CONTROL DATA®
CYBER 70 COMPUTER SYSTEMS
MODELS 72, 73, 74
6000 COMPUTER SYSTEMS

SCOPE INSTALLATION HANDBOOK
MODELS 72, 73, 74 VERSION 3.4
6000 VERSION 3.4
New features, as well as changes, deletions, and additions to information in this manual are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

<table>
<thead>
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<td>B</td>
<td>This revision consists of corrections and additions to the original printing, but does not contain changes necessitated by PSRs. Revision C is a complete reprint.</td>
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Publication No.
60307400

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CONTROL DATA CORPORATION
Software Documentation
215 MOFFETT PARK DRIVE
SUNNYVALE, CALIFORNIA 94086

or use Comment Sheet in the back of this manual.
Product testing was performed on SCOPE 3.4 as a unified product set. The new features of each product are discussed in appropriate sections of this document. General points of interest are:

The program libraries are numbered as follows.

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***WARNING***

The initial release of SCOPE 3.4 and product set supports 49K and larger central memory hardware configurations.

Installation of the full product set cannot be accomplished on 32K configurations and performance of that portion of the product set which can be installed is not guaranteed.

This product is intended for use only as described in this document. Control Data cannot be responsible for the proper functioning of undescribed features or undescribed parameters.
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INTRODUCTION

1. Development and testing of SCOPE 3.4 was done on a variety of hardware configurations. The main configuration was a 131K 6600 which included the following major equipment. FCOs are listed in chronological order of installation:

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While equipment designations and FCO levels are not provided, testing was also done on a 65K 6400 and selected CYBER models.
2. The full SCOPE 3.4 product set includes 11 system texts constructed from common decks included on the SCOPE and 6RM program libraries. Their source location and contents are shown below:

**ACTCOM (SCOPE program library)**
System action request macro prototypes

**6RMCOM (Record Manager program library)**
Record Manager user macro prototypes

**CPSYS (SCOPE program library)**
CPC IO macro prototypes

**STATCOM (SCOPE program library)**
7000 Station symbol definitions

**IPARAMS (SCOPE program library)**
Installation parameters

**IMACOM (SCOPE program library)**
Loader macro prototypes

**PFCOM (SCOPE program library)**
Permanent file macro prototypes

**PPSYS (SCOPE program library)**
SCOPE symbol definitions and PP macro prototypes

**SCHCOM (SCOPE program library)**
Integrated scheduler macro prototypes

**RMCOM (Record Manager program library)**
Record Manager internal macro prototypes

**SISICOM (SCOPE program library)**
SIS 1.0 macro prototypes

The following chart shows the combination of these common decks into the 11 system texts required for full utilization of the SCOPE 3.4 product set. All these texts are fixed in content except SYSTEXT; as released, SYSTEXT will contain 6RMCOM which contains IS 2.0 macro prototypes. At installation option, SYSTEXT may contain SISICOM and CPSYS in lieu of 6RMCOM.

The system texts are constructed as a part of the installation process discussed later in this document.
<table>
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<th>System Text Name</th>
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<th>LMACOM</th>
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<th>PPSYS</th>
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ALGTEXT and SMTEXT are installed when ALGOL and SORT/MERGE are installed. ALGTEXT is used only by ALGOL programs. COMPASS routines containing SORT/MERGE macros require specification of SMTEXT when assembled.
3. Representative times for the various provided installation/assembly decks are as follows when they are run on a 131K 6600 in conjunction with other batch processing:

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The above table does not include times for the Version 3.0 Object Library or any of the Editlib decks.
Installation time can be shortened perceptibly by utilizing the system's multiprogramming capability. Due to the interdependent relationships involving Record Manager and FORTRAN Extended, the jobs required for their installation must be run before any of their dependent products can be installed.

While not absolutely required for initial installation, maintenance mode installation involving introduction of PSR code dictates a prescribed order to ensure complete product set compatibility of relocatable binary and absolute binary overlays.

Each of the following steps contain one or more jobs that can be run concurrently; all jobs in a step must run to completion before the next step can begin:

A. Create FORTRAN Extended Compiler maintenance format tape using CINSTAL; assemble Record Manager using SIXRM1.

B. Replace Record Manager in the running system using SIXRM2; assemble FTN Compiler and FORM using CMaint and FORM2.

C. Add FTN Compiler and FORM to the running system using FTN2C and FORM2; assemble COBOL, SORT, and the 8-Bit Subroutines using COBOL1, SORT1, and BIT81.

D. Add COBOL, SORT, and the 8-Bit Subroutines to the running system using COBOL2, SORT2, and BIT82; assemble FTN Library and IS using FTN4LIB and IS1.

E. Add FTN Library and IS to the running system using LIB4 and IS2; assemble DA using DA1.

F. Add DA to the running system using DA2; assemble SCOPE and INTERCOM using SCOPE1 and INTCM1.

G. Add INTERCOM to the running system using INTCM2; assemble QU using QU1.

H. Add QU to the running system using QU2.

I. Create a configured deadstart tape using SCOPE2.

Deck AIDS1 must be run at step F or later but not before decks V23RUN1 and V23RUN2 have been run to install FORTRAN 23 (RUN). Deck AIDS2 may then be run at any convenient time.

Deck V3COB1 may be run at step C or later. Deck V3COB2 may then be run at any convenient time.

Deck SCOPE3 creates a configured deadstart tape from the running system. Execution of deck SCOPE3 at any time prior to step I will create an expanded though still unconfigured deadstart tape.

All other products may be installed at any point in the sequence outlined above.
4. All release tapes provided for SCOPE 3.4 and its product set are available in binary mode recorded in either 7- or 9-track format. The installation decks listed in this document and present on either the 7- or 9-track tapes are structured for use with the 7-track tapes.

A single tape is provided with the SCOPE release package which contains installation decks for the entire product set especially tailored for use at sites having only 9-track tape drives.

5. The installation decks provided create nine libraries. The following list defines contents of these libraries assuming all members of the SCOPE 3.4 product set are installed. The library names referenced should be considered reserved to CONTROL DATA CORPORATION.

The list is constructed in the order the products are installed for the Sunnyvale Development Center system. While listed here with all routines associated with each product shown in inclusive order, the PPLIB file of a deadstart tape is sorted in alphanumeric order by EDITLIB. The other deadstart tape library files are not sorted.

PPLIB    CM Resident Library
Peripheral processor routines associated with SCOPE, INTERCOM, CE Diagnostics, Conversion Aids, and one PP routine associated with DA.
**SCOPE**

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1IR JANUS MAIN PROGRAM
1IS JANUS MAIN PROGRAM
1Q JANUS ROUTINE
1U INITIATE JANUS CONTROL POINT
1RP JANUS BACKSPACE PRINT NAME
1RF END-OF-REEL SWAPPING
1CP 1RP OVERLAY
1CL FILE CLOSE ROUTINE
1TC CLOSE TAPE FILE
1TO TAFE OPEN ROUTINE
1TO OVERLAY TO IT0
1OF OPEN FILE ROUTINE (ALL FILES)
1FE CFEN ROUTINE (DUMMY)
1CO FILE CLOSE ROUTINE (DUMMY)
1DA FAMILY DISK PACK LABEL PROCESSOR
1PK SEQUENTIAL PACK CLOSE
1PK SEQUENTIAL PACK INITIALIZATION
1DA DISK PACK LABEL ROUTINE
1KG FAMILY PACK END OF JOB PROCESSOR
1RE EDITLIB ROUTINE TO COMPLETE DISK ADDRESS OF RECORD
1BT TAPE/DISK BLANK LABELS
1DF DUMP CAYFILE
1MF MULTIFILE POSITION ROUTINE FOR ANSI LABELLED TAPES
1NH DSD #HOTHER'S HELPERS
1OM DEVICE QUEUE MANAGER
1SN VISUAL SERIAL NUMBER
1LT LOAD JOBS FROM TAPE
1NT DRIVER FOR LONG RECORD STRANGER (L) TAPES FOR 7-TRACK TAPES
1TF TAPE RECOVERY (WRITE DRIVER)
1PF RECOVERY (POSITIONING DRIVER)
1PS 1P4 OVERLAY
1PM TAPE RECOVERY (VERIFICATION DRIVER)
1PO 1P3 OVERLAY
1PF TAPE RECOVERY (POSITIONING DRIVER)
1PM 1F1 OVERLAY
1MI SCOPE TAPE WRITE DRIVER FOR 7-TRACK TAPES
1RV TAPE READ RECOVERY - INITIALIZATION
1RQ TAPE READ RECOVERY-NOISE RECORD-NOISE VERIFY
1NO TAPE READ RECOVERY-NOISE RECORD-VERIFY
1NQ TAPE READ RECOVERY-NOISE RECORD-READ FORWARD 1
1NQ TAPE READ RECOVERY-NOISE RECORD-READ FORWARD 2
1R2 TAPE READ RECOVERY-TAPE PARITY ERROR REC 1
1R3 TAPE READ RECOVERY-TAPE PARITY ERROR REC 2
3R3 SEGMENT OF 1R3 LOADED WHEN GO OR DROP DECISION NECESSARY BY OPERATOR
1TF FORWARD SKIP ROUTINE FOR TAPE
1NS STRANGER (S) TAPE WRITE DRIVER
1NH 9-TRACK S-FORMAT TAPE WRITE DRIVER
8T3 SEGMENT FOR LOADING OF MMTC CONVERSION MEMORY
2TB BACKWARD SKIP ROUTINE FOR TAPE
1GR TAPE READ RECOVERY-WRITE CM FOR S-FORMAT 9-TRACK TAPES
1CT TAPE READ RECOVERY-WRITE CM FOR SCOPE FORMAT 7-TRACK TAPES
1CS TAPE READ RECOVERY-WRITE CM FOR S-FORMAT 7-TRACK TAPES
1TF SCOPE TAPE READ DRIVER
1FS STRANGER (S) TAPE READ DRIVER FOR 7-TRACK TAPES
1NF 9-TRACK S-FORMAT TAPE READ DRIVER
1W9 9-TRACK SCOPE FORMAT TAPE WRITE DRIVER
1C9 TAPE READ RECOVERY-WRITE CM FOR 9-TRACK SCOPE TAPES
1R9 9-TRACK SCOPE FORMAT TAPE READ DRIVER
PLOTTER PROGRAM (DUMMY)
PROCESS STACK PROCESSOR ERRORS
DUMP OUTPUT FILE TO TAPE
INITIATE A BATCH JOB
SWAPIN OR ROLLIN A JOB
OVERLAY TO PROCESS PARITY ERROR FOR 1SI
SWAPOUT OR ROLLOUT A JOB
ANSI/DISPLAY CODE CONVERSION TABLE FOR MMTI MEMORY
EBCDIC/DISPLAY CODE CONVERSION TABLE FOR MMTI MEMORY
ON-LINE PRINTER DRIVER
ON-LINE CARD PUNCH DRIVER
ON-LINE CARD READER DRIVER
TRANSLATE JOB CARD
TAPE LABEL PROCESSOR (ANSI)
4LB OVERLAY
4LB OVERLAY
LOAD FIELD NAME MESSAGES
LOAD CONVERSION TABLE INTO MMTI
4LB INLAY TO CONVERT PRU COUNT
BCD CONVERSION TABLE INLAY FOR 4LB
4LB INLAY TO CHECK THAT PROPER CONVERSION TABLE IS IN THE MMTI
4LB INLAY FOR DEBUG MESSAGE WRITER
4LB INLAY TO FORMAT THE LABEL INFORMATION
4LB INLAY TO PACK AND WRITE LABEL TO TAPES TABLE
3000 TYPE LABEL PROCESSOR
3000 LABEL PROCESSOR READ FUNCTION CODE OVERLAY
3000 LABEL PROCESSOR WRITE FUNCTION CODE OVERLAY
DAYFILE MESSAGES FOR I/O REQUESTS
OVERLAY TO 6WM
OVERLAY TO 6WW
CENTRAL ERROR MANAGER
TAPE SAMPLER
RESTORE QUEUE
DUMP QUEUE
PROCESS DISPOSE FUNCTION
TAPE CHECKPOINT
RESET FNT FOR RESTART
RESTORE CONTROL POINT AREA FOR RESTART
RELOAD CORE FOR RESTART
PROCESS REPRIEVE FUNCTION
STATUS ROUTINE
PROCESS JOB DEPENDENCY
LOADER UTILITY
ABSOLUTE OVERLAY LOADER
ABSOLUTE OVERLAY LOADER
MOVE SYSTEM DIRECTORY (EDITLIB USE)
DUMMY EDITLIB OVERLAY
TERMINATE DEADSTART
PERMISSION CODE PROCESSOR FOR PERMANENT FILES
CHECK IF INTERCOM CONTROL POINT
CONNECT FILE NAME TO TTY
SEND PERMANENT FILE AUDIT INFORMATION
INTERCOM
MULTIPLEXOR DRIVER
MULTIPLEXOR DRIVER
MULTIPLEXOR DRIVER
HIGH SPEED EXPORT PROCESSOR
PROCESS SPECIAL DIRECTIVES
3XF PROCESS OUTPUT DATA STREAM
5XF OUTPUT BANNER TO TERMINAL
6XF OUTPUT LACED CARD
4XF PROCESS INPUT DATA STREAM
1XG GRAPHICS INPUT/OUTPUT PROCESSOR
7XF END PROCESSING
1LX LCC EXPORT PROCESSOR
3LX OVERLAY TO 1LX
4LX OVERLAY TO 1LX
1ME INTERCOM V4 WIDE BAND DRIVER
0Z2 INTERCOM LCC DRIVER INITIATOR
1Z2 INTERCOM LCC DRIVER
9Z2 INTERCOM LCC DRIVER
1CI COMMON COMMUNICATIONS INTERFACE
3CU ASSIGN NEW USER TABLE
3CI USER TABLE PROCESSOR
3CT USER TABLE PROCESSOR
3CX COMMAND PROCESSOR FOR 1CI
3CF CLEAN UP PHASE OF 1CI
111 STARTS INTERCOM AT CONTROL POINT
3TT READ/WRITE FOR REMOTE TERMINAL
3T1 READ SEGMENT OF 3TT
3T2 WRITE SEGMENT OF 3TT
1ER INTERCOM VR4 BUFFER MANAGER
10P MUJ PROCESSOR
10M 1CP OVERLAY
1FT INTERCOM VR4 LOW SPEED EXPORT PROCESSOR
8FT INPUT FILE TRANSMISSION
9FT OUTPUT FILE TRANSMISSION
1PJ PROCESS JOB CARD
1ID SEND DAYFILE MESSAGE TO INTERCOM TERMINAL
111 SENDS MESSAGES TO TERMINALS FROM PP ROUTINES
1DS H DISPLAY GENERATOR FOR INTERCOM VR4
1T6 INTERCOM 4.1 7000 DISPLAY GENERATOR
1BL INTERCOM VR4 TABLE TRANSMITTER
FNT MODIFIES VR4 FNT ENTRY FOR BATCH AND DROP
IUP INITIATE USER PROGRAM
IAF INITIATE ANOTHER PROGRAM
MES MESSAGE TRANSFER ROUTINE
2ME OVERLAY TO MES
3ME OVERLAY TO MES
MUJ MULTI-USER JOB INITIALIZATION
MAC MUJ ACCOUNTING
FAD FILE ATTACH/DETACH FOR MUJ
G8J BEGINS GRAPHICS MODE
GEJ ENDS GRAPHICS MODE
1GJ UPDATE IGS QUEUE WHEN IGS DATA STREAMS DEFINED
2GJ FORMAT SCOPE ERROR MESSAGES FOR 274 IGS
1GR 274 IGS RECOVERY

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MSD

*** AIDS ***
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NUCLEUS  CM Resident Library

Routines callable by control card, including all compiler (0,0) overlays. COMPASS 3.0, LOADER, and EDITLIB non-0,0 overlays are included in NUCLEUS.

**********
*          *
* NUCLEUS*  *
*          *
**********

*** SCOPE ***
PFCCP     CCFYF
LCADPF    CCFYCF
TRANSF    CCFYCR
DUMPF     CCFYER
REQUEST   CCFYN
RESTART   CCFYBSF
CCFYXS     REWIND
SEGBILD   UNLOAD
SEGRES    RETURN
LOAD      UPDATE
LOADC     SKIP8
LCADH     SKIP
LOADU     TRANSR
LCADUC    TRANSF
LOADUM    DISPOSE
LOADD     RECOVER
LIBRARY   SYSTRM
LOADQ     AUDIO
LOADQ01   DMFCES
LOADQ02   PFDUMP
LOADQ03   LQRTXT
COMBINE   PMTEXT
XXXREGQ   SCRTXT
XXXMPQ    FFTEXT
EDITLIB   SCRTXT
EDITSYS   CFCRTXT
EDITUSR   STATEXT
CCFYECO   IFTEXT
LABEL     CE DIAG
CCFYL     CEDIA
LISTMF    CERMS
CFC       CEFAP
IORANDM   EC2
IO        CR6
COMPARE   MY1
CHEKPT    ALS
TRAP      FST
TRAPPER   CT3
SETORE    CU1
BKSP      ALX

*** 6RM ***
SYSTEXT
IGTTEXT
TXTGRM
FILE
FTAMAC
*** FORTRAN ***
*** 8 EIT ROUTINES ***
*** 8 EIT ROUTINES ***
CCFY8P
*** FGRM ***
FORM
*** QUERY/UPDATE ***
CU
CCEOL
GU1
GU2
COPYC
*** SORT/MERGE ***
*** OLIDDL ***
SORTMERG
QUIDDL
*** COMPASS ***
COMPASS
CCMP28
*** RUN ***
RUN
*** SYMPL ***
SYMPL
*** AIDS ***
AIDS
SCF
CFSPY$
LOGOUT
CONVERT
WHEN
BRESEQ
FRNTSYP
CONVFP
RANCCNV
STORE
DISCARD
SIFT
FETCH
DATAR
XEG
SGRT
LEF
*** BASIC ***
*** BASIC ***
ALGOL
*** ALGOL ***
ALGOL
*** ALGTEXT ***
*** SIMULA ***
SIMULA
*** SIMULA ***
*** SIMSCRIPT ***
SIN
*** AFT ***
AFT
*** MARS ***
MARS

60307400 A  xx i
SYSOVL  CM or Disk Resident Library

Overlays other than (0,0) for the SCOPE 3.4 product set. This library is the central source for all system overlay calls.

*******
*      *
* SYSOVL*
*      *
*******

*** FORTRAN ***
LSTFRO$ SYMP10 LCSV70
PSICTL$ SYMP15 LAGDE
CLOSE2$ SYMP16 DFSUB
FTMSSG$ SYMP17 LAL0
FASS15$ SYMP13 SGLINK2
FASS14$ SYMP30 SARTOLG

*** CCEOL ***
CCEOL10 SYMF31 SCLINKK
CCEOL11 SYMF32 SCLINKK
CCEOL12 SYMF50 UF39
CCEOL13 SYMF51 UF31
CCEOL14 SYMF52 UF32
CCEOL15 ** ALGOL *** UF33
CCEOL16 ALG0 UF34
CCEOL20 ALG1 UF35
CCEOL21 ALG2 UF36
CCEOL22 ALG3 UF37
CCEOL23 ALG4 UF38
CCEOL24 ALG5 S0линK9
CCEOL30 *** SIMULA *** RES00

*** SORT/MERGE ***
SORT0 SIM0 LAGRE
SORT1 SIM1 RES01
SORT11 SIM2 RES06
SORT12 SIM3 RES015
SORT20 SIM4 RES017
SORT30 SIM5 RES020
SORT31 ** AFT *** RES013
SORT32 SECTN1 RES02
SORT40 OVER11 RES03
SORT41 OVER12 RES010

*** QU ***
G6000 OVER13 RES04
G7000 OVER14 RES011

*** INTERCOM ***
ERTM OVER16 MASSUP
ERCOB OVER17 MASS51
ERRUN OVER18 MASS52

*** QUDDOL ***
QUDDL10 CALSEC2 MASS54
QUDDL20 ARLM2 RP660

*** RUN ***
RUN1 POCKET RP661
Q8DIA GP RLDSR RP662

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60307400 C
COBOL  Disk Resident Library

Object time routines for COBOL 4.0 and SORT/MERGE 4.0

******
* * COECL *
* *
******

*** COECL ***
DCFIVEO DDEXAMC
CCNSTAN DDMOVE
DCTRUEL DBCOCH
DGZONE DSCCM
DG2N3A DG2N6A
DG2N5A CANV1
DG2N6A DGSPACE
DG2NTAE DCINITL
DGSTFTE ODPRINT
DGZ7A DG2GEN
DGSTF1A DDEEGFP
DGSTF2A DDENDRF
DGSTRP3 *** SORT/MERGE ***
DGATCN OSMCON
DGENDP TSMCON
DGTEURS MSMCON
DGTRNHS MACPRO
DGCV8D SOCHKR
DG1SA ENDPRO
DG2N1SA EXTRACT
DG2N5SA KYCFL
DG2N6SA KEYCOD
DG2N6SS BUFAFF
DEN10S TRNSRT
DEN10S TSC.
DEN6GA TMC
DEN6SS TMC
DB1DDA NEXRGM
DB6DDA FMC
DB6DDA FMIP
DEN6GD FMOP
DEN1SB FSRTGET
DEN1SD MAGCON
EN1SEA DMC
ECD MRGDSN
AOFTN MZC
DDEDAL SRTCON
DDEDIT SRTPUT
DDEDALP SRTGET
DDEOP

xxiv 60307400 C
RUN2P3  Disk Resident Library

Object time routines for RUN 2.3

*********
*        *
*  RUN2P3*
*        *
*********
**SCCFE**

** R23RCVR  FTNBIN
**  RLN ***  ICINT
** RUNCALL   INFUN
** ACGOER    INPUTS
** DELE      LENGTH
** EXF       OUTPN
** IEAIEX    OUTPIS
** INITMS    OVERFL
** LEGVAR    OVERLAY
** LCCF      FALSE
** SINCOS    RANF
** SNGL      REAIEX
** SQRT      RBAREX
** SYSTEM    READEC
** TAN       README
** XACL      REMARK
** ALNLCG    BACKSP
** ASINCOS   BUFEI
** ATAN      BUFE0
** ATAN2     CCN03S
** CAES      ENDFIL
** CEAIEX    ICHEC
** CCOS      IFENO0
** CEXP      INFUB
** CLCG      INFUC
** CSIN      ICHEK
** CSQRT     KODER
** DAES      KRAKER
** DATAN     OUTFT8
** DEADEX    OUTPTC
** GBAIEX    REWINN
** CEXP      SLITE
** DISFRA    SLITET
** DNLNCG    SSWITCH
** DMCD      START
** OSGN      SIS=TIM
** OSGCOS    TANH
** OSGRT     TIME
** DSMF      WRITEC
** DVCHK     WRITMS
SCOPE system I/O routines, 6000 Record Manager (6RM), including the Direct Access (DA) and Indexed Sequential (IS) modules, other independent I/O routines available to the product set members plus the SYMPLE and FORM object library routines.

*** ERM ***
LEUF.SQ  LXER.SQ  GETFAR  SD$SEEK  T8.NCH
SC.RM    ENDF.SQ  NEWCONS  SFACE   T8.MVB
WAR.RM   WECR.SQ  FINMAIN  SQGUEZ3  T8.CE.
IS.RM    WMK.SQ   README   SEARCH  T8.CNF6
DA.RM    DL.RM    FINTER   SD$TRC  T8.CNF6
CLO.RM   DLT.WA   DEFAULT  FILEIS  T8.CNF6
ERR.RM   SKFL.RM  ACCESS   FILESD  T8.CNF6
MOVE.RM  SKFF.SQ  ACCPRCK  FILEWA  T8.CNF6
CMWR.SQ  SKFL.SQ  CHKFET  FITCOM  T8.CNA
MCT.RM   SKFL.WA  DELETE   ERRPRCC  ** FCNM ***
MIPG.RM  GETN.RM  FCRCEM  CPACLS  FMSDDFE
CHEK.RM  GETN.SQ  INSERT   GET     FMSCCFR
OPEN.RM  GETN.WA  FINCALL  PUT      FMSGAL
FCM.RM   REFL.RM  OFENNEW  REFLC   FMSGF
OPEN.SO  REFL.SO  OFENCLOD  DLE    FMSGF
OPEN.WA  REFL.WA  OFENPCLD  GETN   FMSGF
OPEN.WA  SEEK.RM  REFOS    SEEKF  FMSGCA
OPEN.IS  SEEK.SQ  SEEK     SKIP    FMSSEQ
OPEN.OA  SEEK.WA  SETELKD  SETRC  FMSGF
PUT.RM   SKEL.RM  SETELKI  GET  FMSGCNF
REQ.RM   SKEL.SQ  SETCOLL  PUTF  FMSFCRM
PUT.SQ   SKFP.SQ  SETERROR  SCANCWA  FMSGCC
WAR.SO  SKEL.WA  SETKEY  ** B EIT ROUTINES ***  FMSFDK
PUT.WA   MSG.RM  STFETFS  T8.ERR   FMSX3
CLSF.RM  R6RM.RM  STKEYFS  XFACK  FMSFX3
FLSM.SO  ** ACMMON ***  T8.RD    FMSFX3
FLSM.SO  ** SIS ***  TERMIN  XFANC  FMSFX3
CLSV.RM  BUFALOC  BFILEDA  XMCEF  FMSFX3
CLSV.SO  DATM  CLSE  TCCRACK  FMSFX6
CLSW.RM  DIAGNOS  SD$IDEL  T8.MXTB  FMSFX6
CLASS.WA  FINDIT  D.IEIN  BDPTAB  FMSFX6
CLSFS.IS  INDEXM  SD$FIND  T8.GTAE  FMSFX6
CLSF.OA  IOMGR  SC$GETN  XFIL  FMSBT6
REW.RM   PPCALL  SD$HASH  XREAD  *** RUN2F3 ***
REW.SQ   CEIGRM  SD$ADD  WRITIE  GETEA
GET.RM   WRITERM  D.INREC  T8.CHK  SIC$  *** SYMPLE ***
GET.SQ   REGSAV  SC$IC  T8.PARS  SYMHESS
Z.SQ     SAAM.IS  SD$KEY  T8.CCM  SYMBSW
R.SQ     SISCLSE  RECOM  T8.TXT  SYMCC
W.SQ     SISKY  D.OFN  T8.CNC  SYMCI
DTS.SQ   SISOPEN  SORFM  T8.CAT  SYMCO
FSU.SQ   SISRFP  SD$RFLC  T8.CN6  SYMSB
BFTS.SQ  SISSEEK  SCARPV  T8.NNA  SYMC
GET.WA   SISSKIP  SD$RLCV  T8.TSTC  SYMCC
PUTL.SQ  SIZES  T8.TSTT  SYMCC
GETL.SQ  KWAKER  SAAM.OA  T8.TST6
Object time routines for BASIC, ALGOL, SIMULA and SIMSCRIPT. Additionally, the FTN 3.0, COBOL 3.0 and SORT/MERGE 3.0 object time routines appear in SYSMISC if they are installed.

** BASIC **

** SYSMISC **

** ALGOL **

** SIMULA **

** SIMSCRIPT **

** FORTRAN **

** COBOL **

** ECMA **
Disk Resident Library

INTERCOM 4.1 routines associated with the Interactive Graphics 274 terminal subsystem.

*************
*             *
* IGS274      *
*             *
*************

**INTERCOM**
AELBUT
GFONTA
GFONTN
GIABRT
GIABRT
GIBRD
GIBRD
GIESZ
GIESZ
GICONF
GICONF
GICOPY
GICOPY
GIFID
GIFID
GIFSIO
GIFSIO
GILKID
GILKID
GIMAC
GIMAC
GIMESS
GIMESS
GIMOVE
GIMOVE
GIFLCT
GIFLCT
GITIMM
GITIMM
GUARC
GUARC
MARK
MARK
IEO
IEO
GUARG
GUARG
GULINE
GULINE
GUFNTS
GUFNTS
DMINIT
DMINIT
DFFLSH
DFFLSH
DMGET
DMGET
DM сторо
DM сторо
AEEXEC
AEEXEC
CCNSCLC
CCNSCLC
ERASER
ERASER
GIAME
GIAME
GIAMS
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GIEBUT
GIMASK
GIMASK
GUAN
GUAN
MACEVT
MACEVT
GURSET
GURSET
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GVALID
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SEGENR
SCOPE 3.4 DOCUMENTS

CDC CYBER 70 and 6000 Series computer systems hardware and software information is available in the following documents:

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*Limited distribution; available only through Software Manufacturing and Distribution Section, Sunnyvale, Ca. 94086.

†Combined 6000/7000 Series manual.
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GIM General Information Manual
IH Installation Handbook
IN Instant
OG Operator's Guide
PSB Programming Systems Bulletin
RM Reference Manual
SPRM System Programmers Reference Manual
UG User's Guide

*Limited distribution; available only through Software Manufacturing and Distribution Section, Sunnyvale, Ca. 94086.

†Combined 6000/7000 Series manual.
RELEASE DESCRIPTION

SCOPE 3.4 is a revised and extended version of the SCOPE 3 operating system.

HARDWARE CONFIGURATION

The minimum hardware configuration consists of:

1. 6000/CDC CYBER 70 Series computer
24. million characters of mass storage
   on any combination of the following:
   854 disk drive
   865 drum
   814, 6603, or 6638 disk files with standard option 10037-A
   821 data file
   841 multiple disk drive

1. 405 card reader with controller
1. 415 card punch with controller
1. 501 or 512 printer with controller

2. magnetic tapes from any of the following:

RELEASE MATERIALS

Release materials for the basic SCOPE 3.4 operating system package consist of
   the following:

   PL1 SCOPE 3.4 program library
   PL2 COMPASS 3.0 program library
   PL3 6RM 1.0/IS 2.0/DA 1.0 program library
   PL4 FORM 1.0 program library
   PL5 CE Diagnostics program library
   Unconfigured deadstart tape

The SCOPE Program Library Tape contains the source programs for all routines
comprising the SCOPE 3.4 operating system. An itemization of a complete SCOPE
3.4 product set deadstart tape appears in the preface of this document. The
unconfigured deadstart tape contains only the products SCOPE, COMPASS, 6RM,
and SYMPL.
Required supplements to this package are:

PL6 SYMPL 1.0/Maintenance Tools program library
PL7 FORTRAN Extended 4.0 Compiler program library
PL8 FORTRAN Extended 4.0 Object Routines program library

NEW FEATURES

15 Control Points

An installation can select from 1 to 15 control points at system assembly time.

20 Peripheral Processor Support

SCOPE 3.4 will support the hardware capability to have 20 PP's and 24 channels.

Tape Scheduling

Tape Scheduling (in SCOPE 3.3 known as automatic tape assignment) provides more control of system resources. The installation can tailor the system to its needs. The following capabilities are provided:

- Preview of a queue of tape-dependent jobs
- Dynamic tape drive status determination
- Scheduling of tape-dependent jobs based on tape availability
- Use of VSN information to accurately identify tapes
- Handling of fixed priority jobs
- Deadlock prevention

Loader

The SCOPE 3.4 loader directives and control cards allow the full use of alternate and user libraries. Expanded use of overlay structures allows up to 4095 levels of overlays.

The new loader maintains all existing features of the replaced CP and PP loaders, except segmentation. The following features have been added:

- Selection of alternate system libraries or user libraries to satisfy externals
- Selective load of programs from a file
- Greater load map flexibility
- Presetting of core
- Saving of core image of loaded program
Capability of not satisfying selected externals
Expanded user call capability
Multiple entry points to overlays

EDITLIB

EDITLIB has been rewritten to accommodate the new loader library structures, and it includes the capability to generate and modify user libraries.

ECS I/O Buffering

Through REQUEST card or macro declaration, ECS may be used to block the user's input/output records into large ECS buffers thereby reducing the number of accesses to rotating mass storage devices.

ECS is divided into:
- System area: system information, flaw tables
- Paged allocatable area: I/O buffering area, resident library, swap files
- Direct access area: user area, as in SCOPE 3.3

Integrated Scheduler

The job scheduler for SCOPE 3.4 handles the normal batch jobs and in addition, controls the scheduling of all other jobs submitted to the system through remote facilities. The scheduler assigns a number, the job descriptor table (JDT) ordinal, to each job in the queue rather than just the control point number. Based on a set of job class characteristics, set by the installation, jobs may be swapped in and out to resolve resource conflicts or provide additional core for processing of high priority jobs; any job waiting for some external event (terminal I/O, tape assignment, PF availability, etc.) also will be swapped or rolled out. Through the use of job priority computation and job swapping, use of central memory and the central processor is improved. Jobs requiring high priority consideration will be placed in an express queue.

ANSI Label Support

Additional user header and trailer labels conform to the ANSI specifications.

SCOPE 3.4 conforms to an ANSI label standard which supersedes the ANSI standard followed by SCOPE 3.3. Under the new standard, density of the label data is the same as that of subsequent data.

Tapes with labels created under previous systems must be identified as Z labels if label and data densities are not the same. SCOPE 3.3 and 3.4 U labels are not identical. Refer to Appendix E of the SCOPE 3.4 Reference Manual.
Private Pack Support

The disk pack utilization has been expanded in the form of Sequential Packs. A multi-pack file no longer is restricted by the number of disk drives available. The only requirement is that the pack currently in process be mounted. The multi-file capability is not available on Sequential Packs.

Support of SCOPE Format on 659 Transports

This feature allows such capabilities as having the deadstart tape created at 800 or 1600 bpi on a 9-track tape.

STATUS Request

A new macro provides the user with information concerning the remaining resources in the system. This information will include file characteristics and unused rotating mass storage.

Extended Error Processing

An additional capability is provided in the area of error status. By setting a bit in the FET, the user can receive additional detail on the nature of any error condition.

Permanent Files

The PF utilities now read/write non-stop to disk and tape.

A new PF utility, TRANSF, allows the transfer of permanent files and/or the permanent file tables from one public mass storage device to another.

The PF routines re-use RBTC space.

ID hashing is used to search the permanent file directory (PFD).

Automatic archiving and retrieval of permanent files from tape is provided.

Automatic swap-out is provided for jobs waiting for access to files, APF space, or the PF utilities.

Two functions are new. SETP makes it possible to pre-position files at attach time, and ALTER allows end of information for a permanent file to be set to a current position.

PPDUMP

PPDUMP is a Fortran program which calls a PP program PFD, to dump the permanent file tables (PFD and RBTC). The PP program asks for two operator n.GO responses before completion. If an installation does not want this program as part of their running system due to fear of the loss of security to their permanent file system, they should delete it from their program library.
Deadstart and Recovery

Expanded recovery capabilities and reliability
RMS label initialization independent of permanent files
Option to logically turn off a CPU at deadstart time
Exchange jump package dump
Recovery of reconfigured CMR

CORRECTIONS

All eligible PSR corrective code published through Summary 312 has been added to the SCOPE 3.4 program library.

NOTES AND CAUTIONS

To prevent degradation in system performance, RMS devices used for SYSTEM, PFD and/or PF residency should be placed on double ranked channels (24B-33B) in machines having more than 10 PRU's and 12 channels.

Under SCOPE 3.4, it is no longer necessary or permissible to create an EST or RBR entry for ECS.

Sequential pack files (DP or 2DP on REQUEST card) cannot be ECS I/O buffered.

CAUTION: The MMTC controller, operating at 1600 bpi in conversion mode, initiates a memory reference to controller memory cell 377 on detecting the first character of the postamble. Consequently, the flag bit always must be set in this cell; otherwise memory flag bit errors will occur. This problem is resolved when ECO/FCO CA26461(3518) and CA26462(3528) are installed.

When SCOPE 3.4 is run on a 6500 or 6700 using IP.XJ=1 or 2, FCO CA23065 must be installed (to prevent both CPU's from being in monitor mode simultaneously).

If the OUTPUT file is rewound but no other action is performed on the file, the OUTPUT file will be evicted; a skip to EDI is not performed prior to writing the job dayfile on OUTPUT.

An installation defined limit is placed on the amount of mass storage that can be allocated to a job; jobs exceeding this limit will be terminated. The LIMIT control card can be used, however, for a job that is expected to exceed the installation limit.

To free disk space following a disk overflow the alternatives are:

KILL the job at one or more control points

Allow jobs at control points to loop until disk space becomes available as other jobs leave the print queue

A combination of the above
If permanent files are to be recovered, allocatable devices that are to be unavailable should be turned off at deadstart time, rather than having their ESTs zeroed out.

Mass storage accounting is modified slightly. Accounting of mass storage accesses for CM read/write are based on the values assigned by the macro ACCOUNT in CMR. The range of values acceptable to the ACCOUNT macro is 0 to 32. 1SP/1EP rounds down the ACCOUNT values to a power of 2; resulting in effective values of 0, 1, 2, 4, 8, 16, or 32. These values give accounting of 0, .25, .5, 1, 2, 4, or 8 milliseconds per PRU transferred.

Permanent files cannot reside in ECS.

Assignment of long stranger (L) tapes is prevented if SCOPE is assembled with IP.ECSB set to one (via code present in REQ under identifier SC40035). Installations with ECS active must avoid any use of L tapes, as 1MT (the L tape driver) could be locked out of central memory by an ECS transfer, resulting in numerous lost data errors or a system hang.

The COPY utilities do not support the random file features of SCOPE 3.4.

If a reverse function (SKIPB, BKSP, etc.) reaches beginning of reel, the operation is considered complete, as are READSKP and SKIPF when they reach end-of-reel if UP is on. If UP is off, these operations automatically go to the next reel. The number of skips not completed is returned in the FET extension if extended error processing is selected.

If two users submit dependent job strings with the same dependency identifiers and the same job name, SCOPE cannot distinguish between them. Therefore, the installation must prevent duplication by scanning job names for identical dependency identifiers.

If DISPOSE of a file is executed prior to the end of a job but the job continues to use that file name, two files are created and there is no way for the operator to differentiate between them for such operations as EVICT or ENPR.

INSTALLATION PROCEDURES

Installation of SCOPE 3.4 requires customizing to conform to the site's hardware and software specifications as follows:

Selection of general installation parameters within IPARAMS
Selection of tape processing installation parameters within CIOCOM
Choice of tape scheduling option
Configuration of CMR
Consideration of scheduling parameters
Determination of deadstart installation parameters
Selection of permanent file installation parameters
Selection of ECS parameters
Construction of a deadstart tape
INSTALLATION PARAMETERS

General installation parameters related to SCOPE are defined within the COMDECK IPARAMS. IPARAMS is listed in the routine CMR. Other installation parameters are described elsewhere in this and other sections of this document. Assigned (default) values and descriptions are listed below. Changes to the default values listed below should be made at IPARAMS.15. The first parenthetical value is the default value as set on the released program library. Additional parenthetical values, where given, have also been tested.

The default values of the IPARAMS configuration parameters are defined with the CEQU or CMICRO macros, so that an installation can insert all modifications at one given place. The CEQU and CMICRO macros are used to define variables conditionally. Since they are effective only if the variables have not been previously defined, any modifications should precede them.

Symbols can be defined be EQU or CEQU except for IP.SYSL1, IP.VER and IP.SYSE, which are micros and must be defined by CMICRO.

The following list constitutes the extent of installation changeable symbols in IPARAMS. Certain symbols present in IPARAMS in SCOPE 3.3 have been made installation invariant in SCOPE 3.4.

IP.CMU (0)
If nonzero, Compare/Move Unit hardware is present.

IP.CP (6)
If set to 6, all BCD cards will be punched as if by an 026. If set to 9, all BCD cards will be punched as if by an 029. This setting must agree with the mode set by IP.CR.

IP.CR (69D)
If set to 6, all BCD cards will be read as if punched by an 026. If set to 9, all BCD cards will be read as if punched by an 029. If set to 69, all BCD cards will be read as if punched by an 026; however, if a job card or a 7/8/9 end-of-record card has 29 punched in columns 79-80, all following BCD cards in that job will be read as if punched by an 029, until a following 7/8/9 end-of-record card changes the mode again. If set to 96, the inverse is true: 029 is default and job and EOR cards may switch to 026. The card reader routine, 2RC, treats all level 17 EOR cards as end-of-file for compatibility with JANUS.
IP.CSET (IP.C63)

Defines character set to be used throughout the system; it must be set to one of the following values:

IP.C63 63-character set, same as SCOPE 3.3 and earlier systems.
IP.C64.1 CDC standard 64-character set.
IP.C64.2 64-character set where many special symbols have a different definition and graphic than the 63-character set.

The CEQU statements for IP.C63, IP.C64.1, and IP.C64.2 must not be altered by the user.

Each of the three character sets are described in detail in Appendix A of the SCOPE 3.4 Reference Manual, Publication No. 60307200.

IP.CSET must have a constant value as all products to be added to the deadstart tape are assembled.

IP.DSP (PEABCD)

Macro representing a string of two-character mnemonics; each represents special characteristics for a disposition of output files. Example: IP.DSP CMICRO, (1P2P3P) indicates special mnemonics for one-part, two-part, or three-part paper.

IP.ECSB (0) (1)

If zero, the ECS extensions code is not assembled. If non-zero, the ECS extension code is assembled; and the ECS installation parameters are activated.

IP.SP250 (0)

If non-zero, the graphic display package is part of the system.

IP.IMUL (0)

If nonzero, Integer Multiply hardware is present.
IP.IQD (6)

Input queue delay. The lower 6 bits of the input queue priority are incremented by one every 2**IP.IQD seconds (0 to 11). See Scheduling Parameters.

IP.IQPW (3)

Input queue priority weight. The effective input queue priority is (P*(2**IP.IQPW) + A. P = job card priority, A = age addend (0 to 6). See Scheduling Parameters.

IP.LVF (70B)

Lowest fixed priority. Normally, it should be greater than IP.MPR. Since a fixed priority does not age, it is normally higher than can be specified on a job card. Thus it can be created only by operator action.

IP.MAP (10B) (2)

Default loader MAP option. 0 = MAP(S), 1 = (MAP=S), 2 = (MAP=B) (corresponding to SCOPE 3.3 MAP (PART)), 4 = (MAP=E), 10B = (MAP=X) (corresponding to SCOPE 3.3 MAP (ON))
S = Loader statistics and error messages only
B = S Option plus block names, addresses and lengths
E = B Option plus entry point list
X = E option plus a cross reference list of external references

IP.MCPU (1)

Installation option to define maximum number of CPUs to be used by system. The value 1 will produce the most efficient code for use on a single CPU. The system will run on a 6500, but it will use only one CPU. The value 2 will produce an MTR which will run on a 6500 or 6700 using both CPUs or on a 6400 or 6600 using one CPU.

IP.MECS (0) (730B) (40B)

Maximum number 0 to 7777 (octal) of 1000 word (octal) blocks of ECS direct access that may be assigned in response to a job card EC parameter. This value determines whether sections of code are to be assembled within the system to handle ECS allocation.

IP.MFL (1400000B) (3000000B)

Maximum amount of central memory field length that may be assigned to a user job. A user cannot request more than IP.MFL field length on job card or with MEM or RFL. Each installation must set IP.MFL less than (machine FL-CMR size-RBT area size-2*IP.POSFL*100B). If value is too large, a job swapped out waiting for a large field length might be locked out and never be swapped in, even if the machine is idle.
IP.MMS (100B)

Maximum mass storage limit that may be specified by PRUs/100 (octal) on a LIMIT card.

IP.MPPU (10D)

The maximum number (7-20) of peripheral processors in the configuration of any of the CMRs on the deadstart tape.

IP.MPR (20B)

Maximum priority a user can specify on his job card. Range (1 to 70B). Normally, it should be less than IP.LVF.

IP.MSCT (0)

Maximum decimal number of messages (1 to 4095) that may be entered into the dayfile by a single job. Only messages sent through MSG are counted. If zero, no maximum will be considered.

IP.MTL (7777B)

Maximum CP time limit in seconds, 1 to 77777 (octal), that may be assigned to a job.

IP.NDFS (1) (2)

Number of dayfile copies on output. Up to 4095 decimal may be specified.

IP.NJFL (20B)

FL/100B assigned to batch jobs when first assigned to a control point. Range (1 to IP.MFL). The default value allows satisfaction of job setup utilities.

IP.OQD (10B)

Determines delay before incrementing priority of a job in the output queue.

IP.POSPL (5)

Field length/100B reserved for use by ISO for requesting positive field length. Positive field length is not available to user jobs and can be considered part of CMR. Positive field length is allocated internal to the system for swapout use only. Range (4 to 10B).
IP.SECS (0)

Default number of direct access ECS blocks (1000 octal words) to be assigned to a job if not declared on job card; range zero to IP.MECS.

IP.SFL (50000B)

Default central memory field length (octal) to be assigned to a job if not declared; 100 to IP.MFL.

IP.SMS (0)

If non-zero, the default mass storage FRU limit a job can use, divided by 100 (octal). All jobs therefore proceed as if a LIMIT card with value IP.SMS were in the job deck. Refer to the LIMIT card in the SCOPE Reference Manual.

IP.SPR (10B)

Default priority given to a job if no priority specified on job card. Range 1 to IP.MPR.

IP.STL (100B)

Default time limit in octal seconds (1 to IP.MTL) to be assigned to a job if not declared on the job card.
IP.TCPUB (4)

The number of time units that should be accumulated on CPUA for the equivalent of 8 time units on CPUB. The default value should be used on a 6500; for a 6700, the value 9 should be used to indicate CPUA to be 2.25 times as fast as CPUB.

IP.TYPE (6600)

Determines the type of central processor to be used by the system (6600 (CDC CYBER Model 74) or 6400 (CDC CYBER Model 72)) for generation of optimal code. Acceptable values are 6400 and 6600.
IP.XJ (-1) (1)

Values (pertaining to routine CMR only)

0 Computer does not have the central exchange feature; central monitor is simulated.

1 Make use of central exchange jump feature.

2 Make use of central exchange jump feature including the MAN instruction.

-1 Central exchange jump feature is not to be used. An exchange jump protection program is included to protect the system against an accidental execution of an exchange jump instruction.

When multiple CMR's are assembled, any of which are assembled with a value of 0 or -1, MTR must be assembled with a 0 or -1 value.

IP.YMD (MDY)

Micro which shows format of date to be typed in at deadstart. The six possible permutations of the letters MDY constitute the range of this parameter.

The IPARAMS common deck also contains symbols IP,ILCMD, IP.IUSED, IP.1M1, IP.1WB, and IP.1ZZ. The INTERCOM 4.1 section contains a description of these symbols.
TAPE PROCESSING INSTALLATION PARAMETERS

The default values of the CIOCOM configuration parameters are defined with the CEQU or CMICRO macros, so that an installation can insert all modifications at one given place. The CEQU and CMICRO macros are used to define variables conditionally. Since they are effective only if the variables have not been previously defined, any modifications should precede them.

Symbols can be defined by EQU or CEQU except for IP.SYSL1, IP.VER and IP.SYSE, which are macros and must be defined by CMICRO.

Installation parameters specifically oriented to tape processing are defined within the COMDECK CIOCOM. CIOCOM is listed in the routine CMR. Changes to default values should be made at CIOCOM.6. Assigned (default) values, other tested values, and descriptions are as follows:

The following constitutes the extent of installation changeable symbols in CIOCOM. Certain symbols present in CIOCOM in SCOPE 3.3 have been made installation invariant in SCOPE 3.4.

IP.CBKSP (0)

If one, controlled backspace is available in all controllers; if zero, it is not installed.

IP.NBCD (0)

9-track default conversion mode (0=ANSI, 1=EBDIC)

IP.NBRC (0)

If zero, system noise records are used in write recovery; if one, they are not used.

IP.NDEN (2)

Density for label and data on 1/2 inch 9-track tape, if not declared on REQUEST or LABEL card.

IP.NOISE (3)

Maximum decimal number of 12-bit bytes in a noise record on 7-track S and L tapes or 9-track Conversion Mode (S-format) magnetic tape. A record less than or equal to IP.NOISE is discarded.

IP.NOIS9 (17D)

Maximum decimal number of 8-bit bytes in a noise record for packed mode on 9-track tapes. A record less than or equal to IP.NOIS9 is discarded. Default (17D) is the ANSI standard.
IP.RCYC (3R000)

Retention cycle (0-999) for calculating tape label expiration date when no retention cycle is given; 999 indicates permanent retention. The address field of the symbol definition should contain 3Rxxx where xxx defines retention cycle; leading zeros need not be written.

IP.RPE1 (12D)

Total decimal number of read parity retries on a single record (must be less than 60).

IP.RPE2 (8)

Decimal number of read parity retries accomplished by backspacing over the previous three records then reading forward in an attempt to recover (IP.RPE2 must be less than IP.RPE1.)

IP.TDEN (0) (2)

Density for both label and data on 1/2-inch 7-track magnetic tape if not declared on LABEL or REQUEST card: 0=556 bpi, 1=200 bpi, 2=800 bpi.

IP.TRYS (10D)

The number of unsuccessful attempts to locate the last good record, in excess of the minimum before declaring parity error irrecoverable. The minimum is equal to zero if IP.NBRK=1 or number of skips done + 2 if IP.NBRK=0. This value should not exceed 62D.
Tape scheduling options as follows:

<table>
<thead>
<tr>
<th>Name</th>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.AUTO</td>
<td>1</td>
<td>Enable automatic tape assignment according to LABEL or VSN specification</td>
</tr>
<tr>
<td>S.URES</td>
<td>1</td>
<td>Enable job scheduling based on unit availability</td>
</tr>
<tr>
<td>S.PRES</td>
<td>2</td>
<td>Enable pre-staging features (the VSN preview of the P display)</td>
</tr>
<tr>
<td>S.2LBP</td>
<td>3</td>
<td>Only ANSI labels will be accepted and written</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Two label formats (ANSI and 3000) are defined</td>
</tr>
<tr>
<td>S.AUNR</td>
<td>4</td>
<td>Allow auto assign to not ready unit</td>
</tr>
<tr>
<td>S.AUUL</td>
<td>5</td>
<td>Automatic unloading of tapes if necessary to make automatic assignment</td>
</tr>
<tr>
<td>S.SCUL</td>
<td>6</td>
<td>Write-enabled, unlabeled tapes will be considered as usable for assignment as scratch tapes</td>
</tr>
<tr>
<td>S.SCEL</td>
<td>7</td>
<td>Write enabled expired labeled tapes will automatically be considered for assignment as scratch tapes</td>
</tr>
<tr>
<td>S.SCBL</td>
<td>8</td>
<td>Write-enabled blank labeled tapes will automatically be considered as scratch tapes</td>
</tr>
<tr>
<td>S.PREA</td>
<td>9</td>
<td>Give warning if tape job has no VSN information</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Preabort such jobs</td>
</tr>
<tr>
<td>S.OCJI</td>
<td>10</td>
<td>Job initiation is based on tape drive availability; total demand cannot exceed number of drives logically</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Job initiation allows tape drive overcommitment</td>
</tr>
<tr>
<td>S.UEOJ</td>
<td>11</td>
<td>Unless specified otherwise on REQUEST or LABEL cards, all tapes will be unloaded at end of job</td>
</tr>
<tr>
<td>S.PSON</td>
<td>12</td>
<td>Prestaging feature (bit 2) set on at deadstart time. This is equivalent to the STAGE ON typein</td>
</tr>
<tr>
<td></td>
<td>13-16</td>
<td>Reserved for CDC</td>
</tr>
<tr>
<td>S.NOOR</td>
<td>17</td>
<td>Operator cannot override VSN card</td>
</tr>
<tr>
<td>S.DEBUG</td>
<td>18</td>
<td>Enable label debug code (4LB,4LC)</td>
</tr>
<tr>
<td></td>
<td>19-20</td>
<td>Reserved for CDC</td>
</tr>
</tbody>
</table>

Note: Use of bit 4 assumes that the basic auto-assign option (bit 0) is on. Likewise, bit 5 assumes that both bits 0 and 4 are on. Assembly errors result when setting of these bits is inconsistent.
Cross Reference Listing

The following cross-reference listing shows the SCOPE routines that reference each IPARAMS and CICCOM symbol.

*******
IPARAMS
*******
IF.CMIL 1IP
IF.CF 1IP
IF.CSEGL 1IP
IF.DISP 2LP
IF.ECS 1CEA
IF.FEESG 1CEG
IF.FE80G 1CEG
IF.ILM 1CEG
IF.TMUX 1CEG
IF.TGCS 1CEG
IF.TS6 1CEG

********
CICCOM
********
IF.C0KSP 1MT
IF.NECC 1EJ
IF.NERR 1MT
IF.NOISE 1CHG
IF.NOIS9 1CHG
IF.RCIC 4LC
IF.RFEL 4LC
IF.RFES 4LC
IF.TDEN 4LC
IF.TS6 4LC
TAPE SCHEDULING

"ape Scheduling options that may be selected by the installation are implemented by the use of conditionally assembled code. The bits in IP.TSG are tested at assembly time to determine the exact nature of the programs that comprise tape scheduling. For example, bit S.SCBL in IP.TSG governs the automatic scratch status of blank labeled tapes. If the bit is on, blank labeled tapes will be considered scratch without operator intervention; if the bit is off, scratch status will not be granted automatically.

The bits in IP.TSG can be divided into the 3 general categories of automatic assignment bits, pre-staging and overcommitment bits, and miscellaneous bits.

Automatic Assignment Bits

The installation can select 4 levels of automatic assignment by setting the 3 bits S.AUTO, S.AUNR, and S.AUUL:

No automatic assignment (all 3 bits off)

Basic automatic assignment (bit S.AUTO on and others off).

Auto assign to not ready unit (bits S.AUTO and S.AUNR on).

Auto assign to not ready unit with unload (bits S.AUTO, S.AUNR, and S.AUUL on).

With only S.AUTO set on, a specific tape will be assigned automatically when the specific tape is mounted. This level of automatic tape assignment is the basic and most generally useful. In the not ready modes, a search is made for the specific tape requested. When it is found, it is assigned, and the job continues. If it is not found, a not-ready tape unit is selected and the operator is instructed to mount the specific tape on the exact unit selected. If no not-ready tapes are available and the unload option is selected a ready tape will be selected and unloaded and the operator will be instructed to mount the required tape on that unit.

Automatic Scratch Status

Three other bits are related to automatic assignment. They are bits S.SCUL, S.SCCL, and S.SCBL. When set, each bit determines a specific type of tape to be considered automatically as a scratch tape. If all three bits are off, the only tapes treated as scratch are those specifically designated by the operator with the command SCRuu (where uu is the EST ordinal).

A job specifies *MT or VSN = SCRATCH in the request for a scratch tape. If any automatic assignment is turned on (bit S.AUTO is set), the system will try to assign a scratch tape automatically to the job. The tape must be mounted on a ready unit with a write ring in place, it must also be designated as scratch as described above, and it must meet these qualifications:

Tapes designated as scratch by the operator

Unlabeled tapes if bit S.SCUL is on

Tapes with expired labels if bit S.SCCL is on

Tapes with blank labels if bit S.SCBL is on
Pre-Staging Bits

Unit Reservation:

Bit S.URES controls the necessity of jobcard tape parameters, without which overcommitment and deadlock prevention are meaningless and pre-staging will not function.

Pre-Staging:

The prestaging option is assembled if bit S.PRES is set. If this option is on, a pre-staging buffer is assembled in CMR, its length is N.VRNFBUFU*6 (release value gives a 171B word buffer). Installations can change the symbol N.VRNFBUFU in CMR to change the size of the buffer.

If bit S.PSON is on, it sets up CMR as if STAGEON had been typed after a normal deadstart. Deadstart Recovery preserves the current setting of the STAGEON/STAGEOFF switch.

If bit S.PREA is set, a job that specifies tapes on the job card but has no VSN specifications in the job will be pre-aborted.

Overcommitment:

Bit S.OCJI determines whether or not tape drives will be overcommitted. If the bit is off, the total number of tape drives required by all jobs executing at a given time (as determined by job card tape parameters) cannot exceed the total number of tape drives at the installation. If bit S.OCJI is on, tape drives are overcommited; the total tape requirements of executing jobs can exceed the total number of tape drives at the installation. Deadlock is prevented by an algorithm calculated each time a tape is assigned.

Miscellaneous Bits

Two Label Processors:

If, in addition to the ANSI label processor, 4LB, CDC 3000 (Y) labels are to be processed, bit S.ZLBP should be on to allow use of the alternate label processor, 4LC.

EOJ Tape Unload:

Bit S.UEOJ causes 1EJ to unload non-scratch tapes at end of job. If any problems are encountered trying to unload the tape, such as tape not ready, the unload attempt will be ignored. This differs from the SAVE (SV on REQUEST card or X=SV on LABEL card) unload processed by 1EJ; 1EJ issues a message that problems exist and continues trying until the operator types in G0uu.
Operator Cannot Override VSN:

With bit S.Noor off, the operator can assign a tape with a VSN different from the VSN specified by the job; however when this bit is on, a different VSN, is not allowed.

Label Debug:

Bit S.Dbug controls debug code in 4LB and 4LC; use of this bit is not the normal mode of operation. This debug code will produce many messages which show the calls to and returns from the label processors. Such messages may cause other more informative messages to be overwritten.

Option Dependencies (IP.TSG)

The two figures below show dependent bits. Each bit name shown cannot be turned on (or turning it on will have no effect) unless all bit names below it are on. The automatic assignment bits are independent of the Pre-staging and Overcommitment bits and vice versa.

Miscellaneous bits (S.2LBp, S.Ueqj, S.Noor, and S.Dbug) are independent of each other and of the bits shown below:

Auto Assign Dependencies:

<table>
<thead>
<tr>
<th>S.AUUL</th>
<th>S.AUNR</th>
<th>S.SCUL</th>
<th>S.SCEL</th>
<th>S.SCEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>S.AUTO</td>
</tr>
</tbody>
</table>

Pre-Stage and Overcommitment Dependencies:

<table>
<thead>
<tr>
<th>S.Pson</th>
<th>S.Prea</th>
<th>S.Pres</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.Ocji</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S.URES

For example, to set bit S.AUUL on, bits S.AUNR and S.AUTO must be on; not having S.AUTO on will cause assembly errors. S.PREA is dependent on S.PRES and S.URIES but not on S.OCJI.
CMR CONFIGURATION PARAMETERS

The default values of the CMR configuration parameters are defined with the CEQU or CMICRO macros, so that an installation can insert all modifications at one given place. The CEQU and CMICRO macros are used to define variables conditionally. Since they are effective only if the variables have not been previously defined, any modifications should precede them.

Symbols can be defined by EQU or CEQU except for IP.SYSL1, IP.VER and IP.SYSE, which are micros and must be defined by CMICRO.

All the CMR configuration parameters are grouped together near the beginning of CMR. Changes should be made at CMR.964.

General parameters should be tailored to suit the needs of each installation; default values are shown in parentheses:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L.EST</td>
<td>(40B)</td>
<td>Length of equipment status table (≤ 77B)</td>
</tr>
<tr>
<td>L.CST</td>
<td>(50B)</td>
<td>Length of channel status table.</td>
</tr>
<tr>
<td>L.RPT</td>
<td>(10B)</td>
<td>Length of removable pack table.</td>
</tr>
<tr>
<td>L.INS</td>
<td>(0)</td>
<td>Length of installation table. Size, definition and usage of an installation table is completely controlled by the individual site. No SCOPE 3.4 product set program makes reference to the installation table.</td>
</tr>
<tr>
<td>L.FNT</td>
<td>(2200B)</td>
<td>Length of file name table</td>
</tr>
<tr>
<td>L.RMS</td>
<td>(10B)</td>
<td>Length of the C.E. RMS diagnostic table</td>
</tr>
<tr>
<td>L.SEQ</td>
<td>(10B)</td>
<td>Length of diagnostic sequencer table</td>
</tr>
<tr>
<td>LE.DFB00</td>
<td>(400B)</td>
<td>Size of system dayfile buffer</td>
</tr>
<tr>
<td>LE.DFBXX</td>
<td>(100B)</td>
<td>Size of control point dayfile buffer</td>
</tr>
<tr>
<td>LE.CERFB</td>
<td>(40B)</td>
<td>Size of hardware error file buffer</td>
</tr>
<tr>
<td>N.CP</td>
<td>(15D)</td>
<td>Number of control points (1 to 15D)</td>
</tr>
<tr>
<td>N.DEVICE</td>
<td>(3)</td>
<td>Number of controllers for allocatable devices; 1 for each 821 (2 units), 1 for each 814 (2 units), 1 for each 6603 unit, 1 or 2 for each 6638 unit, and 1 for each drum controller (which may drive more than one drum) and each disk pack controller (which may drive more than one disk pack unit). A 6638 with standard option 10037A is two controllers with one unit each (both 0).</td>
</tr>
<tr>
<td>N.RBR</td>
<td>(3)</td>
<td>Number of record block reservation tables; normally 1 for each 6638 unit, 1 for each drum unit, 1 for each 854 disk pack unit, and 2 for each 6603 (one each for inner and outer zones), 8 for each 821, 1 for each 814 unit, and 1 for each 841 disk pack unit.</td>
</tr>
<tr>
<td>N.RQS</td>
<td>(40D)</td>
<td>Number of request stack entries</td>
</tr>
</tbody>
</table>
N.VRNBUF (20D)  Number of entries in VSN buffer. Each entry is 6
words long and represents one line of job VSN
information in the P display.

IP.SYSL1 (SCOPE 3.4)  System label (up to 20 characters); the first
character must be blank.

IP.VER (RELEASE)  System version identifier (up to 10 characters)

IP.SYSE (07/30/72)  System generation date (up to 10 characters)

Parameters set to configure CMR for the permanent files are:

N.ESD (32D)  Number of entries per sub-directory.

N.RBTC (20D)  PRU number (octal) in RBTC

N.SD (11D)  Number of sub-directories

L.APF (30D)  Length of APF table (2 word entries)

INTERCOM parameters:

L.ITABL (19)  Length of INTERCOM table

Scheduler parameters:

L.ECSSWP (3)  (See page I-1-50)

Swap to ECS mask: The value of this symbol
determines which jobs get swapped to ECS. It is
a mask of bits; each bit set defines a set of
jobs that will be swapped to ECS. If all bits
are off (L.ECSSWP=0), only MUJ jobs and INTERCOM
jobs swapped out on a quantum go to ECS. In
addition, the following bit settings cause the
particular types of jobs to be swapped to ECS.

Bit 0  INTERCOM job at end of a command
Bit 1  Batch jobs swapped out on a quantum
Bit 2  Swap all INTERCOM jobs to ECS
Bit 3  Swap all batch jobs to ECS.

L.SCHJCA (20B)  Length of Job Control Area. Must be a multiple of
8. (Needs to be changed only if new classes
are added.)

L.SCHJDT (400B)  Length of Job Descriptor Table. Must be a
multiple of 8.

Establishing a CMR for an installation requires inserting information about
the CMR configuration parameters and tailoring the EST, DST, RBR, and RPT
tables. With 3.4, up to eight different CMR configurations, each with unique
EST, DST, RBR and RPT tables, may be placed on the deadstart tape.
Equipment Table Configurations

Four equipment tables must be tailored for each installation: EST (equipment status table), DST (device status table), RBR (record block reservation table), and RPT (removable pack table) table. The instructions for creating the EST entry differ between allocatable and non-allocatable devices.

The EST may be altered from the console. DST, RBR, and RPT entries may not be altered from the console; as CMR changes in size with the addition or deletion of entries.

The EST may be tailored to any configuration by using the macros described in this section. Its size may be greater than or equal to the number of hardware units present in the configuration. However, it may not exceed 77 (octal) since an EST ordinal must be no more than six bits. Since the first word of the EST may not be used, the first equipment ordinal is 01.

Table Structures

The CMR tables are defined by the TABLE macro.

The sequence of the macro calls defines the sequence of the tables generated in CMR. This sequence can be altered by an installation, but the following constraints must be observed:

1. Origins of EST, CST, FNT and DAT must be located under 10000 (octal).
2. The RQS and DST table must be located under 20000 (octal).
**RMS Devices:**

The **EDST** macro causes a one-word **EST** entry to be constructed where the macro statement occurs. If no **EDST** macro with the same channel 1, channel 2, and controller has been assembled, a **DST** and corresponding **DAT** entry will be constructed. Numeric arguments must not have leading zeros. **EDST** macro entries should be made at CMR.2108. The macro format is:

```
name  EDST type,chan1,chan2,contr,unit,sysres,pf,onoff,priv.
name  Any combination of up to 6 alphanumeric characters
type  Two-letter hardware code:
      AA  6603 disk   AF  814 disk
      AB  6638 disk   AL  821 disk
           (standard option
            10037A required)
      AC  6603-II disk AM  841 disk pack
      AD  865 drum    AP  854 disk pack unit

An **EDST** macro entry is not permissible for **ECS** in **SCOPE** 3.4
```

**chan1**  Primary access channel for device (assumed decimal)

**chan2**  Secondary access channel for device (decimal). Only one channel can be assigned to each mass storage controller.

**contr**  Controller number for device

**unit**  Unit number (decimal) for device

**sysres**  If non-blank, system will be deadstarted onto this device

**pf**  If non-blank, permanent files may reside on this device

**onoff**  If non-blank, device is off initially; otherwise, device is on initially.

**priv**  If non-blank and type is AM or AP; the device will be made a private device.

To avoid degradation in system throughput, the system resident device should be on a channel separate from any other equipment.

Equipment (controller) numbers for 814, 821, 854, 841, and 865 devices must be 4, 5, 6, or 7.

**Disk pack** entries assembled into the **EST** for the installation **CMR** should be designated as logically free, so the operator can make them public or private as required. **Disk packs** which are to be used as private devices must be so configured when the **CMR** is assembled. Operator defined private packs will cause a system hang at first reference.
CMR Mass Storage Flaw processing

Input to the FLAW macro in CMR is a 4-digit (octal) PB (physical block) number. Do not append B to the number. The first PB is number zero. Flaws must be entered in ascending orders. CMR sets flaw bit status of all RB's necessary to cover the PB specified. FLAW macro entries should be inserted at CMR.2375. Given the address of a bad spot in controller address format, the PB containing the bad spot can be computed as follows:

For the 6638, 6603 and 865, no formula is required to compute the PB from a physical address. All that is needed is to decompose the physical address into the 12 bit value described below.

6638
  bit 0  =  0 if sector plus head group is even
          =  1 if sector plus head group is odd
  bits 1-5 = head group
  bits 6-10 = cylinder
  bit 11 = 0

Example: bad spot at position (cylinder) 1, head group 30
decimal sector 9 corresponds to PB 175 (octal) so
6638  FLAW  0175

6603
  bit 0  =  0 if sector number is even
          =  1 if sector number is odd
  bits 1, 2, 10 form the 3-bit head group number
    bit 1 = 0 if head group even; 1 if odd
    bit 10 = 0 if outer zone; 1 if inner zone
  bits 3-9 = head position
  bit 11 = 0

Example: bad spot at position 108, head group 4;
sector 6 corresponds to PB 3540 (octal) so
6603  FLAW  3540

865 drum
  bits 0, 1 = head subgroup
  bits 2-7 = head group
  bit 8 = 0 if sector is even; 1 if odd sector/3 is odd
  bits 9-11 = zeros

Example: bad spot at head group 60 (decimal), head subgroup 3;
sector 119 corresponds to PB 763 (octal)

A formula is required to convert an 814, 821, 841, or 854 physical address into a PB. The formula and examples are as follows.

814
  PB = cylinder*22+N/372+11*E

where N bits 0-4 are sector number +
bits 5-11 are track.
Remainder of N/372 is discarded
E = 0 if N/3 is even and 1 if N/3 is odd

+ the last 4 sectors of each cylinder are not used;
no PB for track 127, sectors 28-31.

Example: bad spot at cylinder 59, track 85, sector 9
PB = 59*22+(2729/372)*11=1298+8+11
    = 1317 = 2445 (octal) so 814  FLAW  2445
PB = cylinder*4+stack*2+E
where E = 0 if sector is even
     = 1 if sector is odd
in controller address first byte, stack is bit 20, cylinder
is 21-23. Sector is in address second byte bits 20 thru 23

Example: bad spot at controller address 0017 0002 (octal)
corresponds to PB 36 (octal) so 821 FLAW 36

PB = cylinder * 5 + N + (track + 2N)/8
where N = 0 if even sector
     = 2 if odd sector
Remainder of division by 8 is discarded

Example: bad spot at cylinder 4 track 8; sector 10
corresponds to PB 25 (octal)

PB = cylinder*13+N/24+M where
     N   bits 0-3 = sectors
     M   bits 4-7 = track

M computed as follows:
Let I = remainder of N/24
R = remainder of I/6
M = 0  if R < 3
M = 6  if R ≥ 3 and I < 15
M = 7  if R ≥ 3 and I ≥ 15

*sectors 12 thru 15 of track 9 on every cylinder are unused.

EXAMPLE: cylinder 7, track 3, sector 15 (decimal): N/24=63/24=2+15/24
I = 15  15/6=2+3/6, R=3, M=7
PB = 7*13+2+7=91+9=100=144 octal.

Deadstart

The input to the FLAW type-in during deadstart is an RB number, the first RB
being number 1. When a parity error is encountered during system operation,
the RB number, RBR ordinal, and corresponding address is recorded in the
system dayfile.

RBR Macro for RMS Devices

The first header word of each RBR contains a 6-bit allocation style and a
default bit which were parameters to the RBR macro when CMR was assembled.

Several RBR's can be generated for a single unit, each describing a unique
area of the device. If RBR's have a unique allocation style for each RB size,
this allocation style can be used to direct a file to the RBR with the desired
RB size: If the default bit is set for an RBR, files with no specific
allocation style may be assigned to that RBR.
One single equipment can be represented by any number of RBR tables (minimum of two for 6603) except for removable devices, which can have only one RBR per unit using the default RB size. Each RBR refers to a different area of the equipment. An RBR table is a single bit string of variable length, up to a maximum of 4095 bits, except for the first RBR of a system or PFD device, which must not exceed 2048 bits. Within an RBR table, one bit represents one RB and the number of PRU's per RB is constant throughout this table. RBR's are added to CMR by inserting RBR macro statements into CMR at CMR.2380.

These statements have the form:

```
name RBR count, prurb, alloc, default
name must agree with name in associated EDSF statement for same device
```

count Number of available record blocks in this RBR. The counts for all the RBRs on one unit must be set so that they do not exceed the size of the device. The number of RBs required to describe one unit of a device using RB size = PB size is shown in the following table.

prurb Number of PRU's per record block. If not specified, the PB size will be used. The record block size may not be less than 1/32 of the PB size or larger than 32 times the PB size.

<table>
<thead>
<tr>
<th>Device</th>
<th>Mnemonic</th>
<th>Standard RB (PB) in PRU</th>
<th>Corres. RBR Size in Bits</th>
</tr>
</thead>
<tbody>
<tr>
<td>6603 disk</td>
<td>AA, AC</td>
<td>50 inner</td>
<td>1024*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>64 outer</td>
<td></td>
</tr>
<tr>
<td>6638 disk</td>
<td>AB</td>
<td>50</td>
<td>2048</td>
</tr>
<tr>
<td>865 drum</td>
<td>AD</td>
<td>21</td>
<td>512</td>
</tr>
<tr>
<td>814 disk</td>
<td>AF</td>
<td>62</td>
<td>2816</td>
</tr>
<tr>
<td>821 disk</td>
<td>AL</td>
<td>320**</td>
<td>2048</td>
</tr>
<tr>
<td>841 pack</td>
<td>AM</td>
<td>56</td>
<td>1000</td>
</tr>
<tr>
<td>854 pack</td>
<td>AP</td>
<td>4</td>
<td>2600</td>
</tr>
</tbody>
</table>

*2 RBR's required

**The RB size for the 821 must not exceed 40 PRUs at time of release.

alloc Specifies allocation style: A value, range 0-77B used to specify RMS areas having particular RB sizes.

default If non-zero, files with no allocation style specified will be allowed on this device.

Note: On previous versions of SCOPE, scratch and system files could be assigned to an RBR with allocation style zero without the default bit set. On SCOPE 3.4, the same RBR must have the default bit set if scratch and system files are to be assigned to the device.

EXAMPLE: An RBR for the 6638 with PRURB=50 requires a count of 2048 to describe one unit. If PRURB is set to 100, the count must be reduced to 1024. If two RBRs are defined for one unit of the 6638, both using PRURB=50, the sum of the counts must not exceed 2048.
The following table reflects file assignment to an RBR depending on allocation style and the default bit setting in the RBR header.

Y file may be assigned to this RBR
N file may not be assigned to this RBR
d default bit
AL allocation style
PDE=1 file request specified: PF, device type, or EST ordinal.
   The RBR in question has already passed these tests.

<table>
<thead>
<tr>
<th>Requested Values</th>
<th>d=0, AL=0</th>
<th>d=0, AL=x</th>
<th>d=1, AL=0</th>
<th>d=1, AL=x</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDE=0 AL=0</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>PDE=1 AL=0</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>PDE=0 AL=x</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>PDE=1 AL=x</td>
<td>N</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>PDE=0 AL=z</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>PDE=1 AL=z</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

With allocation style, installations can differentiate record block sizes.

Non-Allocatable Devices

The macro used for creating an EST entry for non-allocatable devices depends on whether the device is a 3000 series or a 6000 series device (the console, multiplexer, 6671 Data Set controller, 6676 Data Set controller).
Macro for 6000 Series Equipment:

An EST entry for 6000 series equipment is added by insertion into CMR at the appropriate EST ordinal at CMR 2108 as follows (number base is octal for this macro):

```
  h 6000 chan, sync, unit, on/off, ipoint
```

- `h` Two letter hardware type code
- `DS` Display console. See section I-14 for definition of INTERCOM multiplexer types
- `chan` Access channel number
- `sync` Synchronizer or equipment number
- `unit` Not used-retained for compatibility with previous versions
- `on/off` Switch, on=0, off=1
- `ipoint` Pointer to INTERCOM MUX subtable

Example:

```
DS 6000 10,7 Creates an entry for a display console on channel 10, synchronizer 7. Parameters are assumed to be octal.
```
Macro for 3000 Series Equipment:

An EST entry for 3000 series equipment is added by insertion into CMR at the appropriate EST ordinal at CMR.2108 as follows (number base is octal for this macro):

```
h 3000  channels B and A, channels D and C, equipment, MMTC, unit, on/off
h  CR Card Reader (405)
    LP Line Printer(501)
    LQ Line Printer(512)
    MT Magnetic Tape 607,657
    NT Magnetic Tape 659
    CP Card Punch (415)
```

channel A  If one of the channels is channel zero, it must be described as such in the channel A field. (See II-1-26)

The high order bit of the channel A field has special meaning for magnetic tape equipment:

1) The high order bit set to zero indicates that all tape channels are accessed through 6681 data channel converters or through 6684 converters described and used as 6681's.

2) The high order bit set to one indicates that all tape channels are accessed through either all 6684-I converters or through all 6684-II converters.

3) If IPARAMS symbol IP.CSET is equated to IP.C63, the data channel converters used must be all 6681's, all 6684-I's or 6684-II's used as 6681's as in 1) above.

If IPARAMS symbol IP.CSET is equated to either IP.C64.1 or IP.C64.2, The data channel converters, used must be all 6681's, all 6684-II's or all 6684-I's used as 6681's as in 1) above.

channel A is the primary channel over which the equipment being defined will be accessed. Only magnetic tape equipment definitions may have channels B, C, and D specified.

channel B  First alternate channel for access to tape transports
channel C  Second alternate channel for access to tape transports
channel D  Third alternate channel for access to tape transports
equipment  Equipment number for device
MMTC  Set to 1 indicates presence of a 3518 or 3528 type magnetic tape controller. Set to 0 indicates magnetic tape controller other than a 3518 or 3528.
unit  Unit number for device
on/off  Switch, on=0, off=1
Examples:

MT 3000 1213,,5,,1 Creates an entry for a 7-track magnetic tape on
channels 12 and 13 (with a 6681 converter on both
channels) equipment 5, unit 1

MT 3000 1253,,5,,1 Creates an entry for a 7-track magnetic tape on
channels 12 and 13 (with a 6684 converter on both
channels) equipment 5, unit 1

Equipment numbers of 7- and 9-track magnetic tape controllers must be 4,
5, 6, or 7.

Each 6000 channel can have only one 6681 or 6684 channel converter. This
restriction does not exclude the use of a 6000 type controller on the same
channel with the 6681 or 6684 converter.

1. Example modifications to CMR for installation of the following equipment:

6603 disk on channel 0, controller 1, unit 0, which is to be the system
resident device and may have resident permanent files

3000 card punch on channel 11, equipment 4

3000 card reader on channel 12, equipment 4

6000 console on channel 10, synchronizer 7

3000 printer on channel 11, equipment 6

Four magnetic tapes on channel 13, 6681 converter, equipment 5, units 0,
1, 2, and 3

865 drum on channel 11, controller 5, unit 0

Three 854 disk pack units on channel 12, controller 6, unit 0, 1, and 2;
drums and disk packs are to be initially OFF in the EST.
N. DEVICE EQU 3
N. RBR EQU 6

6603 EDST AA,0,1,0,1,PF
      BSSZ 1
CP   3000 11,4
CR   3000 12,4
DS   6000 10,7
LP   3000 11,6
      BSSZ 1
MMTC SET 0
TUNIT SET 0
      DUP 4,2
MT   3000 13,5,MMTC,TUNIT
      SET TUNIT+1
865  EDST AD,11B,5,0,1
854A EDST AP,12B,6,0,1
854B EDST AP,12B,6,1,1
854C EDST AP,12B,6,2,1

*INSERT CMR.2380
6603 RBR 1024,D
6603 RBR 1024,D
865  RBR 512,D
854A RBR 2600,D
854B RBR 2600,D
854C RBR 2600,D
2. Example CMR modifications for installation of the following equipment:

6638 disk; first half on channel 0, controller 1, unit 0, to be the system resident and permanent file directory device; second half on channel 1, controller 2, unit 0

3000 card punch on channel 5, equipment 4

3000 card reader on channel 12, equipment 4

6000 console on channel 10, synchronizer 7

Two 3000 printers on channel 11, equipments 6 and 7

Sixteen magnetic tape units on channels 5, 11, 12 and 13, 6681 converter, equipment number 5, units 0 through 17B

Three 9-track magnetic tape units on channel 7, 6681 converter, equipment number 7, units 0, 1, 2

*INSERT CMR.964
N.DEVICE EQU 2
N.RBR EQU 2
*INSERT CMR.2108
6638A EDST AB,0,,1,0,1,PF
6638B EDST AB,1,,2,0,,1
CP 3000 5,,4
CR 3000 12,,4
DS 6000 10,7
LP 3000 11,,6
LP 3000 11,,7
TNUM SET 0
MMTC SET 0
DUP 16,2
MT 3000 1213B,1105B,5,MMTC,TNUM
TNUM SET TNUM+1
MMTC SET 1
TUNIT SET 0
DUP 3,2
NT 3000 7,,7,MMTC,TUNIT
TUNIT SET TUNIT+1
*INSERT CMR.2380
6638A RBR 2048,,,D
6638B RBR 2048,,,D
*INSERT CMR.2375
6638A FLAW 0320
DEADSTART PANEL SETTINGS

By setting the toggle switches on the Dead Start Panel, the operator establishes a program that is loaded into memory and executed when the deadstart switch is activated. Required settings are determined by the system configuration and tape records. Channel, equipment, and unit numbers of the magnetic tape drive holding the deadstart tape must be specified according to actual connection and settings on the controller and unit.

Bits 6-8 of either word 3 or 5 indicate the record containing configuration data that will be loaded during deadstart. If only one CMR exists, these bits should be set to zero. The other CMR configurations can be accessed by setting the bits to an octal value that is one less than the configuration number. For example, the seventh CMR is obtained by setting these bits to 6.

The PP0 save indicator (word 7) relates to dumping contents of that peripheral processor as the first deadstart action. Unless this bit is 0, the original contents of PP0 cannot be dumped because it will be overwritten by the deadstart dump program. When the bit is not set, the contents of PP0 will be copied to central memory and dumped from there when the dump routine is executed.

Two Dead Start Panel settings are shown. The first figure shows the standard setting for SCOPe; it assumes that the deadstart tape unit is on channel 0, 12 or 13. The setting in the second is for a tape on any of channels 1-11. For all panel settings, a 1 indicates the up or set position; a 0 indicates the down position. Addresses not shown are irrelevant.

ADDRESS

<table>
<thead>
<tr>
<th>Address</th>
<th>ccccc</th>
<th>eee</th>
<th>uuuu</th>
<th>s</th>
<th>rrr</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>1 1 1</td>
<td>1 0 1</td>
<td>0 0 c</td>
<td>c c c</td>
<td></td>
</tr>
<tr>
<td>0002</td>
<td>1 1 1</td>
<td>1 1 1</td>
<td>0 0 c</td>
<td>c c c</td>
<td></td>
</tr>
<tr>
<td>0003</td>
<td>e e e</td>
<td>r r r</td>
<td>0 0 u</td>
<td>u u u</td>
<td></td>
</tr>
<tr>
<td>0004</td>
<td>1 1 1</td>
<td>1 1 1</td>
<td>0 0 c</td>
<td>c c c</td>
<td></td>
</tr>
<tr>
<td>0005</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 1</td>
<td>0 0 0</td>
<td></td>
</tr>
<tr>
<td>0006</td>
<td>1 1 1</td>
<td>1 1 1</td>
<td>0 0 c</td>
<td>c c c</td>
<td></td>
</tr>
<tr>
<td>0007</td>
<td>0 0 1</td>
<td>1 0 0</td>
<td>0 0 0</td>
<td>s 0 0</td>
<td></td>
</tr>
<tr>
<td>0010</td>
<td>1 1 1</td>
<td>1 0 0</td>
<td>0 0 c</td>
<td>c c c</td>
<td></td>
</tr>
<tr>
<td>0011</td>
<td>1 1 1</td>
<td>0 0 1</td>
<td>0 0 c</td>
<td>c c c</td>
<td></td>
</tr>
<tr>
<td>0012</td>
<td>0 0 0</td>
<td>0 0 0</td>
<td>0 0 1</td>
<td>0 1 1</td>
<td></td>
</tr>
</tbody>
</table>

The remainder of the panel is irrelevant.

cccc  Tape channel number (0, 12, or 13)

   Tape controller number

   Tape unit number

s  PP0 save switch (1 if PP0 is not to be saved)

rrr  CMR number (000 for first CMR)
ADDRESS

0001  1 1 1  0 1 1  0 0  c  c  c
0002  0 0 0  0 0 0  0 0 1  0 1 1
0003  1 1 1  1 0 1  0 0  c  c  c
0004  1 1 1  1 1 1  0 0  c  c  c
0005  e e e  r r r  0 0  u  u  u
0006  1 1 1  1 1 1  0 0  c  c  c
0007  0 0 1  1 0 0  0 0 0  s 0 0
0010  1 1 1  1 0 0  0 0  c  c  c
0011  1 1 1  0 0 1  0 0  c  c  c
0012  0 0 0  0 0 0  0 0 1  0 1 1
0013  0 0 0  0 0 0  0 0 0  0 0 0
0014  1 1 1  0 0 1  0 0 1  0 1 0

cccc  Tape channel number (1-11)
eee   Tape controller number
uuuuu Tape unit number
s     PP0 save switch (1 if PP0 is not to be saved)
rrr   CMR number (000 for first CMR)

Dead Start Panel to Read from Tape on Channels 1-11
MAIN DEADSTART DISPLAY

The Operator Option Matrix (Main Deadstart Display) for SCOPE 3.4 is described in the SCOPE 3.4 Operator's Guide. To provide additional flexibility in RMS device label and permanent file processing for SCOPE 3.4, it was necessary to separate functions thus increasing the number of options in the Option Matrix. The following descriptions equate selections between SCOPE 3.3 and SCOPE 3.4.

In SCOPE 3.3:

On non-recovery deadstarts, it always was necessary to pre-load the system from tape.

RMS device labels and permanent file tables (PFD and RTEC) were initialized simultaneously.

In SCOPE 3.4:

SYSTEM=ZZZZZ04 is a permanent file; it is not always necessary to preload from tape on non-recovery deadstarts. It is possible to:

Update RMS device labels (especially the RBR flaw information) without reloading permanent files because the permanent file tables (PFD and RTEC) are not reinitialized.

Reload permanent files after initializing the permanent file tables without re-entering RBR flaw information in RMS device labels.

Prohibit permanent files from residing on mass storage other than pack devices (854 and 841).

When SCOPE 3.4 is brought up initially and the mass storage devices had been used by a system other than SCOPE 3.4, it is necessary to:

Load a fresh system (1.L) (default)
Preload from tape (2.A)
Initialize RMS device labels (3.I)
Initialize permanent file tables (4.I)

This procedure corresponds to an Initial (1.I) deadstart of SCOPE 3.3.

To guarantee the system mass storage file will reflect the current deadstart tape option, the following procedure is necessary when SCOPE 3.4 is deadstarted:

Load a fresh system (1.L) (default)
Preload from tape (2.A)
Check existing RMS device labels (3.C) (default)
Process existing permanent file tables (4.C) (default)

This procedure corresponds to a Normal (1.N) deadstart of SCOPE 3.3.
When SCOPE 3.4 is deadstarted, and this deadstart tape was the last one used with the preload from tape (2.A option), it will be necessary to:

- Load a fresh system (1.L) (default)
- Load from the system mass storage file (2.B) (default)
- Check existing RMS device labels (3.C) (default)
- Process existing permanent file tables (4.C) (default)

Basically, this procedure corresponds to a Normal (1.N) deadstart of SCOPE 3.3; but the time-consuming process of copying the deadstart tape to mass storage (preloading) is bypassed.

DEADSTARTING A DUAL PROCESSOR 6000

In SCOPE 3.3:

With corrective code transmitted for SCOPE 3.3 PSR SC30915, it is possible to deadstart on CPU-B of a dual processor system if CPU-A is inoperative. If the system is deadstarted on CPU-B, CPU-A is turned off and locked out by deadstart and MTR. This option allows the user to deadstart on CPU-B, keeping CPU-A down until it is fixed, and still carry on limited production with CPU-B.

The only change to the regular deadstart procedure is to set bit 2**5 (bit 5 relative to zero) of word 7 on the deadstart panel (SET=SWITCH UP). This applies to all initial, normal, and recovery deadstarts.

In SCOPE 3.4:

Another deadstart option appears on the Operator Option Matrix to provide for a dual processor 6000 (assembled only if IP.MCPU=2). This option provides the capability to:

1. Deadstart on CPU-A and keep CPU-B active to the rest of the Operating System.
2. Deadstart on CPU-A and turn off and lockout CPU-B to the rest of the Operating System.
3. Deadstart on CPU-B and turn off and lockout CPU-A to the rest of the Operating System.

For this option to work, CMR must be configured for dual CPU's. If the user turns off either CPU, that CPU is locked out and cannot be turned on again until another deadstart is performed.
Deadstart Configuration Suggestions

The released values of default parameters in the Operator Option Matrix are determined by a conditional micro in the deadstart parameters common deck DSLCOM. The default MICRO OPTDF determines the initial values for the options. The MICRO appears as follows:

```
OPTDF CMICRO 1,, $LBCCNNYNN$,
```

the default of the options appear from left to right in the MICRO, with I=1, E=2,---etc. To change a default value, insert a micro (named OPTDF) with the desired changes at DSLCOM.11.

The options in the MICRO as released are as follows: (left to right in the micro string):

```
1.L ACTION
2.B SYSTEM
3.C RMS LABELS
4.C PERMANENT FILES
5.N SYSTEM PERMANENT PACKS
6.N EQUIPMENT CHANGES
7.Y RMS pre-allocation
```

The following two values may or may not be defined. Their assembly is governed by the IPARAMS symbols IP.ECSB and IP.MCPU.

```
8.N ECS or OFF CPU
9.N OFF CPU
```

All symbols described below are defined in the common deck DSLCOM. Default values are shown. A 49K memory is assumed. Central memory usage by deadstart may be modified by changing the symbol values at DSLCOM.11. Most symbols are keyed from a symbol defining an adjacent area, and all depend on the value of the symbol BASE. For example, if a 131K system is to have an unusually large CM resident library, it may be necessary to set the origin address of IRCP (IRADDR) to a higher value redefining BASE to any arbitrary address in the middle of CM. In either a 65K or 131K machine, ample space is available to enlarge both the CM resident area and the RBT area.
BASE    CEQU    120000B Location from which origins of other areas are keyed.

CMRSIZE CEQU    17000B Number of words in CMR to be saved for recovery purposes.

PPOSVADR CEQU    BASE Address in CM at which contents of PP0 will be saved for dump purposes.

CHPR  CEQU    12B Dump printer channel number.

CNTPR  CEQU    3 Dump printer controller number.

DFLTDT CEQU    2RLP Default dump printer mnemonic.

DFLICHN CEQU    2R63 Default dump 512 printer chain type.

DSPLCHAN CEQU    10B Display channel number.

DSPLCTRLR CEQU    7 Display controller number.

ROCKCNT CEQU    10B Retry count for tape parity error.

The following dependencies and constraints must be observed:

1. The central memory resident library programs must not extend past IRADR, or loading cannot complete; if they do, BASE must be redefined.

2. IRCP must not be larger than BASE - IRADR (15000B); or it will overlay DVRBUF, destroying the driver overlays. An assembly error will occur if an attempt is made to generate an IRCP larger than the current value of BASE - IRADR.

3. The total area occupied by the RMS driver overlays must not exceed OPCXCTLW - DVRBUF (2000B) words. The current eight drivers occupy about 1100B words.

4. When the old CMR is saved for recovery, the number of words to be moved is determined by the DSICOM symbol CMRSIZE (17000B). This value corresponds to the start of CP.MTR in the CFR block in CMR. If CMR is larger, CMRSIZE must be redefined.

5. It is strongly recommended that the origin of BASE be at machine FL minus (maximum length of RBT area + 3000B + MAX(10200B, CMRSIZE)).
System ECS Resident Library

SCOPE 3.4 system ECS resident routines are no longer in the direct user access area (as in SCOPE 3.3); rather, they occupy a part of the paged area. The paged area is defined in terms of a page stack and accessed through a CMR central processor program (CP.CIO).

The definition and usage of ECS in SCOPE 3.4 is unlike the BNL ECS of previous versions of SCOPE. The following approach provides system ECS residency. ECS residency cannot be specified via EDITLIB creation of the deadstart tape. An EDITLIB run must be performed after deadstart to move routines from their residence as loaded by deadstart to ECS.

When EDITLIB creates a deadstart tape, it terminates the tape with a double end-of-file, effectively creating a null file following the last system library file on the tape. During the pre-loading process (after system library files have been copied to mass storage) if this last file is not null, a job of the following structure is assumed:

```
Job card.
EDITLIB (SYSTEM)
7/8/9
EDITLIB Directives
6/7/8/9
```

This job will be copied to mass storage and cataloged as a permanent file with the following parameters:

```
LFN = ZZZZECSS
PFN = ZZZZECSS
ID = SYSTEM (granted automatically for control point 0 PF operations)
TK = SYSECSLIB
XR = ECSLIB
```

This job will be run automatically by the Terminate Deadstart Sequence PP program (TDS) whenever ECS is up and the SYSTEM level (option 2) is either A (preload from tape) or B (load from the system permanent file).

Because of restrictions imposed for system (control point 0) permanent file operations, a user cannot catalog a new file with an ID of SYSTEM. Thus, ZZZZECSS can be created only in the manner just described. Thereafter, the job can be modified by new-cycle catalog and old-cycle purges with the appropriate permissions (ID=SYSTEM allowed and required).
INSTALLING PERMANENT FILES

Permanent File (PF) Devices

To indicate which devices can hold permanent files, installations must define the PFD device and one or more permanent file devices via the EST macro. The PFD device need not be defined as a permanent file device. However, it is recommended that the PFD device be distinct from the system device. A PFD device must exist since the running system is maintained on a permanent file.

Parameters

Each installation may customize the permanent file structure by modifying the options according to the following instructions.

In the released system, permanent file parameters are defined as listed below. The installation can change them with CEQU statements inserted in the installation deck SCOPEI when SCOPE is assembled. These installation parameters appear in COMDECK PFMIP at the line sequence number shown in parentheses.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
<th>Sequence Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP.ARCH</td>
<td>CEQU</td>
<td>1</td>
</tr>
<tr>
<td>IP.MRWR</td>
<td>CEQU</td>
<td>0</td>
</tr>
<tr>
<td>IP.PFABT</td>
<td>CEQU</td>
<td>0</td>
</tr>
<tr>
<td>IP.PP</td>
<td>CEQU</td>
<td>0</td>
</tr>
<tr>
<td>IP.US</td>
<td>CEQU</td>
<td>0</td>
</tr>
<tr>
<td>IP.PFAC</td>
<td>CEQU</td>
<td>0</td>
</tr>
<tr>
<td>IP.PFRP</td>
<td>CEQU</td>
<td>10D</td>
</tr>
<tr>
<td>IP.UP</td>
<td>CEQU</td>
<td>10B</td>
</tr>
<tr>
<td>IP.RPMAX</td>
<td>CEQU</td>
<td>999</td>
</tr>
</tbody>
</table>

In addition, the following permanent file parameters appear in CMR:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.SD</td>
<td>CEQU</td>
</tr>
<tr>
<td>N.RBTC</td>
<td>CEQU</td>
</tr>
<tr>
<td>N.ESD</td>
<td>CEQU</td>
</tr>
<tr>
<td>L.APF</td>
<td>CEQU</td>
</tr>
</tbody>
</table>

IP.PFAC (PF Accounting Feature) (0)

  0 Accounting parameter is taken from the permanent file directive with the AC keyword.

  1 Accounting parameter is taken from the control point area word, W.CPFFACT. Contents of this word are supplied by the installation.

IP.PFABT (Permission Abort Override on user calls with the RC or RT bit set in FDB) (0)

  0 All permanent file return codes greater than 67B will flag fatal errors.

  1 All permanent file return codes will flag non-fatal errors.
IP.ARCH (Archive Feature)  (1)

Permanent files dumped under a Mode 2 permanent file DUMP:

0  No longer will have an RBTC entry and will not be retrieved from tape at ATTACH time.
1  RBTC entries will be retained and will be retrieved from tape at ATTACH time.
2  RBTC entries retained but will not be retrieved from tape at ATTACH time.

If IP.ARCH=1:

If an installation has system modifications which require accounting information before a job can come to a control point, changes must be made to the routine 1PF to insert appropriate information into the control stream of the job that performs archive file retrieval.

Any accounting information needed by the installation must be inserted into the control card buffer. This card or cards, including the job card, must be formatted according to installation procedures, using DIS or DATA statements. Each DIS or DATA that completes a card must be followed by a call to the PAD macro, which pads the card with zeros.

JOBNAME must be set equal to a valid, five-character, local file name to be used in setting up the input FNT for the archive retrieval job. 1PF will add two random digits to this jobname before storing it into the FNT. JOBNAME should be the same as that used on the job card. No CM, tape, or priority requirements need be on the job card, as 1PF sets up the input FNT with all such requirements satisfied.

Example 1 (accounting information on job card):

*   PTR9312.53
CARD1   DIS   ,*JBNME.   ACCOUNTING INFORMATION.*
       PAD
*   PTR9312.71
JOBNME   DIS   ,*JBNME*

Example 2 (accounting information not on job card):

*   PTR9312.53
CARD1   DIS   ,*ACCOUNTING INFORMATION*
       PAD
CARD2   DIS   ,*FGHIJ.*  (jobcard)
       PAD
*   PTR9312.71
JOBNME   DIS   ,*FGHIJ*
IP.MREW (Multiple Rewrite Access) (0)

If this parameter is set to one, multiple modify access read access on a permanent file are allowed simultaneously.

Installations are cautioned against indiscriminate use of this feature, as the operating system cannot prevent two users from attempting to rewrite the same record at the same time.

IP.FP (Installation Privacy Procedure) (0)

If the installation uses the standard privacy procedure provided, this parameter should be zero. An installation's own privacy procedure routine must be a PP program. This parameter should be the program's name.

IP.US (User Slot Size) (0)

When the installation reserves space (slot) in the RBTC for information to be saved with each permanent file, this parameter is the space length in central memory words.

IP.PRF (Default Retention Period) (10D)

This parameter, 0-999(decimal) is the number of days to be used as a file's retention period in the default case. The value 999 is interpreted as permanent retention.

IP.RPMA (Maximum Retention Period) (999D)

This parameter defines the maximum retention period for permanent files. Only 999D allows an infinite retention period. All other values define the maximum retention disallowing infinite retention.

IP.UP (Universal Permission) (10B) (17B)

The value assigned IP.UP will determine permissions granted when the Universal permission password is submitted. (see section on Universal Permission) Any combination of permissions can be granted, depending on the bit settings as shown below:

- Control (8)
- Modify (4)
- Extend (2)
- Read (1)
L.APF (APF table length in CM words) (30D)

This value, an integral multiple of L.E.APF, defines the APF table length which is low-core resident.

L.E.APF (Length of an APF entry) (2) (Defined in COMDECK PPSYS)

This parameter defines the length of an APF entry.

N.SD (Number of Sub-directories) (11D) (17D)

The value selected should be a prime number.

N.RBTC (Length of RBTC) (20D)

Length of the RBT catalog in PRU's divided by 16 (decimal).

N.ESD (Sub-directory Length) (32D)

Decimal number of PFD entries per sub-directory (4 entries per PRU). If N.ESD is not a multiple of 32D, it will be rounded up to the nearest multiple of 32.

A cross reference listing of the PFMIP parameters follows:

```
******
PFMIP
******
IF.ARCH PFC 1PF  PFA  DPF LPP  PFF  PFE  PFR  1PD  PFS  TPT
IF.MREWR PFC 1PF  PFA  LPF  PFF  PFE  PFR  1PD  PFS  TPT
IF.PFR  PFF  PFC  DPF  TPT LPF  PFF  PFE  PFR  1PD  PFS  TPT
IF.PF  PFC 1PF  PFA  LPF  PFF  PFE  PFR  1PD  PFS  TPT
IF.RBMAX PFC 1PF  PFA  LPF  PFF  PFE  PFR  1PD  PFS  TPT
IF.US  PFA  DPF  TPT
I-1-44
60307400 A
```
Procedures

Size of Directory

Before a permanent file manager can be customized for an installation, the size of the permanent file directory must be determined by estimating the maximum number of unique file names to be allowed in the system. (The actual number of files can be five times this number.) The maximum number of unique file names is determined by the number of entries per subdirectory (N.ESD) times the number of subdirectories (N.SD). After estimating the number of file names and allowing a sufficient margin for expansion (at least 25 percent), the number of subdirectories must be determined (N.SD). In the PFD, files are found by hashing the ID to a subdirectory. Overflow is to the next highest subdirectory. Because of the hashing scheme, the more subdirectories the better. However, an FNT (3 CM words in low core) is required for each subdirectory. The number of subdirectories should be dictated by the number of FNTs the installation wants to allocate. The ID hashing algorithm optionally will distribute the files to the subdirectories if the number of subroutines is a prime number.

Size of Catalog

Each permanent file cycle has an RBT catalog entry of variable length; the minimum is 15 CM words. The average length of an RBT catalog entry for a given system is dependent on the average size of a permanent file. If the size of the RBT chain for the average file was calculated, the size of the average RBT catalog entry would be 15 CM words (minimum length of RBT catalog entry) plus the size of the RBT chain for the average file (CM words) plus the value chosen for IP.US. (These averages are relative to a given installation). The length of the average RBT catalog entry then could be multiplied by the total number of permanent file cycles allowed by the installation, as determined by the size of the PFD. This product would give the suggested size in CM words of the RBT catalog. This number then could be converted to the number of PRUs needed. N.RBTC should be equated to the number of PRUs needed, divided by 16.

RBTC space is reused. The size of the RBTC, if calculated by this algorithm, allows for five cycles for every permanent file. Normally, this many cycles will not be needed. Therefore, the installation may want to decrease the initial estimate.

Size of APF Table

The APF table contains two-word entries and is central memory resident. Every attached permanent file active in the system as opposed to files merely cataloged, must have an APF entry. Number of APF entries (L.APF) limits the number of permanent files attached simultaneously by all jobs in the system.
Other Parameters

Other installation parameters that must be assigned values are described below.

The default retention period (IP.FFRP) for permanent files is decided by the installation, based partly on the amount of available mass storage.

If an installation writes its own privacy procedure routine, IP.UP should be equated to its name. In this case also, if space is required for installation information, it may be reserved within each RBTC entry by equating IP.US to the number of CM words. The only restriction on this option is that no word should start with two bytes of 7's. This option affects the minimum size of the RBTC entry and may affect the size of N.RBTC.

Universal Permission

By setting the parameter IP.UP non-zero, a universal permission code mask may be defined. This mask is the combination of permissions to be granted when the universal password is correctly submitted; it consists of two octal digits as follows:

01 Read permission
02 Extend permission
04 Modify permission
10 Control permission

Thus, if IP.UP were defined as 13(Octal), Read, Extend and Control permissions (but not Modify permission) would be granted when the universal password was submitted.

The universal password (nine characters) is defined by the installation and assembled into the PF routines as in the following sample:

*DELETE PREAMB.152
UNIV DIS ,*UNIVRPERM*

As released, IP.UP is set at 10(Octal), granting only control permission. This is externally identical to the 3.2 and 3.3 release; and as only control permission is granted, privacy is not threatened.

Public ID Permission

If a permanent file has the ID of PUBLIC, the ID parameter need not be specified on all permanent file directives. In other words, ID of PUBLIC is the default ID. Since the ID is used to locate files in the PFD, it is not desirable that many files have the same ID. Therefore, an ID permission password must be supplied at catalog time to allow a file to be cataloged with the ID of PUBLIC.

The PUBLIC ID password (nine characters) is defined by the installation and assembled into the PF routines (identified by PREAMB.153).

IDPERM DIS ,*PUBLICPERM*
Privacy Procedures

Specialized needs of any installation may be met by including their own privacy procedures. Each privacy procedure written for a specific installation must be a PP routine executable in two modes: CATALOG and ATTACH.

Privacy procedures written for SCOPE 3.2 or SCOPE 3.3 will not run under SCOPE 3.4.

Installation parameter IP.FP must be defined as non-zero for individual privacy procedures. The parameter, consisting of the three characters of the PP routine name, must be unique within the system. For a CATALOG or ATTACH function, the permanent file manager checks IP.FP; if non-zero, the permanent file manager calls that routine and does not execute its privacy routine.

Method of Call

When the CATALOG or ATTACH function calls an installation privacy procedure, the address of the FDB*# is put into the function input register. The PP PP routine will call the privacy procedure into its PP. The privacy procedure will save and restore the last three words of the message buffer and then call the PP PP routine. The PP routines should call each other in the same way by: setting bit 41 to 1 in the input register, putting the name of the PP routine to be called in the input register, and jumping to R.IDLE.

A new cycle catalog will be flagged by non-zero bits 24-35 of the input register.

Time of Call

The CATALOG mode call is made at completion of the CATALOG function, prior to unlocking the APF entry. At this time, passwords may be saved, any additional parameters can be extracted from the FDB, and other manipulation carried out. Care must be taken to avoid information changes that will cause a PFM abort.

The ATTACH and newcycle CATALOG mode calls are made instead of calling the system password checking routines. The privacy procedure must include its own password checking and store resultant permissions in word 6 of the PP message buffer.

The PP parameter is available to the installation privacy routine; it can be used to pass up to nine display-coded characters from the user to the routine via the FDB.
Tables

Shown below are the contents of the input register and the last 3 words of the PP message buffer when another permanent file PP routine of privacy procedure is to be called:

<table>
<thead>
<tr>
<th>Byte 0</th>
<th>Byte 1</th>
<th>Byte 2</th>
<th>Byte 3</th>
<th>Byte 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Input Register

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>41</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- PP Routine Name
- Address of FDB+4

Word 4 of PP Message Buffer

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>29</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Return Address
- SUBD (9 bits)
- SDFNT
- APFO
- UFNT

Word 5 of PP Message Buffer

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- RBTA
- RBTO
- PRU
- Entry
- Mode
- CPT FLGS

PFD Entry Pointer

Word 6 of PP Message Buffer

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- RBTA
- RBTO
- PRU
- Entry
- 0
- Cycle (10 bits)

RBTC Pointer
Assembly Options

Delay Limit

At times during execution, permanent file manager routines may be delayed because an interlock is not available. If a routine delays longer than 1000 milliseconds, the event stack is used; a lesser delay is implemented within the PP.

Delay Times

Two specific delay times, associated with different interlocks, are specified in the routines; they can be varied for optimum performance. The system is released with the decimal values shown below.

```
APFDLY EQU 1  Wait, APF table     (PREAMB.108)
RWDELAY EQU 100 Stack processor interface delay  (PREAMB.109)
```

The CM table delays are set to one millisecond each.

Converting Files from SCOPE 3.2 or 3.3 to SCOPE 3.4 System

Because table formats differ for permanent files depending on the version of SCOPE, files cataloged under SCOPE 3.2 or 3.3 cannot be accessed immediately by SCOPE 3.4.

To facilitate file conversion, the LOADPF utility in 3.4 accepts dump tapes created by SCOPE 3.2, or 3.3 permanent file manager. When LOADPF detects input, automatic conversion takes place if the LP parameter is used on the LOADPF control card. For files created and dumped under 3.2 or 3.3 systems, backup tapes should be reloaded onto the system after Initial deadstart of SCOPE 3.4.

Automatic Accounting Feature

This feature is activated by setting IP.PFACT=1, when the system is assembled. It is included for accurate accounting of charges for system resource use.

The installation must provide a PP routine (part of its own accounting routines), to store the user's account number into each control point area, in word WCPFFACT. This account number is presumed to have been taken from the job card or elsewhere. The identification, 1 to 9 alphanumeric display-coded characters, has the following format.

```
|   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---|
| 59|   | 0 |   |   |   |   |   |   |   |   |   |   |   |   |   |
```

Account Number (Right Justified Display Code)  16

The account number should be right justified to the 16 code (octal) and left filled with binary zeros.
SCHEDULING PARAMETERS

Definitions:

1. Minimum queue priority (MINQP) The priority with which a job will first enter the CM queue.

2. Maximum queue priority (MAXQP) The maximum priority level a job in the CM queue may achieve while waiting for scheduling.

3. Base quantum (BQ) The amount of time that a job, once brought to a control point, will maintain a high enough priority to avoid being swapped out by another job.

4. Quantum priority (QP) The priority given to a job when it has been swapped-in. The job maintains that priority for the duration of its base quantum.

5. Age rate (AR) A factor used to weight the priority of a job according to the time it has spent in the CM queue.

The above parameters apply to each of the available classes of jobs. Each class serves to define a series of jobs by their common characteristics, such as response time requirements or the minimum amount of time that a job has access to core.

The five classes are:

BATCH

DEVICE (BATCH with non-allocatable devices)

INTERCOM

MULTI-USER

EXPRESS

When a job requests scheduling for central memory, its Job Descriptor Table entry is placed into the central memory queue with a queue priority equal to the minimum queue priority of its class. Its priority is evaluated according to: its minimum queue priority, the age rate of the class, time in the queue, and the job card priority. When the priority of the job reaches the maximum for the class, aging ceases. This priority evaluation is performed for all jobs in the central memory queue, and the results are compared with the priorities of those jobs at control points. When a job is swapped into central memory, it is given a priority equal to the quantum priority of its class.

When the quantum of the job has elapsed, its priority is reduced to the minimum of its class.

Since it requires some overhead to swap a job, the quantum permits a job to remain at a control point for a reasonable length of time before it becomes eligible for swapping. The quantum of a job is considered elapsed when the job has used a specified amount of CPU and/or PPU time.

All priorities for a class, excepting MAXQP, are weighted by job card priority.
The following figure illustrates the interaction between two classes, batch and INTERCOM and displays in a graphical form, the relationship between the parameters of these two classes.
The assumptions used in formulating this set of parameters were that the response time for INTERCOM users should fall within certain bounds, irrespective of the batch loading; that, once a batch job is executing, it has a guaranteed period of execution before competing with other batch jobs; and that a batch job be allowed to execute a minimum period before a swap-out can be forced by an INTERCOM job. Within the batch class, the aging between the minimum queue priority and maximum queue priority (interval A) is intended to ensure that, job card priority considerations aside, the first batch job to enter the central memory queue will be the first job to be swapped into central memory. The minimum queue priority for an INTERCOM job is greater than the maximum queue priority of the batch job (interval B) so that INTERCOM jobs will not have to compete with batch jobs waiting for central memory. Aging of jobs in the INTERCOM class serves two purposes: Firstly, as in the batch class, to ensure first into the central memory queue - first into central memory. Secondly, to allow INTERCOM jobs, after a certain period of time has elapsed, to force the swap-out of a batch job in order that the INTERCOM job may run.

The extra increment \( D \), between the quantum priority of a batch job and the maximum queue priority of an INTERCOM job, allows INTERCOM jobs to be selective in the batch jobs that are swapped-out to provide core, by becoming eligible to swap, first of all, low job card priority batch jobs and, eventually, to be able to force out even the highest job card priority batch jobs. The interval \( D \) can be set smaller than the total range of the job card priority values. By doing so, those jobs with a very high job card priority will not be forced out by INTERCOM jobs before their quantum has expired. The interval \( E \) between the maximum queue priority and the quantum priority of INTERCOM jobs is used for similar purposes as interval \( C \) in the relationship between INTERCOM jobs and the next higher class of users. Similarly, this also will allow INTERCOM jobs to run to their quantum before they start to compete for central memory with other INTERCOM jobs.

The following list is the default set of parameters, as they appear in CMR. The parameters selected provide good through-put for an installation running a heavy load of batch jobs, as well as provide good response time for a 20-terminal INTERCOM system - where an average of ten terminals are active at any one time.
SCHEDULER PARAMETER SETTINGS

PARAMETER DESCRIPTION TYPEIN S DISPLAY
MAXNBA CEQU 30B MAX NO OF JOBS W/O MAXN1 CMR 1016
NON-ALLOC EQUIP CMR 1017
MAXNDE CEQU 10B MAX NO OF JOBS WITH NON-ALLOC EQUIP CMR 1018
PQINP CEQU 2200B INPUT QUEUE QUANTUM QP0 CMR 1019
PRIORITY CMR 1020
QINF CEQU 2000B INPUT QUEUE BASE QB0 CMR 1021
QUANTUM CMR 1022
BATCH CLASS CMR 1023
MINQPBA CEQU 100B MIN QUEUE PRIORITY MINQP1 CMR 1024
MAXQPBA CEQU 1000B MAX QUEUE PRIORITY MAXQP1 CMR 1025
ARBA CEQU -.8 AGEING RATE AR1 CMR 1026
QPBA CEQU 1400B QUANTUM PRIORITY QP1 CMR 1027
BGQA CEQU 2000B BASE QUANTUM BG1 CMR 1028
DEVICE CLASS CMR 1029
MINQPDE CEQU 200B MIN QUEUE PRIORITY MINQP2 CMR 1030
MAXQPDE CEQU 1000B MAX QUEUE PRIORITY MAXQP2 CMR 1031
ARDE CEQU 10B AGEING RATE AR2 CMR 1032
QDDE CEQU 1400B QUANTUM PRIORITY QP2 CMR 1033
BGDE CEQU 2000B BASE QUANTUM BG2 CMR 1034
INTERCOM CLASS CMR 1035
MINQPIN CEQU 1100B MIN QUEUE PRIORITY MINQP3 CMR 1036
MAXQPIN CEQU 2400B MAX QUEUE PRIORITY MAXQP3 CMR 1037
ARIN CEQU 1000B AGEING RATE AR3 CMR 1038
QPIN CEQU 2500B QUANTUM PRIORITY QP3 CMR 1039
BGIN CEQU 200B BASE QUANTUM BG3 CMR 1040
MULTI-USER CLASS CMR 1041
MINQPNIJ CEQU 2410B MIN QUEUE PRIORITY MINQP4 CMR 1042
MAXQPNIJ CEQU 2510B MAX QUEUE PRIORITY MAXQP4 CMR 1043
ARMUJ CEQU 200B AGEING RATE AR4 CMR 1044
QPMUJ CEQU 3000B QUANTUM PRIORITY QP4 CMR 1045
BGMUJ CEQU 4000B BASE QUANTUM BG4 CMR 1046
EXPRESS CLASS CMR 1047
MINQEXP CEQU 1000B MIN QUEUE PRIORITY MINQEXP CMR 1048
MAXQEXP CEQU 3200B MAX QUEUE PRIORITY MAXQEXP CMR 1049
AREXP CEQU 400B AGEING RATE AR5 CMR 1050
QPEXP CEQU 3200B QUANTUM PRIORITY QP5 CMR 1051
BGEXP CEQU 400B BASE QUANTUM BG5 CMR 1052
**** CMR 1053
The two batch classes have low minimum and maximum queue priorities as well as low age rates. The device class has twice the age rate as the batch class, providing the device class with a scheduling advantage over the batch class. A device class job would experience, on the average, half the wait time of a batch class job. Since the device class represents additional resources being tied up, such as control points and tapes, it is preferable to get that job through the system with a minimal delay.

The quantum priorities of the batch and device classes are low enough so that INTERCOM jobs, having a high age rate, can force batch jobs to be swapped out after a one-half to two second delay, depending on job card priority and quantum considerations.

The INTERCOM class job is given a small base quantum which normally will be enough time to execute an INTERCOM job step. The batch quantum on the other hand, is larger, preventing batch jobs from swapping other batch jobs unnecessarily. The multi-user class job, such as EDITOR, is given the highest priority because it can service several INTERCOM users simultaneously.

The parameter MAXN determines the maximum number of batch or device class jobs which can run at any given time. The number of device class jobs is kept small; the determining factor being that device class jobs are rolled-out rather than swapped out; each job can make a control point unavailable for swapping. It is essential to keep a reasonable number of control points available for serving other jobs. The maximum number of batch jobs is much higher, a large number being preferable to provide the scheduler with a better pool of job candidates, allowing better core utilization. However, too large a job pool may adversely affect individual job turn-around while improving total system throughput.

The two parameters QPO and BQO in the lower half of the S display are the Quantum Priority and Base Quantum given to jobs coming out of the input queue and entering a control point for the first time. The quantum priority is higher than that for normal batch jobs, enabling short jobs to run to completion without swapping.

The express queue is given a high priority and aging rate, since it contains all jobs terminated by operator intervention. The quantum is small because the end-of-job procedure is minimal. This class was given express consideration under the assumption that these jobs would release valuable resources back to the system.

**SELECTION OF ECS INSTALLATION PARAMETERS**

The ECS extensions are designed primarily to improve the efficiency of an I/O bound system by:

1. Buffering the sequentially accessed RMS files through ECS
2. Swapping jobs to ECS
3. Moving a part of the system library to ECS
4. Allocating files in ECS
The default values of the ECS Config configuration parameters are defined with the
CEQU or CMICRO macros, so that an installation can insert all modifications at
one given place. The CEQU and CMICRO macros are used to define variables
conditionally. Since they are effective only if the variable have not been
previously defined, any modifications should precede them.

Installation parameters oriented to ECS are defined in the COMDECK ECS Config.
Changes may be made at ECS Config.8. Default values, other tested values, and
parameter descriptions are as follows:

IP.EBUF (16D)

Defines the default ECS buffer size in pages. To significantly improve system
I/O, the ECS buffer allocated to a file should be at least four times larger
than the buffer used in CM for the same file, resulting in a default value in
the 10000 to 20000 (octal) words range. A larger ECS buffer (40K or more)
does not provide any significant improvement compared with the default value.

If an ECS buffered file does not overflow its buffer, it stays in ECS and is
processed as an ECS resident file, possibly locking a very large amount of ECS
for only one file. Buffer space is not reserved when the buffer is requested;
it is allocated only when needed and released as soon as possible, one page at
a time. Allocation of an ECS buffer to a file having a CM buffer
approximating one RB does not improve throughput because of the scheduling
algorithm used by the stack processor.

IP.BDCT (1) (3)

Number (1-3) of CM system buffers. Throughput may be improved by having a
ratio of one system buffer per RMS device controller (maximum of three can be
handled).

IP.ELIB (0) (60)

If zero, the code for ECS resident library will not be assembled in the
system. If non-zero, maximum number of words/1000 (octal) that may be used
for storing ECS resident library programs. This value can be changed at
deadstart time; however, it can be non-zero only if IP.ECSE is non-zero.
IP.ERES (0) (1)

If set to one the ECS Resident File capability is activated. The ECS Resident File Option feature can improve system throughput for a given job by keeping large files (particularly random access) in ECS. However it can have an adverse effect on the overall improvement of the system by drastically reducing the amount of ECS available for job swapping, ECS buffering, and the system library.

IP.EDAA (40B)

Number of words/1000 (octal) reserved for ECS direct access. This value can be changed at deadstart time.

IP.EPAG (8D)

ECS page size in number of PRUs: 8*64=512 words. This value can be changed at deadstart time. Allocatable ECS is divided into pages. The size of a page is at least 64 words and, normally, a multiple of 64. A small page size (64 to 256 words) will increase the system overhead for space management and a large size (2048 words and up) will increase the amount of wasted space. An initial setting of 512 or 1024 words page is a good compromise.

IP.SBLG (8D)

CM system buffer length in number of PRUs (minimum 4): 2*(8*64+8)=1040 words. The CM system buffers are used by the stack processor to perform the RMS/ECS transfers.

CM System Buffer

A CM system buffer is used by each stack processor for the RMS/ECS transfers. Each independent RMS device should have one such buffer. Because of the CM conflicts, no more than three RMS devices can be driven simultaneously for ECS I/O buffering, therefore, the number of CM system buffers (IP.BDCT) is limited to 1, 2 or 3.

The minimum size (IP.SBLG) of a CM system buffer is 4 PRU's (256 words). A size between 6 and 8 PRU's should be used to minimize the possibility of lost revolutions on RMS devices because of CM access conflicts that can slow down or lock out the stack processor.

A cross reference of the ECS installation parameters is as follows:

| **** | ECSCOM  |
| **** | IP.BDCT CMR |
| I    | IP.EBUF IRCP |
| I    | IP.EDAA IRCP |
| I    | IP.ELIB IRCP STL |
| I    | IP.EPAG IRCP |
| I    | IP.ERES REQ |
| I    | IP.SBLG CMR |

I-1-56 60307400 C
MODEL JOBS FOR CREATION OF AN INSTALLATION DEADSTART TAPE

Installation of SCOPE 3.4 cannot be accomplished using SCOPE 3.2 or SCOPE 3.3 as the running system. The unconfigured deadstart tape provided with the release must be used.

The SCOPE 3.4 unconfigured deadstart tape requires the entry of EST entries for RMS, tape, and unit record equipment at deadstart time. A new assembly of CMR is necessary, with a configured program library and installation tape constructed as soon as possible, so that normal loading becomes feasible. The user is cautioned to review the NOTES AND CAUTIONS, in the early part of this section prior to building a configured system. The SCOPE 3.4 program library requires a full 2400-foot tape reel when it is recorded at 800BPI.

The four jobs listed on the following pages, plus a small verification program, are included on the release PL1; they may be obtained by executing a job such as that listed below.

Job SCOPE1 updates PL1 and places the assembled binary of the revised PL1 on tape BIN. Job SCOPE1 is set up assuming that ECS is present. If the ECS code is not activated, cards must be removed from the SCOPE1 Update record. To use the SCOPE1 deck for program library maintenance, remove the cards sequenced 46 and 47 after initial installation. The updated system texts are added to the running system prior to assembling SCOPE. This effort, not required but strongly encouraged for initial installation, is recommended when subsequent system maintenance is to be performed.

To install SCOPE 3.4 for use as a station front end, a card of the form *DEFINE,STATION must be added to the update record of deck SCOPE1. This card should be removed from the deck once a configured program library is created.

Job SCOPE2 will create a configured deadstart tape containing SCOPE 3.4 from tape BIN and the balance of the running system.

Job SCOPE3 will create a deadstart tape of the running system.

Job SCOPE4 will install system text SYSTEXT in a form equivalent to CPCTEXT. As present on the unconfigured deadstart tape and installed by 6RM installation decks SIXRM1 and SIXRM2, text SYSTEXT will be equivalent to IOTEXT.

FORTRAN Extended 4.0 must be added to the running system prior to assembling SCOPE.

To obtain the installation decks, perform a job of the type:

- Job card
  REQUEST,PL1,E,HY.
  REWIN(PL1)
  SKIP(PL1,1,17)
  COPYBF(PL1,PUNCH,4)
  COPYBF(PL1,PUNCH,1)
  UNLOAD(PL1)
  6/7/89

  Mount released PL1
  Punch installation decks
  Punch verification program

If INTERCOM 4.1 is to be installed, the required IPARAMS and CMR modifications must be included in the SCOPE1 installation deck: the INTERCOM installation deck does not include provision for access to the SCOPE program library.

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The unconfigured deadstart tape contains 3DO, 1S5, 1SX, 1SP and its 3Sx system device overlays as CM resident. If 1EP is DEFINED, the MOVE directive COMMENT cards regarding 1EP and its system device overlays must be invoked within job SCOPE2. Routines established as CM resident in the running system will have CM residency on the new deadstart tape created by jobs SCOPE2 and/or SCOPE3.

CAUTION: ECS residency cannot be carried on a deadstart tape: routines moved to ECS resident will be established as disk resident on a new deadstart tape. The only way to set ECS resident is via MOVE directive changes to the running system.

If one additional CMR is to be added, these cards must be inserted behind the indicated sequence number of jobs SCOPE1 and SCOPE2.

```plaintext
UPDATE(Q,P=PL1,C=COMP)
COMPASS(I=COMP,S=PPTEXT,L=0)

/* PLACE CMR CONFIGURATION HERE.
*COMPILE CMR
7/8/9

COPYBR(BIN,CMR1)
REWIND(CMR1)
TRANSFER(CMR1)
```

(After card 018 in job SCOPE1)

(After card 055 in job SCOPE1)

Only installation parameters in the full update CMR will be assembled into the system.

(After card 008 is job SCOPE2)

CMR from Q update

(After card 023 in job SCOPE2)

If more than one additional CMR is added, the CMR parameter on the COPYBR, REWIND, and TRANSFER cards must be changed to reflect the additional CMR number, for example, CMR2, CMR3, etc. If multiple CMRS are to be added, multiple copies of the above card sequences are required.

NOTE: The T7000 parameter on the SCOPE1 jobcard must be changed to T20000 if the deck is to be run on a 6200; T14000 on a 6400.
SCOPE1,CM65000,T7000,M102.*
COMMENT. THIS JCB UPDATES AND CREATES THE BINARY OF SCOPE
COMMENT. THE TEXTS WILL BE EDITLIBED INTO THE RUNNING SYSTEM AFTER
COMMENT. THE FULL UPDATE
COMMENT. THE NEW PL1 WILL BE THE OLDPL OF SCOPE
COMMENT. THE NEW BIN TAPE WILL CONSIST OF TWO FILES
COMMENT. FILE ONE WILL CONTAIN BINARY OF SCOPE PP ROUTINES
COMMENT. FILE TWO WILL CONTAIN BINARY OF SCOPE CP ROUTINES
LABEL(PL1IN,R,L=SCOPE3P4,D=HY)
REQUEST,PL1,N,HI. SCRATCH FOR NEW PL1
REWIND(PL1IN,PL1)
LABEL(PL1,N,L=SCOPE3P4,D=HY)
REWIND(PL1)
UPDATE(F,P=PL1IN,N=PL1)
COMMENT. *** THE FOLLOWING CARD COMPILES SLRTTEXT THRU IPTEXT ***
COMPASS(I=CCMFILE,S=PPTEXT,B=SAVTXT,L=0)
REWIND(SAVTXT)
EDITLIB(SYSTEM).
COMMENT. *** THE FOLLOWING CARD COMPILES CEA THRU DSD ***
COMPASS(I=CCMFILE,S=PPTEXT,L=0)
UNLOAD(PL1,PL1IN)
COMMENT. *** THE FOLLOWING CARD COMPILES CIO THRU EPF
COMPASS(I=CCMFILE,S=SCPTEXT,L=0)
REWIND(LGO)
REQUEST,EIN,HI. SCRATCH FOR BINARY
REWIND(BIN)
COPYEF LGO,EIN.
REWIND LGO.
COMMENT. *** THE FOLLOWING CARD COMPILES PFCCP THRU SYSEQ
COMPASS(I=CCMFILE,S=SCPTEXT,L=0)
COMMENT. *** THE FOLLOWING CARD COMPILES AUDIT, DMPECS AND PFdump
FTN(I=CCMFILE,S=CPTEXT,B=OVLS,L=0)
LOAD(CVLS) GENERATION OF OVERLAYS
NOGO.

60307400 C
REWIND(SCF)
COPYES(SCF,LGO)
BKSP(LGO,1)
REWIND(SAVTXT)
COPYES(SAVTXT,LGO)
REWIND LGO.
COPYES(LGO,BIN)
UNLOAD(BIN)
7/8/9 END CF RECORD
* ADD CORRECTIONS HERE
* REMOVE CARDS SEQUENCED 46 AND 47 AFTER INITIAL INSTALLATION
*IC 1EFOA
*DEFINE,1EP
7/8/9 END CF RECORD
READY(SYSTEM,OLD).
LIBRARY(NUCLEUS,OLD).
REPLACE(LDRTXT,IPTEXT,SAVTXT)
FINISH.
COMPLETE.
ENCRUN.
7/8/9 END CF RECORD
6/7/8/9 END OF FILE

SCOPE2,CM55000,1000,MT02.
COMMENT. THIS JOB CREATES A NEW DEADSTART TAPE FROM TAPE BIN CREATED BY
COMMENT. JOB SCOPE1 AND THE BALANCE OF THE RUNNING SYSTEM (PRODUCT SET
COMMENT. MEMBERS).
COMMENT. THIS JOB IS SET UP FOR ONE CMR.
REQUEST,BIN,HI. MOUNT BIN TAPE CREATED BY DECK SCOPE1.
REQUEST,NEWSYS,HY. MOUNT SCRATCH TAPE FOR NEW DEADSTART
REWIND,BIN,NEWSYS.
COPYES(BIN,PFLIB) RCCFE PP ROUTINES
COPYES(BIN,NUC) SCOPE OF ROUTINES
REWIND,BIN,PFLIB,NUC.
EDITLIB(SYSTEM)
UNLOAD(BIN,NEWSYS)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY(NEWSYS)
REWIND(SYSTEM)
REWIND(PFLIB)
TRANSFER(CEA,PFLIB)
SKIFF(1,SYSTEM)
/* ADD TRANSFER(12,SYSTEM) IF CEDIAODNSTICS IN RUNNING SYSTEM
TRANSFER(CEA+CM1,PFLIB)
SKIFF(14,PFLIB)
TRANSFER(CHR,PFLIB) FROM FULL UPDATE
SKIFF(15,PFLIB)
TRANSFER(CCM+ICCP,PFLIB)
SKIFF(1,PFLIB)
TRANSFER(*,PFLIB)
INCLUDEP(SYSTEM)
INCLUDE(NUCLEUS,SYSTEM,CM)
INCLUDE(SYSOVL,SYSTEM,DS)
INCLUDE(FCRTRAH,SYSTEM,DS)
INCLUDE(COBOL,SYSTEM,DS)
INCLUDE(RUN2P3,SYSTEM,DS)

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INCLUDE(SYSIO, SYSTEM, DS)
INCLUDE(SYSMISC, SYSTEM, DS)
INCLUDE(IGS274, SYSTEM, DS)
REPLACE(*, PFLIB)  
/* IF ECS TURNED ON ADD CARDS ← NOTE */
/* MOVE(1EP, CM) */
/* MOVE(3EP+3ES, CM) */
SETAL(DIS$1)
SETAL(DMF, 1)
SETAL(VSH, 1)
SETAL(LC0, 1)
LIBRARY(NUCLEUS, OLD)
REPLACE(FFCCF, NUC, AL=7777, FL=2000, FLO=0)
REPLACE(LOAACPF, NUC, AL=7777, FL=31000, FLO=0)
REPLACE(TRANSF, NUC, AL=7777, FL=10000, FLO=0)
REPLACE(GLMKF, NUC, AL=7777, FL=20000, FLO=0)
REPLACE(REQLEST, NUC, AL=3, FL=2000, FLO=0)
REPLACE(RESTART, NUC, AL=7777, FL=20000, FLO=0)
REPLACE(COPYXS, NUC, AL=7777, FL=20000, FLO=0)
REPLACE(SEGSTART, SEGRES, NUC, AL=7777, FL=60000, FLO=1)
REPLACE(LCAC, NUC, AL=7777, FL=30000, FLO=1)
REPLACE(LOADUCLOAD, NUC, AL=0)
REPLACE(LITERARY, NUC, AL=7777, FL=300, FLO=0)
REPLACE(LOAD00LCADO3, NUC, AL=0)
REPLACE(CCHEINE, NUC, AL=7777, FL=20000, FLO=0)
REPLACE(XXRRESG, XXDMPQ, NUC, AL=7777, FL=10000, FLO=0)
REPLACE(EDITLIE, NUC, AL=3, FL=45000, FLO=1)
REPLACE(EDITSYS+EDITUSR, NUC, AL=0)
REPLACE(COPYBCD, NUC, AL=3, FL=20000, FLO=0)
REPLACE(LABEL, NUC, AL=7777, FL=20000, FLO=0)
REPLACE(COPYFL, NUC, AL=3, FL=20000, FLO=0)
REPLACE(LISTMF, NUC, AL=7777, FL=1000, FLO=0)
REPLACE(CPC+IC, NUC, AL=0)
REPLACE(CCMFARE, NUC, AL=3, FL=7000, FLO=0)
REPLACE(CHECKPT, NUC, AL=7777, FL=300, FLO=0)
REPLACE(TRAFF, NUC, AL=7777, FL=20000, FLO=1)
REPLACE(TRAPPER, NUC, AL=0)
REPLACE(SETGORE, NUC, AL=7777, FL=30000, FLO=1)
REPLACE(EKSF, NUC, AL=3, FL=1000, FLO=0)
REPLACE(COPYC+COPYBR, NUC, AL=3, FL=20000, FLO=0)
REPLACE(COPYF, NUC, AL=3, FL=6000, FLO=0)
REPLACE(COPYBSF, NUC, AL=3, FL=20000, FLO=0)
REPLACE(REWINR, NUC, AL=3, FL=2000, FLO=0)
REPLACE(LLLCAD+RETURN, NUC, AL=1, FL=2000, FLO=0)
REPLACE(UPDTE, NUC, AL=3, FL=40000, FLO=0)
REPLACE(SKIP+, SKIPF, NUC, AL=3, FL=1000, FLO=0)
REPLACE(TRANSBRTRANSF, NUC, AL=7777, FL=2000, FLO=0)
REPLACE(CISFOSE, NUC, AL=3, FL=0, FLO=0)
REPLACE(RECCVR, NUC, AL=0)
REPLACE(SSYS, RNS, NUC, AL=0)
REPLACE(AUDIT+, NUC, AL=3, FL=35000, FLO=0)
REPLACE(DMP, ECS, NUC, AL=7777, FL=30000, FLO=0)
REPLACE(PDUMP, NUC, AL=3, FL=35000, FLO=0)
REPLACE(LORTEXT+IPTEXT, NUC, AL=0)
FINISH.
LIBRARY(RUN2P3, OLD)
REPLACE(R23RCVR, NUC, AL=0)
FINISH.
LIBRARY(SYS$ISC,OLD)
REPLACE(F30RCVR,NUC,AL=0)
FINISH.
COMPLETE.
ENCRUN.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

SC5OE3,CM55000,T7000,MT1.
COMMENT. THIS JOB CREATES A DEADSTART TAPE FROM THE RUNNING SYSTEM.
REQUEST,NEW$YS,HY.  MOUNT SCRATCH TAPE FOR NEW DEADSTART
REWIND,NEW$YS.
EDITLIE(SYSTEM)
UNLOAD(NEW$YS)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY(NEW$YS)
REWIND(SYSTEM)
TRANSFER(*,SYSTEM)
SKIPF(2,SYSTEM)
INCLUDE(SYSTEM)
INCLUDE(NUCLEUS,SYSTEM,CM)
INCLUDE(SYS$CVL,SYSTEM,DS)
INCLUDE(FCRT$RAA,SYSTEM,DS)
INCLUDE(COECL,SYSTEM,DS)
INCLUDE(RUN2F3,SYSTEM,DS)
INCLUDE(SYSIO,SYSTEM,DS)
INCLUDE(SYS$ISC,SYSTEM,DS)
INCLUDE(IG$274,SYSTEM,DS)
COMPLETE.
ENCRUN.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

SC5OE4,CM55000,T7000,MT01.
LABEL(F1,L=SC5OE3P4,0=HY)
LATEST SCOPE PL
REWIND(F1)
UPDATE(0,F=F1)
COMPASS(I=CMFILE,S=Q,L=0)
REWIND(LO)
EDITLIE(SYSTEM)
UNLOAD(F1)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
*ID SYSTEXT
*DELETE CPCTEXT.2
IDENT SYSTEXT
*DELETE CPCTEXT.8
*** SYSTEXT - SYSTEM TEXT FOR 6000 SCOPE 3 WITH *CPC*.  
*DELETE CPCTEXT.29
END SYSTEXT
*C CPCTEXT
7/8/9 END OF RECORD
READY(SYSTEM,OLD)
LIBRARY(NUCLEUS,OLD)
VERIFICATION PROGRAM

The dayfile output for the SCOPE, COMPASS, and 6RM programs follows:

SCCPE 3.4
05 43.30. VSQCF3M
05 43.30. VSQCE, CM6000, T1000.
05 43.30. THIS JOB CHECKS THE INSTALLATION OF
05 43.30. SCCPE 3.4, 6RM, AND CCOMPASS
05 43.30. CCOMPASS(L=0,S=SCPTCP)
05 43.31. ASSEMBLY COMPLETE. 46400B SCM USED.
05 43.31. 0.121 CPU SECONDS ASSEMBLY TIME.
05 43.31. LGC.
05 43.33. 1.232 RT SECONDS LOAD TIME
05 43.33. CPCTEXT AND COMPASS ARE IN THE SYSTEM
05 43.33. JOE PASSED
05 43.33. REWIND(LGO)
05 43.33. CCOMPASS(L=0,S=IOTEXT)
05 43.34. ASSEMBLY COMPLETE. 46600B SCM USED.
05 43.34. 0.132 CPU SECONDS ASSEMBLY TIME.
05 43.34. LGO.
05 43.36. 1.315 RT SECONDS LOAD TIME
05 43.36. 6RM IS IN THE SYSTEM
05 43.36. JOB PASSED
05 43.36. CFA 505 SEC.
05 43.36. FF 5.354 SEC.
RELEASE DESCRIPTION

COMPASS 3.0 is an improved comprehensive assembler program for the 6000 Series systems which provides many new capabilities. COMPASS 3.0 runs under SCOPE 3.4 and requires the same minimum hardware configuration as SCOPE.

RELEASE MATERIALS

The program library for COMPASS 3.0 is known as PL2.

MODIFICATIONS

1. New Built-in Operation Code Synonyms

<table>
<thead>
<tr>
<th>New Format</th>
<th>Equivalent To</th>
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<tbody>
<tr>
<td>LXi Bj</td>
<td>LXi Bj,Xi</td>
</tr>
<tr>
<td>AXi Bj</td>
<td>AXi Bj,Xi</td>
</tr>
<tr>
<td>NXi</td>
<td>NXi B0,Xi</td>
</tr>
<tr>
<td>NXi Bj</td>
<td>NXi Bj,Xi</td>
</tr>
<tr>
<td>ZXi</td>
<td>ZXi B0,Xi</td>
</tr>
<tr>
<td>ZXi Bj</td>
<td>ZXi Bj,Xi</td>
</tr>
<tr>
<td>UXi</td>
<td>UXi B0,Xi</td>
</tr>
<tr>
<td>UXi Bj</td>
<td>UXi Bj,Xi</td>
</tr>
<tr>
<td>PXi</td>
<td>PXi B0,Xi</td>
</tr>
<tr>
<td>PXi Bj</td>
<td>PXi Bj,Xi</td>
</tr>
</tbody>
</table>

2. New Built-in Micros

<table>
<thead>
<tr>
<th>BASE</th>
<th>PCOMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CODE</td>
<td>QUAL</td>
</tr>
<tr>
<td>JDATE</td>
<td>SEQUENCE</td>
</tr>
<tr>
<td>MODLEVEL</td>
<td></td>
</tr>
</tbody>
</table>

3. New Pseudo Instructions

<table>
<thead>
<tr>
<th>IFPL</th>
<th>MACHINE</th>
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</thead>
<tbody>
<tr>
<td>IFMI</td>
<td>IFCP6</td>
</tr>
<tr>
<td>ENTRYC</td>
<td>IFCP7</td>
</tr>
<tr>
<td>ORGC</td>
<td>IFPP6</td>
</tr>
<tr>
<td>REPC</td>
<td>IFPP7</td>
</tr>
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</table>

4. Extensions to Old Pseudo Instructions

<table>
<thead>
<tr>
<th>CODE</th>
<th>PPOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMMENT</td>
<td>QUAL</td>
</tr>
<tr>
<td>CPPOP</td>
<td>USELCM</td>
</tr>
<tr>
<td>LIST</td>
<td></td>
</tr>
</tbody>
</table>
5. New Machine Instructions

MAN  Exchange jump to (NA)
IM  Indirect Move
MD  Indirect Move Descriptor Word (pseudo)
DM  Direct Move
CC  Compare Collated
CU  Compare Uncollated

6. Multiple System Text Capability

Up to seven system text overlays may be used for a COMPASS 3.0 assembler run. They are specified by G and S parameters on the COMPASS control card.

7. New Parameters on COMPASS Control Card

ML  Initial Value of MODLEVEL Micro
PC  Initial Value of PCCOMMENT Micro

8. Object Program Binary Format Extensions

The binary card format generated by COMPASS has been extended in Version 3.0. Details are discussed in the Loader Reference Manual, Publication No. 60344200.

CORRECTIONS

All eligible COMPASS 2.0 Programming System Report corrective code through Summary 312 is incorporated in the release tape.

GENERAL DESCRIPTION

COMPASS Version 3.0 consists of two overlays. The level (0,0) overlay COMPASS is the main control program. The level (1,0) overlay COMP2$ contains the assembler which can be called by compilers to process embedded COMPASS source programs.

INSTALLATION PARAMETERS

The installation parameter definitions are in alphabetic order on pages 5-8 of the COMPASS 3.0 assembly listing. Parameters that an installation may change are described below.

INTMUL - integer multiply instruction usage. In the released system, an integer multiply OPDEF is used. If the integer multiply hardware feature is installed:

*D CMP30.114
INTMUL  EQU 1
LIBRARY - library name for overlay. In the released system, the (1,0) overlay
COMP2$ must be in a library in the job's global library set, or in the NUCLEUS
library. To make COMPASS load its overlay from a specific library:

   *D CMP30.120
   LIBRARY MICRO 1,,*libname*

Changing this parameter from its default state will necessitate change in the
installation deck EDITLIB records.

MODEL - CDC CYBER 70 Series model on which COMPASS runs. Model 74 is assumed
in the released system. To change:

   *D CMP30.152
   MODEL MICRO 1,,*xx*

where xx may be 72 or 73.

TIMEMSG - assembly time dayfile message option. In the released system,
COMPASS issues a dayfile message giving the total CPU time at the end of a
batch of assemblies. To suppress this message:

   *D CME30.240
   TIMEMSG EQU 0

INSTALLATION PROCEDURES

The COMPASS 3.0 release tape contains four files:

File 1 program library
File 2 assembled binary
File 3 installation deck CMP1A
File 4 installation deck CMP2A

CMP1A is a maintenance deck which can be used to create a revised program
library and binary file. CMP2A can be used to enter COMPASS 3.0 into the
running system from either the released PL2 or a tape created by CMP1A. After
deck CMP2A has completed, job SCOPE3 (discussed in Section 1) should be run to
create a deadstart tape of the running system.

To obtain the decks included as files 3-4, perform the following job:

   Job card.
   REQUEST(PL2,E)
   REWIND(PL2)
   SKIPF(PL2,2,17)
   COPYBF(PL2,PUNCH,2)
   RETURN(PL2)
   6/7/8/9

The installation decks are shown below.
CMP1A,CMP24000,T07000,MT02.

COMMENT. THIS JCB UPDATES AND CREATES THE BINARY OF COMPASS

COMMENT. THE FIRST FILE OF THE NEW PL2 WILL BE THE NEWPL

COMMENT. THE SECOND FILE WILL BE THE BINARY OF COMPASS

LABEL(F2IN,R,L=COMPASS3P0*3P4,D=HI) COMPASS OLDPL

REQUEST,F2,N,H,SCRATCH FOR NEW PL2

LABEL(F2IN,F2) .SCRATCH FOR NEW PL2

REQUEST(F2,F=FL2IN,N=PL2,E,X)

UNLOAD(FL2IN)

COMPASS(I=COMPFILE,S=0,B=COMTEXT,L=0)

COMMENT VERSION CREATED BY DECK CMP1A MAY BE USED.

REWINC(LGO)

SKIPF(F2,1,17)

COFYEF(LGO,F2)

UNLOAD(PL2)

7/8/9 END OF RECORD

7/8/9 END OF RECORD

6/7/8/9 END OF FILE

CMF2A,CMP24000,T07000,MT01.

COMMENT. THIS JCB EDITLIBS THE COMPASS 3.0 BINARY FROM THE PL2 TAPE

COMMENT INTO THE RUNNING SYSTEM. EITHER THE RELEASED VERSION OR THE

COMMENT. VERSION CREATED BY DECK CMP1A MAY BE USED.

LABEL(F2IN,R,L=COMPASS3P0*3P4,D=HI) MOUNT COMPASS V3.0 OLDPL

REQUEST(F2,F=FL2IN)

SKIPF(F2,1,17)

COFYEF(F2,COMP)

REWINC(F2,CMF).

UNLOAD(F2)

EDITLIB(SYSTEM)

COMMENT. *** END OF JOB ***

7/8/9 END OF RECORD

6/7/8/9 END OF FILE
RELEASE DESCRIPTION

To differentiate between 6000 and 7000 Series Record Manager, the term 6RM is used in the following description.

6RM 1.0 operates under SCOPE 3.4, on the same minimum configuration as SCOPE.

A program library for 6RM is contained on the release program library tape PL3. 6RM occurs first on a tape shared with SCOPE Indexed Sequential (IS), SCOPE Direct Access (DA), and the 8-Bit Subroutines.

The structure of the release format PL3 tape is as follows:

Files 1-5 6RM 1.0
1 6RM program library in UPDATE format
2 SYSTEXT, IOTEXT, TXT6RM binary
3 I/O modules binary
4 FILE control card processor absolute binary
5 FILE control card processor relocatable binary

Files 6-7 IS 2.0
6 IS 2.0 program library
7 IS 2.0 binary

Files 8-9 DA 1.0
8 DA 1.0 program library
9 DA 1.0 binary

Files 10-13 8-Bit Routines
10 9-Bit Routines program library
11 8-Bit Routines binary
12 COPY8P relocatable binary
13 COPY8P absolute binary

Files 14-26 Installation decks for 6RM, IS, DA, 8-Bit Routines
14-15 6RM installation decks
16-19 IS 2.0 installation and verification decks
20-22 DA 1.0 installation and verification decks
23-26 8-Bit Routine installation and verification decks

The procedures defined herein are intended for the installation of 6RM I/O routines in relocatable binary format; methods for assembling 6RM Sequential and Word Addressable I/O routines into absolute programs are described in an appendix of the Record Manager Reference Manual.
DEFICIENCIES

EO = TD/DD/AD, does not work.

Checksumming of I type blocks is not available.

To extend most 6RM files, which are also permanent files, MODIFY permission is required.

Calls to the 7000 Record Manager are not available.

If C blocked, non-W record, SCOPE tapes are copied to S tapes, section boundaries may be lost.

ADDITIONAL INFORMATION

6RM I/O modules are divided into two parts:

Basic Access Modules

These routines control selective loading based on file organization. They contain jump vectors directing a user call to the I/O code appropriate to the file organization selected. Their program names have an RM suffix.
Sequential and Word Addressable I/O Modules

Texts: The I/O macro text included with the 6RM program library is IOTEXT, which is identical to the default SYSTEXT. It consists of, but is not limited to the macros included in the following table. (Some auxiliary macros exist which are not supported at the user level.)

<table>
<thead>
<tr>
<th>MACRO NAME</th>
<th>SYSTEM</th>
<th>REFERENCE</th>
<th>COMDECK</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILE</td>
<td>6RM</td>
<td>RM Ref. Man.</td>
<td>6RMCOM</td>
</tr>
<tr>
<td>FETCH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STORE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPENM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOSEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GET</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GETP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GETN</td>
<td>IS/DA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUT</td>
<td>6RM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUTP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REPLACE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DELETE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENDFILE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SKIPd</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SEEK</td>
<td>IS/DA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>REWINDM</td>
<td>6RM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WTMK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GETL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUTL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOSEL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHECK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABORT</td>
<td>SCOPE</td>
<td>SCOPE 3.4 Ref. Man.*</td>
<td>ACTCOM</td>
</tr>
<tr>
<td>CHECKPT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLOCK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONTLC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DISPOSE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ENDRUN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>JDATE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FILESTAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOADREQ</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEMORY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MESSAGE</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECALL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RECOVR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>REQUEST</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTIME</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSTEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TIME</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRANSR</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* These macros are source compatible with the corresponding macros on CPCTEXT (SCOPE 3.3 SYSTEXT), but they do not generate the same code.
INSTALLATION PARAMETERS

The installation parameters, described below, permit a certain amount of tailoring. To facilitate writing the UPDATE cards, each installation parameter has a unique, mnemonic UPDATE identifier. To change the parameter from its default value to a user value, the following process is required:

*DELETE  <mnemonic>.1

EQU <parameter>= EQU <user-value>

Updates which set installation parameters always should be done under UPDATE IDENTS of the following format:

*IDENT URM<mmddyy>

mm  month
dd  day
yy  year

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mnemonic</th>
<th>Update ID</th>
<th>Description</th>
<th>Default Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>DBG</td>
<td>DBG</td>
<td></td>
<td>Causes extensive debug code to be assembled if defined.</td>
<td>Off</td>
</tr>
<tr>
<td>MCTL</td>
<td>MCTL</td>
<td></td>
<td>Memory catalog table length. MCTL/2 is the maximum number of files allowed open at one time.</td>
<td>100 decimal</td>
</tr>
<tr>
<td>LBLIM</td>
<td>LBLIM</td>
<td></td>
<td>Length of label buffer. Size limit of a user label string. Each user label requires 9 words. LBLIM should be n*9+1, where n is the maximum number of labels permitted (HDR1-9,...).</td>
<td>10 decimal</td>
</tr>
</tbody>
</table>

INSTALLATION PROCEDURES

File 1 of PL3 contains the 6RM program library.

Files 2-5 are pre-assembled 6RM binaries assembled with default installation parameters. Files 14 and 15 contain decks necessary to install 6RM. They may be obtained as follows:

Job card
REQUEST(PL3,E)
SKIPP(PL3,13,17)
COPYBF(PL3,PUNCH,2)
UNLOAD(PL3)
6/7/8/9

MOUNT TAPE PL3
SKIP 6RM, IS, DA, and 8-Bit Subroutine program libraries
TWO INSTALL DECKS
The installation decks are listed below.

Deck SIXRM1 is a maintenance deck which allows regeneration of the 6RM portion of PL3. This deck updates the program library, assembles 6RM, and places the binary on the new PL as supplemental files. User selected installation parameters should be modified at the indicated place in SIXRM1. Deck SIXRM1 requires access to the SCOPE program library to acquire the common deck ACTCOM used by the 6RM system texts.

Deck SIXRM2 adds 6RM to the running system, either from the released PL3 or a PL3 created by deck SIXRM1. Then deck SCOPE3, described in the SCOPE section of this document, can be run to create a deadstart tape of the running system.

SIXRM1,CM66000,T7000,MT02.
COMMENT THIS JOB UPDATES AND CREATES THE BINARY OF 6RM
COMMENT AND COPIES THE OLDPL AND BINARY OF IS DA AND BIT8
COMMENT TO THE NEWPL3. THE NEW PL3 WILL CONSIST OF THIRTEEN FILES
COMMENT THE FIRST FILE WILL BE THE 6RM NEWPL
COMMENT THE SECOND FILE WILL BE THE BINARY OF THE TEXTS
COMMENT THE THIRD FILE WILL BE THE BINARY OF THE OBJECT TIME ROUTINES
COMMENT THE FOURTH FILE WILL BE THE BINARY OF THE OVERLAY FILE
COMMENT THE FIFTH FILE WILL BE THE RELOCATE BINARY OF FILE
COMMENT THE LAST 8 FILES WILL BE THE PLS AND BINARIES OF IS DA AND BIT8
LABEL (PL1,R,L=SCOPESP4,0=HY) LATEST SCOPE PL
RENEW (PL1)
UPDATE (G,F=PL1,N=RANPL,C=0)
UNLOAD (PL1)
LABEL (PL3IN,R,L=RM*3P4,0=HI) 6RM OLDPL
REQUEST (PL3,N,HI) SCRATCH FOR NEW PL3
LABEL (PL3,W,L=RM*3P4,D=HI)
RENEW (PL3IN,FL3)
UPDATE (F,P=PL3IN,N=PL3,W)
COMPASS (I=CCMFILE,S=0,B=TEXTS,L=0,X=RANPL) SYSTEXT, IOTEXT, TXT6RM
COMPASS (I=CCMFILE,G=TEXTS/TXT6RM,S=PFMTXT,B=IOMDS,L=0) I/O MODS
COMPASS (I=CCMFILE,G=TEXTS/TXT6RM,E=FILEC,L=0) RELOCATE BINARY OF FILE
LIBRARY(SYS10)
LOAD (FILEC) GENERATION OF OVERLAY FILE
NGO.
RENEW,PL3,IOMDS,FILE,TEXTS.
RENEW (FILEC)
SKIPF (FL3,1,17)
COPYBF (TEXTS,PL3)
COPYBF (ICMGES,FL3)
COPYBF (FILE,PL3)
COPYBF (FILE,FL3)
SKIPF (PL3IN,5,17)
COPYBF (PL3IN,PL3,8)
COPY IS DA AND BIT8 TO TAPE
UNLOAD (PL3IN,FL3)
7/6/9 END CF RECORD
*C CFCPTEXT
7/6/9 END CF RECORD
*/ ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE
SIXRM2, CM55000, T70000, MT1.
COMMENT. THIS JCL EDITLIBS ALL OF THE 6RM BINARIES INTO THE RUNNING
COMMENT. SYSTEM FROM THE RELEASED VERSION OF PL3 OR THE VERSION CREATED
COMMENT. BY THE JOB SIXRM1.
LABEL (FL3, R, L=RM*3P4, G=HI) MOUNT PL3.
SKIPF (FL3, 1, 17) SKIP OLDPL
COFYEF (FL3, TEXTS) SYSTEXT, IOTEXT, TXT6RM
COFYBF (FL3, IOMCDS) I/O MODULES
COFYEF (FL3, FILE) FILE GENERATION
UNLOAD (FL3)
EDITLIE (SYSTEM)
COMMENT. *** END OF JOB ***
7/6/9 END OF RECORD
READY (SYSTEM)
LIBRARY (NUCLEUS, OLD)
REPLACE (*, TEXTS, AL=0)
REPLACE (*, FILE, AL=3, FL=2000, FL0=0)
FINISH.
LIBRARY (SYSTC, CLD)
REPLACE (*, ICPCDS)
FINISH.
COMPLETE.
ENDRUN.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE
RELEASE DESCRIPTION

Operating as a functional module of 6RM, SCOPE Indexed Sequential 2.0(IS) provides for the creation and maintenance of a random storage file with records that can be retrieved by key as well as sequentially. An indexed sequential file created by IS(6RM) can be processed only by IS(6RM).

Two utility routines called by control cards are available for indexed sequential files. SISTAT prints the statistics for an existing IS file, and the ESTIMATE produces estimates of block and buffer sizes from input cards containing IS file descriptions.

Interface routines provided allow the execution of SIS V1.0 programs that exist in either source language or binary format.

RELEASE MATERIALS

The SCOPE Indexed Sequential module is contained on program library PL3. This tape also contains 6RM, DA, and the 8-Bit Subroutines.

A complete catalog of PL3 contents may be found in section I-3.

MODIFICATIONS AND DEFICIENCIES

Known Deficiencies and Limitations:

1. If IS is used in a program with overlays, it should be included in the main overlay. The IS routines must not be overlaid.

2. IS will not be reliable if permanent file installation parameter IP.MREWR is in effect, as this option permits access to a file from a control point while another control point is modifying that file.
INSTALLATION PARAMETERS

This system contains parameter values which are effective when the user does not supply settings. These values may be altered during installation as explained in the next section.

The default parameters are defined on the program library tape PL3 in the common deck SISCOMM. Their definitions, default values, ranges of acceptable decimal values, and UPDATE sequence locations are as follows:

```
DAHDRSZW EQU 1  Data block header size in words, range 1-31, (SISCOMM.12)
DFEKFACFAC EQU 2  Default data record blocking factor, range 1-4095 (SISCOMM.16)
DFDAPADP EQU 0  Default data block padding factor, range 0-99 (SISCOMM.17)
DPERPLIM EQU 26  Maximum number of trivial errors + 1. For SIS 1.0 Programs only, range 1-32767 (SISCOMM.18).
DFIBKSZW EQU 511 Default index block size in words, range 1-23767 (SISCOMM.19)
DFINPADP EQU 5  Default index padding factor, range 0-99 (SISCOMM.20)
DFNRLVLS EQU 1  Default number of index levels, range 1-63 (SISCOMM.21)
KEYLIMIT EQU 255 Maximum key size in characters, range 1-511 (SISCOMM.31)
TOTFILES EQU 10  Maximum number of active IS files per run. Defines an internal table size in words - no practical limit. (SISCOMM.338)
```

INSTALLATION PROCEDURES

PL3 contains 18 files: files 6, 7, 16, 17, 18, and 19 pertain to IS 2.0. File 6 contains the IS program library which will generate four COMPILE file records:

- COMPASS code for all IS functions
- COMPASS code for IS utilities
- FORTRAN Extended code for the IS utilities
- COMPASS code for the interface routines to SIS 1.0
File 7 contains the binary produced by assembling the contents of file 6. Files 16 and 17 are installation decks IS1 and IS2 as listed below. Files 18 and 19 contain the verification programs. These decks can be obtained by executing the following job:

```
Job card.
REQUEST(PL3,E)
REWIND(PL3)
SKIPF(PL3,15,17)
COPYBF(PL3,PUNCH,2)
COPYBF(PL3,PUNCH,2)
UNLOAD(PL3)
6/7/8/9
```

Mount PL3
SKIP PL AND BINARY DECKS
PUNCH INSTALLATION DECKS
PUNCH VERIFICATION PROGRAM DECK

IS1 is a maintenance deck which can be used to create a revised program library and binary file containing modifications. IS2 can be used to enter IS into the running system from either the released tape or a tape created by IS1. Job SCOPE3 described in Section 1 should be run to capture a deadstart tape containing IS. If the SIS 1.0 interface code is not desired, remove the last COMPASS card in deck IS1.

To obtain a running version of IS, DA must be in the system. The DA peripheral processor routine MSB is used by IS to process error messages. The DA routine TRC is needed to process trace messages.
IS1,CMK3500,17000,MT02.
COMMENT. THIS JCB UPDATES AND CREATES THE BINARY OF IS
COMMENT. AND COPIES 6FM DA AND BIT8 TO THE NEW PL3A.
COMMENT. THE NEW PL3A WILL CONSIST OF THIRTEEN FILES.
COMMENT. THE FIRST FIVE FILES WILL BE 6RM
COMMENT. FILE SIX WILL BE THE ISNEWPL
COMMENT. FILE SEVEN WILL BE THE IS BINARY
COMMENT. THE LAST SIX FILES WILL BE THE PL3 AND BINARIES OF DA AND BIT8
LABEL(FL3AIN,R,L=RM*3P4,D=HI) IS CLOPL
REQUEST(PL3A,N,HI), SCRACTH FOR NEW PL3A
LABEL(FL3A,R,L=RM*3P4,D=HI)
RESTART(FL3AIN,FL3A)
CFYEFL(FL3AIN,FL3A,5) COPY 6RM TO TAPE
UPDATE(F,P=FL3AIN,N=PL3A,R)
REINC,CMPFILE.
COMTYPE(I=CMFILE,B=NEWBIN,S=TXTERM,L=0,S=IPTEXT)
COMTYPE(I=CMFILE,B=NEWBIN,S=TXTERM,L=0)
FTCAL(CMFILE,B=NEWBIN,L=0,SYSEDIT)
COMTYPE(I=CMFILE,B=NEWBIN,S=TXTERM,S=IIPTEXT,L=0)
REINC(NEWBIN)
SKIP(FL3A,1,17)
CFYEFL(NEWBIN,FL3A,6)
SKIP(FL3AIN,2,17)
CFYEFL(FL3AIN,FL3A,6) COPY DA AND BIT8 TO TAPE
UNLOAD(FL3A,FL3AIN)
7/9/9 END OF RECORD
/* ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/9 END OF FILE

IS2,CMK55000,17000,MT1.
COMMENT. THIS JCB EDITLIBS THE SIS BINARIES FROM THE PL3 TAPE, EITHER
COMMENT. THE RELEASED VERSION OR THE VERSION CREATED BY DECK IS1, INTO
COMMENT. THE RUNNING SYSTEM.
LABEL(FL3A,R,L=RM*3P4,D=HI) MOUNT PL3 CONTAINING SIS
REINC,FL3A.
SKIP(FL3A,6,17)
CFYEFL(FL3A,SIS,35) ACOMMON-INSERT
CFYEFL(FL3A,FL3R,1) RNCALL
CFYEFL(FL3A,SIS) FTNCALL-TERMNAT
REINC(SIS,RUN)
UNLOAD(FL3A)
EDITLIB(SYSTEM)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY(SYSTEM)
LIBRARY(NUCLEUS,OLD)
REPLACE(ESTIMATE,SIS,AL=3,FL=37000,FLO=1)
REPLACE(SISTAT,SIS,AL=3,FL=21000,FLO=1)
REINC(SIS)
FINISH.
LIBRARY(SYSIO,OLD)
REPLACE(*,SIS)
DELETE(SISTAT)
DELETE(ESTIMATE)
FINISH.
LIBRARY(RUN2F3,OLD)
REPLACE(*,RUN)
FINISH.
COMPLETE.
ENDRUN.
7/9/9 END OF RECORD
6/7/9 EAC OF FILE

I-4-4 60307400 A
VERIFICATION PROGRAMS

FORTRAN Extended and COBOL 4.0 must be installed before the corresponding installation verification program on files 14 and 15 can be run. Comment cards describe the purpose of each deck.

Dayfile output obtained by running the decks included on files 14 and 15 of the release tape is as follows:

SCOPE 3.4 07/14/72
21.14.29.VSIS100
21.14.29. ******** IS VS 1 ********
21.14.29.COMPASS(S=CPCTEXT)
21.14.32. ASSEMBLY COMPLETE. 43500B SCM USED.
21.14.32. 2,376 CPU SECONDS ASSEMBLY TIME.
21.14.32.LIBRARY(SYS10)
21.14.32.LGO.
21.14.35. 2,898 RT SECONDS LOAD TIME
21.14.38. TEST PASSED
21.14.38.REWIND(SIMMSS)
21.14.40. 498 RT SECONDS LOAD TIME
21.14.40.REWIND(LGO)
21.14.41. 502 RT SECONDS LOAD TIME
21.14.41.FTN.
21.14.42. 612 RT SECONDS LOAD TIME
21.14.43. 264 CP SECONDS COMPILATION TIME
21.14.43.LGO.
21.14.51. 7,101 RT SECONDS LOAD TIME
21.14.54. END TEST
21.14.54. TEST PASSED
21.14.54.REWIND(SIMMSS)
21.14.55. 769 RT SECONDS LOAD TIME
21.14.55.REWIND(OUTPUT)
21.14.56. 827 RT SECONDS LOAD TIME
21.14.56.REWIND(LGO)
21.14.57. 1,293 RT SECONDS LOAD TIME
21.14.58.RETURN(SISFILE)
21.14.59. 1,310 RT SECONDS LOAD TIME
21.15.00.COBOL(LM,Z)
21.15.02. 2,087 RT SECONDS LOAD TIME
21.15.04.COMPILING SISTEST
21.15.15. 000 E AND T/U DIAGNOSTICS ISSUED
21.15.16. FIELD LENGTH NEEDED FOR COBOL 052600
21.15.16. 646 CP SECONDS COMPILATION TIME
21.15.16.END COBOL
21.15.16.LGO.
21.15.26. 9,894 RT SECONDS LOAD TIME
21.15.33. TEST PASSED
21.15.33.REWIND(SIMMSS)
21.15.36. 1,965 RT SECONDS LOAD TIME
21.15.36.REWIND(OUTPUT)
21.15.49. 1,432 RT SECONDS LOAD TIME
21.15.49.COPY8F(E0F,OUTPUT)
21.16.41. 1,438 RT SECONDS LOAD TIME
21.16.42.E0F/E01 ENCOUNTERED
21.16.42.CPA 9,527 SEC.
21.16.42.PP 30,417 SEC.
21.16.42.10 3,865 SEC.
SCOPE 3.4

THIS IS THE COMPASS VERIFICATION TEST

** S I S V 2 **

LIBRARY(SYSIO)

REWIND(LGO)

.803 RT SECONDS LOAD TIME

COMPASS(S=IOTEXT)

.864 RT SECONDS LOAD TIME

1 WARNING MESSAGE IN I2P01

ASSEMBLY COMPLETE. 47600B SCM USED.

3.377 CPU SECONDS ASSEMBLY TIME.

LGO.

4.373 RT SECONDS LOAD TIME

***** TEST PASSED *****

REWIND,ZZZZZEF.

.688 RT SECONDS LOAD TIME

REWIND(OUTPUT)

.644 RT SECONDS LOAD TIME

REWIND(LGO)

.802 RT SECONDS LOAD TIME

RETURN(GENFILE)

2.034 RT SECONDS LOAD TIME

FTN.

3.736 RT SECONDS LOAD TIME

593 CP SECONDS COMPILATION TIME

LIBRARY(NUCLEUS,SYSOVL)

.863 RT SECONDS LOAD TIME

LGO.

13.441 RT SECONDS LOAD TIME

END INSTEST

***** TEST PASSED *****

REWIND,ZZZZZEF.

REWIND(OUTPUT)

REWIND(LGO)

RETURN(SISFILE)

COBOL.

1.982 RT SECONDS LOAD TIME

COMPILING BUILD

000 E AND I/U DIAGNOSTICS ISSUED

FIELD LENGTH NEEDED FOR COBOL 092600

478 CP SECONDS COMPILATION TIME

END COBOL

LGO.

NON-FATAL LOADER ERRORS - SEE MAP

11.578 RT SECONDS LOAD TIME

***** TEST PASSED *****

REWIND,OUTPUT.

REWIND,ZZZZZEF.

COPYBF(EOF,OUTPUT)

EOF/E0I ENCOUNTERED

CPA 10.021 SEC.

PP 46.539 SEC.

IO 4.221 SEC.
RELEASE DESCRIPTION

Operating as a functional module of 6RM, SCOPE Direct Access (DA) provides all the routines requisite to creating, updating, and accessing random files on mass storage. It consists of a related set of central processor routines which are loaded, as required, in the user's field length. Additionally, DA contains one PP routine which is used for diagnostic processing.

A key analysis utility routine is available to aid in the selection of a hashing routine.

A create utility routine is available for use in creating DA files efficiently.

A direct access file created by DA (6RM) can be processed only by DA (6RM) operating under the SCOPE 3.4 operating system.

RELEASE MATERIALS

DA 1.0 is contained on program library tape PL3. PL3 also contains 6RM 1.0, IS 2.0, and the 8-Bit Subroutines.

A complete catalog of PL3 contents may be found in section I-3.

MODIFICATIONS AND DEFICIENCIES

Known Deficiencies and Limitations

1. If DA is used in a program with overlays, it should be included in the main overlay. The DA routines must not be overlaid.

2. DA will not be reliable if permanent file installation parameter IP_MREWR is in effect, as this option permits access to a file from one control point while another control point is modifying that file.

3. The create utility requires that SORT MERGE be installed. If SORT/MERGE is not available, comparable DA files can be created through explicit 6RM calls, at the expense of appreciably greater creation time.
INSTALLATION PARAMETERS

DA contains a single parameter value which is effective when the user does not supply his own setting. This value may be altered during installation of DA. The default parameter is defined on the program library tape in the common deck, SDACOM. Its definition, default value, range of acceptable decimal values, and UPDATE sequence location is:

BLKHDL EQU 1 Block header length (CM words), range 1-31 (SDACOM.38)

If the above parameter is out of range, the following message will be issued:

INSTALLATION PARAM BLKHDL OUTSIDE 1-31 RANGE

INSTALLATION PROCEDURES

PL3 contains 26 files: files 8, 9, 20, 21, and 22 pertain to DA. File 8 contains a program library that will generate four records on the COMPILE file:

COMPASS code for all DA CP routines
COMPASS code for the DA FP diagnostic routine
COMPASS code for the FORTRAN interface
COMPASS code for the key analysis and create utilities

File 9 contains the binary produced by assembling the contents of file 8. Files 20 and 21 contain installation decks DA1 and DA2. File 22 contains the installation verification programs. These decks can be obtained by executing the following job:

Job card.
REQUEST(PL3,E) MOUNT DA PROGRAM LIBRARY
REWIND(PL3) SKIP UPDATE AND BINARY DECKS
SKIPF(PL3,19,17) PUNCH INSTALLATION DECKS
COPYBF(PL3,PUNCH,2) PUNCH VERIFICATION PROGRAM DECKS
COPYBF(PL3,PUNCH,1) 6/7/8/9
UNLOAD(PL3)

Successful assembly of the routines processed by deck DA1 card 020 requires that SORT MERGE be previously installed (see limitation 3). If SMTEXT is not present in the running system when deck DA1 is run, three assembly errors will appear in routine DCREATE, and deck DA2 will yield an EDITLIB diagnostic that cannot be satisfied in the interval.
DA1 is a maintenance deck which can be used to create a revised program library and binary file containing modifications. DA2 can be used to enter DA into the running system from either the released tape or a tape created by SDA1. Job SCOPE3, described in Section 1, should be run to capture a deadstart tape containing DA.

NOTE: If the key analysis utility is to be used as an owncode exit from FORM (see Section 6), FORM must be present in the system.

DA1,C#6000,T7000,MT02.
COMMENT, THIS JCB UPDATES AND CREATES THE BINARY OF DA
COMMENT, AND COPIES 6RM AND IS TO THE NEW PL3B.
COMMENT, THE NEW PL3B WILL CONSIST OF THIRTEEN FILES.
COMMENT, THE FIRST SEVEN FILES WILL BE THE OLDFLS AND BINARIES
COMMENT, CF 6RM AND IS
COMMENT, FILE EIGHT WILL BE THE DA NEMPL
COMMENT, FILE NINE WILL BE THE BINARY OF DA
LABEL(FL3E1N,R,L=RM*3P4,Z=D=HI) DA OLOPL
REQUEST,FL3E1N,H=HI,SCRATCH FOR NEW PL3B
LABEL(FL3E1N,R,L=RM*3P4,Z=D=HI)
RENEW(FL3E1N,FL3B)
COPYF(FL3E1N,FL3B,7) COPY 6RM AND IS TO TAPE
UPDATA(F,P=FL3E1N,N=PL3B,R,X)
RENEW,CCMFILE.
COMPASS(I=CCMFILE,L=0,S=TXT6RM)
COMPASS(I=CCMFILE,S=PPTEXT,L=0)
COMPASS(I=CCMFILE,S=IOTEXT,L=0)
COMPASS(I=CCMFILE,S=IOTEXT,S=CPTTEXT,S=LOREXT,S=SMTXT,L=0)
RENEW(LGC)
SKIPF(FL3B,1,17)
COPYF(LGC,FL3B)
RENEW(FL3E1N)
SKIPF(FL3E1N,9,17)
COPYF(FL3E1N,FL3B,4) COPY BIT8 TO TAPE
UNLOAD(FL3E1N,FL3B)
7/8/9 END OF RECORD
*/ ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

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VERIFICATION PROGRAMS

FORTRAN Extended 4.0 and COBOL 4.0 must be installed before the corresponding installation verification program on file 18 can be run. Comment cards describe the purpose of the deck.

Dayfile output of the verification programs is as follows:

SCOPE 3.4
21.14.58. VSDA000
21.14.58. LIBRARY(SYSIO)
21.14.58. COMPASS(S=IOTEXT)
21.14.59. .804 RT SECONDS LOAD TIME
21.15.07. 1 WARNING MESSAGE IN INSTALL
21.15.07. ASSEMBLY COMPLETE. 476008 SCM USED.
21.15.07. 4,276 CPU SECONDS ASSEMBLY TIME.
21.15.07. *** INSTALLATION TEST ***
21.15.07. LANGUAGE= COMPASS
21.15.07. PRODUCT= SDA
21.15.07. SWITCH(1)
21.15.07. LG0.
21.15.15.  6.737 RT SECONDS LOAD TIME
21.15.45.  ********** TEST PASSED ************
21.15.45.  REWIND, ZZZZZEF.
21.15.47.  2.009 RT SECONDS LOAD TIME
21.15.48.  REWIND(OUTPUT)
21.16.05.  9.565 RT SECONDS LOAD TIME
21.16.05.  REWIND(LGO)
21.17.36.  4.477 RT SECONDS LOAD TIME
21.17.36.  FTN.
21.17.55.  1.994 RT SECONDS LOAD TIME
21.17.59.  4.419 CP SECONDS COMPILATION TIME
21.17.59.  *** INSTALLATION TEST ***
21.17.59.  LANGUAGE- FORTRAN
21.17.59.  PRODUCT- SDA
21.17.59.  LGO.
21.18.12.  12.583 RT SECONDS LOAD TIME
21.18.47.  END INSTALL
21.18.47.  ********** TEST PASSED ************
21.18.47.  REWIND, ZZZZZEF.
21.18.49.  1.783 RT SECONDS LOAD TIME
21.18.49.  REWIND(OUTPUT)
21.18.51.  1.750 RT SECONDS LOAD TIME
21.18.51.  *** INSTALLATION TEST ***
21.18.51.  LANGUAGE- COBOL
21.18.51.  PRODUCT- SDA
21.18.51.  REWIND(LGO)
21.18.53.  1.362 RT SECONDS LOAD TIME
21.18.53.  COBOL.
21.18.57.  3.412 RT SECONDS LOAD TIME
21.19.00.00. COMPILING PTEST2
21.19.05. 000 E AND T U DIAGNOSTICS ISSUED
21.19.05. FIELD LENGTH NEEDED FOR COBOL 052500
21.19.05. 512 CP SECONDS COMPILATION TIME
21.19.05. END COBOL
21.19.05. LGO.
21.19.15.  NON-FATAL LOADER ERRORS - SEE MAP
21.19.16.  10.671 RT SECONDS LOAD TIME
21.19.50.  ********** TEST PASSED ************
21.19.50.  REWIND, ZZZZZEF.
21.19.51.  4.985 RT SECONDS LOAD TIME
21.19.51.  REWIND(OUTPUT)
21.19.52.  4.997 RT SECONDS LOAD TIME
21.19.53.  COPYBF(EOF,OUTPUT)
21.19.54.  1.008 RT SECONDS LOAD TIME
21.19.55.  EOF/EOI ENCLOSED
21.19.55.  CPA  11.383 SEC.
21.19.55.  PP  62.271 SEC.
GENERAL DESCRIPTION

FORM is a general purpose utility routine operating on records supplied by a user; it is capable of performing the following functions:

- Conversion to and from System/360 format
- Record selection according to data content
- Record redefinition as to data type, content, and organization
- File reorganization
- Sequence numbering
- Print reformatting

RELEASE MATERIALS

FORM 1.0 is contained on program library PL4.

HARDWARE CONFIGURATION

FORM requires the same minimum hardware configuration as SCOPE.

INSTALLATION PARAMETER

FORM will reference IP.CSET at installation time and provide the necessary options as defined for the character set.

INSTALLATION PROCEDURES

The FORM release tape contains five files: file 1, program library; file 2, compiled binary; files 3 and 4, installation decks; and file 5, the verification program.

FORM1 (file 3) is a maintenance deck which can be used to create a revised program library and binary. FORM2 (file 4) may be used to add FORM to the running system from either the released tape or a tape prepared by FORM1. To obtain these three decks, execute a job of the type:

```
Job card.
REQUEST(PL4,E)
REWIND(PL4)
SKIPF(PL4,2,17)    SKIP PL and BINARY
COPYBF(PL4,PUNCH,2) COPY INSTALLATION DECKS
COPYBF(PL4,PUNCH,1) COPY VERIFICATION DECK
UNLOAD(PL4)
6/1/8/9
```

Following execution of FORM2, Job SCOPE3, described in Section 1, may be run to create a deadstart tape containing FORM.
FORM1, CM70000, T70000, MT02.
COMMENT. THIS JOB UPDATES AND CREATES THE BINARY OF FORM.
COMMENT. THE FIRST FILE OF THE NEW PL4 WILL BE THE NEWPL
COMMENT. AND THE SECOND FILE WILL BE THE BINARY
LABEL (FL4IN, R = FORM1F0*3P4, D = HI) FORM OLDPL
REQUEST, FL4, N, HI. SCATCH FOR NEW PL4
LABEL (FL4, W, L = FORM1P0*3P4, D = HI)
RELOAD (FL4IN, FL4)
UPDATE (F = FL4IN, N = PL4)
UNLOAD (FL4IN)
SYMPL(I = COMPILE, L = 0)
COMPASS(I = CCFILE, S = IOTEXT, S = ITEXT, L = 0)
RELOAD (LGO)
RELOAD (FL41, 1, 17)
RELOAD (LGO, FL4)
UNLOAD (FL4)
7/8/9 END CF RECORD
" * ADD CORRECTIONS HERE
7/8/9 END CF RECORD
6/7/8/9 END CF FILE

FORM2, CM50000, T70000, MT1.
COMMENT. THIS JOB TAKES THE RELEASED VERSION OF FORM OR THE VERSION
COMMENT. CREATED BY THE JOB FORM1 AND EDITLIBS THE BINARIES FROM PL14
COMMENT. INTO THE RUNNING SYSTEM.
LABEL (FL4, R, L = FORM1P0*3P4, D = HI) MOUNT PL4 TAPE
RELOAD (FL4)
SKIP (FL4, 1, 17)
CFOYER (FL4, FMC1, 1)
CFOYER (FL4, FMC1, 1)
RELOAD (FMCC, FML, PL4)
UNLOAD (FL4)
EDITLIB (SYSTEM)
COMMENT. *** END OF JOB ***
7/8/9 END CF RECORD
READY (SYSTEM)
LITERARY (NUCLEUS, OLD)
REPLACE (FORM, FMC1, AL = 3, FL = 530000, FLO = 1)
FINISH.
LITERARY (SYSLQ, OLD)
REPLACE (*, FML, AL = 0)
FINISH.
COMPLETE.
ENCRUN.
7/8/9 END CF RECORD
6/7/8/9 END CF FILE
VERIFICATION PROGRAM

After installation deck FORM2 has completed, the FORM verification program should be run. Dayfile output from this job should match the following.

```
SCCE 3.4
05.44.21.WFCRM3Y
05.44.21.WFCRM,CM65000,T50.
05.44.21.FORM.
05.44.28. 7.118 RT SECONDS LOAD TIME
05.44.50. END OF JOB
05.44.50.CFA 1.728 SEC.
05.44.50.PF  8.315 SEC.
```
RELEASE DESCRIPTION

CE Diagnostics require the same hardware configuration as SCOPE 3.4.

RELEASE MATERIALS

CE Diagnostics are released on program library tape PL5.

NEW FEATURES

A new magnetic tape test (MTT) has been added to comply with the new tape subsystem testing standard.

A new random instruction test (ALX) has been added also which is basically the same as ALS with the exception that it does not utilize a store after store. Essentially ALX is a faster version of ALS.

Two new routines (CEDIAG and DLE) enable all non-RMS diagnostics to be called into execution in the same manner. Central processor routine CEDIAG uses the central programmable L display to allow the operator to assign equipments to this control point for future testing by a diagnostic program. CP routine CEDIAG uses PPU program DLE to pass equipment status table information and assign operator requested I/O devices. As a result of new programs CEDIAG and DLE, no I/O diagnostics are callable by control card.

The automatic sequencer program (APR) has been removed from the SCOPE program library and added to the CE Diagnostics PL. Externally, APR is the same as it appeared on PL1. Internally, the code is optimized and tag names redefined to add lucidity to the listing. APR also is capable of processing a 17-bit sequencer table address.

Because of new system philosophy, a new ordering of job control cards is required to run a sequence job. See 6000 SCOPE 3.4 HARDWARE MAINTENANCE FEATURES REFERENCE MANUAL (Publication No. 60364800) for example.

CORRECTIONS

All eligible PSR Code published through PSR Summary No. 312 has been added to the CE Diagnostic program library.
INSTALLING CE DIAGNOSTIC PROGRAMS

Installation Parameters

Release values of installation parameters in the deadstart diagnostic sequencer routine, CES, are shown below. To change these parameters, cards with the proper code and the CEQU macro should be placed after an *INSERT CES,54 card and inserted into installation deck CEDIAG1.

IP.DFL CEQU 200B

Central memory field length, divided by 100B, used by the deadstart diagnostics. This parameter is used by the Y-option testing only.

IP.DRA CEQU 400B

Central memory RA/100B, used by the deadstart diagnostics. This parameter is used by the Y-option testing only.

IP.MCPU CEQU 1

Number of central processors present in the system; should be set to 1 for 6400 and 6600, to 2 for 6500 and 6700.

IP.NOISE CEQU 3

Same as IP.NOISE in CIOCOM of the SCOPE program library. IP.NOISE must have identical settings on the SCOPE and CE Diagnostic program libraries.

INSTALLATION PROCEDURES

The structure of the CE Diagnostic program library is: file 1, program library; file 2, binary form of running system diagnostics; file 3, binary form of diagnostic deadstart records; file 4, relocatable binary of CEFAP and EC2; and files 5 and 6 installation decks. To obtain the decks, perform the job:

```
Job card.
REQUEST(PL5,E)
REWIND(PL5)
SKIPP(PL5,4,17)
COPYBF(PL5,PUNCH,2)
UNLOAD(PL5)
6/7/8/9
```

Installation job CEDIAG1 updates and creates a new CE diagnostics program library including assembled/compiled binaries of both the deadstart and running system diagnostics as files 2, 3 and 4. Job CEDIAG2 creates a deadstart tape of the running system including deadstart and running system CE diagnostic routines.

When a deadstart tape is configured for one system, location SITENUM in subroutine CEFAPC should be changed to the CE site number of that particular system.
Example:

*ID MYSITE
*D PTR8081.285 (Current sequence number of SITENUM)
SITENUM DIS ,C18J2.3*
*COMPILE CEFAP

When a deadstart tape is configured for multiple systems and the CE site number is to change for each system, location SITENUM should be changed to DATA 0; and CEFAP will request the site number through the L display.

Example:

*ID MYSITE
*D PTR8081.285 (Current sequence number of SITENUM)
SITENUM DATA 0
*COMPILE CEFAP

Because of new system philosophy, a new ordering of job control cards is required to run a sequence job. See 6000 SCOPE 3.4 HARDWARE MAINTENANCE FEATURES REFERENCE MANUAL (Publication No. 60364800) for example.

CEDIAG1,CM626000,T7000,MT02,
COM T R. THIS JCB UPDATES AND CREATES THE BINARY OF C.E.DIAGNOSTICS.
COM T R. THE New PL5 WILL CONSIST OF FOUR FILES
COM T R. THE FIRST FILE WILL BE THE NEWPL
COM T R. THE SECOND FILE WILL BE THE ABSOLUTE AND RELOCATABLE BINARIES
COM T R. THE THIRD FILE WILL BE THE BINARY OF THE DEADSTART ROUTINES
COM T R. THE FOURTH FILE WILL BE THE RELOCATABLE BINARY OF CEFAP AND EC2
LAEL(L5I1V,R=4L=CEIDIAG*3P4,D=HI) CE DIAG OLDPL
REQUEST,FL5,N,HI.
LAEL(L5I1V,M,W=CEIDIAG*3P4,D=HI)
RE WING(P5I5N,PL5)
UPDAT(E,F,P=PL5I5N,N=PL5)
UNLOAD(P5I5N)
COM PASS(I=COMPILE,S=SCPTEXT,L=0,B=BIN1)
COM PASS(I=CMFILE,S=SCPTEXT,L=0,B=EI1)
COM PASS(I=CCMFILE,S=SCPTEXT,S=SMFILE,L=0)
FTH(I=COMPILE,S=CPTEXT,S=PFTEXT,B=BIN,L=0)
RE WING(BIN)
LOA D(BIN) GENERATION OF OVERLAYS CEFAP AND EC2
NOGO.
RE WING(CEFAP,EC2)
RE WING(BIN)
COFYEF(CEFAP,LGC)
BKSP(LGC,1)
COFYEF(EC2,LGC)
RE WING(BIN1)
COFYER(BIN1,NIL,5)
BKSP(LGC,1)
COFYEF(BIN1,LGC)
RE WING(BIN1,LGC)
SKIPF(PL5,1,17)
COFYEF(LGC,PL5)
COFYEF(BIN1,PL5)
COFYEF(BIN,PL5)
UNLOAD(PL5)

7/8/9 END OF RECORD
\* ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

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CECIAG2,CMS2000, 7000, MT2.

COMMENT: THIS JOB TAKES THE BINARIES FROM THE C.E. DIAGNOSTICS PL AND

COMMENT: EDITS THEM INTO THE PLANNING SYSTEM. THE SECOND EDITLIB WILL

COMMENT: CREATE A NEW DEADSTART TAPE WHICH WILL CONTAIN THE DEADSTART

COMMENT: DIAGNOSTICS ROUTINES.

COMMENT:

COMMENT: IF C.E. DIAGNOSTICS HAS NOT BEEN INSTALLED IN THE SYSTEM,

COMMENT: REMOVE THE CARD...SKIP(12,SYSTEM)...FROM THE SECOND EDITLIB.

LABEL(FL5,R,L=CECIAG*3P4,D=HI) MOUNT C.E. DIAGNOSTICS PL

REQUEST,NEWSYS,HY. MOUNT SCRATCH TAPE FOR NEW DEADSTART

REWIC,F65,NEWSYS.

SKIP(FL5,1,17) SKIP OLDPL

COPYEF(FL5,CECIAG) PP AND CP ROUTINES

COPYEF(P65,DSR) DEADSTART ROUTINES

REWIC,F65,CECIAG,DSR.

EDITLIB(SYSTEM)

EDITOR(SYSTEM)

UNLOAD(PL5,NEWSYS)

COMMENT. *** END OF JOB ***

7/8/9 END CF RECORD

RELFIX(SYSTEM)

REFLACE(MT+CR1,CECIAG)

REFLACE(APR,CECIAG,AL=1)

REFLACE(IEF+PFL,CECIAG)

REWIC(CECIAG)

LIBRARY(NUCLEUS,OLD)

REFLACE(CECIAG+CRMS,CECIAG,AL=7777,FL=2800,FLO=1)

REFLACE(CEFAP,CECIAG,AL=7777,FL=40000,FLG=0)

REFLACE(EC2,CECIAG,AL=7777,FL=45000,FLG=0)

REFLACE(CE6,CECIAG,AL=7777,FL=20000,FLO=0)

REFLACE(ALS,CECIAG,AL=7777,FL=1500,FLO=0)

REFLACE(FST,CECIAG,AL=7777,FL=1200,FLO=0)

REFLACE(CT3,CECIAG,AL=7777,FL=5000,FLO=0)

REFLACE(CU1,CECIAG,AL=7777,FL=7000,FLO=0)

REFLACE(ALX,CECIAG,AL=7777,FL=1500,FLO=0)

FINISH.

COMPLETE.

ENDRUN.

7/8/9 END CF RECORD

READY(NEWSYS)

REWIC(SYSTEM)

TRANSFER(CE4,SYSTEM)

SKIF(12,SYSTEM)

TRANSFER(CE6+ALX,DSR)

TRANSFER(*,SYSTEM)

SKIF(2,SYSTEM)

INCLUDE(F,SYSTEM)

INCLUDE(NUCLEUS,SYSTEM,CM)

INCLUDE(SYSCL,SYSTEM,DS)

INCLUDE(FCFTRK,SYSTEM,DS)

INCLUDE(GOEBL,SYSTEM,DS)

INCLUDE(RUN2P3,SYSTEM,DS)

INCLUDE(SYSIO,SYSTEM,DS)

INCLUDE(SYSMC,SYSTEM,DS)

INCLUDE(IGS274,SYSTEM,DS)

COMPLETE.

ENDRUN.

7/8/9 END CF RECORD

6/7/8/9 END CF FILE

PULL OUT IF C.E. DIAG NOT IN SYSTEM
RElease DESCRIPTION

Maintenance tools for SCOPE 3.4 are provided on program library tape PL6. These maintenance tools are divided into three categories: SYMPL compiler, Version 3.0 object libraries, and conversion aids.

The structure of the release format PL6 is as follows:

Files 1-4 SYMPL, as follows
1 SYMPL source in UPDATE program library format
2 SYMPL compiler in relocatable binary
3 SYMPL compiler in absolute overlay binary
4 SYMPL object library in relocatable binary

Files 5-10 Version 3.0 object library source and binary
5 V3 FTN Object Library PL
6 V3 FTN Object Library Binary
7 V3 COBOL Object Library PL
8 V3 COBOL Object Library Binary
9 V3 SORT Object Library PL
10 V3 SORT Object Library Binary

Files 11-12 Conversion Aids
11 Conversion Aids source in UPDATE program library format
12 Conversion Aids binary

Files 13-22 Installation Decks
13,14 SYMPL installation decks
15,16 V3.0 FTN Object Library installation decks
17,18 V3.0 COBOL Object Library installation decks
19,20 V3.0 SORT Object Library installation decks
21,22 Conversion Aids installation decks

A. SYMPL

SYMPL (Systems Programming Language) is designed to facilitate systems programming; it does not contain some features normally found in higher level languages, such as complex arithmetic and input/output capability. Instead, it contains features particularly suited to systems programming -- bit manipulations, based arrays, and an elementary macro capability. It produces code optimized for efficient register and functional unit usage, particularly oriented toward the 6600 computer.
GENERAL DESCRIPTION

The SYMP1 compiler is written mainly in SYMP1; only the system interface routines are in COMPASS. Thus an absolute binary of SYMP1 is necessary for installation if changes are to be made to the source.

INSTALLATION PARAMETERS

SYMP1 has no installation parameters.

INSTALLATION PROCEDURES

Before SYMP1 can be installed, SCOPE, COMPASS, Record Manager and the FORTRAN Extended object library must have been installed previously. SYMP1 can be updated and installed with the following jobs. Job SYMP1 updates the SYMP1 library tape. Job SYMP12 edits SYMP1 into the system from a SYMP1 program library tape. To obtain the installation decks for SYMP1, perform a job of the type:

```
Job card.
REQUEST PL6,E. Mount Maintenance Tools Tape
REWIND PL6.
SKIPF(PL6,12,17)
COPYBF(PL6,PUNCH,2)
UNLOAD PL6.
6/7/89
```

NOTE: The T7000 parameter on the SYMP1 job card must be changed to T20000 if the deck is to be run on a 6200.

SYMP1,CM100000,T7000,MT2.
001
COMMENT. THIS JOB UPDATE AND ASSEMBLES SYMP1.
002
COMMENT. THE NEW PL6 WILL CONTAIN 12 FILES.
003
COMMENT. FILE 1---SYMP1 OLDPL
004
COMMENT. FILE 2---RELOCATABLE BINARY FOR COMPILER ROUTINES
005
COMMENT. FILE 3---ABSOLUTE BINARY OF COMPILER
006
COMMENT. FILE 4---RELOCATABLE BINARY OF OBJECT ROUTINES
007
COMMENT. FILES 5 THRU 12 ARE THE VERSION 3.0 OLDPL#S AND BINARIES OF
008
COMMENT. THE F14, COBOL, SORT LIBRARIES AND THE CONVERSION AIDS.
009
COMMENT. THIS JOB UPDATE AND ASSEMBLES SYMP1.
010
LABEL,FL6IN,R,L=MAINTTOOLS*3P4,D=HI
011
REQUEST,FL6,N,HI.
012
LABEL (FL6,W,L=MAINTTOOLS*3P4,D=HI)
013
REWIND,FL6IN,FL6.
014
COPYBF(FL6IN,OLDPL)
015
COPYBF(FL6IN,RELOC)
016
SKIPP(FL6IN,1,17)
017
COPYBF(FL6IN,OBJ)
018
REWIND(OLDPL,RELOC,OBJ)
019
UPDATE (W,N)
020
SYMP1(I=COMFILE,B=SRR,L=0)
021
COMPASS(I=COMFILE,B=SRR,S=IOTEXT,S=IPTEXT,L=0)
022
COMPASS(I=COMFILE,B=SRR,L=0)
023
REWIND,SRR.
024
COPY(FL6IN,SRR,SLGO)
025
LOAD(SLGO)
026
NOGO.
027
REWIND,SYMP1,SLGO.
028
REWIND(SRR)
029

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COFY(L(CBJ, SRR, NCBJ)
COFY(K(NXFL, FL6)
COFY(K(STGC, FL6)
COFY(K(SYMP, FL6)
REWIND(NCEJ, PL6N)
COFY(K(NCEJ, PL6)
SKIPP(FL6N, 0, 17)
COFY(K(FL6N, PL6, 8)
UNLOAD(FL6N, PL6)
7/8/9 END OF RECORD
*G CRFLST, ENSYM
*G INIT52, EDCMP
*G SYM10, ENDOEJ
*/ ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/8/9 ENC OF FILE

SYMPLE, CM5500G, T700, MT1.
COMMENT. THIS JCB EDITS THE SYMPLE BINARIES INTO THE RUNNING SYSTEM
COMMENT. FROM THE PL6 TAPE. EITHER THE RELEASED VERSION OF PL6 OR THE
COMMENT. VERSION CREATED BY THE DECK SYMPLE MAY BE USED.
LABEL(FL6, R1, L=MAINTOOLS*3F4, O=HI) MOUNT PL6
REWIND, FL6.
SKIPP(FL6, 2, 17)
COFY(K(PL6, SYMP)
BKSP(SYMP, 1)
COFY(K(FL6, SYMP)
REWIND, PL6, SYMP.
UNLOAD(FL6)
EDITLIE(SYSTEM)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY(SYSTEM)
LIBRARY(NUCLEUS, OLD)
REPLACE(SYMFL, SYMP, AL=3, FL=52000, FLO=1)
FINISH.
LIBRARY(SYSCVL, OLD)
REPLACE(SYMFL0+SYMP52, SYMP)
FINISH.
LIBRARY(SYS10, OLD)
REPLACE(*, SYMP)
FINISH.
COMPLETE.
ENDRUN.
7/8/9 END OF RECORD
6/7/8/9 ENC OF FILE

VERIFICATION PROGRAM

The best verification of successful installation of SYMPL is satisfactory
compilation of FORM, QU, and/or QUIDDL.
B. VERSION 3.0 OBJECT LIBRARIES

The Maintenance Tools tape contains the object libraries for FORTRAN Extended 3.0, COBOL 3.0, and SORT/MERGE 3.0 for use in conversion of SCOPE 3.3 jobs to SCOPE 3.4. These three object libraries are to be used to satisfy external symbols from binary decks created by Version 3 of FORTRAN Extended, COBOL, or COMPASS programs containing calls to SORT MERGE 3.0. The Version 3 libraries do not use Record Manager for input/output; they retain calls to CIO. These routines are provided solely to allow usage of existing binary decks during the 3.3 to 3.4 transition phase. All three of these object libraries contain eligible PSR code as published through PSR Summary 312.

INSTALLATION PROCEDURES

Separate decks are provided to update and assemble each of the program libraries. Separate EDITLIB decks are provided to add the binary provided, or that created by the assembly deck, to the running system. To obtain these decks perform a job of the type

```
Job card.
REQUEST PL6,E.
REWIND PL6.
SKIPF(PL6,14,17)
COPYBF(PL6,PUNCH,2)
COPYBF(PL6,PUNCH,2)
COPYBF(PL6,PUNCH,2)
UNLOAD PL6.

Mount Maintenance Tools Tape
PUNCH V3FTN1,3VFTN2 DECKS
PUNCH V3COB1,V3COB2 DECKS
PUNCH V3SRT1,V3SRT2 DECKS

6/7/89
```

Note that the deck V3FTN1 will run correctly only under SCOPE 3.3.

Once the V3FTN2, V3COB2 and/or V3SRT2 EDITLIB operations have completed, job SCOPE3 (see section 1) should be run to create a deadstart tape of the running system.

Use of the 3.3 object time routines under SCOPE 3.4 requires an LDSET(LIB=SYSMISC/SYSIO) control card prior to the EXECUTE control card.
V3FTN1,CME0000,T7000,MT2.
COMMENT. THIS DECK CAN ONLY RUN ON 3.3 AND 3.4.
COMMENT. WILL PRODUCE INCORRECT RESULTS.
COMMENT. IF RUN ON 3.4.
COMMENT. THIS JCB UPDATES AND ASSEMBLES THE FTN EXTENDED V3.0 OBJECT.
COMMENT. LIBRARY ROUTINES AND CREATES A NEW PLEA.
COMMENT. THE NEW PLEA WILL CONTAIN 12 FILES.
COMMENT. FILES 1 THRU 4---THE SYMPL OLDPL AND BINARIES.
COMMENT. FILES 5 AND 6---V3.0 FTN OLDPL AND BINARIES.
COMMENT. FILES 7 THRU 12---V3.0 CCBOL, SORT AND CONVERSION AIDS OLDPL#S.
COMMENT. AND BINARIES.
LABEL(FL6AIN,F,L=MAINTTOOLS*3P4,D=HI) 011
REQUEST(FL6A,N,H). 012
LABEL(FL6A,F,L=MAINTTOOLS*3P4,D=HI) 013
REWIND(FL6A,FL6A). 014
COFYEF(FL6AIN,FL6A). 015
UPDACE(F,F=FL6AIN,N=PL6A,R=C) 016
COFYEF(EC8,FL6A). 017
SKIP(FLEAIN,2,17) 018
FTN(SYSEDIT=IDENT,I=COMPIL,S=IPTEXT,L=0) 019
REWIND,LGO. 020
COFYEF(LGC,FL6A). 021
COFYEF(FL6AIN,FL6A). 022
UNLOAD(FL6AIN,FL6A). 023
COMMENT. *** END OF JOB *** 024
7/8/9 END OF RECORD
*/ ADD CORRECTIONS FOR V3.0 FTN OBJECT LIBRARY ROUTINES ONLY
7/8/9 END OF RECORD
6/7/8/9 ENC OF FILE

V3FTN2,CME5000,T7000,MT1.
COMMENT. THIS JCB EDITLIBS THE FORTRAN EXTENDED V3.0 OBJECT TIME.
COMMENT. Routines INTO THE RUNNING SYSTEM FROM THE PL6 TAPE. EITHER THE
COMMENT. RELEASED VERSION OF PL6 OR THE VERSION CREATED BY THE DECK.
COMMENT. V3FTN1 MAY BE USED.
LABEL(FL6A,F,L=MAINTTOOLS*3P4,D=HI) MOUNT PL6 001
REWIND(FL6A). 002
SKIP(FL6A,2,17) 003
COFYEF(FL6A,FCRT) 004
REWIND(FL6A,FCRT). 005
UNLOAD(FL6A). 006
EDITLIB(SYSTEM). 007
COMMENT. *** END OF JOB *** 008
7/8/9 END OF RECORD
READY(SYSTEM). 009
LITERARY(SYSMISC,OLD). 010
REPLACE(*,FCRT). 011
FINISH. 012
COMPLETE. 013
ENDRUN. 014
7/8/9 END OF RECORD
6/7/8/9 ENC OF FILE
V3COE1,CM66000,T7000,MT2.
COMMENT. THIS JCB UPDATES AND ASSEMBLES THE COEOL V3.0 OBJECT LIBRARY
COMMENT. ROUTINES AND CREATES A NEW PL6B.
COMMENT. THE NEW PL6B WILL CONTAIN 12 FILES
COMMENT. FILES 1 THRU 6---SYMPOL AND V3.0 FTN OLDPLS AND BINARIES.
COMMENT. FILES 7 AND 8---V3.0 COECL OLDPL AND EINARY.
COMMENT. FILES 9 THRU 12---V3.0 SCRT AND CONVERSION AIDS OLDPLS AND
COMMENT. EINARIES.
LABEL(FLEBIN,R,L=MAINTTOOLS*3P4,D=H)
REQUEST(FLE,C,H)
LABEL(FLE2,W,L=MAINTTOOLS*3P4,D=H)
REWINC(FLEBIN,FLE6).
COFYEF(FLEBIN,FLE6,E)
UPDATE(F,P=FLEBIN,N=FLE6,R=P,C,X)
COFYEF(ECF,FLE6)
SKEIFF(FLEBIN,2,17)
COMPASS(I,S=CFCTEXT,S=IPTEXT,L=0)
REWINC,LGC.
COFYEF(LGC,FLE6)
COFYEF(FLE6IN,FLE6,4)
UNLOAD(FLE6IN,FLE6)
COMMENT. *** END OF JOB ***
7/6/9 END OF CF RECORD
*/ ADD CORRECTIONS FOR V3.0 COBOL OBJECT LIBRARY ROUTINES ONLY
7/6/9 END OF RECORD
6/7/8/9 END OF FILE

V3COE2,CM55000,T7000,MT1.
COMMENT. THIS JCB EDITLIBS THE COECL V3.0 OBJECT TIME ROUTINES INTO THE
COMMENT. RUNNING SYSTEM FROM THE PL6 TAPE. EITHER THE RELEASED VERSION
COMMENT. OF PL6 OR THE VERSION CREATED BY DECK V3COE1 MAY BE USED.
LABEL(FLE6,R,L=MAINTTOOLS*3P4,D=H) MOUNT PL6
REWIND,FLE6.
SKEIFF(FLE,7,17)
COFYEF(FLE6,CCE)
REWIND,FLE6,CCE.
UNLOAD(FLE6)
EDITLIB(SYSTEM)
COMMENT. *** END OF JOB ***
7/8/9 END OF CF RECORD
READY(SYSTEM)
LIBRARY(SYSHICL,OLD)
REPLACE(,,CCB)
FINISH.
COMPLETE.
ENCRUN.
7/8/9 END OF CF RECORD
6/7/8/9 END OF FILE
V3SRT,CM50000,T7000,MT2.
COMMENT, THIS JOB UPDATES AND ASSEMBLES THE SORT V3.0 OBJECT
COMMENT, LIBRARY ROUTINES AND CREATE A NEW PLEC.
COMMENT, THE NEW PLEC WILL CONTAIN 12 FILES
COMMENT, FILES 1 THRU 8---SYMPL, V3 FTN AND COFOL OLDPL#S AND BINARIES.
COMMENT, FILES 9 AND 10---V3.0 SORT OLDPL AND BINARIES.
COMMENT, FILES 11 THRU 12---CONVERSION AIDS OLDPL#S AND BINARIES.
LABEL(FLECIN,F,L=MAINTTOOLS*3P4,D=HI)
REQUEST,FLEC,N,HI.
LABEL(FLEC,W,L=MAINTTOOLS*3P4,D=HI)
REWINC,FLECIN,FLEC.
COFYBF(FLECIN,FLEC,8)
UPDATE(F,P=FLECIN,N=PL6C,R=C,X)
COFYBF(EC,FLEC)
SKIPF(FLECIN,2,17)
COMPASS(I,S=CFCTEXT,S=IPTEXT,L=0)
REWINC,LGO.
COFYBF(LGO,FLEC)
COFYBF(FLECIN,FLEC,2)
UNLCAC(FLECIN,FLEC)
COMMENT, *** END OF JOB ***
7/6/9 END OF RECORD
*/ ADD CORRECTIONS FOR V3.0 SORT CEJECT LIBRARY ROUTINES ONLY
7/6/9 END OF RECORD
6/7/8/9 END OF FILE

V3SRT2,CM50000,T7000,MT1.
COMMENT, THIS JCB EDITS THE SORT/MERGE V3.0 OBJECT TIME ROUTINES INTO
COMMENT, THE RUNNING SYSTEM FROM THE PL6 TAPE. EITHER THE RELEASED
COMMENT, VERSION OF PL6 OR THE VERSION CREATED BY DECK V3SRT1 MAY BE
COMMENT, USED.
LABEL(FLEC,F,L=MAINTTOOLS*3P4,D=HI) MOUNT PLEC
REWINC,FLEC.
SKIPF(FLEC,5,17)
COFYBF(FLEC,SORT) SORT V3.0 BINARIES
REWINC,FLEC,SORT.
UNLCAC(FLEC)
EDITILE(SYS)
COMMENT, *** END OF JOB ***
7/6/9 END OF RECORD
READY(SYS)
LIBRARY(SYSFISC,OLD)
REPLACE(*,SRT)
FINISH.
COMPLETE.
ENDRUN.
7/6/9 END OF RECORD
6/7/8/9 END OF FILE
C. CONVERSION AIDS

The following conversion aid programs are provided on the Maintenance Tools tape:

- **SIPT**
  A program to convert RUN 2.3 programs to FTN 4.0 format.

- **BBTO6RM**
  A program to convert FORTRAN binary blocked files to files that can be processed by SCOPE 3.4 and 6RM.

- **RANCONV**
  A program to convert single level SCOPE name/number indexed files created by COBOL 3.0 or FORTRAN Extended 3.0 to indexed word-addressable files that can be processed by COBOL 4.0 or FORTRAN Extended 4.0.

- **SPY**
  Utility package used to monitor the P register of a CPU program and provide an histogram of elapsed time used in specific areas of code.

- **WHEN**
  Control card callable utility that skips over selected cards in the control card record.

- **DOCK**
  Utility for extracting IMS information from the SCOPE program library.

- **STIMULATOR**
  Utility package used to simulate live INTERCOM 4.1 low speed terminals.

- **CONVPP**
  Utility allowing conversion of permanent files between SCOPE 3.3 and 3.4 formats. CONVPP is also described in the SCOPE 3.3 to SCOPE 3.4 Conversion Aids PSB.
INSTALLATION PROCEDURES

Before the Conversion Aids can be installed, FORTRAN Extended must be in the running system. Job AIDES1 updates and compiles File 11 creating a complete revised PL6. Job AIDS2 adds binary from File 12 to the running system. Jobs AIDS1 and AIDS2 may be obtained by performing a job of the type:

    Job card.
    REQUEST PL6,E. Mount Maintenance Tools Tape
    REWIND PL6.
    SKIPF(PL6,20,17)
    COPYBF(PL6,PUNCH,2)
    UNLOAD PL6.
    6/7/8/9

Once AIDS2 has completed, job SCOPE3 (see section 1) may be run to create a deadstart tape of the running system.

AIDES1,C73000,77000,5T02.
COMMENT. THIS JOB UPDATES AND ASSEMBLES THE 3,4 CONVERSION AIDS. 001
COMMENT. THE NEW PL6D WILL CONSIST OF 12 FILES. 002
COMMENT. FILES 1 THRU 4 CONTAIN SYMPL OLDPL AND BINARIES. 003
COMMENT. FILES 5 THRU 6 CONTAIN V3FTN OBJECT CLDPL AND BINARY. 004
COMMENT. FILES 7 THRU 8 CONTAIN V3COBOL OBJECT OLDPL AND BINARY. 005
COMMENT. FILES 9 THRU 10 CONTAIN V3SORT OBJECT OLDPL AND BINARY. 006
COMMENT. FILE 11 CONTAINS THE CONVERSION AIDS OLDPL. 007
COMMENT. FILE 12 CONTAINS THE BINARIES OF CONVERSION AIDS. 008
REQUEST(CLUDLF,E,HY) LATEST SCOPE PL 009
UPDGETG,N=RANFL) 010
UNLOAD(CLUDLF) 011
LAEL(FL60IN,K,L=MAINTOOLS*3P4,D=HI) 012
REQUEST(CLUDLF,N=PL6D) SCRATCH TAPE FOR NEW FL6D 013
LAEL(FL60IN,K,L=MAINTOOLS*3P4,D=HI) 014
REWIND(CLUDLF,PL60) 015
COPYBF(CLUDLF,FL60,K,L=PL60) 016
COPYBF(CLUDLF,FL60,10) 017
UPDATE(F,P=CLUDLF,N=CLUDLF,R=C) 018
COPYBF(CLUDLF,FL60) 019
UNLOAD(CLUDLF) 020
COMPASS(I=CLUDLF,S=CLUDLF,L=CLUDLF,B=CLUDLF) 021
COMPASS(I=CLUDLF,S=CLUDLF,L=CLUDLF,B=CLUDLF) 022
FTN(I=CLUDLF,L=CLUDLF) SKIPF SORT DEBUGGING AID 023
COPYF(CLUDLF,N=CLUDLF) 024
RUN(S,,CLUDLF,N=AID) 025
COMPASS(I=CLUDLF,S=CLUDLF,L=CLUDLF,B=CLUDLF) 026
COMPASS(I=CLUDLF,S=CLUDLF,L=CLUDLF,B=CLUDLF) 027
REUNI0(AIDS) 028
LDSET(PRESET=ZERO) 029
LOAD(AIDS) 030
NOGO. 031
REUNI0(AID) 032
LOAD(AID) 033
NOGO. 034
REUNI0(AIDES,LGC) 035
COPYBF(LGC,FL60) 036
REKBF(FL60,1) 037
COPYBF(AIDES,FL60) 038
UNLOAD(FL60) 039
7/8/8/9 END CF RECORD
AICS2, CM55000, T7000, MT01.

COMMENT: THIS JOB EDITLIBS THE BINARIES OF THE CONVERSION AIDS INTO

COMMENT: THE RUNNING SYSTEM. EITHER THE RELEASE VERSION OF PL6 OR THE

COMMENT: VERSION CREATED BY DECK AIDS1 MAY BE USED.

LABEL(FLG0D, R,L=PAINTOOLS*3P4) MOUNT PL6

REINC(FLG0D)

SKIP(FLC, 11, 17)

COPYFL(FLC, AICS)

UNLOAD(FLC)

EDITLIB(SYSTEM)

COMMENT: *** END OF JOB ***

7/8/9 END CF RECORD

REINC(SYSTEM)

/* REMOVE THE FOLLOWING CARD IF STIMULATOR IS NOT TO BE INSTALLED

REPLACE(SMF, VGS, AIDSS)

/* REMOVE THE FOLLOWING CARD IF SPY IS NOT TO BE INSTALLED

REPLACE(SFY+SFZ, AIDSS)

LIBRARY(MINCLES, OLD)

/* REMOVE THE FOLLOWING CARD IF STIMULATOR IS NOT TO BE INSTALLED

REPLACE(SIF, AICS, AL=3, FL=20000, FLC=1)

/* REMOVE THE FOLLOWING CARD IF SPY IS NOT TO BE INSTALLED

REPLACE(CSPY, AIDES, AL=1)

/* REMOVE THE FOLLOWING CARD IF DOCK IS NOT TO BE INSTALLED

REPLACE(CCCC, AICS, AL=3, FL=10000, FLC=1)

/* REMOVE THE FOLLOWING CARD IF WHEN IS NOT TO BE INSTALLED

REPLACE(WMW, AICS, AL=3, FL=12000, FLC=1)

/* REMOVE THE FOLLOWING CARD IF EBTOSRM IS NOT TO BE INSTALLED

REPLACE(ETCERM, AIDSS, AL=3, FL=10000, FLC=1)

/* REMOVE THE FOLLOWING CARD IF RANCONV IS NOT TO BE INSTALLED

REPLACE(RANCONV, AICS, AL=3, FL=6000, FLC=1)

/* REMOVE THE FOLLOWING CARD IF SPY IS NOT TO BE INSTALLED

REPLACE(FRNSFY, AIDSS, AL=1, FL=35000)

/* REMOVE THE FOLLOWING CARD IF CONVPF IS NOT TO BE INSTALLED

REPLACE(CCONVFF, AIDSS, AL=7777, FL=30000, FLC=0)

/* REMOVE THE FOLLOWING CARD IF SIFT IS NOT TO BE INSTALLED

REPLACE(SIFT, AICSS, AL=3, FL=25000, FLC=1)

/* REMOVE THE FOLLOWING 2 CARDS IF STIMULATOR IS NOT TO BE INSTALLED

REPLACE(CATAR, AIDSS, AL=3, FL=6000, FLC=1)

REPLACE(SCFT, AICSS, AL=3, FL=5000, FLC=1)

REPLACE(FLLE, AICSS, AL=3, FL=52000, FLC=1)

FINISH.

COMPLETE.

ENDRUN.

7/8/9 END OF RECORD

6/7/8/9 END OF FILE
D. USAGE OF PF CONVERSION AIDS

Usage instructions for SIFT may be found in SIFT (FORTRAN Translator Program PSB, publication 60358400).

Usage instructions for BBTO6RM, RANCONV, WHEN, and SPY, may be found in SCOPE V3.3 to SCOPE V3.4 Conversion Aids PSB, publication 60358200.

Usage instruction for the other conversion aids are as follows.

D.1 WHEN Use in a SCOPE 3.3 Environment

During conversion from SCOPE 3.3 to SCOPE 3.4, the compass source language utility WHEN allows control cards unique to one environment to be skipped in the other. As WHEN is not a part of the standard SCOPE 3.3 environment, the following job structure may be used for entering WHEN into a 3.3 system through EDITLIB.

```
JOB,CM55000,T100,MT01.
REQUEST OLDPL,E,HI.
MOUNT 3.4 CONVERSION AIDS PL
SKIPP(OLDPL,10,17)
COPYBP(OLDPL,PL)
UPDATE(Q,P=PL)
COMPASS(I=COMPILE,S=SCPTEXT,L=0)
REWIND LGO.
LOAD(LGO)
NOGO.
REWIND AIDES.
EDITLIB.
7/8/9
*C WHEN
7/8/9
READY(SYSTEM)
RPADD WHEN,AIDES
COMPLETE.
6/7/8/9
```
D2. DOCK USAGE.

DOCK is a FORTRAN source language utility for extracting listable Internal Maintenance Specification information from a COMPILF file generated from the SCOPE 3.4 program library.

The control card directive is of the form:

DOCK(p1,p2,p3,...,pn)

Definition:

Default, if parameter is not specified.

Assumed, if parameter is specified, but not equivalenced.

I= Name of program source file. (Assumed to be an update COMPILF or source file not exceeding 90-column BCD characters.) Default = SOURCE, Assumed = COMPILF.

L= Name of file containing documentation list; (cannot be the same name as I). Default = Assumed = OUTPUT.

F= Up to 25 characters to be printed in the bottom left corner of each page of documentation. Default = INT, Folio = $INTERNAL DOCUMENTATION.$

EXT, Folio = $EXTERNAL DOCUMENTATION.$ Assumed = $I M S.$

INT Internal; all internal and external documentation will be listed on file L.

EXT External; only external documentation will be listed on file L. Default = INT.

INDEX At the end of each routine processed an index is printed, all symbols found in location field of EJECT, SPACE, TITLE, and TTL cards. Default = INDEX off.

NR No rewind of input file. (I) Default = rewind of INPUT.

NT No table generation. Default = table generation.

NP No propogation of page numbers across routine. Default = on.

TE Documentation file, L, formatted for input into program TEXTJAB. Default = off.
Default Parameter Settings:

DOCK(I=SOURCE, L=OUTPUT, F=$INTERNAL DOCUMENTATION.$, INT, P)

Assumed Parameter Settings:

DOCK(I=COMPILE, L=OUTPUT, F=$INTERNAL DOCUMENTATION.$, INT, P)

The following dayfile messages are issued by DOCK:

FL TOO SHORT FOR DOCK. (REQUIRES 12K).

Not enough field length was allowed; current minimum field length is 10K (octal).

FILE NAME CONFLICT.

Input, I, and List, L, file names are the same.

MEMORY OVERFLOW IN BUILDING INDEX TABLE.

Not enough field length for index table; increase by 4K (octal).

EMPTY INPUT FILE. NO DOCUMENTATION PRODUCED.

Input file was empty.

INPUT FILE NAME IS ILLEGAL.
OUTPUT FILE NAME IS ILLEGAL.

Illegal character specified in file name.

FILE EQUIVALENCE MAY NOT BE 0.

A file parameter cannot be set to zero.
D.3 STIMULATOR OPERATING INSTRUCTIONS

D.3.1 Automatic Table Setting:

The STIMULATOR is revised to automatically set the EST and mux-subtables if the user so specifies. The new operating procedures are as follows:

Bring up the STIMULATOR at any NEXT control point, read in the SIP job.

After requesting appropriate tape assignments, the STIMULATOR asks:

DO YOU WANT AUTOMATIC TABLE SETTING -- N.YES OR N.NO

When the answer is YES, the STIMULATOR makes the following checks:

Is INTERCOM already up? If so, the following diagnostic is issued and the SIP job drops:

INTERCOM IS ALREADY UP--DROP INTERCOM TO CONTINUE

If INTERCOM is not already up, the STIMULATOR checks for a mux-subtable pointer in low core. If no pointer is found, the following diagnostic is issued and the SIP job drops.

ERROR--DON'T HAVE MUX SUBTABLE DEFINED

If both checks are passed:

The STIMULATOR searches the EST until it finds either a YC or DC entry (turned OFF). When not enough YC or DC entries are found in the EST, the following is displayed:

NOT ENOUGH EXISTING EST YC OR DC ENTRIES--SET MANUALLY

EST YC entries will not be created because a valid mux-subtable pointer cannot be chosen arbitrarily.

When a valid YC or DC entry is found, the entry is changed to YC if necessary; and the channel number from the SIP card C parameter is used.

The mux-subtable pointer from this EST entry is used to modify the appropriate mux-subtable. The SIP card T parameter is placed in the mux-subtable to indicate the number of Teletypes.

The mux table header word also is set to indicate a STIMULATOR run.

When all tables are set properly, the following message is displayed:

--OFF EXTRA MU XS THEN BRING UP INTERCOM--

When INTERCOM is brought up, the following is displayed, and the STIMULATOR run is continued:

CONTINUE SIMULATION

The STIMULATOR changes only the first one or two EST entries encountered (depending on M parameter of SIP card).
If NO is the answer to DO YOU WANT AUTOMATIC TABLE SETTINGS the following is displayed:

YOU ARE RESPONSIBLE FOR TABLES SETUP--TYPE N.GO TO CONTINUE

Thus, the user can set tables manually if he wishes.

D.3.2 Manual Table Setting:

The EST must contain an entry for a 6676 multiplexer specifying the channel to be used for the stimulation. The entry should point to a valid multiplexer subtable. The entry can be typed manually after unlocking the keyboard. For example: if the entry is to be at 2532 in memory, type:

```
2532,0000 0004 0000 3103 0002.
```

Channel     Equip    YC       entry in mux

Points to 1st

The mux header word must have byte 4 set to the value 1. The INTERCOM pointer word (word 16, byte 1) points to this word. For example, if word 16 points to 5640 type:

```
5640,4,1.
```

The mux table must be set to reflect the number of terminals (this value must agree with the SIP card T parameter). Type:

```
5642, 00xx. xx=number of terminals
```

D.3.3 Running Two Multiplexers

Case one: two 6676's simulated on the same channel

The M parameter on the SIP card should be set to 2. The T parameter should indicate the number of terminals on each mux. The STIMULATOR input tape must contain as many sessions as the total number of terminals: 2*T. Two EST YC entries and two mux subtables are required. (Assemble the INTERCOM driver with IP,N6676 EQU 2.)

Case two: One simulated 6676 and one actual 667X on another channel

It is possible to simulate one 6676 multiplexer and at the same time run another actual hardware 6671 or 6676 multiplexer on a different channel. In this case, the user must ensure that an EST entry and mux subtable also exist and properly define the live multiplexer and its terminals.

The SIP parameters are set in the same way as for one simulated multiplexer.

D.3.4 Bringing up INTERCOM and the STIMULATOR:

Please refer also to Automatic Table Setting instructions.

Bring up INTERCOM by typing: INTERCOML.

The STIMULATOR can be run at any available control point but it should be locked in to avoid attempts to roll it out. Type in:

n.LOCKIN.
Background batch can be run as desired. Remember, in SCOPE 3.4, any NEXT control point can be used to run both INTERCOM and batch jobs.

The STIMULATOR will drop automatically when INTERCOM is dropped. To drop INTERCOM type:

INTERCOM, DROP.

D.3.5 Description of STIMULATOR Parameters:

A maximum of two tapes is required for a simulation run: TAPEI and TAPEO. TAPEI is the input tape containing the Teletype programs to be simulated during the run; this tape must be assigned for all simulation runs. TAPEO is used for recording all system output resulting from the simulation; it is required if the user selects the option to recover system output. The STIMULATOR requests assignment of the appropriate tapes during its initialization phase.

The STIMULATOR is called with a Program Call control card of the form:

SIP(Mx,Txxx,Dxxx,Sxxxx,Lxx,Cxx,Ox,Fxxxx)

The parameters M,T,D,S,L,C,O,F are order independent, all values are octal:

- **Mx** Number of simulated multiplexers (maximum of 2)
- **Txxx** Number of Teletypes per multiplexer (1-100)
- **Dxxx** Number of Teletypes per multiplexer to activate dynamically every 8 cycles
- **Sxxxx** Time interval in octal cycles for activating D Teletypes (one cycle equals approximately 200 ms)
- **Lxx** 0 implies each TTY is to simulate all input programs for current run. L=0 option requires INTERCOM modifications, as same user would LOGIN at more than one terminal.
  1-77 indicates the number of times each TTY is to loop on its assigned program
- **Cxx** Channel number of simulated multiplexers
- **Ox** Zero implies recover system output, non-zero implies to bypass output
- **Fxxxx** File number of TAPEI to be used for current SIMULATION

The following default values are assumed:

- **M** = 1
- **T** = 1
- **D** = 0
- **S** = 0
- **L** = 1
- **O** = 0
- **F** = 1
If the channel parameter C is not specified, SIP will be terminated with an error messages. The only restriction on the S parameter:

T.S
---<4096
D

The following sample deck will perform the data acquisition for a 20 terminal simulation on one multiplexer:

JOB1,T1000,MT02,CM20000.
SIP(M1,T24,D24,S1,L2,CO,00,F1)
6/7/8/9

D.3.6 STIMULATOR Input Card Format

Test programs are stored on cards for input to INTERCOM via the STIMULATOR. Each card image represents one Teletype line of information. The first character must be punched in column 1 and the last character must be a v (11-0 punch).

If the input line will generate a line feed as the only response from INTERCOM, as with text editing under EDITOR, the character (0-8-7 punch) must precede the character v (11-0 punch) on the card. The STIMULATOR interprets the character for internal purposes only; it is sent to INTERCOM as a blank. The v character is transmitted to INTERCOM as a carriage return.

Each test program must begin with the LOGIN procedure and end with the LOGOUT system commands. The main body of the test program can contain any combination of system commands, source input, or data. Essentially, each test program represents a complete user session at a Teletype from LOGIN to LOGOUT. In converting programs from Teletype input to cards for STIMULATOR input, the differences in character sets must be considered. For example, the quotations character " for Teletypes is the equivalence character (=, 0-8-6 punch) on cards. For a more detailed description of display and TTY characters refer to INTERCOM section 14 of this document or the INTERCOM 4 Reference Manual (publication no. 60307100).

The card images can be copied to tape with the COPYBF utility. EOR's separate each test program.

Since the following characters have special meaning to the STIMULATOR, they should not be used as data in the input tape:

\( V \) indicates carriage return
\( \wedge \) indicates EDITOR text editing line
\([\) indicates control X
\( ]\) indicates control Z

example: ] A gives user abort
Example of input tape preparation:

```
JOB,M01.
REQUEST,TAPE,HI.
COPYBF(INPUT,TAPE)
7/8/9
LOGIN,v
NAMEv (user name)
PASSWDv (user password)
EDITOR.v
FOR,Fv
10 PROGRAM Z(INPUT,OUTPUT) v
20 PRINT 10^v
30 READ 20,A^v
   .
   .
160 END^v
RUN,FTNv
2.0v
3.0v
BYEv
LOGOUT,v
7/8/9
   (second test program)
7/8/9
   .
   .
7/8/9
   (last test program, maximum of 64)
7/8/9
6/7/8/9
```

all text editing commands require ^ character before v character
D.3.7. Data Reduction Phase:

The following sample deck will perform data reduction of the STIMULATOR output tape:

```
JOB2,CM55000,T1000,MT01.
REQUEST,TAPE1,HI. STIMULATOR OUTPUT TAPE
REWIND(TAPE1)
DATAR.
6/7/8/9
```

DATAR will give the following output:

A raw output showing: number of Active Terminals, all response times, and a two-word debugging output for each response.

A histogram which slots all response times and calculates a mean and standard deviation. The cumulative probability column gives the probability that response time will be less than a given number of seconds. If cumulative probability is .4891 and the interval is 10.5-11.0, 48.9% of all response times were less than 11.0 seconds.

The following deck will give a more detailed report of the simulation:

```
JOB3,CM60000,T7777,MT2.
REQUEST,TAPE0,HI. STIMULATOR OUTPUT TAPE
REWIND(TAPE0)
COPYBF(TAPE0,TAPE2)
SORT.
REQUEST,TAPE3,HI. STIMULATOR INPUT TAPE
REWIND,TAPE1,TAPE3.
LEE(LC=7777)
7/8/9
6/7/8/9
```

LEE will give a detailed report of the activity for each terminal. For each command, the response received will be shown as well as the response time in seconds and milli-seconds.

D.3.8 Miscellaneous Information:

Normally, the STIMULATOR will shrink its field length to the minimum required. If it is necessary to simulate a machine with less CM than is actually available (e.g., 49K), the CM on the STIMULATOR Job card can be set accordingly and FL reduction can be prevented by the following modification:

```
*IDENT,FIXCORE
*DELETE,VSM.335
*DELETE,VSM.358
*COMPILE,VSM
```
The operator can examine the data captured by the STIMULATOR by displaying the output tape buffer and the TTY output pots. Suppose the STIMULATOR is running at JDT 20:

Type: \texttt{C = 20}

Cycle display until the FET for TAPEO is found (about 350) FIRST will be about 2040, type: \texttt{C4,2040} for beginning display of TAPEO buffer.

The display can be cycled until OUTPUT pots are found. The OUTPUT pots are two 8-word buffers per TTY that give an up-to-date account of the data being received by each terminal. They are located near 3000 relative to RA.

\textbf{D.3.9 Type time:} the release version of the STIMULATOR has a built in type time of 0 seconds. To change the type time, the following modification should be made to \texttt{1VG}:

\begin{verbatim}
*IDENT,TYPET
*DELETE,THHR,1
ADN x (x is the type time in octal seconds; must be \leq 77)
*COMPILE,1VG
\end{verbatim}

\textbf{D.3.10 Changes to INTERCOM:}

At times, changes should be made to INTERCOM depending on the type of simulation.

When more than 30 terminals are running, the EDITOR buffers should be increased appropriately. Refer to the INTERCOM \texttt{V4.1} section of this document for description of EDITOR parameters.

The appropriate version of the INTERCOM driver must be available. The TYPEJ variant with \texttt{IP,N6671 EQU 0 and IP,N6676 EQU 1} is required for a one multiplexer simulation. For other variations, the appropriate version of the driver must be assembled. Refer to the INTERCOM \texttt{V4.1} section for more details.

\textbf{D.3.11 Hardware Resources needed by the STIMULATOR:}

If the output is being saved on tape the STIMULATOR requires two dedicated PP's; but only one is required if output is not saved.

A free data channel with no equipment on it is required for communication between the STIMULATOR and the INTERCOM drivers. Equipment 0 is used for the first multiplexer and 1 for the second.

The STIMULATOR uses one control point; the field length depends on the length of the input tape and the number of simulated terminals. (Approximately 15K (octal) for a typical run consisting of one mux and an input tape consisting of 64 sessions, 30 lines per session.)
E. CONVPF Utility

The CONVPF utility allows the conversion of SCOPE permanent files between SCOPE 3.3 and SCOPE 3.4:

When the conversion is from SCOPE 3.3 to SCOPE 3.4 CONVPF execution is the last operation performed under the running SCOPE 3.3 system before a system load of SCOPE 3.4.

When the conversion is from SCOPE 3.4 to SCOPE 3.3, CONVPF execution is the last operation performed under the running SCOPE 3.4 system before a system load of SCOPE 3.3.

Procedures for using the CONVPF utility: Ensure that RBR descriptions of the PFD and PF devices are identical in both SCOPE 3.3 and SCOPE 3.4 system; correspondence of RBR ordinals for these devices must be the same in number and name. The best procedure is to construct the RBR table in the respective CMRs identically; however, the objective can be achieved by careful reconfiguration at deadstart time. If the RBR correspondence is not assured, several error diagnostics from deadstart could be displayed, such as, RB CONFLICT.

CONVPF requires a comparable interface relationship in both the SCOPE 3.3 and SCOPE 3.4 environments. The following PSRs must be installed to ensure that CONVPF will function as intended in both environments. Ensure the following PSRs are installed:

**SCOPE 3.3:**

SC31474 (PSR summary 322) 6PC only removes FNT for FNTs with APF ordinal of 7777B. Routines affected: EFF, 6PC.

SC31485 (PSR summary 324) Stack processor does not read ahead if the exact bit is set on a PP read. Routines affected: ISP, PPC, PFA, PFR, LPF.

SC31486 (PSR summary 326) IRCP does not recognize RBT word pairs not being split across PRUs of RHTC. Routine affected: IRCP.

**SCOPE 3.4:**

SC40036 (PSR summary 324) IRCP doubles the values of the EOI PRU in the RBT chain of the PFD when permanent files are recovered after a TRANSPF of the permanent file tables. Routine affected: IRCP.

SC40039 (PSR summary 324) IOP modified to not issue INDEX BUFFER NOT SPECIFIED message to the B-display. Routine affected: IOP.

SC40040 (PSR summary 324) PFD is modified to support CONVPF. Routine affected: PFD.
Execution of the CONVPF utility -SCOPE 3.3

Step 1. EDITLIB routines CONVPF, PFD

CONVPF, a FORTRAN Program and its partner PP program, PFD, will not be a part of the standard SCOPE 3.3 system. Therefore, EDITLIB should be used. The following job setup, to be run under 3.3, is suggested:

Job card.
REQUEST(OLDPL,HI,E) MOUNT SCOPE 3.4 CONVERSION AIDS PL SKIPF(OLDPL, 10, 17)
COPYBF(OLDPL, PL)
UNLOAD(OLDPL)
UPDATE(Q, P=PL)
FTN(I=COMPILE, S=SCPTEXT, OPT=1, L=0) COMPILE CONVPF
REWIND(LGO)
LOAD(LGO)
NOGO.
REWIND(AIDES)
REQUEST(OLDPL, HY, E) REQUEST SCOPE 3.4 PL
UPDATE(Q, X)
COMPASS(I=COMPILE, S=SCPTEXT, L=0, B=BIN)
REWIND(BIN)
EDITLIB.
7/8/9
*COMPILE CONVPF
7/8/9
*COMPILE PFD
7/8/9
READY(SYSTEM)
RPADD(CONVPF, AIDES, DS)
RPADD(PFD, BIN, DS)
COMPLETE.
6/7/8/9
Step 2. Idle running system.

Step 3. Type in n.X CONVPF.

Step 4. Communicate with CONVPF utility.

Dialogue:

CONVPF: NUMBER (OCTAL) OF SUBDIRECTORIES IN 3.4 - GO OR CFO

OPERATOR: n.GO.

A GO. response will result in the same number of subdirectories as SCOPE 3.3 is using. (Note: In SCOPE 3.3, the number of subdirectories in CMR includes subdirectory zero; however, in SCOPE 3.4, subdirectory zero does not exist. Therefore, on a GO. response, the SCOPE 3.3 CMR value for the number of subdirectories will be decremented by 1 and used as the number of subdirectories for the target SCOPE 3.4 system.) Or,

OPERATOR: n.CFO m.

The value m should be the value of N.SD in the SCOPE 3.4 CMR that will be used.

CONVPF: mB SUBDIRECTORIES - GO OR DROP

CONVPF will echo the value that will be used.

OPERATOR: n.GO.

The operator believes CONVPF to have the correct value. Or,

OPERATOR: n.DROP.

The operator believes his response was incorrect.

CONVPF: NUMBER (OCTAL) OF ENTRIES PER SUBDIRECTORY IN SCOPE 3.4

- GO or CFO

OPERATOR: n.GO.

The SCOPE 3.3 CMR value for N.ESD will be used in the construction of the SCOPE 3.4 PFD. Or,

OPERATOR: n.CFO m.

The value m should be the value of N.ESD in the SCOPE 3.4 CMR that will be used.

CONVPF: mB ENTRIES PER SUBDIRECTORY - GO OR DROP

OPERATOR: n.GO.

Correct value. Or,

OPERATOR: n.DROP.

CONVPF: NUMBER (OCTAL) OF PRUS/20B IN 3.4 RBTC-GO OR CFO

OPERATOR: n.GO.

The SCOPE 3.3 CMR value for N.RBTC will be used for the SCOPE 3.4 RBTC. Or,

OPERATOR: n.CFO m.

The value m will be used for the value of N.RBTC in SCOPE 3.4. This is the only value which need not be identical to the respective value specified in the SCOPE 3.4 CMR.

CONVPF: mB PRUS/20B IN RBTC-GO OR DROP

OPERATOR: n.GO. Or,

OPERATOR: n.DROP.
CONVPF: CONVPF FIELD LENGTH (OCTAL THOUSANDS), DEFAULT IS 50B
-Go OR CFO
OPERATOR: n.GO.
50000B will be used as field length. Or,
OPERATOR: n.CFO m.
m thousand will be the field length used; the larger the field
length that is used the faster the routine will execute.

CONVPF: m 000B FIELD LENGTH -Go OR DROP
OPERATOR: n.GO. Or,
OPERATOR: n.DROP.

CONVPF: PF DUMP OR CONVPF REQUEST -Go OR DROP
OPERATOR: n.GO. Or,
OPERATOR: n.DROP.
At this point CONVPF is requesting permission to read PFD.

CONVPF: PF DUMP OR CONVPF REQUEST -Go OR DROP
OPERATOR: n.GO. Or,
OPERATOR: n.DROP.
At this point CONVPF is requesting permission to read RBTC.

CONVPF: PF DUMP OR CONVPF REQUEST -Go OR DROP
OPERATOR: n.GO. Or,
OPERATOR: n.DROP.
At this point CONVPF is requesting permission to read PFD device
label.

CONVPF: REWRITING PFD DEVICE LABEL -Go OR DROP
OPERATOR: n.GO. Or,
OPERATOR: n.DROP.
At this point CONVPF is requesting permission to rewrite PFD
device label. A Go. response will prohibit any further
permanent file activity under SCOPE 3.3.

This message informs operator of how he is to do a normal
deadstart of SCOPE 3.4.

WARNING:

CONVPF will not stop flashing a question until a valid response is
entered.

CONVPF can be called only through DIS or by the operator.

CONVPF can be dropped and restarted anytime before the the label is
rewritten.

Execution of the CONVPF utility - SCOPE 3.4

Step 1. Idle running system.

Step 2. Type in n.X CONVPF.

Step 3. Communicate with CONVPF utility as in SCOPE 3.3.
EXCEPTIONS: A .GO. response should be made to the question of how many subdirectories in SCOPE 3.3 only if the CMR value of N.SD in 3.3 is one greater than the CMR value of N.SD in SCOPE 3.4.

The last message by CONVPF is the following:


SCOPE 3.4 CONVPF messages in order of occurrence:

1. NUMBER (OCTAL) OF SUBDIRECTORIES IN 3.4 - GO OR CFO
2. mB SUBDIRECTORIES - GO OR DROP
3. NUMBER (OCTAL) OF ENTRIES PER SUBDIRECTORY IN SCOPE 3.4 - GO OR CFO
4. mS ENTRIES PER SUBDIRECTORY - GO OR DROP
5. NUMBER (OCTAL) OF PRUS/20B IN 3.4 RBTC - GO OR CFO
6. mB PRUS/20B IN RBTC - GO OR DROP
7. CONVPF FIELD LENGTH (OCTAL THOUSANDS), DEFAULT 50B - GO OR CFO
8. m000 FIELD LENGTH - GO OR DROP
9. PFPDUMP OR CONVPF REQUEST - GO OR DROP
10. PFPDUMP OR CONVPF REQUEST - GO OR DROP
11. PFPDUMP OR CONVPF REQUEST - GO OR DROP
12. REWRITING PFD DEVICE LABEL - GO OR DROP

WARNING:

Permanent file names are qualified by the ID in SCOPE 3.4 but not in SCOPE 3.3; therefore, duplicate permanent file names could exist after a SCOPE 3.4 to SCOPE 3.3 permanent file conversion. Some files could become inaccessible under SCOPE 3.3.

Cycle numbers can be no larger than 999D in SCOPE 3.4; however, SCOPE 3.3 only supports cycle numbers less than 64. Therefore, Permanent files with cycle numbers greater than 63 could not be used in SCOPE 3.3.

Archived permanent files are not supported under SCOPE 3.3; therefore, under SCOPE 3.3 converted SCOPE 3.4 archived files will appear as vacuous files.

A conversion of SCOPE 3.4 permanent files to SCOPE 3.3 permanent file will result in the format of the permanent file tables introduced by PSR SC31480 published in PSR summary 324. This format is compatible with a SCOPE 3.3 system without SC31480 installed.

The first conversion of SCOPE 3.4 to SCOPE 3.3 always will increase the size of RBTC entries as compared to the size of SCOPE 3.3 RBTC entries that were not created as a result of a PF conversion. The amount of space used in the RBTC table may or may not increase over the original SCOPE 3.3 system.

If the Permanent file ID hashing scheme has been modified in SCOPE 3.4, the routine HSH must also be modified appropriately.

During SCOPE 3.3 normal deadstart process after a successful CONVPF execution on SCOPE 3.4, the following message may be issued to the display for the non-PFD devices:

CHECKSUM ERROR ON LABEL - RB nnnn

The correct operator response is NEW.
CONVPF ERROR MESSAGES AND RECOMMENDED OPERATOR ACTION

INSUFFICIENT FL AT 1031

WRITE ERROR AT nnnn
where nnnn is statement number

READ ERROR AT nnnn
where nnnn is statement number

PFD DEVICE OVERFLOW AT 143

END-OF-RECORD IN SUBDIRECTORY FILE

PARTIAL ENTRY IN SUBDIRECTORY

PFD OVERFLOW AT 11 TP33
PFD OVERFLOW AT 11 TP34

BAD 1ST RBT ORD AT 51 TP33
BAD 1ST RBT ORD AT 41 TP34

BAD RBT ORD AT 55 TP33
BAD RBT ORD AT 42 TP34

RBTC OVERFLOW AT 59 TP33
RBTC OVERFLOW AT 50 TP34
RBTC OVERFLOW AT 108 TR34
RBTC OVERFLOW AT 51 WRA

Rerun CONVPF with larger field length specified.

Dump CONVPF field length and call system analyst. Dump high and low core of CM also.

Same as above.

Release disk space on PFD device and rerun CONVPF i.e. do DUMPF(MO=2) on PFD device.

Dump high and low core in CM. Dump CONVPF field length and call system analyst.

Same as above.

PFD specification for target CMR is too small. Consult system analyst.

Same as above.

Same as above.

Rerun CONVPF with larger RBTC size specified.
RELEASE DESCRIPTION

FORTRAN Extended Version 4.0 provides many new capabilities. It operates under the SCOPE 3.4 operating system and requires the same minimum hardware configuration as SCOPE.

RELEASE MATERIALS

FORTRAN Extended 4.0 is released on two reels of tape: PL7 contains the FORTRAN Extended 4.0 compiler; PL8 contains the FTN 4.0 object library. This object library is used also by 7000 SCOPE 2.0, FORTRAN Extended 2.0, and RUN FORTRAN 2.0 programs.

MODIFICATIONS

Major improvements include the following:

1. IMPLICIT Statement

   IMPLICIT type1(range1),type2(range2),...,typen(rangen)

      type    LOGICAL, INTEGER, REAL, COMPLEX, DOUBLE PRECISION

      range   r1,r2,...,rm

      ri      letter or letter-letter

2. LEVEL Statement

   LEVEL n, list

   n      6000           7000
   1      Central Memory  SCM
   2      Central Memory  LCM (Direct Access)
   3      ECS (Block Copy) LCM (Block Copy)

   List    List of variable/array names separated by commas

3. Quote Delimited Strings

   Version 4.0 extends the usage of the quote delimited string to any context where a Hollerith expression is allowed.
4. Expressions in Output Lists

Items which may occur in an output list have been expanded to permit Hollerith strings as well as any expression.

PRINT 23,#X=#,Y*Y+Z*Z

5. STORES Statement Extension

C$ STORES(variable1,operator,variable2)

6. Syntax Scan only Compiler Mode

FTN(Q), the program is scanned for syntax errors, and a reference map is produced.

7. Line Limit on Output File

OUTPUT file line control is provided by PL option on the control card.

FTN(R=3,OPT=2,PL=1000)

Also may be specified at object time.

LGO(PL=7000)

8. Multiple Systems Texts

Multiple systems texts may be specified on the FTN control card as:

FTN(S=IOTEXT,S=NUCLEUS/FTNMAC)

9. System Text Specification from a File

System texts may be specified on the FTN control card to be loaded from a local binary file as:

FTN(GT=MYTEXT,GT=TXTEXT/NEWTXT)

10. Exclusive OR Function

A=XR(STRING,MASK)

11. Reference Map with Suppressed Program Listing

Any of the reference map options may be selected with the program listing suppressed, for example:

FTN(L=0,R=3)

12. Mass Storage Rewrite in Place

User may rewrite in place rather than at end-of-information.
13. Messages on STOP and PAUSE Statements

STOP  PAUSE
STOP n  PAUSE n
STOP#string#  PAUSE#string#

n octal number (up to five characters), #string# up to 70-character message

14. External text (XTEXT) Specification

An external text may be specified on the FTN control card as:

FTN (XT=TXNAME)

15. MOVLEV Library Subroutine

CALL MOVLEV (from, to, n)

n=number of words

16. Integer Multiply Installation Option

CORRECTIONS

All eligible Programming System Report corrective code through Summary 312 is incorporated in the release program libraries.

LIMITATIONS

When the debugging compilation mode (control card parameter D) and the full cross reference features (R=2 or R=3) are used, more core may be required for compilation than otherwise. Detailed information is contained in the FORTRAN Extended Version 4.0 Reference Manual.

The intrinsic function SHIFT will not accept double word arguments (double precision or complex words).

FORTRAN Extended is designed to produce efficient object code. The rate of compilation tends to be higher on program units which avoid lengthy sequences of complicated arithmetic replacement statements (such as contiguous statements with no branching entries or exits). However, lengthy sequences tend to produce faster object code.

Code produced under the 6400 compiler option may not work properly on a 6600 because of optimization considerations. The compiler option to produce code for a 6600 produces binaries that can be run on either a 6400 or a 6600.

When the FTN control statement specifies either the C or E option, the compiler generates the object program in COMPASS source language form, rather than binary machine language. Since a local library set cannot be specified in a COMPASS source program, the user must place either the SCOPE control statement LIBRARY(FORTRAN,SYSIO) or the loader directive LDSET(LIB=FORTAN/SYSIO) at appropriate points in the control card section of the job deck.
Under FTN 3.0 unformatted read and write statements processed S type records. Under FTN 4.0, W type records are the default style. Files of this type produced under 3.0 can be processed in the SCOPE 3.4 environment by using FILE and LDSET control cards to define the record type at object time.

Binary blocked and/or random indexed files created under FTN 3.0 cannot be handled directly by FTN 4.0: they must be converted to a file structure accepted by FTN 4.0 through use of the Conversion Aid utilities BBTO6RM and/or RANCONV.
INSTALLATION PARAMETERS

The amount of core needed to compile jobs can be altered by modifying the size of compiler tables and scratch file buffers. Parameters which modify table sizes are included in the options listed at the end of this section. File buffer sizes can be changed by modifying the controlling routine FTN. FTN is the main overlay of the compiler (level 0,0).

System compatibility parameters provide the following features. At the time of release, these parameters are set as listed below: UPDATE sequence numbers for all installation parameters may be determined by listing the OPTIONS portion of routine FTNTEXT and listing the routine FTN from release tape PL7.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Names</th>
<th>Release Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>CCACT</td>
<td>Abort job on FTN control card error</td>
<td>Abort</td>
</tr>
<tr>
<td>CTIMO</td>
<td>Compiler message issued to control point dayfile (CPU seconds necessary for compilation)</td>
<td>Time message sent</td>
</tr>
<tr>
<td>LMAX</td>
<td>Lines per page listing limit (not applicable to intermixed COMPASS programs)</td>
<td>57</td>
</tr>
</tbody>
</table>

File names used by compiler:

- INPUT: Source input
- OUTPUT: Compiler listing
- LGO: Relocatable object code
- COMPS: COMPASS card images
- ZZZZZRL: Intermediate language
- ZZZZZRM: Reference map
- ZZZZZOP: OPT=2 and D mode scratch
If the following control card options are not specified, the default settings at the time of release are as shown:

<table>
<thead>
<tr>
<th>Control Card Option</th>
<th>Usage</th>
<th>Release Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Abort to EXIT(S) card if fatal compilation error occurs</td>
<td>No abort</td>
</tr>
<tr>
<td>B</td>
<td>Produce object code file</td>
<td>Produces object code on standard file (LGC)</td>
</tr>
<tr>
<td>C</td>
<td>Use COMPASS assembler for compiler generated code. If C is not selected, the FORTRAN assembler is used. (FORTRAN assembler saves about 60% of CPU time compared with COMPASS assembler.)</td>
<td>C is not set</td>
</tr>
<tr>
<td>D</td>
<td>Debug mode of compilation</td>
<td>No debug mode</td>
</tr>
<tr>
<td>E</td>
<td>Format file for editing (COMPASS card image file is produced with *DECK cards for each program unit, suitable as input for UPDATE)</td>
<td>No file for editing</td>
</tr>
<tr>
<td>G</td>
<td>Compile and go option</td>
<td>No compile and go</td>
</tr>
<tr>
<td>I = lfn</td>
<td>Select compiler input file</td>
<td>lfn = INPUT</td>
</tr>
<tr>
<td></td>
<td>I Not Specified</td>
<td>lfn = COMPIL</td>
</tr>
<tr>
<td></td>
<td>I Specified without lfn</td>
<td></td>
</tr>
<tr>
<td>list = lfn</td>
<td>Select compiler listing file and listing options as follows:</td>
<td>lfn=OUTPUT</td>
</tr>
<tr>
<td></td>
<td>L List source code</td>
<td>list=L</td>
</tr>
<tr>
<td></td>
<td>O List COMPASS card images</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X List ANSI violation diagnostics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N Suppress informative diagnostics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>R (equivalent to long reference map option R=2)</td>
<td></td>
</tr>
</tbody>
</table>

The R option may be used as a stand alone option of the form R = n if a reference level other than the default is required. The values for n select the following reference map options:

0 no reference map
1 short reference map
2 full cross reference map
3 full cross reference map plus common and equivalence information
<table>
<thead>
<tr>
<th>Control Card Option</th>
<th>Usage</th>
<th>Release Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPT=level</td>
<td>Select level of optimization:</td>
<td>OPT=1</td>
</tr>
<tr>
<td></td>
<td>0 Lowest optimization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Slightly above FORTRAN Extended 2.0 optimization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Program unit flow analysis used in optimization</td>
<td></td>
</tr>
<tr>
<td>Q</td>
<td>Program verification option</td>
<td>Q is not set</td>
</tr>
<tr>
<td>Round=s</td>
<td>s = */+- Select 1-4 of these operators to round arithmetic</td>
<td>No rounding</td>
</tr>
<tr>
<td>SYSEDIT=ss</td>
<td>This feature is intended for system programmer usage:</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>ss=FILES Form execution time input/output unit references through indirect search of low core table rather than by using entry points and external references.</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>Maximum error checking in mathematical library routines (basic external functions)</td>
<td>No error checking</td>
</tr>
<tr>
<td>V</td>
<td>Selects minimal input/output buffer allocation (513 words per buffer) for compiler buffers during compilation. This may increase compile time but will allow jobs with a large number of declarative statements to compile in smaller field length than would be possible otherwise.</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>Specifies system text files (global library set) to be used for intermixed COMPASS programs.</td>
<td>SYSTEXT</td>
</tr>
<tr>
<td>GT</td>
<td>Specifies system text files (sequential binary file) to be used for intermixed COMPASS programs.</td>
<td>SYSTEXT</td>
</tr>
<tr>
<td>Z</td>
<td>Forces all subroutine calls with no parameters to pass a parameter list consisting of a zero word.</td>
<td>None</td>
</tr>
<tr>
<td>PL</td>
<td>Selects maximum number of allowable records on the OUTPUT file.</td>
<td>5000</td>
</tr>
<tr>
<td>XT</td>
<td>Specifies external text (XTEXT) to be used for intermixed COMPASS programs.</td>
<td>OLDPL</td>
</tr>
<tr>
<td></td>
<td>XT specified without lfn</td>
<td>CPI</td>
</tr>
</tbody>
</table>

A listing of the Options portion of FTN follows:
OPTIONS - FORTRAN EXTENDED INSTALLATION PARAMETERS.

The parameters defined in this deck determine the specific configuration of the FORTRAN extended compiler. When installing the compiler, parameters should be revised as necessary to describe the installation's exact hardware configuration and specific functional requirements.

Additional installation function parameters will be found in the program deck <FTN>.

*******************************************************************************

INSTALLATION WARNING NOTICE

An asterisked box similar to this encloses each parameter that is intended to be changed when installing the FORTRAN extended compiler.

No other parameter in the *OPTIONS* deck should be changed.

Control Data Corporation accepts no responsibility for satisfactory performance of the FORTRAN extended compiler if this notice is disregarded.

*******************************************************************************

*** PROCESSOR NAME AND VERSION NUMBER

LPNAME  MICRO 1,7,8/FTN / LANGUAGE PROCESSOR NAME
VER  MICRO 1,3,4,0/
*** CENTRAL PROCESSOR MODEL / SERIES DECLARATIONS.

TO INSTALL FORTRAN EXTENDED ON A CYBER 70/ MODEL XX
* PROCESSOR, SET THE FOLLOWING SYMBOL TO THE APPRO-
* PRISE MODEL NUMBER, AND DELETE THE SUBSEQUENT
* SYMOL [ MACHINE ].

CYBERMD EQU 748 CYBER 70/ MODEL NUMBER
* REFERENCES -- FAX, FTN, FTNMAC, OPTB, RFFMAP.

TO INSTALL FORTRAN EXTENDED ON A 6X00 / 7X00
* PROCESSOR, SET THE FOLLOWING SYMBOL TO THE APPRO-
* PRISE SERIES NUMBER, AND DELETE THE PRECEDING
* SYMOL [ CYBERMD ].

MACHINE EQU 6600B 6X00 / 7X00 SERIES NUMBER
* REFERENCES -- FAX, FTN, FTNMAC, OPTB, RFFMAP.

C IF DEF, CYBERMD
IFLT CYBERMD, 748, 2
6600 MACHINE, EQU 6600B
S SKIP
S ENDF
*I [MACHINE.] REFERENCES -- FAX, FTN, FTNMAC, OPTB, RFFMAP.
6600 MACHINE EQU MACHINE, FORMER NAME OF SYMBOL
TARGET OCTMIC MACHINE.
""""""""
** DEFINE #MODEL# MICRO.
MODEL OCTMIC CYBERMD
* [#MODEL#] REFERENCES -- FTA, FTNTEXT.
 ott 6.0 OVERLAY, INITIALIZATION AND I/O CONTROL

** EARLY MODEL 6600 PARAMETER (STORE OUT OF ORDER). **

WHEN THE TARGET, I.E., OBJECT TIME, CPU IS A 6600

CLASS A, B OR C MACHINE, SERIAL NUMBER 1-1-47, THAT

LACKS FC0 20436, SET THE FOLLOWING PARAMETER TO ZERO.

(FC0 20436 RESOLVE A STORE OUT OF ORDER PROBLEM.)

1 STORE600 EQU 1

1 REFERENCES -- OPT9.

** HARDWARE INTEGER MULTIPLY FEATURE. VALUES ARE -- **

1 = INTEGER MULTIPLY INSTALLED.

0 = INTEGER MULTIPLY NOT INSTALLED.

0 OPTIMUL EQU 0

1 REFERENCES -- FINTEXT.

1 OBJSIMUL EQU 0

1 REFERENCES -- ARITH, DOPRE, MACROX, MACRS.

** 70M (DATA MANAGER) APPLICABILITY. DENOTES WHETHER OR NOT 70M **

WILL BE USED, BASED ON THE PROCESSOR MODEL. SINCE THE SYMBOL

IS MORE CONVENIENT IN A NEGATIVE SENSE, IT IS DEFINED AS --

1 70M DOES NOT APPLY (MODEL 7+ OR LOWER / 6X00 SERIES).

0 70M APPLIES (MODEL 75 OR HIGHER / 7X00 SERIES).

1 NEDM EQU 1

**
*                        ******************************************************************* F600250 154
* *  FILE CONTAINING CCPASS RANDOM FL WITH /COMPCOM/.* * F600250 151
* *  * F600250 152
PLCMPS MICRO 1,, COMPCOM F600250  1
* *  * F600250 174
*                        ******************************************************************* F600250 173

PLRM IFNE OPEM*NEQM,0 F600250 177
PLRM ENDIF F600250 153

*                        ******************************************************************* F600250 187
* *  * CHARACTER APPENDIX TO FILE NAMES FOR UNIQUENESS.* * F600250 188
* *  * F600250 189
C MICRO 1,,/E/ F600250 191
* *  * REFERENCES -- BUGCRL,DBGFLG,FTAMAG,LISTIO,PHCITL.* F600250 192
*                        ******************************************************************* F600250 194
FTN - G.0 OVERLAY, INITIALIZATION AND I/O CONTROL
OPTION S - FORTRAN EXT INSTALLATION PARAMETERS

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * FIXED LENGTH TABLES. *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* * LENGTH OF INTERMEDIATE STORAGE AREA FOR ALL CON-
* * STANTS IN ANY ONE SOURCE STATEMENT. EACH CONSTANT *
* * BEGINS ON A NEW WORD BOUNDARY, AND IS PACKED AS TEN *
* * DISPLAY-CODED CHARACTERS PER WORD. *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

484 CONSTORS EQU 300D
* REFERENCES -- SCANNER.
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

240 MXOSE EQU 160D
* REFERENCES -- ARITH.
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

132 MXFRSTE EQU 90D
* REFERENCES -- ARITH.
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

3200 ARLSZ EQU 3200B
* REFERENCES -- FSICIL.
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
* SELECT DIVISION BY RECIPROCAL MULTIPLICATION. *
* WHEN THE FOLLOWING PARAMETER IS ZERO, <ARITH> WILL *
* ATTEMPT TO REPLACE X/C BY X*(1/C), WHERE (X) IS AN *
* EXPRESSION AND (C) IS A CONSTANT (REDUCTION IN *
* STRENGTH). SET NON-ZERO TO DEFEAT THE FEATURE. *
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

0 NOINVERT EQU 0
* REFERENCES -- ARITH.
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
**Initialization and I/O Control Options**

<table>
<thead>
<tr>
<th>Field</th>
<th>Options Selected</th>
<th>Not Selected</th>
<th>File</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC.A MICRO 1, 0</td>
<td>A 1</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>CC.G MICRO 1, 0</td>
<td>G -1</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>CC.F MICRO 1, 0</td>
<td>C -1</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>CC.D MICRO 0</td>
<td>D NA</td>
<td>0</td>
<td>LFN</td>
</tr>
<tr>
<td>CC.E MICRO 1, 0</td>
<td>E -1</td>
<td>0</td>
<td>LFN</td>
</tr>
<tr>
<td>CC.G MICRO 1, 0</td>
<td>GT=LFN ALWAYS</td>
<td>NA</td>
<td>LFN</td>
</tr>
<tr>
<td>CC.E MICRO 1, 0</td>
<td>I=LFN ALWAYS</td>
<td>NA</td>
<td>LFN</td>
</tr>
<tr>
<td>CC.PL MICRO 1, 0</td>
<td>PL=N 5000</td>
<td>5000</td>
<td>NA</td>
</tr>
<tr>
<td>CC.G MICRO 1, 0</td>
<td>G -1</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>CC.R MICRO 1, 0</td>
<td>R=0,1,2,CR 3</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>CC.S MICRO 1, 0</td>
<td>SYSTEXTS=LFN</td>
<td>NA</td>
<td>LFN</td>
</tr>
<tr>
<td>CC.T MICRO 1, 0</td>
<td>T -1</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>CC.XT MICRO 1, 0</td>
<td>XT</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>CC.OPT MICRO 1, 0</td>
<td>CPT=0,1,2,4</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>CC.Round MICRO 1, 0</td>
<td>0ES37 ROUND=10 FOR</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>CC.IOE MICRO 1, 0</td>
<td>SYSECT=IDENT</td>
<td>0</td>
<td>NA</td>
</tr>
<tr>
<td>CC.FILES MICRO 1, 0</td>
<td>SYSECT=FILES</td>
<td>0</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Initialization and I/O Control Options**

<table>
<thead>
<tr>
<th>Field</th>
<th>Options Selected</th>
<th>Not Selected</th>
<th>File</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFG EQ major</td>
<td>#CG.OPT# / 0, 1</td>
<td>0</td>
<td>NA</td>
</tr>
</tbody>
</table>
*** ASSEMBLY OPTIONS

**

**

eq

de

** LOCAL ASSEMBLY OPTIONS REFERENCED ONLY IN #TH#

* CGBT EQU 1 SET TO NON ZERO VALUE FOR ABOCT CH

* EM IFNE OPERM,0 CONTROL CARD ERRORS

* EM ENDF

71 LMAX EQU 570 LINES / PAGE

1 PSR MICRO 1,4/,F213/ FSR LEVEL OF THE COMPILER

1 CTIMO EQU 1 =0 NO MESSAGE

* =1 ISSUE DAYTIME MESSAGE FOR CPU

* PSR MICRO 1,4/,F310/ FSR LEVEL TITLE 1

CDC6466 OCTMIC MACHINE.

* MACHINE THAT CODE IS GENERATED FCR

1 K MICRO 1,,/059/ *1000B

1 TV MICRO 1,,/*1/2* TRIGGER VALUE

1 TVS EQU 1 LOG2(1/TV) FIN 86

**

MIN,FL,MIN,DFL = MINIMUM FIELD LENGTH TO EXECUTE IN.

MIN,FL = MAX(LWA LOAD)+406+100B ROUNDED UP TO NEXT 1006

WHERE1

MAX(LWA LOAD) = LAST WORD ADDR OF THE OVERLAY LOADS

406B IS FOR MINIMUM LIST AND COMPS BLIFERS

1000B IS FOR WORKING STORAGE.

CURRENTLY PASS 1 ( THE 1,1 OVERLAY ) IS THE LARGEST

FOR FL > MIN,FL+5K STANDARD SIZE BUFFERS (L,RLST,L,COMP)

ARE ALLOCATED FOR RLST AND COMPS.

42000 MIN,FL EQU $2K*TEST*2000B MINIMUM FL FOR EXECUTION

61000 MIN,DFL EQU MIN,DFL+17K2 MINIMUM FL IF D OPTION SELECTED

MIN,FL OCTMIC MIN,FL

MIN,FL MICRO 1,2/,#/MIN,FL#/ MINIMUM FL IF D OPTION SELECTED

MIN,DFL OCTMIC MIN,DFL

MIN,DFL MICRO 1,2/,#/MIN,DFL#/ DEFAULT FILE NAMES

* DEFAULT FILE NAMES
INPUT
MICRO 1, $INPUT$

OUTPUT
MICRO 1, $OUTPUT$

LGO
MICRO 1, $LGO$

COMP
MICRO 1, $COMP$

RLIST
MICRO 1, $IIZIZI$

RMAP
MICRO 1, $IIIZI$

OPT
MICRO 1, $IIIZI$

IFNE TEST, 0, 3

BUFL
MICRO 1, 10020 MINIMUM BUFFER SIZE

RMI

L.INPUT EQU IBUFL
L.OUTPUT EQU OBUL

1002 L.COMPS EQU #BUFL# COMPASS SOURCE IMAGE BUFFER LENGTH
0423 L.LGO EQU #BUFL#2 BINARY OUTPUT BUFFER LENGTH
0423 L.OPT EQU #BUFL#2 MAX OPT (OPT=2) SCRATCH FILE BUFFER LENGTH
0423 L.RLIST EQU #BUFL#2 INTERMEDIATE CODE SCRATCH FILE
0423 L.RMAP EQU #BUFL# LONG REFERENCE MAP (R=3) BUFFER LENGTH

* THE LENGTHS OF THE $INPUT$ AND $LGO$ BUFFERS MUST BE
* 10000 SINCE THEY MAY BE ON TAPE.

3 NOPTVL EQU 3 NUMBER OF LEVELS OF OPTIMIZATION
COMPILER PROGRAM LIBRARY STRUCTURE

When a full update is performed on PL7, eight records are produced on the compile file as follows:

<table>
<thead>
<tr>
<th>Contents</th>
<th>Deck Names Needed to Compile</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. FTNMAC</td>
<td>FTNMAC</td>
</tr>
<tr>
<td>2. FTNTEXT</td>
<td>FTNTEXT</td>
</tr>
<tr>
<td>3. Controller</td>
<td>FTN</td>
</tr>
<tr>
<td></td>
<td>LSTPRO.SNAP</td>
</tr>
<tr>
<td>Pass 1--normal</td>
<td>PS1CTL.PH1CTL</td>
</tr>
<tr>
<td>Pass 2</td>
<td>CLOSE2.MACROX</td>
</tr>
<tr>
<td></td>
<td>PS2CTL</td>
</tr>
<tr>
<td>4. Pass 1-1/2</td>
<td>PASS15.CHECK</td>
</tr>
<tr>
<td>5. Pass 1--debug</td>
<td>DBGPHCT.SAVREGS</td>
</tr>
<tr>
<td>6. Debug COPYL deck</td>
<td>FORMDBG</td>
</tr>
<tr>
<td>7. RDUMP</td>
<td>MACROR, RDUMP.CP</td>
</tr>
<tr>
<td>8. CMPAR</td>
<td>CMPAR</td>
</tr>
</tbody>
</table>

FTNMAC

This routine is a text collection of the macros necessary to assemble a FTN compiled job using the COMPASS assembler. Assembling the FTNMAC record from the compile file will produce a record suitable for entering the system through EDITLIB. The assembled routine is in system text format and can be used in FTN and COMPASS assemblies through the S parameter specification.

FTNTEXT

This record consists of a collection of macros, micros, and symbol definitions which facilitate the assembly of the FTN version 4.0 compiler. Assembling the FTNTEXT record from the compile file will produce a record in system text format that will be referenced through the GT parameter for compiler assemblies.
(0,0) Overlay (FTN)

This overlay is a batch controller which accomplishes the following:

- Breaks down the parameters on the FTN control card
- Initializes the compiler to reflect compile time options
- Contains basic I/O routines and system communication routines
- Handles COMPASS-FTN communication for intermixed COMPASS language program units

(1,0) Overlay (LSTPRO$)

This overlay holds information necessary for communication between passes of the compiler. It contains the symbol/label table lookup routine (needed by pass 1, pass 1-1/2, and the assembly phase of pass 2); a routine to allow the usage of formatted I/O in the FORTRAN coded routines which are a part of the debug and pass 1-1/2 portions of the compiler; and a snap facility active only when the compiler is in test mode.

(1,1) Overlay (PS1CTL$)

This overlay is the first pass of the compiler under normal mode (when the debug mode is not selected by the D control card option); it handles lexical, syntactical and semantic analysis of a FORTRAN program unit. The FORTRAN program unit is translated through a lexical element language (E-list) to an intermediate language (R-list).

(1,2) Overlay (CLOSE2$)

This overlay is the second pass of the compiler. Using the R-list generated by pass 1, this pass produces COMPASS instructions which are assembled (optionally by the COMPASS assembler at the expense of CPU time) into an object deck.

(1,3) Overlay (PS2CTL)

Overlay 1,3 is loaded only if errors occur in the FORTRAN program. This overlay issues full line error messages for both fatal and informative errors.
(1,5) Overlay (PASS15$)

This overlay is selected optionally (OPT=2 on the FTN control card); it is executed between the normal pass 1 and pass 2. This pass (1-1/2) uses the R-list language generated by pass 1 as input and, utilizing flow analysis, produces a modified R-list file for input to pass 2. This file will reflect the movement of invariant code from frequently executed regions to those less frequently executed and it will allow register allocation over loops.

(1,4) Overlay (PASS14$)

This overlay serves the same purpose as overlay (1,1) with the addition that debug statements will be acted upon as specified by the D option in the FTN control card. On the program library, only the routines unique to the debug mode constitute the fifth record. The sixth record of the compile file constitutes a full overlay (1,4).

Debug COPYL Deck

This deck contains a series of zero length COMPASS routines with identifiers of the (1,1) overlay routines needed to complete the (1,4) overlay. By compiling the fifth and sixth records of the compile file to the same object file, the object file may be used as an OLDLIB file for COPYL with the object file of the (1,1) overlay serving as the replacement file to produce a full (1,4) overlay.

RDUMP

This utility routine is to be used with the test mode of the compiler. For a single program unit, RDUMP will dump the R-list file generated by pass 1 of the compiler. (Since an attempt is made to keep this file completely in core, the V (for very small buffers) option on the control card should be used; it is active in test mode only.)

CMPAR

This routine compares two object records and lists discrepancies by loader table. It is unlikely that a FORTRAN program using the FTN4.0 internal assembler will have the same object representation as when it is handled by the COMPASS assembler (though a load from either of the object routines will produce the same core image in non-BSS storage).
INSTALLATION INSTRUCTIONS

The release tape for the FORTRAN Extended 4.0 compiler, PL7, contains 5 files. File 1 is the compiler program library. Files 2, 3, and 4 contain installation decks; file 5 contains an installation verification program. The decks in files 2 through 5 can be obtained by performing the job:

```
Job card.
REQUEST(PL7,E)
REWIND(PL7)
SKIPF(PL7,1,17)  SKIP PL AND BINARY FILES
COPYBF(PL7,PUNCH,3) INSTALLATION DECKS
COPYBF(PL7,PUNCH,1) VERIFICATION PROGRAM
UNLOAD(PL7)
6/7/8/9
```

The installation decks provide a method for introducing the FORTRAN Extended 4.0 compiler into a SCOPE 3.4 system. The first job (CINSTAL) updates the program library, producing a new program library tape including supplemental binary files. Deck CINSTAL requires access to the COMPASS program library to acquire the common deck COMPCOM. The second job, CMaint, updates the program library and supplemental binary files producing a new maintenance form tape. Deck CMaint also requires access to the COMPASS program library. CINSTAL should be used only for initial installation; CMaint should be used for subsequent maintenance. Deck FTNC2 must be run following CINSTAL or CMaint but before attempting installation of the object library.

The release tape for the FORTRAN Extended 4.0 object library, PL8, contains three files. File 1 is the FORTRAN object library PL. File 2 contains a maintenance procedure to be used with SCOPE 3.4; file 3 contains deck LIB4. To obtain these decks, perform a job of the type:

```
Job card.
REQUEST(PL8,E)
REWIND(PL8)
SKIPF(PL8,1,17)
COPYBF(PL8,PUNCH,2)
UNLOAD(PL8)
6/7/8/9
```

The installation decks provide a method for updating the program library and generating binary files to be introduced into the system. Deck FTN4LIB is the SCOPE 3.4 procedure to update the program library and generate binaries to be used by FTN Version 4.0 programs. PL8 deck LIB4 must be run following FTN4LIB; upon completion, job SCOPE3 (Section 1) can be run to generate a deadstart tape.

NOTE: The T7000 parameter on the CINSTAL job card must be changed to T20000 if the deck is to be run on a 6200.
INSTALL,CM5000,T7000,MT2.

COMMENT.  THIS JOB UPDATES FORTRAN EXTENDED 4.6 FROM THE RELEASED PL7.

COMMENT.  AN UPDATED PROGRAM LIBRARY, TWO FILES WHICH WILL BE OF USE IN

COMMENT.  MAINTAINING THE COMPLILER, AND A FILE FOR EDITLIBING THE COMPLILER

COMMENT.  INTO A RUNNING SYSTEM WILL BE PRODUCED ON THE TAPE NEWPL7.

COMMENT.

COMMENT.  THE CONTENTS OF THE RELEASED PL7 ARE --

COMMENT.  FILE 1 -- COMPILER PROGRAM LIBRARY

COMMENT.  FILE 2 -- INSTALLATION DECK

COMMENT.  FILE 3 -- MAINTENANCE DECK

COMMENT.  FILE 4 -- EDITLIB DECK FOR THE COMPLILER

COMMENT.  FILE 5 -- VERIFICATION PROGRAM DECK

COMMENT.

COMMENT.  THIS JOB USES THE COMPASS V3.0 PL TO CAPTURE THE COMPASS

COMMENT.  COMPASS DECK COMPFCOM WHICH IS NECESSARY FOR COMPASS/FTN

COMMENT.  INTERFACE.

COMMENT.

REQUEST(PL2,E,HI)            COMPASS PROGRAM LIBRARY
UPDTE(C,F=FL2,N=COMPFCOM,C=O)
UNLDC(FL2)
REQUEST(PL7,E,HI)            RELEASE PL7
REQUEST(NEWFL7,N,HI)         TAPE TO RECEIVE MODIFIED PL
LABEL(NEWFL7,W,L=FTN&POCONF*3P4,D=K)
REWIND(FL7,NEWFL7)
UPDTE(F,F=FL7,N=NEWFL7,R=C)
COFYEF(ECF,NEWFL7)
UNLCAC(FL7)

COMPASS2=CMPFILE,L=LISTFTN,B=FTNMAC,S=O)
COMPASS2=CMPFILE,L=LISTFTN,B=FTNEXE,S=O)
COMPASS2=CMPFILE,L=LISTFTN,B=SYSPRIN,S=IPTEXT,G=FTNEXE)
REWIND(SYSPRIN)
MAFOFF)
LOAD(SYSPRIN)
NMG.
EDITLIB(USER)
RETURN(FTN)

LIBRARY(NEWFTN)
FTNX1=CMPFILE,L=LISTFTN,GT=FTNEXE,S=0,B=SYSOPT,OPT=1)
FTNX1=CMPFILE,L=LISTFTN,GT=FTNEXE,S=0,B=FDEBUG,OPT=1)
FTNX1=CMPFILE,L=LISTFTN,GT=FTNEXE,S=0,B=FDEBUG,OPT=1)
LIBRARY.
REWIND(SYSPRIN,FDEBUG)
COFYEF(FDEBUG,SYSPRIN,SYSDBG)
REWIND(SYSPRIN,SYSDBG,SYSDBG)
RETURN(FDEBUG)

COFYEF(SYSPRIN,SYSDTG)
SKIPF(SYSDTG)
COFYEF(SYSDTG,SYSDTG)
REWIND(SYSDTG)
COFYEF(SYSDTG,NEWPL7)
SKIPF(SYSDTG)
COFYEF(SYSDTG,SYSDTG)
REWIND(SYSDTG)
COFYEF(SYSDTG,SYSDTG)
REWIND(SYSDTG)
MAFOFF)
LOAD(SYSDTG)
NMG.
REWIND(FTNMAC,FTN)

I-9-20 60307400 A
COFYER(FTNMAC,NEWPL7)
COFYBF(FTN,NEWPL7)
UNLCAF(NEWPL7)
REQUEST(LISTAF,E,HI)
REWIN(LISTTN)
COFYF(LISTTN,LISTAPE)
UNLCAF(LISTAPE)
7/6/9 END OF RECORD
# CCMPFCOM
7/8/9 END OF RECORD
** PLACE ANY INSTALLATION MODIFICATIONS AFTER THIS CARD.**
7/8/9 END OF RECORD
LIBRARY(NEWFTN,NEW)
ADG(FTN,FTN,AL=3)
FINISH.
LIBRARY(SYSCVL,NEW)
ADG(LISTRC,NEW,FTNMSG,R,C,FTN)
FINISH.
ENCRUN.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

CMAINT,CM65000,70000,MT2.
COMMENT. THIS JOB UPDATES THE FORTRAN EXTENDED COMPILER AND CREATES
COMMENT. A NEW PL7 WITH PROGRAM LIBRARY AND COMPILER BINARIES.
COMMENT.
COMMENT. THE CONTENTS OF THE NEWPL7 TAPE ARE --
COMMENT. FILE 1 -- FORTRAN COMPILER PROGRAM LIBRARY
COMMENT. FILE 2 -- RELOCATEABLE BINARIES OF THE NON DEBUG OVERLAYS
COMMENT. FILE 3 -- RELOCATEABLE BINARIES OF THE DEBUG OVERLAY
COMMENT. FILE 4 -- FTNMAC AND ABSOLUTE BINARIES OF THE COMPILER
COMMENT.
COMMENT. THIS JOB USES THE COMPASS V3.0 PL TO CAPTURE THE COMPASS
COMMENT. CCOMPN DECK COMPFCOM WHICH IS NECESSARY FOR COMPASS/FTN
COMMENT. INTERFACE.
COMMENT.
REQUEST(FL2,E,HI) COMPASS PL
UPDATE(G,FL2,N=COMPCOM,C=0)
UNLCAF(FL2)
REQUEST(CLCFL7,E,HI) PL TO BE UPDATED
REQUEST(NEWPL7,N,HI) TAPE TO RECEIVE MODIFIED PL
LABEL(NEWPL7,N,FTN,F=COMP*3P4,D=HI)
REWIN(CLCFL7,NEWPL7)
UPDATE(F=CLCFL7,N=NEWPL7,R=C)
COFYF(ECF,NEWPL7)
COFYF(CLCFL7,H,IL)
COMPASS(I=CCMPF,LI=0,SI=0,P=FTNMAC)
COMPASS(I=CCMPF,LI=0,SI=0,P=FTNTEXT)
FTN(I=CCMPF,GT=FTNTEXT,S=IPTEXT,L=0,B=REPLACE,O=OPT=1)
FTN(I=CCMPF,GT=FTNTEXT,S=IPTEXT,L=0,B=REPLACE,O=OPT=1)
FTN(I=CCMPF,GT=FTNTEXT,S=IPTEXT,L=0,B=REPLACE,O=OPT=1)
COFYF(CLCFL7,REPLACE,SYSCOMAIN)
COFYF(CLCFL7,REPLACE,SYSCOMAIN)
UNLCAF(CLCFL7)
REWIN(SYSCOMAIN,SYSCOMAIN)
COFYF(SYSCOMAIN,NEWPL7)
COFYF(SYSCOMAIN,NEWPL7)
001
60307400 A
002
003
004
005
006
007
008
009
010
011
012
013
014
015
016
017
018
019
020
021
022
023
024
025
026
027
028
029
030
031
032
033
034
035
036
I-9-21
REWD(SYSDR3)
COFYF(SYSDR3,SYSDR4)
LOAD(SYSDR4)
NOGO.
REWD(FIN,FINMAC)
COFYF(FINMAC,NEWPL7)
COFYF(FIN,NEWPL7)
UNLOAD(NEWPL7)
7/8/9 END OF RECORD
*C COMFCOM
7/8/9 END OF RECORD
*C FTNMAC,FINTEXT
*/ PLACE ANY COMPILER MODIFICATIONS AFTER THIS CARD.
7/8/9 END OF RECORD
6/7/8/9 ENC OF FILE

FTNC2,CM5000,T7000,MT1.
COMMENT.
COMMENT. THIS JOB EDITLIBS THE FTN COMPILER INTO THE RUNNING SYSTEM
COMMENT. FROM THE TAPE MADE BY DECK CIN STL OR CM AINT
COMMENT.
COMMENT.
LABEL(FTNCOMP,F,LF=FTN4P0000*3P4,D=HI) MOUNT PL7
REWD,FTNCHMF.
SKIF(FNACOMP,3,17)
COFYF(FTNCOMP,FTNC)
REWD FTNC,FTNCHMF.
UNLOAD FTNCHMF.
EDITLIB(SYSTEM)
7/8/9 END OF RECORD
READY(SYSTEM,OLD).
LIBRARY(NUCLEUS,OLD).
REPLACE(FTNMAC,FTNC).
REPLACE(FTN,FTNC,AL=3,FL=47000,FLO=1).
FINISH.
LIBRARY(SYSCLL,OLD).
REWD(FTNC).
REPLACE($LSTFCMV$+$PASS14$$,FTNC).
FINISH.
COMPLETE.
ENDRUN.
7/8/9 END OF RECORD
6/7/8/9 ENC OF FILE

The T1000 parameter on this job card is insufficient on a 6200 or 6400.
Please increase the value to T2000.

FTN4LIB,CM60000,T1000,MT2.
COMMENT. THIS SCOPE 3.4 JOB UPDATES THE FORTRAN EXTENDED 4.0 OBJECT
COMMENT. LIBRARY FROM THE RELEASED PL8 OR FROM A NEWPL8 TAPE. AN
COMMENT. UPDATED PROGRAM LIBRARY AND A FILE CONTAINING ASSEMBLED
COMMENT. EINARIES OF THE LIBRARY WILL BE PRODUCED ON THE TAPE NEWPL8.
COMMENT.
COMMENT. THE CONTENTS OF THE RELEASED PL8 ARE --
COMMENT. FILE 1 -- FORTRAN OBJECT LIBRARY PL
COMMENT. FILE 2 -- 3.4 INSTALLATION DECK
COMMENT. FILE 3 -- 3.4 EDITLIB DECK
COMMENT. FILE 4-6 -- 2.0 INSTALLATION DECKS
REQUEST(FL8,E,H1) REQUEST(NEWFL8,N,H1) LAAEL(NEWFL8,N,L=FTNLIBS*3F4,D=H1) REWINC(FL8,NEWFL8) UPDATE(F,P=FL8,K=NEWFL8,R=C) COFYEF(ECF,NEWFL8) UNLOAD(PL8) COMPASS(I=CCMFILE,L=LISTLIB,S=SYSTEXT,S=IPTEXT,E=LIBRARY) I/C-MATH LIBRARY FTN(I=CCMFILE,L=LISTLIB,S=SYSTEXT,S=IPTEXT,E=LIBRARY,OFT=1) FTN DEBUG LIBRARY REWINC(LIBRARY) COFYEF(LIBRARY,NEWFL8) UNLOAD(NEWFL8) REQUEST(LISTABE,H1) TAPE TO RECEIVE LIBRARY LISTING REWINC(LISTABE) REWINC(LISTLIB) COFYEF(LISTLIB,LISTABE) UNLOAD(LISTABE) 7/6/9 END OF RECORD */ PLACE ANY LIBRARY MODIFICATIONS AFTER THIS CARD. 7/6/9 END OF RECORD 6/6/9 END OF FILE

LIE4,CMD5000,HIG1,T70000. COMMENT, THIS JCB EDITLIBS THE FTN LIBRARY INTO THE RUNNING SYSTEM. LAAEL(FTNLIE,T=LSTLIBS*3P4,D=H1) MOUNT PL8 MADE BY DECK FTNLIE REWINC(FTNLIE) SKIP(FTNLIE,1,17) COFYEF(FTNLIE,FTNL) REWINC FTNLIE,FTNL. UNLOAD FTNLIE. EDITLIB(SYSTEM) 7/6/9 END OF RECORD READY(SYSTEM,OLD) LIBRARY(FCTRAN,OLD). REPLACE(*,FTNL). FINISH. COMPLETE. ENDRUN. 7/6/9 END OF RECORD 6/7/8/9 END OF FILE
VERIFICATION PROGRAM

Dayfile output of the FTN 4.0 verification program should be similar to the following:

```
SCOPE 3.4
05 .44.23.VFTN032
05 .44.23.VFTN,CM55000,T200.
05 .44.23. THIS SIMPLE PROGRAM VERIFIES CORRECT IN
05 .44.23.STALLATION OF
05 .44.23. FORTRAN EXTENDED 4.0
05 .44.23. FTN(G,OPT=1)
05 .44.24. .727 RT SECONDS LOAD TIME
05 .44.28. .356 CP SECONDS COMPILATION TIME
05 .44.28.LGO
05 .44.33. 4.754 RT SECONDS LOAD TIME
05 .44.33.COMPUTATION SUCCESSFUL
05 .44.33. STOP
05 .44.33.BKSP(INPUT)
05 .44.35. 1.485 RT SECONDS LOAD TIME
05 .44.35.RETURN(LGO)
05 .44.37. FTN(G,OPT=2)
05 .45.02. 11.035 RT SECONDS LOAD TIME
05 .45.07. .434 CP SECONDS COMPILATION TIME
05 .45.07.LGO
05 .45.12. 4.703 RT SECONDS LOAD TIME
05 .45.12.COMPUTATION SUCCESSFUL
05 .45.12. STOP
05 .45.12.BKSP(INPUT)
05 .45.14. .975 RT SECONDS LOAD TIME
05 .45.14.RETURN(LGO)
05 .45.14. FTN(G,OPT=0)
05 .45.27. 2.013 RT SECONDS LOAD TIME
05 .46.21. .238 CP SECONDS COMPILATION TIME
05 .46.21.LGO
05 .47.10. 48.476 RT SECONDS LOAD TIME
05 .47.10.COMPUTATION SUCCESSFUL
05 .47.10. STOP
05 .47.10. END OF JOB
05 .47.10.CFA 3.492 SEC.
05 .47.10.PP 27.262 SEC.
```
RELEASE MATERIALS

COBOL Version 4.0 release material consists of a magnetic tape containing the program library.

The source code has been resequenced completely.

NEW FEATURES

New features incorporated in version 4.0 include the following:

1. New verbs (REWRITE, DELETE, SKIP) to support IS and DA files and future COBOL standardization.

2. All I/O handled through Record Manager to provide compatibility with other compilers.

3. Compliance with ANSI COBOL standards. Non-ANSI usage and statements can be diagnosed by the compiler.

4. Faster execution times as a result of generating more code inline and more optimization.

5. Compilation and execution of version 3.0 programs under control card option.

6. Selection of 6400 or 6600 object code for more execution efficiency.

7. Dynamic sort area and buffer assignment at execution time, therefore a reduction in field length requirements.

CORRECTIONS

All eligible PSR code has been added to the program library including all code as published through PSR Summary No. 314.
LIMITATIONS

Source decks may need modifying if the following are used:

USE procedures. The USE AFTER STANDARD LABEL Procedure on output files
now is executed just before the label is written. Previously, it was
executed after the label was written.

Positive sign presence on signed fields. The positive sign will not
always be carried. The absence of a negative sign now signals positive.
Existing tests must be changed that redefine the field as alphanumeric and
compare with the letters A-I or < (less than).

Random files. Version 3.0 random files must be converted to 4.0 format
with the supplied conversion routine. (See CONVERSION AIDS discussion in
Section 6).

ENTER statements containing a parameter to reference an FET. COBOL 4.0
establishes FIT's which contain a pointer to the FET; the code must be
altered to go through the FIT to the FET.

Blank fill on variable length records. For reasons of efficiency COBOL
4.0 does not guarantee blank fill on variable length records, except for Z
mode records. Version 3.0 blank filled all variable length records. Care
must be taken that unused portion of the record area are not expected to
contain blanks.

Non-standard labels are no longer in the record area. They are read into
each label area only, and any references to the record area will have to
be changed.

End of file cards: On INPUT, Version 3 considered 7/8/9 level 15 as end

When an elementary A/N item of more than 18 characters is moved to a
numeric edited field, the rightmost are moved rather than the leftmost.

No editing on a group to a numeric edited field.

Signed numeric to an equal A/N field removes the sign. To an unequal size
field, the sign is not removed.

INSTALLATION PARAMETERS

The COBOL compiler uses symbol definitions from INTEXT for IP.CMU, IP.IMUL,
and IP.TYPE (see SCOPE section discussion of IPARAMS). To override these
installation parameter values, make the following changes in the COMDECK
ASSEMBLY when COBOL is assembled.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Change Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generate code optimized for a 6600</td>
<td>*D ASSEMOP.3, 4</td>
</tr>
<tr>
<td>Generate code optimized for a 6400</td>
<td>*D ASSEMOP.3</td>
</tr>
<tr>
<td>Generate integer multiply instruction code</td>
<td>*D ASSEMOP.6, 7</td>
</tr>
<tr>
<td>Generate non-integer multiply instruction code</td>
<td>*D ASSEMOP.6</td>
</tr>
<tr>
<td>Generate CMU instructions</td>
<td>*D ASSEMOP.9, 10</td>
</tr>
<tr>
<td>Generate non CMU instructions</td>
<td>*D ASSEMOP.9</td>
</tr>
</tbody>
</table>
INSTALLATION PROCEDURES

The release tape, PL9, contains seven files. File one contains the COBOL 4.0 program library. This file includes both compiler and object routines. Files 2-4 contain binary decks of the object time routines and the compiler overlays. Files 5 and 6 contain the installation decks, and file 7 contains the sample installation verification program.

The installation job decks add COBOL to the running system. The first job (COBOL1) uses the release tape as input to create a tape containing four files as output:

File 1 Update version of the COBOL program library

File 2 Relocatable binary records resulting from assembly plus the COBOL system routines

File 3 Overlays forming the COBOL 4.0 compiler that will be installed into the system

File 4 COPYCL routine in absolute form

When the second job (COBOL2) is performed, using either the released tape or the output tape created by the first job (COBOL1), COBOL 4.0 is added to the running system by EDITLIB. Job SCOPE3, described in Section 1, can be used to generate a deadstart tape.

These installation decks can be acquired by performing the job:

Job card.
REQUEST(PL9,E) MOUNT COBOL 4.0 PL
REWIND(PL9) SKIP COBOL PL AND BINARY
COPYBF(PL9,PUNCH,2) PUNCH INSTALLATION DECKS
COPYBF(PL9,PUNCH,1) PUNCH VERIFICATION PROGRAM DECK
UNLOAD(PL9)
6/17/8/9
VERIFICATION PROGRAM

The dayfile output for the COBOL 4.0 verification program is listed below.

SCCPE 3.4
05.44.24. VCCB030
05.44.25. VCCB,CM60000,T20.
05.44.25. THIS SIMPLE PROGRAM VERIFIES CORRECT IN
05.44.25. STALLATION OF
05.44.25. CCEOL 4.0
05.44.25. CCEOL(LX)
05.44.28. 2.492 RT SECONDS LOAD TIME
05.44.31. COMPILING COBOL-V
05.44.42. 000 E AND 000 T/U DIAGNOSTICS ISSUED
05.44.42. FIELD LENGTH NEEDED FOR COBOL 052300
05.44.42. 203 CP SECONDS COMPIILATION TIME
05.44.42. END CCEOL
05.44.42. MAF(OFF)
05.44.42. LGC.
05.44.51. 7.862 RT SECONDS LOAD TIME
05.44.51. CCEOL 4.0 EXISTS UNDER SCOPE 3.4
05.44.52. END OF JOB
05.44.52. CFA 1.116 SEC.
05.44.52. PF 11.554 SEC.
RELEASE DESCRIPTION

SORT/MERGE 4.0 runs under 6000 SCOPE 3.4 and 6000 RECORD MANAGER 1.0.

RELEASE MATERIALS

SORT/MERGE 4.0 is released on program library tape PL10.

HARDWARE CONFIGURATION

SORT/MERGE 4.0 requires the same minimum hardware configuration as SCOPE 3.4. If the Tape Sort option is used, additional magnetic tape units are required: polyphase requires three; balanced requires four.

NEW FEATURES

The following new features were added for user convenience and system reliability:

FREE FIELD CONTROL CARDS

Two SORT/MERGE control card directive types are available to the user. Format 1, an upward 7000 based compatible design, has free field directives beginning in columns 1-72. Format 2 is based on 6000 SORT/MERGE 3.0 control card formats. Format 2 control cards will enable the user to run 3.0 jobs without rewriting them. New SORT/MERGE jobs should be written in Format 1.

UNLIMITED SIZE AND/OR NUMBER OF FILES

SORT/MERGE 4.0 imposes no restrictions on the size of the file or number of files to be sorted in a single run, other than the restrictions under 6RM. Currently 100 input files are allowed.

COLLATING SEQUENCE CHARACTERS

Characters within a collating sequence may be equated by the user.

OWNCODE EXITS

The system provides the user with additional OWNCODE exits, EXIT5 and EXIT6. The EXIT5 option exits to the user when two records with identical keys are found. EXIT6 is required for non-standard label tapes in directive Format 1. EXIT6 supplies the non-standard label to the user for validation on input and exits to the user for the non-standard label on output. When directive Format 2 is used, non-standard labels are skipped and not processed.
A NEW SORT/MERGE FORMAT

The 6000 SORT/MERGE 3.0 Macro format has been replaced with a new format which is upward 7000 compatible.

MODIFICATIONS

1. The 4.0 SORT/MERGE system does not provide the TAG SORT capability.

2. 6RM handles the following:
   - Record types
   - Block types
   - Parity error processing
   - Padding character processing
   - Label processing
   - Multi-reel and multi-file reel processing
   - Disk overflow detection (SORT/MERGE still handles disk overflow recovery)

GENERAL DESCRIPTION

SORT/MERGE 4.0 runs under SCOPE 3.4 and 6RM 1.0. The system consists of two control card directive formats and a Macro Sort format. Directive format 1 is based on upward compatibility toward 7000 SORT/MERGE and Format 2 is based on the SORT/MERGE 3.0 control card format. The Macro Sort format is also based on 7000 compatibility. SORT/MERGE 4.0 is a more modularized package, consisting of overlay modules which are in core only when necessary. (For example, a disk sort does not need the tape merge overlay modules.) This product is designed to optimize speed and core space as well as to utilize 6RM and SCOPE 3.4 capabilities.

INSTALLATION PROCEDURE

PL10 contains the following files:

<table>
<thead>
<tr>
<th>File</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SORT/MERGE program library</td>
</tr>
<tr>
<td>2</td>
<td>SORT/MERGE relocatable binary decks (macro sort)</td>
</tr>
<tr>
<td>3</td>
<td>SORT/MERGE relocatable binary decks (control card sort)</td>
</tr>
<tr>
<td>4</td>
<td>SORT/MERGE binary overlays</td>
</tr>
<tr>
<td>5</td>
<td>SMTEXT binary</td>
</tr>
<tr>
<td>6</td>
<td>SORT1 Installation deck</td>
</tr>
<tr>
<td>7</td>
<td>SORT2 Installation deck</td>
</tr>
<tr>
<td>8, 9, 10</td>
<td>Verification programs</td>
</tr>
</tbody>
</table>

To obtain the installation and verification program decks, perform a job of the type:

Job card.
REQUEST (PL10,E) Assign SORT PL
SKIPF(PL10,5,17)
COPYBF(PL10,PUNCH,5)
UNLOAD(PL10)
6/7/8/9
The installation jobs function as follows:

**SORT1** Updates the program library with modifications producing a new program library tape including assembled binary information as supplemetal files. This job essentially allows creation of a revised release tape.

**SORT2** Adds SORT/MERGE to the running system. SORT2 can use either the released PL10 or a tape created by job SORT1 as input.

After job SORT2 has been run, job SCOPE3 described in Section 1 can be run to create a deadstart tape of the running system containing SORT/MERGE.

The system text SMTEXT is installed via execution of installation decks SORT1 and SORT2.

```
SORT1,CM56000,T7000,MT2. 001
COMMENT. THIS JOB UPDATES AND CREATES THE BINARY OF SORT/MERGE 002
COMMENT. THE NEW PL10 WILL CONSIST OF FIVE FILES 003
COMMENT. THE FIRST FILE WILL BE THE NEWPL 004
COMMENT. THE SECOND FILE WILL BE THE BINARY OF THE RELOCATEABLE ROUTINES FOR 005
COMMENT. MACROC SORT 006
COMMENT. THE THIRD FILE WILL BE THE BINARY OF THE RELOCATEABLE ROUTINES FOR 007
COMMENT. CONTROLS CARD SORTS 008
COMMENT. THE FOURTH FILE WILL BE BINARY OF THE SORT OVERLAYS 009
COMMENT. THE FIFTH FILE WILL BE THE BINARY OF SMTEXT 010
LABEL(FL10IN,R,L=SOR1P0*3P4,D=HI) MOUNT SORT V4.0 PL 011
REQUEST,FL10,N,HI. SCRATCH FOR NEW PL10 012
LABEL(FL10,W,L=SOR1P6*3P4,D=HI) 013
REWINP(FL10IN,PL10) 014
UPDATE,(P=FL10IN,H=PL10,Y) 015
COMPASS(I=CMFILE,S=IOTEXT,T=S=IPTEXT,B=SRTOBJ,L=0) COMPILE ALL BINARIES 016
COMPASS(I=CMFILE,S=0,L=0) COMPILE SMTEXT 017
REWINC,SRTCEJ. 018
REWINC(LGO) 019
REWINC(F10,1,17) 020
REWINC(FL10IN) 021
SKIFF(FL10IN,1,17) 022
COFY(LFL10IN,SRTOBJ,PL10) PUT FILE TWO ON NEWPL 023
REWINC,SRTCEJ. 024
COFY(LFL10IN,SRTOBJ2) 025
REWINC(SRTOBJ2) 026
COFYEF(SRTCEJ2,FL10) PUT FILE THREE ON NEWPL 027
REWINC(SRTCEJ2) 028
LDSET(LIE=SYSIC/NUCLEUS) 029
LOAD(SRTCEJ2) GENERATION OF SORT OVERLAYS 030
NOGO. 031
REWINC,SCRTPRG. 032
COFY(LFL10IN,SCRTPRG,FL10) PUT FILE FOUR ON NEWPL 033
COFYEF(LGO,FL10) PUT FILE FIVE ON NEWPL 034
ULGAC(PL10,FL10IN) 035
7/8/9 END CF RECORD 036
*/ ADD CORRECTIONS HERE 037
7/8/9 END OF RECORD 038
6/7/8/9 END CF FILE 039
```
SORT2,CM=5000,T7000,MT1.

COMMENT. THIS JCB TAKES THE SORT/MERGE BINARIES FROM PL10 AND EDITLIBS

COMMENT. THEM INTO THE RUNNING SYSTEM. EITHER THE RELEASED VERSION OF

COMMENT. PL10 OR THE VERSION CREATED BY DECK SORI1 MAY BE USED.

LABEL(FL10,RFL=SORT4PC*3P4,0=HI) MOUNT SORT/MERGE V4.0 PL

REWIND,PL10.

SKIP(FL10,1,17) SKIP CLDPL

COFEVF(FL10,SORTM) GET BINARIES FOR MACRO SORTS

SKII(FL10,1,17) SKIP RELOCATABLES FOR CONTROL CARD SORTS

COFEVF(FL10,SORTC,1) 0,G OVERLAY

COFEVF(FL10,SORTO) REST OF OVERLAYS

COFEVF(FL10,SMTXT) SMTEXT

REWIND,SMTXT.

REWIND,FL10,SORTM,SORTC,SORTO.

UNLOAD(FL10)

EDITUSE(SYSTEM)

COMMENT. *** END OF JOB ***

7/8/9 END OF RECORD

READY(SYSTEM)

LIBRARY(NICLUS,OLD)

REPLACE(*,SORC,AL=3,FL=60000,FL0=1)

REPLACE(*,SMTXT,AL=0)

FINISH.

LIBRARY(SYSCVL,OLD)

REPLACE(*,SORTC,AL=0)

FINISH.

LIBRARY(CCECL,OLD)

REPLACE(*,SORTM)

FINISH.

COMPLETE.

ENDRUN.

7/8/9 END OF RECORD

6/7/8/9 END OF FILE
VERIFICATION PROGRAM

Dayfile output for the verification programs is as follows:

SCCFE 3.4
05.44.51.VSCRT31
05.44.52.VSCRT1,CM65000,T500.
05.44.52.DIRECTIVE FORMAT 1 VERIFICATION DECK -
05.44.52.SORT/MERGE 4.0
05.44.52.JOE SORTS 10 RECORDS - ASCENDING ORDER
05.44.52.FILE(INPUT,RT=Z,BT=C,FL=80,ERL=1)
05.44.54.FILE(OUTPUT,RT=Z,BT=C,FL=80,ERL=1)
05.44.57.SORTMRG(7C)
05.45.40. 1,475 RT SECONDS LOAD TIME
05.47.05. ** INSERTIONS DURING INPUT ************0
05.47.05. ** DELETIONS DURING INPUT ************0
05.47.05. ** TOTAL RECORDS SORTED **********10
05.47.05. ** INSERTIONS DURING OUTPUT ************0
05.47.05. ** DELETIONS DURING OUTPUT ************0
05.47.05. ** TOTAL RECORDS OUTPUT **********10
05.47.05. **END SORT RUN
05.47.06.CFA  254 SEC.
05.47.06.PF  20.724 SEC.

SCCFE 3.4
05.44.36.VSCRT32
05.44.37.VSCRT2,CM65000,T500.
05.44.37.DIRECTIVE FORMAT 2 VERIFICATION DECK -
05.44.37.SORT/MERGE 4.0
05.44.37.JOE SORTS 10 RECORDS - ASCENDING ORDER
05.44.37.SORTMRG(6C)
05.45.25. 1,636 RT SECONDS LOAD TIME
05.45.42. ** INSERTIONS DURING INPUT ************0
05.45.42. ** DELETIONS DURING INPUT ************0
05.45.42. ** TOTAL RECORDS SORTED **********10
05.45.42. ** INSERTIONS DURING OUTPUT ************0
05.45.42. ** DELETIONS DURING OUTPUT ************0
05.45.42. ** TOTAL RECORDS OUTPUT **********10
05.45.42. **END SORT RUN
05.45.43.CFA  234 SEC.
05.45.43.PF  16.522 SEC.
05.45.43.IO  281 SEC.
SCCPE 3.4

05.44.50.VSCRT3
05.44.50.VSCRT3,CM65000,T500.
05.44.50. MACRO SORT VERIFICATION DECK -
05.44.50. SORT/MERGE 4.0
05.44.50. JCE SORTS 10 RECORDS - ASCENDING ORDER
05.44.50. C0MPASS(S=SMTEXT,S=IOTEXT)
05.44.57. ASSEMBLY COMPLETE. 52700B SCM USED.
05.44.57. 1.333 CFU SECONDS ASSEMBLY TIME.
05.44.57. LDSET(LIB=COBOL/SYSIO)
05.44.58. LGC,
05.45.06. 8.113 RT SECONDS LOAD TIME
05.45.06.
05.45.06.
05.45.08. ** INSERTIONS DURING INPUT **********0
05.45.08. ** DELETIONS DURING INPUT **********0
05.45.08. ** TCTAL RECORDS SORTED **********10
05.45.08. ** INSERTIONS DURING OUTPUT **********0
05.45.08. ** DELETIONS DURING OUTPUT **********0
05.45.08. ** TCTAL RECORDS OUTPUT **********10
05.45.08. **END SORT RUN
05.45.08.CPA  2.682 SEC.
05.45.08.FP   6.389 SEC.
RELEASE DESCRIPTION

QUERY UPDATE (QU) Version 1.0 is contained in the SCOPE 3.4 product set.

RELEASE MATERIALS

QU 1.0 is released on the program library tape PL11. QUIDDL is also included on this tape.

The structure of the release format PL11 is as follows:

Files 1-3 QU, as follows
   1 QU program library
   2 QU binary - absolute format
   3 QU binary - relocatable format

Files 4-6 QUIDDL, as follows
   4 QUIDDL program library
   5 QUIDDL binary - absolute format
   6 QUIDDL binary - relocatable format

Files 7-13 Installation Decks
   7,8 QU installation decks
   9,10,11 QU, QUIDDL verification decks
   12,13 QUIDDL installation decks

HARDWARE CONFIGURATION

QU requires the same minimum hardware configuration as SCOPE.
GENERAL DESCRIPTION

The user, either at a terminal or through batch processing, can insert or delete records in a file, modify and display fields within records, specify selection criteria for record manipulation, and define various modes for operation and input/output options.

Data to be manipulated must be on a mass storage device; it may be organized as sequential, indexed sequential or direct access. Data within a file is referred to by symbolic names which have been recorded in a mass storage directory constructed through use of QUDDL.

QU is written primarily in SYMPL, but it has several COMPASS routines.

INSTALLATION OPTIONS

The installation of Query Update Version 1.0 does not require selection or modification of any installation parameters.

INSTALLATION PROCEDURES

To obtain the QU installation decks, execute a program of the type:

```
Job card.
REQUEST(PL11,E)
SKIPF(PL11,6,17)
COPYBF(PL11,PUNCH,2)
COPYBF(PL11,PUNCH,3)
UNLOAD(PL11)
6/7/8/9
```

Deck QU1 allows regeneration of PL11 to incorporate changes to the program library file which will be reflected in the binary. Successful formation of the absolute overlay may result in externals unsatisfied to the different access methods. This is of no consequence if such access methods are not to be used. Access methods IS 2.0, DA 1.0 should be present in the running system to satisfy externals when the NOGO directive of the deck QU1 is honored. Deck QU2 adds binary from either the released PL11 or a tape created by QU1 to the running system. Once QU2 has completed, job SCOPE3 (section 1) can be used to create a deadstart tape from the running system.
QU1,CK64000,T7000,MT02.

COMMENT. THIS JOB UPDATES AND CREATES THE BINARY OF Q/U
COMMENT. AND COPIES THE OLDPAT AND BINARY OF QUIDDL TO THE NEW PL11.
COMMENT. THE NEW PL11 WILL CONSIST OF SIX FILES
COMMENT. THE FIRST FILE OF PL11 WILL BE THE QU NEWPL
COMMENT. THE SECOND FILE WILL BE THE ABSOLUTE BINARY OF QU
COMMENT. THE THIRD FILE WILL BE THE RELOCATABLE BINARY OF THE OVERLAY QU
COMMENT. THE LAST THREE FILES WILL BE QUIDDL
LABEL(FL1INR,PL11,1,11)  MOUNT QU PL
REQUEST,PL11,N,H1.  SCRATCH FOR NEW PL11
LABEL(FL11,1,11)  MOUNT QU QUIDDL*3F4,D=H1
REINDEX(FL1IN,FL11)
UPDATE(F,F=FL1IN,N=PL11)
COMPASS(I=CCMFILE,E=QX,L=0,S=IOTEXT,S=IPTEXT)
SYMPH(I=CCMFILE,L=0,B=QX)
COMPASS(I=CCMFILE,E=QX,L=0)
SYMPH(I=CCMFILE,L=0,B=QX)
COMPASS(I=CCMFILE,E=QX,L=0)
SYMPH(I=CCMFILE,L=0,B=QX)
REINDEX(QX)
LDSET(LIE=SYSIC/NUCLEUS)
LOAD(CX)  GENERATION OF OVERLAY QU
NOGO.
REINDEX(QU,QX)
SKIP(FL11,1,17)  COPY BINARY FILE TO NEW PL11
COFYBF(QU,FL11)
COFYBF(QX,FL11)
REINDEX(FL1IN)
SKIP(FL1IN,1,17)
COFYBF(FL1IN,FL11)
COPY QUIDDL TO TAPE
UNLOAD(FL1IN,FL11)
7/8/9 END OF RECORD
** ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

QU2,CM55000,T7000,MT1.

COMMENT. THIS JOB EDITLIBS THE QUERY/UPDATE BINARIES INTO THE RUNNING
COMMENT. SYSTEM FROM THE PL11 TAPE. EITHER THE RELEASED VERSION OF PL11
COMMENT. OR THE VERSION CREATED BY DECK QU1 MAY BE USED.
LABEL(FL11,R,L=QU*QUIDDL*3F4,D=H1)  MOUNT QU PL
REINDEX,FL11.
SKIP(FL11,1,17)  SKIP OLDPAT
COFYBF(FL11,QU)  Q/U EINARIES
REINDEX,FL11,QU.
UNLOAD(FL11)
EDITLIB(SYSTEM)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY(SYSTEM)  014
LIBRARY(NUCLEUS,OLD)
REPLACE(*.QL,AL=3,FL=E4000,FLO=1)
FINISH.
COMPLETE.
ENDRUN.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE
VERIFICATION PROGRAMS

The QU verification deck consists of three jobs which use the SCOPE Job Dependency option to control the order of execution. Since these are the same verification decks used by QUDDL, QUDDL must also be installed in the system before running the verification program decks. The first job (SCHEMA) creates a directory; the second one (AREA), an indexed sequential file; the third (QU) runs Query Update using the directory and the indexed sequential file.

SCOPE 3.4
05.44.52.SCHEM35
05.44.52.SCHEMA,T160,CM63000,0QU00.
05.44.52.REQUEST(TAPE5,*PF)
05.44.54.QUDDL(M=C,S=TAPE5)
05.45.12. 3.082 RT SECONDS LOAD TIME
05.45.15.( TAPE5 ASSIGNED TO EST 07 )
05.45.47.QUDDL COMPLETE
05.45.48.CATALOG(TAPE5,DOLEDIRECT,ID=VERIFY,CY=1,C
05.45.48.N=********,PW=********)
05.45.48.INITIAL CATALOG
05.45.50.RF = 010 DAYS
05.45.51.RETURN(TAPE5)
05.45.52.TRANSF(QU)
05.45.53. TRANSFERRED TO QU00036
05.45.53.FTN(L=0)
05.46.54. 2.055 RT SECONDS LOAD TIME
05.46.59. 243 CP SECONDS COMPILATION TIME
05.46.59.CCMFASS(L=0)
05.47.03. ASSEMBLY COMPLETE. 466008 SCM USED.
05.47.03. 1427 CFU SECONDS ASSEMBLY TIME.
05.47.03.MAF(1FF)
05.47.04.ATTACH(TAPE5,DOLEDIRECT,ID=VERIFY)
05.47.06.PF CYCLE NO. = 001
05.47.06.LGO.
05.47.34. 3.710 RT SECONDS LOAD TIME
05.47.36. STOP
05.47.38.CPA 3.646 SEC.
05.47.38.FF 30.040 SEC.
GENERAL DESCRIPTION

With QUDDL, a data base administrator defines data in terms of its attributes and the relationships that exist and must be maintained, thus permitting users to store and retrieve data from secondary storage easily and efficiently. The data base consists of all records and areas in mass storage; they are described by a specific schema. The user, in combination with SCOPE 3.4 features, has the ability to:

Structure data physically in the manner most suitable to each application regardless of whether any portion of that data may be used for some other application as well.

Control the physical placement of data.

Declare a variety of data structures.

Interact with data without concern for the mechanics of maintaining data structural associations.

QUDDL has routines written in SYMPL and COMPASS.

RELEASE DESCRIPTION

QUDDL Version 1.0 runs under the SCOPE 3.4 operating system; it operates on the same minimum hardware configuration as SCOPE 3.4.

RELEASE MATERIALS

The Update program library for QUDDL shares release tape PL11 with QU.

A complete catalog of PL11 contents is included in section I-12.

LIMITATIONS

A directory cannot be compressed to eliminate wasted space if UPDATE mode is used.
INSTALLATION PARAMETERS

QUDDL 1.0 will reference IP.CSET of IPTEXT in the running system at installation time to determine the exact character set.

INSTALLATION PROCEDURES

QUDDL shares PL11 with QU. The installation decks refer to the release QUDDL tape as P11A.

To obtain the QUDDL installation decks execute a program of the type:

```
Job card.
REQUEST(PL11,E)
SKIPP(PL11,11,17)
COPYBF(PL11,PUNCH,2)
UNLOAD(PL11)
6/7/69
```

Deck QUDDL1 allows regeneration of the release tape incorporating changes to the program library file which will be reflected in the binary. Deck QUDDL2 adds binary from either the released tape or a tape created by QUDDL1 to the running system. Once QUDDL2 has completed, job SCOPE3 (section 1) can be used to create a deadstart tape from the running system.
The QUIDDL verification decks are shared with QU. See the QU section of this document for description of the verification process.
RELEASE DESCRIPTION

INTERCOM 4.1 in conjunction with the SCOPE 3.4 operating system provides Teletype and CRT terminals with time-shared access to CYBER 70 Series computers. Remote batch jobs may be submitted from terminals equipped with a remote card reader and printer, from a remote computer (1700 or 8231) running an IMPORT package, or from a High Speed Batch Terminal. Programs written in the RUN, FORTRAN Extended, COBOL, ALGOL, COMPASS, and BASIC languages can be submitted from a remote terminal for execution at control points; the user at the remote terminal can interact with the executing program. Program output can be routed to the line printer and card punch at the central site or to a terminal equipped with line printers or card readers. Through the SCOPE permanent file feature, input from a central site magnetic tape or card reader is available to the remote user.

INTERCOM 4.1 further provides the capability for multi-user jobs to be written which can handle many users simultaneously with one copy of a program. The program-text editor, EDITOR, introduced in Version 3.0, utilizes this capability.

HARDWARE CONFIGURATION

In addition to the minimum hardware required by the SCOPE system, INTERCOM 4.1 requires the following equipment for communication and operation.

One of the following:

CRT terminal, model 214-11, 214-12, 217-11, 217-12, 217-13, 217-14, or 711-102,
or a model 33 or 35 KSR or ASR Teletype terminal, or a 713 Teletype compatible terminal,
or a 1700 or 8231 remote computer running an IMPORT package
or a 733-10 High Speed Batch Terminal (HSET)

Also: A dedicated multiplexer on a dedicated channel 6671, 6676, 6673, or 6674 (6671 for Teletype and/or CRT terminals; 6676 for Teletype terminals only; 6673 or 6674 for high speed connections to remote computer)
Or: A dedicated 7077 Communications Station on a dedicated channel with a 791 Local Communications Controller (LCC) for Teletypes and HSBTs.

Also: Data Sets for communication between the remote terminal and central site: Teletype terminals require 103A Data Sets; CRT terminals require 201A or 201B Data Sets, or CONTROL DATA 358 Transceivers; remote computers and HSBTs require 301B or 303 Data Sets and a TELPAK A communication line, or CONTROL DATA 358 Transceivers.
Hardware Options

Teletype
Paper tape reader/punch

CRT
Card reader: 224-11, 12, 13, or 14
Line printer: 222-11, 12, 13, or 14

HSBT
Card reader (one additional) 733-120
Line printer (up to three additional) 733-110
Card punch 733-101
Memory increment (if additional peripherals are used beyond the basic
HSBT required options, single card reader and line printer) 733-140
Data Set Adaptor 733-130
CRT (16x80 or 18x64) 733-150 or 733-152

The High Speed Import for the 8231 and for 1700 are discussed in separate
sections of this Installation Handbook and hardware options are included in
those sections.

RELEASE MATERIALS

INTERCOM Version 4.1 release material consists of a magnetic tape (PL12)
containing the INTERCOM Version 4.1 OLDPL as file one and installation decks
as files two and three.

MODIFICATIONS AND DEFICIENCIES

New Features and Modifications

INTERCOM Version 4.1 includes all the interactive commands of INTERCOM Version
3.0 with the exception of SETUP, the filename facility (available through
XEQ), and B. All facilities offered by SETUP are available through the multi-
user editor features of EDITOR.

The remote batch commands of INTERCOM Version 4.1 are changed as follows:

<table>
<thead>
<tr>
<th>New Commands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>REP</td>
<td>Repeat the printing of a file</td>
</tr>
<tr>
<td>KILL</td>
<td>Kill a job in execution or in the input queue</td>
</tr>
<tr>
<td>RTN</td>
<td>Return the file now printing to the output queue</td>
</tr>
</tbody>
</table>

New Names

<table>
<thead>
<tr>
<th>Old Names</th>
</tr>
</thead>
<tbody>
<tr>
<td>REW</td>
</tr>
<tr>
<td>BSP</td>
</tr>
<tr>
<td>DIVERT</td>
</tr>
</tbody>
</table>

The XEQ command, added in INTERCOM Version 4.1, makes available to the user
many of the features of the new LOADER for SCOPE 3.4. It also adds greater
consistency in the definition of an INTERCOM language.
The BRESEQ command, added in INTERCOM Version 4.1, allows the user to resequence a BASIC program and gives him control over how the file is resequenced.

Through the new INTERCOM PAUSE capability, a terminal user can improve control of the interactive program at the terminal.

The 1WB driver is capable of supporting the 6673 and 6674 multiplexers and remote 1700 and 8231 computers.

The 1ZZ driver in INTERCOM Version 4.1 is capable of supporting the LCC and High Speed Batch Terminals and Teletypes.

Teletype operation via both the 791 LCC and the 6671 or 6676 multiplexer differs from INTERCOM 3.0 as follows:

The left arrow ( <<- ) no longer is used for backspacing. The backspace character (CTRL H) must be used.

Logical lines longer than 72 characters can be entered via paper tape by terminating continued lines with a LINE FEED as the first control character (LINE FEED, RETURN) and terminating the last physical line with a carriage return as the first control character (RETURN, LINE FEED).

Teletype code has been changed as follows:

<table>
<thead>
<tr>
<th>Graphic</th>
<th>INTERCOM 3.0</th>
<th>INTERCOM 4.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CDC 63 Character Display Code</td>
<td>CDC 64 Character Display Code</td>
</tr>
<tr>
<td>#</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>' (apostrophe)</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>! (exclamation)</td>
<td>71</td>
<td>71</td>
</tr>
<tr>
<td>%</td>
<td>76</td>
<td>63</td>
</tr>
<tr>
<td>&quot; (quote)</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>_ (underline) or ←</td>
<td>none</td>
<td>76</td>
</tr>
<tr>
<td>]</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td>@</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>?</td>
<td>75</td>
<td>75</td>
</tr>
<tr>
<td>[</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>&lt;</td>
<td>72</td>
<td>72</td>
</tr>
<tr>
<td>\</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td>~ (circumflex) or ↑ (on some TTYs)</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>:</td>
<td>63</td>
<td>00</td>
</tr>
</tbody>
</table>
Corrections

All eligible PSR code for INTERCOM Version 2.0 or Version 3.0 published through PSR Summary 320 has been incorporated in Version 4.1.

Limitations

1. EDITOR commands input through the terminal cannot exceed 518 characters; the longest text line allowed by EDITOR is 510 characters. On the Teletype, data input to a user's interactive program can be of any length (subject to the limitations imposed by the size of the user's circular buffer); and it may be a full screen on the CRT.

2. The following SCOPE commands are not allowed as direct INTERCOM commands, although they are allowed as part of a job created through EDITOR to be submitted subsequently for batch execution. REQUEST is allowed only for a permanent file device:
   CKP, RFL, DMPECS, RESTART, LIMIT, LOAD, LIELOAD, SLOAD, CMLOAD, ECSLOAD, EXECUTE, NOGO, LIBRARY, RPACK, LABEL, and VSN.
   These commands should be given an access level of 7777B when a deadstart tape is made.

3. When the CONNECT command (or CONNEC call) is used, the specified data is routed to or from the terminal each time the file is read or written. When simultaneous operations are to be performed, no more than one file should be connected to a terminal for interactive operations at any given time.

4. Time must be entered into the SCOPE system prior to bringing up INTERCOM. INTERCOM will request a time entry if it has not been done.

5. PASSWRD can be run while INTERCOM is up; normally, however, it should not be done as INTERCOM users may experience poor response to LOGIN, SEND, SITUATE while PASSWRD is running.

6. A single copy of the PP multiplexer driver cannot service both BCD and ANSI 200 User Terminals.

7. Teletype operation via the 791 LCC differs from Teletype operation via the 6671 or 6676 multiplexer.

   Teletype interrupts (CTRL Z followed by the directive A or S) require a carriage return (RETURN) to complete the message before the interrupt is processed. If the continue message (CTRL Z RETURN) is input, interrupted output will continue at the next line; characters in the interrupted line will be lost.

   The delete line character (CTRL X) is recognized on paper tape.

   Physical lines longer than the width of the Teletype carriage cannot be entered. The message LINE TOO LONG will be issued and the user must re-type the complete line.

9. Pending a modification to :7000 SCOPE 2.0, which should result from PSR S00848, the Q command does not distinguish between a parameter of the form 6x and a parameter of the form 7x.

The information returned for either form will be the same, and will be dependent on whether or not the 6000 running INTERCOM is the 7000 operator console as well. If it is, 6x and 7x will both perform as 7x is documented. Otherwise, they will both perform as 6x.

GENERAL PROCEDURES

Installation of a complete INTERCOM system requires establishing installation parameters and installing from the INTERCOM OLDFL. The card deck described later can be run at the central site to install INTERCOM. FORTRAN Extended 4.0 and COMPASS 3.0 must be installed before INTERCOM 4.1 can be installed.

CENTRAL MEMORY REQUIREMENTS

The standard installation of INTERCOM Version 4.1 requires about 2000 (decimal) CM/ECS locations for PP programs 1CI, 1BR, 1OP, MJU, 3TT and all the 3TT and 1CI overlays (except 3CU, 3CX). In addition, the PP routine 1PT may be made CM/ECS resident to increase performance; 1PT is on periodic recall at control point zero. If the system has a heavy high speed remote batch utilization, 1XP and its overlays should be made CM or ECS resident. The LCC driver is not dedicated and enters timed recall at control point zero if activity is low. Therefore, 1ZZ and 9ZZ may be made CM/ECS resident as well as the HSBT remote batch processor 1LX and its overlays. These additions increase the total CM or ECS requirement to about 4500 locations.

Whenever INTERCOM is in idle state, approximately 500 additional CM words are required for multiplexer tables and minimum empty buffer chains.

INSTALLATION PARAMETERS

To configure the INTERCOM system for a particular installation:

An equipment status table (EST) entry must be established for each multiplexer dedicated to INTERCOM.

In CMR, a multiplexer table must be defined which contains subtables for each multiplexer dedicated to INTERCOM.

The installation deck must contain an assembly for each variant of the low speed multiplexer driver required.

Parameters in the INTERCOM common deck INTCOM may be changed to affect the characteristics of INTERCOM.

Parameters in the EDITOR common decks IPFTN and IPCOM may be changed to affect the characteristics of EDITOR.

Parameters in the multiuser job common decks MUJCOM and CMUJCOM may be changed to affect the characteristics of multiuser jobs (particularly EDITOR).
INTERCOM COMMON DECK SETTINGS

Release values are shown in the following list of INTERCOM parameters for the common deck INTCOM present on PL12. If these parameters are to be changed, the cards containing the proper code with the CEQU macro should be placed after an *INSERT INTCOM,91 card and inserted into the first update record of the deck INTCM1 after card 035. Alternate tested values are shown in parentheses.

IP.AABT CEQU 76B

Display code for the character recognized by the multiplexer driver as an abort request. This value is for the 63 character set, and a 63B will be assigned for the 64 character set when it is selected.

IP.CTCT CEQU 20

Maximum number of 200 User Terminals at 2400 baud which the PPU multiplexer driver will attempt to service in one cycle. If this number is set too high and the 200 UTs are very active, an attempt may be made to service too many users in one cycle and retransmissions may be observed. If this number is set too low and more than this number of terminals are active, the polling rate at some terminals may be slowed noticeably. In general this number should not require change.

The maximum absolute value which may be defined is 32; 32 is the maximum number of 6671 ports supported by one low speed driver.

IP.CTCT4 CEQU 8

Maximum number of 200 User Terminals at 2400 or 4800 baud which the PPU multiplexer driver will attempt to service in one cycle if at least one 4800 baud terminal is defined for this driver. The effect of this parameter is similar to IP.CTCT; it also should not require change. The maximum value stated for IP.CTCT is applicable here also.

IP.HRCL CEQU 5

Number of seconds delay (when 1WB is in recall) before taking over a PP to check if any terminals are attempting to establish communications. It represents, approximately, the maximum amount of time a user will wait after loading IMPORT before communication is established.
IP.HSYNC   CEQU   7500B

Number of communication cycles 1WB will wait for a sync acknowledge from
terminal before causing error indication and retransmission. The value of
this parameter will vary with the length of the longest transmission line
attached to the highspeed multiplexer.

The duration of a communication cycle is approximately 250 microseconds. The
release value should be large enough to provide for the longest transmission
line possible in the continental United States (3500 miles).

IP.HINFW   CEQU   7500B

Number of communication cycles 1WB will wait for first input word from
terminal before causing error indication and retransmission. The value of
this parameter will vary with the length of the largest transmission line
attached to the high speed multiplexer. The value of this parameter is
similar to IP.HSYNC and will vary accordingly.

IP.HCRXT   CEQU   100

Number of consecutive retransmissions allowed a given terminal before ending
communication with the terminal and attempting to restart from the initiate-
communication phase.

A single transmission generally requires between 10 and 250 milliseconds.

IP.1LX     CEQU   1

If 1, one copy of 1LX will be called to process all LCC users. If 2, one copy
of 1LX will be called for each LCC.

IP.PRIX    CEQU   3777B   (7000B)

Non-zero, indicates the priority given to input files read from remote site.
If zero, priority will be taken from Job card.
Number of bits in the 11-bit user table access field assigned for the user access level. The remainder will be used for permission bits. Both access level and permission bits are used to determine if a user has access to a specific utility or routine.

When a request is made to use a command, the user's access level is checked to determine whether it is greater than or equal to the access level of the command. If it is, the permission bits of the user are compared against the permission bits of the command. If they match, the user is given access to the command. If either test fails, permission is not granted.

Example:

In a university environment all undergraduates are assigned access Level 5; therefore, all commands having an access level of 5 or less are available to the undergraduates. Only commands X, Y, and Z however, are available to members of the Computer Science Department. This may be controlled by assigning a portion of the access field to the access level with the remainder used for permission bits. Then such commands could be assigned a permission value of 3, which also would be assigned only to members of the Computer Science Department.

IP.ID CEQU 1

If one, the INTERCOM user id is used as the default permanent file id by the commands STORE, FETCH, and DISCARD. If zero, the permanent file id must be specified by the INTERCOM user.

IP.IDFL CEQU 55000B

Default field length assigned to a user's program, or any control card when field length override is specified in the library directory, and user has not entered a field length (EFL).

IP.IGCON CEQU 0

Maximum number of 1700/274 Graphics consoles known to the system; should be set to zero if Graphics is not defined in the system. IP.IGCON has a maximum possible value of 24.

IP.IGS CEQU 0 (1)

If one 1700/274 Graphics is defined as existing within the system; if zero 1700/274 Graphics is not present in the system.

IP.IHEAD CMICRO 0,(CONTROL DATA INTERCOM 4.1)

Header output by 1PT when a remote terminal dials into the INTERCOM system.
IP.ISCRN CEQU 1

Specifies the default size of CRT screens at the installation: if 0, a 13 x 80 screen is assumed; if 1, a 50 x 20 screen.

IP.MALOC CEQU 4000B

A 12-bit octal value defining the allocation style for files created by a multi-user job. Bit 11 always is set to one to indicate that a permanent file device is requested. The bits indicating the allocation style are bits 5-0. This value is placed in the File Name Table entry generated for new multi-user job files, in byte C.FALLOC.

IP.MPRIT CEQU 4000B

Priority of output files directed to the central site by the remote batch command DIVERT.

IP.N6671 CEQU 2

Number of 6671 multiplexers for which the driver is assembled. 0, 1, or 2. No individual driver can support more than 2 multiplexers total.

IP.N6676 CEQU 0

Number of 6676 multiplexers for which the driver is assembled. 0, 1, or 2. If set to 2, IP.N6671 must be set to zero. Refer to the section on the Installation of INTERCOM for a further discussion on the required settings for these two parameters.

IP.N791 CEQU 3

Maximum number of LCC's per channel that the LCC driver can support: 1, 2 or 3.

IP.TILL CEQU 55B

An illegal character input from Teletype will be converted to IP.TILL.

IP.TSL CEQU 10B

Default time limit in seconds for execution of a user's program, if the user has not entered a time limit (STL).

IP.1PT CEQU 1

1PT will not be called if this parameter is set to zero; if set to 1, 1PT will be called only if CPT terminals are configured. If set to 2, 1PT will always be called when low speed multiplexer drivers are called.
CROSS REFERENCE LISTING

The following cross-reference listing shows the routines that reference each INTCOM symbol:

<table>
<thead>
<tr>
<th>**********</th>
<th>LOGIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTCOM</td>
<td></td>
</tr>
<tr>
<td>**********</td>
<td></td>
</tr>
<tr>
<td>I&gt; AABT</td>
<td>8ZM</td>
</tr>
<tr>
<td>I&gt; CTC</td>
<td>1ZM</td>
</tr>
<tr>
<td>I&gt; CTCT4</td>
<td>1ZM</td>
</tr>
<tr>
<td>I&gt; 4GCL</td>
<td>1WB</td>
</tr>
<tr>
<td>I&gt; 4SYNC</td>
<td>1WB</td>
</tr>
<tr>
<td>I&gt; 4INFN</td>
<td>1WB</td>
</tr>
<tr>
<td>I&gt; 4CRXT</td>
<td>1WB</td>
</tr>
<tr>
<td>I&gt; ILX</td>
<td>111</td>
</tr>
<tr>
<td>I&gt; PRIX</td>
<td>1XP</td>
</tr>
<tr>
<td>I&gt; IAGES</td>
<td>1CI</td>
</tr>
<tr>
<td>I&gt; IO</td>
<td>STORBEG DISBES FETBEG</td>
</tr>
<tr>
<td>I&gt; IFL</td>
<td>1CI</td>
</tr>
<tr>
<td>I&gt; IGGON</td>
<td>111</td>
</tr>
<tr>
<td>I&gt; IGS</td>
<td>1XP</td>
</tr>
<tr>
<td>I&gt; IHEAD</td>
<td>1CI</td>
</tr>
<tr>
<td>I&gt; ISCRN</td>
<td>1CI</td>
</tr>
<tr>
<td>I&gt; 4ALOC</td>
<td>FAD</td>
</tr>
<tr>
<td>I&gt; 4PRIT</td>
<td>1XP</td>
</tr>
<tr>
<td>I&gt; 46671</td>
<td>1ZM</td>
</tr>
<tr>
<td>I&gt; 46676</td>
<td>1ZM</td>
</tr>
<tr>
<td>I&gt; 4791</td>
<td>1ZM</td>
</tr>
<tr>
<td>I&gt; FNT</td>
<td>13R</td>
</tr>
<tr>
<td>I&gt; JLL</td>
<td>8ZM</td>
</tr>
<tr>
<td>I&gt; ISL</td>
<td>1CI</td>
</tr>
<tr>
<td>I&gt; ITP</td>
<td>111</td>
</tr>
</tbody>
</table>

| ********** |      |
| I>        |      |

* I-14-10 60307400
SCOPE IPARAMS SETTINGS

These parameters must be set at *INSERT IPARAMS.15 when SCOPE 3.4 is installed
(deck SCOPE1).

IP.ILCMD  CEQU  1

If set to 1, the last word in the user table (W.IINS reserved for the
installation) will store the last command entered by each user for display on
the DSD Q display. If 0, it will not be used for this purpose.

IP.IUSID  CEQU  2RAH

Defines the first user id available for assignment by the program PASSWRD.
The value of this parameter is determined by the number of highspeed
multiplexers with sub-tables defined in the system and the number of HSBT
terminals defined in the system. The highspeed multiplexers use two id's per
6673 or 4 id's per 6674, starting with user id AB. The ICC's use one id per
HSBT line defined in the ICC mux subtables.

This user ID is the lowest available to be assigned a user at a lowspeed
terminal. Every 1700 or 8231 remote highspeed batch terminal connected to the
system must have its own user ID assigned to it.

IP.1M1  CEQU  3

Maximum number of active low speed multiplexer drivers allowed in the system
simultaneously. Should be zero if the system has no 6671 or 6676
multiplexers. The setting never should exceed three. This entry is dependent
on the number of channels configured for use by low speed multiplexer drivers.
One copy of a driver may service only one channel.

IP.1WB  CEQU  2

Maximum number of active highspeed multiplexer drivers allowed in the system
simultaneously. Should be zero if the system has no 6673 or 6674
multiplexers. The setting never should exceed two; it is determined in the
same manner as IP.1M1.

IP.1ZZ  CEQU  0

Maximum number of active LCC drivers allowed in the system simultaneously.
Should be zero if system has none; it should never exceed two.
EST ENTRY

The EST table established when deck SCOPE1 is run to install SCOPE3.4, must contain an entry for each multiplexer dedicated to INTERCOM. The channel referenced in this entry must be dedicated to the INTERCOM multiplexers on that channel. A separate copy of the driver in a dedicated PP is required to service each channel assigned to INTERCOM. For non-allocatable equipment, the EST uses the 6000 macro which has been modified as follows:

```
type 6000 channel, sync, unit, onoff, ipoint
```

Macro parameters used by INTERCOM:

```
type DC for 6671, YC for 6676, SC for 6673 or 6674, CS for 791
channel Channel for multiplexer or 7077 Communication Station
sync Equipment number for multiplexer or 7077 SAC/CSM I/O channel for 791
unit Not used by INTERCOM
onoff Switch, on = 0, off = 1
ipoint Index to INTERCOM multiplexer table
```

A typical EST entry might appear as follows:

```
*I CMR.2108
DC 6000 3,5,0,0,MUX1-T.ITABL
```

This entry notifies the multiplexer driver that a 6671 with equipment number 5 is on channel 3; and the index to the multiplexer table is MUX1-T.ITABL, where MUX1 is the symbol on the card defining the multiplexer subroutine for this 6671, and T.ITABL is the beginning of the multiplexer table.

Typical EST entries for two LCC 791's on SAC/CSM channels 0 and 1 connected to a 7077 connected to channel 4 would appear as follows:

```
CS 6000 4,0,0,0,MUX2-T.ITABL
CS 6000 4,1,0,0,MUX3-T.ITABL
```
CONFIGURATION PARAMETERS (INTERNAL TO CMR)

This parameter defines the length of the INTERCOM multiplexer table. It must be set at *INSERT CMR.964 when SCOPE 3.4 is installed. The default value is:

L.ITABL. CEQU 19

This parameter should be changed to reflect the size of the multiplexer table for each installation. The length of the table can be determined from the following formula:

\[ L.\text{ITABL} = 2 \times 2 \times \text{N76} + \text{N71} + \text{N71PORTS} + \text{N73} + \text{N74} + 2 \times \text{N91} + \text{N91PORTS} \]

N76 number of 6676 multiplexers dedicated to INTERCOM
N71 number of 6671 multiplexers dedicated to INTERCOM
N71PORTS total number of 6671 ports defined
N73 number of 6673 multiplexers dedicated to INTERCOM
N74 number of 6674 multiplexers dedicated to INTERCOM
NG number of 6673 or 6674 multiplexers defined for GRAPHICS support
N91 number of 791's
N91PORTS total number of 791 ports defined

CMR MULTIPLEXER TABLE

The CM resident INTERCOM multiplexer table is used by INTERCOM to provide data on the hardware configuration of the installation and to record parameters. It consists of two dedicated parameter words and one or more subtables assigned to the multiplexers serviced by INTERCOM.

The first two words of the multiplexer table, the parameter words, start at location T.ITABL in CMR. They are already assembled into CMR. The subtables follow the parameter words in any order convenient to the installation. The first subtable must be defined at *INSERT CMR.2238 when SCOPE 3.4 is installed. Each subtable has a relative pointer in the EST entry for that multiplexer. The upper bound of the multiplexer subtable may not extend beyond 7777B.

CMR MULTIPLEXER SUBTABLE GENERAL FORMAT

Each multiplexer subtable contains one entry to define the type of multiplexer, one entry for each port defined on that multiplexer if a 6671 or a 791, or a single entry if a 6676, or no further entries if a 6673 or 6674 does not support graphics consoles or a single entry if a 6673 or 6674 supports graphics consoles. The address of the entry describing the multiplexer is the same address used in the EST entry defining that multiplexer. A subtable for a 6671 multiplexer might be defined as follows:

| MUX1 | MUX71 | 4 |
| CRT  | CRT   |   |
| CRT  | CRT   |   |
| TTY  |       |   |
When a 6671 multiplexer is configured it is advisable to place the highest speed terminals on the lowest ports and to place any empty ports at the high number port positions. Thus, the 6671 should be configured 4800 baud terminals first, the 2400 and 2000 baud terminals, then TTY's, then empty ports. The MUX71 macro port count parameter can be set to exclude the empty ports and increase driver efficiency. This saving is especially important when a driver is to support both a 6671 and a 6676.

A suitable for the 6673/6674 multiplexer might be defined as follows:

MUX4 MUX73 0, 3, G

The mux is defined with terminals attached to ports 0 and 3, and it also is described as capable of graphics support.

MULTIPLEXER DEFINITION ENTRIES

INTERCOM recognizes four types of multiplexers, the 6671, 6676, 6673 and 6674, and one type of communications subsystem, the 791 (LCC). They are defined with the following macros:

MUX71 no. of ports
MUX76 no. of ports
MUX73 P0, P1, G
MUX74 P0, P1, P2, P3, G
MUXLCC No. of ports, memory size

The parameter (number of ports) indicates the highest numbered port + 1 which INTERCOM is to service. For the 6673 and 6674, the parameters Pi are the port numbers which are attached to the multiplexer. The parameter G, if specified, is the letter G and designates this multiplexer as being defined for Graphics support. The memory size parameter for the LCC indicates the size of the LCC memory. It should be either the characters 4k or 8k. If omitted 8k is assumed. A 6671 with ports 0, 1 and 3 attached to data sets should be defined as:

MUX71 4

A 791 with ports 0, 1, and 3 attached to data sets should be defined as:

MUXLCC 4

Since a 6676 multiplexer can have only TTY ports, the MUX76 macro does not require port definition entries. The MUX73, MUX74, and MUX76 macro generate all multiplexer subtable entries necessary to completely define the multiplexers.
PORT DEFINITION ENTRIES

Currently, six types of ports are recognized by the CMR macros for a 6671 multiplexer only. They are defined with the following macros:

TTY  Teletype Model 33 or 35 or CDC 713
CRT  BCD CRT or 200 User Terminal, 2400 baud
CRTA  ANSI CRT or 200 User Terminal or CDC 711 2400 baud
CRT4  BCD CRT or 200 User Terminal, 4800 baud
CRTA4  ANSI CRT or 200 User Terminal or CDC 711 4800 baud
EMPTY  EMPTY Port (not serviced by INTERCOM)

The port definition entries immediately follow the entry for the corresponding 6671 multiplexer. Each entry defines one port, beginning with port 0 as the first entry, the second is port 1, and so on. All ports through the highest to be serviced by INTERCOM on that multiplexer must be defined. Thus, if the number of ports parameter on the MUX71 macro is 10B, then 8 port definition entries must follow even though some may not be used. Unused ports should be defined with the EMPTY macro.

Because the INTERCOM low speed multiplexer driver cannot handle both BCD and ANSI terminal types on the same channel, these terminal mixes should not be specified. Refer to the section on the installation of INTERCOM for allowable terminal combinations. Terminals to be operated at 4800 baud must operate in full duplex mode.

Port definition entry macros without parameters indicate that the ports are servicing normal dial-up telephone circuits. Site addresses for dial-up CRTs not on party lines are assumed to be zero by the INTERCOM system. They must be set manually to zero at the terminal. It is possible also to define hard-wired and party-line connections by adding parameters to any of the CRT definition macros as described below.

Five types of ports are recognized by the CMR macro for an LCC. They are defined with the following macros:

TTY  Teletype model 33 or 35 or CDC 713
LSBT  Low Speed Batch Terminal
MSBT  Medium Speed Batch Terminal
HSBT  High Speed Batch Terminal
EMPTY  Empty port (not processed by INTERCOM)

Note, however, that INTERCOM 4.1 has not been tested using Low, Medium, and/or High Speed Batch Terminals; therefore, these three terminal types are not supported with this initial release of INTERCOM 4.1.
## Port Distributions for Low Speed Multiplexers

<table>
<thead>
<tr>
<th>Multiplexer Configuration</th>
<th>Hardware Limits</th>
<th>Software Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200 UTs</td>
<td>2400 Baud</td>
</tr>
<tr>
<td></td>
<td>TTYs</td>
<td>200 UTs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TTYs</td>
</tr>
<tr>
<td>One PPU</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>6671</td>
<td>32</td>
<td>28-32</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>14-16</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>2X6671</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>6676</td>
<td>128</td>
<td>100-128</td>
</tr>
<tr>
<td>2X6676</td>
<td>16</td>
<td>64</td>
</tr>
<tr>
<td>6671, 6676</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

The chart indicates the hardware limitations for each low speed multiplexer configuration. These limitations show the maximum number of 200 UT ports that can be defined and, the maximum number of TTY ports that can be defined. Each 200 UT port can be a party-line port and support more than one 200 UT.

For each hardware configuration, the chart indicates the best estimates of what the software will support satisfactorily. Under heavy loads, terminals may suffer some degradation.
PARTY LINES

Any of the CRT definition macros may be used to define party-line configurations by adding parameters to the macro call. The general form is:

\[
\text{CRT } sa0, sa1, ... sa15
\]

A list of site addresses indicates the port is to service a party-line to which terminals at those site addresses may be connected. Up to 16 site addresses, 0 to 17B, may be specified. The macro will stop scanning after the 16th parameter, or at the first null parameter. Site addresses may be specified in any order.

For example, a BCD 2400 baud CRT or 200 User Terminal party-line with six possible site addresses might be defined as follows:

\[
\text{CRT } 5,1,0,10,15,6
\]

HARD-WIRED CONNECTIONS

Because of the way INTERCOM handles hard-wired (non dial-up) terminals, they must be specified as party-lines with only one site address (usually zero for only one terminal; however, the site address specified in the macro should match the site address of the terminal). A terminal connected to a 6671 with Control Data 358-2 transceivers should be defined as follows:

\[
\text{CRT } 0
\]

Example:

A system with two multiplexers, an LCC, and a number of different types of terminals might be defined as follows:

**EST Entries:**

\[
\begin{align*}
\text{DC} & \quad 6000 \\
\text{YC} & \quad 6000 \\
\text{CS} & \quad 6000
\end{align*}
\]

\[
\text{3,0,0,0,MUX1-T.ITABL} \\
\text{3,1,0,0,MUX2-T.ITABL} \\
\text{4,0,0,0,MUX3-T.ITABL}
\]

**Multiplexer Table:**

\[
\begin{align*}
\text{T.ITABL} & \quad \text{VFD} & \quad 6/1IA,6/0,12/0,36/0 \\
& \quad \text{VFD} & \quad 60/0 \\
& \quad \text{MUX2} & \quad \text{MUX76} & \quad 10B \\
& \quad \text{MUX1} & \quad \text{MUX71} & \quad 12B \\
& \quad \text{CRT} & \quad \text{CRT} & \quad 0 \\
& \quad \text{CRT} & \quad \text{CRT} & \quad 0 \\
& \quad \text{CRT} & \quad \text{CRT} & \quad 0 \\
& \quad \text{CRT} & \quad \text{CRT} & \quad 0,1,2,3 \\
& \quad \text{CRT} & \quad \text{CRT} & \quad 4,5,6,7 \\
& \quad \text{EMPTY} & \quad \text{EMPTY} & \quad \text{EMPTY} \\
& \quad \text{TTY} & \quad \text{TTY} & \quad \text{TTY} \\
& \quad \text{MUX3} & \quad \text{MUXLCC} & \quad 3 \\
& \quad \text{HSBT} & \quad \text{HSBT} & \quad \text{HSBT} \\
& \quad \text{TTY} & \quad \text{TTY} & \quad \text{TTY} \\
& \quad \text{MUX4} & \quad \text{MUX73} & \quad 0,3,6
\end{align*}
\]
GRAPHICS MULTIPLEXERS

A 6673 or 6674 multiplexer may be designated as a GRAPHICS multiplexer by inclusion of the G parameter. In this case the GCON macro should be specified immediately following. This macro has the following form:

   GCON p0, p1, p2, ..., p23

The pi are GRAPHICS console numbers defining the 274 consoles attached via this multiplexer. In the 2-digit console number, the first digit designates the port through which this console is accessible, 0 or 1 for 6673, 0, 1, 2 or 3 for 6674; and the second digit designates the console number on a particular remote system 0-6.

LCC PROGRAMS

The INTERCOM 4.1 LCC initializer uses the LCC multiplexer subtables to determine which variants of the LCC programs to load before the LCC driver is brought up. INTERCOM 4.1 assumes the proper variants are available on the SCOPE system library and are disk resident. The following table indicates the names of the LCC programs that the LCC initializer will search for.

<table>
<thead>
<tr>
<th>LCC memory size</th>
<th>8k</th>
<th>4k</th>
<th>*Configuration not supported by LCC programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSBT ports only defined</td>
<td>0ZD</td>
<td>0ZE</td>
<td></td>
</tr>
<tr>
<td>Teletype ports only defined</td>
<td>0ZF</td>
<td>0ZG</td>
<td></td>
</tr>
<tr>
<td>HSBT and Teletype ports defined</td>
<td>0ZJ</td>
<td>0ZK*</td>
<td></td>
</tr>
</tbody>
</table>

In addition the LCC autoload program 0ZA must also be available on the system library and be disk resident.

All these programs are available in binary format as part of a separate release of the LCC programs. They may be added to the running system using the following job:

```
Job card.
EDITLIB(SYSTEM)
7/8/9
READY(SYSTEM,OLD)
REPLACE(*,INPUT)
COMPLETE.
ENDRUN.
7/8/9
Binary decks of LCC programs
6/7/8/9
```
DRIVER TYPE SELECTION

If the variant of the low speed driver which supports BCD 200 User Terminals (2400 baud) and Teletypes on the 6671 multiplexer only is not required, card number 40 must be changed to #DEFINE TYPEx, where x is A to N determined from the following table. Find the column containing the combination of Y's which corresponds with your equipment configuration, then obtain the letter x from the bottom row. Any equipment configuration not included on the chart is either an impossibility (e.g., CRTs on a 6676), or it contains more terminal types than can be supported by one variant of the driver (e.g., both BCD and ANSI 200 UT).

| IP.N6671 #0 | Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| IP.N6676 #0 | Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| BCD 200 UT (2400 baud) | Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| TTY | Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| BCD 200 UT (4800 baud) | Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| ANSI 200 UT (2400 baud) | Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| ANSI 200 UT (4800 baud) | Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y Y |
| x | A B C D E E F G H I J K L M N |

Each hardware channel dedicated to INTERCOM is serviced by only one copy of the driver in a dedicated FPU. In general, a different variant of the driver is required for each hardware channel dedicated to INTERCOM with either a different multiplexer mix or a different terminal mix supported. There are two exceptions: As indicated in the table, the driver variant which drives CRTs at both 2400 and 4800 baud is the same variant which drives CRTs at 4800 baud only; whereas the driver which only drives CRTs at 2400 baud requires a different variant. Likewise, the same variant which drives TTYs on the 6671 and 6676 multiplexers also drives TTYs on the 6676 multiplexer alone; whereas the 6671 alone requires a different variant. Thus, if an installation has two channels dedicated to INTERCOM, one with a 6671 and a 6676 and the other with a single 6676, and only TTYs are supported, only one variant of the driver need be assembled, variant J.

Note that only differences in the type of multiplexers supported, and not differences in the number of multiplexers supported, will require different variants of the driver to be assembled for different channels. However, the symbols IP.N6671 and IP.N6676 must be set to the number of multiplexers of the given type on the channel with the greatest number of that type multiplexer. In the example of the preceding paragraph, the J variant of the driver should be assembled with IP.N6671 set to one and IP.N6676 set to one. Similarly, an installation could assemble a variant of the driver with IP.N6676 set to two, even though only one 6676 is to be supported.
For each additional variant of the low speed driver required, the following
cards must be inserted in the installation deck INTCM1 (see Installation
Procedures, page I-14-35).

After card 017

UPDATE(P=PL12,C=COMPx,Q) UPDATE DRIVER 1Zx
COMPASS(I=COMPx,S=PPTXT,S=IPTEXT,L=0) ASSEMBLE DRIVER 1Zx

After card 046

*IDENT YYYYx
*DEFINE TYPEx
*INSERT INTCOM.91
* /
** INCLUDE INTERCOM 4.1 INSTALLATION PARAMETER CHANGES HERE
** INCLUDING REDEFINITION OF IP.N6671 AND IP.N6676 IF NEEDED
*/
*COMPILE 1M1
7/8/9 END OF RECORD

where x is one of the above.

The UPDATE deck name for the low speed driver is 1M1, however, each variant of
the driver produced will have a different name of the form 1Zx where x is a
character from A through N indicating the terminal mix supported by that
driver. (The character x will correspond to that used on the *DEFINE card.)
Similarly, the driver's overlays, 8Zx and 9Zx, will have names indicating the
terminal mix supported.

When INTERCOM is first initiated, the INTERCOM initialization routine, 1I1,
initiates the drivers as dictated by the multiplexers defined in the EST and
the port definitions defined in the multiplexer subtables. If all equipments
(multiplexers) on a channel are turned off when INTERCOM is initiated, no
driver will be initiated to service that channel; however, the multiplexer
subtables for all of the equipments will be examined and initialized by 1I1.
If some (but not all) of the equipments on a channel are turned off when
INTERCOM is initiated, the variant of the driver initiated will be the same
as if all equipments were turned on. The multiplexer subtables of all of the
equipments, on or off, will be read and initialized.

The user should make certain that only one EST entry points to each
multiplexer subtable whether the equipment is on or off.

Installation deck INTCM1 also will compile the relocatable multi-user job
subroutines (deckname MUJSUBS). Deck INTCM2 will not add them to the running
system for reasons of size and expected infrequency of use. MUJSUBS always
must be included on the COMPILE file, however, when EDITOR IS compiled and
loaded, so that references to the muj subroutines from EDITOR will be
satisfied. If a full UPDATE is done, the subroutines will be included on the
COMPILE file. If an UPDATE,Q is done and the EDITOR is to be modified, the
UPDATE input must include a *COMPILE MUJSUBS. (EDITOR does not use FTNMUJ or
COBOMUJ, the decknames for the FORTRAN Extended and COBOL muj preprocessors.)
After the password files are established and the time has been initialized, INTERCOM should be brought up at control point zero with the console type-in INTERCOM. The INTERCOM system will be ready to service remote terminal users.

COMMAND TABLE STRUCTURE (1CI OVERLAY 3CT)

Prior to INTERCOM installation, release values in the command table of 3CT may be changed to add a new command or multi-user job. These modifications are accomplished with the BATCH, TABLE, and MUJ macros, and should be installed at 1CI.4173.

BATCH MACRO

The BATCH macro is used on all remote batch commands such as READ, GO, etc. Macro format:

```
BATCH name,ordinal,overlay,level,perm
```

name Name of remote batch command

ordinal Command ordinal (within overlay specified by next parameter)

overlay Overlay of 1CI containing command

level Access level

perm Permission bit value

TABLE MACRO

The TABLE macro is used for commands other than batch type which require special processing. Otherwise, placing them in the NUCLEUS directory is sufficient.

```
TABLE name, level, FL, TL,,PERM
```

name Name of command

Level Access level

FL Field length required

TL Time limit (in power of two seconds)

PERM Permission bits for access to command (not used in release version)
MUJ MACRO

This macro defines a table entry for multi-user jobs such as EDITOR. If a new multi-user job is added by the installation, the MUJ macro must define a table entry in the 3CT table. A corresponding entry also must be made in the 1QP MUJTABL to completely define a muj (refer to the description of the 1QP table below). MUJ macro format:

```
MUJ name,ordinal,overlay,level,perm
```

- **name**: Name of muj (each defined muj must begin with a different letter, as this letter is used as part of the muj id and must be unique)
- **ordinal**: Command ordinal (within overlay specified by next parameter)
- **overlay**: Section of 1CI containing code to process muj
- **level**: Access level
- **perm**: Permission bit value

In addition to the MUJ macro, the following cards must be inserted in the overlay 3CT for each muj added by the installation:

```
*INSERT 1CI.4092
  LJM  MUJn
*INSERT 1CI.4214
  MUJn  LDN  1QP muj ordinal
  UJK    PROMUJ
```

The first *INSERT places an entry in the jump table in 3CT. The position of the LJM instruction in the jump table constitutes the command ordinal as specified in the MUJ macro. For the EDITOR, this ordinal is 4; the next available entry to be added would be 8, and so on. The second *INSERT adds code for loading the 1QP muj ordinal (position of this muj in 1QP MUJTABL) and for jumping to process the request.
Muj Table Structure (1QP)

Each multi-user job as defined in the command table of 3CT also must be defined in the muj table of 1QP, MUJTABL. The position of an entry in MUJTABL is defined as the 1QP muj ordinal. Entries are made with the macro MUJTABL.

MUJTABL name,fl,swpin,swpout,editor

name Name of the muj
fl Field length of muj (actual value)
swpin Delay, in 1CI cycles (depends on IP.TICI, released for 1/2 second), between discovery of need to swap in the muj and actual entry into the scheduling queue. This value increases response time to muj requests (when the muj is swapped out) but allows requests to accumulate; so that when the muj is in, it is more likely to process multiple users. Maximum of 4095.
swpout Delay, in 1CI cycles, between discovery of need to swap out muj and actual swap out. A high value setting essentially dedicates the muj at a control point.
editor 1 muj EDITOR
0 otherwise

The parameters swpin, swpout, and editor may be null, and default values 1, 0, and 0, respectively, will be assumed.

Table Changes and Release Settings

Changes to the tables in routines 3CT and 1QP should be included in the UPDATE record at card 044 of the installation deck INTCM1. The following list shows the release values and UPDATE identifiers.

```
TREG EQU * 1CI 4114
MUJ EQU EDITOR,4,8SP,1 1CI 4115
TABLE CATALOG,3,29B 1CI 4115
TABLE ATTACH,1,20B 1CI 4117
TABLE PURGE,0,20B 1CI 4119
TABLE EXTEND,1,20B 1CI 4120
TABLE RENAME,1,20B 1CI 4121
TABLE ALTER,1,20B 1CI 4122
TABLE SETP,1,20B 1CI 4123
TABLE MODE,1,10B 1CI 4124
TABLE PAGE,1,4000,7 1CI 4125
BATCH TAPE,1,85P 1CI 4126
BATCH LOCK,2,8SP 1CI 4127
BATCH SAVEFL,3,85P 1CI 4128
BATCH REDUCE,6,85P 1CI 4129
BATCH CMP,5,85P 1CI 4130
TABLE MAP,1,12B 1CI 4131
BATCH IMPORT,7,8SP 1CI 4132
P4 EQU 3 END OF PAUSE TYPE COMMANDS 1CI 4133
CN EQU 14 1CI 4134
```
BEGINNING OF COMMAND BATCH TYPE ONLY

*CALL INCOM

MUJTBLB SSS 0  DEFINE BEGINNING OF TABLE
MUJTBL EDITOR, 40000, 0, 2, 1
END

101  4135
101  4137
101  4138
100  4139
101  4140
101  4141
101  4142
101  4143
101  4144
101  4145
101  4146
101  4147
100  4148
101  4149
101  4150
101  4151
101  4152
101  4153
101  4154
101  4155
101  4156
101  4157
101  4158
101  4159
101  4160
101  4161
101  4162
101  4163
101  4164
101  4165
101  4166
101  4167
101  4168
101  4169
101  4170
101  4171
101  4172
101  4173
101  4174
6000 OPERATOR CONSOLE COMMANDS

The following commands and one special display (Q) are available to the 6000 operator to aid in his control of the INTERCOM environment. Full details may be seen in the SCOPE Operator's Guide.

DIVERT Diverts file or files to and/or from remote and/or central.

ILOCK Prevents users from logging into INTERCOM.

INTERCOM Activates INTERCOM (other variants to activate one part of INTERCOM).

IUNLOCK Cancels ILOCK condition.

M,ID,MESSAGE Sends message to INTERCOM user id.

The Q display, an INTERCOM display, exists in DSD. This display indicates the operating environment of INTERCOM and lists all logged in users along with their status and current activity. For a complete description of the operator commands and the Q display, refer to the SCOPE Operator's Guide.
MUJ SYSTEM ERRORS

INTERCOM multi-user jobs (e.g. EDITOR), upon encountering hardware and/or software errors, produce diagnostic dumps. These dumps contain a header MUJ SYSTEM ERROR xx. This message is sent to the system dayfile and to each user currently using the muj. Values of xx less than 50 indicate error conditions encountered by the system muj subroutines; values 50 or greater denote errors detected by the multi-user job itself.

<table>
<thead>
<tr>
<th>Number</th>
<th>Issued By</th>
<th>Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>USER</td>
<td>User area lost internally</td>
</tr>
<tr>
<td>2</td>
<td>SERVICE</td>
<td>User area lost internally</td>
</tr>
<tr>
<td>3</td>
<td>SERVICE</td>
<td>Bit KWCOM should not be set for this value of MMACT (FATAL)</td>
</tr>
<tr>
<td>4</td>
<td>SWAPOK</td>
<td>Error (from CIO) on last user area swap</td>
</tr>
<tr>
<td>5</td>
<td>SWAPOK</td>
<td>Illegal CIO function code on last user area swap (FATAL)</td>
</tr>
<tr>
<td>6</td>
<td>SWAPOK</td>
<td>User area lost on swap-out (FATAL)</td>
</tr>
<tr>
<td>7</td>
<td>not used</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>not used</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>USER</td>
<td>Muj returning user area not assigned to it. (User error) (FATAL)</td>
</tr>
<tr>
<td>10</td>
<td>USER</td>
<td>Invalid ACTN code sent by muj (User error) (FATAL)</td>
</tr>
<tr>
<td>11</td>
<td>USER</td>
<td>Invalid information from 1QP</td>
</tr>
<tr>
<td>12</td>
<td>USER</td>
<td>Internal logic error</td>
</tr>
<tr>
<td>13</td>
<td>USER</td>
<td>A non-ready user was marked as ready</td>
</tr>
<tr>
<td>14</td>
<td>LUNSRCH</td>
<td>Logical unit number was specified in call to USERFO, but corresponding file was not declared on muj PROGRAM card (User error) (FATAL)</td>
</tr>
<tr>
<td>15</td>
<td>not used</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>USER</td>
<td>Muj is returning user not assigned to it. (User error) (FATAL)</td>
</tr>
<tr>
<td>17</td>
<td>USER</td>
<td>User's files cannot be returned when user leaves muj</td>
</tr>
<tr>
<td>50</td>
<td>SYSERR</td>
<td>One of various EDITOR errors. Refer to dump to determine which routine called SYSERR</td>
</tr>
<tr>
<td>51</td>
<td>SYSERR</td>
<td>Same as 50, except EDITOR debugging code is on</td>
</tr>
<tr>
<td>52</td>
<td>WRTPRN</td>
<td>Input/output error occurred on file EDITFIL</td>
</tr>
</tbody>
</table>
EDITOR INSTALLATION PARAMETERS

EDITOR uses two common decks IPFTN (FORTRAN) and IPCOM (COMPASS) to hold installation parameters. Generally, a change to one common deck requires a corresponding change to the other. With the exception of arrays which must be dimensioned for FORTRAN in common deck IPFTN, the values of installation parameters are not defined in IPFTN. IPFTN merely allocates storage for these definitions. The definitions are DATA statements in the BLOCK DATA subprogram IPFILL.

IPCOM contains EQU's which define the installation parameters. Since many parameters are of such a nature that a change in one implies a change of another, a dependency chart is included below to aid the installation.

Summary of the steps to be taken to change an EDITOR installation parameter:

1. Change the DATA Statement in IPFILL or the EQU in IPCOM, or both, as indicated by the parameter description.

2. Consult the dependency chart for any dependent installation parameters that require change, and change them as in step 1.

3. Consult the dependency chart for dimensions of arrays in IPFTN. If they are affected, change them as indicated in the table, Array Dimensions in IPFTN.

Any changes which cause the size of the EDITOR to increase may require an increase in the field length defined for EDITOR in the MUJTABL for 10P. The following list shows the release values and UPDATE identifiers for IPFILL, IPCOM, and IPFTN.
EDITOR Installation Parameters

In this table, -* in the Range column indicates where a parameter has essentially no absolute upper limit. The installation determines the practical upper limit based on considerations such as EDITOR size and expected number of users.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Defined In</th>
<th>Description</th>
<th>Range</th>
<th>Release Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLINE</td>
<td>X</td>
<td>Default first line number for CREATE, EDIT, RESEQ</td>
<td>6L000001 to 6L999999</td>
<td>6L000100</td>
</tr>
<tr>
<td>NINCR</td>
<td>X</td>
<td>Default line number increment for ADD, CREATE, EDIT, RESEQ</td>
<td>1-999998</td>
<td>10</td>
</tr>
<tr>
<td>NUAS</td>
<td>X X</td>
<td>Number of user area buffers</td>
<td>1-* Large number decreases response time if there are many users</td>
<td>3</td>
</tr>
<tr>
<td>NFILES</td>
<td>X X</td>
<td>Maximum number of user files which may be attached at any one time</td>
<td>1-* Should equal NBBS because EDITOR assigns a big buffer for each attached file</td>
<td>2</td>
</tr>
<tr>
<td>NBBS</td>
<td>X X</td>
<td>Number of big buffers (used for EDIT, SAVE, RUN)</td>
<td>1-* Increase if many EDITS, SAVES, RUNs anticipated</td>
<td>2</td>
</tr>
<tr>
<td>NPBS</td>
<td>X X</td>
<td>Number of pool buffers. Each is 64*NPRUS words</td>
<td>2-* Increase when heavy file modifications or long text lines expected, generally NPBS=NUAS</td>
<td>3</td>
</tr>
<tr>
<td>NUSERS</td>
<td>X X</td>
<td>Maximum number of users simultaneously using EDITOR</td>
<td>1-* Vary with expected usage of EDITOR</td>
<td>30</td>
</tr>
<tr>
<td>Parameter</td>
<td>Defined In</td>
<td>Description</td>
<td>Range</td>
<td>Value</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
<td>-------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>NPRUS</td>
<td>X</td>
<td>Number of 64-word PFUs in one block in edit file</td>
<td>1-* large number decreases response time for commands which process large files, but it also increases amount of central memory required for EDITOR by 64 words for each pool buffer and 64 words for each user area buffer</td>
<td>2</td>
</tr>
<tr>
<td>NSUA</td>
<td>X</td>
<td>Size of user area; must be modified in IPPILL if NPRUS is changed. NSUA=67+64*NPRUS. Size does not include portion of user area used for tabs, return jump links, and edit file index</td>
<td>131-*</td>
<td>195</td>
</tr>
<tr>
<td>JTABLES</td>
<td>X</td>
<td>Number of word in user area which holds tab values; must be modified in IPPILL if NPRUS is changed. ( JTABLES = 67 + 64 \times NPRUS )</td>
<td>131-*</td>
<td>195</td>
</tr>
<tr>
<td>JNDXHDR</td>
<td>X</td>
<td>Number of index header word in user area; must be modified in IPPILL if NPRUS is changed. ( JNDXHDR = JTABLES \times (NTBSMAX+4)/5 )</td>
<td>132-*</td>
<td>197</td>
</tr>
<tr>
<td>Parameter</td>
<td>Defined In</td>
<td>Description</td>
<td>Range</td>
<td>Release Value</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
<td>-------------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>JINDEX</td>
<td>X</td>
<td>Number of first word in edit file index in user area; must be modified in IPPFILL if NPRUS is changed. JINDEX=JNDEXHDR+1</td>
<td>133-*</td>
<td>198</td>
</tr>
<tr>
<td>JRJLNKS</td>
<td>X</td>
<td>Number of first word in return jump link area in user area; must be modified if NPRUS is changed. JRJLNKS=JINDEX+NSINDEX</td>
<td>153-*</td>
<td>218</td>
</tr>
<tr>
<td>NSINDEX</td>
<td>X X</td>
<td>Number of index entries for each user's edit file</td>
<td>1-* Increase for editing very large files</td>
<td>20</td>
</tr>
<tr>
<td>NTBSMAX</td>
<td>X X</td>
<td>Maximum number of tab settings permitted by FORMAT command</td>
<td>1-509 Must be ≥ NTBSPFN, NTBSCOM, NTBSCOB, NTBSALG, NTBSDEF</td>
<td>10</td>
</tr>
<tr>
<td>XNPCENT</td>
<td>X</td>
<td>Percent to which each block of user's edit file is filled by EDIT (Padding factor)</td>
<td>.01-1.00 Decrease if heavy file modification is expected</td>
<td>.90</td>
</tr>
<tr>
<td>NTABFTN</td>
<td>X</td>
<td>FORTRAN tab character</td>
<td>1LA-1L;</td>
<td>1L;</td>
</tr>
<tr>
<td>NTABCOM</td>
<td>X</td>
<td>COMPASS tab character</td>
<td>1LA-1L;</td>
<td>1L;</td>
</tr>
<tr>
<td>NTABCOB</td>
<td>X</td>
<td>COBOL tab character</td>
<td>1LA-1L;</td>
<td>1L;</td>
</tr>
<tr>
<td>NTABALG</td>
<td>X</td>
<td>ALGOL tab character</td>
<td>1LA-1L;</td>
<td>1L$</td>
</tr>
<tr>
<td>NTABDEF</td>
<td>X</td>
<td>Default tab character</td>
<td>1LA-1L;</td>
<td>1L;</td>
</tr>
<tr>
<td>Parameter</td>
<td>Defined In</td>
<td>Description</td>
<td>Range</td>
<td>Release Value</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>-------------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>NTBSFTN</td>
<td>IPFILL</td>
<td>Number of FORTRAN tabs defined</td>
<td>0-509</td>
<td>1</td>
</tr>
<tr>
<td>NTBSCOM</td>
<td>IPFILL</td>
<td>Number of COMPASS tabs defined</td>
<td>0-509</td>
<td>3</td>
</tr>
<tr>
<td>NTBSCOB</td>
<td>IPFILL</td>
<td>Number of COBOL tabs defined</td>
<td>0-509</td>
<td>5</td>
</tr>
<tr>
<td>NTBSALG</td>
<td>IPFILL</td>
<td>Number of ALGOL tabs defined</td>
<td>0-509</td>
<td>5</td>
</tr>
<tr>
<td>NTBSDEF</td>
<td>IPFILL</td>
<td>Number of Default tabs defined</td>
<td>0-509</td>
<td>1</td>
</tr>
<tr>
<td>NCHFTN</td>
<td>IPFILL</td>
<td>Maximum no. of characters in FORTRAN line</td>
<td>1-510</td>
<td>72</td>
</tr>
<tr>
<td>NCHCOM</td>
<td>IPFILL</td>
<td>Maximum no. of characters in COMPASS line</td>
<td>1-510</td>
<td>72</td>
</tr>
<tr>
<td>NCHCOB</td>
<td>IPFILL</td>
<td>Maximum no. of characters in COBOL line</td>
<td>1-510</td>
<td>72</td>
</tr>
<tr>
<td>NCHALG</td>
<td>IPFILL</td>
<td>Maximum no. of characters in ALGOL line</td>
<td>1-510</td>
<td>72</td>
</tr>
<tr>
<td>NCHDEF</td>
<td>IPFILL</td>
<td>Maximum no. of characters in default format</td>
<td>1-510</td>
<td>72</td>
</tr>
<tr>
<td>NCHBAS</td>
<td>IPFILL</td>
<td>Maximum no. of characters in BASIC line</td>
<td>1-510</td>
<td>72</td>
</tr>
<tr>
<td>Parameter</td>
<td>Defined In</td>
<td>Description</td>
<td>Range</td>
<td>Release Value</td>
</tr>
<tr>
<td>-----------</td>
<td>------------</td>
<td>-------------</td>
<td>-------</td>
<td>---------------</td>
</tr>
<tr>
<td>FTNTABS</td>
<td>IPFILL X</td>
<td>Consecutive stream of bits, each 12 define a tab position for FORTRAN format. Must be ascending order</td>
<td>1-511</td>
<td>000700000000000000B</td>
</tr>
<tr>
<td>COMTABS</td>
<td>X</td>
<td>Same as above, for COMPASS</td>
<td>1-511</td>
<td>001300220040000000B</td>
</tr>
<tr>
<td>COBTABS</td>
<td>X</td>
<td>Same as above, for COBOL</td>
<td>1-511</td>
<td>00100014002000240030B</td>
</tr>
<tr>
<td>ALGTABS</td>
<td>X</td>
<td>Same as above, for ALGOL</td>
<td>1-511</td>
<td>00070012001500200023B</td>
</tr>
<tr>
<td>DEFTABS</td>
<td>X</td>
<td>Same as above, for Default format</td>
<td>1-511</td>
<td>000700000000000000B</td>
</tr>
<tr>
<td>NSBB</td>
<td>X</td>
<td>Size of big buffers used for EDIT, SAVE, RUN (does not include FET)</td>
<td>64-* Increase for very large files</td>
<td>257</td>
</tr>
</tbody>
</table>
## EDITOR Array Dimensions in IPPTN

<table>
<thead>
<tr>
<th>Array Name</th>
<th>Usage</th>
<th>Array Dimension</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTNTABS</td>
<td>FORTRAN tabs</td>
<td>(NTBSFTN+4)/5</td>
</tr>
<tr>
<td>CONTABS</td>
<td>COMPASS tabs</td>
<td>(NTBSCOM+4)/5</td>
</tr>
<tr>
<td>COBTA5BS</td>
<td>COBOL tabs</td>
<td>(NTBSCOB+4)/5</td>
</tr>
<tr>
<td>ALGTA5BS</td>
<td>ALGOL tabs</td>
<td>(NTBSALG+4)/5</td>
</tr>
<tr>
<td>DEPTABS</td>
<td>Default tabs</td>
<td>(NTBSDEF+4)/5</td>
</tr>
<tr>
<td>MMUWTSBL</td>
<td>Storage needed by muj subroutine tables</td>
<td>3<em>NUSTR + NFILES + NUAS + 6</em>(NPRUS+1)</td>
</tr>
<tr>
<td>MUAS</td>
<td>User area buffers</td>
<td>NUAS* (size of full user area) where:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(size of full user area) =</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(NTBSMAX+4)/5 + NSINDEX + 1 + NSUA + NSRJLK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: NSRJLK should not have to be changed by an installation</td>
</tr>
<tr>
<td>MBBS</td>
<td>Big buffers</td>
<td>NBBS<em>NSBB + NBBS</em>6</td>
</tr>
<tr>
<td>MPBS</td>
<td>Pool buffers</td>
<td>NPRUS<em>64</em>NPRUS</td>
</tr>
<tr>
<td>MBBMA</td>
<td>Big buffer management area</td>
<td>NBBS</td>
</tr>
<tr>
<td>MPBEMNA</td>
<td>Pool buffer management area</td>
<td>NPRUS</td>
</tr>
</tbody>
</table>
EDITOR Dependency Chart

<table>
<thead>
<tr>
<th>If changed</th>
<th>Check parameters in IPFILL and/or IFCOM</th>
<th>and arrays in IPFTN</th>
</tr>
</thead>
<tbody>
<tr>
<td>NLINE</td>
<td></td>
<td>KMUJTBL, MUAS</td>
</tr>
<tr>
<td>NINCR</td>
<td></td>
<td>MMUJTBL</td>
</tr>
<tr>
<td>NUAS</td>
<td></td>
<td>MBES, MBBMA</td>
</tr>
<tr>
<td>NFFILES</td>
<td>NBBS</td>
<td>MPBS, MPBMA, MMUJTBL</td>
</tr>
<tr>
<td>NBBS</td>
<td>NFILES</td>
<td>MMUJTBL</td>
</tr>
<tr>
<td>NPBS</td>
<td></td>
<td>MUAS</td>
</tr>
<tr>
<td>NUSERS*</td>
<td>JRJLNKS</td>
<td>MUAS</td>
</tr>
<tr>
<td>NSINDEX</td>
<td>JNDXHDR, JINDEX, JRJLNKS</td>
<td></td>
</tr>
<tr>
<td>NTBSMAX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>XNPONENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTABFTN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTABCOMP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTABCOB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTABALG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTABDEF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NTBSFNTN</td>
<td>NTBSMAX, FTNTABS</td>
<td>FTNTABS</td>
</tr>
<tr>
<td>NTBSCOM</td>
<td>NTBSMAX, COMTABS</td>
<td>CCMTABS</td>
</tr>
<tr>
<td>NTBSCOB</td>
<td>NTBSMAX, COFTABS</td>
<td>CCBTABS</td>
</tr>
<tr>
<td>NTBSALG</td>
<td>NTBSMAX, ALGTABLES</td>
<td>ALGTABLES</td>
</tr>
<tr>
<td>NTBSDEF</td>
<td>NTBSMAX, DEFTABS</td>
<td>DEFTABS</td>
</tr>
<tr>
<td>NCHFTN</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCHCOM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCHCOB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCHALG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCHDEF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NCHHAS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FTNTABS</td>
<td>NTBSFJTN</td>
<td>FTNABS</td>
</tr>
<tr>
<td>COMTABS</td>
<td>NTBSFJTN</td>
<td>COMTABLES</td>
</tr>
<tr>
<td>COFTABS</td>
<td>NTBSFJTN</td>
<td>COFTABLES</td>
</tr>
<tr>
<td>ALGTABLES</td>
<td>NTBSFJTN</td>
<td>ALGTABLES</td>
</tr>
<tr>
<td>DEFTABS</td>
<td>NTBSFJTN</td>
<td>DEFTABLES</td>
</tr>
<tr>
<td>NSBB</td>
<td></td>
<td>MBBS</td>
</tr>
<tr>
<td>NDEBBUG</td>
<td>JTABS, JNDXHDR, JINDEX, JRJLNKS, GUIA</td>
<td>MFBF, MUAS</td>
</tr>
<tr>
<td>NPRUS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*When NUSERS is increased, the user should consider changing also the size of the TERMIN and TERMOUT tables in the muj subroutines MUJSUBS. See INTERCOM MULTI-USER JOB CAPABILITY Programming System Bulletin (60356300) under the heading "Changing Size of TERMIN and TERMOUT."
EDITOR DEBUG CODE

If EDITOR encounters hardware and/or software problems, diagnostic printout is produced. If the problem is considered fatal, all EDITOR users are detached. The content of the diagnostic printout depends upon the error encountered and the setting of NDEBUG. In any event, the diagnostic printout should accompany any PSR relating to a MUJ SYSTEM ERROR. See also MDEBUG below.

MULTI-USER JOB INSTALLATION PARAMETERS

The multi-user job (muj) subroutines use two common decks, MUJCOM and CMUJCOM. Both contain storage allocation for an array, ECSBUF. The MUJCOM deck in FORTRAN code contains a DIMENSION statement; the CMUJCOM deck in COMPASS code contains a BSS statement. This array is used by the muj peripheral processor routines, FAD, to read information from Extended Core Storage (ECS). Array length must be (n*64+1) central memory words. The value of n may be selected by the installations, depending on the expected use of ECS for storage of user swap files (if ECS will be used, n should be at least 2) and on the number of local files allowed for an INTERCOM user. As a guide, n may be increased by one for each 20 local files allowed per user. The upper limit for n is dependent on the amount of storage to be used for ECS buffer in the muj, and the size of the swap buffer in FAD.

The peripheral processor routine FAD contains two parameters relevant to allocation of space for ECSBUF. ECSBFLN (near FAD,659) is a COMPASS EQU instruction. It must be equated to the number of central memory words in the ECSBUF array. SWAPBF (near FAD,650) is a table FAD uses to read the ECSBUF array into PP memory. The value of ECSBFLN, and thus the size of the ECSBUF array in MUJCOM and CMUJCOM, must not be greater than 1+ (length of SWAPBF)/5.

MDEBUG

Symbol MDEBUG in common deck CMUJCOM controls muj debugging code (0=off, 1=on). It should be set to 1 if EDITOR installation parameter NDEBUG is set to 1.

INSTALLATION PROCEDURES

Two installation decks are included on the released program library as files 2 and 3. Deck INTCM1 assembles the released program library adding the created binary to the PL tape as supplemental files. The release tape does not contain assembled binary. Deck INTCM2 uses EDITLIB to enter the binary created by deck INTCM1 into the running system. Deck INTCM1 will require modification if the single default low speed driver type is not the correct variant or multiple low speed driver types are desired. If the hardware configuration does not contain 200 User Terminals or teletype devices (e.g., LCC only system), assembly of the low-speed multiplexer driver can be avoided by changing card number 17 of deck INTCM1 to COPYBF(COMPILE,NIL).

Job card.
REQUEST(PL12,E)
REWIND(PL12)
SKIPF(PL12,1,17)
COPYBF(PL12,PUNCH,2)
UNLOAD(PL12)
6/7/8/9

Skip PL
Punch installation decks

60307400 C I-14-35
With deck INTCM1, one variant of the PP multiplexer low speed driver will be produced which will drive BCD 200 User Terminals (2400 baud) and Teletypes on the 6671 multiplexer. The exact number and type of multiplexers supported by the driver is determined by the settings of the IP.N6671 and IP.N6676 symbols in the INTERCOM common deck INTCOM. Instructions follow the deck listing regarding how to change the driver definition or increase the number of drivers defined.

Deck INTCM2 suggests CM residency for selected PP routines. Sites having ECS may wish to move some of these PP routines to ECS by employing the method discussed in the Deadstart portion of the SCOPE section.

NOTE: The T7000 parameter on the INTCOM1 job card must be changed to T20000 if the deck is to be run on a 6200.

INCM1,CM65000,T7000,MT2.
COMMENT. THIS JCB UPDATES AND CREATES THE BINARY OF INTERCOM 001
COMMENT. THE NEW PL12 WILL CONSIST OF FIVE FILES 002
COMMENT. THE FIRST FILE WILL BE THE NEWPL 003
COMMENT. THE SECOND FILE WILL BE THE BINARY OF THE PP ROUTINES 004
COMMENT. THE THIRD FILE WILL BE THE RELOCATABLE BINARY OF THE OVERLAYS 005
COMMENT. THE FOURTH FILE WILL BE THE BINARY OF THE INTERACTIVE GRAPHICS 006
COMMENT. SYSTEM 007
COMMENT. THE FIFTH FILE WILL BE THE ABSOLUTE BINARIES OF THE OVERLAYS 008
LABEL(FL12IN,R,L=INTERCOM4P1*3P4,D=H1) INTERCOM OLDPL 009
REQUEST(PL12,N,H1) SCRATCH FOR NEW PL12 010
LABEL(FL12,N,L=INTERCOM4P1*3P4,D=H1) 011
REWINO(FL12IN,PL12) 012
UPDATE(F,P=FL12IN,N=PL12,C=0) 013
UPDATE(F,P=FL12) 014
UNLOAD(FL12IN) 015
COMPASS1,S=PTEXT,F=IPTEXT,L=0) 016
COMPASS1=S=CHFILE,S=CPTEXT,S=IPTEXT,S=SCHEPTEXT,S=STATEXST,L=0) 017
FTK(I=COMPILE,S=CPTEXT,F=PPTEXT,S=IPTEXT,S=IPTEXT,B=LGO1,L=0,OPT=1) 018
CROYER(CMPILE,HIL) 019
FTK(I=COMPILE,S=CPTEXT,B=LGO2,L=0,OPT=1) IGS ROUTINES 020
FTK(I=COMPILE,S=CPTEXT,B=LGO2,L=0,OPT=1) IGS ROUTINES 021
REWINO,LGO,LGO1,LGO2. 022
SKIP(FL12,1,17) 023
COYER(LGO,PL12) 024
COYER(LGO1,PL12) 025
COYER(LGO2,PL12) 026
REWINO,LGO1. 027
LOAD,LGO1. 028
NOGO. 029
REWINO(INTERCOM) 030
COYER(INTERCOM,FL12) 031

I-14-36 60307400
UNLOAD(PL12)
7/8/9 END OF RECORD
*/ ADD CORRECTIONS HERE
7/8/9 END OF RECORD
*IC YMKM2JST
*YANKDECK,MRJST
*IDENT,YYF
*DEFINE,TDYFEF SELECTS DRIVER TYPE
*I INTCOM,91
IF.K6671 CEQ 1
IF.K6676 CEQ 0
*CCMFILE,1M1
7/8/9 END OF RECORD
*/ FLACE MULTIPLE DRIVER UPDATE MODIFICATION RECORDS HERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

Deck INTCM2 suggests CM residency for selected PP routines. Sites having ECS
may wish to move some of these PP routines to ECS by employing the method
discussed in the Deadstart portion of the SCOPE section.

INTCM2,CM5500,17000,MT1.
COMMENT. THIS JCB EDITS THE INTERCOM V4.1 BINARIES FROM THE NEW PL12
COMMENT. CREATED BY THE DECK INTCM1.
LABEL(FL12,F,L=INTERCOM4P1*3P4,0=F1) MOUNT INTERCOM V4.1 PL
REWIND,FL12.
SKEF(FL12,1,17) SKIP OLD PL
COFYEF(FL12,INTPP) INTERCOM PP ROUTINES
SKEF(FL12,1,17) SKIP OVERLAYS IN RELOCATABLE FORMAT
COFYEF(FL12,IGS) BINARIES OF IGS
COFYEF(FL12,INTCP) INTERCOM CP ROUTINES
REWIND,INTFF,IGS,INTCF,PL12.
UNLOAD(PL12)
EDITLIB(SYSTEM)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY(SYSTEM)
REPLACE(*,INTFF)
MOVE(1ER,CM)
MOVE(1GP,CM)
MOVE(1TT,CM)
MOVE(1TI,CM)
MOVE(1T2,CM)
MOVE(1CI,CM)
MOVE(3CI,CM)
MOVE(3CT,CM)
MOVE(3CF,CM)
LIBRARY(NUCLEUS,OLD)
REPLACE(LOGIN,INTCP,AL=1,FL=20400,FLO=0)
REPLACE(CCCNCT,INTCP,AL=3,FL=200,FLO=0)
REPLACE(SITLATE,INTCP,AL=3,FL=16100,FLO=0)
REPLACE(DISCONT,INTCP,AL=3,FL=200,FLO=0)
REPLACE(SATCH,INTCP,AL=1,FL=16300,FLO=0)
REPLACE(G,INTCF,AL=3,FL=14400,FLO=0)
REPLACE(FAGE,INTCP,AL=3,FL=32400,FLO=0)
REPLACE(SEND,INTCP,AL=3,FL=20100,FLO=0)
REPLACE(MCGCUT,INTCP,AL=1,FL=12300,FLO=0)
REPLACE(CONVERT,INTCP,AL=3,FL=22300,FLO=0)
REPLACE(RESESEQ,INTCP,AL=3,FL=40000,FLO=0)
REPLACE(TEACH,INTCP,AL=1,FL=34000,FLO=0)
REPLACE(FILES,INTCP,AL=1,FL=103600,FLO=0)
REPLACE(STORE,INTCP,AL=1,FL=14200,FLO=0)
REPLACE(CISCARD,INTCP,AL=1,FL=12800,FLO=0)
REPLACE(FETCH,INTCP,AL=3,FL=14000,FLO=0)
REPLACE(XEG,INTCP,AL=3,FL=15300,FLO=0)
REPLACE(PASSWDC,INTCP,AL=7777,FL=46400,FLO=0)
REPLACE(ASSET,INTCP,AL=1,FL=10200,FLO=0)
REPLACE(REAC,INTCP,AL=3,FL=7400,FLO=0)
REPLACE(ERRCRS,INTCP,AL=3,FL=26000,FLO=0)
REPLACE(TESTLP,INTCP,AL=3,FL=2000,FLO=0)
REPLACE(EDITOR,INTCP,AL=3,FL=37000,FLO=0)
FINISH.
LIBRARY(SYSCLASS,OLD)
REPLACE(INTCP)
REPLACE(G6000,G7000,INTCP)
REPLACE(ERFTN+ERRUN,INTCP)
FINISH.
LIBRARY(IGS274,OLD)
REPLACE(,* ,IGS,AL=0)
FINISH.
COMPLETE.
ENDRUC.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

PASSWORD FILE CREATION

Access to the INTERCOM system is controlled by passwords. The user must specify a valid password to log in to the INTERCOM system. Two types of passwords exist:

Restricted passwords: When he logs in, the user must specify a valid user-name associated with the given password. The installation defines valid password/user-name combinations. A user id (two alphanumeric characters) is assigned by the PASSWRD utility, and it is permanently associated with the password/user-name. This user id is assigned from a pool of available user ids; it is marked as available again only when the password/user-name is deleted.

Unrestricted passwords: The user may specify any user-name when he logs in; the user-name is not validated. However, when a user first logs in under a given user-name, a user id is associated by the LOGIN utility with that password/user-name combination. Thereafter, this user id is associated with the password/user-name combination, until the password/user-name is deleted from the system.

Through the INTERCOM routine PASSWRD, the installation defines valid restricted password/user-name combinations and valid unrestricted passwords and accounting values to be associated with the password/user-names or passwords. PASSWRD must be called from a data deck submitted to the central site as a batch job. The routine will create two permanent files (or edit existing files). One file, with the permanent file name INTERCOMPASSWDS, contains all unrestricted passwords, all restricted password/user-names, and all accounting information. The other file, with the permanent file name INTERCOMUNRESTRICTED, contains a bit map defining assigned user ids; it also contains all unrestricted password/user-name combinations currently specified at LOGIN time.
A total of 1296 user ID's (all possible 2-character combinations of A-Z, 0-9) are available to the INTERCOM system. User ID's are assigned permanently to password/user-name combinations. Installations with many users should:

Instruct users of unrestricted passwords always to use the same character string for user-name when logging in.

Make use, on a regular basis, of the editing facilities in PASSWRD to delete all unrestricted user-names, etc, freeing user ID's.

While a user is in the process of logging in, he is assigned a temporary ID. Temporary ID's begin with one of the following special characters: + - */ ( ) $ =

The following deck structure can be used to run the PASSWRD routine, creating a password permanent file:

```
Job card.
PASSWRD.
7/8/9
NEW
ADD
.
.
6/7/8/9
```

The following deck structure can be used to modify existing password permanent files:

```
Job card.
PASSWRD.
7/8/9
OLD
ADD or
DEL
.
.
6/7/8/9
```

This mode of PASSWRD operation will update the existing permanent files by adding new or deleting old entries. If both files do not exist a PF ERROR=12B will abort the run.

To protect against unauthorized modification of the password files, the PASSWRD utility requests permission from the console operator before any modifications are made.

Between the NEW (or OLD) card and the 6/7/8/9 card appear the parameter cards which specify the new entries or the editing requirements. After a NEW card, only ADD parameter cards may appear; after an OLD card, either ADD or DEL parameter cards may appear. The ADD card creates a new entry, or replaces an old entry which has the same password/user-name. The DEL card deletes one or more entries. The NEW card may be used to delete existing files entirely and to construct new ones.
The format for an ADD parameter card is:

```
ADD U=username,P=password,F=flength,T=time,A=accevl,N=nfiles
```

- **username**: User name (1-10 alphanumeric characters) must be specified for restricted passwords; it must be blank or omitted for unrestricted passwords.
- **password**: Password (1-10 alphanumeric characters) must be specified. It must be the only unrestricted password of this name defined by the installation. If it is restricted, it must be the only password/user-name of this particular combination defined by the installation. (If the password or password/user-name have been previously defined, the ADD card will function as a replace.)
- **flength**: Maximum field length available to the user (1-6 octal digits). If blank or omitted, 60000 octal CM words will be assumed. This value may not exceed IP.MFL.
- **time**: Time limit for user's session (1-4 octal digits, also defines the maximum ETTL for individual jobs). If blank or omitted, 500 octal seconds will be assumed.
- **accevl**: Access level/permission bits for the user (1-4 octal digits). This value defines which programs the user can access. If blank or omitted, an access level of 5 is assumed.
- **nfiles**: Number of files this user is permitted to attach as local files at any one time (1-2 octal digits). If blank or omitted, 24 (octal) files will be allowed. This value may not exceed 76B.

All parameters start after column four on the ADD and DEL cards. They may be specified in any order and should be separated by delimiters (special characters).

The DEL card is used to delete one or more entries from one or both of the permanent files. It has two formats:

```
DEL U=username,P=password
DEL I=id
```
username

May take three forms: 1-10 alphanumeric characters, blank, or the character string *NAMES. If the first form is used, the password/user-name combination (restricted or unrestricted) will be deleted; and the user ID will become available. If the second form is used, all entries in the two files with the given password will be deleted. All user ID's associated with these entries will become available; the password will no longer be defined. The third form may be used only if the specified password is unrestricted. All entries in the unrestricted password file with the given password will be deleted, and the associated ID's will be made available. The password will still be defined.

password

Password to be processed. Whether an unrestricted password is deleted or not depends on the username parameter. If password is *NAMES, all user-names for all unrestricted passwords will be deleted from the permanent files; and the user ID's for these user-names will become available. The unrestricted passwords will still be defined.

ID

User ID; may be used as a shorthand notation to specify the password/user-name associated with this user ID. The given password/user-name entry (restricted or otherwise) is deleted and the user ID becomes available. If the password is unrestricted, it will still be defined.
VERIFICATION PROCEDURE

INTERCOM is brought to control point zero when INTERCOM is entered at the
console after the operator has entered the time.

The verification procedure cannot proceed unless a permanent file has been
established containing the user passwords.

The following sample from a Teletype terminal session will indicate if
INTERCOM 4.1 is installed correctly. The underlined characters are typed by
the user.

CONTROL DATA INTERCOM 4.1
DATE 07/19/72
TIME 14.11.41.

PLEASE LOGIN
LOGIN
ENTER USER NAME-USERA
********** ENTER PASSWORD-

07/19/72 LOGGED IN AT 14.12.30.
WITH USER-ID BT
EQUIP/PORT 54/03
COMMAND- FILES
NONE
COMMAND- EDITOR
**FORMAT,FORTRAN
**FORMAT,SHOW
CH= 72 TAB CHAK=; TAB COL= 7
**CREATE
100=;PROGRAM A(OUTPUT)
110=;PRINT 1
120=;FORMAT(* TEST*)
130=;END
140==
**SAVE,R
**RUN,FN
.084 CP SECONDS COMPILATION TIME
TEST
END A
**BYE,BYE
COMMAND- FILES
--LOCAL FILES--
B $INPUT $OUTPUT LGO
COMMAND- RETURN,B
COMMAND- RETURN, LGO
COMMAND- FILES
--LOCAL FILES--
   $INPUT $OUTPUT
COMMAND- EDITOR
   **FORMAT, BASIC
   **FORMAT, SHOW
CH= 72 TAB CHAR=; TAB COL= 0
   **10 PRINT # TYPE A NUMBER OR 0 (ZERO) TO END #
20 INPUT X
25 IF X=0 THEN 80
30 F=1
40 FOR I = 1 TO X
50 F = F * I
55 NEXT I
60 PRINT # FACTORIAL # X; # IS #F;
70 GO TO 10
80 END
SAVE, BASIN
**EYE
COMMAND- REWIND(BASIN)
COMMAND- CONNECT(BASOUT)
COMMAND- BASIC(I=BASIN, K=BASOUT)

TYPE A NUMBER OR 0 (ZERO) TO END
\ 2
 FACTORIAL 2 IS 2 TYPE A NUMBER OR 0 (ZERO) TO END
\ 3
 FACTORIAL 3 IS 6 TYPE A NUMBER OR 0 (ZERO) TO END
\ 4
 FACTORIAL 4 IS 24 TYPE A NUMBER OR 0 (ZERO) TO END
\ 0
COMMAND- DISCONT, BASOUT
COMMAND- FILES
--LOCAL FILES--
   $INPUT $OUTPUT BASIN BASOUT
COMMAND- LOGOUT
CP TIME  2.819
PP TIME  21.796
CONNECT TIME  0 HRS. 11 MIN.
07/19/72 LOGGED OUT AT 14:23:42.
RELEASE DESCRIPTION

HARDWARE CONFIGURATION

PERT/TIME requires a minimum hardware configuration of one computer with at least 65K central memory, three tape units, and the other minimum equipment required by SCOPE.

RELEASE MATERIALS

PERT/TIME is released on program library PL13.

LIMITATIONS

Since the file names TAPE1 through TAPE6 are used internally, no user file name may be TAPE1-6.

CORRECTIONS

All eligible PSR code as published through PSR Summary 312 has been added to the program library.

GENERAL PROCEDURES

PERT/TIME 1.2 runs under SCOPE 3.4 and is on the PL13 program library tape.

INSTALLATION PARAMETERS

None for PERT/TIME.

INSTALLATION PROCEDURES

PL13 contains 4 files. File 1 is the program library; file 2 contains PERT in overlay format. Files 3 and 4 contain the installation and verification program decks.

To obtain these decks, perform the job:

    Job card.
    REQUEST(PL13,E)
    REWIND(PL13)
    SKIPF(PL13,2,17)
    COPYBF(PL13,PUNCH,2)
    UNLOAD(PL13)
    6/7/8/9

PUNCH INSTALLATION AND VERIFICATION DECKS
The installation deck PERT provided as release tape file 3 compiles the PERT/TIME product, forms the necessary overlays, and writes these overlays on the program library tape. PERT must be executed from this overlay tape; PERT cannot be executed from the running system. It is not possible to build a PERT/TIME binary tape or to execute programs on a computer with only 32K memory.

To execute from the overlay tape, the following deck is required:

```
PERT,T1000,CM120000,TP1.
REQUEST TAP,E.
REWIND(TAP)
SKIPF(TAP,1,17)
COPYBF(TAP,PERT66)
PERT66.
7/8/9    PERT networks
7/8/9
6/7/8/9
```

If a master tape is made, insert after card 3:

```
REQUEST TAP66,MT.
```
If an old master tape is input and a new master tape saved, insert the following after card 3:

REQUEST TAPE4,MT. OLD MASTER
REQUEST TAPE6,MT. NEW MASTER

If either option is used the TP1 job card parameter must be increased.

Successive PERT/TIME networks may be processed by batching as follows:

K  L  M  X  Y  W
A  PERT BATCHED NETWORKS
  •  •  •  A  Z  K  L  •  •  •  Z

(Input for each network starts with the K control card and ends with the Z control card).
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<td>23 26</td>
<td></td>
<td>.99</td>
<td>4.1</td>
<td>5/27/65</td>
<td>7/16/65</td>
<td>6.4</td>
<td>0.1</td>
<td>0.1</td>
<td>7/16/65</td>
<td>4.1</td>
<td>0.0 22</td>
</tr>
<tr>
<td>24 27</td>
<td>24 27</td>
<td></td>
<td>.99</td>
<td>5.1</td>
<td>6/3/65</td>
<td>8/2/65</td>
<td>8.4</td>
<td>0.1</td>
<td>0.1</td>
<td>8/2/65</td>
<td>5.1</td>
<td>0.0 21</td>
</tr>
<tr>
<td>25 25</td>
<td>25 25</td>
<td></td>
<td>.99</td>
<td>5.6</td>
<td>5/5/65</td>
<td>6/24/65</td>
<td>7.1</td>
<td>0.1</td>
<td>0.1</td>
<td>6/24/65</td>
<td>5.6</td>
<td>0.0 42</td>
</tr>
<tr>
<td>25 27</td>
<td>25 27</td>
<td></td>
<td>.99</td>
<td>4.5</td>
<td>7/26/65</td>
<td>8/2/65</td>
<td>8.4</td>
<td>0.1</td>
<td>0.1</td>
<td>8/2/65</td>
<td>4.5</td>
<td>0.0 11</td>
</tr>
<tr>
<td>26 27</td>
<td>26 27</td>
<td></td>
<td>.99</td>
<td>3.0</td>
<td>6/17/65</td>
<td>8/2/65</td>
<td>8.4</td>
<td>0.1</td>
<td>0.1</td>
<td>8/2/65</td>
<td>3.0</td>
<td>0.0 23</td>
</tr>
</tbody>
</table>
VERIFICATION PROGRAM

Output from the PERT/TIME Verification program follows. The time required to run this program is less than two minutes of 6400 computer clock time.

SCCFE 3.4
05.45.08.VPERT37
05.45.09.VPERT,CM120000,T7000,TP1.*
05.45.09. THIS SIMPLE PROGRAM VERIFIES CORRECT IN
05.45.09.STALLATION OF
05.45.09. PERT/TIME
05.45.09.REQUEST,PL13,E,H. LATEST PERT/TIME OLD P
05.45.09.L
05.45.52.( MT25 ASSIGNED)
05.45.52.REWIND,PL13.*
05.45.53.SKIPF(FL13,1,17)
05.45.57.MT25 VOLUME SERIAL NUMBER IS 004246
05.46.02.COPYBF(PL13,PERT6E).
05.46.14.$MT 25 RD RVD TAPE PAR ERR
05.46.14.$MT 25 PRU = 00000221
05.46.17.RETURN(PL13)
05.46.18.PERT6E.
05.46.27.* 8.464 RT SECONDS LOAD TIME
05.47.36.STOP
05.47.39. END CF JOB
05.47.39.CPA 4.049 SEC.
05.47.39.PP 60.938 SEC.
RELEASE DESCRIPTION

SIMSCRIPT Version 2.0 operates under SCOPE 3.4 on the same minimum configuration as SCOPE.

RELEASE MATERIALS

The release materials for SIMSCRIPT Version 2.0 are included on program library tape PL14.

CORRECTIONS

All eligible PSR code as published through PSR Summary No. 312 has been added.

LIMITATIONS

SIMSCRIPT Version 2.0 operates under SCOPE 3.4 in conjunction with COMPASS 3.0 and either FORTRAN Extended 3.0 or FORTRAN 2.3.

Jobs interfacing with FORTRAN 2.3 require a card of the form LIBRARY (RUN2P3, SYSIMISC) preceding the LGO directive. Jobs interfacing with FORTRAN Extended 3.0 require the V3.0 FTN object library to be installed and a card of the form LIBRARY (SYSIMISC) preceding the LGO directive.

INSTALLATION PARAMETERS

None

INSTALLATION PROCEDURES

PL14 contains 6 files. File 1 contains the SIMSCRIPT program library; file 2 contains the relocatable binary of the execution time routines; file 3 contains the compiler overlays in absolute binary format. Files 4 and 5 contain the installation decks; file 6 contains the verification program.

To obtain the SIMSCRIPT installation and verification decks, perform the following job:

Job card.
REQUEST(PL14,E) MOUNT SIMSCRIPT PL
REWIND(PL14) PUNCH INSTALLATION AND VERIFICATION DECKS
SKIPF(PL14,3,17)
COPYBF(PL14,PUNCH,3)
UNLOAD(PL14)
6/7/8/9

60307400 C
Job SIMSC1 is a maintenance deck which creates a release format tape containing a revised program library and compiled binary. Job SIMSC2 can be used to enter SIMSCRIPT into the running system through EDITLIB either from the released tape or from the tape created by SIMSC1. Job SCOPE3, described in section 1, then should be run to generate a deadstart tape of the running system.

SIMPSC1,CM65600,T7000,MT02.
COMMENT, THIS JOB UPDATES AND CREATES THE BINARY OF SIMSCRIPT
COMMENT, THE NEW PL14 WILL CONSIST OF THREE FILES
COMMENT, THE FIRST FILE WILL BE THE SIMSCRIPT NEWS.
COMMENT, THE SECOND FILE WILL BE THE BINARY
COMMENT, OF THE RELOCATABLE CP ROUTINES
COMMENT, THE THIRD FILE WILL BE THE BINARY OF THE OVERLAY SIMS
LAEEL(PL14IN,F,L=SIMSCRIPT*3F4,D=HI) SIMSCRIPT PL
REQUEST,PL14,H,HI, SCRATCH FOR NEW PL14
LAEEL(PL14,H,K=SIMSCRIPT*3F4,D=HI)
REWIND(PL14IN,PL14)
SKIPF(PL14IN,5,17)
COFYEF(PL14IN,SIMS)
REWIND,SIMS.
UPATE(IF,P=PL14IN,N=PL14)
UNLOAD(PL14IN)
SIMS(I=CMPFILE,L=0) SIMS CREATES COMPASS SOURCE ON FILE MAPTP
COMPASS(I=MAPTP,L=0,S=GPTEXT,S=IFTEXT)
REWIND,LGC.
SKIPF(PL14,1,17)
COFYEF(LGC,PL14)
REWIND,LGC.
COFYEF(LGC,SIMEIN,85)
REWIND,SIMS.
LOAD(SIMBIN)
NOGO.
REWIND,SIMS.
COFYEF(SIMS,PL14)
UNLOAD(PL14)
7/8/9 END OF RECORD
*/ ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE
VERIFICATION PROGRAM

The verification deck provided with the release validates SIMSCRIPT. The validation consists of a SIMSCRIPT job with a report. The time required to run the validation job is about one minute. The output includes the actual validation (magic squares) and dayfile as follows:

THIS IS A 3 BY 3 MAGIC SQUARE. ALL OF THE ROWS, COLUMNS AND DIAGONALS SUM 10 15

4   3   8
9   5   1
2   7   6

THIS IS A 5 BY 5 MAGIC SQUARE. ALL OF THE ROWS, COLUMNS AND DIAGONALS SUM 10 65

11  10  4  23  17
18  12  6  5  24
25  19  13  7  1
2  21  20  14  8
9   3   22  16  15

60307400 A       I-16-3
SCOPE 3.4
07/14/72

21.16.04. 12.738 RT SECONDS LOAD TIME
21.16.11.COMPASS(I=MAP1P,L=0)
21.16.18.ASSEMBLY COMPLETE. 46600B SCM USED.
21.16.18. 4,555 CPU SECONDS ASSEMBLY TIME.
21.16.18.MAP(OFF)
21.16.18.LOSET(LIB=SYNMSC)
21.16.19.LGO.
21.16.23. 4.191 RT SECONDS LOAD TIME
21.16.24. END OF JOB
21.16.24.CPA 9.227 SEC.
21.16.24.PP 6.847 SEC.
21.16.24.IO 1.004 SEC.
RELEASE DESCRIPTION

8231 IMPORT HIGH SPEED (HS) version 1.0 operates in conjunction with INTERCOM 4.1 under SCOPE 3.4. It is coded in OSAS-A format and may be assembled on the central computer using IMPASSE (IMPORT Assembler). Off-line utility functions of card-to-printer and card-to-punch (if the configuration includes a card punch) are provided.

This system provides a remote job submission center, which accepts jobs for 6000 SCOPE 3.4 in the same unit record format as the central site and provides identical unit record output within hardware limitations.

HARDWARE CONFIGURATION

The minimum configuration for the 8231 IMPORT HS Terminal is as follows:

8090 Computer (8K is minimum core requirement for IMPORT and buffers)
161 On-Line I/O Typewriter
3681 Data Channel Converter
3447/405 Card Reader
3256/501 Line Printer
8529-B Data Set Adapter on dedicated Buffered Data Channel (BDC)

Hardware Options

A 160-A Computer may be substituted for the 8090. A 3446/415 Card Punch may be included in the 8231 Terminal configuration.

Communication Link

Each terminal is connected to the central site by a communication link consisting of two DATAPHONE Data Sets 301B or 303, and one TELPAK A communication line, or their logical and physical equivalent.
Logical Unit Assignments

Equipment numbers for the 8231 should be assigned as follows:

Card Reader  3
Card Punch   4
Line Printer 5

RELEASE MATERIALS

An updated program library for 8231 IMPORT HS 1.0 is contained on program library tape PL15.

Corrections

All eligible PSR code as published through PSR Summary No. 312 has been added to the program library.

ADDITIONAL INFORMATION

IMPASSE

IMPASSE (Import Assembler) is designed to assemble 8231 IMPORT HS programs under the SCOPE Operating System on CONTROL DATA 6000 Series computers. It is intended for installations using 8231 HS terminals which do not have adequate peripheral equipment for program assembly.

IMPASSE is coded in FORTRAN, except for the subroutine SHIFT, which is coded in COMPASS. 8231 IMPORT HS is written in standard OSAS-A format.

In the assembly process, IMPASSE reads input from file TAPE1 and produces binary output on file TAPE2 and an assembly listing, including a symbol reference table, on the OUTPUT file.

IMPASSE produces binary output for the 8231 HS terminal system.

The terminal identification in 8231 IMPORT is not used under INTERCOM 4.1; the central site assigns an ID and notifies IMPORT.

Job Input Limit Bypass

The statement ?DVT,'LP may be entered by the operator to divert all line printer output to the central site. When this statement is entered, the job input limit will be ignored and all line printer output will be diverted to the central site until the system is reloaded.
GENERAL PROCEDURES

Installation of 8231 IMPORT HIGH SPEED version 1.0 requires the following:

1. Setting of installation parameters for:

   Connect Codes
   Equipment numbers
   Number of active jobs

2. Assembling 8231 IMPORT HS.

3. Bootstrapping IMPORT on the 160A computer by using the binary deck (output from the assembly).

INSTALLATION PARAMETERS

Connect codes for terminal equipment are assembled at the beginning of 8231 IMPORT HS as shown below. The card format for IMPASSE differs from that of COMPASS; the location field begins in column 2, the operation field in column 10, and the variable field in column 15.

<table>
<thead>
<tr>
<th>LPCN</th>
<th>EQU</th>
<th>5000</th>
<th>Line Printer is equipment 5 (8231IMP.80)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRCN</td>
<td>EQU</td>
<td>3000</td>
<td>Card Reader is equipment 3 (8231IMP.81)</td>
</tr>
<tr>
<td>CPCN</td>
<td>EQU</td>
<td>4000</td>
<td>Card Punch is equipment 4 (8231IMP.82)</td>
</tr>
</tbody>
</table>

An equipment number may be changed by replacing the appropriate EQU card. If the configuration does not include a card punch, the CPCN card may be made any value by EQU, but the CPUNCH card must be made equal to 0 by EQU. The default value assumes the card punch is present.

| CPUNCH EQU | 0 | Card Punch is absent |
| CPUNCH EQU | 1 | Card Punch is present (OHP28.1) |
The installation may choose any value as a control on the number of jobs active at any time from the terminal. The default value is 25.

JOBLIM EQU 25 Number of jobs active (QHP21.1).

The installation may choose either the 026 or the 029 character set at installation time only. The 026 character set is the default value. This cannot be overridden from the terminal.

To use the 026 characters, set:

CONTB EQU DISBCD

To use the 029 characters, set:

CONTB EQU DISB29

This card is located at QHP36.110.

Logical Terminal Assignments

A terminal line number is determined by the physical connection.

INSTALLATION PROCEDURES

PL15 contains three files: file 1 contains the IMPASSE assembler and 8231 IMPORT HS program library in UPDATE format, file 2 contains the installation deck, and file 3 the verification program.

The installation and verification decks as listed below can be obtained by performing the job:

Job card.
REQUEST(PL15,E)
REWIND(PL15)
SKIPP(PL15,1,17)
COPYBF(PL15,PUNCH,2) Punch installation and verification decks
UNLOAD(PL15)
6/7/8/9

Ident I864CS, as included on the released 8231 IMPORT HS program library, activates selection of the 64-character sets at the remote site. This ident is deactivated however by an update YANK directive included in the installation deck. The installation deck as provided forces selection of the 63-character set; to select the 64-character sets, the YANK card must be removed.
1. To assemble 8231 IMPORT HS, the following job is run on the 6000 computer:

```
IMFHS,CM55000,70000,MT02.
COMMENT. THIS JOB CREATES A NEW FL15 AND A
COMMENT. EINARY DECK OF 8231 IMPORT
LABEL(FL15K,R,L=8231IMPORT,D=HI)
REQUEST(FL15,R,H) SCRATCH FOR NEW FL15
LABEL(FL15,H,L=8231IMPORT,D=HI)
REWINC(FL15IN;FL15)
UPATE(F,P=FL15IN,N=PL15)
UNLOAD(PL15IN)
UPDATE(O,P=FL15)
UPATE(O,C=TAPE1,P=FL15) UPDATE IMPORT 8231 HS
RUN(S,,COMPILE,,,4000) COMPILE IMPASSE
RETURN(FL15)
LSEG(LIE=RUN2F3/SYSIC/NUCLEUS)
LGC. EXECUTE IMPASSE
COMMENT. THE BINARY OF IMPORT HS IS WRITTEN ON TAPE2
REWINC(TAPE2)
COFYEF(TAPE2,FUNCHB) PUNCH 160A BINARY DECK
7/8/9 END CF RECORD
*/ ACC CORRECTION HERE
7/8/9 END CF RECORD
*CMFILE;IMFASSE
7/8/9 END CF RECORD
*ICENT YK4645S
*YANK 10645S
*ICENT IMP8231
*/ FOLLOWING CARDS ARE SAMPLE ONLY
*DELETE CHF21.1
JCLIHK EQL 25 ADD JOB LIMIT DESIRED
CFUNCH EQL 1 IF CARD PUNCH, 0 IF NONE
*DELETE CHF28.1
*DELETE 8231IMP,80,8231IMP,82
CRFCN EQL 3000
CRFCN EQL 4000
LFCN EQL 5000
*DELETE CMF36,110
CCLNT EQL DISCOCD
*CMFILE;8231IMP
7/8/9 END CF RECORD
6/7/8/9 END OF FILE
```

The output from this job will be a listing of 8231 IMPORT HS plus a binary deck of IMPORT for the 160A computer. The card numbered 1 in column 80 is a one-card loader read by the bootstrap program (step 2) which loads the program following it. This should be first card in the deck. The EOR card following card 101(octal) must be discarded; the next EOR card remains as the last card. The IMPORT program cards that precede the second EOR card must be retained. The deck is ready for loading into the 8231 system.
2. Enter the following program at location 7524 in bank 1:
   a. While holding BANK CLEAR button, press MASTER CLEAR.
   b. Set ENTER/SWEEP switch to ENTER.
   c. Set REL BANK to 1 (set bit 0).
   d. Set register P to 7524.
   e. Set register Z to the following values, pressing the RUN/STEP switch to STEP once after each value is entered. The value of the P register advances by one with the addition of each entry.
      
      0061
      7500
      6004
      2200
      x000  (x is card reader/equipment number)
      7677
      7500
      6020
      7202
      7656
      7536
   
   f. Both P and A registers should contain 7536.
   g. Neutralize all switches and MASTER CLEAR.

3. Read the IMPORT binary deck:
   a. Set REL BANK to 1.
   b. Set register P to 7524.
   c. Place the IMPORT program binary deck in card reader.
   d. Press MOTOR POWER, RELOAD MEMORY, and READY buttons.
   e. Set RUN switch to run.
   f. When all cards are read in, neutralize RUN/STEP switch.
   g. Press MASTER CLEAR and set RUN/STEP switch to RUN.
   h. Computer will halt if typewriter switches are not up or if the DSC is not operating properly.
   i. //IMPORT READY is typed out and IMPORT HS will wait for operator to specify action to be taken.
If loading of the IMPORT binary deck stops before the last card is read, start again at step 1.

A MASTER CLEAR followed by a RUN will re-initialize IMPORT.

If END is typed, IMPORT can be placed in operation by placing the RUN/STEP switch to RUN.

VERIFICATION PROGRAM

Remote terminal output from the 8231 IMPORT HS verification program which verifies communication with computer at the central site follows. This job requires less than one minute of 6400 computer clock time.

SCOPE 3.4 07/14/72
21.15.53.V823100
21.15.53.V8231,CM10000,T100.
21.15.53.
21.15.53. THIS VERIFIES CORRECT INTERACTION OF 82
21.15.53.31 IMPORT HS
21.15.53. VIA INTERCOM 4.1
RELEASE DESCRIPTION

Participants of the APT Long Range Program have released Standard APT Systems to the public domain; therefore, Control Data 6000 APT Version 2.2 is available to all 6000 users. Version 2.2 supersedes Version 2.1.

HARDWARE CONFIGURATION

125K (octal) of core is required to create the APT version 2.2 system, and 65K (octal) of core is required to execute it. A minimum of 65K (octal) of core is required to compile the APT version 2.2 system.

Three tape drives are required if all APT features are used; otherwise fewer tapes may suffice.

RELEASE MATERIALS

APT 2.2 is released under SCOPE 3.4 on program library tape PL16.

MODIFICATIONS

The release materials are now in UPDATE 1.2 program library format.

CORRECTIONS

All eligible PSR code (except AT20025, allowing compilation by FORTRAN Extended 4.0) published through PSR Summary 312 has been added to APT.

ADDITIONAL INFORMATION

Post-processors can be handled in one of two ways: they can be installed on the SCOPE system library by making one entry per post-processor into the LBSRCH table. The routine DISPAT can be modified to call OVERLAY and run the post-processor from a separate overlay tape.
INSTALLATION PROCEDURES

The APT release tape contains five files. File one is the program library, file two is the compiled binary in relocatable format, file three is compiled binary in absolute overlay format, files four and five are the installation decks, and file six is the installation verification program. To obtain these card decks perform a job of the type:

Job card.
REQUEST PL16,E.       MOUNT APT PL.
REWRITE PL16.
SKIPF(PL16,3,17).
COPYBF(PL16,PUNCH,3)
UNLOAD PL16.
6/7/89

Deck APT1 will serve as a program library maintenance deck in that it allows regeneration of the APT program library and binary file. Deck APT2 will use EDITLIB to enter APT into the running system either from the release tape or from a tape created by deck APT1.

APT1,CM125000,TF02,T3500.
COMMENT THIS JOB UPDATES AND CREATES THE BINARY OF APT 2.2
COMMENT THE FIRST FILE OF THE NEW PL16 WILL BE THE PROGRAM LIBRARY,
COMMENT FILE TWO WILL BE THE RELLOCATABLE BINARY PRIOR TO OVERLAY
COMMENT FORMATION, AND FILE THREE WILL BE THE FORMED OVERLAYS.
LAEL(FL161,F,L=AP2F2*3P4,D=HI)
REQUEST FL16,N,H1, SCRATCH FOR NEW PL16
LAEL(FL16,W,L=AP2F2*3P4,D=HI)
REWRITE(FL16,PL16IN)
UPDATE(D,F,FL16IN,N=PL16)
UNLOAD FL16IN.
RUN(S,1001,CMFILE,LIST,LGO,500000)
REWRITE FL16,LGO.
SKIPF(FL16,1,17)
COFYEF(LGC,FL16,1)
REWRITE LGC.
LOAD(LGC)
NOGO.
REWRITE LISTAP.
COFYEF(LISTAP,FL16,1)
UNLOAD FL16.
7/8/9 END CF RECORD
ifdef CCCRECTIONS HERE
endif
7/8/9 END CF RECORD
6/7/8/9 END OF FILE
APT2,CM5500,77000,MT1.
COMMENT. THIS JOB TAKES THE APT V2.2 BINARY OVERLAYS AND EDITLIBS THEM
COMMENT. INTO THE RUNNING SYSTEM FROM THE PL16 TAPE.
LABEL(FL16,R,L=APT2P2*3P4,0=HI) MOUNT PL16
REHIND,FL16.
SKIFF(FL16,2,17)
COFYBF(FL16,LIETAP)
REHINC,FL16,LIETAP.
UNLOAD(FL16)
EDITLIB(SYSTEM)
COMMENT. *** END OF JOB ***
7/6/9 END CF RECORD
READY(SYSTEM)
LIBRARY(NUCLELS,OLD)
REPLACE(APT,LIETAP,AL=3,FL=65000,FLO=1)
FINISH.
LIBRARY(SYSCVL,CLD)
REPLACE(*,LIETAP,AL=0)
FINISH.
COMPLETE.
ENCRUN.
7/8/9 END CF RECORD
6/7/8/9 END OF FILE

VERIFICATION PROGRAM

Output from the verification program for APT 2.2 follows. Approximately 10
seconds of real time are required to run this program.

SCOPE 3.4

07/14/72
21.15.55.VAPT000
21.15.55.VAPT,CM66000,T1000.
21.15.55. THIS SIMPLE PROGRAM VERIFIES CORRECT IN
21.15.55. STALLATION OF
21.15.55. APT
21.15.55. APT.
21.17.25. 3.211 RT SECONDS LOAD TIME
21.17.35. END OF JOB
21.17.35.CPA   1.186 SEC.
21.17.35.PP    10.986 SEC.
21.17.35.10    1.475 SEC.
## Ruled Surface Test

**Cutter:** 0.50000

### From /STPT

<table>
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<th>X</th>
<th>Y</th>
<th>Z</th>
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**DS IS/CIR2**

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<th>Y</th>
<th>Z</th>
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</thead>
<tbody>
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<td>0.0000000</td>
</tr>
</tbody>
</table>

**CIR2** (0) = **CIRCLE**/ 3.0000 1.5000 0.0000 3.0000

**DS IS/CIR2**

<table>
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<tr>
<th>X</th>
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<th>Z</th>
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</tr>
</tbody>
</table>

**DS IS/RS1**

<table>
<thead>
<tr>
<th>X</th>
<th>Y</th>
<th>Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7500000</td>
<td>3.6556676</td>
<td>3.6002807</td>
</tr>
<tr>
<td>2.7500000</td>
<td>3.2325055</td>
<td>5.0000479</td>
</tr>
</tbody>
</table>

**FINI**

**End of Part Program**
RELEASE DESCRIPTION

6000 BASIC version 2.0 runs under SCOPE 3.4. The minimum hardware configuration to operate BASIC 2.0 in batch mode is the minimum configuration required for SCOPE. The minimum hardware configuration to operate BASIC 2.0 from a terminal is the minimum configuration for INTERCOM version 4.1.

RELEASE MATERIALS

The release materials for BASIC 2.0 are provided on program library tape PL17.

CORRECTIONS

All eligible PSR code as published through PSR Summary No. 312 has been included on the BASIC program library.

ADDITIONAL INFORMATION

BASIC 2.0 is designed to be operated primarily from a terminal with a normal mode of operation of compile to core and execute. Thus, the BASIC compiler also includes the run time system which consists of one overlay. BASIC 2.0 can be operated in batch mode allowing the generation of load-and-go files, etc., from a BASIC program. The installation deck also creates a relocatable copy of the run-time system which is used only if a BASIC program is executed via the loader.

INSTALLATION PARAMETERS

BASIC 2.0 has no installation parameters. However, the following procedures may be used to make BASIC 2.0 compatible with BASIC 1.0 in the two areas where they differ.

1. In BASIC 1.0, unary minus was performed first. In BASIC 2.0, it is performed following exponentiation. Thus -2**2 = 4 in BASIC 1.0 and -4 in BASIC 2.0. To perform unary minus first, the correction identifier UNMIN should be removed with the *YANK directive.

2. In BASIC 1.0, the lower limit was zero for array dimensions; in BASIC 2.0, it is one. To allow a lower limit of zero, the correction identifier DIM should be removed with the *YANK directive.
INSTALLATION PROCEDURES

PL17 contains five files: File 1 contains the program library; file 2 contains the compiler in absolute binary; file 3 contains the compiler in relocatable binary; files 4 and 5 contain installation decks; file 6 contains the installation verification deck.

The two installation decks and the verification program may be obtained by performing the following job:

```
Job card.  MOUNT BASIC 2.0 PL
REQUEST(PL17,E)  SKIP PL AND BINARY DECKS
REWIND(PL17)  PUNCH INSTALLATION DECKS
SKIPF(PL17,3,17)  PUNCH VERIFICATION PROGRAM DECK
COPYBF(PL17,PUNCH,2)  
COPYBF(PL17,PUNCH,1)  
UNLOAD(PL17)  
6/7/8/9
```

Job BASIC1 is a maintenance deck which can be used to create a revised release format tape containing a modified program library and assembled binary. Job BASIC2 can be used to enter BASIC into the running system through EDITLIB either from the released tape or from the tape created by deck BASIC1. Job SCOPE3, described in section 1, then should be run to capture the running system on a deadstart tape.
BASIC1,CM56000,T7000,M102.
COMMENT. THIS JOB UPDATES AND CREATES THE BINARY OF BASIC
COMMENT. THE NEW PL17 WILL CONSIST OF THREE FILES
COMMENT. THE FIRST FILE WILL BE THE BASIC NEMPL
COMMENT. THE SECOND FILE WILL BE THE BINARY OF BASIC
COMMENT. THE THIRD FILE WILL BE THE RELOCATABLE BINARY OF THE BASIC OVERLAYS
LABEL (FL17IN,R,L=BASIC2P0*3P4,D=HI) MOUNT BASIC PL
REQUEST,FL17,R,HI. SCRATCH FOR NEW PL17
LABEL (FL17,W,L=BASIC2P0*3P4,D=HI)
REWIND (PL17IN,PL17)
UPDATE (F,F=FL17IN,N=PL17,X)
UNLOAD (FL17IN)
COMPASS (I=CMFILE,S=CPCTEXT,L=0,B=EASIC00)
COMPASS (I=CMFILE,S=CPCTEXT,L=0,B=BASRTS,S=IPTEXT)
COMPASS (I=CMFILE,S=CPCTEXT,L=0,B=IPTEXT,L=0)
COMPASS (I=CMFILE,S=CPCTEXT,L=0)
REWIND,EASIC00.
REWIND,BASRTS.
REWIND,LGO.
COFYER (EASIC00,EASOVER,2)
COFYER (BASRTS,EASOVER,9)
COFYBER (LGO,EASOVER)
LOAD (EASOVER) GENERATION OF OVERLAY BASIC
NOGO.
REWIND,EASIC.
REWIND,BASRTS.
REWIND,EASOVER.
REWIND(EASOVER)
SKIP (FL17,1,17)
COFYER (EASIC,FL17)
COFYBER (EASRTS,FL17)
COFYBER (EASOVER,FL17)
UNLOAD (FL17) 033
*/ ADD CORRECTIONS WERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

BASIC2,CM55000,T7000,M11.
COMMENT. THIS JOB TAKES THE BASIC BINARIES FROM FL17 AND EDITLBS
COMMENT. THEM INTO THE RUNNING SYSTEM. EITHER THE RELEASED VERSION OF
COMMENT. FL17 OR THE VERSION CREATED BY THE DECK BASIC1 MAY BE USED.
LABEL (FL17,R,L=EASIC2P0*3P4,D=HI) MOUNT PL17
REWIND,FL17.
SKIP (FL17,1,17) SKIP OLDPL
COFYER (FL17,BASIC,1) BASIC CONTROL CAR CALLABLE ROUTINE
COFYER (FL17,BASICL) BASIC LIBRARY
REWIND,FL17,BASIC,BASICL.
UNLOAD (FL17) 011
EDITLIB (SYSTEM)
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY (SYSTEM) 015
LITERARY (NUCLEUS,OLD)
REPLACE(*,BASIC,AL=3,FL=40000,FLO=1)
FINISH.
LITERARY (SYS#ISC,OLD)
REPLACE(*,BASICL)
FINISH.
COMPLETE.
ENDRUN.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE
VERIFICATION PROGRAM

The verification program supplied with the release compiles and executes two BASIC programs in batch mode. The first verifies that the compiler has been installed correctly and the second that the relocatable version of the runtime system has been installed correctly.

Less than one minute is required to run the verification program deck after BASIC 2.0 has been installed.

Output from the verification program follows:

BASIC LIBRARY INSTALLED CORRECTLY
THIS TEST DECK USED COMPILE TO LGO MODE
THANK YOU FOR INSTALLING BASIC 2.0

BASIC-6000  (2.0)  BASICXX  07/18/72  21.15 HRS
20 PRINT 'BASIC LIBRARY INSTALLED CORRECTLY=
30 PRINT
40 PRINT 'THIS TEST DECK USED COMPILE TO LGO MODE=
50 PRINT
60 PRINT 'THANK YOU FOR INSTALLING BASIC 2.0=
100 END

BASIC INSTALLED CORRECTLY
THIS DECK USED COMPILE AND EXECUTE MODE

08/23/72 SCOPE 3.4  SVSN58CLEVEL DE 08/10/72
09.45.18.VEASINE
09.45.18.VEASIC,CM5000,T100.
09.45.18. THIS SIMPLE PROGRAM VERIFIES CORRECT IN
09.45.18.STALLATION OF
09.45.18. BASIC 2.0
09.45.18.BASIC(L)
09.46.43.EASIC(L98,N)
09.46.45.MAP(OFF)
09.46.45.LGC,
09.46.49.  3.075 RT SECONDS LOAD TIME
09.46.51. END OF JOB
09.46.51.CPA  .184 SEC.
09.46.51.PF   5.211 SEC.
09.46.51.IO   .287 SEC.
RELEASE DESCRIPTION

ALGOL-60 Version 3.0 operates under the SCOPE 3.4 operating system. The minimum hardware configuration for ALGOL-60 is the minimum required by SCOPE.

RELEASE MATERIALS

The program library for ALGOL 3.0 is contained on the release tape PL18. This tape also contains installation materials for ALGOL 3.0.

MODIFICATIONS

The released default options during compilation include the F option (full ALGOL-60 checking). Under ALGOL 2.0 it was necessary to select F explicitly on the ALGOL control card. The ALGOL 2.0 default option now is represented in ALGOL 3.0 as the Q option. To achieve object code of maximum efficiency for debugging programs, it is necessary to select Q explicitly on the ALGOL control card. Installation parameters are provided for retaining the ALGOL 2.0 characteristic of producing Q option code by default.

A new control card parameter of the form, option=Q, is provided for removing installation default parameters. Also, a message indicating all active options is produced after each compilation.

It is no longer necessary for every call to a code bodied procedure to provide the same number of actual parameters.

The restrictions on the kind of arithmetic expression permitted for control of an implied-fcr-loop in an I/O list have been removed.

The N option is provided to suppress array bounds checking when the F option is active.

CORRECTIONS

ALGOL 3.0 incorporates all eligible PSR corrective code published in PSR Summaries up to and including Summary Number 312.

LIMITATIONS

The SCOPE control card REDUCE cannot be used when ALGOL programs are executed, since they use the space following the program as the stack area for all variables and for input-output buffers. For the same reason the REDUCE,OFF command should be used whenever necessary for interactive execution.

Segment mode loading (ALGOL control card options S, U, R, G) has been deactivated: attempts to use these options will result in job termination.
INSTALLATION PARAMETERS

Installation options are available in the following areas:

- Default compiler options
- Default execution-time options
- Graphic (character set) dependency

The default compiler options are handled by a macro, ALGOL. The parameters of the ALGOL macro are the compiler control card options required to be on by default (without specification). The release tape contains the following ALGOL call:

```
ALGOL     L,X,F
```

To change these compiler defaults, the macro parameters must be modified as follows:

```
*DELETE,V3CCARD.115
ALGOL     default options
*COMPILE,ALGOL,ALG0
```

The default execution time options are handled by a macro, OPTIONS. The parameters are execution time options which are required to be on by default (without specification). The parameters are provided in the same format as on an OPTIONS card. The release tape contains the following OPTIONS call:

```
OPTIONS     S=0,D=0,C=61,E=Y
```

To change these defaults, the parameters must be modified as follows:

```
*DELETE,V3DEFB0.156
OPTIONS     default options
*COMPILE,ALG1B00
```

If the compiler is dependent on the installation graphic set selection, IP.CSET, the punched card codes corresponding to certain ALGOL symbols (less than, left bracket, and right bracket) will differ between installations having different values of IP.CSET. The 64-character set will be card code compatible with ALGOL 2.0. The release tape is configured to override graphic set dependency, to maintain compatible source decks, and to preserve maximum character representation of ALGOL symbols. Override is achieved by the following instructions:

```
IPCHOVR    SET 1    override true
```

To establish a dependency on the value of IP.CSET the override must be turned off as follows:

```
*DELETE,V3CSET.42
IPCHOVR    SET 0
*COMPILE,ALGOL,ALG1
```
INSTALLATION PROCEDURES

The ALGOL 3.0 release tape contains eight files. File 1 contains the program library in UPDATE 1.2 format. File 2 contains relocatable binary of the object time routines. File 3 contains the absolute compiler overlays. File 4 contains binary of ALGTEXT. File 5 contains the relocatable binary of the compiler. File 6 contains a maintenance program deck. File 7 contains an installation program deck. File 8 contains a verification program deck. The three program decks can be obtained by running the following job.

Job card.
REQUEST(PL18,E) ALGOL 3.0 Release Tape
SKIP(PL18,5,17) Skip PL and binaries
COPYBF(PL18, PUNCH) Punch maintenance program.
COPYBF(PL18, PUNCH) Punch installation program.
COPYBF(PL18, PUNCH) Punch verification program.
UNLOAD(PL18)
6/7/89

The maintenance program, ALGOL1, produces an updated copy of the first five files of the release tape; it should be used for introducing installation parameters into the program library. Deck ALGOL1 requires access to the SCOPE program library tape.

The installation program, ALGOL2, uses the tape produced by the maintenance program, or the release tape if no modifications are required, to enter ALGOL 3.0 into the running system through EDITLIB.

System text ALGTEXT is installed by execution of decks ALGOL1 and ALGOL2.

ALGOL1,CMPFILE,PL18PL,MT02.
COMMENT. THIS JCB UPDATES AND CREATES THE BINARIES OF ALGOL.
COMMENT. THE NEW PL18 WILL CONSIST OF FIVE FILES.
COMMENT. THE FIRST FILE WILL BE THE ALGOL NEWPL.
COMMENT. THE SECOND FILE WILL BE THE BINARIES OF THE RELOCATABLE.
COMMENT. OF ROUTINES AND THE PP ROUTINES.
COMMENT. THE THIRD FILE WILL BE THE BINARIES OF THE OVERLAYS.
COMMENT. THE FOURTH FILE WILL BE THE BINARIES OF ALGTEXT.
COMMENT. THE FIFTH FILE WILL BE THE RELOCATABLE BINARIES OF THE ALGOL OVERLAYS.
REQUESTFL1,E,HY, LATEST SSCP PL.
UPDATE(F=PL18,N=OPL,C=0,G)
UNLOAC(PL18)
LABEL(FL18H,R,L=ALGOL3PG*3P4,D=HI) ALGOL OLDPL
REQUESTFL18,N=HI,
SCRATCH FOR NEW PL18
LABEL(FL18H,L=ALGOL3PG*3P4,D=HI)
REWINC(PL18IN,FL18)
UPDATING(F,F=FL18IN,N=PL18,X)
UNLOAC(PL18IN)
COMPASS(I=CMCPFL6,B=ALGOL,L=0,S=CPCTEXT,S=IPTEXT)
COMPASS(I=CMCPFL6,S=CPCTEXT,B=ALGOL,L=0,S=CPCTEXT,S=IPTEXT)
COMPASS(I=CMCPFL6,S=0,X=0PL,B=ALTTEXT,L=0)
REWINC(ALGCL)
LOAD(ALGCL) GENERATION OF ALGCL OVERLAYS
NO GO.
REWINC(ALGCLMP)

60307400 A  I-20-3
VERIFICATION PROGRAM

Dayfile output from running the installation verification program should appear similar to the following:

ALGOL IS BEST

```
SCOPE 3.4
21.15.55.VALGOL0
21.15.55.VALGOL,T100,CM56000.
21.15.56.ALGOL(L,0)
21.15.58.  1.653 RT SECONDS LOAD TIME
21.16.01.  0  332
21.16.01.MAP(OFF)
21.16.01.LGO.
21.16.04.  2.604 RT SECONDS LOAD TIME
21.16.06.  END OF JOB
21.16.06.CPA .587 SEC.
21.16.06.PP  4.624 SEC.

END OF ALGOL RUN *V3.0*
```
NORMAL OPERATING MODE

1. Press MC button.
2. Press LOAD ADDR button.
3. Enter 6400 via keyboard.
4. Press STEP button.
5. Press Bank 2 button.
6. Press OPR MEM button.
7. Press PROC MODE button.
8. Press RUN button.
9. Press ON LINE button.
10. Dial 6000 computer via dataphone.
11. When connection is made, type LOGIN on the keyboard and press SEND button.
12. Proceed as for normal INTERCOM communication.
RELEASE DESCRIPTION

SIMULA Version 1.0 runs under the SCOPE 3.4 operating system. The minimum hardware configuration required for SIMULA is the same as the minimum configuration required by SCOPE.

RELEASE MATERIALS

The updated program library for SIMULA is contained on the release tape PL19.

CORRECTIONS

All eligible PSR code as published through PSR Summary No. 312 has been added to the program library.

LIMITATIONS

Code procedures and direct files are not implemented.

The SCOPE control card REDUCE cannot be used when SIMULA programs are executed because the space following the program is used as the stack area for variables.

Segment mode loading (SIMULA control card options S, U, R, G) has been deactivated: attempts to use these options will result in job termination.

SIMULA expects compiler input to conform to the SCOPE 63 character set (IP.CSET=IP.C63). Accordingly, if the system is configured to a different character set, input must be translated to conform to the expected display code values for colon, less than, left bracket, and right bracket.

GENERAL PROCEDURES

To install SIMULA, the program library release tape can be used as input to produce a deadstart tape containing SIMULA.

INSTALLATION PARAMETERS

None.
INSTALLATION PROCEDURES

The SIMULA 1.0 release tape contains six files. File 1 contains the program library. Files 2 and 3 contain relocatable binary object time routines and absolute compiler overlays, respectively. File 4 contains relocatable binaries of the compiler. Files 5 and 6 contain the installation decks; file 7 contains the verification program deck. To obtain these decks, perform the job:

```
REQUEST(PL19,E)
REWIND(PL19)
SKIPF(PL19,4,17)  Skip PL and Binary Files
COPYEF(PL19,PUNCH,2)  Punch Installation Decks
COPYEF(PL19,PUNCH,1)  Punch Verification Program
UNLOAD(PL19)
6/7/89
```

Job SIMULA1 is a maintenance deck which can be used to create a revised release format tape containing a modified program library and assembled binary. Job SIMULA2 can be used to enter SIMULA into the running system through EDITLIB either from the released PL19 or from the tape created by deck SIMULA1. Job SCOPE3, described in section 1 then should be run to capture the running system on a deadstart tape.

```
SIMULA1,CM66000,T7000,MT02.
COMMENT. THIS JCB UPDATES AND CREATES THE BINARY OF SIMULA
COMMENT. THE NEW PL19 WILL CONSIST OF FOUR FILES
COMMENT. THE FIRST FILE WILL BE THE SIMULA NEWPL
COMMENT. THE SECOND FILE WILL BE THE BINARY OF THE RELOCATEABLE
COMMENT. CF ROUTINES AND THE PP ROUTINES
COMMENT. THE THIRD FILE WILL BE THE ABSOLUTE BINARY OF THE OVERLAYS
COMMENT. THE FOURTH FILE WILL BE THE RELOCATEABLE BINARY OF THE OVERLAYS
LAEL(FL19IN1,F1,L=SIMULA1P0*3P4,0=HI) MOUNT SIMULA PL
REQUEST(PL19,N=111.) SCRATCH FOR NEW PL19
LAEL(FL19W1,L=SIMULA1P0*3P4,0=HI)
REWIND(IN1,IN1)
UPDATE(F,F=FL19IN,N=PL19,X)
UNLOAD(IN1)
COMPASS(I=COMPILE,S=IPTEXT,B=SIMLE,L=0)
COMPASS(I=COMPILE,S=PTEXT,B=SIMLE,L=0,S=IPTEXT)
REWIND(SIMLE)
LOAD(SIMLE) GENERATION OF SIMULA OVERLAYS
NOGO.
REWIND(SIMULAC.
REWIND(SIMLE.
REWIND(SIME.
REWIND(SIME.
SKIPF(FL19,1,17)
COPYEF(SIMLE,FL19)
COPYEF(SIMULAC,FL19)
COPYEF(SIME,FL19)
UNLOAD(FL19)
7/8/9 END OF RECORD
*/ ADD CORRECTIONS HERE
7/8/9 END OF RECORD
6/7/8/9 END OF FILE
```

I-21-2 60307400 A
SIMULA2,CM55000,T760,MT1.
COMMENT. THIS JOB TAKES THE RELEASED VERSION OF SIMULA V1.0, OR THE
COMMENT. VERSION CREATED BY THE JOE SIMULA1, AND EDITS THE BINARIES
COMMENT. INTO THE RUNNING SYSTEM FROM PL19.
LABEL(F19,R,L=SIMULAP0*3P4,D=HI) MOUNT PL19
REWIND,F19.
SKIP(F19,1,17) SKIP CLDPL
COMMENT.
COFYBF(F19,SIMLB) SIMULA LIBRARY ROUTINES
COFYER(F19,SIMUC,1) SIMULA CONTROL CARD CALLABLE ROUTINE
COFYER(F19,SIMUC) SIMULA OVERLAYS
REWIND,F19,SIMLB, SIMUC, SIMUC.
UNLGC(F19)
EDITLIE(SYSTEM)
COMMENT.
COMMENT. *** END OF JOB ***
7/8/9 END OF RECORD
READY(SYSTEM)
*/
LIBRARY(NUCLEUS,OLD)
REPLACE(*,SIMUC,AL=3,FL=40000,FLO=1)
FINISH.
LIBRARY(SYSCL8,CLD)
REPLACE(*,SIMUC,AL=0)
FINISH.
LIBRARY(SYSMISC,OLD)
REPLACE(*,SIMLE)
FINISH.
COMPLETE.
ENCRUN.
7/8/9 END OF RECORD
6/7/8/9 END OF FILE

VERIFICATION PROGRAM

Output from the SIMULA verification program is listed below: The time
required to run this program is approximately 5 seconds of 6400 computer clock
time.

LIBRARY 0 EXISTS
LIBRARY 1 EXISTS
LIBRARY 2 EXISTS
LIBRARY 3 EXISTS
GARbage COLLECTOR EXISTS

END OF SIMULA RUN

1 GARBAGE COLLECTIONS
21.15.59. VSIMULO
21.15.59. VSIMUL, T100, CM56000.
21.15.59. THIS SIMPLE PROGRAM VERIFIES CORRECT IN
21.15.59. STALLATION OF
21.15.59. SIMULA 1.0
21.15.59. SIMULA(LX)
21.17.15. 1.161 RT SECONDS LOAD TIME
21.17.18. MAP(OFF)
21.17.18. LG0.
21.17.23. 4.406 RT SECONDS LOAD TIME
21.17.23. END OF JOB
21.17.24. CPA .906 SEC.
21.17.24. PP 4.148 SEC.
RELEASE DESCRIPTION

1700 MSOS IMPORT HS Version 1.0 runs under the 1700 MSOS 3.0 operating system and operates in conjunction with INTERCOM 4.1 which runs under the SCOPE 3.4 operating system. 1700 MSOS IMPORT HS consists of modules written in 1700 Assembly language.

The 1700 computer is used as a remote terminal center which accepts jobs for 6000 SCOPE in the same unit record format as the central site and provides identical unit record output within hardware limitations.

Six simultaneous data streams, in addition to operator messages, are possible between the terminal and the central site. The data streams are restricted only by hardware configurations.

RELEASE MATERIALS

The 1700 MSOS IMPORT HIGH SPEED release consists of an UPDATE format program library tape including both MSOS IMPORT and the CLASS assembler.

Product Description

A brief description of each module of IMPORT HS designed to operate with MSOS 3.0 is given below:

IMMINT

IMMINT is the standard MSOS Manual Interrupt module, which has been modified to divert all commands prefixed with a question mark (?) to CRIMPT (the Core Resident IMPORT) module. It also has been modified to accept messages of the length required by IMPORT HS.

CRIMPT

CRIMPT first determines whether or not IMPORT HS has been loaded. If so, CRIMPT diverts control to IMPORT. If not, CRIMPT loads IMPORT.

IMPORT

IMPORT goes through initialization and starts central to terminal message processing.
MESIMP

MESIMP processes all terminal operator type-in messages. Directives are constructed and transmitted in accordance with typed-in instructions. Data streams are also defined, initialized, and terminated via this module.

TRAFIC

TRAFIC controls orderly routing of transmissions to and from the central site. Special directives and operator messages are given priority over data stream transmissions.

TCPROC

TCPROC controls terminal to central site data streams. These streams allow jobs to be submitted from either tape or cards. These jobs are identical in format to those submitted at the central site.

CTPROC

CTPROC processes all central site to terminal output (card punch and/or line printer) data.

TPR

TPR is the tape to printer utility routine. Data from the central site intended for the printer can be assigned to a tape unit and later printed out on the printer at the 1700 site.

TPU

TPU is the tape to punch utility routine. Data from the central site can be assigned to a tape unit and later punched cards can be produced at the 1700 site.

CTA

CTA is the card to tape utility routine. This routine copies card images onto magnetic tape so that data can be prepared at the 1700 site for subsequent processing at the central site.
The MSOS SPACE program must be modified if normal MSOS job processing is to occur concurrently with IMPORT HS processing. This modification adds to allocatable core the amount of core expected to be used by IMPORT HS. If this modification is not made, IMPORT HS will cause core-swapping which locks out job processing.

DR1747

This program operates as a normal MSOS device driver to handle read and write requests through the 1747 Multiplexer to the central site computer.

HARDWARE CONFIGURATION

The suggested minimum configuration for the 1700 MSOS IMPORT HS Terminals follows. This configuration does not allow concurrent job processing.

- 1704 4K Computer
- 1708 8K Storage Module
- 1705 Interrupt Data Channel
- 1706 Buffered Data Channel
- 1747 Multiplexer
- 1711 or 1713 Teletypewriter
- 1726/405 or 1728/430 Card Reader/Punch
- 1740/501 or 1742/HR300 Line Printer
- 1573 Line Sync Clock
- 1750 Data and Control Terminal
- 1738 Disk Controller
- 853/854 Disk Pack

To allow concurrent job processing, the above minimum configuration may include the following; and depending on the number of defined data streams, an extra 4K of core storage may be required.

- 1721/1722 Paper Tape Reader
- 1723/1724 Paper Tape Punch
Additional Equipment

MSOS IMPORT HS will allow up to six concurrent data streams which may use any combination of the following:

- 601/1731/1706 Buffered Magnetic Tape Units
- 608/609/1732/1706 Buffered Magnetic Tape Units
- 1726/405 Card Reader
- 1728/430 Card Reader/Punch
- 1742/HR300 Line Printer
- 1740/501 Line Printer
- 1729-2 Card Reader
- 1729 Card Reader

Communication Link

Each terminal is connected to the central site by a communication link consisting of two DATAPHONE Data Sets 301B or 303, and one TELEPAK A communication line or their logical and physical equivalent.

Logical Unit Assignments

Any logical unit assignments acceptable to MSOS are suitable for IMPORT HS.

MODIFICATIONS AND DEFICIENCIES

A proper base has been established for introduction of 64-character set code.

Limitations

Before installation of 1700 MSOS IMPORT HS is attempted, all PSR summaries for INTERCOM 4.1 and MSOS 3.0 should be reviewed.

16K SYSTEM

SYSBUF Modification Kit - The 28 extra entries added to the scheduler stack SCHSTK are not required in a 16K system.

When allocatable core is oversubscribed, jobs are written out on disk; and core used by these jobs is made available for allocation.

In a 16K system, job processing is swapped out as soon as IMPORT is called. If several data streams are defined and released, small unusable fragments of allocatable core may remain. Defining the remaining data streams could result in the message //NO CORE before all six data streams are defined. Although the total fragments of core available could complete the remaining stream, not enough space is available in one block.
This same situation can occur if magnetic tape reading or writing takes place before all six data streams are defined. If IMPORT is called during job processing, some core is not available to IMPORT.

In a 16K system, there may not be sufficient space to load the mass storage resident manual interrupt processor, MIFRO, which processes non-IMPORT commands. If the operator enters a non-IMPORT command, or mistakenly omits the ? prefix from an IMPORT command, MSOS attempts to load MIFRO to process the message. The core allocator finds no available core, and stacks the request until core is available. Under MSOS, such requests are not timed out and the request is never honored. No further manual interrupt is possible, so the operator cannot communicate with IMPORT, and a data stream cannot be released to make additional core available. This situation can also occur in any system where job processing has been locked out and a statement to job processing has been input.

In such a case, the operator can change the equipment number on the Data Set Controller to retain the active background job processing. This causes the 1747 driver to reject and type DSC REJ. Then IMPORT types //CCM LOST, releases its core, and types IMPORT OFF. Core will be available then to complete the processing of the TTY command and job processing continues.

INTERCOM treats this situation as though the IMPORT operator entered ?END. INTERCOM rewinds all attached output files putting them back into the output queue and discards all incomplete input files.
ADDITIONAL INFORMATION

1. 1726/405 Card Reader Operation

When a 1726/405 Card Reader is used, IMPORT HS cannot read the last card in the hopper. To ensure that the job is read completely, an extra end-of-file card (6/7/8/9 punches in column one) should be added to the end of the deck. IMPORT HS ignores multiple end-of-file cards, so extras will cause no difficulty.

2. Job Completion Messages

When a job finishes printing, 1700 MSOS IMPORT HS will produce the following messages on the teletypewriter:

//LUxx jobname DONE where xx is the logical equipment device used

3. Job Input Limit Bypass

Only one terminal operator command affects the job limit. The various formats of the ?DVT command follow:

<table>
<thead>
<tr>
<th>Command</th>
<th>Effect on job counter</th>
</tr>
</thead>
<tbody>
<tr>
<td>?DVT</td>
<td>reset to zero</td>
</tr>
<tr>
<td>?DVT, JOBNAME</td>
<td>decreased by one</td>
</tr>
<tr>
<td>?DVT, JOBNAME, LP</td>
<td>decreased by one</td>
</tr>
<tr>
<td>?DVT,, LP</td>
<td>counter is bypassed (no limit)</td>
</tr>
<tr>
<td>?DVT, JOBNAME, CP</td>
<td>no effect</td>
</tr>
<tr>
<td>?DVT,, CP</td>
<td>no effect</td>
</tr>
</tbody>
</table>

4. Utility Routines

The utility routines are executed as normal unprotected jobs and normally are resident on the program library. For installation procedures, see the general description.

5. If an output device is defined and activated, but no output is available for the device, this message is typed out.

//LUxx WAITING ON CENTRAL

This message also may be output periodically when no visible activity is taking place to let the user know the output streams are still functioning.

6. When ?WAIT is entered, the //OK. response indicates the wait bit has been set for the data stream; however, the data stream cannot enter the wait condition until any active requests are completed. Therefore, during the WAITING ON CENTRAL condition, a maximum of 30 seconds may elapse before ?WAIT becomes effective. The ?GO command is invalid during this period. WAITING ON CENTRAL is the delay required for the data stream driver to time out.
GENERAL PROCEDURES

1700 MSOS IMPORT HS is composed of modules written in 1700 Assembly Language. It runs under the standard MSOS 3.0 operating system. To install MSOS IMPORT, modules must be added to an existing working MSOS system. Utility functions are provided.

INSTALLATION PROCEDURES AND PARAMETERS

The 1700 MSOS IMPORT HS release tape consists of 5 files. File 1 contains the source of MSOS IMPORT in Update 1.2 program library format. File 2 contains Update 1.2 program library format source of CLASS. A definition how to use CLASS to assemble MSOS IMPORT source on the 6000 is included at the end of this chapter. File 3 contains ECL cards of the SYSEUF Modification Kit to be used in modifying a workable MSOS SYSEUF to accommodate MSOS IMPORT. File 4 contains binary of MSOS IMPORT. File 5 contains a MSOS IMPORT Verification program.

To obtain the contents of files 3, 4, and 5 in card form, perform a job of the following for the 6000.

```plaintext
Job card.
REQUEST PL20,E.
REWIND PL20.
SKIPF(PL20,2,17)
COPYBF(PL20,PUNCH)
COPYBF(PL20,TEMP)
REWIND TEMP.
DISPOSE(TEMP,P8)
UNLOAD PL20.
6/7/89
```

To install MSOS IMPORT, an existing working MSOS system containing the desired hardware configuration must be available. MSOS IMPORT modules are added to these systems. Modify the existing MSOS system as follows:

Replace the MSOS module MINT with the IMPORT variant of the module IMMINT, the Manual Interrupt statement decoder. To Core Resident MSOS add the routine, CRINT. The following items should be added to MSOS SYSEUF (these cards are contained in the SYSEUF Modification Kit):

```plaintext
| IMPPD  | ADC   | DUMMY |
| IMPTC  | ADC   | DUMMY |
| IMPCT  | ADC   | DUMMY |
| INSTR1 | ADC   | DUMMY |
| IMLAST | ADC   | DUMMY |
```

The cards specified above are contained in the SYSEUF Modification Kit; they are added as the last items of table LOG1A after the card EQU LAST(*) and before the card NUMLU.

The card with the comment IMPORT LOG1 ENTRIES should be added at the end of the LOG1 table.

Three cards, the first of which has the comment IMPORT LOG2 ENTRIES, should be added at the end of the table LOG2.
Twenty-eight cards, the first of which has the comment 28 EXTRAS FOR IMPORT, should be added at the end of the scheduler stack SCHSTK, (before NUM 0,0 $FFFF,0 scheduler stack entry 24).

Six cards, the first of which has the comment UP TO 6 ENTRIES MAY BE PLUGGED BY IMPORT, should be added to the end of the diagnostic timer table, DGNTAB.

The remaining cards of the IMPORT SYSBUF Modification Kit should be added at the end of SYSBUF. Some of the following may require change depending on the site configuration of the remote terminal:

EQU IMPCOM(4) IMPORT comment device logical unit
EQU R26(0) If R26=0, all BCD cards are read as if punched by an 026 keypunch. However, by punching the digits 29 in columns 79-80 of a job card or a 7/8/9 end of record card, the remaining BCD cards in that job are read as if punched by an 029 keypunch. The mode can be changed again by punching the digits 26 in another 7/8/9 end of record card.
If R26=1, all BCD cards are read as if punched by an 029 keypunch. However, by punching the digits 26 in columns 79-80, the remaining BCD cards in that job are read as if punched by an 026 keypunch. The mode can be changed again by punching the digits 29 in another 7/8/9 end of record card.
EQU P26(0) If P26=0, all Hollerith cards will be punched in 026 keypunch format.
If P26=1, all Hollerith cards will be punched in 029 keypunch format.
EQU IMPRI(6) Priority level at which IMPORT is to run
EQU LUDSC(22) Logical unit number of Data Set Controller
EQU PRIDSC(10) Priority level at which the Data Set Controller is to run
EQU BSIZE(165) Default transmission buffer size; the only alternate is 325
IMTID ALF 1,ME Default terminal ID. Although this parameter was essential for communication with EXPORT HS, it is ignored in communication with INTERCOM.

INSTALLATION OF THE 1747 ESC DRIVER (DR1747)
An entry of the form, ADC PB1747, should be added to table LOG1A at the positions corresponding to the interrupt line used by the 1747. Entry of the form, NUM 0, should be added to the table LOG1.
An entry of the form, NUM $FFFF, should be added to the table LOG2.
The mask table, MASKT, should be modified by adding a 1 bit to the interrupt mask for all priorities lower than those at which the 1747 is to run.

The entry, ADC PH1747, should be added to the table, DGNTAB.

The code for the 1747 Interrupt Response Routine and PHYSTAB follows:

<table>
<thead>
<tr>
<th>I1747</th>
<th>Ent</th>
<th>I1747</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDI</td>
<td>=XPH1747</td>
<td></td>
</tr>
<tr>
<td>JMP*</td>
<td>(PH1747+2)</td>
<td></td>
</tr>
<tr>
<td>EXT</td>
<td>IN1747</td>
<td></td>
</tr>
<tr>
<td>EXT</td>
<td>CN1747</td>
<td></td>
</tr>
<tr>
<td>EXT</td>
<td>EX1747</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PH1747</th>
<th>Num</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Num</td>
<td>$120A</td>
<td>0</td>
</tr>
<tr>
<td>ADC</td>
<td>IN1747</td>
<td>1</td>
</tr>
<tr>
<td>ADC</td>
<td>CN1747</td>
<td>2</td>
</tr>
<tr>
<td>ADC</td>
<td>EX1747</td>
<td>3</td>
</tr>
<tr>
<td>NUM</td>
<td>-1</td>
<td>4</td>
</tr>
<tr>
<td>ADC</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>ADC</td>
<td>$1401</td>
<td>6</td>
</tr>
<tr>
<td>ADC</td>
<td>$641</td>
<td>7</td>
</tr>
<tr>
<td>NUM</td>
<td>9</td>
<td>Switches</td>
</tr>
<tr>
<td>ADC</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>ADC</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>ADC</td>
<td>0</td>
<td>11</td>
</tr>
<tr>
<td>ADC</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>ADC</td>
<td>0</td>
<td>3-15</td>
</tr>
<tr>
<td>ADC</td>
<td>0</td>
<td>16</td>
</tr>
<tr>
<td>ADC</td>
<td>17</td>
<td>ISAVE</td>
</tr>
<tr>
<td>RTJ-</td>
<td>($F4)</td>
<td>18</td>
</tr>
</tbody>
</table>

| RTJ | $C88 | 19 |
| ADC | TTYCMP | 20 |
| ADC | 0 | 21 |
| ADC | 4 | 22 |
| ADC | 0 | 23 |
| ADC | 0 | 24 |
| JMP- | ($EA) | 25 |
| TTYCMP | LDA* | 26 |
| STA- | 1 | 27 |
| JMP+ | 0 | 28 and 29 |

LOCORE MODIFICATIONS

The following card should be added to the program LOCORE.

EXT I1747

60307400 A
In addition, the interrupt slot for the interrupt line used by the 1747 should be set up as follows:

```
LINExx  NUM 0
RTJ- ($FE)
NUM PRI priority level
ADC 1747
```

**PRIORITY LEVEL ASSIGNMENTS**

The multiplexer driver should run at a priority level higher than other I/O devices not subject to malfunction when their interrupts are not serviced promptly. It should be lower than that used by devices subject to such malfunction. The priority level at which IMPORT is run should be lower than that used by the Core Allocator, but not so low as to cause unnecessary delays at the central site.

**IMPORT MASS STORAGE RESIDENT MODULE**

This module is composed of the following routines:

- IMPORT
- TRAFIC
- MESSIMP
- TCPROG
- CTPROG

To add this module, the following modifications must be made to the system initializer input deck.

```
*YM,IMPORT,xx
```

where `xx` is the ordinal number of this Mass Storage Resident module.

This card should be added to the other *YM cards at the beginning of the deck after the decks comprising the Mass Storage Resident module preceding IMPORT.

```
*M IMPORT
```

This is followed by the binary cards for the above named five IMPORT programs. Program IMPORT must be first.

```
*S,xx,p,M
```

`xx` is the ordinal of the IMPORT module.

`p` is the priority level at which IMPORT runs

letter `M` (not a variable)

This card should be added to the other *S cards at the end of the initialization input deck. LIBEDT processes these cards by assigning the specified priority level to the module.
If simultaneous job processing is required, allocatable core area, AREAC, in program SPACE must be increased by the amount of core IMPORT will use when the streams have been defined. IMPORT occupies 5100 (decimal) core locations.

Each line printer stream will require:

1  100-word PHYSTAB
2  69-word device buffers
2  165- or 325-word transmission buffers

Each card punch stream will require:

1  100-word PHYSTAB
2  60-word device buffers
2  165-or 325-word transmission buffers

Each card read stream will require:

1  83-word PHYSTAB
2  60-word device buffers
2  165- or 325-word transmission buffers

Assembly Options

The user has the option of changing the transmission buffer size default value at installation time.

<table>
<thead>
<tr>
<th>TYPE-IN</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>?IM carriage return</td>
<td>TRANSMISSION BUFFER SIZE=165</td>
</tr>
<tr>
<td>?IM,,325</td>
<td>TRANSMISSION BUFFER SIZE=325</td>
</tr>
</tbody>
</table>

JOBMAX contains the maximum number of jobs allowed in the system at any one time. When this number is reached, IMPORT will stop reading cards until a job is printed and leaves the system. The value in JOBMAX is arbitrary and can be made significantly larger or smaller to suit the needs of the application. The standard value is 25(decimal). To modify this value by assembly, change the NUM value for JOBMAX. To modify it by using hexadecimal corrections, set the contents of the last cell in SYSBUF to contain the desired maximum value. This value may range from 1 to 32k.
The binary deck as provided is correctly set up to handle the 63-character set. If either of the 64-character sets is to be selected, modules MESIMP, TCPROC, and CTXPROC must be reassembled and new binary decks produced, including the following changes:

*D CHAROPT.6
C64I EQU C64I(1)

*C MESIMP, CTXPROC, TCPROC

Procedures for preparation of input to the MSOS Macro Assembler 2.0 are described in Section 25, 1700 SOURCE. Procedures for use of the CLASS Assembler on the CDC CYBER/70 are described at the end of this section.

Utility Routine Installation

Press: AUTO-LOAD

1. Move the STEP/RUN switch to RUN
   Message: PP
   Type: *
   Press: Carriage Return
   Press: Manual Interrupt
   Message: MI
   Type: *LIBEDT
   Message: LIB
IN

2. Load binary card decks in card reader:
   Type: *K,I1u 1u is input device

3. LIBEDT responds when loading is complete.
   Message: IN
   Type: *L, n...n  n...n is program name at execution time

4. To execute the program:
   Type: *n...n
   This loads the utility being called into core and begins execution.
1747 DSC CE Diagnostics

If any of the following messages appear on the teletypewriter, a customer engineer should be consulted.

BDC BUSY
DSC BUSY
DSC NOT READY
NO CARRIER
TEST MODE
DSC REJECT
BDC NOT READY

(BDC is Buffered Data Channel)
(DSC is Data Set Controller)

These diagnostics are produced primarily for the customer engineer. They generally indicate a hardware failure rather than a software failure.

Logical Terminal Assignments

A terminal line number is determined by the physical connection. The unique two-character identifier associated with each line is established by INTERCOM when the terminal establishes communication.

SYSEBUF MODIFICATION KIT

A complete listing of the SYSEBUF Modification Kit is provided for general information only.
MCGRIMF, CM10000, T50, P17.

COMMENT: THIS JOB VERIFIES 1700 MSOS AND INTERCOM HIGH SPEED INSTALLATION
7/8/9 END OF RECORD

NAM MGK KIT FOR SYSBUF

*THIS MODULE IS NOT INTENDED TO BE ASSEMBLED
*IT CONTAINS CARDS TO BE ADDED TO SYSBUF WHEN MSOS IMPORT
*IS ADDL TO A SYSTEM

* THE FOLLOWING 6 CARDS ARE TO BE ADDED AS THE LAST 9 ENTRIES IN LOG1A
IMFSD0 ADC DUMMY IMPORT LOG1A ENTRIES
IMFTC ADC DUMMY
IMFCT ADC DUMMY
IMSTR1 ADC DUMMY, DUMMY, DUMMY
ADC DUMMY, DUMMY, DUMMY
IMLAST ADC DUMMY

* THESE ENTRIES ARE TO BE ADDED TO LOG1
NUM 0, 0, 0, 0, 0, 0, 0, 0, 0 IMPORT LOG1 ENTRIES

* THESE ENTRIES ARE TO BE ADDED TO LOG2
NUM $FFFF, $FFFF, $FFFF IMPORT LOG2 ENTRIES

* THESE ENTRIES ARE TO BE ADDED TO THE SCHEDULER STACK-SCHSTK
ADC 0, 0, **2, 0 28 EXTRAS FOR IMPORT
ADC 0, 0, **2, 0
ADC 0, 0, **2, 0
ADC 0, 0, **2, 0
ADC 0, 0, **2, 0
ADC 0, 0, **2, 0
ADC 0, 0, **2, 0
ADC 0, 0, **2, 0
ADC 0, 0, **2, 0
 THESE ENTRIES ARE TO BE ADDED TO THE DIAGNOSTIC TIMER TIMER TABLE-DGNTAB
NUM $FFF
NUM $FFF
NUM $FFF
NUM $FFF
NUM $FFF
NUM $FFF
UP TO 6 ENTRIES MAY BE PLUGGED BY IMPORT

 THESE ENTRIES ARE THE 1747 DRIVER INTERRUPT RESPONSE ROUTINE AND
PHYSTAB-NOTE THAT ENTRY 7 SHOULD BE SET TO THE CONVERTER AND
EQUIPMENT NUMBER AT YOUR SITE

ENT I1747

I1747 LCQ =XFH1747
JMP* (PH1747+2)
EXT IN1747
EXT CN1747
EXT EX1747

PH1747 NUM $120A 0
    ADC IN1747 1
    ADC CN1747 2
    ADC EX1747 3
    NUM -1 4
    ADC 0 5 LU
    ADC 0 6 PARAM CONV.
    ADC $1401 7 Q FOR EQUIF 8 BDC 1
    NUM $641 8
    ADC 0 9
    ACC 0 10
    ACC 0 11 LAST LOC+1
    ACC 0 12 STATUS
    ACC 0 13 NO MASS MEM
    ACC 0 14 NO MM LENGTH
    ACC 0 15 RETURN INFORMATION FNR
    ACC 0 16 TEMP

ISAVE ACC 0 17 ISAVE
RTJ- ($F4) 18 TTYREQ
NUM $C88 19
    ADC TTYCMF 20
    ACC 0 21 TTY THREAD
    ACC 4 22
    ACC 0 23
    ACC 0 24
    JMP* ($EA) 25
TTYCMF LDA* ISAVE 26
STL 1 27
JMP 0
THE FOLLOWING ITEMS SHOULD BE ADDED AT THE END OF SYSBUF
ENT IMPSPD,IMFC1,IMSTR1,IMLAST,IMPC1
ENT DSCLU
ENT DSCPRI
ENT IMCOM
ENT IPPI,IMBFSZ,IMTID
ENT UNDEF
ENT P2E29,R2E29
UNDEF ACC DUMMY
IPPI ACC IMPRI
DSCPRI ACC PRIDSC
IMFESZ ACC BSIZ2
P2E29 ACC P26
R2E29 ACC R2E
IMCOM ACC IMPCOM
DSCLU ACC LUCSC
ENT SYNCLI
ENT RETLIM
ENT JCEMAX

THE FOLLOWING ITEMS ARE DEFAULT CONDITIONS

THEY SHOULD BE CHANGED TO SUIT YOUR SITE'S REQUIREMENTS AND CONFIGURATION

ECL IMPCOM(4) IMPORT COMMENT DEVICE
ECL R2E(0) 026-025 READ IND.(0=026)
ECL P2E(0) 026-025 PUNCH IND.(0=026)
ECL IMPRI(1)
ECL LUDESC(22)
ECL PRIDSC(10)
ECL BSIZ2(16)
IMTID ALF 1,ME DEFAULT IMPORI TERMINAL IC
SYNCLI NUM -10 SYNCERR LIMIT
RETLIM NL1M -10
JCEMAX NUM 25

The CLASS ASSEMBLER is a CDC Cyber 70 version of the 1700 Macro Assembler. CLASS, written in COMPASS, provides assembly listings and binary object decks from 1700 Assembly Language source.
INSTALLATION

The source of the CLASS Assembler is on the second file of the 1700 MSOS IMPORT source program library. The following deck is an example of a SCOPE 3.4 job to install CLASS and its macro skeleton as permanent files in the SCOPE 3.4 system.

CLASS,CM70000,T770,MT1.
REQUEST(MT,E) 1700 MSOS IMPORT RELEASE TAPE
REQUEST,CLASS,*PF.
REQUEST,SMAC17,*PF.
SKIPF(MT,1,15) SKIP MSOS IMPORT PL
COPYBF(MT,PL) MOVE CLASS PL
UPDATE(A,P=PL,N=OLDPL)
UNLOAD(MT)
UPDATE(Q)
COMPASS(I,L=0,B=TEXT,S=0) ASSEMBLE KRONTXT
UPDATE(Q)
COMPASS(I,L=0,B=CLASS,G=TEXT) ASSEMBLE CLASS
CATALOG(CLASS,CLASS,ID=CLASS,XR=CLASS)
UPDATE(Q)
CLASS(I,N=SMAC17,L=0) ASSEMBLE MACRO SKELETON
CATALOG(SMAC17,SMAC17,ID=CLASS,XR=CLASS)
7/8/8/9
*C KRONTXT
7/8/8/9
*C CLASS
7/8/8/9
*C SMAC17
7/8/8/9
6/7/8/9

ASSEMBLY OPTIONS

The following CLASS features are additional to those found in the 1700 MACRO Assembler:

1. Banner page at the head of each listing including:
   
   Address and length of program
   Address of END card
   All entry points with their addresses in alphabetical order
   All external symbols in alphabetical order
   All BSS/BSS blocks and addresses

60307400 A  

I-22-17
2. TIDY option which lists the free-form input in specified columns on the output listing.

3. Capability to print list control (LST, SPC, NLS, etc.) cards.

4. Option to omit from the listing comment cards designated by an * in column 1.

5. Option to treat EJT cards as four spaces instead of a page eject. When a page is more than 3/4 full, the listing will be spaced to top-of-form.

6. Option to suppress the listing of conditional code which is not generated.

7. Option to suppress the listing of all but the first word of machine code generated by multiword instructions.

8. Full cross-reference map with page/line number references.

9. Option for a short cross reference map including only the value of the symbol.

CLASS CONTROL CARD PARAMETERS

Input
Not specified input on file INPUT
I input on file COMPILE
I=fname input on file fname

Output
L full list on file OUTPUT
L=fname full list on file fname
L=0 no list output

Binary
B or not specified binary output on file LGO
B=fname binary output on file fname
B=0 no binary output

Binary output to be punched should be disposed to a file with free-form punch disposition (PB).

TIDY tab columns
Not specified if list options specify T, tab columns will be 11-18-30
T=nmmmoo TIDY columns are nn, mm, and oo; must be a six digit number. Example: T=081322 sets tab columns 8, 13, and 22.
List options

LO = any combination of up to 7 of the allowable list options shown below. If more than 7 options are required, more than one LO may appear on the control card.

If no LO options appears, EMR and T are selected. When IO is specified, only the options requested are selected.

LO=B list E2S/BSS blocks on banner page
C list program list controls (EMT,SPC,etc.)
D suppress comment cards
E process EJT as a page eject
I list code skipped by an IFA pseudo op
M list all entries on multiword entries
R list full reference map
S list abbreviated reference map
T tidy the list file into specified tab columns
X suppress macro expansion

EXAMPLE ASSEMBLIES

To assemble DR1747 from the 1700 MSOS IMPORT source program library:

    JOB,CM700000,TP1.
    REQUEST(OLEPL,E) 1700 MSOS IMPORT SOURCE
    UPDATE(Q)
    ATTACH(CLASS,CLASS,ID=CLASS)
    ATTACH(SMAC17,SMAC17,ID=CLASS)
    CLASS(I,G=SMAC17)
    DISPOSE(LGO,P8)
    7/8/9
    ...Any corrections
    *C DR1747
    7/8/9
    6/7/8/9

To assemble a 1700 program with source on cards, TIDY tab columns 8,13,22, and no binary.

    JOB,CM700000.
    ATTACH(CLASS,CLASS,ID=CLASS)
    ATTACH(SMAC17,SMAC17,ID=CLASS)
    CLASS(B=0,T=081322,LO=BTRM)
    7/8/9
    source program cards
    7/8/9
    6/7/8/9

LIMITATIONS

If a name with more than seven characters appears on an EXT card, the symbol will be treated as an entry point.
RELEASE DESCRIPTION

FORTRAN Version 2.3 runs under the SCOPE 3.4 operating system. FORTRAN requires the same minimum hardware configuration as SCOPE.

RELEASE MATERIALS

The released program library for FORTRAN 2.3 is known as PL21.

CORRECTIONS

All eligible PSR code published through PSR Summary 314 has been added to the FORTRAN program library. Additionally, idents FTC0147A (Summary 316) and FT3K125A (Summary 318) have been incorporated.

LIMITATIONS

All known deficiencies or limitations are reported in the PSR Summary as unanswered PSR's or as mentioned in memoranda accompanying this release.

INSTALLATION PARAMETERS

In the standard release of PL21, binary blocking code has been assembled into the I/O routines; the default condition for unformatted files is set to unblocked. To set the default condition for unformatted files to blocked, the identifier RM1567B should be removed by using the *YANK control card. If the identifier RM1557A is removed by *YANK, the code associated with binary blocking will not be assembled. The following two jobs demonstrate these assembly options:
JOB 1  Sets unformatted files default condition to blocked

JOB(CM60000,T400,MT1)
REQUEST(PL21,E)  FORTRAN 2.3 program library
UPDATE(Q,P=PL21)
RETURN(PL21)
COMPASS(I=COMPILE,B=REPLACE,I=0,S=CPCTEXT,S=IPTEXT)
EDITLIB(SYSTEM)
7/8/9

*IDENT,BLOCK
*YANK,RM1567B
*COMPILE,SYSTEM
7/8/9

REWIND(REPLACE)
READY(SYSTEM,OLD)
LIBRARY(RUN2P3,OLD)
REPLACE(*,REPLACE)
FINISH.
COMPLETE.
ENDRUN.
6/7/8/9

JOB 2  Prevents assembly of code for binary blocking

JOB(CM60000,T400,MT1)  RELEASE TAPE
REQUEST(PL21,E)
UPDATE(Q,P=PL21)
RETURN(PL21)
COMPASS(I=COMPILE,B=REPLACE,I=0,S=CPCTEXT,S=IPTEXT)
EDITLIB(SYSTEM)
7/8/9

*IDENT,NOBLOCK
*YANK,RM1567A
*COMPILE,IODEFS,SYSTEM,BACKSP,ENDFIL,IFENDF,INPUTB
*COMPILE,OUTPTB,REWIND,SIO$$,FTNBIN
7/8/9
REWIND(REPLACE)
READY(SYSTEM,OLD)
LIBRARY(RUN2P3,OLD)
REPLACE(*,REPLACE)
DELETE($SIO$$)
FINISH.
LIBRARY(SYSIO,OLD)
REPLACE($SIO$$,REPLACE)
FINISH.
COMPLETE.
ENDRUN.
6/7/8/9
A trigger value is used to trigger an access to an I/O device for blocked binary files. On input, it represents the number of buffer words that must be available before a read buffer request is issued; on output, it is the number of words that must be ready for output before a write buffer request is issued.

The trigger value is set to a fixed percentage of the buffer length; however, if that percentage (or the remainder of the buffer) is less than one PRU, the PRU size is taken as the trigger value. The default is set to 80 percent; to change it, the value of the micro TRIGGER in SIO$ should be changed. For example, to change the triggering percentage to 50 percent:

*DELETE,SCU316M.94
TRIGGER MICRO 1,0,/50/
*COMPILE SIO$

The trigger value must be less than 100.

INSTALLATION PROCEDURES

The FORTRAN 2.3 release tape contains five files: file 1, the program library; file 2, assembled binary; file 3, installation deck V23RUN1; file 4, installation deck V23RUN2; and file 5, a verification program.

V23RUN1 is a maintenance deck which can be used to create a revised program library and binary file. V23RUN2 can be used to enter FORTRAN 2.3 into the running system from either the released tape or a tape created by V23RUN1. Following completion of V23RUN2, job SCOFE3 (see Section 1) can be run to create a deadstart tape of the running system.

To obtain the decks included as files 3–5, perform a job of the type:

Job card.
REQUEST(PL21,E)
RELOAD(PL21)
SKIP(PL21,2,17)  SKIP PL AND BINARY
COPYEF(PL21,PUCH,3)  PUNCH INSTALLATION AND VERIFICATION DECKS
UNLOAD(PL21)
6/7/8/9

V23RUN1,CM55000,TC000,MT02.
COMMENT. THIS JCB UPDATES AND CREATES THE BINARY OF RUN 2.3
COMMENT. THE FIRST FILE OF THE NEW PL21 WILL BE THE NEWPL
COMMENT. THE SECOND FILE WILL BE THE ABSOLUTE BINARY OF THE OVERLAYS AND THE
COMMENT. THE FIRST FILE OF THE NEW PL21 WILL BE THE NEWPL
COMMENT. THE SECOND FILE WILL BE THE ABSOLUTE BINARY OF THE OVERLAYS AND THE
COMMENT. EINARY OF THE RELOCATABLE ROUTINES
REQUEST PL2,E,H1. MOUNT LATEST OMPASS PL
REIND PL2.
UPDATE(A,P=FL2,N=COMPCOM)
UNLAC PL2.
LABEL(FL21H,F,L=RUN2FL3*3P4,D=HI) RUN 2.3 OLDPL
REQUEST,FL21,H,H1. SCRATCH FOR NEW PL21
LABEL(FL21,h,L=RUN2P3*3P4,D=HI)
REIND(PL211N,FL21)
UPDATE(F,F=FL211N,N=PL21,E,X)
VERIFICATION PROGRAM

Dayfile output of the RUN 2.3 verification program is as follows:

    SCCFE 3.4
05.45.28. VRUN04E
05.45.29. VRUN, CP55000, T200.
05.45.29. THIS SIMPLE PROGRAM VERIFIES CORRECT IN
05.45.29. STALLATION OF
05.45.29. RUN(G)
05.45.32. LGC
05.45.38.  4.353 RT SECONDS LOAD TIME
05.45.38. COMPUTATION SUCCESSFUL
05.45.38. STOP
05.45.38.  RUN 2.3
05.45.38.  END OF JOB
05.45.38. CFA    4.444 SEC.
05.45.38. PF     4.429 SEC.
RELEASE DESCRIPTION

1700 IMPORT HIGH SPEED version 1.0 operates in conjunction with INTERCOM 4.1 and runs under SCOPE 3.4.

The 1700 computer is used as a remote terminal center which accepts jobs for 6000 SCOPE in the same unit record format as the central site and provides identical unit record output within hardware limitations.

Three simultaneous data streams, in addition to operator messages, are provided between the terminal and the central site. The data streams are restricted to one card reader and two printers. A flexible language allows the terminal operator to control his jobs at the central site.

1700 IMPORT HS is written in 1700 Assembly language. It runs under a special operating system constructed from modules of 1700 Mass Storage Operating System (MSOS). No utility functions are provided.

RELEASE MATERIALS

The 1700 IMPORT HS release consists of the following:

IMPORT HS installation deck in binary format

Two decks to establish proper character set orientation

IMPORT HS Verification Program

Source tape of 1700 IMPORT HS (optional)

List tape of 1700 IMPORT HS (optional)

Note: The source and list tapes do not correspond exactly to the binary deck.

HARDWARE CONFIGURATION

The minimum configuration for the 1700 IMPORT HS Terminal is as follows:

1704 4K Computer
1708 4K Storage Module
1705 Interrupt Data Channel
1706 Buffered Data Channel
1747 Multiplexer
1711 or 1713 Teletypewriter
1726/405 or 1728/430 Card Reader
1740/501 or 1742/HR300 Printer

A minimum of 8K core is required for 1700 IMPORT HS, its operating system, and buffers.
Hardware Options

A second printer may be included in the basic configuration.

Communication Link

Each terminal is connected to the central site by a communication link consisting of two DATAPHONE data sets 301B or 303, and one TELPAK A communications line, or their logical and physical equivalent.

Logical Unit Assignments

The following are the logical unit assignments for 1700 IMPORT HS:

<table>
<thead>
<tr>
<th>Unit Number</th>
<th>Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>or 1728/430 Card Reader</td>
</tr>
<tr>
<td>3</td>
<td>1726/405 Card Reader</td>
</tr>
<tr>
<td>4</td>
<td>First printer</td>
</tr>
<tr>
<td>5</td>
<td>Second printer (if any)</td>
</tr>
</tbody>
</table>

Physical Unit Assignments

The following are the physical unit assignments for 1700 IMPORT HS:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Interrupt Line No.</th>
<th>Equipment No. (hexadecimal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1706 Buffered Data Channel</td>
<td>N/A</td>
<td>(first connection)</td>
</tr>
<tr>
<td>1747 Multiplexer</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>1711 or 1713 Teletypewriter</td>
<td>1</td>
<td>N/A</td>
</tr>
<tr>
<td>1728/430 Card Reader</td>
<td>8 = Data</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>9 = EOP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 = Alarm</td>
<td></td>
</tr>
<tr>
<td>1726/405 Card Reader</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>First Printer</td>
<td>5</td>
<td>F</td>
</tr>
<tr>
<td>(1742/HR300 or 1740/501)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second Printer</td>
<td>6</td>
<td>E</td>
</tr>
<tr>
<td>(1742/HR300 or 1740/501)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
MODIFICATIONS AND CORRECTIONS

CORRECTIONS

All eligible PSR code published through PSR Summary 320 has been added to the binary deck by addition of hexadecimal patch cards.

Deficiencies

The 1742/HR300 Printer occasionally will lose an interrupt. IMPORT HS detects this and causes the system to signal the operator:

Ln1 failed, 00

ACTION

nn is the logical unit number of the printer. The operator should respond with RP to repeat the request.

Limitations

If paper is torn or the supply is depleted, the 1742 rejects all functions including the clear interrupt, causing the same interrupt to be processed repeatedly until the system limits are reached. To recover, reload IMPORT HS.

When paper is running low, the operator should instruct the system to idle the printer by entering ?WAIT,(printer) while the new paper supply is readied. When ready, enter ?GO,(printer) to activate printer.

ADDITIONAL INFORMATION

1. 1726/405 Card Reader Operation

When a 1726/405 Card Reader is used, IMPORT HS cannot read the last card in the hopper. To ensure that the job is completely read, an extra end-of-file (6/7/8/9 punches in column one) should be added to the end of the deck. IMPORT HS ignores multiple end-of-file cards, so extras will cause no difficulty.

2. Print Complete Messages

When a job finishes printing, 1700 IMPRINT HS will produce the following messages on the teletypewriter:

JOENAME LP1 DONE for the first printer.

JOENAME LP2 DONE for the second printer.

These messages are the 1700 IMPORT HS variant of the message:

JOENAME LP DONE
3. Restarting IMPORT HS

1700 IMPORT HS should be reloaded from the card reader each time it is executed. The autoload sequence should be checked each time to ascertain that core has not been cleared or used by another program.

A restart procedure is available if IMPORT HS is terminated by ?END, or if the starting procedure stops before communication is established. To restart IMPORT HS, clear the machine and run. The regular initialization should be executed. If not, reload the deck.

The above method is not effective if the system was stopped while IMPORT HS processing was active, in such a case, it is best to reload the deck.

4. Job Input Limit Bypass

The operator may enter ?DVT,,LP to divert all line printer output to the central site. When this statement is entered, the job input limit is ignored until the system is reloaded. Other versions of the DVT command do not cause the job input limit to be bypassed. In these cases, IMPORT HS does not have a true count of jobs in the system.

5. Overflow Light

When IMPORT HS is entered, the //IMPORT READY message appears, and the operator responds with ?WAIT or one of the options of the ?GO statement, followed by a carriage return. The IMPORT HS system sends an interrupt code to the central site and waits for an answer. During this idle period, before the central site answers the interrupt, a blinking overflow light on the console indicates that IMPORT HS is functioning properly.

6. The IMPORT HS configuration available for checkout included a 501 printer with an ASCII print drum.

GENERAL PROCEDURES

Installation of 1700 IMPORT HIGH SPEED version 1.0 requires the following:

1. Setting installation parameters for the remote terminal configuration, if necessary, and changing any preset parameters as necessary.

2. Loading the IMPORT deck.

3. Modifying core prior to executing IMPORT if necessary.

INSTALLATION PARAMETERS

None
HEXADECIMAL MODIFICATION ROUTINE

If it is necessary to modify core prior to executing IMPORT, hexadecimal change cards must be inserted before the terminating *T card (in Hollerith format) of the released IMPORT deck. The format for these cards follows:

Each modification card may have one or more 9-column change fields starting with an asterisk. The four succeeding characters should contain a hexadecimal address to be changed; the last four should contain the hexadecimal constant to be inserted into this location. Any number of blanks and/or commas may precede or follow each field; and the fields may contain only the characters 0-9 and A-F. If any others are used, results are unpredictable as no error checking is performed by the hexadecimal modification routine. The modification field must be completed by the end of a card, it cannot be continued to the next card. The *T terminator may be placed after all change fields of a modification card.

Examples:

*1234ABCD causes $ABCD to be placed in location 1234. Reading continues.

*0001AAAA, *0002BBBB*0003CCCC*0004DDDD*T causes $AAAA, $BBBB, $CCCC, and $DDDD to be placed into locations 1, 2, 3, and 4, respectively; and IMPORT will be executed.

INSTALLATION OPTIONS

The following changes may be required based on the configuration of the remote terminal. The release deck is constructed for the minimum configuration: one 1728/430 Card Reader and one 1742/HR300 Printer. If another configuration is used, the following hexadecimal corrections should be made to the release deck.

$P9 contains the logical unit number of the card reader. It is set to 2 for the 1728/430. It should be set to 3 to use the 1726/405 Card Reader.

$FB contains the logical unit number of the first printer. It is set to 4 in the release version. This is correct for the first printer, whichever type is used.

$FA contains the logical unit number of the second printer, if available. The released version is set to 0 since it assumes no second printer. If a second printer is to be used, set $FA to 5.

$311 and $240 each contain the constant $2944 in the released version. This assumes 1742/HR300 printers or 1740/501 printers with ASCII type print heads. To print on a 1740/501 printer with an EBCD type print head, change contents of $311 to $2844 for the first printer and/or change contents of $240 to $2844 if the second printer has an EBCD print head.
The former installation option TERMID is no longer significant. Unique two-character identifiers are now assigned to each port of each BS MUX by the control site.

MJILIM is the maximum number of jobs allowed in the system at any one time. When this number is reached, IMPORT will stop reading jobs from the card reader until a job is printed and leaves the system. The value of MJILIM is arbitrary and can be made significantly larger or smaller to suit the application. The standard value is 25(decimal). To modify this value by assembly, change the EQU value for MJILIM. To modify by using hexadecimal corrections, set cell INITI to the instruction ENA- MJILIM where the value may range from 1 to 7F or 127(decimal). For a larger limit, modify cells INITI and INITI+1 to both contain 0B01(hexadecimal). Then set low core cell $DB to contain the number of allowable jobs. This value may range from 1 to 32K. INITI is at location $0BE4.

026-029 Keypunch. Core location $1693 in the release contains the command $EA28 which causes IMPORT to convert Hollerith to display, assuming 026 keypunch code. If this location is changed to $EA43, 029 code will be used. This option must be selected at installation time and cannot be overridden.

PRESET PARAMETERS

The following parameters may be modified as follows:

SYNCCK is set to 10(decimal) in the release version. This setting specifies that status is to be taken ten times upon an interrupt when a transmission occurs before a sync word acknowledge error is recorded. It provides a short time delay for the sync word acknowledge status bit to appear. To change this option by assembly, modify SYNCCK to the desired value. To change it with hexadecimal modifications, place the instruction ENA- SYNCC in INTT in IMPORT. INTT is at location $0CC5.

TRANCT is set to 120(decimal) in the release version of IMPORT. When a sync word acknowledge error occurs, this count is reduced by one. After 120 unsuccessful retransmissions have been tried, the routine switches to receive mode in an attempt to recover. To change this option, change the EQU value for TRANCT. To change it with hexadecimal corrections, change cell INTTP to contain the instruction ENA- TRANCT. INTTP is at location $0CD2.

RECCYC indicates the number of times status is repeated before recording a cyclic code error on input from the data set controller. It provides a short time loop allowing the cyclic code error bit to clear before registering the error. RECCYC is set to 3(decimal) in the release version. To change it by assembly, modify EQU for RECCYC. To change it with hexadecimal corrections, modify INTR to contain the instruction ENA- RECCYC. INTR is at location $0CE5.

Logical Terminal Assignments

A terminal line number is determined by the physical connection.
INSTALLATION PROCEDURES

Additions are required to the released binary deck to select the character set. To select the 63-character set, remove the header card and insert the 63-character set hexadecimal patch cards ahead of the binary deck *T card.

To select the 64-character set, remove the header card and insert the 64-character set hexadecimal patch cards ahead of the binary deck *T card.

Caution: Only one of the above sequences of cards should be added.

LOADING IMPORT DECK

An autoload sequence must be keyed in as follows:

1. Clear the machine, turn on the ENTER switch.
2. Set P to LOC; for this version, use LOC=$1BF0.
3. Set X to the first word of the autoload sequence below.
4. Press the STEP key.
5. Repeat steps 3 and 4 until all the following words are keyed in.

Autoload Word Sequence

Each of the following words must be keyed in sequence according to the above procedure.

E80D
C80D
03FE
0DFE
02FE
0FC8
7809
02FE
B807
0107
7806
D8FE
18F7
04A1 (for 430 Reader, 0201 for the 405)
0080

6. Load the IMPORT deck into the 430 or 405 Reader and ready the unit. If a 405 is used, a blank card must be placed after the last card in the deck.
7. Put ENTER switch in neutral position.
8. Set P to LOC and run. The deck will be loaded and IMPORT executed.
Punching the IMPORT Deck

If the SKIP switch is on, at the time the IMPORT deck is loaded, a new IMPORT deck will be punched on the 430 before execution of IMPORT. This feature is useful if the number of modification cards is excessive, or if the original deck is in poor condition.

If the original IMPORT deck is loaded from the 1728/430 card reader to punch a new deck, looping will occur after loading is completed, and before punching begins. To punch the new deck, clear the machine and set P to LOC+$DO and run.

Loading the IMPORT Deck

The following errors are detected and signaled by looping with register X set to $16FF at the following locations:

- LOC+$56  Deck out of sequence. An 8-bit sequence number is punched into rows 0-5, 11, and 12.
- LOC+$61  Incorrect record length. Row 2 of column 2 of each of the two records must contain a punch; this is the sign position of the complemented record field length.
- LOC+$70  Checksum error. Deck read or punched incorrectly.

DISK RESIDENT IMPORT

Preparing a Disk Containing the IMPORT System

Load a copy of the MSOS systems initializer and execute it to prepare the new disk. The following statements must be entered from the teletypewriter:

- *I,LU  Binary input device definition
- *C,LU  Comment device definition
- *V     Begin reading input
- *T     Final completion after all decks are read
Producing an IMPORT Deck from Disk

If an IMPORT system has been constructed on disk and a deck is to be produced, the following steps are necessary:

1. Turn on the SKIP switch.

2. Autoload the disk; after setting the run switch in run position, the system will loop immediately.

3. Key in the autoload sequence as specified previously in the section Loading IMPORT Deck.

4. Put the first seven cards of the IMPORT deck into the 430 or 405 Reader. If the 405 is used, an extra blank card should be placed at the end of the deck. Then execute the autoload sequence. If the first seven cards are not available, they can be produced by assembling and executing the program BOOTLD. The first seven cards produced by this procedure can be used as specified above. The remainder of the output from the BOOTLD job is of no value and should be discarded.

5. When reading terminates, clear the computer, turn off the SKIP switch, set P to LOC+$D0, and run. A complete deck will be punched and IMPORT reentered. All of core is punched up to the location preceding that into which the autoload sequence is entered.

VERIFICATION PROGRAM

The 1700 IMPORT HS verification program verifies communication with the central site computer. Running time is less than one minute of 6400 computer clock time.
RELEASE DESCRIPTION

The CONTROL DATA 1700/274 Interactive Graphics System (IGS) Version 2.0 permits real time use of the 6000 Series computers or CDC CYBER 70/Models 72, 73, and 74 by a 274 Graphics Console operator while batch and remote jobs are running under SCOPE 3.4 and INTERCOM 4.1.

The CONTROL DATA 1700 Series Computer is used to control the basic functions of the graphics hardware and allow the software to operate without programmer intervention. Terminals equipped with a remote card reader or card reader/punch and printer may be used to receive output and to submit jobs for execution at the central site.

Programs written in FORTRAN, FORTRAN Extended, COBOL, ALGOL, COMPASS, and BASIC, as well as INTERCOM and IGS jobs may be run under the SCOPE 3.4 Operating System. FORTRAN Extended is used to compile IGS jobs.

IGS can service a maximum of 24 independent graphics consoles simultaneously through four 1700 Series computers.

HARDWARE CONFIGURATION

In addition to the minimum hardware required by 1700 MSOS IMPORT HS and the SCOPE 3.4 Operating System, 1700/274 IGS requires an additional 1706 Data Channel and 1-6 graphics consoles with 1744 Controllers for each 1700 computer.

RELEASE MATERIALS

1700 IGS Version 2.0 source tape (OLDFL) is a labeled binary tape with 3 files.

File 1: UPDATE OLDFL source of the 1700 IGS modules and MSOS 3.0 IGS modification kit

File 2: Binary installation deck

File 3: Verification job deck
LIMITATIONS AND DEFICIENCIES

Limitations

1. Recovery Deadstart does not recover graphics jobs attached to consoles; each job is aborted or rerun.

2. NC=ALL aborts all jobs attached to consoles, but it does not clear the NCON queue.

3. A maximum of 2 IGS jobs may be queued for each console.

4. If an error fatal to the graphics data stream occurs on one 1700, graphics processing is suspended and the data stream must be redefined. All jobs using consoles attached to the 1700 are aborted.

5. Response time is degraded when several consoles use one disk.

6. Buffered magnetic tapes and the IGS/274 console cannot be run on the same 1706 Buffered Data Channel.

Deficiencies

1. Hard copy capabilities are not provided; however routines are available to create hard copies of data on a device chosen by the installation.

1700 INTERACTIVE GRAPHICS INSTALLATION PROCEDURES

The release package, 1700 MSOS 3.0 IGS, is designed for installation in an MSOS 3.0 Operating System in which 1700 MSOS IMPORT HS has been installed.

CUSTOMIZING MSOS 3.0

Modifications to LOCORE and SYSEUF are discussed in separate sections. No changes to MSOS 3.0 other than LOCORE and SYSEUF customization are required for 1700 IGS.

All PSR corrections to MSOS 3.0 and MSOS 3.0 IMPORT HS should be reviewed.

CUSTOMIZING IMPORT HS FOR IGS

MASS MEMORY ORDINAL OF IMPORT

IGS increases the IMPORT mass memory module by adding three routines. As shown in the example, it may be necessary to add IMPORT as mass memory ordinal one or two before the loading of core resident *L DRCORE and *L DRIVERS is processed. This procedure gives the system initializer more room for loader tables while loading IMPORT to avoid overflow.

The sample system memory map demonstrates the *YM control card changes and the deck sequence to load IMPORT at ordinal 2 in the system library. CRIMPT must be included in the *L LOCCORE core resident load to avoid unsatisfied externals.
TRANSMISSION BUFFER SIZE

Either transmission buffer size, 165 or 325, can be used for IMPORT when IGS is active. The larger size is more efficient and should be used unless 1700 memory size limitations necessitate the smaller buffers.

DIVERT BY TERMINAL ID

The modified MESIMP provided with the IGS 1700 installation package recognizes a third parameter on the ?DVT command. This parameter allows remote files to be diverted to another remote terminal as well as to central site. To implement this terminal identifier parameter, the following change is required to TRAFIC.

Reassemble module TRAFIC from the 1700 MSGS IMPORT source tape including the following corrective code:

* D M304 NEAR TRAFIC
    EQU IGS(1) ASSEMBLE DVT TID CODE

* C TRAFIC

LOCORE MODIFICATIONS

The standard 1700 MSOS 3.0 LOCORE has been modified for IGS. DECK name IMODKIT on the OLDPL contains the source of the LOCORE modification kit. The LOCORE modification package supplies source card images to define the GRAPHICS communications region in LOCORE. After customization, the cards should replace LOCORE card image 00048 (E8S $B2-$47+1) which defines the length of the free process control area in LOCORE.

Example of 6000 or CDC Cyber 70 job to punch the IMPORT source cards from source OLDPL:

   JOB,CM40000,TP1.
   REQUEST(OLDPL,E) 1700 IGS OLDPL
   UPDATE(Q,8)
   DISPOSE(COMPILE,PU)
   7/8/9
   *C IMODKIT
   7/8/9
   6/7/8/9

Most examples in the following sections use specific numerical values for clarity. The actual values must be determined individually for each site.

In LOCORE, an interrupt trap area should be added for each interrupt line connected to a 1744/274. Example for NCON=1:

<table>
<thead>
<tr>
<th>LINE</th>
<th>EXT</th>
<th>DIGIT</th>
<th>NUM</th>
<th>RTJ- ($FE)</th>
<th>NUM</th>
<th>$B</th>
<th>ADC</th>
<th>DIGIT</th>
</tr>
</thead>
</table>

$B is a sample priority level related to the interrupt mask table.
DIGIT is a sample interrupt processor entry in the PHYSTAB for a 1744/274.
For more than one 1744/274, additional interrupt trap entries are required. A second interrupt trap might appear:

```
EXT DIGI2
LINEm
NUM 0
RTJ- ($FE)
NUM $B
ADC DIGI2
```

DIGI2 is an entry point in the 1744/274 PHYSTAB for the second console. The interrupt trap source cards are not in IMODKIT.

CUSTOMIZING LOCORE IGS MODIFICATIONS

Two changes may be required to customize an installation:

1. 274 consoles on the system should be represented by an entry in the TABLE OF LOGICAL UNITS of 274 CRTS. Each entry is the logical unit of the console and the table should have six entries. The first entry in the table will be console 1; the second console 2, etc. Console numbers should correspond to entries in word 23 of the PHYSTAB tables for the consoles in SYSBUF (SYSBUF modifications). An ADC 0 card should occupy the entry for every NCON not physically present on the system.

2. The mask used to clear graphics interrupts should be set to a 16-bit hexadecimal number such that each bit representing a 1744/274 interrupt line is clear and all others are set.

Example:

A 1700 terminal is configured with:

1744/274 interrupt line 9 logical unit 15
1744/274 interrupt line 10 logical unit 16

Required changes to the IGS LOCORE modification package:

To establish the console numbers:

```
*D IMODKIT.27,28
NUM 15    LU NCON1
NUM 16    LU NCON2
*C IMODKIT
```

To establish the INTERRUPT CLEAR MASK:

```
*D IMODKIT.50
NUM $F9FF    So that bits corresponding to
             interrupt lines 9 and 10 are clear.
*C IMODKIT
```

SOURCE OF IGS LOCORE MODIFICATIONS

The source is available on the source tape as UPDATE DECK name IMODKIT. A Modification listing is included here for information only.
SYSBUF MODIFICATIONS

An example of the PHYSTAB entry for a 1744/274 follows: Additional SYSBUF modifications include customizing the LOG1, LOG1A, and LOG2 tables. The interrupt mask table should be modified to reflect the addition of the 1744/274 interrupt lines.

* IMODK139
***** SAMPLE SYSBUF PHYSTAB ENTRIES FOR 1744/274 IMODK140
* IMODK141
* NOTE THAT WORD SEVEN SHOULD BE CHANGED TO REFLECT THE EQUIPMENT NUMBER IMODK142
* AT YOUR SITE IMODK143
********** 1744 I74 CONSOLE 1 *********************************************** IMODK144
* IMODK145
* IMODK146
ENT DIGI1,DIGI2 IMODK147
EXT DIGINI,DIGDRV,DIGERR IMODK148
* IMODK149
DIGI1 LOQ =XPH2741 IMODK150
JMP* (PH2741+2) IMODK151
* IMODK152
PH2741 NUM $12BB 0 SCHEDULER REQUEST/PRIORITY LEVEL IMODK153
ADC DIGI1 1 IMODK154
ADC DIGDRV 2 IMODK155
ADC DIGERR 3 IMODK156
NUM -1 4 IMODK157
NUM 0 5 IMODK158
NUM 0 6 IMODK159
NUM $3E00 7 EQUIP C BDC 2 - Q REGISTER IMODK160
NUM $A6 8 IMODK161
NUM 0 9 IMODK162
NUM 0 10 IMODK163
NUM 0 11 IMODK164
NUM 0 12 IMODK165
ADC 0 13 MASS MEM LENGTH 0, DRIVER CORE RESIDENT IMODK166
ADC 0 14 MASS MEM SECTOR NAME IMODK167
ADC 0 15 FNR RETURN INFORMATION IMODK168
ADC 0 16 IMODK169
* THIS ADC POINTS TO THE NEXT AVAILABLE CONSOLE. IMODK170
* IF THERE IS NO OTHER CONSOLE PRESENT IT POINTS TO ITSELF. IMODK171
ADC PH2742 17 IMODK172
ADC 0 18 IMODK173
ADC 0 19 IMODK174
NUM 0 20 IMODK175
NUM 0 21 IMODK176
NUM 0 22 IMODK177
NUM 0 23 CONSOLE NUMBER MINUS 1 IMODK178
EJT IMODK179

†If multiple 1744/274 units are on the system, this address constant points to the PHYSTAB of the next console. If only one is present, it points to itself. In this example, if PH2741 is the only 274 PHYSTAB, the instruction will be ADC PH2741.

Each 1744/274 in the configuration should be represented by an interrupt processor (DIGI1 above) and a PHYSTAB (PH2741 above).
For the second 1744/274 PHYSTAB, the last word will be NUM 1, as it always contains the quantity (NCON-1). For the third PHYSTAB, the last word should be replaced by NUM 2, etc.

Sample PHYSTAB entries are in DECK name IMODKIT in the 1700 IGS OLDPL.

Step by Step Procedures for SYSBUF modification:

1. Customize the LOG1A table by placing
   ADC (PHYSTAB address)
   in the entry corresponding to the logical unit selected for the 1744/274 when the LOCORE modifications were customized. The entry should follow the EQU Lnn(*) card in LOG1A for the interrupt line of the 1744/274.

   For the example of PHYSTAB used in this section, the LOG1A entry would be
   ADC PH2741

2. Add to LOG1 table
   ADC 0
   at the ordinal corresponding to the logical unit of the 1744/274.

3. Add to LOG 2 table
   NUM $FFFF
   at the ordinal corresponding to the logical unit selected for the 1744/274.

4. The interrupt mask table, MASKT, should be customized so that the interrupt bit corresponding to the interrupt line of the 2744/274 is set in every priority up to, but not including the priority for the 1744/274 in the interrupt trap region in SYSBUF. For example, if the 1744/274 is running at priority 8, as in the examples, the MASKT entries for priorities zero through ten ($A) must be changed. If the 1744/274 is on interrupt line 8, this change requires adding $0100 (setting bit 8) to all the MASKT entries which must be changed.

5. The 1744/274 entries should not be added to DGNTAB, the diagnostic timer table.

6. The PHYSTAB, physical device table, should be added to SYSBUF. If the priority of the 1744/274 is other than $E, word zero of the PHYSTAB should be changed from
   
   TAG NUM $12BB  to  TAG NUM $12xx

   where x is the priority level chosen for the 1744/274. Word seven of the PHYSTAB should be customized to reflect the data channel and equipment code of the 1744/274.

   The priority also appears in the interrupt trap region. That priority and the one in PHYSTAB must be the same.
CUSTOMIZING 1744 CONTROLLER SIZE

The 1700 IGS system, as released, is configured for the following controller sizes:

- Console one 8K
- Console two 8K
- Console three 4K
- Console four 4K
- Console five 4K
- Console six 4K

They may be changed by modifying the IGSPRO module before building the system or by entering a hexadecimal patch at initialization.

MODIFYING IGSPRO

The MAXBUF table in IGSPRO contains six entries, each corresponding to a possible 1744/274 in the configuration. Each entry in the table represents the last word address of the 1744 controller corresponding to the console. For a 4K controller, this entry is $FFF; for an 8K controller, $1FFF.

In the release source and binary, the table appears:

```
MAXBUF NUM $1FFF,$1FFF,$FFF,$FFF,$FFF,$FFF IGS PRO 1377
```

The following UPDATE correction will modify IGSPRO to indicate that console 1 and 2 are connected with 4K 1744 controllers.

```
*IDENT,FOURK
*DELETE,IGSPRO.1377
MAXBUF NUM $FFF,$FFF,$FFF,$FFF,$FFF,$FFF
*C IGSPRO
```

MAXBUF must have six entries. Values in the table that correspond to consoles not present in the configuration will not be used.

HEXADECIMAL PATCH

The following procedure, using the CDEBUG module, allows initialization patching of the table indicating the 1744 controller size. All type-in's are followed by a carriage return.

1. Initialize IMPORT, and establish communications with INTERCOM.

2. Define a GRAPHICS data stream using the standard procedure; do not type ?GO to initialize data transfer.

3. Press the manual interrupt switch and enter DB to load the DEBUG package. DEBUG responds DEBUG IN.
4. Dump the contents of LOCORE cell $5D by typing DPC,5D
DEBUG responds 005D hhhh
NEXT?

The value dumped, hhhh, is the address of a table in IGSPRO.

5. Add 5 plus console number (one to six) to the hhhh hexadecimal value just
   dumped. The result is the address of the MAXEUF entry for the console to
   be changed. aaaa = hhhh + 5 + console number.

6. Store the last word address of the 1744 controller into aaaa (the result
   from step 5) by typing

          LHX,aaaa,size

size is FFF for a four K controller and 1FFF for an 8K controller.

DEBUG responds NEXT?

7. Enter OFF to exit the DEBUG package.

In the following example, the MAXEUF table is patched to indicate that console
   two is present on the configuration with a 4K 1744 controller.

Operator Action

Press manual interrupt

  type-in
  MI
  ?IM,,325
  //1700 MSOS IMPORT
  //CENTRAL READY

Press manual interrupt

  type-in
  //YOUR TERMINAL ID IS AC
  MI
  ?DEF,GR,15
  //01.00.00 OK
  //01.00.00 CK

Press manual interrupt

  type-in
  MI
  DB
  DEBUG IN
  DPC,5D
  005D 3600

  type-in
  LHX,3607,FFF
  NEXT?

  type-in
  OFF
  DEBUG OUT

Press manual interrupt

  type-in
  MI
  ?GO
  
  

The patch is stored in address 3607 which is the contents of address 5D plus 5
plus console number, 2 for the example. All numbers and calculations used
with DEBUG in the example are hexadecimal.
INTERACTIVE GRAPHICS 1700 BINARY INSTALLATION PACKAGE

The binary installation and verification decks are on files 2 and 3 of the 1700 MSOS 3.0 IGS tape. Example program to obtain the decks on cards:

    PUN,CM20000,TP1.
    REQUEST(O,E)  1700 IGS TAPE
    SKIPP(C,1,15)
    COPYBF(O,P80C)
    COPYBF(O,PUNCH)
    6/7/8/9

The binary installation package contains binary object decks and binary system initialization control cards. For installation, it should be separated into five sections.

Separating the binary object decks by card count may lead to errors. The Mass Storage Operating System Version 3.0 Reference Manual contains a discussion of binary card format and relocatable binary format which may be referenced when separating the binary installation package into the proper set of object decks.

1. System Initialization Control Cards

The first 14 cards in the deck are *YM control cards for establishing the system library ordinals of 14 GRAPHICS overlays. It is assumed that the MSOS 3.0 operating system with MSOS IMPORT HS installed has 17 system library ordinals established. The control cards are:

    *YM*GIOV1,18
    *YM*GIOV2,19
    *YM*GIOV3,20
    *YM*GIOV4,21
    *YM*GIOV5,22
    *YM*GIOV6,23
    *YM*GIOV7,24
    *YM*GIOV8,25
    *YM*GIOV9,26
    *YM*GIOV10,27
    *YM*GIOV11,28
    *YM*GIOV12,29
    *YM*QUEUE,30
    *YM*GIOV13,31

These control cards should be placed in the system initialization deck following the *YM control card which defines system library ordinal 17. If the number of system library ordinals is not 17 before IGS is installed, the *YM cards should be changed so that the IGS overlays will be the next 14 system library modules.

The next 14 cards in the package are control cards of the form *S,ordinal,priority,M. They should be placed at the end of the system initialization deck with the other *S control cards, which establish the core priorities of existing system library modules (after the *T control card). If the ordinals of the IGS overlays have been changed on the *YM control cards, the ordinal field of each *S card must be changed accordingly.
2. DIGDRV (2744/274 driver) Object Deck

The next 30 cards in the package are a binary object deck of DIGDRV, the
1744/274 driver. This deck should be placed in the system initialization
dock so that it will be loaded in core resident. In the example on the
following pages, DIGDRV is placed in the *L DRIVERS core resident load.
As always, DIGDRV must precede SPACE, as the SPACE program must be the
last core resident program loaded.

3. MESIMP Object Deck (modified for IGS)

The next 71 cards in the installation package are a binary object deck of
the MESIMP module (Message Processor for IMPORT) as modified for IGS.
This object deck should replace the binary of MESIMP installed with MSOS
IMPORT HS. It must be part of the *M IMPORT load.

4. IGSFRO, IDSGR, GRAPH, Modules to be Added to IMPORT

The next 88 cards include three object decks, IGSFRO, IDSGR, and GRAPH, to
be added to the IMPORT module. They may be added as the last three decks
following the *M IMPORT control card and preceding the next system
initialization control card. Routine IMPORT must be the first routine
loaded in that module.

5. IGS Overlays and Control Cards

The remainder of the deck (557 cards) includes an *M control card and the
binary object decks for each of 14 IGS overlays. These should be placed
in the system initialization deck so that the order of the *M control card
matches the ordinals on the *YM control cards previously inserted in the
deck.

In the example, the overlays are the last 14 mass memory resident system
library routines in the installation deck.

The order of the overlays in the IGS installation package matches the
order of the routines on the *YM control cards included in the package.

Summary of Deck Structure 1700 IGS Installation Package

| Binary *YM control cards | 14 cards |
| Binary *S control cards | 14 cards |
| Binary object deck DIGDRV | 30 cards |
| Binary object deck MESIMP | 71 cards |
| Binary object decks to be added to IMPORT module (IGSFRO, IDSGR, GRAPH) | 88 cards |
| IGS overlays, control cards and object decks | 557 cards |

The *M card to load GIOV1 specifies sector number 140 (base 16) to ensure that
all primary IGS overlays are resident on the same disk cylinder, reducing disk
repositioning time during graphics activity. If the system library loaded
before GIOV1 occupies this sector, the *M card must be changed.
1700 SOURCE

The source code of the IGS Version 2.0 routines which run in the 1700 system is provided on a magnetic tape PL17, together with MESIMP (a portion of the 1700 Installation Package). The tape is in 6000 UPDATE OLDPL format compatible with UPDATE 1.2 under the SCOPE 3.4 Operating System.

The source of the IGS modules and MESIMP is followed by *CWEOR,0. Following the conditional end of record is the DECK IMODEKIT containing 1700 IGS LOCORE and SYSBUF modifications.

The first file on the tape is the OLDPL source. The sample job below demonstrates how the tape may be used to punch a source deck with sequence numbers from the COMPILE file of an UPDATE run. It also is possible to obtain card images with an UPDATE control card including the parameter C=PUNCH.

Program PUN copies the first three characters of the UPDATE correction identifier to columns 73-75 of the card and places the UPDATE sequence number in columns 76-80.

Sample Run to Create Card Source with Sequence Numbers

```
REQUEST, OLDPL,E.
UPDATE(Q)
RUN(G)
DISPOSE(TAPE2,PU)
7/8/9
*Compile, Digdrv
7/8/9
PROGRAM PUN(PUNCH,COMPIL,E,TAPE1=CMPE1,TAPE2)
    DIMENSION IC(80)
1   READ(1,100) IC,IN
    IF (EOF,1) 3,2
2   WRITE(2,101) (IC(I),I=1,72), (IC(I),I=74,76), IN
    GO TO 1
3   STOP
100 FORMAT(80R1,I6)
101 FORMAT(75R1,15)
END
7/8/9
6/7/8/9
```

If magnetic tape equipment is available on the 1700, PROGRAM PUN may be used to write a tape suitable for input to the 1700 Macro Assembler. The output tape should be an S tape at density suitable for the 1700 magnetic tape equipment. Example REQUEST card, placed before the PUN(G) control card:

```
REQUEST(TAPE2,MT,S,HI)
```

If TAPE2 is defined as magnetic tape, the DISPOSE control card must be removed.

Procedures for the use of CLASS, a CDC CYBER 70 Version of the 1700 Macro Assembler, are described at the end of section II-22. Either CLASS or the 1700 Macro Assembler Version 2.0 may be used to maintain 1700 IGS.
Organization of routines in the IGS 1700 overlays and the corresponding source by UPDATE DECK name, as it appears on the release source tape:

<table>
<thead>
<tr>
<th>Overlay</th>
<th>Routines Required</th>
<th>Corresponding Source UPDATE DECK</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIOV1</td>
<td>*GIOV1</td>
<td>GIOV1</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td>GIOV2</td>
<td>*GIOV2</td>
<td>GIOV2</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td></td>
<td>RWAAT</td>
<td>+RWAAT</td>
</tr>
<tr>
<td>GIOV3</td>
<td>*GIOV3</td>
<td>GIOV3</td>
</tr>
<tr>
<td></td>
<td>GICLR</td>
<td>GICLPA</td>
</tr>
<tr>
<td>GIOV4</td>
<td>GIOV4</td>
<td>GIOV4</td>
</tr>
<tr>
<td>GIOV5</td>
<td>*GIOV5</td>
<td>GIOV5</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td></td>
<td>RWAAT</td>
<td>+RWAAT</td>
</tr>
<tr>
<td>GIOV6</td>
<td>*GIOV6</td>
<td>GIOV6</td>
</tr>
<tr>
<td></td>
<td>RWAAT</td>
<td>+RWAAT</td>
</tr>
<tr>
<td>GIOV7</td>
<td>*GIOV7</td>
<td>GIOV7</td>
</tr>
<tr>
<td></td>
<td>GIDISP</td>
<td>GIDISPA</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td></td>
<td>RWAAT</td>
<td>+RWAAT</td>
</tr>
<tr>
<td>GIOV8</td>
<td>*GIOV8</td>
<td>GIOV8</td>
</tr>
<tr>
<td></td>
<td>GIMASK</td>
<td>GIMASK</td>
</tr>
<tr>
<td></td>
<td>GICLR</td>
<td>GICLR</td>
</tr>
<tr>
<td></td>
<td>GIAERT</td>
<td>GIAERT</td>
</tr>
<tr>
<td></td>
<td>GUAN</td>
<td>GUAN</td>
</tr>
<tr>
<td></td>
<td>PUT</td>
<td>PUT</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td></td>
<td>RWAAT</td>
<td>+RWAAT</td>
</tr>
<tr>
<td>GIOV9</td>
<td>*GIOV9</td>
<td>GIOV9</td>
</tr>
<tr>
<td></td>
<td>QUEUE2</td>
<td>QUEUE2</td>
</tr>
<tr>
<td></td>
<td>QUEUE3</td>
<td>QUEUE3</td>
</tr>
<tr>
<td></td>
<td>GIANP</td>
<td>GIANP</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td>GIOV10</td>
<td>*GIOV10</td>
<td>GIOV10</td>
</tr>
<tr>
<td></td>
<td>GITCON</td>
<td>GITCON</td>
</tr>
<tr>
<td></td>
<td>GITMMV</td>
<td>GITMMV</td>
</tr>
<tr>
<td></td>
<td>GITIMV</td>
<td>GITIMV</td>
</tr>
<tr>
<td></td>
<td>GIBRWT</td>
<td>GIBRWT</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td></td>
<td>RWAAT</td>
<td>+RWAAT</td>
</tr>
<tr>
<td>GIMAC</td>
<td>*GIMAC</td>
<td>GIMAC</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td>GIOV12</td>
<td>*GIMACE</td>
<td>GIMACE</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
<tr>
<td>QUEUE</td>
<td>*QUEUE</td>
<td>QUEUE</td>
</tr>
<tr>
<td></td>
<td>TRACD</td>
<td>TRACD</td>
</tr>
<tr>
<td></td>
<td>GIANP</td>
<td>GIANP</td>
</tr>
<tr>
<td>GIOV13</td>
<td>*GIOV13</td>
<td>GIOV13</td>
</tr>
<tr>
<td></td>
<td>GIAERT</td>
<td>GIAERT</td>
</tr>
<tr>
<td></td>
<td>GURSET</td>
<td>GURSET</td>
</tr>
<tr>
<td></td>
<td>GUAN</td>
<td>GUAN</td>
</tr>
<tr>
<td></td>
<td>PUT</td>
<td>PUT</td>
</tr>
<tr>
<td></td>
<td>RW</td>
<td>+RW</td>
</tr>
</tbody>
</table>

*The object deck for this routine must be the first binary in the overlay.
+Although multiple copies of the object deck for these routines occur in the system, they correspond to one copy of source on the source tape.
SUMMARY OF REMOTE ACTIVATION SEQUENCE

The operator loads MSOS IMPORT HS from the system disk to start operation. Jobs are input through the remote terminal's card reader. MSOS IMPORT HS is loaded at the terminal according to the following sequence.

1. Set all console switches to neutral.

2. Verify that:
   - Previously prepared disk pack on the disk pack on the disk drive contains the operating system, MSOS IMPORT HS, and MSCS IMPORT HS IGS
   - Disk and controller are on and ready
   - DSC is on, all test switches are off, and the data set is plugged in
   - Card reader, printers, and teletypewriter power is on
   - 1713 teletypewriter right-hand selector switch is set in the ON LINE position and that it is in K mode.

3. Press the CLEAR switch on the computer console.

4. Momentarily press the AUTO LOAD button on the 1738 Disk Pack Controller.

5. Momentarily set the RUN-STEP switch to RUN. At the teletypewriter, the typeout PP appears.

6. Set the PROTECT switch to the PROTECT position.

7. Press the BREAK RELEASE button and type an asterisk, followed by a carriage return.

8. Press MANUAL INTERRUPT key each time a command is entered.

9. MI is typed out each time in response.


11. Enter command:

   ?IM,,325 to initialize MSOS IMPORT HS.

12. Press carriage return key.
13. The system responds as follows:

//1700 MSOS IMPORT (MSOS IMPORT HS has been loaded)

//NO COMM (Printed out every 30 seconds until central site responds)

//CENTRAL READY (Communication has been established with INTERCOM)

//YOUR TERMINAL ID IS AC

14. To drop MSOS IMPORT HS at any point, enter the following command: (All commands must be followed by a carriage return and preceded by a manual interrupt).

?END

This command may be entered also after the NO COMM message is received.

15. Otherwise, press the MANUAL INTERRUPT key.

16. MI is typed out.

17. Typically, the next step is to assign a data stream as follows:

?DEF,GR,lu (lu is the logical unit number of the data stream assigned.)

18. Command is acknowledged:

//hh.mm.ss OK

//hh.mm.ss OK

19. Additional data streams, such as one for the card reader, may be defined and acknowledged. If core is not available, the following message appears:

//NO CORE

If desired, another stream can be released to make core available.

20. Enter command to activate data streams:

?GO or ?GO,lu

21. Command is acknowledged:

//OK
22. The system is ready to receive and process graphics and batch data. The teletypewriter output produced should appear as follows:

```
PP
*
MI
?IM,,325
//1700,MSOS IMPORT
//CENTRAL READY
//YOUR TERMINAL ID IS AC
MI
?DEF,GR,14
//--0.20.15.OK.
//--0.20.15.OK.
MI
?GO,14
//--OK
```

IGS VERSION 2.0 VALIDATION DECK

The deck may be input from central or remote site.

IMPORT must be active and communicating with INTERCOM, and the graphics data streams must be defined.

When the job attaches the console, it displays:

```
BUTTON
ONE FOUR
TWO FIVE
THREE SIX
```

BUTTON is a light button. The others are single picks.

Pick one of the six single pick alphanumeric; it will be marked (blink). Pick BUTTON; it also will be marked. When the button request from the 6000 has been completed, both display items will be unmarked and the cycle may begin again. The validation deck prints out the data returned.
The following output should result from lightpen selection of: one, button, two, button, three, button, four, button, five, button, six, button.

BUTTON SELECTED
STRING PICK 1 SELECTED

BUTTON SELECTED
STRING PICK 2 SELECTED

BUTTON SELECTED
STRING PICK 3 SELECTED

BUTTON SELECTED
STRING PICK 4 SELECTED

BUTTON SELECTED
STRING PICK 5 SELECTED

BUTTON SELECTED
STRING PICK 6 SELECTED
RELEASE DESCRIPTION

8-Bit Subroutines Version 1.0 run under 6000 SCOPE 3.4 and 6000 Record Manager 1.0.

RELEASE MATERIALS

The 8-Bit package is released on program library tape PL3 along with 6RM (6000 Record Manager), IS (SCOPE Indexed Sequential) and DA (SCOPE Direct Access).

A complete catalog of PL3 contents may be found in section I-3.

HARDWARE CONFIGURATION

The 8-Bit package requires the same minimum hardware configuration as SCOPE 3.4. An extended print train is required to print ASCII 96-character graphic files, if used.

GENERAL DESCRIPTION

The relocatable routines from the 8-Bit package 1.0 run under SCOPE 3.4, 6RM 1.0 with COBOL 4.0 or FORTRAN Extended 4.0 or COMPASS 3.0. COPY8P, a stand-alone routine used to print 360/370 print files, is control card callable and runs under SCOPE 3.4.

INSTALLATION PROCEDURES

PL3 contains 26 files, files 10-13 and 23-26 apply to the 8-Bit package: A complete PL description appears in section 3 of this document.

Files 23-26 may be obtained as follows:

Job Card

REQUEST(PL3,E)  mount tape PL3
SKIPF(PL3,22,17)  skip 22 files
COPYBF(PL3,PUNCH,2)  2 installation decks
COPYBF(PL3,PUNCH,2)  2 verification decks
UNLOAD(PL3)
6/7/8/9
The installation decks are listed below:

Deck BIT81 is a maintenance deck that allows updates of the 8-Bit package routines on the PL3 tape. This deck updates the 8-Bit program library, assembles the 8-Bit relocatable object routines, assembles COPY8P and creates a new COPY8P absolute overlay. The job essentially allows creation of a revised PL3 release tape.

Deck BIT82 adds the 8-Bit package to the running system. Relocatable object routines are put in the SYST0 library. COPY8P becomes part of the NUCLEUS library. Deck SCOPE3, described in the SCOPE section of this document, then can be run to create a deadstart tape of the running system.

The T600 parameter on the BIT81 job card has been found to be insufficient on a 6200 or 6400. Please increase the value to T1400.

BIT81,CN65000,T600,MT2.
COMMENT, THIS JCB UPDATES AND CREATES BINARIES OF 8 BIT SUBROUTINES 001
COMMENT, AND COPIES THE OLOPL AND BINARY OF 6RM, IS AND DA TO THE NEW 002
COMMENT, FL3C. THE NEW PL3C WILL CONSIST OF 13 FILES AND 8-BITS BEGINS 003
COMMENT, WITH FILE 10. 004
COMMENT, FILE 10 WILL BE THE 8-BIT NEMPL WITH A *WEOR BETWEEN 005
COMMENT, OBJECT-TIME ROUTINES AND CONTROL CARD CALLABLE COPY8P. 006
COMMENT, FILE 11 WILL BE RELOCATABLE BINARIES CF OBJECT-TIME ROUTINES. 007
COMMENT, FILE 12 WILL BE RELOCATABLE BINARY OF COPY8P. 008
COMMENT, FILE 13 WILL BE CONTROL CARD CALLABLE COPY8P IN OVERLAY. 009
LAEL(FL3C1h,R,L=RM*3P4,D=HI) 010
REQUEST,FL3C,H,HI. SCRAP FOR NEW PL3C 011
LAEL(FL3C1,H,L=RM*3P4,D=HI) 012
RENAME(FL3C1F,FL3C) 013
COPYOF(FL3C1F,FL3C,9) 014
UPDATE(FP=FL3C1F,N=FL3C1,FX) 015
COPYOF(EOF,FL3C) 016
UNLOAD(FL3C1h) 017
RENAME(CGMFILE) 018
COMPASS(I,S=ICTEXT,S=IPTEXT,L=0,B=PL3C) 019
OBJECT ROUTINES 020
COPYOF(EOF,FL3C) 021
COMPASS(I,S=ICTEXT,S=IPTEXT,L=0,B=COPY8) 022
RENAME(CPY8) 023
COPYOF(CPY8,FL3C) 024
LOAD(CPY8) 025
NOGO. 026
RENAME(COPY8P) 027
COPYOF(COPY8F,FL3C) 028
UNLOAD(FL3C) 029
7/8/9 END OF RECORD 030
*/ ADD CORRECTIONS HERE 031
*C PARSE 032
7/8/9 END OF RECORD 033
6/7/8/9 END OF FILE 034
BIT82,CM45000,T50,MT1.
COMMENT. THIS JOB EDITLIBS THE 8-BIT BINARIES FROM
COMMENT. THE RELEASED 8-BIT PL OR THE PL CREATED BY DECK BIT81.
LABEL(FL3C,FL3C,FL3C),MOUNT PL3C
SKIP(FL3C,10,17) SKIP ERNM, IS, DA AND 8-BIT PL
COFYEF(FL3C,EIT8) RELOCATABLES
COFYEF(FL3C,CPY8) COPY8P OVERLAY
REWIND(EIT8,CPY8)
EDITLIB(SYSTEM)
UNLOAD(PL3C)
7/8/9 END OF CF RECORD
READY(SYSTEM)
LIBRARY(NUCLEUS,OLD)
REPLACE(*,CPY8,AL=1,FL=13300,FLO=1)
FINISH.
LIBRARY(SYSIC,CLD)
REPLACE(*,EIT8)
FINISH.
COMPLETE.
ENDRUN.
7/8/9 END OF CF RECORD
6/7/8/5 ENDC OF FILE

VERIFICATION PROGRAMS

Dayfile output as produced by running the two verification program jobs is listed below.

SCOPE 3.4
21.15.07,VAL8BIT
21.15.08,VAL8BIT,CM45000,T100.
21.15.08,COBOL(LRM)
21.16.08. 1.875 RT SECONDS LOAD TIME
21.16.12,COMPILING NESTED
21.16.23, 000 E AND T/U DIAGNOSTICS ISSUED
21.16.23, FIELD LENGTH NEEDED FOR COBOL 05310
21.16.25, 0.093 CP SECONDS COMPIILATION TIME
21.16.25,END COBOL
21.16.25,FILE(TAPE01,BT=K,RT=U,RB=1,MBL=270,MBR=271)
21.16.25,CM=NO
21.16.26,REDUCE
21.16.25,LDSET(FILES=TAPE01)
21.16.27,LD0.
21.16.53, NON-FATAL LOADER ERRORS - SEE MAP
21.16.57. 30.852 RT SECONDS LOAD TIME
21.17.05. 8 BITS ROUTINES VALIDATE
21.17.06.CPA 5.597 SEC.
21.17.06,PP 23.840 SEC.

SCOPE 3.4
21.15.04,VLCPY8P
21.15.04,COPY8P(IN1,IN2,CODE=A)
21.15.05, COPY8P VALIDATES
21.15.05.CPA  .004 SEC.
21.15.05,PP  .639 SEC.
RELEASE DESCRIPTION

MARS VI, Multi-Access Retrieval System for 6000 Series computers, is a data management system which allows a user to organize data in the computer, store it, and retrieve, and/or modify all or any specified part of the data. The language follows simple English syntax, facilitating use of the system by non-programmers. MARS VI provides extremely rapid retrievals; it operates from remote terminals as well as from the central site. It allows batch mode processing under SCOPE 3.4 as well as Teletype or 200 User Terminal interactive processing under INTERCOM, Version 4.1.

Version 2.1 includes relocatable subroutines that can be called from a COBOL program to access the data base. MARS VI is a central memory application program operating under the SCOPE 3.4 Operating System in conjunction with RUN FORTRAN Version 2.3, COMPASS 2.0 assembler and FORTRAN Extended Version 3.0. The MARS VI system has no peripheral processor routines.

HARDWARE REQUIREMENTS

Central memory requirement is 49,152 decimal words; otherwise the minimum configuration for MARS VI is the same as for SCOPE 3.4.

RELEASE MATERIALS

MARS VI is released on an Update program library.

LIMITATIONS

1. Minimum octal field length requirements for the MARS VI modules:
   
<table>
<thead>
<tr>
<th>Module</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOADER</td>
<td>62K</td>
</tr>
<tr>
<td>RETRIEVAL</td>
<td>55K</td>
</tr>
<tr>
<td>REPORTER</td>
<td>55K</td>
</tr>
<tr>
<td>UPDATE</td>
<td>65K (non-key updates)</td>
</tr>
</tbody>
</table>

2. When absolute overlays are being prepared, at least 105000 (octal) field length is required.

3. When index tables of a partially inverted file are on permanent files, the user must make certain he has EXTEND and MODIFY permissions before using the UPDATE module, or he may destroy his data base.

4. The validation deck will not execute properly unless COBOL interface has been installed.

5. No embedded blanks are allowed in arithmetic expressions.
INSTALLATION PROCEDURES

The release tape for MARS contains eight files. File 1 contains the program libraries; file 2 contains binary of MARS in absolute overlay format; file 3 contains the COBOL interface in a form which may be cataloged as a permanent file; file 4 contains the same information as file 2 but in relocatable format. Files 5-8, which contain the necessary installation and verification decks, may be obtained by running a job of the type:

```
job card
REQUEST,PL23,E.
SKIPF(PL23,4,17)
COPYBF(PL23,PUNCH,4)
UNLOAD,PL23.
6/7/8/9
```

Job MARS1 performs program library maintenance regenerating files 1 through 4 of the release tape. Job MARS2 use EDITLIB to enter file 2 of the release tape, or a tape created by deck MARS1, into the running system. Job MARS3 catalogs the COBOL interface as a permanent file.

**NOTE:** The T7000 parameter on the MARS1 job card must be changed to T20000 if the deck is to be run on a 6200.

```
MARS1,CM105000,T7000,MT02. 001
RFL(65000) 002
COMMENT. THIS JOB UPDATES AND CREATES THE BINARY OF MARS 003
COMMENT. THE NEW PL23 WILL CONSIST OF FOUR FILES 004
COMMENT. THE FIRST FILE WILL BE THE MARS NEMPL 005
COMMENT. THE SECOND FILE WILL BE THE ABSOLUTE OVERLAYS 006
COMMENT. THE THIRD FILE WILL BE MARS COBOL INTERFACE 007
COMMENT. THE FOURTH FILE WILL BE THE RELOCATABLE BINARY 008
LABEL(FL23IN,R,L=MARS2P1*3P4,D=HI) MARS OLDPL 009
REQUEST(FL23,N,HI) SCRATCH FOR NEW PL23 010
LABEL(PL23,H,L=MARS2P1*3P4,D=HI) 011
REWIN(PL23IN,PL23) 012
UPDAT(F,P=PL23IN,N=PL23) 013
UNLOAD(PL23IN) 014
RUN(S,COMPILE,XX) 015
RUN(S,COMPILE,XX,MARSCOB) 016
FTX(I=COMPILE,E=MARSCOB,L=XX,OPT=2) 017
REWIN(MARSCOB) 018
RFL(105000) 019
LOAD(LGO) 020
NO GO. 021
RFL(25000) 022
REWIN(MARS,PL23,LGO) 023
SKIFF(PL23,1,17) 024
COPYBF(MARS,FL23) 025
COPYBF(MARSCOB,FL23) 026
COPYBF(LGO,FL23) 027
UNLOAD(PL23). 028
COMMENT. *** END OF JOB *** 029
7/8/9 END OF RECORD 030
* / ADD CORRECTIONS HERE 031
7/8/9 END OF RECORD 032
6/7/8/9 ENC OF FILE
```

I-27-2 60307400 C
MARS2,CM55000,T7000,MT01.
COMMENT. THIS JOB EDITLIBS THE MARS V2.1 BINNARIES FROM THE 001
COMMENT. MARS PL OR THE PL CREATED BY DECK MARS1.
LABEL(FL23,R,L=MARS2P1*3P4,O=HI) MOUNT MARS 2.1 PL 002
REWIND(FL23) 003
SKIFF(FL23,E,17) SKIP OLDPL 004
COFYER(FL23,Mar) MARS MAIN OVERLAY 005
COFYER(FL23,MARSOVL) SECONDARY OVERLAYS 006
REWIND(FL23,Mar,MARSOVL) 007
UNLOAD(FL23) 008
EDITLIB(SYSRE) 009
COMMENT. *** END OF JOB *** 010
7/8/9 END OF CF RECORD 011
READY(SYSRE) 012
LIBRARY(NUCLEUS,OLD) 013
PLACE(MARS,Mar,AL=1,FL=65000,FLC=1) 014
FINISH. 015
LIBRARY(SYSCVL,CLD) 016
PLACE(*,MARSCVL) 017
FINISH. 018
COMPLETE. 019
ENCRUN. 020
7/8/9 END OF RECORD 021
6/7/8/9 END OF FILE 022

MARS3,CM35000,T100,MT61.
COMMENT. THIS JOB CATALOGS THE COEOL INTERFACE 001
COMMENT. AS A PERMANENT FILE CALLED MARSCOB.
LABEL(FL23,R,L=MARS2P1*3P4,O=HI) MARS PL 002
REQUEST(MARSCCE,*PF) 003
REWIND(FL23) 004
SKIFF(FL23,E,17) SKIP OLDPL AND OVERLAYS 005
COFYER(FL23,MARSCOB) 006
REWIND(FL23,MARSCOB) 007
CATALGC(MARSCOB,MARSCOB,ID=MARS,MR=1) 008
UNLOAD(FL23) 009
COMMENT. *** END OF JOB *** 010
7/6/9 END OF CF RECORD 011
6/7/8/9 END OF FILE 012

The header information should be changed when PSR's are installed to reflect the current PSR or PSR summary.

The following cards can be used for this purpose:

*I LZ.1 HEADR (1MARS VI V2.1 PSR 1)

USER LIBRARIES

The following paragraphs apply only when MARS is executed from a user library.

To install MARS as a user library, it is necessary to assemble the name of the library into MARS.

*DELETE USERLIB.1
LIBNAME VFD 60/61MARSVI
The default value for LIBNAME is SYSOVL. The EDITLIB directives to create a user library are:

REQUEST(MARSVI,*PF)
EDITLIB(USER)
CATALOG(MARSVI,MARSVI,ID=MARS)
7/8/9
LIBRARY(MARSVI,NEW)
REPLACE(*,MARS,AL=1,FL=65000,FLO=1)
FINISH.
ENDRUN.
6/7/8/9

The above example assumes the overlays to be on a file called MARS.

If LIBNAME is not changed while MARS is assembled, the MARS command

USERLIB IS MARSVI;

can be issued while in MARS. This command has the same effect of assembling in the library name.

EXECUTION FROM USER LIBRARIES

When batch, is running the following control cards are required

ATTACH(MARSVI, MARSVI,ID=MARS,MR=1)
LIBRARY(MARSVI)
MARS.

For execution under INTERCOM, the following commands should be entered.

ATTACH(MARSVI, MARSVI,ID=MARS,MR=1)
XEQ,LIBLOAD=MARSVI,MARS,EXECUTE

VERIFICATION PROGRAM

Dayfile output from running the verification program should be similar to the following. The COBOL Interface must be available as a permanent file for the verification program to run.
DEFINE:
NEW DATA BASE AIRFIELD:
1) IC NUMBER(INTEGER NUMBER):
MAP:
DEFINE SUBITEMS:
RECORD IC IS AFIELD:
COL 1-10, C1, IDENTIFICATION NUMBER,NUM,KEY:
COL 11-37, NAME, AIRFIELD NAME, ALPHA:
COL 38, CODE, ENTRY CODE:
COL 39-53, COORDS, GEOGRAPHIC COORDINATES:
COL 54-63, DEGLAT, DEGREES, LATITUDE, NUM:
COL 64, NSDIREC, NORTH OR SOUTH DIRECTION, ALPHA:
COL 65, EDIREC, EAST OR WEST DIRECTION, ALPHA:
COL 66, OPSTAIDS, OPERATIONAL STATUS CODE:
COL 67-69, ELNEV, ELEVATION, INTEGER:
COL 70, MAINTCODE, MAINTENANCE FACILITIES CODE:
COL 71-76, LIGHTING CODE:
COL 77, RUNWAY CONDITION:
COL 96-115/2, RG1:
COL 1-3, RG2, ALPHA:
COL 4-8, RG3, ALPHA:
COL 9-10, RG4, ALPHA:
END RG1:
COL 99-103, ANWYELEV, RUNWAY ENDELEVATION, NUM:
COL 106-108, FENCIO, HIGH RUNWAY IDENTIFICATION, NUM:
COL 111-115, ROVER, RUNWAY OVERRUN:
COL 118-120, RUNCENS, RUNWAY CONDITION:
COL 126-129, MAGVAR, MAGNETIC VARIATION:
COL 130, RECMARK, RECORD MARK:
END DEFINITION:
LOADER:
RECORD FILE IS TEST:
SCAN AFIELD:
NUMBER OF RECCDS EXAMINED WAS 20
NUMBER OF RECCDS ACCEPTED WAS 20
NUMBER OF RECCDS STARED WAS 0
NUMBER OF RECCDS ON RECOD FILE IS 20

AIRFIELD DEFINITION VERSION 1 DATA VERSION 1
UNLOAD TEST:
DEFINE MACRO MYMACRO:
EXPAND ON:
THIS IS A MACRO EXPANDING:
ATTACH: AFIELD; ID=CG:CY=-C; FINIS; GETPF TESTA, TESTAPP:
RETRIEVAL:
EXPAND OFF:
END MACRO:
DEFINE MACRO REPORT1:

60307400 A
MESSAGE FILE IS NULL:
RETRIEVAL:
IF CCL(38) EC #P(01) AND (ELEV-3)/10 EQ #P(02) QUALIFY C1,KK=#P(03),
CODE,Ek=C1*K#P(04),BY LOW PK:
REPORT:
FORMAT:
TITLE IS A R R E T E I L D O R T E:
TITLE IS THE PARAMETERS USED IN THE RETRIEVAL ARE #P(01),#P(02),#P(03),
AND #P(04):
HEADING IS C1,KK,CODE,BK:
DETAIL IS C1,KK,CODE,PK:
FOOT IS END OF PAGE:
SPACE TO 16 IN T1 BEFORE II:
SPACE TO 15,47,53 IN T1,H1,H1 BEFORE I2,I3,I4;
SPACE TO 15,47,53 IN D1,D1,D1 BEFORE I2,I3,I4;
SPACE TO 10 IN F1 BEFORE II;
GENERATE:
RETRIEVAL:
MESSAGE FILE IS OUTPUT:
END MACRC:
$:
$:
RETRIEVAL:
PRINT C1,CODE,MAGVAR WHERE C1 GT 0000500140 AND C1 LT 0000500210:
C1=0000500150
CODE="
MAGVAR=012E
C1=0000500160
CODE="
MAGVAR=015E
C1=0000500170
CODE="
MAGVAR=018E
C1=0000500180
CODE="
MAGVAR=020E
C1=0000500190
CODE="
MAGVAR=024E
C1=0000500200
CODE="
MAGVAR=030E
--- END OF RETRIEVAL ---
IF C1 RANGE(0000500140,0000500210) MASS UPDATE:
CODE=E;
READY
MAGVAR=AECC;
READY
FINIS;
UPDATE COMPLETE, ENTER COMMAND
RETRIEVAL:
PRINT C1,CODE,MAGVAR WHERE C1 EQ 0000500170;
C1=0000500170
CODE=E
MAGVAR=AECC
I-27-6
60307400 A
--- END OF RETRIEVAL ---
PRINT C1,NAM3,CFSTATUS WHERE C1 EC RANGE(500190/500260):
C1=00005000190 NAME=GRAND HAVEN MEM OP STATUS=A
C1=0000500200 NAME=GRAND HAVEN MEM OP STATUS=A
C1=0000500210 NAME=GRAND HAVEN MEM OP STATUS=A
C1=0000500220 NAME=GRAND HAVEN MEM OP STATUS=A
C1=0000500230 NAME=GRAND HAVEN MEM OP STATUS=A
C1=0000500240 NAME=GRAND HAVEN MEM OP STATUS=A
C1=0000500250 NAME=GRAND HAVEN MEM OP STATUS=A
C1=0000500260 NAME=GRAND HAVEN MEM OP STATUS=A

--- END OF RETRIEVAL ---
IF (RG4(ANY) EC N) AND (C1 LT 0000500160) PRINT C1,RG2(EACH):
C1=00005000100 RG2( 1)=090 RG2( 2)=270
C1=0000500110 RG2( 1)=090 RG2( 2)=270
C1=0000500120 RG2( 1)=090 RG2( 2)=270
C1=0000500130 RG2( 1)=090 RG2( 2)=270
C1=0000500140 RG2( 1)=090 RG2( 2)=270
C1=0000500150 RG2( 1)=090 RG2( 2)=270

--- END OF RETRIEVAL ---
IF C1+50 GT 500250 REPORT C1,NAM3,CODE,IX=C1/100:
60307400 A
<table>
<thead>
<tr>
<th>C1</th>
<th>NAME</th>
<th>CODE</th>
<th>IX</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>000500210</td>
<td>GRAND HAVEN MEM</td>
<td>26</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500220</td>
<td>GRAND HAVEN MEM</td>
<td>27</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500230</td>
<td>GRAND HAVEN MEM</td>
<td>28</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500240</td>
<td>GRAND HAVEN MEM</td>
<td>29</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500250</td>
<td>GRAND HAVEN MEM</td>
<td>30</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500260</td>
<td>GRAND HAVEN MEM</td>
<td>31</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500270</td>
<td>GRAND HAVEN MEM</td>
<td>32</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500280</td>
<td>GRAND HAVEN MEM</td>
<td>33</td>
<td>N</td>
<td>5002</td>
</tr>
<tr>
<td>000500290</td>
<td>GRAND HAVEN MEM</td>
<td>34</td>
<td>N</td>
<td>5002</td>
</tr>
</tbody>
</table>

--- END OF RETRIEVAL ---
PRINT RCORC(DETAIL) WHERE C1 EQ 500170;
C1=0000500170
NAME=GRAND HAVEN MEM 22
CODE=E
COORDS=4302000,1200000
DEGLAT=43
NSCIFECT=N
EWSCIRC=T
OP STATUS=A
ELEV=00630
MAINCCOE=0
LICT=7
RUTNCOD=G
RG2(1)=050
RG3(1)=U
RG4(1)=N
RG2(2)=270
RG3(2)=U
RG4(2)=N
RNWYELEV=U
RENDIC=270
ROVERUN=N
RUNOBS=270
MAGVAR=AEGD
REMARK=1

--- END OF RETRIEVAL ---
CATALOG;
PF
   #FIELD;
   #ID=CDC;
   CY=40;
   PERMANENT FILE FUNCTION COMPLETE
FINISH
SAVE TESTA,TESTAPFN;
PERMANENT FILE FUNCTION COMPLETE
EXIT

.I-27-8  60307400 A
IDENTIFICATION DIVISION.

PROGRAM-ID. LP25.

ENVIRONMENT DIVISION.

CONFIGURATION SECTION.

INPUT-OUTPUT SECTION.

FILE-CONTROL.

SELECT FILE-1 ASSIGN TO OUTPUT.

DATA DIVISION.

FILE SECTION.

FD FILE-1.

LABEL RECORDS ARE OMITTED.

DATA RECORD IS REC-1.

01 REC-1.

02 C1 PIC X(10).

02 C-NAME PIC X(27).

02 C-CODE PIC X(1).

02 C-C9 PIC X(10).

WORKING-STORAGE SECTION.

77 NAME VALUE #NAME# PIC X(4).

77 CODES VALUE #CODE# PIC X(4).

77 C1 VALUE #C1# PIC X(2).

77 C9 VALUE #C9999# PIC X(3).

01 TEMPS.

02 CIVALUE VALUE #0000500220# PIC X(10).

02 CPVALUE VALUE #0000500210# PIC X(10).

02 RECC USAGE IS COMP-1 PIC 9(10).

02 ERFLG USAGE IS COMP-1 PIC 9(10).

02 KEWCODE PIC X(1).

01 FILESTUF.

02 DATABASE VALUE #AFIELD# PIC X(6).

02 DBP VALUE #IC=CDC# PIC X(7).

02 REF VALUE #TESTA# PIC X(3).
PROCEDURE DIVISION.

START.

OPEN OUTPUT FILE-1.

ENTER MARSOPN USING DATABASE, OEP.

ENTER MARSDEF USING REF, NAME, C-NAME, CCEDS, O-CODE, C1,
O-C1, C9, O-C9.

ENTER MARSGET USING REF, C1, C1VALUE, RECC, ERFLG, ERPAPA.

WRITE REC-1.

MOVE #27 TO C-CODE.

ENTER MARSSTOR USING REF.

ENTER MARSSEP.

ENTER MARSGET USING REF, C1, C2VALUE, RECC, ERFLG, ERPAPA.

WRITE REC-1.

ENTER MARSGET USING REF, C1, C1VALUE, RECC, ERFLG, ERPAPA.

WRITE REC-1.

ENTER MARSCLG.

CLOSE FILE-1.

STOP RUN.

ERPAPA.

DISPAY #FAIL#.

STOP RUN.

LENGTH IS 100204

FIELD LENGTH NEEDED FOR COFOL 0:2500

000520220PAND HAVEN MEM 27N 13
000520210PAND HAVEN MEM 26N 12
000520200GRAND HAVEN MEM 27Z 13
MARS VI V2.1 05/01/78

% THIS IS A MACRO EXPANDING 

ATTACH:
PFA=
AFILFD:
ID=GOC:
CY=40:
PERMANENT FILE FUNCTION COMPLETE
FINIS;
GETFF TESTA,TESTAFN:
PERMANENT FILE FUNCTION COMPLETE
RETRIEVAL:
EXPAND OFF:
RETRIEVAL:
REPORT FILE IS X:
IF C1 LT 000000200 SUBSET C1,NAMENAME,LL=LEVEL=3:
--- END OF RETRIEVAL ---
SUBSET COMPLETES-- 10 RECORDS-- 6 WORDS EACH-- 9 CHAR OF FILL
REPORT FILE IS OUTPUT:
REWRITING X:
TRANS FILE IS UF,CP:
MASS UPDATE BY C1:
DEFINITION:
DATA BASE:
END:

INVALID TRANSACTION RECORD, KEY VALUE NOT IN FILE SPECIFIED OR FILE INACTIVE
RTESTA 000000031ST. LOUIS MISSOURI USA

INVALID TRANSACTION RECORD, KEY VALUE ALREADY IN FILE SPECIFIED
RTESTA 000000031ST. LOUIS MISSOURI USA

INVALID TRANSACTION RECORD, FILE NAME NOT RECOGNIZED
SXXXXX 000000031ST. LOUIS MISSOURI USA

INVALID TRANSACTION RECORD, FILE NAME NOT RECOGNIZED
PXFIELD 000000031ST. LOUIS MISSOURI USA

INVALID TRANSACTION RECORD, KEY VALUE NOT IN FILE SPECIFIED OR FILE INACTIVE
RTESTA 000000031ST. LOUIS MISSOURI USA

10 TRANSACTIONS PROCESSED
UPDATE COMPLETE, ENTER COMMAND
RETRIEVAL:
PRINT C1,NAMENAME,CFSTATUS WHERE C1 GT 300 AND C1 LT 800;
C1=0000000210 NAME=GRAND HAVEN MEM 26 OPSTATUS=A

C1=0000000220 NAME=GRAND HAVEN MEM 27 OPSTATUS=A

C1=0000000230 NAME=GRAND HAVEN MEM 28 OPSTATUS=A

60307400 A I-27-11
C1=0000500260
NAME=GRAND HAVEN MEM
OP STATUS=A

C1=0000500260
NAME=GRAND HAVEN MEM
OP STATUS=A

--- END OF RETRIEVAL ---
PRINT PG2(1),PG2(2) WHERE SAME:
RG2(1)=050
RG2(2)=U

RG2(1)=050
RG3(2)=U

PG2(1)=096
PG3(2)=U

RG2(1)=090
RG3(2)=U

--- END OF RETRIEVAL ---
TRANS FILE IS INPUT:
MASS UPDATE BY C1:
NO CHECK;
READY
C1=0000500260,CCDE=7;
READY
C1=0000500260,CCDE=7;
KEY VALUE CCDE NOT EXIST OR FILL INACTIVE
READY
C1=0000500260,LEV=DEGLAT+1,;
READY
FINISH;
UPDATE COMPLETE, ENTER COMMAND
RETRIEVAL;
PRINT C1,CCDE,MAGVAR WHERE C1 EQ 0000500150 OR C1 EQ 0000500200:
C1=0000500150
CCDE=7
MAGVAR=AECC

--- END OF RETRIEVAL ---
*REPORT1,A,50,COL(11 TO 37),2*
IF $\text{SAME COUNT RECORD:}$
\text{COUNT} = 10
--- END OF RETRIEVAL ---
DESCRIBE MACRO SKELETONS:

MACRO NAME = MYMACRO
EXFAND ON:
$\text{THIS IS A MACRO EXPANDING}$

ATTACH: AFIELD; ID=CC; CY=-1; FINISH; GETPF TESTA,TESTAPFN;
RETRIEVAL;
EXFAND OFF;
END MACRO:

MACRO NAME = REPORT1
MESSAGE FILE IS NULL;
RETRIEVAL:
IF COL(38) EQ #P(01)' AND (ELEV-3)/10 EQ #P(02) QUALIFY C1,KK=#P(33),
CODE, BK=#P(04), BY LOW BK;
REFORMAT;
FORMAT:
TITLE IS A FILE REPORT;
TITLE IS THE PARAMETERS USED IN THE RETRIEVAL ARE #P(01), #P(02), #P(03),
AND #P(04);
HEADER IS C1, KK, CODE, BK;
DETAIL IS C1, KK, CODE, BK;
FOOT IS END OF PAGE;
SPACE TO 16 IN I1 BEFORE I1;
SPACE TO 15,47,3 IN P1,P1,P1 BEFORE I2,I3,I4;
SPACE TO 15,7,3 IN I1,I1,I1 BEFORE I2,I3,I4;
SPACE TO 18 IN F1 BEFORE I1;
GENERATE:
MESSAGE FILE IS OUTPUT:
END MACRO:
END DESCRIPTION
PURGE:
PF1 =
AFIELD;
CY=40;
PERMANENT FILE FUNCTION COMPLETE
EXIT;

21.08.51.YMARSIC
21.08.51.YMARS,CM65000,T2:00.
21.08.51.COPYER(INP,UP,1)
21.08.52.COPYER(INP,TEST,1)
21.08.52.REWIND(UP,TEST,LOAD)
21.08.53.COPYER(UP,OUTPUT)
21.08.54.COPYER(OUTPUT)
21.08.54.REWIND(LOAD,TEST,UP)
21.08.55.REQUEST(REQUEST,PF)
21.08.55.RESP(FP)
21.08.57.2.185 RT SECONDS LOAD TIME
21.08.57.RESP(TAPEC,PF)
21.08.57.RESP(TAPE12,PF)
21.08.57.RESP(TAPE11,PF)
21.08.57.RESP(TAPE10,PF)
21.08.58.REQUEST(TAPE5,*,PF)
21.08.58.REQUEST(TAPE8,*,PF)
21.08.58.REQUEST(TAPE7,*,PF)
21.08.58.REQUEST(TAPE6,*,PF)
21.08.59.( TAP6 Assigned TO EST 10 )
21.08.59.( TAP6 Assigned TO EST 10 )
21.08.59.( TAP8 Assigned TO EST 10 )
21.08.59.( TAP6 Assigned TO EST 10 )
21.08.59.( TAP6 Assigned TO EST 10 )
21.08.59.( TAP10 Assigned TO EST 10 )
21.08.59.( TAP11 Assigned TO EST 10 )
21.08.59.( TAP12 Assigned TO EST 10 )
21.09.04.( TESTA Assigned TO EST 10 )
21.09.05.SRTMRG
21.09.05. 41 RECORDS SORTED
21.09.06. 1 INTERNAL MERGE PHASES
21.09.09.SRTMRG
21.09.09. 41 RECORDS SORTED
21.09.09. 1 INTERNAL MERGE PHASES
21.09.09.INDEX BUFFER NOT SPECIFIED IN FET
21.09.09.INDEX BUFFER NOT SPECIFIED IN FET
21.09.09.INDEX BUFFER NOT SPECIFIED IN FET
21.09.09.INDEX BUFFER NOT SPECIFIED IN FET
21.09.09.INDEX BUFFER NOT SPECIFIED IN FET
21.09.09.INDEX BUFFER NOT SPECIFIED IN FET
21.09.09.RESTORE(TESTA)
21.10.07.ATTACH(MARS,C,MAPSCOB,IC=MARS,MR=1)
21.10.07.PF CYCLE NO. = 011
21.10.07.ATTACH(TESTA,TESTAFF,IC=CDC)
21.10.07.PF CYCLE NO. = 010
21.10.07.CCECL(L)
21.10.10. 1,857 RT SECONDS LOAD TIME
21.10.11.COMPILED LPF5
21.10.17. ODC AND T/V DIAGNOSTICS ISSUEC
21.10.17. FIELD LENGTH NEEDED FOR COBOL 65/250
21.10.18. .415 CF SECONDS COMPIULATION TIME
21.10.18.END CCECL
21.10.18.LLOAD(MAPSCOB)
21.10.18.LGC.
21.10.30. 12,496 RT SECONDS LOAD TIME
21.10.37.RETURN(TESTA)
21.11.01.ATTACH(TAPE9,AFIELD,91,IO=CCG,CM=40)
21.11.01.MARS(P=MYMASCFO)
21.11.01. 2,260 RT SECONDS LOAD TIME
21.11.01.SRTMRG
21.11.02. 3 RECORDS SORTED
21.11.02. 1 INTERNAL MERGE PHASES
21.11.09.SRTMRG
21.11.06. 3 RECORDS SORTED
21.11.06. 1 INTERNAL MERGE PHASES
21.11.09.INDEX BUFFER NOT SPECIFIED IN FET
21.11.09.INDEX BUFFER NOT SPECIFIED IN FET
21.11.09.INDEX BUFFER NOT SPECIFIED IN FET
21.11.09.INDEX BUFFER NOT SPECIFIED IN FET
21.11.09.INDEX BUFFER NOT SPECIFIED IN FET
21.11.09.INDEX BUFFER NOT SPECIFIED IN FET
INDEX BUFFER NOT SPECIFIED IN FET
21.11.58.REWIND(TESTA)
21.11.58.COPYSEF(TESTA,OUTPUT)
21.11.59.REWIND(X)
21.11.59.COPYSEF(X,OUTPUT)
21.12.00.FURGE(TESTA)
21.12.00.CFA  10.173 SEC.
21.12.00.PF  166.305 SEC.
RELEASE DESCRIPTION

6000/241/IGS Version 2.1 runs under INTERCOM 4.1 in conjunction with SCOPE 3.4 to provide a remote interactive graphics capability in IGS mode as well as the capability to converse with INTERCOM in COMMAND mode.

The 6000/241/IGS package allows the user to write a central memory application in FORTRAN Extended and interact with that program at the console through the keyboard, function keys, or lightpen. The IGS routines are callable only under FORTRAN Extended. The user, in COMMAND mode, has all the normal INTERCOM commands and capabilities available to a CRT terminal user under INTERCOM 4.1.

The installation of 6000/241/IGS Version 2.1 requires the previous installation of INTERCOM 4.1 and those products required by INTERCOM 4.1 under SCOPE 3.4.

6000/241/IGS Version 2.1 will be made available under SCOPE 3.3 at a later date.

HARDWARE CONFIGURATION

In addition to the minimum hardware required by SCOPE 3.4 and INTERCOM 4.1, 6000/241/IGS requires the following equipment for communication and operations:

1. A 241-1 Graphics Subsystem with a 248-2 Memory Expansion for each terminal.

2. The communication between the remote terminal and the central site requires a 201A or 201B Data Set or a 358-2 Transceiver. This communication equipment must be connected to the 6671 multiplexer as required for INTERCOM 4.1.

Hardware Options

No other hardware options are supported by this software.
RELEASE MATERIALS

6000/241/IGS Version 2.1 release material consists of 2 magnetic tapes which contain the 6000/241/IGS 2.1 OLDPLs in UPDATE format.

PL24 Central Memory Routines
PL25 Remote Routines

PL24 consists of the following files:

OLDPL File

File 1: 6000/241/IGS Version 2.1 CM OLDPL in UPDATE format.
(This contains the central memory routines required for IGS operation.)

Binary File

File 2: Central memory routines. This file is part of the LIBRARY IGS241.

Installation Decks

File 3: CMFINST Performs new installation of central memory routines.

File 4: CMFMANT Updates OLDPL (File 1) and performs system EDITLIB functions.

File 5: CMFBIN Installs from Binary File 2

File 6: JOB3 Verification deck

PL25 consists of the following files:

OLDPL File

File 1: 6000/241/IGS Version 2.1 RM OLDPL in UPDATE format.
(This contains the remote terminal resident software and utilities to assemble and format the code.)

Binary Files

File 2: BNG GRASS Assembler\{Part of LIBRARY IGS241

File 3 : BNB BINTAP routine \{Part of LIBRARY IGS241

File 4: GIN Central memory transfer routine for GFINT

File 5: GFINT Grid resident routine

I-28-2 60307400 B
Installation Decks

File 6: RMFINST Performs new installation of RM routines
File 7: RMMANT Updates OLDPL (File 1) and performs system EDITLIB functions
File 8: RMFBIN Install from Binary Files (2-5)

NEW FEATURES

1. 6000/241/IGS Version 2.1 runs under INTERCOM 4.1 with no modifications made to SCOPE 3.4 or INTERCOM 4.1 routines.

2. The GRIDRES routine has been rewritten to conform to the changes in the central memory Q8EXEC routine. The internal table structure in GRIDRES has also been changed to reduce the amount of storage required for processing and the time required to process the graphics data.

3. GUPNNTS routine has been added which provides point plot capability.

4. The GUARC and GULINE routines have been added. These routines provide line and arc scissoring capabilities in the central processor.

5. A new error processing feature has been added which will display error messages at the remote terminal as they are generated. To continue, the user is required to pick the error message with the lightpen.

LIMITATIONS

1. All limitations as they exist for INTERCOM 4.1 apply to 6000/241/IGS Version 2.1 when operating in COMMAND mode.

2. IGS application programs must use FORTRAN Extended to call the IGS subroutines.

3. The 6000/241/IGS Version 2.1 communication with INTERCOM assumes the place of a 217-13 or 217-14 CRT remote terminal, (an ANSI terminal). Please note the restriction in INTERCOM 4.1 concerning the prohibition of mixing BCD and ANSI 200 User Terminals.

4. The simultaneous use of interactive graphics data and non-IGS data at a remote terminal is not allowed. During IGS mode, INPUT and OUTPUT files in the central memory program should be disconnected to eliminate the possibility of mixing IGS and non-IGS data.
GENERAL PROCEDURES

The installation of the complete 6000/241/IGS system requires installing from the 6000/241/IGS program libraries. The jobs required to install the system are released as installation decks. The installation of INTERCOM 4.1 is required before attempting to use 6000/241/IGS Version 2.1 but not necessary for the proper installation of IGS.

Central Memory Requirements

The standard installation of 6000/241/IGS Version 2.1 does not require any CMR space beyond that required by INTERCOM 4.1 for multiplexer tables and buffers.

Installation Parameters

See INTERCOM 4.1 installation instructions.

Port Definition Entry

For each 6671 multiplexer port which is to service a 241 GRID terminal, a port definition entry macro-CRTA must be used in the CMR MULTIPLEXER SUBTABLE.

Password

A password entry is required to initialize the 241 memory using the Deadstart Initialization Procedure:

ADD U=G41,P=G41,F=60000,T=777

INSTALLATION PROCEDURES

The 6000/241/IGS Version 2.1 system is to be installed under SCOPE 3.4. The following set of jobs will produce a new system with IGS installed. The jobs are included with the release program libraries. (See files 3, 4, 5, 6 of PL24 and 6, 7, 8 of PL25 under Release Materials.)

To create a deadstart tape from the running system, modify job SCOPE3 from the SCOPE 3.4 PL by inserting this card in front of card 22 (the COMPLETE card):

INCLUDE(IGS241,SYSTEM,DS). A similar card must be inserted in front of card 038 of deck SCOPE2 (see section 1, MODEL JOBS).

Deck RMFMANT contains two PURGE cards which must be removed if no previous level of RMFMANT exists in the system.

Files that contain the necessary installation decks may be obtained by running a job of the type:

jobcard
REQUEST,PL24,E.
SKIPP(PL24,2,17)
COPYBF(PL24,PUNCH,3)
UNLOAD,PL24.
6/7/8/9

jobcard
REQUEST,PL25,E.
SKIPP(PL25,5,17)
COPYBF(PL25,PUNCH,3)
UNLOAD,PL25.
6/7/8/9
COMMENT. THIS DECK MAY BE USED TO INSTALL 241IGS VERSION 2.1
COMMENT. CENTRAL MEMORY ROUTINES
COMMENT. THIS JOB WILL REQUIRE PL24 AS INPUT AND WILL
COMMENT. EDITLIB -IGS241- INTO SYSTEM.
COMMENT. PL24 FOLLOWS
FILE1 -- UPDATED OLDPL OF CENTRAL MEMORY IGS
COMMENT. ROUTINES WITH MODIFICATIONS.
FILE2 -- RELOCATABLE OBJECT CODE FOR 241IGS
COMMENT. CENTRAL MEMORY ROUTINES.
FILE3 -- A COPY OF THIS DECK.
FILE4 -- A COPY OF THE MAINTENANCE DECK.
FILE5 -- A COPY OF A DECK TO INSTALL FROM THE
COMMENT. BINARIES ON THIS TAPE OR THE BINARIES
COMMENT. ON A MAINTENANCE TAPE.
FILE6 -- A COPY OF THE VERIFICATION PROGRAM.
LABEL(PL24,R,L=241CMF2P1*3P4,D=HI)
COPYBF(PL24,CMO)
COPYBF(PL24,NIL,4)
COPYBF(PL24,PUNCH)
UNLOAD(NIL)
UNLOAD(PL24)
COMMENT. THIS UPDATE MAKES NEWPL WITH INSTALLATION MODIFICATIONS.
UPDATE(P=CHO,F,C=CMN)
UNLOAD(CHO)
FIN(1=CMN+B=BN1+S=PFMTEXT+S=CPCTEXT,OPT=1)
COMMENT. MAKES LIBRARY OF ABOVE ROUTINES = IGS241.
EDITLIB(SYSTEM)
7/8/9
MODIFICATIONS TO CENTRAL MEMORY ROUTINES SHOULD FOLLOW THIS CARD.
7/8/9
REWIND(BN1)
READY(SYSTEM,OLD)
LIBRARY(IGS241+OLD)
ADD(*+BN1)
FINISH.
COMPLETE.
ENDRUN.
6/7/8/9
RMFINST, CM60000, T2000, MT2.

COMMENT. THIS DECK MAY BE USED TO INSTALL 2411GS VERSION 2.1
COMMENT. REMOTE Routines.

COMMENT. THIS JOB WILL REQUIRE PL25 AS INPUT AND WILL
COMMENT. ADD TO LIBRARY (IGS241) IN THE SYSTEM.

COMMENT. PL25 FOLLOWS

FILE1 -- UPDATED OLDPL OF GRIDRES AND UTILITIES
        WITH MODIFICATIONS.

FILE2 -- RELOCATABLE OBJECT CODE FOR
        GRASS ASSEMBLER.

FILE3 -- RELOCATABLE OBJECT CODE FOR
        BINTAP ROUTINE.

FILE4 -- RELOCATABLE OBJECT CODE FOR
        GINIT ROUTINE.

FILE5 -- RELOCATABLE OBJECT CODE FOR
        GRID RESIDENT FORMED BY BINTAP.

FILE6 -- A COPY OF THIS DECK.

FILE7 -- A COPY OF THE MAINTENANCE DECK.

FILE8 -- A COPY OF A DECK TO INSTALL FROM THE
        BINARIES ON THIS TAPE OR THE BINARIES
        ON A MAINTENANCE TAPE.

LABEL(PL25, R, L=241RMF2PI*3P4, D=HI)
COPYBF(PL25, CM0)
REWIND(CM0)
UNLOAD(PL25)

COMMENT. THIS UPDATE MAKES NEWPL WITH INSTALLATION MODIFICATIONS.
UPDATE(P=CM0, F+N=CMN)
UNLOAD(CM0)

COMMENT. THIS UPDATE PUTS THE GRASS ASSEMBLER SOURCE ON A FILE NAMED
COMMENT. GRAS FOR INPUT TO THE RUN COMPILER.
UPDATE(P=CMN, Q+C=GRAS)

COMMENT. THIS UPDATE PUTS THE GRID RESIDENT SOURCE ON A FILE NAMED
COMMENT. GRES FOR INPUT TO THE GRASS ASSEMBLER.
UPDATE(P=CMN, Q+C=GRES)

COMMENT. THIS UPDATE PUTS BINTAP SOURCE ON A FILE NAMED BINT
COMMENT. FOR INPUT TO COMPASS.
UPDATE(P=CMN, Q+C=BINT)

COMMENT. THIS UPDATE PUTS GINIT SOURCE ON A FILE NAMED GINIT
COMMENT. FOR INPUT TO COMPASS.
UPDATE(P=CMN, Q+C=GINIT)
RUN(5,GRASS,BN2,100000)
COMMENT THIS LOAD CREATES A FILE NAMED BNG WHICH CONTAINS THE GRASS
COMMENT ASSEMBLER TO BE EDITLIBED INTO THE SYSTEM.
LIBRARY(RUN2P3)
LOAD(BN2)
NOGO.
COMPASS(I=GIN+PB=BNB*S=PFMTXT,S=CPCTEXT)
COMMENT MAKES LIBRARY OF ABOVE ROUTINES = IGS241.
EDITLIB(SYSTEM)
REQUEST(GIN+*PF)
COMMENT GINIT IS A PROGRAM USED TO TRANSMIT GRID RESIDENT.
COMPASS(I=GINT*PB=GIN+S=PFMTXT,S=CPCTEXT)
CATALOG(GIN+GIN,ID=G41,RP=999)
LIBRARY(IGS241)
GRASS(GRES,BNT)
REIND(BNT)
REQUEST(GFINT+*PF)
COMMENT GFINT IS A FILE CONTAINING FORMATED GRID RESIDENT.
BINTAP(GFINT)
CATALOG(GFINT+GFINT,ID=IGS241,RP=999)
7/8/9
\# MODIFICATIONS TO GRASS SHOULD FOLLOW THIS CARD.
\# MODIFICATIONS TO GRID RESIDENT SHOULD FOLLOW THIS CARD.
\# MODIFICATIONS TO BINTAP SHOULD FOLLOW THIS CARD.
\# MODIFICATIONS TO GINIT SHOULD FOLLOW THIS CARD.
7/8/9
\*COMPILE GRASS
7/8/9
\*COMPILE GRIDRES
7/8/9
\*COMPILE BINTAP
7/8/9
\*COMPILE GINIT
7/8/9
REIND(BNG)
REIND(BNB)
READY(SYSTEM+OLD)
LIBRARY(IGS241,OLD)
ADD(*BNB+AL=1)
ADD(*BNG+AL=1)
FINISH.
COMPLETE.
ENDRUN.
6/7/8/9
CMFMANT, CM60000, T2000, MT2.

COMMENT. CENTRAL MEMORY ROUTINES.

COMMENT. THIS DECK IS ISSUED TO FACILITATE THE MAINTENANCE OF

COMMENT. 2411GS VERSION 2.1. THIS JOB REQUIRES A MAINTENANCE

COMMENT. FORM TAPE (EITHER THE PL24 TAPE FROM THE INSTALLATION

COMMENT. RUN OR THE OUTPUT TAPE FROM A PREVIOUS MAINTENANCE RUN)

COMMENT. AS INPUT. THE INPUT TAPE WILL BE REQUESTED AS PL24;

COMMENT. AN OUTPUT TAPE WILL BE CREATED AS FOLLOWS-

COMMENT. NPL24 -- A NEW MAINTENANCE TAPE WITH MODIFICATIONS.

COMMENT. IF AN EDITLIB IS NOT DESIRED, DELETE

COMMENT. EDITLIB(SYSTEM) = CARD 37

COMMENT. 7/8/9 THRU ENDRUN. -CARDS 53 THRU 60

COMMENT.

LABEL (PL24, R$=241CMF2P1+3P4, D=HI)

COPYBF (PL24, CH)

COPYBF (PL24, NIL)

COPYBF (PL24, FILE3)

COPYBF (PL24, FILE4)

COPYBF (PL24, FILE5)

COPYBF (PL24, FILE6)

REWIND (CMO, FILE3, FILE4, FILE5, FILE6)

UNLOAD (NIL)

UNLOAD (PL24)

COMMENT. THIS UPDATE MAKES NEWPL WITH INSTALLATION MODIFICATIONS.

UPDATE (P=CMO, F=N=CMN)

UNLOAD (CMO)

COMMENT. THIS UPDATE PUTS SOURCE ON FILE CMU FOR FINX USE.

UPDATE (P=CMN, F=C=CMU)

FTN (I=CMU+B=BN1, S=PFMEXT, S=CPCTEXT, OPT=1)

COMMENT. MAKES LIBRARY OF ABOVE ROUTINES = 1GS241.

EDITLIB (SYSTEM)

REWIND (BN1)

LABEL (NPL24, R$=241CMF2P1+3P4, T=999, D=HI)

UPDATE (P=CMN, F=N=NPL24, B)

REWIND (NPL24)

COPYBF (NPL24, Z)

COPYBF (BN1, NPL24)

COPYBF (FILE3, NPL24)

COPYBF (FILE4, NPL24)

COPYBF (FILE5, NPL24)

COPYBF (FILE6, NPL24)

UNLOAD (NPL24)

7/8/9

** MODIFICATIONS TO CENTRAL MEMORY ROUTINES SHOULD FOLLOW THIS CARD.
**

7/8/9

7/8/9

7/8/9

REWIND (BN1)

READY (SYSTEM, OLD)

LIBRARY (1GS241, OLD)

REPLACE (BYTSUBG=QB GEXEC, BNL)

FINISH.

COMPLETE.

ENDRUN.

7/8/9

6/7/8/9
RMFMANT, CM60000, T2000, MT2.
COMMENT. THIS DECK IS ISSUED TO FACILITATE THE MAINTENANCE OF 001
COMMENT. 241IGS VERSION 2.1. THIS JOB REQUIRES A MAINTENANCE 002
COMMENT. FORM TAPE (EITHER THE PL25 TAPE FROM THE INSTALLATION 003
COMMENT. RUN OR THE OUTPUT TAPE FROM A PREVIOUS MAINTENANCE RUN) 004
COMMENT. AS INPUT. THE INPUT TAPE WILL BE REQUESTED AS PL25. 005
COMMENT. AN OUTPUT TAPE WILL BE CREATED AS FOLLOWS- 006
COMMENT. 007
COMMENT. NPL25 -- A NEW MAINTENANCE TAPE WITH MODIFICATIONS. 008
COMMENT. 009
COMMENT. IF AN EDITLIB IS NOT DESIRED, DELETE 010
COMMENT. EDITLIB(SYSTEM) THRU REQUEST(GIN,*PF) - CARDS 48 TO 50 011
COMMENT. CATALOG(GIN,GIN,*) AND PURGE(JUNC,*) - CARDS 53 AND 54 012
COMMENT. REQUEST(GFIN,*PF) AND CATALOG(GFIN,*) CARDS 58 AND 60 013
COMMENT. 7/8/9 THRU ENDRUN - CARDS 91 TO 100 014
LABEL(PL25,R,L=241RMF2P1*3P4,D=HI) 015
COPYBF(PL25,CMO) 016
COPYBF(PL25,NIL=4) 017
COPYBF(PL25,FILE6) 018
COPYBF(PL25,FILE7) 019
COPYBF(PL25,FILE8) 020
REWRIND(CMO,FILE6,FILE7,FILE8) 021
UNLOAD(NIL) 022
UNLOAD(PL25) 023
COMMENT. THIS UPDATE MAKES NEWPL WITH INSTALLATION MODIFICATIONS. 024
UPDATE(P=CMO,F,N=CMN) 025
UNLOAD(CMO) 026
COMMENT. THIS UPDATE PUTS THE GRASS ASSEMBLER SOURCE ON A FILE NAMED 027
COMMENT. GRAS FOR INPUT TO THE RUN COMPILER. 028
UPDATE(P=CMN,O,C=GRAS) 029
COMMENT. THIS UPDATE PUTS THE GRID RESIDENT SOURCE ON A FILE NAMED 030
COMMENT. GRES FOR INPUT TO THE GRASS ASSEMBLER. 031
UPDATE(P=CMN,O,C=GRES) 032
COMMENT. THIS UPDATE PUTS BINTAP SOURCE ON A FILE NAMED BINT 033
COMMENT. FOR INPUT TO COMPASS. 034
UPDATE(P=CMN,O,C=BINT) 035
COMMENT. THIS UPDATE PUTS GINIT SOURCE ON A FILE NAMED GINIT 036
COMMENT. FOR INPUT TO COMPASS. 037
UPDATE(P=CMN,O,C=GINIT) 038
RUN(5,*,GRAS,BN2,100000) 039
COMMENT. THIS LOAD CREATES A FILE NAMED BNG WHICH CONTAINS THE GRASS 040
COMMENT. ASSEMBLER TO BE EDITLIBED INTO THE SYSTEM. 041
LIBRARY(RUN2P3) 042
LOAD(BN2) 043
Nogo.
COMPASS(I=BINT,B=BNB,S=PPMTEXT,S=CPTEXT) 044
COMMENT. MAKES LIBRARY OF ABOVE ROUTINES = IGS241. 045
EDITLIB(SYSTEM) 046
PURGE(JUNK,GIN,*,ID=641) 047
REQUEST(GIN,*PF) 048
COMMENT. GINIT IS A PROGRAM USED TO TRANSMIT GRID RESIDENT. 049
COMPASS(I=6GIN,B=GIN,S=PPMTEXT,S=CPTEXT) 050
CATALOG(GIN,GIN,*,ID=641,RP=999) 051
PURGE(JUNC,GFIN,*,ID=IGS241) 052
LIBRARY(IGS241) 053
GRASS(GRES,BNT) 054
REWRIND(BNT) 055
REQUEST(GFIN,*PF) 056

Pull these PURGE cards if no previous level of RMFMANT exists in the system.
BINTAP(GFIN1)
CATALOG(GFIN1,GFIN1,ID=IGS241,RP=999)
REWIND(BNG,BNB,GIN,GFIN1)
LABEL(NPL25,W,L=21RMF2P1#3P4,T=999,D=H1)
UPDATE(P=CMN,F,N=NPL25,B)
REWIND(NPL25)
COPYBF(NPL25,Z)
COPYBF(BNG,NPL25)
COPYBF(BNG,NPL25)
COPYBF(GIN,NPL25)
COPYBF(GFIN1,NPL25)
COPYBF(FILE6,NPL25)
COPYBF(FILE7,NPL25)
COPYBF(FILE8,NPL25)
UNLOAD(NPL25)
1/8/9
*/ MODIFICATIONS TO GRASS SHOULD FOLLOW THIS CARD.
*/ MODIFICATIONS TO GRID:RESIDENT SHOULD FOLLOW THIS CARD.
*/ MODIFICATIONS TO BINTAP SHOULD FOLLOW THIS CARD.
*/ MODIFICATIONS TO GINIT SHOULD FOLLOW THIS CARD.
*/
1/8/9
** COMPILE GRASS
1/8/9
** COMPILE GRIDRES
1/8/9
** COMPILE BINTAP
1/8/9
** COMPILE GINIT
1/8/9
REWIND(BNG)
REWIND(BNB)
READY(SYSTEM,OLD)
LIBRARY(IGS241,OLD)
REPLACE(GRASS,BNG,AL=1)
REPLACE(BINTAP,BNB,AL=1)
FINISH.
COMPLETE.
EXIT.
1/8/9
6/7/8/9.
CMFBIN*CM60000*T2000*MT1.
COMMENT. INSTALL 241/IGS FROM BINARIES.
LABEL(PL24,R,L=241CMF2P1*3P4,D=HI)
COPYBF(PL24*X)
UNLOAD(X)
COPYBF(PL24*BN1)
EDITLIB(SYSTEM)
COPYBF(PL24*Z+3)
UNLOAD(Z)
COMMENT. PUNCH VERIFICATION DECK.
COPYBF(PL24*PUNCH)
7/8/9
READY(SYSTEM,OLD)
LIBRARY(IGS241,OLD)
REWIND(8N1)
ADD(*,8N1)
FINISH.
COMPLETE.
ENDRUN.
6/7/8/9

RMFBIN*CM60000*T2000*MT1.
COMMENT. INSTALL 241/IGS REMOTE ROUTINES.
COMMENT. FROM BINARIES.
COMMENT. ASSUMES IGS241 LIBRARY EXISTS
COMMENT. FROM INSTALLATION OF CM ROUTINES.
LABEL(PL25,R,L=241RMF2P1*3P4,D=HI)
COPYBF(PL25*X)
UNLOAD(X)
COPYBF(PL25*BN1)
COPYBF(PL25*BNB)
EDITLIB(SYSTEM)
REQUEST(GIN,*PF)
COPYBF(PL25*GIN)
CATALOG(GIN*GIN*ID=G41,RP=999)
REQUEST*GFINT*PF.
COPYBF(PL25*GFINT)
CATALOG(GFIN*GFINT,ID=IGS241)
7/8/9
READY(SYSTEM,OLD)
LIBRARY(IGS241,OLD)
REWIND(BNG)
REWIND(BNB)
ADD(*,BNB,AL=1)
ADD(*,BNG,AL=1)
FINISH.
COMPLETE.
ENDRUN.
6/7/8/9
JOB3,CM50000,T500.
COMMENT. MAKES A PERM FILE OF VRFY.
REQUEST(VRFY,PF)
FTN(B=VRFY)
CATALOG(VRFY,VRFY,ID=CDC)

7/8/9

PROGRAM VRFY
DIMENSION IBUF(40), MESS(24), IPRT(4)
DATA IALF/4/LOKOK/
DATA JALF/4/NNONO/
DATA MESS(J), J=1,4)
* /1OH THIS IS A HTML ATION TEST /1OH*
DATA(MESS(J), J=5,8)
* /1OH PICK ANY /1OH PART OF SO /1OH M UARE WITH /1OH M LIGHT PEN
DATA MESS(J), J=9,12
* /1OH THE PICK /1OH WILL BE QU /1OH HEUED AS A /1OH M BUTTON
DATA MESS(J), J=13,16
* /1OH IF PICK /1OH GOOD THE /1OH SQUARE WI /1OH M LL VANISH
DATA MESS(J), J=17,20
* /1OH AND M EGS. /1OH OKOK WILL /1OH BE D S PLA /1OH HYED.
DATA MESS(J), J=21,24
* /1OH IF PICK /1OH IS BAD, NON /1OH M WLL APP /1OH HEAR.
* IDC=2; IDT=8; IDDD=5; NCON=1; NBYTE=0
CALL GCINJB(NCON)
CALL GICLR(NCON)
CALL GIMASK(NCON, 33, 8, 0)
JH=40; JV=40; I=0; IEND=10H
I=0
DO 82 J=1,6
DO 81 K=1,4
IPRT(K)=MESS(K+I)
CALL GURSET(JH, JV, IBUF, NBYTE=200)
CALL GUAN(IPRT+40, IBUF, NBYTE=200)
CALL GIDISP(1, IBUF, NBYTE, IDX)
JV=JV-40
I=I+4
82 CONTINUE

C DRAW OUTSIDE SQUARE.
CALL GUSEG(-500, -500, IBUF, NBYTE=200)
CALL GUSEG(-500, -500, -500, IBUF, NBYTE=200)
CALL GUSEG(-500, -500, 100, IBUF, NBYTE=200)
CALL GUSEG(-500, -500, -500, -500, NBYTE=200)
CALL GUSEG(-500, -500, 100, 100, NBYTE=200)
CALL GIDISP(1, IBUF, NBYTE, IDAD, IDT, IDC)
CONTINUE

CALL GIBUT(0, 1, LDT, LDC)
IF (LDC, EQ. 2) GO TO 10
CALL GIDISP(-100, -100, IBUF, NBYTE=200)
CALL GUAN(JALF+4, IBUF, NBYTE=200)
CALL GIDISP(1, IBUF, NBYTE, JDDAD, IDT, IDC)
GO TO 11
CONTINUE

10 IER=IDDD
CALL GIERAS(IER)
CALL GURSET(-100, -100, IBUF, NBYTE=200)
CALL GUAN(JALF+4, IBUF, NBYTE=200)
CALL GIDISP(1, IBUF, NBYTE, JDDAD, IDT, IDC)
CALL GIMOVE(0, 0, 4, JDDAD)
CALL GCINNL(NCON)
END
VERIFICATION PROCEDURE

When the installation of 6000/241/IGS Version 2.1 is complete, the EDITLIB of the IGS central routines will be complete, the files GIN and GFINT will be made permanent, the PASSWORD files entered, and INTERCOM enabled in the system.

Execution of job deck 4, file 6 of the release tape, PL24, will produce the file, VRFY, which will be used to verify the installation of 241 IGS.

Enter the BOOTSTRAP into the remote terminal memory using the Deadstart Initialization Procedure. After valid user name and password have been entered and accepted by INTERCOM, the word COMMAND will be displayed:

1. Type: FETCH,VRFY,CDC, press SEND key
   Response: COMMAND

2. Type: XEQ,LOAD=VRFY,SATISFY=IGS241,EXECUTE, press SEND key
   Response: Program VRFY will send:

   "THIS IS A VERIFICATION TEST"
   PICK ANY PART OF SQUARE WITH LIGHTPEN
   THE PICK WILL BE QUEUED AS A BUTTON IF
   PICK IS GOOD, THE SQUARE WILL VANISH
   AND MESS. OKOK WILL BE DISPLAYED.
   IF PICK IS BAD, NONO WILL APPEAR.

3. Using lightpen, with LPCAPT light on, pick a portion of the square.
4. The sequence, as stated, should proceed. The display will then be cleared and control returned to Command Mode.
5. Type: LOGOUT., press SEND key

TERMINAL OPERATING PROCEDURES

Procedures for using the 241 Remote Terminal depend on the following circumstances:

1. Deadstart Initialization Procedure
   This procedure is required when it is not certain whether the resident program is intact. Partial destruction might be caused by preventive maintenance, emergency maintenance, a Power OFF condition, or a manual change in the resident program.

2. Normal Operating Procedure
   This procedure assumes that the resident program is intact. The resident program should be assumed to remain unchanged even though the previous user may have aborted his job.
DEADSTART INITIALIZATION PROCEDURE

1. Press MC (Master Clear) button.
2. Press LOAD ADDR button.
3. Press KBD button (to see what is entered via the keyboard-buttons 0 through 7).
4. Enter 7500 via keyboard (7500 should be visible in keyboard display).
5. Press STEP button once, press Bank 2 button.
6. Press WRITE MEM button.
7. Enter code as defined in the GRIDRES listing, beginning at Bank 2, location 7500. For example:

   The listing contains---
   
   2 7500 0062       BOOT
   2 7501 2200 7101
   2 7503 4021

   Enter 0062 via keyboard, press STEP button (once)
   Enter 2200 via keyboard, press STEP button (once)
   Enter 7101 via keyboard, press STEP button (once)
   Enter 4021 via keyboard, press STEP button (once)

   The address to be entered can be verified by pressing P - button.

8. Press LOAD ADDR button.
9. Enter 7500 via keyboard.
11. Press OPR MEM button.
12. Press PROC MODE button.
13. Press RUN button.
14. Press ON LINE button.
15. Dial 6000 computer via dataphone.
16. When connection is made, the numbers 4, 3, 2, 1 appear on the CRT. After the initialization program is established, the words LOADING GRID appear on the CRT.
17. When the total resident routine is loaded, the bootstrap will LOGOUT automatically. A cursor will appear on the upper left corner of the CRT indicating the user can LOGIN.
TABLE FORMATS

The table formats are intended to serve only as reference material for those who are familiar with SCOPE 3.4 and its product set; more detailed information is available in the various reference manuals and internal maintenance specifications.

Section 1 contains formats of tables that are part of CMR. Generally, they are of interest only to SCOPE and INTERCOM system programmers.

Section 2 contains formats of tables that can be used by central processor programs running at a control point. Section 2 is generally of interest to all users of the product set.

Section 3 contains formats of tables residing on mass storage devices. Generally, they are of interest only to system programmers.

Section 4 contains formats of tables and areas that reside in ECS. ECS formats are generally of interest only to SCOPE system programmers.

Unless reserved for a specific purpose or group, all currently unused fields, names, codes, etc. are reserved for future standard development.
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PP Status Words
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Control Point Area
System Job Exchange Package Area
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SECTION 1

CENTRAL MEMORY RESIDENT TABLES
<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Pointers</td>
</tr>
<tr>
<td>100</td>
<td>Channel Status Table</td>
</tr>
<tr>
<td>154</td>
<td>PP Status Words</td>
</tr>
<tr>
<td>200</td>
<td>T.CPA_n  Control Point Areas</td>
</tr>
<tr>
<td></td>
<td>T.XPIDLA System Exchange Packages</td>
</tr>
<tr>
<td></td>
<td>T.PPC_n  PP Communication Areas</td>
</tr>
<tr>
<td></td>
<td>T.EST    Equipment Status Table</td>
</tr>
<tr>
<td></td>
<td>T.FNT    File Name Table</td>
</tr>
<tr>
<td></td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>*</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>†</td>
</tr>
<tr>
<td></td>
<td>†</td>
</tr>
<tr>
<td></td>
<td>T.TAPES  Tapes Table</td>
</tr>
<tr>
<td></td>
<td>T.RPT    Removable Pack Table</td>
</tr>
<tr>
<td></td>
<td>T.MAIL   Scheduler Mailbox Buffer</td>
</tr>
<tr>
<td></td>
<td>T.DFB    Dayfile Buffers</td>
</tr>
<tr>
<td></td>
<td>T.PJT    Parameter Storage for Delayed PP Jobs</td>
</tr>
<tr>
<td></td>
<td>T.SCHPT  (Optional) Scheduler Statistics</td>
</tr>
<tr>
<td></td>
<td>T.SCHJCA Scheduler Job Control Area</td>
</tr>
<tr>
<td></td>
<td>T.SCHJDT Scheduler Job Descriptor Table</td>
</tr>
<tr>
<td></td>
<td>T.BCFAP  CPMTR CEFAP Buffer</td>
</tr>
<tr>
<td></td>
<td>T.EPAGE  Empty Page Stack</td>
</tr>
<tr>
<td></td>
<td>T.ECSPRM ECS Parameters</td>
</tr>
<tr>
<td></td>
<td>T.SUBPG  Subpage Buffer</td>
</tr>
<tr>
<td></td>
<td>T.ECTL   Description of T.EBUF Area</td>
</tr>
<tr>
<td></td>
<td>T.EBUF   ECS Buffer for RMS–ECS Transfer</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
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</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Table Must Begin Before 100000b
†Table Must Begin Before 200000b
### P.LIB(1)

**C.DSFLAG**

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>S.SYSED T</td>
</tr>
<tr>
<td>1-2</td>
<td>S.EDTRUN</td>
</tr>
<tr>
<td>3-5</td>
<td>S.ECSLV L</td>
</tr>
<tr>
<td>6</td>
<td>S.ACTION</td>
</tr>
<tr>
<td>7-8</td>
<td>S.SYSLVL</td>
</tr>
<tr>
<td>9</td>
<td>S.PFLVL</td>
</tr>
<tr>
<td>10-11</td>
<td>S.LBLLVL</td>
</tr>
</tbody>
</table>

- **Library change bit**
- 1=bypass EDITLIB “GO/DROP” message (internal to deadstart)
- 01=EDITLIB running
- ECS level
- 000=no ECS
- 001=ECS up
- 0=load
- 1=recovery
- System level
- 00=A
- 01=B
- 10=C
- 11=D
- PF level
- 0=initialize
- 1=check
- RMS label level
- 00=initialize
- 01=check

### P.PFM1(6)

**CPFMCH**

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>S.RBTCW</td>
</tr>
<tr>
<td>1</td>
<td>S.APFIL</td>
</tr>
<tr>
<td>2</td>
<td>S.PFDIL</td>
</tr>
<tr>
<td>3</td>
<td>S.RBTCIL</td>
</tr>
<tr>
<td>4</td>
<td>S.PFUTIL</td>
</tr>
<tr>
<td>5</td>
<td>S.MDIL</td>
</tr>
<tr>
<td>6</td>
<td>TRANSPF lockout</td>
</tr>
</tbody>
</table>

- RBTC wraparound
- APF interlock
- PFD interlock
- RBTC interlock
- Utility interlock
- MD interlock
- TRANSFP lockout
### CMR POINTER AREA

<p>| | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>47</td>
<td>41</td>
<td>35</td>
<td>23</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>T.JDATE</td>
<td>(Leading Zeros)</td>
<td>Y</td>
<td>Y</td>
<td>D</td>
<td>D</td>
<td>D</td>
</tr>
<tr>
<td>P.NRBR</td>
<td>Number of Request Stack Entries (N.RQS)</td>
<td>Number of RBR Headers (N.RBR)</td>
<td>Size of Total RBR Area (L.RBR)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.BJDT</td>
<td>Julian Date in Binary (YYYYDDD)</td>
<td>Time in Binary (HHMMSS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.EVICT</td>
<td>Trace Buffer T.TRB/B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.CMFL</td>
<td>Machine FL/100B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.CPJOBN</td>
<td>Job Sequence Number</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.PJT</td>
<td>P.SPDROP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.EPBL</td>
<td>C.SPDROP DST Ordinal for ISP Drop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P.ECSFL</td>
<td>ECS Page Length</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.CLK</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>S</td>
<td>S</td>
</tr>
<tr>
<td>T.SLAB1</td>
<td>M</td>
<td>M</td>
<td>/</td>
<td>D</td>
<td>D</td>
<td>/</td>
</tr>
<tr>
<td>T.SLAB2</td>
<td>System Label</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T.SLAB6</td>
<td>Debugger</td>
<td>Step Flag</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
- T.JDATE: The date in the format YYYYDDD, where D represents the day of the month.
- P.NRBR: Indicates the number of request stack entries and RBR headers.
- T.BJDT: The Julian date in binary format.
- P.EVICT: Trace buffer-related information.
- P.CMFL: Machine model FL/100B.
- T.CPJOBN: Job sequence number.
- T.EPBL: ECS page length.
- T.CLC: Time in hours, minutes, and seconds.
- T.SLAB1: Additional data fields related to the system.
- T.SLAB2: System label information.
- T.SLAB6: Debugger and step flag details.
### CMR POINTER AREA

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.MSC</td>
<td>Count of PP Job Queue Entries</td>
</tr>
<tr>
<td></td>
<td>Number of Idle PPs</td>
</tr>
<tr>
<td></td>
<td>Number of Seconds ( \times 4096 )</td>
</tr>
<tr>
<td>P.CHRO</td>
<td>C.CHRO First 10 Channels</td>
</tr>
<tr>
<td></td>
<td>C.CHRO2 Second 10 Channels</td>
</tr>
<tr>
<td>P.PPLIB</td>
<td>Position of CIO</td>
</tr>
<tr>
<td></td>
<td>Number of Programs</td>
</tr>
<tr>
<td></td>
<td>Address of First Entry</td>
</tr>
<tr>
<td>P.VRNBUF</td>
<td>C.VRNFIN Pointer to First VSN</td>
</tr>
<tr>
<td></td>
<td>C.STGFLG ON/OFF</td>
</tr>
<tr>
<td></td>
<td>C.VRNINT Buffer Interlock</td>
</tr>
<tr>
<td></td>
<td>C.VRFNUL Buffer Full Flag</td>
</tr>
<tr>
<td>T.CPSTA</td>
<td>Idle Exchange Package Address</td>
</tr>
<tr>
<td></td>
<td>NextSlice Time</td>
</tr>
<tr>
<td></td>
<td>Active XP Address</td>
</tr>
<tr>
<td>T.CPSTB</td>
<td></td>
</tr>
<tr>
<td>T.MXNCTL</td>
<td>STL Code</td>
</tr>
<tr>
<td></td>
<td>Active XP Address</td>
</tr>
<tr>
<td>T.PPID</td>
<td>CP-MTR Requests</td>
</tr>
<tr>
<td></td>
<td>PP Input Register Address</td>
</tr>
<tr>
<td>T.PPIP</td>
<td>PP-MTR Requests</td>
</tr>
<tr>
<td></td>
<td>PP Input Register Address</td>
</tr>
<tr>
<td></td>
<td>(Reserved)</td>
</tr>
<tr>
<td></td>
<td>(Reserved)</td>
</tr>
<tr>
<td>T.SPF</td>
<td>Control Point Number</td>
</tr>
<tr>
<td></td>
<td>EST Ordinal</td>
</tr>
<tr>
<td></td>
<td>(Reserved)</td>
</tr>
<tr>
<td>T.RCHN</td>
<td>SPM-1RN Communications Word</td>
</tr>
<tr>
<td></td>
<td>First RBT Word Pair to Release</td>
</tr>
<tr>
<td>T.CPT1</td>
<td>Unassigned CM/100B</td>
</tr>
<tr>
<td>T.UAS</td>
<td>Unassigned ECS/100B</td>
</tr>
<tr>
<td></td>
<td>ECS Size</td>
</tr>
<tr>
<td></td>
<td>Initial CMTR P Address</td>
</tr>
<tr>
<td>T.ECSPAR</td>
<td>C.EPAGE</td>
</tr>
<tr>
<td>P.EPAGE</td>
<td>T.EPAGE</td>
</tr>
<tr>
<td></td>
<td>ECS Flaw Table Flag</td>
</tr>
<tr>
<td></td>
<td>ECS Parity Flag</td>
</tr>
<tr>
<td></td>
<td>ECS Parity Address/100B</td>
</tr>
</tbody>
</table>

- \( L = 0 \) Turned Off
- \( L = 1 \) Locked Off
- \( P = 1 \) CPUA
- \( P = 1 \) CPUB
### CMR POINTER AREA

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>P.SCH</strong></td>
<td>C.SRS</td>
<td>C.JCA</td>
<td>C.LJDT</td>
<td>C.JDT</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>C.LEJDT</td>
<td>T.SCHJCA/8</td>
<td>L.SCHJDT</td>
<td>T.SCHJDT/8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LE.JDT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P.STR</strong></td>
<td>C.NFL</td>
<td>C.RFL</td>
<td>C.STMF</td>
<td>C.AFL</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Needed</td>
<td>Queue Priority of</td>
<td>SCH Recall</td>
<td>Available</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FL/100B</td>
<td>Job in Counter</td>
<td>FL/100B</td>
<td>FL/100B</td>
<td></td>
</tr>
<tr>
<td><strong>T.SCHCP</strong></td>
<td>Interlock Word (Scheduler)</td>
<td></td>
<td></td>
<td></td>
<td>62</td>
</tr>
<tr>
<td><strong>T.SCHPP</strong></td>
<td>Interlock Word (PP Routines)</td>
<td></td>
<td></td>
<td></td>
<td>63</td>
</tr>
<tr>
<td><strong>P.RPT</strong></td>
<td>T.RPT/8</td>
<td>L.RPT</td>
<td></td>
<td></td>
<td>64</td>
</tr>
<tr>
<td><strong>P.MAIL</strong></td>
<td>C.MAILF</td>
<td>C.MAILL</td>
<td>C.SWPECS</td>
<td>C.SCHPT</td>
<td>65</td>
</tr>
<tr>
<td><strong>P.SWPECS</strong></td>
<td>T.MAIL/8</td>
<td>L.MAIL</td>
<td>L.ECSSWP</td>
<td>T.SCHPT/8</td>
<td></td>
</tr>
<tr>
<td><strong>P.SCHPT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P.ILR</strong></td>
<td>C.ILR</td>
<td>C.PPOVL</td>
<td></td>
<td></td>
<td>77</td>
</tr>
<tr>
<td><strong>P.PPOVL</strong></td>
<td>IP.ILR</td>
<td>T.PPOVL/10B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>P.SWPECS(65)</strong></td>
<td>C.SWPECS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The bits in C.SWPECS determine which jobs are swapped to ECS. If no bits are set, only INTERCOM and graphics jobs swapped to the central memory queue and MUJ jobs are swapped to ECS. Additional job types are swapped to ECS as follows:

<table>
<thead>
<tr>
<th>Bit</th>
<th>Job Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1 = INTERCOM and graphics jobs at end of command (EOJ bit set)</td>
</tr>
<tr>
<td>1</td>
<td>1 = Batch jobs in the central memory queue</td>
</tr>
<tr>
<td>2</td>
<td>1 = All INTERCOM and graphics jobs</td>
</tr>
<tr>
<td>3</td>
<td>1 = All batch jobs</td>
</tr>
</tbody>
</table>
CHANNEL STATUS TABLE

<table>
<thead>
<tr>
<th></th>
<th>C.CSTCN</th>
<th></th>
<th>C.CSTCB</th>
<th>26</th>
<th>24</th>
<th>12</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Channel Number</td>
<td></td>
<td>C</td>
<td>X</td>
<td>Y</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C  MMTC Conversion Table
00 — No Table
01 — EBCDIC
10 — ASCII
11 — Reserved

X  Address of this word

Y  Same as X when channel not reserved
    PPIR address when reserved

CHANNELS

00-13  Hardware channels
14  CH.FST
15  CH.FNT/CH.ILR
16  CH.LIB (GRAPHICS software only)
17  CH.RBT
20-33  Hardware channels
34  CH.CPA
35  CH.PFM
36  CH.INS
37  CH.DMP
40  CH.ESP = CH.TAPE
41  CH.ICOM INTERCOM/SCOPE communication interlock
42  CH.IEMBF INTERCOM empty buffer channel
43  CH.IUSER INTERCOM user table channel
44  CH.SCH scheduler channel
45  CH.IHUSR High speed user table channel
46  CH.IHSMT High speed empty buffer channel
### PP STATUS WORDS

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.PPS1</td>
<td>Control Point Address</td>
<td>PP Status</td>
<td>Field Access Flag</td>
<td>Channel I/O Time</td>
</tr>
<tr>
<td></td>
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### EXCHANGE PACKAGE

<table>
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<tbody>
<tr>
<td>P</td>
<td>A0</td>
<td>B0</td>
<td>CMRA</td>
<td>A1</td>
<td>B1</td>
<td>CMFL</td>
<td>A2</td>
<td>B2</td>
<td>EM</td>
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<tr>
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<td>15</td>
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<tr>
<td>ECS RA</td>
<td>A4</td>
<td>B4</td>
<td>ECS FL</td>
<td>A5</td>
<td>B5</td>
<td>MA</td>
<td>A6</td>
<td>B6</td>
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### CONTROL POINT AREA

<table>
<thead>
<tr>
<th>Exchange Package</th>
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<tbody>
<tr>
<td>W.CPUSTAT</td>
</tr>
<tr>
<td>W.CPLINK</td>
</tr>
<tr>
<td>W.CPTIME</td>
</tr>
<tr>
<td>W.CPTIMB</td>
</tr>
<tr>
<td>W.PPTIME</td>
</tr>
<tr>
<td>W.CPPTM</td>
</tr>
<tr>
<td>W.CPSTAT</td>
</tr>
<tr>
<td>W.CPFL</td>
</tr>
<tr>
<td>W.CPEF</td>
</tr>
<tr>
<td>W.CPJNAM</td>
</tr>
<tr>
<td>W.CPCC</td>
</tr>
<tr>
<td>W.CPECS</td>
</tr>
<tr>
<td>W.CPDFM</td>
</tr>
<tr>
<td>W.CPPRI</td>
</tr>
<tr>
<td>W.CPJCP</td>
</tr>
<tr>
<td>W.CPTIML</td>
</tr>
<tr>
<td>W.CPSWP</td>
</tr>
<tr>
<td>W.CPINT</td>
</tr>
<tr>
<td>W.CPSCH</td>
</tr>
<tr>
<td>W.CPRO</td>
</tr>
<tr>
<td>W.SSW</td>
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<tr>
<td>W.CPSSW</td>
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#### Last Dayfile Message

<table>
<thead>
<tr>
<th>C.CPTML</th>
</tr>
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<tbody>
<tr>
<td>C.CPTMS</td>
</tr>
<tr>
<td>C.CPPRI</td>
</tr>
<tr>
<td>C.CPECS</td>
</tr>
<tr>
<td>C.CPFLI</td>
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<table>
<thead>
<tr>
<th>C.CPSWP</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.CPINT</td>
</tr>
<tr>
<td>C.CPSCH</td>
</tr>
<tr>
<td>C.CPRO</td>
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<table>
<thead>
<tr>
<th>C.CPJDA</th>
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<tr>
<td>C.CPSSW</td>
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<table>
<thead>
<tr>
<th>(Reserved)</th>
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<tbody>
<tr>
<td>(Reserved)</td>
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</table>

<table>
<thead>
<tr>
<th>(Reserved)</th>
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<tbody>
<tr>
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# NOTES: CONTROL POINT AREA

<table>
<thead>
<tr>
<th>W.CPLINK(20)</th>
<th>C.CPSTAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit</td>
<td>Move flag - move in progress</td>
</tr>
<tr>
<td>0</td>
<td>S.CPUSTM</td>
</tr>
<tr>
<td>1</td>
<td>S.CPUSTY</td>
</tr>
<tr>
<td>2</td>
<td>S.CPUSTA</td>
</tr>
<tr>
<td>3</td>
<td>S.CPUSTB</td>
</tr>
<tr>
<td>4</td>
<td>S.CPUSTX</td>
</tr>
<tr>
<td>5</td>
<td>S.CPUSTW</td>
</tr>
<tr>
<td>6</td>
<td>S.CPUSR</td>
</tr>
<tr>
<td>7</td>
<td>S.CPUSTC</td>
</tr>
<tr>
<td>8</td>
<td>S.CPUSTD</td>
</tr>
<tr>
<td>9</td>
<td>S.CPUSTS</td>
</tr>
<tr>
<td>10</td>
<td>S.CPUSTP</td>
</tr>
</tbody>
</table>

**W.CPEF(24) C.CPEF Values:**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>F.ERTL Time limit exceeded</td>
</tr>
<tr>
<td>0002</td>
<td>F.ERAR Arithmetic error</td>
</tr>
<tr>
<td>0003</td>
<td>F.ERPP PPU abort (M.ABORT)</td>
</tr>
<tr>
<td>0004</td>
<td>F.ERC PPU abort (ABT in RA+1)</td>
</tr>
<tr>
<td>0005</td>
<td>F.ERPCE PP call error (garbage in RA+1)</td>
</tr>
<tr>
<td>0006</td>
<td>F.EROD Operator drop</td>
</tr>
<tr>
<td>0007</td>
<td>F.IUABT INTERCOM user abort</td>
</tr>
<tr>
<td>0010</td>
<td>F.ERRN Operator kill (batch job only)</td>
</tr>
<tr>
<td>0011</td>
<td>F.EREX Rerun (batch job only)</td>
</tr>
<tr>
<td>0012</td>
<td>F.ERCC Control card error</td>
</tr>
<tr>
<td>0013</td>
<td>F.ERECP ECS parity error</td>
</tr>
<tr>
<td>0014</td>
<td>F.IJBCRD Job card error</td>
</tr>
<tr>
<td>0015</td>
<td>F.IJBCRD Pre-abort (batch job only)</td>
</tr>
<tr>
<td>0016</td>
<td>F.IJBCRD Auto-recall error</td>
</tr>
<tr>
<td>0017</td>
<td>F.IJBCRD Job hung in auto-recall</td>
</tr>
<tr>
<td>0020</td>
<td>F.IJBCRD Mass storage limit exceeded (batch job only)</td>
</tr>
</tbody>
</table>

**W.CPSWP(41) C.CPORG Values:**

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Real time</td>
</tr>
<tr>
<td>10</td>
<td>Graphics</td>
</tr>
<tr>
<td>20</td>
<td>Multi-user</td>
</tr>
<tr>
<td>40</td>
<td>INTERCOM</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Swap out event bit</td>
</tr>
</tbody>
</table>
# NOTES: CONTROL POINT AREA (CONT’D)

## W.CPSCH(42) C.CPFLG Values:

<table>
<thead>
<tr>
<th>Bit</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>S.CP11B</td>
<td>1IB bit</td>
</tr>
<tr>
<td>4</td>
<td>S.CPFFL</td>
<td>FNTs in positive FL</td>
</tr>
<tr>
<td>5</td>
<td>S.CPEOJ</td>
<td>End of job</td>
</tr>
<tr>
<td>6</td>
<td>S.CPCLR</td>
<td>Control point area clear request</td>
</tr>
<tr>
<td>7</td>
<td>S.CPRFL</td>
<td>Storage request</td>
</tr>
<tr>
<td>8</td>
<td>S.CPROOP</td>
<td>Roll out</td>
</tr>
<tr>
<td>9</td>
<td>S.CPSIP</td>
<td>Swap in</td>
</tr>
<tr>
<td>10</td>
<td>S.CPSOP</td>
<td>Swap out</td>
</tr>
<tr>
<td>11</td>
<td>S.CPSWC</td>
<td>Swap out complete</td>
</tr>
</tbody>
</table>

## W.CPCKP(52) C.CPCON

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Console checkpoint request</td>
</tr>
</tbody>
</table>

## W.CPLDR1(55) C.CPLW

<table>
<thead>
<tr>
<th>Bit</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S.CPLP</td>
<td>Program loaded from non-system library</td>
</tr>
<tr>
<td>2-3</td>
<td>L</td>
<td>Library set indicator</td>
</tr>
<tr>
<td>4</td>
<td>S.CPLT</td>
<td>Debugging aid flag</td>
</tr>
<tr>
<td>5</td>
<td>R</td>
<td>Reducing flag</td>
</tr>
<tr>
<td>6-9</td>
<td>M</td>
<td>Map Options</td>
</tr>
<tr>
<td>10-11</td>
<td>W</td>
<td>Indicator for loader to be used</td>
</tr>
</tbody>
</table>

## W.CPLDR1(55) W.CPLDR2(56)

### W.CPLDR3(57) Global Library Set Indicators:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>End of global library set</td>
</tr>
<tr>
<td>01-76</td>
<td>LNT ordinal of system library</td>
</tr>
<tr>
<td>77</td>
<td>User library; lfn of first user library in W.CPLDR3; lfn of second user library</td>
</tr>
</tbody>
</table>

## W.CPFLAG(63) C.CPFLAG

<table>
<thead>
<tr>
<th>Bit</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>S.CPLDAF</td>
<td>MDI interlock</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Private pack overflow</td>
</tr>
<tr>
<td>3</td>
<td>S.CPNFNT</td>
<td>If on, do not search FNT</td>
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## W.CPFP(63)

### W.CPFP

<table>
<thead>
<tr>
<th>Bit</th>
<th>Value</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>S.CPL</td>
<td>Reprocess</td>
</tr>
<tr>
<td>1</td>
<td>S.CPG</td>
<td>Abort</td>
</tr>
<tr>
<td>2</td>
<td>S.CPA</td>
<td>No return</td>
</tr>
<tr>
<td>3</td>
<td>S.CPS</td>
<td>Sequencer</td>
</tr>
<tr>
<td>4</td>
<td>S.CPN</td>
<td>Checkpoint taken</td>
</tr>
<tr>
<td>5</td>
<td>S.CPX</td>
<td>EXIT card encountered</td>
</tr>
<tr>
<td>6</td>
<td>S.CPDP</td>
<td>Private disk pack</td>
</tr>
<tr>
<td>7</td>
<td>S.CPEOR</td>
<td>Control card EOR</td>
</tr>
<tr>
<td>8</td>
<td>S.CPJFL</td>
<td>Job card field length assigned</td>
</tr>
<tr>
<td>9</td>
<td>S.CPJ</td>
<td>JANUS</td>
</tr>
<tr>
<td>10</td>
<td>S.CPR</td>
<td>Remote batch</td>
</tr>
<tr>
<td>11</td>
<td>S.CPE</td>
<td>INTERCOM</td>
</tr>
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### SYSTEM JOB EXCHANGE PACKAGE AREA

<table>
<thead>
<tr>
<th>T.XPSCH</th>
<th>Exchange Package for Scheduler and Storage Move</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.CPU/W.CPSLIC</td>
<td>Status Byte</td>
</tr>
<tr>
<td>W.CPTIME</td>
<td>CPU-A Scheduler/Storage Move Time</td>
</tr>
<tr>
<td>W.CPTIMB</td>
<td>CPU-B Scheduler/Storage Move Time</td>
</tr>
<tr>
<td>W.PPTIME</td>
<td>PPU Idle Time</td>
</tr>
<tr>
<td>W.XPIR</td>
<td>Scheduler Input Register</td>
</tr>
<tr>
<td>W.XPOR</td>
<td>Scheduler Output Register</td>
</tr>
<tr>
<td>T.SCHR</td>
<td>Scheduler Request Stack Table</td>
</tr>
<tr>
<td>L.SCHR</td>
<td>L.SCHR=4</td>
</tr>
<tr>
<td>T.MTRR</td>
<td>CPMTR MTR Request Stack</td>
</tr>
<tr>
<td>L.MTRR</td>
<td>L.MTRR=4</td>
</tr>
<tr>
<td>T.XPIDLA</td>
<td>CPU-A Idle Program Exchange Package</td>
</tr>
<tr>
<td>P=CP,MTR</td>
<td>(if IP.ECSB=0, FL=400000B ECS FL=17777777B B2=1 B5=L.ECSTK B7=0 A6=T.EPAGE)</td>
</tr>
<tr>
<td>W.CPTIME</td>
<td>CPU-A Idle Time</td>
</tr>
<tr>
<td>W.XPIR</td>
<td>I D L E 1</td>
</tr>
<tr>
<td>T.XPIDLB</td>
<td>(If IP.MCPU=2) CPU-B Idle Program Exchange Package</td>
</tr>
<tr>
<td>P=CP,MTR</td>
<td>(If IP.ECSB=0, FL=400000B ECS FL=17777777B B2=1 B5=L.ECSTK B7=1 A6=T.EPAGE)</td>
</tr>
<tr>
<td>W.CPTIME</td>
<td>CPU-B Idle Time</td>
</tr>
<tr>
<td>W.XPIR</td>
<td>I D L E 2</td>
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### PP COMMUNICATION AREA

#### FOR PPO

<table>
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<tr>
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<tbody>
<tr>
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<td>CPCIO Output Register</td>
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<tr>
<td>17</td>
<td>MTR Output Register</td>
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</tr>
<tr>
<td>W.PPMES1</td>
<td>Stack Request Parameters</td>
<td></td>
</tr>
<tr>
<td>W.PPMES2</td>
<td>7HDAYFILE</td>
<td>000030</td>
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<tr>
<td>W.PPMES3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.PPMES4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.PPMES5</td>
<td>7HCERFILE</td>
<td>000030</td>
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<tr>
<td>W.PPMES6</td>
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Extend for System Dayfile
Extend for CERFILE

#### FOR PP1

<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>W.PPIR</td>
<td>DSD Input Register</td>
<td></td>
</tr>
<tr>
<td>W.PPOR</td>
<td>DSD Output Register</td>
<td></td>
</tr>
<tr>
<td>W.PPMES1</td>
<td>Stack Request Parameters</td>
<td></td>
</tr>
<tr>
<td>W.PPMES2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.PPMES3</td>
<td>Control Point 0</td>
<td></td>
</tr>
<tr>
<td>W.PPMES4</td>
<td>Message Buffer</td>
<td></td>
</tr>
<tr>
<td>W.PPMES5</td>
<td>DSD – 1DL Communication Word</td>
<td></td>
</tr>
<tr>
<td>W.PPMES6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
PP COMMUNICATION AREA
FOR PP2 THROUGH PPh

W.PPIR
Program Name or 0

W.PPOR
MTR
Function
Code
Recall
Control Point No.
Called from event or delay stack

W.PPMES1
/STACK REQUEST PARAMETERS/

W.PPMES2

W.PPMES3
COMMUNICATION WORD

W.PPMES4

W.PPMES5
EVENT STACK PARAMETERS

W.PPMES6

COMMUNICATION WORD

C.RWPCF
Control Point

C.RWPWT
Cumulative Byte Count

C.RWPPLW
PP Buffer Length

C.RWPPCC
C.RWPPST
Current PRU Byte Code and Status

C.RWPPWC
Byte Count
<table>
<thead>
<tr>
<th>Routine Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AOO (010000)</td>
<td>Stack Processor segment</td>
</tr>
<tr>
<td>ACE</td>
<td>Advance control card</td>
</tr>
<tr>
<td>CCP</td>
<td>6000 station routine</td>
</tr>
<tr>
<td>CEM</td>
<td>Central error manager for ECS</td>
</tr>
<tr>
<td>CIO</td>
<td>Preliminary I/O request processor</td>
</tr>
<tr>
<td>CKP</td>
<td>Saves information necessary to restart a checkpoint job</td>
</tr>
<tr>
<td>CLO</td>
<td>Dummy program used to call CIO</td>
</tr>
<tr>
<td>CON</td>
<td>INTERCOM-connect file to remote terminal</td>
</tr>
<tr>
<td>CP1</td>
<td>C.E.-415 card punch test</td>
</tr>
<tr>
<td>CR1</td>
<td>C.E.-405 card reader test</td>
</tr>
<tr>
<td>CY1</td>
<td>Resets FNT of file being processed by restart</td>
</tr>
<tr>
<td>DF4</td>
<td>C.E.-3234 test</td>
</tr>
<tr>
<td>DF7</td>
<td>C.E.-3553 test</td>
</tr>
<tr>
<td>DF8</td>
<td>C.E.-808 test</td>
</tr>
<tr>
<td>DIS</td>
<td>Console display program for a control point</td>
</tr>
<tr>
<td>DLE</td>
<td>C.E. Diagnostics</td>
</tr>
<tr>
<td>DMP</td>
<td>Dump CM</td>
</tr>
<tr>
<td>DPF</td>
<td>Dump permanent files to tape</td>
</tr>
<tr>
<td>DSP</td>
<td>Dispose function processor</td>
</tr>
<tr>
<td>EKG</td>
<td>Private pack closing-1EJ</td>
</tr>
<tr>
<td>EPF</td>
<td>Send audit information to CM</td>
</tr>
<tr>
<td>FAD</td>
<td>INTERCOM</td>
</tr>
<tr>
<td>FNT</td>
<td>INTERCOM-FNT alter routine</td>
</tr>
<tr>
<td>GBJ</td>
<td>INTERCOM-274 Graphics begin job</td>
</tr>
<tr>
<td>GEJ</td>
<td>INTERCOM-274 Graphics end job</td>
</tr>
<tr>
<td>IAP</td>
<td>INTERCOM-initiate another program</td>
</tr>
<tr>
<td>IEF</td>
<td>Routine for CEFAP</td>
</tr>
<tr>
<td>IUP</td>
<td>INTERCOM-initiate user program</td>
</tr>
<tr>
<td>JDP</td>
<td>Job dependency count decremenitor</td>
</tr>
<tr>
<td>LDL</td>
<td>Loader utility program</td>
</tr>
<tr>
<td>LDV</td>
<td>Loads CPU absolute overlays</td>
</tr>
<tr>
<td>LDW</td>
<td>Loads CPU absolute overlays in conjunction with LDV</td>
</tr>
<tr>
<td>LOC</td>
<td>Load octal corrections</td>
</tr>
<tr>
<td>LPF</td>
<td>In conjunction with LOADPF, reloads permanent files</td>
</tr>
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<tr>
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<tr>
<td>MDI</td>
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<tr>
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<tr>
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<td>Dummy program used to call CIO</td>
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<tr>
<td>PFA</td>
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<td>PFC</td>
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<tr>
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</tr>
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</tr>
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<tr>
<td>8XK</td>
<td>Tape scheduling commands overlay for DSD</td>
</tr>
<tr>
<td>8XL</td>
<td>Operator action manager commands overlay for DSD</td>
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<tr>
<td>8XM</td>
<td>Error flag commands overlay for DSD</td>
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<tr>
<td>8XN</td>
<td>CP-PP interlock commands overlay for DSD</td>
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<tr>
<td>8XO</td>
<td>Initiate system jobs command overlay for DSD</td>
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<tr>
<td>8XP</td>
<td>Tape assignment command overlay for DSD</td>
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<td>8XQ</td>
<td>Bring up displays command overlay for DSD</td>
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<tr>
<td>8XR</td>
<td>Divert a file command overlay for DSD</td>
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<tr>
<td>8X1-8X9</td>
<td>DSD</td>
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<td>8YA-8Y9</td>
<td>DSD (7000 Station Commands)</td>
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<tr>
<td>8ZA-8Z9</td>
<td>INTERCOM PP drivers</td>
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<td>Customer Engineering</td>
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<td>9PU-9Y9</td>
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### MONITOR FUNCTIONS

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<td>01</td>
<td>M.SETST</td>
<td>Set CPU status bits</td>
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<td>02</td>
<td>M.CLRST</td>
<td>Clear CPU status bits</td>
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<tr>
<td>03</td>
<td>M.RCP</td>
<td>Request central processor</td>
</tr>
<tr>
<td>04</td>
<td>M.DCP</td>
<td>Drop central processor</td>
</tr>
<tr>
<td>05</td>
<td>M.RCLCP</td>
<td>Recall central processor</td>
</tr>
<tr>
<td>06</td>
<td>M.ICE</td>
<td>Initiate central executive</td>
</tr>
<tr>
<td>00</td>
<td>EX.CMSTM</td>
<td>CM storage move</td>
</tr>
<tr>
<td>01</td>
<td>EX.ECSM</td>
<td>ECS storage move</td>
</tr>
<tr>
<td>02</td>
<td>EX.ECOVL</td>
<td>ECS overlay load</td>
</tr>
<tr>
<td>03</td>
<td>EX.SPM</td>
<td>Call stack processor manager</td>
</tr>
<tr>
<td>05</td>
<td>EX.SCH</td>
<td>Call scheduler</td>
</tr>
<tr>
<td>06</td>
<td>EX.SCH1</td>
<td>Call scheduler (storage request entry)</td>
</tr>
<tr>
<td>07</td>
<td>EX.REQEB</td>
<td>Request ECS buffer</td>
</tr>
<tr>
<td>10</td>
<td>EX.RELEB</td>
<td>Release ECS buffer</td>
</tr>
<tr>
<td>11</td>
<td>EX.REQSB</td>
<td>Request system buffer</td>
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<tr>
<td>12</td>
<td>EX.RELSB</td>
<td>Release system buffer</td>
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<tr>
<td>13</td>
<td>EX.MVIN</td>
<td>Move data to ECS from system buffer</td>
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<tr>
<td>14</td>
<td>EX.MVOUT</td>
<td>Move data from ECS to system buffer</td>
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<tr>
<td>15</td>
<td>EX.FLHB</td>
<td>Flush buffer</td>
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<tr>
<td>16</td>
<td>EX.CSWAP</td>
<td>Clean ECS after ECS RPE in swap file</td>
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<td>17</td>
<td>EX.AUTEB</td>
<td>Terminate automatic allocation</td>
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<tr>
<td>20</td>
<td>EX.ECD</td>
<td>Display ECS</td>
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<tr>
<td>21</td>
<td>EX.ECR</td>
<td>Release display</td>
</tr>
<tr>
<td>22</td>
<td>EX.CCW</td>
<td>Modify ECS</td>
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<tr>
<td>23</td>
<td>EX.CEM</td>
<td>Clear CEM-working flag</td>
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<tr>
<td>24</td>
<td>EX.DDPER</td>
<td>Process DDP overlay loading error</td>
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<tr>
<td>25</td>
<td>EX.ECLDV</td>
<td>Make successive partial reads of ECS record</td>
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<tr>
<td>07</td>
<td>M.CPUST</td>
<td>Change CPU status (IP.MCPU ≠ 1)</td>
</tr>
<tr>
<td>10</td>
<td>M.SLICE</td>
<td>MTR interrupts CPMTR at end of time slice for job</td>
</tr>
<tr>
<td>12</td>
<td>M.RCH</td>
<td>Reserve channel</td>
</tr>
<tr>
<td>13</td>
<td>M.DFM</td>
<td>Process day/file message</td>
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<tr>
<td>15</td>
<td>M.STEP</td>
<td>Enter step mode</td>
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<tr>
<td>16</td>
<td>M.RBTSTO</td>
<td>Request RBT storage</td>
</tr>
<tr>
<td>17</td>
<td>M.RSTOR</td>
<td>Request storage</td>
</tr>
<tr>
<td>20</td>
<td>M.TSR</td>
<td>Terminate storage request (IP.RTMTR ≠ 0)</td>
</tr>
<tr>
<td>21</td>
<td>M.DPP</td>
<td>Drop PP</td>
</tr>
<tr>
<td>22</td>
<td>M.ABORT</td>
<td>Abort control point and drop PP</td>
</tr>
<tr>
<td>25</td>
<td>M.SEQ</td>
<td>Assign job sequence number</td>
</tr>
<tr>
<td>26</td>
<td>M.SEF</td>
<td>Set error flag</td>
</tr>
<tr>
<td>27</td>
<td>M.ISP</td>
<td>Initiate stack processor</td>
</tr>
<tr>
<td>30</td>
<td>M.SPRCL</td>
<td>Stack processor recall</td>
</tr>
<tr>
<td>31</td>
<td>M.CCPA</td>
<td>Change control point assignment</td>
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<tr>
<td>32</td>
<td>M.RPJ</td>
<td>Request peripheral job</td>
</tr>
<tr>
<td>33</td>
<td>M.EES</td>
<td>Enter event stack</td>
</tr>
<tr>
<td>34</td>
<td>M.CPJ</td>
<td>Capture peripheral job</td>
</tr>
<tr>
<td>35</td>
<td>M.SCH</td>
<td>Initiate integrated scheduler</td>
</tr>
<tr>
<td>36</td>
<td>M.PASS</td>
<td>MTR ignores it -- to be cleared by another routine</td>
</tr>
<tr>
<td>37</td>
<td>M.RACT</td>
<td>Request control point activity</td>
</tr>
<tr>
<td>41</td>
<td>M.NTIME</td>
<td>Enter new time limit</td>
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**MONITOR FUNCTIONS (CONT'D)**

<table>
<thead>
<tr>
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<th>Function</th>
<th>Description</th>
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<tbody>
<tr>
<td>42</td>
<td>M.NOTE</td>
<td>Null function, cleared immediately. Used as break point</td>
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<tr>
<td>43</td>
<td>M.PPCH</td>
<td>Request channel surveillance</td>
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<tr>
<td>44</td>
<td>M.BUFPTR</td>
<td>Buffer pointer address</td>
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<tr>
<td>45</td>
<td>M.PATCH</td>
<td>Enter a patch into MTR</td>
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<tr>
<td>46</td>
<td>M.TRACE</td>
<td>Turn on MTR trace</td>
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<tr>
<td>47</td>
<td>M.SLPER</td>
<td>XJ to other CPU</td>
</tr>
<tr>
<td>77</td>
<td>M.KILL</td>
<td>Bad monitor request made</td>
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### EQUIPMENT STATUS TABLE

**PUBLIC RMS DEVICE ENTRY**

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<tr>
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<tr>
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<td>000000</td>
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<td>Eqp. No.</td>
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<td>C.ESTMNE Hardware Mnemonic</td>
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<td>100</td>
<td>S.ESTSYS — System Device</td>
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<td>S.ESTPF — Permanent File Device</td>
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**PRIVATE RMS DEVICE ENTRY**

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<td>10000</td>
<td>Control Point Number</td>
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<td>S.ESTBSY — BUSY Bit</td>
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<td>S.ESTFR — FREE Bit</td>
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**MAGNETIC TAPE ENTRY**

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<tr>
<td>C.ESTAT</td>
<td>000000</td>
<td>C.ESTCH1</td>
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<tr>
<td>0</td>
<td>Channel B</td>
<td>Channel A</td>
<td>Channel D</td>
<td>6681/6684</td>
<td>ON/OFF Bit</td>
<td>MMTC Bit</td>
<td></td>
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<tr>
<td></td>
<td>Tape Status Check in Progress</td>
<td>Control Point Number</td>
<td></td>
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**UNIT RECORD EQUIPMENT ENTRY**

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<tr>
<td>C.ESTAT</td>
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<td>C.ESTSD Special Disposition</td>
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<td>Control Point Number</td>
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II-1-26

60307400 C
### EQUIPMENT STATUS TABLE

#### 6612 DISPLAY CONSOLE ENTRY

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<td>C.ESTCH1</td>
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<td>Available Bit</td>
<td>Control Point Number</td>
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#### MULTIPLEXOR ENTRY

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#### 6000/7000 CHANNEL COUPLER

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#### DDP ENTRY

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## DEVICE CODES

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<th>Device Type</th>
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<tr>
<td>AA</td>
<td>01</td>
<td>6603-I disk</td>
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<td>AB</td>
<td>02</td>
<td>6638 disk</td>
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<tr>
<td></td>
<td>03</td>
<td>Data cell</td>
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<tr>
<td>AC</td>
<td>04</td>
<td>6603-II disk</td>
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<tr>
<td>AL</td>
<td>05</td>
<td>821 data file</td>
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<tr>
<td>AM</td>
<td>06</td>
<td>841 multiple disk drive</td>
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<tr>
<td>AP</td>
<td>07</td>
<td>3234/854 disk pack drive</td>
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<tr>
<td>AF</td>
<td>10</td>
<td>814 disk file</td>
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<td></td>
<td>11</td>
<td>CDC reserved</td>
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<tr>
<td>AD</td>
<td>12</td>
<td>3637/865 drum</td>
</tr>
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<td>AY</td>
<td>13</td>
<td>Reserved for 844 disk pack</td>
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<td>ECS resident file</td>
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<td>16</td>
<td>CDC reserved</td>
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<tr>
<td></td>
<td>17</td>
<td>Reserved for installations, RMS devices only</td>
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<tr>
<td>MT</td>
<td>40 xx</td>
<td>7-track magnetic tape†</td>
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<tr>
<td></td>
<td>41 xx</td>
<td>9-track magnetic tape†</td>
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<td>NT</td>
<td>42 xx</td>
<td>Member file 7-track tape†</td>
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<tr>
<td></td>
<td>43 xx</td>
<td>Member file 9-track tape†</td>
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<tr>
<td>TR</td>
<td>44</td>
<td>Paper tape reader</td>
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<tr>
<td>TP</td>
<td>45</td>
<td>Paper tape punch</td>
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<tr>
<td></td>
<td>46</td>
<td>Reserved for installations</td>
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<tr>
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<td>47</td>
<td>Reserved for installations</td>
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<td>LP</td>
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<td>LI</td>
<td>51</td>
<td>501, 505 line printer</td>
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<td>L2</td>
<td>52</td>
<td>512 line printer</td>
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<td>61</td>
<td>Remote terminal keyboard</td>
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<td></td>
<td>62xx</td>
<td>7-track multi-file set tape†</td>
</tr>
<tr>
<td></td>
<td>63xx</td>
<td>9-track multi-file set tape†</td>
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*See following page*
### DEVICE CODES (CONT'D)

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<thead>
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<th>Mnemonic</th>
<th>Device Type</th>
<th>Description</th>
</tr>
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<td>- -</td>
<td>64</td>
<td>Pseudo code for tape staging</td>
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<tr>
<td>- -</td>
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<tr>
<td>- -</td>
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<td>Reserved for installations</td>
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<tr>
<td>- -</td>
<td>67</td>
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<tr>
<td>CP</td>
<td>70</td>
<td>415 card punch</td>
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<tr>
<td>DS</td>
<td>71</td>
<td>6612 keyboard/display console</td>
</tr>
<tr>
<td>GC</td>
<td>72</td>
<td>252-2 graphic console</td>
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<tr>
<td>HC</td>
<td>73</td>
<td>523-2 hard copy recorder</td>
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<td>FM</td>
<td>74</td>
<td>254-2 microfilm recorder</td>
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<td>- -</td>
<td>76</td>
<td>Reserved for installations</td>
</tr>
<tr>
<td>- -</td>
<td>77</td>
<td>Reserved for installations</td>
</tr>
<tr>
<td>DC</td>
<td>--</td>
<td>6671 DSC</td>
</tr>
<tr>
<td>IX</td>
<td>--</td>
<td>Reserved for installations</td>
</tr>
<tr>
<td>Wx</td>
<td>--</td>
<td>Reserved for installations</td>
</tr>
<tr>
<td>Xx</td>
<td>--</td>
<td>Reserved for installations</td>
</tr>
<tr>
<td>SC</td>
<td>--</td>
<td>6673/6674 DSC</td>
</tr>
<tr>
<td>YC</td>
<td>--</td>
<td>6676 DSC</td>
</tr>
<tr>
<td>CC</td>
<td>--</td>
<td>6000/7000 channel coupler</td>
</tr>
<tr>
<td>CS</td>
<td>--</td>
<td>7077-1 communications station (LCC)</td>
</tr>
<tr>
<td>DP</td>
<td>--</td>
<td>DDP</td>
</tr>
</tbody>
</table>

† Low order  
6 bits (xx)  

<table>
<thead>
<tr>
<th>7-track</th>
<th>9-track</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-00---</td>
<td>HI-density (556 bpi)</td>
</tr>
<tr>
<td>11-01---</td>
<td>LO density (200 bpi)</td>
</tr>
<tr>
<td>11-10---</td>
<td>HY density (800 bpi)</td>
</tr>
<tr>
<td>11-11---</td>
<td>CDC-reserved</td>
</tr>
<tr>
<td>10---00--</td>
<td>Unlabeled</td>
</tr>
<tr>
<td>10---01--</td>
<td>U- or Z-labeled</td>
</tr>
<tr>
<td>10---10--</td>
<td>Y-labeled</td>
</tr>
<tr>
<td>10---11--</td>
<td>CDC-reserved</td>
</tr>
<tr>
<td>11-00----</td>
<td>SCOPE data format</td>
</tr>
<tr>
<td>11-01----</td>
<td>CDC-reserved</td>
</tr>
<tr>
<td>11-10----</td>
<td>S tape</td>
</tr>
<tr>
<td>11-11----</td>
<td>L tape</td>
</tr>
</tbody>
</table>
FILE NAME TABLE
ENTRY AND OPTIONAL SUPPLEMENT
FOR FILE IN INPUT QUEUE

59  53  50  47  35  23  18  11  0

C.FNAME  Job Name  C.FLINK
C.FTAPE/C.FNT
C.FRBA  First RBT
C.ECFL  ECS FL/1000B
C.FINTID  INTERCOM ID
C.FINTAD  Link to
C.FFL  CM FL/100B

C.FCPU  Time Limit
C.FABT  Disposition
C.FRRN  Code

00 = CPU-A/CPU-B
20 = CPU-A only
40 = CPU-B only
60 = 7000 only
77 = 6000 or 7000

Job Card Error
JANUS Pre-abort
Rerun

Real Time Job
No FL Specified

59  47  35  23  17  11  0

00778  C.FBKLK  Backward Link  0  0000

C.FEQP  Device Type
C.FFRBA  First RBT
C.FLRBWP  Current RBT
C.FCB  Current Byte
C.FDPU  Current PRU#

C.FDPCN  Job Dependency
C.FDPV  Job Dependency
C.FDC  Disposition Code

# if nonzero, fields apply to pre-OUTPUT file
## FILE NAME TABLE

### TAPE FILE ENTRIES

#### BEFORE EQUIPMENT ASSIGNMENT (GNT)

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FNAME</td>
<td>Logical File Name</td>
</tr>
<tr>
<td>C.LINK</td>
<td>Link Bit</td>
</tr>
<tr>
<td>C.FLWKAD</td>
<td>Control Pt. No.</td>
</tr>
<tr>
<td>C.FLNKAD</td>
<td>Link to Optional Supplement</td>
</tr>
</tbody>
</table>

- **Word 2 from REQ Function Parameter List**
- **VSN Valid**
- **GNT Word 3 Filled in from REQ Parameter List**
- **Label Address in Control Point Area W.CPOAE**
- **Awaiting Tape Assignment**

#### SUPPLEMENT(S) IF MORE THAN ONE VSN GIVEN

<table>
<thead>
<tr>
<th>Sequence</th>
<th>C.FBKLK</th>
<th>Alternate VSNs</th>
<th>C.FLWKAD</th>
<th>Backward Link</th>
<th>Volume Serial Number</th>
<th>Control Point Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0077B</td>
<td>C.FBKLK</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### SUPPLEMENT IF 2MT/2NT DECLARED

<table>
<thead>
<tr>
<th>Sequence</th>
<th>C.FBKLK</th>
<th>2MT/2NT Supplement</th>
<th>Control Point Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>0077B</td>
<td>C.FBKLK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FEOP</td>
<td>C.2TORD</td>
<td>EST Ordinal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T.TAPES</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7777B</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7777B</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FILE NAME TABLE

TAPE FILE ENTRIES AFTER EQUIPMENT ASSIGNMENT
MULTI-FILE SET MASTER ENTRY

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>36</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FNAME</td>
<td>Multi-File Set Name</td>
<td>C.FCPNUM</td>
<td>0 0</td>
<td>0 0</td>
<td>C.FLNKAD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FEOQ</td>
<td>Device Type</td>
<td>C.FTPORD</td>
<td>T.TAPES Ordinal</td>
<td>C.FPDEV</td>
<td>Primary EST Ordinal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CV</td>
<td>Number of Set Member Last Opened (Binary)</td>
<td>FNT of Member Last Opened</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conversion Mode (NT) — 10 = US</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z Labels — 01 = EB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NR (No Error Recovery)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NS (Nonstandard Labels)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>End-of-Set E/N Bit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TAPE FILE ENTRY DURING PROCESSING

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>36</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FNAME</td>
<td>Logical File Name</td>
<td>C.FLINK</td>
<td>C.FCPNUM</td>
<td>C.FLNKAD</td>
<td>Link to FNT Supplement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FEOQ</td>
<td>Device Type</td>
<td>C.FTPORD</td>
<td>T.TAPES Ordinal</td>
<td>C.FPDEV</td>
<td>Primary EST Ordinal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FETAD</td>
<td>FET Address</td>
<td>C.FDC</td>
<td>Disposition Code</td>
<td>C.FSC</td>
<td>Code and Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conversion Mode (NT) — 10 = US</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z labels — 01 = EB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NR (No Error Recovery)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NS (Nonstandard Labels)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FILE NAME TABLE
ENTRY FOR LOCAL RMS FILE
BEFORE ASSIGNMENT TO A DEVICE

59 53 47 35 23 17 11 0

<table>
<thead>
<tr>
<th>C.FNAME</th>
<th>Logical File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FEOP</td>
<td>Device Type</td>
</tr>
<tr>
<td>C.FPPFN</td>
<td></td>
</tr>
<tr>
<td>C.FPNUM</td>
<td>Link to</td>
</tr>
<tr>
<td>C.FLINK</td>
<td>Supplement</td>
</tr>
</tbody>
</table>

Lock Bit
Control Pt. No.

| 00 = No ECS Use |
| 10 = ECS Use; Supplement Required |

Defered Assignment (Reserved)
ECS Buffered (Reserved)
Overflow Allowed
PF Device

Sequential Pack E/N Bit, or Index Write Bit

AFTER ASSIGNMENT TO A DEVICE
AND THROUGHOUT PROCESSING

59 53 47 35 23 17 11 0

<table>
<thead>
<tr>
<th>C.FNAME</th>
<th>Logical File Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FEOP</td>
<td>Device Type</td>
</tr>
<tr>
<td>C.FETAD</td>
<td>FET Address</td>
</tr>
<tr>
<td>C.FFR8A</td>
<td>First RBT Word Pair</td>
</tr>
<tr>
<td>C.FRRBP</td>
<td>Current RBT Word Pair</td>
</tr>
<tr>
<td>C.FLRBP</td>
<td>Link or APF Pointer</td>
</tr>
<tr>
<td>C.FRCB</td>
<td>Curr. Byte</td>
</tr>
<tr>
<td>C.FEC/</td>
<td>Code and Status</td>
</tr>
<tr>
<td>C.FFREW</td>
<td></td>
</tr>
</tbody>
</table>

Link Bit
Control Pt. No.

Lock Bit

PF Rewrite Bit
Do not release RBT chain
00 = No ECS Use
10 = ECS Use; Supplement Required
Sequential Pack E/N Bit, or Index Write Bit
**FILE NAME TABLE**

**OPTIONAL SUPPLEMENTS FOR LOCAL RMS FILES**

**SEQUENTIAL PACK FILE SUPPLEMENT**

<table>
<thead>
<tr>
<th>Control Pt. No.</th>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 7 7 8</td>
<td>C.FBKLPK</td>
<td>Backward Link</td>
<td>0 0</td>
<td></td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 0 0 0</td>
<td>T.RPT Ordinal</td>
<td>Primary EST</td>
<td>0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 0 0 0</td>
<td>Visual Identifier of First Pack</td>
<td>EST Ordinal of First Pack Assigned</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INTERCOM-USER FILE SUPPLEMENT**

*(Required only when file to be attached to swapped-out job)*

<table>
<thead>
<tr>
<th>Control Pt. No.</th>
<th>59</th>
<th>47</th>
<th>41</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 7 7 8</td>
<td>C.FBKLPK</td>
<td>Backward Link</td>
<td>(Reserved for Deferred Special DISPOSE)</td>
<td>0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 0 0 0</td>
<td>C.FAPF</td>
<td>APF Pointer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 0 0 0</td>
<td>User Table Address</td>
<td>C.FLOCID</td>
<td>INTERCOM ID</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ECS FILE SUPPLEMENT** *(ECS resident files or IO buffers)*

<table>
<thead>
<tr>
<th>Control Pt. No.</th>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 7 7 8</td>
<td>C.FBKLPK</td>
<td>Backward Link</td>
<td>(Reserved for Deferred Special DISPOSE)</td>
<td>0 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 0 0 0 0 0 0 0</td>
<td>0 0 0 0 0</td>
<td>C.FAPF</td>
<td>APF Pointer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current Subpage Index</th>
<th>Address of First Subpage</th>
<th>Address of Current Subpage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Backspace Count (ECS Overflow While Transferring from RMS to ECS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Word 1**

- Bit 54: Outstanding PPCIO Request
- Bit 55: Release ECS Buffer
- Bit 56: ECS Preallocation Flag
- Bit 56: 1 = Release Bit
- Bit 56: 0 = Output Buffer
- Bit 56: 1 = Input Buffer
- Bit 56: Buffer Overflow
- Bit 56: 1 = ECS Buffered File
- Bit 56: Release ECS Buffer After the Current SR
- Bit 56: Index Written (Close Random File)
- Bit 56: Transfer in Progress (ECS Resident Random Files)
### ECS FILE SUPPLEMENT

(ECS Resident Library)

<table>
<thead>
<tr>
<th>111 111 11</th>
<th>CFBKLK Backward Link</th>
<th>(Reserved for Deferred Special DISPOSE)</th>
<th>Control Pt. No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 7 7 0</td>
<td>00</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Index</td>
<td>Address of First Subpage</td>
<td>Address of EOI Subpage</td>
<td>1</td>
</tr>
<tr>
<td>Index</td>
<td>Addr. First Auxiliary Subpage</td>
<td>Address Current Subpage</td>
<td>2</td>
</tr>
</tbody>
</table>

**Word 1 Bit 55** ECS Preallocation Flag
- 1 = Release Bit
- 59 = ECS Buffered File

**Word 2 Bit 59** Transfer in Progress
FILE NAME TABLE

ENTRIES FOR PERMANENT FILE TABLES
(LAST ENTRIES IN FNT)

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>17</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>R</td>
<td>B</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>C.FEOP Device Type</td>
<td>Pointer to First PRU after Chain</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0</th>
<th>S</th>
<th>D</th>
<th>0</th>
<th>0</th>
<th>1</th>
<th>00</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FEOP Device Type</td>
<td>Pointer to First PRU after Chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FS DT SD Entry Count</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>0</th>
<th>S</th>
<th>D</th>
<th>0</th>
<th>0</th>
<th>2</th>
<th>00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pointer to First PRU of Subdirectory</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FS DT SD Entry Count</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ENTRY FOR ON-LINE CARD READER FILE

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>41</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FNAME Logical File Name</td>
<td>00</td>
<td>0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06B</td>
<td>C.FREC CT Record Count</td>
<td>C.FCREC Current Record</td>
<td>C.FPDEV EST Ordinal</td>
<td>00</td>
<td>E</td>
<td>C.FLBL Card Count</td>
<td></td>
</tr>
<tr>
<td>00</td>
<td>C.FFET AD FET Address</td>
<td>0000</td>
<td>Perm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code and Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ENTRY FOR ON-LINE CARD PUNCH FILE

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FNAME Logical File Name</td>
<td>00</td>
<td>0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>70B</td>
<td>0 0 0000</td>
<td>C.FPDEV EST Ordinal</td>
<td>C.F2PC 2PC Flag</td>
<td>C.FLBL Card Count</td>
<td></td>
<td></td>
</tr>
<tr>
<td>00</td>
<td>C.FFET AD FET Address</td>
<td>0000</td>
<td>Perm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Code and Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### FILE NAME TABLE

**ENTRIES AND REQUIRED SUPPLEMENT FOR FILES IN OUTPUT QUEUES**

**WAITING IN OUTPUT QUEUE**

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>18</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FNAME</td>
<td>Job Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FEQP</td>
<td>Device Type</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FFRBA</td>
<td>First RBT Word Pair</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FLRBWP</td>
<td>Current RBT Word Pair</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FCB</td>
<td>Curr Byte</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FPRU</td>
<td>Current PRU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeat Count</td>
<td>C.FSQC/C.FIOTID</td>
<td>Sector Count or Special Dispose or INTERCOM ID</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C.FDC</td>
<td>Disposition Code</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(See Local RMS File)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C.FPRI</td>
<td>Priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DURING PROCESSING**

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>15</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.FNAME</td>
<td>Job Name</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C.FEQP</td>
<td>Device Type</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C.FFRBA</td>
<td>First RBT Word Pair</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C.FLRBWP</td>
<td>Current RBT Word Pair</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>C.FCB</td>
<td>Curr Byte</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.FPRU</td>
<td>Current PRU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C.FETAD</td>
<td>FET Address</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C.FDC</td>
<td>Disposition Code</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(See Local RMS File)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C.FCS</td>
<td>Code and Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>15</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>0077</td>
<td>C.FBLK</td>
<td>Backward Link</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Reserved)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repeat Count</td>
<td>Sector Count</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C.FSPOIS</td>
<td>Special Dispose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C.FPRI</td>
<td>Priority</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DISPOSITION CODE VALUES

Non-Allocatable Devices

<table>
<thead>
<tr>
<th>Code</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CK</td>
<td>XXX1</td>
<td>Checkpoint</td>
</tr>
<tr>
<td>IU</td>
<td>XXX2</td>
<td>Inhibit unload</td>
</tr>
<tr>
<td>CI</td>
<td>XXX3</td>
<td>Checkpoint and inhibit unload</td>
</tr>
<tr>
<td>SV</td>
<td>XXX4</td>
<td>Save</td>
</tr>
<tr>
<td>CS</td>
<td>XXX5</td>
<td>Checkpoint and save</td>
</tr>
<tr>
<td></td>
<td>XXX6-7777</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

Allocatable Devices

<table>
<thead>
<tr>
<th>Bit</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>11</td>
<td>INTERCOM user file (I)</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>INTERCOM submitted batch job (RB)</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
<td>Reserved</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>Special dispose file (SD)</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>File named OUTPUT (O)</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Interrupted print file (IP)</td>
</tr>
</tbody>
</table>

Low Order 6 Bits

<table>
<thead>
<tr>
<th>Code</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>02</td>
<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>03</td>
<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>04</td>
<td></td>
<td>Input job ready for scheduling</td>
</tr>
<tr>
<td>05</td>
<td></td>
<td>Input tape job</td>
</tr>
<tr>
<td>06</td>
<td></td>
<td>Input tape job on VSN display</td>
</tr>
<tr>
<td>07</td>
<td></td>
<td>Reserved</td>
</tr>
<tr>
<td>PU</td>
<td>10</td>
<td>Punch installation default character set from display code</td>
</tr>
<tr>
<td>PB</td>
<td>12</td>
<td>Punch 6000/7000 format binary</td>
</tr>
<tr>
<td>P8</td>
<td>14</td>
<td>Punch 80 column binary</td>
</tr>
<tr>
<td>FR*</td>
<td>20</td>
<td>Film print</td>
</tr>
<tr>
<td></td>
<td>21</td>
<td>Reserved</td>
</tr>
<tr>
<td>FL*</td>
<td>22</td>
<td>Film plot</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>Reserved</td>
</tr>
<tr>
<td>HR*</td>
<td>24</td>
<td>Hard copy print</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>Reserved</td>
</tr>
<tr>
<td>HL*</td>
<td>26</td>
<td>Hard copy plot</td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>Reserved</td>
</tr>
<tr>
<td>PT*</td>
<td>30</td>
<td>Plot</td>
</tr>
<tr>
<td></td>
<td>31-37</td>
<td>Reserved</td>
</tr>
</tbody>
</table>

*Not supported by SCOPE 3.4
## DISPOSITION CODE VALUES (CON’T)

<table>
<thead>
<tr>
<th>Code</th>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PR</td>
<td>40</td>
<td>Any available 501/505/512</td>
</tr>
<tr>
<td>P1</td>
<td>41</td>
<td>Any available 501/505</td>
</tr>
<tr>
<td>P2</td>
<td>42</td>
<td>Any available 512</td>
</tr>
<tr>
<td></td>
<td>43</td>
<td>Any available 512 with 48-character set</td>
</tr>
<tr>
<td>PE</td>
<td>44</td>
<td>Any available 512 with forms code PE.</td>
</tr>
<tr>
<td></td>
<td>45-67</td>
<td>Reserved</td>
</tr>
<tr>
<td></td>
<td>70-77</td>
<td>Reserved to installations</td>
</tr>
</tbody>
</table>
## 6671 Multiplexer Subtable

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>27</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.IOTFL</td>
<td>C.ILSDT</td>
<td>C.IMPAR</td>
<td>C.INPTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count of Output Failures</td>
<td>Count of Lost Data Failures</td>
<td>Count of MUX Memory/Parity Errors</td>
<td>Number of ports serviced</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.INBUF</td>
<td>First user table in chain assigned to this port</td>
<td>*</td>
<td>C.IMSG</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Treated as one contiguous field (bits "15" - 0)

Bits "15" - 0 = 0 : dial-up line
"15" - 0 ≠ 0 : hard-wired: site n exists if bit n = 1

## 6676 Multiplexer Subtable

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.IOTFL</td>
<td>C.ILSDT</td>
<td>C.INPTS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count of Output Failures</td>
<td>Count of Lost Data Failures</td>
<td>Number of Ports Serviced</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.INBUF</td>
<td>First user table in chain assigned to this port</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 6673/6674 Multiplexer Subtable

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.INBUF</td>
<td>C.IHID</td>
<td>C.IHCON</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First high speed user table address</td>
<td>First User ID Allocated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IADN1</td>
<td>C.IGCON Def. of existing 274 Graphics Consoles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† Word 2 present if S.IGRAPH = 1
LCC MULTIPLEXOR SUBTABLE

<table>
<thead>
<tr>
<th>C.ILCST</th>
<th>C.ILNLST</th>
<th>C.INRPS</th>
<th>C.1RPLST</th>
<th>C.INPTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>LCC State</td>
<td>LCC line list for this LCC</td>
<td>No. of entries</td>
<td>FWA of CSM response list entries</td>
<td>Highest line ≠ +1</td>
</tr>
</tbody>
</table>

1. First terminal ID allocated
2. Bit map of LCC lines downed by operator (Bit n=1 → line n down)
3. Line 0
4. Line 1
5. Line n

Terminal type:
- 0 = No terminal
- 2 = TTY
- 22 = HSBT

*Bit map of streams configured by HSBT operator on this line.

<table>
<thead>
<tr>
<th>Bits</th>
<th>Stream</th>
<th>configured</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>stream</td>
<td>0</td>
<td>IDS output</td>
</tr>
<tr>
<td>1</td>
<td>stream</td>
<td>2</td>
<td>CRT</td>
</tr>
<tr>
<td>2</td>
<td>stream</td>
<td>8</td>
<td>CP1</td>
</tr>
<tr>
<td>3</td>
<td>stream</td>
<td>12</td>
<td>LP4</td>
</tr>
<tr>
<td>4</td>
<td>stream</td>
<td>10</td>
<td>LP3</td>
</tr>
<tr>
<td>5</td>
<td>stream</td>
<td>6</td>
<td>LP2</td>
</tr>
<tr>
<td>6</td>
<td>stream</td>
<td>4</td>
<td>LP1</td>
</tr>
<tr>
<td>8-15</td>
<td>unused</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>stream</td>
<td>1</td>
<td>IDS input</td>
</tr>
<tr>
<td>17</td>
<td>stream</td>
<td>3</td>
<td>KBD</td>
</tr>
<tr>
<td>18</td>
<td>stream</td>
<td>7</td>
<td>CR2</td>
</tr>
<tr>
<td>19</td>
<td>stream</td>
<td>5</td>
<td>CR1</td>
</tr>
<tr>
<td>20-23</td>
<td>unused</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### DEVICE ACTIVITY TABLE ENTRY

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>41</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.DATDST</td>
<td>C.DATEOP</td>
<td>C.DATACT</td>
<td>(Reserved for Dual Access)</td>
<td>Count Maintained By SPM</td>
<td></td>
</tr>
<tr>
<td>DST Ordinal</td>
<td>Eqp. Type</td>
<td>Activity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Reserved for Dual Access)

### TAPE STAGING TABLE

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.STGMAX</td>
<td>W.STGFRE</td>
<td>W.STGSAT</td>
<td>W.STGUFDF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of MT Defined</td>
<td>Number of MT ON + Unassigned</td>
<td>Number of MT Held by Satisfied Jobs</td>
<td>Unfilled MT Demand</td>
<td>(Total)</td>
<td></td>
</tr>
<tr>
<td>Number of NT Defined</td>
<td>Number of NT ON + Unassigned</td>
<td>Number of NT Held by Satisfied Jobs</td>
<td>Unfilled NT Demand</td>
<td>(Available)</td>
<td></td>
</tr>
<tr>
<td>(Reserved)</td>
<td>(Reserved)</td>
<td>(Reserved)</td>
<td></td>
<td>(Assigned)</td>
<td></td>
</tr>
<tr>
<td>(Reserved)</td>
<td>(Reserved)</td>
<td>(Reserved)</td>
<td></td>
<td>(Unfilled Demand)</td>
<td></td>
</tr>
</tbody>
</table>
**ATTACHED PERMANENT FILE TABLE**

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.PFD1</td>
<td>C.PFD2</td>
<td>C.PFD3</td>
<td>C.PFD4</td>
<td>C.PFQ*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PFD Pointer</td>
</tr>
<tr>
<td>PFD Pointer</td>
<td>PFD Pointer</td>
<td>PFD Pointer</td>
<td>PFD Pointer</td>
<td>PFD Pointer</td>
<td></td>
</tr>
<tr>
<td>C.PFRBT</td>
<td>C.PFCNT2</td>
<td>C.PFCNT</td>
<td>C.PFCY</td>
<td>C.PFLAG</td>
<td></td>
</tr>
<tr>
<td>First RBTA</td>
<td>Count 2</td>
<td>Count 1</td>
<td>Cycle No.</td>
<td>Flag Byte</td>
<td></td>
</tr>
</tbody>
</table>

**C.PFLAG**

```
0: Interlock
1: (Reserved)
2: Exclusive access
3: Single modify
4: Single write
5: Priority lockout
6: System PF
7: Obsolete FRBT
8: Archive
9: Utilities
10: (Reserved)
```

*If ≠ 0, PFQ Address = JDT Address of a job waiting for permanent file.*
## REQUEST STACK ENTRY

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.STPRBA</td>
<td>RB address</td>
</tr>
<tr>
<td>C.STPRBN</td>
<td>RB index</td>
</tr>
<tr>
<td>RB byte</td>
<td></td>
</tr>
<tr>
<td>C.STPRU</td>
<td>PRU number</td>
</tr>
<tr>
<td>C.STO</td>
<td>DB Rec. level</td>
</tr>
<tr>
<td>C.SPCPU</td>
<td>Reserved</td>
</tr>
<tr>
<td>C.SPCT</td>
<td>Order code</td>
</tr>
<tr>
<td>CTL. PT.</td>
<td>Request stack chain link</td>
</tr>
<tr>
<td>FST Address</td>
<td>(Reserved)</td>
</tr>
</tbody>
</table>

### Direct Access to Reading/Writing M.S. Label

Don't check buffer in FL

### Second Word

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FWA of FET or reply word address</td>
<td></td>
</tr>
<tr>
<td>FWA in PP core</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
</tr>
<tr>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Z</td>
<td></td>
</tr>
<tr>
<td>LWA in PP core</td>
<td></td>
</tr>
<tr>
<td>LWA+2 in CM</td>
<td></td>
</tr>
</tbody>
</table>

### Third Word

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>EOI PRU</td>
<td></td>
</tr>
<tr>
<td>FST address</td>
<td></td>
</tr>
<tr>
<td>First RB number of RBR</td>
<td></td>
</tr>
<tr>
<td>PRU/RB of this RBR</td>
<td></td>
</tr>
<tr>
<td>RBR number</td>
<td></td>
</tr>
<tr>
<td>Unit</td>
<td></td>
</tr>
</tbody>
</table>

(Supplied by SPM)

## STACK PROCESSOR ORDER CODES

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>00</td>
<td>O.READ</td>
</tr>
<tr>
<td>01</td>
<td>O.RDSK</td>
</tr>
<tr>
<td>02</td>
<td>O.RCMPR</td>
</tr>
<tr>
<td>03</td>
<td>O.RDNS</td>
</tr>
<tr>
<td>04</td>
<td>O.WRT</td>
</tr>
<tr>
<td>05</td>
<td>O.WRTR</td>
</tr>
<tr>
<td>06</td>
<td>O.RMR</td>
</tr>
<tr>
<td>07</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>O.RDP</td>
</tr>
<tr>
<td>11</td>
<td>O.RDPNP</td>
</tr>
<tr>
<td>12</td>
<td>O.SKIF</td>
</tr>
<tr>
<td>13</td>
<td>O.SKIB</td>
</tr>
<tr>
<td>14</td>
<td>O.WRP</td>
</tr>
<tr>
<td>15</td>
<td>O.WRPR</td>
</tr>
<tr>
<td>16</td>
<td>O.BPRU</td>
</tr>
<tr>
<td>17</td>
<td>O.RCHN</td>
</tr>
<tr>
<td>20</td>
<td>O.RCTNU</td>
</tr>
<tr>
<td>24</td>
<td>O.WCTNU</td>
</tr>
</tbody>
</table>
### RECORD BLOCK RESERVATION TABLE

<table>
<thead>
<tr>
<th>C.RBRTPA</th>
<th>W.RBRTPA</th>
<th>W.RBRUNT</th>
<th>C.RBRUNT</th>
<th>W.RBRUNT</th>
<th>W.RBRLAN</th>
<th>T.RBR</th>
<th>53</th>
<th>47</th>
<th>41</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>EST Ordinal Family Pack</td>
<td>Unit</td>
<td>Starting Device Address</td>
<td>A</td>
<td>C.RBRA Allocation Style</td>
<td>PRU/RB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length/2 Bit Table</td>
<td>RBR Bit Table Starting Address</td>
<td>C.RBREST EST Ordinal</td>
<td>C.RBRLAV Available RBs</td>
<td>Usable RBs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Any Additional Header Word Pairs**

**T.RBRBIT**

- Bit Table Starting Address Pointed to by Header Word

**Length**

**ET** Equipment type
- A Files without specified allocation style may go on this device
- B EST ordinal of first pack of pack family

---

II-1-46

60307400 A
## DEVICE STATUS TABLE

<table>
<thead>
<tr>
<th>Channel Time Accounting Factor</th>
<th>Driver Name</th>
<th>Res. for Inst.</th>
<th>Pointer to End of Chain</th>
<th>Alt. Channel</th>
<th>Pri. Channel</th>
<th>DST Ordinal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head 1 Position</td>
<td>Head 2 Position</td>
<td>Pointer to Start of Chain</td>
<td>Res. for Inst.</td>
<td>E</td>
<td>Non-Zero if a PP is Assigned</td>
<td></td>
</tr>
</tbody>
</table>

### E Equipment

**Driver Name**
A display code letter which is added to the characters 3S to form the overlay name

- Valid Letters Are
- P 6603-1 Disk
- Q 6638 Disk
- R 865 Drum
- S 854 Disk Pack
- T 6603-2 Disk
- U 814 Disk
- V 821 Disk
- W 841 Disk Pack
- Y 844 Disk Pack
### DEVICE POOL TABLE

Internal Information Passed Between 1EP and 1SP Each Time One Calls the Other

<table>
<thead>
<tr>
<th>T.DPT</th>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Y</td>
<td>A₁</td>
<td>A₂</td>
<td>A₃</td>
<td>A₄</td>
</tr>
<tr>
<td>2</td>
<td>A₅</td>
<td>A₆</td>
<td>A₇</td>
<td>A₈</td>
<td>A₉</td>
</tr>
<tr>
<td>3</td>
<td>A₁₀</td>
<td>A₁₁</td>
<td>A₁₂</td>
<td>B₁</td>
<td>B₂</td>
</tr>
<tr>
<td>4</td>
<td>B₃</td>
<td>B₄</td>
<td>B₅</td>
<td>B₆</td>
<td>B₇</td>
</tr>
<tr>
<td>5</td>
<td>B₈</td>
<td>B₉</td>
<td>B₁₀</td>
<td>B₁₁</td>
<td>B₁₂</td>
</tr>
<tr>
<td>6</td>
<td>C₁</td>
<td>C₂</td>
<td>C₃</td>
<td>C₄</td>
<td>C₅</td>
</tr>
<tr>
<td>7</td>
<td>C₆</td>
<td>C₇</td>
<td>C₈</td>
<td>C₉</td>
<td>C₁₀</td>
</tr>
<tr>
<td>8</td>
<td>C₁₁</td>
<td>C₁₂</td>
<td>X</td>
<td>Z</td>
<td>(Reserved)</td>
</tr>
</tbody>
</table>

#### Stack Request Ordinal

- **Aᵢ**: Stack Request Ordinal
- **ECS Bit**
- **PRI Bit**
- **Unit Number**

#### First Physical Sector for Latency Calculation

- **Bᵢ**: First Physical Sector for Latency Calculation
- **Write Flag**
- **Subpriority**
- **Bypass Bit**

#### Standard First RB Number for Positioning Time Calculation

- **Cᵢ**: Standard First RB Number for Positioning Time Calculation

#### Ordinal of S.R. that may be Reissued

- **X**: Ordinal of S.R. that may be Reissued

#### Number of S.R. Waiting in Pool

- **Y**: Number of S.R. Waiting in Pool

#### Limiting RB for Search in RBR During Service of Write Stack Request

- **Z**: Limiting RB for Search in RBR During Service of Write Stack Request
A = Maximum number of job entries (L_SEQ:2/2)
B = Number of jobs in Sequencer Table
C = On/Off/Drop Flag
   0=Off
   1=On
   2=Drop
D = Table Interlock Flag
E = Entry Full Flag
F = Diagnostic Flag Bits
   Bit 0 = CT3
   Bit 1 = MY1
   Bit 2 = CM6
   Bit 3 = CU1
   Bit 4 = ALS
   Bit 5 = FST
   Bit 6 = EC2
   Bit 7 = ALX
   Bit 8 = CEFAP
   Bit 9 = reserved
   Bit 10 = reserved
   Bit 11 = reserved
G = Entry Drop Flag
H = Interval
I = Clock
J = Job Name
K = Last known FNT Address
<table>
<thead>
<tr>
<th>T.RMS</th>
<th>59</th>
<th>51</th>
<th>40</th>
<th>29</th>
<th>21</th>
<th>10</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>E0</td>
<td>E0L</td>
<td>E0U</td>
<td>E1</td>
<td>E1L</td>
<td>E1U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E2</td>
<td>E2L</td>
<td>E2U</td>
<td>E3</td>
<td>E3L</td>
<td>E3U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E4</td>
<td>E4L</td>
<td>E4U</td>
<td>E5</td>
<td>E5L</td>
<td>E5U</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E6</td>
<td>E6L</td>
<td>E6U</td>
<td>E7</td>
<td>E7L</td>
<td>E7U</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

E0, E1, E2, etc. — EST ordinal of RMS device that was preallocated
E0L, E1L, etc. — Lower cylinder boundary of preallocated area
E0U, E1U, etc. — Upper cylinder boundary of preallocated area
VSNBUF

0 = used
1 = free

Line Reservation Bits
(Bit 59 = line 1, Bit 58 = line 2, etc.)

C.VRNNXT
Link to Next Line

C.VRNFFNT
FNT Address

= 0 if end of display

= 0 if not first entry for this job

VSN Information to be Displayed

Line 1

Line 2

Line n
## T.TAPES TABLE

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>29</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>EST Ordinal (Binary)</td>
<td>FNT Address</td>
<td>Control Point Number</td>
<td>MT or NT (Display Code)</td>
<td>EST Ordinal (Display Code)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**W.TFLN1**
- Label Name
- Position Number

**W.TREEL**
- Multi-File Name
- Reel Number

**W.TFLGS**
- Flag Bits

**W.TVNR**
- Volume Serial Number of Current Reel
- Channel Byte Count of Previous Record

**W.TVNR1**
- Volume Serial Number of First Reel
- PRU Number of Last PRU That Got Noise Warning 1

### C.TFLGS — Job-Oriented Flag Bits

<table>
<thead>
<tr>
<th>59</th>
<th>58</th>
<th>57</th>
<th>56</th>
<th>55</th>
<th>54</th>
<th>53</th>
<th>52</th>
<th>51</th>
<th>50</th>
<th>49</th>
<th>48</th>
</tr>
</thead>
<tbody>
<tr>
<td>GO</td>
<td>RC</td>
<td>ST</td>
<td>VP</td>
<td>MP</td>
<td>LC</td>
<td>EC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- S.TTFGO — Go bit
- S.TTFRC — Recheck bit
- S.TTFST — Stop Staging

### C.TFLGS+1 — Unit-Oriented Flag Bits

<table>
<thead>
<tr>
<th>47</th>
<th>46</th>
<th>45</th>
<th>44</th>
<th>43</th>
<th>42</th>
<th>41</th>
<th>40</th>
<th>39</th>
<th>38</th>
<th>37</th>
<th>36</th>
</tr>
</thead>
<tbody>
<tr>
<td>VT</td>
<td>OV</td>
<td>SC</td>
<td>RD</td>
<td>EL</td>
<td>BL</td>
<td>LB</td>
<td>FS</td>
<td>RI</td>
<td>WN</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- S.TTFVT — VSN read from tape
- S.TTFOS — Operator-supplied VSN
- S.TTFSC — Scratch
- S.TTFRD — Ready

- Unexpired label w-ring—warning — S.TTFWN
- Ring in bit — S.TTFRI
- Flash save bit — S.TTFFS
- Labeled — S.TTFLB
- Blank labeled — S.TTFBL
- Expired label — S.TTFEL
### DAYFILE FET AND BUFFER AREA

<table>
<thead>
<tr>
<th>CP0 FET</th>
<th>Index (IN₀ Pointer)</th>
<th>Size (LIMIT₀-FIRST₀)</th>
<th>(FIRST₀-T.DFB)</th>
<th>Remaining Number of Preallocated PRUs</th>
<th>MTR Code Word</th>
<th>T.DFB</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP1 FET</td>
<td>Index (IN₁ Pointer)</td>
<td>Size (LIMIT₁-FIRST₁)</td>
<td>(FIRST₁-T.DFB)</td>
<td>(Reserved)</td>
<td>(Reserved)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPn FET</td>
<td>Index (INₙ Pointer)</td>
<td>Size (LIMITₙ-FIRSTₙ)</td>
<td>(FIRSTₙ-T.DFB)</td>
<td>(Reserved)</td>
<td>(Reserved)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CERFILE FET</th>
<th>Index (INₐ Pointer)</th>
<th>Size (LIMITₐ-FIRSTₐ)</th>
<th>(FIRSTₐ-T.DFB)</th>
<th>Remaining Number of Preallocated PRUs</th>
<th>MTR Code Word</th>
</tr>
</thead>
</table>

**System Dayfile Buffer**

**Control Point 1 Dayfile Buffer**
- ...
- ...
- ...

**Control Point n Dayfile Buffer**
- ...
- ...
- ...

**CE Error File Buffer**
**PERIPHERAL JOB TABLE**

<table>
<thead>
<tr>
<th>Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP Input Register Image</td>
</tr>
<tr>
<td>W.PPMES4 Image</td>
</tr>
<tr>
<td>W.PPMES5 Image</td>
</tr>
<tr>
<td>W.PPMES6 Image</td>
</tr>
<tr>
<td>T.SCHPT</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Reserved for Storage of Intermediate Times</td>
</tr>
</tbody>
</table>

- **S.PTNSTD** — Manual/benchmark option selected
- **S.PTINIT** — Initialization of TSPT
- **S.PTSTOP** — Stop data gathering
- **S.PUBNCH** — Benchmark option selected
- **S.PTFJOB** — First Job execution started
JOB CONTROL AREA

Input Queue Entry

Class 1 (No Non-allocatable Devices)

Class 2 (Non-allocatable Devices)

Class 3 (Interactive Jobs)

Class 4 (Multi-user Jobs)

Class 5 (Express Jobs)

\[ a = 1 \text{ Fixed priority tape jobs in Input Queue.} \]
\[ b = 1 \text{ Fixed priority non-tape jobs in Input Queue.} \]

JOB DESCRIPTOR TABLE ENTRY

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WJDNAM, WJDLNK</td>
<td>Job Name</td>
</tr>
<tr>
<td>WJDSWP</td>
<td>Equipment Code, First subpage address of ESS swap file</td>
</tr>
<tr>
<td>WJDSD</td>
<td>Priority, J.D. Ordinal, Time Limit, Operator Flags, SSW Origin</td>
</tr>
<tr>
<td>WJDMGR</td>
<td>Job St. Class, PFM, Time into Chain, APF Pointer, Base Priority, PP/CP Time</td>
</tr>
<tr>
<td>WJDINT</td>
<td>INTERCOM User ID, CPU Time, User Table Address, Length of Positive FL/100B</td>
</tr>
</tbody>
</table>

CJDEQC: Equipment Code
CJDFRB: First RBT Flags
CJDFLG: Flags
CJDFFL: FL/100B Flags
CJDPSL: Positive FL
CJDOPF: Operator Flags
CJDORQ: SSW Origin
CJDSTL: Time Limit
CJDTPM: Time into Chain or APF Pointer
CJDTPN: Priority
CJDUPR: Base Priority
CJDUTA: User Table Address
CJDLPFL: Length of Positive FL/100B
# NOTES: JOB DESCRIPTOR TABLE

## WJDSWP  CJDFLG

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>unused</td>
</tr>
<tr>
<td>1</td>
<td>unused</td>
</tr>
<tr>
<td>2</td>
<td>unused</td>
</tr>
<tr>
<td>3</td>
<td>SJDNFNT</td>
</tr>
<tr>
<td>4</td>
<td>SJDROLL</td>
</tr>
<tr>
<td>5</td>
<td>SJDSKFL</td>
</tr>
<tr>
<td>6</td>
<td>SJDECS</td>
</tr>
<tr>
<td>7</td>
<td>SJDNJ</td>
</tr>
<tr>
<td>8</td>
<td>SJDLGO</td>
</tr>
<tr>
<td>9</td>
<td>SJDLGI</td>
</tr>
<tr>
<td>10</td>
<td>SJDNRX</td>
</tr>
<tr>
<td>11</td>
<td>SJDDBC</td>
</tr>
</tbody>
</table>

## WJDSD  CJDOFP

Contains operator flags:

<table>
<thead>
<tr>
<th>Bits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>Error codes: FJDKILL, FJDDROP, FJDRRUN, FJDDRNP</td>
</tr>
<tr>
<td>3</td>
<td>SJDLOK</td>
</tr>
<tr>
<td>4</td>
<td>SJDNS</td>
</tr>
<tr>
<td>5</td>
<td>SJDGO</td>
</tr>
<tr>
<td>6</td>
<td>SJDEXP</td>
</tr>
<tr>
<td>9-11</td>
<td>0</td>
</tr>
</tbody>
</table>

## CJDORG

Sense switches:

<table>
<thead>
<tr>
<th>Bits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-11</td>
<td>Sense switches</td>
</tr>
<tr>
<td>0-5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SJDINT</td>
</tr>
<tr>
<td>4</td>
<td>SJDMJU</td>
</tr>
<tr>
<td>3</td>
<td>SJDGR</td>
</tr>
<tr>
<td>2</td>
<td>SJDRT</td>
</tr>
</tbody>
</table>

## WJDGMR  CJDJST:

Contains job class:

<table>
<thead>
<tr>
<th>Bits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>48-53</td>
<td>Contain job class</td>
</tr>
<tr>
<td>01</td>
<td>FJDBAT</td>
</tr>
<tr>
<td>02</td>
<td>FJDBNA</td>
</tr>
<tr>
<td>03</td>
<td>FJDINT</td>
</tr>
<tr>
<td>04</td>
<td>FJDMUJ</td>
</tr>
<tr>
<td>05</td>
<td>FJDEXP</td>
</tr>
</tbody>
</table>
NOTES: JOB DESCRIPTOR TABLE (CONT'D)

<table>
<thead>
<tr>
<th>Bits</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0X</td>
<td>F.JDLMB</td>
</tr>
<tr>
<td>1X</td>
<td>F.JDWCM</td>
</tr>
<tr>
<td>2X</td>
<td>F.JDPWF</td>
</tr>
<tr>
<td>3X</td>
<td>F.JDWDA</td>
</tr>
<tr>
<td>4X</td>
<td>F.JDWOA</td>
</tr>
<tr>
<td>5X</td>
<td>F.JDWIA</td>
</tr>
<tr>
<td>X1</td>
<td>F.JDSWI</td>
</tr>
<tr>
<td>X2</td>
<td>F.JDACT</td>
</tr>
<tr>
<td>X3</td>
<td>F.JDWCC</td>
</tr>
</tbody>
</table>

  Description:
  - 0X F.JDLMB: Waiting for entry in scheduling structure
  - 1X F.JDWCM: Waiting for CM
  - 2X F.JDPWF: Waiting for permanent file availability
  - 3X F.JDWDA: Waiting for device assignment
  - 4X F.JDWOA: Waiting for operator action
  - 5X F.JDWIA: Waiting for INTERCOM action
  - X1 F.JDSWI: Waiting for swap in
  - X2 F.JDACT: Currently executing at control point
  - X3 F.JDWCC: Waiting for scheduler action

CJDPMF

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>42</td>
<td>Read permission desired</td>
</tr>
<tr>
<td>43</td>
<td>Extend permission desired</td>
</tr>
<tr>
<td>44</td>
<td>Modify permission desired</td>
</tr>
<tr>
<td>45</td>
<td>Control permission desired</td>
</tr>
<tr>
<td>46</td>
<td>Exclusive access desired</td>
</tr>
<tr>
<td>47</td>
<td>Purge bit</td>
</tr>
</tbody>
</table>
CEFAP BUFFER AREA

T.BCFAP

CEM Working Flag

Buffers

Buffer for Error Codes 0-3

X0 = ECS FWA of Transfer
A0 = CM FWA of Transfer
Bj+K = Length of Transfer
Exact ECS Address of Transfer
CEFAP Error Code (Unweighted)
Pointer to Next Buffer (0 = End of Chain)

Buffer for Error Codes 20-27

ECS FWA of Transfer (or Unused)
Port Channel
Length of Transfer (or Unused)
PPNT Address + 1
CEFAP Error Code
Pointer to Next Buffer (0 = End of Chain)

Error Code (Unweighted)
0 = Write Abort
1 = Read Parity Error
2 = Recovered Read Parity
3 = Interlock Register Abort
20 = Unclassified DDP Error (DDP Reply = 0)
21 = DDP Found ECS Abort (DDP Reply = 1)
22 = DDP Channel Drops Active
23 = DDP Channel Stays Full
24 = DDP Found ECS Read Parity Error (DDP Reply = 4)
25 = Unclassified DDP Error (DDP Reply = 5)
26 = DDP Unable to Connect
27 = DDP Logically OFF
EMPTY PAGE STACK

T.EPAGE

59  23  0

FWA of ECS Page

FWA of ECS Page

L.ECSTK

(A6 + B5 in CP.MTR exchange package points to next entry)

T.ECSPRM

59  53  35  23  17  0

C.ECTL  C.BCFAPL  C.BCFAP  W.BCFAP

T.ECTL  L.BCFAPA  T.BCFAP+1  W.ECTL

60307400 A

II-1-61
### SUBPAGE BUFFER

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.SUBPG</td>
<td>Subpage Type</td>
<td>FWA of this System Page</td>
<td>Page Address of Current Data if Input Buffer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>File Name</td>
<td>Number of Available Words in Page if Output Buffer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>JDT Ordinal</td>
<td>Maximum Buffer Length</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Record Descriptors**

### RECORD DESCRIPTORS

<table>
<thead>
<tr>
<th>59</th>
<th>55</th>
<th>51</th>
<th>41</th>
<th>23</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>id=10XY</td>
<td>Level</td>
<td>Data Length</td>
<td>Data Address</td>
<td></td>
<td></td>
</tr>
<tr>
<td>X = 1</td>
<td>Beginning of a new data page</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y = 1</td>
<td>Transmission RMS parity error flag</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>23</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>id=11XY</td>
<td>Data Length</td>
</tr>
<tr>
<td>X = 1</td>
<td>Beginning of a new data page</td>
</tr>
<tr>
<td>Y = 1</td>
<td>Transmission RMS parity error flag</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>23</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>id=0100</td>
<td>Next Subpage Address</td>
</tr>
<tr>
<td>Forward Link</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>23</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>id=0110</td>
<td>Previous Subpage Address</td>
</tr>
<tr>
<td>Backward Link</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>47</th>
<th>23</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>id=000X</td>
<td>FWA of Available Space in Data Page</td>
<td>Current Buffer Length</td>
</tr>
<tr>
<td>X = 0</td>
<td>End of ECS buffer</td>
<td></td>
</tr>
<tr>
<td>X = 1</td>
<td>End of Information on disk</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>41</th>
<th>23</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>id=0010</td>
<td>Index of First Entry in Preallocated Space†</td>
<td>Address of Preallocated Space in ECS†</td>
</tr>
<tr>
<td>Beginning of Descriptor List</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

† Used only for the library
NOTES: SUBPAGE BUFFER

Subpage Type (bits 59-48)

Subpage Position (bits 49-48)

00 = continuation subpage
01 = first subpage in a file
10 = last subpage

Data Type

Bit 50  release data as read
51 (reserved)
52  I/O buffer (with bit 50)
53  library file (ZZZZZ06)
54  ECS resident file
55  swap file
56  auxiliary file for ECS resident random file
57  index for random ECS file
58 (reserved)
59 (reserved)

id (bits 59-56)

0XXX = system descriptor
   0000 = end of list; continued on disc
   0001 = end of list; EOI on file
   0010 = beginning of list
   0100 = forward link pointer
   0110 = backward link pointer
1XXX = data descriptor
   10XX = full record descriptor
   11XX = split record descriptor (full record described by this and next descriptor)
   1X0X = current data page
   1X1X = new data page
   1XX0 = no parity error
   1XX1 = parity error in record
ECS BUFFER FOR RMS—ECS TRANSFER

T.ECTL

Total Numbers of Buffers (2*IP.BDCT)

FWA of Descriptor Area

FWA of Buffer

Number of Available Buffers

FWA of Buffer

Buffer In Use Flag

T.EBUF

X 0 Record Level 0 Word Count

2 Such Entries For Each Buffered Device

Descriptor Area

1 Word for Each PRU in Buffer

Buffer 6410 Words/PRU

X = 0 No Parity Error
X = 4000B Uncorrectable Disk Read Parity Error

2 Entries For Each Buffered Device

IP.SBLG

IP.SBLG PRUs
CMR DIRECTORY

- T.LIB
- LWA+1 of LNT
  - Library Name Table (LNT)
    - (5 Words per Entry)
- LWA+1 of PP
  - Program Bodies
- LWA+1 of PPNT
  - PP Program Name Table (PPNT)
    - (2 Words per Program)
- PP Program Bodies
- CM Resident Libraries

LIBRARY NAME TABLE ENTRY

- Entry Point Name Table
- External Reference Table
- Program Number Table
- Program Name Table

<table>
<thead>
<tr>
<th>Library Name</th>
<th>Address of ECS Descriptor</th>
<th>CM FWA of Library</th>
<th>Disk Address of Library</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Library</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modified Library</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use Disk Address</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CM Library
ECS Library
EDITEXTEND/SYSTEM Library

60307400 A
### PP PROGRAM NAME TABLE ENTRY

<table>
<thead>
<tr>
<th>Field</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP Program Name</td>
<td>59</td>
</tr>
<tr>
<td>Length in CM Words</td>
<td>41</td>
</tr>
<tr>
<td>ECS Address</td>
<td>38</td>
</tr>
<tr>
<td>CM Address</td>
<td>35</td>
</tr>
<tr>
<td>Short Disk Address</td>
<td>23</td>
</tr>
<tr>
<td>Long Disk Address</td>
<td>17</td>
</tr>
<tr>
<td>Access Level</td>
<td>14</td>
</tr>
</tbody>
</table>

### CM RESIDENT LIBRARY FORMAT

<table>
<thead>
<tr>
<th>Field</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of PNT</td>
<td>59</td>
</tr>
<tr>
<td>Length of PNUT</td>
<td>47</td>
</tr>
<tr>
<td>Length of ERT</td>
<td>35</td>
</tr>
<tr>
<td>Length of EPNT</td>
<td>17</td>
</tr>
<tr>
<td>Entry Point Name Table</td>
<td>11</td>
</tr>
<tr>
<td>External Reference Table</td>
<td>0</td>
</tr>
<tr>
<td>Program Number Table</td>
<td></td>
</tr>
<tr>
<td>Program Name Table</td>
<td></td>
</tr>
<tr>
<td>Library Program Bodies</td>
<td></td>
</tr>
</tbody>
</table>

- Entry Point Name Table (EPNT) (1 Word per Entry Point)
- External Reference Table (ERT) (1 Byte per External Reference)
- Program Number Table (PNUT) (1 Byte per Entry Point)
- Program Name Table (PNT) (2 Words per Program)
EPNT ENTRY FORMAT

<table>
<thead>
<tr>
<th>59</th>
<th>17</th>
<th>14</th>
<th>3</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entry Point Name</td>
<td>Access Level</td>
<td>Control Card Callable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

000 = Relocatable
001 = Overlay (50 Table)
010 = Overlay (51 Table)
011 = Overlay (53 Table)

ERT ENTRY FORMAT

<table>
<thead>
<tr>
<th>Entry Point Number + 1</th>
<th>Entry Point Number + 1</th>
<th>Entry Point Number + 1</th>
<th>Entry Point Number + 1</th>
<th>Entry Point Number + 1 or Continuation</th>
</tr>
</thead>
</table>

PNUT ENTRY FORMAT

<table>
<thead>
<tr>
<th>Parcel 0 Relative PNT Address</th>
<th>Parcel 1 Relative PNT Address</th>
<th>Parcel 2</th>
<th>Parcel 3</th>
<th>Parcel 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parcel 5</td>
<td>Parcel 6</td>
<td></td>
<td></td>
<td>Parcel n</td>
</tr>
</tbody>
</table>

PNT ENTRY FORMAT

<table>
<thead>
<tr>
<th>59</th>
<th>35</th>
<th>17</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Name</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

00 = Disk Address
01 = CM Address
10 = ECS Address

1 = Program on EDITEXTEND

EFL Override Allowed

FL Required Divided by 100B

ECS or CM Address | Length of Binary Program | Disk Address |
### INTERCOM POINTER AREA

**Terminal/Central Site**

**Communication Area**

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.INBUF</td>
<td>Small buffer empty chain pointer</td>
</tr>
<tr>
<td>W.IEMBF</td>
<td>Small buffer empty chain interlock table pointer</td>
</tr>
<tr>
<td>C.INBUFT</td>
<td>Interlock table length=N.1M1+2</td>
</tr>
<tr>
<td>C.IITYPE</td>
<td>Interlock type = 0 0 0 1</td>
</tr>
<tr>
<td>W.IEMBI</td>
<td>LS user table chain pointer</td>
</tr>
<tr>
<td>C.INUSRE</td>
<td>Number of entries in chain</td>
</tr>
<tr>
<td>W.IUSER</td>
<td>LS user table interlock table pointer</td>
</tr>
<tr>
<td>C.IINCT</td>
<td>C.IITYPE</td>
</tr>
<tr>
<td>W.IUSEI</td>
<td>C.IUWSTST</td>
</tr>
<tr>
<td>EST</td>
<td>Port</td>
</tr>
<tr>
<td>W.IUSEW</td>
<td>User table request word interlock table pointer</td>
</tr>
<tr>
<td>C.INBTC</td>
<td>C.IITCY</td>
</tr>
<tr>
<td>W.IUSWI</td>
<td>N.1M1+2</td>
</tr>
<tr>
<td>C.INBUFR</td>
<td>Interlock table chain index</td>
</tr>
<tr>
<td>W.IMES</td>
<td>HS/LS user table chain index</td>
</tr>
<tr>
<td>W.IOUTI</td>
<td>W.IOTPUT interlock table pointer (LS)</td>
</tr>
<tr>
<td>C.INBUFT</td>
<td>N.1M1+2</td>
</tr>
<tr>
<td>W.IINPI</td>
<td>C.IINCT</td>
</tr>
<tr>
<td>W.IINPUT interlock table pointer (LS)</td>
<td></td>
</tr>
<tr>
<td>C.IINCT</td>
<td>C.IITYPE</td>
</tr>
<tr>
<td>W.IJUST1</td>
<td>N.1M1+2</td>
</tr>
<tr>
<td>C.INBUFR</td>
<td>C.IINCT</td>
</tr>
<tr>
<td>W.IINPUT/W.IOTPUT interlock table pointer (LS)</td>
<td></td>
</tr>
<tr>
<td>C.IINCT</td>
<td>C.IITYPE</td>
</tr>
<tr>
<td>W.IMUJ</td>
<td>MUJ table chain pointer</td>
</tr>
<tr>
<td>C.IINMUJ</td>
<td>C.IOPINT</td>
</tr>
<tr>
<td>W.IINMUJ</td>
<td>1OP interlock</td>
</tr>
<tr>
<td>C.IDROP</td>
<td>Delay counter small buffer release code</td>
</tr>
<tr>
<td>C.ICTR</td>
<td>Counter for &quot;no CM obtained&quot; message</td>
</tr>
<tr>
<td>W.I18BR</td>
<td>C.IIMM</td>
</tr>
<tr>
<td>C.ITOT</td>
<td>Number of times message written</td>
</tr>
</tbody>
</table>

---

**S.I776-interlock bit for INTERCOM Request Area in 6000 Station Control Point Area**

<table>
<thead>
<tr>
<th>Column</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.I776</td>
<td></td>
</tr>
<tr>
<td>C.INBUF</td>
<td>Data stream interlock table pointer (HS/LCC)</td>
</tr>
<tr>
<td>C.INBUFR</td>
<td>N.1W8+N.12Z+2</td>
</tr>
<tr>
<td>W.IDSI</td>
<td>C.IINCT</td>
</tr>
<tr>
<td>C.IITYPE</td>
<td>0 0 0 3</td>
</tr>
<tr>
<td>W.IHSMT</td>
<td>Large buffer empty chain pointer</td>
</tr>
</tbody>
</table>

---

**LCC HS LS LCC HS LSS**

Drop complete Drop in progress
## INTERCOM POINTER AREA

<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>17</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.IHSMTI</td>
<td>C.INBUF</td>
<td>Large buffer empty chain interlock table pointer</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 43</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IHUSR</td>
<td>C.INBUF</td>
<td>HS user table chain pointer</td>
<td>C.INUSER Number of entries in chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.ILCUSR</td>
<td>C.INBUF</td>
<td>LCC user table chain pointer</td>
<td>C.INUSER Number of entries in chain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IHUSRI</td>
<td>C.INBUF</td>
<td>HS/LCC user table interlock table pointer</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 46</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IHOUTI</td>
<td>C.INBUF</td>
<td>W.IOPTPUT interlock table pointer (HS/LCC)</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IHINPI</td>
<td>C.INBUF</td>
<td>W.IINPUT interlock table pointer (HS/LCC)</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IHTI</td>
<td>C.INBUF</td>
<td>W.ITNPUT/W.IOPTPUT interlock table pointer (HS/LCC)</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.ISTATI</td>
<td>C.INBUF</td>
<td>Data Stream Status word interlock table pointer (HS/LCC)</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IEMBAI</td>
<td>C.INBUF</td>
<td>Small buffer empty chain auxiliary interlock table pointer</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 53</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IUSWAI</td>
<td>C.INBUF</td>
<td>User table request word auxiliary interlock table pointer</td>
<td>C.INCT N.1WB+ N.1ZZ+1</td>
<td>C.IITYPE 54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IGUTC</td>
<td>C.INBUF</td>
<td>Graphics user table chain pointer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IGRES</td>
<td>C.INBUF</td>
<td>Graphics console reservation table pointer</td>
<td>C.IGEJC Ports for which GEJ Called</td>
<td>C.IGEJ No. of executing Copies of GEJ</td>
<td>C.IGDSF GEJ Deadstart Recovery Flag</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IGSI</td>
<td>C.INBUF</td>
<td>Graphics interlock word pointer</td>
<td>C.INCT</td>
<td>C.IITYPE 57</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Interlock Area

274 IGS Console Reservation Table

S.IGSMN=console in SIGNON mode
S.IGAV=console available in configuration

N.IGCON-1
### Type 1 Interlock Table Format

<table>
<thead>
<tr>
<th>59</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP.1M1</td>
<td>Indicator</td>
<td>System &amp; 1BR word</td>
</tr>
<tr>
<td></td>
<td>Indicator</td>
<td>Low-speed driver words</td>
</tr>
<tr>
<td></td>
<td>Indicator</td>
<td>High-speed &amp; LCC driver words</td>
</tr>
</tbody>
</table>

Indicator = any non-zero value

### Type 2 Interlock Table Format

<table>
<thead>
<tr>
<th>59</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP.1WB</td>
<td>Indicator</td>
<td>System &amp; 1BR word</td>
</tr>
<tr>
<td>IP.1ZZ</td>
<td>Indicator</td>
<td>High-speed driver words</td>
</tr>
<tr>
<td></td>
<td>Indicator</td>
<td>LCC driver words</td>
</tr>
</tbody>
</table>

Indicator = any non-zero value

### Type 3 Interlock Table Format

<table>
<thead>
<tr>
<th>59</th>
<th>17</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP.1WB</td>
<td>Indicator</td>
<td>System word</td>
</tr>
<tr>
<td>IP.1ZZ</td>
<td>Indicator</td>
<td>High-speed driver words</td>
</tr>
<tr>
<td></td>
<td>Indicator</td>
<td>LCC driver words</td>
</tr>
</tbody>
</table>

Indicator = 18 bit CM address of data stream word pair (in auxiliary high-speed user table)

### Type 4 Interlock Table Format

<table>
<thead>
<tr>
<th>59</th>
<th>17</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP.1WB</td>
<td>Indicator</td>
<td>System &amp; 1BR word</td>
</tr>
<tr>
<td>IP.1ZZ</td>
<td>Indicator</td>
<td>High-speed driver words</td>
</tr>
<tr>
<td></td>
<td>Indicator</td>
<td>LCC driver words</td>
</tr>
</tbody>
</table>

Indicator = 18 bit CM address of user table
## Multi-User Job Table

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.IUSTA</td>
<td>C.INBUF Address of Next MUJ Table</td>
</tr>
<tr>
<td>W.IMNAME</td>
<td>MUJ Name</td>
</tr>
<tr>
<td>W.IMOP</td>
<td>Total Number of MUJ Users, C.IMUC Activity Count, C.IMSTAT MUJ Status Byte, C.IMSF Swapin Flag, C.IMSOF Swapout Flag</td>
</tr>
<tr>
<td>W.IUFST</td>
<td>C.IJDA MUJ JDT Address</td>
</tr>
<tr>
<td>W.IMDES</td>
<td>C.IMED EDITOR Flag, C.IMSID Swapin Delay, C.IMSOD Swapout Delay, C.IMFL MUJ FL/100B</td>
</tr>
<tr>
<td>W.IMTIN</td>
<td>C.IMTIP Address of TERMIN, C.IMTIL Length of TERMIN</td>
</tr>
<tr>
<td>W.IMTOUT</td>
<td>C.IMTOP Address of TERMOUT, C.IMTOL Length of TERMOUT</td>
</tr>
</tbody>
</table>

- W.IMOP(2) C.IMSTAT 0001 = Waiting for I/O 0003 = MUJ Active
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.IUSTA</td>
<td>Address of Next HS User Table</td>
</tr>
<tr>
<td>W.IFLGS</td>
<td></td>
</tr>
<tr>
<td>W.IJBCRD</td>
<td>Pointer to Job Card</td>
</tr>
<tr>
<td>W.INPUT</td>
<td>Incoming Message OUT Pointer</td>
</tr>
<tr>
<td>W.IOTPUT</td>
<td>Outgoing Message OUT Pointer</td>
</tr>
<tr>
<td>W.ISDOT</td>
<td>Special Directives OUT Pointer</td>
</tr>
<tr>
<td>W.ISDIN</td>
<td>Special Directives IN Pointer</td>
</tr>
<tr>
<td>W.IUEOP</td>
<td>EST Port Number</td>
</tr>
<tr>
<td>W.IUSTAT</td>
<td>1WB Temporary Storage</td>
</tr>
<tr>
<td>W.IUDRV2</td>
<td>Number of SYNch Errors</td>
</tr>
<tr>
<td>W.IINS</td>
<td>(Reserved for Installation)</td>
</tr>
</tbody>
</table>

**High Speed User Table**

- C.INBUF: Terminal ID
- C.IUSID: Address of Next HS User Table
- C.IJBCRD: Pointer to Job Card
- C.IDVRT: Number of Data Streams
- C.IOVFL: Max. Buffer Size
- C.IMESCI: Address of Aux. User Table
- C.IUWAIT: Terminal Status
- C.ISYNC: Number of Synch Errors
- C.ICYCL: No. of Cyclic Code Errors
- C.IIO: Number of I/O Errors
- C.IDSEQ: No. of Sequence Bit Errors
- C.ITOTRX: Number of Retransmissions

(Reserved for CDC)

(Reserved for Installation)
### AUXILIARY HIGH SPEED USER TABLE

<table>
<thead>
<tr>
<th>W.IUSTA</th>
<th>C.IOST</th>
<th>C.IPST</th>
<th>C.ISST</th>
<th>C.ITST</th>
<th>C.IOST</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.ICSTAT</th>
<th>S.IDSO—Message Waiting</th>
<th>Can Receive Input or Data Available</th>
<th>Special Directive Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.IDS1X</td>
<td>S.IDSI—Accept Message</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data Stream Word Pairs

<table>
<thead>
<tr>
<th>W.ICDIR</th>
<th>Latest Directive Block Received from Terminal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### INPUT DATA STREAM WORD PAIR

<table>
<thead>
<tr>
<th>C.IDINOT</th>
<th>Data Stream OUT Pointer</th>
<th>C.IFNT</th>
<th>FNT Address</th>
<th>C.IFSTAT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C.IFDC</th>
<th>C.IDININ</th>
<th>Data Stream IN Pointer</th>
<th>C.IMXL</th>
<th>Maximum Block Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 0 0 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Job Card Error — S.IJCER
- Job Card — S.IJCIP
- EOF — S.IXEOF
### PRINT OUTPUT DATA STREAM WORD PAIR

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.IXOTIN</td>
<td>Data Stream IN Pointer</td>
<td>C.IPRI File Priority</td>
<td>C.IFNT FNT Address</td>
<td>C.IFSTAT</td>
</tr>
<tr>
<td>C.IFDC</td>
<td>6 0 4 0</td>
<td>C.IXOTOT</td>
<td>Data Stream OUT Pointer</td>
<td>C.IMXL Maximum Block Length</td>
</tr>
</tbody>
</table>

### PUNCH OUTPUT DATA STREAM WORD PAIR

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.IXOTIN</td>
<td>Data Stream IN Pointer</td>
<td>C.IPRI File Priority</td>
<td>C.IFNT FNT Address</td>
<td>C.IFSTAT</td>
</tr>
<tr>
<td>C.IFDC</td>
<td>1 1</td>
<td>1 0</td>
<td>C.IXOTOT</td>
<td>Data Stream OUT Pointer</td>
</tr>
<tr>
<td>C.IMXL Maximum Block Length</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Send End-of-Line – S.IXEOL
- EOI Read – S.IXEOL
- Suspended – S.ISPND
- Diverted – S.IDVRT

- Hollerith Data – S.IHP
- Free Form Binary Data – S.IDSDEF
## NOTES: HIGH SPEED USER TABLE

<table>
<thead>
<tr>
<th>W.IFLGS</th>
<th>C.IDWRT/C.IOVFL/C.IMESC</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 = divert punch output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 = divert print output</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 = divert print and punch output</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>S.IMAX</td>
<td>Maximum message buffers assigned or no available empty buffers</td>
</tr>
<tr>
<td>7</td>
<td>S.IOVFL</td>
<td>Generated message lost; no available empty buffer</td>
</tr>
<tr>
<td>8-11</td>
<td>(Unused)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUSTAT</th>
<th>C.IUSTAT</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>S.IXDRP</td>
<td>Terminal shut down</td>
</tr>
<tr>
<td>1</td>
<td>S.IXACK</td>
<td>Drop request acknowledgement</td>
</tr>
<tr>
<td>2</td>
<td>S.IXUP</td>
<td>Start of terminal activity</td>
</tr>
<tr>
<td>3</td>
<td>S.IXOFF</td>
<td>Terminal terminated communication</td>
</tr>
<tr>
<td>4</td>
<td>S.IXUTBY</td>
<td>Release to empty chain</td>
</tr>
<tr>
<td>5-11</td>
<td>(Unused)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUEQP</th>
<th>C.IGSON</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>S.IGRMUX</td>
<td>Graphics MUX</td>
</tr>
<tr>
<td>7</td>
<td>S.IGSON</td>
<td>Graphics streams defined</td>
</tr>
<tr>
<td>8-11</td>
<td>(Unused)</td>
<td></td>
</tr>
</tbody>
</table>
## LOW SPEED USER TABLE

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
<th>Address</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.IUSTA</td>
<td>C.INBUF</td>
<td>Address of Next LS User Table</td>
<td>59</td>
</tr>
<tr>
<td>W.IUCMD</td>
<td>C.ICMD</td>
<td>Batch Command</td>
<td>53</td>
</tr>
<tr>
<td>W.IUCMD</td>
<td>C.IPARAM</td>
<td>Parameter</td>
<td>47</td>
</tr>
<tr>
<td>W.IUCMD</td>
<td>C.IUBCRD</td>
<td>Pointer to Job Card</td>
<td>35</td>
</tr>
<tr>
<td>W.IUCMD</td>
<td>C.IUSTAT</td>
<td>Flags</td>
<td>29</td>
</tr>
<tr>
<td>W.IUMUJ</td>
<td>C.IUMJS</td>
<td>MUJ Status</td>
<td>23</td>
</tr>
<tr>
<td>W.IUMUJ</td>
<td>C.IUJMP</td>
<td>MUJ Table Pointer</td>
<td>11</td>
</tr>
<tr>
<td>W.IUMUJ</td>
<td>C.IUJDA</td>
<td>JDT Address</td>
<td>0</td>
</tr>
<tr>
<td>W.IUFST</td>
<td>C.IUFSC</td>
<td>Swap File Equipment Code</td>
<td>59</td>
</tr>
<tr>
<td>W.IUFST</td>
<td>C.IUFRCB</td>
<td>Swap File First BRT Word Pair</td>
<td>53</td>
</tr>
<tr>
<td>W.IUFST</td>
<td>C.IUFSL</td>
<td>Swap File Length/100B</td>
<td>47</td>
</tr>
<tr>
<td>W.IUFST</td>
<td>C.IUFPL</td>
<td>Positive FL/100B</td>
<td>35</td>
</tr>
<tr>
<td>W.IUFST</td>
<td>C.IUFEB</td>
<td>File Count and Flags</td>
<td>29</td>
</tr>
<tr>
<td>W.IINPUT</td>
<td>C.IDINOT</td>
<td>Input Data OUT Pointer</td>
<td>23</td>
</tr>
<tr>
<td>W.IINPUT</td>
<td>C.IDININ</td>
<td>Input Data IN Pointer</td>
<td>11</td>
</tr>
<tr>
<td>W.IOUTPUT</td>
<td>C.IDOTOT</td>
<td>Output Data OUT Pointer</td>
<td>0</td>
</tr>
<tr>
<td>W.IOUTPUT</td>
<td>C.IDOTIN</td>
<td>Output Data IN Pointer</td>
<td>0</td>
</tr>
<tr>
<td>W.ITINPUT</td>
<td>C.IDINOT</td>
<td>Transmission Input Data OUT Pointer</td>
<td>59</td>
</tr>
<tr>
<td>W.ITINPUT</td>
<td>C.IDININ</td>
<td>Transmission Input Data IN Pointer</td>
<td>53</td>
</tr>
<tr>
<td>W.ITINPUT</td>
<td>C.IDFSTAT</td>
<td>Status</td>
<td>47</td>
</tr>
<tr>
<td>W.ITOUTPUT</td>
<td>C.IDOTOT</td>
<td>Transmission Output Data OUT Pointer</td>
<td>35</td>
</tr>
<tr>
<td>W.ITOUTPUT</td>
<td>C.IDOTIN</td>
<td>Transmission Output Data IN Pointer</td>
<td>29</td>
</tr>
<tr>
<td>W.UUEOP</td>
<td>S.IUEST/S.IUPORT</td>
<td>Est. Ord., Port</td>
<td>11</td>
</tr>
<tr>
<td>W.UUEOP</td>
<td>C.IUSITE</td>
<td>Site Address</td>
<td>10</td>
</tr>
<tr>
<td>W.UUEOP</td>
<td>C.IIFNT</td>
<td>FNT Pointer</td>
<td>6</td>
</tr>
<tr>
<td>W.UUEOP</td>
<td>C.IOFNT</td>
<td>FNT Pointer</td>
<td>6</td>
</tr>
<tr>
<td>W.UUEOP</td>
<td>C.IMSG</td>
<td>Message Ordinal</td>
<td>6</td>
</tr>
<tr>
<td>W.IUDRV1</td>
<td>C.IDRET</td>
<td>Return Address</td>
<td>1</td>
</tr>
<tr>
<td>W.IUDRV1</td>
<td>C.IDTEN</td>
<td>No. of Spaces Left</td>
<td>0</td>
</tr>
<tr>
<td>W.IUDRV1</td>
<td>C.IUDSTA</td>
<td>Station Address</td>
<td>0</td>
</tr>
<tr>
<td>W.IUDRV1</td>
<td>C.IUDECD</td>
<td>Retry e-Code</td>
<td>0</td>
</tr>
<tr>
<td>W.IUDRV1</td>
<td>C.IDSTAT</td>
<td>Status</td>
<td>0</td>
</tr>
<tr>
<td>W.IUDRV1</td>
<td>C.IUCCD</td>
<td>Status</td>
<td>0</td>
</tr>
<tr>
<td>W.IUDRV2</td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>W.IUAFT</td>
<td>C.IUFL</td>
<td>Current FL/100B</td>
<td>59</td>
</tr>
<tr>
<td>W.IUAFT</td>
<td>C.IMXFL</td>
<td>Max. FL/100B</td>
<td>53</td>
</tr>
<tr>
<td>W.IUAFT</td>
<td>C.ICUTL</td>
<td>Current Time Limit</td>
<td>47</td>
</tr>
<tr>
<td>W.IUAFT</td>
<td>C.IMXTL</td>
<td>Maximum Time Limit</td>
<td>35</td>
</tr>
<tr>
<td>W.IUAFT</td>
<td>C.IMXFI</td>
<td>Maximum Files</td>
<td>29</td>
</tr>
<tr>
<td>W.IUAPP</td>
<td>C.IUCS</td>
<td>Access Level</td>
<td>23</td>
</tr>
<tr>
<td>W.IUAPP</td>
<td>C.IUFLGS</td>
<td>User Table Flags</td>
<td>11</td>
</tr>
<tr>
<td>W.IUACP</td>
<td>C.IUCA/C.IUIUP</td>
<td>Flags</td>
<td>0</td>
</tr>
<tr>
<td>W.IIINS</td>
<td></td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

**Driver Parameters**

- Partially Transmitted Word of Data
- Current Data Word Being Assembled/Disassembled

**Control Card Buffer**

- Date of Login
- Time of Login
- Reserved for Installations or Last Command for DSD Q-Display
### NOTES: LOW SPEED USER TABLE

<table>
<thead>
<tr>
<th>W.IUSTA(0)</th>
<th>C.IBSTAT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bit</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>4</td>
<td>S.IDISC Terminal Disconnected</td>
</tr>
<tr>
<td>5-6</td>
<td>S.ILOGO</td>
</tr>
<tr>
<td></td>
<td>00 = user logged out</td>
</tr>
<tr>
<td></td>
<td>01 = user logged in</td>
</tr>
<tr>
<td></td>
<td>10 = auto-logout requested</td>
</tr>
<tr>
<td></td>
<td>11 = auto-logout in progress</td>
</tr>
<tr>
<td>7-8</td>
<td>S.ISTATE</td>
</tr>
<tr>
<td></td>
<td>00 = transmission state</td>
</tr>
<tr>
<td></td>
<td>01 = waiting input</td>
</tr>
<tr>
<td></td>
<td>10 = waiting output</td>
</tr>
<tr>
<td></td>
<td>11 = active or assigned to control point</td>
</tr>
<tr>
<td>9</td>
<td>S.IRDIS Request disconnect</td>
</tr>
<tr>
<td>10</td>
<td>S.IUTAPE Request paper tape reading</td>
</tr>
<tr>
<td>11</td>
<td>S.IABRT Abort request</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUCMD(1)</th>
<th>C.ICMD</th>
<th>C.IPARAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No command</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>REW</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>BSP,nnn</td>
<td>PRU count to backspace</td>
</tr>
<tr>
<td>3</td>
<td>CONTINUE</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>END,CR</td>
<td>User ID</td>
</tr>
<tr>
<td>5</td>
<td>END,LP</td>
<td>FNT address</td>
</tr>
<tr>
<td>6</td>
<td>GO</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>DIVERT</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>READ</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>SUSPEND</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>REP,n</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>No command - MES active</td>
<td>Parameter for 1CI overlay</td>
</tr>
<tr>
<td>14</td>
<td>No command - attached to MUJ</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>No command - flag for 1CI</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUCMD(1)</th>
<th>C.IUSTAT</th>
<th>Used by IDS to determine type of H display wanted</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bit</strong></td>
<td><strong>Description</strong></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>S.IMPORT Import on flag</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>S.ICTAPE Paper tape on flag</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUMUJ(2)</th>
<th>C.IUMJS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bit</strong></td>
<td><strong>Description</strong></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>S.IMNUS New user</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>S.IMRUN RUN command in progress</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>S.IMDIS Reconnected after disconnect</td>
<td></td>
</tr>
<tr>
<td>3-6</td>
<td>(Unused)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>S.IMBKS Break sent</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>S.IMLGS Logout sent</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>S.IMWO Waiting for output to complete</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>S.IMWI Waiting for input</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>S.IMUJ Attached to MUJ</td>
<td></td>
</tr>
</tbody>
</table>
### W.IUFST(3) - C.IUFILE

<table>
<thead>
<tr>
<th>Bits</th>
<th>S.IUEOE</th>
<th>Count of FNT entries in swap file</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>S.IUOE</td>
<td>End of execution</td>
</tr>
<tr>
<td>7</td>
<td>S.IUDMP</td>
<td>SAVEFL flag</td>
</tr>
<tr>
<td>8</td>
<td>S.IUPS</td>
<td>Pause bit</td>
</tr>
<tr>
<td>9</td>
<td>S.IUECS</td>
<td>Swap file on ECS</td>
</tr>
<tr>
<td>10</td>
<td>S.IUFNT</td>
<td>FNT to be associated on next swap</td>
</tr>
<tr>
<td>11</td>
<td>S.IURED</td>
<td>REDUCE flag</td>
</tr>
</tbody>
</table>

### W.INPUT(6) - C.IFSTAT

<table>
<thead>
<tr>
<th>Bit</th>
<th>S.ITMNT</th>
<th>Read cards now</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>S.ITFIL</td>
<td>0 = reading jobs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = reading named file</td>
</tr>
<tr>
<td>2-4</td>
<td>S.ITERR</td>
<td>001 = reader not ready</td>
</tr>
<tr>
<td></td>
<td></td>
<td>010 = input file error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>011 = card read error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 = job card error</td>
</tr>
<tr>
<td>5</td>
<td>S.IEOF</td>
<td>End-of-file card read</td>
</tr>
<tr>
<td>6</td>
<td>S.IFEOF</td>
<td>Stop at end of current message</td>
</tr>
<tr>
<td>7</td>
<td>S.IREAD</td>
<td>READ command issued</td>
</tr>
<tr>
<td>8-11</td>
<td>S.ICRDS</td>
<td>Number of words of current card already written</td>
</tr>
</tbody>
</table>

### W.IOTPUT(7) - C.IDOTIN

<table>
<thead>
<tr>
<th>Bits</th>
<th>10-6</th>
<th>Count of data words in output buffer past IN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1 = at least a partial word past IN</td>
</tr>
</tbody>
</table>

### W.IOTPUT(7) - C.IFSTAT

<table>
<thead>
<tr>
<th>Bit</th>
<th>S.ITMNT</th>
<th>Send data</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>S.ITDEV</td>
<td>0 = printer to receive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = CRT to receive</td>
</tr>
<tr>
<td>2-4</td>
<td>S.ITERR</td>
<td>001 = printer not ready</td>
</tr>
<tr>
<td></td>
<td></td>
<td>011 = PM message flag</td>
</tr>
<tr>
<td>5</td>
<td>S.IEOI</td>
<td>EOI reached</td>
</tr>
<tr>
<td>6</td>
<td>S.IENDLP</td>
<td>END,LP issued</td>
</tr>
<tr>
<td>7</td>
<td>S.ITSSP</td>
<td>SUSPEND active</td>
</tr>
<tr>
<td>8</td>
<td>S.ITACT</td>
<td>Printing to be done</td>
</tr>
</tbody>
</table>

### W.IUEQP(10) - C.IUMSG

<table>
<thead>
<tr>
<th>Bit</th>
<th>S.IUMSG</th>
<th>001₂ = BCD 200 UT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td></td>
<td>010₂ = TTY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100₂ ANSI 200 UT</td>
</tr>
<tr>
<td>10</td>
<td>S.ILS</td>
<td>4800 baud UT</td>
</tr>
<tr>
<td>11</td>
<td>S.ISA</td>
<td>Hardwired terminal</td>
</tr>
</tbody>
</table>
NOTES: LOW SPEED USER TABLE (CONT’D)

W.IUDRV1(1) C.IUDSTA

Bits 0-1 Station address ordinal received
      00 = address 141
      01 = address 140
      10 = address 161
      11 = address 160
      2-5 Zero
      6-9 Send message type
            0 = blanks to fill display input line
            1 = display output line
            2 = E3 write to request card input from UT
            3 = data to UT printer
            4 = send clear-write message after page wait
            10 = poll
      9-10 Sending station address ordinal
      11  (Unused)

W.IUDRV1(11) C.IDSTAT/C.IUDCCD

Bits 0-5
      0 = read
      1 = acknowledge
      2 = reject
      3 = error
      6  S.IUDPAG  Page wait flag
      7  S.IVEROR  Transmission error on reply
      8  S.IUBDCH  Bad character received
      9  S.IUBDWR  Check for previous bad write
      10  (Unused)
      11  S.IUNODT  No data expected

W.IUAPP(14) C.IUFLGS

Bits 0-5 S.IUSSW  Sense switch setting changes
      6-9 (Unused)
      10  S.ITLOK  Lock bit
      11  (Unused)

W.IUACP/W.IUIUP(15) C.IUCCA/C.IUIUP

Bit 6  S.IUCCP  Control cards moved to control point area
      7-10 (Unused)
      11  S.IUEDC  Buffer contains control cards sent from EDITOR
<table>
<thead>
<tr>
<th>59</th>
<th>53</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.IUSTA</td>
<td>C.INBUF</td>
<td>Address next user table in chain</td>
<td>C.IUSID</td>
<td>User id</td>
<td>C.IBSTAT</td>
<td>Flags</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IUFST</td>
<td>C.IUIDA</td>
<td>Job descriptor addr.</td>
<td>C.IUCLAS</td>
<td>Job class before entering IGS queue</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.INPUT</td>
<td>C.IDINOT</td>
<td>Graphics input data out pointer</td>
<td>C.IDININ</td>
<td>Graphics input data in pointer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
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<tr>
<td>W.IOOUTPUT</td>
<td>C.IDOTOT</td>
<td>Graphics output data out pointer</td>
<td>C.IDOTIN</td>
<td>Graphics output data in pointer</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
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<td>5</td>
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</tr>
<tr>
<td>W.IUAC</td>
<td>C.IUAC</td>
<td>Est ordinal Port no.</td>
<td>C.IUGS</td>
<td>Pointer to high speed user table</td>
<td>C.IUMSG</td>
<td>0 0 1 0</td>
</tr>
<tr>
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<td>6</td>
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<td>C.IBSTAT Flags</td>
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</tr>
<tr>
<td>1</td>
<td>C.IUSTAT Flags</td>
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<td>C.IUFILE File Count and Flags</td>
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</tr>
<tr>
<td>3</td>
<td>C.IUMORD MUJ Ordinal</td>
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<tr>
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<td>C.IUMORD MUJ Ordinal</td>
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<td>C.ISIZLN Page Size</td>
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<td>6</td>
<td>C.ISIZLN Line Length</td>
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<td>C.IUFILE File Count and Flags</td>
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</tr>
<tr>
<td>8</td>
<td>C.IUDRV1 Batch Stream States</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>C.IUAFI Current FL/100B</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>10</td>
<td>C.IUAFI Maximum FL/100B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>C.IUAFI Current TL/100B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>C.IUAFI Maximum TL/100B</td>
<td></td>
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<tr>
<td>13</td>
<td>C.IUAFI Maximum Files</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14</td>
<td>C.IUAFI PP Time as Number of Seconds * 4096</td>
<td></td>
<td></td>
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<tr>
<td>15</td>
<td>C.IUAFI CP Time as Number of Seconds * 4096</td>
<td></td>
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<td>16</td>
<td>C.IUAFI Date of Login</td>
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<td>17</td>
<td>C.IUAFI Time of Login</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**LCC User Table**

- **C.INBUF**: Address of Next LCC User Table
- **C.IUSID**: User ID
- **C.ITIME**: Timer
- **C.IUBBF**: Address of Next User Buffer
- **C.IUCMD**: Command Code
- **C.IUCMD Parameter**: Parameter to Command
- **C.IUBRD**: Pointer to Job Card
- **C.IUJORD**: MUJ Ordinal
- **C.IUMORD**: MUJ Ordinal
- **C.IUMIP**: MUJ Pointer
- **C.IUFILE**: File Count and Flags
- **C.IUFILE**: File Count and Flags
- **C.IUDRV1**: Batch Stream States
- **C.IUAFI**: Current FL/100B
- **C.IUAFI**: Maximum FL/100B
- **C.IUAFI**: Current TL/100B
- **C.IUAFI**: Maximum TL/100B
- **C.IUAFI**: Maximum Files
- **C.IUAFI**: PP Time as Number of Seconds \* 4096
- **C.IUAFI**: CP Time as Number of Seconds \* 4096
- **C.IUAFI**: Date of Login
- **C.IUAFI**: Time of Login

**Reserved for Installations or Last Command for DSD Q-Display**
## NOTES: LCC USER TABLE

<table>
<thead>
<tr>
<th>W.IUSTA(0)</th>
<th>C.IBSTAT(4)</th>
<th>W.IFLGS(1)</th>
<th>C.ICMD(0)</th>
<th>W.IFLGS(1)</th>
<th>C.IJUSTAT(4)</th>
<th>W.IUMUJ(2)</th>
<th>C.IUMIS(0)</th>
<th>W.INPUT(4)</th>
<th>C.ISIZLN(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td></td>
<td>Bits</td>
<td></td>
<td>Bits</td>
<td></td>
<td>Bit</td>
<td></td>
<td>Bits</td>
<td></td>
</tr>
<tr>
<td>0-3</td>
<td>S.ITYPE</td>
<td>0-11</td>
<td></td>
<td>6</td>
<td>S.IDVTCP</td>
<td>0</td>
<td></td>
<td>0-11</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>S.IDISC</td>
<td>13</td>
<td>0 No command</td>
<td>7</td>
<td>S.IDVTLP</td>
<td>1</td>
<td></td>
<td>1</td>
<td>New user</td>
</tr>
<tr>
<td>5-6</td>
<td>S.ILOGO</td>
<td>14</td>
<td>No command-MES active</td>
<td>8</td>
<td>S.IOFFL</td>
<td>2</td>
<td></td>
<td>2</td>
<td>RUN command in progress</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td>No command-attached to MUJ</td>
<td>9</td>
<td>S.ILUTBY</td>
<td>3-6</td>
<td>(unused)</td>
<td>3-6</td>
<td>Reconnected after disconnect</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Parameter for 1CI overlay</td>
<td>11</td>
<td>S.ICTAPE</td>
<td></td>
<td></td>
<td></td>
<td>Paper tape on flag</td>
</tr>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td>7-8</td>
<td>S.ISTATE</td>
<td></td>
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</tr>
<tr>
<td>9</td>
<td>S.IRDIS</td>
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<td>S.IUTAPE</td>
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</tr>
<tr>
<td>11</td>
<td>S.IABRT</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 00 = user logged out
- 01 = user logged in
- 10 = auto-logout requested
- 11 = auto-logout in progress
- 01 = waiting input
- 10 = waiting output
- 11 = active or assigned to control point
- Request disconnect
- Request paper tape reading
- Abort request

- Used by 1DS to determine type of H display wanted
- Divert all CP files
- Divert all LP files
- Offline
- Set by 1LX; user table can be released
- Paper tape on flag

- New user
- RUN command in progress
- Reconnected after disconnect
- (unused)
- Break sent
- Logout sent
- Waiting for output to complete
- Waiting for input
- Attached to MUJ

- No. of lines/page
  = 7777B TTY
  = 14D HSBT with 16x80 screen
  = 16D HSBT with 18x64 screen
### NOTES: LCC USER TABLE (CONT'D)

<table>
<thead>
<tr>
<th></th>
<th>W.IOTPUT(5)</th>
<th>C.ISIZLN(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-11</td>
<td>No. of characters/line</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 72D TTY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 80D HSBT with 16x80 screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 64D HSBT with 18x64 screen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUEQP(10)</th>
<th>C.IUAUT(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-17</td>
<td>Auxiliary user table pointer</td>
</tr>
<tr>
<td></td>
<td>23</td>
<td>= 0 Auxiliary user table available</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 1 Auxiliary user table not available</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUEQP(10)</th>
<th>C.IUMSG(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-11</td>
<td>Terminal type</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 2 TTY</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 22B HSBT</td>
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<table>
<thead>
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<th></th>
<th>W.IUDRV1(11)</th>
<th>C.IBCNT(1)</th>
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</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-10</td>
<td>Interactive input stream byte count</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>= 0 Current input line terminated with CR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 1 Current input line terminated with LF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUDRV1(11)</th>
<th>C.IDININ(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-17</td>
<td>0 previous input line terminated with CR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≠ 0 IN pointer for previous input line terminated with LF</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUDRV1(11)</th>
<th>C.IBPOS(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>6-8, 9</td>
<td>Byte position for previous input line terminated with LF</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>= 0 Store next input character in right half of byte</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 1 Store next input character in left half of byte</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>= 0 Last operation was input</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 1 Last operation was output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 1 Teletype output was interrupted</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUDRV2(12)</th>
<th>byte 0(0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5, 6-11</td>
<td>Batch stream state — stream no 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUDRV2(12)</th>
<th>byte 1(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5, 6-11</td>
<td>Batch stream state — stream no 7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUDRV2(12)</th>
<th>byte 2(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5, 6-11</td>
<td>Batch stream state — stream no 8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>W.IUDRV2(12)</th>
<th>Unused</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5, 6-11</td>
<td>Batch stream state — stream no 8</td>
</tr>
</tbody>
</table>
**NOTES: LCC USER TABLE (CONT'D)**

<table>
<thead>
<tr>
<th>W.IUDRV2(12)</th>
<th>Byte 3(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5</td>
</tr>
<tr>
<td></td>
<td>6-11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUDRV2(12)</th>
<th>Byte 4(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5</td>
</tr>
<tr>
<td></td>
<td>6-11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUAPP(14)</th>
<th>C.IUFLGS(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bits</td>
<td>0-5</td>
</tr>
<tr>
<td></td>
<td>6-9</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>W.IUACP(15)</th>
<th>C.IIUJUP(0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bit</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>7-10</td>
</tr>
<tr>
<td></td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## AUXILIARY LCC USER TABLE

<table>
<thead>
<tr>
<th>W.IUSTA</th>
<th>0</th>
<th>W.ICSTAT</th>
<th>1</th>
<th>W.IDS1X</th>
<th>2</th>
<th>W.IDS2X</th>
<th>4</th>
<th>W.IDS3X</th>
<th>6</th>
<th>W.IDS4X</th>
<th>10</th>
<th>W.IDS5X</th>
<th>12</th>
<th>W.IDS6X</th>
<th>14</th>
<th>W.IDS7X</th>
<th>16</th>
<th>W.IDS8X</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C.INBUF</th>
<th>0 0 0 0 0 0 0 0 0</th>
<th>C.IUSID</th>
<th>Terminal ID</th>
<th>C.ILCADS</th>
<th>C.IBSTAT</th>
<th>0110</th>
</tr>
</thead>
</table>

**Last Stack Request Response**

**Data Stream Word Pairs**
## Output Data Stream Word Pair

<table>
<thead>
<tr>
<th></th>
<th>W.I.DS-X</th>
<th>W.I.DS-X+1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C.IXOTIN</td>
<td>C.IFDC</td>
</tr>
<tr>
<td></td>
<td>Byte</td>
<td>Disposition</td>
</tr>
<tr>
<td>Pos.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Output IN Pointer</td>
<td>C.IFSTAT</td>
</tr>
<tr>
<td></td>
<td>C.IFCM</td>
<td>C.IXOTOT</td>
</tr>
<tr>
<td></td>
<td>Special Disposition Code</td>
<td>C.IBPOS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Byte]</td>
</tr>
<tr>
<td></td>
<td>C.IFNT</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FNT Address</td>
<td>C.IFSTAT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C.IFSTAT</td>
</tr>
</tbody>
</table>

### Notes: LCC Output Data Stream Word Pair

#### W.I.DS-X

<table>
<thead>
<tr>
<th>Bit</th>
<th>S.IOFF</th>
<th>S.IXABT</th>
<th>S.ISTOP</th>
<th>S.IETX</th>
<th>S.IEOL</th>
<th>S.IXNDLP</th>
<th>S.ISUP</th>
<th>S.IBAN</th>
<th>S.IHDR</th>
<th>S.IWEOJ</th>
<th>S.IWAITX</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Set/cleared by 1LX to request 1ZZ off/on stream</td>
<td>Set by 1LX to request 1ZZ abort stream</td>
<td>Set by 1LX to request 1ZZ stop processing stream</td>
<td>Set by 1LX to request 1ZZ sent ETX block</td>
<td>Unused</td>
<td>End-of-line flag</td>
<td>End flag</td>
<td>Suppress-carriage-control flag</td>
<td>No-banner flag</td>
<td>Header flag</td>
<td>Wait-end-of-job flag</td>
</tr>
<tr>
<td>4</td>
<td>Unused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>S.IEOF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6</td>
<td>S.IXNDLP</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>S.ISUP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>S.IBAN</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>9</td>
<td>S.IHDR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>S.IWEOJ</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>S.IWAITX</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### W.I.DS-X+1

<table>
<thead>
<tr>
<th>Bits</th>
<th>C.IFDC(0)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disposition code</td>
</tr>
<tr>
<td>5</td>
<td>S.IHP</td>
</tr>
<tr>
<td>6</td>
<td>S.ISNT</td>
</tr>
<tr>
<td>7-9</td>
<td>S.IIDC</td>
</tr>
<tr>
<td>9</td>
<td>S.IPBIN</td>
</tr>
<tr>
<td>10-11</td>
<td>Unused</td>
</tr>
</tbody>
</table>

#### W.I.DS-X+1

<table>
<thead>
<tr>
<th>Bit</th>
<th>S.IOFF</th>
<th>S.IXABT</th>
<th>S.ISTOP</th>
<th>S.IETX</th>
<th>S.IXABTI</th>
<th>S.IDSN</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Set/cleared by 1ZZ to indicate stream off/on</td>
<td>Set by 1ZZ to indicate stream aborted</td>
<td>Set by 1ZZ to indicate stream stopped</td>
<td>Set by 1ZZ to indicate ETX block sent</td>
<td>Set by 1ZZ to indicate abort issued</td>
<td>Stream no.</td>
</tr>
<tr>
<td>5</td>
<td>Unused</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## INPUT DATA STREAM WORD PAIR

<table>
<thead>
<tr>
<th>W.IDS-X</th>
<th>C.IDINOT (Byte Pos.)</th>
<th>Input OUT Pointer</th>
<th>C.IRPC</th>
<th>C.IFNT</th>
<th>C.IFSTAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.IDINOT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>W.IDS-X+1</td>
<td>C.IBCNT (Byte Pos.)</td>
<td>Byte Count</td>
<td>C.IDININ</td>
<td>C.IBPOS</td>
<td>Input IN Pointer</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

0 = ETX Block Received  
1 = ETB Block Received

## NOTES: LCC INPUT DATA STREAM WORD PAIR

### W.IDS-X

<table>
<thead>
<tr>
<th>Bit</th>
<th>C.IFSTAT(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>S.IOFF</td>
</tr>
<tr>
<td>1</td>
<td>S.IXABT</td>
</tr>
<tr>
<td>2</td>
<td>S.ISTOP</td>
</tr>
<tr>
<td>3</td>
<td>Unused</td>
</tr>
<tr>
<td>4</td>
<td>Unused</td>
</tr>
<tr>
<td>5</td>
<td>S..IXEOF</td>
</tr>
<tr>
<td>6</td>
<td>S.IJCIP</td>
</tr>
<tr>
<td>7</td>
<td>S.JCER</td>
</tr>
<tr>
<td>8</td>
<td>S.IASC</td>
</tr>
<tr>
<td>9</td>
<td>S.IBIN</td>
</tr>
<tr>
<td>10</td>
<td>S.IWEOJ</td>
</tr>
<tr>
<td>11</td>
<td>S.IWAITX</td>
</tr>
</tbody>
</table>

### W.IDS-X+1

<table>
<thead>
<tr>
<th>Bit</th>
<th>C.IFSTAT(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>S.IOFF</td>
</tr>
<tr>
<td>1</td>
<td>S.IXABT</td>
</tr>
<tr>
<td>2</td>
<td>S.ISTOP</td>
</tr>
<tr>
<td>3</td>
<td>S.IETX</td>
</tr>
<tr>
<td>4</td>
<td>S.IXABTI</td>
</tr>
<tr>
<td>5</td>
<td>Unused</td>
</tr>
<tr>
<td>6-11</td>
<td>S.IDSN</td>
</tr>
</tbody>
</table>
### RECORD BLOCK TABLE ENTRY

**First RBT Word Pair:**

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>S.RBTRBR</th>
<th>35</th>
<th>29</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.RBTWPL</td>
<td>C.RBTRBR</td>
<td>C.RBTFB</td>
<td>C.RBTAL</td>
<td>Alloc. Type</td>
<td>C.RBTPRU</td>
<td>Last PRU + 1</td>
<td>C.RBTBIT</td>
</tr>
<tr>
<td>Next Word Pair</td>
<td>C.RBTWPL</td>
<td>C.RBTRBR</td>
<td>C.RBTFB</td>
<td>RBR Ordinal</td>
<td>3</td>
<td>R85</td>
<td>R86</td>
</tr>
<tr>
<td>RB3</td>
<td>RB4</td>
<td>R85</td>
<td>R86</td>
<td>R87</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other Word Pairs:**

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.RBTWPL</td>
<td>C.RBTRBR</td>
<td>C.RBTFB</td>
<td>RBR Ordinal</td>
<td>0</td>
<td>R80</td>
</tr>
<tr>
<td>Next Word Pair</td>
<td>RB3</td>
<td>RB4</td>
<td>RB5</td>
<td>R86</td>
<td>R87</td>
</tr>
</tbody>
</table>

### C.RBTBIT

- **S.RBTDEV** — Assigned by device type
- **S.RBTEST** — Assigned by EST ordinal
- **S.RBTPFD** — PF device assigned
- **S.RBTNEW** — RBT new
- **S.RBTOVF** — Overflow
- **S.RBTRND** — Random

**Diagram:**

- Lines 11-10: (Reserved)
- Lines 9-8: (Reserved)
- Lines 7-6: (Reserved)
- Lines 5-4: (Reserved)
- Lines 3-2: (Reserved)
- Line 1: FO = IS/DA — S.RBTSAM

---

II-1-88 60307400 A
RECORD BLOCK TABLE BYTE

(Computation of physical addresses for default allocation styles)

814

Track Number

6603

Z Head Position HG O/E

6638

Head Position S Head Group O/E

865

000 O/E Head Group SG

854

Track Number

821

N

841

N

Z Zone
0 = Outer
1 = Inner

HG Head Group

O/E Odd/Even
0 = Even
1 = Odd

S Stack

SG Subgroup

841 Cylinder = \frac{N-1}{5}

Track = 8 \times \text{remainder of} \frac{N-1}{5} \text{ modulo } 20

Sector = 0 \text{ if remainder of} \frac{N-1}{5} \leq 2
0 \text{ if remainder of} \frac{N-1}{5} > 2

821 Cylinder = \frac{N-1}{2}

Track = 0

Sector = 0 \text{ if } N-1 \text{ is even}
1 \text{ if } N-1 \text{ is odd}
SECTION 2

JOB CONTROL POINT TABLES
### RA COMMUNICATION AREA

<table>
<thead>
<tr>
<th>RA+0</th>
<th>RA+1</th>
<th>RA+2</th>
<th>RA+53</th>
<th>RA+54</th>
<th>RA+63</th>
<th>RA+64</th>
<th>RA+65</th>
<th>RA+66</th>
<th>RA+67</th>
<th>RA+70</th>
<th>RA+77</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>User/System Interface</td>
<td>Parameter</td>
<td>(Reserved)</td>
<td>Code</td>
<td>1AJ Bootstrap for Absolute Programs</td>
<td>Name/Library Name</td>
<td>Number of Parameter Words, Beginning in RA+2</td>
<td>M</td>
<td>LWA+1 of Loadable Area in ECS</td>
<td>L</td>
<td>LWA+1 of Loadable Area in CM</td>
</tr>
<tr>
<td></td>
<td></td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
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<td></td>
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</tr>
<tr>
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<tr>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Control Statement Card Image
(Replaced by Operator Message if CFO Type-in)

<table>
<thead>
<tr>
<th>RA+77</th>
<th>Run 2,3 ASA Flag +0 = Non-ASA; -0 = ASA</th>
</tr>
</thead>
</table>

#### User Program

60307400 C II-2-3
NOTES: RA COMMUNICATION AREA

R  Job dependency recheck bit
T  Storage move flag (1 = move being attempted)
P  Pause flag (1 = control point pausing)
SS Sense switches
SL Sense lights
CODE 00 = Continuation
     01 = Comma
     02 = Equals sign
     03 = Slash
     04 = Left parenthesis
     05 = Plus sign
     06 = Minus sign
     07 = Blank
     10 = Semi-colon
     11 =
     12 =
     13 = (reserved)
     14 =
     15 =
     16 = Other
     17 = Termination
L  Library/file flag (1 = name is library name)
X  XJ flag: if XJ = 1, and XJ can be issued
C  LDV completion flag (bit 29)
D  DIS RSS flag (bit 18)
M  CMU Bit
### FILE ENVIRONMENT TABLE

<table>
<thead>
<tr>
<th>Logic Line</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>59-32</td>
<td>LOGICAL FILE NAME</td>
</tr>
<tr>
<td>31-23</td>
<td>LEVEL NO.</td>
</tr>
<tr>
<td>22-4</td>
<td>ERROR CODE</td>
</tr>
<tr>
<td>3-2</td>
<td>CODE/STATUS</td>
</tr>
<tr>
<td>1</td>
<td>FIRST POINTER</td>
</tr>
<tr>
<td>0</td>
<td>IN POINTER</td>
</tr>
<tr>
<td>3-2</td>
<td>OUT POINTER</td>
</tr>
<tr>
<td>2</td>
<td>LIMIT POINTER</td>
</tr>
<tr>
<td>5</td>
<td>PSEUDO IN POINTER</td>
</tr>
<tr>
<td>6</td>
<td>FWA WORKING STORAGE AREA</td>
</tr>
<tr>
<td>7</td>
<td>MLRS (S/L TAPES ONLY)</td>
</tr>
<tr>
<td>8</td>
<td>RECORD REQUEST/RETURN INFORMATION (RANDOM RMS ONLY)</td>
</tr>
<tr>
<td>9</td>
<td>FWA OF SCOPE INDEX</td>
</tr>
<tr>
<td>10</td>
<td>CPC ERROR EXIT ADDRESS</td>
</tr>
<tr>
<td>11</td>
<td>CPC EOI ADDRESS</td>
</tr>
<tr>
<td>12</td>
<td>FWA OF LABEL BUFFER</td>
</tr>
<tr>
<td>13</td>
<td>LENGTH OF LABEL BUFFER</td>
</tr>
<tr>
<td>14-10</td>
<td>FIRST 10 CHARACTERS OF FILE LABEL NAME</td>
</tr>
<tr>
<td>11-7</td>
<td>RESERVED</td>
</tr>
<tr>
<td>12-8</td>
<td>LAST 7 CHARACTERS OF FILE LABEL NAME</td>
</tr>
<tr>
<td>13-9</td>
<td>RESERVED</td>
</tr>
<tr>
<td>14-10</td>
<td>EDITION NUMBER</td>
</tr>
<tr>
<td>11-7</td>
<td>RETENTION CYCLE</td>
</tr>
<tr>
<td>12-8</td>
<td>CREATION DATE</td>
</tr>
<tr>
<td>13-9</td>
<td>RESERVED</td>
</tr>
<tr>
<td>14-10</td>
<td>MULTI-FILE SET NAME</td>
</tr>
<tr>
<td>11-7</td>
<td>REEL NUMBER</td>
</tr>
<tr>
<td>12-8</td>
<td>LENGTH OF EXTENSION (N)</td>
</tr>
<tr>
<td>13-9</td>
<td>RESIDUAL SKIP COUNT</td>
</tr>
<tr>
<td>14-10</td>
<td>PERM BITS</td>
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</table>
**SCOPE CIO CODES IN OCTAL**

All codes are shown for coded mode operations; add 2 for binary mode. Example: 010 is coded READ, 012 is binary READ.

<table>
<thead>
<tr>
<th>Code</th>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>RPHR</td>
<td>170</td>
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<td>004</td>
<td>WPHR</td>
<td>174</td>
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<tr>
<td>010</td>
<td>READ</td>
<td>200</td>
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<tr>
<td>014</td>
<td>WRITE</td>
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<td>020</td>
<td>READSKP</td>
<td>210</td>
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<tr>
<td>024</td>
<td>WRITER</td>
<td>214</td>
</tr>
<tr>
<td>030</td>
<td>-</td>
<td>220</td>
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<td>034</td>
<td>WRITEF</td>
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<td>040</td>
<td>BKSP</td>
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<td>044</td>
<td>BKSPRUI</td>
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<td>050</td>
<td>REWIND</td>
<td>240</td>
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<td>054</td>
<td>-</td>
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<tr>
<td>060</td>
<td>UNLOAD</td>
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<td>064</td>
<td>-</td>
<td>254</td>
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<tr>
<td>070</td>
<td>RETURN</td>
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<tr>
<td>074</td>
<td>-</td>
<td>264</td>
</tr>
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<td>100</td>
<td>OPEN,NR</td>
<td>270-274</td>
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<tr>
<td>104</td>
<td>OPEN WRITE,NR</td>
<td>300</td>
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<td>110</td>
<td>POSMF</td>
<td>304-324</td>
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<td>114</td>
<td>EVICT</td>
<td>330</td>
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<td>120</td>
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<td>124</td>
<td>-</td>
<td>340</td>
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<td>130</td>
<td>CLOSE,NR</td>
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<tr>
<td>134</td>
<td>-</td>
<td>354-364</td>
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<tr>
<td>140</td>
<td>OPEN</td>
<td>370</td>
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<td>144</td>
<td>OPEN WRITE</td>
<td>374-474</td>
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<td>150</td>
<td>CLOSE</td>
<td>500-574</td>
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<tr>
<td>154</td>
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<td>600-634</td>
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<tr>
<td>160</td>
<td>OPEN</td>
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<td>164</td>
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### LOCAL SCRATCH FILE NAMES

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<td>(DIAXNOS)</td>
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<td>ZZZZZ11</td>
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<td>ZZZZZ12</td>
<td>(EDITLIB)</td>
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<td>ZZZZZ13</td>
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<td>ZZZZZ14</td>
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<td>ZZZZZ15</td>
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<td>ZZZZZ16</td>
<td>(LOADER)</td>
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<td>ZZZZZ17</td>
<td>(LOADER)</td>
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<td>ZZZZZ18</td>
<td>(FORM)</td>
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<td>ZZZZZ19</td>
<td>(FORM)</td>
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<td>ZZZZZ20</td>
<td>(FORM)</td>
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<td>ZZZZZ21</td>
<td>(FORM)</td>
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<tr>
<td>ZZZZZ22</td>
<td>(6RM)</td>
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<td>ZZZZZ23</td>
<td>(EDITLIB)</td>
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<tr>
<td>ZZZZZ24</td>
<td>(QUERY/UPDATE)</td>
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<td>ZZZZZ25</td>
<td>(LOADER)</td>
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<td>ZZZZZ26</td>
<td>(GRAPHICS)</td>
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<td>ZZZZZ27</td>
<td>(LOADER)</td>
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<td>ZZZZZ28</td>
<td>(DEBUGGING AIDS)</td>
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<td>ZZZZZ29</td>
<td>(LOADO)</td>
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<td>ZZZZZ22A-2Z</td>
<td>(SORT/MERGE)</td>
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<td>ZZZZZ30</td>
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<td>ZZZZZ31</td>
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<td>ZZZZZ32</td>
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<td>ZZZZZ33A-3Z</td>
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<td>ZZZZZ41-47</td>
<td>(COBOL)</td>
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<td>ZZZZZ50-59</td>
<td>(PL1)</td>
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<td>ZZZZZAA-A9</td>
<td>(Index Processor)</td>
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<td>ZZZZZBA-B0</td>
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<td>(CDC Special Systems)</td>
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<td>ZZZZZC4</td>
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<td>(PAGE Utility)</td>
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<td>ZZZZZOP</td>
<td>(FTN 4.0/COMPASS)</td>
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<td>ZZZZZOU</td>
<td>(PAGE Utility)</td>
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<td>(PFM)</td>
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<td>ZZZZZSA-SD</td>
<td>(SIFT)</td>
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<td>ZZZZZSE</td>
<td>(EDITOR/SETUP)</td>
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<td>ZZZZZSF</td>
<td>(SETUP)</td>
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<td>ZZZZZUN</td>
<td>(INTERCOM)</td>
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<td>ZZZZZVx-Zx</td>
<td>(Installations)</td>
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### ENTRY POINT NAMES

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<td>ALxxxxx</td>
<td>APT</td>
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<td>CPxxxxx</td>
<td>FORTRAN Extended</td>
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<td>Dxxxxx</td>
<td>FORM</td>
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<tr>
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<td>RUN</td>
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<td>G6xxxxx</td>
<td>IGS/6000 EXPORT HS</td>
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<tr>
<td>G7xxxxx</td>
<td>IGS/1700 IMPORT</td>
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<tr>
<td>INxxxxx</td>
<td>INTERCOM</td>
</tr>
<tr>
<td>IXxxxxx</td>
<td>Index Processor</td>
</tr>
<tr>
<td>ISxxxxx</td>
<td>SIS 1.0</td>
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<td>ITxxxxx</td>
<td>INTERCOM</td>
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<td>IT7xxxxx</td>
<td>1700 IMPORT HS</td>
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<tr>
<td>IS8xxxxx</td>
<td>8231 IMPORT HS</td>
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<tr>
<td>JVxxxxx</td>
<td>JOVIAL</td>
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<td>MIxxxxx</td>
<td>1700 MSOS IMPORT HS</td>
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<td>Yxxxxxx</td>
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### FET ERROR CODES - WORD 1

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>01</td>
<td>End of information</td>
</tr>
<tr>
<td>02</td>
<td>End of reel</td>
</tr>
<tr>
<td>04</td>
<td>Parity error</td>
</tr>
<tr>
<td>10</td>
<td>Device capacity exceeded</td>
</tr>
<tr>
<td>21</td>
<td>End of multi-file set</td>
</tr>
<tr>
<td>22</td>
<td>Fatal error</td>
</tr>
<tr>
<td>23</td>
<td>Index buffer full</td>
</tr>
<tr>
<td>24</td>
<td>Reserved</td>
</tr>
<tr>
<td>25</td>
<td>Index full on random read/write of record n</td>
</tr>
<tr>
<td>26</td>
<td>Nonexistent record named on random read</td>
</tr>
<tr>
<td>27</td>
<td>Nonexistent record named on random write and index is full</td>
</tr>
<tr>
<td>30</td>
<td>Function undefined on device</td>
</tr>
<tr>
<td>31</td>
<td>Permission not granted</td>
</tr>
<tr>
<td>32</td>
<td>Function illegal on permanent file</td>
</tr>
<tr>
<td>33-37</td>
<td>Reserved</td>
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</table>

### FET FLAG BITS - WORD 2 - Meaning if bit is set

<table>
<thead>
<tr>
<th>Bit</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>47</td>
<td>(R) Process SCOPE index if OPEN/CLOSE; else random read/write</td>
</tr>
<tr>
<td>46</td>
<td>(N) Release record blocks as read</td>
</tr>
<tr>
<td>45</td>
<td>(UP) User processing at end of volume</td>
</tr>
<tr>
<td>44</td>
<td>(EP) User processing on error condition</td>
</tr>
<tr>
<td>43</td>
<td>(EB) Reserved</td>
</tr>
<tr>
<td>42</td>
<td>(IN) INTERCOM (multi-user job or graphics)</td>
</tr>
<tr>
<td>41</td>
<td>(XL) Extended label processing</td>
</tr>
<tr>
<td>40</td>
<td>(XP) Extended error processing</td>
</tr>
<tr>
<td>39</td>
<td>(EC) Disallow automatic allocation of ECS buffer</td>
</tr>
<tr>
<td>38</td>
<td>(NS) File has non-standard labels; processing of label records is left to user</td>
</tr>
<tr>
<td>37</td>
<td>Reserved</td>
</tr>
<tr>
<td>36</td>
<td>(ST) 6000 Station control point</td>
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</table>

### FET DETAIL ERROR CODES - WORD 7

#### Software Warning

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>0000-0017</td>
<td>(Reserved)</td>
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<tr>
<td>0020</td>
<td>25 feet erased (not ANSI compatible)</td>
</tr>
<tr>
<td>0021</td>
<td>Erase limit (installation-defined)</td>
</tr>
<tr>
<td>0023</td>
<td>Bad erase</td>
</tr>
<tr>
<td>0024</td>
<td>Read opposite mode successful</td>
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<tr>
<td>0025</td>
<td>Noise in inter-record gap</td>
</tr>
<tr>
<td>0026</td>
<td>Function not complete</td>
</tr>
<tr>
<td>0027</td>
<td>Possible record fragment</td>
</tr>
<tr>
<td>0030</td>
<td>Record length greater than PRU size or MLRS as applicable</td>
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</tbody>
</table>

#### Bad Hardware Status

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>0040</td>
<td>Lost data</td>
</tr>
<tr>
<td>0041</td>
<td>Tape parity error</td>
</tr>
</tbody>
</table>
FET DETAIL ERROR CODES – WORD 7 (continued)

Hardware Malfunction

0050  MMTC memory parity error
0051  Transmission parity error

Position Uncertain

0100  Valid data probably destroyed — highly unlikely that a close will be successful
0101  Valid data probably intact — likely that a close will be successful
FILE INFORMATION TABLE

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>LFN</td>
<td>Logical File Name</td>
</tr>
<tr>
<td>RL</td>
<td>Current Record Length</td>
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<tr>
<td>PTL</td>
<td>Partial Transfer Length</td>
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<tr>
<td>HL</td>
<td>Header Length of T Record</td>
</tr>
<tr>
<td>TL</td>
<td>Trailer Length of T Record</td>
</tr>
<tr>
<td>VNO</td>
<td>Error Count</td>
</tr>
<tr>
<td>FL</td>
<td>Length of F/Z Record</td>
</tr>
<tr>
<td>KP</td>
<td>Key Length</td>
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<tr>
<td>MNB</td>
<td>Minimum Block Length</td>
</tr>
<tr>
<td>LP</td>
<td>BCP of D Record Length Field</td>
</tr>
<tr>
<td>LL</td>
<td>Length of D Record Length Field</td>
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<tr>
<td>LBL</td>
<td>Length of Label Area</td>
</tr>
<tr>
<td>IBL</td>
<td>Index Block Length</td>
</tr>
<tr>
<td>HMB</td>
<td>Number of Home Blocks</td>
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<tr>
<td>HRL</td>
<td>Address of Key Hashing Routine</td>
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<tr>
<td>FDT</td>
<td>File Description Table</td>
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<tr>
<td>FET</td>
<td>FET Address</td>
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<tr>
<td>LX</td>
<td>Address of Label Routine</td>
</tr>
<tr>
<td>DX</td>
<td>Address of End-of-Data Routine</td>
</tr>
<tr>
<td>EX</td>
<td>Address of Error Routine</td>
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<tr>
<td>EO</td>
<td>FWA of Working Storage Area</td>
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<tr>
<td>PNA</td>
<td>Address of Partition Name</td>
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<tr>
<td>KA</td>
<td>Address of Key</td>
</tr>
<tr>
<td>PAR</td>
<td>Parameter List Address</td>
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<tr>
<td>RC</td>
<td>Record Count</td>
</tr>
<tr>
<td>BN</td>
<td>Current Block Number</td>
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<tr>
<td>TRC</td>
<td>Error Code Location</td>
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<tr>
<td>ECL</td>
<td>Error Code Location</td>
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<tr>
<td>FLM</td>
<td>DL</td>
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<td>PRS</td>
<td>WA</td>
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<tr>
<td>Reserved for Installation</td>
<td></td>
</tr>
</tbody>
</table>

II-2-12  60307400 A
NOTES: FIT

Word 1: 35 PM
processing mode (6RM only)
0 random
1 sequential

34-32 FO
file organization
000 sequential (SQ)
001 word addressable (WA)
010 direct (DR)
011 indexed sequential (IS)
100 library (partition) (LB)
101 direct access (DA)

31 MIX
reserved for future access method

30-28 BT
block type
000 \{ default/internal (I)
001 \} character count (C)
010 record count (K)
100 exact records (E)

27 BCK
block checksums (not supported for SQ files)
0 no
1 yes

26 DT
device type (6RM only)
0 mass storage
1 tape

25-22 RT
record type
0000 control word (W)
0001 fixed length (F)
0010 record mark (R)
0011 zero byte (Z)
0100 decimal character count (D)
0101 trailer count (T)
0110 binary character count (B)
0111 undefined (U)
1000 SCOPE logical records (S)

21 DKI
duplicate key indicator; indicates duplicate key permission on an IS file.
0 no
1 yes

20-18 PD
processing direction
000 \{ input (INPUT)
001 \} output (OUTPUT)
010 input/output (I-O)
100 reverse (REV)
NOTES: FIT

Word 2: 35-34 OF
open flags, positioning of file at OPENM time
00 1 open
01 1 close
10 no rewind (N)
11 extend (E)

33-32 VF
end of volume flags, positioning of file volume CLOSEM time
00 unload (default)
01 rewind (R)
10 no rewind (N)
11 unload (U)

31-30 CF
close flags, positioning of file at CLOSEM time
00 1 open
01 1 close
10 no rewind (N)
11 unload (U)

29-28 LT
label type
00 ANSI standard (ST)
01 non-standard (NS)
10 unlabelled (UL)
11 any (ANY)

27-25 ULP
user label processing
000 none
001 VOL/EOV (V)
010 HDR/EOF (F)
011 VOL/HDR/EOF/EOV (VF)
100 UHL/UTL/UVL (U)
101 VOL/UHL/UTL/UVL/EOV (VU)
110 HDR/EOF/UHL/UTL/UVL (FU)
111 all (VFU)

24-18 FP
file position (in octal)
0 mid record
1 in header label group. (only set during user label processing)
2 beginning of information/volume (BOI/BOV) only set on SKIPBl in connection with DX
4 end of volume (EOV)
10 end of section (EOS)
20 end of record (EOR)
40 end of partition (EOP)
100 end of information (EOI)
### NOTES: FIT

**Word 4:**
- **35-18 ES** error status
  - 35 **FNF** fatal/non-fatal flag
    - 0 non-fatal
    - 1 fatal
  - **34-31 reserved**
- **30-27 SES** system error severity
  - 01 read parity error level 1
  - 02 read parity error level 2
  - 03 read parity error level 3
  - 04 read parity error level 4
  - 05 write parity error level 1
  - 06 write parity error level 2
- **26-18 IRS** invalid request subfield (6RM error code)

**Word 5:**
- **59-54 VNO** current volume number of multi-volume sequential file
- **35 FPB** file position bit; for use by user
- **34 SVO** SIS version number
  - 0 SISV1 user
  - 1 SISV2 user
- **33 SPR** suppress read ahead
  - 0 read ahead/write behind (buffered sequential I/O)
  - 1 no read ahead/no write behind (unbuffered sequential I/O)
- **32 unused**
- **31 SDS** system error message disposition
- **30-29 OC** open/close
  - 00 never opened
  - 01 opened
  - 10 closed
- **28 FWI** forced write of IS and DA file blocks
  - 0 no forced write (NO)
  - 1 forced write (YES)
- **27 ON** old/or new file
  - 0 old (OLD)
  - 1 new (NEW)
Word 5: (Cont'd)

26 LCR label action on PD=I-O tape
   0 create (new) labels (N)
   1 check existing labels (E)

24 HB reserved for future access method

23-18 LVL level number of an S-type record

Word 6: 25 CM conversion mode (EC to IC)
   0 no conversion (NO)
   1 conversion (YES)

24-22 EO error option
   000 terminate job (T)
   001 drop erroneous data (D)
   010 accept (A)
   100 terminate job and display data (TD)
   101 drop erroneous data and display data (DD)
   110 accept erroneous data and display data (AD)

Word 7: 59-56 KP beginning character position of key

37-34 RKP relative key word position (DA files)

33-22 IP index block padding factor (% padding)

28-22 DP data block padding factor (% padding)

Word 8: 27-22 PC padding character for sequential file blocks

27-22 KT key type for indexed sequential files
   000000 symbolic (S)
   000001
   000010 integer (I)
   000011 floating (F)
   000100 computational-1
   000101 actual (A)
   000110 computational-2
   000111 reserved for CDC
   111111
NOTES: FIT

Word 10: 35-30 LOP last operation code (the high order bit of LOP is a “write bit”, indicating whether or not the last operation wrote data to the file).
01 OPENM (OP)
02 CLOSEM (CM)
03 GET or GETP (GE)
43 PUT or PUTP (PU)
44 REPLACE (RP)
04 SEEK (SE)
05 SKIP (SK) or SKIPF (SF)
06 DELETE (DE)
07 GETN (GN)
47 WEOR (WE)
10 REWIND (RE)
11 GETL (GL) or PUTL (PL)
12 SKIPB (SB)
13 CLOSEL (CL)
14 LABEL (LL) 7DM only
63 WTMK (WK)
23 READS (RS)
53 WRITES (WS)

35 WPN write bit. The upper bit of LOP is a one-bit subfield that can be accessed separately; it is on (YES) if the last operation was a write.

Word 11: 35-30 MUL multiple of characters per K, E type block
23-18 TRC number of transactions to be traced (IS or DA files)

Word 12: 35-30 NL number of levels of index blocks in an IS file
29-0 DL directory length
29-0 FLM file limit, records/file (IS/DA)
17-0 PRS previous record size after a forward sequential GET

Word 15: 51-30 CDT address of collating sequence to display code conversion table for indexed sequential (IS) files
21-0 DCT address of display code to collating sequence conversion table for indexed sequential (IS) files

Words 16, 17, 18: Scratch area used by 6RM
## FILE DEFINITION BLOCK

<table>
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<tr>
<th>17</th>
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### Permanent File Name
(Left Justified Binary Zero Filled)

### Logical File Name (Left Justified, Binary Zero Filled)

### Return Code

<table>
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<tr>
<th>N</th>
<th>R</th>
<th>RC</th>
<th>FC</th>
<th>C</th>
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</table>

### Parameter Value (Right Justified, Binary Zero Filled)

### Key Word

### NR (Bit 8)

1 = NR option specified

### RC (Bits 7-6)

01 = No RC or RT specified
00 = RC option specified
10 = RT option specified (implies RC as well)

### FC (Bits 5-2)

<table>
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<tr>
<td>0001 = SETP</td>
<td>1 = Function completed</td>
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<td>0010 = ATTACH</td>
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<td>0100 = CATALOG</td>
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<td>0110 = EXTEND</td>
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<td>0111 = ALTER</td>
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<td>1000 = PURGE</td>
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<td>1010 = RENAME</td>
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</tr>
<tr>
<td>1100 = PERM</td>
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**II-2-18**

**60307400 A**
NOTES: FILE DEFINITION BLOCK

Return code (Bits 17-9)

0  Function successful
1  ID error
2  Ln fn already in use
3  Unknown fn
4  No room for extra cycle
5  RBTC full
6  No fn or pffn
10  Latest index not written
11  File not on PF device
12  File not in system
13  Archive retrieval aborted
15  Cycle number limit reached
16  PFD Full
17  Function attempted on non-permanent file
20  Function attempted on non-local file
22  File never assigned to a device
23  Cycle incomplete or dumped
24  PF already attached
25  File unavailable
27  Illegal fn
33  Alter needs exclusive access
35  File already in system
70  PFM stopped by system
71  Incorrect permission
72  FDB address error

Key Word

01 PP — Privacy Procedure PP name
02 RP — Retention Period (days)
03 CY — Cycle Number
04 TK — Turnkey Password Definition
05 CN — Control Password Definition
06 MD — Modify Password Definition
07 EX — Extend Password Definition
10 RD — Read Password Definition
11 MR — Multi-Read Parameter
12 SD — Ignored
13 XR — Control, Modify, Extend Password Definition
14 ID — Owner-Identification
15 RN — Ignored
16 AC — Account Parameter
17 EC — ECS Buffering

20 PW — Passwords
21 FO — File Organization
25 FO — File Organization
26 PS — Position
31 LC — Lowest Cycle
32 ST — Station ID (7000 only)
33 RW — Multi-Access Rewrite
## REQ FUNCTION PARAMETER LIST

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<td>13</td>
<td>(IU)</td>
</tr>
<tr>
<td>12</td>
<td>(CK)</td>
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</table>

- **MN**: accept either MT or NT assignment
- **A**: assign any RMS device (overrides device type specification)
- **EL**: extended label fields in parameter words 5-9
- **NL**: normal label fields in parameter words 5-8
- **EC**: ECS buffering requested; parameter word 4
- **OV**: allow overflow to a different device
- **PF**: assign file to a PF device
- **US**: ASCII conversion mode on 9-track tape
- **EB**: EBCDIC conversion mode on 9-track tape
- **AA**: assign automatically
- **SY**: print card image from RA+70
- **2D**: assign 2 devices (DP,NT,MT only)
- **VS**: VSN declared in parameter word 3
- **EN**: tape has existing labels
- **NS**: tape has non-standard labels
- **NR**: disable standard tape parity recovery procedure
- **Z**: SCOPE 3.3 labeled tape
- **SR**: return error code without dayfile message or operator intervention
- **C1**: console checkpoint request
- **MF**: multi-user tape request
- **DP**: sequential pack request
- **PK**: family pack request
- **DD**: default density for labels and data
- **SV**: save tape
- **IU**: inhibit physical unload
- **CK**: checkpoint tape
### SCOPE 3.4

#### STANDARD CHARACTER SETS

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<td>03</td>
<td>03</td>
<td>0-3</td>
<td>33</td>
<td>÷</td>
<td>÷</td>
<td>77</td>
<td>12-8-7</td>
<td>77</td>
<td>11-8-6</td>
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<td>37</td>
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<td>04</td>
<td>0-4</td>
<td>34</td>
<td>⟨ (circumflex)</td>
<td>⟨</td>
<td>76</td>
<td>12-8-6</td>
<td>76</td>
<td>11-8-7</td>
<td>5E</td>
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<td>5</td>
<td>40</td>
<td>05</td>
<td>05</td>
<td>0-5</td>
<td>35</td>
<td>; (semicolon)</td>
<td>; (semicolon)</td>
<td>77</td>
<td>12-8-7</td>
<td>77</td>
<td>11-8-6</td>
<td>3B</td>
</tr>
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</table>

† Twelve or more zero bits at the end of a 60-bit word are interpreted as end-of-line mark rather than two colons. End-of-line mark is converted to external BCD 1632.

†† In installations using the CDC 63-graphic set, display code 00 has no associated graphic or Hollerith code; display code 63 is the colon (8-2 punch).

††† The alternate Hollerith (026) and ASCII (029) punches are accepted for input only.
SECTION 3

DISK TABLES AND FILE FORMATS
**RBT Catalog Entry**

<table>
<thead>
<tr>
<th>59</th>
<th>47</th>
<th>35</th>
<th>23</th>
<th>11</th>
<th>5</th>
<th>0</th>
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<tr>
<td>7777</td>
<td>7777</td>
<td>RB</td>
<td>TC</td>
<td>C.PCFLAG Flags</td>
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<td></td>
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<tr>
<td>(Right Justified, Blank Filled)</td>
<td>OWNER-ID</td>
<td>14B</td>
<td></td>
<td></td>
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<td>PERMANENT</td>
<td>FILE</td>
<td>NAME</td>
<td></td>
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<td>PFD Pointer</td>
<td>CYCLE</td>
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</tr>
<tr>
<td>Creation Date (J-Date)</td>
<td>Retention Period</td>
<td>EST Ordinal</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Date of Last Attach</td>
<td>Time of Last Attach</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Date of Last Alteration</td>
<td>Time of Last Alter</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Attach</td>
<td>Number of Extends</td>
<td>Number of Rewrites</td>
<td>Size of Entry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>Pointer to S</td>
<td>Pointer to T</td>
<td>Subdirectory (Reserved)</td>
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<td></td>
<td></td>
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<tr>
<td>Account Parameter (display zero-filled binary)</td>
<td>16B</td>
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<tr>
<td>Dump Tape VSN No. 1</td>
<td>Position</td>
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</tr>
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<td>Dump Tape VSN No. 2</td>
<td>Position (CKP)</td>
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<td>Installation Slot</td>
<td>RBT Chain</td>
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**C.PCFLAG**

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<tr>
<th>11</th>
<th>10</th>
<th>9</th>
<th>8</th>
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<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
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<tr>
<td>9-Track Tape Positioned</td>
<td>S.PFCEF (Entry Free Flag)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Random</td>
<td>New Version</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FO = IS/D/Δ</td>
<td>Archive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Word 0 of an RBTC pru.
INDEX BLOCK FORMAT (IS FILE)

INDEX

Index Level Number

First Word of Padding

Low Key

Flags

PRU Pointer to Lower Index Level or to Data Block

High Key

Flags

PRU Pointer to Lower Index Level or to Data Block

Padding

Optional Checksum

DATA BLOCK FORMAT (IS FILE)

PRU Pointer to Next Sequential Data Block

Current Size of Padding

First Word of Padding

(Reserved for Installation – DAHDRSZW Words)

Unused Bit Count

Record Size

Low Record

Unused Bit Count

Record Size

High Record

Padding

High Key

FWA of Record Header

Low Key

FWA of Record Header

Optional Checksum
<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHEKSUM</td>
<td>FSTT Checksum</td>
</tr>
<tr>
<td>HEADWORD</td>
<td>S A A M - S I S V 2</td>
</tr>
<tr>
<td>TRAILERS</td>
<td>(Reserved for SIP)</td>
</tr>
<tr>
<td>FSTTSZW</td>
<td>FSTT Size in Words</td>
</tr>
<tr>
<td>DAHRSZW</td>
<td>Data Header Size (words)</td>
</tr>
<tr>
<td>ABNORMB</td>
<td>File Abnormally Terminated</td>
</tr>
<tr>
<td>AVALDABK</td>
<td>PRU Number of Next Empty Data Block</td>
</tr>
<tr>
<td>AVALINBK</td>
<td>PRU Number of Next Empty Index Block</td>
</tr>
<tr>
<td>CHKSUMB</td>
<td>Checksum File</td>
</tr>
<tr>
<td>CODITABL</td>
<td>Collating Sequence to Display Code Conversion Table</td>
</tr>
<tr>
<td>CODITAB2</td>
<td></td>
</tr>
<tr>
<td>CODITAB3</td>
<td></td>
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<td>CODITAB4</td>
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<td>CODITAB5</td>
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<td>CODITAB6</td>
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<tr>
<td>CODITAB7</td>
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<td>CODITAB8</td>
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</tr>
<tr>
<td>CURFILPP</td>
<td>PTREE Index</td>
</tr>
<tr>
<td></td>
<td>Key Displacement in Data Block</td>
</tr>
<tr>
<td></td>
<td>Address of Buffer Catalog</td>
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<tr>
<td>DABKSZW</td>
<td>Data Block Size in PRUs</td>
</tr>
<tr>
<td>DABKSZW</td>
<td>Data Block Size in Words</td>
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<tr>
<td>DAPADSZW</td>
<td>Data Block Padding Size in Words</td>
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<td>Total DELETES</td>
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<td>Display Code to Collating Sequence Conversion Table</td>
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<tr>
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<td>DICOTAB7</td>
<td></td>
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<td>DICOTAB8</td>
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<td>DUPKEYB</td>
<td>Duplicate Keys Allowed</td>
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<tr>
<td>FEMDABK</td>
<td>Deleted Data Block Chain Pointer</td>
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<td>Deleted Index Block Chain Pointer</td>
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<td>FILDATE</td>
<td>File Creation Date</td>
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<td>FILENAME</td>
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<td>Index Block Size in PRUs</td>
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<td>Index Block Size in Words</td>
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<tr>
<td>Field</td>
<td>Description</td>
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<tr>
<td>------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>INPADSZW</td>
<td>Index Block Padding Size in Words</td>
</tr>
<tr>
<td>KEYBIAS</td>
<td>COMP-1 Floating Bias</td>
</tr>
<tr>
<td>KEYENSZW</td>
<td>Key Entry Size (words)</td>
</tr>
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<td>KEYPACKB</td>
<td>Key Ends in Character Position 0-4 of Last Word</td>
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<td>KEYSZC</td>
<td>Key Size in Characters</td>
</tr>
<tr>
<td>KEYPACKB</td>
<td>Key Ends in Character Position 0-4 of Last Word</td>
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<td>KEYTYPE</td>
<td>Key Type</td>
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<td>LASDABK</td>
<td>Final Data Block Pointer</td>
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<td>MAXRECSZ</td>
<td>Maximum Record Size in Chars</td>
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<td>MINRECSZ</td>
<td>Minimum Record Size in Chars</td>
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<tr>
<td>NRACSTO</td>
<td>Total GETs</td>
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<tr>
<td>NRDABKTO</td>
<td>Total Number of Data Blocks</td>
</tr>
<tr>
<td>NRDAREC</td>
<td>Total Number of Data Records</td>
</tr>
<tr>
<td>NREMADABK</td>
<td>Number of Deleted Data Blocks</td>
</tr>
<tr>
<td>NREMNBK</td>
<td>Number of Deleted Index Blocks</td>
</tr>
<tr>
<td>NRINBKTO</td>
<td>Total Number of Index Blocks</td>
</tr>
<tr>
<td>NRINSTO</td>
<td>Total PUTs</td>
</tr>
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<td>NRLVLSF</td>
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<td>NRWUDISK</td>
<td>Number of Unused Words on Disk</td>
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<td>Next Unassigned PRU Number</td>
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<tr>
<td>PRINBK</td>
<td>Primary Index Block PRU Number</td>
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<td>Total REPLACES</td>
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<td>SEQINSS</td>
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<td>UEPRINBK</td>
<td>Number of Unused Key Entries in Primary Index Block</td>
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<td>-----------------------------------------------------------------------------</td>
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<td>CKSWORD</td>
<td>FSTT Checksum</td>
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<td>HEADER</td>
<td>- F S T T - b - S D A b</td>
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<tr>
<td>TRAILERS</td>
<td>(Reserved for SIP)</td>
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<tr>
<td>FSTTSZW</td>
<td>FSTT Size in Words</td>
</tr>
<tr>
<td>DAHRSZW</td>
<td>Data Header Size (Words)</td>
</tr>
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<td>CSFLAG</td>
<td>Block Checksum Option (BCK at OPENM NEW)</td>
</tr>
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<td>STATADD</td>
<td>Total Number of PUTs</td>
</tr>
<tr>
<td>STATDLT</td>
<td>Total Number of DELETEs</td>
</tr>
<tr>
<td>STATRPL</td>
<td>Total Number of REPLACES</td>
</tr>
<tr>
<td>STATRET</td>
<td>Total Number of GETs and GETNs</td>
</tr>
<tr>
<td>STATOVF</td>
<td>Total Number of Overflow Blocks</td>
</tr>
<tr>
<td>STATHOM</td>
<td>Number of Home Blocks in Use</td>
</tr>
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<td>STATHR</td>
<td>Total Number of Records in Home Blocks</td>
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<tr>
<td>STATOR</td>
<td>Total Number of Records in Overflow Blocks</td>
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<tr>
<td>FILESZ</td>
<td>Total Number of Home Blocks</td>
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<tr>
<td>KEYS</td>
<td>Relative Key Position (RKP) Relative Key Word (RKW) Key Length (KL)</td>
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<td>Minimum Record Size (MNR) Maximum Record Size (MRL)</td>
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<td>Next Unassigned PRU Number</td>
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<td>NXTUPDSK</td>
<td>Next Usable PRU on disk</td>
</tr>
<tr>
<td>OVF</td>
<td>Overflow Manager</td>
</tr>
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<td>DATABASESZ</td>
<td>Data Block Size (words)</td>
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<td>PRUBLK</td>
<td>Number of PRUs per Block</td>
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<td>RUNADD</td>
<td>Number of PUTs – Current OPENM</td>
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<tr>
<td>RUNDLT</td>
<td>Number of DELETEs – Current OPENM</td>
</tr>
<tr>
<td>RUNRET</td>
<td>Number of GETs and GETNs – Current OPENM</td>
</tr>
<tr>
<td>RUNRPL</td>
<td>Number of REPLACES – Current OPENM</td>
</tr>
<tr>
<td>RUNOVF</td>
<td>Number of Overflow Blocks Created – Current OPENM</td>
</tr>
<tr>
<td>RUNHOM</td>
<td>Number of Home Blocks in Use First Time – Current OPENM</td>
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<td>RECHOM</td>
<td>Number of Records in Home Blocks – Current OPENM</td>
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<tr>
<td>RECOVF</td>
<td>Number of Records Placed in Overflow Blocks – Current OPENM</td>
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<tr>
<td>NRSCIOLS</td>
<td>Total Number of CIO Calls</td>
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<tr>
<td>CURPRU</td>
<td>Current PRU for Use by GETN</td>
</tr>
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<td>RELDBW</td>
<td>Relative Data Block Word for Use by GETN</td>
</tr>
<tr>
<td>BUFSCATS</td>
<td>Address of Buffer Catalog</td>
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<td></td>
<td>Length of Buffer Catalog</td>
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<tr>
<td>Field</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>LASBZBUF</td>
<td>Address of Last Accessed Data Block</td>
</tr>
<tr>
<td>LASTSK</td>
<td>PRU Number of Last SEEK</td>
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<tr>
<td>BITMAPS</td>
<td>Address of Bit Map (Creation Run Only)</td>
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<td>WORDCT</td>
<td>Record Header of Record to be PUT</td>
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<td>STRNGSP</td>
<td>Stranger Space in Receiving Block</td>
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<td>EMPTYSPI</td>
<td>Empty Space in Receiving Block</td>
</tr>
<tr>
<td>AVAILSPC</td>
<td>Empty Space in Block of Record to be Removed</td>
</tr>
<tr>
<td>STRANGER</td>
<td>Stranger Space in Block of Record to be Removed</td>
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<tr>
<td>ADDRPL</td>
<td>File Position Undefined for GETN</td>
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<tr>
<td>RECLNGTH</td>
<td>Unused Bits Record Length</td>
</tr>
<tr>
<td>KEYBUFF</td>
<td>Address of Key Alignment Buffer</td>
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<td>OVERWRIT</td>
<td>Number PRUs after Last Block</td>
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<tr>
<td>FWBVALUE</td>
<td>Address of User Buffer</td>
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<td>LSTOP</td>
<td>Last Operation Code</td>
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<td>BCUPDT</td>
<td>BUFCAT Address of Last Update</td>
</tr>
<tr>
<td>FSTTPOS</td>
<td>(Reserved)</td>
</tr>
<tr>
<td></td>
<td>(Reserved)</td>
</tr>
<tr>
<td>Most</td>
<td>PRU Address of a Data Block</td>
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<tr>
<td>Empty</td>
<td>Empty Space in the Block</td>
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<tr>
<td>Table</td>
<td></td>
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<td></td>
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### PUBLIC RMS AND DISK PACK LABEL (PRU 0)

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<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W.LBID</td>
<td>Creation Date</td>
</tr>
<tr>
<td>W.LBDATE</td>
<td>V ID (Right justified, display zero filled)</td>
</tr>
<tr>
<td>W.LBVID</td>
<td>00  3  4</td>
</tr>
<tr>
<td>W.LBPFD</td>
<td>VID of Current Pack (Right justified, display zero filled)</td>
</tr>
<tr>
<td>W.LBRCRC</td>
<td>PFD  RB  RBTC  RB</td>
</tr>
<tr>
<td>W.LBPRIV</td>
<td>Family Pack Name (Left-justified, binary zero filled)</td>
</tr>
<tr>
<td></td>
<td>Random Bits  Family Number  n</td>
</tr>
<tr>
<td>W.LBRBR</td>
<td>VID of First Pack (Right-justified, display zero filled)</td>
</tr>
<tr>
<td></td>
<td>RBR Ordinal</td>
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<tr>
<td>W.LPAKNO</td>
<td>Pack Number of Current Pack (Right-justified, display zero filled)</td>
</tr>
<tr>
<td>W.LBCK</td>
<td>Checksum of PRU</td>
</tr>
<tr>
<td>W.LBFLAW</td>
<td>RBR Header Words</td>
</tr>
<tr>
<td></td>
<td>Public Pack Flaw Table (RRR Skeleton)</td>
</tr>
<tr>
<td></td>
<td>Private Pack RBR Body</td>
</tr>
</tbody>
</table>

n = Number of files in family (0 - 77^2) if Family Number field = 0
Not significant if Family Number field ≠ 0

Public RMS Device labels can be more than 1 PRU. Possibilities are:

1. If an RBR has more than 2160D RB-s, label is written on 2 consecutive PRU-s, of which each has half of RB-s along with label header.

2. If a device has multiple RBR-s, each RBR occupies a PRU but the above (1.) holds true for each RBR.
SECTION 4
EXTENDED CORE STORAGE TABLES
<table>
<thead>
<tr>
<th>System Area</th>
<th>Inter-Computer Area (ICC)</th>
<th>IP.EICC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>System Pointer Area</td>
<td>IP.ESYS</td>
</tr>
<tr>
<td></td>
<td>Flaw Table</td>
<td>IP.EFLW+1</td>
</tr>
<tr>
<td></td>
<td>Empty Page Stack</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Length Computed at Deadstart; 1 Word/Page in Paged Area)</td>
<td></td>
</tr>
<tr>
<td>Paged Area</td>
<td>System Pages and Data Pages</td>
<td></td>
</tr>
<tr>
<td>Direct Access Area</td>
<td>Direct Access</td>
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</tbody>
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### INTER-COMPUTER AREA

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<tr>
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<th>Length of System Area</th>
<th>Length of ICC Area</th>
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</thead>
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<tr>
<td>0</td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>Size of ECS/1000B</td>
<td>Library Size/1000B</td>
</tr>
<tr>
<td>2</td>
<td>(Reserved)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>(Reserved)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
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<tr>
<td>14</td>
<td></td>
<td>Address 1st active system page</td>
</tr>
<tr>
<td>15</td>
<td>ICC Areas (8 Words/Computer)</td>
<td></td>
</tr>
</tbody>
</table>
# SYSTEM POINTER AREA

<table>
<thead>
<tr>
<th>Address</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>59</td>
<td>Page Length</td>
</tr>
<tr>
<td>47</td>
<td>Standard Buffer Length</td>
</tr>
<tr>
<td>41</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>23</td>
<td>Current Number of Empty Pages</td>
</tr>
<tr>
<td>0</td>
<td>Pointer to FWA of Empty Page Stack</td>
</tr>
<tr>
<td>59</td>
<td>(Reserved)</td>
</tr>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>IP.ESYS &gt;= 12^8</td>
</tr>
<tr>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>
FLAW TABLE

Maximum Number of Flaws
Current Number of Flaws
Address of Flawed Page

IP.EFLW+1

SYSTEM PAGE

Subpage Length
Previous System Page Address
Next System Page Address
System Page Header

Maximum Number of Subpages
Current Number of Empty Subpages
First Empty Subpage Address

Subpages
(Subpage Format Shown in CMR Section)
COMMENT SHEET

TITLE: SCOPE 3.4 Installation Handbook

PUBLICATION NO. 60307400       REVISION  C

This form is not intended to be used as an order blank. Control Data Corporation solicits your comments about this manual with a view to improving its usefulness in later editions.

Applications for which you use this manual.

Do you find it adequate for your purpose?

What improvements to this manual do you recommend to better serve your purpose?

Note specific errors discovered (please include page number reference).

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COMPANY
NAME: ____________________________________________

ADDRESS: __________________________________________

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