch writer routine
FGPSPOLU	3540 Reader routine
FGPSPOLV	3540 Reader routine
FGPSPOLW	3540 Reader routine
FGPSPOLX	3540 Reader routine
FGPSPOL4	Reader routine
$$BPOWR1	POWER initialize/terminate

Figure 2-18. POWER Phases

Phase Name	Function
FGPTYPB0	Console command processor
FGPTYPB1	Console command processor
FGPTYPB2	Console command processor
FGPTYPB3	Console command processor
FGPTYPB4	Console command processor
FGPTYPI0	Console command processor
FGPTYPP1	Console command processor
FGPTYPS1	Console command processor
FGPTYPS2	Console command processor
FGPTYPO0	Console command processor
FGPPRJEB	Work station command processor
FGPPRJEC	Work station command processor
FGPPRJED	Work station command processor
FGPPRJEE	Work station command processor
FGPPRJEI	Work station command processor
FGPPRJEJ	Work station command processor
FGPPRJEM	Work station command processor
FGPPRJEO	Work station command processor
FGPPRJES	RJE terminal reconfigurator routine
FGTYPD5	Command processor
FGPPRJET	RJE work station command processor
FGPPRJEL	RJE routine monitor
FGPPRJEN	RJE routine reader
FGPPRJEX	RJE routine reader
FGPPRJEY	RJE routine reader
FGPPRJE4	RJE routine reader
FGPPRJEG	RJE routine punch writer
FGPPRJEH	RJE routine punch writer
FGPPRJEQ	RJE routine punch writer
FGPPRJEF	RJE punch writer routine
FGPPRJEU	RJE routine print writer
FGPPRJEV	RJE routine print writer
FGPPRJEW	RJE routine print writer
FGPPRJEZ	RJE routine print writer
FGPPRJEP	RJE message writer
IO27X0	RJE BTAM interface module
IO2540	RJE local testing module

Figure 2-19. POWER RJE Phases

Figure 2-19 shows the names and functions of the POWER RJE overlay phases.

The POWER macros contained in the source statement library are:

For local POWER:

E.POWER
E.POWERRES
E.POWERSUP
E.POWERBUF
E.DSKIO

For POWER RJE:
E.RJEBLK
E.RJEBLKLST
E.RJBTMOD
E.RJUSERS
E.TPIO

The following system macros must also be available when POWER, with or without RJE, is assembled, including all BTAM macros necessary to assemble BTMOD and DTFBT:

```
   E.CCB          E.OPEN
   E.EXCP         E.DUMP
   E.ASYMCOM      E.LBRET
   E.PE.DUMP      DTFPH
   E.EOJ          E.BTWAIT
   E.LOAD         E.BTMOD
   E.WAIT         E.DTFBT
   S.SYSCOM
   E.BDYBOX
   E.MAPCCB
   E.MAPPIB
   E.MAPCOMR
   E.RUNMODE
```

POWER Library Space Requirements

POWER library space requirements are for:

Core Image Library	92 Blocks
Relocatable Library	531 Blocks
Source Statement Library (Macros)	3,196 Blocks

Deleting POWER Phases and Macros

The statements to delete POWER phases and macros are listed below.

Source Statement Library

```
// EXEC MAINT
   DELETS E.POWER
       .
       .
       .
   DELETS E.TPIO
/*
```

For a complete list of the POWER macro names, refer to "POWER Phases and Macros".

Relocatable Library

```
// EXEC MAINT
   DELETR FGPTYPN0
       .
       .
       .
   DELETR IO2540
/*
```

For a complete list of the phase names, refer to "POWER Phases and Macros".

Core Image Library

```
// EXEC MAINT
   DELETC FGPTYPN0
       .
       .
       .
   DELETC IO2540
/*
```

For a complete list of the phase names, refer to "POWER Phases and Macros".

Module 3: Installation Verification Procedure

Modular Outline

Modular Index

Introduction

DOS/VS provides Installation Verification Procedures to enable you to verify the generation of system components. IVP verifies components such as the emulators, which are user-assembled, and system utilities, which are link-edited by the user.

The IVP consists of a set of macros (containing the verification procedures) which are distributed, along with the DOS/VS system, on the IBM-supplied distribution medium. Towards the end of system generation, after having deleted any unwanted DOS/VS system components and having generated the components you require for verification, you should perform the installation verification procedure.

The verification procedures are generated by assembling the IVPGEN macro. A number of parameters specify the optional SCP functions selected for verification, in addition to the standard functions which are included automatically. The standard functions are not included if you are running the program again to verify one or more functions only (indicated by the parameter RERUN=YES in the IVPGEN macro).

For a complete description of the parameters of the IVPGEN macro refer to the section entitled "IVPGEN Parameters".

The Standard SCP Functions

ABD - The ABEND Dump (part of program 5745-SC-AIT)
ASL - The assembler librarian Edit/De-Edit routines (part of the assembler program 5745-SC-ASM)
UTL - The system utilities Disk-Only functions. Card, tape, and data cell functions are configuration dependent and optional (part of program 5745-SC-UTL).

The Optional SCP Functions

CAP - Cataloged procedures
EMA - System/370 Emulator for IBM 1401/1440/1460
EMB - System/370 Emulator for IBM 1410/7010
E20 - System/360 Model 20 Emulator
OLT - OLTEP
PWR - POWER

IVP Books

The separate parts that make up each verification procedure are contained in one or more pre-edited source statement library macro books.

IVPGEN-Stage I--Assembly

IVPGEN is a two-stage process. In stage I, the IVPGEN macro calls in the control books of the standard and selected SCP functions. The

generated jobstream (input for stage II) is SYSPCH output. You may assign SYSPCH to a card punch, a magnetic tape unit, or a disk extent.

If SYSPCH is assigned to a card punch, you must remove the punched deck (output of stage I) from the stacker and put it in a card reader as input to stage II (IVP execution). The last card (an object END card) of the deck must be removed.

If SYSPCH is assigned to either tape or disk, there is an automatic transition from stage I to stage II provided that the required Job Control cards are punched (see Figure 3-1).

At the very beginning of system generation, you can assemble the IVPGEN macro with the option VERIFY=YES, under control of the IBM-supplied supervisor. This will provide you with a diagnostic of the specified parameters. It also provides you (if specified in the IVPGEN assembly) with a job stream to delete the unused IVP books.

This job can be run to free up space in the source statement library. The advantage of specifying VERIFY=YES is that you have ample time to correct any specification errors before the IVP procedure is actually performed at the end of system generation.

IVPGEN-Stage II--Execution

Before it actually starts executing the verification, stage II successively performs

- LISTIO ALL to display (on SYSLST) all the devices that are supported
- MAP to display (on SYSLOG) the sizes of the partitions assigned
- DSERV of all the assigned libraries to display in alphabetical order (on SYSLST) the names of all the transients, phases, modules, macros, and (optionally) procedures, that the system comprises.

IVPGEN Parameters

A. Component Dependent

ABD={YES / NO}	The ABEND dump IVP is always automatically generated (YES is forced) unless RERUN=YES is specified in which case ABD=NO is the default
ASL={YES / NO}	The display, verify, replace, and delete capabilities of the ESERV program are automatically verified (YES is forced) unless RERUN=YES is specified, in which case the default for ASL is NO.
CAP={NO / YES}	Specify if Cataloged Procedures Support is to be verified.
EMA={NO / YES}	Specify if the DOS/VS 1401/1440/1460 Emulator program is to be verified.
EMANAME=name	Specify the phase name of the user-generated 1401/1440/1460 emulator program.
EMATA=cuu	Device address of the tape unit assigned to 1400 tape unit 1. Specify only if tape functions are to be verified.
EMATSN=SYSnnn	Name of the logical unit assigned to 1400 tape unit 1. Specify only if tape functions are to be verified.
EMATYPE={1401 / 1401G / 1440}	Specify the type of verification procedure to be selected. Refer to the section entitled "EMA-1401/1440/1460 Emulator" for a detailed description of the EMATYPE operands.
EMB={NO / YES}	Specify if the DOS/VS 1410/7010 Emulator program is to be verified.
EMBNAME=name	Specify the phase name of the user-generated 1410/7010 emulator program.
EMBTA=cuu	Device address of the tape unit assigned to 1400 tape unit 1, channel 1. Specify only if tape functions are to be verified.
EMBTSN=SYSnnn	Name of the logical unit assigned to 1400 tape unit 1, channel 1. Specify only if tape functions are to be verified.
E20={NO / YES}	Specify if the System/360 Model 20 Emulator program generation is to be verified.
E20NAME=name	Specify the phase name of the user-generated System/360 Model 20 Emulator program.
OLT={NO / YES}	Specify if the IVP job for OLTEP is to be generated.

A. Component Dependent (continued)

PWR={NO / YES}	Specify if the IVP job for POWER is to be generated.
UTL={YES / NO}	The disk functions of the system utilities are automatically verified (YES is forced) unless RERUN=YES is specified in which case the default for UTL is NO.
UTLDA=(cuu,cuu)	Specify the disk device addresses of two work disks for use by the disk functions of the system utilities.
UTLDRT=nnnn	Disk extent relative track number of a one-track work space on the disk work volumes.
UTLDT={3330 / nnnn}	Specify the device type of the two work disks.
UTLDV=(nnnnnn,mmmmmm)	Specify the volume serial numbers of the two work disks in the same order as specified by the UTLDA parameter.
UTLT={NO / YES}	Specify if the tape functions of the system utilities are to be verified.
UTLTA=cuu	Specify the device address of the tape drive on which a work tape is to be mounted.
UTLTM={C0 / mm}	Specify the tape device mode. If this parameter is omitted, a 9-track, 1,600 BPI tape is assumed.
UTLZ={NO / YES}	Specify if the data cell functions of the system utilities are to be verified.
UTLZA=cuu	Specify the device address of the data cell drive that contains a work cell to be used by the Installation Verification Program.
UTLZCN=n	Specify the number of the work data cell.
UTLZRT=	Specify the data cell extent relative track number of a one-track work space on the data cell work volume.

B. Component Independent

DELUNSD={YES / NO}	Specify if a delete job is to be generated for those IVP books that are not used in this assembly of the IVPGEN macro.
DELUSED={NO / YES}	Specify if a delete job is to be generated for all the IVP books that are used in this assembly of the IVPGEN macro.
IPTADDR={00C / cuu}	Device address of the system card reader. SYSRDR and SYSIPT will be reset to this address after completion of IVP stage II.
LSTADDR={00E / cuu}	Device address of the system printer during the execution of IVP stage II.
PCHADDR=cuu	Device address of the system card punch during the execution of IVP stage II. If no verification of disk-to-card functions of the system utilities is desired, this parameter should not be specified.
RERUN={NO / YES}	Specify YES if this IVP is a rerun. A rerun can be performed if one or more SCP functions are to be verified again. If RERUN=YES is specified, a default of NO is taken for ABD, ASL, and UTL.
VERIFY={NO / YES}	Specification of YES causes a diagnostic to be made without generation of an IVP stage II job stream. In this case, the only job that is generated is the delete job for the unused IVP books (if DELUNSD=YES).

```
IVP STAGE I INPUT -- CREATION OF IVP STAGE II JOBSTREAM

In cards

// JOB IVPSTG1
   LOG
// OPTION DECK
// EXEC ASSEMBLY
   IVPGEN selected parameters
   END
/*
/&

On tape

// JOB IVPSTG1
   LOG
// PAUSE "OPERATOR PLEASE MOUNT A SCRATCH TAPE ON UNIT X'cuu'"
   MTC REW,X'cuu'
ASSGN SYSPCH,X'cuu' Assign SYSPCH to tape
// OPTION DECK
// EXEC ASSEMBLY
   IVPGEN selected parameters
   END
/*
CLOSE SYSPCH,X'00D' Close SYSPCH and reset tc standard assignment
// PAUSE OPERATOR PLEASE MOUNT TAPE ON UNIT X'cuu' AGAIN
ASSGN SYSIN,X'cuu' Set tc address of tape unit
/&

On disk

// JOB IVPSTG1
   LOG
// DLBL IJSYSPH,'IVP STAGE II JOBSTREAM'     Stage 1 cutput
// EXTENT SYSPCH,nnnnnn,,,nnnn,nnnn          (see Note)
// DLBL IJSYSIN,'IVP STAGE II JOBSTREAM'     Stage 2 input
// EXTENT SYSIN,nnnnnn,,,nnnn,nnnn           (See  Note)
ASSGN SYSPCH,X'cuu' Assign SYSPCH to disk
// OPTION DECK
// EXEC ASSEMBLY
   IVPGEN selected parameters
   END
/*
CLOSE SYSPCH,X'00D' Close SYSPCH and reset tc standard assignment
ASSGN SYSIN,X'cuu' Set to disk address
/&

Note:  The extent information and volume sequence numbers in the two
EXTENT statements must be identical.
```

Figure 3-1. Example of IVP Stage I Jcb Contrcl Statements

PREPARING THE IVP JOBSTREAM

The following information should be carefully considered before you start executing the Installation Verification Procedures.

Set-Up Requirements

SYS001, SYS002, SYS003, and SYSLNK must be assigned to disk work extents.

If SYSPCH is assigned to a disk device, the allocated extent must be at least 4 cylinders on a 2316 disk pack, 3 cylinders on a 3336 disk pack, or 7 cylinders on a 3348 data module.

A minimum of 14K bytes of real storage and of 30K bytes of virtual storage must be allocated when executing IVP. If POWER is to be verified, add the storage requirements for POWER to these values.

Operating Instructions

Prepare the following job control cards:

1

```
// JOB ASSEMBLE IVPGEN
// ASSGN SYSPCH,X'cuu' (can be card, tape, or a disk extent)
// ASSGN SYS001,X'cuu' work file
// ASSGN SYS002,X'cuu' work file
// ASSGN SYS003,X'cuu' work file
// EXEC ASSEMBLY
   IVPGEN (selected parameters)
   END
/*
/&
```

2

If SYSPCH is assigned to a card punch, remove the last card from the deck. This is the (object) END statement, which cannot be processed by Job Control. Put the remaining cards in the hopper of the reader, assigned to SYSIN. Press START and EOF. IVP stage II will now be executed.

3

If SYSPCH is assigned to either tape or disk close SYSPCH (if SYSPCH was assigned to tape, ready the tape device again) and assign SYSIN to the same tape or disk device. This will start the execution of IVP stage II.

Stage II successively executes a:

LISTIO ALL	to display (on SYSLST) all the devices supported.
MAP	to display (on SYSLOG) the partition sizes assigned.
DSERV DSPLYS ALL	to provide a sorted printout of the library directories.

Furthermore stage II performs the standard IVP functions that is verification of the ABEND dump, of the Assembler and Utility Programs, and of all optional functions selected. It also produces the delete jobs for used and/or unused IVP books (if specified).

ABD - The ABEND Dump

The ABD function forces an abnormal end-of-job condition. A real storage dump is printed on SYSLST.

ASL

This IVP function verifies the display and update capabilities of the ESERV program.

Example of SYSLOG Output

```
BG // JOB IVPASL      TEST ESERV
   DATE 11/04/73, CLOCK 07/22/56
BG * ************************************************************************
BG * IDENTIFICATION : ESERV PROGRAM
BG * PURPOSE : TO SHOW THE DISPLAY AND UPDATE CAPABILITIES OF ESERV
BG * FUNCTIONS TESTED : DISPLAY, VERIFY, REPLACE DELETE
BG * SET UP REQUIREMENTS : SYS002, MUST BE ASSIGNED
BG *                        TO DISK, SYSLST MUST BE ASSIGNED
BG * NORMAL COMPLETION MESSAGES : * IVPASL COMPLETED ++++++++++++++++++++
BG *                               LISTING CONTAINS INSTRUCTIONS ON HOW TO
BG *                               CHECK FOR SUCCESSFUL EXECUTION
BG * MODULES TESTED/USED : IPKAD, IPKVA, IPKVD, IPKVE, IPKVF,
BG *                        IPKVG, IPKVI, IPKVK, IPKVM
BG * INPUT DESCRIPTION : TWO DSPLY CONTROL CARDS, THE SECOND
BG *                     FOLLOWED BY ) COL, ) VER, ) REP, ) DEL
BG *                     AND ) END CARDS, AN EDITED MACRO
BG *                     ( IVPAS' S ) IN THE E SUBLIBRARY
BG * OUTPUT DESCRIPTION : A DISPLAY OF IVPASLS, A DISPLAY OF IVPASLS,
BG *                      UPDATED BY THE ) REP CARDS, AN UPDATE SURVEY
BG * ************************************************************************
BG * IVPASL COMPLETED ++++++++++++++++++++++++
BG EOJ IVPASL
   DATE 11/04/73, CLOCK 07/24/59, DURATION 00/02/02
BG 1C00A ATTN. 0 0C.
BG
```

Example of SYSLST Output

```
// JOB IVPASL      TEST ESERV                              DATE 11/04/73,CLOCK 07/22/56
* ************************************************************************
* IDENTIFICATION: ESERV PROGRAM
* PURPOSE: TO SHOW THE DISPLAY AND UPDATE CAPABILITYS OF ESERV
* FUNCTIONS TESTED: DISPLAY, VERIFY, REPLACE, DELETE
* SET UP REQUIREMENTS: SYS001, SYS002 MUST BE ASSIGNED
*                      TO DISK, SYSLST MUST BE ASSIGNED
* NORMAL COMPLETION MESSAGES: * IVPASL COMPLETED ++++++++++++++++++++
*                             LISTING CONTAINS INSTRUCTIONS ON HOW TO
*                             CHECK FOR SUCCESSFUL EXECUTION
* MODULES TESTED/USED: IPKAD,IPKVA,IPKVD,IPKVE,IPKVF,
*                      IPKVG,IPKVI,IPKVK,IPKVM
* INPUT DESCRIPTION: TWO DSPLY CONTROL CARDS, THE SECOND
*                    FOLLOWED BY ) COL, ) VER, ) REP, ) DEL
*                    AND ) END CARDS, AN EDITED MACRO
*                    (IVPASLS) IN THE E SUBLIBRARY
* OUTPUT DESCRIPTION: A DISPLAY OF IVPASLS, A DISPLAY OF IVPASLS,
*                     UPDATED BY THE ) REP CARDS, AN UPDATE SURVEY
* ************************************************************************
// EXEC ESERV


DSPLY E IVPASLS



E.IVPASLS                                                          73/11/04

            CATALS A.IVPASLS
 1          MACRO                                                  00000000
 2  IVPASLS &PP1,&PP2,&PP3,&PP4,&PP5,&PP6,                        X
 3                &KW1=,&KW2=,&KW3=
 4 * DISK OPERATING SYSTEM                                        00250000
 5 * IVPASLS  -  5745-SC-ASM  -  RELEASE 28.0                     00300000
 6 * /* START OF SPECIFICATIONS ***********************************00310000
 7 *                                                              00320000
 8 *01* MODULE-NAME = IVPASLS                                     00330000
 9 *                                                              00340000
10 *01* DESCRIPTIVE NAME = INSTALLATION VERIFICATION PROCEDURE     00342000
11 *                        TEST PROGRAM FOR ESERV PROGRAM        00344000
12 *                        -SOURCE BOOK-                         00346000
13 *                                                              00348000
14 *01* FUNCTION = AS FOLLOWS.                                    00348100
15 *    THIS MACRO IS USED AS INPUT TO THE ESERV PROGRAM IN THE   00348200
16 *    INSTALLATION VERIFICATION PROCEDURE (IVP). TO CHECK THAT  00348600
17 *    THE IVP WAS SUCCESSFUL, COMPARE THE TWO DISPLAYS OF THIS  00349000
18 *    MACRO THE IVP PRINTS. THEY OUGHT TO BE EQUAL, EXCEPT      00349100
19 *    FOR TWO STATEMENTS. THE STATEMENT NUMBER 007500           00349200
20 *             AIF   (T'&PP2 EQ '0').TWO                        00350900
21 *    IN THE FIRST DISPLAY WILL BE CHANGED TO -                 00352900
22 *             AIF   (T'&PP2 EQ '0').THREE                      00355000
23 *    IN THE SECOND DISPLAY. THE STATEMENT NUMBER 014000        00356800
24 *             MNOTE ' VALUE OF &&PP5 IS &PP6'                  00357200
25 *    IN THE FIRST DISPLAY WILL BE DELETED IN THE SECOND DISPLAY 00357600
26 *                                                              00360900
27 *01* NOTES = CHANGE ACTIVITY                                   00361500
28 *    @ DENOTES CHANGE ACTIVITY FLAGS. D IS SYSTEM IDENTIFIER   00361900
```

```
29 *     FOR DOS. MEANING OF THE THIRD CHARACTER IS: A = APAR,                  00364000
30 *     M = PTM, L = NEW DEVELOPMENT. ALL OTHER CHARACTERS ARE                 00366100
31 *     FOR IBM INTERNAL USE.                                                  00368200
32 *                                                                            00370300
33 *01* CHANGE ACTIVITY = AS FOLLOWS.                                          00372400
34 *     CHANGE DESCRIPTIONS.                                                   00374500
35 *     NEW MODULE - FIRST RELEASE 28.                          @DL28301       00376600
36 *                                                                            00378600
37 * /* END OF SPECIFICATIONS ***********************************              00380600
38  GBLA &GBLA
39  GBLB &GBLB
40  GBLC &GBLC
41  LCLA &LCLA
42  LCLB &LCLB
43  LCLC &LCLC
44 .ONE      ANOP
45           AIF   (T'&PP1 EQ 'O').TWO                                         00650000
46 &GBLA     SETA  &PP1                                                        00700000
47 .TWO      ANOP
48           AIF   (T'&PP2 EQ 'O').THREE                                       00750000
49 &GBLB     SETB  (1)                                                         00800000
50 .THREE    ANOP
51           AIF   (T'&PP3 EQ 'O').FOUR                                        00850000
52 &GBLC     SETC  '&PP3'                                                      00900000
```

E.IVPASLS 73/11/04

```
53 .FOUR     ANOP
54           AIF   (T'&KW1 EQ 'O').FIVE                                        00950000
55 &LCLA     SETA  &KW1                                                        01000000
56 .FIVE     ANOP
57           AIF   (T'&KW2 EQ 'O').SIX                                         01050000
58 &LCLB     SETB  (1)                                                         01100000
59 .SIX      ANOP
60           AIF   (T'&KW3 EQ 'O').SEVEN                                       01150000
61 &LCLC     SETC  '&KW3'                                                      01200000
62 .SEVEN    ANOP
63           AIF   (T'&PP4 EQ 'O').EIGHT                                       01250000
64           MNOTE ' VALUE OF &&PP4 IS &PP4'                                   01300000
65 .EIGHT    ANOP
66           AIF   (T'&PP5 EQ 'O').NINE                                        01350000
67           MNOTE ' VALUE OF &&PP5 IS &PP5'                                   01360000
68 .NINE     ANOP
69           AIF   (T'&PP6 EQ 'O').TEN                                         01370000
70           MNOTE ' VALUE OF &&PP5 IS &PP6' THIS STATEMENT WILL BE DELETED    01400000
71           MNOTE ' VALUE OF &&PP6 IS &PP6'                                   01450000
72 .TEN      ANOP
73           AIF   (NOT &GBLB AND NOT &LCLB).ELEVEN                           01500000
74           MNOTE ' VALUE OF &&PP2+&&KW2 IS &PP2+&KW2'                        01550000
75 .ELEVEN   ANOP
76           MNOTE ' &&PP2 AND/OR &&KW2 NOT SPECIFIED'                         01600000
77           MEND                                                              01750000
```

```
DSPLY E.IVPASLS

E.IVPASLS                                                                73/11/04

          CATALS A.IVPASLS
 1        MACRO                                                          00000000
 2  IVPASLS &PP1,&PP2,&PP3,&PP4,&PP5,&PP6,                               X
 3                &KW1=,&KW2=,&KW3=
 4 * DISK OPERATING SYSTEM                                              00250000
 5 * IVPASLS  -  5745-SC-ASM  -  RELEASE 28.0                           00300000
 6 * /* START OF SPECIFICATIONS ***********************************     00310000
 7 *                                                                    00320000
 8 *01* MODULE-NAME = IVPASLS                                           00330000
 9 *                                                                    00340000
10 *01* DESCRIPTIVE NAME = INSTALLATION VERIFICATION PROCEDURE          00342000
11 *                       TEST PROGRAM FOR ESERV PROGRAM               00344000
12 *                       -SOURCE BOOK-                                00346000
13 *                                                                    00348000
14 *01* FUNCTION = AS FOLLOWS.                                          00348100
15 *    THIS MACRO IS USED AS INPUT TO THE ESERV PROGRAM IN THE         00348200
16 *    INSTALLATION VERIFICATION PROCEDURE (IVP). TO CHECK THAT        00348600
17 *    THE IVP WAS SUCCESSFUL, COMPARE THE TWO DISPLAYS OF THIS        00349000
18 *    MACRO THE IVP PRINTS. THEY OUGHT TO BE EQUAL, EXCEPT            00349100
19 *    FOR TWO STATEMENTS. THE STATEMENT NUMBER 007500                 00349200
20 *             AIF   (T'&PP2 EQ '0').TWO                              00350900
21 *    IN THE FIRST DISPLAY WILL BE CHANGED TO -                       00352900
22 *             AIF   (T'&PP2 EQ '0').THREE                            00355000
23 *    IN THE SECOND DISPLAY. THE STATEMENT NUMBER 014000              00356800
24 *             MNOTE ' VALUE OF &&PP5 IS &PP6'                        00357200
25 *    IN THE FIRST DISPLAY WILL BE DELETED IN THE SECOND DISPLAY      00357600
26 *                                                                    00360900
27 *01* NOTES = CHANGE ACTIVITY                                         00361500
28 *    @ DENOTES CHANGE ACTIVITY FLAGS. D IS SYSTEM IDENTIFIER         00361900
29 *    FOR DOS. MEANING OF THE THIRD CHARACTER IS: A = APAR,           00364000
30 *    M = PTM, L = NEW DEVELOPMENT. ALL OTHER CHARACTERS ARE          00366100
31 *    FOR IBM INTERNAL USE.                                           00368200
32 *                                                                    00370300
33 *01* CHANGE ACTIVITY = AS FOLLOWS.                                   00372400
34 *    CHANGE DESCRIPTIONS.                                            00374500
35 *    NEW MODULE - FIRST RELEASE 28.                        @DL28301  00376600
36 *                                                                    00378600
37 * /* END OF SPECIFICATIONS *************************************     00380600
38  GBLA &GBLA
39  GBLB &GBLB
40  GBLC &GBLC
41  LCLA &LCLA
42  LCLB &LCLB
43  LCLC &LCLC
44 .ONE    ANOP
45          AIF   (T'&PP1 EQ '0').TWO                                   00650000
46 &GBLA    SETA  &PP1                                                  00700000
47 .TWO     ANOP
48          AIF   (T'&PP2 EQ '0').THREE
49 &GBLB    SETB  (1)                                                   00800000
50 .THREE   ANOP
51          AIF   (T'&PP3 EQ '0').FOUR                                  00850000
52 &GBLC    SETC  '&PP3'                                                00900000
```

```
E.IVPASLS                                                              73/11/04

      53 .FOUR    ANOP
      54          AIF   (T'&KW1 EQ 'O').FIVE                                00950000
      55 &LCLA    SETA  &KW1                                                01000000
      56 .FIVE    ANOP
      57          AIF   (T'&KW2 EQ 'O').SIX                                 01050000
      58 &LCLB    SETB  (1)                                                 01100000
      59 .SIX     ANOP
      60          AIF   (T'&KW3 EQ 'O').SEVEN                               01150000
      61 &LCLC    SETC  '&KW3'                                              01200000
      62 .SEVEN   ANOP
      63          AIF   (T'&PP4 EQ 'O').EIGHT                               01250000
      64          MNOTE ' VALUE OF &&PP4 IS &PP4'                           01300000
      65 .EIGHT   ANOP
      66          AIF   (T'&PP5 EQ 'O').NINE                                01350000
      67          MNOTE ' VALUE OF &&PP5 IS &PP5'                           01360000
      68 .NINE    ANOP
      69          AIF   (T'&PP6 EQ 'O').TEN                                 01370000
      70          MNOTE ' VALUE OF &&PP6 IS &PP6'                           01450000
      71 .TEN     ANOP
      72          AIF   (NOT &GBLB AND NOT &LCLB).ELEVEN                    01500000
      73          MNOTE ' VALUE OF &&PP2+&&KW2 IS &PP2+&KW2'                01550000
      74 .ELEVEN  ANOP
      75          MNOTE ' &&PP2 AND/OR &&KW2 NOT SPECIFIED'                 01600000
      76          MEND                                                      01750000


E.IVPASLS                                                              73/11/04

UPDATE SURVEY
) COL 73,6
) VER 003000
* IVPASLS  -  5745-SC-ASM  -  RELEASE 28.0                                ....VERIFY CARD
* IVPASLS  -  5745-SC-ASM  -  RELEASE 28.0                  00300000      ....ACTUAL STMT
) VER 007000+1,8
.TWO                                                                      ....VERIFY CARD
.TWO     ANOP                                                             ....ACTUAL STMT
) REP 007500
         AIF   (T'&PP2 EQ 'O').TWO                         00750000       ....DELETED
         AIF   (T'&PP2 EQ 'O').THREE                                      ....ADDED
) DEL 014000
         MNOTE ' VALUE OF &&PP5 IS &PP6' THIS STATEMENT                   ....DELETED
) END                                    WILL BE DELETED 01400000

END OF UPDATE SURVEY


                /*

THIS TERMINATES THE ESERV PROCESSING



* IVPASL COMPLETED ++++++++++++++          DATE 11/04/73,CLOCK 07/24/59,DURATION 00/02/02
EOJ IVPASL



STOP
```

CAP - Cataloged Procedures

This function verifies the cataloging of a procedure into the procedure library and its subsequent execution.

Set-Up Requirements

A procedure library must be allocated. More than six unused blocks must be available in the member space.

Example of SYSLOG Output

```
BG // JOB IVPCAP1
   DATE 11/04/73, CLOCK 07/14/36
BG * ************************************************************
BG * IDENTIFICATION :  IVPCAP1
BG * PURPOSE :  CATALOGING OF A PROCEDURE
BG * FUNCTIONS TESTED : CATALP
BG * SET UP REQUIREMENTS : SYSTEM WITH PROCEDURE
BG * LIBRARY WITH MORE THEN SIX UNUSED BLOCKS IN MEMBER SPACE
BG * MODULES TESTED :  MAINT
BG * OUTPUT DESCRIPTION : SYSTEM STATUS REPORT PRODUCED
BG * BY $MAINEJO
BG * ************************************************************
BG EOJ IVPCAP1
   DATE 11/04/73, CLOCK 07/16/20, DURATION 00/01/43
BG // JOB IVPCAP2
   DATE 11/04/73, CLOCK 07/16/28
BG * ************************************************************
BG * IDENTIFICATION : IVPCAP2
BG * PURPOSE : EXECUTION OF A CATALOGUED PROCEDURE
BG * FUNCTIONS TESTED : EXECUTION OF CATALOGUED PROCEDURE IVPCAP1
BG * WHEREBY AN ASSEMBLED PROGRAM IS ASSEMBLED,
BG * LINK EDITED, TEMPORARIL  CATALOGUED INTO
BG * THE CORE IMAGE LIBRARY AND EXECUTED
BG * SET UP REQUIREMENTS : SYSLNK, SYS001, SYS002, SYS003 MUST BE
BG * ASSIGNED
BG * MODULES TESTED : JOB CONTROL
BG * OUTPUT DESCRIPTION : PRINTING OF DATA LIST
BG * ************************************************************
BG * BEGIN OF PROCEDURE
BG * END OF PROCEDURE
BG EOP IVPCAP1
BG IVPCAP1  STARTED ++++++++++++++++++++++
BG IVPCAP1 COMPLETED SUCCESSFULLY ++++++++++++++++++++++++
BG EOJ IVPCAP2
   DATE 11/04/73, CLOCK 07/20/29, DURATION 00/03/59
BG // JOB IVPCAP3
   DATE 11/04/73, CLOCK 07/20/36
BG * DELETE IVPCAP1 FROM PROCEDURE LIBRARY
BG EOJ IVPCAP3
   DATE 11/04/73, CLOCK 07/21/17, DURATION 00/00/41
BG 1C00A ATTN. 0 0C.
BG
```

Example of SYSLST Output

```
// JOB IVPCAP1                                                    DATE 11/04/73,CLOCK 07/14/36
* ********************************************************
* IDENTIFICATION: IVPCAP1
* PURPOSE: CATALOGING OF A PROCEDURE
* FUNCTIONS TESTED: CATALP
* SET UP REQUIREMENTS: SYSTEM WITH PROCEDURE
* LIBRARY WITH MORE THEN SIX UNUSED BLOCKS IN MEMBER SPACE
* MODULES TESTED: MAINT
* OUTPUT DESCRIPTION: SYSTEM STATUS REPORT PRODUCED
* BY $MAINEJO
* ********************************************************
// EXEC MAINT


   CATALP IVPCAP1


PRIVATE DIRECTORY                PRV-CORE IMAGE      PRV-RELOCATABLE     PRV-SOURCE STATEMENT

11/04/73                         ----------------------DECIMAL-----------------------------

                                    C  H  R  E          C  H  R  E          C  H  R  E
DIRECTORY STARTING ADDRESS         47 10 01            73 00 01           103 00 01
DIRECTORY NEXT ENTRY               47 12 06 08         73 02 09 16        103 01 15 07
DIRECTORY LAST ENTRY               47 14 15 17         73 09 17 19        103 09 27 09

LIBRARY   STARTING ADDRESS         47 15 01            73 10 01           103 10 01
LIBRARY   NEXT AVAILABLE ENTRY     71 07 02            98 10 12           196 05 02
LIBRARY   LAST AVAILABLE ENTRY     72 19 04           102 19 16           196 19 27

                                 -------------------STATUS INFORMATION----------------------------

DIRECTORY ENTRIES ACTIVE           637                 849                412

LIBRARY   BLOCKS ALLOCATED        2020                9440               50490
LIBRARY   BLOCKS ACTIVE           1861                7922               50086
LIBRARY   BLOCKS DELETED           28                  89                 00
LIBRARY   BLOCKS AVAILABLE        131                 1429               404

AUTOMATIC CONDENSE LIMIT           00                  00                 00

LIBRARY   ALLOCATED CYLINDERS      26                  30                 94
DIRECTORY ALLOCATED TRACKS         05                  10                 10
```

```
SYSTEM DIRECTORY--SYSRES                      CORE-IMAGE          RELOCATABLE         SOURCE-STATEMENT     PROCEDURE

11/04/73                                 -----------------------DECIMAL-----------------------------------------------------

                                           C  H  R  E           C  H  R  E           C  H  R  E            C  H  R  E
DIRECTORY STARTING ADDRESS                 00 10 01             16 00 01             31 00 01              41 00 01
DIRECTORY NEXT ENTRY                       00 11 15 16          16 01 07 02          31 00 08 03           41 00 03 06
DIRECTORY LAST ENTRY                       00 14 15 17          16 04 17 19          31 04 27 09           41 04 27 09

LIBRARY   STARTING ADDRESS                 00 15 01             16 05 01             31 05 01              41 05 01
LIBRARY   NEXT AVAILABLE ENTRY             14 00 02             27 04 05             38 14 05              41 09 36
LIBRARY   LAST AVAILABLE ENTRY             15 19 04             30 19 16             40 19 27              45 19 40

                                         ------------------STATUS  INFORMATION--------------------------------------------

DIRECTORY ENTRIES ACTIVE                   538                  457                  68                    20

LIBRARY   BLOCKS ALLOCATED                1220                 4720                 5265                  3795
LIBRARY   BLOCKS ACTIVE                   1061                 3508                 4027                   183
LIBRARY   BLOCKS DELETED                    00                   00                   00                    07
LIBRARY   BLOCKS AVAILABLE                 159                 1212                 1238                  3605

AUTOMATIC CONDENSE LIMIT                 65535                   00                65535                    00

LIBRARY   ALLOCATED CYLINDERS               15                   15                   10                    05
DIRECTORY ALLOCATED TRACKS                  05                   05                   05                    05


// EXEC PSERV


IVPCAP1     VERSION 0.0         7     BLOCKS       PROCEDURE LIBRARY

            * BEGIN OF PROCEDURE
            // OPTION LINK
            // EXEC ASSEMBLY
             ENTRY
            // EXEC LNKEDT
            * END OF PROCEDURE
            /+

EOJ IVPCAP1                                                                   DATE 11/04/73,CLOCK 07/16/20,DURATION 00/01/43
```

```
// JOB IVPCAP2                                                    DATE 11/04/73,CLOCK 07/16/28
* ************************************************************
* IDENTIFICATION: IVPCAP2
* PURPOSE: EXECUTION OF A CATALOGUED PROCEDURE
* FUNCTIONS TESTED: EXECUTION OF CATALOGUED PROCEDURE IVPCAP1
* WHEREBY AN ASSEMBLER PROGRAM IS ASSEMBLED,
* LINK EDITED, TEMPORARILY CATALOGUED INTO
* THE CORE IMAGE LIBRARY AND EXECUTED
* SET UP REQUIREMENTS: SYSLNK,SYS001,SYS002,SYS003 MUST BE
* ASSIGNED
* MODULES TESTED: JOB CONTROL
* OUTPUT DESCRIPTION: PRINTING OF DATA LIST
* ************************************************************
// EXEC PROC=IVPCAP1
*  BEGIN OF PROCEDURE
// OPTION LINK
// EXEC ASSEMBLY
```

```
                                  EXTERNAL SYMBOL DICTIONARY                    PAGE     1

SYMBOL    TYPE          ID  ADDR   LENGTH LD-ID

TEST      SD (CSECT)    01  007D00 0001C0
IJDFZZZZ  ER (EXTRN)    02
IJDFZZZZ  SD (CSECT)    03  000000 00002A
IJCFZIZ0  ER (EXTRN)    04


                                  DUMMY SECTION DICTIONARY

SYMBOL    ID LENGTH

IJDPD012  FF 000030
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                    DOS/VS ASSEMBLER REL 28.0 07.19 73/11/04

007D00                             1 TEST     START  32000
                                   2          IVPCAPS
                                   3+* IVPCAPS  -  5754-SC-LBR  -  RELEASE 28.0                                  04000028
                                   4+*                                                                            05000028
                                   5+* /* START OF SPECIFICATIONS ***************************************** 06000028
                                   6+*                                                                            07000028
                                   7+*01* MODULE-NAME=IVPCAPS                                                     08000028
                                   8+*                                                                            09000028
                                   9+*01* DESCRIPTIVE-NAME=INSTALLATION VERIFICATION PROCEDURE                     10000028
                                  10+*                      TEST FOR CATALOGUED PROCEDURES                      11000028
                                  11+*                                                                            12000028
                                  12+*01* NOTES = CHANGE ACTIVITY                                                 13000028
                                  13+*    @ DENOTES CHANGE ACTIVITY FLAG. D IS SYSTEM  IDENTIFIER FOR DOS.        14000028
                                  14+*    MEANING OF THE THIRD CHARACTER IS - A=APAR,M=PTM,I=NEW                  15000028
                                  15+*    DEVELOPMENT. OTHER CHARACTERS ARE FOR IBM INTERNAL USE.                 16000028
                                  16+*                                                                            17000028
                                  17+*01* CHANGE ACTIVITY = AS FOLLOWS                                            18000028
                                  18+*    CHANGE DESCRIPTIONS                                                     19000028
                                  19+*    NEW MODULE - FIRST RELEASE 28                                           20000028
                                  20+*    WRONG SEARCH IN PCIL                                                    21000028
                                  21+*                                                                            22000028
                                  22+**** END OF SPECIFICATIONS *****************************************/ 23000028
007D00 05A0                       23+START   BALR  10,0                                                          24000028
                         07D02    24+        USING *,10                                                          25000028
007D02 41B0 A0D8         07DDA    25+        LA    REG,TYPECCB                                                   26000028
                                  26+* SUPVR COMMN MACOS - EXCP - 5745-SC-SUP - REL. 28.0                       15050028
007D06 181B                       27+        LR    1,REG                                                         50000025
007D08 0A00                       28+        SVC   0                                                       EM 55010028
                                  29+* SUPERVISOR - WAIT - 5745-SC-SUP - REL. 28.0                             12000028
007D0A 181B                       30+        LR    1,REG                                                         39000025
007D0C 9180 1002         00002    31+        TM    2(1),X'80'                                                    54000025
007D10 4710 A014         07D16    32+        BO    *+6                                                           57000025
007D14 0A07                       33+        SVC   7                                                             60000025
                                  34+* IOCS - OPEN - 5745-SC-IOX - REL 28.0                                    12000028
007D16 0700                       35+        CNOP  0,4                                                           20000025
007D18                            36+        DC    0F'0'                                                         22000025
007D18 4110 A1A6         07EA8    37+        LA    1,=C'ƒƒBOPEN '                                                46000025
007D1C 4500 A026         07D28    38+IJJ00004    BAL 0,*+4+4*(3-1)                                              54000025
007D20 00007DA8                   39+        DC    A(INPUT)                                                      64000025
007D24 00007D78                   40+        DC    A(OUTPUT)                                                     64000025
007D28 0A02                       41+        SVC   2                                                             74000025


                                  43+* IOCS - GET - 5745-SC-IOX - REL 28.0                                     12000028
007D2A 5810 A1B6         07EB8    44+LABEL   L     1,=A(INPUT)              GET DTF TABLE ADDRESS              42000025
007D2E 58F1 0010         00010    45+        L     15,16(1)                 GET LOGIC MODULE ADDRESS           75000025
007D32 45EF 0008         00008    46+        BAL   14,8(15)                 BRANCH TO GET ROUTINE              78000025
                                  47+* IOCS AND DEVICE INDEPENDENT I/O - PUT - 5745-SC-IOX - REL. 28.0         05000028
007D36 5810 A1BA         07EBC    48+        L     1,=A(OUTPUT)             GET DTF TABLE ADDRESS              15000025
007D3A 58F1 0010         00010    49+        L     15,16(1)               GET LOGIC MODULE ADDRESS     3-5 54000025
007D3E 45EF 000C         0000C    50+        BAL   14,12(15)              BRANCH TO PUT ROUTINE        3-5 55000025
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                    DOS/VS ASSEMBLER REL 28.0 07.19 73/11/04

007D42 47F0 A028      07D2A          51+          B     LABEL                                                    33000028
                                     52+* IOCS AND DEVICE INDEPENDANT I/O - CLOSE - 5745-SC-IOX - REL. 28.0      08100028
007D46 0700                          53+          CNOP  0,4                                                      20000025
007D48                               54+END       DC    0F'0'                                                    22000025
007D48 4110 A1AE            07EB0    55+          LA    1,=C'ffBCLOSE'                                           46000025
007D4C 4500 A056            07D58    56+IJJC0007    BAL 0,*+4+4*(3-1)                                          54000025
007D50 00007DA8                      57+          DC    A(INPUT)                                                 64000025
007D54 00007D78                      58+          DC    A(OUTPUT)                                                64000025
007D58 0A02                          59+          SVC   2                                                        74000025
007D5A 41B0 A0F6            07DF8    60+          LA    REG,TYPNCCW                                              35000028
007D5E 50B0 A0E0            07DE2    61+          ST    REG,TYPECCB+8                                            36000028
       *** ERROR ***
007D62 41B0 A0D8            07DDA    62+          LA    REG,TYPECCB                                              36050028
                                     63+* SUPVR COMMN MACOS - EXCP - 5745-SC-SUP - REL. 28.0                     15050028
007D66 181B                          64+          LR    1,REG                                                    50000025
007D68 0A00                          65+          SVC   0                                                    EM 55010028
                                     66+* SUPERVISOR - WAIT - 5745-SC-SUP - REL. 28.0                           12000028
007D6A 181B                          67+          LR    1,REG                                                    39000025
007D6C 9180 1002      00002          68+          TM    2(1),X'80'                                               54000025
007D70 4710 A074      07D76          69+          BO    **+6                                                     57000025
007D74 0A07                          70+          SVC   7                                                        60000025
                                     71+* SUPVR COMMN MACROS - EOJ - 5745-SC-SUP - REL. 28.0                    40000028
007D76 0A0E                          72+          SVC   14                                                       50000025


                                     74+* IOCS AND DEVICE INDEPENDANT I/O - DTFPR - 5745-SC-IOX - REL. 28.0      02870028
007D78                               75+          DC    0D'0'                                                    60000025
007D78 000080000000                  76+OUTPUT    DC    X'000080000000'          RES. COUNT, COM. BYTES BTS  JJ 61510028
007D7E 00                            77+          DC    AL1(0)                LOGICAL UNIT CLASS                 70000025
007D7F 03                            78+          DC    AL1(3)                LOGICAL UNIT                       70200028
007D80 00007DA0                      79+          DC    A(*+32)               CCW  ADDR.                      JJ 71000028
007D84 00000000                      80+          DC    4X'00'                CCB-ST BYTE,CSW CCW ADDRESS     JJ 71200028
007D88 00                            81+          DC    AL1(0)                SWITCH 3                      4-0 71750027
007D89 000000                        82+          DC    VL3(IJDFZZZZ)                  ADDR OF LOGIC MODUL3-8 76800025
007D8C 08                            83+          DC    X'08'                 DTF TYPE  (PRINTER)             JJ 77580028
007D8D 10                            84+          DC    AL1(16)               SWITCHES                           77600025
007D8E 09                            85+          DC    AL1(9)                 NORMAL  COMM. CODE           4-0 78000027
007D8F 09                            86+          DC    AL1(9)                 CONTROL COMM. CODE           4-0 78400027
007D90 00007E58                      87+           DC    A(IN+0)              ADDRESS OF DATA IN IOAREA1         78800025
007D94 00000000                      88+          DC    4X'00'                 BUCKET                       3-5 84000025
007D98 0700                          89+          NOPR  0                     PUT LENGTH IN REG12 (ONLY UNDEF. 84800025
007D9A 4700 0000      00000          90+          NOP   0                     LOAD USER POINTER REG              86400025
007D9E 0000                          91+          DC    2X'00'                 NOT USED                     3-5 89600025
007DA0 09007E5820000050              92+           CCW   9,IN+0,X'20',80-0                                   4-0 91200027
                            07DA8    93+IJJZ0011    EQU *                                                       92000025
                                     94+* IOCS AND DEVICE INDEPENDANT I/O - PRMOD - 5745-SC-IOX - REL. 28.0     01290028
000000                               95+IJDPD012  DSECT                                                        16200025
000000                               96+IJDP0012  DS    CL2                RESIDUAL COUNT                      16400025
000002                               97+IJDP1012  DS    CL1                COMMUNICATION BYTE 1                16600025
000003                               98+IJDP2012  DS    CL1                COMMUNICATION BYTE 2                16800025
000004                               99+IJDP0012  DS    CL2                CSW STATUS BYTES                    17000025
```

```
 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                    DOS/VS ASSEMBLER REL 28.0 07.19 73/11/04

000006                             100+IJDP3012  DS    CL2                  LOGICAL UNIT ADDRESS                17200025
000008                             101+          DS    CL1                  NOT USED                            17400025
000009                             102+IJDP4012  DS    CL3                  ADDRESS OF CCW                      17600025
00000C                             103+          DS    CL1                  STATUS BYTE                         17800025
00000D                             104+          DS    CL3                  CSW CCW ADDR.                       18000025
000010                             105+IJDM1012  DS    CL4                       ADDRESS OF LOGIC MODULE 4-0    18050027
000014                             106+IJDP5012  DS    CL1                  DTF TYPE                            18400025
000015                             107+IJDP6012  DS    CL1                  SWITCHES                            18600025
000016                             108+IJDP9012  DS    CL1                  NORMAL COMMAND CODE                 18800025
000017                             109+IJDPA012  DS    CL1                  CONTROL COMMAND CODE                19000025
000018                             110+IJDP7012  DS    CL4                  ADDRESS OF  IOAREA 1                19200025
00001C                             111+IJDP8012  DS    CL4                  BUCKET                              19400025
000020                             112+IJDPB012  DS    CL2                  L 12,&RECSIZE                       19600025
000022                             113+IJDPC012  DS    CL4                  LA &IOREG,0(14)                     19800025
000026                             114+IJDPE012  DS    CL1                  BUCKET FOR PRTOV IF ASA CH 9        20000025
000027                             115+IJDPF012  DS    CL1                  BUCKET FOR PRTOV IF ASA CH 12       20200025
000028                             116+IJDPG012  DS    CL1                  COMMAND CODE                        21000025
000029                             117+IJDPH012  DS    CL3                  ADDRESS IOAREA 2                    21200025
00002C                             118+IJDPI012  DS    CL1                  FLAGS =X'20'                        21400025
00002D                             119+          DS    CL1                  NOT USED                            21600025
00002E                             120+IJDPJ012  DS    CL2                  COUNT                               21800025
000000                             121+IJDFZZZZ  CSECT                                                           22000025
                          00000    122+          USING IJDP0012,1                                               24800025
                          00000    123+          USING *,15                                                     25000025
000000 0A32                        124+          SVC   IJDL6012             CONTROL  ERROR                      26000025
000002 0000                        125+          DC    1H'0'                                                    26200025
000004 0A32                        126+          SVC   IJDL6012             PRTOV  ERROR                       27000025
000006 0000                        127+          DC    1H'0'                                                    27200025
000008 0A32                        128+          SVC   IJDL6012             GET ERROR                           27400025
00000A 0000                        129+          DC    1H'0'                                                    27600025
00000C 47F0 F01A      0001A        130+          B     IJDPR012             BRANCH TO PUT                       27800025
000010 C9D1C4C6E9E9E9E9            131+          DC    CL8'IJDFZZZZ'        MODULE NAME                  4-0    28000027
000018 2800                        132+          DC    X'2800'    MODULE CHANGE LEVEL                @DM01457 28050028
                          0001A    133+IJDPR012  EQU   *                                                        28400025
00001A 0A00                        134+          SVC   IJDL7012             EXCP                                58800025
00001C 9180 1002      00002        135+          TM    IJDP1012,IJDL8012    WAIT CHANNEL END             4-0    59400027
000020 4710 F026      00026        136+          BO    *+6                                                      59600025
000024 0A07                        137+          SVC   7                                                        59800025
000026 07FE                        138+          BR    IJDL4012        BACK TO USER                        3-9    60250026
000028 0100                        139+IJDQ8012  DC    H'256'                                              4-0    69700027
                          0000B    140+IJDL1012  EQU   11                   REG 11                         3-3    69800025
                          0000C    141+IJDL2012  EQU   12                   REG 12                                70000025
                          0000D    142+IJDL3012  EQU   13                   REG 13                                70200025
                          0000E    143+IJDL4012  EQU   14                   REG 14                                70400025
                          0000F    144+IJDL5012  EQU   15                   REG 15                                70600025
                          00032    145+IJDL6012  EQU   50                   ABEOJ                                 70800025
                          00000    146+IJDL7012  EQU   0                    EXCP                                  71000025
                          00080    147+IJDL8012  EQU   X'80'                                                     71200025
                          00040    148+IJDL9012  EQU   X'40'                                                     71400025
                          00020    149+IJDLA012  EQU   X'20'                                                     71600025
                          00008    150+IJDLB012  EQU   X'08'                                                     71800025
```

```
 LOC  OBJECT CODE     ADDR1 ADDR2  STMT   SOURCE STATEMENT                    DOS/VS ASSEMBLER REL 28.0 07.19 73/11/04

                            00010   151+IJDLC012  EQU   X'10'                                                    72000025
                            00004   152+IJDLD012  EQU   X'04'                                                    72200025
                            00006   153+IJDLE012  EQU   X'06'                                                    72400025
                            00001   154+IJDLF012  EQU   X'01'                                                    72600025
                            00002   155+IJDLG012  EQU   X'02'                                                    72800025
                            0008B   156+IJDLH012  EQU   X'8B'                                                    73000025
                            000FE   157+IJDLI012  EQU   X'FE'                                                    73200025
                            0000B   158+IJDLJ012  EQU   X'0B'                                                    73400025
                            000BF   159+IJDLK012  EQU   X'BF'                                                    73600025
                            000F8   160+IJDLL012  EQU   X'F8'        CCB+3  ERROR PASSBACK BITS          3-9 73650026
                            00040   161+IJDLM012  EQU   X'40'        CCB+2  ERROR PASSBACK BITS          3-9 73700026
                            00001   162+IJDLN012  EQU   1            REG 1                               3-9 73750026
                            00015   163+IJDM6012  EQU   X'15'                 DISP FOR SWITCHES          4-0 73750527
                            00038   164+IJDM8012  EQU   56                    ASOCFLE DISP IN DTF        4-0 73751027
                            00023   165+IJDJM012  EQU   X'23'                 FD,SS COMMAND              4-0 73751527
                            00005   166+IJD05012  EQU   X'05'                 LINE POSITION ZERO FOR 3525 4-0 73752027
                            0008D   167+IJD8D012  EQU   X'8D'                 TEST FOR CHANNEL 9         4-0 73752527
                            000BD   168+IJDBD012  EQU   X'BD'                 TEST FOR CHANNEL 12        4-0 73753027
                            0001D   169+IJD1D012  EQU   X'1D'                 LINE 3                     4-0 73753527
                            0000D   170+IJD0D012  EQU   X'0D'                 LINE 1                     4-0 73754027
                            000CD   171+IJDCD012  EQU   X'CD'                 LINE 25                    4-0 73754527
                            00030   172+IJDV2012  EQU   48                    DISP IN PUNCH DTF          4-0 73755027
007DA8                              173+TEST      CSECT                                                        75800025
                                    174+* IOCS AND DEVICE INDEPENDANT I/O - DTFCD - 5745-SC-IOX - REL. 28.0     01220028
007DA8                              175+          DC    0D'0'                                                  44800025
007DA8 000080000000                 176+INPUT     DC    X'000080000000'          RES. COUNT, COM. BYTES STATUJJ 45200028
007DAE 00                           177+          DC    AL1(0)                   LOGICAL UNIT CLASS            49800025
007DAF 01                           178+          DC    AL1(1)                   LOGICAL UNIT                  50000025
007DB0 00007DC8                     179+          DC    A(IJCX0013)              CCW ADDRESS                   50400025
007DB4 00000000                     180+          DC    4X'00'                   CCB-ST BYTE,CSW CCW ADDR.     51000025
007DB8 00                           181+          DC    AL1(0)             SWITCH 3                    4-0 51200027
007DB9 000000                       182+          DC    VL3(IJCFZIZ0)              ADDRESS OF LOGIC MODULE 3-3 53600025
007DBC 02                           183+          DC    X'02'                    DTF TYPE (READER)              JJ 53940028
007DBD 00                           184+          DC    AL1(0)                   SWITCHES                      55200025
007DBE 02                           185+          DC    AL1(2)                   NORMAL COMM.CODE              59400025
007DBF 02                           186+          DC    AL1(2)                   CNTROL COMM.CODE              59600025
007DC0 00007E58                     187+          DC    A(IN)                    ADDR. OF IOAREA1              60000025
007DC4 00                           188+          DC    AL1(0)                                                 JJ 60600028
007DC5 007D48                       189+          DC    AL3(END)           EOF ADDRESS                         JJ 60800028
007DC8 02007E5820000050             190+IJCX0013  CCW   2,IN,X'20',80                                          62600025
007DD0 4700 0000       00000        191+          NOP   0                        LOAD USER POINTER REG.        63000025
007DD4 4700 0000       00000        192+          NOP   0                        MOVE IOAREA TO WORKA          63800025
007DD8 0000                         193+          DC    X'0000'                                                64000025
                            07DDA   194+IJJZ0013    EQU *                                                      85800025
                                    195+* SUPVR COMMN MACROS - CCB - 5745-SC-SUP - REL. 28.0                   07100028
007DDA 0000                         196+TYPECCB   DC    XL2'0' .           RESIDUAL COUNT                      49000028
007DDC 0000                         197+          DC    XL2'0'      .        COMMUNICATIONS BYTES              50000028
007DDE 0000                         198+          DC    XL2'0' .           CSW STATUS BYTES                    51000028
007DE0 00                           199+          DC    AL1(0)      .            LOGICAL UNIT CLASS            52000028
007DE1 04                           200+          DC    AL1(4)    .            LOGICAL UNIT                    53000028
007DE2 00                           201+          DC    XL1'0'                                                 54000028
```

```
 LOC  OBJECT CODE    ADDR1 ADDR2  STMT   SOURCE STATEMENT                    DOS/VS ASSEMBLER REL 28.0 07.19 73/11/04

007DE3 007DF0                     202+          DC    AL3(TYPECCW) .     CCW ADDRESS                              55000028
007DE6 00                         203+          DC    B'00000000'      .     STATUS BYTE                        56000028
007DE7 000000                     204+          DC    AL3(0) .           CSW CCW ADDRESS                          57000028
007DEA 000000000000
007DF0 09007E0000000025           205+TYPECCW   CCW   9,MSGST,0,L'MSGST                                          45000028
007DF8 09007E2500000033           206+TYPNCCW   CCW   9,MSGEN,0,L'MSGEN                                          46000028
007E00 C9E5D7C3C1D74040           207+MSGST     DC    C'IVPCAP   STARTED ++++++++++++++++++++'                  47000028
007E25 C9E5D7C3C1D74040           208+MSGEN     DC    C'IVPCAP  COMPLETED SUCCESSFULLY ++++++++++++++++++++'   48000028
                            0000B 209+REG       EQU   11                                                       49000028
007E58                            210+IN        DS CL80                                                        50000028
                            07D00 211           END    START
007EA8 5B5BC2D6D7C5D540           212                 =C'ff BOPEN '
007EB0 5B5BC2C3D3D6E2C5           213                 =C'ff BCLOSE'
007EB8 00007DA8                   214                 =A(INPUT)
007EBC 00007D78                   215                 =A(OUTPUT)
```

RELOCATION DICTIONARY


```
ESDID FOR  ESDID FOR   TYPE  LENGTH  ADDRESS                                                    73/11/04
ADDR CON   REF SYMBOL

     01         +01      A       4     007D20
     01         +01      A       4     007D24
     01         +01      A       4     007D50
     01         +01      A       4     007D54
     01         +01      A       4     007D80
     01         +02      V       3     007D89
     01         +01      A       4     007D90
     01         +01     CCW      3     007DA1
     01         +01      A       4     007DB0
     01         +04      V       3     007DB9
     01         +01      A       4     007DC0
     01         +01      A       3     007DC5
     01         +01     CCW      3     007DC9
     01         +01      A       3     007DE3
     01         +01     CCW      3     007DF1
     01         +01     CCW      3     007DF9
     01         +01      A       4     007EB8
     01         +01      A       4     007EBC
```

73/11/04

SYMBOL	LEN	ID	VALUE	DEFN	REFERENCES
END	00004	01	007D48	00054	0189
IJCX0013	00008	01	007DC8	00190	0179
IJDBD012	00001		0000BD	00168	
IJDCD012	00001		0000CD	00171	
IJDFZZZZ	00001	03	000000	00121	
IJDJM012	00001		000023	00165	
IJDLA012	00001		000020	00149	
IJDLB012	00001		000008	00150	
IJDLC012	00001		000010	00151	
IJDLD012	00001		000004	00152	
IJDLE012	00001		000006	00153	
IJDLF012	00001		000001	00154	
IJDLG012	00001		000002	00155	
IJDLH012	00001		00008B	00156	
IJDLI012	00001		0000FE	00157	
IJDLJ012	00001		00000B	00158	
IJDLK012	00001		0000BF	00159	
IJDLL012	00001		0000F8	00160	
IJDLM012	00001		000040	00161	
IJDLN012	00001		000001	00162	
IJDL1012	00001		00000B	00140	
IJDL2012	00001		00000C	00141	
IJDL3012	00001		00000D	00142	
IJDL4012	00001		00000E	00143	0138
IJDL5012	00001		00000F	00144	
IJDL6012	00001		000032	00145	0124 0126 0128
IJDL7012	00001		000000	00146	0134
IJDL8012	00001		000080	00147	0135
IJDL9012	00001		000040	00148	
IJDM1012	00004	FF	000010	00105	
IJDM6012	00001		000015	00163	
IJDM8012	00001		000038	00164	
IJDPA012	00001	FF	000017	00109	
IJDPB012	00002	FF	000020	00112	
IJDPC012	00004	FF	000022	00113	
IJDPD012	00001	FF	000000	00095	
IJDPE012	00001	FF	000026	00114	
IJDPF012	00001	FF	000027	00115	
IJDPG012	00001	FF	000028	00116	
IJDPH012	00003	FF	000029	00117	
IJDPI012	00001	FF	00002C	00118	
IJDPJ012	00002	FF	00002E	00120	
IJDPO012	00002	FF	000004	00099	
IJDPR012	00001	03	00001A	00133	0130
IJDPU012	00002	FF	000000	00096	0122
IJDP1012	00001	FF	000002	00097	0135
IJDP2012	00001	FF	000003	00098	
IJDP3012	00002	FF	000006	00100	
IJDP4012	00003	FF	000009	00102	
IJDP5012	00001	FF	000014	00106	
IJDP6012	00001	FF	000015	00107	

```
SYMBOL    LEN  ID VALUE  DEFN     REFERENCES                                        73-11-04

IJDP7012 00004 FF 000018 00110
IJDP8012 00004 FF 00001C 00111
IJDP9012 00001 FF 000016 00108
IJDQ8012 00002 03 000028 00139
IJDV2012 00001    000030 00172
IJDOD012 00001    00000D 00170
IJDO5012 00001    000005 00166
IJD1D012 00001    00001D 00169
IJD8D012 00001    00008D 00167
IJJC0007 00004 01 007D4C 00056
IJJO0004 00004 01 007D1C 00038
IJJZ0011 00001 01 007DA8 00093
IJJZ0013 00001 01 007DDA 00194
IN       00080 01 007E58 00210  0087  0092  0187  0190
INPUT    00006 01 007DA8 00176  0039  0057  0214
LABEL    00004 01 007D2A 00044  0051
MSGEN    00051 01 007E25 00208  0206  0206
MSGST    00037 01 007E00 00207  0205  0205
OUTPUT   00006 01 007D78 00076  0040  0058  0215
REG      00001    00000B 00209  0025  0027  0030  0060  0061  0062  0064  0067
START    00002 01 007D00 00023  0211
TEST     00001 01 007D00 00001  0173
TYPECCB  00002 01 007DDA 00196  0025  0061  0062
TYPECCW  00008 01 007DF0 00205  0202
TYPNCCW  00008 01 007DF8 00206  0060
=A(INPUT)
         00004 01 007EB8 00214  0044
=A(OUTPUT)
         00004 01 007EBC 00215  0048
=C'ffBOPEN '
         00008 01 007EA8 00212  0037
=C'ffBCLOSE'
         00008 01 007EB0 00213  0055
```

STMNT ERROR NO. MESSAGE 73-11-04

61 IPK182 ALIGNMENT ERROR IN OPERAND 2

THE FOLLOWING MACRO NAMES HAVE BEEN FOUND IN MACRO INSTRUCTIONS
IVPCAPS EXCP WAIT OPEN GET PUT CLOSE EOJ DTFPR PRMOD DTFCD CCB BTWAIT

OPTIONS FOR THIS ASSEMBLY - ALIGN, LIST, XREF, LINK, DECK, NOEDECK

THE ASSEMBLER WAS RUN IN 204680 BYTES
END OF ASSEMBLY

ENTRY
// EXEC LNKEDT

JOB IVPCAP2 11/04/73 DOS LINKAGE EDITOR DIAGNOSTIC OF INPUT

ACTION TAKEN MAP REL
LIST AUTOLINK IJCFZIZO
LIST ENTRY

11/04/73	PHASE	XFR-AD	LOCORE	HICORE	DSK-AD	ESD TYPE	LABEL	LOADED	REL-FR	
	PHASE***	080078	080078	080203	047 07 2	CSECT	TEST	080078	078378	RELOCATABLE
						CSECT	IJDFZZZZ	080238	080238	
						CSECT	IJCFZIZO	080268	080268	

```
// JOB IVPCAP3                                          DATE 11/04/73,CLOCK 07/20/36
* DELETE IVPCAP1 FROM PROCEDURE LIBRARY
// EXEC MAINT


 DELETP IVPCAP1
```

PRIVATE DIRECTORY	PRV-CORE IMAGE	PRV-RELOCATABLE	PRV-SOURCE STATEMENT
11/04/73	----------DECIMAL----------		
	C H R E	C H R E	C H R E
DIRECTORY STARTING ADDRESS	47 10 01	73 00 01	103 00 01
DIRECTORY NEXT ENTRY	47 12 06 08	73 02 09 16	103 01 15 07
DIRECTORY LAST ENTRY	47 14 15 17	73 09 17 19	103 09 27 09
LIBRARY STARTING ADDRESS	47 15 01	73 10 01	103 10 01
LIBRARY NEXT AVAILABLE ENTRY	71 07 02	98 10 12	196 05 02
LIBRARY LAST AVAILABLE ENTRY	72 19 04	102 19 16	196 19 27
	----------STATUS INFORMATION----------		
DIRECTORY ENTRIES ACTIVE	637	849	412
LIBRARY BLOCKS ALLOCATED	2020	9440	50490
LIBRARY BLOCKS ACTIVE	1861	7922	50086
LIBRARY BLOCKS DELETED	28	89	00
LIBRARY BLOCKS AVAILABLE	131	1429	404
AUTOMATIC CONDENSE LIMIT	00	00	00
LIBRARY ALLOCATED CYLINDERS	26	30	94
DIRECTORY ALLOCATED TRACKS	05	10	10

SYSTEM DIRECTORY--SYSRES	CORE-IMAGE	RELOCATABLE	SOURCE-STATEMENT	PROCEDURE
11/04/73	----------DECIMAL----------			
	C H R E	C H R E	C H R E	C H R E
DIRECTORY STARTING ADDRESS	00 10 01	16 00 01	31 00 01	41 00 01
DIRECTORY NEXT ENTRY	00 11 15 16	16 01 07 02	31 00 08 03	41 00 03 06
DIRECTORY LAST ENTRY	00 14 15 17	16 04 17 19	31 04 27 09	41 04 27 09
LIBRARY STARTING ADDRESS	00 15 01	16 05 01	31 05 01	41 05 01
LIBRARY NEXT AVAILABLE ENTRY	14 00 02	27 04 05	38 14 05	41 09 36
LIBRARY LAST AVAILABLE ENTRY	15 19 04	30 19 16	40 19 27	45 19 40
	----------STATUS INFORMATION----------			
DIRECTORY ENTRIES ACTIVE	538	457	68	19
LIBRARY BLOCKS ALLOCATED	1220	4720	5265	3795
LIBRARY BLOCKS ACTIVE	1061	3508	4027	176
LIBRARY BLOCKS DELETED	00	00	00	14
LIBRARY BLOCKS AVAILABLE	159	1212	1238	3605
AUTOMATIC CONDENSE LIMIT	65535	00	65535	00
LIBRARY ALLOCATED CYLINDERS	15	15	10	05
DIRECTORY ALLOCATED TRACKS	05	05	05	05

```
EOJ IVPCAP3                                          DATE 11/04/73,CLOCK 07/21/17,DURATION 00/00/41
```

EMA - 1401/1440/1460 Emulator

Functions Tested:

Three verification procedures are provided with the emulator:

- One to be used with an emulator generated for a 1401 or a 1460, with the following options: advanced programming, sense switches, and 1400 console.
- One to be used with an emulator generated for a 1401 or a 1401G or a 1460 without the above options.
- One to be used with an emulator generated for a 1440 with the options advanced programming and sense switches.

IVPGEN MACRO OPTIONS

EMA={NO / YES} Specify if the DOS/VS 1401/1440/1460 Emulator program is to be verified.

Required Parameters

EMATYPE={1401 / 1440 / 1401G} Specify the required verification procedure.

1401 : Verification procedure for a 1401/1460 emulator with options.
1440 : Verification procedure for a 1440 emulator.
1401G: Verification procedure for a 1410/1460 emulator without options, or verification procedure for a 1401G emulator.

EMANAME=X Specify the phasename under which the emulator is cataloged in the core image library.

Optional Parameters

Specify the following two parameters only if you want to verify the tape functions.

EMATSN=SYSnnn Specify the logical name of the tape device assigned to the 1400 tape unit 1. This unit must have been defined in an EMTAPE emulator macro instruction. Do not specify this parameter if spanned tape format has been specified (IPSUP=SPANNED in the EMSUP emulator macro instruction), or if the emulator does not emulate the tapes (TPSUP=NONE in the EMSUP macro instruction).

EMATA=cuu Device address of the tape drive. Specify only if EMATSN=SYSnnn is also specified.

Note that only one emulator program can be executed during one IVP run and that, conversely, this emulator can execute only one of the verification procedures.

In addition to testing the 1400 CPU functions and the operator communication functions, the verification procedures:

- Read data from the System/370 device assigned as 1400 card reader
- Punch data on the System/370 device assigned as 1400 card punch
- Print the data read from the 1400 card reader on the System/370 device assigned as 1400 printer.

If the System/370 configuration includes a tape unit, the verification procedures (except those for the 1401G or the 1401/1460 without options) optionally write on and read from tape in 1400 format (TPSUP=ORIGINAL or MIXED in the EMSUP emulator macro instruction).

The verification procedures contain 1400 object programs and data as well as the DOS/VS control cards required to execute the emulator. You can perform the verification procedures with the emulator generated in accordance with your specifications and cataloged to the core image library.

However, the verification procedures cannot be used with an emulator generated to handle:

- column binary data
- card image data
- 51-column cards.

A 1401/1440/1460 emulator must emulate real storage of a size of at least 4,000 bytes.

A 1401G emulator must emulate real storage of a size of at least 4,000 bytes.

SOFTWARE REQUIREMENTS

Emulator Macro Options

The following emulator instructions generate a minimum emulator to execute the verification procedures (does not apply to the 1401G emulator):

```
EMULATOR CPU=xxxx,CORE=4,ADVPROG=YES,SENSESW=YES,MODEL=145
EMSUP    EMNAME=EMSPL01,CCRDR=SYSRDR,                          X
         TPSUP=ORIGINAL,CONSOLE=YES
EMRDR    TODEV=2540
EMPNCH   FROMDEV=1402,TODEV=2540
EMPTR    FROMDEV=1403,TODEV=1403
EMTAPE   DEVADDR=SYS001,UNIT=1,                                X
         TYPEFLE=OUTPUT,RECFM=ORIGINAL,BLKSIZE=80
EMEND
END
```

Notes

1. xxxx in the EMULATOR macro can be either 1401,1440, or 1460.

2. The EMTAPE macro specification is not required if no tape functions are to be verified.

For a 1401G the minimum emulator is generated as follows:

```
EMULATOR CPU=1401G,CORE=4,ADVPROG=YES,SENSESW=YES,MODEL=145
EMSUP    EMNAME=EMSPL01,CCRDR=SYSRDR
EMRDR    TODEV=2540
EMPNCH   FROMDEV=1402,TODEV=2540
EMPTR    FROMDEV=1403,TODEV=1403
EMEND
END
```

The logical names of the System/370 devices assigned as 1400 reader, punch, and printer are by default SYSIPT, SYSPCH, and SYSLST. If you specified logical names in the form DEVADDR=SYSnnn, be sure that these devices relate to the same devices as SYSIPT, SYSPCH, and SYSLST.

HARDWARE REQUIREMENTS

A Central Processing Unit equipped with:

- The IBM Compatibility Feature 4457 for Models 125 and 135
- The IBM Compatibility Feature 4457 or 4458 for Model 145
- Standard instruction set
- One tape drive, if the tape functions are to be verified

STORAGE REQUIREMENTS

The amount of storage required depends on what you specify when generating your emulator. The emulator described in the section "Software Requirements" takes up approximately 27,500 bytes of storage.

OPERATING INSTRUCTIONS

1. Set-Up Requirements.

None, if tape functions are not to be verified. Otherwise, mount a scratch tape on the tape unit assigned to 1400 tape unit 1.

2. Operating Instructions.

Type in START in response to message

```
EN021D IVPEMA HALT IAR=nnnnnn
AAR=00001/2 BAR=00001/2
```

EMB - 1410/7010 Emulator

Functions Tested:

- 1410/7010 CPU functions
- Operator communication functions
- Console operations
- Tape functions - 1400 format (optional)

IVPGEN MACRO OPTIONS

EMB={NO / YES} Specify if the DOS/VS 1410/7010 Emulator program is to be verified.

Required Parameter

EMBNAME=x Specify the phase name under which the emulator is cataloged in the core image library.

Optional Parameters

EMBTSN=SYSnnn Specify the logical name of the System/370 tape device assigned to 1400 tape unit 1, channel 1.

EMBTA=cuu Device address of the tape drive. Specify only if EMATSN=SYSnnn is also specified.

In addition to testing the 1410/7010 CPU functions and the operator communication functions, the verification procedures:

- Read data from the System/370 device assigned as 1400 card reader
- Punch data on the System/370 device assigned as 1400 card punch
- Print the data read from the 1400 card reader on the System/370 device assigned as 1400 printer.

If the System/370 configuration includes a tape unit the verification procedures optionally write on and read from tape in 1400 format (TPSUP=ORIGINAL or MIXED in the EMSUP emulator macro instruction).

The verification procedure comprises a 1400 object program and data as well as the DOS/VS control cards required to execute the emulator program. You can perform the verification procedures with an emulator generated in accordance with your specifications and cataloged to the core image library.

The minimum amount of storage that can be handled by a 1410/7010 emulator is 40,000 bytes.

For a 1410 emulator the EMULATOR macro instruction must specify URCHAN=1 and OVERLAP=YES, in addition to the selected parameters.

SOFTWARE REQUIREMENTS

The following instructions will generate a minimum size emulator tc execute the verification procedures:

```
EMULATOR  CPU=xxxx,CORE=40,CHAN=1,URCHAN=1,OVERLAP=YES,MCDEL=145
   EMSUP  EMNAME=EMSPL10,CCRDR=SYSRDR,                              X
          TPSUP=ORIGINAL
   EMRDR  TODEV=2540
  EMPNCH  TODEV=2540
   EMPTR  TODEV=1403
  EMTAPE  DEVADDR=SYS001,UNIT=11,                                  X
          TYPEFLE=OUTPUT,RECFM=ORIGINAL,BLKSIZE=80
  EMCNSL
   EMEND
END
```

Notes:

1. xxxx in the EMULATOR macro can be either 1410 or 7010.

2. Do not specify OVERLAP=YES if CPU=7010 is specified,

The logical names of the System/370 devices assigned as 1400 reader, punch, and printer are by default SYSIPT, SYSPCH and SYSLST. If ycu specified logical names in the form DEVADDR=SYSnnn, be sure that these devices relate to the same devices as SYSIPT, SYSPCH, and SYSLST.

HARDWARE REQUIREMENTS

A Central Processing Unit equipped with:

- The IBM Compatibility Feature 4458 for Models 145
- Standard instruction set
- One tape drive, if tape functions are tc be verified.

STORAGE REQUIREMENTS

The amount of storage required is dependent on what you specify when generating your emulator. The emulator described in the section "Software Requirements" takes up approximately 27,500 bytes of storage.

OPERATING INSTRUCTIONS

1. Set-Up Requirements

   None, if tape functions are not to be verified. Otherwise, mount a scratch tape on the tape unit assigned to 1400 unit 1, channel 1.

2. Operating Instructions

   On display of message

EP022D IVPEMB HALT/BRANCH IAR=nnnnn AAR=xxxxx BAR=xxxxx DMOD=1

- Type in START if nnnnn=06106
- Type in EOJ if nnnnn is not 06106

E20 - System/360 Model 20 Emulator

Functions Tested

The Installation Verification Procedure for the System/360 Model 20 emulator tests the following Model 20 functions:

- CPU instructions
- Interrupt capability
- CPU data and address checking
- Operator communications
- I/O operations for each type of device the emulator program supports.

Note: If the E20 verification procedure makes use of a read/punch device (2520 or 2560) it can be used for only one run. For a following run it is necessary to assemble the IVPGEN macro again.

IVPGEN MACRO OPTIONS

E20={NO / YES} Specify if the DOS/VS System/360 Model 20 Emulator program generation is to be verified.

Required Parameter

E20NAME=xxxx Specify the phase name under which the emulator is cataloged in the core image library. Length of the phase name may be from four to seven characters.

HARDWARE REQUIREMENTS

- A Central Processing Unit equipped with the IBM Compatibility Feature 7520 for Models 125 and 135 and a standard instruction set.
- One physical device for each Model 20 device emulated.

If the System/360 configuration comprises an MFCM, note that the emulation can either be performed on a System/370 MFCM or on the combination of a 3504/3505 and a 3525. The MFCM is emulated at DOS/VS level by two physical devices, therefore, enter two ASSGN commands.

OPERATING INSTRUCTIONS

1. Set-Up Requirements

   The system printer must be provided with a carriage control tape with punches in (at least) channels 1, 9, and 12.

2. Operating Instructions

   In response to message

   ```
   E201D 01 STOP UL=99,PSW=0100062C,ESTR=OFFF
   ```

   type in EOJ to pass control to DOS/VS job control.

Example of SYSLOG Output

```
BG // JOB IVPE20
   DATE 11/04/73, CLOCK 23/33/07
BG * INSTALLATION VERIFICATION PROCEDURE FOR MODEL 20 EMULATOR ON S/370
BG * YOU MUST ASSIGN EACH LOGICAL UNIT USED IN THE EMULATOR GENERATION TO
BG * A VALID S/370 PHYSICAL DEVICE
BG * FOR EXAMPLE M20 2501 CARD READER HAS BEEN GENERATED ON SYS004
BG * YOU MUST ENTER THE FOLLOWING DOS COMMAND
BG *       // ASSIGN SYS004,X'00C'
BG * ASSUMING THAT 00C IS A VALID CARD READER TYPE FOR EMULATION
BG * YOU MUST DO THAT FOR M20 2501 2520/2560 1442 1403/2203 AND TAPES
BG // PAUSE PLEASE ENTER YOUR ASSIGN COMMANDS NOW
BG // ASSGN SYS004,X'00C'
BG // ASSGN SYS010,X'280'
BG // ASSGN SYS011,X'281'
BG
BG // PAUSE IT IS YOUR LAST CHANCE FOR ENTERING ASSGN COMMANDS
BG
BG // EXEC EMUL3
BG E220D ENTER 'DI ON' COMMAND FOR DEVICE INDEPENDENCE, IF NOT 'DI OFF'
BG DI OFF
BG E201D 01 STOP UL=99,PSW=000001F8,ESTR=0000
BG S
BG E201D 01 STOP UL=99,PSW=1000047E,ESTR=0001
BG CF.S
BG TAPES 081=SYS011  080=SYS010
BG DISKS 002=AAAAAA    002=BBBBBB
BG UR    2501=SYS004  1442=SYSPCH 1403/2203=SYSLST
BG E201D 01 STOP UL=99,PSW=10000482,ESTR=0386
BG S
BG E201D 01 STOP UL=99,PSW=010004A6,ESTR=2501
BG S
BG E201D 01 STOP UL=99,PSW=010004EE,ESTR=1442
BG S
BG E201D 01 STOP UL=99,PSW=0100050E,ESTR=1403
BG S
BG E201D 01 STOP UL=99,PSW=0100051E,ESTR=0070
BG S
BG E201D 01 STOP UL=99,PSW=31000542,ESTR=0002
BG S
BG E202D MOD20 PROGRAMMING ERROR UL=FA,I=07,PSW=010005F2
BG CS SD=X'5F2'
BG 5F2  FA440B820B82488006204A80068C4B80
BG CS DS=X'B82'
BG B82  00000000000000000000000000000000
BG CS SA=(X'B82',X'000000001C').S
BG E202D MOD20 PROGRAMMING ERROR UL=4A,I=08,PSW=11000612
BG HELP
BG E2121 CONSULT 'UL' AND 'PSW' WHICH SPECIFY ERROR TYPE AND ADDRESS -
BG E2121 - OF INSTRUCTION IN ERROR
BG E2121 USE 'CS' COMMAND, FOLLOWED BY 'S' TO CORRECT THE ERROR
BG E2121 IF THE ERROR PERSISTS, ENTER 'DF ED,TD,EDJ' TO CANCEL EMULATOR RUN
BG CS RA=(8,X'0').S
BG E202D MOD20 PROGRAMMING ERROR UL=1A,I=08,PSW=1100061A
BG CS RA=(8,X'0').S
BG E201D 01 STOP UL=99,PSW=01000628,ESTR=0003
BG S
BG E201D 01 STOP UL=99,PSW=0100062C,ESTR=OFFF
BG S
BG E201D 01 STOP UL=99,PSW=0100062C,ESTR=OFFF
BG EOJ
BG * IVPE20 IS FINISHED
BG EOJ IVPE20
   DATE 11/04/73,CLOCK 23/04/08,DURATION 00/07/00
```

Example of SYSLST Output

```
// JOB IVPE20  DATE 11/04/73,CLOCK 23/33/07
* INSTALLATION VERIFICATION PROCEDURE FOR MODEL 20 EMULATOR ON S/370
* YOU MUST ASSIGN EACH LOGICAL UNIT USED IN THE EMULATOR GENERATION TO
* A VALID S/370 PHYSICAL DEVICE
* FOR EXAMPLE M20 2501 CARD READER HAS BEEN GENERATED ON SYS004
* YOU MUST ENTER THE FOLLOWING DOS COMMAND
*       // ASSGN SYS004,X'00C'
* ASSUMING THAT 00C IS A VALID CARD READER TYPE FOR EMULATION
* YOU MUST DO THAT FOR M2C 2501 2520/2560 1442 1403/2203 AND TAPES
// PAUSE PLEASE ENTER YOUR ASSGN COMMANDS NOW
// ASSGN SYS004,X'00C'
// ASSGN SYS01C,X'280'
// ASSGN SYS011,X'281'
// PAUSE IT IS YOUR LAST CHANCE FOR ENTERING ASSGN COMMANDS
// EXEC EMUL3
DI OFF
EC DC='//LC'
LD

SAMPLE OUTPUT DATA
SAMPLE OUTPUT DATA                    THE 18 FIRST CHARACTERS OF THIS LINE ARE THE
                                      SAME AS THOSE OF THE PREVIOUS LINE

SAMPLE OUTPUT DATA
NOW SKIP TO CHANNEL 1

NOW SKIP TO CHANNEL 12

NOW SKIP TO CHANNEL 09

* IVPE20 IS FINISHED
EOJ IVPE20                  DATE 11/04/73,CLOCK 23/40/08,DURATION 00/07/00


YOU HAVE GENERATED THE FOLLOWING MODEL 20 CONFIGURATION

   2501 CARD READER

   1442 CARD PUNCH

   1403/2203 PRINTER

YOUR TAPE UNIT ADDRESSES ARE = 80 81

YOU HAVE GENERATED STORAGE CONTROL FEATURE
```

OLT - OLTEP

Function Tested

- The possibility of initializing online testing.

OPERATING INSTRUCTIONS

Action Messages

O1E1O5D ENTER-DEV/TEST/OPT/

Reply by typing in

R 01,'CANCEL'

to terminate the execution of the OLTEP verification prccedure.

PWR - POWER

Function Tested

A test is made to see if the versiоn of POWER generated functions in accordance with the specifications.

SOFTWARE REQUIREMENTS

POWER=YES must have been specified as a SUPVR macrc parameter when assembling the supervisor. POWER must be running while the test is being made.

UTL - System Utilities

Functions Tested

Standard

```
CLRDK       Clear Disk
CDKCD       Copy disk to card
CDKDK       Copy disk to disk
RCDDK       Restore card to disk
LVTOC       VTOC display
```

Note: If the PCHADDR parameter is not specified, CDKCD and RCDDK will not be verified.

Optional

- If UTLT=YES is specified in the IVPGEN macro:

```
INTTP       Initialize tape
CDKTP       Copy disk to tape
RTPDK       Restore tape to disk
```

- If UTLZ=YES is specified in the IVPGEN macro:

```
CLRDC       Clear data cell
CDKTP       Copy data cell to tape   (only if UTIT=YES is specified)
RTPDK       Restore tape to data cell
```

HARDWARE REQUIREMENTS

```
Required:  2 direct-access devices
           1 printer.

Optional:  1 tape drive
           1 data cell drive
           1 card reader
           1 card punch.
```

Module 4: 1401/1440/1460 DOS/VS Emulator on System/370 --5745-SC-EML

Modular Outline

The 1401/1440/1460 Emulator Program for the IBM System/370 consists of a group of macro instructions and object and load modules that are shipped in the source statement, relocatable, and core image libraries. Two sample programs that test the working of a 1401/1460 program, of a 1440 program, and of a 1401G program under the emulator are contained in the source statement library under the name Z.EMSPL01. The source cards of this program are cataloged under the name Z.EMSPL01S.

PARTITION SIZE REQUIRED

This emulator program requires at least a 20,480 byte partition. For further information, refer to the emulator publication.

SOURCE STATEMENT LIBRARY

Number of Macros	Number of Library Blocks (Physical Records)
31	5942

Note: 21 macros are common to the 1401/1440/1460 and the 1410/7010 emulators. The macros marked with an asterisk below are unique to the 1401/1440/1460 emulator.

Macros

E.ANUM
E.BDIL
E.BIFLAG
E.CCMP
E.DBIB

E.DDTF
E.DDUB
E.DIIQCR *
E.DIL
E.DSUB

E.EMCNSL
E.EMDISK
E.EMEND
E.EMPNCH
E.EMPTR

E.EMRDR
E.EMSUP
E.EMTAPE
E.EMULATOR
E.EMVERIFY

E.IIQBR *
E.IIQCR *
E.IIQDS *
E.IIQEI *
E.IIQID *

E.IIQIU *
E.IIQOJ *
E.IIQUR *
E.IVPEMAC *
E.MCPU
E.MIO
E.MULDIV

Delete Statements

```
DELETS E.ANUM
DELETS E.BDIL
DELETS E.BIFLAG
DELETS E.CCMP
.
.
.
DELETS E.MIO
```

Note: The 21 macros that are common to the 1401/1440/1460 and the 1410/7010 emulators should not be deleted for a system that is to contain a 1410/7010 emulator. Delete only those macros that are unique to the 1401/1440/1460 emulator.

RELOCATABLE LIBRARY

Number of Modules	Number of Library Blocks (Physical Records)
29	244

Module Name	Bytes of Storage
IIQAP	345
IIQBF	250
IIQBY	448
IIQCC	1675
IIQCF	2464
IIQCN	731
IIQCP	412
IIQCS	5362
IIQDB	764
IIQDI	794
IIQDK	2101
IIQEJ	290
IIQEP	754
IIQEP1	-
IIQMC	486

```
IIQMD                806
IIQMD1

IIQMT                629
IIQMTP               741
IIQMW                592
IIQNT               2708
IIQOA               1674

IIQOB               1538
IIQPOST             6065
IIQPRE              7075
IIQSD                390
IIQTP               1841
IIQUR1              1389
IIQVT               3376
```

Transients

```
$$BIIQBD
$$BIIQBS
$$BIIQMW
$$BIIQSD
$$BIIQSS

$$BIIQT1
$$BIIQT2
$$BIIQT3
$$BIIQT4
$$BIIQT5
$$BIIQT6
```

Link-Edit Statements

Tape Preprocessor Program

```
   PHASE phasename,*,NCAUTO
   INCLUDE IIQMTP
   INCLUDE IIQPRE
   ENTRY IIQPRE
/*
// LBLTYP TAPE
// EXEC LNKEDT
```

Tape Postprocessor Program

```
   PHASE phasename,*,NCAUTO
   INCLUDE IIQMTP
   INCLUDE IIQPOST
   ENTRY IIQPOST
/*
// LBLTYP TAPE
// EXEC LNKEDT
```

Delete Statement

```
DELETR IIQ.ALL
```

Phases

```
IIQOC
IIQOD
IIQOE
IIQOF

IIQOG
IIQOH
IIQOI
IIQOK
```

Delete Statements

```
DELETC IIQC.ALL
DELETC $$BIIQBD
DELETC $$BIIQBS
DELETC $$BIIQMW
.
.
.
DELETC $$BIIQT6
```

CORE IMAGE LIBRARY

	Phases	Blocks
Transients	11	11
Phases	8	16

SAMPLE PROGRAM

```
Z.EMSPL01,Z.EMSPL01S
```

SAMPLE PROGRAM SUMMARY: Figure 4-1 illustrates the card deck that is punched when the sample programs are retrieved from the source statement library.

```
Cards Retrieved
CATALS Z.EMSPL01,4.0
BKEND Z.EMSPL01
 1400 object decks and source decks
BKEND
CATALS Z.EMSPL01S,4.0
BKEND Z.EMSPL01S
 1400 source deck
BKEND
```

Figure 4-1. Sample Program Card Deck, 1401/1440/1460 Emulator

The sample program lists 20 records on the printer, and it writes out the records on tape if tape is available and assigned. For a complete description of the sample programs, refer to the 1401/1440/1460 Emulator manual.

Module 5: 1410/7010 DOS/VS Emulator on System/370 --5745-SC-EML

Modular Outline

The 1410/7010 Emulator Program consists of a group of macro instructions and object and load modules that are shipped in the source statement, relocatable, and core image libraries. A sample program that tests the working of a 1410 and 7010 program under the emulator is contained in the source statement library under the name Z.EMSPL10. The source cards of this program are cataloged under the name Z.EMSPL10S.

PARTITION SIZE

30,000 bytes. For further information, refer to the Emulator publication.

Source Statement Library

Number of Macros	Number of Library Blocks (Physical Records)
30	3,249

Note: 21 macros are common to 1401/1440/1460 and 1410/7010 emulators. The macros marked with an asterisk below are those that are unique to the 1410/7010 emulator.

Macros

E.ANUM
E.BDIL
E.BIFLAG
E.COMP
E.DBIB

E.DDTF
E.DDUB
E.DECCB *
E.DIIRCR *
E.DIL

E.DSUB
E.EMCNSL
E.EMDISK
E.EMEND
E.EMPNCH

E.EMPTR
E.EMRDR
E.EMSUP
E.EMTAPE
E.EMULATOR
E.EMVERIFY
E.IIRCR *
E.IIRDCC *
E.IIREI *
E.IIRID *

E.IIRIU *
E.IIROJ *
E.IVPEMBC *
E.MCPU
E.MIO

Delete Statements

```
DELETS E.ANUM
DELETS E.BDIL
DELETS E.BIFLAG
.
.
.
DELETS E.MIO
```

Note: The 21 macros that are common to the 1401/1440/1460 and the 1410/7010 emulators should not be deleted when the system is to include a 1401/1440/1460 emulator. Delete only those macros that are unique to the 1410/7010 emulator.

RELOCATABLE LIBRARY

Number of Modules	Number of Library Blocks (Physical Records)
25	237

Module Name	Bytes of Storage
IIRBF	250
IIRCC	1675
IIRCP	1547
IIRDB	772
IIRDK	4126
IIRDL	2236
IIRDS	656
IIREJ	290
IIRFP	2698
IIRIS	976
IIRMI	1160
IIRMT	629
IIRMTP	741
IIRMW	596
IIRNT	3292
IIROA	1706
IIROB	1538

```
IIRPOST          6073
IIRPR             442
IIRPRE           7083

IIRSD             366
IIRST             366
IIRTP            1943
IIRUR            1846
IIRVT            3376
```

Link-Edit Statements

Tape Preprocessor Program

```
   PHASE phasename,*,NOAUTO
   INCLUDE IIRMTP
   INCLUDE IIRPRE
   ENTRY IIRPRE
/*
// LBLTYP TAPE
// EXEC LNKEDT
```

Tape Postprocessor Program

```
   PHASE phasename,*,NOAUTO
   INCLUDE IIRMTP
   INCLUDE IIRPOST
   ENTRY IIRPOST
/*
// LBLTYP TAPE
// EXEC LNKEDT
```

Delete Statement

```
DELETR IIR.ALL
```

CORE IMAGE LIBRARY

	Phases	Blocks
Transients	10	11
Phases	8	16

Transients

```
$$BIIRBD
$$BIIRBS
$$BIIRMW
$$BIIRSD
$$BIIRT1

$$BIIRT2
$$BIIRT3
$$BIIRT4
$$BIIRT5
$$BIIRT6
```

Phases

```
IIROC
IIROD
IIROE
IIROF

IIROG
IIROH
IIROI
IIROK
```

Delete Statements

```
DELETC IIRC.ALL
DELETC $$BIIRBD
DELETC $$BIIRBS
DELETC $$BIIRMW
.
.
.
DELETC $$BIIRT6
```

SAMPLE PROGRAM

Z.EMSPI10, Z.EMSPL10S

SAMPLE PROGRAM SUMMARY: Figure 5-1 illustrates the card deck that is punched when the sample program is retrieved from the source statement library.

```
┌----------------------------------------┐
|  Cards Retrieved                       |
├----------------------------------------┤
|  CATALS Z.EMSPL10,4.0                  |
|  BKEND Z.EMSPL10                       |
|   1400 object decks and source decks   |
|  BKEND                                 |
|  CATALS Z.EMSPL10S,4.0                 |
|  BKEND Z.EMSPL10S                      |
|   1400 source deck                     |
|  BKEND                                 |
└----------------------------------------┘
```

Figure 5-1. Sample Program Card Deck, 1410/7010 Emulator

The sample program lists 20 records on the printer. If a tape is available and assigned, the sample program writes out the records on tape. For a complete description of the sample programs, refer to the 1410/7010 Emulator manual.

Module 6: Emulating the System/360 Model 20 on Models 115, 125, and 135 --5745-SC-E20

Modular Outline

MODEL 20 EMULATOR UNDER DOS/VS

The Model 20 Emulator Program consists of a group of macro instructions and object and load modules that are shipped in the source statement, relocatable, and core image libraries. An installation verification program for postgeneration use is contained in the source statement library under the name Z.IISIVP20. In addition to the emulator, a data interchange function is supplied with the generation macro E.EMUDI.

PARTITION SIZE

xx bytes. For further information, refer to the Model 20 emulator publication.

Number of Macros	Number of Library Blocks (Physical Records)
22	2,222

Macros

E.EM1403
E.EM1442
E.EM20CHK
E.EM20CONV
E.EM20CPU

E.EM20DI
E.EM20END
E.EM20MESS
E.EM20PRHD
E.EM20SYS

E.EM20VRIF
E.EM2152
E.EM2203
E.EM2311
E.EM2400

E.EM2501
E.EM2520
E.EM2560
E.IISCR
E.IISDC
E.IISEDB
E.IVPER0C

Delete Statements

DELETS E.EM1403
DELETS E.EM1442
DELETS E.EM20CHK
.
.
.
DELETS E.IISEDB

RELOCATABLE LIBRARY

Number of Modules	Number of Library Blocks (Physical Records)
27	195

Module Name

IISCM
IISCMS
IISCP
IISCPS
IISDB

IISDD
IISDE
IISDF
IISDFED
IISDI

IISDK
IISD1
IISD2
IISD3
IISD4

IISED
IISHC
IISHF1
IISHF2
IISID

IISIN
IISMD2
IISMF
IISPD2
IISTD

IISTP
IISTR

Link-Edit Statements

The ACTION CLEAR, PHASE, and INCLUDE statements are generated automatically, in accordance with your specifications, when the E.EM20END macro is assembled. For more detailed information on the link-edit statements, refer to the Model 20 emulator publication.

Delete Statements

IIS is the identifier for both the basic Model 20 Emulator and the associated data interchange function. The statement DELETR IIS.ALL causes both the emulator and its data interchange function to be deleted. Unless this is desired, delete the modules one by one:

```
DELETR IISCM
DELETR IISCMS
.
.
.
DELETR IISTR
```

CORE IMAGE LIBRARY

Number of Transients	Number of Library Blocks (Physical Records)
19	32

Transients

```
$$BIISAL
$$BIISAS
$$BIISA2
$$BIISCC
$$BIISCD

$$BIISCF
$$BIISCS
$$BIISDI
$$BIISDP
$$BIISLE

$$BIISM1
$$BIISM2
$$BIISM3
$$BIISM4
$$BIISPR

$$BIISRL
$$BIISTD
$$BIISTS
$$BIISUR
```

Delete Statements

```
DELETC $$BIISAL
DELETC $$BIISAS
.
.
.
DELETC $$BIISUR
```

DATA INTERCHANGE FUNCTION

The Model 20 Data Interchange Function is generated as part of the Model 20 Emulator, under macrc E.EMUDI.

PARTITION SIZE

For further informatiсn, refer tc the Model 20 emulator publication.

SOURCE STATEMENT LIBRARY

Number of Macros	Number of Library Blocks (Physical Records)
1	187

Macrc

```
E.EMUDI
```

Delete Statement

```
DELETS E.EMUDI
```

RELOCATABLE LIBRARY

Number of Modules	Number of Library Blocks (Physical Records)
45	300

Module Name

```
IISCA
IISDA
IISDS
IISEQ
IISF1

IISF2
IISF3
IISF4
IISIB
IISIF
IISIL1

IISIL2
IISIL3
IISIL4
```

```
IISIR1
IISIR2
IISIR3
IISIR4

IISMD
IISMI
IISML
IISMO
IISMR

IISMS
IISSMG
IISSC
IISSCI

IISSCV
IISSQ
IISS1
IISS2
IISS3
IISS4
IISTK

IISTKC
IISTKE
IISTKI
IIST1
IIST2

IIST3
IIST4
IISV1
IISV2
IISV3
IISV4
```

Link-Edit Statements

The link-edit statements are generated automatically, in accordance with your specifications, when the E.EMUDI macro is assembled. For more detailed information, refer to the Model 20 emulator publication.

Delete Statements

IIS is the module identifier for both the Model 20 Emulator and the associated data interchange function. The statement DELETR IIS.ALL causes both the emulator and the data interchange function to be deleted. Data interchange modules must therefore be deleted individually:

```
DELETS IISCA
DELETS IISDA
.
.
.
DELETS IISV4
```

CORE IMAGE LIBRARY

		Number of Library Blocks (Physical Records)
Transients	6	8
Phases	7	7

Transients

```
$$BIISUC
$$BIISUM
$$BIISBI
$$BIISBS
$$BIISEX
$$BIISFM
```

Phases

```
IISMTA
IISMTB
IISMTC
IISMTD
IISMTE

IISMTF
IISMTG
```

Delete Statements

```
DELETC $$BIISUC
DELETC $$BIISUM
.
.
.
DELETC $$BIISFM

DELETC IISMTA
DELETC IISMTB
.
.
.
DELETC IISMTG
```

Module 7: Compiler IOCS Modules --5745-SC-IOM

Modular Outline

Modular Index

# TRANSIENTS	CIL BLOCKS
20	22

CORE IMAGE LIBRARY

Transients

$$BCBLIS
$$BCBLOP
$$BCBODA
$$BCBUSR
$$BCBUSW

$$BCOBER
$$BCOBR1
$$BFCMUL
$$BPLOSE
$IJKS00

$IJKS10
$IJKS20
$IJKS30
$IJKS40
$IJKS50

$IJKS60
$IJKS70
$$BMU100
$$BMU200
$$BMU300

Module 7 indicates the names of the preassembled modules shipped by IBM in the relocatable library, their sizes in bytes, their external storage requirements in library blocks, and the compilers that create linkage for their use. No IOCS modules are required for FORTRAN. An x in a column headed by a compiler indicates that the particular module may be linked by that compiler to the problem program. For example, an x in the columns headed by COBOL and PL/I indicates that COBOL and PL/I link the module so identified. For assembler language programs, the user can preassemble IOCS modules as described in DOS/VS Supervisor and I/O Macros, GC33-5373. Note that separate modules are not assembled for DTFCN or DTFSR.

The preassembled modules named in this module can be used by any other problem program whenever applicable.

	Modules	Blocks
	223	1247
Am. Nat. St. COBOL	132	864
Am. Nat. St. COBOL & COBOL	158	1053
Am. Nat. St. COBOL & PL/I	163	970
Am. Nat. St. COBOL, COBOL & PL/I	341	1134
COBOL	77	548
COBOL & PL/I	107	662
PL/I	70	400
Required IOCS Modules	27	84

Note: Certain preassembled IOCS modules are required when cataloging IBM components to the core image library. Do not delete these modules from the relocatable library until after all the IBM components you desire have been cataloged to the core image library. The modules are found in "Required IOCS Modules".

Relocatable Module Naming Conventions

Each module name begins with a 3-character prefix and consists of a 5-character field corresponding to the option permitted in generation of the module. The following 3-character prefixes identify the preassembled IOCS modules shipped by IBM:

IJC I/O Card (CDMOD) and 3881 Optical Mark Reader

IJD I/O Printer (PRMOD)

IJF I/O Magnetic Tape (MTMOD)

IJG Sequential Direct Access (SDMOD)

IJH Index Sequential Direct Access (ISMOD)

IJI Direct Access Method (DAMOD)

IJJ Device Independent Access Method (DIMOD)

CDMOD

```
CDMOD name = IJCabcde

a = F  RECFORM=FIXUNB (always for INPUT and CMBND files)
  = U  RECFORM=UNDEF
  = V  RECFORM=VARUNB

b = A  CTLCHR=ASA (not specified  CMBND)
  = C  CONTROL=YES
  = Y  CTLCHR=YES
  = Z  neither CTLCHR nor CONTROL is specified

c = B  RDONLY=YES and TYPEFLE=CMBND
  = C  TYPEFLE=CMBND
  = H  RDONLY=YES and TYPEFLE=INPUT
  = I  TYPEFLE=INPUT
  = N  RDONLY=YES and TYPEFLE=OUTPUT
  = O  TYPEFLE=OUTPUT

d = B  WORKA=YES and IOAREA2=YES
  = I  IOAREA2=YES
  = W  WORKA=YES
  = Z  neither WORKA nor IOAREA2 is specified
       (for CMBND files:  WORKA is not specified)

e = 0  DEVICE=2540 or DEVICE=3881
  = 1  DEVICE=1442 or DEVICE=2596
  = 2  DEVICE=2520
  = 3  DEVICE=2501
  = 4  DEVICE=2540 and CRDERR is specified
  = 5  DEVICE=2520 and CRDERR is specified
  = 6  DEVICE=3505
  = 7  DEVICE=3525 and FUNC omitted, FUNC=R or FUNC=P
  = 8  DEVICE=2560 and FUNC omitted, FUNC=R or FUNC=P
  = 9  DEVICE=5425 and FUNC omitted, FUNC=R or FUNC=P
  = A  DEVICE=3525 and FUNC=RP
  = B  DEVICE=3525 and FUNC=RW
  = C  DEVICE=3525 and FUNC=PW
  = D  DEVICE=3525 and FUNC=I
  = E  DEVICE=3525 and FUNC=RPW
  = F  DEVICE=2560 and FUNC=RP
  = G  DEVICE=2560 and FUNC=RW
  = H  DEVICE=2560 and FUNC=PW
  = I  DEVICE=2560 and FUNC=I
  = J  DEVICE=2560 and FUNC=RPW
  = K  DEVICE=5425 and FUNC=RP
  = L  DEVICE=5425 and FUNC=RW
  = M  DEVICE=5425 and FUNC=PW
  = N  DEVICE=5425 and FUNC=I
  = O  DEVICE=5425 and FUNC=RPW
```

CDMOD Names	COBOL	PL/I	Am. Nat. St. COBOL	Bytes of Storage
IJCFAOI0				116
IJCFAOI1	x	x	x	152
IJCFAOI2	x	x		156
IJCFAOI4	x	x	x	264
IJCFAOI5	x		x	248
IJCFAOZ0				92
IJCFAOZ1	x	x	x	128
IJCFAOZ2		x		132
IJCFAOZ4	x	x	x	248
IJCFAOZ5	x		x	224
IJCFCCZ0				218
IJCFCCZ1				132
IJCFCCZ2				218
IJCFCIZ0				158
IJCFCIZ1				132
IJCFCIZ2				158
IJCFYOI0				96
IJCFYOI1		x		132
IJCFYOI2		x		136
IJCFYOI4		x		248
IJCFYOZ0				72
IJCFYOZ1		x		108
IJCFYOZ2		x		112
IJCFYOZ4		x		224
IJCFZII0	x	x	x	136
IJCFZII1	x	x	x	140
IJCFZII2	x	x	x	136
IJCFZII3	x	x	x	136
IJCFZIZ0	x	x	x	104
IJCFZIZ1	x	x	x	108
IJCFZIZ2	x	x	x	104
IJCFZIZ3	x	x	x	104
IJCFZOI1	x	x	x	116
IJCFZOI2		x		124
IJCFZOI4	x	x	x	232
IJCFZOI5	x		x	216
IJCFZOZ1	x	x	x	74
IJCFZOZ2		x		80
IJCFZOZ4	x	x	x	208
IJCFZOZ5	x		x	192
IJCUAOI1			x	164
IJCUAOI4			x	280

CDMOD Names	COBOL	PL/I	Am. Nat. St. COBOL	Bytes of Storage
IJCUAOI5			x	264
IJCUAOZ1			x	140
IJCUAOZ4			x	256
IJCUAOZ5			x	240
IJCUZOI1			x	124
IJCUZOI4			x	240
IJCUZOI5			x	224
IJCUZOZ1			x	104
IJCUZOZ4			x	224
IJCUZOZ5			x	200
IJCVAOI1			x	180
IJCVAOI4			x	296
IJCVAOI5			x	280
IJCVAOZ1			x	156
IJCVAOZ4			x	272
IJCVAOZ5			x	256
IJCVZOI1			x	152
IJCVZOI4			x	272
IJCVZOI5			x	248
IJCVZOZ1			x	128
IJCVZOZ4			x	248
IJCVZOZ5			x	224

DAMOD

DAMOD name = IJIabcde

a = B RECFORM=UNDEF (handles both UNDEF and FIXUNB)
  = F RECFORM=FIXUNB
  = S RECFORM=SPNUNB
  = V RECFORM=VARUNB

b = A AFTER=YES
  = Z AFTER is not specified

c = E IDLOC=YES and FEOVD=YES
  = I IDLOC=YES
  = R FEOVD=YES
  = Z neither is specified

d = H ERREXT=YES and RELTRK=YES
  = P ERREXT=YES
  = R RELTRK=YES
  = Z neither is specified

e = W HOLD=YES and RDONLY=YES
  = X HOLD=YES
  = Y RDONLY=YES
  = Z neither is specified

DAMOD Names	COBOL	PL/I	Am. Nat. St. COBOL	Bytes of Storage
IJIBAIRZ			x	1632
IJIBAIZZ	x		x	1220
IJIBAZRZ			x	1220
IJIBAZZZ	x		x	1012
IJIBZIRZ			x	1416
IJIBZIZZ	x		x	1004
IJIBZZRZ			x	1004
IJIBZZZZ	x		x	796
IJIFAIRZ			x	1532
IJIFAIZZ	x		x	1120
IJIFAZRZ			x	1148
IJIFAZZZ	x	x	x	940
IJIFZIRZ			x	1228
IJIFZIZZ	x		x	816
IJIFZZRZ			x	848
IJIFZZZZ	x	x	x	636
IJISAIRZ			x	3684
IJISAIZZ			x	3640
IJISAZRZ			x	3324
IJISAZZZ			x	3324
IJISZIRZ			x	2680
IJISZIZZ			x	2636
IJISZZRZ			x	2320
IJISZZZZ			x	2320

DIMOD

DIMOD name = IJJabcde

a = F RECFORM=FIXUNB
b = C always
c = B TYPEFLE=OUTPUT (processes both input and output)
  = I TYPEFLE=INPUT
d = I IOAREA2=YES
  = Z IOAREA2 is not specified
e = C RDONLY=YES
  = D RDONLY is not specified

DIMOD Names	PL/I	Bytes of Storage
IJJFCBID	x	1055
IJJFCBZD	x	903
IJJFCIID	x	566
IJJFCIZD	x	454

Note: See "Required IOCS Modules" before deleting modules with the IJJ prefix.

ISMOD

ISMOD name = IJHabcde

a = A RECFORM=BOTH and IOROUT=ADD or ADDRTR
  = B RECFORM=FIXBLK and IOROUT=ADD or ADDRTR
  = U RECFORM=FIXUNB and IOROUT=ADD or ADDRTR
  = Z RECFORM is not specified and IOROUT=LOAD or RETRVE

b = A IOROUT=ADDRTR
  = I IOROUT=ADD
  = L IOROUT=LOAD
  = R IOROUT=RETRVE

c = B TYPEFLE=RANSEQ
  = G IOAREA2=YES and TYPEFLE=SEQNTL or IOROUT=LOAD
  = R TYPEFLE=RANDOM
  = S TYPEFLE=SEQNTL
  = Z neither is specified and IOROUT=LOAD or ADD

d = B CORINDX=YES and HOLD=YES
  = C CORINDX=YES
  = O HOLD=YES
  = Z neither specified

e = F CORDATA=YES, ERREXT=YES, and RDONLY=YES
  = G CORDATA=YES and ERREXT=YES
  = O CORDATA=YES and RDONLY=YES
  = P CORDATA=YES
  = S ERREXT=YES and RDONLY=YES
  = T ERREXT=YES
  = Y RDONLY=YES
  = Z nothing is specified

ISMOD Names	COBOL	PL/I	Am. Nat. St. COBOL	Bytes of Storage
IJHAABCP			x	
IJHAABCZ			x	
IJHAABZP			x	
IJHAABZZ	x			4802
IJHAARCP	x	x	x	4570
IJHAARCZ	x	x	x	4198
IJHAARZP	x	x	x	4288
IJHAARZZ	x	x	x	3916
IJHAASZZ	x			4090
IJHAIZZZ	x			3196
IJHBABCP			x	5208
IJHBABCZ			x	4836
IJHBABZP			x	4930
IJHBABZZ	x		x	4558
IJHBARCP	x	x	x	4326
IJHBARCZ	x	x	x	3950
IJHBARZP		x	x	4048
IJHBARZZ	x	x	x	3672
IJHBASZZ	x			3844
IJHBIZZZ	x			2950
IJHUABCP			x	4940
IJHUABCZ			x	4624
IJHUABZP			x	4658
IJHUABZZ	x		x	4342
IJHUARCP	x	x	x	4058
IJHUARCZ	x	x	x	3738
IJHUARZP	x	x	x	3776
IJHUARZZ	x	x	x	3456
IJHUASZZ	x			3630
IJHUIZZZ	x			2736
IJHZLZZZ	x	x	x	823
IJHZRBCZ	x		x	2550
IJHZRBZZ	x		x	2374
IJHZRRCZ	x	x	x	1668
IJHZRRZZ	x	x	x	1492
IJHZRSZZ	x	x	x	1234

MTMOD

MTMOD name = IJFabcde

a = F RECFORM=FIXUNB or FIXBLK
  = S RECFORM=SPNUNB or SPNBLK
  = U RECFORM=UNDEF
  = V RECFORM=VARUNB or VARBLK

  = N RECFORM=UNDEF and ASCII=YES
  = R RECFORM=VARUNB or VARBLK, and ASCII=YES
  = X RECFORM=FIXUNB or FIXBLK, and ASCII=YES

b = B READ=BACK
  = Z READ=FORWARD, or READ is <u>not</u> specified

c = C CKPTREC=YES
  = Z CKPTREC is not specified

d = W WORKA=YES is specified
  = Z WORKA is not specified

e = M ERREXT=YES and RDONLY=YES
  = N ERREXT=YES
  = Y RDONLY=YES
  = Z neither is specified

MTMOD Names	COBOL	PL/I	Am. Nat. St. COBOL	Bytes of Storage
IJFFBCZZ	x			904
IJFFBZZN			x	880
IJFFBZZZ		x		784
IJFFZCZZ			x	784
IJFFZZZZ		x	x	688
IJFSZZWN			x	2104
IJFUBCZZ	x			696
IJFUBZZZ		x		576
IJFUZZZN			x	656
IJFUZZZZ		x	x	560
IJFVBCWZ	x			1128
IJFVBCZZ	x			1000
IJFVZCWZ				1064
IJFVZZZN			x	920
IJFVZZZZ		x	x	824

Name list for workfile type modules (TYPEFLE=WORK):

MTMOD name = IJFabcde

a = W always

b = E ERROPT=YES
  = Z ERROPT is not specified

c = N NOTEPNT=YES
  = S NOTEPNT=POINTS
  = Z NOTEPNT is not specified

d = Z always

e = M ERREXT=YES and RDONLY=YES
  = N ERREXT=YES
  = Y RDONLY=YES
  = Z neither is specified

System I/O Modules

IJFWEZZZ
IJFWZNZZ
IJFWZZZZ

Note: See "Required IOCS Modules" before deleting modules with the IJF prefix.

PRMOD

PRMOD name = IJDabcde

a = F RECFORM=FIXUNB
  = V RECFORM=VARUNB
  = U RECFORM=UNDEF

b = A CTLCHR=ASA
  = Y CTLCHR=YES
  = C CONTROL=YES
  = S STLIST=YES
  = Z neither CTLCHR nor CONTROL nor STLIST is specified
  = U DEVICE=2560
  = V DEVICE=5425

c = B ERROPT=YES (ERROPT=name in DTFPR) and PRINTOV=YES
  = P PRINTOV=YES, DEVICE is not a 3525, and ERROPT is not specified
      (ERROPT=RETRY or omitted in DTFPR)
  = I PRINTOV=YES, DEVICE=3525, and FUNC=W T or omitted
  = F PRINTOV=YES, DEVICE=3525, and FUNC=RW T
  = C PRINTOV=YES, DEVICE=3525, and FUNC=PW T
  = D PRINTOV=YES, DEVICE=3525, and FUNC=RPW T
  = Z neither ERROPT (ERROPT=RETRY or omitted in DTFPR) nor PRINTOV is
      specified, and DEVICE is not a 3525
  = O PRINTOV=YES is not specified, DEVICE=3525 and FUNC=W T or omitted
  = R PRINTOV=YES is not specified, DEVICE=3525 and FUNC=RW T
  = S PRINTOV=YES is not specified, DEVICE=3525 and FUNC=PW T
  = T PRINTOV=YES is not specified, DEVICE=3525 and FUNC=RPW T
  = E ERROPT=YES (ERROPT=name in DTFPR) and PRINTOV=YES is not specified
  = U DEVICE=2560 or 5425 and FUNC=W or omitted
  = V DEVICE=2560 or 5425 and FUNC=RW
  = W DEVICE=2560 or 5425 and FUNC=PW
  = X DEVICE=2560 or 5425 and FUNC=RPW

d = I IOAREA2=YES
  = Z IOAREA2 is not specified

e = V RDONLY=YES and WORKA=YES
  = W WORKA=YES
  = Y RDONLY=YES
  = Z neither is specified

PRMOD Names	COBOL	PL/I	Am. Nat. St. COBOL	Bytes of Storage
IJDFAPIZ	x		x	280
IJDFAPZZ	x		x	268
IJDFAZIZ		x		220
IJDFAZZZ		x		196
IJDFYPIZ			x	152
IJDFYPZZ	x		x	140
IJDFYZIZ		x		96
IJDFYZZZ		x		72
IJDFZPIZ	x	x	x	152
IJDFZPZZ	x	x	x	118
IJDUAPIZ			x	292
IJDUAPZZ			x	280
IJDUYPIZ			x	164
IJDUYPZZ			x	152

IJDUZPIZ	x	160
IJDUZPZZ	x	148
IJDVAPIZ	x	312
IJDVAPZZ	x	296
IJDVYPIZ	x	184
IJDVYPZZ	x	168
IJDVZPIZ	x	188
IJDVZPZZ	x	172

SDMOD

SDMODxx name = IJGabcde

a = C RECFORM=FIXUNB or FIXBLK and HOLD=YES
  = F RECFORM=FIXUNB or FIXBLK and HOLD is not specified
  = P RECFORM=SPNUNB or SPNBLK and HOLD=YES
  = Q RECFORM=SPNUNB or SPNBLK and HOLD is not specified
  = R RECFORM=UNDEF and HOLD=YES
  = S RECFORM=VARUNB or VARBLK and HOLD=YES
  = U RECFORM=UNDEF and HOLD is nct specified
  = V RECFORM=VARUNB or VARBLK and HOLD is not specified

b = I SDMODxI
  = O SDMODxO
  = U SDMODxU

c = C ERROPT=YES and ERREXT=YES
  = E ERROPT=YES
  = Z neither is specified

d = M TRUNCS=YES and FEOVD=YES
  = T TRUNCS=YES
  = W FEOVD=YES
  = Z neither is specified

e = B CONTROL=YES and RDONLY=YES
  = C CONTROL=YES
  = Y RDONLY=YES
  = Z neither is specified

SDMOD Names	COBOL	PL/I	Am. Nat. St. COBOL	Bytes of Storage
IJGFIETZ	x	x		746
IJGFIEWZ			x	670
IJGFIEZZ	x	x		614
IJGFIZZZ	x			470
IJGFOEWZ			x	718
IJGFOEZZ		x		630
IJGFOZZZ	x			566
IJGFUETZ		x		1102
IJGFUEWZ			x	1054
IJGFUEZZ		x		998
IJGFUZZZ	x			834
IJGQIEWZ			x	1157
IJGQIEZZ			x	1113
IJGQOEWZ			x	2409
IJGQOEZZ			x	2317
IJGQUEWZ			x	2662
IJGQUEZZ			x	2598
IJGUIEWZ			x	685

IJGUIEZZ	x	x		641
IJGUIZZZ	x			541
IJGUOEWZ			x	801
IJGUOEZZ		x		721
IJGUOZZZ	x			653
IJGUUEWZ			x	1153
IJGUUEZZ		x		1097
IJGUUZZZ	x			949
IJGVIEWZ			x	785
IJGVIEZZ	x	x		741
IJGVIZZZ	x			637
IJGVOEWZ			x	1229
IJGVOEZZ		x		1137
IJGVOZZZ	x			1065
IJGVUEWZ			x	1346
IJGVUEZZ		x		1282
IJGVUZZZ	x			1106

NAME LIST FOR WORKFILE TYPE MODULES (TYPEFLE=WCRK)

SDMODxx name = IJGabcde

a = T SDMODW specifies HOLD=YES
  = W SDMODW does not specify HOLD=YES

b = C ERROPT=YES and ERREXT=YES
  = E ERROPT=YES
  = Z neither is specified

c = N NOTEPNT=YES
  = R NOTEPNT=POINTRW
  = Z NOTEPNT is not specified

d = C CONTROL=YES
  = Z CONTROL is not specified

e = T RDONLY=YES and UPDATE=YES
  = U UPDATE=YES
  = Y RDONLY=YES
  = Z neither is specified

System I/O Modules

IJGWEZZU
IJGWEZZZ
IJGWZNZZ
IJGWZRZZ

Note: See "Required IOCS Modules" before deleting modules with the IJG prefix.

Required IOCS Modules

The following preassembled IOCS modules are required when cataloging and/or link-editing IBM components to the core image library.

Module Names	Bytes of Storage
IJFWEZZZ	280
IJFWZNZZ	424
IJFWZZZZ	232
IJGFIETZ	746
IJGWEZZU	868
IJGWEZZZ	796
IJGWZNZZ	902
IJGWZRZZ	840
IJJCPA1N	838
IJJCPDV	750
IJJCPDV1	694
IJJCPDV2	358
IJJCPD0	854
IJJCPD0N	798
IJJCPD1	718
IJJCPD1N	762
IJJCPD2	478
IJJCPD3	350
IJJCPV	343
IJJCPV1	271
IJJCPV2	68
IJJCP0	389
IJJCP0N	317
IJJCP1	311
IJJCP1N	239
IJJCP2	128
IJJCP3	58

Module 8: Direct Access --5745-SC-DAM

Modular Outline

Number of Transients	Core Image Library Blocks
8	9

Transients

$$BODACL
$$BODAIN
$$BODAI1
$$BODAO1
$$BODAO2
$$BODAO3
$$BODAO4
$$BODAU1

Number of Macros	Source Statement Library Blocks
3	1,084

SOURCE STATEMENT LIBRARY

File Definition Macros

E.DAMOD
E.DAMODV
E.DTFDA

STORAGE REQUIREMENTS:

Figure 8-1 defines the storage requirements for DAMOD. The following are the storage requirements for DTFDA.

DTFDA (Define The File: Direct-Access Device) Table Requirements

RECFORM=FIXUNB requires 205-225 bytes, depending upon imperative macros used in the DTF.

VERIFY=YES requires 40-80 bytes, depending upon imperative macros used in the DTF.

AFTER=YES requires 80 additional bytes.

RECFORM=SPNUNB requires 282-378 bytes, depending upon the imperative macros used in the DTF.

VERIFY=YES requires 64-72 additional bytes, depending upon the imperative macros used in the DTF.

AFTER=YES requires 88 additional bytes.

RECFORM=UNDEF requires 265-285 bytes, depending upon the imperative macro used in the DTF.

VERIFY=YES requires 40-80 additional bytes, depending upon the imperative macros used in the DTF.

AFTER=YES requires 16 additional bytes.

RECFORM=VARUNB requires 216-330 bytes, depending upon the imperative macros used in the DTF.

VERIFY=YES requires 64-72 additional bytes, depending upon the imperative macros used in the DTF.

AFTER=YES requires 88 additional bytes.

Relative addressing increases the size of the DTF 60-80 bytes plus 8 bytes per extent. (See DOS/VS Supervisor and I/O Macros listed on the front cover of this manual.)

DAMOD (Direct-Access Device Module)

			Formatting Module				
RECFORM=	Basic Module	IDLOC	AFTER	AFTER and IDLOC	RELTRK	HOLD	ERREXT
FIXUNB	636	+180	+304	+484	+212	+84	+28
UNDEF	796	+208	+216	+426	+208	+88	+28
VARUNB	686	+210	+298	+508	+226	+84	+34
SPNUNB	2320	+316	+1004	+1320	---	+104	+32

Notes:

1. Basic Module includes coding to handle either FIXUNB or UNDEF records and the WRITEKY, READKEY, READID, WRITEID, SRCHM, VERIFY, and CONTROL functions.

2. AFTER includes coding to create the file and to handle the RZERO option.

3. IDLOC includes coding to return the record identifier to the user in a location he specifies.

4. Specification of trailer label processing in the DTF increases the size of each module by 50 ± 20 bytes.

5. RDONLY=YES changes the size of the module -50 to +50 bytes. In addition, the user's program must provide a 72-byte save area each time the module is reentered.

6. RELTRK may be specified for SPNUNB records. This specification requires no additional bytes.

Figure 8-1. DAMOD--Storage Requirements

Module 9: 3540 Diskette I/O Unit IOCS --5745-SC-DIO

Modular Outline

Libraries			
Core Image		Source Statement	
Transients	Blocks	Macros	Blocks
20	20	3	492

CORE IMAGE LIBRARY

Transients

$$ABERR7
$$BODIO1
$$BODIO2
$$BODIO3
$$BODIO4

$$BODIO5
$$BODIO6
$$BODIO7
$$BODIO8
$$BODMSG

$$BODMS2
$$BODSMO
$$BODSPO
$$BODUCA
$$BOPEN3

$$BOVDMO
$$BOWDMO
$$B3540I
$$B3540O
$$B35400

SOURCE STATEMENT LIBRARY

File Definition Macros

E.DTFDU
E.DUMODFI
E.DUMODFO

Storage requirements

Figure 9-1 and 9-2 specify the storage required by DTFDU and DUMOD.

DTFDU (Define The File Diskette Unit)

	CMDCHN			
TYPEFLE	1	2	13	26
INPUT	152	160	248	352
OUTPUT	160	168	256	360

Figure 9-1. DTFDU--Storage Requirements

DUMOD (Diskette Unit MODule)

Module Name	Basic Module	RDONLY	ERROPT	ERROPT RDONLY	ERROPT ERREXT	ERROPT ERREXT RDONLY
DUMODFI	788	776	868	848	924	902
DUMODFO	632	594	696	642	1078	1024

Note: For RDONLY=YES, the user's program must provide a 72-byte save area each time the module is reentered.

Figure 9-2. DUMOD--Main Storage Requirements

Module 10: Indexed Sequential Access Method --5745-SC-ISM

Modular Outline

Number of Transients	Core Image Library Blocks
21	28

Transients

$$BCIS0A
$$BENDFF
$$BENDFL
$$BINDEX
$$BOIS01

$$BOIS02
$$BOIS03
$$BOIS04
$$BOIS05
$$BOIS06

$$BOIS07
$$BOIS08
$$BOIS09
$$BORTV1
$$BORTV2

$$BSETFF
$$BSETFG
$$BSETFH
$$BSETFL
$$BSETL
$$BSETL1

Number of Macros	Source Statement Library Blocks
6	2242

SOURCE STATEMENT LIBRARY

Macros

FILE DEFINITION

E.DTFIS
E.ISMOD

IMPERATIVE

E.ENDFL
E.ESETL
E.SETFL
E.SETL

Storage Requirements

Figure 10-1 defines the storage requirements for ISMOD. The storage requirements for DTFIS are:

DTFIS (Define The File Indexed Sequential) Table Requirements:

1. IOROUT=LOAD requires 248 bytes plus 4 bytes per disk extent specified, plus 8 bytes for IOAREA2.

2. IOROUT=ADD requires 530 bytes plus 4 bytes per disk extent specified plus KL (the length of the key).

3. IOROUT=RETRVE requires 276 bytes plus 4 bytes per disk extent specified, when TYPEFLE=SEQNTL.

4. IOROUT=RETRVE requires 292 bytes plus 4 bytes per disk extent specified when TYPEFLE=RANDOM cr RANSEQ.

5. IOROUT=ADDRTR requires 548 bytes plus 4 bytes per disk extent specified plus KL (the length of the key).

6. IOROUT=ADDRTR, TYPEFLE=RANDOM, INDAREA=name, and INDSIZE=n require 572 bytes plus 4 bytes per disk extent.

ISMOD (Indexed Sequential Module)

	IOROUT=									
	LOAD				ADD					
		ERREXT	IOAREA2	ERREXT IOAREA2		CORDATA	ERREXT	HOLD	CORDATA ERREXT	HOLD CORDATA ERREXT
RECFORM=										
FIXUNB					2608	+184	+476	+194	+660	+854
FIXBLK					2822	+272	+498	+186	+770	+956
BOTH	823	+224	+212	+436	3068	+246	+428	+210	+674	+884

Figure 10-1. ISMOD Storage Requirements (Part 1 of 5)

	IOROUT=RETRVE									
	TYPEFLE=									
	RANDOM			SEQNTL				RANSEQ		
		ERREXT	HOLD		ERREXT	IOAREA2	HOLD		ERREXT	HOLD
RECFORM										
FIXUNB										
FIXBLK										
BOTH	1304	+302	+156	1326	+246	+836	+104	2186	+332	+236

Figure 10-1. ISMOD Storage Requirements (Part 2 of 5)

	IORCUT=ADDRTR									
	TYPEFLE=									
	RANDOM					SEQNTL				
		CORDATA	ERREXT	CORDATA ERREXT	HOLD		CCRDATA	IOAREA2	HCLD	ERREXT
RECFORM										
FIXUNB	3252	+320	+534	+718	+304	3502	+94	+386	+278	+510
FIXBLK	3468	+376	+554	+826	+304	3716	+272	+386	+278	+528
BOTH	3712	+372	+588	+834	+320	3962	+274	+386	+294	+558

Figure 10-1. ISMOD Storage Requirements (Part 3 of 5)

	IOROUT=ADDRTR				
	TYPEFLE=RANSEQ				
		CORDATA	ERREXT	CORDATA ERREXT	HOLD
RECFORM=					
FIXUMB	4266	+316	+556	+750	+384
FIXBLK	4494	+372	+584	+856	+384
BOTH	4726	+248	+616	+864	+400

Figure 10-1. ISMOD Storage Requirements (Part 4 of 5)

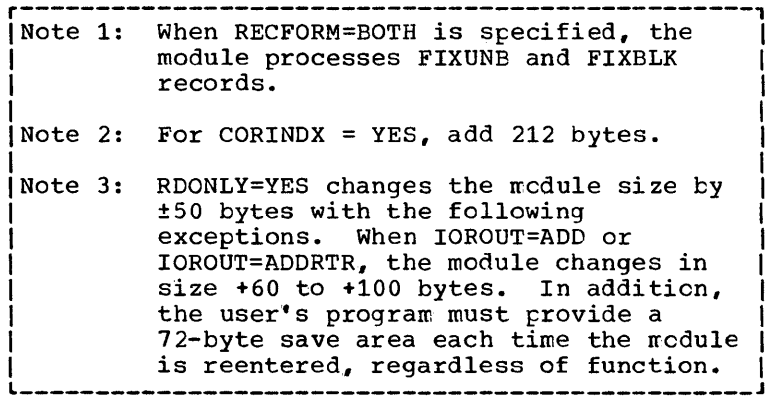

Figure 10-1. ISMOD Storage Requirements (Part 5 of 5)

Module 11: Magnetic Character Reader IOCS --5745-SC-MCR

Modular Outline

Libraries			
Core Image		Source Statement	
Transients	Blocks	Macros	Blocks
4	4	6	278

CORE IMAGE LIBRARY

Transients

$$ABERRS Error Recovery Procedure
$$BCMR01 CLOSE
$$BMMR20 Message Writer
$$BOMR01 OPEN

SOURCE STATEMENT LIBRARY

Macros

FILE DEFINITION

E.DTFMR
E.MRMOD

IMPERATIVE

E.DISEN
E.LITE

SAMPLE PROBLEMS

Z.MCR1
Z.MCR2

STORAGE REQUIREMENTS

DTFMR (Define The File Magnetic Character Reader) Table Requirements:

If ADDRESS=DUAL is specified, the table requires 264 bytes.

If ADDRESS=DUAL is not specified, the table requires 250 bytes.

MRMOD (Magnetic Character Reader Module)

If ADDRESS=DUAL is specified, the module requires 1,050 bytes.

If ADDRESS=DUAL is not specified, the module requires 946 bytes.

Sample Problems

	Disk Extent Number			
Phase	1	2	3	4
ASSEMBLE	SYSLNK	SYS001	SYS002	SYS003
LINKEDIT	SYSLNK	SYS001	-	-
EXECUTE	-	-	-	-

Figure 11-1. MICR--Sample Problem File Requirements

Cards Retrieved	Card Cols. 73-76	Card Cols. 77-80
CATALS Z.MCR1 BKEND Z.MCR1 MCR1 Source Deck (71 Cards) BKEND	$477	0001-0071
CATALS Z.MCR2 BKEND Z.MCR2 MCR2 Source Deck (115 Cards) BKEND	$477	0001-0115

Figure 11-2. MICR--Sample Problem card Decks

SAMPLE PROBLEM SUMMARY

Figure 11-1 defines the files required for the MICR sample problems. Figure 11-2 shows the sample problem card decks retrieved from the source statement library.

The first 1419 Magnetic Character Reader sample problem processes 500 documents from one magnetic character reader using GET logic. The documents are read into pocket 3 in groups of approximately 50. After each group is read, the 1419 Magnetic Character Reader is disengaged, the batch number is updated, and the pocket light is turned on. All documents are listed on the printer. If the Selective Tape List feature is present on the printer, the documents are listed on the leftmost tape. The controls on the magnetic character reader that must be pressed, if present, are: BATCH NUMBER ON, PROG SORT, and at least one field for the VALIDITY CHECK AND READ OUT control.

The second 1419 Magnetic Character Reader sample problem processes 250 documents from each of two magnetic character readers (both of the same type: both with a single address adapter or both with a dual address adapter), using READ, CHECK and WAITF logic. The only controls that must be pressed are PROG SORT and at least one field for the VALIDITY CHECK AND READ OUT control. Documents from one reader are selected into pockets one or zero depending on whether or not the selected field is present. Documents read in error are rejected, and all data is listed on a printer. If the Selective Tape List feature is present on the printer, data is printed on the leftmost tape.

Documents from the second reader are selected according to a digit in the field read and printed on SYSLST. If manual intervention is required on the second reader, a message is printed on SYSLOG. This message is:

INTERVENTION REQUIRED ON FILE2.

The program names are Z.MCR1 and Z.MCR2. The 1419 sample problems support the 1255/1259.

Instructions show how to remove the following optional features:

1. Dual addressing adapter feature
2. Batch numbering
3. Pocket lights
4. Selective Tape List Feature (Printer)

SYSLOG Output Is:

```
BG // JOB MCR SAMPLE PROBLEMS
BG // PAUSE END OF MCR1 SAMPLE PROBLEM
BG
BG INTERVENTION REQUIRED ON FILE2
BG ECJ MCR
BG // PAUSE END OF MCR SAMPLE PROBLEMS
```

SYSLST Output Summary:

- Job control cards
- External symbol dictionary
- Source program listing
- Relocation dictionary
- Linkage editor input diagnostics
- Linkage editor storage map
- Document data listings

Module 12: Magnetic Tape IOCS --5745-SC-TAP

Modular Outline

Libraries			
Core Image		Source Statement	
Transients	Blocks	Macros	Blocks
18	32	2	973

CORE IMAGE LIBRARY

Transients

$$BCEOV1 Monitor EOV/EOF
$$BCMT01 Tape EOF/EOV input-forward
$$BCMT02 Tape CLOSE-alternate switching
$$BCMT03 Tape CLOSE input-backward
$$BCMT04 Tape EOV output-forward

$$BCMT05 Tape CLOSE
$$BCMT06 Tape CLOSE-work files
$$BCMT07 Tape-alternate switching
$$BOMT0M Tape OPEN message
$$BCMT0W Tape OPEN message

$$BOMT01 Tape OPEN input-forward-standard labels (Phase 1)
$$BOMT02 Tape OPEN input-backward-standard labels
$$BOMT03 Tape OPEN output forward-standard label
$$BOMT04 Tape OPEN output-standard labels
$$BOMT05 Tape OPEN I/O forward/backward nonstandard/unlabeled

$$BOMT06 Tape OPEN workfiles
$$BOMT07 Tape OPEN input-forward-standard labels (Phase 2)
$$BONVOL Tape rewriting

File Definition Macros

E.DTFMT
E.MTMOD

STORAGE REQUIREMENTS

Figures 12-1 and 12-2 define the storage requirements for DTFMT and MTMOD.

DTFMT (Define The File: Magnetic Tape) Table Requirements

TYPEFLE=WORK requires 48 bytes per workfile.

The table requirements for INPUT and OUTPUT files are:

TYPEFLE=	RECFORM =	Basic Size Without STDLABELS	ERROPT, ERREXT (Without STDLABELS)	Basic Size With STDLABELS	ERROPT, ERREXT (With STDLABELS)
INPUT	FIXUNB or FIXBLK	96	*	112	*
	VARUNB or VARBLK	109	*	128	*
	UNDEF	92	*	108	*
	SPNUNB	132	*	132	*
OUTPUT	FIXUNB or FIXBLK	86	+10	104	+4
	VARUNB or VARBLK	98	+10	116	+4
	UNDEF	84	+4	100	+4
	SPNUNB	132	*	132	*

* Included in basic Size of Module.

Figure 12-1. DTFMT--Table Requirements

MTMOD (Magnetic Tape Module)

EBCDIC MAGNETIC TAPE MODULE					
		INDEPENDENT OPTIONS			
RECFORM=	BASIC MODULE	WORKA= YES	CKPRTEC= YES	READ= BACK	ERREXT
FIXUNB/FIXBLK	688	+80	+112	+96	+96
VARUNB/VARBLK	824	+112	+108	+84	+96
UNDEF	560	+80	+120	+16	+96
SPNUNB/SPNBLK	1808	-	+260	+300	+252

Notes:
1. Only one module is required for processing all files having a common RECFORM. This module can be generated with the options charted above. To determine the size of the module with the options, the number of option bytes specified in the chart must be added to the basic module.
2. RDONLY=YES, changes the size of the module -50 to +50 bytes. In addition, the user's program must provide a 72-byte save area each time the module is reentered.

Figure 12-2. MTMOD--Storage Table Requirements (Part 1 of 3)

WORKFILE MODULE			
		NOTEPNT=	
TYPEFLE=WORK	without NOTEPNT	YES	POINTS
without ERROPT	232	424	286
with ERROPT	280	540	380
with ERROPT & ERREXT	436	654	494

Figure 12-2. MTMOD--Storage Table Requirements (Part 2 of 3)

ASCII MAGNETIC TAPE MODULE					
		INDEPENDENT OPTIONS			
RECFORM=	BASIC MODULE	WORKA= YES	CKPRTEC= YES	READ= BACK	ERREXT
FIXUNB/FIXBLK	824	+92		+128	+120
VARUNB/VARBLK	968	+112		+56	+96
UNDEF	656	+80		+8	+96

Figure 12-2. MTMOD--Storage Requirements (Part 3 of 3)

Module 13: IBM 1287 Optical Character Reader IOCS --5745-SC-OCR

Modular Outline

Libraries			
Core Image		Source Statement	
Transients	Blocks	Macros	Blocks
2	2	5	712

CORE IMAGE LIBRARY

Transients

$$ABERRT Error Recovery Procedure
$$BOOR01 OPEN

SOURCE STATEMENT LIBRARY

ORMOD (Optical Reader Module --except for the 3881 Optical Mark Reader)

Macros

FILE DEFINITION

E.DTFOR
E.ORMOD

IMPERATIVE

E.DSPLY
E.RDLNE
E.RESCN

STORAGE REQUIREMENTS

Figure 13-1 defines the storage requirements for ORMOD.

			INDEPENDENT OPTIONS			
DEVICE=	RECFORM=	Basic Module	CONTROL= YES	IOAREA2= YES	WCRKA= YES	IOAREA2= YES and WORKA=YES
1287T/	FIXUNB	892	+220	+76	+60	+96
	FIXBLK	1256	+264	+56	+28	+84
	UNDEF	848	+224	+56	+64	+88
	UNDEF					
	BLKFAC=YES	1180	+268	+56	+24	+80
1287D or 1288	FIXUNB	1360	+184	---	---	---
	UNDEF	1256	+188	---	---	---

Figure 13-1. OPTICAL READER--ORMOD Storage Requirements

DTFOR (Define The File: 1287 Optical Reader) Table Requirements

1. RECFORM=FIXUNB requires 136 bytes.
2. RECFORM=FIXBLK varies as a function of blocking.
   Size = 136 + (16 x blocking factor x number of I/O areas)
3. RECFORM=UNDEF requires 136 bytes.

Sample Problem Summary

The 1288 sample problem is obtained by retrieving the sample problem for the 1287 journal tape mode of operation (Z.CRJT) and changing the cards with the sequence numbers 1058 and 1071 as follows: For both cards change the parameter DEVICE=1287T to DEVICE=1287D. (Refer to the listing containing the source statements for the sample test program for journal tape processing). Figure 13-2 illustrates the files used by both problems, and Figure 13-3 illustrates the card decks that are punched when the sample problem is retrieved.

The sample problem illustrating document processing for the 1287 or 1288 optical reader (Z.ORDC) reads documents for data input into an input area, and then prints this data on SYSLST. Whenever the 1287 or 1288 document hopper empties, press end-of-file or replenish the stack.

Any approved document type may be used because the reference mark and data field coordinates are entered at program execution time. However, the data field chosen to be read may not exceed six characters in length.

Figure 13-4 is a sample input document. The listing contains examples of keyed-in error corrections identified by comments.

Note: When using this program on a 1288, remove the RESCN and DSPLY macro statements within sequence numbers 0091 and 0109.

The sample problem illustrating journal tape mode processing for the 1287 optical reader reads undefined records from the 1287 optical reader into a work area from two I/O areas, and then prints these records on SYSLST.

Any journal tape with a maximum record size of 38 characters is suitable for this sample problem.

Figure 13-5 is a portion of a sample input journal tape.

Disk Extent Number				
Phase	1	2	3	4
Assemble	SYSLNK	SYS001	SYS002	SYS003
Link Edit	SYSLNK	SYS001	-	-
Execute	-	-	-	-

Figure 13-2. OPTICAL READER--Sample Problem

Cards Retrieved	Card Cols. 73-76	Card Cols. 77-80
CATALS Z. CRDC BKEND Z.ORDC Document Mode Source Deck (179 Cards) BKEND	$478	0001-0179
CATALS Z.CRJT BKEND Z.CRJT Journal Tape Source Deck (81 Cards) BKEND	$478	1001-1081

Figure 13-3. OPTICAL READER--Sample problem Card Deck

SYSLOG Output:

```
// JOB OPTICAL READER SAMPLE PROBLEM
EOJ OPTICAL
// PAUSE END OF OPTICAL READER SAMPLE
PROBLEM
```

SYSLST Output Summary:

- Job control cards
- External symbol dictionary
- Source program listing
- Relocation dictionary
- Linkage editor input diagnostics
- Linkage editor storage map
- List of fields read from:
  for document sample problem, or
  for journal tape sample problem

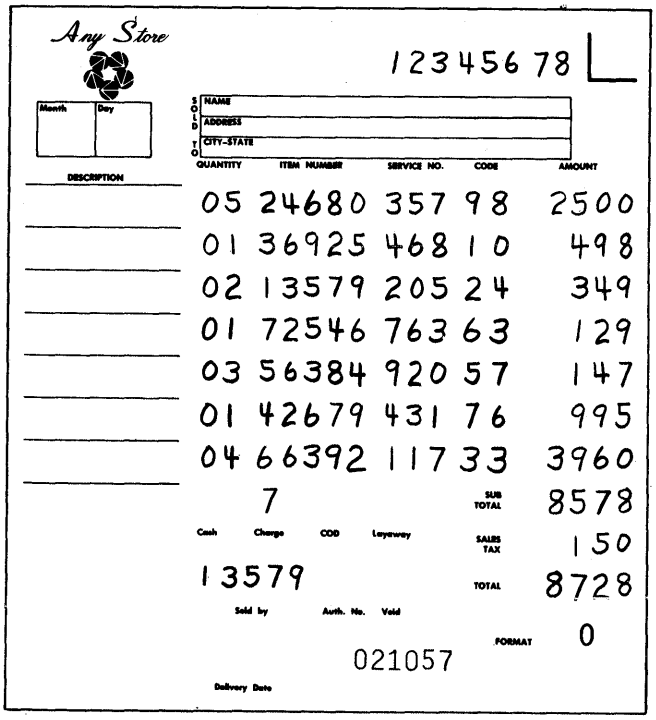

Figure 13-4. OPTICAL READER-- Sample Input Document for Document Mode Processing

```
012 3456 789C
123 4567 890S
234 5678 901T
345 6789 012N
456 7890 123S
567 8901 234X
678 9012 345C
789 0123 456T
890 1234 567Z
901 2345 678/
012 3456 789C
123 4567 890S
234 5678 901T
345 6789 012N
456 7890 123S
567 8901 234X
678 9012 345C
789 0123 456T
890 1234 567Z
901 2345 678/
012 3456 789C
123 4567 890S
234 5678 901T
345 6789 012N
456 7890 123S
567 8901 234X
678 9012 345C
789 0123 456T
890 1234 567Z
901 2345 678/
```

Figure 13-5. OPTICAL READER--Sample Input for Journal Tape Mode Processing

Module 14: IBM 3886 Optical Character Reader IOCS --5745-SC-OCR

Modular Outline

Libraries			
Core Image		Source Statement	
Transients	Blocks	Macros	Blocks
2	2	6	357

CORE IMAGE LIBRARY

Transients

$$ABERAN Error Recovery Procedure
$$BCOR01 OPEN

SOURCE STATEMENT LIBRARY

DRMOD (3886 Optical Character Reader Module)

Macros

1. Format Definition

E.DFR
E.DLINT
E.DLINTIN (Inner macro, used only by the DLINT macro)

2. File Definition

E.DTFDR
E.DRMOD

3. Imperative

E.SETDEV

STORAGE REQUIREMENTS

DRMOD:

(Basic Size = 443 bytes)

Basic + RDONLY=395

Basic + SETDEV=773

Basic + RDONLY + SETDEV=773

DTFDR Table Requirements:

Size = 124+BLKSIZE+FRSIZE

Module 15: Paper Tape IOCS --5745-SC-PTP

Modular Outline

Libraries			
Core Image		Source Statement	
Transients	Blocks	Macros	Blocks
3	4	2	593

CORE IMAGE LIBRARY

Transients

$$ABERRU Error Recovery Procedure (ERP)
$$ABERRV ERP
$$BERPTP ERP - 1018 with error
          correction feature

SOURCE STATEMENT LIBRARY

File Definition Macros

E.DTFPT
E.PTMOD

STORAGE REQUIREMENTS

DTFPT (Define The File: Paper Tape) Table Requirements

INPUT FILE

The possible table specifications and sizes are:

1. No translations, no shifts, and no deletes require 72 bytes.
2. TRANS=name with no shifts and no deletes requires 76 bytes.
3. TRANS=name, SCAN=name, RECFORM=FIXUNB require 110 bytes.
4. TRANS=name, SCAN=name, RECFORM=UNDEF require 94 bytes.

OUTPUT FILE

The possible table specifications and sizes are:

1. No shifts require 69 bytes.
2. Shifts require 83 bytes.

PTMOD (Paper Tape Module)

The module specifications and sizes are specified in Figure 15-1.

	INPUT		OUTPUT
	2671	1017	1018
1. No parameters specified (no translation, no shifts and no deletes)	244	288	
2. TRANS=YES with no shifts and no deletes	310	354	
3. TRANS=YES, SCAN=YES, RECFORM=FIXUNB	536	570	
4. TRANS=YES, SCAN=YES, RECFORM=UNDEF	436	474	
5. No shifts			352
6. Shifts			570

Note: If module 2 is used, all records require translation.

Figure 15-1. PTMOD--Storage Requirements

Module 16: Sequential Disk IOCS --5745-SC-DSK

Modular Outline

Libraries			
Core Image		Source Statement	
Transients	Blocks	Macros	Blocks
22	22	11	5363

CORE IMAGE LIBRARY

Transients

$$BOSDC1
$$BOSDC2
$$BOSDEV
$$BOSDI1
$$BOSDI2

$$BOSDI3
$$BOSDI4
$$BOSDO1
$$BOSDO2
$$BOSDO3

$$BOSDO4
$$BOSDO5
$$BOSDO6
$$BOSDO7
$$BOSDO8

$$BOSDO9
$$BOSDW1
$$BOSDW2
$$BOSDW3
$$BOSD00

$$BOSD01
$$BO2321

SOURCE STATEMENT LIBRARY

File Definition Macros

E.DTFSD
E.SDMODFI
E.SDMODFO
E.SDMODFU
E.SDMODUI

E.SDMODUO
E.SDMODUU
E.SDMODVI
E.SDMODVO
E.SDMODVU
E.SDMODW

STORAGE REQUIREMENTS

Figures 16-1 and 16.2 specify the storage required by DTFSD and SDMOD.

DTFSD (Define The File: Sequential DASD)

	TYPEFLE					
	INPUT		OUTPUT	WORK		
RECFORM=	with UPDATE	without UPDATE		with UPDATE	without UPDATE	CONTROL = YES
FIXBLK or FIXUNB	176	152	160	152	152	+24
VARBLK or VARUNB	192	152	170	---	---	+24
SPNBLK or SPNUNB	240	188	244	---	---	+24
UNDEF	192	152	162	152	152	+24

Figure 16-1. DTFSD--Storage Requirements

SDMOD (SEQUENTIAL DASD MODULE)

Module Name	Basic Module	TRUNCS	CONTROL	ERROPT	HOLD	ERRCPT ERREXT	RECFORM=SPNBLK RECFORM=SPNUNB
SDMODFI	462	+80	+28	+144	*	+228	--
SDMODFO	546	+136	+28	+64	*	+200	--
SDMODFU	798	+88	+28	+164	+96	+252	--
SDMODUI	533		+28	+100	*	+171	--
SDMODUO	653		+28	+68	*	+116	--
SDMODUU	941		+28	+148	+40	+248	--
SDMODVI	729		+28	+104	*	+188	300-400
SDMODVO	1045		+28	+68	*	+120	1050-1150
SDMODVU	1086		+28	+176	+76	+296	1500
SDMODW	572		+22	+148	+10	+246	--

*The HOLD function does not apply to these modules.

Notes:

1. For SDMODW, NOTEPNT=YES requires 206 additional bytes: NOTEPNT=POINTRW requires 144 additional bytes, UPDATE=YES requires 40 additional bytes.

2. RDONLY=YES changes the size of the module -50 to +50 bytes. In addition, the user's program must provide a 72-byte save area each time the module is reentered.

Figure 16-2. SDMOD--Storage Requirements

17

Module 17: VSAM

Modular Outline

VSAM INDEPENDENT COMPONENT RELEASE

CORE IMAGE LIBRARY

	VSAM	AMS
Transients	13	-
Blocks	14	-
Phases	23	65
Blocks	206	232

Transients

$$BCVSAM
$$BCVS02
$$BCVS03
$$BCVS04

$$BJIBFF
$$BJIB00
$$BOCISC
$$BODADE
$$BODADS

$$BOVSAM
$$BOVS01
$$BOVS03
$$BTCLOS

Phases

IDCAL01
IDCAMS
IDCCDAL
IDCCDDE
IDCCDDL

IDCCDLC
IDCCDMP
IDCCDPM
IDCCDPR
IDCCDRP
IDCCDVY

IDCCDXP
IDCDB01
IDCDB02
IDCDE01
IDCDI01

IDCDI02
IDCDI03
IDCDI04
IDCDI05
IDCDI06

IDCDI07
IDCDI08
IDCDI09
IDCDI10
IDCDI11

IDCDI12
IDCDI13
IDCDI14
IDCDI15
IDCDL01

IDCEX02
IDCEX03
IDCIO02
IDCIO03
IDCLC01

IDCMP01
IDCPM01
IDCPR01
IDCRIKT
IDCRILT

IDCRI01
IDCRI02
IDCRI03
IDCRP01
IDCSA04

IDCSA05
IDCTP04
IDCTP05
IDCTSAL0
IDCTSDE0
IDCTSDL0
IDCTSEX0
IDCTSIO0
IDCTSLC0
IDCTSLC1
IDCTSMP0

IDCTSPR0
IDCTSRI0
IDCTSTP0
IDCTSTP1
IDCTSUV0

IDCTSXP0
IDCVY01
IDCXP01
IIPAMDTF
IIPCLOSE

IIPOPEN
IIPPROC
IKQVCAT*
IKQVCLC*

IKQVCLOS*
IKOVDCN
IKQVDNT*
IKQVDUMP
IKQVEDX*

IKQVEOV*
IKQVGEN*
IKQVJIBS*
IKQVLAB*
IKQVLASF

IKQVLASM*
IKQVNEX*
IKQVOPEN*
IKQVPBF*
IKQVRBA*
IKQVRM*
IKQVTMS*

* These VSAM modules can run in the SVA. Note that Access Method Services and some VSAM modules cannot run in the SVA.

RELOCATABLE LIBRARY

Number of Modules	Number of Blocks
201	2052

Transients

$$BCVSAM
$$BCVS02
$$BCVS03
$$BCVS04

$$BJIBFF
$$BJIB00
IIPBMR00
$$BODADE
$$BODADS

$$BOVSAM
$$BOVS01
$$BOVS03
$$BTCLOS

Modules

IDCAL01
IDCCDAL
IDCCDDE
IDCCDDL
IDCCDLC

IDCCDMP
IDCCDPM
IDCCDPR
IDCCDRP
IDCCDVY

IDCCDXP
IDCCMZ1
IDCCMZ2
IDCDB01
IDCDB02

IDCDE01
IDCDI01
IDCDI02
IDCDI03
IDCDI04

IDCDI05
IDCDI06
IDCDI07
IDCDI08
IDCDI09

IDCDI10
IDCDI11
IDCDI12
IDCDI13
IDCDI14

IDCDI15
IDCDL01
IDCEX01
IDCEX02
IDCEX03

IDCIO01
IDCIO02
IDCIO03
IDCLC01
IDCMP01

IDCPM01
IDCPR01
IDCRIKT
IDCRILT
IDCRI01

IDCRI02
IDCRI03
IDCRP01
IDCSA01
IDCSA02

IDCSA03
IDCSA05

IDCTP01
IDCTP04
IDCTP05

IDCTSAL0
IDCTSDE0
IDCTSDL0
IDCTSEX0
IDCTSIO0

IDCTSLC0
IDCTSLC1
IDCTSMP0
IDCTSPR0
IDCTSRI0

IDCTSP0
IDCTSTP1
IDCTSUV0
IDCTSXP0
IDCVY01

IDCXP01
IGG0CLAB
IGG0CLAC
IGG0CLAD
IGG0CLAE

IGG0CLAF
IGG0CLAG
IGG0CLAH
IGG0CLAJ
IGG0CLAK

IGG0CLAL
IGG0CLAN
IGG0CLAP
IGG0CLAQ
IGG0CLAR

IGG0CLAS
IGG0CLAT
IGG0CLAU
IGG0CLAV
IGG0CLAW

IGG0CLAX
IGG0CLAY
IGG0CLAZ
IGG0CLA6
IGG0CLA7

IGG0CLA8
IGG0CLBA
IGG0CLBB
IGG0CLBC
IGG0CLBD

IGG0CLBE
IGG0CLBF
IGG0CLBG
IGG0CLBH
IGG0CLBL

IGG0CLBM
IGG0CLBN
IGG0CLBQ
IGG0CLBR
IGG0CLBS

IGG0CLBT
IGG0CLBU
IGG0CLBW
IGG0CLBX
IGG0CLBY

IGG0CLB8
IGG0CLC9
IIPAMT00
IIPBMR00
IIPCLS00

IIPIIP00
IIPOPN00
IIPPRCMR
IIPPRCPR
IKQALL00

IKQBFA
IKQBLD
IKQCAS
IKQCIS
IKQCLCAT

IKQCLEAN
IKQCLO
IKQCOV00
IKQDCN
IKQDNT

IKQDTLC
IKQDUMP
IKQDUMPC
IKQEDX
IKQEOV

IKQERH
IKQERX
IKQGEN
IKQGNX
IKQGPT

IKQICA
IKQIOB
IKQIXE
IKQIXF
IKQIXS

IKQJIBSM
IKQKRD
IKQLAB
IKQLASFT
IKQLASMD

IKQLCD
IKQLCN
IKQMDY
IKQNCA
IKQNEX

IKQOPN
IKQOPNCT
IKQOPNDO
IKQOPNHC
IKQOPNOV

IKQPBF
IKQPFO
IKQPOP00
IKQRBA
IKQRCL

IKQRDS00
IKQREN00
IKQRQA
IKQRQB
IKQRTV

IKQSCN
IKQSCR00
IKQSFT
IKQSPM
IKQSRT

IKQTMS
IKQUPD
IKQVFY
IKQVSM
IKQVSMLK

IKQVTC00
IKQWDS00
IKQZAP

SOURCE STATEMENT LIBRARY

Number of Macros	Number of Blocks
14	1399

Macros (Edited)

ACB
ENDREQ
ERASE
EXLST
GENCB

IKQCB1
IKQCB2
IKQERMAC
MODCB
POINT
RPL
SHOWCB
TCLOSE
TESTCB

VSAM STORAGE REQUIREMENTS

VIRTUAL STORAGE

Virtual storage must be obtained not only for VSAM phases and work areas, but for its utilities (Access Method Services) and, if required, the ISAM Interface Program. VSAM routines reside in pageable virtual storage. A recommendable approach to allocating storage would be to allocate 240K bytes in any partition in which VSAM will be executing. This basic allocation would also cover any requirement caused when ISAM Interface Program phases are loaded when a VSAM file is processed by an ISAM program.

In addition to the 240K-byte basic allocation, an additional 300K bytes should be allocated in any partition in which Access Method Services will be executing. Note that if VSAM runs in the SVA, only 50K bytes must be allocated in the partition.

VSAM

The following VSAM phases are loaded into virtual storage when a VSAM file is opened:

Function	Phase	Size (bytes)
Record management routines	IKQVRM	25,300
Open routines	IKQVOPEN	10,800
Close routines	IKQVCLOS	3,500
Label processing routines	IKQVLAB	1,300
Catalog routines	IKQVCAT IKQVDCN	120,600
File table routines	IKQVLASM IKQVLASF	1,500
TOTAL		163,000

When certain other conditions are encountered in VSAM processing, other

phases will be loaded into virtual storage. These phases remain in virtual storage with the originally loaded phases until the job step is ended. The following additional phases can be loaded:

Condition	Phase	Size (bytes)
I/O forced to completion (during Close, for example)	IKQVPBF	700
Shared option 4 used and (1) a control area must be split or (2) the file is extended	IKQVRBA	1,000
A new extent is needed when file is extended	IKQVNEX	3,400
GENCB macro is used by the processing program	IKQVGEN	2,100
MODCB, SHOWCB, or TESTCB macro is used by the processing program	IKQVTMS	2,100
A non-contiguous range of RBAs is encountered	IKQVEDX	2,200
Non-VSAM file entry in VSAM catalog is processed	IKQVDNT	400
A new volume must be mounted	IKQVEOV	1,200
DASD file protection option is included in DOS/VS system	IKQVJIBS	1,100
VSAM Close or Record Management routines must update the VSAM catalog	IKQVCLC	2,200
Programmer specifies that VSAM control blocks are to be dumped	IKQVDUMP	7,500
Programmer specifies that VSAM phases in the Core Image Library are to be changed	IKQZAP	4,500
Programmer requests VTOC cleanup and scratching of protected VSAM files	IKQSCR	18,000
TOTAL		46,400

In addition, virtual storage must be provided for buffers and control blocks obtained by the phases mentioned above.

The user should allow approximately 50K bytes for VSAM buffers and control blocks. The control block requirements depend primarily on the number of files to be open in the partition. The minimum amount of buffer space allowed for a file is found in the VSAM catalog. The user can allocate more than the minimum buffer space when a file is processed (see DOS/VS Supervisor and I/O Macros). Note that phases IKQSCR, IKQVDUMP, and IKQZAP are requested separately by the programmer and cannot run in the SVA. If these phases are loaded, up to 30K additional storage will be required in the user's partition.

ISAM Interface Program

When a VSAM file is processed by an ISAM program, the ISAM Interface phases are loaded into virtual storage along with the VSAM phases. The following ISAM Interface phases are loaded when the ISAM program is opened:

Function	Phase	Size (bytes)
Open routines	IIPOPEN	800
Processing routines	IIPPROC	3,300
Close routines	IIPCLOSE	500
ISAM Interface DTF	IIPAMDTF	200
TOTAL		4,800

Access Method Services

Access Method Services requires up to 300K bytes of virtual storage.

MINIMUM REAL STORAGE

To avoid excessive paging, enough real storage should be available for VSAM buffers, control blocks, and frequently used control sections of phase IKQVRM. The recommended minimum amount of real storage is:

VSAM routines*	13,550 bytes
Buffers	3,050 bytes
Control blocks	750 bytes
Total	17,350 bytes

* VSAM routines include the following modules of phase IKQVRM:

IKQBLD
IKQBFA00
IKQBFB00
IKQGPT
IKQIOA00

IKQIOB00
IKQIXS00
IKQKRD
IKQLCD
IKQLCN

IKQMDY
IKQRCA
IKQRTV
IKQSCN
IKQSRT
IKQUPD

Module 18: Assembler --5745-SC-ASM

Modular Outline

CORE IMAGE LIBRARY

	Phase	Blocks
Assembler	19	120
ESERV	7	40

Phases

Assembler

ASSECA
ASSEDA
ASSEEA

ASSEFA
ASSEGA
ASSEHA
ASSEIA
ASSEJA

ASSEKA
ASSELA
ASSEMA
ASSEMBLY
ASSEOA
ASSEQA

ASSERA
ASSERB
ASSERC
ASSESA
ASSETA

ESERV

ESERV
ESERVB
ESERVD
ESERVE
ESERVF

ESERVG
ESERVI

RELOCATABLE LIBRARY

	Modules	Blocks
Assembler	38	605
ESERV	10	213

Modules

Assembler

IPKAA
IPKAB
IPKAC
IPKAD

IPKAE
IPKAF
IPKAG
IPKAH
IPKAI

IPKAJ
IPKBA
IPKCA
IPKCB
IPKCC

IPKCD
IPKDA
IPKDB
IPKEA
IPKFA

IPKGA
IPKHA
IPKIA
IPKIC
IPKJA

IPKKA
IPKLA
IPKLINK
IPKMA
IPKNA
IPKOA

IPKPA
IPKQA
IPKRA
IPKRB
IPKRC

IPKSA
IPKSB
IPKTA

Link-Edit Statements

```
  INCLUDE IPKLINK
/*
// EXEC LNKEDT
```

ESERV

IPKESERV
IPKVA
IPKVB

IPKVD
IPKVE

IPKVF
IPKVG
IPKVI
IPKVK
IPKVM

Link-Edit Statements

```
  INCLUDE IPKESERV
/*
// EXEC LNKEDT
```

Note: When link-editing the ESERV program, the Link-Edit Map will contain one unresolved address constant (IPKAB103). This is a symbol used in the Assembler only.

SOURCE STATEMENT LIBRARY

Number of Macros	Source Statement Library Blocks
2	44

Macros

E.IVPASLC
E.IVPASLS

Workfiles

To determine the number of bytes required for the assembler workfiles, use the following formulas:

SYS001: Whichever is the larger of

60(ITXT+SM)

and

60(SM+LM)

SYS002: Whichever is the larger of

60(ITXT+SM)

and

40.ETXT

SYS003: If option NOXREF is in effect:

60.OTXT

If option XREF is in effect:

100.OTXT

SYSLNK: 15.ETXT

where

ITXT = Total number of statements on SYSIPT.

OTXT = Total number of statements on SYSLST.

SM = Number of statements in source macro definitions.

ETXT = OTXT IS SM - number of comment statements.

IM = Number of statements in library macro definitions called by the program.

The approximate number of tracks can be computed by dividing the number of bytes by 6000 for a 2314/2319 file, by 12000 for a 3330 file.

Module 19: OLTEP --5745-SC-OLT

Modular Outline

PARTITION SIZE

14,336 bytes
18,432 bytes with RETAIN active

CORE IMAGE LIBRARY

	Phases	Blocks
OLTEP	47	81
B-Transients	2	2

Phases

IJZACEOM
IJZACOMP
IJZACONV

IJZADO00
IJZADO02
IJZADO03
IJZADO07
IJZADO10

IJZADO11
IJZADO16
IJZADO21
IJZADO22
IJZADO24

IJZADO26
IJZADO28
IJZADO31
IJZADO32
IJZADO33

IJZADO35
IJZADO36
IJZADO37
IJZADO39
IJZADO40

IJZADO41
IJZADO42
IJZADO43
IJZADO44
IJZADO45

IJZADO47
IJZADO49
IJZADO52
IJZADO56
IJZADO57
IJZADO62

IJZADO64
IJZADO70
IJZADO71
IJZADO76
IJZADO77

IJZADO78
IJZADOAA
IJZADOAB

IJZADOAJ
IJZADOLD
IJZADOLT
IJZACPUT
IJZARATA

B-Transients

$$BOLTEP
$$BTOLTP

Note: The B-Transients are cataloged into the core image library along with the OLTEP component.

CONFIGURATION DATA SET

A Configuration Data Set (CDS) is required in the core image library for each device on the system and one for the CPU. This is the formula for calculating the block requirements:

$$\frac{\text{number of devices on system} + 1}{6} = \text{number of core image library blocks}$$

ONLINE TESTS (OLTS)

The number of core image library blocks required for the Online Tests (OLTs) is dependent on the number of devices types on the system, and the number and size of the OLTs needed to test these devices. This information can be found in the writeup that accompanies the OLTs.

GENERATING THE OLT/CDS LIBRARY

The Program Information Department (PID) supplies a master tape or disk (if the system has no tape drives) to the Customer Engineer. This tape contains OLTSEP, SOSP, and OLTs. The EDITDOS program of the Standalone Service Program (SOSP) is used to create OLT and CDS input for the DOS Linkage Editor. This input can be created on disk or tape.

The Job Control statements required to link the OLTs and CDSs into the core image library are as follows:

Tape Input

```
// JOB    XXXXXXXX
assign work files for the Linkage Editor,
if necessary

// ASSGN SYSIN,X'cuu'

where cuu is the address of the tape drive.
```

Disk Input

```
// JOB    XXXXXXXX

assign work files for the Linkage Editor,
if necessary

// DLBL IJSYSIN,'EDITPACK'
// ASSGN SYSIN,X'cuu'

where cuu is the address of the disk drive.
```

The OLTs and CDSs are required to run tests under OLTEP. The customer engineer will create the library using the specified procedure. This procedure is also used to add new OLTs and/or CDSs when devices are added to the system.

RELOCATABLE LIBRARY

Modules	Blocks
50	400

Modules

```
IJZABOOK
IJZACEOM
IJZACOMP
IJZACONV
IJZADO00

IJZADO02
IJZADO03
IJZADO07
IJZADO10
IJZADO11

IJZADO16
IJZADO21
IJZADO22
IJZADO24
IJZADO26
IJZADO28
IJZADO31
IJZADO32
IJZADO33
IJZADO35

IJZADO36
IJZADO37
IJZADO39
IJZADO40
IJZADO41

IJZADO42
IJZADO43
IJZADO44
IJZADO45
IJZADO47

IJZADO49
IJZADO52
IJZADO56
IJZADO57
IJZADO62

IJZADO64
IJZADO70
IJZADO71
IJZADO76
IJZADO77

IJZADO78
IJZADOAA
IJZADOAB
IJZADOAJ
IJZADOLD

IJZADOLT
IJZAOLTP
IJZACPUT
IJZARATA
IJZATOLT
```

Link-edit Statements

```
   INCLUDE IJZABOOK
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJZ.ALL
```

Module 20: BTAM --5745-SC-BTM

Modular Outline

Modular Index

CORE IMAGE LIBRARY

	Phases	Blocks
BTAM On-Line Terminal Test Patterns:	52	52
Transients	8	14
BTAM Transient Routines (other than Test Patterns)	19	20

BTAM Online Terminal Test Pattern Phase Identification

Phase Names	Test Patterns for Online Terminal Tests
IJLBOT02	Transparent EBCDIC Message
IJLBOT03	USASCII Transparency Message
IJLBOT04	Normal EBCDIC Message
IJLBOT05	Normal USASCII Message
IJLBOT06	Alphameric USASCII Message
IJLBOT07	USASCII Printer Message
IJLBOT08	USASCII Punch Message
IJLBOT09	TRANSCODE Printer Message
IJLBOT10	TRANSCODE Punch Message
IJLBOT11	TRANSCODE Multipoint Message
IJLBOT12	EBCDIC Printer Message
IJLBOT13	EBCDIC Punch Message
IJLBOT14	EBCDIC Alphameric Message
IJLBOT15	EBCDIC Weak Pattern Message for Switched Line
IJLBOT16	EBCDIC Weak Pattern Message for Leased Line
IJLBOT17	TRANSCODE Weak Pattern Message for Switched Line
IJLBOT18	TRANSCODE Weak Pattern Message for Leased Line
IJLBOT19	EBCDIC Weak Pattern for OLE SYN Insertion
IJLBOT20	EBCDIC 80-Character Transparent Message
IJLBOT21	EBCDIC 120-Character Transparent Message
IJLBOT22	EBCDIC 144-Character Transparent Message
IJLBOT23	3270 Basic EBCDIC Test Pattern
IJLBOT24	3270 Model 1 Align EBCDIC Test Pattern
IJLBOT25	3270 Model 2 Align EBCDIC Test Pattern
IJLBOT26	3270 Orders EBCDIC Test Pattern
IJLBOT27	3270 Universal Character Set Test Pattern
IJLBOT28	3270 NL/EOM Printer EBCDIC Test Pattern
IJLBOT29	3270 Basic ASCII Test Pattern
IJLBOT30	3270 Model 1 Align ASCII Test Pattern
IJLBOT31	3270 Model 2 Align ASCII Test Pattern
IJLBOT32	3270 Orders ASCII Test Pattern
IJLBOT33	3270 Universal Character Set Test Pattern
IJLBOT34	3270 NL/EOM Printer ASCII Test Pattern
IJLT2ALC	All Character Test for IBM 2848
IJLT2ROT	Rotate Test for IBM 2848

IJLT2TLT	Tilt Test for IBM 2848
IJLT2TWS	Twist Test for IBM 2848
IJLT3ALC	All Character Test for IBM 1030
IJLT3ROT	Rotate Test for IBM 1030
IJLT3SLA	Analyzer Test for IBM 1030 (SELECTRIC)
IJLT3TLT	Tilt Test for IBM 1030
IJLT3TWS	Twist Test for IBM 1030
IJLT5ALC	All Character Test for IBM 1050 or 2740
IJLT5ROT	Rotate Test for IBM 1050 or 2740
IJLT5SLA	SELECTRIC Analyzer Test for IBM 1050 or 2740
IJLT5TLT	Tilt Test for IBM 1050 or 2740
IJLT5TWS	Twist Test for IBM 1050 or 2740
IJLT6ALC	All Character Test for IBM 1060
IJLT6ROT	Rotate Test for IBM 1060
IJLT6SLA	SELECTRIC Analyzer Test for IBM 1060
IJLT6TLT	Tilt Test for IBM 1060
IJLT6TWS	Twist Test for IBM 1060

BTAM Transients

$$ABERP1	Control handler for BTAM special message writer and error statistics recorder
$$ABERP2	BSC online test message writer
$$ABERP3	Console special message writer
$$ABERP4	Remote 3270 status/sense error recorder
$$ABERP5	Error recovery message writer, phase 1
$$ABERP6	Error recovery message writer, phase 2
$$ABERP7	Error recovery message writer, phase 3
$$ABERP8	RMSR record builder
$$ABERP9	Free areas from real storage
$$BBT3SC	OLTEP device assignment
$$BBT3SI	OLTEP device assignment initiation
$$BCTC01	CLOSE routine
$$BETPRT	Error threshold message
$$BHDRCK	Terminal test request validation and comparison
$$BLEPRT	Line error print routine
$$BLOPEN	OPEN routine
$$BOTC01	OPEN routine
$$BOTC02	OPEN for local devices routine
$$BRESPL	Reset Polling Lines
$$BTCNCL	Cancel routine
$$BTMEBG	Terminal test request - IBM 1030 Manual Entry and Badge Reader
$$BT1030	Terminal test module - IBM 1030
$$BT1050	Terminal test module - IBM 1050
$$BT1060	Terminal test module - IBM 1060
$$BT2260	Terminal test module - IBM 2260
$$BT2740	Terminal test module - IBM 2740
$$BT2848	Terminal test module - IBM 2848

RELOCATABLE LIBRARY

Modules	Blocks
65	177

Modules

Module Name	Description	Bytes of Storage
CONCURRENT_OLTEP		
BT3270SC	Concurrent OLTEP Set-up	2535
IJLZSCAN		5796
CHANNEL_PROGRAM		
(For start-stop, the modules include a table of special characters.)		
IJL0EZ	WTTA	124
IJL00Y	IBM 7770	76
IJL01J	IBM 1030 (Auto Poll)	187
IJL01Z	IBM 1030	139
IJL02J	IBM 1060 (Auto Poll)	175
IJL02Z	IBM 1060	127
IJL03Z	IBM 2848 Remote	209
IJL04Z	AT&T 83B3	78
IJL05Z	Western Union 115A	72
IJL06Z	Table Generation for 2260 Local Channel Program	16
IJL07J	IBM 1050 Nonswitched (Auto Poll)	132
IJL07Y	IBM 1050 Switched	202
IJL07Z	IBM 1050 Nonswitched	124
IJL08H	IBM 2740 with Station Control (Auto Poll)	97
IJL08M	IBM 2740 with Dial, Transmit Control, and Checking	176
IJL08P	IBM 2740 with Station Control and Checking	132
IJL08Q	IBM 2740 with Dial and Checking	172
IJL08R	IBM 2740 with Checking	141
IJL08U	IBM 2740 with Dial and Transmit Control	122
IJL08X	IBM 2740 with Station Control	92
IJL08Y	IBM 2740 with Dial	114
IJL08Z	IBM 2740 Basic	93
IJL081	IBM 2740 and OIU with Dial and Checking	246
IJL082	IBM 2740 and OIU with Checking	181
IJL089	IBM 2740 with Station Control and Checking (Auto Poll)	145
IJL09Y	TWX 33	110
IJL10Y	IBM 7772	76

WTTA SUBROUTINE

IJLWTZ	WTTA Subroutines	1223

LOCAL 3270 TABLE OF COMMAND CODES

IJL0HZ	3277L table of command codes	30

CHANNEL PROGRAM MODULES FOR BSC

The following relocatable modules are BSC channel program modules for switched lines using ID verification (CPU-to-CPU). The correspondence between relocatable module name and the codes that appear in the FEATURE operand sublist in the DTFBT macro instruction is indicated.

IJL0BY	For switched lines	415
IJL0BZ	For nonswitched lines	281
IJL0DY	IBM 2780 switched point to point	212
IJL0DZ	IBM 2780 nonswitched point to point	148
IJL1BZ	BSC Multipoint Lines	253
IJL2DZ	IBM 2780 Multipoint for TRANSCODE	136
IJLEDIT3	Logic, TP EDIT Macro	2090

BSC TABLES OF SPECIAL CHARACTERS

IJLASC	In ASCII for BSC	85
IJLEBD	In EBCDIC for BSC	85
IJLTCD	In 6-bit transcode for BSC	69

TRANSLATION TABLES

IJLRASA	For USASCII to EBCDIC for BCS	256
IJLRCTW	For ITA2 to EBCDIC (World Trade Teletype)	256
IJLRCT1	From BAUDOT to EBCDIC	256
IJLRCT2	From TWX TO EBCDIC	256
IJLRCT3	From ZSC3 to EBCDIC (World Trade Teletype)	256
IJLRC30	From 1080 to EBCDIC	256
IJLRC40	From 2740 to EBCDIC (lowercase)	256
IJLRC50	From 1050 to EBCDIC (lowercase)	256
IJLRC60	From 1060 to EBCDIC	256
IJLRC80	From 6-Bit TRANSCODE to EBCDIC	256
IJLRF40	From 2740 to EBCDIC (uppercase)	256
IJLRF50	From 1050 to EBCDIC (uppercase)	256
IJLRSCI	From USASCII to EBCDIC with 2848 Attached to 2701 via IBM Terminal Control Type III	256

IJLSASA	From EBCDIC to USASCII for BSC	256
IJLSCTW	From EBCDIC to ITA2 (World Trade Teletype)	256
IJLSCT1	From EBCDIC to BAUDOT	256
IJLSCT2	From EBCDIC to TWX	256
IJLSCT3	From EBCDIC to ZSC3 (World Trade Teletype)	256
IJLSD30	From EBCDIC to 1030	256
IJLSD40	From EBCDIC to 2740	256
IJLSD50	From EBCDIC to 1050	256
IJLSD60	From EBCDIC to 1060	256
IJLSD80	From EBCDIC to 6-bit TRANSCODE	256
IJLSSCI	From EBCDIC to USASCII with 2848 Attached to 2701 via IBM Terminal Control Type III	256

Delete Statements

To delete the BTAM phases from the core image library, the BTAM modules from the relocatable library, and the BTAM books from the source statement library, you must supply the DELET card for the appropriate library and the name of the phase, module, or book to be deleted. For example:

```
// JOB DELETC
// EXEC MAINT
   DELETC $$ECT01,$$BETPRT,etc.
   DELETC IJLT2ALC,IJLT2ROT,etc.
   DELETR IJL00Y,IJL01Z,IJL02Z,etc.
   DELETS E.CONTROL,E.LERB,etc.
/&
```

To delete both BTAM and QTAM from the core image, relocatable and source statement libraries, the DELET card for the appropriate library and the following entries must be made: For the core image transients, you must supply the DELETC card with a separate entry for each transient (QTAM and BTAM) to be deleted. For the core image phase names, enter the delete card as follows:

```
   DELETC $$BCTC01,$$B00003,$$BETPRT,etc.
   DELETC IJLB.ALL
   DELETC IJLT.ALL
```

To delete both BTAM and QTAM from the relocatable library enter the delete card as follows:

```
   DELETR IJL.ALL
```

To delete the BTAM and QTAM books from the source statement library, enter the DELETS card with a separate entry for each book to be deleted. The following example shows the required delete cards and type of entries to be made in those cards:

```
// JOB DELETE
// EXEC MAINT
   DELETS E.CONTROL,E.CANCELM,etc.
/&
```

SOURCE STATEMENT LIBRARY

Macro	Blocks
64	7842

Macros

		Storage Bytes Basic	For Variables
E.AS			
E.ASCTR			
E.ASLIST			
E.BTBONLT	(inner macro in BTMOD)		
E.BTBTEIH	(inner macro in BTMOD)		
E.BTBTFIX	(inner macro in BTMOD)		
E.BTBTFREE	(inner macro in BTMOD)		
E.BTBTROD	(inner macro in BTMOD)		
E.BTBTRSCH			
E.BTCEMODE	(inner macro in BTMOD)		
E.BTCKID	(inner macro in BTMOD)		
E.BTCONST			
E.BTCSE	(inner macro in BTMOD)		
E.BTCTUPT	(inner macro in BTMOD)		
E.BTMOD			
E.BTNCKID	(inner macro in BTMOD)		
E.BTOLTCMP			
E.BTOLTIH	(inner macro in BTMOD)		
E.BTONLAP	(inner macro in BTMOD)		
E.BTONLOA	(inner macro in BTMOD)		
E.BTRD			
E.BTRLBF	(inner macro in BTMOD)		
E.BTRQBF	(inner macro in BTMOD)		
E.BTRWC			
E.BTTRANS	(inner macro in BTMOD)		
E.BTWAIT			
E.CHGNTRY		20 (Start-stop)	+6 (Note 2)
		72 (BCS)	
		20 (Start-stop Auto Poll)	+72 (Note 2)
		22 (2260 Local)	+4 (Note 2)
E.CONFIGUR			
E.CONTROL		20	+38 (Note 2)
E.CTRGROUP			
E.CTRLIST			
E.CTRSCHED			
E.DEULIST			
E.DISPGUID			
E.DFTRMLST			
E.DTFBT			
E.GDUAS			
E.GDULIST			
E.GDUTRANS			
E.LERB		20	
E.LERPRT		14	+8 (Note 2)
E.LOPEN		8	+2 (Note 2)
E.ONLTST			
E.PARAMNUM			
E.PARMLIST			
E.RELBUF		14	+4 (Note 3)

E.REQBUF	12	+8 (Note 4)
E.RESETPL	12	+4 (Note 2)
E.RMSRTAB		
Z.SAMP327L		
Z.SAMP327R		
E.SCANREQ		
E.SDRTAB		
E.STEND		
E.TGROUP		
E.TPEDIT		
E.TRLIST		
E.TRANSLAT		
E.TRNSLATE	26	+16 (Note 2)
E.TRSRCTW	256	
E.TRSRCT3	256	
E.TRSSCTW	256	
E.TRSSCT3	256	
E.TWAIT	24	+20 (Note 4)

Notes:

1. n=number of different operands coded.

2. No operands coded in register notation.

3. First operand not coded in register notation.

4. All possible operands not coded in register notation.

Storage Requirements

DTFBT (DEFINE THE FILE: BTAM)

TABLE REQUIREMENTS

Size = 64 + N (40 + 8x) + BUFCB + BUFNO (BUFL + f) + y + z
(+ 32N for BSC only)

Where:

- N = number of lines in the line group (or, for a local 2260 and local 3270**, the number of devices attached to the control unit)
- x = number of CCWs in the largest channel program available for the device, given in Figure 20-1
- *BUFCB = 8 if a buffer pool is used
  = 0 if a buffer is not used
- *BUFNO = number of buffers in the pool
- *BUFL = length of each buffer
- f = number of bytes required to extend each buffer to a multiple of 8
- y = size of the model channel program table for the line group, given in Figure 20-1. If two or more DTFBTs use the same model channel program and are linkage edited together, include the value only once.
- Z = Size of the table of special characters given in Figure 20-1. For BSC only, if two or more DTFBTs use the same transmission code, include the value only once.

* If the buffer pool is shared by two or more DTFBTs, include the value only once.

** For a local 3270, at least one DTFBT is required for each control unit.

Device	x: without start/stop	x: with Auto Poll	y	z
1030	7	9	84	23
1050NS	7	9	68	16
1050S	11		136	34
1060	6	9	80	15
2260L	1		Not applicable	Not applicable
2260R	7		136	20
2740	4		24	21
2740C	4		68	33
2740DC0	8		207	30
2740C0	8		155	24
2740D	6		52	18
2740DC	7		100	32
2740DT	8		68	22
2740DTC	8		116	36
2740S	6	9	48	12
2740SC	7	9	84	24
3277L	3		28	Not applicable
115A	4		36	4
83B3	5		40	6
TWX 33/35	7		56	18
WTTA	5		52	36
BSC1; also 1130, 2780, and 2020 nonswitched point to point	8		248	53
BSC2; also 1130, 2780, and 2020 switched point to point	8		372	53
BSC3; also 1130, 2780, 2020, and 2972 multipoint.	8		252	53
2780 transcode, nonswitched point to point.	8		111	53
2780 transcode, switched point to point	8		175	53
2780 multipoint	8		123	53

Figure 20-1. BTAM--Parameters for DTFBT Table Requirements Formula

DTFBTND (Define The File End: BTAM)

This macro instruction does not require storage at execution time.

DFTRMLST (Define The Terminal List: BTAM)

Table Requirements for OPENLST and WRAPLST

Size = n (m + 1) + 2

where: n = number of list entries
m = number of polling/addressing characters--a function of the device, as shown in Figure 20-2

Device	m
1030	1
1050NS	2
1050S	2
1060	2
2260L	Not applicable
2260R	2
2740	Not applicable
2740C	Not applicable
2740D	Not applicable
2740DC	Not applicable
2740DT	Not applicable
2740DTC	Not applicable
2740S	1
2740SC	1
2740DC0	Not applicable
2740C0	Not applicable
3277R	5
115A	2
83B3	2
1130	2
2780	3
WTTA	Not applicable

Figure 20-2. BTAM--Number of Polling/Addressing Characters

Table Requirements for DIALST

Size = n(m + 1) + 1 + q + p + i

where:
n = number of list entries
m = values specified in Figure 20-2
q = 2 if the list includes entries for polling or addressing
= 0 otherwise
p = number of dial digits
i = 3 if the inlist operand is coded (ESC only)
= 0 otherwise

Table Requirements for IDLST

Size of TWX calling list = d + 5 + 2b
Size of TWX answering list = 5 + b
Size of BSC IDLST only = 3 + d + 2r + s + i

where:
d = number of dial digits

b = number of TWX ID characters
= 0 otherwise
r = number of ID characters expected to be received (BSC)
s = number of ID characters to be sent (BSC)
i = 3 if the inlist operand is coded (BSC)
= 0 otherwise

Table Requirements for SSLAST/SSAWLST
Size = n(m + 1) + 6

where: n = number of list entries
m = values specified in Figure 20-2

Table Requirements for AUTOLST/AUTCWLST
Size = n(m + 2) + 8 19

where: n = number of list entries
m = values specified in Figure 20-2

Table Requirements for WTTALST

1. When the WRU feature is present in DTFBT:

   Size = 3 + 2r + s

2. When the IAM feature is present, and WRU is not present in DTFBT:

   Size = 2 + s

where: r = number of ID characters expected tc be received
s = number of ID characters to be sent

BTMOD (BTAM Logic Module)

The size of the BTAM module varies with the options selected as shown in Figure 20-3. When all operands are omitted or the standard (default) options are coded, the resulting basic module requires 7100 bytes of main storage.

BTAM DATA EVENT CONTROL BLOCK TABLE REQUIREMENTS

Size = 40 bytes

When the MF operand of a READ or WRITE macro is coded MF=L, or when the MF operand is omitted, a Data Event Control Block (DECB) is reserved. One DECB should be reserved per line.

SCANREQ DISPLAY ALPHAMERIC CONTROL AREA (DACA) REQUIREMENTS

Size of each DACA = 24 bytes

When the MF operand of a SCANREQ macro is coded MF=L, or when the MF operand is omitted, a Display Alphameric Control Area (DACA) is reserved. One DACA should be reserved per device.

Operand	Option	Number of bytes added to basic module
ERLOGIC=*	N	-2040
	C	+400
	NC	-1800
SWITCH	YES	+1700 (If BUFFER=NO, BSCTEST=NO)
		+1750 (If BUFFER=YES, BSCTEST=NO)
		+1800 (If BUFFER=YES, BSCTEST=YES)
	NEWID	+2900(If BUFFER=NO, BSCTEST=NO)
		+2950 (If BUFFER=YES, BSCTEST=NO)
		+3000 (If BUFFER=YES, BSCTEST=YES)
AUDIO	YES	+ 410 (SWITCH must equal YES)
BUFFER=	YES	+1950 (If L2260=NO and L3277=NO)
		+2075 (If L2260=NO or L3277=YES)
	REQREL	+ 710 (If L2260=NO and L3277=NO)
		+ 825 (If L2260=YES or L3277=YES)
TERMTST=	YES	+1044
L2260= L3277	YES	- 980 (If ERLOGIC=N)
		+1440 (If ERLOGIC=E)
	NO	+1750 (If ERLOGIC=C)
		- 730 (If ERLOGIC=NC)

* Use the ERLOGIC storage estimate only if neither L2260, nor L3277, nor $SAPL is specified.

Figure 20-3. BTAM--Storage Requirements (Part 1 of 2)

Operand	Option	Number of bytes added to basic module
		- 15 (If ERLOGIC=N)
L2260	NO	+2680 (If ERLOGIC=E)
L3277	NO	+3000 (If ERLOGIC=C)
		+ 270 (If ERLOGIC=NC)
L2260	YES	+ 770 (If ERLOGIC=N)
L3277	YES	+3725 (If ERLOGIC=E)
		+4050 (If ERLOGIC=C)
		+1160 (If ERLOGIC=NC)
TST3277	YES	+1325 (nL3277 must equal YES)
TRANSL=	YES	+ 170
		+11000 (If SWITCH=YES and BUFFER=YES)
BSCS=	YES	+7960 (If SWITCH=YES and BUFFER=NO)
		+6235 (If SWITCH=NO and BUFFER=NO)
		+9240 (If SWITCH=NO and BUFFER=YES)
		+9125 (If SWITCH=NEWID and BUFFER=NO)
		+12180 (If SWITCH=NEWID and BUFFER=YES)
SSAPL=	YES	-1170 (If ERLOGIC=N)
		+1520 (If ERLOGIC=E)
		- 910 (If ERLOGIC=NC)
		+1830 (If ERLOGIC=C)
BSCMPT=	YES	+1150 (BSCS must equal YES)
WTTA	YES	+ 320
BSCTEST	YES	+3320
DECBEXT	YES	- 50 (BSCS must equal YES)
RMSR=	YES	+568 (If L2260=NO and L3277=NO)
		+694 (If L2260=YES and L3277=NO)
		+726 (If L2260=NO and L3277=YES)
		+ 852 (If L2260=YES and L3277=YES)
RESETPL	NO	+ 120

Figure 20-3. BTAM--Storage Requirements (Part 2 of 2)

Module 21: QTAM --5745-SC-QTM

Modular Outline

Modular Index

CORE IMAGE LIBRARY

Transients	Blocks
22	34

Transients

$$BCQC01	Close Phase 1
$$BCQC02	Close Phase 2
$$BCQC03	Close Phase 3
$$BOQO01	Open Monitor/DASD Message Queues, Phase 1
$$BOQO02	Open Line Group and Main Storage Process/Destination Queues
$$BOQO03	Open Checkpoint/Restart, Phase 1
$$BOQO04	Open Checkpoint/Restart, Phase 2
$$BOQO06	Open Main Storage Process/Destination Queues
$$BOQO07	Open Phase 7
$$BOQO08	Open Audio Line Group and Output Queue
$$BQCNCL	Cancel
$$BQCNCM	Cancel
$$BQHDCK	Terminal Test Header Analysis
$$BQWTRA	ARU Message Writer
$$BQWTR1	Message Writer, Phase 1
$$BQWTR2	Message Writer, Phase 2
$$BQWTR3	Message Writer, Phase 3
$$BQ1030	Terminal Test Module for IBM 1030
$$BQ1050	Terminal Test Module for IBM 1050
$$BQ1060	Terminal Test Module for IBM 1060
$$BQ2260	Terminal Test Module for IBM 2260
$$BQ2740	Terminal Test Module for IBM 2740

RELOCATABLE LIBRARY

Modules	Blocks
109	393

Modules

BASIC QTAM LOGIC MODULES: Basic QTAM Logic modules are identified by one asterisk (*) preceding the listed module.

QTAM DEVICE I/O MODULES: QTAM device I/O modules are identified by two asterisks (**) preceding the listed module. Include the storage requirements for a particular device I/O module only once, and only if the terminal type is present in the system.

Module Name	Description	Bytes of Storage
IJLQAA	Audio Line Appendage	2386
Note:	Required if the QTAM audio support is selected.	
IJLQAD	Audio 7772 disk appendage	2898
IJLQBO	Breakoff (BREAKOFF)	212
*IJLQCK	Checkpoint	1208
Note:	Required if the Checkpoint/Restart Facility is selected in the DTFQT.	
IJLQCL	Change Line (STARTLN AND STOPLN)	557
IJLQCM	Cancel Message (CNACELM)	160
IJLQCP	Change Polling List Entry (CHNGP)	146
IJLQCR	Checkpoint Request (CKREQ)	98
IJLQCT	Change Terminal Table Entry (CHNGT)	250
*IJLQDA	Disk I/O Module	1372
Note:	Not required when the system contains only audio devices.	
IJLQDC	Copy Counters (COPYC)	280
IJLQDE	Copy Terminal Table Entry (COPYT)	120
IJLQDL	Distribution List	156
IJLQDP	Copy Polling List Entry (COPYP)	104
IJLQDQ	Copy Queue Control Block Status (COPYQ)	98
IJLQDT	Insert Date in Message Header (DATESTMP)	60
IJLQEA	End-of-Address (EOA)	100
IJLQEB	End-of-Block (EOB)	132
IJLQEC	End-of-Block and Line Correction (EOBLC)	396
IJLQER	Error Message (ERRMSG)	292
IJLQEX	Expand Message header	70
IJLQFL	DTF Locator	78
IJLQGA	Get Audio Message	324
IJLQGB	Get Audio or Nonaudio Message	732
IJLQGC	Get audio message or nonaudio message record (GET)	760
IJLQGD	Get audio message or nonaudio message segment (GET)	714
IJLQGM	Get complete message (GET)	472
IJLQGR	Get message record (GET)	500
IJLQGS	Get message segment (GET)	454
*IJLQIP	QTAM implementation	3692
IJLQIT	Intercept message (INTERCPT, permanent queuing)	140

Module Name	Description	Bytes of Storage
*IJLQLA	Line appendage and ERP module PCI and program Note: Not required when the system contains only audio devices.	4152
*IJLQLC	Line appendage for PCI and program check module Note: Not required when the system contains only audio devices.	630
IJLQLG	Audio input message logging (LOGSEG)	304
IJLQLK	Lookup terminal table entry (DIRECT)	104
*IJLQLO	IBM 2260 local appendage Note: Required if the IBM 2260 local device is used.	1288
IJLQMC	Conversational mode (MODE)	384
IJLQMI	Initiate mode (MODE)	18
IJLQMM	Message-mode interface (MODE)	44
IJLQMP	Priority mode (MODE)	36
IJLQMT	Compare Message Type (MSGTYPE)	60
*IJLQMW	Error recovery procedures message writer subtask	1359
**IJLQM0	Model channel program for IBM 1030 terminals	194
**IJLQM1	Model channel program for IBM 1060 terminals	168
**IJLQM2	Model channel program for IBM 2260 terminals	206
**IJLQM3	Model channel program for AT&T 83B3 terminals	102
**IJLQM4	Model channel program for Western Union Plan 115A terminals	91
**IJLQM5	Model channel program for IBM 1050 switched and nonswitched terminals	207
**IJLQM6	Model channel program for IBM 1050 nonswitched terminals	194
**IJLQM8	Model channel program for AT&T TWX terminals (Models 33 and 35)	113
**IJLQM9	Model channel program for IBM 2260 local terminals	75
**IJLQN0	Model channel program for IBM 2740 Basic terminals	99
**IJLQN1	Model channel program for IBM 2740 Basic Dial terminals	166
**IJLQN2	Model channel program for IBM 2740 terminals with station control	172

Module Name	Description	Bytes of Storage
**IJLQN3	Model channel program for IBM 2740 terminals with station control checking	221
**IJLQN4	Model channel program for IBM 2740 dial terminals with transient control and checking	198
**IJLQN5	Model channel program for IBM 2740 terminals with checking	128
**IJLQN6	Model channel program for IBM 2740 dial terminals with checking	192
**IJLQN7	Model channel program for IBM 2740 dial terminals with transmit control	156
**IJLQN8	Model channel program for World Trade Telegraph Terminals (WTTA)	356
IJLQOA	Operator awareness	1380
IJLQOB	SDR counter incrementer	2576
IJLQOC	Operator Control (OPCTL)	3530
IJLQPA	Put audio message (PUT)	370
IJLQPL	Polling limit control (POLLIMIT)	120
IJLQPM	Put complete message (PUT)	480
IJLQPR	Put message record (PUT)	544
IJLQPS	Put message segment (PUT)	520
IJLQPZ	Pause-transmit idle characters (PAUSE)	360
IJLQQT	Close message control (CLOSEMC)	474
IJLQRA	Translate table RCVARU: ARU code to EBCDIC	266
IJLQRB	Translation table RCVITA2 (EBCDIC to International Telegraph Alphabet No. 2)	266
IJLQRC	Translation table RCVZ-RCVZC3 (EBCDIC to Figure-Protected Code ZSC3)	266
IJLQRD	Retrieve message segment by DASD address (RETRIEVE)	124
IJLQRG	Route message (ROUTE)	48
IJLQRM	Release message (RELEASEM)	234
IJLQRR	Reroute message (REROUTE)	72

Module Name	Description	Bytes of Storage
IJLQRS	Retrieve message header by sequence number (RETRIEVE)	380
*IJLQRW	Physical input/output control Note: Not required when the system contains only audio devices.	1569
IJLQR1	Translate table RCV1030: 1030 to EBCDIC	266
IJLQR2	Translate table RCV1050: 1050 to EBCDIC	266
IJLQR3	Translate table RCV1050F: 1050 to monocase EBCDIC	266
IJLQR4	Translate table RCV1060: 1060 to EBCDIC	266
IJLQR5	Translate table RCV2260: 2260 to EBCDIC	266
IJLQR6	Translate tables RCV83B3 or RCV115A: AT&T 83B3 or WU Plan 115A to EBCDIC	266
IJLQR7	Translate table RCVTWX: AT&T Models 33/35 (TWX) to EBCDIC	266
IJLQR8	Translate table RCV2740: 2740 to EBCDIC	266
IJLQR9	Translate table RCV2740F: 2740 to EBCDIC	266
IJLQSB	Translation table SNDITA2 (International Telegraph Alphabet No. 2 to EBCDIC)	266
IJLQSC	Translation table SNDZSC3 (Figure-Protected Code ZSC3 to EBCDIC	266
IJLQSH	Scan message header	104
IJLQSI	Sequence-in number verification (SEQIN)	140
IJLQSK	Skip-through-character (SKIP)	76
IJLQSO	Insert sequence-out number in message header (SEQOUT)	68
IJLQSR	Source terminal name verification (SOURCE)	128
IJLQSS	Change audio line (STARTARU and STOPARU)	300

Module Name	Description	Bytes of Storage
IJLQST	Skip-on-count (SKIP)	48
IJLQS1	Translate table SND1030: EBCDIC to 1030	266
IJLQS2	Translate table SND1050: EBCDIC to 1050	266
IJLQS4	Translate table SND1060: EBCDIC to 1060	266
IJLQS5	Translate table SND2260: EBCDIC to 2260	266
IJLQS6	Translate tables SND83B3 or SND115A EBCDIC to AT&T 83B3 or WU Plan 115A	266
IJLQS7	Translate table SNDTWXE: EBCDIC to AT&T Models 33/35--TWX (even parity)	266
IJLQS8	Translate table SND2740: EBCDIC TO 2740	266
IJLQS9	Translate table SNDTWXO: EBCDIC to AT&T Models 33/35--TWX (nonparity)	266
*IJLQTA	World Trade Telegraph Terminals (WTTA) Line Appendage	1406
Note:	Required if World Trade Telegraph support is selected.	
IJLQTR	Code translation used in conjunction with QTAM or user provided translate table (TRANS).	114+226T
Note:	T = number of translation tables.	
IJLQTS	Insert time-of-day in message header (TIMESTMP)	198
*IJLQTT	Terminal test recognition (LPSTART)	1394
Note:	Not required when the system contains only audio devices.	

Delete Statements

To delete the QTAM phases from the core image library, the QTAM modules from the relocatable library, and the QTAM books from the source statement library, the DELET card for the appropriate library and the name of the phase, module or book to be deleted must be supplied. For example:

```
// JOB DELETE
// EXEC MAINT
   DELETC $$BCQC01,$$BQWTR1,etc.
   DELETR IJLQBO,IJLQCL,IJLQCM,etc.
   DELETS E.BREAKOFF,E.BUFFER,E.CANCELM,etc.
/&
```

To delete both BTAM and QTAM from the core image, relocatable and source statement libraries, the DELET card for the appropriate library and the following entries must be made: For the core image transients, you must supply the DELETC, card with a separate entry for each transient (QTAM and BTAM) to be deleted. For the core image phase names, enter the delete card as follows:

```
DELETC $$BCTC01,$$BCOO03,$$BETPRT, etc.
DELETC IJLB.ALL
DELETC IJLT.ALL
```

To delete both BTAM and QTAM from the relocatable library enter the delete card as follows:

```
DELETR IJL.ALL
```

To delete the BTAM and QTAM books from the source statement library, enter the DELETS card with a separate entry for each book to be deleted. The following example shows the required delete cards and type of entries to be made in those cards.

```
// JOB DELETE
// EXEC MAINT
   DELETS E.CONTROL,E.CANCELM, etc.
/&
```

SOURCE STATEMENT LIBRARY

Macro	Blocks
78	2013

Macros

Basic

E.ARUMGTYP
E.BREAKOFF
E.BUFARU
E.BUFFER
E.CANCELM

E.CHECKARU
E.CHNGP
E.CHNGT
E.CKREQ
E.CLOSEMC

E.COPYC
E.COPYP
E.COPYQ
E.COPYT
E.COUNTER

E.CTLTBL
E.DATESTMP
E.DIRECT
E.DTFQT
E.ENDRCV

E.ENDREADY
E.ENDSEND
E.EOA
E.EOB

E.EOBLC
E.ERRMSG
E.INTERCPT
E.LCBD
E.LINE

E.LINETBL
E.LIST
E.LOGSEG
E.LPSTART
E.MODE

E.MSGTYPE
E.OPCTL

E.OPTION
E.PAUSE
E.POLL
E.POLLIMIT
E.POSTARU

E.POSTRCV
E.POSTSEND
E.PREFIXD
E.PROCESS
E.QCBD

E.RCVHDR
E.RCVITA2
E.RCVSEG
E.RCVZSC3
E.RELEASEM

E.REPEAT
E.REROUTE
E.RETRIEVE
E.ROUTE
E.SENDHDR

E.SENDSEG
E.SEQIN
E.SEQOUT
E.SKIP
E.SNDITA2

E.SNDZSC3
E.SOURCE
E.STARTARU
E.STARTLN
E.STCBD

E.STOPARU
E.STOPLN
E.TERM
E.TERMTBL
E.TERMTBLD

E.TIMESTMP
E.TRANS
E.WORD
E.WORDTBL
E.WRU

System Generation

E.IJLQDSCT
E.IJLQTSVC

QTAM STORAGE REQUIREMENTS

The storage requirements for QTAM depend to a great extent on the configuration of your teleprocessing installation and the nature of your applications. Storage requirements increase proportionately as the number of communication lines, terminals, and QTAM-provided processing functions increase. These requirements can be estimated from formulas and tables presented in this module.

To determine the storage requirements for the Basic QTAM Logic modules and the QTAM Device I/O modules, refer to "Relocatable Library".

DTFQT (Define The File: QTAM)

Seven types of DTF tables may be generated by a DTFQT macro instruction. The storage estimates for each follow.

DASD Message Queues Files
Size = 315 bytes

Communication Line Group File
For Nonaudio Line Group
Size = 48 + (128 + 8x)N

For Audio Line Group
Size = $64 + (161 + L_1 + L_2 + G + x\text{-}z)N$

where: N = number of lines in the line group
x = a function of the device, given in Figure 21-1
L_1 = length of input buffers
L_2 = length of address chain buffers
G = 9 when using time stamping option, otherwise = 0
z = 17 when information mode is used

Device	x
1030	8
1050NS	8
1050S	10
1060	7
2260 Remote	8
2260 Local	5
274A	4
274B	6
274C	6
274D	7
274E	7
274F	4
274G	6
274H	7
115A	8
83B3	7
TWX33/35	6
7770	0
WTTA	8

Figure 21-1. QTAM--Values for Communication Line Group Table

Real Storage Process Queue
Size = 84 + 12x

where: x = 0 for nonmixed application, and
1 for mixed application

Real Storage Destination Queue
Size = 80 bytes

Checkpoint Records File
Size = 220+L

where: L = length of the Checkpoint record specified by the SOWA keyword operand.

Audio Output Queue
Size = 76 bytes

CONTROL INFORMATION
The storage estimates for required control information are shown in Figure 21-2.

Control Blocks and Information	Storage Requirements (in bytes)
Terminal table TERMTBL macro instruction	12
OPTION macro instruction	No storage is reserved for this macro; it defines user areas that are included in the expansion of the TERM macro instruction (U parameter)
TERM macro instruction[1]	9 + I + U + D + 44F where: (I + U + D)≤243
LIST macro instruction[1]	12 + L + 2N + 140[2] where: (3 + L +2N)≤243
PROCESS macro instruction[1]	13 + A for audio process program entry 9 + Y for nonaudio process program entry
Polling list POLL macro instruction[3]	4 + 3N for autopolled terminals except IBM 1030 4 + 2N for nonswitched terminals or autopolled IBM 1030 5 for switched IBM terminals 3 + I for TWX 4 + T for WTTA terminals
Queue Control Block for Process Queues and Destination Queues	32X
Audio Line Table LINETBL macro instruction[1]	4
LINE macro instruction[1]	5 + Z
Audio Word Table WORDTBL macro instruction[1]	4
WORD macro instruction[1]	8 + W

Figure 21-2. QTAM--Storage Requirements for Control Information (Part 1 of 2)

Buffers

For Nonaudio Applications:
  Buffer Pool Size = 8+(x+16)N + 24M

where: N = number of buffers specified.
X = size of each buffer
M = number of CCWs QTAM generates for data insertion by the PAUSE macro

where: N = number of terminals
I = number of bytes in terminal ID
U = number of bytes in optional area
D = number of bytes in device address area; size depends on contents:

For nonswitched terminal--addressing and polling characters (1 byte/character)
For IBM switched terminal--field telling the number of dial digits (1 byte) + dial digits (1 byte/digit) + addressing characters (1 byte/character)
For TWX--field telling the number of dial characters (1 byte) + dial digits (1 byte/digit) + field telling the number of ID characters (1 byte) + ID characters (2 bytes/character)
For WTTA terminals--1 byte + field telling the number of ID characters (1 byte) + ID characters (2 bytes/character)
For IBM 2260 Local--a field of 6 fullwords consisting of a CCB and other control information

L = number of bytes in name of the distribution list entry in terminal table (1-8)
A = number of bytes in name of the audio process entry in the terminal table. Because the following field in the entry must be aligned to a fullword boundary, this field must be either three, seven or eleven bytes long.
X = number of lines or terminals (depending on queueing techniques) and the number of process queues
Y = number of bytes in name of the process entry in terminal table (1-8)
Z = number of bytes in name of the line entry in line table (1-8)
W = number of bytes of the selected word
F = 1 for IBM 2740 Model 2 terminals with the Buffer Receiver Option; 0 for other terminals
T = number of bytes in the CPU identification (WTTA terminals)

Notes:

1. Add the number of bytes necessary for fullword boundary.

2. This number (140) is the number of bytes in the Distribution List module (IJLQDL). This number is included in the storage requirements only once if the LIST macro is used more than once.

3. Add the number of bytes necessary for halfword boundary.

Figure 21-2. QTAM--Storage Requirements for Control Information (Part 2 of 2)

QTAM Macro Instructions

Figure 21-3 gives the storage requirements for all other QTAM macro instructions.

Much QTAM logic consists of modules introduced by the use of certain QTAM macro instructions in the user's program. These macro instructions expand into in-line coding that establishes the linkage to, and parameters for, the QTAM modules. Often a module so introduced into the system itself introduces another module, a process termed a second level routine.

Column two of Figure 21-3 shows the extent of the coding produced by the expansion of the macro instruction in column one. If the coding links to QTAM module, the module is presented in column three; if that module links to other modules, they are presented in column four.

Storage requirements for a sharable module, or for a second level routine that is linked to more than once in the same partition are included only once. For example, the macro instructions DIRECT, EOA, and ROUTE all link to the same module, IJLQLK. If two or more of these macro instructions are used in the same message control program, the module is included only once. Similarly, if the same macro instruction is used more than once in the same program, storage is required for only the additional linkage because the module is included just once.

Macro Instruction	In-line linkage or code Note 5	Sharable modules		Second level routine	
		Name	Size	Name	Size
ARUMGTYP	16				
BREAKOFF	8	IJLQBC	212		
CANCELM	8	IJLQCM	160		
CHECKARU	70+ message text				
CHNGP	42	IJLQCP	146	IJLQFL	78
CHNGT	26	IJLQCT	250		
CKREQ	10	IJLQCR	98		
CLOSEMC	6	IJLQQT	474	IJLQCL	549
COPYC	24	IJLQDC	504		
COPYP	34	IJLQDP	104	IJLQFL	78
COPYQ	34	IJLQDQ	98		
COPYT	30	IJLQDE	120		
COUNTER	12				
DATESTMP	8	IJLQDT	60	IJLQEX	70
DIRECT	12	IJLQLK	104		
ENDRCV	10	Note 1			
ENDRCV (WTTA)	16	IJLQEB	132		
ENDREADY	80	Note 1			
ENDSEND	10	Note 1			
EOA	28	IJLQEA	100	IJLQSH IJLQSK IJLQRG IJLQMT IJLQLK	104 76 48 60 104 Note 2
EOB	6	IJLQEB	132	Note 1	
EOBLC	6	IJLQEC	380	Note 1	

Figure 21-3. QTAM Storage Requirements for Other Macro Instructions (Part 1 of 5)

Macro Instruction	In-line linkage or code Note 5	Sharable modules		Second level routine	
		Name	Size	Name	Size
ERRMSG	32+ message text	IJLQER Note 1	292	IJLQLK	104
GET					
Segment		IJLQGS	454		
Message		IJLQGM	472		
Record		IJLQGR	500		
GET (AUDIO)					
Audio message		IJLQGA	324		
Audio and non-audio messages		IJLQGB	732		
Audio message & nonaudio record		IJLQGC	760		
Audio message & nonaudio segment		IJLQGD	714		
INTERCPT	12	IJLQIT	140		
LOGSEG	32		Note 3		
LOGSEG (ARU)	26	IJLQLG	304		
LPSTART	28	Note 1			
MODE (C)	14	MODE (U) module & IJLQMM	44	IJLQSH	104
MODE (U)					
INITIATE	10	IJLQMI	18		
PRIORITY	10	IJLQMP	36	IJLQSH	104
CONVERSE	10	IJLQMC Note 1	384		
MOD2260	4				
MSGTYPE (C)	19	IJLQMT	60	IJLQSH	104
MSGTYPE (U)	4				
OPCTL	56	IJLQOC	3610	IJLQLK IJLQSH IJLQCL Note 1	104 104 549

Figure 21-3. QTAM--Storage Requirements for Other Macro Instructions (Part 2 of 5)

Macro Instruction	In-line Linkage or code Note 5	Sharable Modules		Second Level routine	
		Name	Size	Name	Size
PAUSE	13 + insert chars.	IJLQPZ	360	Note 1	
POLIIMIT	12	IJLQPL	120		
POSTARU	6		Note 1		
POSTRCV	6	Note 1			
POSTSEND	12	Note 1			
PUT					
Segment		IJLQPS	520		
Message)		IJLQPM	480		
Record		IJLQPR	544		
PUT (AUDIO)		IJLQPA	370		
RCVHDR	8				
RCVSEG Note 4	0				
RELEASEM	12	IJLQRM	230		
REPEAT	34		Note 1		
REROUTE	26	IJLQRR Note 1	72	IJLQLK	104
RETRIEVE					
DASD address	14	IJLQRD	124		
By sequence number	26	IJLQRS	380	IJLQRD	124
ROUTE	8	IJLQRG	48	IJLQLK IJLQSH	104 104
SENDHDR	16				
SENDSEG Note 4	4				
SEQIN	8	IJLQSI	140	IJLQSH	104
SEQOUT	8	IJLQSO	68	IJLQEX	70
SKIP (CT)	8	IJLQST	48	IJLQSH	104

Figure 21-3. QTAM--Storage Requirements for Other Macro Instructions (Part 3 of 5)

Macro Instruction	In-line linkage or code Note 5	Sharable modules		Second level routine	
		Name	Size	Name	Size
SKIP (S)	8 + no. to be skipped	IJLQSK	76	IJLQSH	104
SOURCE	8	IJLQSR	128	IJLQSH	104
STARTARU	42	IJLQSS	300	IJLQFL	78
STARTIN	12	IJLQCL	512	IJLQFL	78
STOPARU	42	IJLQSS	300	IJLQFL	78
STOPLN	12	IJLQCL	512	IJLQFL	78
TIMESTMP	8	IJLQTS	198	IJLQEX	70
TRANS	10	IJLQTR	114+ 266*T		
WRU	0				

Figure 21-3. QTAM--Storage Requirements for Other Macro Instructions (Part 4 of 5)

where:
C = character operand specified (conditional)
U = character operand null (unconditional)
S = skip to and include designated character configuration
CT = skip designated count of nonblank characters
T = number of translation tables

Translation tables are: RCV1030, RCV1050, RCV1050F, RCV1060, RCV2260, RCV2740, RCV2740F, RCVARU, RCV83B3, RCV115A, RCVTWX, RCVITA2, RCVZSC3, SND1030, SND1050, SND1060, SND2260, SNDITA2, SNDZSC3, SND2740, SND83B3, SND115A, SNDTWXE, and SNDTWXO

Notes:

1. These delimiters or modules cause linkages to QTAM routines included in "Basic QTAM Logic Modules" listed earlier in this module under "Relocatable Library".

2. If the macro instruction MSGTYPE, ROUTE, or SKIP (S) is used in the program, the storage estimate for IJLQMT, IJLORG, or IJLQSK, respectively, is not included in the storage estimate for EOA.

3. Because the user defines his own DTFxx and xxMOD macros for his message log file, the size requirements cannot be specified here. Information to determine the storage requirements for the specific logging medium is given under the pertinent DTF and Module, i.e., DTFMT and MTMOD for Tape. Modules 7-18 contain storage requirements for declarative macros.

4. Identifies entry point for RCVSEG and SENDSEG subgroups of LPS.

5. The linkage requirements for OPEN, CLOSE, GET, and PUT are given in Module 1.

Figure 21-3. QTAM--Storage Requirements for Other Macro Instructions (Part 5 of 5)

Module 22: System Utilities --5745-SC-UTL

Modular Outline

Modular Index

The library requirements for the Utility programs are the following:

Component	Libraries: Core Image Phases	Core Image Blocks	Relocatable Modules	Relocatable Blocks	Source Statement Macros	Source Statement Blocks
Assign Alternate Track Disk	5	41	6	90		
Assign Alternate Track Data Cell	5	26	6	69		
Clear Disk	3	7	4	34		
Clear Data Cell	3	7	4	32		
Copy Disk to Card	2	11	3	51		
Copy Disk to Disk	2	13	3	57		
Copy Disk or Data Cell to Tape	2	11	3	52		
Copy and Restore Diskette	1	19	1	71		
Deblock Utility	1	16	2	63		
Initialize Disk	4	25	5	108		
Initialize Data Cell	4	18	5	65		
Initialize Tape	1	5	2	22		
Restore Card to Disk	1	7	2	32		
Restore Tape to Disk or Data Cell	1	8	2	34		
VTOC Display	1	5	4	32		
Transient	1	1				
Page Data Set Dump (PDSDM)	1	11	1	40		
Fast Copy Disk Volume	2	49	4	56	1	212

PARTITION SIZE

10,240 bytes

Note: To delete all utilities, use the following statement.

```
DELETR IJW.ALL
```

Assign Alternate Track Disk

CORE IMAGE LIBRARY

Phases

```
ALTDK
ALTDK2
ALTDK3
ALTDK4
ALTDK5
```

RELOCATABLE LIBRARY

Modules

```
IJWATD
IJWATD1
IJWATD2
IJWATD3
IJWATD4
IJWATD5
```

Link-Edit Statements

```
   INCLUDE IJWATD
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWATD
DELETR IJWATD1
DELETR IJWATD2
DELETR IJWATD3
DELETR IJWATD4
DELETR IJWATD5
```

Assign Alternate Track Data Cell

CORE IMAGE LIBRARY

Phases

```
ALTDC
ALTDC2
ALTDC3
ALTDC4
ALTDC5
```

RELOCATABLE LIBRARY

Modules

IJWATM
IJWATM1
IJWATM2
IJWATM3
IJWATM4
IJWATM5

Link-Edit Statements

```
   INCLUDE IJWATM
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWATM
DELETR IJWATM1
DELETR IJWATM2
DELETR IJWATM3
DELETR IJWATM4
DELETR IJWATM5
```

Clear Disk

CORE IMAGE LIBRARY

Phases

CLRDK
CLRDK2
CLRDK3

RELOCATABLE LIBRARY

Modules

IJWCCD
IJWCCD1
IJWCCD2
IJWCCD3

Link-Edit Statements

```
   INCLUDE IJWCCD
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWCCD
DELETR IJWCCD1
DELETR IJWCCD2 (See note)
DELETR IJWCCD3 (See note)
```

Note: Only if CLEAR DATA CELL not performed.

Clear Data Cell

CORE IMAGE LIBRARY

Phases

CLRDC
CLRDC2
CLRDC3

RELOCATABLE LIBRARY

Modules

IJWCCM
IJWCCM1
IJWCCD2
IJWCCD3

Link-Edit Statements

```
   INCLUDE IJWCCM
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWCCM
DELETR IJWCCM1
DELETR IJWCCD2 (See note)
DELETR IJWCCD3 (See note)
```

Note: Cannot delete if already deleted by CLEAR DISK.

Copy Disk to Card

CORE IMAGE LIBRARY

Phases

CDKCD
CDKCD2

RELOCATABLE LIBRARY

Modules

IJWCDC
IJWCDC1
IJWCDC2

Link-Edit Statements

```
   INCLUDE IJWCDC
// LBLTYP NSD(nn)
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWCDC
DELETR IJWCDC1
DELETR IJWCDC2
```

Copy Disk to Disk

CORE IMAGE LIBRARY

Phases

CDKDK
CDKDK2

RELOCATABLE LIBRARY

Modules

IJWCDD
IJWCDD1
IJWCDD2

Link-Edit Statements

```
   INCLUDE IJWCDD
// LBLTYP NSD(nn)
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWCDD
DELETR IJWCDD1
DELETR IJWCDD2
```

Copy Disk or Data Cell to Tape

CORE IMAGE LIBRARY

Phases

CDKTP
CDKTP2

RELOCATABLE LIBRARY

Modules

IJWCDT
IJWCDT1
IJWCDT2

Link-Edit Statements

```
   INCLUDE IJWCDT
// LBLTYP NSD(nn)
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWCDT
DELETR IJWCDT1
DELETR IJWCDT2
```

Copy and Restore Diskette

CORE IMAGE LIBRARY

Phase

CRDR

RELOCATABLE LIBRARY

Module

IJWCRD

Link-Edit Statements

```
   PHASE CRDR,S
   INCLUDE IJWCRD
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWCRD
```

Deblock Utility

CORE IMAGE LIBRARY

Phase

DSTRB

RELOCATABLE LIBRARY

Modules

```
IJWDST
IJWDST1
```

Link-Edit Statements

```
   INCLUDE IJWDST
// LBLTYP TAPE
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWDST
DELETR IJWDST1
```

Fast Copy Disk Volume

CORE IMAGE LIBRARY (INTEGRATED VERSION)

Phases

```
FCOPY
FCOPY2
```

RELOCATABLE LIBRARY (INTEGRATED VERSION)

Modules

```
IJWDFC
IJWDFC1
IJWDFC2
IJFUZZZZ
```

Link-Edit Statements (Integrated Version)

```
// OPTION CATAL
   INCLUDE IJWDFC
// LBLTYP TAPE
// EXEC LNKEDT
```

SOURCE STATEMENT LIBRARY (STAND-ALONE VERSION)

Macro

```
Z.FASTCOPY
```

Statements to obtain Card Deck (Stand-alone Version)

```
// EXEC SSERV
   PUNCH Z.FASTCOPY
/*
```

Delete Statements

```
DELETR IJWDFC
DELETR IJWDFC1
DELETR IJWDFC2
DELETR IJFUZZZZ
DELETS Z.FASTCOPY
```

Initialize Disk

CORE IMAGE LIBRARY

Phases

```
INTDK
INTDK2
INTDK3
INTDK4
```

RELOCATABLE LIBRARY

Modules

```
IJWIND
IJWIND1
IJWIND2
IJWIND3
IJWIND4
```

Link-Edit Statements

```
   INCLUDE IJWIND
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWIND
DELETR IJWIND1
DELETR IJWIND2
DELETR IJWIND3
DELETR IJWIND4
```

Initialize Data Cell

CORE IMAGE LIBRARY

Phases

```
INTDC
INTDC2
INTDC3
INTDC4
```

RELOCATABLE LIBRARY

Modules

```
IJWINM
IJWINM1
IJWINM2
IJWINM3
IJWINM4
```

Link-Edit Statements

```
   INCLUDE IJWINM
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWINM
DELETR IJWINM1
DELETR IJWINM2
DELETR IJWINM3
DELETR IJWINM4
```

Initialize Tape

CORE IMAGE LIBRARY

Phase

```
INTTP
```

RELOCATABLE LIBRARY

Modules

```
IJWINT
IJWINT1
```

Link-Edit Statements

```
   INCLUDE IJWINT
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWINT
DELETR IJWINT1
```

Restore Card to Disk

CORE IMAGE LIBRARY

Phase

RCDDK

RELOCATABLE LIBRARY

Modules

IJWRCD
IJWRCD1

Link-Edit Statements

```
   INCLUDE IJWRCD
// LBLTYP NSD(nn)
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWRCD
DELETR IJWRCD1
```

Restore Tape to Disk or Data Cell

CORE IMAGE LIBRARY

Phase

RTPDK

RELOCATABLE LIBRARY

Modules

IJWRTD
IJWRTD1

Link-Edit Statements

```
   INCLUDE IJWRTD
// LBLTYP NSD(10)
// EXEC LNKEDT
```

Delete Statements

```
DELETR IJWRTD
DELETR IJWRTD1
```

VTOC Display

CORE IMAGE LIBRARY

Phase

IVTOC

Transient

$$BLVTOC

Note: $$BLVTOC is catalcged intc the core image library along with the VTOC program.

RELOCATABLE LIBRARY

Modules (BJS)

IJWLTVB
IJWLTVT
IJWLTV1

Link-Edit Statements, Non-Multiprogramming System

```
   INCLUDE IJWLTVB
// LBLTYP TAPE
// EXEC LNKEDT
```

Delete Statements, Non-Multiprcgramming System

```
DELETR  IJWLTVB
DELETR  IJWLTVM
```

Modules (MPS)

IJWLTVM
IJWLTVT
IJWLTV1

Link-Edit Statements, Multiprogramming System

```
   INCLUDE IJWLTVM
// EXEC LNKEDT
```

Delete Statements, Multiprogramming System

```
DELETR  IJWLTVM
DELETR  IJWLTVB
```

Page Data Set Dump

CORE IMAGE LIBRARY

Phase

PDSDM

RELOCATABLE LIBRARY

Module

IJBPDSDM

Link-Edit Statements

```
   INCLUDE IJBPDSDM
/*
// LBLTYP TAPE (see Note)
// EXEC LNKEDT
```

Note: Required only if tape is to be used for intermediate storage of the page data set dump.

Module 23: EREP --5745-SC-ERP

Modular Outline

PARTITION SIZE

10.240 bytes.

CORE IMAGE LIBRARY

	Phases	Blocks
Transients	1	1
Phases	76	204

Modular Outline

Transients

$$BSDRUP

Phases

EREP
EREPADPT
EREPASTA
EREPCCH
EREPCCHC
EREPC125
EREPC135
EREPC145
EREPDOLD
EREPEDCP
EREPEDCR
EREPEDCU
EREPEDDA
EREPEDDK
EREPEDES
EREPEDD1
EREPEDIT
EREPEDTD
EREPEDTP
EREPEDTR
EREPEDT1
EREPEDUR
EREPEDU1
EREPEDX1
EREPEOD
EREPESPT
EREPESTR
EREPESWK
EREPHIST
EREPIPL
EREPMCAR
EREPMCRC
EREPMNTR
EREPM145
EREPRDE
EREPRETV
EREPSHRT
EREPSHRU
EREPSMCP
EREPSMCR
EREPSMCU
EREPSMDA
EREPSMDK
EREPSMD1
EREPSMES
EREPSMTD
EREPSMTP
EREPSMTR
EREPSMT1
EREPSMUR
EREPSMU1
EREPSPCL
EREPTES
EREPTPE1
EREPUCCM
EREPUNIT
EREPUOLD
EREP145A
EREP145B
EREP145C
EREP145D
EREP2400
EREP2715
EREP3211
EREP333X
EREP333Y
EREP333Z
EREP3330
EREP3340
EREP334X
EREP334Y
EREP334Z
EREP3410
EREP3420
EREP3500
EREP3540

RELOCATABLE LIBRARY

Modules	Blocks
76	863

Modules

IJBEREP
IJBEADPT
IJBEASTA
IJBECALA
IJBECALB
IJBECALC
IJBECALD
IJBECCH
IJBECCHC

```
IJBEC125
IJBEC135
IJBEC145
IJBEEDDK
IJBEDOLD
IJBEEDCP
IJBEEDCR
IJBEEDCU
IJBEEDDA
IJBEEDD1
IJBEEDES
IJBEEDIT
IJBEEDTD
IJBEEDTP
IJBEEDTR
IJBEEDT1
IJBEEDUR
IJBEEDU1
IJBEEDX1
IJBEEOD
IJBEESPT
IJBEESTR
IJBEESWK
IJBEHIST
IJBEIPL
IJBEMCAR
IJBEMCRC
IJBEMNTR
IJBEM145
IJBERDE
IJBERETV
IJBESHRT
IJBESHRU
IJBESMCP
IJBESMCR
IJBESMCU
IJBESMDA
IJBESMDK
IJBESMD1
IJBESMES
IJBESMTD
IJBESMTP
IJBESMTR
IJBESMT1
IJBESMUR
IJBESMU1
IJBESPCL
IJBETES
IJBETPE1
IJBEUCCM
IJBEUNIT
IJBEUOLD
IJBE145A
IJBE145B
IJBE145C
IJBE145D
IJBE2400
IJBE2715
IJBE3211
IJBE333Z
IJBE3330
IJBE334Z
IJBE3340
IJBE3410
IJBE3420
IJBE3500
IJBE3540
```

Link-Edit Statements

```
   PHASE EREP,S+80*   (For a non-multiprogramming system)    Choose
   PHASE EREP,+0      (For a multiprogramming system)          one
   INCLUDE IJBECALA   (Monitor)
// EXEC LNKEDT
   INCLUDE IJBECALB   (Edit/Select Retrieval)
// EXEC LNKEDT
   INCLUDE IJBECALC   (Summary)
// EXEC LNKEDT
   INCLUDE IJBECALD   (Tape Error Statistics)
// EXEC LNKEDT
   INCLUDE IJBERDE    (RDE Summary**)
// EXEC LNKEDT
```

* 80 byte area reserved for tape label processing. This procedure does away with the necessity of including a // LBLTYP card.

** The summary function will supply meaningful information only if ERRLOG=RDE is specified during system generation.

Delete Statements

```
DELETR IJBEREP,IJBEADPT,IJBEASTA,etc.
```

GN

SOURCE STATEMENT LIBRARY

Macros	Blocks
7	187

Macros

E.MAPCCB
E.MAPCOMR
E.MAPERPIB
E.MAPLOWC
E.MAPPIB
E.MAPPUB2
E.MAPRFTAB

```
$$BIISAL   6
$$BIISAS   6
$$BIISA2   6
$$BIISBI   6
$$BIISBS   6
$$BIISCC   6
$$BIISCD   6
$$BIISCF   6
$$BIISCS   6
$$BIISDI   6
$$BIISDP   6
$$BIISEX   6
$$BIISFM   6
$$BIISLE   6
$$BIISM1   6
$$BIISM2   6
$$BIISM3   6
$$BIISM4   6
$$BIISPR   6
$$BIISRL   6
$$BIISTD   6
$$BIISTS   6
$$BIISUC   6
$$BIISUM   6
$$BIISUR   6
$$BILSVC   1
$$BINDEX   1
$$BJCOPT   1
$$BJCOPI   1
$$BJDUMP   1
$$BJIBFF   17
$$BJIB00   17
$$BLEPRT   20
$$BLOPEN   20
$$BLSTIO   1
$$BLVTOC   1
$$BMMR20   11
$$BMSGWR   1
$$BMVKEY   1
$$BOCISC   17
$$BOCPM1   1
$$BOCPM2   1
$$BOCPT1   1
$$BOCPT2   1
$$BOCPT3   1
$$BOCPT4   1
$$BOCP01   1
$$BOCP02   1
$$BOCP03   1
$$BOCP11   1
$$BOCP12   1
$$BOCRTA   1
$$BOCRTB   1
$$BOCRTC   1
$$BOCRTD   1
$$BOCRTE   1
$$BOCRTF   1
$$BOCRTG   1
$$BOCRTH   1
$$BOCRTK   1
$$BOCRTL   1
$$BOCRTM   1
$$BOCRTN   1
$$BOCRTO   1
$$BOCRTP   1
$$BOCRTQ   1
$$BOCRTR   1
$$BOCRTS   1
$$BOCRTT   1
$$BOCRTU   1
$$BOCRTV   1
$$BOCRTW   1
$$BOCRTX   1
$$BOCRTY   1
$$BOCRTZ   1
$$BOCRT1   1
$$BOCRT2   1
$$BOCRT3   1
$$BOCRT4   1
$$BOCRT5   1
$$BOCRT6   1
$$BODACL   1
$$BODADE   17
$$BODADS   17
$$BODAIN   1
$$BODAI1   1
$$BODAO1   1
$$BODAO2   1
$$BODAO3   1
$$BODAO4   1
$$BODIO1   1,9
$$BODIO2   1,9
$$BODIO3   1,9
$$BODIO4   1,9
$$BODIO5   1,9
$$BODIO6   1,9
$$BODIO7   1,9
$$BODIO8   1,9
$$BODMSG   1,9
$$BODMS2   1,9
$$BODQUE   1
$$BODSMW   1
$$BODSMO   1,9
$$BODSPO   1,9
$$BODSPV   1
$$BODSPW   1
$$BODUCP   1,9
$$BOFLPT   1
$$BOIS01   1
$$BOIS02   1
$$BOIS03   1
$$BOIS04   1
$$BOIS05   1
$$BOIS06   1
$$BOIS07   1
$$BOIS08   1
$$BOIS09   1
$$BOIS10   1
$$BOMRCE   1
$$BOMR01   11
$$BOMSG1   1
$$BOMSG2   1
$$BOMSG3   1
$$BOMSG4   1
$$BOMSG5   1
$$BOMSG6   1
$$BOMSG7   1
$$BOMT0M   1
$$BOMT0W   1
$$BOMT01   1
$$BOMT02   1
$$BOMT03   1
$$BOMT04   1
$$BOMT05   1
$$BOMT06   1
$$BOMT07   1
$$BONVOL   1
```

DOS/VS System Generation

READER'S COMMENT FORM

GC33-5377-1

This sheet is for comments and suggestions about this manual. We would appreciate *your* views, favorable or unfavorable, in order to aid us in improving *this* publication. This form will be sent directly to the author's department. Please include your name and address if you wish a reply. Contact your IBM branch office for answers to technical questions about the system or when requesting additional publications. Thank you.

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*** We would especially appreciate your comments on any of the following topics:**

Clarity of the text	Accuracy	Index	Illustrations	Appearance	Paper
Organization of the text	Cross-references	Tables	Examples	Printing	Binding

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DOS/VS System Generation (S370-31) Printed in U.S.A. GC33-5377-1

Technical Newsletter

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DOS/VS System Generation

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This Technical Newsletter, a part of release 29 of the IBM Disk Operating System/Virtual Storage, provides replacement pages for your publication. These replacement pages remain in effect for subsequent releases unless specifically altered. Pages to be inserted and/or removed are:

Cover, 2	143 - 146
35, 36	171 (172 blank)
39 - 42	241, 242
55, 56	267, 268
59 - 62	333 - 338
125, 126	338.1 (added)
135 - 140	395 - 398

A change to the text or to an illustration is indicated by a vertical line to the left of the change.

Summary of Amendments

- Replacement of the VSAM section (book module 17) by a VSAM Independent Component Release.
- Miscellaneous corrections.

Note: *Please insert this page in your publication to provide a record of changes.*

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