CONTROL DATA
CORPORATION

CONTROL DATA®
3100/3150/3170
3200/3300/3500
COMPUTER SYSTEMS

MSOS VERSION 5
INSTALLATION HANDBOOK

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REVISION RECORD

REVISION	DESCRIPTION
2-1-74	Original printing.
B	Manual revised. Errors and omissions are corrected from the first printing.
4-15-74	
C	Manual revised to reflect moving of ANSI FORTRAN and COBOL from separate tapes to system
5-15-74	tape (package A).
D	Manual revised to reflect version 5.1.
1-15-75	
Publication No. 60410800	

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St. Paul, Minnesota 55112

or use Comment Sheet in the back of this manual.

PREFACE

This handbook is intended for use by personnel responsible for installing a CONTROL DATA® Mass Storage Operating System (MSOS) version 5 or for updating MSOS 4.2 to MSOS 5. The handbook is divided into three parts. All references to sections contained in the same part as the section making the references show only the section number. References to sections in other parts include the part number.

The user should be familiar with and have available for reference the latest editions of the following manuals.

3100/3150/3170/3200/3300/3500 MSOS version 5 Reference Manual

3100/3150/3170/3200/3300/3500 MSOS version 5 Operator's Guide

3100/3150/3170/3200/3300/3500 MSOS version 5 Diagnostic Handbook

3100/3200/3300/3500 COMPASS Reference Manual

In addition to the previous manuals, the hardware reference manuals for the system hardware and the reference manuals for each product to be installed with MSOS are needed by the user.

Control Data Corporation intends that the user of the MSOS 5 use only those features, functions, and parameter values which are described in this handbook and in the manuals previously listed. The use of undefined parameter values, features, or functions not described in these manuals, even though coding for them may exist in the system, is at the user's risk.

The following are publications relating to MSOS 5 and its product set members. The latest revision levels of these publications may be obtained from the latest edition of the Literature and Distribution Services catalog.

Control Data Publications	Publication No.
3100/3150/3170/3200/3300/3500 MSOS version 5 Reference Manual	60410600
3100/3150/3170/3200/3300/3500 MSOS version 5 Operator's Guide	60410700
3100/3150/3170/3200/3300/3500 MSOS version 5 Diagnostic Handbook	60410900
3100/3150/3170/3200/3300/3500 COMPASS Reference Manual	60236800
3100/3150/3170/3200/3300/3500 FORTRAN Reference Manual	60057600
3100/3150/3170/3200/3300/3500 COSY/MSOS Reference Manual	60207300
3100/3150/3170/3200/3300/3500 COBOL/MSOS Reference Manual	60191100
3100/3150/3170/3200/3300/3500 MSOS Sort Merge Reference Manual	60281500
3100/3150/3170/3200/3300/3500 ALGOL Reference Manual	60371800
3100/3150/3170/3200/3300/3500 ADAPT Reference Manual	60173400
3100/3150/3170/3200/3300/3500 PERT COST Reference Manual	60132500
3100/3150/3170/3200/3300/3500 PERT TIME Reference Manual	60131100
3100/3150/3170/3200/3300/3500 SAINT Reference Manual	60213700

Control Data Publications	Publication No.
3100/3150/3170/3200/3300/3500 LISA Reference Manual	60236900
3100/3150/3170/3200/3300/3500 ANSI COBOL MSOS Reference Manual	60417900
3100/3150/3170/3200/3300/3500 ANSI FORTRAN MASTER/MSOS Reference Manual	60281400

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PART I RELEASE SUMMARY

PART II INSTALLATION PROCEDURES

PART III RELEASE AIDS

SYSTEM SUMMARY 1

1.1 PRODUCT SET MEMBERS

Version 5.1 of the Mass Storage Operating System (MSOS) is accompanied by the following product set members.

COMPASS version 3.3

Mass Storage FORTRAN version 4.3

COSY version 3.3

ANSI COBOL version 2.1

Mass Storage (BDP) COBOL version 4.3

Mass Storage (BCD) COBOL version 4.3

Mass Storage SORT version 3.3

ALGOL version 1.5

ADAPT version 1.1 (32K variant)

PERT TIME version 2.2 (32K variant)

PERT TIME version 2.2 (16K variant)

PERT COST version 2.2

SAINT version 2.4

Tape SORT/MERGE version 2.3

Linked Index Sequential Access version 1.3

MSOS Utility version 1.4

ANSI FORTRAN version 1.2

1.2 RELEASE MATERIALS

The release materials for MSOS 5.1 and its product set consist of the following packages. All tapes are available in 7-track or 9-track format.

1.2.1 PACKAGE A

Package A contains the following magnetic tapes.

1. A binary release tape consisting of the following files.
   - Install routine used in the interim library installation.
   - Interim library dump used to install MSOS on an 853, 854, 863, or 841 system device.
   - Autoload correction deck (binary with 2-card loader) used to put the autoload routine on the system device of an existing MSOS 4.2 system.
   - Interim library PRELIB source (unblocked) in a format compatible with MSOS version 4.2.
   - Product set verification tests.
2. A COSY* tape containing corrections made against MSOS 5.1 through PSR summary 379.
3. COSY tape number 1 containing MSOS 5.1 system routines plus APC, forms control, COSY, COMPASS, MS FORTRAN, and SAINT.
4. COSY tape number 2 containing the product set routines LISA, MSOS utility, L-MSIO, MS COBOL (BCD and BDP), MS SORT, Tape Sort/Merge, ALGOL, and IUP.
5. A PRELIB source tape containing binary information in blocked format for use with MSOS 5.1.

1.2.2 PACKAGE B

Package B contains the COSY source file for ANSI COBOL.

1.2.3 PACKAGE C

Package C contains the COSY source file for ANSI FORTRAN.

1.2.4 PACKAGE D

Package D contains the overlay preparation decks and the COSY source file for PERT TIME in a 32K MSOS environment.

1.2.5 PACKAGE E

Package E contains the overlay preparation decks and the COSY source file for PERT COST.

1.2.6 PACKAGE F

Package F contains the overlay preparation decks and the COSY source file for ADAPT.

1.2.7 PACKAGE G

Package G contains the binary source file and the COSY source file for the routine INITUSER (for extended core systems only).

1.3 RELEASE MATERIAL DESCRIPTION

1.3.1 PACKAGE A MSOS 5.1

Release package A contains the following tapes.

A-1 Binary release †

	INSTALL routine with 2-card loader	File 1 (binary)
	Interim library (IUP format dump)	File 2 (binary)
Mandatory for → MSOS version 5.1 use when installing version 5.1 on an MSOS 4.2 system	AUTOLOAD correction deck with 2-card loader	File 3 (binary)
MSOS 4.2 → compatible	Interim library PRELIB source (unblocked)	Files 4, 5 (mixed mode)
	Product set verification tests (80-character card image format)	Files 6 through 20 (BCD)

† All files are separated by EOF marks.

A-2 COSY release tapes†

COSY No. 1
MSOS resident Error recovery routines Variable resident
PLIBEDIT
PRELIB routines
Utility routines
Forms control routines
APC routines
COSY routines
COMPASS routines
FORTRAN routines
SAINT

COSY No. 2
LISA routines
MSOS utility routines
Logical MSIO routines
BCD COBOL routines
BDP COBOL routines
MS Sort routines
Tape Sort routines
ALGOL routines
IUP routines

† Refer to Table II-2-2 for a complete list of the COSY decks on the COSY release tapes.

A-3 PRELIB source tape

ABS File	MSOS version 5.1 system (BCD)†	Includes all drivers; unwanted drivers must be edited off the tape.
	COMPASS	
	ALGOL	
	MS FORTRAN	
	Logical MSIO	
	ANSI FORTRAN compile time	
	ANSI COBOL compile time	
	MS COBOL (BCD)	

NOTE
Product set routines which use the BDP3312 option are repeated with alternate option settings. Decks with unwanted settings must be edited off the PRELIB source tape.

† This system contains a marker for correct positioning of INITUSER for extended systems.

REL File

MS COBOL (BDP)
APC
COMPASSB
ANSI FORTRAN object time
ANSI COBOL object time
SAINT
COSY
MS FORTRAN object time
ALGOL object time
MS Sort
Tape Sort
MSOS utilities
MS COBOL (BCD) object time
MS COBOL (BDP) object time
LISA
PRELIB
MSUTIL
FORMS
COMAC
OC-AE-MR
EOF ENDSCOPE *EOF*

1.3.2 PACKAGE B ANSI COBOL

Release package B is the ANSI COBOL COSY tape.

1.3.3 PACKAGE C ANSI FORTRAN

Release package C is the ANSI FORTRAN COSY tape.

1.3.4 PACKAGE D PERT TIME - 32K

Release package D consists of a tape containing the PERT TIME 32K variant formatted as follows:

MAIN x Binary decks for MAIN OV1 xx Binary decks for overlay 1 . . . OVn xx Binary decks for overlay n . . . EOF
COSY formatted source

xx is the file ordinal of the overlay file

1.3.5 PACKAGE E PERT COST

Release package E consists of a tape containing PERT COST formatted as shown in section 1.3.4.

1.3.6 PACKAGE F ADAPT

Release package F consists of a tape containing ADAPT formatted as shown in section 1.3.4.

1.3.7 PACKAGE G INITUSER

Release package G consists of the following tape.

Binary source of INITUSER
COSY formatted source

1.4 NEW FEATURES AND DIFFERENCES

The following sections list the new features incorporated in MSOS 5.1 and its product set, differences between MSOS 4.2 and 5.0 and between MSOS 5.0 and 5.1, which may require modification of deck structures or recoding of programs, and changes in operating characteristics between MSOS 4.2 and 5.1.

1.4.1 MSOS 5.1 NEW FEATURES

1. An assembly option, CLASSR, allows the interchange of class-R disk packs and the files contained on the packs between any MSOS systems with the option selected. In addition, the pack structure is compatible with the MASTER Operating System.
2. File labels on class-R packs are updated automatically when class-R files are used.
3. The online processor updates MSD, ID, and LABEL files when class-R packs are placed online or taken offline.
4. Two new control cards have been added. The RRAT card functions are the same as the RAT card, except that they define the resident allocation table as class R. The RONL card requests the operator to mount a specified class-R pack.
5. Interrupt modes have been modified to allow both P1 and P2 real-time interrupt selection and to prevent reentrant use of the register save area table.
6. The CONTROL DATA® 580 Line Printer has been added to the list of available units.
7. For the ALLOCATE and EXPAND functions, the default device type is the first entry in the RAT, and the system device is used only as a last resort, provided that the RRAT is not in effect.
8. The job control processor executes in bank 1 of extended core systems.
9. Seven additional processors have been added.

TIME	Called by COMPASS and ANSI FORTRAN to obtain the current time of day (deck Q.TIME on the COSY file)
DATE	Called by COMPASS and ANSI FORTRAN to obtain the current date (deck Q.DATE on the COSY file)
LDABSV50	Called by COMPASS to load and execute absolute tasks from a file (SEPOINT in deck EXEC)
PTIOV50	Paper tape user interface used in place of CIO calls to read or write on paper tape (deck PTIOV50 on COSY file)
DRIVPT	New paper tape driver (deck DRIVPT on COSY file)
MISC3	Class-R file manager (deck MISC3 on COSY file)
JOBCTL24	RONL control card processor (deck JOBCTL24 on COSY file)

10. Calls to the manual interrupt processor have been improved.

1.6.4 ANSI COBOL

Compute statement involving exponentiation of BCD numeric fields that are greater than 11 digits loses accuracy since exponentiation is performed in floating-point mode.

ANSI COBOL is limited to one of the following minimum hardware configurations.

1. A 3170, 3300, or 3500 computer system with 32K of memory and a BDP module (3304-2, 3304-3, 3504-1, 3514-2, or a 3514-4).

2. A 3100, 3170, or 3200 computer system with 32K of memory and a 3312/10256 BDP module and interface.

1.6.5 MSOS UTILITY

Performing an I/O function from a unit onto itself does not result in a diagnostic.

MSOS utility functions which use tape parity (even or odd) to determine the mode in which data is recorded (BCD or binary) do not perform correctly with 9-track tape transports (MMTC/659). In particular, COPY and VERIFY are unable to process mixed-mode 9-track input tapes correctly. COPY and VERIFY process a pack mode input tape correctly. COPY writes output tapes correctly, regardless of the modes to be used.

1.6.6 ANSI FORTRAN

ANSI FORTRAN is limited to the following minimum configuration.

Minimum requirements for MSOS 5.1.

32K memory

Compiler routines compiled with ANSI FORTRAN must be compiled with the S option. †

Object-time routines compiled with ANSI FORTRAN must be compiled without the S option. †

1.6.7 ALGOL

A $^{7}_{8}$ punch in column 1 is interpreted by CDC card readers as an end-of-file card. Therefore, a $^{7}_{8}$ punch (left brace in Hollerith, quotation mark in ASCII) in column 1 of card input causes an end-of-file indication. Therefore, ALGOL source cards using ASCII card punch codes should not begin control statements (such as BEGIN and END) in column 1.

† The presence of the S parameter on the UFORTRAN card specifies integers and logical variables compiled as 24-bit entities; the absence of the S parameter specifies 48-bit entities.

1.4 NEW FEATURES AND DIFFERENCES

The following sections list the new features incorporated in MSOS 5.1 and its product set, differences between MSOS 4.2 and 5.0 and between MSOS 5.0 and 5.1, which may require modification of deck structures or recoding of programs, and changes in operating characteristics between MSOS 4.2 and 5.1.

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1. An assembly option, CLASSR, allows the interchange of class-R disk packs and the files contained on the packs between any MSOS systems with the option selected. In addition, the pack structure is compatible with the MASTER Operating System.
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3. The online processor updates MSD, ID, and LABEL files when class-R packs are placed online or taken offline.
4. Two new control cards have been added. The RRAT card functions are the same as the RAT card, except that they define the resident allocation table as class R. The RONL card requests the operator to mount a specified class-R pack.
5. Interrupt modes have been modified to allow both P1 and P2 real-time interrupt selection and to prevent reentrant use of the register save area table.
6. The CONTROL DATA® 580 Line Printer has been added to the list of available units.
7. For the ALLOCATE and EXPAND functions, the default device type is the first entry in the RAT, and the system device is used only as a last resort, provided that the RRAT is not in effect.
8. The job control processor executes in bank 1 of extended core systems.
9. Seven additional processors have been added.

TIME	Called by COMPASS and ANSI FORTRAN to obtain the current time of day (deck Q.TIME on the COSY file)
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LDABSV50	Called by COMPASS to load and execute absolute tasks from a file (SEPOINT in deck EXEC)
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DRIVPT	New paper tape driver (deck DRIVPT on COSY file)
MISC3	Class-R file manager (deck MISC3 on COSY file)
JOBCTL24	RONL control card processor (deck JOBCTL24 on COSY file)

10. Calls to the manual interrupt processor have been improved.

1.4.2 MSOS 5.0 DIFFERENCES

The following differences between MSOS 5.1 and MSOS 4.2 may require recoding of programs or changing of deck structures.

1. The offset format request is set up to offset the next card to punch. Under MSOS 4.2, the request would offset the last card punched, provided that the user could get back within 5 milliseconds.
2. A batch job aborts when the time limit on the JOB card or the system default time limit is exceeded.
3. The FET control statement requires a block size and if the edition is alphabetic, requires a 2-character edition field.
4. The EQUIP statement for mass storage is illegal.
5. File 55 must always be open when loading relocatable programs, since the loader uses this file to absolutize programs.
6. The new PRIORITY statement replaces the BACK statement. The BACK statement is no longer recognized.
7. The PURGE function of MSUTIL is now a privileged task and requires specification of the system security codes before execution. PURGE requires that a file be closed before the file is released.
8. Auxiliary libraries now require a block size of 960 characters.
9. The RPT table has been rearranged. Any use of this table by user programs must be investigated and possibly recoded.
10. The AUT table consists of up to 50 4-word entries and replaces the AET table.
11. The RHT and BRHT tables no longer exist. Refer to WHATKIND for a functional replacement.

12. Use of the MSOS files 64, 65, and 66 (MSDFILE, IDFILE, and LABELFILE) is restricted to OCAREM and system routines.

13. Use of a RAT card with no parameters is no longer required to clear previous RATs. All previous RATs are cleared when a new RAT card is encountered.

14. A new control statement, MACRO/, has been added to PLIBEDIT for handling macros, and old control statements are illegal for macro use.

15. The static status check does not update the unit available (U) bit if the unit is static. The dynamic status check must be used to check for actual status of the external equipment. In addition, the end-of-operation interrupt sets the U-bit to 0 regardless of the actual value of busy or ready. The C-bit (channel available) which existed under MSOS 4.2 is always 0 under MSOS 5.1.

16. The density bits for 9-track tape are not edited. New values are used for 800 bpi and 1600 cpi.

17. The error recovery routine RAAR aborts when an irrecoverable reject occurs rather than passing control to the entry point RAARREJ. The entry point PROGNAME is not used by any of the recovery routines.

18. CIO does not abort with an illegal logical unit. It returns a reject to P + 2 with an error code in the A register.

19. Status calls to MSIO return information the same as status calls to CIO, with the status word return somewhat different from the previous returns from MSIO under MSOS 4.2. The I/O entries MSIO and MSIO.SP have been eliminated but SEPOINTs have been maintained for compatibility. All I/O in MSOS 5.1 goes to CIO.

20. The status which in MSOS 4.2 was contained in SCARUST1 must be obtained by calling CIO with a status function code.

21. The system accounts file has been changed in the following fields:

    Time

    Job time limit

    Line limit

    Lines printed

    Card limit

    Cards punched

22. There is no longer an automatic page eject after the RUN card on standard OUT. This feature allows a site to conserve paper. Users should select all paper format functions.

23. The loader searches an auxiliary library only once in an attempt to satisfy external references and then searches the system library for any remaining externals. As a result, a subroutine cannot be loaded from an auxiliary library if the only reference to the subroutine is from a routine on the system library.

24. Jobs submitted from priority programs are initiated only when an EOJ statement is processed from the standard INP. Therefore, a job stream with no EOJ cards inhibits priority job submission.

25. The separate definition of logical units for unit record devices and file ordinals for mass storage files is no longer used. All I/O peripheral devices are referenced by a logical unit number. Therefore, each equipped unit record device and open mass storage file must be assigned a unique logical unit number.

26. SUMS units, now called AP files, are treated in the same manner as other unit record devices. Interrupts can be selected and error recovery can be called with these units. All special codes for these units should be removed.

27. MSOS 5.1 does not edit logical parity on the card reader and thus does not return a parity error bit in the edited status as MSOS 4.2 did.

28. Nonresident drivers are not allowed, except for real time application.

1.4.3 MSOS 5.1 DIFFERENCES

1. CIO calls to the paper tape driver have changed. Refer to the MSOS Version 5 Reference Manual for details.

2. All references to MIBUF must be removed, since it is no longer a SEPOINT.

3. Calls to the manual interrupt processor must be modified. Refer to the MSOS Version 5 Reference Manual for details.

4. Core allocation for logical MSIO overlays must be increased if class-R packs are to be used. Refer to the TPOVSIZE assembly option.

5. A new PRELIB and its associated overlays must be added to the current MSOS 5 library or called from an auxiliary library in order to build an MSOS 5.1 library.

1.4.4 MSOS OPERATING DIFFERENCES

1. The MSUTIL function ENTER has been modified as follows:

    - No EQUIP statement is required for a mass storage device.
    - Verification is requested from the operator before entering a device on a given channel, equipment, and unit.
    - A device with a currently open file is not entered.
    - A device containing a label currently known to the system is not entered unless the operator gives permission to do so.

2. EQUIP cards are logged on the typewriter only if they are for tapes. If units are equated, they are not logged. Tapes are assigned in order of usage, rather than numerical order.

3. Files to be purged must be closed.

4. A buffered typewriter driver has been added for system use. Therefore, the operator may not clear typewriter messages (with the CLEAR switch) without risking destruction of other messages that may be stacked in the internal buffer.
5. Date and time are both required parameters during autoloading.
6. SELECT JUMP 5 is used to enter operator statements after a JOB statement is processed from the standard input.
7. Operator termination of a recovery dump has been altered for MSOS 5.0. The operator must press MANUAL INTERRUPT, type TERM, FG, ND, and press MANUAL INTERRUPT.

1.4.5 ANSI FORTRAN DIFFERENCES

1. Programs compiled under MSOS 4.2 that reference any of the following library routines must be recompiled under MSOS 5.1.

ALOG	COS	SQRT
ALOG10	EXP	SIN
ATAN	LOCATE	

   This requirement is caused by changes in entry-point names to allow ANSI FORTRAN and MS FORTRAN to reside on the same library.

1.5 SYSTEM ENTRY POINTS (SEPOINT)

Several changes were made to SEPOINTs in MSOS 5.0 that may affect programs running under MSOS 4.2. Certain SEPOINTs remained the same but the information returned was changed; other SEPOINTs were eliminated but equivalent SEPOINTs were established; and still others were eliminated with no equivalent present. Programs that use any of these SEPOINTs must be investigated and possibly recoded to produce acceptable results under MSOS 5.1. Refer to the MSOS version 5 Reference Manual for table structures and calling sequences.

1.5.1 UNCHANGED SEPOINT NAMES

The following SEPOINT names were unchanged, but the information returned or other changes were made.

SEPOINT	Comments
ACCOUNTS	Entries were changed
RPT	Entries were changed
MSIO (status only)	Different status word returned
SCAR	Changed calling sequence
RAAR	Changed calling sequence
WHATKIND	New return parameters

1.5.2 DELETED SEPOINTS WITH EQUIVALENTS

The following SEPOINTs were removed and possible substitutes for the functions these SEPOINTs performed are shown in the adjacent column. All references to the deleted SEPOINTs must be removed from programs before running under MSOS 5.1.

Old SEPOINT	New SEPOINT
AET	AUTV50
BKEXIT	ABNORMAL(primary entry point)
BKRUNFLG	PMODEV50
BNJ.	BJSV50
BRHT	WHATKIND
CIP	SETCLV50
CIT	SETFTV50
CIT.RTM	SETCHV50
IOP	WHATKIND
MEMORY	LMEMV50, UMEMV50
MIBKADD	SETMIV50
MIFORADD	SETMIV50
NDEXIT	ABNORMAL (primary entry point)
RHT	WHATKIND
SETCLOCK	SETCLV50
UST	CIO (status call)

1.5.3 DELETED SEPOINTS

The following SEPOINTs were eliminated and there are no equivalents.

ALGOPT	LOADMSIO	MTRPRR
BERADD	LOC5	MTWPR
BK.SP	MSIOFLG	MTWPRR
CIC3.01	MTDER	NRC
CIC3.2	MTDERNM	NWR
CIO5.7	MTLDACPR	PERADD
CPDER	MTLDCPRR	PRCPR
CRDER	MTRPR	SCARNM
CST	MTRPRNM	SCARUST1
EST		

1.5.4 SEPOINTS DELETED IN MSOS 5.1

The SEPOINT MIBUF was eliminated in MSOS 5.1. Programs with calls to MIBUF must be recoded before running under MSOS 5.1.

1.6 LIMITATIONS

1.6.1 MSOS

MSOS 5.1 does not support 852 disk drives.

Character I/O is not allowed on 659 tape transports. The following MMTC status bits are edited into the existing parity bit in the UST.

- Parity errors
- Phase encoded errors
- Cyclic redundancy errors
- Memory flag bit errors

MSOS converts the CDC 64-character subset of ASCII only. Therefore, opening and closing braces must be represented by $^{12}_{0}$ and $^{11}_{0}$ punches, respectively.

A $^{7}_{8}$ punch in column 1 is interpreted by CDC card readers as an end-of-file card. Therefore a $^{7}_{8}$ punch (left brace in Hollerith, quotation mark in ASCII) in column 1 of card input causes an end-of-file indication.

If the operator switches the system list or punch output unit to a tape drive while APC is running, an occasional internal control record may be written on the tape. If the tape is listed or punched while APC is running (that is, with a tape copy statement), APC removes the extraneous records. If the tape is listed or punched without APC, the extraneous records are printed as extra lines in the listing or punched as extra cards in the output deck.

1.6.2 COMPASS

When using nested conditionals or macros, the number of lines tagged with IFZ or IFN may not be accurate. However, the assembly is correct and the program does execute properly.

1.6.3 FORTRAN

The user can DIMENSION in all TYPE statements except TYPE other.

1.6.4 ANSI COBOL

Compute statement involving exponentiation of BCD numeric fields that are greater than 11 digits loses accuracy since exponentiation is performed in floating-point mode.

ANSI COBOL is limited to one of the following minimum hardware configurations.

1. A 3170, 3300, or 3500 computer system with 32K of memory and a BDP module (3304-2, 3304-3, 3504-1, 3514-2, or a 3514-4).

2. A 3100, 3170, or 3200 computer system with 32K of memory and a 3312/10256 BDP module and interface.

1.6.5 MSOS UTILITY

Performing an I/O function from a unit onto itself does not result in a diagnostic.

MSOS utility functions which use tape parity (even or odd) to determine the mode in which data is recorded (BCD or binary) do not perform correctly with 9-track tape transports (MMTC/659). In particular, COPY and VERIFY are unable to process mixed-mode 9-track input tapes correctly. COPY and VERIFY process a pack mode input tape correctly. COPY writes output tapes correctly, regardless of the modes to be used.

1.6.6 ANSI FORTRAN

ANSI FORTRAN is limited to the following minimum configuration.

Minimum requirements for MSOS 5.1.

32K memory

Compiler routines compiled with ANSI FORTRAN must be compiled with the S option. †

Object-time routines compiled with ANSI FORTRAN must be compiled without the S option. †

1.6.7 ALGOL

A $\substack{7\\8}$ punch in column 1 is interpreted by CDC card readers as an end-of-file card. Therefore, a $\substack{7\\8}$ punch (left brace in Hollerith, quotation mark in ASCII) in column 1 of card input causes an end-of-file indication. Therefore, ALGOL source cards using ASCII card punch codes should not begin control statements (such as BEGIN and END) in column 1.

† The presence of the S parameter on the UFORTRAN card specifies integers and logical variables compiled as 24-bit entities; the absence of the S parameter specifies 48-bit entities.

INSTALLATION PROCEDURES 1

The following general steps are required for MSOS installation (Figure II-1-1).

System definition and configuration
MSOS option selection
Hardware initialization
Install interim library
Deck preparation
Binary source modification
Final library generation
Product set incorporation

1.1 SYSTEM DEFINITION AND CONFIGURATION

The chart in Figure II-1-2 is provided as an aid for determining system hardware configuration parameters. It is recommended that the chart be completed at this time. Once controllers, equipment, channels, and units are defined, this chart proves an invaluable aid in completing machine operations and assembly option settings.

1.2 UPDATING MSOS 4.2 TO MSOS 5.1

An MSOS 4.2 system at PSR summary level 310 or above can be updated to version 5.1 without disturbing the OCAREM files. The following is a summary of the procedures necessary to create an MSOS 5.1 interim library and to update the system.

1. Define the new system configuration and prepare a COSY correction deck or tape for the system hardware configurations and assembly options (refer to Table II-1-2 and section 2).

2. Mount the binary release tape and modify the autoload routine on disk (refer to section 1.2.1).

3. Reautoload with SELECT JUMP 6 set.

4. Reassign INP to the unit on which the binary release tape is mounted. If the tape is not repositioned after modifying the autoload routine, the tape is at the proper point for the next step. If the tape is repositioned, sequence errors occur until the tape reaches the proper point.

5. Run PRELIB under MSOS 4.2 to create a version 5.1 interim library. Use file 4 of the binary release tape (tape A-1).

6. Autoload the interim library (edition IL) and define the interim library hardware environment (refer to part III, section 6). After autoload, MSOS will automatically request the type and location of the hardware.

7. Use COSY and COMPASS to reassemble the decks containing options to be changed for the system.

8. Refer to section 4 and use PLIBEDIT to add reassembled COSY decks and delete unused decks and flag cards from the PRELIB source tape (tape A-1).

9. Run PRELIB to generate the final library (section III-8).

10. Autoload the final library.

11. Run the verification tests (section II-6).

12. Add the product set members such as PERT TIME required by the installation (section II-5).

1.2.1 MODIFYING THE AUTOLOAD ROUTINE

The MSOS 4.2 autoload routine on disk must be modified before the system can be updated to version 5.1. File 3 on the binary release tape contains a 2-card loader and an autoload correction deck. This file is utilized to modify the autoload routine on disk by entering machine instructions from the console. An alternate method involves assembling the COSY decks TWOCDLDR and AUTOLOAD from the COSY tape containing the MSOS 5.1 system routines. Whichever method is used, a series of messages requiring responses appears on the console.

The following procedure describes the machine instruction method for modifying the autoload routine.

1. Mount the binary release tape on unit 0.

2. Enter the following instructions into memory.

Location	Instruction	Comments
20000	770ce000	Connect magnetic tape channel c, equipment e, unit 0
20001	01020000	
20002	771c0010	
20003	01020002	
20004	771c0013	
20005	01020004	
20006	771c0013	
20007	01020006	
20010	74000050	
20011	c0000000	
20012	01020010	
20013	772c0002	
20014	01020013	
20015	01000000	

3. Set P to 20000 and press GO.

The following is the procedure for assembling the COSY decks and modifying the autoload routine through the card reader.

1. Mount the COSY tape containing the MSOS 5.1 system routines.
2. Assemble and execute COSY deck TWOCDLDR (first deck on the tape). This step produces a set of 2-card loader cards on logical unit 62.
3. Assemble COSY deck AUTOLOAD, with binary output to logical unit 62.
4. Place the 2-card loader cards followed by the binary deck of AUTOLOAD in the card reader.
5. Use the MSOS 4.2 card reader autoload routine to read and execute the loader cards and binary deck.

Whichever method is used to modify the autoload routine, the following messages appear on the console.

SYSTEM CHANNEL =

Type the channel number for the system pack; one digit (for example, 2)

EQUIP NO. =

Type the equipment number for the system pack; one digit (for example, 0)

UNIT NO. =

Type the unit number for the system pack; two digits (for example, 10)

DEVICE TYPE=

Type the system device type (853,854,etc.)

When processing is completed, the system types:

AUTOLOAD HAS BEEN CHANGED

1.3 INSTALLING MSOS 5.1 IN A NEW SYSTEM

The following is a summary of the procedural steps necessary to install MSOS 5.1 on a new system.

1. Refer to section 2 and prepare a COSY correction deck for the system installation options.

2. Refer to section III-2 and initialize all mass storage drives in the system.

3. Refer to section III-1 and load the autoload routine for IUP, starting at address 77x40.

4. Refer to section III-4 and autoload IUP from file 1 of the binary release tape A-1. Section 3 contains an example of autoloading IUP.

5. Refer to section III-4 and use IUP to install the interim library from file 2 of the binary release tape. Section 3 contains examples of installing the minimum library using IUP.

6. Autoload the interim library generated by IUP. Section 3 contains an example of autoloading the interim library.

7. Refer to section 7. Release the system scratch files and reallocate them in accordance with system requirements. Section 3 contains an example of reallocation of the scratch files.

8. Use COSY and COMPASS to change and reassemble all COSY decks containing the assembly options to be changed for the system.

9. Refer to section 4 and use PLIBEDIT to add reassembled COSY decks and delete unused decks and flag cards from the PRELIB source tape (tape A-1).

10. Run PRELIB to generate the final library (section III-8).

11. Autoload the final library.

12. Run the verification tests (section II-6).

13. Add the product set members such as PERT TIME required by the installation (section II-5).

14. If the system bad track utility routines are to be used, refer to section 11 and allocate the system bad track file.

1.4 UPDATING MSOS 5.0 TO MSOS 5.1

The following is a summary of the procedural steps necessary to update an MSOS 5.0 system to MSOS 5.1.

1. Prepare a COSY correction file for the system installation options.
2. Use COSY and COMPASS to change and reassemble the decks containing options to be changed for the system.
3. Refer to section 4 and use PLIBEDIT to add reassembled COSY decks and delete unused decks and flag cards from the PRELIB source tape (tape A-1).

NOTE

Because of differences in linking certain routines, MSOS 5.1 PRELIB must be placed on the MSOS 5.0 library or on an auxiliary library. (Refer to the MSOS Version 5 Reference Manual for details regarding auxiliary libraries and AUX cards.)

4. Run PRELIB to generate the final library (section III-8).
5. Autoload the final library.
6. Run the verification tests (section 6).
7. Add the product set members such as PERT TIME required by the installation (section 5).

CAUTION

When MSOS 5.1 and MSOS 5.0 operating systems are both used on the same computer system, do not leave class-R packs online when going from version 5.1 to version 5.0.

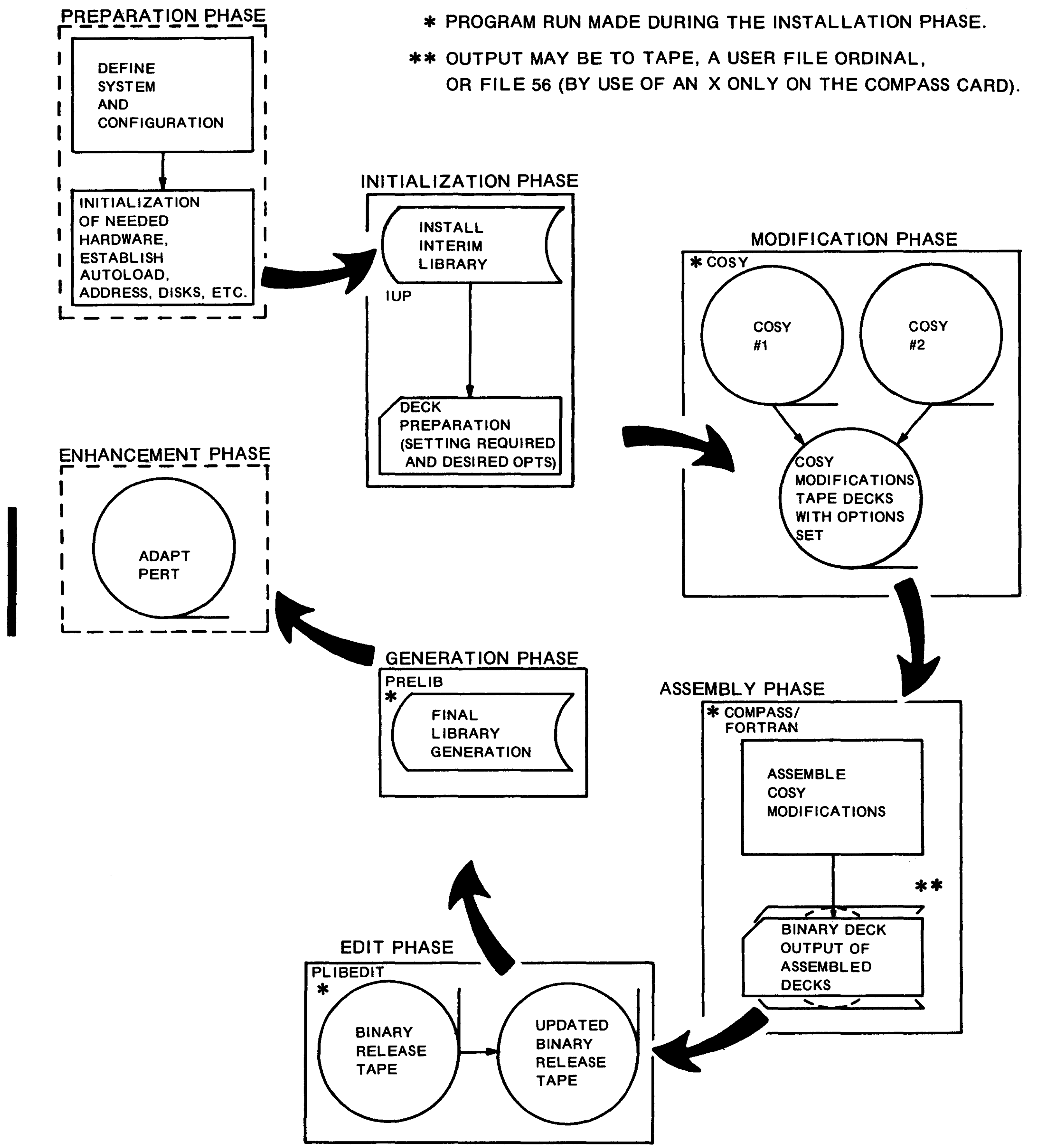


Figure II-1-1. Overview of Installation Procedures for a New System

COMPUTER (Circle One)	3500	3300	3170	3200	3150	3100
MEMORY SIZE (Circle One)	16K	32K	48K	65K		
SYSTEM TYPE (Circle One)	STANDARD 3170/3300/3500 MEMORY PROTECT 3100/3150/3300 MP EXTENDED CORE					

3500/3300/3170 OPTIONAL HARDWARE			3200/3150/3100 OPTIONAL HARDWARE		
Floating Point Hardware	YES	NO	Floating Point Hardware	YES	NO
Business Data Processor (BDP)			BCD Option	YES	NO
Nonenhanced	YES	NO	Business Data Processor (BDP)		
Enhanced	YES	NO	Nonenhanced	YES	NO
			Enhanced	YES	NO
Memory Protect Hardware	YES	NO	Memory Protect Hardware	YES	NO
			Programmable Memory Protect Hardware	YES	NO

Type	Controller	Quan.	Chan.	Equip.	Unit	AUT Ord.	Hdwr Code	Entry Point	System Unit	Cosy Deck Name
854	3234	1			1X	01	13	MSIO3234	LIB	DRIVMS
853	3234	1			1X	01	13	MSIO3234	LIB	DRIVMS
863	3436 3637	1			0X	01	15	MSIO3436	LIB	DRIV3436
841	3553	1			1X	01	13	MSIO3553	LIB	DRIVMS
Console		1	00	00	00	02	05	DRIVER05	CTO/ CFO	DRIVTYWR
405	3447 3649	1			00	03	02	DRIVER02	INP	DRIVCR
405	3248	1			00	03	02	DRIVER02	INP	DRIVCR
501/505	3256 3659	1			00	04	03	DRIVER03	OUT	DRIVPR
3254	3254	1			00	04	03	DRIVER03	OUT	DRIVPR
512	3555	1			00	04	03	DRIVER03	OUT	DRIVPR
415	3446	1			00	05	04	DRIVER04	PUN	DRIV3644
415	3245	1			00	05	04	DRIVER44	PUN	DRIV3245
			Available magnetic tape units							DRIVMT
			Available mass storage units							
			Other available hardware units							

Figure II-1-2. System Definition and Configuration Chart

MSOS OPTION SELECTION 2

The MSOS binary source file requires preparation before a final MSOS system is generated. The preparation procedures are divided into the following subsections.

Installation options

Installation dependent routines

2.1 MSOS INSTALLATION OPTIONS

2.1.1 STANDARD

The standard option provides the ability to process batch jobs and priority programs in a time-shared manner. The recommended memory size is 32K words.

2.1.2 MEMORY PROTECT

The memory protect option provides the ability to process batch jobs and priority programs in a time-shared manner. It provides memory protection for the operating system and priority programs through the use of hardware toggle switches or through programming with the enhanced block control option. 3200/3150/3100 memory protect option requires the 10123 Memory Protect hardware or the enhanced block control option. 3170/3300/3500 memory protect option requires the 10099 Memory Protect hardware. Memory size of 32K is required for the programmed memory protection.

2.1.3 EXTENDED CORE

The extended core option allows the use of 48K or 65K of memory for larger batch and priority programs. 3170/3300/3500 extended core requires the use of the standard memory protect hardware, while the 3100/3150/3200 systems require the enhanced block control option.

2.2 INSTALLATION DEPENDENT ROUTINES

Table II-2-1 lists the assembly options in alphabetical order, with the decks containing the options in the order that they appear on the COSY tape. Some options apply to all systems, while some apply only to standard, memory protect, or to extended core MSOS. The AUT and MST options must be used in all systems to define the I/O hardware configuration.

TABLE II-2-1. MSOS ASSEMBLY OPTIONS

ASSEMBLY OPTION	CIC	CIO	DRIVMT	DRIVPR	DRIVTYWR	DRIVMS	SCARV50	EXEC	INITIAL	ANLSV50	REJRV50	NMTRV50	MTRRV50	MTWRV50	MTNRV50	RDUMP	JOBCTL	JOBCTL10	JOBCTL11	JOBCTL20
ALG								X												
AUT		X																		
ASCII		X						X									X			
BDP	X								X											
BDP3312																				
BJSOPT		X						X									X			
CARDS																	X			
CARDPNCH										X		X								
CBL								X												
CC				X																
CLASSR																	X			
CLKTIME																				
CMP								X												
Coll. Seq.	X																			
CP. RETRY												X								
DT813																				
DT841																				
EMP	X	X		X	X		X	X	X	X							X	X	X	X
FDP	X								X											
FGFDTL		X																		
FINIS																	X			
FTN								X												
IL. INIT									X											
INTRLACE						X														
JOBTI								X												
JOBTL																	X			
LED																				
LIMITS		X															X			
LINECNT								X												
LINES																	X			
MACHSIZE																				
MEMPTKT																				
MFS		X																		
MIBUFLNG	X																			
MMTC									X											
MODEBIT																				
MP	X	X					X	X	X								X			
MS		X																		
MS3234						X														
MS3553						X														
MSBIAS		X																		
MSEC		X																		
MSOS. 4																				
MST		X																		
MS. RETRY											X									
MT. CBKSP			X																	
MT. PCL			X																	
MTB. RTRY													X							
MTE. RTRY														X						
MTN. RTRY															X					
MTS. RTRY													X							
MZEROSUP																				
NOCH		X						X												
NRATL																				
NRCP																				
NRPR																				
NSTDNL																		X		

ASSEMBLY OPTION	MISC1	MISC3	MISC2	JOBCTL21	JOBCTL22	AE	JOBCTL23	JOBCTL24	LOADER	PLIBEDIT	APCV50	APCINIT	PASSONE	BCDOUT	MSIOGPRW	MSIOTPOV	COBOLD2	PCOBOLD2	PCOBOLP2	PMULTIPL	PVARAN	MSSORT	MSSINTS	MSSMERG	SORT	SORTPHS1	SRTEQUAL
ALG																											
AUT																											
ASCII											X																
BDP																											
BDP3312													X		X				X		X	X	X	X	X	X	X
BJSOPT																											
CARDS																											
CARDPNCH																											
CBL																											
CC																											
CLASSR	X	X																									
CLKTIME											X																
CMP																											
Coll. Seq.																											
CP. RETRY																											
DT813			X																								
DT841			X																								
EMP				X	X		X	X	X																		
FDP																				X							
FGFDTL																											
FINIS																											
FTN																											
IL. INIT																											
INTRLACE																											
JOBTI																											
JOBTL																											
LED									X																		
LIMITS																											
LINECNT																											
LINES																											
MACHSIZE																	X	X									
MEMPTKT																						X			X		
MFS																											
MIBUFLNG																											
MMTC																											
MODEBIT															X												
MP																											
MS																											
MS3234																											
MS3553																											
MSBIAS																											
MSEC																											
MSOS. 4										X																	
MST																											
MS. RETRY																											
MT. CBKSP																											
MT. PCL																											
MTB. RTRY																											
MTE. RTRY																											
MTN. RTRY																											
MTS. RTRY																											
MZEROSUP														X													
NOCH																											
NRATL	X					X																					
NRCP											X																
NRPR											X																
NSTDNL																											

TABLE II-2-1. MSOS ASSEMBLY OPTIONS (Cont'd)

ASSEMBLY OPTION	DECK NAME																																													
	CIC	CIO	DRIVMT	DRIVPR	DRIVTYWR	DRIVMS	SCARV50	EXEC	INITIAL	ANLSV50	REJRV50	NMTRV50	MTRRV50	MTWRV50	MTNRV50	RDUMP	JOBCTL	JOBCTL10	JOBCTL11	JOBCTL20	MISC1	MISC3	MISC2	JOBCTL21	JOBCTL22	AE	JOBCTL23	JOBCTL24	LOADER	PLIBEDIT	APCV50	APCINIT	PASSONE	BCDOUT	MSIOGPRW	MSIOTPOV	COBOLD2	PCOBOLD2	PCOBOLP2	PMULTIPL	PVARAN	MSSORT	MSSINTS	MSSMERG	SORT	SORTPHS1	SRTEQUAL
OCCSNAP																													X																		
OPCTL																	X																														
OVLENGTH							X																																								
P1	X	X					X																																								
P1FDTL		X																																													
P2	X	X					X																																								
P2FDTL		X																																													
P3	X	X					X																																								
P3FDTL		X																																													
P4	X	X					X																																								
P4FDTL		X																																													
PANIC	X																																														
PCL													X																																		
PMP		X							X								X																														
PR501				X																																											
PR512				X					X										X																												
PR580				X					X										X																												
PR. RETRY												X																																			
RATL		X																																													
REALTIME	X																																														
REC								X																																							
REJLIM	X	X																																													
REJMESS	X	X																																													
REST																															X	X															
SCHCP																															X																
SCHCR																															X																
SCHPR																															X																
SEGCNT																					X					X																					
STACKENT	X																																														
SUBSET																X																															
SXTK																																										X					
SYSID																	X																														
SYSINP		X																																													
SYSOUT		X																																													
SYSPUN		X																																													
SYSTYPE		X																																													
T601			X																																												
T607			X																																												
T657			X																																												
T659			X																																												
TIMELMT								X	X																																						
TPOVSIZE																																				X											
TRN5951																			X																												
TRN5952																			X																												
TRN5953																			X																												
TRN5954																			X																												
UCBL								X																																							
UCBLV42																													X																		
UFTN								X																																							
UNRE																															X																
ZROSUPOC																																		X													

2.2.1 MSOS COSY TAPE CONTENTS

The MSOS COSY tapes contain all MSOS routine (decks) used in generating either STD, MP, or EXT MSOS libraries. Table II-2-2 lists the COSY routines in the order that they occur on the COSY tape. COMPASS is the source language for all decks on COSY tapes 1 and 2.

TABLE II-2-2. MSOS COSY TAPES

COSY Tape Number 1

Deck Name	Product Name	Deck Name	Product Name
TWOCDLDR	Two card loader	JOBCTL22	
AUTOLOAD	Autoload routine	AE	
CIC		JOBCTL23	
CIO		MR	
DRIVMT		JOBCTL24	MSOS system
DRIVCR		LOADER	routines
DRIVPR		RAAR	
DRIV3245		SCAR	
DRIV3644			
DRIVTYWR		OPTBOXS	
DRIVMS		FDPBOXS	Simulation routines
DRIV3436		BCDBOXS	
DRIV3195			
DRIV3293		PLIBEDIT	PLIBEDIT routine
DRIVPT			
DRIVDS			
SCARV50		PRELIB	
EXEC		PLOVINT	
INITIAL	MSOS system	OV1	
ANLSV50	routines	PHASE1	
REJRV50		PHASE2	PRELIB routines
NMTRV50		PLOVINT1	
MTRRV50		PLOV2	
MTWRV50		PLOV3	
MTNRV50			
MTWVV50		EXECOVR	
MESSV50		PTIOV50	
RDUMP		Q. DATE	Object routine
JOBCTL		Q. TIME	
JOBCTL10		BDTRKV50	
JOBCTL11		MSUTIL	
JOBCTL20		UDUMP	
MISC1		LOAD	MSUTIL routines
MISC3		ENTER	
MISC2		FLD. MAP	
JOBCTL21		VFLD	
OC		MSDLRW	

TABLE II-2-2. MSOS COSY TAPES (Cont'd)

Deck Name	Product Name	Deck Name	Product Name
DMSD	MSUTIL routines	FTN1	MS FORTRAN compiler
PSM		FTN2	
PSM2		FTN3	
FLL		FTN4	
FLL2		FTN5	
PFLD		FTN6	
PRINT3		FTNE	
BINTOBCD		FTN	FORTRAN LDR
SPLTDATE		FLOVER	MS FORTRAN object-time routines
DTB		BCDINP	
SNAPSHOT	Object routine	BCDOUT	
COMAC	COMPASS macros	FORMAT	
FORMSV50	Forms control	BINARY	
FORMFV50		BUFFER	
FORMCV50		UNIT	
APCV50	APC routine	IOCHK	
APV50	Alternate processor	EOFCHK	
APCINIT	APC routine	TAPEHAND	
COSY	COSY	PAUSE	
COSYRDWT		CONTROL	
COMPASSB	COMPASS LDR	CIO. MSIO	
COMPASS	COMPASS assembler	LOCATE	
OVERLAY1		DOUBLE	
PASSONE		DFPRIME	
PASSTWO		DFP	
SYMTBLE		Q1QADRI	
CRT		ITOJ	
		ITOX	
		XTOI	
		POWRF	
		SINCOS	
		ATANF	
		EXPF	
		LOGF	
		TANF	

TABLE II-2-2. MSOS COSY TAPES (Cont'd)

Deck Name	Product Name	Deck Name	Product Name
INVERSE			
ADAMS			
XLAGF			
RKGILL			
XMATX			
XINV			
MATRIX			
CMATX			
TRANS			
SIGNF			
SQRTF			
ABSF	MS FORTRAN		
EXTREMA1	object-time		
EXTREMA2	routines		
FLOATF			
FIXF			
INTF			
MOD			
MASKINGF			
FAULTS			
SENSLITE			
SENSWTCH			
Q8QERROR			
SAINT	SAINT		
End of COSY Tape Number 1			

TABLE II-2-2. MSOS COSY TAPES (Cont'd)

COSY Tape Number 2			
Deck Name	**Product Name**	**Deck Name**	**Product Name**
EXPANDSF		TRANSMIT	
REPLACE		FIGCON	
DELETE		COMPARE	
INSERT		EDIT	
UPDATE		EDITCOBL	
ISGET		MULTIPLY	
BUILD		DIVIDE	
BLOCKER	LISA routines	BMULTPLY	
FILEDEF		BDIVIDE	
RECDEF		ERRSTOP	
BUFDEF		TYPELOOP	
FILEDEFF		DPMULDIV	
RECDEFF		STRIPPER	
BUFDEFF		BSTRIPPR	
FD		SUBSCRP	MS COBOL BCD object-time routines
		DEEDIT	
MSOSUTIL		EXAMINE	
COPYT		NUMERIC	
VERIFY	MSOS utility routines	ALPHABET	
DUMP		ACCEPT	
ERROR		DISPLAY	
MSIOMAIN		MVFIGCON	
MSIOGPRW		VARC1	
MSIOTPOV	L-MSIO routines	VARN	
MSIOMSOV		VARAN	
MRESTART		ROUNDER	
COBOL		CONVERT	
COBOLIE		ZIPPER	
COBOLD1		LOGICAL	
COBOLP1	MS COBOL BCD compiler	PCOBOL	
COBOLD2		PCOBOLIE	
COBOLP2		PCOBOLD1	
COBOLP3		PCOBOLP1	MS COBOL BDP compiler routines
COBOLIO		PCOBOLD2	
		PCOBOLP2	
		PCOBOLDP	
		PCOBOLO	

TABLE II-2-2. MSOS COSY TAPES (Cont'd)

Deck Name	Product Name	Deck Name	Product Name
PERRSTOP		SRTMPOLB	
PTYPELOO		SORTPDMY	
PFIGCON		SORTEDIT	
PCOMPARE		SORTIOP1	
PMULTIPL		SORTPHS1	
PDIVIDE		SRTRBALF	
PSTRIPPE		SRTRPOLF	
PSUBSCRP		SRTRBALB	
PDEEDIT		SRTRPOLB	Tape Sort routines
PEXAMINE	MS COBOL BDP object-time routines	SRESTART	
PNUMERIC		RESTART1	
PALPHABE		RSTRTDUM	
PACCEPT		SORTIOP2	
PDISPLAY		SRTEQUAL	
PMVFIGCO		POLYFORW	
PVARC1		BALCFORW	
PVARN		BALCBACK	
PVARAN		POLYBACK	
PDPBINBC		WAITBEEP	
PDPBCDBI		ALGOL	ALGOL LDR
PZIPPER		ALG0	
PLOGICAL		ALG1	
MSSORT		ALG2	ALGOL compiler routines
MDYNALL		ALG3	
MSSEDIT		ALG4	
MSSIOP1	MS SORT routines	ALG5	
MSSIOP2		ALGLIB00	
MSSINTS		ALGLIB01	ALGOL object-time routines
MSSMERG		ALGLIB02	
SORT		ALGLIB03	
TDYNALL		ALGLIB04	
BINANDEC	Tape Sort routines	ALBLIB05	
SDUMP		ALGLIB06	
SRTPRINT		ALGOLRUN	
SORTPOLY		IUP.INIT	IUP routines
SRTMBALF		IUP	
SRTMALB		End of COSY Tape Number 2	
SRTMPOLF			

2.2.2 ASSEMBLY OPTION CODING SHEETS

It is recommended that the assembly option coding sheets (Table II-2-3) be used as an aid in selecting assembly options. Unused lines can be crossed out and parameters supplied for chosen lines. These coding sheets contain all options and a DECK/ card for each deck in the COSY file that has assembly options. The DECK/ cards are in the same order as on the COSY file.

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS

Location	Operation	Address Field	Comments
1 8	10	20	41
	DELETE/	3	
MP	EQU		Memory protect option
	DELETE/	4	
EMP	EQU		Extended memory protection
	DELETE/	5	
PMP	EQU		Programmable memory protection
	DELETE/	6	
FDP	EQU		Floating point hardware
	DELETE/	7	
BDP	EQU		BDP hardware option
	DELETE/	9	
REJMESS	EQU		Reject message option
	DELETE/	10	
STACKENT	EQU		Stacked interrupts option
	DELETE/	11	
MIBUFLNG	EQU		Manual interrupt buffer length option
	DELETE/	12	
P1	EQU		Priority level 1 option
	DELETE/	13	
P2	EQU		Priority level 2 option
	DELETE/	14	
P3	EQU		Priority level 3 option
	DELETE/	15	
P4	EQU		Priority level 4 option
	DELETE/	16	
PANIC	EQU		Debugging panic dump option
	DELETE/	17	
REJLIM	EQU		Reject limit option
	DELETE/	18	
REALTIME	EQU		
	DELETE/	233,248	
	OCT		BDP collating sequence when BDP = 2
	OCT		
	OCT		
	OCT		
	OCT		
	OCT		
	OCT		
	OCT		
CIC	DECK/		

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location	Operation	Address Field	Comments
1 8	10	20	41
	DELETE/	260	
NOCH	EQU		Number of channels option
	DELETE/	261	
RATL	EQU		MST size option
	DELETE/	262	
MSBIAS	EQU		SEEK lead option
	DELETE/	263	
MS	EQU		Dual channel access option
	DELETE/	264	
MP	EQU		Memory protect option
	DELETE/	265	
EMP	EQU		Extended memory protection option
	DELETE/	266	
BJSOPT	EQU		Batch job submission option
	DELETE/	267	
ASCII	EQU		ASCII capability option
	DELETE/	269	
REJMESS	EQU		Reject message option
	DELETE/	270	
REJLIM	EQU		Reject limit option
	DELETE/	273	
LIMITS	EQU		Card or line limit option
	DELETE/	274	
P1	EQU		Priority level 1 option
	DELETE/	275	
P2	EQU		Priority level 2 option
	DELETE/	276	
P3	EQU		Priority level 3 option
	DELETE/	277	
P4	EQU		Priority level 4 option
	DELETE/	283,287	
	MST		MST macros (one macro for each mass storage drive in the system)
	.		
	.		
	.		
	MST		
	DELETE/	295,320	
	AUT		AUT macros (one macro for each I/O unit in the system)
	.		
	.		
	.		
	AUT		
	DELETE/	323	
SYSLIB	EQU		AUT ordinal of system library
	DELETE/	324	
SYSTYPE	EQU		AUT ordinal of system typewriter
	DELETE/	325	
SYSINP	EQU		AUT ordinal of system input device
	DELETE/	326	
SYSOUT	EQU		AUT ordinal of system output device

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location 1 8	Operation 10	Address Field 20	Comments 41
	DELETE/	327	
SYSPUN	EQU		AUT ordinal of system punch
	DELETE/	328	
MFS	EQU		Maximum file size (tracks)
	DELETE/	329	
FGFDTL	EQU		Batch FDT length option
	DELETE/	330	
P4FDTL	EQU		Priority level 4 FDT length option
	DELETE/	331	
P3FDTL	EQU		Priority level 3 FDT length option
	DELETE/	332	
P2FDTL	EQU		Priority level 2 FDT length option
	DELETE/	333	
P1FDTL	EQU		Priority level 1 FDT length option
	DELETE/	378	
MSEC	OCT		System access and system modification privacy codes (two words)
CIO	DECK/		
	DELETE/	26	
T659	EQU		659 transport option
	DELETE/	27	
T657	EQU		657 transport option
	DELETE/	28	
T607	EQU		607 transport option
	DELETE/	29	
T601	EQU		601 transport option
	DELETE/	30	
MT.CBKSP	EQU		Controlled backspace hardware option on tape drives
	DELETE/	31	
MT.PCL	EQU		Programmable clipping level hardware option on tape drives
DRIVMT	DECK/		
	DELETE/	3	
PR501	EQU		501/505/3254 line printer option
	DELETE/	4	
PR512	EQU		512 printer option
	DELETE/	5	
EMP	EQU		Extended memory protect option
	DELETE/	6	
CC	EQU		Carriage control option
	DELETE	7	
PR580	EQU		580 printer option
DRIVPR	DECK/		
	DELETE/	3	
EMP	EQU		Extended memory protection option
DRIVTYWR	DECK/		
	DELETE/	14	
MS3553	EQU		3553 controller option

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location 1 … 8	Operation 10	Address Field 20	Comments 41
	DELETE/	15	
MS3234	EQU		3234 controller option
	DELETE/	16	
INTRLACE	EQU		841 interlace option
DRIVMS	DECK/		
	DELETE/	52	
MP	EQU		Memory protect option
	DELETE/	53	
EMP	EQU		Extended memory protection option
	DELETE/	54	
P1	EQU		Priority level 1 option
	DELETE/	55	
P2	EQU		Priority level 2 option
	DELETE/	56	
P3	EQU		Priority level 3 option
	DELETE/	57	
P4	EQU		Priority level 4 option
	DELETE/	62	
OVLENGTH	EQU		Error recovery overlay length
SCARV50	DECK/		
	DELETE/	3	
MP	EQU		Memory protect option
	DELETE/	4	
EMP	EQU		Extended memory protect option
	DELETE/	5	
BJSOPT	EQU		Batch job submission option
	DELETE/	6	
ASCII	EQU		ASCII capability option
	DELETE/	7	
TIMELMT	EQU		Time limit test option
	DELETE/	8	
LINECNT	EQU		Lines per page option
	DELETE/	9	
JOBTI	EQU		Execution time sampling interval
	DELETE/	10	
CMP	EQU		COMPASS RDT option
	DELETE/	11	
FTN	EQU		MS FORTRAN RDT option

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location 1 8	Operation 10	Address Field 20	Comments 41
	DELETE/	12	
CBL	EQU		MS COBOL RDT option
	DELETE/	13	
ALG	EQU		ALGOL RDT option
	DELETE/	14	
UFTN	EQU		ANSI FORTRAN RDT option
	DELETE/	15	
UCBL	EQU		ANSI COBOL RDT option
	DELETE/	16	
REC	EQU		Error recovery RDT option
	DELETE/	17	
NOCH	EQU		Number of channels option
EXEC	DECK/		
	DELETE/	3	
MP	EQU		Memory protect option
	DELETE/	4	
EMP	EQU		Extended memory protection option
	DELETE/	5	
PMP	EQU		Programmable memory protection option
	DELETE/	6	
BDP	EQU		BDP hardware option
	DELETE/	7	
PR512	EQU		512 printer option
	DELETE/	8	
PR580	EQU		580 printer option
	DELETE/	9	
MMTC	EQU		MMTC option
	DELETE/	10	
FDP	EQU		FDP hardware option
	DELETE/	11	
TIMELMT	EQU		Time limit test option
	DELETE/	13	
IL.INIT	EQU		Interim library code option
INITIAL	DECK/		
	DELETE/	57	
EMP	EQU		Extended memory protection option
	DELETE/	58	
CARDPNCH	EQU		Card punch error recovery option
ANLSV50	DECK/		

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location	Operation	Address Field	Comments
1 8	10	20	41
	DELETE/	34	
MS. RETRY	EQU		Mass storage retry option
REJRV50	DECK/		
	DELETE/	58	
PR. RETRY	EQU		Printer retry option
	DELETE/	59	
CP. RETRY	EQU		Card punch retry option
	DELETE	61	
CARDPNCH	EQU		Card punch error recovery option
NMTRV50	DECK/		
	DELETE/	54	
MTB. RTRY	EQU		Tape backspace – reread option
	DELETE/	55	
MTS. RTRY	EQU		Tape cleaner option
	DELETE/	57	
PCL	EQU		Programmable clipping hardware option
MTRRV50	DECK/		
	DELETE/	44	
MTE. RTRY	EQU		Tape erase option
MTWRV50	DECK/		
	DELETE/	33	
MTN. RTRY	EQU		Noise recovery option
MTNRV50	DECK/		
	DELETE/	3	
SUBSET	EQU		Printer character set option
RDUMP	DECK/		
	DELETE/	10	
MP	EQU		Memory protect option
	DELETE/	11	
EMP	EQU		Extended memory protect option
	DELETE/	12	
PMP	EQU		Programmable memory protect option
	DELETE/	13	
OPCTL	EQU		Operator control option

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location 1 … 8	Operation 10	Address Field 20	Comments 41
	DELETE/	14	
BJSOPT	EQU		Batch job submission option
	DELETE/	15	
JOBTL	EQU		Job time limit option
	DELETE/	16	
CARDS	EQU		Punch card limit option
	DELETE/	17	
LINES	EQU, C		Line limit option
	DELETE/	18	
SYSID	EQU		System identifier line option
	DELETE/	19	
LIMITS	EQU		Sense limits option
	DELETE/	20	
FINIS	EQU		Message response option
	DELETE/	22	
ASCII	EQU		ASCII capability option
	DELETE/	23	
CLASSR	EQU		Class R files option
JOBCTL	DECK/		
	DELETE/	3	
NSTDNL	EQU		Nonstandard noise length option
	DELETE/	5	
EMP	EQU		Extended memory protection
JOBCTL10	DECK/		
	DELETE/	3	
EMP	EQU		Extended memory protection
	DELETE/	4	
PR512	EQU		512 printer option
	DELETE/	5	
PR580	EQU		580 printer option
	DELETE/	6	
TRN5951	EQU		501 compatible train option
	DELETE/	7	
TRN5952	EQU		AN train option
	DELETE/	8	
TRN5953	EQU		HN train option
	DELETE/	9	
TRN5954	EQU		ASCII train option
JOBCTL11	DECK/		
	DELETE/	3	
EMP	EQU		Extended memory protection
JOBCTL20	DECK/		

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location 1 8	Operation 10	Address Field 20	Comments 41
	DELETE/	3	
SEGCNT	EQU		File segment maximum
	DELETE/	4	
NRATL	EQU		MST size option
	DELETE/	5	
CLASSR	EQU		Class-R files option
MISC1	DECK/		
	DELETE/	3	
CLASSR	EQU	0	Class-R files option
MISC3	DECK/		
	DELETE/	19	
DT841	EQU		841 availability option
	DELETE/	20	
DT813	EQU		813 availability option
MISC2	DECK/		
	DELETE/	3	
EMP	EQU		Extended memory protection
JOBCTL21	DECK/		
	DELETE/	3	
EMP	EQU		Extended memory protection
JOBCTL22	DECK/		
	DELETE/	3	
NRATL	EQU		MST size option
	DELETE/	4	
SEGCNT	EQU		File segment maximum
AE	DECK/		
	DELETE/	3	
EMP	EQU		Extended memory protection
JOBCTL23	DECK/		
	DELETE/	3	
EMP	EQU		Extended memory protection
JOBCTL24	DECK/		

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location 1 8	Operation 10	Address Field 20	Comments 41
	DELETE/	3	
OCCSNAP	EQU		OCC and SNAP card option
	DELETE/	4	
LED	EQU		LED card option
	DELETE/	5	
UCBLV42	EQU		ANSI COBOL option
	DELETE/	6	
EMP	EQU		Extended memory protection
LOADER	DECK/		
	DELETE/	5	
MSOS.4	EQU		PLIBEDIT version option
PLIBEDIT	DECK/		
	DELETE/	78	
NRPR	EQU		APC printer availability option
	DELETE/	80	
NRCP	EQU		APC punch availability option
	DELETE/	82	
SCHCR	EQU		APC job stack option
	DELETE/	84	
SCHPR	EQU		APC print file stack option
	DELETE/	86	
SCHCP	EQU		APC punch file stack option
	DELETE/	88	
REST	EQU		APC restart option
	DELETE/	91	
UNRE	EQU		APC operator intervention option
	DELETE/	94	
ASCII	EQU		ASCII capability option
	DELETE/	98	
CLKTIME	EQU		Clock interrupt option
APCV50	DECK/		
	DELETE/	30	
REST	EQU		APC restart option
APCINIT	DECK/		
	DELETE/	17	
BDP3312	EQU		BDP hardware option
PASSONE	DECK/		
	DELETE/	4	
ZROSUPOC	EQU		Suppress leading zeros
	DELETE/	5	
MZEROSUP	EQU		Print negative zero
BCDOUT	DECK/		

TABLE II-2-3. MSOS ASSEMBLY OPTION CODING SHEETS (Cont'd)

Location 1 … 8	Operation 10	Address Field 20	Comments 41
	DELETE/	3	
BDP3312	EQU		BDP hardware option
	DELETE/	15	
MODEBIT	EQU		Mode bit option
MSIOGPRW	DECK/		
	DELETE/	77	
TPOVSIZE	EQU		Logical MSIO overlay area size
MSIOTPOV	DECK/		
	DELETE/	495	
MACHSIZE	EQU		Memory limit option (BCD COBOL)
COBOLD2	DECK/		
	DELETE/	496	
MACHSIZE	EQU		Memory limit option (BDP COBOL)
PCOBOLD2	DECK/		
	DELETE/	12	
BDP3312	EQU		BDP hardware option
PCOBOLP2	DECK/		
	DELETE/	9	
FDP	EQU		FDP hardware option
PMULTIPL	DECK/		
	DELETE/	18	
BDP3312	EQU		BDP hardware option
PVARAN	DECK/		
	DELETE/	9	
BDP3312	EQU		BDP hardware option
	DELETE/	12	
MEMPTKT	EQU		Memory protect option
	DELETE/	21	
SXTK	EQU		Memory size option
MSSORT	DECK/		
	DELETE/	4	
BDP3312	EQU		BDP hardware option
MSSINTS	DECK/		
	DELETE/	8	
BDP3312	EQU		BDP hardware option
MSSMERG	DECK/		
	DELETE/	9	
BDP3312	EQU		BDP hardware option
	DELETE/	12	
MEMPTKT	EQU		Memory protect option
SORT	DECK/		
	DELETE/	6	
BDP3312	EQU		BDP hardware option
SORTPHS1	DECK/		
	DELETE/	5	
BDP3312	EQU		BDP hardware option
SRTEQUAL	DECK/		

2.3 ASSEMBLY OPTION DEFINITION

The following paragraphs describe all assembly options for MSOS and its product sets supplied in release package A (part I, section 1.3). The assembly options for the products supplied on release packages B, C, D, E, F, G (ANSI COBOL, ANSI FORTRAN, PERT COST/TIME, ADAPT, and SAINT) are described in section 5.

All options are listed in alphabetical order. The format of each assembly option definition is as follows:

Assembly option (mnemonic)

Definition:

Option:

mnemonic	operator	address

Dependency:

Release value:

COSY modifiers and deck cards for all decks containing the option

2.3.1 RDT ENTRY OPTION FOR ALGOL (ALG)

Definition: The ALG option allows the user to eliminate the RDT entries for the ALGOL absolute records, if ALGOL is to be excluded from the library. Use of this option reduces the system resident requirement in words of core by five times the number of absolute records normally on the ABS file for ALGOL.

Option:	ALG	EQU	0	ALGOL is not included on the library
	ALG	EQU	6	Number of ALGOL absolute records

Dependency: When ALGOL is on the library, ALG must equal the number of absolute records for ALGOL on the ABS file.

Release value: ALG equals 6 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	13
EXEC	DECK/	p1, p2

2.3.2 ASCII HARDWARE OPTION (ASCII)

Definition: The ASCII option provides ASCII capability for system units.

Option:

ASCII	EQU	0	No ASCII capability for system units
ASCII	EQU	1	System units have ASCII capability

Dependency: ASCII hardware availability

Release value: ASCII equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	267
CIO	DECK/	p1, p2
	DELETE/	6
EXEC	DECK/	p1, p2
	DELETE/	22
JOBCTL	DECK/	p1, p2
	DELETE/	94
APCV50	DECK/	p1, p2

2.3.2A SYSTEM HARDWARE DEFINITION (AUT)

Definition: The AUT option specifies the system I/O hardware configuration. This is performed by inserting AUT macros in CIO. PRELIB uses these macros to build the AUT table. The AUT table and macro is described in section III-5.

Option: A maximum of 50 macros can be inserted. The macros must be inserted in the order listed below.

Dependency: One macro is required for each I/O unit in the system.

Release value: The release version contains 26 macros that define the system on which MSOS 5 was developed and tested.

Deck and COSY numbers:

	DELETE/	295, 320	
	AUT	(parameters)	- Library device
	AUT	(parameters)	- Console typewriter
	AUT	(parameters)	- Input unit
	AUT	(parameters)	- Output unit
	AUT	(parameters)	- Punch unit
	AUT	(parameters)	Other I/O units in any order
	.	.	
	.	.	
	.	.	
	AUT	(parameters)	
CIO	DECK/	p1, p2	

Dependency: Availability and type of BDP hardware; option BDP must be equated to the same value as this option.

Release value: BDP3312 equals 0 on the MSOS COSY tape and the BCD version of the routines on the source tape; BDP3312 equals 1 in the BDP versions and equals 2 in the enhanced BDP versions of the routines on the MSOS binary source.

Decks and COSY numbers:

	DELETE/	17
PASSONE	DECK/	p1, p2
	DELETE/	3
MSIOGPRW	DECK/	p1, p2
	DELETE/	12
PCOBOLP2	DECK/	p1, p2
	DELETE/	18
PVARAN	DECK/	p1, p2
	DELETE/	9
MSSORT	DECK/	p1, p2
	DELETE/	4
MSSINTS	DECK/	p1, p2
	DELETE/	8
MSSMERG	DECK/	p1, p2
	DELETE/	9
SORT	DECK/	p1, p2
	DELETE/	6
SORTPHS1	DECK/	p1, p2
	DELETE/	5
SRTEQUAL	DECK/	p1, p2

2.3.5 BDP COLLATING SEQUENCE

Definition: Installations having the enhanced BDP hardware can manually reset the desired priority of their collating sequence.

Option:

```
OCT    66677071,72737475
OCT    76770127,30020304
OCT    20323334,35363740
OCT    41423115,16131417
OCT    23444546,47505152
OCT    53544321,22101112
OCT    00245657,60616263
OCT    64655525,26050607
```

Dependency: The BDP collating sequence is only applicable when options BDP and BDP3312 are equated to 2. The BDP collating sequence is utilized by the enhanced BDP hardware and the numeric and alphanumeric compare instructions.

Release value: On the MSOS COSY tape the BDP collating sequence is as shown previously. On the MSOS binary source, the BDP collating sequence is not assembled, because BDP is equated to 0. It is assembled in deck CIC when option BDP is equated to 2.

Decks and COSY numbers:

	DELETE/	233,248
CIC	DECK/	p1, p2

2.3.6 BATCH JOB SUBMISSION OPTION (BJSOPT)

Definition: The batch job submission option allows priority programs to submit batch jobs.

Option:

BJSOPT	EQU	0	No batch job submission by priority programs
		1	Priority programs may submit batch jobs.

Dependency: At least one priority level (option Pn) must be selected.

Release value: BJSOPT equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	266
CIO	DECK/	p1, p2
	DELETE/	5
EXEC	DECK/	p1, p2
	DELETE/	14
JOBCTL	DECK/	p1, p2

2.3.7 PUNCHED CARD LIMIT (CARDS)

Definition: The CARDS option specifies the default limit on the number of cards punched for a job.

Option:

CARDS	EQU	n	Default number of cards to be punched

Dependency: LIMITS option must be on.

Release value: CARDS equals 2000 on the MSOS COSY tape and the MSOS binary source tape.

2.3.9 CARRIAGE CONTROL OPTION (CC)

Definition: The CC option distinguishes between ANSI carriage control and the CDC standard carriage control. ANSI control characters are limited to +, 0, 1, or blank.

Option:

CC	EQU	0	ANSI carriage control
CC	EQU	1	CDC standard carriage control

Dependency: None; user preference.

Release value: CC equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	6
DRIVPR	DECK/	p1, p2

2.3.9A CLASS-R FILES OPTION (CLASSR)

Definition: The CLASSR option allows the use of class-R mass storage files.

Option:

CLASSR	EQU	0	Class-R files are not recognized
CLASSR	EQU	1	Class-R files can be used

Dependency: User preference. If class-R files are to be used, the option must be set. If CLASSR is set and logical MSIO is to be used (either through COMPASS macro calls or by COBOL or LISA), the option TPOVSIZE must be modified.

Release value: CLASSR equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	23
JOBCTL	DECK/	p1, p2
	DELETE/	5
MISC1	DECK/	p1, p2
	DELETE/	3
MISC3	DECK/	p1, p2

2.3.10 CLOCK QUANTUM OPTION (CLKTIME)

Definition: The CLKTIME option specifies the real-time clock quantum in milliseconds in which APC attempts to initiate I/O on a peripheral device available for I/O.

Option:

CLKTIME	EQU	n	Time quantum in milliseconds

Dependency: None

Release value: CLKTIME equals 10 on the MSOS COSY tape and the MSOS binary tape.

Decks and COSY numbers:

	DELETE/	98
APCV50	DECK/	p1, p2

2.3.11 RDT ENTRY OPTION FOR COMPASS (CMP)

Definition: The CMP option allows the user to eliminate the RDT entries for the COMPASS absolute records if COMPASS is to be excluded from the library. Use of this option reduces the system resident requirement in words of core by five times the number of absolute records normally on the ABS file for COMPASS.

Option:

CMP	EQU	0	COMPASS is not included on the library
CMP	EQU	5	Number of COMPASS absolute records

Dependency: When COMPASS is on the library, CMP must equal the number of absolute records for COMPASS on the ABS file.

Release value: CMP equals 5 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	10
EXEC	DECK/	p1, p2

2.3.12 CARD PUNCH RETRY OPTION (CP.RETRY)

Definition: The CP.RETRY option specifies the number of retries required on the card punch before declaring a channel parity or compare error irrecoverable.

Option:

CP.RETRY	EQU	n	Number of retries, 0 through 511

Dependency: None

Release value: CP.RETRY equals 5 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	59
NMTRV50	DECK/	p1, p2

2.3.13 813/814 DISK FILE OPTION (DT813)

Definition: The DT813 option specifies whether an 813 or 814 disk file is available in the system.

Option:

DT813	EQU	0	No 813/814 disk file present
DT813	EQU	1	813/814 disk file is present

Dependency: Availability of hardware.

Release value: DT813 equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	20
MISC2	DECK/	p1, p2

2.3.14 MULTIPLE DISK DRIVE OPTION (DT841)

Definition: The DT841 option specifies whether an 841 multiple disk drive is available in the system.

Option:

DT841	EQU	0	No 841 multiple disk drive available
DT841	EQU	1	841 multiple disk drive is available

Dependency: Availability of hardware; must be set to 1 if 841 drives are used in the system.

Release value: DT841 equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	19
MISC2	DECK/	p1, p2

2.3.15 EXTENDED MEMORY PROTECT OPTION (EMP)

Definition: This option distinguishes between standard 32K memory protect and 48K or 65K extended memory protect systems.

Option:

EMP	EQU	0	Standard 32K memory protect
EMP	EQU	1	48K or 65K extended memory protect

Dependency: Availability of extended memory. If the MP option is present in the deck in which EMP is equated to 1, MP must also be equated to 1.

Release value: EMP equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	4
CIC	DECK/	p1, p2

	DELETE/	265
CIO	DECK/	p1, p2
	DELETE/	5
DRIVPR	DECK/	p1, p2
	DELETE/	3
DRIVTYWR	DECK/	p1, p2
	DELETE/	53
SCARV50	DECK/	p1, p2
	DELETE/	4
EXEC	DECK/	p1, p2
	DELETE/	4
INITIAL	DECK/	p1, p2
	DELETE/	57
ANLSV50	DECK/	p1, p2
	DELETE/	11
JOBCTL	DECK/	p1, p2
	DELETE/	5
JOBCTL10	DECK/	p1, p2
	DELETE/	3
JOBCTL11	DECK/	p1, p2
	DELETE/	3
JOBCTL20	DECK/	p1, p2
	DELETE/	3
JOBCTL21	DECK/	p1, p2
	DELETE/	3
JOBCTL22	DECK/	p1, p2
	DELETE/	3
JOBCTL23	DECK/	p1, p2
	DELETE/	3
JOBCTL24	DECK/	p1, p2
	DELETE/	6
LOADER	DECK/	p1, p2

2.3.16 FLOATING POINT HARDWARE OPTION (FDP)

Definition: The FDP option permits those installations with CDC FDP hardware to utilize the hardware through software modifications.

Option:

FDP	EQU	0	No FDP hardware present
FDP	EQU	1	FDP hardware present

Dependency: FDP hardware availability.

Release value: FDP equals 1 on the MSOS COSY tape and the MSOS binary source tape. This option may be left on even if hardware is not available. The option controls only the saving of the E registers so that different priority levels can use the floating point hardware.

Decks and COSY numbers:

	DELETE/	6
CIC	DECK/	p1, p2
	DELETE/	10
INITIAL	DECK/	p1, p2
	DELETE/	9
PMULTIPL	DECK/	p1, p2

The correction to PMULTIPL applies only to BDP COBOL.

2.3.17 FILE DESCRIPTION TABLE LENGTH OPTION (FGFDTL/PnFDTL)

Definition: The length of the FDT is set by the value of FGFDTL for batch files and PnFDTL for priority files, where n is the priority level 1 through 4. These respective tables (FGFDT and PnFDT) contain the necessary information to process an open file. Each open mass storage file uses eight words plus three words for each segment of the file. Each open unit record file uses a 9-word entry in its table.

Option:

FGFDTL	EQU	n	Eleven times the number of open batch files
P4FDTL	EQU	n	Eleven times the number of open level 4 priority files
P3FDTL	EQU	n	Eleven times the number of open level 3 priority files
P2FDTL	EQU	n	Eleven times the number of open level 2 priority files
P1FDTL	EQU	n	Eleven times the number of open level 1 priority files

Dependency: Installation preference. A factor of eleven times the number of open files can be used as a general rule to determine the size of the tables. PnFDTL is not assembled into the system if the corresponding Pn option (section 2.3.52) is set to 0.

Release value: FGFDTL equals 350 and PnFDTL equals 55 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	329, 333
CIO	DECK/	p1, p2

2.3.18 MESSAGE RESPONSE OPTION (FINIS)

Definition: The FINIS option determines whether certain messages are responded to by pressing FINISH or whether MANUAL INTERRUPT must be pressed and a response typed.

Option:

FINIS	EQU	0	MANUAL INTERRUPT must be pressed for response
FINIS	EQU	1	FINISH is used as a response

Dependency: None

Release value: FINIS equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	20
JOBCTL	DECK/	p1, p2

2.3.19 RDT ENTRY OPTION FOR MS FORTRAN (FTN)

Definition: The FTN option allows the user to eliminate the RDT entries for the MS FORTRAN absolute records, if MS FORTRAN is to be excluded from the library. Use of this option reduces the system resident requirement in words of core by five times the number of absolute records normally on the ABS file for MS FORTRAN.

Option:

FTN	EQU	0	MS FORTRAN is not included on the library
FTN	EQU	7	Number of MS FORTRAN absolute records

Dependency: When MS FORTRAN is on the library, FTN must equal the number of absolute records for MS FORTRAN on the ABS file.

Release value: FTN equals 7 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	11
EXEC	DECK/	p1, p2

2.3.20 INTERIM LIBRARY OPTION (IL.INIT)

Definition: The interim library option determines whether special code for an interim library is assembled from COSY deck INITIAL.

Option:

IL. INIT	EQU	0	Interim library code is not assembled
IL. INIT	EQU	1	Interim library code is assembled

Dependency: None

Release value: IL. INIT equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	13
INITIAL	DECK/	p1, p2

2.3.21 841 INTERLACE OPTION (INTRLACE)

Definition: The INTRLACE option specifies the interlace for the 841 multiple disk drive.

Option:

INTRLACE	EQU	10B	1:1 interlace
INTRLACE	EQU	12B	2:1 interlace
INTRLACE	EQU	14B	4:1 interlace
INTRLACE	EQU	16B	8:1 interlace

Dependency: Should be same interlace value that was used to write addresses on these devices.

Release value: INTRLACE equals 12B on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	16
DRIVMS	DECK/	p1, p2

2.3.22 SAMPLING TIME INTERVAL (JOBTI)

Definition: The JOBTI option specifies the time interval in milliseconds for sampling batch job execution time and lost interrupts.

Option:

JOBTI	EQU	n	Time interval in milliseconds

Dependency: If JOBTI is set to other than 0, TIMELMT (section 2.3.76) must be set to 1. JOBTI must be set to a nonzero value if lost interrupts are to be detected. JOBTI may require a value as high as 13000_{10} for some systems with lower speed tape drives such as 601 drives.

Release value: JOBTI equals 3000B on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	9
EXEC	DECK/	p1, p2

2.3.23 JOB TIME LIMIT OPTION (JOBTL)

Defintion: The JOBTL option sets the default time limit for job execution.

Option:

JOBTL	EQU	n	Number of seconds allowed for job execution. If n is equated to 0, no time limit is specified unless the user sets one for the current job.

Dependency: No system dependency.

Release value: JOBTL equals 1200 (20 minutes) on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	15
JOBCTL	DECK/	p1, p2

2.3.24 LOADER EQUIPMENT DECLARATION CARD OPTION (LED)

Definition: The LED option determines the occurrence or use of logical equipment declaration cards.

Option:

LED	EQU	0	No LED cards processed
LED	EQU	1	Process LED cards

Dependency: None

Release value: LED equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	4
LOADER	DECK/	p1, p2

2.3.25 CARD OR LINE LIMIT OPTION (LIMITS)

Definition: The LIMITS option determines whether the limit specified for the number of cards punched or lines printed on batch jobs will be sensed.

Option:

LIMITS	EQU	0	No limits set on cards or lines
LIMITS	EQU	1	Limits set on cards and lines

Dependency: If the CARDS or LINES options are to be specified and observed, LIMITS must be set equal to 1.

Release value: LIMITS equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	273
CIO	DECK/	p1, p2
	DELETE/	19
JOBCTL	DECK/	p1, p2

2.3.26 LINE COUNT OPTION (LINECNT)

Definition: The line count option specifies the number of lines per page for the printer.

Option:

LINECNT	EQU	n	Number of lines per printer page

Dependency: None

Release value: LINECNT equals 58 on the MSOS COSY tape and the MSOS binary source tape. Certain products such as COSY do not observe the system value.

Decks and COSY numbers:

	DELETE/	8
EXEC	DECK/	p1, p2

2.3.27 LINE LIMIT OPTION (LINES)

Definition: The LINES option sets the default limit for the number of lines printed for a job.

Option:

LINES	EQU, C	n	Default number of lines to be printed

Dependency: LIMITS option must be equated to 1.

Release value: LINES equals 131,071 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	17
JOBCTL	DECK/	p1, p2

2.3.28 MEMORY LIMIT OPTION (MACHSIZE)

Definition: The MACHSIZE option informs the user if COMMON or COMMON plus DATA exceeds available memory.

Option:

MACHSIZE	EQU	0	32K core available
MACHSIZE	EQU	$\neq 0$	16K core available

Dependency: Amount of storage available. If the system is an extended core variant, the option should be set according to the bank 1 memory available.

Release value: MACHSIZE equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	495	
COBOLD2	DECK/	p1, p2	(BCD COBOL)
	DELETE/	496	
PCOBOLD2	DECK/	p1, p2	(BDP COBOL)

2.3.29 SORT AND MS SORT MEMORY PROTECTION OPTION (MEMPTKT)

Definition: The option MEMPTKT assembles the necessary code in SORT and MSSORT according to BDP hardware availability and the type of system being created.

Option:

MEMPTKT	EQU	0	For a STD or batch system or MP system with BDP hardware
MEMPTKT	EQU	2	For a MP system without BDP hardware

Dependency: System type and BDP hardware availability.

Release value: MEMPTKT equals 0 on the MSOS COSY tape and BCD and BDP sections of the MSOS binary source.

NOTE

This option must be modified for a memory protect system without BDP hardware.

Decks and COSY numbers:

	DELETE/	12
MSSORT	DECK/	p1, p2
	DELETE/	12
SORT	DECK/	p1, p2

2.3.29A MAXIMUM FILE SIZE OPTION (MFS)

Definition: The option MFS defines the maximum number of tracks that a file can be allocated, or the maximum number of tracks to which it can be expanded.

Option:

MFS	EQU	x	Where x is the maximum file size to be used. (Maximum value of x is 32,767 tracks.)

Dependency: The number of mass storage devices available and entered.

Release value: MFS equals 4028 on the MSOS COSY tape and binary source.

Decks and COSY numbers:

	DELETE/	328
CIO	DECK/	p1,p2

2.3.30 MANUAL INTERRUPT BUFFER LENGTH OPTION (MIBUFLNG)

Definition: This option specifies the size of the manual interrupt buffer.

Option:

MIBUFLNG	EQU	n	Word size of manual interrupt buffer.

Dependency: The range of values for MIBUFLNG is 8 through 20 words.

Release value: MIBUFLNG equals 8 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	11
CIC	DECK/	p1, p2

2.3.31 MMTC OPTION (MMTC)

Definition: The MMTC option allows image memory initialization on MMTCs (65x).

Option:

MMTC	EQU	0	No image memory initialization
MMTC	EQU	1	Image memory initialization is allowed

Dependency: Availability of hardware; it need not be changed if image memory is not going to be changed.

Release value: MMTC equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	9
INITIAL	DECK/	p1, p2

2.3.31A MODE BIT OPTION (MODEBIT)

Definition: The mode bit option specifies whether or not the mode will be returned with the record length to the user via the key field when processing universal records.

Option:

MODEBIT	EQU	0	Mode bit returned
MODEBIT	EQU	≠0	Mode bit not returned

Dependency: None.

Release value: MODEBIT equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	15
MSIOGPRW	DECK/	p1, p2

2.3.32 MEMORY PROTECT OPTION (MP)

Definition: The memory protect option distinguishes between the standard batch mode and memory protect systems.

Option:

MP	EQU	0	No memory protect
MP	EQU	1	3170/3300/3500 memory protect or 3150/3200 with enhanced block control option
MP	EQU	32	3100/3150/3200 memory protect without enhanced block control option

Dependency: Availability of memory protect hardware.

Release value: MP equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	3
CIC	DECK/	p1, p2
	DELETE/	264
CIO	DECK/	p1, p2
	DELETE/	52
SCARV50	DECK/	p1, p2
	DELETE/	3
EXEC	DECK/	p1, p2
	DELETE/	3
INITIAL	DECK/	p1, p2
	DELETE/	10
JOBCTL	DECK/	p1, p2

2.3.33 MASS STORAGE CHANNEL ACCESS OPTION (MS)

Definition: The MS option allows the user to select dual channel access on a CONTROL DATA® 3234 Disk Storage Controller.

Option:

MS	EQU	0	Single channel access selected
MS	EQU	1	Dual channel access selected

Dependency: Must have a 3234 Disk Storage Controller, and both channels must be defined in the available unit table (AUT) if MS=1 (selected). Equipment numbers to both accesses must be the same.

Release value: MS equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	263
CIO	DECK/	p1, p2

2.3.33A MASS STORAGE TABLE DEFINITION (MST)

Definition: The MST option specifies the mass storage drives in the system. This is performed by inserting MST macros in deck CIO. PRELIB uses these macros to build the MST table. The MST table and macro are described in section III-5.

Dependency: One macro is required for each mass storage drive in the system.

Release value: The release version contains 5 macros that define the mass storage on which the system was developed and tested.

Deck and COSY numbers:

DELETE/ 283,287

	MST	(parameters)
	.	.
	.	.
	.	.
	MST	(parameters)
CIO	DECK/	p1, p2

2.3.34 3234 CONTROLLER OPTION (MS3234)

Definition: The MS3234 controller option specifies whether a 3234 Mass Storage Controller is in the system.

Option:

MS3234	EQU	0	3234 not present
MS3234	EQU	1	3234 is present

Dependency: The 3234 controller is used with the 853 and 854 disk drives and the 813 and 814 disk files. It need not be changed from the release value.

Release value: MS3234 equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	15
DRIVMS	DECK/	p1, p2

2.3.35 3553 CONTROLLER OPTION (MS3553)

Definition: The MS3553 option specifies whether a 3553 Mass Storage Controller is included in the system.

Option:

MS3553	EQU	0	3553 not present
MS3553	EQU	1	3553 is present

Dependency: The MS3553 option must be set to 1 if other than a 1:1 interlace is used with 841 drives. It may remain equal to 1 even though no 841 drives are available.

Release value: MS3553 equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	14
DRIVMS	DECK/	p1, p2

2.3.36 MASS STORAGE BIAS OPTION (MSBIAS)

Definition: The MSBIAS option selects the number of sectors between the end of seek interrupt and the actual sector desired for data transfer. This option provides the capability to issue a data transfer within a seek interrupt subroutine without missing a revolution of the disk.

Option:

MSBIAS	EQU	0	No lead sectors
MSBIAS	EQU	2	Two lead sectors
MSBIAS	EQU	1	3500 system with 841 drives

Dependency: Configuration. The model number of the system, the channel to which mass storage devices are attached, and the presence of various options all may have a bearing on the value selected. For example, a 3150 system without enhanced block control may require equating MSBIAS to a value of 6.

Decks and COSY numbers:

	DELETE/	262
CIO	DECK/	p1, p2

2.3.36A SYSTEM PRIVACY CODES (MSEC)

Definition: The MSEC option changes the system access and modification privacy codes.

Option: Any four character alphanumeric code may be used for each privacy code.

Dependency: None.

Release Value: Four zeros for each code.

Deck and COSY numbers:

	DELETE/	378	
MSEC	OCT	a, m	a is access code, m is
CIO	DECK/	p1, p2	modification code

2.3.37 PLIBEDIT VERSION OPTION (MSOS.4)

Definition: The MSOS. 4 option determines the version of MSOS under which PLIBEDIT is to be run.

Option:

MSOS. 4	EQU	0	Run PLIBEDIT under MSOS 5
MSOS. 4	EQU	1	Run PLIBEDIT under MSOS 4. x

Dependency: MSOS operating system version

Release value: MSOS. 4 equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	5
PLIBEDIT	DECK/	p1, p2

2.3.38 MASS STORAGE RETRY OPTION (MS.RETRY)

Definition: The MS.RETRY option specifies the number of retries required before declaring an error recovery overlay unreadable or declaring a mass storage I/O error irrecoverable.

Option:

MS.RETRY	EQU	n	Number of retries, 1 through 63

Dependency: None

Release value: MS.RETRY equals 10 on the MSOS COSY tape and the MSOS binary source tape; it need not be changed.

Decks and COSY numbers:

	DELETE/	34
REJRV50	DECK/	p1, p2

2.3.38A CONTROLLED BACKSPACE HARDWARE OPTION (MT.CBKSP)

Definition: The MT.CBKSP option indicates whether any of the system tape drives contain the controlled backspace hardware option.

Option:

MT.CBKSP	EQU	0	No tape drives contain controlled backspace hardware
MT.CBKSP	EQU	1	One or more tape drives contain controlled backspace hardware

Dependency: The 0 option saves core in EXEC resident. The 1 option causes more efficient operation of tape drives with the special hardware, but has no effect on tape drives without the special hardware.

Release value: MT.CBKSP is 1 in both the COSY tape and the binary source tape.

Decks and COSY numbers:

	DELETE/	30
DRIVMT	DECK/	p1, p2

2.3.38B PROGRAMMABLE READ CLIPPING-LEVEL HARDWARE OPTION (MT.PCL)

Definition: The MT. PCL option indicates whether any of the system tape drives contain programmable read clipping-level hardware.

Option:

MT. PCL	EQU	0	No tape drive contains programmable read clipping-level hardware
MT. PCL	EQU	1	One or more tape drives contain programmable read clipping-level hardware

Dependency: The 0 option saves core in the EXEC resident area. The 1 option provides more reliable operation and better error recovery. The 1 option has no effect on tape drives without the special hardware.

Release value: MT. PCL is 1 in both the COSY tape and the binary source tape.

Decks and COSY numbers:

	DELETE/	31
DRIVMT	DECK/	p1, p2

2.3.39 MAGNETIC TAPE BACKSPACE/REREAD OPTION (MTB.RTRY)

Definition: The MTB. RTRY option defines the index for the backspace-reread loop for error recovery on magnetic tapes.

Option:

MTB. RTRY	EQU	n	Number of retries, 1 through 63

Dependency: The product of the values for the MTB. RTRY option and the MTS. RTRY option (section 2.3.42) must not exceed 511. If the PCL option (section 2.3.54) equals 1, option MTB. RTRY should remain at the release value.

Release value: MTB. RTRY equals 7 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	54
MTRRV50	DECK/	p1, p2

2.3.40 MAGNETIC TAPE ERASE RETRY OPTION (MTE.RTRY)

Definition: The MTE. RTRY option specifies the number of times an erase retries before a write error is declared irrecoverable.

Option:

MTE. RTRY	EQU	n	Number of retries, 1 through 63

Dependency: None

Release value: MTE. RTRY equals 50 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	44
MTWRV50	DECK/	p1, p2

2.3.41 MAGNETIC TAPE NOISE RECOVERY OPTION (MTN.RTRY)

Definition: The MTN.RTRY option specifies the number of backspace/reread cycles required before discarding a noise record.

Option:

MTN.RTRY	EQU	n	Number of cycles, 1 through 63

Dependency: None

Release value: MTN.RTRY equals 5 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	33
MTNRV50	DECK/	p1, p2

2.3.42 MAGNETIC TAPE CLEANER MOTION OPTION (MTS.RTRY)

Definition: The MTS.RTRY option specifies the number of times that the recovery routines pass a magnetic tape back through the tape cleaner portion of the head assembly in attempting error recovery.

Option:

MTS.RTRY	EQU	n	Number of passes, 1 through 63

Dependency: The product of the values for the MTS.RTRY option and the MTB.RTRY option must not exceed 511.

Release value: MTS.RTRY equals 4 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	55
MTRRV50	DECK/	p1, p2

2.3.43 NEGATIVE ZERO OPTION (MZEROSUP)

Definition: The option MZEROSUP allows the user to print negative zero as zero in BCD output.

Option:

MZEROSUP	EQU	0	Allows -0 to be printed as -0
MZEROSUP	EQU	$\neq 0$	Prints -0 as 0

Dependency: None

Release value: The option MZEROSUP equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	5
BCDOUT	DECK/	p1, p2

2.3.44 NUMBER OF CHANNELS OPTION (NOCH)

Definition: The option NOCH is the controlling parameter to establish a channel status table (CST).

Option:

NOCH	EQU	n	Highest channel available code

Dependency: Highest available channel number. The value n should be set according to the following table.

Highest Available Channel Number	Value to Use (n)
0	1
1	2
2	3
3	4
4	5
5	6
6	7
7	8

Release value: NOCH equals 8 on the MSOS COSY tape and the MSOS binary source tape; it need not be changed.

Decks and COSY numbers:

	DELETE/	260
CIO	DECK/	p1, p2
	DELETE/	17
EXEC	DECK/	p1, p2

2.3.45 MASS STORAGE TABLE SIZE OPTION (NRATL)

Definition: The NRATL option specifies the number of MST entries.

Option:

NRATL	EQU	n	Number of MST entries

Dependency: Number of MST entries; must be equal to or greater than RATL (section 2.3.59).

Release value: NRATL equals 9 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	4
MISC1	DECK/	p1, p2
	DELETE/	3
AE	DECK/	p1, p2

2.3.46 APC CARD PUNCH AVAILABILITY OPTION (NRCP)

Definition: The NRCP option determines the number of card punches available to the automatic peripheral control (APC) package.

Option:

NRCP	EQU	0	Punch directly to standard PUN or no punch available on the system
NRCP	EQU	1	Output to specified punch file

Dependency: Availability of card punches.

Release value: NRCP equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	80
APCV50	DECK/	p1, p2

2.3.47 APC PRINTER AVAILABILITY OPTION (NRPR)

Definition: The NRPR option determines the number of printers available to the APC package.

Option:

NRPR	EQU	0	Print direct to standard OUT
NRPR	EQU	1	One printer available to APC
NRPR	EQU	2	Two printers available to APC

Dependency: Number of available line printers; if NRPR=2, the second line printer must be equipped by the user to logical unit 21 at the time APC is loaded.

Release value: NRPR equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	78
APCV50	DECK/	p1, p2

2.3.48 NOISE RECORD LENGTH OPTION (NSTDNL)

Definition: The NSTDNL option determines the minimum length of acceptable data records on magnetic tape. Records smaller than the equated size are discarded as noise records.

Option:

NSTDNL	EQU	0	Standard noise recovery (18 characters) is used as a default
NSTDNL	EQU	n	1 < n < 63; minimum acceptable data record if other than standard size.

Dependency: If NSTDNL ≠ 0, system noise records are not written on magnetic tape.

Release value: NSTDNL equals 0 on the MSOS COSY tape and the MSOS binary source tape; it need not be changed.

Decks and COSY numbers:

	DELETE/	3
JOBCTL10	DECK/	p1, p2

2.3.49 OCC AND SNAP CARD OPTION (OCCSNAP)

Definition: The OCCSNAP option specifies whether octal correction cards and snapshot dump cards are processed.

Option:

OCCSNAP	EQU	0	No OCC or SNAP cards are processed
OCCSNAP	EQU	1	OCC and SNAP cards are processed

Dependency: None

Release value: OCCSNAP equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	3
LOADER	DECK/	p1, p2

2.3.50 OPERATOR CONTROL OPTION (OPCTL)

Definition: The OPCTL option specifies whether the operator can enter job control statements or is limited to reassigning system units.

Option:

OPCTL	EQU	0	Operator may only reassign system units
OPCTL	EQU	1	Operator may enter job control statements and reassign system units

Dependency: None

Release value: OPCTL equals 1 on the MSOS COSY tape and the MSOS binary source tape; it need not be changed.

Decks and COSY numbers:

	DELETE/	13
JOBCTL	DECK/	p1, p2

2.3.51 ERROR RECOVERY OVERLAY LENGTH OPTION (OVLENGTH)

Definition: The OVLENGTH option defines the length of the longest error recovery overlay.

Option:

OVLENGTH	EQU	n	Length of longest error recovery overlay (octal number of words)

Dependency: OVLENGTH must be set equal to or greater than the longest error recovery overlay.

Release value: OVLENGTH equals 611B on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	62
SCARV50	DECK/	p1, p2

2.3.52 PRIORITY LEVEL OPTIONS (P1, P2, P3, P4)

Definition: The priority level options define the existence of priority levels required by the user.

Option:

P1 P2 P3 P4	EQU	0	This level not used
P1 P2 P3 P4	EQU	1	Assemble a table for this priority level

Dependency: Number of priority partitions required. Users with 16K core storage should set these options to 0.

Release value: Pn equals 1 (four priority levels) on the MSOS COSY tape and the MSOS binary source.

Decks and COSY numbers:

	DELETE/	12,15
CIC	DECK/	p1,p2
	DELETE/	274,277
CIO	DECK/	p1,p2
	DELETE/	54,57
SCARV50	DECK/	p1,p2

2.3.53 PANIC DUMP OPTION (PANIC)

Definition: The PANIC option, when set, provides a means for dumping the operating system and/or all of core memory while in a debugging mode.

Option:

PANIC	EQU	0	Code to handle panic dumps not assembled
PANIC	EQU	1	Code for panic dumps is included

Dependency: PANIC is usually set to 1 only for operating system debugging.

Release value: PANIC equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	16
CIC	DECK/	p1,p2

2.3.54 PROGRAMMABLE CLIPPING LEVEL OPTION (PCL)

Definition: The PCL option is used to determine the clipping level required for recovery from magnetic tape errors.

Option:

PCL	EQU	0	No units equipped with PCL hardware
PCL	EQU	1	At least one unit equipped with PCL hardware

Dependency: Availability of magnetic tape transport with programmable clipping hardware. Refer also to the MTB.RTRY option, section 2.3.39.

Release value: PCL equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	57
MTRRV50	DECK/	p1,p2

2.3.55 PROGRAMMABLE MEMORY PROTECT OPTION (PMP)

Definition: The PMP option distinguishes between memory protection via operator set memory protect switches and programmable memory protection using the enhanced block control option for the 3100, 3150, and 3200 computer systems.

Option:

PMP	EQU	0	Operator-set memory protect switches
PMP	EQU	1	Programmable memory protection

Dependency: 3100/3200 enhanced block control option hardware availability.

Release value: PMP equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	5
CIC	DECK/	p1, p2
	DELETE/	5
INITIAL	DECK/	p1, p2
	DELETE/	12
JOBCTL	DECK/	p1, p2

2.3.56 501/505/3254 LINE PRINTER OPTION (PR501)

Definition: The PR501 option determines the presence or absence of 501, 505, or 3254 printers in the system.

Option:

PR501	EQU	0	No 501, 505, or 3254 printer present
PR501	EQU	1	501, 505, or 3254 printers are present

Dependency: Type of hardware available.

Release value: PR501 equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	3
DRIVPR	DECK/	p1, p2

2.3.57 512 PRINTER OPTION (PR512)

Definition: The PR512 option determines the presence or absence of a 512 printer in the system and allows for reinitialization of the image memory when changing trains.

Option:

PR512	EQU	0	512 printer not present
PR512	EQU	1	512 printer present

Dependency: Availability of 512 printer. The option need not be turned on in INITIAL and JOBCTL11 unless the installation anticipates changing trains on the printer. Either PR512 or PR580 must be set in DRIVPR if a 512 printer is available in the system.

Release value: PR512 equals 0 on the MSOS COSY tape and the MSOS binary source tape in decks INITIAL and JOBCTL11 and 1 in DRIVPR.

Decks and COSY numbers:

	DELETE/	4
DRIVPR	DECK/	p1, p2
	DELETE/	7
INITIAL	DECK/	p1, p2
	DELETE/	4
JOBCTL11	DECK/	p1, p2

2.3.57A 580 PRINTER OPTION (PR580)

Definition: The PR580 option determines the presence or absence of a 580 printer in the system and allows for reinitialization of the image memory when changing trains.

Option:

PR580	EQU	0	580 printer not present
PR580	EQU	1	580 printer present

Dependency: Availability of a 580 printer. The option need not be turned on in INITIAL and JOBCTL11 unless the installation anticipates changing trains on the printer. Either PR580 or PR512 must be set in DRIVPR if a 580 printer is available in the system.

Release value: PR580 equals 0 on the MSOS COSY tape and the MSOS binary source tape in decks INITIAL and JOBCTL11 and 1 in DRIVPR.

Decks and COSY numbers:

	DELETE/	7
DRIVPR	DECK/	p1, p2
	DELETE/	8
INITIAL	DECK/	p1, p2
	DELETE/	5
JOBCTL11	DECK/	p1, p2

2.3.58 PRINTER RETRY OPTION (PR.RETRY)

Definition: The PR.RETRY option specifies the number of times an operation retries before declaring a channel parity, compare fault, or print error irrecoverable.

Option:

PR.RETRY	EQU	n	Number of retries, 0 through 511

Dependency: None

Release value: PR.RETRY equals 5 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	58
NMTRV50	DECK/	p1, p2

2.3.60 RDT ENTRY OPTION FOR ERROR RECOVERY (REC)

Definition: The REC option allows the user to eliminate the RDT entries of the error recovery absolute records, if error recovery is to be excluded from the system. Use of this option reduces the system resident requirement in words of core by five times the number of absolute records normally on the ABS file for the error recovery overlays.

Option:

REC	EQU	0	Error recovery is not included in the library
REC	EQU	8	Number of error recovery absolute records

Dependency: When error recovery is on the library, REC must equal the number of absolute records for error recovery on the ABS file.

Release value: REC equals 8 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	16
EXEC	DECK/	p1, p2

2.3.61 REJECT LIMIT OPTION (REJLIM)

Definition: The REJLIM option allows the user to specify the maximum number of rejects of a connect, select, or I/O before the operation is considered an irrecoverable error.

Option:

REJLIM	EQU	n	Maximum number of rejects, 1 through 63

Dependency: None.

Release value: REJLIM equals 4 on the MSOS COSY and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	17
CIC	DECK/	p1, p2
	DELETE/	270
CIO	DECK/	p1, p2

2.3.62 REJECT MESSAGE OPTION (REJMESS)

Definition: The reject message option allows the user to select whether error messages for connect, select, or I/O rejects are produced.

Option:

REJMESS	EQU	0	No error messages for rejects
REJMESS	EQU	1	Reject error messages are produced

Dependency: None

Release value: REJMESS equals 1 on the MSOS COSY and MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	9
CIC	DECK/	p1, p2
	DELETE/	269
CIO	DECK/	p1, p2

2.3.63 RESTARTABILITY OPTION (REST)

Definition: The REST option defines the restart capability supported by APC.

Option:

REST	EQU	0	No restart capability for APC
REST	EQU	1	Restart autoload supported

Dependency: None. The option should be set the same in both APCINIT and APCV50.

Release value: REST equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	88
APCV50	DECK/	p1, p2
	DELETE/	30
APCINIT	DECK/	p1, p2

2.3.64 STACKED JOBS/FILES OPTION (SCHxx)

Definition: The SCHCR, SCHPR, and SCHCP options define the number of jobs, print files, and punch files, respectively, that can be stacked on mass storage.

Option:

SCHCR	EQU	0 to n	Maximum number of jobs that can be stacked
SCHPR	EQU	0 to n	Maximum number of printer files that can be stacked
SCHCP	EQU	0 to n	Maximum number of punch files that can be stacked

Dependency: $n_1 + n_2 + n_3 \leq \frac{\text{(blocksize of restart file in words - 8)}}{2}$

Release value: SCHCR, SCHPR, and SCHCP each equal 50 on the MSOS COSY tape and the MSOS binary source tape.

2.3.59 MASS STORAGE TABLE SIZE OPTION (RATL)

Definition: The option RATL must equal the number of MST entries.

Option:

RATL	EQU	n

Dependency: Number of MST entries.

Release value: RATL equals 5 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	261
CIO	DECK/	p1, p2

2.3.59A REAL TIME OPTION (REALTIME)

Definition: The REALTIME option enables the user to use real-time interrupts and run real-time programs.

Option:

REALTIME	EQU	0	Real-time programs not enabled
REALTIME	EQU	1	Real-time programs are enabled

Dependency: If real-time routines are to be utilized, REALTIME must remain set to 1. Options P1 or P2 must also be set.

Release value: REALTIME equals 1 on the MSOS COSY and the MSOS binary source tape.

Deck and COSY number:

	DELETE/	18
CIC	DECK/	p1, p2

Decks and COSY numbers:

	DELETE/	82
SCHCR	EQU	n
	DELETE/	84
SCHPR	EQU	n
	DELETE/	86
SCHCP	EQU	n
APCV50	DECK/	p1, p2

2.3.65 NUMBER OF SEGMENTS OPTION (SEGCNT)

Definition: The SEGCNT option specifies the maximum number of segments allowed for mass storage files.

Option:

SEGCNT	EQU	n	Maximum number of segments, 1 through 63

Dependency: None. Users with 16K of core memory should consider this option carefully for core savings.

Release value: SEGCNT equals 63 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	3
MISC1	DECK/	p1, p2
	DELETE/	4
AE	DECK/	p1, p2

2.3.66 STACKED INTERRUPTS OPTION (STACKENT)

Definition: The STACKENT option specifies the maximum number of interrupts that can be stacked.

Option:

STACKENT	EQU	n	Maximum number of stacked interrupts

Dependency: STACKENT must not equal 0 and should be a minimum of 10. If P2 real-time programs are running, the value may need to be set to 30 or higher.

Release value: STACKENT equals 15 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	10
CIC	DECK/	p1, p2

2.3.67 PRINTER CHARACTER SET OPTION (SUBSET)

Definition: The SUBSET option specifies whether the full 64-character printer set or a 40-character printer subset is to be used during recovery dumps.

Option:

SUBSET	EQU	0	Use complete 64 character set
SUBSET	EQU	1	Use 40 character subset

Dependency: None. If SUBSET is equated to 0 and recovery dumps are printed on a 512 printer, the print speed may drop below 300 lines per minute.

Release value: SUBSET equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	3
RDUMP	DECK/	p1, p2

2.3.68 MEMORY SIZE OPTION (SXTK)

Definition: The option SXTK assembles the proper code according to the computer memory size.

Option:

SXTK	EQU	0	32K memory size
SXTK	EQU	1	16K memory size

Dependency: Computer memory size.

Release value: SXTK equals 0 on the MSOS COSY tape and the BCD and BDP sections of the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	21
MSSORT	DECK/	p1, p2

2.3.69 SYSTEM IDENTIFICATION OPTION (SYSID)

Definition: The SYSID option determines whether the identification of the system version and edition, the current date, and the time a job was run appears on the OUT file on the JOB card line.

Option:

SYSID	EQU	0	System identification does not appear
SYSID	EQU	1	Identifier line appears on OUT

Dependency: None.

Release value: SYSID equals 1 on the MSOS COSY tape and the MSOS binary source tape; it need not be changed.

Decks and COSY numbers:

	DELETE/	18
JOBCTL	DECK/	p1, p2

2.3.70 SYSTEM INPUT AUT ORDINAL (SYSINP)

Definition: The SYSINP option specifies the AUT ordinal of the system input device.

Option:

```
SYSINP     EQU     n     AUT ordinal of system input unit
```

Dependency: The system input should be the third entry (EQU 3) in the AUT. However, it may be changed to suit the user's preference.

Release value: SYSINP equals 3 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	325
CIO	DECK/	p1, p2

2.3.71 SYSTEM LIBRARY AUT ORDINAL (SYSLIB)

Definition: This option specifies the Available Unit Table (AUT) ordinal of the system library.

Option:

```
SYSLIB     EQU     n     AUT ordinal of system library
```

Dependency: The system library should be the first entry in the AUT. It may be changed, however, to suit the user's preference.

Release value: SYSLIB equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	323
CIO	DECK/	p1, p2

2.3.72 SYSTEM OUTPUT AUT ORDINAL (SYSOUT)

Definition: The SYSOUT option specifies the AUT ordinal of the system output device.

Option:

```
SYSOUT     EQU     n     AUT ordinal of system output unit
```

Dependency: The system output unit should be the fourth entry (EQU 4) in the AUT. However, it may be changed to suit the user's preference.

Release value: SYSOUT equals 4 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	326
CIO	DECK/	p1, p2

2.3.73 SYSTEM PUNCH AUT ORDINAL (SYSPUN)

Definition: The SYSPUN option specifies the AUT ordinal of the system punch.

Option:

SYSPUN	EQU	n	AUT ordinal of system punch

Dependency: The system punch unit should be the fifth entry (EQU 5) in the AUT. It may be changed, however, to suit the user's preference.

Release value: SYSPUN equals 5 on the MSOS COSY tape and the MSOS binary source tape. If no punch unit is available, the value must be set to 0.

Decks and COSY numbers:

	DELETE/	327
CIO	DECK/	p1, p2

2.3.74 SYSTEM TYPEWRITER AUT ORDINAL (SYSTYPE)

Definition: This option specifies the AUT ordinal of the system typewriter.

Option:

SYSTYPE	EQU	n	AUT ordinal of system typewriter

Dependency: The system typewriter should be the second entry (EQU 2) in the AUT. However, it may be changed to suit the user's preference.

Release value: SYSTYPE equals 2 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	324
CIO	DECK/	p1, p2

2.3.75 TAPE TRANSPORT AVAILABILITY OPTIONS (T6xx)

Definition: The tape transport options define the availability of specific magnetic tape transports.

Option:

T659	EQU	0 or 1	set to 1 for 659	
T657	EQU	0 or 1	set to 1 for 657	
T607	EQU	0 or 1	set to 1 for 602, 604, 607, 608	Both T607 and T601 must be selected for 608 tape drives.
T601	EQU	0 or 1	set to 1 for 601, 603, 606, 608	

Dependency: Availability of magnetic tape hardware.

Release value: T6xx equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	26,29
DRIVMT	DECK/	p1, p2

2.3.76 TIME LIMIT TEST OPTION (TIMELMT)

Definition: The time limit test option allows an installation to bypass batch job time limit testing and lost interrupt detection and correction.

Option:

TIMELMT	EQU	0	No time limit test
TIMELMT	EQU	1	Batch jobs are terminated if they exceed their time limit and lost interrupts are detected and corrected.

Dependency: If TIMELMT equals 1, option JOBTI (sampling time interval) must be specified.

Release value: TIMELMT equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	7
EXEC	DECK/	p1, p2
	DELETE/	11
INITIAL	DECK/	p1, p2

2.3.76A LOGICAL MSIO OVERLAY SIZE (TPOVSIZE)

Definition: The TPOVSIZE option allows expansion of the overlay area for logical MSIO to include the routines MISC2 and MISC3. These routines are required when class-R packs are used.

Option:

TPOVSIZE	EQU	n	n is the octal number of words of memory required for the overlay area.

Dependency: Use of logical MSIO and class-R packs. The recommended value is equal to the combined program lengths of MSIOMSOV, MISC1, and OC when option CLASSR equals 0, and equal to the preceding total plus the program lengths of MISC2 and MISC3 when CLASSR equals 1. A value of 3400B has proven satisfactory in testing with class-R packs.

Release value: TPOVSIZE equals 560B on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	77
MSIOTPOV	DECK/	p1,p2

2.3.77 PRINTER TRAIN TYPE OPTION (TRN595x)

Definition: The train type option specifies the available trains if the PR512 option is set.

Option:

TRN5951	EQU	x	63 character 501 compatible set
TRN5952	EQU	x	48 character AN set
TRN5953	EQU	x	48 character HN set
TRN5954	EQU	x	64 character ASCII set

where: x = 0 Train not available

x = 1 Train is available

Dependency: Availability of specific train; it need not be changed.

Release value: TRN595x equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	6, 9
JOBCTL11	DECK/	p1, p2

2.3.78 RDT ENTRY OPTION FOR ANSI COBOL (UCBL)

Definition: The UCBL option allows the user to eliminate the RDT entries for the ANSI COBOL absolute records if ANSI COBOL is to be excluded from the library. Use of this option reduces the system resident requirement in words of core by five times the number of absolute records normally on the ABS file for ANSI COBOL.

Option:

UCBL	EQU	0	ANSI COBOL is not included on the library
UCBL	EQU	14	Number of ANSI COBOL absolute records

Dependency: When ANSI COBOL is on the library, UCBL must equal the number of absolute records for ANSI COBOL on the ABS file.

Release value: UCBL equals 14 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	15
EXEC	DECK/	p1, p2

2.3.79 ANSI COBOL BINARY DECK OPTION (UCBLV42)

Definition: The UCBLV42 option specifies whether the code necessary to process ANSI COBOL binary decks prepared under MSOS version 4.2 is generated in MSOS version 5.0. This option allows compatibility between versions 4.2 and 5.0 for COBOL object-time decks.

Option:

UCBLV42	EQU	0	No MSOS V4.2 ANSI COBOL binary decks to process
UCBLV42	EQU	1	Process MSOS V4.2 ANSI COBOL binary decks

Dependency: None.

Release value: UCBLV42 equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	5
LOADER	DECK/	p1, p2

2.3.80 RDT ENTRY OPTION FOR ANSI FORTRAN (UFTN)

Definition: The UFTN option allows the user to eliminate the RDT entries for the ANSI FORTRAN absolute records if ANSI FORTRAN is to be excluded from the library. Use of this option reduces the system resident requirement in words of core by five times the number of absolute records normally on the ABS file for ANSI FORTRAN.

Option:

UFTN	EQU	0	ANSI FORTRAN is not included on the library
UFTN	EQU	9	Number of ANSI FORTRAN absolute records

Dependency: When ANSI FORTRAN is on the library, UFTN must equal the number of absolute records for ANSI FORTRAN on the ABS file.

Release value: UFTN equals 9 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	14
EXEC	DECK/	p1, p2

2.3.81 OPERATOR INTERVENTION OPTION (UNRE)

Definition: The operator intervention option specifies the action allowed by the operator in regard to peripheral devices under APC.

Option:

UNRE	EQU	0	No operator intervention
UNRE	EQU	1	Operator may reassign or down peripheral devices

Dependency: None

Release value: UNRE equals 1 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	91
APCV50	DECK/	p1, p2

2.3.82 ZERO SUPPRESSION OPTION (ZROSUPOC)

Definition: The option ZROSUPOC permits the user to suppress leading zeros in BCD output.

Option:

ZROSUPOC	EQU	0	No octal leading zero suppression
ZROSUPOC	EQU	Nonzero	Suppress leading zeros

Dependency: None.

Release value: ZROSUPOC equals 0 on the MSOS COSY tape and the MSOS binary source tape.

Decks and COSY numbers:

	DELETE/	4
BCDOUT	DECK/	p1, p2

2.4 ASSEMBLY OPTION DEFAULT VALUES

Table II-2-4 lists the release value of each assembly option according to the routine and the applicable section of the binary source. Routines listed in the ABS column are absolutized routines which are stored in the ABS or RES file. Routines listed in the REL column are relocatable routines which are stored on the LIB file.

Routines listed in the BCD, BDP, and EBDP columns are REL routines unless noted differently. These routines have more than one binary deck in the PRELIB binary source tape. Each deck is preceded by a control card flag to indicate whether the deck was assembled for BCD hardware, BDP hardware, or enhanced BDP (EBDP) hardware. The extra decks and all flag cards must be removed from the PRELIB tape before generating the library.

TABLE II-2-4. ASSEMBLY OPTION DEFAULT VALUES

Routine	Assembly Option	OPER	Section of MSOS Binary Source: Common ABS	BCD	BDP	EBDP	Common REL
CIC	MP	EQU	0				
	EMP	EQU	0				
	PMP	EQU	0				
	FDP	EQU	1				
	BDP	EQU	0				
	REJMESS	EQU	1				
	STACKENT	EQU	15				
	MIBUFLNG	EQU	8				
	P1	EQU	1				
	P2	EQU	1				
	P3	EQU	1				
	P4	EQU	1				
	PANIC	EQU	0				
	REJLIM	EQU	4				
	REALTIME	EQU	1				
CIO	NOCH	EQU	8				
	RATL	EQU	5				
	MSBIAS	EQU	2				
	MS	EQU	1				
	MP	EQU	0				
	EMP	EQU	0				
	BJSOPT	EQU	1				
	ASCII	EQU	0				
	REJMESS	EQU	1				
	REJLIM	EQU	4				
	LIMITS	EQU	1				
	P1	EQU	1				
	P2	EQU	1				
	P3	EQU	1				
	P4	EQU	1				
	SYSLIB	EQU	1				
	SYSTYPE	EQU	2				
	SYSINP	EQU	3				
	SYSOUT	EQU	4				
	SYSPUN	EQU	5				
	MFS	EQU	4028				
	FGFDTL	EQU	350				
	P4FDTL	EQU	55				
	P3FDTL	EQU	55				
	P2FDTL	EQU	55				
	P1FDTL	EQU	55				
	MSEC	OCT	0,0				
DRIVMT	T659	EQU	1				
	T657	EQU	1				
	T607	EQU	1				
	T601	EQU	1				
	MT.CBKSP	EQU	1				
	MT.PCL	EQU	1				

TABLE II-2-4. ASSEMBLY OPTION DEFAULT VALUES (Cont'd)

Routine	Assembly Option	OPER	Section of MSOS Binary Source				
			Common ABS	BCD	BDP	EBDP	Common REL
DRIVPR	PR501	EQU	1				
	PR512	EQU	1				
	EMP	EQU	0				
	CC	EQU	1				
	PR580	EQU	1				
DRIVTYWR	EMP	EQU	0				
DRIVMS	MS3553	EQU	1				
	MS3234	EQU	1				
	INTRLACE	EQU	12B				
SCARV50	MP	EQU	0				
	EMP	EQU	0				
	P1	EQU	1				
	P2	EQU	1				
	P3	EQU	1				
	P4	EQU	1				
	OVLENGTH	EQU	611B				
EXEC	MP	EQU	0				
	EMP	EQU	0				
	BJSOPT	EQU	1				
	ASCII	EQU	0				
	TIMELMT	EQU	1				
	LINECNT	EQU	58				
	JOBTI	EQU	3000B				
	CMP	EQU	5				
	FTN	EQU	7				
	CBL	EQU	6				
	ALG	EQU	6				
	UFTN	EQU	9				
	UCBL	EQU	14				
	REC	EQU	8				
	NOCH	EQU	8				
INITIAL	MP	EQU	0				
	EMP	EQU	0				
	PMP	EQU	0				
	BDP	EQU	0				
	PR512	EQU	0				
	PR580	EQU	0				
	MMTC	EQU	0				
	FDP	EQU	1				
	TIMELMT	EQU	1				
	IL.INIT	EQU	0				
ANLSV50	EMP	EQU	0				
	CARDPNCH	EQU	1				
REJRV50	MS.RETRY	EQU	10				
NMTRV50	PR.RETRY	EQU	5				
	CP.RETRY	EQU	5				
	CARDPNCH	EQU	1				

TABLE II-2-4. ASSEMBLY OPTION DEFAULT VALUES (Cont'd)

Routine	Assembly Option	OPER	Section of MSOS Binary Source				
			Common ABS	BCD	BDP	EBDP	Common REL
MTRRV50	MTB. RTRY	EQU	7				
	MTS. RTRY	EQU	4				
	PCL	EQU	1				
MTWRV50	MTE. RTRY	EQU	50				
MTNRV50	MTN. RTRY	EQU	5				
RDUMP	SUBSET	EQU	1				
JOBCTL	MP	EQU	0				
	EMP	EQU	0				
	PMP	EQU	0				
	OPCTL	EQU	1				
	BJSOPT	EQU	1				
	JOBTL	EQU	1200				
	CARDS	EQU	2000				
	LINES	EQU, C	131071				
	SYSID	EQU	1				
	LIMITS	EQU	1				
	FINIS	EQU	1				
	ASCII	EQU	0				
	CLASSR	EQU	0				
JOBCTL10	NSTDNL	EQU	0				
	EMP	EQU	0				
JOBCTL11	EMP	EQU	0				
	PR512	EQU	0				
	PR580	EQU	0				
	TRN5951	EQU	1				
	TRN5952	EQU	1				
	TRN5953	EQU	1				
	TRN5954	EQU	1				
JOBCTL20	EMP	EQU	0				
MISC1	SEGCNT	EQU	63				63
	NRATL	EQU	9				9
	CLASSR	EQU	0				0
MISC3	CLASSR	EQU	0				
MISC2	DT841	EQU					1
	DT813	EQU					0
JOBCTL21	EMP	EQU	0				
JOBCTL22	EMP	EQU	0				
AE	NRATL	EQU	9				
	SEGCNT	EQU	63				

TABLE II-2-4. ASSEMBLY OPTION DEFAULT VALUES (Cont'd)

Routine	Assembly Option	OPER	Section of MSOS Binary Source				
			Common ABS	BCD	BDP	EBDP	Common REL
JOBCTL23	EMP	EQU	0				
JOBCTL24	EMP	EQU	0				
LOADER	OCCSNAP	EQU	1				
	LED	EQU	1				
	UCBLV42	EQU	1				
	EMP	EQU	0				
PLIBEDIT	MSOS. 4	EQU					0
APCV50	NRPR	EQU					1
	NRCP	EQU					1
	SCHCR	EQU					10
	SCHPR	EQU					10
	SCHCP	EQU					10
	REST	EQU					1
	UNRE	EQU					1
	ASCII	EQU					0
	CLKTIME	EQU					10
APCINIT	REST	EQU					1
PASSONE	BDP3312	EQU		0†	1†	2†	
BCDOUT	ZROSUPOC	EQU					0
	MZEROSUP	EQU					0
MSIOGPRW	BDP3312	EQU		0†	1†	2†	
	MODEBIT	EQU		0	0	0	
MSIOTPOV	TPOVSIZE	EQU	560B				
COBOLD2	MACHSIZE	EQU	0				
PCOBOLD2	MACHSIZE	EQU	0				
PCOBOLP2	BDP3312	EQU		0†	1†	2†	
PMULTIPL	FDP	EQU	1				
PVARAN	BDP3312	EQU		0†	1†	2†	
MSSORT	BDP3312	EQU		0	1	2	
	MEMPTKT	EQU		0	0		
	SXTK	EQU		0	0		
MSSINTS	BDP3312	EQU		0	1	2	
MSSMERG	BDP3312	EQU		0	1	2	
SORT	BDP3312	EQU		0	1	2	
	MEMPTKT	EQU		0	0		
SORTPHS1	BDP3312	EQU		0	1	2	
SRTEQUAL	BDP3312	EQU		0	1	2	

† These routines are in the ABS portion of the binary source tape.

INTERIM LIBRARY INSTALLATION, HARDWARE INITIALIZATION, AND DECK PREPARATION 3

The construction of an operable MSOS system requires the use of the installation utility package (IUP). IUP establishes the interim library on the system mass storage device which is then used for hardware initialization, deck preparation, binary source modification, and final library generation. The user should be familiar with the IUP functions (part III, section 4).

3.1 INTERIM LIBRARY INSTALLATION AND HARDWARE INITIALIZATION

The following steps must be used to install the MSOS interim library.

1. Ready the system device. If it is an 853, 854, or 841, mount the system pack.
2. Write address (853, 854, or 841) and clear the system pack (part III, section 2).
3. Establish an autoload routine in memory (part III, section 1).
4. Mount the MSOS binary release tape on unit 0 or if the installation is from cards, place the deck of IUP in the card reader, followed by an EOF card and the generalized interim library deck.
5. Autoload from the input unit to initiate IUP (part III, section 4).
6. IUP types:

   I IUP 003 INSTALLATION UTILITY PROGRAM LOADED.

   INP = LUN
7. Respond by typing:

   TY
8. IUP types:

   A IUP 006 READY FOR INPUT
9. Respond by typing:

   DEV

   and press FINISH

IUP now requests the DEV statement parameters. These statements define the equipment available to IUP and assign a logical unit number. When IUP is accepting a parameter and REPEAT is pressed, IUP:

Repeats the present request if some characters have already been entered for the request, or

Repeats the previous request, if no characters have been entered.

10. Define the system device. The DEV statement parameters are explained in part III, section 4.2.1. In sections 2 and 3 one example is used throughout the installation procedures. The user, however, must supply his own parameters according to the equipment available.

    LUN 01 HT DP C 2 E 0 UU 10 DT 853 CLR N

11. IUP types:

    A IUP 006 READY FOR INPUT

12. Respond by typing:

    DEV

    and press FINISH

13. Define the logical unit containing the MSOS binary source.

    LUN 02 HT MT C 0 E 0 UU 00 DT 657

14. IUP types:

    A IUP 006 READY FOR INPUT

Steps 15 through 20 are optional; the user may proceed directly to step 21.

15. Respond by typing:

    DEV

    and press FINISH

16. Define the logical unit for the card punch.

    LUN 03 HT CP C 0 E 1 UU 00 CDT 3446

17. IUP types:

    A IUP 006 READY FOR INPUT

18. Respond by typing:

    DEV

    and press FINISH

19. Define the logical unit for the line printer.

    LUN 04 HT PR C 0 E 2 UU 00 DT 512

20. IUP types:

    A IUP 006 READY FOR INPUT

21. Instruct IUP to install the interim library on the system device defined in step 10 (part III, section 4.2.11).

    INST LIB 01 DUMP UNIT 02 EDITION IL DN dn MFC yyy MSC xx EXID exid

Recommended values for yyy and xx are as shown in Table II-3-1.

TABLE II-3-1. RECOMMENDED MAXIMUM FILE AND SEGMENT COUNTS

Device Type	yyy Value	xx Value
853,854,863,813	480	26
841	560	36

The value for yyy can be changed later by PRELIB, but the value for xx is fixed for the life of the system.

The value specified for dn may be one to six digits and may correspond to an external number or any value chosen by the user.

The parameter exid should correspond to some external identifier.

This example installs the interim library from unit 02 onto the system device defined as unit 01 setting the edition identifier to IL. It also creates an FLD and ID file for a maximum segment count and number of files as determined by device type.

Interim library installation is now complete. The following steps are for hardware initialization. Steps 23 and 24 are optional; the user may proceed directly to step 25.

22. IUP types the following message when the interim library is established.

    A IUP 006 READY FOR INPUT

23. Load image memory of the 512/3555 before executing print operations (part III, section 4.2.5).

    INIT LUN 04 IMAGE 1

This example loads the image memory of the 512/3555 defined as device 04 with train image 1 (501 compatible).

24. Load image memory of the 65x/MMTC (3518 or 3528) before executing character mode operations (BCD). See part III, section 4.2.5.

    INIT LUN 02 IMAGE 1

    This example loads the image memory of the 65x/MMTC defined as device 02 with image 1 (ASCII).

NOTE

For completion of the MSOS installation, the MMTC image memory must contain image 1.

25. Interim library installation and hardware initialization should be complete.

    Type:

        END

26. IUP responds:

        I IUP 039 INSTALLATION UTILITY PROGRAM TERMINATED

The user must now define the interim library environment according to the installation configuration (part III, section 6).

1. Press MC

2. Set SELECT JUMP 6 if image memory initialization is required.

3. Press AUTODUMP

4. When autoloading is complete, the autoload routine types:

    EDITION

5. Respond by typing:

    IL

6. AUTOLOAD loads library edition IL and transfers control to the interim INITIAL which types the following. The user supplies the underlined parameters (part III, section 6).

```
*INTERIM SYSTEM*
DEFINE ENVIRONMENT
LIB = DPC2E0U10
DT = 853
INP = CRC1E1U00
CDT = 3248
OUT = PRC0E2U00
DT = 512
PUN = CPC0E1U00 }  If no card punch is to be defined, press FINISH
CDT = 3446      }
SCR = DPC2E0U11
DT = 853
SCR = MTC0E0U00
```

DT = 657

SCR = MTC0E0U01

DT = 657

SCR =

7. Upon completion of the interim library environment:

Press FINISH
Message: PERMANENT LIBRARY
Type: YES (to make the interim library permanent and to avoid the requirement to describe the environment in future use)
Press FINISH

Message: DATE
Type date: mmddyy
Press FINISH

Message: TIME
Type time: hhmmss
Press FINISH

If SELFCT JUMP 6 was set at step 2, the following message is typed after the response to the TIME request.

A INIT 041 AUT ORDINAL OF UNIT TO BE INITIALIZED

Type the AUT ordinal of the device for which image memory is to be initialized or press FINISH if no image memory initialization is to be performed.

If an AUT ordinal is typed, the following message appears.

IMAGE

The response to this request is an image number as described for the INIT statement in section III-4. Refer to the MSOS Version 5 Diagnostic Handbook for any additional messages.

Message: PUN
If a punchless system is desired, type 00
Press FINISH

Message: OUT
Press FINISH

Message: INP
Press FINISH

Message: CFO
Type OPER

8. The computer responds:

   I SYS 048 (OPERATOR CONTROL)
   OP

9. Type JOB,,,,   (Parameters are optional)
   Press FINISH

10. The computer responds:

    OP

11. System scratch files 54, 55, and 56 are allocated on the interim library at the minimum size of one track. Therefore, the user must release and reallocate these files according to his device type. Type the following statements.

    CLOSE, 54

    FET, MSOS, FILE54, 512, 00, 0000, 0000

    RELEASE, ALL

    ALLOCATE, x, 991231   (Refer to Table II-3-2 for value of x)

    OPEN, 54
    CLOSE, 55

```
FET, MSOS, FILE55, 512, 00, 0000, 0000
RELEASE, ALL
ALLOCATE, y, 991231          (Refer to Table II-3-2 for value of y)
OPEN, 55
CLOSE, 56
FET, MSOS, FILE56, 960, 00, 0000, 0000
RELEASE, ALL
ALLOCATE, z, 991231          (Refer to Table II-3-2 for value of z)
OPEN, 56
```

TABLE II-3-2. SCRATCH FILE SIZES

Device type	813	841	853	854	863
x (54)	50	50	100	100	100
y (55)	125	125	250	250	250
z (56)	75	75	150	150	150

12. Type MSUTIL
    Press FINISH

13. The computer responds:

    I SYS 850 MSUTIL LOADED

14. Type ENTER,,853/1,,,,,,exid (exid is a required external identifier of the device)

    Press FINISH

If any of the following messages appear, consult the MSOS version 5 Operator's Guide or the Diagnostic Handbook for the action to be taken.

A SYS 870

A SYS 871

A SYS 876

A SYS 880

15. Type SCOPE, END, or STOP
    Press FINISH

The interim library is now available to process batch jobs. Proceed to section 3.2.

3.2 DECK PREPARATION

The interim library is now ready to prepare the MSOS binary decks necessary to generate the final MSOS PRELIB source. To prepare the binary decks, the user must:

1. Run a COSY,* and COSY job to incorporate the site dependent assembly options described in section 2.

2. Call COMPASS to assemble the new binary decks for the PRELIB source.

3.2.1 EXAMPLE OF COSY AND COMPASS JOBS

Four tapes contain the COSY source for release packages A, B, and C (all system routines and product set members except ADAPT, PERT TIME, PERT COST, and INITUSER).

The COSY* tape contains a DECK/ card for every deck on the COSY tapes, and corrections for the COSY decks where required. The DECK/ card for each deck contains an I parameter equal to the number of the COSY tape on which the deck appears and an H parameter equal to 05.

The following example assumes that the COSY tapes have been transferred to mass storage and assumes the following site dependent hardware configuration.

Standard MSOS

No floating-point hardware available

32K 3100 Computer

TABLE II-3-3. SAMPLE HARDWARE CONFIGURATION

Equipment type	Quantity	Controller	Channel	Equipment	Unit
Console Typewriter	1	None	None	None	None
853 disk drive	2	3234	2	0	10,11
405 card reader	1	3248	1	1	0
512 printer	1	3555	0	2	0
415 card punch	1	3446	0	1	0
657 tape units	4	3518	0	0	0,1,2,3

Step 1.

```
$JOB,...
$CTO,LUN07 IS COSY* TAPE
$EQUIP,07=MT
$FET,MSOS,COSY1,512,50,0000,0000
$OPEN,01,I
$FET,MSOS,COSY2,512,50,0000,0000
$OPEN,02,I
$FET,MSOS,COSY3,512,50,0000,0000
$OPEN,03,I
$FET,MSOS,COSY4,512,50,0000,0000
$OPEN,04,I
$FET,STAR,STAROUT,512,00,0000,0000
$RELEASE,ALL
$ALLOCATE,100,000001
$OPEN,06
$FET,COMP,COMPOUT,512,00,0000,0000
$RELEASE,ALL
```

2. Driver Selection. The drivers in Table II-4-1 are contained on the MSOS binary source. Drivers that are nonapplicable to the installation hardware availability should be deleted with a DELETE/ statement.

The drivers are identified by unique program lengths on their IDC cards and may be removed by cross-referencing the binary source listing and Table II-4-1.

All drivers placed in resident must have unique entry point names specified.

TABLE II-4-1. RESIDENT DRIVERS

Hardware	Control Data Controllers	Control Data Equipment (in Combination)	COSY Name	Entry Point Name	Octal Deck Length †	
					Minimum	Maximum
MT	3x2x 35x8	604 607 608 601 603 606 657 659	DRIVMT	DRIVER01	320	463
CR	3447 3649 3248	405	DRIVCR	DRIVER02	76	76
PR	3256 3659 3254 3555	501 505 512 580	DRIVPR	DRIVER03	277 323	406 406
CP	3644 3446	415	DRIV3644	DRIVER04	200	210
CP	3245	415	DRIV3245	DRIVER44	321	327
TY	Console typewriter		DRIVTYWR	DRIVER05	67 Std/MP	142 EMP
PL	3293	Plotter	DRIV3293	DRIVER11	61	61
DP	3234 3553	853, 854 813, 814 841	DRIVMS	MSIO3234 MSIO3553	132 132	140 140
DR	3436 3637	863	MSIO3436	MSIO3436	70	70
OR	3195	915	DRIV3195	DRIVER16	330	330
TR TP	3691	Paper tape station	DRIVPT	DRIVER06 DRIVER07	206	206
DS	3290	DD211	DRIVDS	DRIVDS	36	36

† Length depends upon options selected.

3. All source decks that were reassembled to change an assembly option must be added to the binary source file, and the existing deck must be deleted. This can be accomplished with DELETE/ cards.

4. Decks with BDP3312 Option. Product set decks that use the BDP3312 option are repeated on the file with each of the optional values selected. Decks with options other than that required by the installation must be removed from the PRELIB source file. For example:

IDC	COMPASS
IDC	OVERLAY1
CC	BCD
IDC	PASSONE
CC	BDP = 1
IDC	PASSONE
CC	BDP = 2
IDC	PASSONE
IDC	PASSTWO
IDC	SYMTBLE
etc.	

Installations with enhanced BDP hardware must edit the PASSONE decks containing the BDP3312 option set to 0 and 1 off the PRELIB source file. Also, the flag cards CC BCD, CC BDP = 1, and CC BDP = 2 must be removed.

RECORD and ORIGIN cards have purposely been omitted from this example. When deleting unwanted decks, all flag cards must also be deleted.

The following procedure illustrates modification of the binary source file for the system defined in section 3.1. This procedure is for a standard system without FDP hardware. Additional examples may be found in section III-10.

1. Autoload the interim library disk. Clear SELECT JUMP 6.

2. Upon completion of autoload, the following is typed.

   Message: EDITION

   Type: IL

   Press FINISH

3. Respond to the DATE and TIME requests as described in section 3.1.

4. Use PLIBEDIT to modify the MSOS binary source on the binary release file (file 01) and place the output on file 02. This output is the new PRELIB source file. The new PRELIB source file is assigned as input for a PRELIB run to generate an MSOS system. The decks deleted must be in the order they appear on the old binary source file (file 01).

```
$JOB,,,
$CTO,,LUN01 IS BINARY RELEASE TAPE NO. 1
$CTO,,LUN02 IS NEW PLIBEDIT (SOURCE) FILE
$FET, USER, RESDECK, 960
$OPEN, 10                      Open the file containing binary card images of CIC and
                               CIO
$EQUIP, 01=MT
$FET, PRELIB, SOURCE, 1280
$ALLOCATE, 325, 999999
$OPEN, 02
$PLIBEDIT
         DELETE/     UNIT, 20      (delete UNIT card)
DRIV3245 DELETE/
DRIV3293 DELETE/
    .
    .
    (DELETE/ cards for unwanted flag cards and decks containing options set to
    unwanted values)
    .
    .
         ENDEDIT/
77
88
$EOJ
```

4.3 PRELIB RUN

After the PRELIB source file has been modified in accordance with the site's requirements, use the file as the input to PRELIB in order to generate the final MSOS library. Refer to section III-8 for a description of PRELIB.

The following procedure is an example of the steps which may be used for final library generation. Assume that the interim library is still loaded and that the PRELIB source tape is mounted.

1. Run the following job.

   ```
   $JOB,...
   $RAT, 853/1                (scratch pack for PRELIB)
   $EQUIP, 40=MT              (Unit number for binary source input file
                              must be in the range 20 through 53)
   $PRELIB,,,,,ed, I=40       (ed is the edition number of the final library)
   77
   88 EOF
   $EOJ
   ```

2. Autoload the library just generated.

3. Execute verification programs on the MSOS product set contained in the release PRELIB source tape (refer to section 6).

4. Proceed to section 5 for incorporating or modifying any of the following product set members.

   SAINT
   ADAPT
   PERT TIME
   PERT COST

INCORPORATING PRODUCT SET MEMBERS 5

Some members of the MSOS product set are incorporated using separate procedures for one of the following reasons.

1. The products involved are special applications programs or use special applications equipment that some users may or may not have or need.

2. The procedures depend on the existence of a fully operable MSOS final library.

The procedures that follow involve installation and generation of:

SAINT

ADAPT

PERT TIME

PERT COST

5.1 SAINT

SAINT is released on MSOS COSY tape 1 and on the binary release tape. To modify the assembly options to a value other than the release value, the following sample procedures should be followed.

1. Mount MSOS pack on unit 0 and scratch pack on unit 1.

2. Mount MSOS COSY tape 1 on logical unit 1, scratch tape on logical unit 2.

3. Create and run a card deck of the following form.

   Job 1 is an assembly in which several options (16K simulator with multiply and divide) are selected from available SAINT options. COMPASS assembles Hollerith tape 2. Job 1 produces a listing of SAINT and a binary deck containing the specified options.

   $^{7}_{9}$SEQUENCE,001

   $^{7}_{9}$JOB,SAINT-COSY, ...

   $^{7}_{9}$EQUIP,01=MT,02=MT

   $^{7}_{9}$COSY

```
                DELETE/     39,41
DIVIDE          EQU         TRUE
MEMSIZE         EQU         16000          Option examples
MULTIPLY        EQU         TRUE
SAINT           DECK/       I=01,H=02
                ENDCOSY/
```

$^{7}_{9}$COMPASS, I=02, L, R, P

$^{77}_{88}$end-of-file

4. Modify SAINT on the PRELIB source tape in the following manner.

```
$JOB,,,
$EQUIP,02=MT,01=MT
$PLIBEDIT
FILE        MCHANGE/      56
        binary deck of SAINT from JOB1
            ENDEDIT/
```

$^{78}_{78}$end-of-file

$EOJ

5.1.1 ASSEMBLY OPTIONS

Table II-5-1 provides the COSY sequence number, SAINT core requirements, and the name of the assembly parameters that must be equated to TRUE to select the various options in SAINT. For a complete description of assembly options, refer to appendix C of the 3100/3200/3300/3500 SAINT Reference Manual listed in the preface.

TABLE II-5-1. SAINT ASSEMBLY OPTIONS

Sequence Number	Name	Core Required (decimal)	Release Value
30	ADDRTABL	288	FALSE (0)
31	BRANBIT	20	FALSE
32	COLBIN	306	FALSE
33	COMPRESS	88	FALSE
39	DIVIDE	123	FALSE
40	MEMSIZE	4K - 2000 †	8000
		8K - 4000 †	
		12K - 6000 †	
		16K - 8000 †	
41	MULTIPLY	90	FALSE
43	SIM1403	-7	FALSE
44	SIM1407	236	FALSE
46	STERLING	1386	FALSE
47	TRACEDMP	293	FALSE
48	TRANSLAT	101	FALSE
49	WMIO	195	FALSE
50	WMBL	151	0

† The simulation of SAINT memory requires half the nonsimulated core size.

For WMBL, WMIO must be equated to TRUE.

If WMIO is TRUE and WMBL is nonzero, tape word mark I/O is performed in a non-time-dependent manner. This can be equated to the minimum number of characters desired in the input/output buffer. When using word mark I/O, if WMBL is equated to the maximum number of input or output characters, no density (tape) restrictions apply. However, if WMBL is equated to FALSE, the following restrictions apply.

3200/3300	601, 603, 604 tape transports, no density restrictions 606, 607 tape transports, restricted to 200 bpi.
3100	Restricted to 200 bpi for all tape units.

5.1.2 CORE REQUIREMENTS

Use the following equation to find total core size of SAINT.

$$st = 2510 + \frac{memsize}{2} + so + \frac{wmbl}{4}$$

st	Total core requirement for SAINT
so	Total of option core requirements
wmbl	Size of word mark buffer length (variable)
memsize	Size of simulated memory

5.2 ADAPT

The ADAPT version 1.1 32K release consists of a magnetic tape containing:

A binary (load-and-go) file from which to make the ADAPT overlay tape

A COSY-formatted source file

ADAPT Internal Maintenance Specifications are available by request.

ADAPT operates from an overlay tape made from either the binary file or the COSY source tape furnished as a part of the ADAPT system release; ADAPT also operates from decks punched from the tape.

5.2.1 INSTALL ADAPT USING COSY TAPE

Create the overlay structure from the ADAPT COSY tape. Several methods can be used depending on the system configuration. The following method assumes the existence of three magnetic tape drives, a card punch, and the use of APC. †

1. Mount the COSY tape on logical unit 01 and scratch tapes on logical units 02 and 03.

2. Allocate APC files and initialize APC.

```
$PRIORITY,P2
$FET,APC,SYSTEM-INPUT,...          If the APC system files have already
$ALLOCATE,...                      been allocated, the FET and ALLOCATE
$FET,APC,SYSTEM-OUTPUT,...         cards can be eliminated.
$ALLOCATE,...
$FET,APC,SYSTEM-PUNCH,...
$ALLOCATE,...
$APCV50
77
88
$EOJ
```

3. Compile and assemble ADAPT routines using the following cards.

```
$JOB,...
$EQUIP,01=MT,02=MT,03=MT      (LUN01=ADAPT COSY, LUN02=Hollerith
$UTILITY                       output for FORTRAN compilation, LUN03=
SKFF,01                        Hollerith output for COMPASS assembly)
END
$COSY
CDCADAPT        DECK/        I=01,H=02
         (DECK/   H=02 cards for intervening decks)
FLOVER          DECK/        I=01,H=03
```

† The use of APC and allocation of mass storage files for spooling is discussed in detail in the MSOS Reference Manual.

```
PASS1A          DECK/          I=01, H=02
        (DECK/  H=02 cards for intervening decks)
STDPACK         DECK/          I=01, H=03
        (DECK/  H=03 cards for intervening decks)
P1ASEG1         DECK/          I=01, H=02
        (DECK/  H=02 cards for intervening decks)
DISPAT          DECK/          I=01, H=02
                ENDCOSY/
$FORTRAN, I=02, L, P
$COMPASS, I=03, L, R, P
77
88
$EOJ
```

4. Duplicate the following decks.

   STDPACK (used in overlays 1 and 2)
   STDUNPK (used in overlays 1 and 2)
   PTRIT (used in overlay 1, segments 2 and 3)
   CROSS (used in overlays 2 and 4)
   NORM (used in overlays 2 and 4)

5. Set up the following jobs.

   Job 1 enters the overlay pack and allocates files.

```
7
9SEQUENCE, 001          (Optional)

7
9JOB, , , ,

7
9MSUTIL
ENTER, 01, dt/dn, , , , , , exid  }  Requires operator action
SCOPE                             }

7
9RAT, dt/dn

7
9FET, ADAPT, OVLY49, 200

7
9ALLOCATE, 249, 991231

7
9FET, ADAPT, ADAPT5, 512

7
9ALLOCATE, 375, 991231
```

$^{7}_{9}$FET, ADAPT, ADAPT7, 512

$^{7}_{9}$ALLOCATE, 375, 991231

$^{77}_{88}$end-of-file

Job 2 creates the overlay file.

$^{7}_{9}$SEQUENCE, 002 (Optional)

$^{7}_{9}$JOB, , , ,

$^{7}_{9}$FET, ADAPT, OVLY49, 200

$^{7}_{9}$OPEN, 49

$^{7}_{9}$FET, ADAPT, ADAPT5, 512

$^{7}_{9}$OPEN, 05

$^{7}_{9}$FET, ADAPT, ADAPT7, 512

$^{7}_{9}$OPEN, 07

12
0
7 49
9

Binary decks for MAIN overlay

CDCADAPT

INITIAL

PRCNTL

LBSRCH

TAPERD

TAPEWT

FLOVER

12
0
3 49, 1
7
9

Binary decks for overlay 1

PASS1A

ITYPE

DOMAC

PTIDENT

ERRMSG

BCDFETCH

JUGGLE

TABLSFT

NUSTOR

STDPACK

STDUNPK

XABLE

YABLE

```
12
 0
 2  49,1
 7
 9
```

Binary decks for overlay 1, segment 1

P1ASEG1

CARDBKUP

PTGEN

SERCHV

TABLCK

```
12
 0
 2  49,2
 7
 9
```

Binary decks for overlay 1, segment 2

P1ASEG2

POSMACH

MACDEF

CAWL

TERMAC

RESERV

PTRIT

```
12
 0
 2  49,3
 7
 9
```

Binary decks for overlay 1, segment 3

P1ASEG3

COMPUT

IFJUMP

PTRIT

GEOM1A

FINI

```
12
 0
 3 49,2
 7
 9
```

Binary decks for overlay 2

PASS1B

PTID

TABLS1B

ERRMSG

STDPACK

STDUNPK

CANPUT

CANGET

```
12
 0
 2 49,1
 7
 9
```

Binary decks for overlay 2, segment 1

SEND

BCDINF

FINIB

MISC

PSIS

POKE

RITAPE

MOTION

PREPRO

TABCO

QUAD

RFCTF

SSQRF

PPARAM

```
12
 0
 2 49,2
 7
 9
```

Binary decks for overlay 2, segment 2

DEFPRE
JDSPAT
GENPLN
ZVECT
ZVALUE
CROSS
DOT
LENGTH
NORM
PONT01
PONT02
PONT03
PONT04
PONT05
PONT07
LINE01
LINE02
LINE03
LINE04
LINE05
LINE06
LINE07
LINE08
LINE09
PLAN01
PLAN02
PLAN03
CIRL01
CIRL02
CIRL03
CIRL05
CIRL08
CIRL09
CIRL10
CIRL11
CIRL12
ELLP01
ELLHYP
GCON01
MATX01
MATX02

MATX03
MATX04

12
 0
 3 49,3
 7
 9

Binary decks for overlay 3

CALLSEG2
SUPER
AMINDX
DDSTX
UNRMALX
AERRX
ASTOSX
CENTRX
RADARX
CPLANX
CCURVX
DELTAX
ARLMG
SNAP
TLNORMX
CHECKX
QUADX
ATAPEX
VNORMX
STRTUPX
AJUNDDX
AREPREX

12
 0
 2 49,1
 7
 9

Binary decks for overlay 3, segment 1

CALLSEG1
SECTN2X

12
 0
 2 49,2
 7
 9

Binary decks for overlay 3, segment 2

ARLMCL

```
12
 0
 2 49,3
 7
 9
```

Binary decks for overlay 3, segment 3

CALLSEG3

UNTABC

DDTABC

```
12
 0
 3 49,4
 7
 9
```

Binary decks for overlay 4

PICKPOCK

POCKET

ATAPEY

ASTOSY

AERRY

NORM

CROSS

```
12
 0
 3 49,5
 7
 9
```

Binary decks for overlay 5

PASS3

CLPRNT

SEARCH

IFIXED

MULTM

TSFMPT

TSFMVC

MATMOV

TABFCT

12
0
3 49,6
7
9

Binary decks for overlay 6

SECTN4

DISPAT

(Post processors, if any, must be inserted here; each post processor constitutes a separate segment of overlay 6.)

$^{7}_{9}$RUN

Test part programs

$^{77}_{88}$end-of-file

6. Once the overlay file has been created, part programs may be run as follows:

$^{7}_{9}$SEQUENCE, 001 (Optional)

$^{7}_{9}$JOB,,,,

$^{7}_{9}$FET, ADAPT, OVLY49, 200

$^{7}_{9}$OPEN, 49

$^{7}_{9}$FET, ADAPT, ADAPT5, 512

$^{7}_{9}$OPEN, 05

$^{7}_{9}$FET, ADAPT, ADAPT7, 512

$^{7}_{9}$OPEN, 07

Binary decks for MAIN overlay or a $ABSTSK card

$^{7}_{9}$RUN

Part programs

$^{77}_{88}$end-of-file

5.2.2 INSTALL ADAPT USING THE BINARY RELEASE FILE

1. Enter the overlay pack and allocate files in the manner described for the COSY file.

2. Punch file 1 of the binary release tape (package F) and incorporate the necessary MSOS control cards or use PLIBEDIT to edit the control cards onto the tape.

3. Run the job created in step 2.

4. To run ADAPT part programs after creating the overlay file, punch the MAIN overlay decks from the binary tape and proceed as described for the ADAPT COSY file.

5.3 PERT TIME

To generate a PERT TIME system, use the following short-form procedure.

Punch the first file (PERT TIME binary deck with control cards) from the release tape† and incorporate necessary MSOS control cards to create an overlay file.

Files 2 through n contain COSY-formatted source for PERT TIME.

If recreation of the overlay preparation deck is necessary or if a listing is desired, use the following procedure.

1. Skip the release tape forward one file.

2. Run COSY to produce Hollerith output tapes.

3. Run FORTRAN and COMPASS to compile/assemble the decks.

PERT TIME operates in either 11200_{10} words (called a 16K variant) or 21000_{10} words (called a 32K variant) of core storage. To build a 16K variant, the following decks must be listed from the COSY portion of the 32K PERT TIME release tape. The 16K options, identified by comments, must then be set and the routines must be assembled or compiled and punched decks produced. The 16K binary decks must then replace the same named decks in the 32K PERT TIME binary release file (overlay preparation deck).

PERT32	RANK	BACKPASS
OUTPUT	PHASE3	LOOP
MEM	FORPASS	PRNTLOOP

† If tape units are not available, the release consists of a binary card deck of the PERT TIME program with necessary control cards. Use this deck with the appropriate MSOS control cards to create the overlay file.

5.3.1 ESTABLISH MEMORY AND MASS STORAGE REQUIREMENTS

PERT TIME requires a minimum of one 853 Disk Storage Drive or its equivalent, in addition to those required by MSOS. PERT TIME files for the 32K variant† using one 854 Disk Drive are shown in Table II-5-2.

TABLE II-5-2. PERT TIME FILES

File Name	Logical Unit	Mode	Block Size	File Size (Tracks)
SCRATCH1	01	Sector	3840	300
SCRATCH2	02	Sector	3840	300
SCRATCH3	03	Sector	3840	300
COSTLINK	07	Sector	3840	98
OLDMASTER	06	Sector	3840	300
NEWMASTER	04	Sector	3840	300
OVERLAY	05	Sector	256	90

5.3.2 ALLOCATE PERT TIME FILES

The control cards shown below illustrate the allocation of PERT TIME to a previously labeled 854 Disk Storage Drive. Control cards must be in the order shown. Refer to the MSOS Reference Manual for complete format and discussion of control cards.

```
$JOB,,,
$RAT,854/25
$FET,PERT,SCRATCH1,3840
$ALLOCATE,300
$FET,PERT,SCRATCH2,3840
$ALLOCATE,300
$FET,PERT,SCRATCH3,3840
$ALLOCATE,300
$FET,PERT,COSTLINK,3840
$ALLOCATE,98
$FET,PERT,NEWMASTER,3840
$ALLOCATE,300
$FET,PERT,OLDMASTER,3840
$ALLOCATE,300
$FET,PERT,OVERLAY,256
$ALLOCATE,90
77
88 end-of-file
$EOJ
```

† The 16K variant of PERT TIME allows a maximum of 1200 activities and 900 events. The 16K variant runs on a 16K system only if it is a 16K batch system with no options.

5.3.3 CREATE OVERLAY FILE

Create a PERT TIME overlay file by adding MSOS control cards to PERT TIME binary decks. The resultant program is as follows:

```
$JOB,,,,
$FET,PERT,SCRATCH1,3840
$OPEN,01
$FET,PERT,SCRATCH2,3840
$OPEN,02
$FET,PERT,SCRATCH3,3840
$OPEN,03
$FET,PERT,NEWMASTER,3840
$OPEN,04
$FET,PERT,OVERLAY,256
$OPEN,05
$FET,PERT,OLDMASTER,3840
$OPEN,06
$FET,PERT,COSTLINK,3840
$OPEN,07
```

```
+
0
7 05
9
```

Binary cards for main program

```
+
0
305,1
7
9
```

Binary cards for first overlay

```
+
0
305,2
7
9
```

Binary cards for second overlay

.
.
.

+
0
305, n
7
9

Binary cards for nth overlay

$RUN

K control card

L control card

Calendar modification cards, if any

M control card

X control card

Y control card

W control card

Activity and/or event name cards sorted by predecessor and successor event number

Z control card

K

.
.
.

Z

STOP

$CLOSE, 04

$CLOSE, 05

$CLOSE, 06

$CLOSE, 07

$^{77}_{88}$end-of-file

$EOJ

$JOB, , , ,

$FET, PERT, SCRATCH1, 3840

$RELEASE, ALL

$FET, PERT, SCRATCH2, 3840

$RELEASE, ALL

$FET, PERT, SCRATCH3, 3840

$RELEASE, ALL

$^{77}_{88}$end-of-file

$EOJ

If either master file COSTLINK or OVERLAY is not being saved for future executions, the CLOSE card with the appropriate file ordinal should be followed by FET and RELEASE cards to remove the label from the file label directory.

To run successive PERT TIME networks, cards K through Z are followed by a STOP control card after the last Z card. If an error is encountered in a network, a diagnostic is printed, the current network is abandoned, and the next network is processed.

5.3.4 EXECUTION RUN

To run the final PERT TIME system installed on an MSOS final library, use an established overlay file, control cards, binary cards, and PERT TIME input cards as follows:

```
$JOB,,,,
$FET,PERT,SCRATCH1,3840
$OPEN,01
$FET,PERT,SCRATCH2,3840
$OPEN,02
$FET,PERT,SCRATCH3,3840
$OPEN,03
$FET,PERT,NEWMASTER,3840
$OPEN,04
$FET,PERT,OVERLAY,256
$OPEN,05
$FET,PERT,OLDMASTER,3840
$OPEN,06
$FET,PERT,COSTLINK,3840
$OPEN,07
$ABSTSK,05
$RUN
```

K control card

L control card

Calendar modification cards, if any

M control card

X control card

Y control card

W control card

Activity and/or event name cards sorted by predecessor and successor event number

```
Z control card
K
•
•
•
Z
STOP
$CLOSE,04
$CLOSE,05
$CLOSE,06
$CLOSE,07
77
88 end-of-file
$EOJ
$JOB,,,,
$FET,PERT,SCRATCH1,3840
$RELEASE,ALL
$FET,PERT,SCRATCH2,3840
$RELEASE,ALL
$FET,PERT,SCRATCH3,3840
$RELEASE,ALL
77
88 end-of-file
$EOJ
```

A disk pack must be entered with a properly allocated and established PERT TIME overlay file. A properly allocated and established PERT TIME master file must also be entered if a master file is to be updated.

No special provisions are necessary to assign the PERT TIME master files to magnetic tape except to equip units 4 and 6 to magnetic tape drives and to eliminate all MSIO control cards pertaining to the master files.

5.4 PERT COST

To generate a PERT COST system, use the following short-form procedure.

Punch the first file (PERT COST binary deck with control cards) of the release tape† and incorporate necessary MSOS control cards to create an overlay file. Files 2 through n contain COSY-formatted source for PERT COST.

If recreation of the overlay preparation deck is necessary, use the following procedure.

1. Skip the release tape forward one file.
2. Run COSY to produce Hollerith output tapes.

†If tape units are not available, the release consists of a binary card deck of the PERT COST program with necessary overlay control cards. Use this deck with the appropriate MSOS control cards to create the overlay file.

3. Run FORTRAN and COMPASS to compile/assemble the decks.

4. Insert main and overlay cards in the designated positions, using the listed output from the previous step as a guide.

5. Add MSOS control cards and run the job to create the overlay file.

Detailed procedures for generating and installing a PERT COST system include assembly and the execution run.

5.4.1 ESTABLISH MEMORY AND MASS STORAGE REQUIREMENTS

The size of core memory determines the maximum summary numbers and charge numbers in the work breakdown structure. These requirements are in addition to those of the operating system and priority programming. The capacity of each variant depends on the availability of a sufficient quantity of disk storage drives to handle PERT COST master and scratch files.

TABLE II-5-3. SUMMARY AND ACCOUNT NUMBER CAPACITY

Memory Used	Maximum Account Numbers	Maximum Summary Numbers	Total
8K	1500	1000	2500
20K	3000	2000	5000

In addition to disk storage required by MSOS, the PERT COST system may be run with a minimum of one 853 Disk Storage Drive or the equivalent. However, at least two 853 Disk Storage Drives or the equivalent are recommended.

The logical file allocation for an 854 Disk Storage Drive is shown in Table II-5-4.

TABLE II-5-4. 854 DISK STORAGE DRIVE LOGICAL FILE ALLOCATION

File Name	Logical Unit	Block Size	File Size (Tracks)
OLD SUMMARY NUMBERS	11	256	10
OLD ACCOUNT NUMBERS	12	200	100
OLD COSTS	13	200	194
OLD RATES	14	300	150
OLD F & G CATEGORY	15	512	20
OLD HIERARCHY TABLE	16	512	10
NEW SUMMARY NUMBERS	21	256	10
NEW ACCOUNT NUMBERS	22	200	100
NEW COSTS	23	200	194
NEW RATES	24	300	150
NEW F & G CATEGORY	25	512	20
NEW HIERARCHY TABLE	26	512	10
SCRATCH1	01	3840	379
SCRATCH2	02	3840	379
SCRATCH3	03	3840	379
COVERLAY	05	256	104

These file sizes allow processing of 500 summary numbers and 1000 account numbers. The master cost files provide for a maximum of 1940 records. Each six months of cost (budgets, estimates, and actuals) entered for an account number, performing organization, or resource code combination generates one master cost record. The PERT COST basic work file (scratch file) cannot exceed 6820 records. A record for the work file is generated for each summary number and account number, along with each month of costs associated with each account number, performing organization, and resource code combination.

The above file allocation capacities are determined by the number of records stored on an 854 disk track, which will store one of the following.

- 40 summary records
- 20 account number records
- 20 master cost records
- 18 basic work (scratch) file records

These factors can be used to compute the number of disk storage tracks that must be allocated to obtain a desired capacity.

Additional drives obtain the maximum capacities. File sizes can then be increased to use the added disk storage capacity.

When files are allocated with the mode and block size indicated above, the PERT COST system operates most efficiently and optimizes use of the disk storage.

5.4.2 ALLOCATE SCRATCH FILES

The control card examples illustrate the allocation of disk storage for scratch files. For complete format and discussion of control cards, refer to the MSOS Reference Manual.

```
$JOB,,,
$RAT,854/31
$FET,PERT,SCRATCH1,3840
$ALLOCATE,379
$FET,PERT,SCRATCH2,3840
$ALLOCATE,379
$FET,PERT,COVERLAY,256
$ALLOCATE,94
$FET,PERT,SCRATCH3,3840
$ALLOCATE,379
77
88 end-of-file
$EOJ
```

5.4.3 CREATE OVERLAY FILE AND RUN WITH PERT COST MASTER FILES ON TAPE

Execute PERT COST with SELECT JUMP 1 on. This is necessary for proper handling of the six individual files that make up the PERT COST data master. Construct a program to create a PERT COST overlay file and execute with master files on tape as follows:

```
$JOB,,,
$EQUIP,11=MT,12=11,13=11,14=11,15=11,16=11†
$EQUIP,21=MT,22=21,23=21,24=21,25=21,26=21†
$FET,PERT,SCRATCH1,3840
$OPEN,01
$FET,PERT,SCRATCH2,3840
$OPEN,02
$FET,PERT,SCRATCH3,3840
$OPEN,03
$FET,PERT,COSTLINK,3840
$OPEN,07
$FET,PERT,COVERLAY,256
$OPEN,05
```

† When using magnetic tape files to save master files, SELECT JUMP 1 must be set for execution.

\+
0
05
7
9

Binary cards for main program

\+
0
305, 1
7
9

Binary cards for first overlay

\+
0
305, 2
7
9

Binary cards for second overlay

\+
0
305, ...
7
9

Binary cards for last overlay

$RUN

T control card

U control card

S cards
C cards
B cards
E cards
P cards   Optional
Q cards
R cards
F cards
G cards

H control card

Report request cards in ascending order by type number

V control card

CLOSE, 05

CLOSE, 07

$^{77}_{88}$end-of-file

$EOJ

$JOB, ,

$FET, PERT, SCRATCH1, 3840

$RELEASE, ALL

$FET, PERT, SCRATCH2, 3840

$RELEASE, ALL

$FET, PERT, SCRATCH3, 3840

$RELEASE, ALL

$^{77}_{88}$end-of-file

$EOJ

When the COSTLINK or OVERLAY files are not being saved for future executions, the CLOSE card with the appropriate file ordinal should be followed by FET and RELEASE cards to remove the label from the file label directory.

To assign the PERT TIME summary (COSTLINK) file to magnetic tape, equip unit 7 to a magnetic tape drive.

5.4.4 ALLOCATION OF FILES WITH PERT COST MASTER FILES ON MASS STORAGE

The control card examples illustrate the allocation of PERT COST files to an 854 Disk Storage Drive. These cards must be in the order given. Refer to the MSOS Reference Manual for complete format and discussion of control cards.

$JOB, , ,

$RAT, 854/30

$FET, PERT, OLDSUMMARYNUMBERS, 256

$ALLOCATE, 10

$FET, PERT, OLDACCOUNTNUMBERS, 200

$ALLOCATE, 100

$FET, PERT, OLDCOSTS, 200

$ALLOCATE, 194

$FET, PERT, OLDRATES, 300

$ALLOCATE, 150

$FET, PERT, OLDF+GCATEGORIES, 512

$ALLOCATE, 20

$FET, PERT, OLDHIERARCHYTABLE, 512

$ALLOCATE, 10

$FET, PERT, NEWSUMMARYNUMBERS, 256

```
$ALLOCATE, 10
$FET, PERT, NEWACCOUNTNUMBERS, 200
$ALLOCATE, 100
$FET, PERT, NEWCOSTS, 200
$ALLOCATE, 194
$FET, PERT, NEWRATES, 300
$ALLOCATE, 150
$FET, PERT, NEWF+GCATEGORIES, 512
$ALLOCATE, 20
$FET, PERT, NEWHIERARCHYTABLE, 512
$ALLOCATE, 10
$FET, PERT, SCRATCH1, 3840
$ALLOCATE, 379
$ALLOCATE, 1
$FET, PERT, SCRATCH2, 3840
$ALLOCATE, 379
$FET, PERT, COVERLAY, 256
$ALLOCATE, 94
$FET, PERT, SCRATCH3, 3840
$ALLOCATE, 379
77
88 end-of-file
$EOJ
```

5.4.5 CREATE OVERLAY FILE AND RUN WITH PERT COST MASTER FILES ON MASS STORAGE

Construct a program to create a PERT COST overlay file and execute with master files on mass storage as follows:

```
$JOB, , ,
$FET, PERT, OLDSUMMARYNUMBERS, 256
$OPEN, 11
$FET, PERT, OLDACCOUNTNUMBERS, 200
$OPEN, 12
$FET, PERT, OLDCOSTS, 200
$OPEN, 13
$FET, PERT, OLDRATES, 300
$OPEN, 14
$FET, PERT, OLDF+GCATEGORIES, 512
$OPEN, 15
```

```
$FET, PERT, OLDHIERARCHYTABLE, 512
$OPEN, 16
$FET, PERT, NEWSUMMARYNUMBERS, 256
$OPEN, 21
$FET, PERT, NEWACCOUNTNUMBERS, 200
$OPEN, 22
$FET, PERT, NEWCOSTS, 200
$OPEN, 23
$FET, PERT, NEWRATES, 300
$OPEN, 24
$FET, PERT, NEWF+GCATEGORIES, 512
$OPEN, 25
$FET, PERT, NEWHIERARCHYTABLE, 512
$OPEN, 26
$FET, PERT, SCRATCH1, 3840
$OPEN, 01
$FET, PERT, SCRATCH2, 3840
$OPEN, 02
$FET, PERT, SCRATCH3, 3840
$OPEN, 03
$FET, PERT, COSTLINK, 3840
$OPEN, 07
$FET, PERT, COVERLAY, 256
$OPEN, 05

+
0
 05
7
9

Binary cards for main program

+
0
305, 1
7
9

Binary cards for first overlay

+
0
305, 2
7
9
```

Binary cards for second overlay

.
.
.

+
0
305, n
7
9

Binary cards for nth overlay

$RUN

T control card

U control card

S cards
C cards
B cards
E cards
P cards   Optional
Q cards
R cards
F cards
G cards

H control card

Report request cards in ascending order by type number

V control card

$CLOSE, 05
$CLOSE, 07
$CLOSE, 11
$CLOSE, 12
$CLOSE, 13
$CLOSE, 14
$CLOSE, 15
$CLOSE, 16
$CLOSE, 21
$CLOSE, 22
$CLOSE, 23
$CLOSE, 24

```
$CLOSE,25
$CLOSE,26
77
88 end-of-file
$EOJ
$JOB,,,
$FET,PERT,SCRATCH1,3840
$RELEASE,ALL
$FET,PERT,SCRATCH2,3840
$RELEASE,ALL
$FET,PERT,SCRATCH3,3840
$RELEASE,ALL
77
88 end-of-file
$EOJ
```

When the master files, COSTLINK, or overlay files are not being saved for future executions, the CLOSE cards with the appropriate file ordinals should be followed by FET and RELEASE cards to remove the label from the file label directory.

5.5 ANSI FORTRAN

5.5.1 ANSI FORTRAN SYSTEM PREPARATION

The binary portion of this compiler is included in the package A materials.

File 55 must be at least the size specified in the following listing to execute the ANSI FORTRAN compiler.

	813	841	853	854	863	Device
FILE 55	100	100	200	200	200	Tracks

5.5.2 COSY FILE CONTENTS

The following list gives the sequence of the routines found on the COSY source for the ANSI FORTRAN tape (package C).

The deck name of each routine is suffixed with a source language code, defined as follows:

CMP	COMPASS
UFTN	ANSI FORTRAN

Table II-5-5 lists the ANSI FORTRAN COSY deck names in order of occurrence on the COSY tape. Compiler routines compiled with ANSI FORTRAN must be compiled with the S option. † Object time routines compiled with ANSI FORTRAN must be compiled without the S option.

TABLE II-5-5. ANSI FORTRAN COSY TAPE

Deck Name	Source Language	Product Name	Deck Name	Source Language	Product Name
FTNUSASI	CMP		EQUSIZE	UFTN	
UFBINBCD	CMP		CLEAR	UFTN	
ADDNAME	CMP		GETBSS	UFTN	
UFMOVER	CMP		COMBINE	UFTN	
LISTIN	UFTN		GETRUNS	UFTN	
GETROOM	UFTN		IALREADY	UFTN	
LEXPAND	UFTN		Q.ENTRY3	CMP	
MISQU	UFTN		FAZ1	UFTN	
COGEN	UFTN		IODELAY	UFTN	
QABORT	CMP		IOSWITCH	UFTN	
COMPIO	CMP		IOCONTRL	UFTN	
Q.ENTRY1	CMP		POLCNTRL	UFTN	
LABSRCH	CMP		SN2HOLD	UFTN	
CONTRANS	CMP		DOER	UFTN	
COMCHAR	CMP		QCONPRO	UFTN	
CHEKINT	CMP		Q.ENTRY4	CMP	
GETCARDS	CMP	ANSI	ISWITCH	UFTN	ANSI
Q.MDDD	CMP	FORTRAN	BKRWEF	UFTN	FORTRAN
CONTABS	CMP	compiler	ENDFAZ1	UFTN	compiler
UFKEYWRD	CMP	routines	SCAN4	UFTN	routines
LABDEF	UFTN		GETDIMS	UFTN	
SCAN3	UFTN		Q.ENTRY5	CMP	
SCAN1	UFTN		FPCOGEN	UFTN	
CONGETTR	UFTN		TABLEIT	UFTN	
LOGRELOP	UFTN		ADDFUNC	UFTN	
COMSTRNG	UFTN		OV2END	CMP	
DATATRAN	UFTN		Q.ENTRY6	CMP	
SUBCRACK	UFTN		ITOR	CMP	
AOPERAND	UFTN		ITOD	CMP	
ENDDO	UFTN		RTOI	CMP	
OV1END	CMP		FAZ3	UFTN	
Q.ENTRY2	CMP		GENERAL	UFTN	
DECLAR	UFTN		INDXCALL	UFTN	

† The presence of the S parameter on the $UFORTRAN card specifies integers and logical variables compile as 24-bit entities; the absence of the S parameter as 48-bit entities.

TABLE II-5-5. ANSI FORTRAN COSY TAPE (Cont'd)

Deck Name	Source Language	Product Name
DOPRO	UFTN	
DOPARAM	UFTN	
CALLPAUL	UFTN	
CONGEN	UFTN	
COMPUTE	UFTN	
FRSTLEVL	UFTN	
SCNDLEVL	UFTN	
THRDLEVL	UFTN	
FRTHLEVL	UFTN	
FILTER	UFTN	
GETREGS	UFTN	ANSI FORTRAN compiler routines
CODER	UFTN	
RELOCATE	UFTN	
INSTR	UFTN	
STL2OPL	UFTN	
INTRNSIC	UFTN	
CONV	UFTN	
Q.ENTRY7	CMP	
UFAND	CMP	
ERRPRO	CMP	
INFGEN	UFTN	
QSWITCH	UFTN	
QPOWER	UFTN	
RISROS	UFTN	
EXTGEN	UFTN	
INITCODE	UFTN	
QRADIX	UFTN	
FMTSUBS	UFTN	
FMTSYN	UFTN	
GETEL	UFTN	
GETSUB	UFTN	
DATASUBS	UFTN	
DATAGEN	UFTN	
TABCHK1	UFTN	
TABCHK2	UFTN	
BINBCD2	UFTN	
Q.ENTRY8	CMP	
CODEGEN	CMP	
UFORTRAN	CMP	ANSI FTN LDR
UFOVER	CMP	
Q.IODONE	CMP	
UFBNARR	CMP	
UFBINARY	CMP	ANSI FORTRAN object-time routines
UFBUFFIO	CMP	
UFBCDIN	CMP	
UFBCDOUT	CMP	
UFIOUTIL	CMP	
UFIO	CMP	
Q.LOCATE	CMP	

Deck Name	Source Language	Product Name
UFLITES	CMP	
Q.ERROR	CMP	
UFSELECT	CMP	
Q.STOP	CMP	
Q.SCHECK	CMP	
UFAIMAG	CMP	
UFAINT	CMP	
UFALOG10	CMP	
Q.EXISC	CMP	
Q.EXIC	CMP	
Q.EXCIS	CMP	
Q.EXCI	CMP	
Q.EXCD	CMP	
Q.EXDC	CMP	
Q.EXRC	CMP	
Q.EXCR	CMP	
Q.EXCC	CMP	
UFCLOG	CMP	
UFATAN	CMP	
Q.EXSIS	CMP	
Q.EXII	CMP	
Q.EXRIS	CMP	
Q.EXRI	CMP	
Q.EXISR	CMP	
Q.EXIR	CMP	
Q.EXRR	CMP	
UFALOG	CMP	ANSI FORTRAN object-time routines
UFCABS	CMP	
UFCEXP	CMP	
UFCMPLX	CMP	
UFCONJG	CMP	
UFCSIN	CMP	
UFDABS	CMP	
UFDBLE	CMP	
UFDCOSSN	CMP	
Q.EXDIS	CMP	
Q.EXDI	CMP	
Q.EXDR	CMP	
Q.EXISD	CMP	
Q.EXID	CMP	
Q.EXRD	CMP	
Q.EXDD	CMP	
UFDEXP	CMP	
UFDIMDIM	CMP	
UFDLOG2	CMP	
UFDMOD	CMP	
UFDSIGN	CMP	
UFDSQRT	CMP	
UFEXP	CMP	
UFFLOAT	CMP	
UFIDINT	CMP	
UFIFIX	CMP	

TABLE II-5-5. ANSI FORTRAN COSY TAPE (Cont'd)

Deck Name	Source Language	Product Name	Deck Name	Source Language	Product Name
UFMINMAX	CMP	ANSI FORTRAN object-time routines	Q.STCI	CMP	ANSI FORTRAN object-time routines
UFMINMXD	CMP		Q.STISC	CMP	
UFSINCOS	CMP		Q.STISR	CMP	
UFSIGN	CMP		Q.STIC	CMP	
UFSNGL	CMP		Q.STCR	CMP	
UFSQRT	CMP		Q.STDIS	CMP	
Q.ADCR	CMP		Q.STDI	CMP	
Q.ADID	CMP		Q.STIR	CMP	
Q.ADDC	CMP		Q.STRIS	CMP	
Q.ADRD	CMP		Q.STCC	CMP	
Q.ADDIS	CMP		Q.SBRC	CMP	
Q.ADDR	CMP		Q.SBCR	CMP	
Q.ADISD	CMP		Q.SBDI	CMP	
Q.ADDI	CMP		Q.SBRD	CMP	
Q.ADCD	CMP		Q.SBDC	CMP	
Q.ADISC	CMP		Q.SBCD	CMP	
Q.ADCIS	CMP		Q.SBISD	CMP	
Q.ADCI	CMP		Q.SBID	CMP	
Q.ADIC	CMP		Q.SBDIS	CMP	
Q.ADRC	CMP		Q.DBDR	CMP	
Q.ADRI	CMP		Q.SBCIS	CMP	
Q.ADRIS	CMP		Q.SBCI	CMP	
Q.ADISR	CMP		Q.SBISC	CMP	
Q.ADIR	CMP		Q.SBIC	CMP	
Q.ADCC	CMP		Q.SBISR	CMP	
Q.DVRD	CMP		Q.SBRI	CMP	
Q.DVID	CMP		Q.SBRIS	CMP	
Q.DVCR	CMP		Q.SBIR	CMP	
Q.DVISD	CMP		Q.SBCC	CMP	
Q.DVCD	CMP		Q.SBDD	CMP	
Q.DVDI	CMP		Q.MURC	CMP	
Q.DVDIS	CMP		Q.MUDC	CMP	
Q.DVDC	CMP		Q.MUDR	CMP	
Q.DVDR	CMP		Q.MUCD	CMP	
Q.DVISC	CMP		Q.MURD	CMP	
Q.DVIC	CMP		Q.MUISD	CMP	
Q.DVCIS	CMP		Q.MUDIS	CMP	
Q.DVCI	CMP		Q.MUID	CMP	
Q.DVRC	CMP		Q.MUDI	CMP	
Q.DVRIS	CMP		Q.MUCIS	CMP	
Q.DVRI	CMP		Q.MUISC	CMP	
Q.DVIR	CMP		Q.MUCI	CMP	
Q.DVISR	CMP		Q.MUIC	CMP	
Q.DVCC	CMP		Q.MUCR	CMP	
Q.STRC	CMP		Q.MURI	CMP	
Q.STRD	CMP		Q.MUIR	CMP	
Q.STDR	CMP		Q.MUISR	CMP	
Q.STISD	CMP		Q.MURIS	CMP	
Q.STDC	CMP		Q.MUCC	CMP	
Q.STCD	CMP		Q.ADDD	CMP	
Q.STID	CMP		Q.LDCC	CMP	
Q.STRI	CMP		UFFORCON	CMP	
Q.STCIS	CMP		UFUTIL	CMP	

TABLE II-5-5. ANSI FORTRAN COSY TAPE (Cont'd)

Deck Name	Source Language	Product Name	Deck Name	Source Language	Product Name
Q.XOACC	CMP	ANSI FORTRAN object-time routines			
UFTANH	UFTN				
UFCSQRT	UFTN				
UFDATAN2	UFTN				
UFDATAN	UFTN				

5.6 ANSI COBOL

5.6.1 ANSI COBOL SYSTEM PREPARATION

The binary portion of this compiler is included in the package A materials.

File 55 must be at least the size specified in the following listing to assemble the ANSI COBOL compiler.

File 55	813	841	853	854	863	Device
	250	240	500	500	500	Tracks

5.6.2 ANSI COBOL OPTION SELECTION

The following definitions explain the assembly options within each particular routine. The user is cautioned to correlate the particular assembly option setting with the major installation option on the system binary source file† to determine if the assembly option must be changed. Note that there is a difference between the COSY option setting and the assembled value on the binary source in some cases. The format of each definition is as follows.

Routine

Assembly option (mnemonic)

Definition:

Option:	COSY modifier	
mnemonic	operator	address

Deck card:

Dependency:

Release value:

Table II-5-6 shows which assembly option is applicable to each routine.

TABLE II-5-6. ANSI COBOL ASSEMBLY OPTIONS

Reassembled Routine	Assembly Options			
	BDP MULDV	BDP 3312	NONUSASI	UMSDEVIC
UDCT			X	
UCIE			X	
UCDD			X	
UCR1			X	
UCP1			X	
UCG1	X	X		
UCBLSORT		X		X
UFIGCON		X		
UVARAN		X		

The assembly options are listed in alphabetical order and the routines are in the order they appear on the system binary source file.

†Refer to description of package A.

5.6.3 UDCT

ANSI COBOL OPTION (NONUSASI)

Definition: The option NONUSASI depicts two different versions of the ANSI COBOL compiler. The ANSI-only version conforms to the American National Standards Institute COBOL standards. The NONANSI-only version contains additional COBOL features over and above the ANSI standard. The NONUSASI assembly option is incorporated into five routines: UDCT, UCDD, UCIE, UCR1, and UCP1.

Option:		DELETE/	10	
	NONUSASI	EQU	0	Non-ANSI COBOL version
	NONUSASI	EQU	1	ANSI COBOL-only version
Deck card:	UDCT	DECK/	I=22, H	(Refer to Dictionary Assembly Option)

Release value: NONUSASI=0 on the UCBL COSY tape and binary source.

NOTE

DICT is a program consisting of ANSI COBOL reserved words and hash tables to aid in the syntax analysis of COBOL source text. The binary deck is created by executing the program UDCT which is located on COSY tape. All other binary decks are created by the normal execution of a COMPASS assembly.

The following job should be run to produce the binary deck for UDCT. It must be run on a system using BDP hardware.

```
$SEQUENCE,001        (Optional)

$JOB,33L13,,,

$EQUIP,22=MT

$COSY

UDCT        DECK/        I=22,H
            ENDCOSY/

$COMPASS,I=54,X

$LOAD,56

$RUN

77
88

$EOJ
```

5.6.4 UCIE

ANSI COBOL OPTION (NONUSASI)

Definition: Refer to section 5.6.3.

Option:		DELETE/	435	
	NONUSASI	EQU	0	Non-ANSI COBOL version
	NONUSASI	EQU	1	ANSI COBOL-only version
Deck card:	UCIE	DECK/	p_1, p_2	

Release value: NONUSASI=0 on the UCBL COSY tape and system binary source. †

5.6.5 UCDD

ANSI COBOL OPTION (NONUSASI)

Definition: Refer to section 5.6.3.

Option:		DELETE/	819	
	NONUSASI	EQU	0	Non-ANSI COBOL version
	NONUSASI	EQU	1	ANSI COBOL-only version
Deck card:	UCDD	DECK/	p_1, p_2	

Release value: NONUSASI=0 on the UCBL COSY tape and system binary source.

5.6.6 UCR1

ANSI COBOL OPTION (NONUSASI)

Definition: Refer to section 5.6.3.

Option:		DELETE/	121	
	NONUSASI	EQU	0	Non-ANSI COBOL version
	NONUSASI	EQU	1	ANSI COBOL-only version
Deck card:	UCR1	DECK/	p_1, p_2	

Release value: NONUSASI=0 on the UCBL COSY tape and the system binary source.

†Package A material.

5.6.7 UCP1

ANSI COBOL OPTION (NONUSASI)

Definition: Refer to section 5.6.3.

Option:		DELETE/	67	
	NONUSASI	EQU	0	Non-ANSI COBOL version
	NONUSASI	EQU	1	ANSI COBOL-only version
Deck card:	UCP1	DECK/	p_1, p_2	

Release value: NONUSASI=0 on the UCBL COSY tape and the system binary source.

5.6.8 UCG1

BDP OPTION (BDP3312)

Definition: The option BDP3312 allows the ANSI COBOL compiler and object-time routines to utilize either the nonenhanced or enhanced BDP hardware. The option BDP3312 is contained in four routines: UCG1, UCBLSORT, UFIGCON, and UVARAN.

Option:		DELETE/	481	
	BDP3312	EQU	1	Nonenhanced BDP hardware
	BDP3312	EQU	2	Enhanced BDP hardware
Deck card:	UCG1	DECK/	p_1, p_2	

Dependency: Type of BDP hardware available to run ANSI COBOL.

Release value: BDP3312=1 on the UCBL COSY tape and the system binary source.

FLOATING POINT HARDWARE OPTION (BDPMULDV)

Definition: The option BDPMULDV allows the compiler to generate or not to generate double precision instructions (MUAQ, DVAQ).

Option:		DELETE/	501	
	BDPMULDV	EQU	0	Floating-point hardware
	BDPMULDV	EQU	1	No floating-point hardware
Deck card:	UCG1	DECK/	p_1, p_2	

Dependency: Availability of floating-point hardware.

Release value: BDPMULDV equals 0 on the UCBL COSY tape and the system binary source.

5.6.9 UCBLSORT

BDP OPTION (BDP3312)

Definition: The option BDP3312 allows the ANSI COBOL compiler and object-time routines to utilize either the nonenhanced or enhanced BDP hardware. The option BDP3312 is contained in four routines: UCG1, UCBLSORT, UFIGCON, and UVARAN.

Option:		DELETE/	9	
	BDP3312	EQU	1	Nonenhanced BDP hardware
	BDP3312	EQU	2	Enhanced BDP hardware
Deck card:	UCBLSORT	DECK/	p_1, p_2	

Dependency: Type of BDP hardware available to run ANSI COBOL.

Release value: BDP3312=1 on the UCBL COSY tape and the system binary source.

MASS STORAGE DEVICE OPTION (UMSDEVIC)

Definition: The option UMSDEVIC allows the ANSI COBOL object-time routines to utilize an optimum block size for its work files depending on the type of mass storage available.

Option:		DELETE/	23	
	UMSDEVIC	EQU	1	853, 854, 813, 814, 863
	UMSDEVIC	EQU	2	841
Deck card:	UCBLSORT	DECK/	p_1, p_2	

Dependency: Type of mass storage available.

Release value: UMSDEVIC equals 1 on the UCBL COSY tape and the system binary source.

5.6.10 UFIGCON

BDP OPTION (BDP3312)

Definition: Refer to section 5.6.9.

Option:		DELETE/	3	
	BDP3312	EQU	1	Nonenhanced BDP hardware
	BDP3312	EQU	2	Enhanced BDP hardware
Deck card:	UFIGCON	DECK/	p_1, p_2	

Dependency: Type of BDP hardware available to run ANSI COBOL.

Release value: BDP3312=1 on the UCBL COSY tape and the system binary source.

5.6.11 UVARAN

BDP OPTION (BDP3312)

Definition: Refer to section 5.6.9.

Option:		DELETE/	3	
	BDP3312	EQU	1	Nonenhanced BDP hardware
	BDP3312	EQU	2	Enhanced BDP hardware
Deck card:	UVARAN	DECK/	p_1, p_2	

Dependency: Type of BDP hardware available to run ANSI COBOL.

Release value: BDP3312=1 on the UCBL COSY tape and the system binary source.

5.6.12 ASSEMBLY OPTION CODING SHEETS

It is recommended that the coding sheets in Table II-5-7 be used as an aid in selecting options. Unused lines can be crossed out and parameters supplied for chosen lines. These coding sheets contain all options described in this section.

5.6.13 ANSI COBOL COSY FILE CONTENTS

Table II-5-8 lists the COSY decks and the sequence in which they occur on the ANSI COBOL COSY tape. The deck name of each routine in the list is suffixed with a special code. The definition of this code is as follows:

U Specified routine is used for ANSI COBOL

Z Specified routine has a special assembly option.

5.7 EXTENDED CORE SYSTEMS

Systems with 48K or 65K words of memory must incorporate the INITUSER routine, contained in package G, into the library. This can be done by replacing the UNIT card on the MSOS PRELIB source with either a $^7_9$UNIT,lu card, where lu is the logical unit containing the binary INITUSER routine or with the binary deck of INITUSER.

The INITUSER routine contains only one assembly option, PMP (refer to section 2.3.55). PMP is equated to 0 in the binary source and the COSY source contained in package G. To change the option, use the following cards in a COSY run.

	DELETE/	3
PMP	EQU	n
INITUSER	DECK/	

TABLE II-5-7. ANSI COBOL ASSEMBLY OPTION CODING SHEET

Location	Operation	Address Field	Comments
1 8	10	20	41
	DELETE/	10	
NONUSASI	EQU		Type of ANSI COBOL
UDCT	DECK/		
	DELETE/	435	
NONUSASI	EQU		Type of ANSI COBOL
UCIE	DECK/		
	DELETE/	819	
NONUSASI	EQU		Type of ANSI COBOL
UCDD	DECK/		
	DELETE/	121	
NONUSASI	EQU		Type of ANSI COBOL
UCR1	DECK/		
	DELETE/	68	
NONUSASI	EQU		Type of ANSI COBOL
UCP1	DECK/		
	DELETE/	481	
BDP3312	EQU		BDP option
	DELETE/	501	
BDPMULDV	EQU		Floating point hardware
UCG1	DECK/		
	DELETE/	9	
BDP3312	EQU		BDP option
	DELETE/	23	
UMSDEVIC	EQU		Mass storage hardware type for
UCBLSORT	DECK/		work files
	DELETE/	3	
BDP3312	EQU		BDP option
UFIGCON	DECK/		
	DELETE/	3	
BDP3312	EQU		BDP option
UVARAN	DECK/		

TABLE II-5-8. ANSI COBOL COSY TAPE

Deck Name	Code	Source Language	Product Name
UCDV	U	CMP	ANSI COBOL compiler routines
UDCT	UZ	CMP	
UCIE	UZ	CMP	
UCDD	UZ	CMP	
UCR1	UZ	CMP	
UCP1	UZ	CMP	
UCR2	UZ	CMP	
UCAL	U	CMP	
UCP2	U	CMP	
UCG1	UZ	CMP	
UCFA	U	CMP	
UCDP	U	CMP	
UDP1	U	CMP	
UDP2	U	CMP	
UCBL	U	CMP	ANSI COBOL LDR.
UTIMER	U	CMP	ANSI COBOL object-time routines
USYSTIME	U	CMP	
USYSDATE	U	CMP	
UOVER	U	CMP	
UCOBOLIO	U	CMP	
UCBWRITA	UZ	CMP	
UNSLABEL	U	CMP	
UCBLSORT	UZ	CMP	
UACCEPT	U	CMP	
UALPHA	U	CMP	
UANEDIT	U	CMP	
UBCDFP	U	CMP	
UBINFP	U	CMP	
UBIN2AN	U	CMP	
UCFAULT	U	CMP	
UCOMPARE	U	CMP	
UDEEDIT	U	CMP	
UDISPLAY	U	CMP	
UDIVIDE	U	CMP	
UEXAMINE	U	CMP	
UFIGCON	UZ	CMP	
UFPBCD	U	CMP	
UFPBIN	U	CMP	
UFP2FPE	U	CMP	
UMULT	U	CMP	
UMVG4095	U	CMP	
UODDEDIT	U	CMP	
USUBSC	U	CMP	
UVARAN	U	CMP	
UVARC1	U	CMP	
UVARC2	U	CMP	
UVARN	UZ	CMP	ANSI COBOL object-time routines
UEXPONC	U	CMP	
UDBINCON	U	CMP	
UDFPCONV	U	CMP	
UDLOG	U	CMP	
UDNTILOG	U	CMP	
UDASMD	U	CMP	
UDCH1WRK	U	CMP	
UNUMERIC	U	CMP	

VERIFICATION DECK OUTPUT 6

To run the verification tests, the following procedure may be used.

1. Rewind the install tape.
2. Assign input to tape.
3. With select jump 6 set, call MSOS Utility from the console.
4. Skip the tape forward 5 files (for example, SKFF,60,05).
5. Run the jobs contained on the tape.

```
JOB,,,,
FORTRAN,L,X                                         ** SEQ= 002 **   MSOS V5.0 ED=81 D=01/17/74 T=14/40/ 7.


     MS FORTRAN  (4.3) / MSOS                        01/17 74          PAGE 001

           PROGRAM VERIFY
           DIMENSION FILE(72),FILEID(30),ED(2),OWNER(8),PRIVACY(4),
          1MODSEC(4),DSI(4),BUF(100),RDADR(20)
           INTEGER FILE,OFFSET,KEYSIZE,RECSIZE,BLKSIZE,CA,BUF,BUFN,RECL,
          1BCL,NOB,NA
           CHARACTER FILEID,ED,PRIVACY,MODSEC,TYPE,DSI,USE,RDADR
           WRITE(61,20)
        20 FORMAT(46H LISA/MSOS HAS BEEN INSTALLED ON THIS LIBRARY.)
           STOP
        30 CALL FILEDEFF(FILE,FILEID,ED,OWNER,PRIVACY,MODSEC)
           CALL RECDEFF(FILE,OFFSET,KEYSIZE,TYPE,RECSIZE,BLKSIZE)
           CALL BUFDEFF(FILE,CA,DSI,BUF,BUFN,BLKSIZE,RECL,BCL)
           CALL ISOPENF(FILE,USE)
           CALL BUILDF(FILE,RDADR)
           CALL ISCLOSEF(FILE,NOB,NA)
           END

                FORTRAN DIAGNOSTIC RESULTS  FOR    VERIFY

   NULL STATEMENT NUMBERS
        30




LOAD,56,M
```

```
 M 55

   SUBP
64035  MSIOMAIN    67242  FILEDEFF    67277  RECDEFF     67442  BUFDEFF     67537  FD          71710  BLOCKER
72204  BUILD       72610  Q8QERROR    73053  CIO.MSIO    73532  PAUSE       73622  FORMAT      74240  CONTROL
75500  BCDOUT      77344  VERIFY

   ENTR
67740  ADDRESS     13634  BCDBOXS     67637  BLKMES      72067  BLOCKER     67442  BUFDEFF     72211  BUILDF
72205  BUILD       71170  CBLOAD      71161  CBLSAVE     71141  CHKSUB      73053  CIO.MSIO    71535  CLEARCA
71530  CLEARDLT    71523  CLEAREOF    73011  ERRMES      71176  ERRORF      13634  FDPBOXS     67242  FILEDEFF
72140  FITEST      71031  FUNCTION    71566  GETBLKSZ    71270  GETBUF      71541  GETFRDSZ    71553  GETVRDSZ
67547  ILBUFNO     67621  ILEGALOP    71456  IOCHECK     75305  IO.REJ      70621  ISCLOSEF    70511  ISCLOSE
70100  ISOPENF     70464  ISOPEN      67765  JLLENGTH    67775  KEYINWRD    67560  KEYMES      70011  LCOMPARE
67771  LENGTH4     67766  LENGTHD     67767  LENGTHDW    67774  LISAEPTS    70751  LOCATES     70775  LSTATUS
67111  MBERRORF    66152  MCHECKPT    65304  MCLOSEF     64460  MGET        65607  MLOCATE     64653  MOPENF
70050  MOVECH      72030  MOVEWD      67122  MPAUSEF     64152  MPUTADDR    64501  MPUT        65203  MRBTOBOZ
65223  MRDTRBOZ    64536  MREADF      64644  MRELSE      64412  MUNSTDLB    72044  MVBLKFIL    64544  MWRITEF
67122  PAUSE       75303  PROGNAME    75354  PWRTBLO     75356  PWRTBL      74433  Q8QARRAY    75272  Q8QBCDWT
75262  Q8QCONVT    74771  Q8QEDBIN    74774  Q8QEDITS    76335  Q8QENGOT    74240  Q8QENTRY    73327  Q8QEOFRC
72610  Q8QERROR    74243  Q8QEXITS    73660  Q8QFORMT    73512  Q8QFOTAB    73622  Q8QIFRMT    75342  Q8QINFMS
75500  Q8QINGOT    74473  Q8QIOERR    74373  Q8QIOSET    74607  Q8QIOSVB    74413  Q8QIOTAB    75603  Q8QLGOTC
75611  Q8QLGOTI    75616  Q8QLGOTR    74715  Q8QMSIO     74241  Q8QOUTTB    73552  Q8QPAUSE    75327  Q8QRJMES
74355  Q8QSENSE    73532  Q8QSTOP     72726  Q9QERROR    70560  READ        67277  RECDEFF     67627  RECMES
70072  RESTORE     70064  SAVER       71333  SCANBUF     71601  SEQCHECK    64147  SEQUSER     71012  SETACT
71017  SETDLETE    72167  SETPOFAC    71715  SIZER       67770  TYPE        71637  UFLAG       72157  UPPOFAC
67745  USAGE       71142  USASIFLG    74240  UTESUMIT    77713  VERIFY      71024  WAITIO      67523  WRCHECKF
70572  WRITF

   LDTA
       NONE

   COMM
       NONE

   DATA
       NONE

   PEXT
       NONE
RUN
LISA/MSOS HAS BEEN INSTALLED ON THIS LIBRARY.

I FTNO 0060  STOP
EOJ

I SYS 400 00/00/14          L=       67 C=        0
```

```
SEQUENCE,026                                            ** SEQ= 026 **   MSOS V5.0 ED=81 D=01/17/74 T=14/40/22.
JOB,,TAPE-SORT,,
EQUIP,10=MT,11=MT,12=MT
COBOL,L,X
```

```
3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY               / /      000000      PAGE    0001

            LENGTH OF   VERIFY     00064
            LENGTH OF   COMMON     00476
            LENGTH OF   DATA       00044

                ENTRY-POINT SYMBOLS
                        XVERIFY    00000
```

```
3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY               / /      000000      PAGE    0002

            IDENTIFICATION DIVISION.
            PROGRAM-ID. VERIFY.
            REMARKS.
                THE PURPOSE OF THIS PROGRAM IS TO VERIFY THE PRESENCE
                    OF THE TAPE SORT PRODUCT
                    ON THE MSOS LIBRARY.
            ENVIRONMENT DIVISION.
            CONFIGURATION SECTION.
            SOURCE-COMPUTER. 3300.
            OBJECT-COMPUTER. 3300.
            SPECIAL-NAMES.
                SYSTEM-OUTPUT-TAPE IS OUT.
            INPUT-OUTPUT SECTION.
            FILE-CONTROL.
                SELECT DSK ASSIGN TO TAPE 12.
```

```
3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY               / /      000000      PAGE    0003

            DATA DIVISION.

            FD DSK
                    BLOCK 504 CHARACTERS
                    LABEL RECORDS ARE OMITTED
                    DATA RECORD OUT-REC.
            01 OUT-REC.                                         C00027
            02 FLD-1 PICTURE X(4).                              C00027
            02 KEY PICTURE 9(10).                               C00030
            02 FLD-2 PICTURE X(154).                            C000322

            WORKING-STORAGE SECTION.
            77 N COMPUTATIONAL-1.                               C00475
```

```
3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY                        / /       000000      PAGE    0004

      00000 PROCEDURE DIVISION.

      00000 AMGANG.
      00001       MOVE      #WXYZ#
      00001       TO FLD-1.
      00004       MOVE 999 TO KEY.
      00007       MOVE 1 TO N.
      00011       MOVE ALL      #JKLMN#
      00011       TO FLD-2.
      00015       OPEN OUTPUT DSK.

      00024 PAR-1.
      00024       WRITE OUT-REC.
      00031       SUBTRACT 1 FROM KEY.
      00034       ADD 1 TO N
      00037       IF N GREATER 500
      00042       GO TO EOJ.
      00043       IF KEY LESS 499
      00056       GO TO EOJ.
      00057       GO TO PAR-1.

      00060 EOJ.
      00060       CLOSE DSK.
      00062       STOP RUN.

      00063 END PROGRAM


3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY                        / /       000000      PAGE    0005

            NUMBER OF DIAGNOSTICS  0000
           EXTERNAL SYMBOLS
                        MPUT
                        MOPENF
                        MCLOSEF
                        MVFIGCON


LOAD,56,M
```

```
 M 55

    SUBP
74311  ZIPPER       74415  MVFIGCON     74442  MSIOMAIN     77713  VERIFY

    ENTR
13634  BCDBOXS      13634  FDPBOXS      77516  MBERRORF     76557  MCHECKPT     75711  MCLOSEF      75065  MGET
76214  MLOCATE      75260  MOPENF       77527  MPAUSEF      74557  MPUTADDR     75106  MPUT         75610  MRBTDBOZ
75630  MRDTBBOZ     75143  MREADF       75251  MRELSE       75017  MUNSTDLB     74415  MVFIGCON     75151  MWRITEF
74402  NUZIPPER     77527  PAUSE        74554  SEQUSER      77713  XVERIFY      74371  ZIPAADD      74374  ZIPALEN
74377  ZIPAPOI      74366  ZIPB2        74367  ZIPB3        74372  ZIPBADD      74375  ZIPBLEN      74400  ZIPBPOI
74373  ZIPCADD      74376  ZIPCLEN      74401  ZIPCPOI      74365  ZIPNORM      74324  ZIPPER

    LDTA
        NONE

    COMM
04627    05324

    DATA
77647  NONE

    PEXT
        NONE
RUN
SORT
    01122211R 101112                          1100100005
    1ISI01680504F       CM12  01X
    1B 001680504F       CM      X
    9ENDSORT
 I TSRT 213 B   INTERNAL MERGE IP LOG UNITS
10,11.
 I TSRT 214 B   INTERNAL MERGE OP LOG UNITS
12.
 A TSRT 323 B   UNIT 12 FOR SORT IP.
 I TSRT 239 B   IB 126      OB 1974      G 564
 A TSRT 303 B   UNIT 12.    MOUNT SCRATCH.
 I TSRT 222 B        500  IN
 I TSRT 223 B        500 OUT
 I TSRT 232 B          1 SEQ
 I TSRT 236 B   FINAL MERGE
 A TSRT 305 B   UNIT 12.    MOUNT O/P TAPE.
 I TSRT 216 B   UNIT 12.    FINAL OUTPUT.  REEL  01.
 I TSRT 222 B        500 IN
 I TSRT 223 B        500 OUT
EOJ

I SYS 400 00/02/24          L=      115 C=        0
```

```
SEQUENCE,027
JOB,ALGOL,,,                                                                    ** SEQ= 027 **   MSOS V5.0 ED=81 D=01/17/74 T=14/42/58.
ALGOL,L,X




ALGOL(1.5)/MSOS(5.0)              VERIFY.                          01/17/74     14/42/58        PAGE   1

   0** VERIFY.
                 THIS PROGRAM IS INTENDED TO VERIFY THE PRESENCE OF THE
                        ALGOL PRODUCT ON THE MSOS LIBRARY.
      #BEGIN#
      OUTPUT(61,#(#//,#(# ALGOL PRODUCT VERIFICATION COMPLETED#)##)#).,
      #END#
               #EOP#
               FINIS




ALGOL(1.5)/MSOS(5.0)              VERIFY.                          01/17/74     14/42/58        PAGE   1***
                  LINE 0003    PROGRAM BEGINS                      (01)
                  LINE 0005    PROGRAM ENDS                        (01)
                  LINE 0005    SOURCE DECK ENDS                    (01)




LOAD,56,M
```

```
 M 55

   SUBP
63006  ALGLIB00     65700  ALGLIB06     66664  ALGLIB02     74620  ALGOLRUN     76777  VERIFY.

   ENTR
63006  ALGLIB00     66664  ALGLIB02     65700  ALGLIB06     74620  ALGOLRUN     13634  BCDBOXS      13634  FDPBOXS
76777  VERIFY.

   LDTA
       NONE

   COMM
00013   00013

   DATA
76477  NONE

   PEXT
       NONE
RUN
   CHANNEL,60=LU60,P80
   CHANNEL,61=LU61,P136,PP60
   CHANNEL,END



 ALGOL PRODUCT VERIFICATION COMPLETED



END OF ALGOL RUN
EOJ

I SYS 400 00/00/11 ALGOL    L=       44 C=        0
```

```
SEQUENCE,028
JOB,COSY,,                                                        ** SEQ= 028 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/43/10.
COSY


  COSY V3.3     - MSOS V5.0    01/17/74
   VERIFY   DECK/      H,L
            THE PURPOSE OF THIS PROGRAM IS TO VERIFY THE PRESENCE OF THE      00001 000
                     COSY PRODUCT ON THE MSOS LIBRARY.                        00002
   *                                                                          00003
     COSY PRODUCT VERIFICATION COMPLETED                                      00004
            ENDCOSY/
EOJ

I SYS 400 00/00/04 COSY     L=      11 C=        0
```

```
SEQUENCE,029
JOB,FORTRAN,,                                                              ** SEQ= 029 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/43/15.
FORTRAN,L,X


      MS FORTRAN  (4.3) / MSOS                          01/17 74            PAGE 001
            PROGRAM VERIFY
      C
      C     THE PURPOSE OF THIS PROGRAM IS TO VERIFY THE PRESENCE OF THE
      C         MS FORTRAN PRODUCT
      C         ON THE MSOS LIBRARY.
      C
       1000 FORMAT (43H0 MS FORTRAN PRODUCT VERIFICATION COMPLETED)
            PRINT 1000
            END
                   FORTRAN DIAGNOSTIC RESULTS  FOR     VERIFY

NO ERRORS
```

```
LOAD,56,M



 M 55

   SUBP
73303  Q8QERROR     73546  CIO.MSIO     74225  FORMAT       74643  CONTROL      76103  BCDOUT       77747  VERIFY

   ENTR
13634  BCDBOXS      73546  CIO.MSIO     73504  ERRMES       13634  FDPBOXS      75710  IO.REJ       75706  PROGNAME
75757  PWRTBL0      75761  PWRTBL       75036  Q8QARRAY     75675  Q8QBCDWT     75665  Q8QCONVT     75374  Q8QEDBIN
75377  Q8QEDITS     76740  Q8QENGOT     74643  Q8QENTRY     74022  Q8QEOFRC     73303  Q8QERROR     74646  Q8QEXITS
74263  Q8QFORMT     74205  Q8QFOTAB     74225  Q8QIFRMT     75745  Q8QINFMS     76103  Q8QINGOT     75076  Q8QIOERR
74776  Q8QIOSET     75212  Q8QIOSVB     75016  Q8QIOTAB     76206  Q8QLGOTC     76214  Q8QLGOTI     76221  Q8QLGOTR
75320  Q8QMSIO      74644  Q8QOUTTB     75732  Q8QRJMES     74760  Q8QSENSE     73421  Q9QERROR     74643  UTESUMIT
77764  VERIFY

   LDTA
       NONE

   COMM
       NONE

   DATA
       NONE

   PEXT
       NONE
RUN

 MS FORTRAN PRODUCT VERIFICATION COMPLETED
EOJ

I SYS 400 00/00/10 FORTRAN  L=      43 C=        0
```

```
SEQUENCE,030
JOB,COMPASS,,
COMPASS,L,R,X
                                              ** SEQ= 030 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/43/26.

 COMPASS 3.3/MSOS 5.0          CHECKCOM                         01/17/74  PAGE     1


 EXTERNAL SYMBOLS
     CIO


 ENTRY-POINT SYMBOLS
     TOP              00000


 LENGTH OF SUBPROGRAM       00050
 LENGTH OF COMMON           00000
 LENGTH OF DATA             00000
```

```
COMPASS 3.3/MSOS 5.0          CHECKCOM                                                01/17/74  PAGE    2
                                               EXT       CIO
                                               ENTRY     TOP
     00000  01077777 01 0  77777 0  TOP        UJP       **
     00001  00777777 00 1 X77777 3             RTJ       CIO                PRINT MESSAGE
     00002  02000075 02 0  00075 0             02        61                 LUN 61
     00003  01000001 01 0 P00001 0             UJP       *-2                REJECT
     00004  00000022 00 0 P00022 0             00        MESSAGE1           FWA
     00005  00000013 00 0  00013 0                       11                 NUMBER OF WORDS
     00006  00700001 00 1 X00001 3             RTJ       CIO                TYPE MESSAGE
     00007  02000073 02 0  00073 0             02        59                 LUN 59
     00010  01000006 01 0 P00006 0             UJP       *-2                REJECT
     00011  00000035 00 0 P00035 0             00        MESSAGE2           FWA
     00012  00000013 00 0  00013 0                       11                 NUMBER OF WORDS
     00013  00700006 00 1 X00006 3             RTJ       CIO                GET STATUS
     00014  13000075 13 0  00075 0             13        61                 LUN 61
     00015  03200013 03 0 P00013 2             AZJ,GE    *-2                BUSY
     00016  00700013 00 1 X00013 3             RTJ       CIO                GET STATUS
     00017  13000073 13 0  00073 0             13        59                 LUN 59
     00020  03200016 03 0 P00016 2             AZJ,GE    *-2                BUSY
     00021  01400000 01 1 P00000 0             UJP,I     TOP
     00022        60234644          MESSAGE1 BCD         11, COMPASS HAS BEEN INSTALLED ON THIS LIBRARY.
     00023        47216262
     00024        60302162
     00025        60222525
     00026        45603145
     00027        62632143
     00030        43252460
     00031        46456063
     00032        30316260
     00033        43312251
     00034        21517033
     00035        77234644          MESSAGE2 BCD         11,^COMPASS HAS BEEN INSTALLED ON THIS LIBRARY.
     00036        47216262
     00037        60302162
     00040        60222525
     00041        45603145
     00042        62632143
     00043        43252460
     00044        46456063
     00045        30316260
     00046        43312251
     00047        21517033
                                               END       TOP

                                              NUMBER OF LINES WITH DIAGNOSTICS        0
```

```
COMPASS 3.3/MSOS 5.0          CHECKCOM                                         01/17/74  PAGE     1

     CIO                       EXTERNAL           P00001          P00006          P00013          P00016
     MESSAGE1    P00022                           P00004
     MESSAGE2    P00035                           P00011
     TOP         P00000                           P00021



LOAD.56,M




 M 55

   SUBP
77727  CHECKCOM

   ENTR
13634  BCDBOXS      13634  FDPBOXS      77727  TOP

   LDTA
      NONE

   COMM
      NONE

   DATA
      NONE

   PEXT
      NONE
RUN
COMPASS HAS BEEN INSTALLED ON THIS LIBRARY.
EOJ

I SYS 400 00/00/11 COMPASS  L=      99 C=        0
```

```
SEQUENCE,031                                                              ** SEQ= 031 **   MSOS V5.0 ED=81 D=01/17/74 T=14/43/38.
JOB,MSCOBOL,,
COBOL,L,X


   3300 MS COBOL BDP VER 4.3 FOR MSOS          MS-COBOL                 / /      000000      PAGE    0001

             LENGTH OF   MS-COBOL    00024
             LENGTH OF   COMMON      00161
             LENGTH OF   DATA        00053

                 ENTRY-POINT SYMBOLS
                         XMS-COBO    00000


   3300 MS COBOL BDP VER 4.3 FOR MSOS          MS-COBOL                 / /      000000      PAGE    0002

             IDENTIFICATION DIVISION.
             PROGRAM-ID. MS-COBOL-VERIFICATION.
             AUTHOR. PRODUCT-TEST.
             REMARKS.
                 THIS PROGRAM IS INTENDED TO VERIFY THE PRESENCE
                     OF THE MS COBOL PRODUCT
                     ON THE MSOS LIBRARY.
             ENVIRONMENT DIVISION.
             CONFIGURATION SECTION.
             SOURCE-COMPUTER. 3300.
             OBJECT-COMPUTER. 3300.
             INPUT-OUTPUT SECTION.
             FILE-CONTROL.
                 SELECT PRINT ASSIGN TO SYSTEM-OUTPUT-TAPE.


   3300 MS COBOL BDP VER 4.3 FOR MSOS          MS-COBOL                 / /      000000      PAGE    0003

             DATA DIVISION.
             FILE SECTION.

             FD PRINT
                     LABEL RECORDS ARE OMITTED
                     DATA RECORD IS LIN.
             01 LIN PICTURE X(120).                                 C00027
```

```
3300 MS COBOL BDP VER 4.3 FOR MSOS          MS-COBOL                          / /       000000      PAGE     0004

      00000 PROCEDURE DIVISION.

      00000 THE-ONLY SECTION.

      00001 P-1.
      00001      OPEN OUTPUT PRINT.
      00010      MOVE     #0 MS COBOL PRODUCT VERIFICATION COMPLETED#
      00010      TO LIN.
      00013      WRITE LIN.
      00020      CLOSE PRINT.
      00022      STOP RUN.

      00023 END PROGRAM.


3300 MS COBOL BDP VER 4.3 FOR MSOS          MS-COBOL                          / /       000000      PAGE     0005

            NUMBER OF DIAGNOSTICS  0000
           EXTERNAL SYMBOLS
                         MPUT
                         MOPENF
                         MCLOSEF
```

```
LOAD,56,M


 M 55

   SUBP
74473  MSIOMAIN     77753  MS-COBOL

   ENTR
13634  BCDBOXS      13634  FDPBOXS      77547  MBERRORF     76610  MCHECKPT     75742  MCLOSEF      75116  MGET
76245  MLOCATE      75311  MOPENF       77560  MPAUSEF      74610  MPUTADDR     75137  MPUT         75641  MRBTDBOZ
75661  MRDTBBOZ     75174  MREADF       75302  MRELSE       75050  MUNSTDLB     75202  MWRITEF      77560  PAUSE
74605  SEQUSER      77753  XMS-COBO

   LDTA
       NONE

   COMM
04627   05007

   DATA
77700  NONE

   PEXT
       NONE
RUN

 MS COBOL PRODUCT VERIFICATION COMPLETED
EOJ

I SYS 400 00/00/15 MSCOBOL  L=       72 C=        0
```

```
SEQUENCE,032
JOB,UCBL,,,                                                    ** SEQ= 032 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/43/54.
UCBL,L,X
```

1

```
USASI COBOL 2.1/MSOS 5.0          USASI-COBOL-VERIFICATION          01/17/74          PAGE     1

                          IDENTIFICATION DIVISION.
                          PROGRAM-ID. USASI-COBOL-VERIFICATION.
                          AUTHOR. PRODUCT-TEST.
                          REMARKS.
                              THIS PROGRAM IS INTENDED TO VERIFY THE PRESENCE
                                  OF THE USASI COBOL PRODUCT
                                  ON THE MSOS LIBRARY.
                          ENVIRONMENT DIVISION.
                          CONFIGURATION SECTION.
                          SOURCE-COMPUTER. 3300.
                          OBJECT-COMPUTER. 3300.
                          INPUT-OUTPUT SECTION.
                          FILE-CONTROL.
                              SELECT PRINT ASSIGN TO SYSTEM-OUTPUT.
```

```
USASI COBOL 2.1/MSOS 5.0          USASI-COBOL-VERIFICATION          01/17/74          PAGE     2

                          DATA DIVISION.
                          FILE SECTION.
                          FD PRINT LABEL RECORDS ARE OMITTED DATA RECORD IS LIN.
            C00010        01  LIN PICTURE X(120).
```

```
USASI COBOL 2.1/MSOS 5.0          USASI-COBOL-VERIFICATION          01/17/74          PAGE     3

                          PROCEDURE DIVISION.
                          THE-ONLY SECTION.
                          P-1. OPEN OUTPUT PRINT.
                              MOVE ≠0 USASI COBOL PRODUCT VERIFICATION COMPLETED≠ TO LIN.
                              WRITE LIN. CLOSE PRINT. STOP RUN.
                          END PROGRAM
```

```
USASI COBOL 2.1/MSOS 5.0              USASI-COBOL-VERIFICATION              01/17/74           PAGE     4
   LENGTH OF   XUSASI-C                     32
   LENGTH OF   OBJECT-TIME ROUTINES
   LENGTH OF   NUMBERED COMMON             136
   LENGTH OF   DATA                         73
   LENGTH OF   COMMON STORAGE


   ENTRY POINT

       XUSASI-C   00001


   EXTERNAL

       MPUT
       MOPENF
       MCLOSEF
       ABNORMAL
   0 ERRORS IN VERIFICA


LOAD,56,M



 M 55

   SUBP
74445  MSIOMAIN     77745  XUSASI-C

   ENTR
77652  %USASI-C     13634  BCDBOXS      13634  FDPBOXS      77665  .USASI-C     77521  MBERRORF     76562  MCHECKPT
75714  MCLOSEF      75070  MGET         76217  MLOCATE      75263  MOPENF       77532  MPAUSEF      74562  MPUTADDR
75111  MPUT         75613  MRBTDBOZ     75633  MRDTBBOZ     75146  MREADF       75254  MRELSE       75022  MUNSTDLB
75154  MWRITEF      77532  PAUSE        74557  SEQUSER      13634  UFP2FPE      77746  XUSASI-C

   LDTA
77652  %USASI-C     77665  .USASI-C

   COMM
04627   04764

   DATA
       NONE

   PEXT
       NONE
RUN

 USASI COBOL PRODUCT VERIFICATION COMPLETED
EOJ

I SYS 400 00/00/15 UCBL     L=       78 C=        0
```

```
SEQUENCE,033
JOB,UFORTRAN,,,                                              ** SEQ= 033 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/44/10.
UFORTRAN,L,X


     ANSI FORTRAN(1.2)/MSOS 5.0    INTEGER WORD SIZE = 2                 DATE    01/17/74        PAGE     001

                 PROGRAM VERIFY
          C
          C      THE PURPOSE OF THIS PROGRAM IS TO VERIFY THE PRESENCE OF THE
          C          USASI FORTRAN PRODUCT
          C          ON THE MSOS LIBRARY.
          C
                 WRITE (61,1000)
            1000 FORMAT (46H0 USASI FORTRAN PRODUCT VERIFICATION COMPLETED)
                 END

        USASI FORTRAN DIAGNOSTIC RESULTS FOR VERIFY

             NO ERRORS


LOAD,56,M
```

```
 M 55

   SUBP
66613  UFUTIL      66753  Q.ADDD      70142  UFSELECT    70422  Q.ERROR     70611  UFIO        73735  UFIOUTIL
75551  UFBCDOUT    77731  Q.IODONE    77744  VERIFY

   ENTR
13634  BCDBOXS     70337  CANARFLT    70331  CANDVFLT    70334  CANEXPOV    74437  D.WIDTH     74644  ERR.10
74646  ERR.11      74650  ERR.12      74652  ERR.13      74654  ERR.14      74621  ERR.1       74623  ERR.2
74626  ERR.3       74630  ERR.4       74632  ERR.5       74634  ERR.6       74636  ERR.7       74640  ERR.8
74642  ERR.9       70313  EXPFLAG     13634  FDPBOXS     77751  FTN.RTRN    70211  IARFLT      70301  IDVCHK
70245  IEXFLT      72362  IFEOF       72330  IFPAR       74463  LSHFTCT.    74744  MESS.1      67025  P.ADDD
67713  P.DVDD      67524  P.MUDD      71470  PROGNAME    72103  Q9QBKSP     72202  Q9QEOF      72042  Q9QREWND
70154  Q9QSLECT    74375  Q.1         74376  Q.2         74377  Q.3         74400  Q.4         74401  Q.5
74402  Q.7         74403  Q.8         75670  Q.ABCOT     72006  Q.ABTIO     67025  Q.ADDD      66716  Q.ADDRES
66621  Q.ARGADR    70126  Q.ARGMAD    66614  Q.ARGMN2    66620  Q.ARGMNT    70166  Q.ARITH     66644  Q.BARGAD
66637  Q.BARGM2    66645  Q.BARGMN    66636  Q.BC2ADD    73441  Q.BCDDSI    71316  Q.BFFMSI    72103  Q.BKSP
73430  Q.BUFEND    73230  Q.BUFFER    66622  Q.C2DATA    73432  Q.CALADR    74362  Q.CALPAR    74446  Q.CCB
71220  Q.CCRSV     71424  Q.CIOWT     71174  Q.CKEOF     71322  Q.CLDATA    73763  Q.CLWRDS    74743  Q.CODE
67430  Q.COMP      71221  Q.CONDSI    75736  Q.CXAOT     75721  Q.CXEOT     74324  Q.DBLADD    74457  Q.DBLFLG
70256  Q.DIVD      67717  Q.DIVIDD    74245  Q.DLLSHF    74311  Q.DLRSHF    74230  Q.DLSHIF    67031  Q.DOUBAD
70614  Q.DSICK     73442  Q.DSI       67713  Q.DVDD      75660  Q.EBCOT     72202  Q.EOF       71252  Q.EOR
70422  Q.ERROR     70313  Q.EXPFLG    70222  Q.EXP       74447  Q.FCB       74451  Q.FCF       75113  Q.FINIT
70401  Q.FLTRT     74435  Q.FORADR    74434  Q.FORCDE    75156  Q.FSCAN     75147  Q.FTERM     73434  Q.FWA
74405  Q.GETPAR    74017  Q.HARRAY    73446  Q.HISTAR    75573  Q.IBCOT     75623  Q.IENC      66617  Q.INDEX1
74454  Q.INTGER    77744  Q.INTSIZ    77731  Q.IODONE    70703  Q.IOWAIT    77737  Q.IOYET     74450  Q.LCB
74452  Q.LCF       74453  Q.M1        74454  Q.M2        74455  Q.M3        74456  Q.M4        74453  Q.MANTIS
73443  Q.MODE      74453  Q.M         71644  Q.MSIOWT    67524  Q.MUDD      67530  Q.MULTDD    71256  Q.NOP
77745  Q.NUSASI    70342  Q.OCTBCD    75774  Q.OTBCD     73750  Q.OUT       71235  Q.POINTD    73444  Q.PONTER
73756  Q.RESTB     72042  Q.REWND     73437  Q.RTNAME    66615  Q.SAVAQ     73751  Q.SAVEB     73745  Q.SB1
74440  Q.SCALE     66646  Q.SET       66717  Q.SETTO     74462  Q.SHFTCT    75562  Q.SOUT      75551  Q.SPUN
73735  Q.SVEREG    74455  Q.SWORD     74006  Q.TMES10    74441  Q.TYPE      72415  Q.TYPIO     73433  Q.UNNAME
74443  Q.VADR      74436  Q.WIDTH     74442  Q.WORDS     74161  Q.WS1       74162  Q.WS2       74163  Q.WS3
74164  Q.WS4       74165  Q.WS5       74166  Q.WS6       70223  Q.XABORT    70325  SELARFLT    70315  SELDVFLT
70321  SELEXPOV    66626  SIMACC.0    66627  SIMACC.1    66630  SIMACC.2    66631  SIMACC.3    73775  TIMES.10
77746  VERIFY      70223  XABORT

   LDTA
       NONE

   COMM
       NONE

   DATA
       NONE

   PEXT
       NONE
RUN

 USASI FORTRAN PRODUCT VERIFICATION COMPLETED
EOJ

I SYS 400 00/00/13 UFORTRAN L=       68 C=         0
```

```
SEQUENCE,034
JOB,UTILITY,,,                                                              ** SEQ= 034 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/44/23.
UTILITY,60,61
I UTIL 000 BEGIN UTILITY
COPY,60,61,,1
I UTIL 100 MAX REC SIZE 35506B
MSOS UTILITY IS INSTALLED ON THIS LIBRARY
I UTIL 110       1 BCD RECORDS COPIED
I UTIL 011 TASK COMPLETED
D UTIL 005 EOF ON CTL
D SYS 029 CTL CD ERROR
EOJ

I SYS 400 00/00/04 UTILITY  L=       12 C=         0
```

```
SEQUENCE,035                                           ** SEQ= 035 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/44/28.
JOB,,MSSORT,,
FET,QA,VERIFICATION,512,01,QAQA
ALLOCATE,10
FET,QA,INT1,512,01,QAQA,QAQA
ALLOCATE,10
FET,QA,INT2,512,01,QAQA,QAQA
ALLOCATE,10
EOJ

I SYS 400 00/00/03        L=       7 C=       0


SEQUENCE,036                                           ** SEQ= 036 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/44/32.
JOB,,MSSORT,,
FET,QA,INT1,512,01,QAQA,QAQA
OPEN,01
FET,QA,INT2,512,01,QAQA,QAQA
OPEN,02
COBOL,L,X


  3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY                 / /       000000      PAGE    0001

             LENGTH OF    VERIFY      00065
             LENGTH OF    COMMON      00524
             LENGTH OF    DATA        00061

                 ENTRY-POINT SYMBOLS
                         XVERIFY      00000


  3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY                 / /       000000      PAGE    0002

             IDENTIFICATION DIVISION.
             PROGRAM-ID. VERIFY.
             REMARKS.
                 THE PURPOSE OF THIS PROGRAM IS TO VERIFY THE PRESENCE
                     OF THE MS SORT PRODUCT
                     ON THE MSOS LIBRARY.
             ENVIRONMENT DIVISION.
             CONFIGURATION SECTION.
             SOURCE-COMPUTER. 3300.
             OBJECT-COMPUTER. 3300.
             SPECIAL-NAMES.
                 SYSTEM-OUTPUT-TAPE IS OUT.
             INPUT-OUTPUT SECTION.
             FILE-CONTROL.
                 SELECT DSK ASSIGN TO DISK 45.
```

```
3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY                    / /       000000      PAGE     0003

          DATA DIVISION.

          FD DSK
                 BLOCK 504 CHARACTERS
                 LABEL RECORD STANDARD VALUE OF ID
             #VERIFICATION#
                 OWNER
             #QA#
                 EDITION-NUMBER 01
                 ACCESS-SECURITY
             #QAQA#
                 DATA RECORD OUT-REC.
          01 OUT-REC.                                                   C00052
          02 FLD-1 PICTURE X(4).                                        C00052
          02 KEY PICTURE 9(10).                                         C00053
          02 FLD-2 PICTURE X(154).                                      C000552


3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY                    / /       000000      PAGE     0004

     00000 PROCEDURE DIVISION.

     00000 AMGANG.
     00001     MOVE      #WXYZ#
     00001     TO FLD-1.
     00004     MOVE 999 TO KEY.
     00007     MOVE ALL      #JKLMN#
     00007     TO FLD-2.
     00013     OPEN OUTPUT DSK.

     00022 PAR-1.
     00022     WRITE OUT-REC INVALID
     00030     CLOSE DSK
     00032     DISPLAY  # INVALID#   UPON OUT
     00040     STOP RUN.
     00041     SUBTRACT 1 FROM KEY.
     00044     IF KEY LESS 900
     00057     GO TO EOJ.
     00060     GO TO PAR-1.

     00061 EOJ.
     00061     CLOSE DSK.
     00063     STOP RUN.

     00064 END PROGRAM


3300 MS COBOL BDP VER 4.3 FOR MSOS          VERIFY                    / /       000000      PAGE     0005

          NUMBER OF DIAGNOSTICS  0000
         EXTERNAL SYMBOLS
                    MPUT
                    MOPENF
                    MCLOSEF
                    DISPLAY
                    DISPLAYS
                    MVFIGCON
```

```
LOAD,56,M



 M 55

   SUBP
73333  TYPELOOP      73440  LOGICAL       73720  DISPLAY       74273  ZIPPER        74377  MVFIGCON      74424  MSIOMAIN
77712  VERIFY

   ENTR
13634  BCDBOXS       74140  DISPLAY       73721  DISPLAYS      13634  FDPBOXS       73442  IRCOVER       73364  KEYWORD
77500  MBERRORF      76541  MCHECKPT      75673  MCLOSEF       75047  MGET          76176  MLOCATE       75242  MOPENF
77511  MPAUSEF       74541  MPUTADDR      75070  MPUT          75572  MRBTDBOZ      75612  MRDTBBOZ      75125  MREADF
75233  MRELSE        75001  MUNSTDLB      74377  MVFIGCON      75133  MWRITEF       74364  NUZIPPER      77511  PAUSE
73644  RAARREJ       74536  SEQUSER       73333  TYPELOOP      77712  XVERIFY       74353  ZIPAADD       74356  ZIPALEN
74361  ZIPAPOI       74350  ZIPB2         74351  ZIPB3         74354  ZIPBADD       74357  ZIPBLEN       74362  ZIPBPOI
74355  ZIPCADD       74360  ZIPCLEN       74363  ZIPCPOI       74347  ZIPNORM       74306  ZIPPER

   LDTA
       NONE

   COMM
04627   05352

   DATA
77631  NONE

   PEXT
       NONE
RUN
FET,QA,VERIFICATION,512,01,QAQA
OPEN,45,0
MSSORT
   0110111                  5100100005
   1ADS01680512F      45
   1CIT01680512F      01QA      INT1                            01QAQAQAQA
   1DIT01680512F      02QA      INT2                            01QAQAQAQA
   1BD001680512F      45QA      VERIFICATION                    01QAQA    S
   9ENDMSS
I MSRT 111  B       100  IN
I MSRT 114  B       100 OUT
I MSRT 115  B         1 SEQ
I MSRT 120  B   FINAL MERGE
I MSRT 111  B       100 IN
I MSRT 114  B       100 OUT
EOJ

I SYS 400 00/00/50          L=      120 C=        0
```

```
SEQUENCE,037
JOB,,MSSORT,,
FET,QA,VERIFICATION,512,01,QAQA
RELEASE,ALL
FET,QA,INT2,512,01,QAQA,QAQA
RELEASE,ALL
FET,QA,INT1,512,01,QAQA,QAQA
RELEASE,ALL
ENDSCOPE,R

I SYS 400 00/00/02          L=         7 C=          0
```

```
** SEQ= 037 **   MSOS V5.0 ED=B1 D=01/17/74 T=14/45/22.
```

SYSTEM SCRATCH FILES 7

7.1 ALLOCATION OF FILES 54, 55, AND 56

Table II-7-6 defines the system scratch file usage.

Users of 863 interim library should release and reallocate files 54 and 56 on the far extremity of the drum unit to provide the contiguous space necessary for PRELIB execution. (Refer to example 3.) Other users may use the same procedure. Scratch files 54 and 55 and load-and-go file 56 are not restricted to the system device. The placement and size of these files is installation-dependent. As installed, files 54, 55, and 56 immediately follow MSOS system files and are allocated for 1 track each.

Since files 54 and 56 can be on any available mass storage device maintained by the system, PRELIB cannot arbitrarily release and reallocate these files. Before a PRELIB run, the user should release any of these files that occur on the system device and restore them after the PRELIB run. If file 54, 55, or 56 occurs on a device other than the system device, it need not be released prior to a PRELIB run as long as enough disk space remains to satisfy the requirements of PRELIB (16,000 segments).

The following are examples of jobs that release and reallocate files 54 to 56.

1. Assume that files 54, 55, and 56 are on the system pack. The following job releases them and allocates file 55 on a scratch pack for use by PRELIB. The scratch pack is 854/2. File 55 must contain at least 500 blocks.

```
$JOB,,,
$RAT,854/2
$CLOSE,54
$FET,MSOS,FILE54,512,00,0000,0000
$RELEASE,ALL
$ALLOCATE,100
$CLOSE,56
$FET,MSOS,FILE56,960,00,0000,0000
$RELEASE,ALL
$ALLOCATE,100
$CLOSE,55
$FET,MSOS,FILE55,512,00,0000,0000
$ALLOCATE,64,999999
77
88 end-of-file
```

NOTE

ANSI FORTRAN requires file 55 to be at least 1600 blocks.

2. After the deck and PRELIB have run, assume the previous environment. This example allocates files 54 and 56 on the system pack and leaves file 55 on scratch device 854/2. This job assumes the device number of the system device is 8541.

```
$JOB,,,
$RAT,854/8541
$CLOSE,54
$FET,MSOS,FILE54,512,00,0000,0000
$RELEASE,ALL
$ALLOCATE,100,991230
$CLOSE,56
$FET,MSOS,FILE56,960,00,0000,0000
$RELEASE,ALL
$ALLOCATE,130,991230
77
88 end-of-file
```

3. The following job releases the system scratch files and reallocates them on the most extreme tracks.

```
$JOB,,,
$CLOSE,54
$FET,MSOS,FILE54,512,00,0000,0000
$RELEASE,ALL
$CLOSE,55
$FET,MSOS,FILE55,512,00,0000,0000
$RELEASE,ALL
$CLOSE,56
$RAT,854/8541
$FET,MSOS,FILE56,960,00,0000,0000
$RELEASE,ALL
$FET,DUMMY,TEMPORARY,4096
$ALLOCATE,xxx,000001†
$FET,MSOS,FILE55,512,00,0000,0000
$ALLOCATE,64,999999
$OPEN,55
$FET,MSOS,FILE54,512,00,0000,0000
$ALLOCATE,1
```

---

†xxx = the number of free tracks beyond the OCAREM and library files minus two tracks for files 54 and 56, and 64 tracks for file 55.

```
$OPEN, 54
$FET, MSOS, FILE56, 960, 00, 0000, 0000
$ALLOCATE, 1
$OPEN, 56
$FET, DUMMY, TEMPORARY, 4096
$RELEASE, ALL
77
88 end-of-file
$EOJ
```

7.2 UTILIZATION OF SYSTEM SCRATCH FILES

TABLE II-7-6. SYSTEM SCRATCH FILE USAGE

	FILE54	FILE55	FILE56
COSY	Used as default for H parameter on DECK/card	Used only if additional space is required for corrections	
COMPASS		Work area	Used only if X or G is specified on $COMPASS card
MS COBOL	Work area	Work area	Used only if X or G is specified on $COBOL card.
UCBL	Default value for S parameter on $UCBL card	Work area	Used only if X or G is specified on $UCBL card
MS FORTRAN		Work area	Work area; load-and-go if X or G is specified
UFTN		Work area	Used only if X or G is specified
ALGOL		Work area	Used only if X or G is specified

COMPASS OVERLAY PREPARATION 8

Figures II-8-1 and II-8-2 illustrate the layout of core and deck structures for the COMPASS assembler. Whenever a $COMPASS card is encountered, COMPASSB is loaded in high core. COMPASSB loads COMPASS (the main subprogram) and then passes control to COMPASS. COMPASS controls the assembly process and calls the overlays, OVERLAY1, PASSONE, PASSTWO, and CRT for each deck assembled.

COMPASS also contains the common routines available to each of the overlays. These are linked to the overlays by externals which appear at the beginning of each deck.

The offset parameters on the $^{7}_{9}$ORIGIN cards for COMPASS associated decks should not be changed.

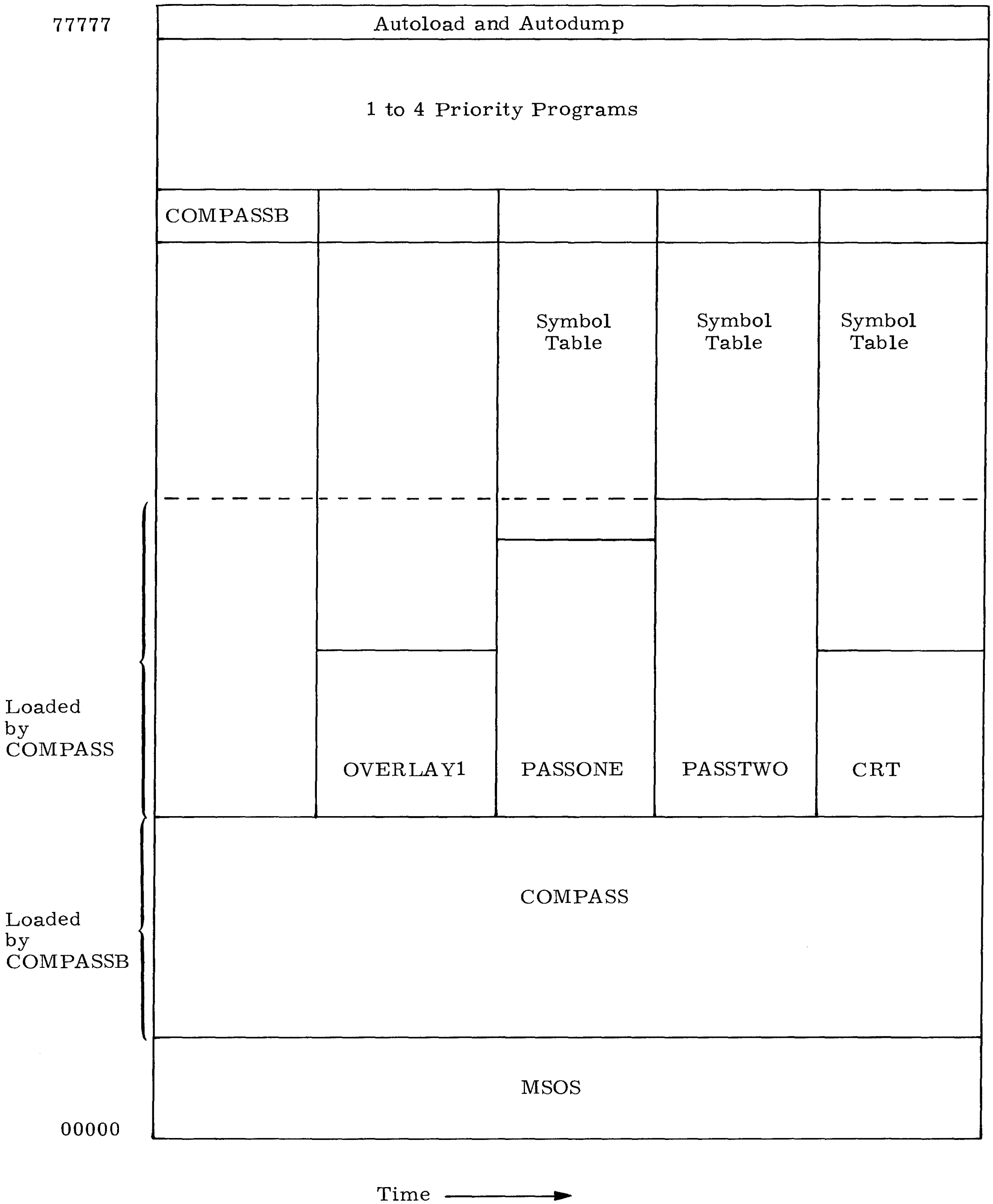


Figure II-8-1. Contents of Core During COMPASS Assembly

P1 - Value of $^{7}_{9}$ORIGIN card parameter for the OVERLAY1, PASSONE, PASSTWO, and CRT decks

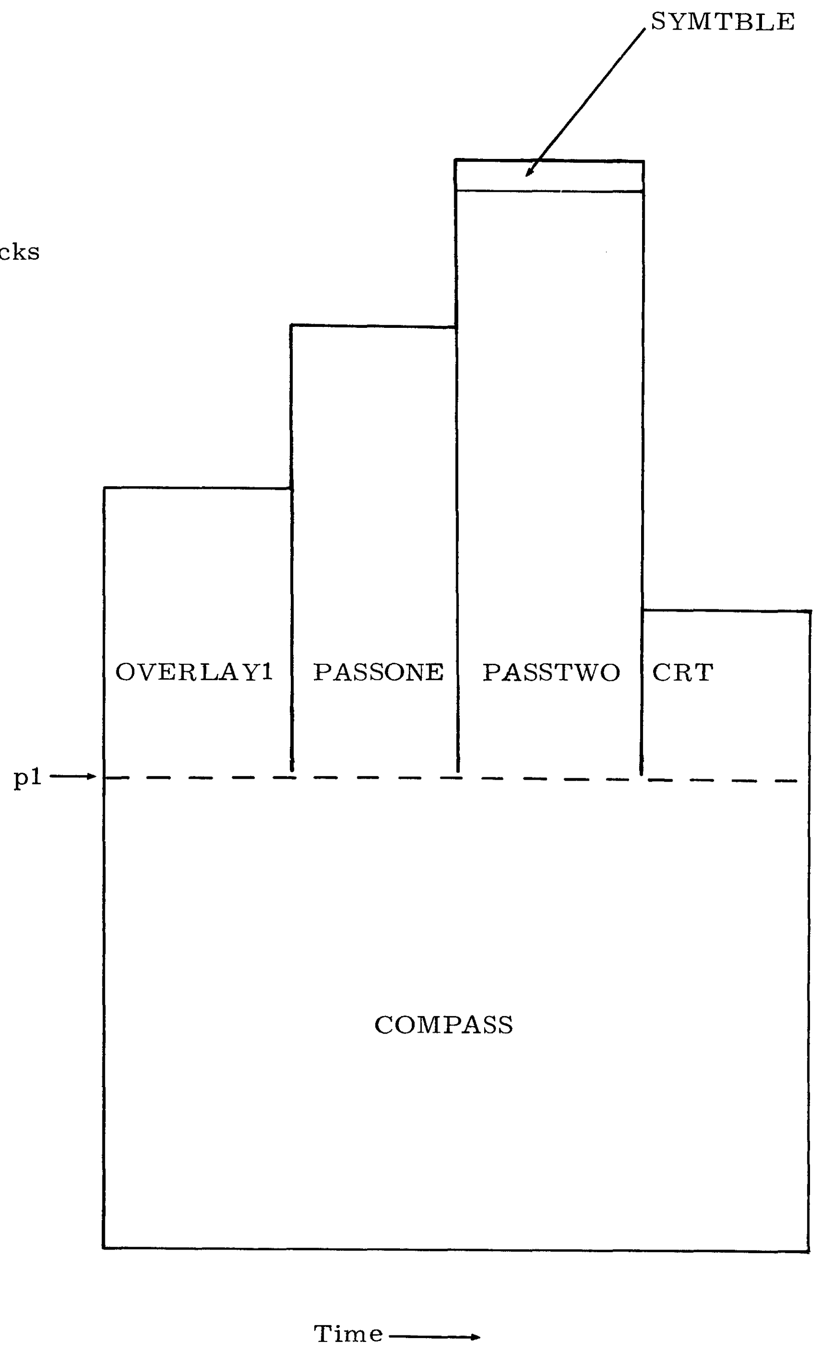


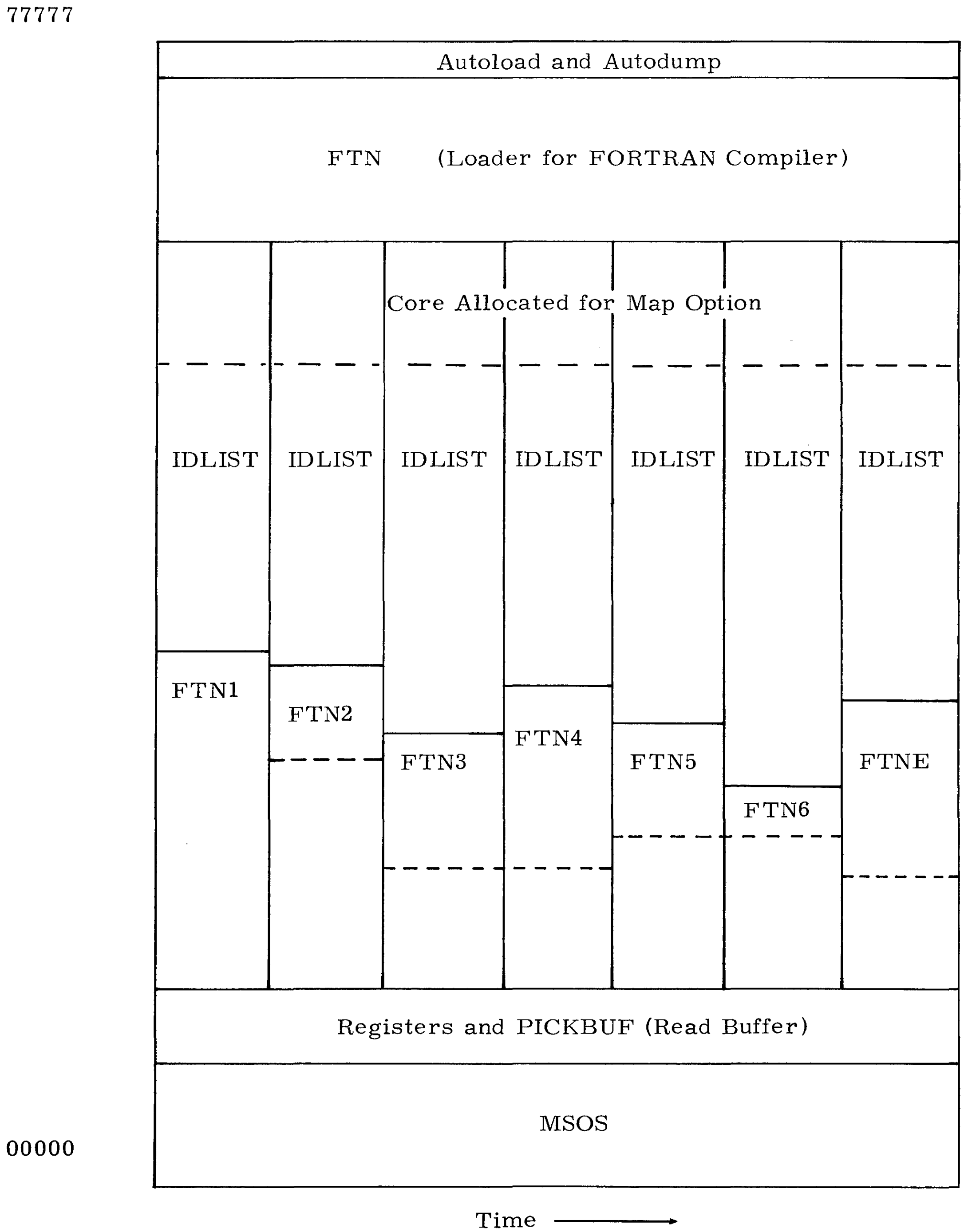
Figure II-8-2. COMPASS Overlay Deck Structure

MS FORTRAN PREPARATION 9

The FORTRAN loader (FTN) remains in core throughout the entire compilation process and loads each of the absolute segments. IDLIST (identifier list), which is formed by FORTRAN, follows each overlay in core. The initialized portion of the FORTRAN loader is now located at the end of FTN1 and is overlaid by the first portion of IDLIST. If the map option parameter is requested, the area reserved for storing variables starts just below FORTRAN loader and utilizes the core space between FORTRAN loader and the end of IDLIST.

The origins for the MS FORTRAN overlays should not be changed.

Figure II-9-1 illustrates the layout of core for the MS FORTRAN compiler.



NOTE

Dotted lines in the FTN2 - FTNE overlay area indicate the amount of core that is not overlayed.

Figure II-9-1. Contents of Core During a FORTRAN Compilation

FCO LEVELS

MSOS version 5 and its product set have been tested on the following configurations on which the following field change orders were incorporated. BDP hardware was available in these configurations.

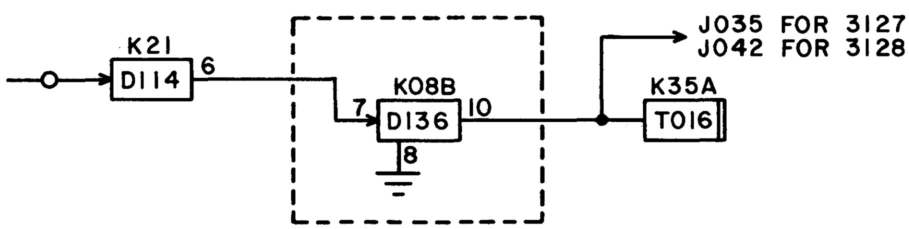
Product	Equipment	Product Designation	FCO Level	Options
Control Data 3114 Basic Processor		C05		10287-4
Control Data 3113 Storage Module		B03		10287-4
Control Data 3107 Communication Channel		A04		
Control Data 10018 Floating Point Module		B07		
Control Data 3312 Business Data Processing Module	AF101	A14		10256-2
Control Data 3501 Console (for 3504)	CR105	A11		
Control Data 3501 Console (for 3514)	CR106	A10		
Control Data 3502 Storage Module				
(first 16K with cabinet)	BB314	A11		
(second 16K)	BB313	A04		
(refrigeration unit)	GH104	A05		
(access channel)	AT105	A01		
Control Data 3504 Processor (includes floating point, page file, and BDP)	AC104	A30		
Control Data 3507 Communication Channel	DC111	A02		
Control Data 3514 Basic Processor				
(includes floating point)	AC106	A23		
(page file)	AT124	A03		
(BDP)	AF102	A12		
(real-time processor)	AT122	A05		
(add interrupt lines)	AT123	A01		
Control Data 3170 Storage Module	(BB105-A)	PD(A01)		
Control Data 3127 Magnetic Tape Controller		A12		

Product	Equipment	Product Designation	FCO Level	Options
Control Data 3228/3229 Magnetic Tape Controller		A10		10311-1
		B02		10311-1
Control Data 3423 Magnetic Tape Controller		A09		10311-2
		B02		
Control Data 3518/3528 Magnetic Tape Controller	FA418A	A38		10311-4
	FA417B	B06		
	FA420A	B06		
Control Data 3234 Disk Storage Controller		A11		
		B01		
		B05		
Control Data 3553 Mass Storage Controller		A12	CA26675	
		B10		
Control Data 3256 Line Printer Controller		A09		
		A11		
		B07		
		C04		
Control Data 3659 Line Printer Controller		A14		
		B04		
		C02		
Control Data 3446 Card Punch Controller		A12		
	FV150	B01		
Control Data 3644 Card Punch Controller		A16		
		B03		
Control Data 3447 Card Reader Controller		A10		
		A16		
		B04		
Control Data 3649 Card Reader Controller		A24		

Product	Equipment	Product Designation	FCO Level	Options
Control Data 3248 Card Reader Controller		A13		
Control Data 3290-2 Display Controller		D03	CD03353	
Control Data 211 Display		P01		
Control Data 3266 Communication Controller		B04		

NOTE

The following changes must be made to the 3127/3128 controllers for successful operation of MSOS 5 with 601 or 608 tape drives. These changes delay the interrupt signal to allow the tape to stop so the next 0X or 4X function code will be accepted. If the tape is not stopped or write control is not dropped, a reject signal will be returned. The logic changes are shown in the following illustration.



The following are the equation and placement changes.

D114 = Z116 • Z118 • Z022
1K21 - 11 * D104 * D124 * K112 * S040 * S044 * S045 * D136

D136 = D114
1K08 B * T016
New term

T016 = D136 • (J035 or J042)
1K35A

The wiring changes consist of the following adds.

4 inches 1K08 - 8 to 1K08 - 14 GND
7 inches 1K08 - 7 to 1K21 - 6
13 inches 1K08 - 10 to 1H13 - 4 (3127 and 601 drives)
27 inches 1K08 - 10 to 1C35 - 4 (3128 and 608 drives)

BAD TRACK FILE ALLOCATION 11

Effective use of mass storage requires that faulty tracks be removed from availability. This is done by identifying the bad tracks and downing them. A track is downed by declaring it nonavailable in the SYSTEM-BADTRACK file.

Identification of faulty tracks is provided by the manufacturer, the customer engineer, system error recovery, and from tests run by the operator under the bad track utility routines described in the MSOS Operator's Guide.

The SYSTEM-BADTRACK file must be allocated if bad track utilities are to be used. This file is used to store a map of all known defective tracks in the system.

The file should normally be allocated as shown by the following cards. If the block size is altered, modifications must be made to the bad track utility routines.

```
$FET, MSOS, SYSTEM-BADTRACK, 8192, 00, 0000, 0000
$ALLOCATE, n, 991234, , seg, dt
```

The value of n for various device types is as follows:

853/854/841	2
813/814	1

CAUTION

If the number of defective tracks known to any single MSOS system exceeds 1022, the system bad track file size must be increased.

11.1 BAD TRACK FILE INITIALIZATION

The system bad track file must be initialized with the UPALL statement. This statement clears the area allocated for the file so that all tracks will initially be set as up. The following sample job illustrates the use of the UPALL statement.

```
$JOB,,,
$BDTRCK, lu          lu is the logical unit from which bad track statements are read
UPALL
END
77
88 EOF
$EOJ
```

3.2.1 EXAMPLE OF COSY AND COMPASS JOBS

Four tapes contain the COSY source for release packages A, B, and C (all system routines and product set members except ADAPT, PERT TIME, PERT COST, and INITUSER).

The COSY* tape contains a DECK/ card for every deck on the COSY tapes, and corrections for the COSY decks where required. The DECK/ card for each deck contains an I parameter equal to the number of the COSY tape on which the deck appears and an H parameter equal to 05.

The following example assumes that the COSY tapes have been transferred to mass storage and assumes the following site dependent hardware configuration.

Standard MSOS

No floating-point hardware available

32K 3100 Computer

TABLE II-3-3. SAMPLE HARDWARE CONFIGURATION

Equipment type	Quantity	Controller	Channel	Equipment	Unit
Console Typewriter	1	None	None	None	None
853 disk drive	2	3234	2	0	10, 11
405 card reader	1	3248	1	1	0
512 printer	1	3555	0	2	0
415 card punch	1	3446	0	1	0
657 tape units	4	3518	0	0	0, 1, 2, 3

Step 1.

```
$JOB,...
$CTO,LUN07 IS COSY* TAPE
$EQUIP,07=MT
$FET,MSOS,COSY1,512,50,0000,0000
$OPEN,01,I
$FET,MSOS,COSY2,512,50,0000,0000
$OPEN,02,I
$FET,MSOS,COSY3,512,50,0000,0000
$OPEN,03,I
$FET,MSOS,COSY4,512,50,0000,0000
$OPEN,04,I
$FET,STAR,STAROUT,512,00,0000,0000
$RELEASE,ALL
$ALLOCATE,100,000001
$OPEN,06
$FET,COMP,COMPOUT,512,00,0000,0000
$RELEASE,ALL
```

```
$ALLOCATE,400,000001
$OPEN,05
$FET,BINARY,COMPSOUT,960
$ALLOCATE,100
$OPEN,20
$FMT,MS2
$COSY,*,S
          INSERT*     1
          DELETE/     6
FDP       EQU         0                                    No FDP hardware
CIC       DECK*       I=07,H=06                            COSY* input from lun 07,
                                                           Hollerith output to file 06
          DELETE/     261
RATL      EQU         2                                    Maximum of 2 mass storage
                                                           entries
          DELETE/     283,289
          MST         (01,DT853)                           AUT ordinal 01, 853 disk
                                                           drive
          MST         (09,DT853)                           AUT ordinal 09, 853 disk
                                                           drive
          DELETE/     295,320
          AUT†        (U,DP,0010,C2,MSIO3234,DT853)        Library device
                                                           Ch 2, Eq 0, Unit 10
          AUT         (A,TY,0,0,DRIVER05.DT,TYPE)          Console typewriter
          AUT         (A,CR,1000,C1,DRIVER02,DT3248)       Card reader
                                                           Ch 1, Eq 1, Unit 0
          AUT         (A,PR,2000,C0,DRIVER03,DT512)        Printer
                                                           Ch 0, Eq 2, Unit 0
          AUT         (A,CP,1000,C0,DRIVER04,DT3446,       Card punch
                      ,,,,CPBUFV50)                        Ch 0, Eq 1, Unit 0
          AUT         (U,MT,3,C0,DRIVER01,DT657,CB,        Magnetic tape
                      PCL)                                 Ch 0, Eq 0, Unit 3
          AUT         (U,MT,2,C0,DRIVER01,DT657,CB,        Magnetic tape
                      PCL)                                 Ch 0, Eq 0, Unit 2
          AUT         (U,MT,1,C0,DRIVER01,DT657,CB,        Magnetic tape
                      PCL)                                 Ch 0, Eq 0, Unit 1
          AUT         (U,DP,0011,C2,MSIO3234,DT853)        Available disk
                                                           Ch 2, Eq 0, Unit 11
          AUT         (U,MT,0,C0,DRIVER01,DT657,CB,        Magnetic tape
                      PCL)                                 Ch 0, Eq 0, Unit 0
CIO       DECK*       I=07,H=06
          END*
$COSY,I=06,S                                               End of step 1.

Step 2.

$COMPASS,I=05,L,R,X=20                                     Input from file 05; binary
                                                           output is on file 20.
77
88EOF                                                      End of step 2.
$CLOSE,20
$CLOSE,05
$CLOSE,06
$FET,STAR,STAROUT,512,00,0000,0000
$RELEASE,ALL
$FET,COMP,COMPOUT,512,00,0000,0000
$RELEASE,ALL
77
88EOF
$EOJ
```

† Refer to part III, section 5.2 for format of the AUT and MST macros.

MSOS BINARY SOURCE MODIFICATION AND FINAL LIBRARY GENERATION 4

Prior to preparing the final MSOS library, the user must have completed COSY and COMPASS runs to reassemble the binary deck of each subprogram or routine in which assembly options are to be changed. In addition, an MSOS library compatible with the version of MSOS to be installed (interim library or MSOS version 5 library) must be up and running. This library is used to run a PLIBEDIT job to modify the PRELIB binary source tape (file). Then the library is used to run a PRELIB job to generate the new library from the modified binary source file.

4.1 BINARY SOURCE FILE LISTING

Before setting up the job for the PLIBEDIT run, a dummy PLIBEDIT run must be made to obtain a listing of the PRELIB binary source file.

Example:

```
$JOB,,,
$EQUIP,01=MT               (PRELIB binary source tape)
$EQUIP,2=MT                (dummy output file; scratch tape)
$PLIBEDIT
    ENDEDIT/
77
88EOF
$EOJ
```

4.2 PLIBEDIT RUN

PLIBEDIT (section III-7) must be used to modify the PRELIB binary source file before making the PRELIB run. The following items normally require changes on the PRELIB binary source file:

1. Unit Card Replacement. A $^{7}_{9}$ UNIT,20 card (section III-8) was placed in the binary source file as a convenience to those using the extended core variant of MSOS. During the PRELIB run, the UNIT card causes PRELIB to switch the input from the binary source tape to unit 20 to add the INITUSER routine to the library.

   If the extended core variant of MSOS is not being installed, use a DELETE/ statement in the PLIBEDIT run to remove the UNIT card from the PRELIB source tape.

   If the extended core variant is being used, mount the release tape containing INITUSER (package G) and equip the drive as unit 20. PLIBEDIT copies the INITUSER deck onto the new library.

2. Driver Selection. The drivers in Table II-4-1 are contained on the MSOS binary source. Drivers that are nonapplicable to the installation hardware availability should be deleted with a DELETE/ statement.

The drivers are identified by unique program lengths on their IDC cards and may be removed by cross-referencing the binary source listing and Table II-4-1.

All drivers placed in resident must have unique entry point names specified.

TABLE II-4-1. RESIDENT DRIVERS

Hardware	Control Data Controllers	Control Data Equipment (in Combination)	COSY Name	Entry Point Name	Octal Deck Length †	
					Minimum	Maximum
MT	3x2x 35x8	604 607 608 601 603 606 657 659	DRIVMT	DRIVER01	320	463
CR	3447 3649 3248	405	DRIVCR	DRIVER02	76	76
PR	3256 3659 3254 3555	501 505 512 580	DRIVPR	DRIVER03	277 323	406 406
CP	3644 3446	415	DRIV3644	DRIVER04	200	210
CP	3245	415	DRIV3245	DRIVER44	321	327
TY	Console typewriter		DRIVTYWR	DRIVER05	67 Std/MP	142 EMP
PL	3293	Plotter	DRIV3293	DRIVER11	61	61
DP	3234 3553	853, 854 813, 814 841	DRIVMS	MSIO3234 MSIO3553	132 132	140 140
DR	3436 3637	863	MSIO3436	MSIO3436	70	70
OR	3195	915	DRIV3195	DRIVER16	330	330
TR TP	3691	Paper tape station	DRIVPT	DRIVER06 DRIVER07	206	206
DS	3290	DD211	DRIVDS	DRIVDS	36	36

† Length depends upon options selected.

INSTALLATION AUTOLOAD ROUTINE 1

Each installation must manually establish an autoload routine in the autoload/autodump region of core. This routine is a permanent machine entry. It initiates IUP. The first routine listed below autoloads from tape or if SELECT JUMP 6 is cleared, reads an autoload card from the card reader to autoload from mass storage. The routines following the first are entered in the autodump region of core and autoload directly from mass storage.

Parameter designations used in the coding are:

- c Channel number appropriate to equipment
- e Equipment number appropriate to unit
- u Unit number
- x Has a value of 6 for 3150 without enhanced block control; has a value of 7 for all others

Installation autoload routine for cards and tape:

Location	Instruction	Comment
77x40	00677x50	If SELECT JUMP 6 is set, load tape
77x41	770ce000	Connect card reader channel c, equipment e, unit 0
77x42	01077x41	Reject
77x43	74000050	Read first data block into locations 00000 through 00050
77x44	c0000000	
77x45	77600nnn	Pause according to channel mask specified by sensing code nnn (refer to the 3000 COMPASS Reference Manual)
77x46	01077x45	Reject
77x47	01000000	Reject
77x50	770ce00u	Connect channel c, equipment e, tape unit u
77x51	01077x50	Reject
77x52	771c0010	Rewind channel c
77x53	01077x52	Reject
77x54	74077x37	Read first record into location 00000
77x55	c0000000	
77x56	01077x54	Reject
77x57	01077x45	Jump to pause

Installation autoload routine for 853, 854, and 841:

Location	Instruction	Comment
77x60	770ce0uu	Connect mass storage unit on equipment e, channel c
77x61	01077x60	Reject
77x62	771c0010	Select load address function on channel c
77x63	01077x62	Reject
77x64	76077x76	Load address at 77x75 to equipment on channel c
77x65	c0077x75	
77x66	771c0040	Select read function on channel c
77x67	01077x66	Reject
77x70	74021000	Read first data block into locations 20000 to 21000
77x71	c0020000	
77x72	772c0002	Sense busy status
77x73	01077x72	Reject
77x74	01020000	Go to location 20000
77x75	00000020	Load address word for controller sector 16_{10}

NOTE

For the 841, the last instruction reads as follows:

77x75	00000100	Load address word for controller sector 14_{10}

When these instructions are entered in the addresses shown, autoloading is accomplished by pressing AUTODUMP.

Installation autoload routine for 863:

Location	Instruction	Comment
77x60	770ce000	Connect mass storage unit 0 on equipment e, channel c
77x61	01077x60	Reject
77x62	771c0040	Select read function on channel c
77x63	01077x62	Reject
77x64	76077x76	Load address at 77x75 to equipment on channel c

Location	Instruction	Comment
77x66	771c0041	Select write function on channel c (used on conjunction with an output operation to the selected unit)
77x67	01077x66	Reject
77x70	74021000	Read first data block into location
77x71	c0020000	20000
77x72	772c0002	Sense busy status
77x73	01077x72	Reject
77x74	771c0000	Release and disconnect channel c
77x75	00004000	Load address word for controller sector 2048_{10}
77x76	01020000	Go to location 20000

MASS STORAGE INITIALIZATION 2

2.1 853/854

The write address and clear operations occur simultaneously through the interaction of the 3234 controller and the particular mass storage unit. The CPU is not used.

1. Ready disk pack.
2. Turn key lock switch to ON.
3. If disk unit n is the unit to address and clear, interchange the wire leads so that physical unit n corresponds to logical unit 00.
4. Set HEADER and DATA switches to WRITE.
5. Set DEVICE SELECT to DISK PACK.
6. Press FILE/CELL.
7. Press SEEK ADRS. (writes addresses and clears the pack simultaneously).
8. When writing is complete (upper address is 313_8 on 854 and 144_8 on 853), restore the wire leads to the proper connections, clear FILE/CELL switch, reset HEADER and DATA switches to READ and turn the key lock switch to OFF.

2.2 841

Address headers for the 841 are written from the 3553 controller maintenance panel. In order to write the header the following procedure should be performed.

1. Ready the disk pack.
2. Turn the maintenance panel key switch to ON.
3. Set the DEVICE SELECT switch to the desired device type.
4. Select the desired ending mode by pressing the appropriate mode switch (TRACK, FILE SELECTED, etc.) and the SELECT switch.
5. Set the INTERLACE switch to desired interlace value:

   2:1 For nonenhanced 3150

   1:1 For all others
6. Press MC.
7. If addressing the whole pack, skip to step 9. Otherwise, select the appropriate portion of the address register via the REGISTER SELECT switch.

8. Enter the starting addresses into the upper and lower portions of the address register.

9. If there is no usable data in the sectors where new headers are to be written, both the HEADER and DATA switches should be set to the WRITE position. If there is useful data in the sectors and only headers are to be written, the HEADER switch must be set to the WRITE position and the DATA switch to the READ position.

NOTE

> Do not use the REPEAT mode switch when writing headers. The REPEAT switch must be OFF.

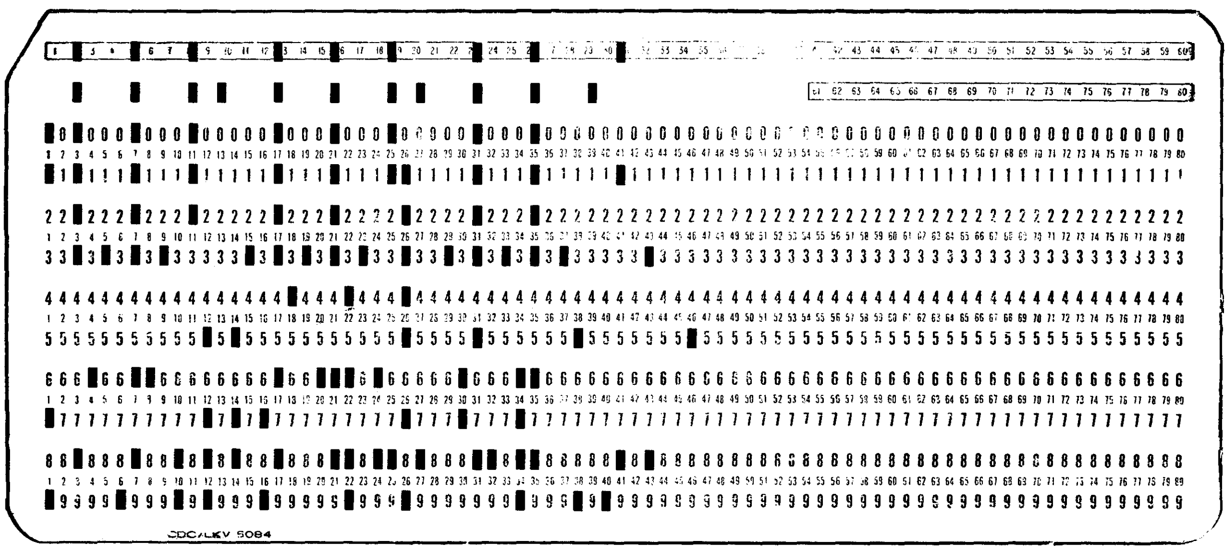
10. Press the SEEK ADRS. switch.

11. The seek address operation ends when the address of the last sector of the selected storage area has been written or an abnormal condition is displayed in the status register. Reset HEADER and DATA switches to READ.

AUTOLOAD CARD PREPARATION 3

To autoload both the interim library and the final MSOS library, each installation may punch an autoload card. The autoload card is used in conjunction with the autoload routine. The cards are punched in column binary format. See Autoload Card Generation (AGEN), section 4.2.8.

3.1 853/854 SAMPLE CARD



Machine Code	Mnemonic	
14050000	NOP	50000B
770ce010	CON	e010B, c
01000001	UJP	1
771c0010	SEL	10B, c
01000003	UJP	3
76000027	OUTW	c, 26B, 27B
c0000026		
01000005	UJP	5
771c0040	SEL	40B, c
01000010	UJP	10B
771c0053	SEL	53B, c
01000012	UJP	12B
74020765	INPW	c, 20000B, 20765B
c0020000		
01000014	UJP	14B
772c0002	EXS	2, c
01000017	UJP	17B
771c0000	SEL	0, c
01000021	UJP	21B
20000001	LDA	1
44020000	SWA	20000B
01020000	UJP	20000B
00000020	OCT	20

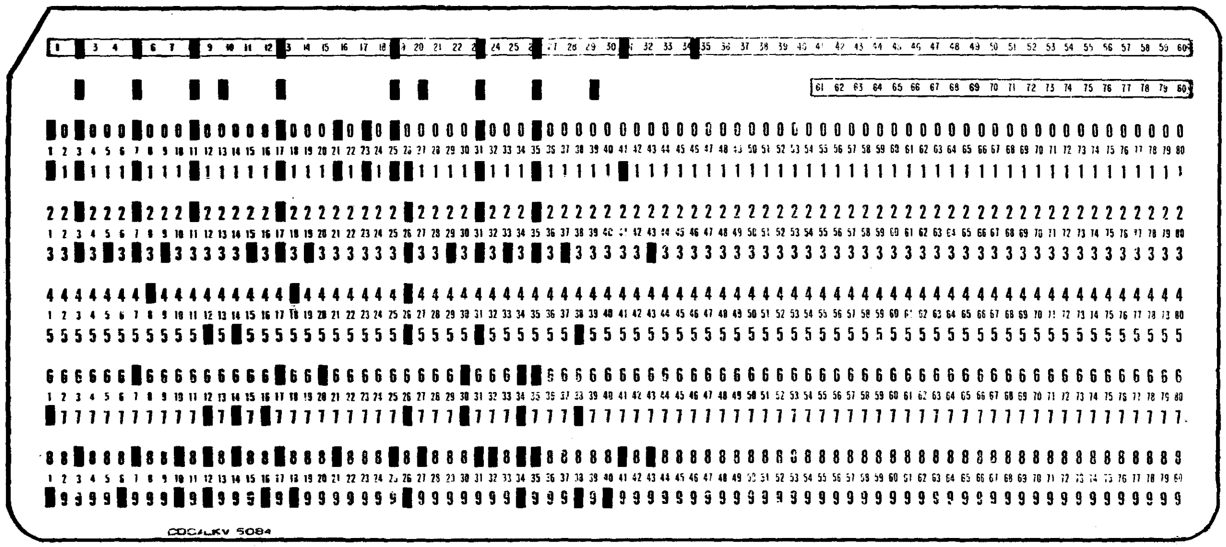
The lower case characters represent octal digits which must be supplied by each installation.

c Channel of the disk drive containing the MSOS library

e Equipment number of the disk drive containing the MSOS library

The values of c and e are 0 on the card shown.

3.2 863 SAMPLE CARD



Machine Code	Mnemonic	
14050000	NOP	50000B
770ce000	CON	e000B, c
01000001	UJP	1
771c0040	SEL	40B, c
01000003	UJP	3
76000027	OUTW	c, 26B, 27B
c0000026		
01000005	UJP	5
771c0041	SEL	41B, c
01000010	UJP	10B
14000000	NOP	
14000000	NOP	
74020765	INPW	c, 20000B, 20765B
c0020000		
01000014	UJP	14B
772c0002	EXS	2, c
01000017	UJP	13B
771c0000	SEL	0, c
01000021	UJP	21B
20000001	LDA	1
44020000	SWA	20000B
01020000	UJP	20000B
00004000	OCT	4000

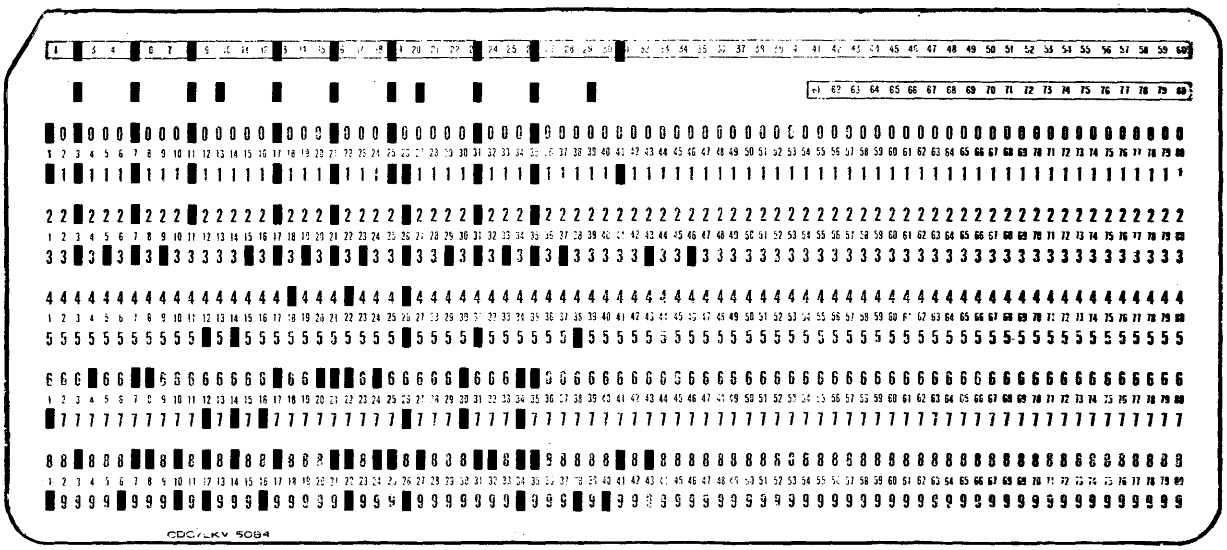
The lower case characters represent octal digits which must be supplied by each installation

c Channel of drum containing MSOS library

e Equipment of drum containing MSOS library

The values of c and e are 0 on the card shown.

3.3 841 SAMPLE CARD



Machine Code	Mnemonic	
14050000	NOP	50000B
770ce010	CON	c010B, c
01000001	UJP	1
771c0012	SEL	12B, c
01000003	UJP	3
76000027	OUTW	c, 26B, 27B
c0000026		
01000005	UJP	5
771c0040	SEL	40B, c
01000010	UJP	10B
771c0053	SEL	53B, c
01000012	UJP	12B
74020765	INPW	c, 20000B, 20765B
c0020000		
01000014	UJP	14B
772c0002	EXS	2, c
01000017	UJP	17B
771c0000	SEL	0, c
01000021	UJP	21B
20000001	LDA	1
44020000	SWA	20000B
01020000	UJP	20000B
00000100	OCT	100

The lower case characters represent octal digits which must be supplied by each installation

c Channel of the disk drive containing the MSOS library

e Equipment number of the disk drive containing the MSOS library

The values of c and e are 0 on the card shown.

MSOS INSTALLATION UTILITY PACKAGE 4

The MSOS IUP is the initialization routine for the MSOS system. IUP is a set of routines which perform the following functions.

Equips devices

Changes source of control statements

Inspects mass storage devices

Changes information on mass storage

Rewinds magnetic tape

Skips file forward on magnetic tape

Initializes 512 and MMTC image memory

Generates autoload cards

Generates 1-card loaders

Dumps a library onto magnetic tape or cards in special format

Installs a library from magnetic tape or cards of special format

4.1 MSOS IUP OPERATION

To operate MSOS IUP, establish an internal autoload routine (section 1) and autoload IUP into memory. MSOS IUP is released on tape in binary format or as binary cards preceded by a 2-card loader and followed by an EOF card. The 2-card loader is a bootstrap routine that loads MSOS IUP and terminates upon encountering an end-of-file.

When IUP is loaded, it types:

I IUP 003 INSTALLATION UTILITY PROGRAM LOADED

Then IUP=LUN is typed to allow the input unit to be designated (section 4.2.2).

4.2 MSOS IUP CONTROL STATEMENTS

IUP accepts control statements from the typewriter, card reader, or magnetic tape. Card images have one control statement per card. Leading, embedded, and trailing blanks are ignored.

For typewriter input, IUP types:

A IUP 006 READY FOR INPUT

IUP is now ready to accept the 3- or 4-character control statement name. Parameters are then requested. When IUP is accepting a parameter and REPEAT is pressed, IUP:

Either repeats the present request if some characters have already been entered for this request, or

Repeats the previous request if no characters have been entered.

Using this feature, it is possible to return to the beginning of a control statement or to an erroneous parameter by pressing REPEAT until the desired request is reached.

4.2.1 DEV

DEV statements define equipment available to IUP and assign logical unit numbers. The first statement entered must be a DEV statement. Otherwise, an error occurs. It is good practice to enter all DEV statements first because some operational control statements may cause device drivers of unequipped devices to be destroyed.

IUP allows up to 63 devices to be equipped.

Card input:

$$\text{DEV,lun,ht,c,e,uu,}\begin{Bmatrix}\text{dt}\\\text{cdt}\end{Bmatrix}\text{,}\left[\text{C}\right]\text{,,}$$

Typewriter input:

$$\text{DEV LUN lun HT ht C c E e UU uu}\begin{Bmatrix}\text{DT dt}\\\text{CDT cdt}\end{Bmatrix}\text{, }\left[\text{CLR}\begin{Bmatrix}\text{Y}\\\text{N}\end{Bmatrix}\right]$$

lun	Logical unit number, 1 < lun < 63; unique for each equipment entered. All references to the device are in terms of the logical unit number.
ht	Hardware type
	MT Magnetic tape
	DP Disk pack
	CP Card punch
	CR Card reader
	TY Console typewriter
	PR Printer
	DR Drum
	DF Disk file
c	Channel number
e	Equipment number of controller
u	Unit number
dt	Unit device type if hardware type is MT, PR, DP, DF, or DR
cdt	Controller device type if hardware type is CR or CP
C	Write zeros on mass storage device (card format)
CLR	Write zeros on mass storage device (typewriter request). Respond Y for yes, N for no.

4.2.2 INP

The INP statement allows the user to change the source of input to a designated unit. The input unit may be the console typewriter, the card reader, or magnetic tape. The INP statement also equips the unit when necessary.

Card input:

$$\text{INP,} \left\{ \begin{matrix} \text{TY} \\ \text{lun} \end{matrix} \left[\text{, ht} \left[\text{,c,e,uu,,} \left\{ \begin{matrix} \text{dt} \\ \text{cdt} \end{matrix} \right\} \right] \right] \right\}$$

Typewriter input:

$$\text{INP LUN} \left\{ \begin{matrix} \text{TY} \\ \text{lun} \end{matrix} \right\} \text{HT ht C c E e UU uu} \left\{ \begin{matrix} \text{DT dt} \\ \text{CDT cdt} \end{matrix} \right\}$$

lun	Logical unit number of new control statement input device
	TY indicates typewriter
HT	Hardware type
c	Channel number of input device
e	Equipment number of controller
uu	Unit number
dt	Device type if hardware type equals MT
cdt	Controller device type if hardware type is CR

Examples:

INP, 60, CR,1, 0, 00, 3248

This statement equips logical unit 60 to the card reader and designates it as the source input unit.

INP, 60, CR (If typewriter request, press FINISH following the C request.)

This statement allows the unit last equipped with the same hardware type to be assigned logical unit 60. Input is accepted from this unit.

INP, 60 (If typewriter input, press FINISH following the HT request.)

This statement changes source input to logical unit 60, but logical unit 60 must be previously equipped.

4.2.3 INSP

The INSP statement allows the inspection of information on mass storage. The output can be by number of sectors or by number of words. The beginning location of the dump may be any sector or word within a sector. The console typewriter, printer, or magnetic tape can be designated for output, but the typewriter should only be used for small inspections.

Card input:

INSP, lun1, lun2, s,b,n

Typewriter input:

INSP FROM lun1 TO lun2 SECTOR s BEGIN b COUNT n

lun1	Logical unit number of mass storage device to be inspected	
lun2	Logical unit number of device where information is to be output	
s	Beginning sector on mass storage device	
b	Numeric	Indicates the beginning word index of the beginning sector
	or S	Indicates that parameter n is the number of sectors dumped rather than the number of words
n	Number of words or sectors to be listed depending on b	

Sector numbers for the INSP and CHNG control statements must be calculated using 1 to indicate the first sector of the mass storage device. Thus, all sector addresses given on an FLD listing (which uses 0 for the first sector) must be increased by one for use in these two statements.

4.2.4 CHNG

CHNG statements permit the changing of information on a mass storage device.

Card input:

CHNG,,lun,s,b,wl, [w2...wn]

Typewriter input:

CHNG LUN lun SECTOR s BEGIN b WORD w1 [WORD w2...WORD wn]

lun	Logical unit number of mass storage device
s	Sector number on mass storage device
b	Beginning word index
w_i	List of words to be written consecutively beginning at relative word 6. On card images this information can only continue to the end of card. When using the typewriter, information is requested until FINISH is pressed and no new characters are read. The data should be in octal numbers. If eight digits are not entered, the information is right-justified with leading zeros.

4.2.5 INIT

The INIT statement directs the initialization of the MMTC or 512 image memory. Initialization can use a standard or a nonstandard image.

Card input:

INIT, lun1, n, lun2

Typewriter input:

INIT LUN lun1 IMAGE n LUN lun2

lun1	Logical unit number of device to initialize		
n	For 512, the train number		
		1	501 compatible
		2	AN compatible
		3	HN compatible
		4	595-2 train image
		Any other character indicates nonstandard image	
	For MMTC, image number		
		Blank, 0, 1	ASCII standard image
		Other	Nonstandard
lun2	Logical unit number for input of nonstandard image memory (CR or MT)		

Nonstandard images must be entered in 80-character records from the card reader or magnetic tape. The card contains the octal digits for each conversion code, separated by commas. Blanks are ignored and each code must contain 1 through 4 octal digits. If less than 4 characters are entered, leading zeros are added.

The 512 initialization requires 288 conversion codes for the image memory. Illegal codes produce error. The MMTC conversion memory consists of two parts:

A 32-word section used for output conversion, and

A 128-word section used for input conversion.

However, IUP requires only the 64 codes for the 32-word output conversion section. This input is used to generate the full image.

Example:

The following is an example of EBCDIC conversion codes used to load a nonstandard EBCDIC image memory for MMTC.

```
        343,344,345,346,347,350,351,117,153,115,155,173,120
      326,327,330,331,320,133,134,174,157,156,100,141,342
    300,113,135,340,137,136,140,321,322,323,324,325
  175,114,154,177,116,301,302,303,304,305,306,307,310,311
360,361,362,363,364,365,366,367,370,371,172,176
```

MMTC drivers may have 2-channel controllers. Thus, both channels must be initialized. After initializing the first channel, IUP requests a second channel via the console typewriter. If a channel is present, the operator types the channel number and the second channel will be initialized. If there is no second channel, press FINISH allowing IUP to continue normally.

4.2.6 SKEF

The SKEF statement directs IUP to skip forward to end-of-file on designated magnetic tapes.

Card input:

SKEF, lun

Typewriter input:

SKEF LUN lun

lun	Logical unit number of magnetic tape

4.2.7 RWND

The RWND statement directs IUP to rewind the designated tape unit.

Card input:

RWND, lun

Typewriter input:

RWND LUN lun

lun	Logical unit number of magnetic tape

4.2.8 AGEN

The AGEN statement directs IUP to punch autoload cards for the designated library device.

Card input:

AGEN, lun1, lun2, n

Typewriter input:

AGEN, LIB lun1 CP lun2 NUMBER n

lun1	Logical unit number of library device
lun2	Logical unit number of card punch
n	Number of cards to be punched

4.2.9 LGEN

The LGEN statement punches 1-card loader cards. These cards are useful for running stand-alone programs; that is, programs capable of running independent of the operating system.

Card input:

LGEN, lun1, lun2, n

Typewriter input:

LGEN CR lun1 CP lun2 NUMBER n

lun1	Logical unit number of card reader
lun2	Logical unit number of card punch
n	Number of cards to punch

4.2.10 DUMP

The DUMP statement produces a dump file of a designated MSOS library edition in a format suitable for install processing (INST control statement).

Card input:

DUMP, lun1, lun2, ed

Typewriter input:

DUMP LIB lun1 DUMP UNIT lun2 EDITION ed

lun1	Logical unit number of mass storage containing MSOS library
lun2	Logical unit number of unit on which the library is to be dumped. The unit can only be the card punch or magnetic tape.
ed	Edition of library to be dumped

4.2.11 INST

The INST statement processes the dump file produced by the IUP DUMP function and installs an MSOS library edition on a designated mass storage device. INST also allocates and opens the OCAREM files (LABELFILE, IDFILE, and MSDFILE). IUP uses the mfc and msc parameters to calculate the size of these files. Refer to section III-9 for additional information regarding these files. System files 54 through 56 and L-MSIO are restored with the same sizes and security codes as on the original system.

Card input:

INST, lun1, lun2, ed, dn, mfc, msc, [exid]

Typewriter input:

INST LIB lun1 DUMP UNIT lun2 EDITION ed DN dn MFC mfc MSC msc [EXID exid]

lun1	Logical unit number of mass storage device on which library is to be installed
lun2	Logical unit number of unit containing the library dump file
ed	Edition of library to be installed. This need not be the same as the edition of the system that was dumped
dn	Device number used in the device label
mfc	Maximum file count for the new system
msc	Maximum segment count per mass storage file for new system
exid	External identification used in device label (optional)

4.2.12 END

The END statement terminates MSOS IUP.

Card and Typewriter input:

END

4.3 MSOS IUP MESSAGES

MSOS IUP communicates with the operator through the console typewriter. Messages are preceded by letter A, I, or D.

- A Operator intervention is required
- I Informative
- D Destructive

IUP messages are listed in Tables III-4-1 through III-4-2.

TABLE III-4-1. IUP ACTION MESSAGES

TYPE	SOURCE	NO.	MESSAGE	UNIT	SIGNIFICANCE	RESULT/ACTION
A	IUP	006	READY FOR INPUT	CTO	IUP is ready to accept a control statement name from CTO.	Type control statement name.
A	IUP	009	END-OF-TAPE ON INPUT UNIT TYPE Y IF NEW TAPE MOUNTED TYPE N FOR IUP TERMINATION	CTO	End-of-tape found on magnetic tape presently used as input.	Type N if no other tape is to be mounted, or type Y after new tape is mounted.
A	IUP	012	UNIT NOT READY FO fo LUN lun	CTO	Mass storage device not ready.	Type R to retry, or A to abandon the call.
A	IUP	013	END-OF-TAPE ON OUTPUT TAPE TYPE Y IF NEW TAPE MOUNTED TYPE N FOR IUP TERMINATION	CTO	Written to end of output tape.	Type Y after mounting new tape, or type N to terminate IUP if no new tape is mounted
A	IUP	018	TURN ON WRITE ADDRESS SWITCH PRESS FINISH WHEN READY	CTO	WA option specified on DEV statement for 852/1311.	1. Turn on WRITE address switch. 2. Press FINISH.
A	IUP	021	UNABLE TO LOAD IMAGE MEMORY CORRECTLY	CTO	IUP compared written image memory and one read-in. They are not equal.	Type R to rewrite the image, or type A to abandon initialization of the unit.
A	IUP	022	SEL CON REJECTED - yyyyyyyy	CTO	A select or connect rejected while trying to initialize image memory yyyyyyyy=rejected instruction	Type R to entry or A to abandon initialization.
A	IUP	023	IMAGE MEMORY OUTW INPW REJECTED	CTO	OUTW or INPW rejected while trying to initialize memory.	Type R to retry or A to abandon initializing the unit.
A	IUP	026	CONTROLLER BEING INITIALIZED IS BUSY AFTER 10 SECONDS	CTO	I/O not completed after 10 seconds when trying to write image memory.	Type R to retry for another 10 seconds, or type A to abandon initialization of the unit.
A	IUP	030	BUSY CHANNEL OR UNIT REJECTED I/O CALL 10000 TIMES FO fo LUN lun	CTO	I/O call to mass storage device rejected 10,000 times because of busy channel or unit.	Type R to retry another 10,000 times, or type A to abandon I/O call and present operational task.

4.3.1 INFORMATIVE MESSAGES

IUP informative messages are listed in Table III-2.

Some of the informative messages can be corrected immediately or require reassigning of source input. If input is from the typewriter, one of the following is requested.

The parameter causing the error is requested again, or

The operator may reassign input. INP = LUN is typed by IUP. The operator then reassigns input using the INP control statement format (section 4.2.2).

If input is from the card reader, the operator may:

Reassign input with an INP statement to a different device.

Reassign to the same unit and skip a bad card.

Remove the bad card from the receiving tray, correct it, return it to the input tray, and reassign input to the same unit.

Assign input to the typewriter, type in the correct control statement, and reassign input back to the card reader using the INP statement.

If input is from magnetic tape, input may be reassigned as from the card reader.

TABLE III-4-2. IUP INFORMATIVE MESSAGES

TYPE	SOURCE	NO.	MESSAGE	UNIT	SIGNIFICANCE	RESULT/ACTION
I	IUP	001	ILLEGAL CONTROL STATEMENT	CTO	Control statement name on card or typewriter is invalid.	NOTE Refer to section 4.3.1 for operator action when type I message occurs.
I	IUP	002	cnst CARD PARAMETER ERROR	CTO	Illegal parameter on cnst control statement where cnst is the control statement name.	
I	IUP	004	CONTROL STATEMENT SEQUENCE ERROR - NO DEVICE CARDS HAVE BEEN PROCESSED.	CTO	A DEV control statement has to be the first control statement.	
I	IUP	005	UNABLE TO EQUIP THIS DEVICE	CTO	Operational control statement caused device drivers of unequipped device to be destroyed.	
I	IUP	007	LOGICAL UNIT ALREADY ASSIGNED	CTO	Logical unit number not unique.	
I	IUP	008	NO DEVICE OF THIS HARDWARE TYPE HAS BEEN EQUIPPED	CTO	Only the logical unit number and hardware type given in INP statement but no device of same hardware type has been equipped.	
I	IUP	010	LOGICAL UNIT NUMBER SPECIFIED IN CONTROL STATEMENT IS UNASSIGNED	CTO	Logical unit number used in control statement has not been assigned in DEV statement.	
I	IUP	014	ILLEGAL DEVICE TYPE LUN lu	CTO	IUP control statement contains the logical unit number lu, of a device type which can not be used for this operation.	
I	IUP	016	CONTROL STATEMENT READ = card read	CTO	This message is produced when a control card is read from a source other than the typewriter.	
I	IUP	017	CONFLICTING HARDWARE TYPE AND DEVICE TYPE OR CONTROLLER DEVICE TYPE	CTO	The hardware type specified on a DEV or INP statement cannot have the device type or controller device type specified.	
I	IUP	019	DUPLICATE MMTC CONVERSION CODES (xx) AND (yy)	CTO	While entering a nonstandard image for MMTC image memory duplicate codes were found.	
I	IUP	020	ONLY 4 MASS STORAGE DEVICES CAN BE EQUIPPED	CTO	More than 4 different mass storage devices trying to be equipped.	
I	IUP	021	IMAGE MEMORY PARITY ERROR	CTO	While reading or writing image memory, a parity error occurred.	

TYPE	SOURCE	NO.	MESSAGE	UNIT	SIGNIFICANCE	RESULT/ACTION
I	IUP	025	UNEXPECTED STATUS WORD II (xxxx)	CTO	During initialization of MMTC image memory an I/O status was returned that was not expected.	
I	IUP	027	NONSTANDARD IMAGE CODE CONTAINS TOO MANY DIGITS	CTO	Nonstandard image memory being entered contains a conversion code greater than 4 digits.	
I	IUP	029	INSTALLATION UTILITY PROGRAM TERMINATED	CTO	IUP program complete. END statement processed.	
I	IUP	033	ATTEMPT TO EQUIP MORE THAN 30 DEVICES	CTO	More than 30 devices trying to be equipped.	
I	IUP	036	DATA CARD CHECKSUM ERROR	CTO	Data card input by INSTALL function has a checksum error.	

4.3.2 DESTRUCTIVE MESSAGES

IUP destructive messages are listed in Table III-4-3.

These messages are produced for errors that terminate an operational function. IUP does not terminate. The operator can reassign input. The messages INP = LUN is typed following the destructive message. The operator may then reassign input using the INP statement. Reassigning input gives the operator the following options.

Reassign the same unit and skip the control card causing the problem.

For card reader input, the card can be corrected and replaced in the input tray before assigning input to the same unit.

For card reader or magnetic tape input, the source input can be reassigned to the typewriter, the correct control statement typed, an incorrect control statement typed, then after the subsequent error message, input reassigned to the original unit.

Assign input to a new device.

TABLE III-4-3. IUP DESTRUCTIVE MESSAGES

TYPE	SOURCE	NO.	MESSAGE	UNIT	SIGNIFICANCE	RESULT/ACTION
D	IUP	011	MSIO REJECT FO = fo LUN = lun REJECT CODE zz	CTO	MSIO reject on I/O operation. zz = MSIO reject code	NOTE Refer to section 4.3.2 for operator action when a type D message occurs.
D	IUP	015	LUN lun message	CTO	I/O error recovery returned one of the following errors. SCAR REJECT RAAR REJECT EQUIPMENT DOWN IRRECOVERABLE ERROR	
D	IUP	028	UNEXPECTED EOF ON LUN lun	CTO	IUP found EOF before expected.	
D	IUP	031	DUMP FILE FORMAT ERROR	CTO	Information being read by install function contains unrecognizable data.	
D	IUP	032	INSUFFICIENT MASS STORAGE	CTO	Mass storage device on which library is being installed does not have room for complete library.	
D	IUP	034	DATA CARD FORMAT ERROR	CTO	The data cards read by the install function do not have correct format.	
D	IUP	035	DATA CARD SEQUENCE ERROR	CTO	Data cards being read by the install function are out of order.	

AUT AND MST MACROS 5

At installation time, the AUT must define physical units available to the system. Each AUT entry consists of four 24-bit words and an external definition which describes the hardware device and the system driver servicing it. Any channel or equipment dedicated to real-time or specialized operations must not appear in the AUT. Each physical unit constitutes one complete AUT entry except an 814 disk file which is represented by two separate AUT entries.

5.1 AUT FORMAT

The format of the AUT entry is:

Word 1

23	22–18	17	16	15	14	13–12	11–00
a	ht	s	r	as			cc

Word 2

23	22–15	14–00
e	c	daddr

Word 3

23–18	17	16	15	14	13	12	11–9	8–7	6	5–00
dt	ao	cb	pc	ab	ms		clip	rdf	sf	size

Word 3 for punch

23–18	18–14	14	13	13–8	8–00
dt		ab	ma		lsb

Word 4

23	22	20	20–00
eof	m		cs

Word 4 for punch

23	22	22–14	14–00
eof	m		pb

The fields are defined as follows:

Word	Bit	Field	Significance
1	23	a	0 Unit not assigned to a logical unit 1 Unit assigned to a logical unit
	22-18	ht	Numeric code 1 through 37 designates hardware type Code — Type 01 — Magnetic tape (MT) 02 — Card reader (CR) 03 — Printer (PR) 04 — Card punch (CP) 05 — Console typewriter (TY) 06 — Paper tape reader (TR) 07 — Paper tape punch (TP) 10 — Typewriter station (TS) 11 — Plotter (PL) 12 — Satellite controller (SL) 13 — Disk pack controller (DP) 14 — Disk file (DF) 15 — Drum (DR) 16 — Optical character reader (OR) 17 — Seismic (SP) 20 — Display station (DS) 21-37 — Unassigned
	17	s	0 Unit operable 1 Unit inoperable
	16	r	0 Not reserved 1 Reserved for another computer
	15	as	0 Unit not ASCII 1 Unit is ASCII
	14-12		Reserved
	11-00	cc	Twelve-bit connect code for each unit; the hardware code used by MSOS in the I/O instruction cc = euuu e = One octal digit equipment number uuu = Up to 3 octal digits right-justified represent the unit number †

† The unit number in the connect code for mass storage is:
00U = 863
0dU = 853/854/813/814/841
U = Unit number
d: 1 = Disk drive; 2 = Disk file

Word	Bit	Field	Significance
2	23	e	0 No action 1 Units to be assigned. Set e to 0 at installation time as this bit is manipulated only by MSOS.
	22-15	c	Eight-bit channel code specifying the channels available to an equipment. A bit set to 1 means the corresponding channel is available to a unit; a bit set to 0 means the channel is not available. The following table shows the correspondence between bit positions and channel numbers. †
	14-00	daddr	A 15-bit address that is the entry point name of the appropriate driver.
3	23-18	dt	Device type code as defined in Table III-4.
	17	ao	0 No ASCII option available on this device 1 ASCII option is available
	16	cb	0 Controlled backspace is not available 1 Controlled backspace is available
	15	pc	0 Programmed clipping hardware is not available 1 Programmed clipping hardware is available
	14	ab	0 Recovery not abandoned 1 Operator abandoned recovery
	13	ms	0 No recovery action 1 Recovery is waiting for operator response
	12		Reserved
	11-9	clip	Value of clip (0 through 7) to be used on next read
	8-7	rdf	Read recovery flag 00 Standard recovery 01 Suppress opposite direction recovery 10 Force opposite direction recovery
	6	sf	0 System noise records not suppressed 1 System noise records are suppressed
	5-0	size	Size in characters minus one of minimum record for magnetic tape
3 (punch)	8-0	lsb	Length of last card punched

Bit Position	22	21	20	19	18	17	16	15
Corresponding Channel	0	1	2	3	4	5	6	7

† The console typewriter (nonchannel) c should equal 0.

Word	Bit	Field	Significance
4	23	eof	0 No end of file
			1 Last record written was an EOF (punch or magnetic tape)
	22	m	0 Last record written was not in binary (magnetic tape or punch)
			1 Last record written was in binary (magnetic tape or punch)
	21		Reserved
	20-00	cs	Checksum of last record written
4 (punch)	21-15		Reserved
	14-00	pb	Address of a 40-word buffer for recovery from errors in the punch.

Entry point names to be used for the various units and their drivers are listed in Table III-4. Specific COSY corrections for adapting the AUT to a particular installation are not given because of the diversity of configurations. A COSY correction causes the complete deletion of the AUT and the user must insert his complete hardware description. A general format of the AUT follows:

AUTV50	Entry 1, word 1	Library
+1	Entry 1, word 2	
+2	Entry 1, word 3	
+3	Entry 1, word 4	
+4	Entry 2, word 1	CTO/CFO
+5	Entry 2, word 2	
+6	Entry 2, word 3	
+7	Entry 2, word 4	
+8	Entry 3, word 1	INP
+9	Entry 3, word 2	
+10	Entry 3, word 3	
+11	Entry 3, word 4	
+12	Entry 4, word 1	OUT
+13	Entry 4, word 2	
+14	Entry 4, word 3	
+15	Entry 4, word 4	
+16	Entry 5, word 1	PUN
+17	Entry 5, word 2	
+18	Entry 5, word 3	
+19	Entry 5, word 4	

In this scheme, the preceding are system units and the following are available units for batch or priority use.

+20	Entry 6, word 1	Available unit
+21	Entry 6, word 2	
+22	Entry 6, word 3	
+23	Entry 6, word 4	
+24	Entry 7, word 1	Available unit
+25	Entry 7, word 2	
+26	Entry 7, word 3	
+27	Entry 7, word 4	

The available unit scheme may continue. A maximum of 50 4-word entries may be defined. Table III-5-1 may be used to determine driver entry point names.

TABLE III-5-1. HARDWARE DRIVER REFERENCE

Hardware	Controllers	Equipment (in combination)	COSY Name	Entry Point Name
MT	3127 3128 362X 342X 322X 3518 3528	601 608 606/607 603/604/606/607 603/604/606/607 657/659 657/659	DRIVMT	DRIVER01
CR	3447 3649 3248	405	DRIVCR	DRIVER02
PR	3256 3659 3254 3555	501/505 501/505 3254 512 580	DRIVPR	DRIVER03
CP	3644 3446	415	DRIV3644	DRIVER04
CP	3245	415	DRIV3245	DRIVER44
TY	Console typewriter		DRIVTYWR	DRIVER05
PL	3293	Plotter	DRIV3293	DRIVER11
DP	3234 3553	853, 854, 813, 814 841	DRIVMS	MSIO3234 or MSIO3553
DR	3436 3637	863	MSIO3436	MSIO3436
OR	3195	915	DRIV3195	DRIVER16
TR TP	3691	Paper tape station	DRIVPT	DRIVER06 DRIVER07
DS	3290	DD211 display station	DRIVDS	DRIVDS

5.2 AUT MACRO

The AUT macro adds entries in the AUT.

AUT (a, ht, eu, c, daddr, dt, cb, pc1, asc1, asc2, pb, d)

a Unit assigned bit;

A Unit assigned as a system unit for input, output, or punch, or as the console typewriter

U Unit unassigned

ht Hardware type of devices corresponding to the AUT entry

MT	Magnetic tape
CR	Card reader
PR	Line printer
CP	Card punch
TY	Console typewriter
TR	Paper tape reader
TP	Paper tape punch
TS	Typewriter station
PL	Plotter
SL	Satellite controller
DP	Disk pack
DF	Disk file
DR	Drum
OR	Optical character reader
SP	Seismic processor
DS	Display station (3290)

eu The unit's equipment (e) number followed by a unit number. The unit (u) number is a right-justified three-digit octal number. If the equipment number is zero, the eu parameter can be abbreviated by using only the unit number.

Example:

eu = 7 = equipment 0, unit 7

eu = 3001 = equipment 3, unit 1

eu = 1000 = equipment 1, unit 0

c Channel bit mnemonic

C0 - C7 represent channels 0 through 7

If multi-channel device, channels should be shown as Cx + Cy (for example, C0 + C3)

daddr Entry point name of the appropriate driver.

dt Device type code

DT.TYPE	Console typewriter
DT3447 DT3649 DT3248	405 card reader (defined by controller)
DT3446 DT3644 DT3245	415 card punch (defined by controller)

DT501 DT3254 DT505 DT512 DT580	Line printer (defined by unit)
DT3691	Paper tape (defined by controller)
DT3290	Display (defined by controller)
DT3293	Plotter (defined by controller)
DT607 DT606 DT604 DT603 DT659 DT657 DT608 DT602 DT601	Magnetic tape (defined by unit)
DT853 DT854 DT841 DT813 DT863	Mass storage (defined by unit)

cb Controlled backspace option in tape controller

CB	Available
Default	Not available

pcl Programmed clipping option in tape controller

PCL	Available
Default	Not available

asc1 ASCII option availability

1	Option available; valid only if ASCII hardware is available
0	Option not available

asc2 ASCII selection; this parameter sets the system default to ASCII without operator or JOB card selection.

1	Unit is ASCII
0	Unit is not ASCII

pb Address of external save area for compare error recovery on the card punch

d Usability indicator

DOWN	Device is unusable
UP or default	Device is usable and assignable

5.3 MST FORMAT

The mass storage table has one two-word entry for each mass storage drive in the system.

MST Entry

	23	17		11	05	00
Word 1	aut	u	c	osegs		
Word 2	dt	dn				

aut The ordinal of the AUT table entry for the unit

u Unit inoperable flag. Flag (bit 17) is set and cleared by system operator

c Device class.

  1 Class R
  0 Other than class R

osegs Number of file segments on the device that are currently open

dt Device type code (i.e. 50, 51, 52, 60, or 70)

dn Device number assigned to the disk pack currently mounted on-line

5.4 MST MACRO

The MST macro inserts entries in the MST.

MST (aut, dt, use)

aut Ordinal of unit's AUT entry (required)

dt Device type. Must be one of the following: DT853, DT854, DT841, DT863, or DT813

use UP specifies unit is up; DOWN specifies unit is down (temporarily inoperable). Default is up (optional parameter)

INTERIM LIBRARY 6

The interim library is a shortened edition of the MSOS version 5 library. When installing an MSOS version 5 library at a new installation (no library running) or at an MSOS installation using MSOS version 4, an interim library must be used as a temporary library to generate the version 5 library. An MSOS version 4 library cannot be used to generate an MSOS version 5 library directly.

The interim library contains the minimum product set members and resident routines that are needed to:

1. Reassemble COSY decks to change assembly options.
2. Modify the PRELIB binary source file.
3. Generate an MSOS 5 library.
4. Define, allocate, open,and close mass storage files.
5. Assemble, load, and execute COMPASS programs.
6. Process MSOS control statements.
7. Test and declare tracks up or down on mass storage devices.

In addition to the operating system routines required to load and execute programs†, the interim library contains the following product set members.

- COSY
- COMPASS
- PLIBEDIT
- PRELIB
- UTILITY (tape utility)
- MSUTIL (mass storage utility)
- BDTRCK (bad track utility)
- APC (automatic peripheral control)

The interim library does not contain FORTRAN, COBOL, ALGOL, L-MSIO, LISA, or SORT.

The interim library is supplied on the binary release tape 1 in two formats. The first is a library dump which can be loaded with the INST statement (IUP, section 4). The second format is a binary source file which can be used by PRELIB (MSOS version 4 or 5) to generate the interim library.

† CIO, CIC, JOBCTL, LOADER, OCAREM, EXEC

When the interim library is autoloaded, it requests a definition for the following files at the console typewriter.

LIB (library and directory)

INP (standard input unit)

OUT (standard output unit)

PUN (standard punch unit)

SCR (scratch packs and scratch tapes)

In each case, the operator must respond by typing a hardware type, a channel, unit, and equipment number, and a device type (for example, 854, 606, etc.). The operator must define LIB, INP, OUT, and two scratch units. He may omit the punch by pressing FINISH when a PUN is requested.

One scratch unit must be a mass storage drive. The second and any additional scratch units may be tape or mass storage drives. However, the maximum number of mass storage drives that can be assigned is three and the maximum number of scratch units that can be assigned is 11, if PUN is not assigned.

After each scratch unit is defined, the system requests the next scratch unit definition until a maximum of 11 scratch units have been assigned. The operator should assign as many scratch units as possible as it increases the running efficiency of the interim library. After the last scratch unit has been defined, the operator must press FINISH when the next request for a scratch unit is typed, in order to terminate any further requests for system units.

The system enters each system device in the AUT table as it is defined by the operator. The AUT permits a total of 15 definitions for system units. Ten of these can be scratch units if PUN is assigned. The system writes the unit definitions in the AUT table in the following order.

AUT Ordinal	System Unit	
1	Library	
2	Console typewriter (automatically assigned)	
3	Input	
4	Output	
5	Punch	(scratch if PUN definition not supplied)
6	Scratch	
7	Scratch	Only 3 of the 11 possible scratch entries may be
8	Scratch	mass storage devices.
.	.	
.	.	
.	.	
15	Scratch	

The device specified for the LIB file is the system device when the final MSOS library is generated. PRELIB allocates all system files (refer to section 9) on this device when it generates the final library. This device must be the device containing the interim library (that is, the device on which the interim library was installed by IUP).

The interim library may be made a permanent library if the user wishes. After all system units are defined, the message PERMANENT LIBRARY appears on the CTO. If the response is YES, the interim library is made permanent and any future uses of it requires only pressing AUTODUMP and typing the edition number.

6.1 DEFINITION OF ENVIRONMENT

```
* INTERIM LIBRARY *
DEFINE ENVIRONMENT

LIB = hhCcEeUuu

DT = ttt

INP = hhCcEeUuu

CDT = cccc

OUT = hhCcEeUuu

DT = ttt

PUN = hhCcEeUuuu (If PUN is not to be defined, press FINISH)

CDT = cccc

SCR = hhCcEeUuu

DT = ttt

SCR = (By pressing FINISH, the interim library environment is defined and
      PERMANENT LIBRARY is typed.)

PERMANENT LIBRARY (Respond with YES if this interim library is to be made
                  permanent.)
```

hh = Hardware type:

hh	Meaning
DP	Disk pack controller
CR	Card reader
PR	Printer
CP	Card punch
MT	Magnetic tape

c = Channel number 0 through 7

e = Equipment number (controller)

uu = Unit number (device)

ttt = Device number

cccc = Controller device type

When the standard units are defined, press FINISH. The request for DATE signals the end of interim library environment definition.

TABLE III-6-1. INTERIM LIBRARY RESPONSE TABLE

CTO Request	Unit DT/ CDT	Hardware Type	Channel Number	Equipment Number	Unit Number
LIB		DP	0 through 7	0 through 7	10 through 17 for 854/853/841 00 for 863
DT	853, 854, 841, 863				
INP		CR	0 through 7	0 through 7	00
CDT	3248, 3447, 3649				
INP		MT	0 through 7	0 through 7	00 through 07
DT	607, 606, 604, 603, 601, 657, 659				
OUT		PR	0 through 7	0 through 7	00
DT	501, 505, 512				
OUT		MT	0 through 7	0 through 7	00 through 07 (May not be previously defined)
DT	607, 606, 604, 603, 601, 657, 659				
PUN		CP	0 through 7	0 through 7	00
CDT	3245, 3446, 3644				
PUN		MT	0 through 7	0 through 7	00 through 07 (May not be previously defined)
DT	607, 606, 604, 603, 601, 657, 659				
SCR		MT	0 through 7	0 through 7	00 through 07
DT	607, 606, 604, 603, 601, 657, 659				
SCR		DP	0 through 7	0 through 7	10 through 17 for 853/854/841†
DT	853, 854, 841, 863, 813, 814				01, 02 for 863† 21, 22 for 813/814

†Duplicate entries are rejected.

6.2 INTERIM LIBRARY RESTRICTIONS

Each system and scratch unit can use only one controller device type and one magnetic tape, card reader, card punch, printer, disk pack, or disk file. If more than one type is assigned for a system or scratch unit, the interim library routine types the following message.

DUPLICATE ch, eq, /uu

In the message, ch is the channel number, eq is the equipment number, and uu is the unit number.

This condition negates the erroneous assignment and the interim library again requests assignment of the unit.

If an attempt is made to enter scratch devices beyond the available space in either the AUT table or MST table (depending upon device type), the interim library routine produces the following message.

AUT/MST TABLE OVERFLOW

This terminates requests for assignment of devices, and interim library generation continues.

If an illegal device or controller type is detected for a specific hardware type, the following message is issued.

ILLEGAL DEVICE FOR HT

The interim library routine then reissues the request for assignment of the unit.

6.3 AUTOLOADING INTERIM LIBRARY EXAMPLES

If autoloading the interim library from magnetic tape, set SELECT JUMP 6 and press AUTOLOAD. In the following examples, the underlined characters are typed by the operator.

Example 1: Device type 854

```
* INTERIM SYSTEM *
DEFINE ENVIRONMENT
LIB = DPC0E0U10
DT = 854

INP = CRC1E1U00
CDT = 3648  (Operator error; REPEAT is pressed)
CDT = 3649
OUT = PRC1E2U00
DT = 501
PUN = CPC7E7U00
CDT = 3446
SCR = DPC0E0U11
DT = 854
SCR = MTC4E4U00
DT = 604
SCR = MTC4E4U01
DT = 604
SCR =                    (Press FINISH)
PERMANENT LIBRARY YES (Press FINISH)
DATE mmddyy
Interim library is now autoloaded.
```

Example 2: Device type 863.

```
* INTERIM SYSTEM *
DEFINE ENVIRONMENT
LIB = DRC2E0U00
DT = 863
INP = CRC1E1U00
CDT = 3447
OUT = PRC1E2U00
DT = 501
PUN = CPC7E7U00
CDT = 3446
SCR = MTC4E4U00
DT = 604
SCR = DRC2E0U01        A minimum of two 863 drums are required to
DT = 863               generate a new MSOS library.
SCR =                  (Press FINISH)
PERMANENT LIBRARY NO   (Press FINISH)
DATE mmddyy
Interim library is now autoloaded.
```

6.4 MODIFYING THE INTERIM LIBRARY

The interim library PRELIB source code may be modified provided that the following assembly options are set as indicated when reassembling any of the COSY decks. Options not shown should remain the same as on the release tape.

```
         DELETE/    12
P1       EQU        0
         DELETE/    14,16
P3       EQU        0
P4       EQU        0
PANIC    EQU        1
CIC      DECK/

         DELETE/    274
P1       EQU        0
         DELETE/    276,277
P3       EQU        0
P4       EQU        0
CIO      DECK/

         DELETE/    54
P1       EQU        0
         DELETE/    56,57
P3       EQU        0
P4       EQU        0
SCARV50  DECK/

         DELETE /   11,15
FTN      EQU        0
CBL      EQU        0
ALG      EQU        0
UFTN     EQU        0
UCBL     EQU        0
EXEC     DECK/

         DELETE/    7
PR512    EQU        1
         DELETE/    9
MMTC     EQU        1
         DELETE/    13
IL.INIT  EQU        1
INITIAL  DECK/

         DELETE/    4
PR512    EQU        1
JOBCTL11 DECK/
```

Care should be exercised when modifying the PRELIB source to ensure that DRIV3245, DRIV3644, and DRIV3436 are included in the new source file.

If the 813 disk file is to be used as a scratch unit, deck MISC2 must be reassembled with the DT813 option set.

```
         DELETE/    20
DT813    EQU        1
MISC2    DECK/
```

PLIBEDIT 7

PLIBEDIT is a routine that deletes and adds subprograms, routines, and PRELIB control statements to the PRELIB binary source file.† Before creating a new library, a PLIBEDIT run is normally made to modify the PRELIB source file. The existing (or release) PRELIB source file is input to PLIBEDIT, and PLIBEDIT generates a new PRELIB source file. The new file is input to PRELIB to generate a new library edition.

7.1 I/O FILES

PLIBEDIT uses the following I/O files.

CPF	Logical unit 01; current PLIBEDIT file
NPF	Logical unit 02; new PLIBEDIT file
CFO	Logical unit 58; comment from operator
CTO	Logical unit 59; comment to operator
INP	Logical unit 60; standard input file
OUT	Logical unit 61; standard output file

The standard system files (58, 59, 60,61, and 62) are assumed to be present and defined. The CPF and NPF files must be equipped or opened as mass storage files with a $FET and OPEN statement. Additional input (logical units and file ordinals) may be used via FILE/ or UNIT/ control cards. These must be equipped and opened by the user. Any logical unit number or file ordinal which does not conflict with systems devices or the above mentioned units may be used. The CPF and NPF may be mass storage or tape files. If on mass storage, the block size must be two sectors. Tape files may be unblocked card images or may be blocked in universal format (1280 characters).

7.2 PLIBEDIT STATEMENTS

Execution of PLIBEDIT requires PLIBEDIT and MSOS control cards.

PLIBEDIT is called by the $^{7}_{9}$ PLIBEDIT control card.

$^{7}_{9}$ PLIBEDIT,x

x = type of output (NPF) file blocking

U = Unblocked tape files or two sector per block for mass storage files

B = 1280 characters per block for tape or two sectors per block for mass storage

omitted = Same as input (CPF) file

† The PRELIB source file consists of all the PRELIB control statements necessary to generate an MSOS version 5 library, a binary copy of each subprogram and routine to be on the library, and a BCD copy of each COMPASS macro to be on the library.

PLIBEDIT processing is directed by 14 user-prepared control cards:

DELETE/	UNIT/
INSERT/	COMMENT/
REPLACE/	REWIND/
LOCATE/	ENDEDIT/
SKIP/	MCHANGE/
POSITION/	MACRO/
FILE/	MCHECK/

Use the following symbols.

X	One to eight BCD characters or numbers of a deck name
X_1	One to eight BCD characters or numbers of a deck name
Y	One to twenty BCD characters or numbers of a control card, excluding column 1
Z	One to eight BCD characters or numbers of macro name
F	File ordinal
U	Logical unit of magnetic tape

7.2.1 DELETE/

PLIBEDIT deletes specified decks or control cards and copies from standard input onto the NPF any binary cards following the DELETE/ card until the next PLIBEDIT control card is encountered.

X	DELETE/		Deck X is deleted
X	DELETE/	X_1	Decks X through X_1 are deleted
	DELETE/	Y	Control card Y is deleted

7.2.2 INSERT/

PLIBEDIT inserts the binary cards following an INSERT/ card up to the next PLIBEDIT control card.

X	INSERT/		Binary cards which follow are inserted in front of deck X
	INSERT/	Y	The following binary cards are inserted in front of control card Y

7.2.3 REPLACE/

PLIBEDIT deletes the specified decks or control cards and replaces these decks with the cards following the REPLACE/ card until a PLIBEDIT control card is encountered.

X	REPLACE/		Deck X is replaced
	REPLACE/	Y	Control card Y is replaced

7.2.4 MCHANGE/

PLIBEDIT places on the designated LUN or FO the binary decks following an MCHANGE/ card up to the next PLIBEDIT control card. A table is generated with a deck name for each entry. Each time an IDC card is encountered on the current PLIBEDIT file, a search of the table occurs. If a matching deck name is found, the deck is placed on the new PLIBEDIT file. Multiple replacement is done with an MCHANGE/ card.

FILE	MCHANGE/	F
UNIT	MCHANGE/	U

7.2.5 LOCATE/

PLIBEDIT locates the current PLIBEDIT file to the specified deck, control card, or n number of end-of-files.

X	LOCATE/		TRA card of deck X is located and all preceding decks or cards including the TRA card are copied onto NPF.
	LOCATE/	Y	Control card Y is located and preceding decks or cards are copied onto NPF. Card Y is copied onto NPF. Y must be 1 through 20 BCD characters or numbers, excluding column 1.
	LOCATE/	EOF=n	Locate CPF past n end-of-files. The value of n must be 1 through 9.
X	LOCATE/	n	TRA card of deck X plus n card images are located. Preceding decks or cards are copied onto NPF. Card n is copied onto NPF. The value of n must be 1 through 99.
	LOCATE/	n	Locate n card images. The value of n must be 1 through 99. Preceding decks or cards and card n are copied onto NPF.

NOTE

LOCATE/ does not locate cards within a macro set.

7.2.6 SKIP/

PLIBEDIT skips cards or skips cards following a specified deck.

	SKIP/	n	Skip n cards. The value of n must be 1 through 99. CPF is ready to process card n + 1.
X	SKIP/	n	Locate to TRA of deck X and skip n cards at that point. TRA card of deck X is copied onto NPF with all preceding decks or cards. CPF is ready to process card n + 1.

NOTE

SKIP/ does not skip cards within a macro set.

7.2.7 POSITION/

PLIBEDIT positions the current PLIBEDIT file (CPF) to the specified deck or control card.

X	POSITION/		TRA card of deck X is located. Preceding decks or cards, including the TRA card, are skipped.
	POSITION/	Y	Control card Y is located and preceding decks or cards including control card Y are skipped.

NOTE

The CPF is positioned on the next control card or IDC card.

7.2.8 FILE/

PLIBEDIT accepts decks from mass storage files.

X	FILE/	F	Deck X is accepted from file ordinal F and is inserted at current location of NPF. CPF location remains unchanged.
	FILE/	F	Input is accepted from file ordinal F until an end-of-file is encountered. Input is inserted at current location of NPF. CPF location remains unchanged.

7.2.9 UNIT/

PLIBEDIT accepts decks from magnetic tape units.

X	UNIT/	U	Deck X is accepted from LUN U and is inserted at current location of NPF. CPF location remains unchanged.
	UNIT/	U	Input is accepted from LUN U until an end-of-file is encountered. Input is inserted at current NPF locations. CPF position remains unchanged.

7.2.10 COMMENT/

PLIBEDIT provides a means of communication between programmer and a PLIBEDIT history output. The information given as the Y field is displayed on the standard output unit. Y may be 1 through 52 BCD characters.

COMMENT/ Y

7.2.11 REWIND/

REWIND/	CPF is rewound

7.2.12 ENDEDIT/

PLIBEDIT continues process of input with the preceding control cards until an ENDEDIT/ card is encountered. Input from CPF, at its current position, is copied onto NPF until an end-of-file is encountered. Control is returned to PLIBEDIT.

ENDEDIT/

7.2.13 MACRO/

PLIBEDIT inserts or deletes macro sets or macro decks, and copies from the standard input (INP) to NPF up to the next PLIBEDIT control card. In the descriptions that follow, the term macro set refers to a $^{7}_{9}$MACRO, Z name card, BCD cards, and an END card. The term macro deck refers to an individual macro within a macro set, and includes a macro header card and data through an ENDM macro terminator card. The term macro deck applies only to COMPASS macros; COBOL macros are always considered sets.

	MACRO/	MACRO, Z	Macro set with name Z is deleted. If the set is to be deleted and replaced, a macro set must follow on INP.
X	MACRO/	MACRO, Z	Macro deck X is deleted in macro set Z. BCD cards that follow on INP are copied to NPF up to the next PLIBEDIT control card.
	MACRO/	X	IDC card X is located on CPF and the macro set following on INP is inserted before IDC card X.
X	MACRO/	Z	The macro deck following on INP is inserted before macro deck X in macro set Z.
	MACRO/		The macro set following on INP is inserted on NPF at the current position. The X and Z field of the MACRO/ control are blank. If the current position of NPF is in a macro set from a previous deck operation, the remainder of the macro set is copied from CPF to NPF. Then the macro set on INP up to the next PLIBEDIT control card is copied to NPF.

7.2.14 MCHECK/

PLIBEDIT builds an MCHANGE table entry (section 7.2.4) for each IDC card encountered in the binary decks on the specified logical unit. Each time an IDC card is encountered on the current PLIBEDIT file, a search of the table occurs. If a matching deck name is found, the deck on lun is placed on the new PLIBEDIT file. Multiple replacements can be done with this control card.

If lun is a magnetic tape, the cards must be unblocked. If lun is a mass storage file, the cards must be blocked with a block size of 960 characters.

```
FILE
UNIT      MCHECK/     lun
```

An example of a job designed to transfer the PRELIB source to mass storage follows:

```
$JOB
$EQUIP,01=MT
$FET,PRELIB,SOURCE,1280
$ALLOCATE,350
$OPEN,02
$FET,SYSTEM,BINARIES,960   }  Assumes binary decks were assembled
$OPEN,03                   }  using an X=03.
$PLIBEDIT
FILE      MCHECK/     03
          ENDEDIT/
$CLOSE,02
$FET,PRELIB,SOURCE,1280
$RELEASE,UNUSED
$MODIFY,I
77
88
$EOJ
```

7.3 PLIBEDIT MESSAGES

Messages appear only on the printer. Messages prefixed by D are bracketed by lines of asterisks.

Message: I PLIBEDIT 001 PLIBEDIT BEGIN...DATE=dd/mm/yr...PAGE 01
Significance: Heading of first page.
Action: None

Message: I PLIBEDIT 002 PLIBEDIT CONTINUED...
Significance: Heading of pages 2 through n.
Action: None

Message: A PLIBEDIT 004 INFORM USER OF I/O TROUBLE ON LUN 61
Significance: Irrecoverable error on logical unit 61.
Action: Operator must inform programmer of abort conditions.

Message: D PLIBEDIT 005 IRRECOVERABLE WRITE ERROR LUN xx
Significance: Unit is down or operation is abandoned as a result of a write error on logical unit xx.
Action: In response to error recovery message, operator typed D, down or A, abandon.

Message: D PLIBEDIT 006 IRRECOVERABLE READ ERROR LUN xx
Significance: Unit is down or operation is abandoned as a result of a read error on logical unit xx.
Action: In response to error recovery message, operator typed D, down or A, abandon.

Message: I PLIBEDIT 007 CARD CHECKSUM ERROR W.C. = xx, A.F. = xxxxx.
Significance: Checksum error on card with word count xx and address field xxxxx.
Action: Correct error condition.

Message: I PLIBEDIT 008 CHECKSUM ERROR IN ABOVE DECK
Significance: Checksum error in last deck named.
Action: Correct error condition.

Message: D PLIBEDIT 009 Y-FIELD ERROR-RUN ABORTED
Significance: Illegal Y field in last control card printed.
Action: Correct Y field on control card.

Message: I PLIBEDIT 010 FORGOTTEN JOB CARD-IGNORED
Significance: A JOB card is part of input data. Card is ignored.
Action: Remove card before next run.

Message: I PLIBEDIT 011 FORGOTTEN BLANK CARD-IGNORED
Significance: A blank card is part of data. Card is ignored.
Action: Remove card before next run.

Message: D PLIBEDIT 012 UNIDENTIFIABLE CARD-RUN ABORTED
Significance: BCD card unidentifiable. Run aborts.
Action: Identify correctly or remove before next run.

Message: I PLIBEDIT 013 FORGOTTEN EOF CARD-IGNORED
Significance: An end-of-file card is part of data. Card is ignored.
Action: Remove card before next run.

Message: D PLIBEDIT 014 REQUESTED C.C/DECK NAME CANNOT BE FOUND-RUN ABORTED.
Significance: Last control card or deck name printed before diagnostic cannot be found on current PLIBEDIT file. Run is aborted.
Action: Check deck name spelling. Reassemble.

Message: D PLIBEDIT 015 MCHANGE TABLE OVERFLOW-RUN ABORTED
Significance: Multiple change table has overflowed. Run aborts.
Action: Maximum number of change decks has been exceeded.

Message: D PLIBEDIT 016 UNIDENTIFIED UNIT xx
Significance: Unit xx is not equipped, assigned, or opened. Run aborts.
Action: Equip, assign, or open the unit.

Message: D PLIBEDIT 017 ILLEGAL BLOCK SIZE FOR UNIT 0x
Significance: The mass storage file for NPF is out of range; it must be 512 through 1280 characters. Run aborts.
Action: Reallocate the file.

Message: I PLIBEDIT 018 OUTPUT TAPE IN BLOCKED
UNBLOCKED FORMAT
Significance: Informs operator of format of output tape.
Action: None.

Message: D PLIBEDIT 019 PLIBEDIT CONTROL CARD ERROR
Significance: The control card listed immediately preceding the message is in error. Run aborts.
Action: Correct the card in error before next run.

Message: D PLIBEDIT 020 IRRECOVERABLE REJ. ON LUN xx
Significance: Irrecoverable reject on logical unit xx. Run aborts. RAARREJ was entered.
Action: In response to ready message, operator typed D, down, or A, abandon.

Message: D PLIBEDIT 021 IRRECOVERABLE MSREJ. xx ON FO. xx
Significance: Irrecoverable reject xx on file ordinal xx. Run aborts.
Action: Locate xx reject error in MSIO. Correct error condition.

Message: D PLIBEDIT 022 ILLEGAL RECORD SIZE ON PICK FILE ORDINAL 01
Significance: Record header length is of illegal value. Probable cause is hardware malfunction. Run aborts.
Action: Consult customer engineer if error occurs on next run.

Message: I PLIBEDIT 023 CARD SEQUENCE ERROR
Significance: Consecutive IDC or TRA cards or a TRA card not preceded by an IDC card.
Action: Check and correct the binary decks before next run.

Message: I PLIBEDIT 099 PLIBEDIT COMPLETED
Significance: PLIBEDIT run is completed.
Action: None

PRELIB 8

The MSOS product set includes PRELIB for the purposes of generating new library editions and creating auxiliary relocatable library files. PRELIB allows the user to absolutize frequently used system programs (COMPASS, FORTRAN, etc.) and eliminate the necessity to relocate and link their routines each time they are called. The capabilities to delete, insert, and replace routines from the input edition to the output edition are also available.

PRELIB generates a new edition (OE) using the input edition (IE), if specified as a parameter, or the autoloaded edition (AE). OE must not be equal to any edition currently in existence on the system device. The IE or AE edition remains on the system device and may be autoloaded and used if desired. Old editions may be purged via MSUTIL (refer to the MSOS Operator's Guide).

When modifying file 2 absolute records and/or relocatable subprograms, no other routines need be changed.† Whenever resident or variable resident is modified, all other routines in the ABS and RES files must be reabsolutized.

Before a PRELIB run, use MSUTIL to enter a scratch pack into the system and then enter a RAT statement for the pack so that the system can allocate PRELIB scratch files on it. This greatly reduces processing time because less head movement is necessary during the PRELIB run.

If PRELIB terminates abnormally during the copyback stage, the user should purge the library edition being built before attempting regeneration of the library. This ensures release of all files allocated and opened internally by PRELIB. PRELIB internally assigns the following file/logical unit numbers. They must not be assigned to other files or units by the user.

1 RESFILE: Current system resident file

2 RESX: New resident file

3 ABSFILE: Absolute file of current system

4 ABSX: New absolute file

5 LIBFILE: Relocatable file of current system

6 LIBX: New relocatable file

7 LIBDIRFILE: DRS of current system

8 DRSX: New directory of relocatable subprograms

9 SCRX: Scratch buffer for PHASE1

10 ABUFX:

11 BBUFX:

12 CBUFX:

13 DBUFX:

(10–13) Scratch buffers for PHASE2

† File 1 is the variable resident section of the ABS file (section 9). File 2 is the section of the ABS file containing absolutized routines that are not part of the system executive, such as the COMPASS assembler, the FORTRAN compiler, etc.

CAUTION

Do not use class-R packs as scratch packs when generating new libraries. Auxiliary libraries, however, may reside on class-R packs.

8.1 LOADING AND EXECUTION

PRELIB uses all of available memory. It may be run while a priority program is in execution. The PRELIB user must be familiar with the PRELIB source deck supplied for installation.

PRELIB detail cards (PDC) are binary cards for the relocatable programs to be placed on the new library. Each deck must begin with an IDC card and end with a TRA card.

8.2 PRELIB CONTROL CARDS

PRELIB control cards (PCC) direct PRELIB in the generation of a new library. They allow addition and deletion of records and entry points. Unlike MSOS control cards, PRELIB control cards must begin with $^{7}_{9}$; a $ is not allowed.

8.2.1 PRELIB

The user loads PRELIB into core with the PRELIB statement. When JOBCTL encounters a PRELIB card, it calls LOADER to load PRELIB and its overlays and segments from file 2 of the library. JOB, EQUIP, and other required MSOS control cards precede the PRELIB card.

MSOS gives control to PRELIB, which reads the PRELIB binary source file or PRELIB control statements from INP or from the I=lun unit. PRELIB executes automatically when called; a RUN card is not needed. There are two formats of the PRELIB control card. If modifications are to be made to the main library, it has the following format.

$PRELIB, S, A, v, ie, oe, I=lun

S — If S is present, PRELIB generates a suppressed history of updated files on OUT. If S is omitted, PRELIB generates a detailed history of updated files on OUT.

A — Must be present if modifications include file 1 absolute records to be absolutized; A is omitted if modifications are for the relocatable file only or if the entire system is being rebuilt.

v — Variant of system being generated. †

- P A memory protection variant is being generated.
- E An extended core variant is being generated.

If this parameter is blank or omitted, a standard system is being generated. This parameter has no influence on LIBFILE modifications.

ie — Two alphanumeric characters designating the input library edition for this PRELIB run. PRELIB reads input library edition ie and modifies it in accordance with the PRELIB control cards to create a new library edition. If ie is omitted, PRELIB assumes ie to be the edition currently running, or that a binary source file is being input to create a brand new library.

oe — Two alphanumeric characters designating the name for the output edition. It must be specified and distinct from any other edition.

lun — Logical unit number for the input file. If this parameter is omitted, the standard input file, INP, is assumed. If lun is a mass storage file, it must be blocked in universal format. Tape files may be blocked or unblocked, but if blocked they must be in universal format.

When only an auxiliary library is to be generated, the PRELIB control card is as follows:

$PRELIB, S, AUX, alf, n, I=lun

S — Same as above

AUX — Required

alf — Logical unit number of the auxiliary library file. The AUX library file must be allocated and opened by the user prior to entering PRELIB. Its block size is 960 characters.

n — Number of blocks to be saved for the AUX DRS. If omitted, 20 blocks are saved (41 symbols can be placed in each block; 20 blocks are sufficient for all the primary entry points in the UFTN object-time routines).

lun — Logical unit number for the input file. If this parameter is omitted, the standard input file, INP, is assumed. If lun is a mass storage file, it must be blocked in universal format. Tape files may be blocked or unblocked, but if blocked they must be in universal format.

† P or E must be present for an MP/ANSI COBOL PRELIB run.

8.2.2 FILE

A FILE card signals the completion of RESFILE and ABSFILE processing. If the FILE card is the first card in the PRELIB input deck, the old RESFILE and ABSFILE are merely copied. The second FILE card signals the end of the relocatable file (LIB-FILE) processing.

$^7_9$FILE, lu, n

lu	Logical unit of the auxiliary library file. The AUX library file must be allocated and opened by the user prior to entering PRELIB. Its block size is 500 characters.
n	Number of blocks to be saved for the AUX DRS (refer to section 8.2.1).

8.2.3 EXPAND

The EXPAND control card is provided as a means for the installation to expand the size of the MSDFILE, LABELFILE, and the IDFILE at PRELIB time.

Although this card is optional, when it is used it must follow the PRELIB control card.

$^7_9$EXPAND, n_1, n_2, n_3

n_1	Decimal digits, $1 \leq n \leq 99$; number of tracks to expand MSD. If omitted, a comma must delineate the field.
n_2	Decimal digits, $1 \leq n \leq 99$; number of tracks to expand LABELFILE. If omitted, a comma must delineate the field.
n_3	Decimal digits, $1 \leq n \leq 99$; number of tracks to expand IDFILE.

8.2.4 REPLACE

A REPLACE card indicates that an entire relocatable file is to be replaced or identifies particular records in file 2 to be replaced. A REPLACE card may be followed by a file 2 UNIT card if the replacement records are not on INP.

Absolute records that are replaced are entered at the end of the absolute file on the new library.

$^7_9$REPLACE, name_i, name_n

name_i, name_n Subprogram on existing relocatable file or blank. The possible combinations specify the following actions.

name_i	name_n	Action
Specified	Specified	Replace subprograms name_i through name_n with PDC records following REPLACE on INP, or with PDC records on unit specified by unit card following REPLACE.

$name_i$	$name_n$	Action
Blank	Specified	Replace subprograms from beginning of relocatable file through $name_n$ with indicated PDCs.
Specified	Blank	Replace subprograms from $name_i$ to end of relocatable file with indicated PDCs.
Blank	Blank	Replace entire relocatable file or RESFILE/ABSFILE with PDCs which follow.

When $name_i$ is the same as $name_n$, only the one subprogram is replaced.

8.2.5 DELETE

A DELETE control card prevents the transfer of the designated records from the old library to the new one. The user must delete subprograms in the order of their appearance in the absolute file and in the relocatable file. There is no provision for deletion of individual resident subprograms since any modification of resident requires a complete regeneration of the system.

$^7_9$DELETE, $name_i$, $name_n$

$name_i$, $name_n$ Subprograms on existing relocatable file or blank. The possible combinations specify the following actions.

$name_i$	$name_n$	Action
Specified	Specified	Delete subprograms $name_i$ through $name_n$ on relocatable file.
Blank	Specified	Delete subprograms from beginning of relocatable file through $name_n$.
Specified	Blank	Delete subprograms from $name_i$ through end of relocatable file.
Blank	Blank	Delete entire relocatable file.
Name		Delete named absolute record; name must not be followed by a comma.

When $name_i$ is the same as $name_n$, only the one subprogram is deleted.

8.2.6 INSERT

INSERT control cards add records. Records are inserted on the relocatable file immediately after the named subprogram. If no subprogram is specified, the new records become the first records of file 2.

$^{7}_{9}$INSERT, name

name Subprogram on existing relocatable file or blank

8.2.7 UNIT

UNIT control cards specify the logical unit, other than INP, containing PRELIB detail cards. When a UNIT card is used to change resident or variable resident, it must follow an origin card or the PRELIB detail TRA card. When a UNIT card is used to control modifications of a relocatable file, it may follow a REPLACE, INSERT, or DELETE card.

During execution, PRELIB uses file ordinals 1 through 13 for its own scratch files.

$^{7}_{9}$UNIT, u

u Logical unit or file ordinal containing PRELIB detail deck

8.2.8 MACRO

MACRO control cards direct PRELIB to read Hollerith cards and write on the new library in a form compatible with the system languages.

$^{7}_{9}$MACRO, p, u

p Symbolic name, such as COMAC, that identifies a group of macros to be written

u Logical unit containing the macro cards. If blank, file 60 (input unit) is assumed. Otherwise, u is the COSY Hollerith output file number

PRELIB adds a pseudo IDC card (word count of 70_8) and then processes the macro cards.

Each 80-column Hollerith card is read into core as a 20-word BCD record modified as follows:

Word 20 (columns 77 through 80) is deleted.

Words 1 through 19 are renumbered 2 through 20.

A new word 1 with a w field of 71_8 and with a $^{7}_{9}$ punch in column 1 is added. Two such cards are then written as a 40-word BCD card image.

Macros used by COMPASS are required to occur in COMAC.

An END card (columns 10 through 12) must follow the last macro in the PRELIB input stream.

8.2.9 RECORD

A RECORD control card marks the beginning of a new record to be absolutized. A RECORD card must be followed by an ORIGIN card.

$^7_9$RECORD, CLST

CLST When present, CLST causes PRELIB's symbol table to be cleared and initialized with only system entry points.

8.2.10 ORIGIN

An ORIGIN control card designates a loading position within a simulated target memory.

$^7_9$ORIGIN, n, i

n Unsigned 1- to 5-digit octal number or previously defined entry point in file 1. Previously defined entry point may be modified by signed (+ or -) 1- to 5-digit octal number.

i Unsigned 1- to 5-digit octal number indicating the number of words to be deleted from beginning of routine when record is written from core. May be blank.

8.2.11 SEPOINT

SEPOINT control cards define system entry points in the executive resident routines. System entry points are symbolic addresses that batch and priority programs can make jumps or return jumps to without causing a program error. The system entry points are permanently entered in the loader symbol table when the library is created.

$^7_9$SEPOINT, name

name Symbolic address in a resident executive routine (routines on RES file).

All SEPOINT cards must immediately follow the LOADER routine on the PRELIB source file.

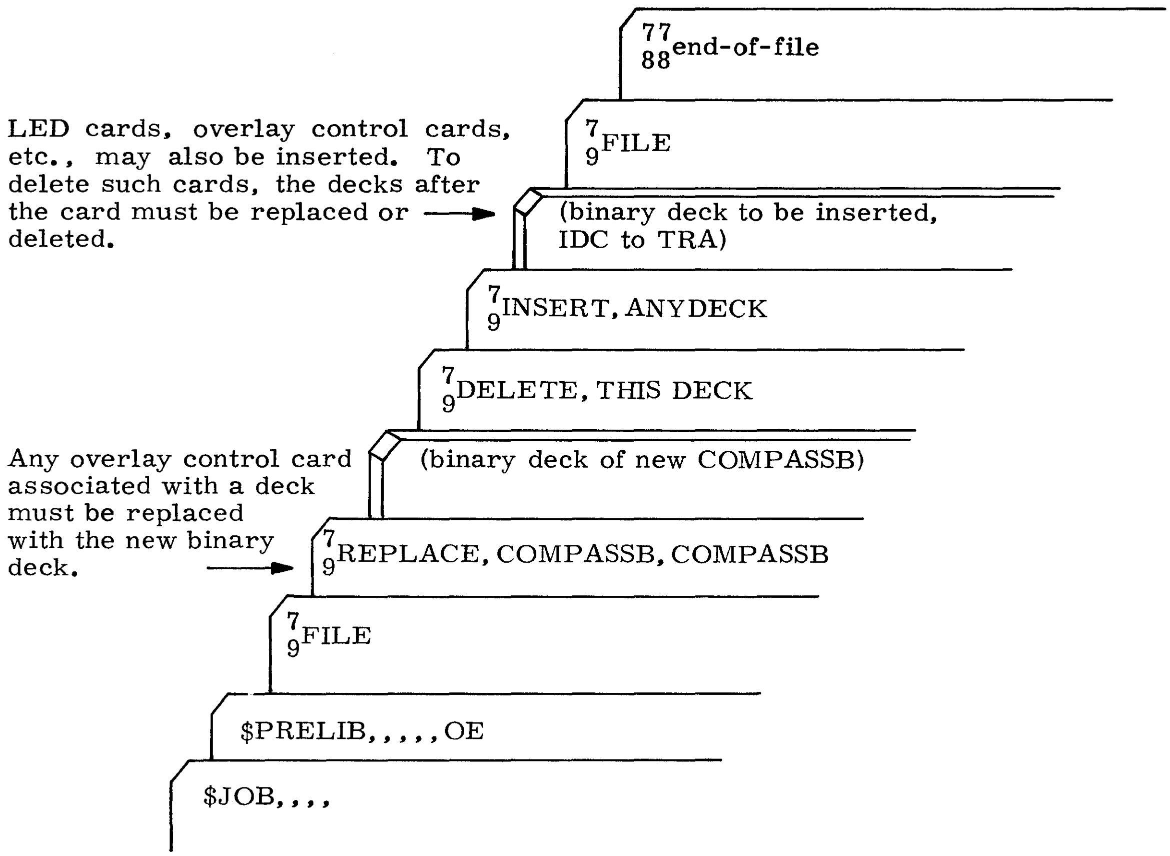
If a SEPOINT name is undefined in the executive resident routines (with an ENTRY statement), name is equated to ABNORMAL. Any program that references the symbol will be terminated by ABNORMAL.

When an existing library is modified and one or more of the routines on the ABS file are changed, PRELIB uses the absolute addresses from the running library's loader symbol table for linking to system entry points. Therefore, the input library edition (the ie parameters on PRELIB card) must be the same as the library being used to run the job. If the editions are not the same, the routines on the ABS file will be linked to the wrong address in the system executive.

8.3 PRELIB EXAMPLES

8.3.1 MODIFY RELOCATABLE ROUTINES

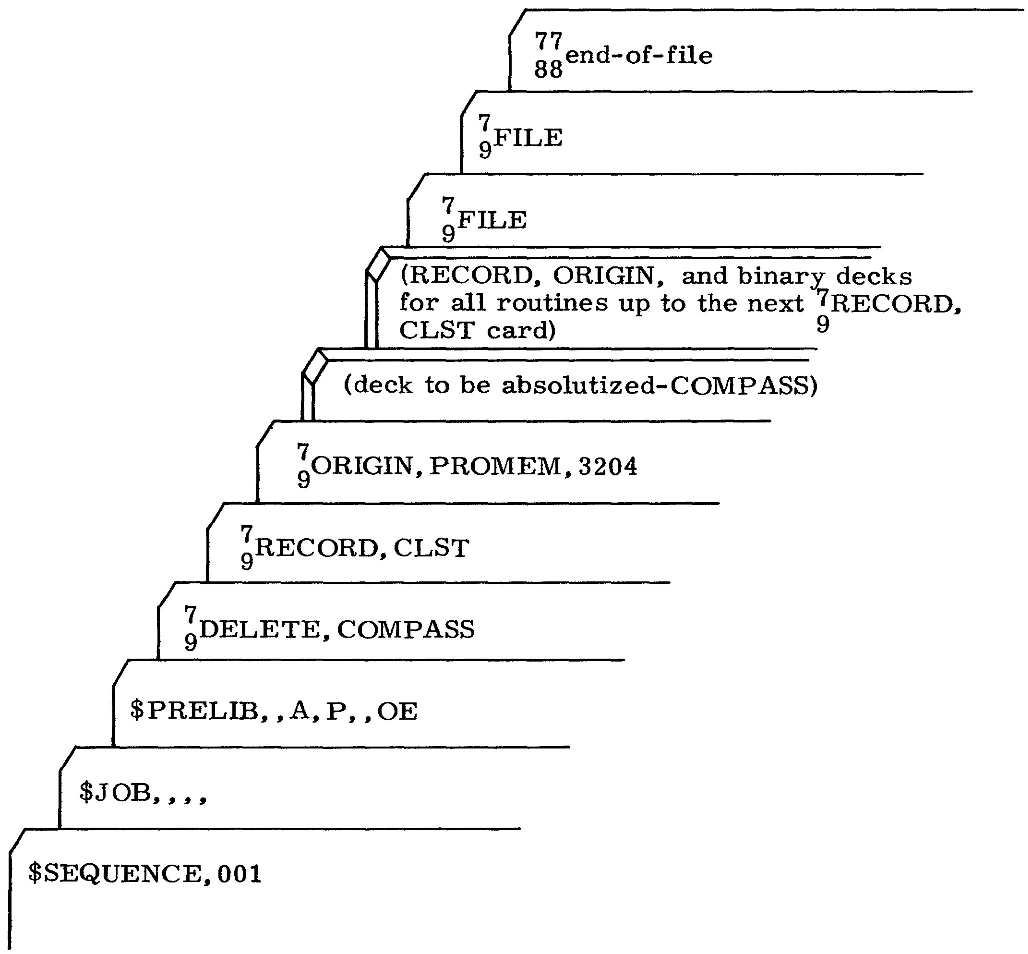
Replace, delete, and insert relocatable routines in file 2.



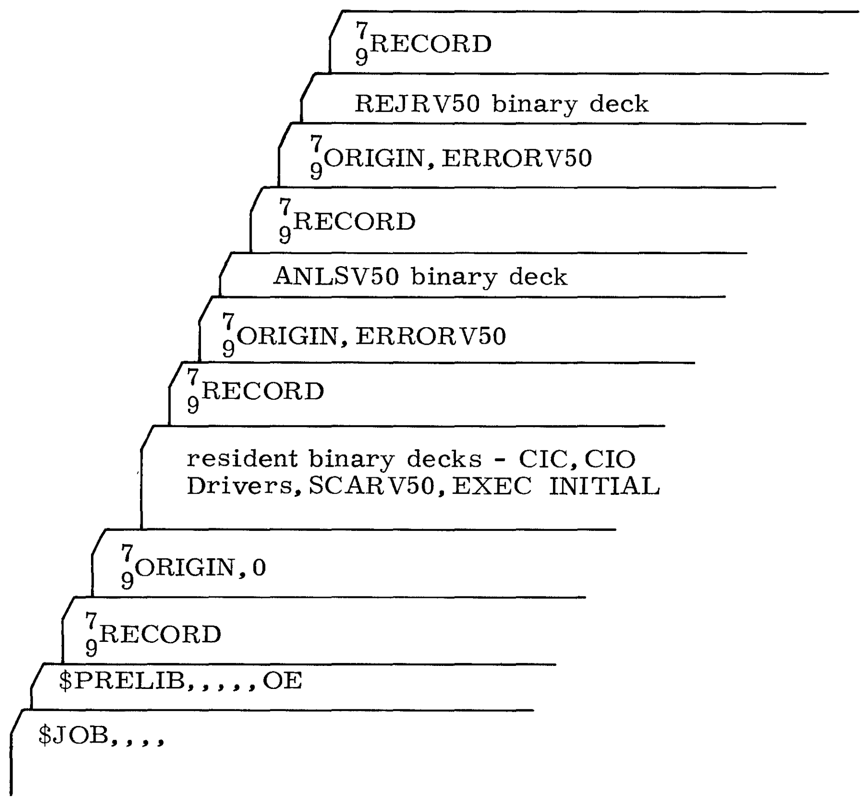
8.3.2 REPLACE ABSOLUTIZED PROGRAMS

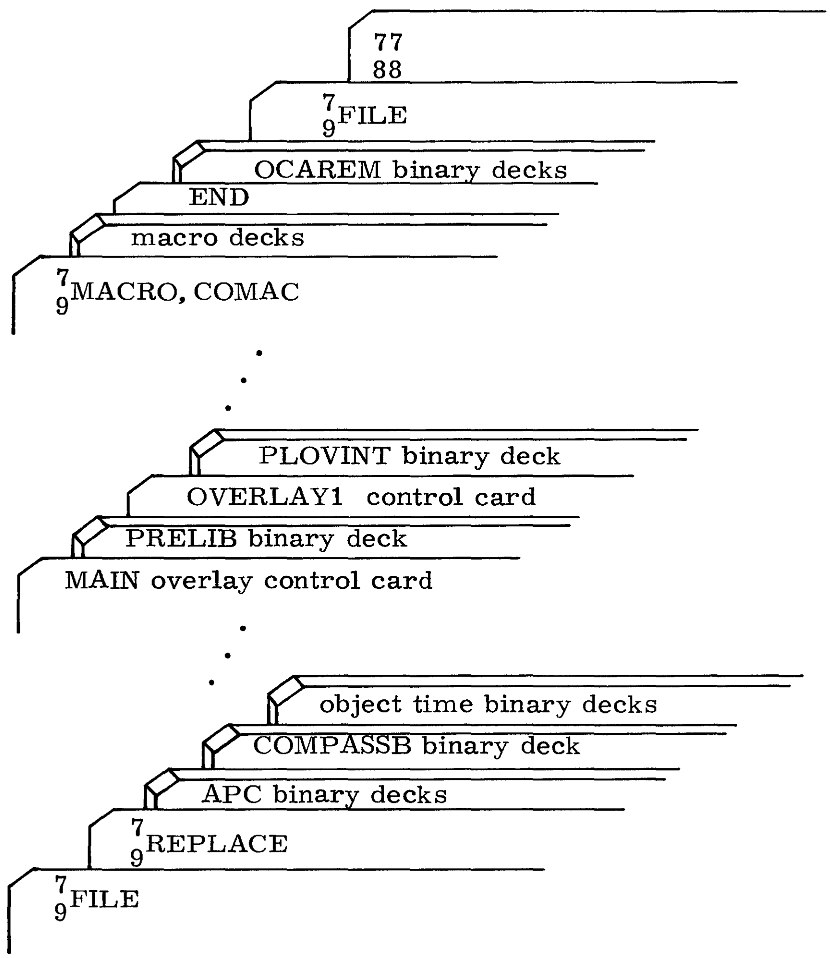
Those products in file 2 partially comprised of absolute routines with overlays or segments (COMPASS, FORTRAN, etc.) can be modified. Resident and variable resident need not be changed.

For example, to replace only COMPASS, all routines up to the next $^{7}_{9}$RECORD, CLST must be replaced.



8.3.3 REPLACE ENTIRE SYSTEM




77
88
7
9FILE
OCAREM binary decks
END
macro decks
7
9MACRO, COMAC
PLOVINT binary deck
OVERLAY1 control card
PRELIB binary deck
MAIN overlay control card
object time binary decks
COMPASSB binary deck
APC binary decks
7
9REPLACE
7
9FILE

8.4 ALLOCATION OF THE ABS AND RES FILES

When generating a new edition of MSOS, PRELIB allocates the new ABS, RES, DRS, and LIB files. However, the ABS and RES files require contiguous space. Sometimes there is not enough contiguous space to allocate the new edition, although sufficient noncontiguous space is available. In this case, one of the following steps may be necessary.

1. Release unnecessary files from the system pack. System scratch files 54, 55, and 56 can be reallocated on a scratch pack (refer to part II, section 7).

2. Release unused portions of files where possible. For PRELIB only file 55 is needed at 500 blocks.

3. Dump files onto tape using MSUTIL. They may be returned to mass storage after PRELIB. This method is especially useful if the file is bounded by unallocated area.

4. If there is enough noncontiguous space available for the ABS or RES files, a dummy file may be used to reallocate this space so it is contiguous. An example of this is illustrated in Figure III-8-1, where edition E1 is to be purged and edition E3 created. The ABS file for edition E3 does not fit the space which E1 occupied prior to being purged. Allocation of a dummy file before the PRELIB for edition E2 provides the needed contiguous space if the dummy file and E1 are released before the PRELIB for edition E3.

5. The relocatable routines that are used less frequently can be stripped from the main LIB file and placed on an AUX LIB file. This file does not have to reside on a system device.

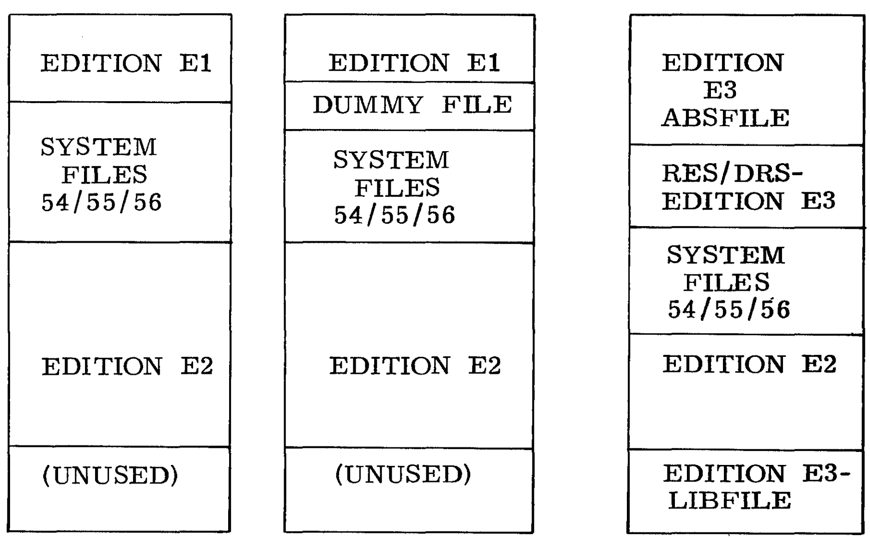


Figure III-8-1. Use of Dummy File to Facilitate Generating New Library Editions

8.5 PLOV2 LISTABLE OUTPUT

A history of the second file update of the LIBT is produced on OUT during PLOV2 execution. This listing contains the names of all relocatable subprograms contained on the updated file in the following format.

```
t        nnnnnnnn LENGTH=xxxxx COMM=xxxxx DATA=xxxxx ** mm dd yy
              ENTRY POINTS
              f  pppppppp        f  pppppppp  .....
              EXTERNAL REFERENCES
              n  rrrrrrrr        n  rrrrrrrr  .....
```

where t = V if the subprogram is a MAIN, OVERLAY, SEGMENT

= M if it is a macro

= Blank if otherwise

nnnnnnnn = The subprogram name from $^{7}_{9}$IDC card

xxxxx = The lengths of the subprogram, length of common block and length of data block, respectively

mm/dd/yy = The assembly date of the binary deck if specified

f = D for doubly defined entry points

= S for uncallable entry points

= Blank if otherwise

pppppppp = The entry point names as obtained from $^{7}_{9}$EPT card(s)

n = B if external reference refers to an entry point already defined

= Blank if otherwise

rrrrrrrr = The names of the external references as obtained from the $^{7}_{9}$XNL card(s)

When the request is made to suppress this listing, only t nnnnnnnn as defined previously is listed.

MSOS/OCAREM SYSTEM FILE MAINTENANCE 9

The following information is provided to aid in the maintenance of MSOS system files. At installation time, the OCAREM related files are initialized. If special circumstances warrant modifying these files, this section should be consulted.

Under MSOS, one mass storage device is reserved for a system device which must remain on-line at all times. The utilization of this device is illustrated in Figure III-9-1. This device contains the following MSOS system files, OCAREM files, and logical MSIO file.

MSOS system files	RESIDENT FILE (RESFILE)
	ABSOLUTE FILE (ABSFILE - FO 67)
	LIBRARY FILE (LIBFILE - FO 63)
	DIRECTORY OF RELOCATABLE SUBPROGRAMS FILE (LIBDIRFILE - FO 68)
	SCRATCH FILES (FILE54, FILE55, FILE56 - FO 54, 55, 56)
OCAREM files	FILE LABEL DIRECTORY FILE (LABELFILE - FO 66)
	IDENTIFICATION FILE (IDFILE - FO 65)
	MASS STORAGE DIRECTORY FILE (MSDFILE - FO 64)
Logical MSIO file	L-MSIO Overlay File (L-MSIO)

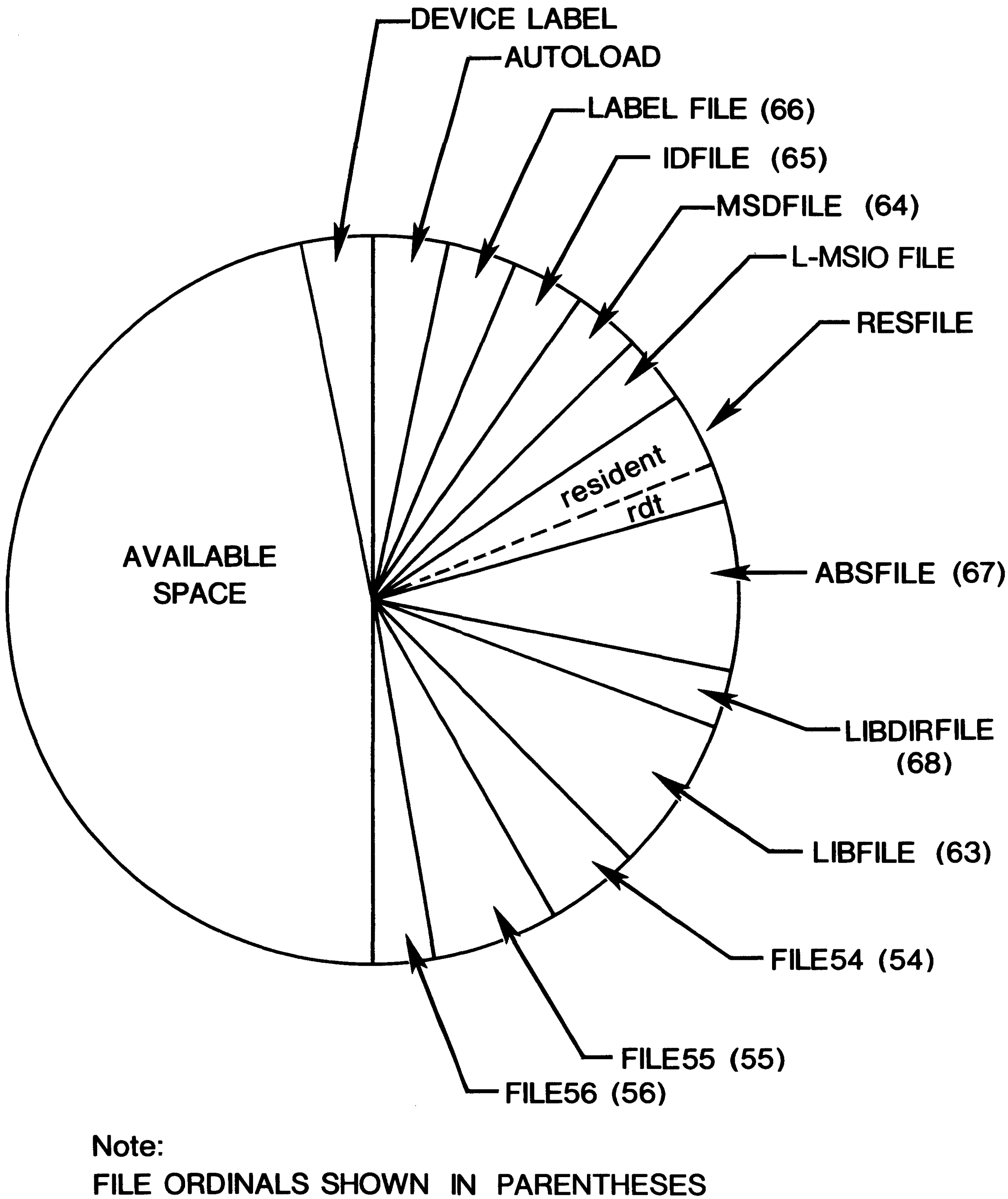


Figure III-9-1. MSOS System Device Utilization

9.1 MSOS SYSTEM FILES

9.1.1 RESIDENT FILE (RES)

Resident contains the following routines and tables which must be available at all times for reference by batch and priority programs.

CIC	Central interrupt control routine; also contains routines for entering messages to MSOS, to batch programs, or to priority programs during system operation
CIO	Central input/output control routine; also prohibits certain operations on standard system units
I/O DRIVERS	Drivers for standard system units
EXEC	Multipurpose resident routine which handles loading of variable resident and routes control through the variable resident routines
TABLES	Tables may be referenced but not changed by users

9.1.2 ABSOLUTE FILE (ABS FILE-FO 67)

ABS contains all records not in resident which must be loaded into a specific core location prior to use. These routines, when loaded, overlay one another in core. The overlay structure is possible because the routines are needed only at particular points of processing. The variable resident routines are:

RDUMP	Recovery dump routine; prints out the contents of the console registers, the register file, and all of batch or priority memory. The routine is executed when a user requests a dump ($DUMP) and a program terminates abnormally or when requested by manual interrupt.
LOADER	Loads and links relocatable subprograms and library routines.
JOBCTL	Clears memory and releases scratch units in preparation for loading; processes control statements; overlay processor; prepares MSOS for entry into user programs.

Other ABS subprograms, such as the COMPASS assembler and the FORTRAN compiler, are included with variable resident routines on the ABS files.

The resident directory table (RDT) provides linkage between resident and ABS. The RDCKF1 routine of resident refers to the RDT to load subprograms from ABS.

9.1.3 LIBRARY FILE (LIB-FO 63)

LIB, written in relocatable binary format, contains all library subprograms and macros.

9.1.4 DIRECTORY OF RELOCATABLE SUBPROGRAM (DRS-FO 68)

When the user calls subprograms from LIB, the loader refers to the directory of relocatable subprograms (DRS). Every primary entry point of a LIB subprogram and every library macro name has a three-word entry in the DRS of the following format.

word 1	entry name
word 2	entry name
word 3	fbn

entry name — Name of LIB subprogram or macro; eight BCD characters, left-justified with blank fill

fbn — Block number, relative to LIB origin, of first binary card image of subprogram

The DRS consists of 125-word blocks with a maximum of 41 entries per block. Unused areas of DRS contain zeros. The last word of each block is a pointer to the next block of DRS as follows:

Last word of block = 0 DRS continues to next block
$\neq$ 0 This block is the last block of DRS

9.1.5 SYSTEM SCRATCH FILES (FO 54, 55, AND 56)

The system library contains three scratch files (54, 55, and 56) which are automatically opened when MSOS is initialized. Programs such as FORTRAN and COMPASS use these files and the batch user may perform input/output operations on system scratch using these file ordinals. At the end of a job, the system scratch files are reset to file origin to be available for the next job.

If the user requires larger scratch files, he may close the system scratch files and open his own scratch files using file ordinals 54 and 55. The block size of user scratch files must be 512 characters. At the end of the job, MSOS reassigns file ordinals 54 and 55 to the system scratch files if any of the system files were closed during job execution.

Unless the programmer specifies otherwise, assembly and compilation load-and-go output appears on 56. An X or G with no parameters on the compiler or assembler control card automatically directs LGO output to 56. The load-and-go file is reset to file origin when a LOAD,56 card is encountered and when a job terminates.

If the user requires a larger load-and-go file, he may close the system LGO and open his own load-and-go using file ordinal 56. The block size of a user LGO must be 960 characters. MSOS reassigns file ordinal 56 to the system LGO at the end of the job if any of the system files were closed during job execution.

The user may refer to the system scratch files and LGO, using the appropriate file ordinal, in the following statements: LOAD, CLOSE, REWIND, or the CIO input/output statements LOCATE, READ, WRITE, and WRITE CHECK.

9.1.6 ALTERING MSOS FILES

The user may alter and add to the MSOS system files, resident, ABS, and LIB, through the PRELIB routine which is contained in the LIB file (refer to PRELIB, section 8).

9.2 OCAREM FILES

9.2.1 FILE LABEL DIRECTORY (FLD)

The FLD is used to provide access to all files maintained by MSOS and is composed of two separate files, IDFILE and LABELFILE. An entry is made in each of the FLD files each time a file is created.

LABELFILE (FO 66)

LABELFILE entries are fixed-length file labels having a block size of 50 + 3 (MSC) words, where MSC is the maximum allowable segment count (defined by the installation during IUP processing.

The entries for a given file occupy the same relative positions within IDFILE and LABELFILE. Thus, to locate a specific label one can search IDFILE until the desired identification is found, then compute the block number within LABELFILE at which the label is stored.

The first label in LABELFILE is for LABELFILE itself. The labels for IDFILE and MSDFILE occupy blocks 2 and 3, respectively, followed by the labels for the four MSOS system files.

A mass storage file label is composed of a fixed 50-word base plus three additional words for each segment of the file. OCAREM is capable of processing files which contain up to 63 segments although installations may set the maximum allowable segment count to some value less than 63 if they wish. The format of a file label is shown in Figure III-9-2 and described in Table III-9-1.

Word	23 – 00
1 (File Identifier)	owner
2 (File Identifier)	owner
3 (File Identifier)	filename
. (File Identifier)	filename
. (File Identifier)	filename
. (File Identifier)	filename
10 (File Identifier)	filename | edition
11	acpr
12	mdpr
13	nbks †
14	r | bksize
15	bcount
16	ucount
17	cdate
18	expdate
19	ladate
20	dt | sc | p | df †
21	dtm | ch † | flg † | dft †
22	cls † | v † | r
23	filesize
24	nasak
25	nasak
26	rm | rf | bf | r | lrs
27	max | tis
28	k_{f_m} | kfs | r | keyloc
29	i_{d_m} | idl | status | idloc
30	sdate †
31	sdate †
32	stime †
33	stime †

† Not used by MSOS

Figure III-9-2. File Label Format

	23 – 17 – 11 – 05 – 00
34	setid†
35	setid† (bits 23–12)
36	reelid†
37	gen†
38	seqno†
39	c† / w† / r
40	rdt† (bits 23–18) / rdn† (bits 17–00)
41	rblk†
42 . . . 49	r
50	checksum
51	r / sdb† / dn
52	lsl
53	sl
. . .	. . .
239	

Words 51–53: ††

† Not used by MSOS
†† These three words are repeated for each segment (maximum 63) of the file.

Figure III-9-2. File Label Format (Cont'd)

TABLE III-9-1. FILE LABEL FIELD DESCRIPTION

Word	Bits	Field	Significance
1 2	23-00 23-00	owner	Owner identification identifies a file in label directory.
3 . . . 10	23-00 . . . 23-12	filename	File name
	11-00	edition	Edition number
11	23-00	acpr	Access privacy code; supplied when file is allocated; it must be supplied for each succeeding OPEN request.
12	23-00	mdpr	Modification privacy code; supplied when file is allocated; it must be supplied for each RELEASE, EXPAND, and MODIFY request.
13	23-00	nbks	Number of blocks (binary) allocated to a file
14	23-18	r	Reserved
	17-00	bksize	Block size (binary); number of 6-bit characters in each record block (1 through 131071).
15	23-00	bcount	Block count; contains, as a binary integer, the number of the highest block written. If file is processed sequentially, this corresponds to the number of blocks written into the file ($0 \leq$ block count $< 2^{23}$).
16	23-00	ucount	Usage count; binary count of number of times file has been opened
17	23-00	cdate	Creation date; date supplied by I/O system when file is allocated; stored as a binary integer, yymmdd.
18	23-00	expdate	Expiration date; date supplied by user when file is allocated; stored as a binary integer, yymmdd. This field determines when a file may be deleted.
19	23-00	ladate	Last access date; date supplied by I/O system each time file is opened or changed; stored as a binary integer, yymmdd.
20	23-18	dt	Device type; 6-bit code to indicate type of mass storage device containing file.

TABLE III-9-1. FILE LABEL FIELD DESCRIPTION (Cont'd)

Word	Bits	Field	Significance
			Code / Device Type 50_8 853 51_8 854 52_8 841 54_8† 821 60_8 813,814 70_8 863
	17-12	sc	Segment count; contains, as a binary integer, the number of segments in file (1 through 63).
	11-06	p	Protection; contains protection flags for use by I/O system; values currently defined are: 0 File may be read or written 1 File may not be written 2 File is a scratch file (used by MS COBOL)
	05-00	df	Duplicate file A Denotes the first half of a duplicate file (dna) B Denotes the second half of a duplicate file (dnb) 0 Indicates that the file is not a duplicate file
21	23-18	dtm	Device type modifier; for 853, 854, 813, 814, 841, and 863, the value is: xxxxx1 Sector mode
	17-12	ch	Channel number; octal channel number on which current half of a duplicate file was originally allocated; is checked on subsequent expansion requests.
	11-06	flg	Flag; set to 1 if any segments in current half of a duplicate file have been marked down as a result of access failure; set by CLOSE.
	05-00	dft	Duplicate file type D Denotes a duplicate file A Denotes a duplicate file in which each half file must reside on independent access 0 Indicates that the file is not a duplicate file

† Not used by MSOS

TABLE III-9-1. FILE LABEL FIELD DESCRIPTION (Cont'd)

Word	Bits	Field	Significance
22	23-18	cls	Class 0 Class B device 1 Class A device 2 Class R device
	17-12	v	Version; applicable to MASTER; zero for MSOS.
	11-00	r	Reserved
23	23-00	filesize	Contains, as a binary integer, the number of allocatable units (tracks) assigned to file (0 < file size < 2^{23}).
24	23-00	nasak	Next available SAK; block number (record 1) where next record can be written within file.
25	23-00		
26	23-18	rm	Record mark; character which terminates each record when record format is record mark variable.
	17-15	rf	Record format; denotes type of records within file 0 Fixed length records 1 Key field contains total number of characters 2 Key field contains number of occurrences of a fixed length trailer item 3 Universal format 4 Record mark specified by rm terminates each record
	14	bf	Block format 1 One logical record per block 0 Logical records are blocked; each block contains a 2-word header which specifies the next block number (NBN) and the position of the first available character within the block (POFAC).
	13-12	r	Reserved
	11-00	lrs	Logical record size (number of characters) of fixed length record; size of fixed portion of variable records which have trailer items; 0 if records vary by key field or record mark.
27	23-12	max	Maximum logical record size; maximum size, in characters, of variable portion of logical records. For variable records with trailers, size of trailer item times maximum number of occurrences. For all others, maximum size of record within file.
	11-00	tis	Trailer item size in characters if rf=2; otherwise, 0.

TABLE III-9-1. FILE LABEL FIELD DESCRIPTION (Cont'd)

Word	Bits	Field	Significance
28	23	kfm	Mode of key field address 0 Key field is within each record 1 Key field is outside record (does not appear in file)
	22-18	kfs	Number of characters in key field
	17	r	Reserved
	16-00	keyloc	Character position of key field relative to beginning of record if key field is within record. Character address of location which contains key field if key field is not contained within record.
29	23	idm	Identification mode; type of record identification associated with every record in file 0 Alphanumeric 1 Numeric
	22-18	idl	Identification length; length in characters of record identification field of every record in file.
	17-12	status	Reflects current status of file as defined by each operating system or library task.
	11-00	idloc	Identification location; starting character position of identification field in each record of file relative to beginning of record.
30 31	23-00 23-00	sdate	Date of the last successful SAVE operation. The date is in the form mm/dd/yy.
32 33	23-00 23-00	stime	Time of last successful SAVE operation. The time is in the form hh/mm/ss.
34 35	23-00 23-12	setid	Set identification of last good SAVE tape
 36	11-00 23-00	reelid	Reel identification of the last good SAVE tape
37	23-00	gen	Generation number of the last good SAVE tape
38	23-00	seqno	Sequence number of the last good SAVE for this file
39	23	c	c is set to 1 if data has been written on the file since the last SAVE.
	22	w	w is set to 1 if the file has ever been formatted for write recovery.
	21-00	r	Reserved

TABLE III-9-1. FILE LABEL FIELD DESCRIPTION (Cont'd)

Word	Bits	Field	Significance
40	23-18	rdt	Class R device type Zero (not used) for class A or B devices
	17-00	rdn	Device number for class R devices Zero (not used) for class A and B devices
41	23-00	rblk	The number of the block in the RLAB file that contains a copy of the file label entry (class R devices) Zero (not used) for class A and B devices
42 . . . 49	23-00 . . . 23-00	r	Reserved for future use by I/O system
50	23-00	checksum	24-bit binary checksum of entire label. This field is checked by I/O system to detect accidental modification of label.
51	23-19	r	Reserved
	18	sdb	Segment down bit; set to 1 if one or more blocks within this segment could not be written as a result of hardware access failure; set by CLOSE for all segments declared down in the FDT.
	17-00	dn	Number of device on which file segment is stored. This field is checked against device label to ensure that proper packs are mounted.
52	23-00	lsl	Low segment bit; binary hardware address at which a file segment begins.
53	23-00	sl	Segment length; number of allocatable units (tracks) in this segment.
54 . . . 239	23-00 . . . 23-18 17-00		Additional segments to a maximum of 63. Refer to words 51 through 53.

IDFILE (FO 65)

The IDFILE entries consist of file identifier (words 1 through 10 of file label) and security codes (words 11 and 12 of the file label) as shown in Figure III-9-3.

Word		
1	OWNER	
2	IDENTIFICATION	
3		
4		
5		
6	FILE NAME	
7		
8		
9		
10		EDITION NO.
11	ACCESS SECURITY	
12	MODIFICATION SECURITY	

Figure III-9-3. IDFILE Format

The IDFILE entries can be thought of as 12-word logical records written in blocks of 120 words each.

The entries for a given file occupy the same relative positions within IDFILE and LABELFILE. Thus, to locate a specific label, one can search IDFILE until the desired identification is found, then compute the block number within LABELFILE at which the label is stored.

9.2.2 MASS STORAGE DIRECTORY (MSDFILE-FO 64)

The MSD contains one entry for each mass storage device maintained by MSOS. The format of the MSD file is shown in Figure III-9-4 and file entries are described in Table III-9-2. Each mass storage device is described in the file by an entry consisting of the following.

Words 1 through 7 of the device label

The number of unassigned tracks

A bit map of available and assigned tracks

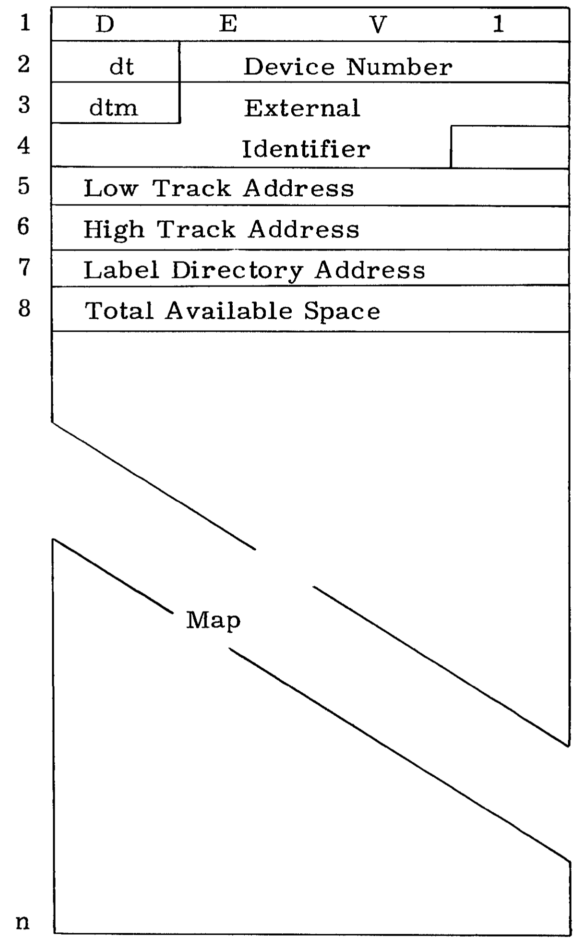


Figure III-9-4. MSD File Format

TABLE III-9-2. MSD FILE FIELD DESCRIPTION

Field Name	Size	Description
DEV1	4 characters	A standard 4-character identifier which is prefixed to device labels
dt	1 character	A 6-bit code to represent device type. dt= octal 51 for 854 disk packs
Device number	3 characters	An 18-bit device number which matches an external number on each device
dtm	1 character	A 6-bit device type modifier. The only value defined is: xxxxx1 This device is recorded in sector mode.
External identifier	6 characters	Any alphanumeric characters. This field corresponds to an external identifier on each device.
Low track address	4 characters	The lowest hardware address (binary) that can be accessed by CIO
High track address	4 characters	The highest hardware address (binary) that can be accessed by CIO
Directory address	4 characters	The binary hardware address at which the file label directory is stored. This is the low address of the LABELFILE and is present only on the device which contains the label directory.

Word	23			0
1	D	E	V	1
2	51	00	00	02
3	01	P	A	C
4	K	0	2	
5	00	00	00	00
6	00	00	37	55
7	00	00	00	00
8	00	00	17	56
9	77	77	77	77
10	77	77	77	77
•				
•				
•				
92	00	00	00	00
93		0	00	00

Figure III-9-5. Sample MSDFILE Entry for 854

The correspondence between bits and tracks is shown in Table III-9-3.

TABLE III-9-3. BIT AND TRACK NUMBER CORRESPONDENCE

Bit Number	Word Number	Track Number
0	9	0
1	9	1
23	9	23
0	10	24
1	10	25
i	j	24 (j-9)+i

MAP OF AVAILABLE ASSIGNED TRACKS

The storage map occupies words 9 through 683 and represents tracks of the mass storage device. That is, the map contains x bits representing x tracks. A bit set to 1 indicates the corresponding track is assigned. A bit set to 0 indicates the corresponding track is available. The values of variables n (number of words per MSD entry) and x (number of bits per map) are defined in Table III-9-4.

TABLE III-9-4. LENGTH OF MSD ENTRY

Device Type	Number of Tracks Per Device (x)	Word Length of MSD Entry (n)
853	1000	50
854	2030	93
814	16384	691
813	16384	691
863	1024	51
841	4060	178

9.2.3 ALTERING OCAREM FILES

The user may alter the size of the OCAREM files through the PRELIB routine (section 7.2.3). Care must be taken to ensure the following.

Only the proper file ordinals are used when referring to the OCAREM files. The file ordinals are:

MSDFILE	64
IDFILE	65
LABELFILE	66

The maximum file count (MFC) of the system is determined by the capacity of the IDFILE and the LABELFILE. The smallest one in capacity determines the MFC. The maximum segment count (MSC) is determined by the block size of the LABELFILE which is an installation option set by the IUP. Both of the values (MFC and MSC) are calculated and placed in the resident parameter table (RPT) in CIO by INITIAL at autoload time.

Example:

If MSOS was installed with MFC = 160 and MSC = 26 on an 854 system, the FLD files would be of the following size.

LABELFILE	20 tracks
IDFILE	2 tracks

The CIO values would be:

MFC	160
MSC	26

If the user needs the capability of 480 files, he must add space for 320 files. On an 854 the FLD files require the following.

LABELFILE	60 tracks
IDFILE	6 tracks

PRELIB is used to expand the system OCAREM files. Refer to section 8.2.3 for use of the $^{7}_{9}$EXPAND control card within PRELIB.

NOTE

The MSC can only be set during an installation. It determines the block size of the FLD for the life of the system.

9.2.4 CORRECTING OCAREM FILES (64-66)

A control statement (VFLD) from the MSUTIL program can be used to compare the contents of the MSDFILE and/or the IDFILE with the contents of the LABELFILE. VFLD lists discrepancies and corrects them whenever possible. The LABELFILE is assumed to be correct. The statement can be entered through the console or the card reader after calling MSUTIL. VFLD does not check the labels of files allocated on class-R devices.
Format:

```
VFLD, p1,p2, p3, p4, p5
```

p1	Logical unit to receive output messages; default is logical unit 61	
p2	Function request	
	IDF or I	Compare IDFILE to LABELFILE
	MSD or M	Compare MSDFILE to LABELFILE. Update is automatic if there are no overlapped files on device type or device number.
	CLR or C	Clear the OCAREM completion error flag.
	Blank or omitted	Compare both IDFILE and MSDFILE to LABELFILE
p3	LIST or L	List all comparison maps on logical unit specified in p1; default results in listing only errors
p4	UPDATE or U	Correct the IDFILE to match the LABELFILE if discrepancies occur; valid only if the function is IDF or I. This parameter may be omitted and U is the default if p2 is blank or omitted.
p5	N or lun	N specifies that no system bad track file is used when comparing the MSDFILE to the LABELFILE. Tracks not in use are made available for use. If a system bad track file exists, N should not be specified. The lun parameter specifies the logical unit number of the previously opened bad track file. If this parameter is omitted, logical unit 53 is assumed to be the open bad track file. Refer to section II-11 for details regarding allocation of the bad track file.

9.3 LOGICAL MSIO FILE

The logical MSIO file, L-MSIO, is used by logical MSIO to store its overlays. The first time logical MSIO is called, it links its overlays and stores them on the L-MSIO file, from which it loads them on a roll-in, roll-out basis. This technique avoids the necessity of linking the overlays each time they are called.

At installation time, the IUP (installation utility package) allocates the L-MSIO file with a block size of 1280 characters and a file size of 15 tracks on an 854, 7 tracks on an 841. Logical MSIO assigns file ordinal 53 to the overlay file. This file number must be reserved for L-MSIO usage and cannot be pre-equipped or opened by the user. If the file is released it must be reallocated by the user prior to using L-MSIO. The FET is as follows:

$FET, MSOS, L-MSIO, 1280, 00, 0000, 0000

During conversion from MSOS 4.2 to MSOS version 5, the user may elect to have both systems resident on the same mass storage device. The change in the block size of the L-MSIO overlay file from 10240 characters under MSOS 4.2 to 1280 characters under MSOS 5 without a corresponding change in the file identification could cause conflicts between the two systems. Such conflicts can be avoided in the interim by allocating the L-MSIO file at 15 tracks (7 tracks on the 841) with a block size of 10240 characters.

9.2.4 CORRECTING OCAREM FILES (64-66)

A control statement (VFLD) from the MSUTIL program can be used to compare the contents of the MSDFILE and/or the IDFILE with the contents of the LABELFILE. VFLD lists discrepancies and corrects them whenever possible. The LABELFILE is assumed to be correct. The statement can be entered through the console or the card reader after calling MSUTIL.

Format:

VFLD, p1,p2, p3, p4, p5

p1	Logical unit to receive output messages; default is logical unit 61	
p2	Function request	
	IDF or I	Compare IDFILE to LABELFILE
	MSD or M	Compare MSDFILE to LABELFILE. Update is automatic if there are no overlapped files on device type or device number.
	CLR or C	Clear the OCAREM error detection busy flag in the system label.
	Blank or omitted	Compare both IDFILE and MSDFILE to LABELFILE
p3	LIST or L	List all comparison maps on logical unit specified in p1; default results in listing only errors
p4	UPDATE or U	Correct the IDFILE to match the LABELFILE if discrepancies occur; valid only if the function is IDF or I. This parameter may be omitted and U is the default if p2 is blank or omitted.
p5	N or lun	N specifies that no system bad track file is used when comparing the MSDFILE to the LABELFILE. Tracks not in use are made available for use. If a system bad track file exists, N should not be specified. The lun parameter specifies the logical unit number of the previously opened bad track file. If this parameter is omitted, logical unit 53 is assumed to be the open bad track file.

9.3 LOGICAL MSIO FILE

The logical MSIO file, L-MSIO, is used by logical MSIO to store its overlays. The first time logical MSIO is called, it links its overlays and stores them on the L-MSIO file, from which it loads them on a roll-in, roll-out basis. This technique avoids the necessity of linking the overlays each time they are called. MSOS allocates the L-MSIO file with a block size of 1280 characters and a file size of 15 tracks on an 854, 7 tracks on an 841.

Logical MSIO assigns file ordinal 52, or the next available lower number if 52 is already assigned, to the L-MSIO file.

10.1 COSY/COMPASS/PLIBEDIT RUN

Four tapes contain the COSY source for release packages A, B, and C (all system routines and product set members except ADAPT, PERT TIME, PERT COST, and INITUSER).

The COSY* tape contains a DECK/ card for every deck on the COSY tapes, and corrections for the COSY decks where required. The DECK/ card for each deck contains an I and an H parameter. I is equal to the number of the COSY tape on which the deck appears and H is equal to 05. For example, if no corrections appear for deck DRIVMS, the COSY* entry appears as follows:

```
DRIVMS      DECK*
            INSERT/      0
DRIVMS      DECK/        I=01,H=05
```

The entry for PCOBOL appears as:

```
PCOBOL      DECK*
            INSERT/      0
PCOBOL      DECK/        I=02,H=05
```

The following example shows the use of PLIBEDIT, COSY, and COMPASS in generating an MSOS PRELIB source tape. The example assumes that the COSY and COSY* tapes have been transferred to mass storage and also assumes the following site-dependent hardware configuration.

Standard MSOS user

Floating-point hardware available; no BCD or BDP hardware.

Configuration for a 32K 3100 computer shown in Table III-10-1.

TABLE III-10-1. PERIPHERAL HARDWARE CONFIGURATION

Equipment type	Quantity	Controller	Channel	Equipment	Unit
Console typewriter	1	None	None	None	None
854 disk drive	2	3234	2	0	10, 11
405 card reader	1	3248	1	0	0
501 printer	1	3256	1	1	0
415 card punch	1	3446	0	1	0
604 tape units	4	3228	0	0	0, 1, 2, 3

Part 1 shows a COSY,* and COSY job incorporating site dependent assembly options into CIO. Hollerith output is on file 05.

Part 2 calls COMPASS. Input is from file 05. Output is an assembly list, cross reference table, and the binary deck for CIO on file 20.

Part 3 uses PLIBEDIT to modify the standard PRELIB source on binary release tape 1, LUN 01, and places the output on LUN 02. This is called the PRELIB source tape. The created PRELIB source tape may be assigned as input for a PRELIB run generating an MSOS system.

```
$JOB                                                                Part 1
$FET, MSOS, COSY*INP, 512, 50, 0000, 0000
$OPEN, 07, I
$FET, MSOS, COSY1, 512, 50, 0000, 0000
$OPEN, 01, I
$FET, MSOS, COSY2, 512, 50, 0000, 0000
$OPEN, 02, I
$FET, MSOS, COSY3, 512, 50, 0000, 0000
$OPEN, 03, I
$FET, MSOS, COSY4, 512, 50, 0000, 0000
$OPEN, 04, I
$FET, STAR, STAROUT, 512, 00, 0000, 0000
$RELEASE, ALL
$ALLOCATE, 100, 000001
$OPEN, 06
$FET, COMP, COMPOUT, 512, 00, 0000, 0000
$RELEASE, ALL
$ALLOCATE, 400,000001
$OPEN, 05
$FET, BINARY, COMPSOUT, 960
$ALLOCATE, 100
$OPEN, 20
$FMT, MS2
$COSY, *, S
         INSERT*    1
         DELETE/    260
NOCH     EQU        4
         DELETE/    261
RATL     EQU        2
         DELETE/    283, 287
         MST        (01, DT854)
         MST        (06, DT854)
         DELETE/    295, 320
         AUT        (U, DP, 0010, C2, MSIO3234, DT854)
         AUT        (A, TY, 0, 0, DRIVER05, DT. TYPE)
         AUT        (A, CR, 0000, C1, DRIVER02, DT3248)
         AUT        (A, PR, 1000, C1, DRIVER03, DT501)
         AUT        (A, CP, 1000, C0, DRIVER04, DT3446, , , 1, , CPBUFV50, UP)
         AUT        (U, DP, 0011, C2, MSIO3234, DT854)
         AUT        (U, MT, 0, C0,  DRIVER01, DT604, CB, PCL)
         AUT        (U, MT, 0001, C0, DRIVFR01, DT604, CB,  PCL)
         AUT        (U, MT, 0002, C0, DRIVER01, DT604, CB, PCL)
         AUT        (U, MT, 0003, C0, DRIVER01, DT604, CB, PCL)
CIO      DECK*      I=07, H=06
         END*
$COSY, I=06, S
$COMPASS, I=05, L, R, X=20                                          Part 2
$CLOSE, 01
$CLOSE, 02
$CTO, LUN02 IS NEW PLIBEDIT (SOURCE) TAPE
$CTO, LUN01 IS BINARY RELEASE TAPE NO. 1
$EQUIP, 01=MT, 02=MT
```

```
$PLIBEDIT
FILE    MCHECK/     20
             .
             .
        delete unwanted decks
        and control cards
             .
             .
        ENDEDIT/
77
88
$CLOSE,20
$CLOSE,05
$CLOSE,06
$FET,STAR,STAROUT,512,00,0000,0000
$RELEASE,ALL
$FET,COMP,COMPOUT,512,00,0000,0000
$RELEASE,ALL
$FET,BINARY,COMPSOUT,960
$RELEASE,ALL
77
88
$EOJ
```

10.2 PLIBEDIT/MSOS CONTROL CARD EXAMPLES

The following deck structures illustrate the use of PLIBEDIT/MSOS control cards. The user must EQUIP or ALLOCATE and OPEN all needed nonstandard files.

Sample 1 replaces the binary deck of CIO and JOBCTL.

```
$JOB,4JL52,DLW,10                                  Sample 1
$EQUIP,01=MT,02=MT
$PLIBEDIT
CIO                 DELETE/
Binary deck of CIO
JOBCTL              DELETE/
Binary deck of JOBCTL
                    ENDEDIT/
77
88
$EOJ
```

Sample 2 deletes control cards for FORTRAN and FORTRAN compiler routines.

```
$JOB,,,                                            Sample 2
$EQUIP,01=MT,02=MT
$PLIBEDIT
                    COMMENT/          DELETE FORTRAN COMPILER AND
                                      CONTROL CARDS
ALG5                SKIP/             2
FTN1                DELETE/           FTNE
                    COMMENT/          NEW FORTRAN REV. 6*7*74
Control cards and binary decks of FORTRAN compiler
                    ENDEDIT/
77
88
$EOJ
```

Sample 3 replaces macros named COMAC.

```
$JOB,4JL52,DLW,10                                  Sample 3
$PLIBEDIT
                    COMMENT/          NEW MACROS
COMAC               MACRO/            MACRO,COMAC
7
9 MACRO,COMAC
Deck of macros named COMAC
                    ENDEDIT/
77
88
$EOJ
```

Sample 4 deletes SEPOINT, SETCLV50, inserts SEPOINT, ACCOUNT1 before SEPOINT, START2, skips two cards after CRT and deletes ALGOL routine.

```
$JOB,4JL52,DLW,10                                          Sample 4
$EQUIP,01=MT,02=MT
$PLIBEDIT
                          DELETE/              SEPOINT,SETCLV50
                          INSERT/              SEPOINT,START2
$SEPOINT,ACCOUNT1
CRT                       LOCATE/
                          SKIP/                2
ALG0                      DELETE/              ALG5
                          ENDEDIT/
77
88
$EOJ
```

Sample 5 replaces the old PRELIB control card, deletes binary decks CIC and CIO, inserts decks CIC and CIO, inserts SEPOINT, MYACCNO before SEPOINT, PLMEMV50, and adds routine COPYTAPE after the COSY routine.

```
$JOB,,,                                                    Sample 5
$EQUIP,01=MT,02=MT
$PLIBEDIT
                          REPLACE/             PRELIB,,,,,xx
$PRELIB,,,P,,42
CIC                       DELETE/              CIO
Binary deck of CIC
Binary deck of CIO
                          INSERT/              SEPOINT,PLMEMV50
7
9SEPOINT,MYACCNO
COSY                      LOCATE/
Binary deck of COPYTAPE
                          ENDEDIT/
77
88
$EOJ
```

Sample 6 deletes MSSORT, accepts input from LUN 12 until encountering an EOF, deletes MSSMERG, and accepts MSSMERG from LUN 15.

Sample 6

```
$JOB,4JL52,DWL,10
$EQUIP,01=MT,02=MT
$EQUIP,12=MT,15=MT
$PLIBEDIT
MSSORT              DELETE/
                    UNIT/          12
MSSMERG             DELETE/
MSSMERG             UNIT/          15
                    ENDEDIT/
77
88
$EOJ
```

Sample 7 deletes COSY through to COSYRDWT, accepts input from LUN 10 (mass storage file) until encountering an EOF, deletes SCAR, and accepts the binary image of SCAR from LUN 12.

Sample 7

```
$JOB,4JL52,XCL,875
$FET,XCL,COSY,960
$OPEN,10
$FET,XCL1,SCAR,960
$OPEN,12
$PLIBEDIT
COSY                DELETE/                  COSYRDWT
                    FILE/          10
SCAR                DELETE/
SCAR                FILE/          12
                    ENDEDIT/
77
88
$EOJ
```

Sample 8 replaces RAAR and SCAR whenever they appear.

```
$JOB,4JL52,DWL,10                                   Sample 8
$EQUIP,10=MT,01=MT,02=MT
$PLIBEDIT
UNIT            MCHANGE/          10
Binary RAAR deck
Binary SCAR deck
                COMMENT/          RAAR/SCAR REPLACED 01/23/74
                ENDEDIT/
77
88
$EOJ
```

10.3 COSY CORRECTION SAMPLE OF SYSTEM WITH CARD PUNCH

The coding and control cards necessary to punch binary decks for insertion into the PRELIB source are shown in the following listing. The example does not represent a complete update. This example assumes the following system.

1. Floating point hardware
2. No BDP hardware
3. A 32K 3300 with the configuration shown in Table III-10-2

TABLE III-10-2. SAMPLE CARD PUNCH SYSTEM CONFIGURATION

Equipment Type	Quantity	Controller	Channel	Equipment	Unit
Console typewriter	1	None	None	None	None
853 disk drive	4	3234	0	4	0, 1, 2, 3
415 card punch	1	3245	1	4	0
501 printer	1	3659	0, 1	5	0
405 card reader	1	3248	1	3	0
607 magnetic tape drive	4	362X	2, 3	4	0, 1, 2, 3

All COSY/COMPASS updates which follow are set up to execute under the interim MSOS library if magnetic tapes are available.

```
$JOB,12345,ABC                    lun 01 = MSOS V5.0 COSY tape
$EQUIP,01=MT,02=MT                lun 02 = Hollerith output tape
$COSY
                DELETE/           260,261
NOCH            EQU               4
RATL            EQU               4
```

	DELETE/	283,287	
	MST	(01,DT853,0)	
	MST	(06,DT853,0)	
	MST	(07,DT853,0)	
	MST	(08,DT853,0)	
	DELETE/	295,320	
	AUT	(U,DP,4010,C0,MSIO3234,DT853)	
	AUT	(A,TY,0,0,DRIVER05,DT.TYPE)	
	AUT	(A,CR,3000,C1,DRIVER02,DT3248)	
	AUT	(A,PR,5000,C0+C1,DRIVER03,DT501)	
	AUT	(A,CP,4000,C1,DRIVER44,DT3245,,, 1,,CPBUFV50,UP)	
	AUT	(U,DP,4011,C0,MSIO3234,DT853)	
	AUT	(U,DP,4012,C0,MSIO3234,DT853)	
	AUT	(U,DP,4013,C0,MSIO3234,DT853)	
	AUT	(U,MT,4003,C2+C3,DRIVER01,DT607, CB,PCL)	
	AUT	(U,MT,4002,C2+C3,DRIVER01,DT607, CB,PCL)	
	AUT	(U,MT,4001,C2+C3,DRIVER01,DT607, CB,PCL)	
	AUT	(U,MT,4000,C2+C3,DRIVER01,DT607, CB,PCL)	
CIO	DECK/ ENDCOSY/	I=01,H=02	

$COMPASS,I=2,L,R,P

77
88

$EOJ

10.4 COSY CORRECTION SAMPLE OF PUNCHLESS SYSTEM

The following example demonstrates the coding and control cards necessary to generate decks on a punchless system. It does not represent a complete update. Example two assumes the following system.

1. A batch MSOS user
2. A 16K 3100 computer with the configuration shown in Table III-10-3.

TABLE III-10-3. SAMPLE PUNCHLESS CONFIGURATION

Equipment Type	Quantity	Controller	Channel	Equipment	Unit
Console typewriter	1	None	None	None	None
854 disk drive	2	3234	0	4	0, 1
405 card reader	1	3649	1	3	0
501 printer	1	3659	1	5	0

The COSY/COMPASS updates which follow execute under the interim MSOS library.

Card Description	Comments
$JOB, 12345, ABC	
$FET, COSY, HOLLERITH-FILE, 512	Hollerith file contains the Hollerith output
$ALLOCATE, 50, , S, , 854	
$OPEN, 01	
$FET, COMPASS, BINARY-FILE1, 960	Binary file 1 contains the binary of CIO
$ALLOCATE, 20, , S, , 854	
$OPEN, 50	

```
        $COSY
        DELETE/         260,261
NOCH    EQU             4
RATL    EQU             2
        DELETE/         283,287
        MST             (01,DT854,0)
        MST             (05,DT854,0)
        DELETE/         295,320
        AUT             (U,DP,4010,C0,MSIO3234,DT854)
        AUT             (A,TY,0,0,DRIVER05,DT.TYPE)
        AUT             (A,CR,3000,C1,DRIVER02,DT3649)
        AUT             (A,PR,5000,C1,DRIVER03,DT501)
        AUT             (U,DP,4011,C0,MSIO3234,DT854)
        DELETE/         327
SYSPUN  EQU             0
CIO     DECK/           H=01
        Insert COSY deck of CIO here
        ENDCOSY/
$COMPASS,I=01,L,R,X=50
$CLOSE,50
77
88
$EOJ
```

This update is not complete. There are no changes in the maximum file size, the privacy code, etc. They may be changed if desired.

MASS STORAGE REQUIREMENT TABLE 11

The following is a guide to determine which library options are most efficient for the space occupied on the system disk. For safety, one sector has been added to all equations. Remainders of calculated values are ignored. PRELIB creates system files blocked according to sector size. Calculations using the following equations are therefore relative to sectors.

11.1 MASS STORAGE REQUIREMENT TABLE (MSRT) EQUATIONS

The following equations are dependent upon the type of library program being considered. The appropriate equation determines the number of sectors occupied.

11.1.1 ABSFILE OCCUPATION

$$\text{sectors} = \left(\frac{\text{program length - decrement}}{\text{words per sector}} + 1 \right)$$

The decrement is indicated by the I parameter on an ORIGIN card.

Example of routine ALG1 follows:

Sector size	64 words (853 specification)
Program length	10701_8
Decrement	74_8

$$\text{sectors} = \left(\frac{10701_8 - 74_8}{100_8} + 1 \right) = 71 \text{ sectors}$$

11.1.2 LIBFILE OCCUPATION

$$\text{sectors} = \left(\frac{\text{number of binary cards in program}}{6} + 1 \right) \left(\frac{240}{\text{sector size}} + 1 \right)$$

The number of binary cards in a program includes LED, overlay, LRL, EXS, and BCT cards.

Example of routine PLOVINT follows:

Sector size	64 words (853 specification)
Number of cards	40

$$\text{sectors} = \left(\frac{40}{6} + 1 \right) \left(\frac{240}{64} + 1 \right) = 35 \text{ sectors}$$

11.1.3 MACRO OCCUPATION

$$\text{sectors} = \left(\frac{\text{number of macro cards}}{10} + 1 \right) \left(\frac{240}{\text{sector size}} + 1 \right)$$

The following exemplifies calculation for a given macro:

Sector size	64 words (853 specification)
Number of cards	4

$$\text{sectors} = \left(\frac{4}{10} + 1 \right) \left(\frac{240}{64} + 1 \right) = 5 \text{ sectors}$$

11.2 PRODUCT SET OCCUPATION

Table III-11-1 may be used to estimate the number of tracks the product set members will occupy. Table III-11-2 lists the storage capacity of mass storage devices usable on the system.

TABLE III-11-1. MASS STORAGE SPACE REQUIRED FOR MSOS PRODUCT SET MEMBERS

PRODUCT	853/854/863		841	
	ABSFILE	LIBFILE	ABSFILE	LIBFILE
SYSTEM[1] (RESFILE)	44		36	
BASIC LIBFILE[2]		81		46
VARIABLE RES.	14.75		6.75	
ANSI COBOL	77.75	22.25	36	12.7
APC		5.5		3.14
ALGOL	21	23.25	9.75	13.3
FORMS		1.5		0.85
MS FORTRAN	29	21.5	13.3	13.3
MS COBOL	22	9.5	10.25	5.43
MSSORT		19.75		[illegible]
TAPE SORT		30		15
LISA		9.75		.57
MSOS UTILITY		4.75		2.7
LOGICAL MSIO	11.5	2.75	3.1	1.57

TABLE III-11-1. MASS STORAGE SPACE REQUIRED FOR MSOS PRODUCT SET MEMBERS (Cont'd)

	853/854/863		841	
PRODUCT	ABSFILE	LIBFILE	ABSFILE	LIBFILE
SNAPSHOT		1.25		0.7
COMPASS	12.25	$0.5+20.25^{3}$	5.65	$0.25+11.15^{3}$
COSY		6.5		3.7
SAINT		3.75		2.15
MSUTIL		14.75		8.43
ANSI FORTRAN	52	66.5	24	38

Superscripts indicated have the following meanings.

1. The system size assumes the following track usage.

	854	841
STD (BCD) resident, 6 standard drivers	9	4
MSDFILE	7	8
IDFILE	2	2
LABELFILE	20	18
DRS	5	3
label	1	1
Total tracks	44	36

2. The basic relocatable file contains only routines essential to the system. The interim library PRELIB source shows these routines.

3. Includes macros

TABLE III-11-2. DEVICE STORAGE CAPACITIES

Device	MSD Length Words	Sectors Per Track	Tracks Per Device	Words Per Sector	Words Per Track	Characters Per Track	Sectors Per Device
853	51	16	1000	64	1024	4096	16,000
854	94	16	2030	64	1024	4096	32,480
841	179	14	4060	160	2240	8960	56,840
813	692	32	16384	64	2048	8192	524,288
814	692	32	16384	64	2048	8192	524,288
863	52	16	1024	64	1024	4096	16,384

COSY UPDATE HISTORY FILE 12

12.1 COSY, * FUNCTION

COSY,* functions in the same manner as COSY, with the following exceptions.

The * must be used in place of the / on COSY control cards.

An END* control card, not an ENDCOSY/ card, terminates a COSY run. END* must begin in column 10.

The dummy control card (INSERT/ 0) appears on listings when the L parameter, list function, is selected on a DECK* card. The card (INSERT/ 0) has a COSY sequence number of 1. This permits the addition of revision cards ahead of cards not listed. To do so the user references COSY sequence number 1. The new COSY ignores this card when a Hollerith revision tape is used as input.

COSY,* output may be used as input to COSY. The END* control card causes COSY,* to output an ENDCOSY/ card instead of the FINIS card output by COSY.

12.2 LISTING OF THE COSY UPDATE HISTORY FILE

The following control cards will list the COSY,*. Mount COSY,* tape on LU-10.

```
$JOB,,,
$EQUIP,10=MT
$COSY
LISTOR                  DECK/        I=10,H
                        ENDCOSY/
$COSY,*,I=54
77
88 EOF
$EOJ
```

Output from the previous example follows. Underlined cards are the control cards used to create the listing. All other cards are images which appear on tape.

```
$JOB,,,,
$EQUIP,10=MT
$COSY,*
CIC          DECK*        I=10,L
             INSERT/      0                    00001
             DELETE/      7                    00002
BDP3312      EQU          2                    00003
             DELETE/      190,217              00004
             IZD          BDP-2,BDP01          00005
*-----------------------BDP COLLATING SEQUENCE---00006
             ORGR         40B                  00007
             OCT          66677071             00008
             OCT          72737475             00009
             OCT          76770127             00010
             OCT          30020304             00011
             OCT          20323334             00012
             OCT          35363740             00013
             OCT          41423115             00014
             OCT          16131417             00015
             OCT          23444546             00016
             OCT          47505152             00017
             OCT          53544321             00018
             OCT          22101112             00019
             OCT          00245657             00020
             OCT          60616263             00021
             OCT          64655525             00022
             OCT          26050607             00023
BDP01        DLT                               00024
CIC          DECK/        I=01,H=05,R          00025
CIO          DECK*        I=10,L
             INSERT/      0
             DELETE/      261
RATL         EQU          4
             DELETE/      274
P1           EQU          1
             DELETE/      276,277
P3           EQU          1
P4           EQU          1
CIO          DECK/        I=01,H=05,R
             END*
```

12.3 USING THE COSY UPDATE HISTORY FILE OUTPUT

Once a listing is obtained, site modifications may be applied to the COSY update history file. COSY sequence numbers on the MSOS COSY tape may be easily located for insertion of site modifications.

Use the COSY sequence numbers found on the right side of the output listing for INSERT* and DELETE* control card parameters.

The following deck structure shows how these revisions may be made and a Hollerith tape of the combined COSY revisions created.

```
$JOB,,,
$CTO,LUN 10=COSY UPDATE HISTORY FILE
$CTO,LUN 06 = OUTPUT UNIT FOR HOLLERITH REVISION TAPE
$EQUIP,10=MT,06=MT
$COSY,*,S
                INSERT*     3
                INSERT/     10
*                                   INSTALLATION MODIFICATION INSERTED
                DELETE*     22
*                                   RELEASE MODIFICATION REMOVED
CIC             DECK*       I=10,H=06,L,R
                INSERT*     3
                INSERT/     3
*                                   INSTALLATION MODIFICATION INSERTED
                DELETE*     22
*                                   RELEASE MODIFICATION REMOVED
CIO             DECK*       I=10,H=06,L,R
                END*
77
88 EOF
$EOJ
```

Once the Hollerith revision tape is created by the previous job, the COSY,I option allows its use as input to COSY.

The following example using COSY,I should be followed.

```
$JOB,,,
$CTO,LUN 01=MSOS COSY TAPE 1
$CTO,LUN 05=SCRATCH TAPE FOR HOLLERITH OUTPUT
$CTO,LUN 06=HOLLERITH REVISION TAPE
$COSY,I=06,S
$COMPASS,I=05,L,R,P
77
88 EOF
$EOJ
```

When assembling from a Hollerith tape consisting of deck names contained on different COSY tapes, the following job sequence should be followed.

```
$JOB,,,,
$EQUIP,01=MT,02=MT,06=MT,05=MT
$CTO,LUN 01=MSOS COSY TAPE #1
$CTO,LUN 05=SCRATCH TAPE FOR HOLLERITH OUTPUT (input to COMPASS)
$CTO,LUN 06=HOLLERITH REVISION TAPE (input to COSY)
$CTO,LUN 02=MSOS COSY TAPE #2
$COSY,I=06
$COMPASS,I=05,L,R,P
77
88 EOF
$EOJ
```

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COMMENT SHEET

MANUAL TITLE 3100/3150/3170/3200/3300/3500 MSOS version 5
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