CONTROL DATA
CORPORATION

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

KRONOS® 2.1
INSTALLATION HANDBOOK

REVISION RECORD

REVISION	DESCRIPTION
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SYSTEM AND MANUAL DESCRIPTION 1

1.1 PURPOSE AND ORGANIZATION OF MANUAL

The purpose of the installation handbook is to provide the information that an analyst with at least 6 months of experience with a CONTROL DATA® 6000 or a CDC® CYBER 70 computer system needs to install the KRONOS® 2.1 Operating System.

To meet these needs, the KRONOS® 2.1 Installation Handbook has the following general design.

Part I	Lists and describes all tapes released with the base KRONOS 2.1 system and those optional products that can be ordered separately. Contains the procedure to configure the deadstart tape that is released with the KRONOS 2.1 package so that it includes the product set and the required installation parameter settings.
Part II	Contains the procedure for deadstarting the system.
Part III	Contains specific installation information for the operating system and each product, such as the standard installation parameters and listings of jobs necessary to modify the operating system and product set.
Part IV	Contains information necessary to maintain a system once it is installed; it covers special system files, VALIDUX, PROFILO (used for account validation), NETWORK (used to describe the communications network), and permanent file utilities. Some of these were formerly covered in the operator's guide.

KRONOS 2.1 and its product set are intended to be used only as described in this document. Control Data is not responsible for the proper functioning of undescribed features or undefined parameters.

1.2 RELEASE DESCRIPTION

1.2.1 LIST OF PRODUCTS

KRONOS 2.1 PRODUCTS

The following products are on the KRONOS 2.1 Operating System package deadstart tape. Description of all materials released with the KRONOS 2.1 base package is in part I, section 2.1.

KRONOS 2.1 Operating System
COMPASS 3.0
Export/Import 1.0
Modify 1.0
Record Manager 1.0
Direct Access 1.0
Indexed Sequential 2.0
SCOPE 3.4 system text, COMDECKs, and programs
Text Editor
Time-Sharing Subsystem
Update

Maintenance tools are also available for use with the base package, but they must be ordered separately. The maintenance tools consist of STIMULA, 1TS, DFSORT, FTNTRAN, PSAMP, FORTRAN Extended 3.0 object library, COBOL 3.0 object library, and Sort/Merge 3.0 object library.

OPTIONAL PRODUCTS

The following products can be ordered separately. The release materials for these products are defined in part I, sections 2.2 through 2.15.

ALGOL 3.0
APL 1.0
BASIC 2.1
COBOL 4.0
Cyberlink Interchange 1.0
FORTRAN 2.3
FORTRAN Extended 4.0
PERT/Time 1.2
SIMSCRIPT I.5 3.0
SIMULA 1.0
Sort/Merge 4.0
Time-Sharing FORTRAN 1.0
Transaction Subsystem 1.0

1.2.2 DEFINITION OF COMMON PRODUCTS

Some products are common to KRONOS and SCOPE, beginning with the releases of KRONOS 2.1 and SCOPE 3.4. As a result, the same product program library tape (referred to as PLxx) is released to a KRONOS 2.1 as to a SCOPE 3.4 site.

It is necessary that some of these common products be assembled with code that is only applicable to KRONOS if they are to be used with KRONOS 2.1 systems. Therefore, since the binaries for the common products may differ, there are additional release tapes for

common products (referred to as KPLxx tapes) that contain binaries assembled to run with KRONOS 2.1 systems. (These tapes are only released with KRONOS 2.1 systems; the binaries to be used with SCOPE 3.4 systems are on the common PLxx tape.)

Each of the KPLxx tapes released for common products contains an empty file that normally would have contained the source program library for the product, which is released on the PLxx tape.

Each product has installation jobs on KPL2 which are listed and described in part I, section 2.1.1. The purpose of a product's job 1 is to generate a new KPLxx containing the program library and assembled binaries. For initial installation of common products, the input to job 1 is its PLxx tape. For subsequent updates to the product program library, KPLxx is input to job 1 and a new KPLxx is created as a result.

The product's job 2 collects the binaries resulting from running job 1 (KPLxx) and generates directives for a subsequent system build. Job 2 is dependent upon the structure (file position of binaries) of the tape created by job 1. Therefore, to allow job 2 to be run before job 1 for initial installation of common product binaries, empty files are placed on the release tape to maintain the same relative file position and file structure as the tape created as a result of running job 1.

For example, if COBOL 4.0 is ordered for use with a KRONOS 2.1 system, the site receives:

PL9 This is the common product tape that contains COBOL 4.0 source code (compiler and library routines in Update format) and the binary code to run COBOL with a SCOPE 3.4 system.

KPL12 This is the additional tape provided to install COBOL 4.0 with a KRONOS 2.1 system; it contains an empty file and the binary code of COBOL 4.0 assembled to run with a KRONOS 2.1 system.

The common products and their release material format for both SCOPE 3.4 and KRONOS 2.1 are:

Common Product	SCOPE 3.4 Materials	KRONOS 2.1 Materials
ALGOL 3.0	PL18	PL18, KPL8
COBOL 4.0	PL9	PL9, KPL12
COMPASS 3.0	PL2	PL2, KPL5
FORTRAN 2.3	PL21	PL21, KPL14
FORTRAN Extended 4.0	PL7, PL8	PL7, PL8, KPL15A, KPL15B
PERT/Time 1.2	PL13	PL13, KPL16
Record Manager 1.0	PL3	PL3, KPL6
Direct Access 1.0	PL3	PL3, KPL6
Indexed Sequential 2.0	PL3	PL3, KPL6
SIMSCRIPT I.5 3.0	PL27	PL27, KPL17
SIMULA 1.0	PL19	PL19, KPL18
Sort/Merge 4.0	PL10	PL10, KPL19
Update	PL1C	PL1C, KPL7

1.2.3 PRODUCTS UNIQUE TO KRONOS 2.1

Products unique to KRONOS 2.1 are released with only KPLxx tapes containing product source program library code and assembled binary code. These products are:

Product	Release Materials
APL 1.0	KPL9
BASIC 2.1	KPL11
Cyberlink Interchange 1.0	KPL13
Time-Sharing FORTRAN 1.0	KPL20
Transaction Subsystem	KPL21

RELEASE MATERIALS DESCRIPTION 2

This section lists the tapes released with the operating system package and each optional product. PL identified tapes are tapes for those products that are common to both SCOPE 3.4 and KRONOS 2.1; KPL identified tapes are tapes that are unique to KRONOS 2.1 and its product set.

2.1 KRONOS 2.1

The tapes released as part of KRONOS 2.1 are:

Deadstart tape		section 2.1.1
KPL1	KRONOS 2.1 source code	
KPL2	Modification, installation, and verification decks	section 2.1.1
KPL4	Binary and source code for SCOPE 3.4 system text, COMDECKs, and programs	section 2.1.1
KPL5	Binary code for COMPASS 3.0	section 2.1.2
PL2	Source code for COMPASS 3.0	section 2.1.2
KPL6	Binary code for Record Manager 1.0, Direct Access (DA) 1.0, and Indexed Sequential (IS) 2.0	section 2.1.3
PL3	Source code for Record Manager 1.0, DA 1.0, and IS 2.0	section 2.1.3
KPL7	Binary code for Update	section 2.1.4
PL1C	Source code for Update	section 2.1.4

The following tape, which must be ordered separately from the KRONOS 2.1 package, is also available.

KPL3	Maintenance tools	section 2.1.5

Materials that are required supplements to the KRONOS 2.1 base package are:

PL7	FORTRAN Extended 4.0 compiler source code	section 2.9
PL8	FORTRAN Extended 4.0 library source code	section 2.9
KPL15A	FORTRAN Extended 4.0 compiler binary code	section 2.9
KPL15B	FORTRAN Extended 4.0 library binary code	section 2.9

2.1.1 OPERATING SYSTEM

Deadstart tape

The KRONOS 2.1 deadstart tape contains binaries of:

KRONOS 2.1 Operating System
COMPASS 3.0
Export/Import 1.0
Modify 1.0
Record Manager 1.0
    Direct Access 1.0
    Indexed Sequential 2.0
SCOPE 3.4 system text, COMDECKs, and programs
Text Editor
Time-Sharing Subsystem
Update

The deadstart tape has the following characteristics: unlabeled, 7- or 9-track, 800 bpi, binary recording mode, one file.

KPL1

The KRONOS 2.1 system OPL contains the source programs for:

KRONOS 2.1 Operating System
Export/Import 1.0
Modify 1.0
Text Editor
Time-Sharing Subsystem

It has the following characteristics: labeled, 7- or 9-track, Modify format, 800 bpi, binary recording mode, one file, KRONOS*2P1 as file id in HDR1 label.

KPL2

KPL2 contains source code in Modify format for the decks necessary to modify and install the products as well as decks to verify that they are correctly installed. There are two or three decks (jobs) on the tape for each product.

Use job 1 to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.

Use job 2 to collect the binaries from the various products' KPLs and generate directive files for later use as input to the procedure file GENSYS (described in part I, section 3.2.2).

Use job 3 to verify that the product is correctly installed.

KPL2 has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, one file, file id in HDR1 label is INSTALLDECKS*2P1.

KRONOS 2.1 Decks

Product	Job Name
KRONOS 2.1 system including Export/Import 1.0, Modify 1.0, Text Editor, and Time-Sharing Subsystem	KR1
7054/844-2 Disk Storage Subsystem Controlware	BCS2
Installation decks tape (KPL2)	INS1
COMPASS 3.0	CMP1 CMP2
Record Manager 1.0	SIXRM1 SIXRM2 SIXRM3
Direct Access 1.0	DA1 DA2 DA3
Indexed Sequential 2.0	IS1 IS2 IS3
Update	UPD1 UPD2
SCOPE 3.4 system text, COMDECKs, and programs	SCP1 SCP2
Maintenance tools	MTN1 MTN2
FORTRAN Extended 3.0 object library	F3L1 F3L2
COBOL 3.0 object library	C3L1 C3L2
Sort/Merge 3.0 object library	S3L1 S3L2

Optional Products Decks

ALGOL 3.0	ALG1 ALG2 ALG3
APL 1.0	APL1 APL2 APL3

Product	Job Name
BASIC 2.1	BAS1 BAS2 BAS3
COBOL 4.0	CBL1 CBL2 CBL3
Cyberlink Interchange 1.0	CYB1 CYB2 CYB3
FORTRAN 2.3	RUN1 RUN2 RUN3
FORTRAN Extended 4.0 compiler	FTNC1 FTNC2 FTNC3
FORTRAN Extended 4.0 library	F4LIB1 F4LIB2
PERT/Time 1.2	PRT1 PRT3
SIMSCRIPT I.5 3.0	SMS1 SMS2 SMS3
SIMULA 1.0	SIM1 SIM2 SIM3
Sort/Merge 4.0	SRM1 SRM2 SRM3
Time-Sharing FORTRAN 1.0	TSR1 TSR2 TSR3
KRONOS Transaction Subsystem	KTS1 KTS2

KPL4

This tape is a program library in Update format that contains the SCOPE 3.4 common decks that are necessary to generate the SCOPE 3.4 system text and additional programs that support the common product set. These decks are from the SCOPE 3.4 tapes named PL1A and PL1B.

KPL4 has the following characteristics: labeled, 7- or 9-track, Update format, 800 bpi, binary recording mode, SCOPE3P4TEXTS*2P1 as file id in HDR1 label, three files.

File 1 Source code in Update format for the following SCOPE PL1A decks: IPARAMS, PPSYS, CPSYS, SISICOM, ACTCOM, COMSRAS, COMACIO, COMAREG, COMAFET, CPCTEXT, IPTEXT, PPTEXT, SCPTEXT, and CPUTEXT.

File 2 Source code in Update format for the following SCOPE PL1B decks: LMACOM, PFCOM, CPCOM, LDRCOM, UCLOAD, IOCOM, CPC, COMCCIO, IORANDM, IO, CHEKPT, SYSEQ, COMCSYS, LDRTEXT, and PFMTEXT.

File 3 Absolute binary code for system text overlays and relocatable binary code for I/O routines.

The common decks included on KPL4 that comprise the SCOPE 3.4 system text are:

ACTCOM	CPU program system action request macros
COMAFET	File environment table generation macros
COMSRAS	System communication symbols
CPSYS	CPU I/O macros using CPC
IPARAMS	Installation parameters for common product set
LMACOM	CPU program loader request macros
PFCOM	Permanent file macros for SCOPE 3.4
PPSYS	SCOPE 3.4 PPU system definitions
SISICOM	Indexed Sequential 2.0 macros
COMACIO	SCOPE 3.4 CPU I/O macros
COMAREG	SCOPE 3.4 replacement for R= pseudo instruction

The 6RMCOM common deck and the IOTEXT deck are not on KPL4; they are on the Record Manager PL3 tape described in section 2.1.3. 6RMCOM contains the Record Manager user macros.

Table I-2-1 indicates which common decks are contained in the eight system text decks.

TABLE I-2-1. SCOPE 3.4 SYSTEM TEXT DECKS

COMDECK Name	Constituent Decks							
	CPCTEXT	IOTEXT	IPTEXT	LDRTEXT	PFMTEXT	PPTEXT	SCPTEXT	CPUTEXT
ACTCOM	X	X					X	X
COMAFET	X						X	X
COMSRAS	X	X				X	X	X
CPSYS	X						X	
IPARAMS			X					
LMACOM				X				
PFCOM					X			
PPSYS						X	X	
SISICOM	X							
6RMCOM		X						
COMACIO								X
COMAREG								X

2.1.2 COMPASS 3.0

KPL5 KPL5 contains binary code for COMPASS 3.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, COMPASS3P0*3P4 as file id in HDR1 label, two files.

File 1	Empty file
File 2	Absolute binary code

PL2 This tape contains the COMPASS 3.0 source code. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, COMPASS3P0*3P4 as file id in HDR1 label.

File 1 Source code in Update format

Other files do not apply to KRONOS 2.1.

2.1.3 RECORD MANAGER 1.0, INDEXED SEQUENTIAL (IS) 2.0, DIRECT ACCESS (DA) 1.0

KPL6 KPL6 contains the absolute and relocatable binary code for Record Manager 1.0, Indexed Sequential 2.0, and Direct Access 1.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, RM*3P4 as file id in HDR1 label, nine files.

File 1	Empty file
File 2	IOTEXT and TXT6RM binary code
File 3	I/O modules binary code
File 4	FILE control card program absolute binary code
File 5	FILE control card program relocatable binary code
File 6	Empty file
File 7	IS 2.0 relocatable binary code
File 8	Empty file
File 9	DA 1.0 relocatable binary code

PL3 This tape contains the source code for Record Manager 1.0, IS 2.0, and DA 1.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, RM*3P4 as file id in HDR1 label.

File 1	Source code in Update format for Record Manager 1.0
File 6	Source code in Update format for IS 2.0
File 8	Source code in Update format for DA 1.0

Other files on PL3 do not apply to KRONOS 2.1.

2.1.4 UPDATE

KPL7 KPL7 contains binary code for Update. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, UPDATE1P2 as file id in HDR1 label, two files.

File 1	Empty file
File 2	Absolute binary code

PL1C PL1C contains the Update source code. It has the following characteristics: labeled, 7- or 9-track, binary recording mode, 800 bpi, UPDATE1P2 as file id in HDR1 label.

File 1 Source code in Update format

Other files do not apply to KRONOS 2.1.

2.1.5 MAINTENANCE TOOLS

KPL3 KPL3 is the maintenance tools tape. It contains the KRONOS Time-Sharing Stimulator (STIMULA and 1TS), the dayfile sort program (DFSORT), the FORTRAN Translator (FTNTRAN), PSAMP (analyzes the P register), and the object libraries for COBOL 3.0, FORTRAN Extended 3.0, and Sort/Merge 3.0.

The purpose of the object libraries is to allow relocatable binary code created under KRONOS 2.0 to satisfy external symbols from the version 3.0 libraries. These libraries do not use Record Manager for input/output; they retain calls to CIO. These libraries are only included to allow the use of 2.0 binary decks during the 2.0 to 2.1 transition phase.

KPL3 has the following characteristics: unlabeled, 7- or 9-track, 800 bpi, binary recording mode, eight files.

File 1	Source code in Modify format for STIMULA, 1TS, DFSORT, FTNTRAN, and PSAMP
File 2	Absolute binary for STIMULA, 1TS, DFSORT, FTNTRAN, and PSAMP
File 3	FORTRAN Extended 3.0 object library in Update format
File 4	FORTRAN Extended 3.0 object library binary
File 5	COBOL 3.0 object library in Update format
File 6	COBOL 3.0 object library binary
File 7	Sort/Merge 3.0 object library in Update format
File 8	Sort/Merge 3.0 object library binary

2.2 ALGOL 3.0

KPL8 This tape contains the ALGOL 3.0 binaries. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, ALGOL3P0*3P4 as file id in HDR1 label, four files.

File 1	Empty file
File 2	Absolute binary code of compiler overlays
File 3	Relocatable binary code of library routines
File 4	Relocatable binary code of compiler overlays

PL18 This tape contains the source code for ALGOL 3.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, ALGOL3P0*3P4 as file id in HDR1 label.

File 1 Source code in Update format

Other files on PL18 do not apply to KRONOS.

2.3 APL 1.0

KPL9 This tape contains the source and binaries for APL 1.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, APL1P0*2P1 as file id in HDR1 label, five files.

File 1	Source code in Update format
File 2	Absolute binary code of overlay loader
File 3	Absolute binary code for terminal processing
File 4	Absolute binary code for batch processing
File 5	Relocatable binary code for terminal and batch processors

2.4 APT

To be released in a subsequent release of KRONOS 2.1.

2.5 BASIC 2.1

KPL11 This tape contains the source and binary code for BASIC 2.1. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, Update format, BASIC2P1*2P1 as file id in HDR1 label, four files.

File 1	Source code in Update format
File 2	Absolute binary code of compiler overlays and user library
File 3	Relocatable binary of library routines
File 4	Relocatable binary code of compiler overlays

2.6 COBOL 4.0

KPL12 This tape contains the binary code for COBOL 4.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, COBOL4P0*3P4 as file id in HDR1 label, five files.

File 1	Empty file
File 2	Absolute binary code of compiler overlays
File 3	Relocatable binary code of library routines
File 4	Relocatable binary code of compiler overlays
File 5	Relocatable binary code of COPYCL overlay

PL9 This tape contains the COBOL 4.0 source code. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, COBOL4P0*3P4 as file id in HDR1 label.

File 1 Source code in Update format

Other files on PL9 do not apply to KRONOS installations.

2.7 CYBERLINK INTERCHANGE 1.0

KPL13 This tape contains the source and binary code for Cyberlink 1.0. It has the following characteristics: labeled, 7- or 9-track, Modify format, 800 bpi, binary recording mode, Cyberlink1P0*2P1 as file id in HDR1 label, two files.

File 1	Source code in Modify format
File 2	Absolute binary code of Cyberlink subsystem routines

2.8 FORTRAN 2.3

KPL14 This tape contains the binary for FORTRAN 2.3. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, RUN2P3*3P4 as file id in HDR1 label, three files.

File 1	Empty file
File 2	Absolute binary code of compiler overlays
File 3	Relocatable binary code of library routines

PL21 This tape contains the source code for FORTRAN 2.3. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, RUN2P3*3P4 as file id in HDR1 label.

File 1	Source code in Update format

Other files on PL21 do not apply to KRONOS installation.

2.9 FORTRAN EXTENDED 4.0

KPL15A This tape contains the FORTRAN Extended 4.0 compiler binary code. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, FTN4P0COMP*3P4 as file id in HDR1 label, four files.

File 1	Empty file
File 2	Relocatable binary code of compiler overlays without DEBUG
File 3	Relocatable binary code of compiler overlays with DEBUG
File 4	Absolute binary code of compiler overlays

KPL15B This tape contains the FORTRAN Extended 4.0 library binary code. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, FTNLIBS*3P4 as file id in HDR1 label, two files.

File 1	Empty file
File 2	Relocatable binary code for library routines

PL7, PL8 These tapes contain the source code for FORTRAN Extended 4.0. They have the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, FTN4P0COMP*3P4 and FTNLIBS*3P4 as file ids in HDR1 labels.

File 1 of PL7	Compiler source code in Update format
File 1 of PL8	Object library source code in Update format

Other files on PL7 and PL8 do not apply to KRONOS installations.

2.10 PERT/TIME 1.2

KPL16 This tape contains the binary code for PERT/Time 1.2. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, PERT*3P4 as file id in HDR1 label, three files.

File 1	Empty file
File 2	Absolute binary code of compiler
File 3	Relocatable binary code of compiler

PL13 This tape contains the source code for PERT/Time 1.2. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, PERT*3P4 as file id in HDR1 label.

File 1 Source code in Update format

Other files on PL13 do not apply to KRONOS installations.

2.11 SIMSCRIPT I.5 3.0

KPL17 This tape contains the binary code for SIMSCRIPT 3.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, SIM153P0*3P4 as file id in HDR1 label, four files.

File 1	Empty file
File 2	Absolute binary code of compiler overlays and user library
File 3	Relocatable binary code of library routines
File 4	Relocatable binary code of compiler overlays

PL27 This tape contains the source code for SIMSCRIPT 3.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, SIM153P0*3P4 as file id in HDR1 label.

File 1 Source code in Update format

Other files on PL27 do not apply to KRONOS installations.

2.12 SIMULA 1.0

KPL18 This tape contains the binary code for SIMULA 1.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, SIMULA1P0*3P4 as file id in HDR1 label, four files.

File 1	Empty file
File 2	Absolute binary code of compiler overlays
File 3	Relocatable binary code of library routines
File 4	Relocatable binary code of compiler overlays

PL19 This tape contains the source code for SIMULA 1.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, SIMULA1P0*3P4 as file id in HDR1 label.

File 1 Source code in Update format

Other files on PL19 do not apply to KRONOS installations.

2.13 SORT/MERGE 4.0

KPL19 This tape contains the binary code for Sort/Merge 4.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, SORT4P0*3P4 as file id in HDR1 label, four files.

File 1	Empty file
File 2	Absolute binary code of compiler overlays
File 3	Relocatable binary code of library routines
File 4	Relocatable binary code of compiler overlays

PL10 This tape contains the source code for Sort/Merge 4.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, SORT4P0*3P4 as file id in HDR1 label.

File 1 Source code in Update format

Other files on PL10 do not apply to KRONOS installations.

2.14 TIME-SHARING FORTRAN 1.0

KPL20 This tape contains the source and binary code for Time-Sharing FORTRAN 1.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, binary recording mode, TSRUN1P0*2P1 as file id in HDR1 label, two files.

File 1	Source code in Modify format
File 2	Absolute binary code of compiler and library routines

2.15 TRANSACTION SUBSYSTEM 1.0

KPL21 This tape contains the source and binary code for the Transaction Subsystem 1.0. It has the following characteristics: labeled, 7- or 9-track, 800 bpi, Modify format, binary recording mode, TRANSACTSYS*2P1 as file id in HDR1 label, three files.

File 1	Source code in Modify format
File 2	Absolute binary code of KTS subsystem and user libraries
File 3	Relocatable binary code of library routines

INSTALLATION OF A CONFIGURED SYSTEM AND PRODUCT SET 3

3.1 GENERAL PROCEDURE

To obtain a running system that is configured according to the requirements of a particular installation site, use the following general procedure along with the references to specific sections for detailed procedures.

1. Deadstart using the released version of the deadstart tape.

   Tape description in part I, section 2.1
   Deadstart procedure in part II, section 1

2. Create VALIDUX (and PROFILO and NETWORK, if needed).

   Part IV, section 1

   To use the system without VALIDUX, turn off job account verification.

   Type DISABLE, VALIDATION.
   Press CR

3. Create a new deadstart tape to include customer requirements.

   a. Possible customer requirements for the operating system are: changing installation parameter settings; creating new or modified CMRDECK, IPRDECK, and LIBDECK; and updating the system to the current PSR level.

      Modification information in part III, section 1
      Procedure in part I, section 3.2

   b. Possible customer requirements for the product set are: adding the optional products to the deadstart tape; changing installation parameter settings; and updating products to the current PSR level.

      Modification information for each product in part III, sections 2 through 15
      Procedure in part I, section 3.2

4. Deadstart using the configured version of the deadstart tape.

   Part II, section 1

5. If only a batch environment is required, it is recommended that automatic job rollout be disabled.

   Type DISABLE, AUTOROLL.
   Press CR

3.2 PROCEDURE TO CREATE A NEW DEADSTART TAPE

It is necessary to create a new deadstart tape to include customer requirements, such as adding optional products or modifying installation parameters. A new tape must also be created whenever PSR updates are necessary to any products on the deadstart tape.

3.2.1 REQUIRED MATERIALS

To install the product set (composed of one or more products) or to modify and/or update the operating system and product set, use the installation job decks on KPL2 for each product and the three procedure files GENINSD, GENFILS, and GENSYS.

INSTALLATION JOB DECKS

There are either two or three installation jobs for each product on the KPL2 tape described in part I, section 2.1.1.

Job 1 — Use this job to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPLxx) containing updated source and binary code.

Job 2 — Use this job to collect the binaries from the various products' KPLs and generate directive files for later use as input to the procedure file GENSYS.

Job 3 — Use this job to verify that the product is correctly installed.

PROCEDURE FILES

The procedure files GENINSD, GENFILS, and GENSYS are written in KCL, the KRONOS job control language, and are on the KRONOS 2.1 deadstart tape.

GENINSD — This program lists and punches the installation decks for all products to be installed.

GENFILS — This program creates four system common files to be used by job 2 installation decks and also the GENSYS procedure file program. The four common files created by executing GENFILS are:

File Name	Description
ZZZZCCF	Contains control card records that are generated by the job 2 installation decks. This file is input to the GENSYS procedure file.
ZZZZLDF	Contains LIBEDIT directives generated by the job 2 installation decks.

File Name	Description
ZZZZSDF	Contains SYSEDIT directives generated by the job 2 installation decks.
ZZZPSBF	Contains the product set binaries collected by the job 2 installation decks.

GENSYS — This program adds the products' binaries from ZZZPSBF into the running system (SYSEDIT process) and/or creates a new deadstart tape containing these products. GENSYS performs these functions by reading SYSEDIT and/or LIBEDIT directives from the common files ZZZZSDF and ZZZZLDF, reading control card records from ZZZZCCF, and accessing the product set binaries from common file ZZZPSBF.

3.2.2 PROCEDURE

1. Call the GENINSD procedure file program to list and punch the installation decks for all products to be installed. A GENINSD control card call has the following format.

   GENINSD(JD=xxxx)

   xxxx is the name of the job deck to be punched.

   Use a job similar to the following to punch the required KPL2 decks. It must create a common file with the name MTPL that contains the contents of KPL2, and it must include a GENINSD control card call for each deck to be punched.

```
JOB card
ACCOUNT(usernumber, password)
LABEL(KPL2, R, FI=INSTALLDECKS*2P1, MT, D=HY, F=I)
COPY(KPL2, MTPL)IN
RETURN(KPL2)
LOCK(MTPL)
COMMON(MTPL)
RETURN(MTPL)
GENINSD(JD=xxxx)
      :
GENINSD(JD=xxxx)
6/7/8/9
```

2. Execute the GENFILS procedure file program. To execute GENFILS from a batch job, run a job similar to the following:

```
JOB card
ACCOUNT(usernumber, password)
GENFILS.
6/7/8/9
```

3. If it is necessary to modify the current values of any installation parameters or to add PSR updates, use the following procedure; otherwise continue with step 4.

The standard installation parameters and also installation job listings are in part III, sections 1 through 15.

For each product that requires modification and/or update:

a. Use Modify or Update directives (depending upon the format of the product's source code) to insert any installation parameter changes or PSR updates in the product's job 1.

b. Run job 1 to create a new KPLxx tape that contains the modified and/or updated source and binary code. (If a PLxx tape was input to a job 1, it is no longer useful.)

4. Run the job 2 installation decks for all of the products in the product set that are to be added to the deadstart tape. These jobs collect the binaries from the products' KPLs on ZZZPSBF and generate directives on files ZZZZSDF, ZZZZLDF, and ZZZZCCF for later use as input to procedure file GENSYS.

   Run the jobs according to the following order. Steps a, b, c, and d may be omitted when starting from the released deadstart tape if no changes (installation parameters or PSR updates) are necessary.

   a. SCOPE 3.4 system text and programs

   b. Update

   c. COMPASS 3.0

   d. Record Manager 1.0

   e. FORTRAN Extended 4.0 compiler

   f. FORTRAN Extended 4.0 object library

   g. Sort/Merge 4.0

   h. Indexed Sequential 2.0

   i. Direct Access 1.0

   j. FORTRAN 2.3

   k. Other products in any order

5. Execute GENSYS to add the products' binaries from ZZZPSBF (generated in step 4) into the running system (SYSEDIT process) and/or to create a new deadstart tape containing these products.

   The system must be relatively inactive in order to run GENSYS; in particular, do not run the Time-Sharing Subsystem during this process.

   To execute GENSYS, type the following DSD command at the system console.

   X. GENSYS(SM=a, DS=b)

a Specifies whether or not to add product set binaries to running system (SYSEDIT)

a=0 Do not add binaries to running system
a=1 Add binaries to running system

b Specifies whether new deadstart tape is to be created

b=0 Do not create deadstart tape
b=1 Create new deadstart tape

Both a and b must be specified in the command; otherwise, the job aborts.

When DS is set to 1, the common files are released at the end of the GENSYS run; they are not released if DS is set to 0.

6. If the SYSEDIT option was selected in step 5 (SM=1), run the verification jobs if desired.

7. If a new deadstart tape was created in step 5 (DS=1), deadstart using the new tape according to the procedures in part II, section 1.

Run verification jobs, if desired.

3.3 INSTALLATION DEPENDENCIES

Table I-3-1 indicates the relationship between the various products.

I Item is necessary to modify and/or update a product.
B Item is necessary to modify and/or update as well as execute a product.
O Item is optional to execute a product.

TABLE I-3-1. INSTALLATION DEPENDENCIES

Product To Be Modified, Updated Or Executed	Items Required in Running System								
	CMP 3.0	RM 1.0	3.4 TXT	UTD	RUN 2.3	FTN 4.0 COMP	FTN 4.0 LIB	SIMSC 3.0	S/M 4.0
KRONOS 2.1, E/I 1.0, Modify, Text Editor Time-Sharing Subsystem	I								
COMPASS 3.0	I			I					
Record Manager 1.0	I		I	I					
Indexed Sequential 2.0	I	B	I	I		I	O(1)		
Direct Access 1.0	I	B	I	I					I
SCOPE 3.4 Texts	I			I					
Update	I			I					
Maintenance Tools	I				I				
FORTRAN Extended 3.0 object library (4)									
ALGOL 3.0	I		I	I					
APL 1.0	I			I					
BASIC 2.1	I			I					
COBOL 4.0	I	B	I	I			O(2)		O(3)
Cyberlink Interchange 4.0	I								
FORTRAN 2.3	I		I	I					
FORTRAN Extended 4.0 Compiler	I			I		I			
FORTRAN Extended 4.0 Library	I	B	I	I		I			
PERT/Time 1.2				I	I				
SIMSCRIPT 3.0	I	B	I	I				I	
SIMULA 1.0	I		I	I					
Sort/Merge 4.0	I	B	I	I					
Time-Sharing FORTRAN 1.0	I								
Transaction Subsystem 1.0	I								

①IS requires FORTRAN Extended 4.0 library to be in the running system to run the two IS utilities SYSTAT and ESTMAT.

②COBOL requires the FORTRAN Extended 4.0 arithmetic library routines to be in the running system to use the exponentiation feature.

③COBOL requires Sort/Merge 4.0 to be in the running system to use the SORT verb.

④Maintenance of the FORTRAN Extended 3.0 object library requires that job F3L1 be run on a KRONOS 2.0 system with FORTRAN Extended 3.0 installed.

3.4 OBJECT LIBRARIES

The operating system and product installation decks on KPL2 create certain object libraries. The following list defines the contents of the object libraries created if all the products supported by KRONOS 2.1 are installed. The library names that are referenced are reserved for Control Data Corporation.

Library	Section
BASLIB	part I, section 3.4.1
BDMLIB	part I, section 3.4.2
COBOL	part I, section 3.4.3
FORTRAN	part I, section 3.4.4
RUN2P3	part I, section 3.4.5
SIMLIB	part I, section 3.4.6
SYSIO	part I, section 3.4.7
SYSMISC	part I, section 3.4.8

3.4.1 BASLIB

CATALOG OF BASLIB

REC	NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
1	BASLIB	ULIB	363	1502	73/06/12.	
2	BASOGEN	REL	2225	7462	73/06/04.	
	BASOPRT					
	BASOCON					
	BASOCHK					
	BASOCLS					
	BASOMOV					
	BASOTAB					
	BASOSRT					
	BASOWRT					
	RCLF					
	BASOMGN					
	BATOMGN					
	CHKMRGN					
	LNLWDCH					
	TABFLG					
	STRFMT					
	VALU					
	STARSW					
	VBLSTR					
	STOP					
	OBUFLCL					
	SETDGTS					
	WNB=					
	CIO=					
	MSG=					
	SYS=					
	BASOFMX					
	BATOFMX					
	BASOSRU					
	BATOSRU					
	BASOPRU					
	BATOPRU					
	BASOFLI					
	BATOFLI					
	BASOUSU					
	BATOUSU					
	BASOFML					
	BATOFML					
3	BASEGEN	REL	602	1301	73/06/04.	
	BASESRT					
	BASEGEN					
	BASEDAT					
	BASEDIM					
	BASESUB					
	BASEXIT					
	BASEONS					
	BASERET					
	BASEZER					
	BASRCHK					
	FINDLBL					
	GETNXTL					
	ILLBL					
	BASEJMP					
	BATEJMP					
	CODSTRT					

REC	CATALOG OF BASLIB NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	CODEND					
	BASERRS					
	BATERRS					
	BASERSS					
	BATERSS					
	VALESL					
	VALESM					
	VALNXL					
	SUBINCR					
4	BASIGEN	REL	237	7637	73/06/04.	
	BASICHK					
	BASISRT					
	BATISRT					
	BASIEND					
	BATIEND					
	BASIREW					
	BATIREW					
	BATOSRT					
	BATOWRT					
	BATOPRT					
	BATOCON					
	BATEGEN					
	BATESRT					
	BATEDAT					
	BATEDIM					
	BATEONS					
	BATESUB					
	BATERET					
	BATEZER					
	BATRCHK					
5	BASIINP	REL	1433	1363	73/06/04.	
	BASIINP					
	BATIINP					
	BASIRED					
	BATIRED					
	BASIDEL					
	BATIDEL					
	BASINOD					
	BATINOD					
	BASOSET					
	BATOSET					
	BASICON					
	BASIUNP					
	BASISCN					
	DLMTNO					
	DLMTSW					
	DLTKND					
	STRINP					
	BSTRBUF					
	FFCLASS					
	BASOFET					
	BATOFET					
	BASONFT					
	BATONFT					
	BASOFFT					
	BATOFFT					

REC	CATALOG OF BASLIB NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
6	BASATRI	REL	207	4603	73/06/04.	
	BASASIN					
	BATASIN					
	BASACOS					
	BATACOS					
	BASATAN					
	BATATAN					
7	BASAATN	REL	120	6335	73/06/04.	
	BASAATN					
	BATAATN					
8	BASALEP	REL	362	4423	73/06/04.	
	BASALOG					
	BATALOG					
	BASALGT					
	BATALGT					
	BASAEXP					
	BATAEXP					
	BASAPWR					
	BATAPWR					
9	BASARST	REL	472	4575	73/06/04.	
	BASASQR					
	BATASQR					
	BASAABS					
	BATAABS					
	BASAINT					
	BATAINT					
	BASAROF					
	BATAROF					
	BASASGN					
	BATASGN					
	BASARND					
	BATARND					
	BASACLK					
	BATACLK					
	BASATIM					
	BATATIM					
	BASATAB					
	BATATAB					
	BASEESL					
	BATEESL					
	BASEESM					
	BATEESM					
	BASENXL					
	BATENXL					
	BASDATE					
	BATDATE					
	BASCLCK					
	BATCLCK					
10	BASMOPR	REL	2165	4650	73/06/04.	
	BASMADD					
	BATMADD					
	BASMSUB					
	BATMSUB					
	BASMSCM					
	BATMSCM					
	BASMMLT					

CATALOG OF BASLIB FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
	BATMMLT					
	BASMTRN					
	BATMTRN					
	BASMZER					
	BATMZER					
	BASMCON					
	BATMCON					
	BASMIDN					
	BATMIDN					
	BASMRED					
	BATMRED					
	BASMPRT					
	BATMPRT					
	BASMINV					
	BATMINV					
	BASMRFL					
	BATMRFL					
	BASMINP					
	BATMINP					
	BASMWRT					
	BATMWRT					
	BASACSV					
	BATACSV					
	BASACVS					
	BATACVS					
	BASXDIS					
	BATXDIS					
	BASXLEN					
	BATXLEN					
	BASXVAL					
	BATXVAL					
	BASXSTR					
	BATXSTR					
	BASXSAV					
	BATXSAV					
	BASXSBF					
	BATXSBF					
	BASXSBS					
	BATXSBS					
	BASXSBT					
	BATXSBT					
	BASACMP					
	BATACMP					
	BASASTR					
	BATASTR					
	BASIINS					
	BATIINS					
11	BASLIB	OPLD	25	3156	73/06/12.	
12	* EOF *	SUM =	11121			

3.4.2 BDMLIB

```
      CATALOG OF BDMLIB          FILE     1                    73/06/12. 02.42.07.      PAGE      1
PEC   NAME        TYPE          LENGTH     CKSUM     DATE      COMMENTS

  1   BDMLIB      ULIB             101      5257   73/06/12.
  2   BDMI        REL             7761      1771   73/05/20. 72/08/05. 72/12/18. KTS BATCH DATA MANAGER INTERFACE.
        SYS=
        RCL=
        WNB=
        MSG=
  3   CALLTSK     REL               31      6055   73/05/20. 72/07/09.           REQUEST SCHEDULING OF TASK(S).
        CALLTSK
  4   CEASE       REL               20      3267   73/05/20. 72/07/09.           TERMINATE TASK EXECUTION.
        CEASE
  5   CMDUMP      REL               57      1524   73/05/20. 72/07/24. 72/10/05. DUMP CENTRAL MEMORY.
        CMDUMP
  6   DMGR        REL              267      6377   73/05/20. 72/07/09.           DATA MANAGER REQUESTS.
        ADDR
        BLKGET
        BLKPUT
        GETT
        GETL
        GETN
        GETNL
        GETB

        GETR
        GETRB
        GETRBL
        GETRL
        GETNR
        GETNRL
        LOCKF
        PURGER
        PUT
        PUTF
        PUTI
        PUTIF
        PUTR
        PUTRF
        PUTRI
        PUTRIF
        RECALAL
        RELES
        RELESAL
        RECHAIN
        REPOS
        UNLOK
        UNLOKAL
        UNLOKF
  7   DSDUMP      REL               40      2017   73/05/20. 72/07/24. 72/10/05. DIRECT SUBSEQUENT DUMPS.
        DSDUMP
  8   JOURNL      REL               31      7047   73/05/20. 72/07/09.           ISSUE JOURNAL MESSAGE.
        JOURNL
  9   SEND        REL               70      0467   73/05/20. 72/07/09.           SEND MESSAGE TO TERMINAL.
        SEND
 10   TARO        REL               36      5667   73/05/20. 72/08/31.           TERMINAL ARGUMENT OPERATIONS.
        TARO
 11   TSIM        REL               40      2541   73/05/20. 72/08/31.           TERMINAL STATUS AND INFORMATION.
        TSIM
 12   BDMLIB      OPLD              27      5571    73/06/12.

 13   * EOF *       SUM =        11007
```

3.4.3 COBOL

REC	CATALOG OF COBOL NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
1	COBOL	ULIB	2063	1267	73/06/12.	
2	DDSUBMV	REL	156	4747	73/06/06.	
	D.SUBMV					
3	DDCKETL	REL	32	3332	73/06/06.	
	D.CKETL					
4	DDCKLA	REL	345	4571	73/06/06.	
	D.CKLA					
	D.MVNSL					
5	DDWALAB	REL	233	4506	73/06/06.	
	D.WALAB					
6	DDOPWA	REL	477	0212	73/06/06.	
	D.CKFLM					
	D.CLOWA					
	D.CLVWA					
	D.CWARL					
	D.GTPT					
	D.OPIWA					
	D.OPMWA					
	D.OPOWA					
	D.OPXWA					
7	DDSQWA	REL	137	5026	73/06/06.	
	D.GTNWA					
	D.PTNWA					
8	DDRAWA	REL	212	4401	73/06/06.	
	D.GETWA					
	D.PUTWA					
	D.REMWA					
	D.SEKWA					
	D.MODWA					
9	CCFINIS	REL	116	7510	73/06/06.	
	D.MSOPN					
10	CCCOBIO	REL	1154	7753	73/06/06.	
	D.NOCFL					
	D.EXALL					
	D.GETRT					
	D.SVRTN					
	D.OPIN					
	D.OPOT					
	D.OPIO					
	D.CLOS					
	D.CLVSQ					
	D.DX					
	D.EX					
	D.OPX					
	D.ERWRT					
	D.STKPT					
	D.NEWP					
	D.SRTFL					
	D.SRT65					
	D.RAAE					
	D.ATEN					
	D.CBFS					
	D.FINIS					
11	DDLABLS	REL	376	1336	73/06/06.	
	D.LABMV					
	D.FTLAB					

REC	CATALOG OF COBOL NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	D.UNFRM					
	D.LBFET					
	D.HDR1					
	D.EOV1					
	D.EOF1					
	D.FRMLB					
	D.BLKLB					
12	DDSQLAB	REL	572	6054	73/06/06.	
	D.SQLAB					
	D.LX					
	D.TEMPL					
13	DDMLLIT	REL	34	0017	73/06/06.	
	D.MLLIT					
14	DDCMLIT	REL	117	0645	73/06/06.	
	D.CMLIT					
	D.COLIT					
15	DDSBLIT	REL	22	5563	73/06/06.	
16	DDZPAR	REL	65	5362	73/06/06.	
	D.ZPAR					
17	DDSQIO	REL	255	5015	73/06/06.	
	D.CLOSQ					
	D.GETSQ					
	D.GTNSQ					
	D.OPISQ					
	D.OPMSQ					
	D.OPOSQ					
	D.OPXSQ					
	D.PTNSQ					
	D.PUTSQ					
18	DDSTIO	REL	351	7606	73/06/06.	
	D.CLOSD					
	D.GETSD					
	D.OPISD					
	D.OPMSD					
	D.OPOSD					
	D.PUTSD					
	D.SEKSD					
19	DDDAIO	REL	266	1333	73/06/06.	
	D.CLODA					
	D.GETDA					
	D.GTNDA					
	D.MODDA					
	D.OPIDA					
	D.OPMDA					
	D.OPODA					
	D.PTNDA					
	D.PUTDA					
	D.REMDA					
	D.SEKDA					
	D.SKPDA					
20	DDISIO	REL	217	0664	73/06/06.	
	D.CLOIS					
	D.GETIS					
	D.GTNIS					
	D.MODIS					

REC	CATALOG OF NAME	COBOL TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	D.OPIIS					
	D.OPMIS					
	D.OPOIS					
	D.PTNIS					
	D.PUTIS					
	D.REMIS					
	D.SEKIS					
	D.SKPIS					
21	DDAKIO	REL	224	2655	73/06/06.	
	D.CLOAK					
	D.GETAK					
	D.GTNAK					
	D.MODAK					
	D.OPIAK					
	D.OPMAK					
	D.OPOAK					
	D.PUTAK					
	D.REMAK					
	D.SEKAK					
	D.SKPAK					
22	DDUPCNT	REL	54	2026	73/06/06.	
	D.UPCNT					
	D.RERUN					
23	DDADVAN	REL	223	1176	73/06/06.	
	D.WBA					
	D.WAA					
24	DOUSE	REL	271	5203	73/06/06.	
	D.USE					
	D.CLUSE					
	D.USEX					
	D.BBF					
	D.ABF					
	D.BEF					
	D.AEF					
	D.BBRF					
	D.ABRF					
	D.BERF					
	D.AERF					
	D.ABR					
	D.BER					
	D.AEBBR					
	D.AER					
	D.BBR					
	D.KEYC					
	D.ERRAB					
25	DDEXP	REL	52	7543	73/06/06.	
	D.EXP					
26	DDANCM	REL	40	7522	73/06/06.	
	D.NUMCM					
27	IFNUMA	REL	52	4140	73/06/06.	
	D.NUMCA					
28	DDIFALP	REL	26	7165	73/06/06.	
	D.ALPCM					
29	DDALPC1	REL	22	6072	73/06/06.	
	D.ALPC1					

REC	CATALOG OF COBOL NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
30	DDSUBSC	REL	23	5117	73/06/06.	
	D.SBSC1					
31	DDSBSC2	REL	31	6426	73/06/06.	
	D.SBSC2					
32	DDSBSER	REL	25	7677	73/06/06.	
	D.SBSER					
	D.SBSCE					
33	DDSBSC6	REL	35	0563	73/06/06.	
	D.SBSC6					
34	DDSBSC7	REL	41	4510	73/06/06.	
	D.SBSC7					
35	DDSOL	REL	154	4320	73/06/06.	
	D.SOL					
	D.SOLP					
	D.SOLE					
	D.OVRLY					
	D.SOLP1					
	D.SOLA					
36	DDSORT	REL	1141	0755	73/06/06.	
	D.SORT					
	D.SORT1					
	D.SORT3					
	D.SORT4					
	D.SRTFN					
	D.SRTL1					
	D.SRTL2					
37	DDDSPLY	REL	462	5214	73/06/06.	
	D.DSPLY					
	D.WRDSP					
38	DDXCEPT	REL	271	6602	73/06/06.	
	D.XCEPT					
39	DDXCPT	REL	213	4635	73/06/06.	
	D.XCPT					
40	DDADSUB	REL	23	6274	73/06/06.	
	D.ADSUB					
41	DDDADD	REL	37	6132	73/06/06.	
	D.DADD					
42	DDFIVED	REL	111	3057	73/06/06.	
	D.TEMPI					
	D.FIVED					
	D.TEMPN					
	D.TEMPC					
	D.TEMP					
43	CONSTAN	REL	176	3207	73/06/06.	
	D.TEMP7					
	D.ZERO					
	D.SIXES					
	D.BLANK					
	D.TEMPS					
	D.SRCH1					
	D.CCPAR					
	D.MXOFF					
	D.FL					
	D.TNTH					
	D.STOR					
	D.STOR1					

REC	CATALOG NAME	OF COBOL TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	D.MASK					
	D.DATE					
	D.HOV					
	D.STOP					
	D.PAUSE					
44	DDTRUBL	REL	175	2200	73/06/06.	
	D.TRUBL					
	D.ETD					
	D.DFMSG					
	D.UNDFP					
	D.TRBL2					
	D.TRBL1					
45	DDZONE	REL	73	5753	73/06/06.	
	D.ZONE0					
	D.ZONE1					
	D.ZONE2					
	D.ZONE4					
46	DDZN3A	REL	21	4660	73/06/06.	
	D.ZN3A					
47	DDZN5A	REL	21	7445	73/06/06.	
	D.ZN5A					
48	DDZN6A	REL	21	3721	73/06/06.	
	D.ZN6A					
49	DDZNTAB	REL	21	7701	73/06/06.	
	D.ZN					
50	STRPN	REL	16	1454	73/06/06.	
	D.STRPN					
51	DDSTPTB	REL	117	1160	73/06/06.	
	D.STRP					
52	DDZN7A	REL	21	0273	73/06/06.	
	D.ZN7A					
53	DDSTP1A	REL	41	1636	73/06/06.	
	D.STP1A					
54	DDSTP2A	REL	44	1625	73/06/06.	
	D.STP2A					
55	DDSTRP3	REL	75	3721	73/06/06.	
	D.STRP3					
	D.STRP4					
56	DDDATCN	REL	102	5612	73/06/06.	
	D.DATCN					
57	DDTENDP	REL	124	6273	73/06/06.	
	D.TENDP					
	D.SLASH					
	D.SLSH1					
	D.QUOT1					
	D.QUOT2					
	D.DIVS1					
	D.DIVS2					
	D.DIVD2					
	D.DIVD1					
58	DDTENS	REL	36	0705	73/06/06.	
	D.TENS					
59	DDTNTHS	REL	63	7564	73/06/06.	
	D.TNTHS					
	D.FIVES					

REC	CATALOG OF COBOL NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
60	DDCVBD	REL	200	2372	73/06/06.	
	D.CVBD3					
	D.CVBD5					
	D.CVBD6					
	D.CVBD7					
	D.CVBD1					
	D.CVBD2					
61	DBN1SA	REL	31	7206	73/06/06.	
	D.BN1SA					
62	DDBN	REL	32	5113	73/06/06.	
	D.BN1SS					
63	DBN6SA	REL	33	0017	73/06/06.	
	D.BN6SA					
64	DBN6SS	REL	35	3777	73/06/06.	
	D.BN6SS					
65	BN1DSA	REL	34	0320	73/06/06.	
	D.B1DSA					
66	DBN1DS	REL	51	2617	73/06/06.	
	D.BN1DS					
67	BN6DSA	REL	35	0336	73/06/06.	
	D.B6DSA					
68	DBN6DS	REL	51	1557	73/06/06.	
	D.BN6DS					
69	DB1DDA	REL	60	7551	73/06/06.	
	D.B1DDA					
70	DBN1DD	REL	53	4724	73/06/06.	
	D.BN1DD					
71	DB6DDA	REL	60	2740	73/06/06.	
	D.B6DDA					
72	DBN6DD	REL	53	2303	73/06/06.	
	D.BN6DD					
73	DBN1SB	REL	23	2073	73/06/06.	
	D.BN1SB					
74	BN1SBA	REL	27	5116	73/06/06.	
	D.B1SBA					
75	DDED	REL	535	5251	73/06/06.	
	D.ED3					
	D.ED5					
	D.ED1					
	D.ED2					
	D.EDI					
	D.AO					
76	AOPTN	REL	62	2703	73/06/06.	
	D.AO6					
	D.AO7					
77	DDEDAL	REL	202	7461	73/06/06.	
	D.EDAL					
78	DDEOP	REL	225	5116	73/06/06.	
	D.EOP1					
	D.EOP2					
	D.EOP3					
	D.EOP4					
	D.EOP5					
	D.SAVA					
79	DDEXAMO	REL	360	2574	73/06/06.	
	D.EXAMO					

REC	CATALOG OF COBOL NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
80	DDMOVE D.MOVE	REL	156	4053	73/06/06.	
81	DDLITCU D.LITCU	REL	56	2347	73/06/06.	
82	DDLITCC D.LITCC	REL	61	0310	73/06/06.	
83	DDBCDCC D.BCDCC	REL	116	7036	73/06/06.	
84	DDCOLSQ D.SHFT D.COLSQ D.CONV	REL	143	2762	73/06/06.	
85	DDBCDCU D.BCDCU	REL	106	5175	73/06/06.	
86	DDBCDCM D.BCDCM D.BCDCP	REL	147	6711	73/06/06.	
87	DDSCM D.CMSML D.BCDAC	REL	137	6112	73/06/06.	
88	CONV1 D.CONV1	REL	117	5406	73/06/06.	
89	DDPAGE D.PAGE	REL	142	0326	73/06/06.	
90	DDLNCT D.LNCT	REL	105	5040	73/06/06.	
91	DDSPACE D.SPACE	REL	134	4444	73/06/06.	
92	DDINITL D.CFRST D.INIT D.NIT D.INITL SVMNR	REL	136	5424	73/06/06.	
93	DDPRINT D.PRINT D.REPC D.REPQ D.REPA D.RHPH	REL	276	2355	73/06/06.	
94	DDRGEN D.RSET D.RGEN D.CHG00 D.CHG01 D.CHG02 D.TABL2 D.CHG03 D.CHG04 D.CHG05 D.CHG06 D.CHG07 D.CHG08 D.CHG09 D.RPGRP D.RPTAB	REL	372	0615	73/06/06.	

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
	D.ADDFL					
	D.ADDSM					
	D.LEVL					
	D.TERM					
	D.LEVEL					
	D.ERROR					
	D.FETR					
	D.JSTIN					
	D.RESC					
	D.RJ					
95	DDBEGRP	REL	23	3741	73/06/06.	
	D.BEGRP					
96	DDENDRP	REL	23	4004	73/06/06.	
	D.ENDRP					
97	DSMCON	REL	42	3351	73/05/10.	
	SMCON7					
98	TSMCON	REL	55	0306	73/05/10.	
	SMCONP					
	SMCONB					
99	MSMCON	REL	36	0336	73/05/10.	
	SMCONM					
100	SORTL	REL	222	5512	73/05/10.	SORT MACRO ROUTINE LOADER
	SORTL					
101	MACPRO	REL	776	1070	73/05/10.	
	MACPRO					
	S.PTLBF					
	S.OWNCD					
	S.PARAM					
	S.SCF					
102	SOCHKR	REL	36	4005	73/05/10.	
	SOCHKR					
	CKPEOR					
103	ENDPRO	REL	4024	4373	73/05/10.	
	XLTBUFF					
	ENDPRO					
	S.ERTBL					
	DPARAM					
	MACFWA					
104	EXTRACT	REL	462	1747	73/05/10.	
	EXTRACT					
	ASSIGN					
	PMFILL					
	CTFILL					
	XDECBI					
	XBIDEC					
	LVLBLZ					
	ERMSG					
	ERMSGS					
	S.PRP2					
105	KYCPL	REL	232	4443	73/05/10.	
	S.EXTR2					
	KYCPL					
106	KEYCOD	REL	1545	7631	73/05/10.	
	KEYCOD					
	KED1					
	KED2					

REC	CATALOG OF COBOL NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	KED4					
107	BUFALL	REL	500	0671	73/05/10.	
	S.BUFAL					
108	TRNSRT	REL	1327	0151	73/05/10.	
	TRNINT					
	S.TRNI					
	TRNMRG					
	TRM.I01					
	TRM.I02					
	TRM.I03					
	TRS.I01					
	TRM.EX					
	VECFIL					
	TRNSRT					
	TRNFLSH					
	EX6NLAB					
	MDGP.3					
	EXIT3					
	EX3					
	EXAMX0					
	MVWDS					
109	TSC	REL	527	7166	73/05/10.	
	TSC					
	SM.TSC					
	TSC.D0					
	IMTFC					
110	TMC	REL	577	5425	73/05/10.	
	TMC					
111	NEXRCM	REL	116	3205	73/05/10.	
	NEXRCM					
	MDGP.2					
	NX.EOS					
	OUTRCM					
	MDGP.1					
	SSRCM					
	MDGP.S					
	SS.EX3					
	SS.X3					
112	FMC	REL	1115	5645	73/05/10.	
	FMC					
	SM.FMC					
113	FMIP	REL	231	1144	73/05/10.	
	FMIP					
	FMI.EOF					
	FMI.KX					
	EXIT22					
	EX22					
	FMIEX22					
114	FMOP	REL	125	5017	73/05/10.	
	FMOP					
	FMO.SEQ					
	FMO.EX3					
	FMO.E3					
115	FSRTGET	REL	105	6021	73/05/10.	
	FSRTGET					

CATALOG OF COBOL 1

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
116	MRGCON	REL	477	2226	73/05/10.	
	MRGCON					
	ISIO					
	ISION					
	SM.MRGC					
	S.MSVB7					
117	DOC	REL	253	2272	73/05/10.	
	DOC					
118	MRGDSN	REL	144	4622	73/05/10.	
	MRGDSN					
	FMRGDSN					
119	SRTCON	REL	277	4777	73/05/10.	
	SRTCON					
	SC.1ST					
	S.1ST					
	FBR.1					
120	SRTPUT	REL	70	2257	73/05/10.	
	SRT.PUT					
121	SRTGET	REL	110	6356	73/05/10.	
	SRT.GET					
122	COBOL	OPLD	363	7732	73/06/12.	
123	* EOF *	SUM =	44367			

3.4.4 FORTRAN

REC	CATALOG NAME	OF FORTRAN TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
1	BACKSP= BACKSP.	REL	74	6255	73/06/06.	BACKSPACE LOGICAL RECORD.
2	BUFIN= BUFIN.	REL	130	3013	73/06/06.	BUFFER IN PROCESSOR.
3	BUFIO= BUFIO.	REL	133	1200	73/06/06.	COMMON SETUP ROUTINE FOR BUFIN=/BUFOUT=
4	BUFOUT= BUFOUT.	REL	62	7766	73/06/06.	BUFFER OUT PROCESSOR
5	BUSY BUSY	REL	23	4215	73/06/06.	STATUS OF BUFFER I/O OPERATION
6	CLOSMS CLOSMS	REL	36	0520	73/06/06.	CLOSE RANDOM FILE LINKAGE ROUTINE.
7	CONDIS CONNEC DISCON	REL	63	7563	73/06/06.	CONNECT/DISCONNECT A TERMINAL FILE.
8	DECODE= DECODI. DECODR.	REL	141	1430	73/06/06.	FORMATTED READ FROM CORE.
9	ENCODE= ENCODI. ENCODR.	REL	156	1455	73/06/06.	FORMATTED WRITE INTO CORE.
10	ENDFIL= ENDFIL.	REL	103	7652	73/06/06.	WRITE END OF LOGICAL FILE MARK.
11	EOF EOF	REL	25	5234	73/06/06.	TEST FOR END OF FILE STATUS.
12	FLTIN= FEIEXP. FEIFSC.	REL	226	2474	73/06/06.	
13	FLTOUT= FEOFAL. FEOEXP. FEORND. FEOSCA. FEOZRO.	REL	434	1620	73/06/06.	COMMON FLOATING OUTPUT CODE
14	FORSYS= CLSLNK. DAT. END. STOP. SYSEND. SYP=1 SYP=2 SYP=3 AUTOFL. FLSCM. FLLCM. Q8NTRY. MEMIT. EXIT ABNORM. SYSARG= PACK. BURST. IOERR. SYSERR. SYS2=	REL	1107	1736	73/06/06.	FORTRAN OBJECT LIBRARY UTILITIES.

CATALOG OF FORTRAN FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
	SYS1= CDD. COD. LINLIM. LOT. MSGAD. DBGFIT.					
15	FTNBIN FTNBIN	REL	11	4341	73/06/06.	DUMMY ROUTINE FOR BINARY BLOCKING CALL.
16	GETFIT= GETFIT. NAME.	REL	55	7437	73/06/06.	LOCATE AN FIT GIVEN A FILE NAME.
17	INCOM= FEIFSG. FEIFST. FEIGNC. FEINUM. FEISBL. FEIFST= FEIBLK= FEIBLK.	REL	232	4244	73/06/06.	COMMON INPUT FORMATTING CODE
18	INPB= INPBI. INPBR.	REL	356	7352	73/06/06.	
19	INPC= INPCI. INPCR.	REL	320	7742	73/06/06.	FORMATTED READ FORTRAN RECORD.
20	INPF= FEIERR. INPFI. INPFR.	REL	434	7606	73/06/06.	LIST DIRECTED INPUT CONTROL
21	IOCHEC IOCHEC	REL	23	5656	73/06/06.	PARITY ERROR CHECK.
22	IODATA= IOCON.	REL	55	7365	73/06/06.	COMMON INPUT/OUTPUT CONSTANTS
23	KODER= KODER.	REL	1651	3674	73/06/06.	OUTPUT FORMAT INTERPRETER.
24	KRAKER= KRAKER. ERRSET	REL	1765	2416	73/06/06.	FORMAT CRACKER FOR INPUT OPERATIONS.
25	LABEL LABEL	REL	232	2412	73/06/06.	SET/CHECK USER TAPE LABELS.
26	LDIN= FEIFAC. LDIN. LDINR.	REL	360	6744	73/06/06.	LIST DIRECTED INPUT FORMATTING
27	LDOUT= FEONTL. FEOREP. LDOUT. LDOUTW. LDOUTX.	REL	424	7474	73/06/06.	LIST DIRECTED OUTPUT FORMATTING
28	LENGTH LENGTH	REL	26	4230	73/06/06.	RETURN THE LENGTH OF A BUFFER IN.
29	NAMIN= NAMIN.	REL	1361	6433	73/06/06.	NAMELIST INPUT ROUTINE.

REC	CATALOG OF FORTRAN NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
30	NAMOUT= NAMOUT.	REL	674	1505	73/06/06.	NAMELIST OUTPUT ROUTINE.
31	OPENMS OPENMS	REL	45	3206	73/06/06.	OPEN RANDOM FILE LINKAGE ROUTINE.
32	OUTB= OUTBI. OUTBR.	REL	302	2447	73/06/06.	BINARY WRITE FORTRAN RECORD.
33	OUTC= OUTCI. OUTCR.	REL	273	7067	73/06/06.	FORMATTED WRITE FORTRAN RECORD.
34	OUTCOM= FEOL. FEOI. FEOAFM. FEOBLS. FEOCNV. FEOR1F. FEOR1O. FEOSTR. FEOXFL. FEOZRS.	REL	234	1326	73/06/06.	COMMON OUTPUT CODE
35	OUTF= OUTFI. OUTFR.	REL	305	1770	73/06/06.	LIST DIRECTED OUTPUT CONTROL
36	RANMS= CLOS.RI OPEN.RI READ.RI STIN.RI WRIT.RI	REL	467	7263	73/06/06.	RECORD INDEXED (MSIO) FILE PROCESSOR.
37	READMS READMS	REL	36	5160	73/06/06.	READ RANDOM FILE LINKAGE ROUTINE.
38	REWIND= REWIND.	REL	57	6252	73/06/06.	POSITION FILE AT BEGINNING-OF-INFORMATION.
39	STINDX STINDX	REL	36	4530	73/06/06.	CHANGE RANDOM FILE INDEX LINKAGE.
40	SYSTEM SYSTEM SYSTEMC SYSLNK.	REL	520	2041	73/06/06.	EXTENDED ERROR HANDLING OPTION.
41	UNIT UNIT	REL	47	2566	73/06/06.	STATUS A BUFFER I/O FILE.
42	WRITMS WRITMS	REL	36	0043	73/06/06.	WRITE RANDOM FILE LINKAGE ROUTINE.
43	XRCL XRCL	REL	25	2053	73/06/06.	ISSUE RECALL REQUEST.
44	CLOCK= CLOCK TIME DATE JDATE SECOND	REL	60	3565	73/06/06.	ACCESS SYSTEM CLOCKS FOR FORTRAN.
45	DISPLA DISPLA	REL	222	2676	73/06/06.	ISSUE MESSAGE AND VALUE TO DAYFILE.
46	DUMP DUMP	REL	161	2722	73/06/06.	DUMP CORE FOR FORTRAN USER.

REC	CATALOG NAME	OF FORTRAN TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	PDUMP					
47	GOTOER= GOTOER.	REL	27	5537	73/06/06.	COMPUTED GO TO ERROR PROCESSOR.
48	LEGVAR LEGVAR	REL	13	1223	73/06/06.	TEST FOR INDEF OR INFINITE VALUE.
49	MOVLEV MOVLEV	REL	106	4710	73/06/06.	GENERALIZED STORAGE MOVE ROUTINE.
50	OVERLAY OVERLAY	REL	216	2150	73/06/06.	OVERLAY LOADING ROUTINE.
51	PAUSE= PAUSE.	REL	37	3151	73/06/06.	PAUSE AND ISSUE A MESSAGE TO CONSOLE.
52	READEC READEC	REL	112	5742	73/06/06.	READ A BLOCK OF WORDS FROM ECS TO SCM.
53	REMARK REMARK	REL	15	0754	73/06/06.	ISSUE A MESSAGE TO THE DAYFILE.
54	SLITE SLITE SLITET	REL	67	4654	73/06/06.	FORTRAN SENSE LIGHT MANIPULATION.
55	SSWTCH SSWTCH	REL	40	5222	73/06/06.	TEST THE SETTING OF A SENSE SWITCH.
56	WRITEC WRITEC	REL	46	7331	73/06/06.	WRITE N WORDS FROM CM INTO ECS.
57	ACOS ACOS	REL	37	3231	73/06/06.	ARCCOSINE OF X.
58	ASIN ASIN	REL	37	6750	73/06/06.	COMPUTE THE ARCSINE OF X
59	ACOSIN= ACOS. ASIN.	REL	136	0633	73/06/06.	COMPUTE ARCSINE OR ARCCOSINE.
60	ALOG= ALOG. ALOG10.	REL	54	0015	73/06/06.	COMPUTE THE LOG AND LOG10 OF X.
61	ALOG ALOG	REL	37	5064	73/06/06.	COMPUTE THE NATURAL LOGARITHM.
62	ALOG10 ALOG10	REL	37	5134	73/06/06.	COMPUTE LOGARITHM BASE 10 OF X.
63	ATAN ATAN	REL	32	1346	73/06/06.	COMPUTE THE ARCTANGENT OF X
64	ATAN= ATAN.	REL	76	5554	73/06/06.	ARCTANGENT OF X.
65	ATAN2 ATAN2	REL	44	4623	73/06/06.	ARCTAN OF RATIO OF Y TO X
66	ATAN2= ATAN2.	REL	120	6560	73/06/06.	ATAN OF THE RATIO OF Y TO X
67	CABS CABS	REL	50	5657	73/06/06.	COMPLEX ABSOLUTE VALUE.
68	CABS= CABS.	REL	32	4540	73/06/06.	COMPLEX ABSOLUTE VALUE
69	CCOS CCOS	REL	72	0032	73/06/06.	COMPLEX COSINE WITH ERROR CHECKING.
70	CCOS= CCOS.	REL	27	3516	73/06/06.	COMPLEX COSINE OF Z.
71	CEXP CEXP	REL	64	6717	73/06/06.	COMPLEX EXPONENTIAL OF Z
72	CEXP= CEXP.	REL	25	1461	73/06/06.	COMPLEX EXPONENTIAL OF Z.

REC	CATALOG NAME	OF FORTRAN TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
73	CLOG CLOG	REL	40	0465	73/06/06.	COMPLEX LOGARITHM OF Z.
74	CLOG= CLOG.	REL	32	7221	73/06/06.	COMPLEX LOGARITHM OF Z
75	COS COS	REL	43	0213	73/06/06.	COSINE OF X.
76	COS=SIN COS.SIN	REL	65	2305	73/06/06.	COMPUTE SIN AND COS OF X
77	CSIN CSIN	REL	72	3254	73/06/06.	COMPLEX SINE OF Z.
78	CSIN= CSIN.	REL	25	7637	73/06/06.	COMPLEX SINE OF Z.
79	CSQRT CSQRT	REL	37	7626	73/06/06.	COMPLEX SQUARE ROOT OF Z.
80	CSQRT= CSQRT.	REL	32	3251	73/06/06.	COMPLEX SQUARE ROOT OF Z.
81	DATAN DATAN	REL	34	0512	73/06/06.	DOUBLE ARCTANGENT.
82	DATAN2 DATAN2	REL	45	5040	73/06/06.	COMPUTE THE DOUBLE ATAN OF Y/X.
83	DATAN= DATAN2. DATAN.	REL	206	6206	73/06/06.	COMPUTE DOUBLE ARCTANGENT.
84	DEXP DEXP	REL	54	3422	73/06/06.	DOUBLE EXPONENTIAL FUNCTION.
85	DEXP= DEXP.	REL	130	4473	73/06/06.	DOUBLE EXPONENTIAL FUNCTION.
86	DLNLOG= DLOG. DLOG10.	REL	177	1002	73/06/06.	COMPUTE DOUBLE LOG AND DLOG10.
87	DLOG DLOG	REL	40	3425	73/06/06.	DOUBLE LOGARITHM BASE E OF X.
88	DLOG10 DLOG10	REL	40	2063	73/06/06.	DOUBLE LOGARITHM BASE 10 OF X.
89	DMOD DMOD	REL	53	5153	73/06/06.	DOUBLE MODULUS OF D1, D2.
90	DMOD= DMOD.	REL	35	2657	73/06/06.	DOUBLE MODULUS OF D1,D2.
91	DCOS DCOS	REL	45	2242	73/06/06.	DOUBLE COSINE OF X.
92	DSIN DSIN	REL	45	3616	73/06/06.	DOUBLE PRECISION SINE OF X.
93	DSNCOS= DSIN. DCOS.	REL	175	1134	73/06/06.	DOUBLE SINE AND COSINE ROUTINE.
94	DSQRT DSQRT	REL	35	2113	73/06/06.	DOUBLE SQUARE ROOT OF X.
95	DSQRT= DSQRT.	REL	41	1602	73/06/06.	DOUBLE PRECISION SQUARE ROOT.
96	DTOD* DTOD$	REL	103	6532	73/06/06.	DOUBLE BASE TO DOUB$E POWER.
97	DTOD= DTOD.	REL	25	0151	73/06/06.	DOUBLE BASE TO DOUBLE POWER.
98	DTOI* DTOI$	REL	52	7052	73/06/06.	DOUBLE BASE TO INTEGER POWER.

REC	CATALOG OF FORTRAN NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
99	DTOI= DTOI.	REL	32	5665	73/06/06.	DOUBLE TO INTEGER EXPONENTIATION.
100	DTOX* DTOX$	REL	103	0525	73/06/06.	DOUBLE BASE TO REAL POWER.
101	DTOX= DTOX.	REL	24	3506	73/06/06.	DOUBLE TO REAL EXPONENTIATION.
102	DTOZ* DTOZ$	REL	125	6576	73/06/06.	DOUBLE TO COMPLEX EXPONENTIATION.
103	DTOZ= DTOZ.	REL	33	1365	73/06/06.	DOUBLE TO COMPLEX EXPONENTIATION.
104	EXP EXP	REL	60	0207	73/06/06.	EXPONENTIAL FUNCTION - E TO THE X.
105	EXP= EXP.	REL	57	1464	73/06/06.	EXPONENTIAL FUNCTION.
106	HYPERB= HYPERB.	REL	41	5011	73/06/06.	HYPERBOLIC SINE AND COSINE.
107	ITOD* ITOD$	REL	103	1557	73/06/06.	INTEGER BASE TO DOUBLE POWER.
108	ITOD= ITOD.	REL	32	0660	73/06/06.	INTEGER TO DOUBLE POWER.
109	ITOJ* ITOJ$	REL	67	0371	73/06/06.	INTEGER BASE TO INTEGER POWER.
110	ITOJ= ITOJ.	REL	27	7222	73/06/06.	INTEGER TO INTEGER EXPONENTIATION.
111	ITOX* ITOX$	REL	101	7255	73/06/06.	INTEGER BASE TO REAL POWER.
112	ITOX= ITOX.	REL	24	3764	73/06/06.	INTEGER TO A REAL POWER.
113	ITOZ* ITOZ$	REL	121	1457	73/06/06.	INTEGER BASE TO COMPLEX POWER.
114	ITOZ= ITOZ.	REL	15	7112	73/06/06.	INTEGER TO COMPLEX EXPONENTIATION.
115	RANF RANF RANDOM. RANMLT. RANGET	REL	26	3442	73/06/06.	UNIFORM RANDOM NUMBER GENERATOR.
116	RANSET RANSET	REL	21	0056	73/06/06.	INITIALIZE THE RANDOM NUMBER SEED.
117	SIN SIN	REL	43	6321	73/06/06.	SINE OF X.
118	SINCOS= SIN. COS.	REL	72	0052	73/06/06.	COMPUTE EITHER THE SINE OR COSINE OF X.
119	SQRT SQRT	REL	33	7633	73/06/06.	COMPUTE THE SQUARE ROOT OF X.
120	SQRT= SQRT.	REL	33	1322	73/06/06.	COMPUTE THE SQUARE ROOT OF X.
121	TAN TAN	REL	43	3274	73/06/06.	TANGENT OF X.
122	TAN= TAN.	REL	111	6445	73/06/06.	TANGENT OF X.
123	TANH TANH	REL	32	0774	73/06/06.	HYPERBOLIC TANGENT OF X.
124	TANH= TANH.	REL	50	5211	73/06/06.	HYPERBOLIC TANGENT OF X.

CATALOG OF FORTRAN FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
125	XTOD* XTOD$	REL	103	2057	73/06/06.	REAL BASE TO DOUBLE POWER.
126	XTOD= XTOD.	REL	31	1322	73/06/06.	REAL TO DOUBLE EXPONENTIATION.
127	XTOI* XTOI$	REL	47	0120	73/06/06.	REAL BASE TO INTEGER POWER.
128	XTOI= XTOI.	REL	21	2225	73/06/06.	REAL TO INTEGER EXPONENTIATION.
129	XTOY* XTOY$	REL	100	7435	73/06/06.	REAL BASE TO REAL POWER.
130	XTOY= XTOY.	REL	23	0345	73/06/06.	REAL TO REAL EXPONENTIATION.
131	XTOZ* XTOZ$	REL	121	3360	73/06/06.	REAL BASE TO COMPLEX POWER.
132	XTOZ= XTOZ.	REL	33	3604	73/06/06.	REAL TO COMPLEX EXPONENTIATION.
133	ZTOI* ZTOI$	REL	52	6234	73/06/06.	COMPLEX BASE TO INTEGER POWER.
134	ZTOI= ZTOI.	REL	31	0757	73/06/06.	COMPLEX TO INTEGER EXPONENTIATION.
135	AND AND	REL	13	6551	73/06/06.	COMPUTE LOGICAL PRODUCT OF ARGUMENTS.
136	COMPL COMPL	REL	11	6326	73/06/06.	COMPLEMENT THE ARGUEMNT.
137	LOCF LOCF	REL	11	3552	73/06/06.	ADDRESS OF ARGUMENT FUNCTION.
138	MASK MASK	REL	33	6672	73/06/06.	FORM A MASK.
139	OR OR	REL	13	6501	73/06/06.	LOGICAL SUM OF ARGUMENTS.
140	SHIFT SHIFT	REL	12	5017	73/06/06.	SHIFT ARG 1 BY ARG 2 BITS.
141	XOR XOR	REL	13	4374	73/06/06.	LOGICAL DIFFERENCE OF ARGUMENTS.
142	ABS IABS ABS	REL	14	1764	73/06/06.	COMPUTE ABSOLUTE VALUE OF ARGUMENT.
143	AIMAG AIMAG	REL	12	7444	73/06/06.	RETURN IMAG PART OF COMPLEX NUMBER Z.
144	AINT AINT	REL	12	4534	73/06/06.	TRUNCATE REAL NUMBER TO INTEGER.
145	AMAX0 AMAX0	REL	16	1357	73/06/06.	REAL MAXIMUM OF INTEGER ARGUMENTS.
146	AMAX1 AMAX1	REL	15	5262	73/06/06.	REAL MAXIMUM OF REAL ARGUMENTS.
147	AMIN0 AMIN0	REL	16	7607	73/06/06.	REAL MINIMUM OF INTEGER ARGUMENTS.
148	AMIN1 AMIN1	REL	15	2704	73/06/06.	REAL MINIMUM OF REAL ARGUMENTS.
149	AMOD AMOD	REL	14	2740	73/06/06.	COMPUTE THE REAL MODULUS OF ARGUMENTS.
150	CMPLX CMPLX	REL	12	0440	73/06/06.	CONVERT TWO REAL ARGUMENTS TO COMPLEX NUMBER.
151	CONJG CONJG	REL	12	7045	73/06/06.	COMPUTE THE COMPLEX CONJUGATE OF Z.

CATALOG OF FORTRAN FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
152	COUNT COUNT	REL	11	0547	73/06/06.	
153	DABS DABS	REL	13	4132	73/06/06.	DOUBLE ABSOLUTE VALUE.
154	DBLE DBLE	REL	12	5403	73/06/06.	CONVERT SINGLE PRECISION ARGUMENT TO DOUBLE.
155	DIM DIM	REL	14	1443	73/06/06.	COMPUTE POSITIVE DIFFERENCE OF X AND Y.
156	DMAX1 DMAX1	REL	22	1034	73/06/06.	DOUBLE MAXIMUM OF DOUBLE ARGUMENTS.
157	DMIN1 DMIN1	REL	22	5647	73/06/06.	DOUBLE MINIMUM OF DOUBLE ARGUMENTS.
158	DSIGN DSIGN	REL	14	7733	73/06/06.	SIGN OF ARGUMENT 2 TO ARGUMENT 1.
159	FLOAT FLOAT	REL	12	1136	73/06/06.	INTEGER TO REAL CONVERSION.
160	IDIM IDIM	REL	13	1754	73/06/06.	INTEGER POSITIVE DIFFERENCE.
161	INT IFIX INT IDINT	REL	16	2516	73/06/06.	TRUNCATE REAL ARGUMENT TO INTEGER.
162	ISIGN SIGN ISIGN	REL	15	1564	73/06/06.	TRANSFER SIGN OF ARGUMENT 1 TO ARGUMENT 2.
163	MAX0 MAX0	REL	15	2572	73/06/06.	INTEGER MAXIMUM OF INTEGER ARGUMENTS.
164	MAX1 MAX1	REL	16	5107	73/06/06.	INTEGER MAXIMUM OF REAL ARGUMENTS.
165	MIN0 MIN0	REL	15	4437	73/06/06.	INTEGER MINIMUM OF INTEGER ARGUMENTS.
166	MIN1 MIN1	REL	16	1611	73/06/06.	INTEGER MINIMUM OF REAL ARGUMENTS.
167	MOD MOD	REL	14	6047	73/06/06.	INTEGER MODULUS OF J AND K.
168	REAL SNGL REAL	REL	13	3677	73/06/06.	RETURN THE REAL PART OF COMPLEX NUMBER Z.
169	BUGARR	REL	114	0656	73/06/06.	
170	BUGCLL	REL	336	3165	73/06/06.	
171	BUGCTL BUGCTL	REL	62	3175	73/06/06.	DEBUG PRINT CONTROLLER.
172	BUGFUN	REL	412	5065	73/06/06.	
173	BUGGTA	REL	117	7171	73/06/06.	
174	BUGSTO	REL	1106	7662	73/06/06.	
175	BUGTRC	REL	231	7622	73/06/06.	
176	BUGTRT	REL	76	2335	73/06/06.	
177	DBGFIT= DEBUG=	REL	27	5113	73/06/06.	SUPPLY A FIT AND BUFFER FOR DEBUG FILE.
178	FTNERR= FTNERR.	REL	31	2357	73/06/06.	FATAL COMPILATION ERROR PROCESSOR.
179	TRACEX TRACEX TRCBKX	REL	36	0145	73/06/06.	DEBUG TRACEBACK INFORMATION PROCESSOR.
180	FORTRAN	OPLD	551	1126	73/06/08.	
181	* EOF *	SUM =	34605			

3.4.5 RUN2P3

REC	CATALOG OF RUN2P3 NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
1	CPC	REL	306	4157	72/10/10.	
	CPC					
	CPC02					
	CPC03					
	CPC04					
	CPC999					
2	IO	REL	250	2552	72/10/10.	
	IOREAD					
	IOWRITE					
	IOREWRT					
	IOIO					
	IOSAV					
	IOZZ					
	IOZW					
3	IORANDM	REL	262	2756	72/10/10.	
	IORR					
	IORW					
	IORRW					
4	ACGOER	REL	26	5275	73/05/05.	
	ACGOER					
5	DBLE	REL	13	3473	73/05/05.	
	DBLE					
6	EXP	REL	77	5511	73/05/05.	
	EXP					
7	IBAIEX	REL	45	6535	73/05/05.	
	IBAIEX					
8	INITMS	REL	153	0003	73/05/05.	
	OPENMS					
	STINDX					
9	LEGVAR	REL	13	1033	73/05/05.	
	LEGVAR					
10	LOCF	REL	14	3176	73/05/05.	
	LOCF					
	XLOCF					
11	SINCOS	REL	123	3651	73/05/05.	
	SIN					
	COS					
12	SNGL	REL	12	5041	73/05/05.	
	SNGL					
13	SQRT	REL	61	1255	73/05/05.	
	SQRT					
14	SYSTEM	REL	1236	6452	73/05/05.	
	Q8NTRY					
	SYSTEM					
	SYSTEMC					
	SYSTEMP					
	END					
	STOP					
	EXIT					
	ABNORML					
15	TAN	REL	133	4560	73/05/05.	
	TAN					
16	XRCL	REL	13	5771	73/05/05.	
	XRCL					
17	ALNLOG	REL	111	0443	73/05/05.	
	ALOG					

CATALOG OF RUN2P3 FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
	ALOG10					
18	ASINCOS	REL	166	4010	73/05/05.	
	ASIN					
	ACOS					
19	ATAN	REL	114	0736	73/05/05.	
	ATAN					
20	ATAN2	REL	135	4313	73/05/05.	
	ATAN2					
21	CABS	REL	52	1644	73/05/05.	
	CABS					
22	CBAIEX	REL	62	1615	73/05/05.	
	CBAIEX					
23	CCOS	REL	71	3426	73/05/05.	
	CCOS					
24	CEXP	REL	55	3204	73/05/05.	
	CEXP					
25	CLOG	REL	52	7023	73/05/05.	
	CLOG					
26	CSIN	REL	71	2232	73/05/05.	
	CSIN					
27	CSQRT	REL	55	0101	73/05/05.	
	CSQRT					
28	DABS	REL	27	4573	73/05/05.	
	DABS					
29	DATAN	REL	236	2250	73/05/05.	
	DATAN					
	DATAN2					
30	DBADEX	REL	127	0302	73/05/05.	
	DBADEX					
	DBAREX					
	RBADEX					
31	DBAIEX	REL	71	3460	73/05/05.	
	DBAIEX					
32	DEXP	REL	165	6401	73/05/05.	
	DEXP					
33	DISPLA	REL	311	5121	73/05/05.	
	DISPLA					
34	DLNLOG	REL	232	7623	73/05/05.	
	DLOG					
	DLOG10					
35	DMOD	REL	64	1035	73/05/05.	
	DMOD					
36	DSIGN	REL	34	5553	73/05/05.	
	DSIGN					
37	DSINCOS	REL	227	5633	73/05/05.	
	DSIN					
	DCOS					
38	DSQRT	REL	100	1766	73/05/05.	
	DSQRT					
39	DUMP	REL	151	3434	73/05/05.	
	PDUMP					
	DUMP					
40	DVCHK	REL	15	1444	73/05/05.	
	DVCHK					
41	FTNBIN	REL	44	5342	73/05/05.	
	FTNBIN					

CATALOG OF RUN2P3

REC	NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
42	IDINT IDINT	REL	41	3451	73/05/05.	
43	INPUTN INPUTN	REL	1111	0572	73/05/05.	
44	INPUTS INPUTS	REL	104	4355	73/05/05.	
45	LENGTH LENGTH	REL	37	1004	73/05/05.	
46	OUTPTN OUTPTN	REL	534	2350	73/05/05.	
47	OUTPTS OUTPTS	REL	111	2677	73/05/05.	
48	OVERFL OVERFL	REL	14	5265	73/05/05.	
49	OVERLAY OVERLAY	REL	155	4541	73/05/05.	
50	PAUSE PAUSE	REL	35	3711	73/05/05.	
51	RANF RANF	REL	21	3562	73/05/05.	
52	RBAIEX RBAIEX	REL	60	2057	73/05/05.	
53	RBAREX RBAREX	REL	76	2456	73/05/05.	
54	READEC READEC	REL	111	5330	73/05/05.	
55	READMS READMS	REL	172	3322	73/05/05.	
56	REMARK REMARK	REL	16	3343	73/05/05.	
57	BACKSP BACKSP	REL	447	2553	73/05/05.	
58	BUFFEI BUFFEI	REL	137	3077	73/05/05.	
59	BUFFEO BUFFEO	REL	135	1323	73/05/05.	
60	CONDIS CONNEC DISCON	REL	113	2662	73/05/05.	
61	ENDFIL ENDFIL	REL	107	3061	73/05/05.	
62	IOCHEC IOCHEC	REL	62	4452	73/05/05.	
63	IFENDF IFENDF	REL	116	4431	73/05/05.	
64	INPUTB INPUTB	REL	336	4123	73/05/05.	
65	INPUTC INPUTC	REL	157	4342	73/05/05.	
66	IOCHEK IOCHEK	REL	120	3312	73/05/05.	
67	KODER KODER	REL	1364	3437	73/05/05.	
68	KRAKER KRAKER	REL	1135	3264	73/05/05.	

CATALOG OF RUN2P3 FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
69	OUTPTB	REL	326	7432	73/05/05.	
	OUTPTB					
70	OUTPTC	REL	124	6543	73/05/05.	
	OUTPTC					
71	REWINM	REL	112	4177	73/05/05.	
	REWINM					
72	SLITE	REL	27	3506	73/05/05.	
	SLITE					
73	SLITET	REL	34	3213	73/05/05.	
	SLITET					
74	SSWTCH	REL	31	7314	73/05/05.	
	SSWTCH					
75	START	REL	16	6166	73/05/05.	
	START					
76	SYS=TIM	REL	56	6701	73/05/05.	
	CLOCK					
	DATE					
	JDATE					
	SECOND					
77	TANH	REL	65	7457	73/05/05.	
	TANH					
78	TIME	REL	34	6524	73/05/05.	
	TIME					
79	WRITEC	REL	52	6654	73/05/05.	
	WRITEC					
80	WRITMS	REL	133	2071	73/05/05.	
	WRITMS					
81	RUNCALL	REL	315	5124	73/06/08.	
	ACSSKF					
	ACSSNF					
	DLETEF					
	FORCEF					
	INSRTF					
	OPNEWF					
	OPNOLF					
	RPLACF					
	REPOSF					
	SEEKLF					
	SEEKSF					
	STBKDF					
	STBKIF					
	STCOLF					
	STERRF					
	STKEYF					
	STFETF					
	TERMNF					
82	RUN2P3	OPLD	245	3053	73/06/08.	

TERMINAL*IBDE.* SUM = 21320

3.4.6 SIMLIB

REC	CATALOG OF SIMLIB NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
1	SIMLIB	ULIB	634	3134	73/06/12.	
2	XX$MAIN	REL	64	3474	73/05/15.	
	XX$MAIN					
3	XX$EVLT	REL	14	1573	73/05/15.	
	XX$XX					
	XX$EXOG					
	XX$ENOG					
4	XX$NIT	REL	311	6323	73/05/15.	
	XX$NIT					
	XX$RNIT					
5	XX$SALL	REL	32	6151	73/05/15.	
	XXSALL					
	XX$CORE					
6	XX$L	REL	13	4534	73/05/15.	
	XX$L					
7	XX$FILE	REL	632	1040	73/05/15.	
	XX$FILE					
	WRITE.					
8	XX$NITR	REL	424	5405	73/05/15.	
	XX$ERRI					
9	XX$RXXD	REL	101	5625	73/05/15.	
	XX$RXXD					
10	XX$GARG	REL	22	3105	73/05/15.	
	XX$GARG					
11	XX$ABER	REL	271	1203	73/05/15.	
	XX$ABER					
12	XX$SYSV	REL	141	4777	73/05/15.	
	GTIME					
	PTIME					
	GHOURS					
	PHOURS					
	GMINS					
	PMINS					
	GDECHR					
	GDPART					
	GHPART					
	GMPART					
	GLINES					
	GLXXNS					
	GOTAPE					
	GPAGE					
	OTAPE					
	PLINES					
	PLXXNS					
	POTAPE					
	PPAGE					
13	XX$TMR	REL	301	6112	73/05/15.	
	XX$FLET					
	XX$EEND					
	XX$INT					
	XX$STRT					
14	XX$CRDS	REL	347	7560	73/05/15.	
	XX$CMAS					
	XX$DMAS					
	XX$CSAT					
	XX$DSAT					

CATALOG OF SIMLIB FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
15	XX$IN	REL	261	2520	73/05/15.	
	XX$IN					
	XX$TAPE					
16	XX$ERRS	REL	633	5233	73/05/15.	
	XX$ERRS					
	XX$END					
	XX$STOP					
17	XX$LKUP	REL	60	5352	73/05/15.	
	XX$STEP					
	XX$LNR					
18	XX$SWCH	REL	21	2777	73/05/15.	
	XX$SWCH					
19	XX$KXX	REL	51	3056	73/05/15.	
	KXX					
	GKXX					
	PKXX					
20	XX$LINK	REL	22	7537	73/05/15.	
	XX$LINK					
21	XX$CNWC	REL	337	1231	73/05/15.	
	XX$CNWA					
	XX$CNWT					
	XX$CNWO					
	XX$CNWI					
	XX$CNWH					
	XX$CNWD					
	XX$CNWM					
22	XX$CNRC	REL	251	6062	73/05/15.	
	XX$CNRH					
	XX$CNRD					
	XX$CNRM					
	XX$CNRI					
	XX$CNRJ					
	XX$CNRO					
	XX$CNRA					
	XX$CNR3					
	XX$BUF					
	DAT=					
23	XX$PUFP	REL	160	7001	73/05/15.	
	XX$GFP					
	XX$PFP					
	XX$G2D					
	XX$P2D					
24	XX$OUT	REL	226	0402	73/05/15.	
	XX$OUT					
	XX$EOL					
25	G$RAND	REL	54	5360	73/05/15.	
	GRANDI					
	GRANDM					
	GRANDS					
	GRANDR					
	PRANDR					
26	XX$INIT	REL	3414	4340	73/05/15.	
	XX$INIT					
	XXMAXX					
	XX$BYP					
27	XX$FMT	REL	307	0636	73/05/15.	
	XX$FMT					
28	SIMLIB	OPLD	67	2362	73/06/12.	
29	* EOF *	SUM =	13031			

3.4.7 SYSIO

REC	CATALOG OF SYSIO NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
1	CPUCPR SETUP. RECOVR CPR=	REL	173	4417	73/01/29. 72/11/17.	CONTROL POINT REPRIEVE PROCESSOR.
2	UCLOAD LOADER= LOADER	REL	254	5666	73/05/16.	L73136 LOADER USER CALL INTERFACE ROUTINE.
3	SYS.RM MSG= RCL= SYS= WNB= CIO=	REL	100	6120	73/05/16.	PROCESS SYSTEM REQUEST.
4	CHEKPT CHEKPTR CHEKPTX CHEKPT	REL	62	2303	73/05/16.	
5	CPC CPC CPC02 CPC03 CPC04 CPC999	REL	306	4153	73/05/16.	
6	IORANDM IORR IORW IORRW	REL	262	6756	73/05/16.	
7	IO IOREAD IOWRITE IOREWRT IOIO IOSAV IOZZ IOZW	REL	250	2552	73/05/16.	
8	GETBA GETBA	REL	30	2503	73/05/05.	
9	SIO$ CIO1. RCL1. DAT. SIO.CTL INITL. SIO. SIO.END OPEN. RDPRU. BKSPRU. ADVIN. POSFI. MVWDS. SYSERR.	REL	1424	0670	73/05/05.	
10	LBUF.SQ LBUF.SQ	REL	45	5622	73/06/08.	
11	SQ.RM SQ.RM	REL	103	3055	73/06/08.	

CATALOG OF SYSIO 1

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
12	WA.RM	REL	31	0147	73/06/08.	
	WA.RM					
13	IS.RM	REL	724	0035	73/06/08.	
	IS.RM					
	GET.IS					
	GETN.IS					
	PUT.IS					
	SEEK.IS					
	DLT.IS					
	REPL.IS					
	REW.IS					
	SKFL.IS					
	SKBL.IS					
14	DA.RM	REL	720	5447	73/06/08.	
	DA.RM					
	GET.DA					
	GETN.DA					
	PUT.DA					
	SEEK.DA					
	DLT.DA					
	REPL.DA					
	REW.DA					
	SKFL.DA					
	SKBL.DA					
15	AK.RM	REL	724	5536	73/06/08.	
	AK.RM					
	GET.AK					
	GETN.AK					
	PUT.AK					
	SEEK.AK					
	DLT.AK					
	REPL.AK					
	REW.AK					
	SKFL.AK					
	SKBL.AK					
16	CIO.RM	REL	61	6775	73/06/08.	
	CIO.RM					
	CIOR.RM					
17	ERR.RM	REL	345	7103	73/06/08.	
	ERR.RM					
	ERR1.RM					
	ERR2.RM					
18	MOVE.RM	REL	103	3360	73/06/08.	
	MOVE.RM					
19	CHWR.SQ	REL	22	3402	73/06/08.	
	CHWR.SQ					
20	MCT.RM	REL	21	6346	73/06/08.	
	MCT.RM					
21	MEM6RM	REL	730	3632	73/06/08.	
	FIND.N					
	NXT.ID					
	STO.FIT					
	CHK.ID					
	R.ID					
	R.FIT					
	W.FIT					

CATALOG OF SYSIO FILE 1

	W.ID				
	REL.SP				
	GET.FIT				
	GET.SP				
	GSP.ERR				
22	CHEK.RM	REL	21	0277	73/06/08.
	CHEK.RM				
23	OPEN.RM	REL	431	7404	73/06/08.
	OPEN.RM				
24	PDF.RM	REL	151	0006	73/06/08.
	PDF.RM				
25	OPEN.SQ	REL	361	5322	73/06/08.
	OPEN.SQ				
	OPXX.SQ				
26	OPEX.SQ	REL	212	4524	73/06/08.
	OPEX.SQ				
27	OPEN.WA	REL	141	5477	73/06/08.
	OPEN.WA				
28	OPEN.IS	REL	56	2021	73/06/08.
	OPEN.IS				
29	OPEN.DA	REL	56	2264	73/06/08.
	OPEN.DA				
30	OPEN.AK	REL	56	7272	73/06/08.
	OPEN.AK				
31	PUT.RM	REL	32	4575	73/06/08.
	PUT.RM				
	PUTP.RM				
32	RLEQ.RM	REL	133	7652	73/06/08.
	RLEQ.RM				
33	PUT.SQ	REL	1161	1457	73/06/08.
	PUT.SQ				
34	WAR.SQ	REL	302	3263	73/06/08.
	REPO.SQ				
35	PUT.WA	REL	570	3213	73/06/08.
	PUT.WA				
	COMM.WA				
	FLSH.WA				
36	CLSF.RM	REL	61	0446	73/06/08.
	CLSF.RM				
37	CLSF.SQ	REL	473	1301	73/06/08.
	CLSF.SQ				
	FLSH.SQ				
	RSPT.SQ				
38	FLSM.SQ	REL	32	0315	73/06/08.
	FLSM.SQ				
39	CLSV.RM	REL	36	2124	73/06/08.
	CLSV.RM				
40	CLSV.SQ	REL	221	7647	73/06/08.
	CLSV.SQ				
41	CLSF.WA	REL	131	2213	73/06/08.
	CLSF.WA				
	REW.WA				
42	CLSV.WA	REL	64	5717	73/06/08.
	CLSV.WA				

CATALOG OF SYSIO

REC	NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
43	CLSF.IS CLSF.IS	REL	47	2272	73/06/08.	
44	CLSF.DA CLSF.DA	REL	47	5650	73/06/08.	
45	CLSF.AK CLSF.AK	REL	47	7330	73/06/08.	
46	REW.RM REW.RM	REL	30	5222	73/06/08.	
47	REW.SQ REW.SQ	REL	75	2414	73/06/08.	
48	GET.RM GET.RM GETP.RM	REL	32	3306	73/06/08.	
49	GET.SQ GET.SQ SKGT.SQ DXIT.SQ AMAC.SQ GXIT.SQ AINI.SQ ANBL.SQ GRTJ.SQ GCNT.SQ	REL	1151	3545	73/06/08.	
50	Z.SQ GET.Z	REL	147	1241	73/06/08.	
51	R.SQ GET.R SCR.SQ	REL	216	3177	73/06/08.	
52	W.SQ GET.W	REL	113	6303	73/06/08.	
53	DT.SQ GET.D GET.T DCDT.SQ	REL	222	7615	73/06/08.	
54	FSU.SQ GET.F GET.S GET.U RMU0.SQ RMU1.SQ RMU.SQ	REL	221	0615	73/06/08.	
55	BTRT.SQ BTRT.SQ PUT.I PUT.C PUT.K PUT.E	REL	223	4424	73/06/08.	
56	GET.WA GET.WA	REL	266	4664	73/06/08.	
57	PUTL.SQ PUTL.SQ	REL	255	1575	73/06/08.	
58	GETL.SQ GETL.SQ ERETURN	REL	301	6540	73/06/08.	
59	LXER.SQ LAB1.SQ	REL	311	3442	73/06/08.	

REC	CATALOG OF NAME	SYSIO TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	RNO.SQ					
60	ENDF.SQ	REL	116	2003	73/06/08.	
	ENDF.SQ					
61	WEOR.SQ	REL	101	3066	73/06/08.	
	WEOR.SQ					
62	WTMK.SQ	REL	34	2462	73/06/08.	
	WTMK.SQ					
63	DLT.RM	REL	30	1540	73/06/08.	
	DLT.RM					
64	DLT.SQ	REL	30	3320	73/06/08.	
	DLT.SQ					
65	DLT.WA	REL	30	4531	73/06/08.	
	DLT.WA					
66	SKFL.RM	REL	30	5563	73/06/08.	
	SKFL.RM					
67	SKFF.SQ	REL	51	4564	73/06/08.	
	SKFF.SQ					
	SKBF.SQ					
	SKFF.RM					
	SKBF.RM					
68	SKFL.SQ	REL	117	6510	73/06/08.	
	SKFL.SQ					
69	SKFL.WA	REL	40	7637	73/06/08.	
	SKFL.WA					
	SKFP.WA					
	SKFF.WA					
70	GETN.RM	REL	30	0420	73/06/08.	
	GETN.RM					
71	GETN.SQ	REL	34	2431	73/06/08.	
	GETN.SQ					
72	GETN.WA	REL	34	4471	73/06/08.	
	GETN.WA					
73	REPL.RM	REL	37	1627	73/06/08.	
	REPL.RM					
74	REPL.SQ	REL	34	0140	73/06/08.	
	REPL.SQ					
75	REPL.WA	REL	34	2200	73/06/08.	
	REPL.WA					
76	SEEK.RM	REL	30	6261	73/06/08.	
	SEEK.RM					
77	SEEK.SQ	REL	34	5306	73/06/08.	
	SEEK.SQ					
78	SEEK.WA	REL	30	2436	73/06/08.	
	SEEK.WA					
79	SKBL.RM	REL	30	5443	73/06/08.	
	SKBL.RM					
80	SKBL.SQ	REL	1077	4262	73/06/08.	
	SKBL.SQ					
	SKBP.SQ					
	SKBP.RM					
81	SKFP.SQ	REL	20	3177	73/06/08.	
	SKFP.SQ					
	SKFP.RM					
82	SKBL.WA	REL	34	4005	73/06/08.	
	SKBL.WA					

CATALOG OF SYSIO 1

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
83	MSG.RM MSGLINL MSGLINE	REL	102	4343	73/06/08.	
84	R6RM.RM R.6RM EPW	REL	230	7547	73/06/08.	
85	ACOMMON CPYRITE	REL	15	7044	73/06/08.	
86	BUFALOC BUFALOC	REL	412	3610	73/06/08.	
87	DATM SISPUT PUTDUMY SISGET SISDELT SISREPL CKFILE MJKYCK CHECKEY	REL	2566	0612	73/06/08.	
88	DIAGNOS DIAGNOS BINDIS	REL	521	4546	73/06/08.	
89	FINDIT FINDIT KYCMPAR MOVEKEY TRNSLAT REVERS	REL	443	3536	73/06/08.	
90	INDEXM IDXINS RPOSX IDXRPL IDXDEL RECLMI	REL	1130	4732	73/06/08.	
91	IOMGR SI$IO	REL	772	2247	73/06/08.	
92	PPCALL PPCALL(	REL	410	1575	73/06/08.	
93	CEOI6RM CEOI6RM	REL	26	3435	73/06/08.	
94	WRIT6RM WRIT6RM	REL	43	1616	73/06/08.	
95	REGSAV SAVREG RESREG SAVREGM RESREGM	REL	111	3034	73/06/08.	
96	SAAM.IS IS.RTRN SAAM.IS	REL	166	2111	73/06/08.	
97	SISCLSE SISCLSE SISCLOS	REL	536	2124	73/06/08.	
98	SISKEY SISKEY	REL	106	4144	73/06/08.	

REC	CATALOG OF SYSIO NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
99	SISOPEN	REL	1434	2447	73/06/08.	
	SISOPEN					
	SISRWIN					
100	SISRPV	REL	150	6710	73/06/08.	
	SISRPV					
	DIAGRTN					
101	SISSEEK	REL	141	0130	73/06/08.	
	SISSEEK					
102	SISSKIP	REL	351	1047	73/06/08.	
	SISSKIP					
103	SIZES	REL	350	7673	73/06/08.	
	SIZES(					
104	KWAKER	REL	324	6705	73/06/08.	
	KWAKER					
	KWAKER2					
	FILLUP(					
	BOMB					
105	GETPAR	REL	201	4621	73/06/08.	
	GETPAR					
	GETFPAR					
106	NEWCONS	REL	72	4762	73/06/08.	
	NEWCONS					
	GETLFN					
	NUMPM					
107	FTNMAIN	REL	173	4103	73/06/08.	
108	READCRD	REL	374	4232	73/06/08.	
109	PRINTER	REL	470	5362	73/06/08.	
110	NRER1	REL	631	3571	73/06/08.	
111	DEFAULT	REL	231	6147	73/06/08.	
112	ACCESS	REL	130	3671	73/06/08.	
	ACCESSK					
	ACCESSN					
	CKFTERR					
113	ACCPRCK	REL	270	3044	73/06/08.	
	MASKER2					
	AXEPIK(					
	OLDCMP1					
	RETRNRL					
	RETRNES					
114	CHKFET	REL	240	7727	73/06/08.	
	CHKFET(					
	V1FATAL					
115	DELETE	REL	53	1632	73/06/08.	
	DELETE					
116	FORCEW	REL	64	7631	73/06/08.	
	FORCEW					
117	INSERT	REL	62	2770	73/06/08.	
	INSERT					
118	FTNCALL	REL	363	5250	73/06/08.	
	ACSSKF					
	ACSSKF$					
	ACSSNF					
	ACSSNF$					
	DLETEF					
	DLETEF$					
	FORCEF					

REC	CATALOG NAME	OF SYSIO TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	FORCEF$					
	INSRTF					
	INSRTF$					
	OPNEWF					
	OPNEWF$					
	OPNOLF					
	OPNOLF$					
	RPLACF					
	RPLACF$					
	REPOSF					
	REPOSF$					
	SEEKLF					
	SEEKLF$					
	SEEKSF					
	SEEKSF$					
	STBKDF					
	STBKDF$					
	STBKIF					
	STBKIF$					
	STCOLF					
	STCOLF$					
	STERRF					
	STERRF$					
	STFETF					
	STKEYF					
	TERMNF					
	TERMNF$					
119	OPENNEW	REL	563	3561	73/06/08.	
	OPENNEW					
	BILDFIT					
120	OPENOLD	REL	267	5704	73/06/08.	
	OPENOLD					
121	REPLACE	REL	62	4551	73/06/08.	
	REPLACE					
122	REPOS	REL	103	1332	73/06/08.	
	REPOS					
123	SEEK	REL	76	5420	73/06/08.	
	SEEKL					
	SEEKS					
124	SETBLKD	REL	126	0523	73/06/08.	
	SETBLKD					
125	SETBLKI	REL	142	3733	73/06/08.	
	SETBLKI					
126	SETCOLL	REL	110	4655	73/06/08.	
	SETCOLL					
127	SETERR	REL	200	2031	73/06/08.	
	SETERR					
128	SETKEY	REL	211	5771	73/06/08.	
	SETKEY					
129	STFETF$	REL	116	0451	73/06/08.	
	STFETF$					
130	STKEYF$	REL	203	1200	73/06/08.	
	STKEYF$					
131	TERMNAT	REL	63	6214	73/06/08.	
	TERMNAT					

CATALOG OF SYSIO FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
132	BINDSDA	REL	61	6114	73/06/08.	
	SD$BIND					
133	CLOSE	REL	414	5471	73/06/08.	
	SD$CLOS					
134	SD$DEL	REL	112	2413	73/06/08.	
	SD$DLTE					
135	D.DIAGN	REL	367	6752	73/06/08.	
	SD$DIAG					
136	SD$FIND	REL	336	1453	73/06/08.	
	SD$FIND					
	SD$FRSK					
	SD$DVID					
	SD$ALKY					
	SD$FTPR					
137	SD$GETN	REL	164	2171	73/06/08.	
	SD$GETN					
	SD$REW					
138	SDAHASH	REL	24	4306	73/06/08.	
	SD$HASH					
139	SD$ADD	REL	126	7671	73/06/08.	
	SD$ADD					
140	D.INREC	REL	64	6267	73/06/08.	
	SD$INRC					
141	SD$IO	REL	411	5340	73/06/08.	
	SD$CBLK					
	SD$CKSM					
	SD$EMTY					
	SD$EXIO					
	SD$FLSH					
	SD$READ					
	SD$WRIT					
	SD$CEOI					
	SD$FSCK					
	SD$WFST					
142	SD$KEY	REL	53	0447	73/06/08.	
	SD$KEY					
143	RECHOM	REL	40	0744	73/06/08.	
	SD$RCHM					
144	D.OPN	REL	710	1757	73/06/08.	
	SD$OFFT					
	SD$OPEN					
	SD$MPLY					
145	OVFM	REL	327	5174	73/06/08.	
	SD$OVFM					
	SD$SET					
146	SD$RPLC	REL	261	3754	73/06/08.	
	SD$RPLC					
147	RETRV	REL	76	0437	73/06/08.	
	SD$RETV					
148	SD$RLCV	REL	32	1057	73/06/08.	
	SD$RLIN					
	SD$RLOT					
	SD$RPVD					
150	SAAM.DA	REL	127	6417	73/06/08.	
	SAAM.DA					

CATALOG OF SYSIO

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
	SD$SVB6					
151	SD$SEEK	REL	42	5351	73/06/08.	
	SD$SEEK					
152	SPACE	REL	26	0104	73/06/08.	
	SD$SPAC					
153	SQUEEZE	REL	54	0770	73/06/08.	
	SD$SQZ1					
	SD$SQUZ					
154	SEARCH	REL	136	4061	73/06/08.	
	SD$SRCH					
	SD$TALY					
155	SD$TRC	REL	321	0442	73/06/08.	
	SD$TRC					
	SD$TCLS					
	SD$OCT					
156	FILEDA	REL	20	0773	73/06/08.	
	FILEDA					
157	FILEIS	REL	27	0466	73/06/08.	
	FILEIS					
158	FILESQ	REL	20	2162	73/06/08.	
	FILESQ					
159	FILEWA	REL	20	5216	73/06/08.	
	FILEWA					
160	FILEAK	REL	20	7753	73/06/08.	
	FILEAK					
161	FITCOM	REL	555	2673	73/06/08.	
	STOREF					
	IFETCH					
	SETFIT					
	SYMSRCH					
162	ERRPROC	REL	155	6113	73/06/08.	
	ERRPROC					
	ERR1					
163	OPNCLS	REL	106	7515	73/06/08.	
	CLOSEM					
	OPENM					
164	GET	REL	72	5562	73/06/08.	
	GET					
165	PUT	REL	101	2376	73/06/08.	
	PUT					
166	REPLC	REL	62	0740	73/06/08.	
	REPLC					
167	DLTE	REL	63	2704	73/06/08.	
	DLTE					
168	GETN	REL	43	4503	73/06/08.	
	GETN					
169	SEEKF	REL	50	4443	73/06/08.	
	SEEKF					
170	SKIP	REL	46	2311	73/06/08.	
	SKIP					
171	REWND	REL	31	1103	73/06/08.	
	REWND					
172	GETP	REL	57	7256	73/06/08.	
	GETP					
173	PUTP	REL	50	6117	73/06/08.	
	PUTP					

CATALOG OF SYSIO FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
174	SQANDWA	REL	127	1663	73/06/08.	
	WEOR					
	WTMK					
	ENDFILE					
	CHECK					
175	KYAN	REL	1730	2573	73/06/08.	
	SDAHASH					
	SD$KEYH					
	SDAKYAN					
	SDAKEYH					
	SDAENDH					
	SD$KYAN					
	SD$ENDH					
176	DCREATE	REL	544	4431	73/06/08.	
	SDACRT					
	SDACRTU					
	SDAENDC					
177	SYSIO	OPLD	541	1515	73/06/12.	
178	* EOF *	SUM =	64047			

3.4.8 SYSLIB

CATALOG OF SYSLIB FILE 1 73/05/15. 01.08.13. PAGE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS	
1	SYSLIB	ULIB	1301	1407	73/05/15.		
2	LOADER LOADER	REL	65	3014	73/05/25.		
3	LDRUSX LDRUSX=	REL	103	4622	73/05/25.		
4	CPUCIO CIO=	REL	27	3602	73/05/25.	70/09/21.	I/O FUNCTION PROCESSOR.
5	CPUCPM CPM=	REL	16	7710	73/05/25.	70/09/21.	CONTROL POINT MANAGER PROCESSOR.
6	CPULFM LFM=	REL	24	7146	73/05/25.	70/09/21.	LOCAL FILE MANAGER PROCESSOR.
7	CPUMVE MVE=	REL	31	3366	73/05/25.	70/09/21.	MOVE BLOCK OF DATA.
8	CPUPFM PFM=	REL	24	0467	73/05/25.	70/09/21.	PERMANENT FILE PROCESSOR.
9	CPUOPE OPE=	REL	25	4250	73/05/25.	70/09/21.	OPEN FILE PROCESSOR.
10	CPUOVL OVL=	REL	24	4302	73/05/25.	70/09/21.	OVERLAY LOAD PROCESSOR.
11	CPURDC RDC=	REL	27	3245	73/05/25.	70/09/21.	READ CODED LINE, -C- FORMAT.
12	CPURDH RDH=	REL	50	2576	73/05/25.	70/09/21.	READ CODED LINE, -H- FORMAT.
13	CPURDO RDO=	REL	40	1643	73/05/25.	70/09/21.	READ ONE WORD.
14	CPURDS RDS=	REL	62	6450	73/05/25.	70/09/21.	READ CODED LINE TO STRING BUFFER.
15	CPURDW LCR= RDW= RDX=	REL	141	6433	73/05/25.	70/09/21.	READ WORDS TO WORKING BUFFER.
16	CPUSYS MSG= RCL= SYS= WNB=	REL	51	4031	73/05/25.	70/09/21.	PROCESS SYSTEM REQUEST.
17	CPUWTC WTC=	REL	26	7624	73/05/25.	70/09/21.	WRITE CODED LINE, -C- FORMAT.
18	CPUWTH WTH=	REL	46	7364	73/05/25.	70/09/21.	WRITE CODED LINE, -H- FORMAT.
19	CPUWTO WTO=	REL	33	2536	73/05/25.	70/09/21.	WRITE ONE WORD.
20	CPUWTS WTS=	REL	63	1725	73/05/25.	70/09/21.	WRITE CODED LINE FROM STRING BUFFER.
21	CPUWTW DCB= WTW= WTX=	REL	115	4662	73/05/25.	70/09/21.	WRITE WORDS FROM WORKING BUFFER.
22	ACGOER ACGOER	REL	27	7234	73/05/25.	70/06/17.	RUN - *GO TO* ERROR PROCESSOR.
23	ALNLOG ALOG ALOG10	REL	111	0443	72/05/14.		
24	EXP EXP	REL	77	5511	72/05/14.		

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
25	INPUTC INPUTC	REL	123	4325	73/05/25. 70/06/21. 71/03/01.	RUN - CODED INPUT.
26	KODER KODER	REL	1301	3755	73/05/25. 01/16/70. 73/10/18.	RUN - CODED DATA ENCODE ROUTINE.
27	KRAKER KRAKER RUNDCF=	REL	1123	3671	73/05/25. 70/06/21. 73/10/18.	RUN - CODED DATA DECODE ROUTINE.
28	OUTPTC OUTPTC	REL	106	7065	73/05/25. 70/06/21. 72/05/19.	RUN - CODED OUTPUT.
29	RBAIEX RBAIEX	REL	60	2057	72/05/14.	
30	RBAREX RBAREX	REL	76	2456	72/05/14.	
31	RUNIOP RUNIOE= RUNSBF= RUNSFP= RUNSFS=	REL	133	4136	73/05/25. 70/06/22. 70/09/29.	RUN - INPUT/OUTPUT PROCESSOR.
32	RUNSYS END EXIT STOP Q8NTRY RUNABT= RUNPTR= ABNORML	REL	420	2512	73/05/25. 70/06/28. 73/05/23.	RUN - OBJECT TIME UTILITY ROUTINES.
33	SQRT SQRT	REL	61	1255	72/05/14.	
34	SYSTEM SYSTEM SYSTEMC SYSTEMP RUNLES=	REL	405	3110	73/05/25. 70/06/17. 73/10/18.	RUN - EXECUTION ERROR PROCESSOR.
35	ABORT ABORT	REL	26	2054	73/05/25. 70/06/17.	RUN - ABORT PROGRAM.
36	ASINCOS ASIN ACOS	REL	166	4010	72/05/14.	
37	ATAN ATAN	REL	114	0736	72/05/14.	
38	ATAN2 ATAN2	REL	135	4313	72/05/14.	
39	BACKSP BACKSP	REL	113	1652	73/05/25. 70/06/28. 73/10/18.	RUN - BACKSPACE FILE.
40	BUFFEI BUFFEI	REL	107	6213	73/05/25. 70/06/17.	RUN - BUFFER IN FILE.
41	BUFFEO BUFFEO	REL	65	4721	73/05/25. 70/06/28. 70/08/12.	RUN - BUFFER OUT FILE.
42	CABS CABS	REL	52	1644	72/05/14.	
43	CBAIEX CBAIEX	REL	62	1615	72/05/14.	
44	CCOS CCOS	REL	71	3426	72/05/14.	
45	CEXP CEXP	REL	55	3204	72/05/14.	

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS		
46	CLOCK CLOCK	REL	20	0507	73/05/25.	70/06/17.		RUN - REQUEST TIME OF DAY.
47	CLOG CLOG	REL	52	7023	72/05/14.			
48	CSIN CSIN	REL	71	2232	72/05/14.			
49	CSQRT CSQRT	REL	55	0101	72/05/14.			
50	DABS DABS	REL	27	4573	72/05/14.			
51	DATER DATER	REL	20	6352	73/05/25.	70/06/17.		RUN - REQUEST DATE.
52	DATAN DATAN DATAN2	REL	236	2250	72/05/14.			
53	DBADEX DBADEX DBAREX RBADEX	REL	127	0302	72/05/14.			
54	DBAIEX DBAIEX	REL	71	3460	72/05/14.			
55	DBLE DBLE	REL	13	3473	72/05/14.			
56	DEXP DEXP	REL	165	6401	72/05/14.			
57	DISPLA DISPLA	REL	307	3014	72/05/14.			
58	DLNLOG DLOG DLOG10	REL	232	7623	72/05/14.			
59	DMOD DMOD	REL	64	1035	72/05/14.			
60	DSIGN DSIGN	REL	34	5553	72/05/14.			
61	DSINCOS DSIN DCOS	REL	227	5633	72/05/14.			
62	DSQRT DSQRT	REL	100	1766	72/05/14.			
63	DUMP PDUMP DUMP	REL	151	3434	72/05/14.			
64	DVCHK DVCHK	REL	15	1444	72/05/14.			
65	ENDFIL ENDFIL	REL	27	3273	73/05/25.	70/06/17.		RUN - WRITE FILE MARK.
66	IBAIEX IBAIEX	REL	45	6535	72/05/14.			
67	ICOUNT ICOUNT	REL	15	7657	73/05/25.	70/06/17.		RUN - COUNT FUNCTION.
68	IDINT IDINT	REL	41	3451	72/05/14.			
69	IFENDF IFENDF	REL	22	5215	73/05/25.	70/06/17.		RUN - END OF FILE CHECK.
70	INPUTB INPUTB	REL	116	1430	73/05/25.	70/06/21.	72/05/19.	RUN - BINARY INPUT.

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
71	INPUTN INPUTN	REL	1142	5204	73/05/25. 70/06/21. 73/10/18.	RUN - NAMELIST INPUT.
72	INPUTS INPUTS	REL	104	3777	73/05/25. 70/06/17.	RUN - DECODE.
73	IOCHEK IOCHEK	REL	40	4126	73/05/25. 70/06/28. 70/08/12.	RUN - CHECK BUFFER FILE STATUS.
74	ISHIFT ISHIFT	REL	15	0052	73/05/25. 70/06/17.	RUN - SHIFT VARIBLE.
75	LEGVAR LEGVAR	REL	13	1033	72/05/14.	
76	LENGTH LENGTH	REL	21	0317	73/05/25. 70/06/17. 70/08/12.	RUN - RETURN BUFFER FILE LENGTH.
77	LOCF LOCF XLOCF	REL	14	3176	72/05/14.	
78	OUTPTB OUTPTB	REL	55	1546	73/05/25. 70/06/17. 70/08/12.	RUN - BINARY OUTPUT.
79	OUTPTN OUTPTN	REL	550	4752	73/05/25. 70/06/21. 71/01/27.	RUN - NAMELIST OUTPUT.
80	OUTPTS OUTPTS	REL	106	5147	73/05/25. 70/06/17. 70/08/12.	RUN - ENCODE.
81	OVERFL OVERFL	REL	14	5265	71/01/14.	
82	OVERLAY OVERLAY OVERLIB	REL	65	3662	73/05/25.	
83	PAUSE PAUSE	REL	3EL	30 6774	73/05/25. 70/06/21. 70/09/29.	RUN - PAUSE FOR OPERATOR.
84	RANF RANF	REL	21	3562	72/05/14.	
85	READB READB	REL	32	0566	73/05/25. 70/06/21.	RUN - READ WORDS.
86	RECALL RECALL	REL	16	6721	73/05/25. 70/06/17.	RUN - PLACE PROGRAM ON RECALL.
87	REMARK REMARK	REL	17	4646	73/05/25. 70/06/17.	RUN - ENTER MESSAGE IN DAYFILE.
88	REWINM REWINM	REL	32	3347	73/05/25. 70/06/21.	RUN - REWIND FILE.
89	RTIME. RTIME	REL	17	1124	73/05/25.	
90	SECOND SECOND	REL	27	7614	73/05/25. 70/06/17.	RUN - REQUEST CPU TIME USED.
91	SINCOS SIN COS	REL	123	3651	72/05/14.	
92	SLITE SLITE	REL	32	1137	73/05/25. 70/06/21.	RUN - TURN ON SENSE LIGHT.
93	SLITET SLITET	REL	33	3727	73/05/25. 70/06/21. 70/09/29.	RUN - TEST SENSE LIGHT.
94	SNGL SNGL	REL	12	5041	72/05/14.	
95	SSWTCH SSWTCH	REL	32	3405	73/05/25. 70/06/21.	RUN - TEST SENSE SWITCH.
96	START START	REL	22	2672	73/05/25. 70/06/17.	RUN - SEND START MESSAGE.

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
97	TANH TANH	REL	65	7457	72/05/14.	
98	TIME TIME	REL	25	7405	73/05/25. 70/06/21.	RUN - SEND TIME MESSAGE.
99	TAN TAN	REL	133	4560	72/05/14.	
100	WRITEB WRITEB	REL	32	3265	73/05/25. 70/06/21.	RUN - WRITE WORDS.
101	SYSLIB	OPLD	311	5450	73/05/15.	
102	* EOF *	SUM =	20015			

3.4.9 SYSMISC

REC	CATALOG OF SYSMISC NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
1	SYSMISC	ULIB	2136	1360	73/06/12.	
2	ALGORUN ALGORUN	REL	3314	7631	73/05/09.	
3	ALGLB00 ALGLB00	REL	3325	6420	73/05/09.	
4	ALGLB01 ALGLB01	REL	720	4541	73/05/09.	
5	ALGLB02 ALGLB02	REL	5640	7422	73/05/09.	
6	ALGLB03 ALGLB03	REL	776	1715	73/05/09.	
7	ALGLB04 ALGLB04	REL	621	0772	73/05/09.	
8	ALGLB05 ALGLB05	REL	1023	4664	73/05/09.	
9	ALGLB06 ALGLB06	REL	1154	2156	73/05/09.	
10	ALGLB07 ALGLB07	REL	621	1006	73/05/09.	
11	ALGLB10 ALGLB10	REL	154	4457	73/05/09.	
12	SIMURUN SIMURUN	REL	7306	1446	73/05/09.	
13	SIMLB00 SIMLB00	REL	3072	7765	73/05/09.	
14	SIMLB01 SIMLB01	REL	2036	4332	73/05/09.	
15	SIMLB02 SIMLB02	REL	1514	5114	73/05/09.	
16	SIMLB03 SIMLB03	REL	3647	5404	73/05/09.	
17	SIMLB05 SIMLB05	REL	671	5670	73/05/09.	
18	SYSTEM$ FLSCM. FLLCM. Q8NTRY. END. EXIT$ STOP. ABNORM. SYSTEME SYSTEM$ SYSTEM. SYSTEM: SYS1: SYS2: LOT: ERRFLG. DBGFET.	REL	1206	5751	03/08/73	
19	ACGOER$ ACGOER.	REL	27	3032	03/08/73	
20	BACKSP$ BACKSP.	REL	423	3557	03/08/73	
21	BUFFEI$ BUFFEI.	REL	127	0070	03/08/73	

CATALOG OF SYSMISC 1

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
22	BUFFEO$	REL	124	4041	03/08/73	
	BUFFEO.					
23	BUGARR$	REL	117	7241	03/08/73	
	BUGARR$					
24	BUGCLL$	REL	405	4420	03/08/73	
	BUGCLL$					
	BUGCLR$					
	STRACE$					
25	BUGCTL$	REL	56	0700	03/08/73	
	BUGCTL$					
26	BUGFUN$	REL	545	7663	03/08/73	
	BUGFUN$					
	BUGFNN$					
27	BUGGTA$	REL	153	2204	03/08/73	
	BUGGTA$					
28	BUGSTO$	REL	1226	2767	03/08/73	
	BUGSTO$					
29	BUGTRC$	REL	311	4725	03/08/73	
	BUGTRC$					
	BUGTRA$					
	BUGTRU$					
30	BUGTRT$	REL	75	2533	03/08/73	
	BUGTRT$					
31	CONDIS$	REL	110	0101	03/08/73	
	CONNEC$					
	DISCON$					
32	DBGFET$	REL	22	1241	03/08/73	
	DEBUG=					
33	DUMP$	REL	116	7562	03/08/73	
	DUMP$					
	PDUMP$					
34	ENDFIL$	REL	106	2174	03/08/73	
	ENDFIL.					
35	FTNBIN$	REL	46	6747	03/08/73	
	FTNBIN$					
36	FTNERR$	REL	31	2622	03/08/73	
	FTNERR.					
37	IFENDF$	REL	110	6470	03/08/73	
	EOF$					
38	INITMS$	REL	154	1605	03/08/73	
	OPENMS$					
	STINDX$					
39	INPUTB$	REL	344	3725	03/08/73	
	IPUTBI.					
	INPUTB.					
40	INPUTC$	REL	177	5511	03/08/73	
	IPUTCI.					
	INPUTC.					
41	INPUTN$	REL	1263	1744	03/08/73	
	INPUTN.					
42	INPUTS$	REL	103	6240	03/08/73	
	DECODI.					
	DECODE.					
43	IOCHEC$	REL	60	3454	03/08/73	
	IOCHEC$					

CATALOG OF SYSMISC FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
44	IOCHEK$	REL	104	4611	03/08/73	
	UNIT$					
45	KODER$	REL	1524	2565	03/08/73	
	KODER.					
46	KRAKER$	REL	1646	7032	03/08/73	
	KRAKER.					
	ERRSET$					
47	LENGTH$	REL	33	2034	03/08/73	
	LENGTH$					
48	MASK$	REL	31	4244	03/08/73	
	MASK$					
49	OUTPTB$	REL	351	7210	03/08/73	
	OPUTBI.					
	OUTPTB.					
50	OUTPTC$	REL	132	6520	03/08/73	
	OPUTCI.					
	OUTPTC.					
51	OUTPTN$	REL	567	2516	03/08/73	
	OUTPTN.					
52	OUTPTS$	REL	127	1302	03/08/73	
	ENCODI.					
	ENCODE.					
53	READEC$	REL	121	5267	03/08/73	
	READEC$					
54	READMS$	REL	175	7535	03/08/73	
	READMS$					
55	REWINM$	REL	112	2070	03/08/73	
	REWINM.					
56	TRACEX$	REL	42	2376	03/08/73	
	TRACEX$					
	TRCBKX$					
57	WRITEC$	REL	60	0616	03/08/73	
	WRITEC$					
58	WRITMS$	REL	135	4176	03/08/73	
	WRITMS$					
59	ABS$	REL	12	2560	03/08/73	
	ABS$					
60	IABS$	REL	12	4412	03/08/73	
	IABS$					
61	DABS$	REL	45	3344	03/08/73	
	DABS$					
62	AINT$	REL	12	1106	03/08/73	
	AINT$					
63	INT$	REL	12	7402	03/08/73	
	INT$					
64	IDINT$	REL	44	7340	03/08/73	
	IDINT$					
65	AMOD$	REL	14	4726	03/08/73	
	AMOD$					
66	MOD$	REL	14	5011	03/08/73	
	MOD$					
67	AMAX0$	REL	16	2370	03/08/73	
	AMAX0$					
68	AMAX1$	REL	15	5047	03/08/73	
	AMAX1$					

CATALOG OF SYSMISC FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
69	MAX0$	REL	15	0756	03/08/73	
	MAX0$					
70	MAX1$	REL	16	0456	03/08/73	
	MAX1$					
71	DMAX1$	REL	21	4744	03/08/73	
	DMAX1$					
72	AMIN0$	REL	16	0174	03/08/73	
	AMIN0$					
73	AMIN1$	REL	15	7177	03/08/73	
	AMIN1$					
74	MIN0$	REL	15	6723	03/08/73	
	MIN0$					
75	MIN1$	REL	16	6560	03/08/73	
	MIN1$					
76	DMIN1$	REL	20	7176	03/08/73	
	DMIN1$					
77	FLOAT$	REL	12	6316	03/08/73	
	FLOAT$					
78	IFIX$	REL	12	2654	03/08/73	
	IFIX$					
79	ISIGN$	REL	13	1366	03/08/73	
	ISIGN$					
80	SIGN$	REL	13	3553	03/08/73	
	SIGN$					
81	DSIGN$	REL	50	5024	03/08/73	
	DSIGN$					
82	DIM$	REL	14	4401	03/08/73	
	DIM$					
83	IDIM$	REL	13	1021	03/08/73	
	IDIM$					
84	SNGL$	REL	11	5155	03/08/73	
	SNGL$					
85	REAL$	REL	11	0700	03/08/73	
	REAL$					
86	AIMAG$	REL	12	7716	03/08/73	
	AIMAG$					
87	DBLE$	REL	12	1765	03/08/73	
	DBLE$					
88	CMPLX$	REL	12	4620	03/08/73	
	CMPLX$					
89	CONJG$	REL	12	7452	03/08/73	
	CONJG$					
90	SHIFT$	REL	12	0177	03/08/73	
	SHIFT$					
91	ACOS$	REL	42	6722	03/08/73	
	ACOS$					
92	ALNLOGE	REL	54	5611	03/08/73	
	ALOG.					
	ALOG10.					
93	ALOG$	REL	50	0473	03/08/73	
	ALOG$					
94	ALOG10$	REL	50	2727	03/08/73	
	ALOG10$					
95	AND$	REL	13	1474	03/08/73	
	AND$					

CATALOG OF SYSMISC

REC	NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
96	ASIN$ ASIN$	REL	42	2440	03/08/73	
97	ASNCOSE ASIN. ACOS.	REL	137	5337	03/08/73	
98	ATAN$ ATAN$	REL	36	2152	03/08/73	
99	ATANE ATAN.	REL	76	0536	03/08/73	
100	ATAN2$ ATAN2$	REL	42	3631	03/08/73	
101	ATAN2E ATAN2.	REL	120	6562	03/08/73	
102	CABS$ CABS$	REL	45	5532	03/08/73	
103	CABSE CABS.	REL	31	6426	03/08/73	
104	CCOS$ CCOS$	REL	65	5310	03/08/73	
105	CCOSE CCOS.	REL	27	5457	03/08/73	
106	CEXP$ CEXP$	REL	63	2306	03/08/73	
107	CEXPE CEXP.	REL	25	6004	03/08/73	
108	CLOG$ CLOG$	REL	43	4757	03/08/73	
109	CLOGE CLOG.	REL	32	2764	03/08/73	
110	COMPL$ COMPL$	REL	11	3426	03/08/73	
111	COS$ COS$	REL	50	0404	03/08/73	
112	COSESIN COS.SIN	REL	65	5217	03/08/73	
113	CSIN$ CSIN$	REL	65	3251	03/08/73	
114	CSINE CSIN.	REL	26	2475	03/08/73	
115	CSQRT$ CSQRT$	REL	36	2156	03/08/73	
116	CSQRTE CSQRT.	REL	33	0212	03/08/73	
117	DATAN$ DATAN$	REL	40	4061	03/08/73	
118	DATAN2$ DATAN2$	REL	44	3727	03/08/73	
119	DATANE DATAN. DATAN2.	REL	210	5235	03/08/73	
120	DCOS$ DCOS$	REL	45	0150	03/08/73	
121	DEXP$ DEXP$	REL	52	4402	03/08/73	
122	DEXPE DEXP.	REL	130	2525	03/08/73	

REC	CATALOG OF SYSMISC NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
123	DLNLOGE DLOG. DLOG10.	REL	175	1241	03/08/73	
124	DLOG$ DLOG$	REL	52	0121	03/08/73	
125	DLOG10$ DLOG10$	REL	52	4422	03/08/73	
126	DMOD$ DMOD$	REL	50	5645	03/08/73	
127	DMODE DMOD.	REL	35	3565	03/08/73	
128	DSIN$ DSIN$	REL	45	5211	03/08/73	
129	DSNCOSE DSIN. DCOS.	REL	175	2767	03/08/73	
130	DSQRT$ DSQRT$	REL	43	6377	03/08/73	
131	DSQRTE DSQRT.	REL	42	6245	03/08/73	
132	DTOD$ DTOD$	REL	103	6635	03/08/73	
133	DTODE DTOD. DTOD$.	REL	31	4632	03/08/73	
134	DTOI$ DTOI$	REL	107	7407	03/08/73	
135	DTOIE DTOI. DTOI$.	REL	34	1640	03/08/73	
136	DTOX$ DTOX$	REL	102	4405	03/08/73	
137	DTOXE DTOX. DTOX$.	REL	26	0147	03/08/73	
138	DTOZ$ DTOZ$	REL	117	2164	03/08/73	
139	DTOZE DTOZ. DTOZ$.	REL	35	2612	03/08/73	
140	DISPLA$ DISPLA$	REL	265	2140	03/08/73	
141	EXP$ EXP$	REL	62	4003	03/08/73	
142	EXPE EXP.	REL	57	7351	03/08/73	
143	HYPERBE HYPERB.	REL	41	7555	03/08/73	
144	ITOD$ ITOD$	REL	102	3475	03/08/73	
145	ITODE ITOD. ITOD$.	REL	32	1174	03/08/73	
146	ITOJ$ ITOJ$	REL	63	1063	03/08/73	

CATALOG OF SYSMISC FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
147	ITOJE ITOJ. ITOJ$.	REL	27	3061	03/08/73	
148	ITOX$ ITOX$	REL	75	0767	03/08/73	
149	ITOXE ITOX. ITOX$.	REL	26	5016	03/08/73	
150	ITOZ$ ITOZ$	REL	116	2322	03/08/73	
151	ITOZE ITOZ. ITOZ$.	REL	17	1446	03/08/73	
152	LABEL$ LABEL$	REL	44	1657	03/08/73	
153	LEGVAR$ LEGVAR$	REL	14	3447	03/08/73	
154	LOCF$ LOCF$	REL	11	1353	03/08/73	
155	OR$ OR$	REL	13	5546	03/08/73	
156	OVERLA$ OVERLA4	REL	173	3035	03/08/73	
157	PAUSE$ PAUSE.	REL	31	6723	03/08/73	
158	RANDOME RANDOM. RANMLT.	REL	13	3633	03/08/73	
159	RANF$ RANF$	REL	17	0271	03/08/73	
160	RANGET$ RANGET$	REL	15	1250	03/08/73	
161	RANSET$ RANSET$	REL	23	1463	03/08/73	
162	REMARK$ REMARK$	REL	37	7252	03/08/73	
163	SEGMEN$ SEGMENR	REL	163	1525	03/08/73	
164	SIN$ SIN$	REL	50	4457	03/08/73	
165	SINCOSE SIN. COS.	REL	72	4663	03/08/73	
166	SLITE$ SLITE$	REL	35	1711	03/08/73	
167	SLITET$ SLITET$	REL	36	0310	03/08/73	
168	SQRT$ SQRT$	REL	42	3703	03/08/73	
169	SQRTE SQRT.	REL	33	4661	03/08/73	
170	SSWTCH$ SSWTCH$	REL	36	7007	03/08/73	
171	TAN$ TAN$	REL	44	0341	03/08/73	

CATALOG OF SYSMISC FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
172	TANE	REL	111	2350	03/08/73	
	TAN.					
173	TANH$	REL	36	0200	03/08/73	
	TANH$					
174	TANHE	REL	45	2043	03/08/73	
	TANH.					
175	TIME$	REL	47	6344	03/08/73	
	TIME$					
	DATE$					
	SECOND$					
176	XTOD$	REL	102	3275	03/08/73	
	XTOD$					
177	XTODE	REL	31	1420	03/08/73	
	XTOD.					
	XTOD$.					
178	XTOI$	REL	67	3174	03/08/73	
	XTOI$					
179	XTOIE	REL	26	5301	03/08/73	
	XTOI.					
	XTOI$.					
180	XTOY$	REL	75	4045	03/08/73	
	XTOY$					
181	XTOYE	REL	25	1100	03/08/73	
	XTOY.					
	XTOY$.					
182	XTOZ$	REL	116	2750	03/08/73	
	XTOZ$					
183	XTOZE	REL	35	1406	03/08/73	
	XTOZ.					
	XTOZ$.					
184	ZTOI$	REL	110	1570	03/08/73	
	ZTOI$					
185	ZTOIE	REL	33	2073	03/08/73	
	ZTOI.					
	ZTOI$.					
186	DDSUBMV	REL	166	5161	03/17/73	
	D.SUBMV					
187	DDCOBIO	REL	5531	5031	03/17/73	
	D.OPRAN					
	D.OPIN					
	D.OPOT					
	D.CLOS					
	D.WRITE					
	D.READ					
	D.MOCKR					
	D.MOCKW					
	D.WAA					
	D.CRELR					
	D.WBA					
	D.RERUN					
	D.SEEK					
	D.TBIG					
	D.TSMAL					
	FRDGJO					
	D.NEWP					

CATALOG OF SYSMISC FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
188	DDEXP	REL	52	7543	03/17/73	
	D.EXP					
189	DDANCM	REL	205	5674	03/17/73	
	D.ALPCM					
	D.NUMCM					
190	DDSUBSC	REL	210	3473	03/17/73	
	D.SBSC1					
	D.STOR					
	D.STOR1					
	D.SBSC2					
	D.SBSC6					
	D.SBSC7					
	D.SBSCK					
191	DDSOL	REL	135	5351	03/17/73	
	SOL					
	SOLP					
	SOLE					
	OVRLYNM					
192	DDSORT	REL	642	4550	03/17/73	
	D.SORT					
	D.SRTFL					
193	FINIS	REL	136	3373	03/17/73	
	D.FINIS					
	D.FILES					
194	DDDSPLY	REL	447	0660	03/17/73	
	D.DSPLY					
	D.WRDSP					
	D.STOP					
	D.DATE					
	D.PAUSE					
195	DDXCEPT	REL	320	0477	03/17/73	
	D.XCEPT					
	TERMINL					
196	DDDADD	REL	36	1735	03/17/73	
	D.DADD					
197	DDFIVED	REL	141	3447	03/17/73	
	D.TEMPI					
	D.FIVED					
	D.TEMP7					
	D.ZERO					
	D.SIXES					
	D.TEMPN					
	D.TEMPC					
	D.TEMP					
	D.BLANK					
	D.TEMPS					
	D.SRCH1					
	D.MXOFF					
198	DDTRUBL	REL	143	4746	03/17/73	
	D.UNDFP					
	D.TRUBL					
199	DDZONE	REL	163	5250	03/17/73	
	D.ZONE3					
	D.ZONE5					
	D.ZONE6					
	D.ZONE7					

REC	CATALOG OF SYSMISC NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	D.ZONE0					
	D.ZONE1					
	D.ZONE2					
	D.ZONE4					
200	DDSTRP	REL	173	1421	03/17/73	
	D.STRP1					
	D.STRP2					
	D.STRP3					
	D.STRP4					
201	DDDATCN	REL	102	5612	03/17/73	
	D.DATCN					
202	DDTENDP	REL	124	6273	03/17/73	
	D.TENDP					
	D.SLASH					
	D.SLSH1					
	D.QUOT2					
	D.DIVS1					
	D.DIVS2					
	D.DIVD2					
	D.DIVD1					
203	DDTENS	REL	36	0705	03/17/73	
	D.TENS					
204	DDTNTHS	REL	63	7564	03/17/73	
	D.TNTHS					
	D.FIVES					
205	DDCVBD	REL	165	1057	03/17/73	
	D.CVBD3					
	D.CVBD5					
	D.CVBD6					
	D.CVBD7					
206	DDBN	REL	237	3264	03/17/73	
	D.BN1SS					
	D.BN6SS					
	D.BN1DS					
	D.BN6DS					
	D.BN1DD					
	D.BN6DD					
	D.BN1SB					
207	DDED	REL	470	3325	03/17/73	
	D.ED3					
	D.ED5					
	D.ED6					
	D.ED7					
	D.EDI					
	D.A0					
	D.A06					
	D.A07					
208	DDEDAL	REL	163	1610	03/17/73	
	D.EDAL					
209	DDEDIT	REL	534	6467	03/17/73	
	D.EDIT3					
	D.EDIT5					
	D.EDIT6					
	D.EDIT7					
	D.EDITI					

REC	CATALOG OF SYSMISC NAME	TYPE	FILE LENGTH	1 CKSUM	DATE	COMMENTS
	D.AOPT					
	D.AOPT6					
	D.AOPT7					
210	DDEDALP	REL	167	4043	03/17/73	
	D.EDALP					
211	DDEOP	REL	232	0076	03/17/73	
	D.EOP1					
	D.EOP2					
	D.EOP3					
	D.EOP4					
	D.EOP5					
	D.SAVA					
212	DDEXAMO	REL	401	3747	03/17/73	
	D.EXAMO					
213	DDMOVIO	REL	200	6154	03/17/73	
	D.MOVIO					
214	DDBCDCM	REL	326	4255	03/17/73	
	D.BCDCM					
	D.BCDCP					
215	CONV1	REL	117	1614	03/17/73	
	CONV1					
216	DDPAGE	REL	140	6226	03/17/73	
	D.PAGE					
217	DDLNCT	REL	105	5040	03/17/73	
	D.LNCT					
218	DDSPPR	REL	137	1153	03/17/73	
	D.SPPR					
219	DDSPACE	REL	207	1412	03/17/73	
	D.SPACE					
220	DDINITL	REL	130	5466	03/17/73	
	D.CFRST					
	D.NIT					
	D.INITL					
221	DDPRINT	REL	230	3132	03/17/73	
	D.PRINT					
	D.REPC					
	D.REPQ					
	D.REPA					
	D.RHPH					
	NOSPACF					
222	DDRGEN	REL	362	0650	03/17/73	
	D.RSET					
	D.RGEN					
	D.CHG00					
	D.CHG01					
	D.CHG02					
	D.TABL2					
	D.CHG03					
	D.CHG04					
	D.CHG05					
	D.CHG06					
	D.CHG07					
	D.CHG08					
	D.CHG09					
	D.RPGRP					
	D.RPTAB					

CATALOG OF SYSMISC FILE 1

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
	D.ADDFL					
	D.ADDSM					
	D.LEVL					
	D.TERM					
	D.LEVEL					
	D.ERROR					
	D.FETR					
	D.JSTIN					
	D.RESC					
	D.RJ					
223	DDBEGRP	REL	23	2202	03/17/73	
	D.BEGRP					
224	DDENDRP	REL	23	3141	03/17/73	
	D.ENDRP					
225	DECK10	REL	5604	4312	03/17/73	
	PARS					
	FEIL					
	CEMPTY					
	CIOERR					
	T.RROPN					
	OCTBCD					
	RFNAME					
	RWRITE					
	FBLA					
	T.RANFD					
	T.GTRCD					
	T.XTRCT					
	ERFLAG					
	RWOPEN					
	CRECALL					
	CHKPT					
	CSEQERR					
	MDSKFUL					
	VBKA					
	VDKA					
	T.MPTY					
	VBRA					
	VBTA					
	VBSA					
	RANREAD					
	VDRA					
	VDTA					
	VDSA					
	FDBA					
	VDRU					
	VBRU					
	FILNAM					
	CTOOBIG					
	ERFILE					
	S.CIOUP					
	CTOOFUL					
226	DECK12	REL	10652	6250	03/17/73	
	SMCON					
227	SYSMISC	OPLD	705	5545	73/06/12.	
228	* EOF *	SUM =	137031			

3.4.10 TRANLIB

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      CATALOG OF TRANLIB          FILE     1                          73/06/12. 02.39.20.      PAGE      1
REC   NAME       TYPE           LENGTH     CKSUM      DATE      COMMENTS

  1   TRANLIB    ULIB               63      5030    73/06/12.
  2   CALLTSK    REL                31      6055  73/05/20. 72/07/09.          REQUEST SCHEDULING OF TASK(S).
       CALLTSK
  3   CEASE      REL                20      3267  73/05/20. 72/07/09.          TERMINATE TASK EXECUTION.
       CEASE
  4   CMDUMP     REL                57      1524  73/05/20. 72/07/24. 72/10/05. DUMP CENTRAL MEMORY.
       CMDUMP
  5   DMGR       REL               267      6377  73/05/20. 72/07/09.          DATA MANAGER REQUESTS.
       ADDR
       BLKGET
       BLKPUT
       GETT
       GETL
       GETN
       GETNL
       GETB
       GETBL
       GETR
       GETRB
       GETRBL
       GETRL
       GETNR
       GETNRL
       LOCKF
       PURGER
       PUT
       PUTF
       PUTI
       PUTIF
       PUTR
       PUTRF
       PUTRI
       PUTRIF
       RECALAL
       RELES
       RELESAL
       RECHAIN
       REPOS
       UNLOK
       UNLOKAL
       UNLOKF
  6   DSDUMP     REL                40      2017  73/05/20. 72/07/24. 72/10/05. DIRECT SUBSEQUENT DUMPS.
       DSDUMP
  7   JOURNL     REL                31      7047  73/05/20. 72/07/09.          ISSUE JOURNAL MESSAGE.
       JOURNL
  8   SEND       REL                70      0467  73/05/20. 72/07/09.          SEND MESSAGE TO TERMINAL.
       SEND
  9   TARO       REL                36      5667  73/05/20. 72/08/31.          TERMINAL ARGUMENT OPERATIONS.
       TARO
 10   TSIM       REL                40      2541  73/05/20. 72/08/31.          TERMINAL STATUS AND INFORMATION.
       TSIM
 11   TRANLIB    OPLD               25      5260    73/06/12.

 12   * EOF *       SUM =         1006
```

ADDITIONAL MANUALS 4

The following manuals contain additional information on the KRONOS 2.1 supported software.

4.1 MANUALS FOR PRODUCTS IN KRONOS 2.1 PACKAGE

Publication	Publication Number
KRONOS 2 1 General Information Manual	60407100
KRONOS 2.1 Reference Manual	60407000
KRONOS 2.1 Instant Manual	60407200
KRONOS 2.1 Operator's Guide	60407700
COMPASS Version 3 Reference Manual	60360900
COMPASS Version 3 General Information Manual	60343400
COMPASS Version 3 Instant	60361000
COMPASS Version 3 Instruction Card	60361700
Modify Reference Manual	60281700
Modify Instant	60283000
KRONOS 2.1 Export/Import Reference Manual	59150500
Record Manager Version 1 Reference Manual	60307300
Record Manager File Organization User's Guide	60359600
KRONOS 2.1 Text Editor Reference Manual	60408200
KRONOS 2.1 Time-Sharing User's Reference Manual	60407600
KRONOS 2.1 Terminal User's Instant	60407800
Update Reference Manual	60342500
Update Instant	60360200

4.2 MANUALS FOR OPTIONAL PRODUCTS

Publication	Publication Number
ALGOL Version 3 Reference Manual	60329000
APL*CYBER Reference Manual	19980400
KRONOS 2.1 BASIC Reference Manual	19980300
COBOL Version 4 Reference Manual	60384100
COBOL Version 4 General Information Manual	60327800
COBOL Version 4 Instant	60328400

Publication	Publication Number
Cyberlink Interchange, Version 1 Reference Manual	60373300
Cyberlink Interchange, Version 1 Operator's Guide	60408400
FORTRAN Version 2.3 Reference Manual	60174900
FORTRAN Version 2.3 Instant	60189500
FORTRAN Extended Version 4 Reference Manual	60305600
FORTRAN Extended Version 4 General Information Manual	60327900
FORTRAN Extended Version 4 Instant	60357900
FORTRAN Extended Debug User's Guide	60329400
PERT/Time Version 1.2 Reference Manual	60133600
PERT/Time Version 1.2 General Information Manual	60133300
SIMSCRIPT Version 3 Reference Manual	60178300
SIMSCRIPT Version 3 General Information Manual	60173500
SIMULA Version 1 Reference Manual	60234800
SIMULA Version 1 General Information Manual	60251900
SIMULA Version 1 Instant	60235100
Sort/Merge Version 4 Reference Manual	60343900
Sort/Merge Version 4 General Information Manual	60342400
Sort/Merge Version 4 Instant	60344000
KRONOS 2.1 Time-Sharing FORTRAN Reference Manual	60408600
KRONOS 2.1 Transaction Subsystem Reference Manual	60407900
KRONOS 2.1 Transaction Subsystem Operator's Guide Addendum	60408000

SUMMARY OF DEADSTART 1

Deadstart is the process of loading the current version of the KRONOS 2.1 deadstart tape into core memory and mass storage. The KRONOS 2.1 deadstart tape consists of a single binary file of programs recorded as logical records. These logical records are divided into groups that are separated by zero-length records. Refer to part III, section 1.1.9, for the system catalog.

1.1 PROCEDURE

The deadstart process includes the following actions.

- Mounting the deadstart tape
- Setting the deadstart panel to indicate:

  The appropriate CMRDECK

  The deadstart function (maintenance deadstart, automatic system deadstart, or system deadstart with options)

  The system devices if the CMRDECK and IPRDECK are not to be modified
- Activating the DEADSTART switch
- Initializing the system
- Initiating job processing

The following outline lists the procedure necessary to deadstart a KRONOS 2.1 system. It references sections containing detailed instructions.

Mount Deadstart Tape

1. Ensure that all mass storage devices are mounted and/or available.
2. Mount current deadstart tape on tape unit to be specified on deadstart panel (word 2 specifies deadstart tape unit and controller); ready the unit.

   Refer to section 2 of the operator's guide for instructions for mounting the deadstart tape.

Set Deadstart Panel

3. Set deadstart panel for deadstart tape loading control and to select (in word 13) the CMRDECK and deadstart function (system or maintenance deadstart).

   Part II, section 2, describes deadstart panel selections.

If system deadstart is selected, also specify (in word 14) the level of deadstart, CPU options, and system devices (if CMRDECK and IPRDECK are not to be modified).

a. Set MODE switch to LOAD

b. Set toggle switches of deadstart panel

4. Momentarily activate either the DEADSTART switch on the deadstart panel or the switch on the system console.

5. The information displayed at the system console depends upon the deadstart function chosen in word 13, yyy.

Maintenance Deadstart (yyy=010 or 011)

Note specific information for 010 (PPU 0 memory display) and 011 (load deadstart dump program).

Specific information is in part II, section 2.3, under yyy=010 and 011.

System Deadstart With Deadstart Options Displayed (yyy=001)

Select one or more of the following.

The deadstart option display is described in part II, section 3.1.

a. Select dump or test option. Continue with step 4 after any of these options.

These options are defined in part II, sections 3.3 through 3.5 and 3.7 through 3.9.

b. Select one or more options to change the deadstart panel settings. Then, continue with the (CR) option.

These options are defined in part II, sections 3.6 and 3.10 through 3.14.

c. Press (CR) to select the load system option

Refer to part II, section 3.2.

Deadstart continues according to the same dependencies as noted in Automatic System Deadstart.

Automatic System Deadstart (yyy=000)

Deadstart continues as follows:

a. If bits 0 through 5 of word 14 are currently set, the system library is loaded onto the system devices. Continue with step 9; there are no further options before initializing the system.

Refer to part II, section 3.2.1.

b. If bits 0 through 5 of word 14 are currently 000 000, CMRINST is displayed. Continue with step 6.

Refer to part II, section 3.2.2.

6. CMRDECK modification

CMRINST appears on the system console display; alternate between the CMRINST and the CMRDECK displays by pressing the right blank key.

CMRDECK is described in part II, section 4.

Enter any CMRDECK information (when CMRINST or CMRDECK are displayed), or continue with step 7.

7. IPRDECK modification

To load the system library without displaying IPRINST or IPRDECK, continue with step 8.

IPRDECK is described in part II, section 5.

To display and modify the current IPRDECK (while CMRDECK or CMRINST is displayed):

Type NEXT.
Press (CR)

IPRINST is displayed; alternate between the IPRINST and the current IPRDECK displays by pressing the right blank key. (The current IPRDECK is specified in the current CMRDECK.)

Enter any IPRDECK information and/or continue with step 8.

8. To indicate that all modifications to the CMRDECK and IPRDECK are completed:

Type GO.
Press (CR)

9. If the system deadstart level is 0 or 2, the system is loaded on the current system devices; if no system devices are specified, the system is automatically loaded on the EST ordinal 0 device.

If level 1, the system library is recovered from the last checkpoint; if level 3, the system library is recovered from the current system device and RPL is recovered from the current central memory residence.

If a deadstart error occurs, a message appears on the right screen. If the system is loaded from the deadstart tape, the decks being loaded are displayed on the right screen as deadstart status messages. If the screen is blank, check the deadstart panel for correct settings.

10. DSD requests on the left screen that the date and time be entered.

    It is possible to recover the date and time from the previous deadstart if this is a level 3 deadstart. However, it is recommended to enter the correct date and time with each deadstart because the system enters the date and time into the system dayfile, error log dayfile, and account dayfile along with the appropriate messages.

    DSD requests the date.

    ENTER DATE YY/MM/DD.

11. Type yy/mm/dd.
    Press (CR)

yy	Year; 0 through 99
mm	Month; 1 through 12
dd	Day; 1 through n; n is number of days in month

    To recover previous date on a level 3 deadstart, press CR. For other levels, pressing CR causes the system to set the date to when the deadstart tape was created.

12. When DSD accepts the date entry, it requests the time.

    ENTER TIME HH.MM.SS.

13. Type hh.mm.ss.
    Press (CR)

hh	Hour; 0 through 23
mm	Minute; 0 through 59
ss	Second; 0 through 59

    To recover the time from the previous deadstart (time entered at original deadstart plus time accumulated until deadstart button is pressed, which causes the system to cease operation) on a level 3 deadstart, press CR. On other levels, pressing CR causes the system to set the time to 00.00.00.

14. If the DSD commands, AUTO, MAINTENANCE, and ISF, are part of the IPRDECK as is recommended, then if loading from a deadstart tape, the first of these commands appears on the left screen and is flashed after date and time are entered. (Each DSD command in the IPRDECK flashes while it is processed.) If the tape load is not complete, these DSD commands may be bypassed by pressing the left blank key until the flashing entry is clear; continue with step 17.

    If these commands are not part of the IPRDECK, then to continue, initiate job processing by assigning control points to the standard packages.

    Type AUTO.
    Press (CR)

    Also, to activate system files VALIDUX (account validation), PROFILO (project validation, if available), RESEXDF and RESEXVF (resource management control files):

    Type X.ISF.
    Press (CR)

    Refer to operator's guide.

15. When the deadstart tape is rewound to load point, deadstart is complete. The deadstart tape is not required again during system operation unless another deadstart is necessary. It is possible to clear, unload, and remove the deadstart tape to use the tape unit for other operations.

16. If the entries in the IPRDECK do not suit the local environment, alter the job control parameters by entering DSD commands.

    Refer to operator's guide.

17. If this deadstart procedure used the deadstart tape released with the system, then continue with the general procedure to construct a deadstart tape that is modified to represent the customer's requirements.

    If this deadstart procedure used a deadstart tape already modified to represent the customer's requirements, the system is now ready for use.

    Part I, section 3 describes how to create a modified and/or updated deadstart tape.

1.2 POTENTIAL DEADSTART PROBLEMS

If errors are encountered during deadstart, a descriptive message is displayed on the right console screen and deadstart halts. Refer to the error processing information in section 2 of the operator's guide.

The following are other problems that may occur during deadstart.

Problem	Cause
Tape moves but stops before any display is activated.	• There is a parity error on one of the first records of the deadstart tape. • The deadstart tape is not an I-mode unlabeled tape. • A 7-track tape is mounted on a 9-track drive, or vice-versa.
Tape does not move.	• If the unit light of the deadstart tape unit is lighted, the correct unit is selected but the deadstart panel is set incorrectly. Often it is the load address in word 12 that is not set correctly. • If the unit light does not light, check the channel, controller, and unit selections on the deadstart panel. • Two or more units may have the same physical unit number. • Unit is not ready.

DEADSTART PANEL SETTINGS 2

2.1 GENERAL DESCRIPTION

The deadstart program is a 12-instruction program that is transferred from the deadstart panel to locations 1 through 14_8 in PPU 0 memory to execute when the DEADSTART switch is activated.

The deadstart program:

- Specifies and activates the equipment to read the deadstart tape (words 1 through 12)
- Selects the CMRDECK to be used to deadstart (word 13, xxx xxx)
- Specifies whether the deadstart is to be a system or a maintenance deadstart (word 13, yyy)
- Specifies the following system deadstart variables:
  - Devices on which system library is to reside (word 14, sss sss)
  - Central processor options (word 14, ppp)
  - Level of system deadstart (word 13, rrr)

Figure II-2-1 illustrates the deadstart panel switch positions for the KRONOS 2.1 deadstart program.

WORD	SWITCH (BIT) POSITIONS											
	11	10	9	8	7	6	5	4	3	2	1	0
0001	1	1	1	1	0	1	c	c	c	c	c	c
0002	1	1	1	1	1	1	c	c	c	c	c	c
0003	e	e	e	0	0	0	0	0	u	u	u	u
0004	1	1	1	1	1	1	c	c	c	c	c	c
0005	0	0	0	0	0	0	0	0	1	0	0	0
0006	1	1	1	1	1	1	c	c	c	c	c	c
0007	0	0	1	1	0	0	0	0	0	0	0	0
0010	1	1	1	1	0	0	c	c	c	c	c	c
0011	1	1	1	0	0	1	c	c	c	c	c	c
0012	1	1	0	1	1	0	0	0	0	1	1	0
0013	0	0	0	x	x	x	x	x	x	y	y	y
0014	r	r	r	p	p	p	s	s	s	s	s	s

Figure II-2-1. KRONOS 2.1 Deadstart Program

The switch positions indicated by a 1 (switch in up position) or a 0 (switch in down position) are mandatory settings. However, the switch positions for fields represented by alphabetic characters are determined by each installation. Each of these fields is described in the information in the following sections.

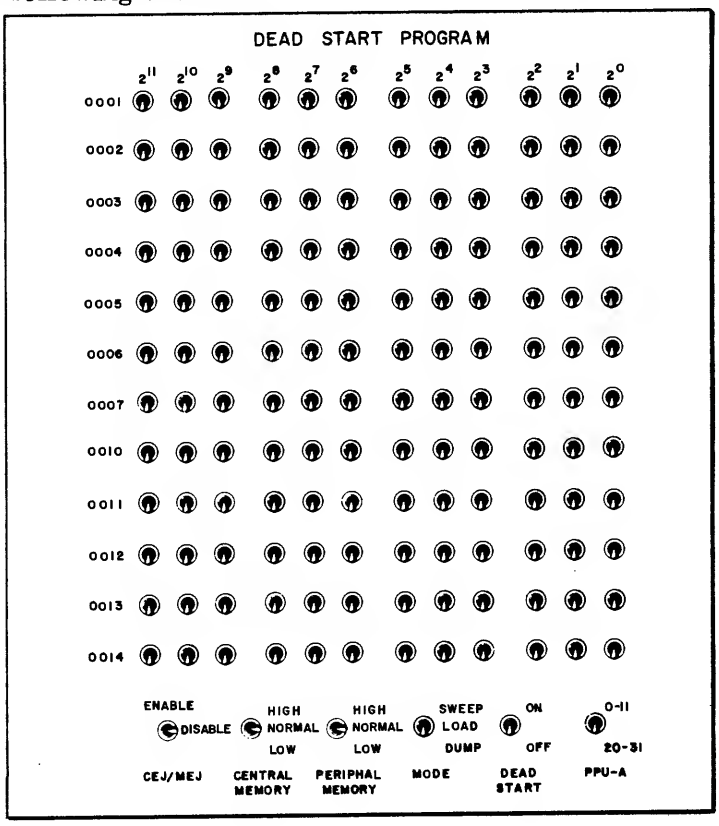


Figure II-2-2. Deadstart Panel

In reference to Figure II-2-2, move switch up to set in 1 or ON position; move switch down to set in 0 or OFF position. Activate the DEADSTART switch by briefly holding in ON position.

2.2 WORDS 0000 THROUGH 0012

Set the switches for words 0000 through 0012 to identify the magnetic tape unit on which the deadstart tape is mounted, its associated controller, and the channel used to access this equipment.

0001	111	101	ccc	ccc
0002	111	111	ccc	ccc
0003	eee	000	00u	uuu
0004	111	111	ccc	ccc
0005	000	000	001	000
0006	111	111	ccc	ccc
0007	001	100	000	000
0010	111	100	ccc	ccc
0011	111	001	ccc	ccc
0012	110	110	000	110

ccc ccc	Channel used to access the magnetic tape equipment
eee	Controller associated with magnetic tape unit uuu
uuu	Magnetic tape unit on which the deadstart tape is mounted

When the deadstart panel is set and the deadstart switch is activated, the hardware automatically:

- Master clears all data channels and sets them to the active and empty condition
- Assigns all PPUs to their corresponding data channels (that is, PPU 1 to channel 1, etc.)
- Sets each PPU to the IAM instruction, so that each PPU is waiting for data to become available on its associated channel
- Loads contents of deadstart panel into PPU 0 memory, disconnects the deadstart panel, disconnects channel 0, and causes the deadstart program (PRL) that was read from the deadstart panel to execute. PRL has two functions: to display and process any maintenance options that are selected and to load the proper records from tape that are selected. (For example, if the PP0 or EJT options are selected, PRL loads these records.)

2.3 WORD 0013

Word 13 specifies the deadstart function and the CMRDECK to be used at deadstart.

0013	000 xxx xxx yyy

yyy — These switches specify the deadstart function that occurs when the deadstart switch is activated. These functions are system deadstart or maintenance deadstart.

The maintenance deadstart function allows KRONOS to be used to perform hardware or software maintenance tasks. Only the maintenance operation selected can be performed; processing of user jobs is not possible.

yyy	Deadstart Function
000	Automatic system deadstart

PRL automatically loads the system without displaying deadstart options, bypasses maintenance tests PP0, DDD, PMM, MM2, and EJT, and activates SET (processes CMRDECK entries).

The first display to appear at the system display after the deadstart switch is activated is determined by the setting of word 14, bits 0 through 5.

yyy	Deadstart Function

Generally this automatic process consists of the following.

1. Validates labels on all mass storage devices. This is done to ensure that the configuration matches that specified in the CMRDECK being used.

2. Builds central memory tables that reflect information contained in the device labels (level zero deadstart only). If a recovery deadstart is being performed, the central memory tables can be recovered from checkpoint information on mass storage (levels 1 and 2) or verified against information in device labels if central memory is found to be intact (level 3).

3. Loads base operating system (core system) programs into central memory. The amount of loading to be performed depends upon the level of deadstart selected in word 14.

001 System deadstart with deadstart options displayed

The deadstart options are displayed on the left console screen when the DEADSTART switch is activated. Deadstart proceeds according to the options selected.

The display and entries that can be made at the system console are described in part II, section 3. (The remaining field in word 13 and all fields of word 14 are optional when yyy=001 because the options display allows the operator to specify values for these fields from the console keyboard. However, it is recommended that these fields be set on the deadstart panel in order to establish default values. In this case, the options display can be used when it is required to alter the default values established on the deadstart panel.

The display that occurs after the deadstart options display depends upon the current setting of word 14, sss sss. (The deadstart panel setting of word 14 can be overridden with the W deadstart option described in part II, section 3.1.)

010 Maintenance deadstart that displays the contents of PPU 0

PRL loads PP0, the memory display program, into PPU memory. PP0 displays the contents of PPU 0 on both system console display screens.

This function is generally used by engineers to enter sample PPU programs (for example, to test peripheral devices on the system).

yyy	Deadstart Function
	To perform another deadstart function, it is necessary to reset this field (yyy) on the deadstart panel and activate the DEADSTART switch. PPU 0 memory can also be displayed when the deadstart options are displayed (part II, section 3.8).
011	Maintenance deadstart to load DDD. PRL loads DDD, the deadstart dump program, into PPU memory when the DEADSTART switch is activated. It allows the contents of PPU memory and/or central memory to be dumped to a specified line printer. Refer to part II, section 3.3 for dump procedures. To continue after dump processing, reset this field (yyy) on the deadstart panel choosing another deadstart function, and activate the DEADSTART switch. Other maintenance deadstarts may be selected during a system deadstart with options displayed (yyy=001). These are EJT, EDD, MM2, and PMM.
xxx xxx	These switches specify which CMRDECK on the deadstart tape is to be used to deadstart. CMRDECK is described in detail in part II, section 4. There can be up to 64_{10} CMRDECKs on the deadstart tape. If it is necessary to perform a level 1, 2, or 3 (recovery) deadstart, the CMRDECK selected during the most recent level 0 deadstart must be used. Levels of deadstart are discussed under word 14. It is not necessary to specify the CMRDECK on the deadstart panel if system deadstart with options displayed is selected in word 13 (yyy=001). In this case, the options displayed allow the operator to specify the CMRDECK to be used from the console keyboard. Additionally, values entered via the options display have precedence over those specified on the deadstart panel. For example, bits 3 through 8 of word 13 on the deadstart panel (xxx xxx) could be set to select the CMRDECK most frequently used by an installation. Another CMRDECK could then be selected when necessary via the options display during a level 0 deadstart.

2.4 WORD 0014

Word 14 is significant only for a system deadstart (word 13, yyy). It specifies the system devices, the central processor options, and the level of system deadstart.

0014	rrr ppp sss sss

sss sss

These switches specify whether the CMRDECK and IPRDECK are to be displayed before loading the system library or whether deadstart is to load the system library without further displays.

It is not necessary to enter word 14 on the deadstart panel if system deadstart with options displayed is selected in word 13 (yyy=001). In this case, the options provided allow the operator to enter all values for word 14 from the console keyboard. The values entered through the options display have precedence over those specified on the deadstart panel.

sss sss	Action
set	These switches (bits 0 through 5) correspond to the mass storage devices defined in the first six entries (ordinals 0 through 5) of the equipment status table (EST). Each switch that is set to the ON position specifies that the system library will reside on the corresponding mass storage device. If more than one device is specified, system efficiency can be greatly improved because more than one system file can then be accessed at the same time. All devices specified must be of the same equipment type. For example, if sss sss is set to 000 101, when the DEADSTART switch is activated the system library from the deadstart tape is placed on mass storage equipment with EST ordinals 0 and 2. The equipment assigned to EST ordinals 0 and 2 must be defined in the CMRDECK as the same type of mass storage equipment. The next display when sss sss is set is the request for date and time. There is no opportunity to alter the CMRDECK or IPRDECK.
000 000	Deadstart displays CMRINST when this setting is selected for sss sss; the CMRDECK selected in word 13 or the IPRDECK specified in the CMRDECK can be altered. Therefore, when it is necessary to make modifications to the CMRDECK during deadstart, no system device can be specified on the deadstart panel. In this case, one of the CMRDECK entries is the SYSTEM entry which allows specifying any of the mass storage devices assigned to the first 17 EST entries as system devices (whereas only mass storage devices assigned to EST ordinals 0 through 5 can be specified via the deadstart panel switches). Refer to section 4 for CMRDECK modifications and to section 5 for IPRDECK modifications.

sss sss Action

In summary, there are three opportunities to select the system device(s).

1. Place one or more of the switches identified by sss sss in the ON position.
2. Select option to enter word 14 via the options display.
3. Specify the SYSTEM entry when making CMRDECK modifications.

If a system device is never specified, the system library will reside on the mass storage device assigned to the first entry of the EST by default.

ppp These switches designate the central processor control settings.

ppp	Central Processor Control Option
bit 6	CPU 0 option
0	Indicates that CPU 0 is available in the system. This switch is significant only for dual CPU systems and is normally left in this position.
1	Indicates that CPU 0 is not available in the system. On dual CPU systems, this allows use of the system when CPU 0 is down. CPU 0 and CPU 1 should not be disabled simultaneously (bits 6 and 7 both in up position).

NOTE

If both CPU 0 and CPU 1 are set to 0 (available), the system determines if both CPUs are available.

bit 7	CPU 1 option
0	Indicates that CPU 1 is available in the system. This switch is significant only for dual CPU systems and is normally left in this position.
1	Indicates that CPU 1 is not available in the system. On dual systems, this allows use of the system when CPU 1 is down. CPU 0 and CPU 1 should not be disabled simultaneously.

NOTE

If both CPU 0 and CPU 1 are set to 0 (available), the system determines if both CPUs are available.

ppp	Central Processor Control Option
bit 8	CEJ/MEJ option
	0 Indicates that CEJ/MEJ option is enabled
	1 Disables CEJ/MEJ option. This is not recommended because KRONOS automatically determines if the CEJ/MEJ option is present and initializes accordingly. Therefore, this switch should always be set to the down position. System failure may result if the CEJ/MEJ option is present in the system and is disabled in this manner. If it is necessary to disable the CEJ/MEJ option for maintenance purposes, use the keylock switch labeled CEJ/MEJ at the bottom of the deadstart panel. Refer to Figure II-2-2 in this section.

rrr These switches designate the level of system deadstart. For additional information concerning levels of deadstart, refer to section 3 of the operator's guide.

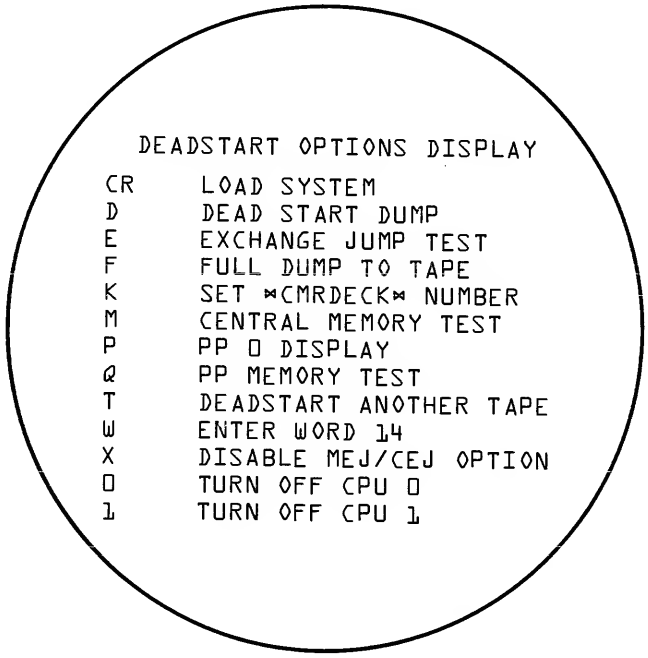
rrr	Level of System Deadstart
000	Indicates an initial or level 0 system deadstart in which the system is loaded from the deadstart tape. This is not considered to be a recovery deadstart although permanent files are recovered automatically. Permanent files are recovered on all levels of system deadstart. Level 0 is specified for the first deadstart following a period in which the system has been inoperative or has been used for other than KRONOS operations. If it becomes necessary to redeadstart the system (because of system malfunction, for example), it is recommended that a level 3 recovery deadstart be attempted. If level 0 is selected, all jobs and active files are lost and the system is reloaded from the deadstart tape.
001	Indicates a level 1 recovery deadstart whereby the system, all jobs, and all active files are recovered from checkpoint information on mass storage. All permanent files are also recovered. At level 1, recovery deadstart is normally performed following a system malfunction that destroys the contents of central memory. Level 1 recovery is effective only if the DSD command CHECK POINT SYSTEM (refer to operator's guide) has been issued prior to the system malfunction. Additionally, if a significant amount of system activity has occurred since the last checkpoint was performed, the checkpoint information may no longer be reliable. In this case, it is recommended that a level 0 (initial) deadstart be performed. It may be desirable to perform a level 1 recovery deadstart temporarily (where possible) in order to dump accounting information (refer to DSD command ACCOUNT in operator's guide).

rrr	Level of System Deadstart
	Unless the operator is certain that the content of central memory was destroyed by the system malfunction, he should always attempt to perform a level 3 recovery deadstart (rrr=011) before attempting level 1 recovery.
010	Indicates a level 2 recovery deadstart whereby all jobs and active files are recovered from checkpoint information. Permanent files are also recovered. However, the system is loaded from a deadstart tape. Level 2 recovery deadstart is normally used in system test situations.
011	Indicates a level 3 recovery deadstart whereby the system, all jobs, and all active files are recovered from central memory tables. Permanent files are also recovered. A level 3 recovery deadstart is normally performed following an equipment malfunction (for example, channel or PPU hung) if the system is intact. It is recommended that a level 3 recovery deadstart be attempted before resorting to level 1 or level 0 deadstart.

DEADSTART OPTIONS 3

3.1 GENERAL DESCRIPTION

If a system deadstart with deadstart options is specified on the deadstart panel (word 13,yyy), the following deadstart options display appears on the console screen when the DEADSTART switch is activated. The various options that can be selected when this display appears are described in the following sections.



Description
section 3.2
section 3.3
section 3.4
section 3.5
section 3.6
section 3.7
section 3.8
section 3.9
section 3.10
section 3.11
section 3.12
section 3.13
section 3.14

3.2 LOAD SYSTEM OPTION

This option provides two possibilities.

To continue deadstart using the system configuration defined in the current CMRDECK.	Refer to section 3.2.1.
To modify the current CMRDECK (and also IPRDECK, if desired) before continuing deadstart.	Refer to section 3.2.2.

Additional options cannot be selected after this entry.

3.2.1 LOAD SYSTEM WITHOUT MODIFICATIONS

Use this procedure to continue deadstart by loading the system library on the system devices.

1. Word 13, xxx xxx must be set to the number of the CMRDECK that defines the system configuration. If the appropriate number is not indicated on the deadstart panel, use the K option described in section 3.5 to specify the correct number.

2. Word 14, sss sss indicates the devices onto which the system library is to be loaded. If sss sss is not set on the deadstart panel, use the W option described in section 3.10 to specify the system devices.

3. At the system console, press (CR).

   The system library is loaded onto the system devices. The next display requests the date. For subsequent procedure, refer to section 1, step 10.

3.2.2 MODIFY CMRDECK AND/OR IPRDECK BEFORE LOADING SYSTEM

1. Word 13, xxx xxx must be set to the number of the CMRDECK that defines the system configuration. If the appropriate number is not indicated on the deadstart panel, use the K option described in section 3.5 to specify the correct number.

2. Word 14, sss sss must be set to 000 000. If it is not set to 000 000 on the deadstart panel, use the W option described in section 3.10 to do so.

3. At the system console, press (CR).

   The next display is the CMRINST display. For subsequent procedure, refer to section 1, step 6.

3.3 DUMP TO PRINTER OPTION

DDD (deadstart dump program) is a maintenance program that can be used to dump a PPU memory or central memory. The following are possible procedures.

Normal PPU memory dump	Refer to section 3.2.1.
Dump PPU 0 saving all memory destroyed by DDD	Refer to section 3.2.2.
Dump central memory	Refer to section 3.2.3.

3.3.1 NORMAL PPU MEMORY DUMP

1. Load DDD in either of the following ways.

   a. If deadstart options are displayed, type

      D

   b. If a dump is requested at the deadstart panel, word 13, bits 0 through 2 must be set to 011.

At the system console:

2. DDD requests channel number of printer to which PPU memory is to be dumped.

   LP CH 00

3. Type ch
   Press (CR)

   ch Two-digit printer channel number; enter value from right to left.

4. DDD requests the same printer's controller number.

   LP NO 00

5. Type no
   Press (CR)

   no Two-digit controller number; enter value from right to left

   If the error message NOT RDY. appears on the display, the printer specified is not ready to print. Respond with either of the following:

   a. Press DEADSTART switch on system console; deadstart again beginning with step 1 designating channel and controller numbers for printer that is ready.

   b. Ready the printer already designated.

6. DDD requests whether a PPU or central memory is to be dumped.

   P OR C

7. Type P

8. DDD requests the number of the PPU whose memory is to be dumped.

   PP NO 00

9. Type no
   Press (CR)

   no Two-digit PPU number; 0 through 11_8; enter value from right to left

   DDD dumps the selected PPU memory to the printer. The format is a matrix of 100_8 words per block with 12 blocks per page.

   During the dump process, the system console screens are blank.

10. After the dump is completed, DDD displays the message P OR C for further dumping. If central memory is to be dumped, continue with step 6 of the procedure in section 3.3.3; if another PPU's memory is to be dumped, continue with step 6 of section 3.3.1. Otherwise, activate the DEADSTART switch.

3.3.2 SAVE ALL PPU O MEMORY DURING DUMP

When DDD dumps a PPU memory, it destroys the following memory locations.

Locations 0 through 15_8 of PPU 0	Deadstart program
Locations 6600 through 7777 of PPU 0	Deadstart dump program
Locations 0 through 3 of all other PPUs	PPU idler routine

Location 6600 through 7777 of PPU 0 can be saved by transferring PPU 0 memory to another PPU first and then dumping that PPU to a printer. Use the following procedure to do so.

At deadstart panel:

1. Before deadstarting, enter the following program.

Word	Setting
0001	2000
0002	7776
0003	73pp
0004	0000
0005	0300

pp Number of PPU to which PPU 0 memory is to be transferred.

Words 6 through 14 are not used at this time.

2. Activate DEADSTART switch.

3. Reset the deadstart panel to load DDD as indicated in section 3.3.1, step 1. Continue with that procedure.

3.3.3 DUMP CENTRAL MEMORY

1. Load DDD in either of the following ways.

   a. If deadstart options are currently displayed, type

      D

   b. If a dump is requested at the deadstart panel, word 13, bits 0 through 2 are set to 011.

At system console:

2. DDD requests channel number of printer to which PPU memory is to be dumped.

   LP CH 00

3. Type ch
   Press (CR)

   ch Two-digit printer channel number; enter value from right to left

4. DDD requests the same printer's controller number.

   LP NO 00

5. Type no
   Press (CR)

   no Two-digit controller number; enter value from right to left

   If the error message NOT RDY. appears on the display, the printer specified is not ready to print. Respond with either of the following actions.

   a. Press DEADSTART switch on system console; deadstart again beginning with step 1 designating channel and controller numbers for printer that is ready.

   b. Ready the printer already designated.

6. DDD requests whether a PPU or central memory is to be dumped.

   P OR C

7. Type C

8. DDD requests the starting address of the portion of central memory to be dumped.

   CM FROM 000000

9. Type address
   Press (CR)

   address Six-digit starting address of memory to be dumped; enter value from right to left

10. DDD requests the end address of the portion of central memory to be dumped.

    CM TO 000000

11. Type address
    Press (CR)

    address Six-digit ending address of memory to be dumped; enter values from right to left

12. DDD dumps the selected portion of central memory to the printer specified. The format is four central memory words per line. Any 4-word line that is a duplicate of the preceding line is indicated by a line with no address on the left and the message DUPLICATED LINES.

    During the dump process, the system console screens are blank.

    DDD does not destroy any central memory locations.

After the dump is completed, DDD displays the message P OR C for further dumping. If a PPU memory is to be dumped, continue with step 6 of Normal PPU Memory Dump procedure. If no further dumps are desired, activate the DEADSTART switch.

3.4 EJT: EXCHANGE JUMP TEST OPTION

This option displays EJT, the exchange jump deadstart maintenance test which is used to determine the reliability of the hardware.

CAUTION

Entering E destroys central memory.

1. Type E
2. The EJT display appear on the system console listing possible options; perform any necessary tests.
3. Activate the DEADSTART switch. Do not use a level 3 recovery deadstart (word 14, rrr) because central memory is destroyed.

3.5 DUMP TO TAPE OPTION

EDD (express deadstart dump) is a maintenance program that can be used to dump all PPUs' memories as well as central memory to magnetic tape during deadstart. ECS memory can optionally be dumped. Later, all or part of this dump can be printed using the utility routine DSDI as described in part IV, section 4. This process is useful because it requires less time at deadstart than using the D option (section 3. 3) to dump directly to a printer.

1. When EDD dumps a PPU memory, it destroys the following PPU memory locations.

Locations 0 through 15_8 of PPU 0	Deadstart program
Locations 6000 through 7777 of PPU 0	EDD program
Locations 0 through 3 of all other PPUs	PPU idler routines

Locations 6000 through 7777 of PPU 0 can be saved by transferring PPU 0 memory to another PPU before performing the express dump. Use the following procedure to do so.

a. Before deadstarting, enter the following program on the deadstart panel.

Word	Setting
0001	2000
0002	7776
0003	73pp
0004	0000
0005	0300

pp Number of PPU to which PPU 0 memory is to be transferred.

Words 6 through 14 are not used at this time.

b. Activate DEADSTART switch.

c. Reset the deadstart panel to standard setting (part II, section 2).

2. To load EDD:

   Type F

3. EDD requests channel number of tape unit to which memory is to be dumped.

   MT CH 00

4. To enter the tape channel number:

   Type ch
   Press (CR)

   ch Two-digit channel number; enter values from right to left

5. EDD requests the tape unit's controller and unit numbers.

   MT E0UU 0000

6. To enter the tape controller and unit numbers:

   Type e0uu
   Press (CR)

   e One-digit number of tape unit's controller
   uu Two-digit number of tape unit

   Enter e0uu from right to left.

7. EDD requests the dump identifier; this identifier will be placed in the tape label for future reference.

   EXPRESS 00 hh.mm.ss. yy/mm/dd

   The time and date are from central memory; they may be incorrect if a system malfunction occurred before using the dump procedure.

8. To enter the dump identifier:

   Type id
   Press (CR)

   id Two-digit dump identifier; enter from right to left

9. EDD requests the tape rewind option

   NONZERO INHIBITS REWIND 00

10. To enter the tape rewind option:

    Type xx
    Press (CR)

    xx Type a two-digit nonzero entry to prevent tape rewind before and after dump; enter 00 (or press (CR)) to cause tape rewind before and after dump.

    Dump of central and PPU memories occurs.

11. EDD requests whether ECS memory is to be dumped:

    ECS SIZE/1000 0000

12. Type size
    Press (CR)

    size Four-digit ECS size/1000; to prevent ECS from being dumped, type 0 (or press (CR) without typing an entry); enter value from right to left

    If ECS is dumped, an area of central memory that is approximately 1040_8 words in length is destroyed after central memory is dumped. The first word address of this area of central memory is defined by CMEC (an EDD assembly symbol). The released value of CMEC is $40,000_8$.

13. EDD indicates that the dump is complete with the following message.

    DUMP COMPLETE 00

14. Activate the DEADSTART switch to continue with another deadstart operation. To dump the memory that is now on tape to a printer, refer to part IV, section 4.

If a tape error occurs during the dump process, a message of the following form appears at the system display.

    err CSaa DSbbbb 00

    err Indicates error type

CON	Connect reject error
FCN	Function reject error
WRT	Write error

    aa Channel converter status
    bbbb Controller status

Pressing (CR) causes EDD to retry the dump operation.

3.6 OPTION TO SELECT ANOTHER CMRDECK

This option displays the current CMRDECK number and allows the selection of another CMRDECK for deadstarting the system. If a level 1 or 2 recovery deadstart is to be performed, the CMRDECK selected during the most recent level 0 deadstart must be used.

1. Type K
2. The following display occurs.

   SET CMRDECK 00

   00 is the current CMRDECK number.

3. Type no
   Press (CR)

   no One or two octal digit number of the CMRDECK desired for deadstart; enter values from right to left

4. The deadstart options display reappears.

3.7 MM2: CENTRAL MEMORY TEST OPTION

The central memory test option is a deadstart maintenance test.

CAUTION

Entering M destroys central memory.

1. Type M
2. The MM2 display appears at the system console listing possible options; perform necessary tests.
3. Activate the DEADSTART switch. Do not use a level 3 recovery deadstart (word 14, rrr) because central memory is destroyed.

3.8 PP0: DISPLAY PPU 0 MEMORY OPTION

Use this option to display the contents of PPU 0 memory. This function is generally used to enter sample PPU programs (to test peripheral devices on the system, for example).

1. Type P
2. PPU 0 memory is displayed on both console screens.
3. Activate the DEADSTART switch.

3.9 PMM: PPU MEMORY TEST OPTION

The PPU 0 memory test (PMM) is a deadstart maintenance test that tests memory reliability for each PPU in the system.

1. Type Q
2. The PMM display appears listing possible options; perform necessary operations.
3. Activate the DEADSTART switch. (Central memory is left intact.)

3.10 DEADSTART ANOTHER TAPE OPTION

Use this option to select a deadstart tape that is on tape equipment other than the equipment specified on the deadstart panel. The equipment to be specified must be connected to the same channel as the equipment indicated on the deadstart panel.

1. Type T
2. The following message appears on the system console.

   DEADSTART TAPE 0000

3. Mount the new deadstart tape on the tape unit connected to the same channel as the tape unit containing the current deadstart tape; ready the unit.
4. Type e0uu
   Press CR

   e — One-digit controller number of tape unit containing newly selected deadstart tape.

   uu — Two-digit tape unit number

   Enter values from right to left.
5. The deadstart options display from the new deadstart tape appears on the system display.

3.11 DISPLAY AND MODIFY WORD 14 OPTION

This option is available to modify any or all parameters in word 14 of the deadstart program. To alter only bits 6, 7, or 8, refer to sections 3.12, 3.13, and 3.14.

1. Type W
2. The octal image of the current contents of word 14 (xxxx) is displayed.

   WORD 14 xxxx

3. Type rpss
   Press CR

Type entire word beginning with the r parameter, even if only changing one parameter. Refer to part II, section 2.4 (word 14) for a detailed description of the parameters.

r Designates the level of system deadstart

0 Initial or level 0 system deadstart
1 Level 1 recovery deadstart
2 Level 2 recovery deadstart
3 Level 3 recovery deadstart

p Designates the central processor control settings; this parameter can also be modified with the options described in sections 3.12, 3.13, and 3.14.

Bit 6 refers to CPU 0
Bit 7 refers to CPU 1
Bit 8 refers to the CEJ/MEJ option

ss Specifies whether the CMRDECK and IPRDECK are to be modified before loading the system library or whether deadstart is to load the system library (set to 00) without further displays.

4. The deadstart options display reappears.

3.12 DISABLE CEJ/MEJ OPTION

If the CEJ/MEJ option is enabled (word 14, bit 8), use this option to disable it.

1. Type X

The deadstart options remain displayed. The only indication that the CEJ/MEJ option is disabled is if the W option is selected; word 14 will indicate that it is disabled.

Use of this option is not recommended because KRONOS automatically determines if the CEJ/MEJ option is present and initializes accordingly. System failure may result if the CEJ/MEJ option is present in the system and is disabled by this method. If it is necessary to disable the CEJ/MEJ option for maintenance purposes, use the keylock switch labeled CEJ/MEJ on the deadstart panel before activating the DEADSTART switch.

Once disabled, CEJ/MEJ can only be enabled by redeadstarting.

3.13 TURN OFF CPU 0 OPTION

Use this option to turn off CPU 0 (word 14, bit 6).

1. Type 0

The deadstart options remain displayed. The only indication that CPU 0 is turned off is if the W option is selected; word 14 will indicate that it is off.

CPU 0 and CPU 1 should not be disabled simultaneously. On dual CPU systems, disabling one CPU may be desired to run benchmarks for systems with only one CPU or may be necessary if one CPU is down.

To specify CPU 0 as available, redeadstart.

3.14 TURN OFF CPU 1 OPTION

Use this option to turn off CPU 1 (word 14, bit 7).

1. Type 1

The deadstart options remain displayed. The only indication that CPU 1 is turned off is if the W option is selected; word 14 will indicate that it is off.

CPU 0 and CPU 1 should not be disabled simultaneously. On dual CPU systems, disabling one CPU may be desired to run benchmarks for systems with only one CPU or may be necessary if one CPU is down.

To specify CPU 1 as available, redeadstart.

4.1 GENERAL DESCRIPTION

The central memory resident deck (CMRDECK) is a text deck on the deadstart tape that is processed by the SET program. It contains entries defining the following types of information.

Central memory descriptions	Section 4.2
Nonmass storage equipment descriptions	Section 4.3
Mass storage equipment descriptions	Section 4.4
Track reservations	Section 4.5

There can be up to 77_8 CMRDECKs on the deadstart tape. Having several CMRDECKs on the same deadstart tape is advantageous so that one tape can be used to deadstart up to 64_{10} configurations.

The released settings of the CMRDECK may be modified in two ways: by typing a new entry during deadstart when the CMRDECK is displayed or by creating a new deadstart tape. The usual method of creating a configured CMRDECK, beginning with a deadstart using the released tape, is:

1. Deadstart using the released deadstart tape and selecting that the CMRINST and the CMRDECK be displayed. — Part II, section 1.1

   CMRINST defines all valid CMRDECK entries. Several of the entries listed are assigned system default values. These values are assumed if the entries do not appear in the CMRDECK being used.

2. Modify the released version of CMRDECK by entering the appropriate changes or additions from the system console. These entries can be made when either the CMRDECK or CMRINST is displayed. Each console entry supersedes the value currently specified in the CMRDECK (or default values noted for central memory entries in section 4.2). However, the modified CMRDECK remains in effect only until the next deadstart is performed. That is, changes to the CMRDECK are not recovered across deadstart unless a new deadstart tape is created to reflect them. — Part II, sections 4.2 through 4.5

3. To expedite subsequent deadstarts, modify the CMRDECK on the deadstart tape using job KR1. — Part III, section 1.1.3

When constructing or modifying a CMRDECK, note the following conventions.

1. The EQ entry must precede any other assignments for a device (such as assigning it for permanent file, system, or temporary file use). If the EQ entry is modified, all other assignments for that equipment must be reentered.

2. Specify all parameters unless they are noted as optional.

3. Separate each entry with a comma when indicated in the entry format.

4. Terminate each entry with a period.

5. An arrow (↑) occurs at the position of an error in an entry typed at the system console. When there is an error in an entry in a CMRDECK on the deadstart tape, the CMRDECK is displayed with an arrow indicating the error. This occurs even if the CMRDECK is not selected to be displayed.

CMRINST Released Format:

```
CMRINST
INSTRUCTIONS FOR INITIAL SETUP OF KRONOS.

BELOW IS A LIST OF ALL SYSTEM ENTRIES.
TO MAKE THESE ENTRIES, ENTER THEM AS
INDICATED FOR THE DESIRED INITIAL CONFIGURATION.
THE ENTRY - NEXT. WILL CAUSE THE LOAD TO CONTINUE.
THE ENTRY - GO. WILL CAUSE THE LOAD TO CONTINUE
WITHOUT FURTHER DISPLAYS.  DISPLAYS BREAK 39 LINES/SCREEN.
THE RIGHT BLANK KEY TOGGLES THE DISPLAY.

DFB=400.  SET DAYFILE BUFFER LENGTH = 400.
ACF=400.  SET ACCOUNT FILE BUFFER LENGTH = 400.
FNT=1000. SET FNT LENGTH = 1000.
NCP=17.   SET THE NUMBER OF CONTROL POINTS = 17.
PPU=X,Y,...Z.  TURN OFF PPU X,Y,...,Z.  (0,1,2,10 ILLEGAL)
NAME=CCC-CCC. SET THE SYSTEM NAME = CCC-CCC.
IPD=0.    ASSEMBLE INSTALLATION PARAMETER DECK 0.
STL=6.    SET SYSTEM EVENT TABLE LENGTH = 6.
ERL=100.  SET ERROR LOG BUFFER LENGTH = 100.
CM=XXXX.  SET CENTRAL MEMORY SIZE TO XXXX HUNDRED WORDS.

EQXX=TY,ST,EN,UN,A,B,C,D. DEFINE EQUIPMENT XX AS FOLOWS
          TY = TYPE (2 LETTERS)
          N = NUMBER OF UNITS CONSECUTIVE STARTING AT *UN*.
          ST = STATUS (ON, OFF)
          EN = EQUIPMENT NUMBER
          UN = UNIT NUMBER
          A - D = CHANNELS
EQXX=YYYY.  ENTER YYYY AS OCTAL ENTRY FOR EQ XX.
EQXX=DE,ST,1000.  SET ECS EQUIPMENT 1000K (250K).
EQXX=DD-N,ST,EN,UN,A.  ENTER 853/854-N FOR EQXX. (N=1-4)
EQXX=DI-N,ST,EN,UN,A,B.ENTER 844-N FOR EQXX.  (N=1-8)
EQXX=MD-N,ST,EN,UN,A,B.ENTER 841-N FOR EQXX.  (N=1-8)
EQXX=MT-N,ST,EN,UN,A,B,C,D.  ENTER CONSECUTIVE MAGNETIC TAPES.

RESERVE TRACKS.
     CTK=X,Y,..Z.   CLEAR PREVIOUS RTK,STK AND TTK ON EQX,Y,..Z.
     STK=XX,NNNN.   SET RESERVATION ON LOGICAL TRACK NNNN.
TK=XX,NNNN.   SET RESERVATION ON LOGICAL TRACK NNNN.
     TTK=XX,CCCC.   TOGGLE RESERVATION. (SAME FORMAT AS RTK.)
     RTK=00,T200,G10,S144. DA 00, 6603.
     RTK=01,P40,H40,S144.  DB 01, 6638.
     RTK=02,U10,G100.      DC 02, 3536/863.
     RTK=03,C310.          DD 03, 854-N.
     RTK=04,A757500.       DE 04, ECS.
     RTK=05,C200,T10000.   DF 05, 813.
     RTK=07,C2000.         DH 07, 3553/821.
     RTK=10,C623,T22,S27.  DI 10, 7054/844-N.
     RTK=11,C2000,S2411.   MD 11, 3553/841-N.
```

```
      THE FOLOWING ENTRIES ARE CLEARED IF EQ IS REDEFINED.
ASR=X,Y,...,Z. SET ALTERNATE SYSTEM DEVICES.
FAMILY=NN. SET EQUIPMENT NUMBER OF DEFAULT FAMILY.
PF=XX,TY,DM,FN,DN.
          DEFINE DEVICE XX FOR PERMANENT FILES.
          REQUIRED ONLY WHEN INITIALIZING.  PARAMETERS ARE SET
          FROM LABEL WHEN NOT INITIALIZING.
          TY = TYPE OF PERM. FILE RESIDENCE.
                 *D* = DIRECT ACCESS ALLOWED
                 *I* = ONLY INDIRECT ACCESS FILES
                 *X* = AUXILIARY (DIRECT AND INDIRECT)
          DM = DEVICE MASK.
          FN = FAMILY NAME (1-7 CHARACTERS)
          DN = DEVICE NUMBER.

INITIALIZE,XX,NC.
          BLANK LABEL MASS STORAGE DEVICE XX.
          ENTRY SHOULD BE USED FOR ALL DEVICES ON WHICH P.F.
          ARE NOT DESIRED AND FOR ALL DEVICES WHICH ARE BEING
          DEFINED AS P.F. DEVICES BY *PF* ENTRY.
                    NC = CATALOG TRACKS (POWER OF 2 .LE. 200)

REMOVE=X,Y,...Z. SET X,Y,...Z AS REMOVABLE DEVICES.
SYSTEM=X,Y,...Z. SET X,Y,...Z AS SYSTEM DEVICES. (ALL SAME TYPE)
TEMP=X,Y,...Z.   SET X,Y,...Z FOR SYSTEM ALLOCATION OF SPACE.
```

Format of the CMRDECK on the Released Deadstart Tape:

```
CMRDECK
NAME= 6400 S/N 127. CDC TIME SHARING SYSTEM.
NCP=27.
EQ0=DB,ON,1,0,0.
EQ1=DB,ON,1,0,3.
EQ2=MD-1,ON,6,0,4.
EQ3=MD-1,ON,6,1,4.
EQ10=DS,ON,7,,10.
EQ11=CR,ON,4,,13.
EQ12=CP,ON,5,,13.
EQ20=LP,ON,6,,13.
EQ21=LP,ON,3,,13.
EQ22=LP,OFF,7,,13.
EQ30=ST,ON,7,0,2.
EQ37=TT,OFF,7,1,5,0,0,1.
EQ40=TT,ON,7,,1,,40.
EQ50=MT-4,ON,5,0,12.
TEMP=0,1.
```

4.2 CENTRAL MEMORY DESCRIPTIONS

The following entries are already specified in the SET program with the released default values indicated. These values are appropriate for most installations.

The general function of these entries is to determine the amount of central memory that is to be used for central memory resident and the amount to be used for job processing. The simplified relationship is that the more central memory that is assigned to dayfile buffers, the less is available for job field lengths.

If, for example, a large portion of central memory is needed to run a job, it might be advisable to decrease the size of the dayfile buffers area in central memory resident (CMR) in order to accommodate that job. However, when the buffers are smaller, the information stored in them is written to mass storage more often, thus requiring more system overhead. If only a few batch jobs are to be run, fewer control points may be required. Thus, the control point area in CMR (which requires 300_8 words per control point: 200_8 for the control point area and 100_8 for the dayfile buffer) could be decreased also.

Entry format	Released Default Value	Significance
ACF=length.	400_8	This entry sets the length of the account dayfile buffer. The account dayfile is an accounting record containing messages indicating information such as kind and amount of resources used, as well as jobs and execution times. This account information is written to the central memory account file buffer during job processing and the central memory buffer is written to mass storage when the buffer is full. The account file buffer resides in CMR in the dayfile buffer area. length — 3 or 4 octal digit length of account file buffer; must be a multiple of 100_8
CM=size.	Actual core size	The actual size of core memory is automatically determined by the SET program during deadstart. This value is a minimum of 32K and a maximum of 131K. The CM parameter allows the actual size to be decreased. This may be necessary, for example, to try to benchmark a configuration that has less central memory size than is available on the computer. size — 1-to 4-octal digit value that restricts the actual core size; this value represents the amount of central memory in hundreds; value cannot be 0 and cannot exceed actual core size.

Entry format	Released Default Value	Significance
DFB=length.	400_8	This entry sets the dayfile buffer length. The dayfile buffer contains the dayfile information that is maintained in the same way as the account file buffer. It resides in CMR in the dayfile buffer area. length — 3 or 4 octal digit length of dayfile buffer in CMR; must be a multiple of 100_8
ERL=length.	100_8	This entry sets the length of the error log dayfile buffer. The error log dayfile is a record of error messages along with execution time for a particular job. This information is maintained in the same manner as the account file buffer. length — 3 or 4 octal digit length of the error log buffer which resides in the dayfile buffer area of CMR; must be a multiple of 100_8
FNT=entry.	1000_8	This entry sets the length of the file name/file status table. This table consists of two one-word entries for each active file, the file name (FNT) and the file status (FST). The table resides in CMR. length — 3 or 4 octal digit length of FNT and FST area; must be multiple of two; minimum value is 100_8
IPD=iprdeck.	First IPRDECK on deadstart tape	This parameter indicates which IPRDECK to use at deadstart. The IPRDECK contains installation parameters defined in part II, section 5. There can be up to 4096_{10} IPRDECKs on a deadstart tape. If an IPD entry is not included in the CMRDECK to be used, the first IPRDECK on the deadstart tape is processed without being displayed. If this parameter is not entered, the first deck (IPRDECK) is processed without being displayed.

Entry Format	Released Default Value	Significance
NAME=date line.	6400 S/N 127. CDC TIME SHARING SYSTEM	This parameter specifies the system date line that is displayed on the system console display. It is stored in words 32 through 37 of CMR. date line — Any length alphanumeric character system date line; only first 60 characters are actually used.
NCP=number.	12_8	This entry sets the number of control points available for job processing to a value other than the default value. Changing the default setting depends upon the type of job mix and environment desired. Each control point uses about 300_8 words of additional CMR space. number — 1 or 2 octal digit number of control points available in central memory; maximum is 27_8; value stored in CMR word 2, bits 12 through 23
PPU=*,	PPUs 10 through 20 are not available	The released system assumes 10 PPUs. To indicate that 20 PPUs are available, enter this command in the CMRDECK. Reentering the command toggles the setting so that the upper 10 PPUs are unavailable.
PPU=ppu,...,ppu.	All available PPUs are active	This command pertains to any physically available PPU. Its purpose is to change the status of any specific PPUs except for 0, 1, 2, or 10, which must always be active. Active status means available for system use; inactive means not available for system use. This is a toggle entry; reenter to change status. This command may be useful if PPU memory is failing or if a channel is causing problems on its associated PPU. ppu — 1 or 2 octal digit PPU number of PPU whose status is to be changed. Any number of PPUs can be specified separated by commas. For example, the following (if there are no other entries of this type) deactivates PPU 3 and PPU 4. PPU=3,4.

4.3 EQUIPMENT ASSIGNMENTS: NONMASS STORAGE

The following EST entries are described in this section.

4.3.1 CLEAR EST ASSIGNMENT ENTRY

Use the following entry to clear an assignment that currently exists for an EST ordinal. Clearing the assignment does not clear flaw entries for that equipment.

```
EQord=0.
```

ord 1 or 2 octal digit EST ordinal of equipment; 0 through 75_8

4.3.2 NONSTANDARD EQUIPMENT EST ENTRY

The nonstandard EST entry is available so that an analyst can define nonstandard equipment or can add his local debugging modifications.

It is possible to make a nonstandard EST entry at two different times, deadstart or during system operation.

During deadstart, use the nonstandard EQ entry described in the following format to enter the actual octal value that is to reside at that EST ordinal.

During system operation, use a DSD memory entry command (refer to section 3 of the operator's guide) to enter the actual octal value to reside in the EST. Specify the low core location of this value using the octal address of the EST ordinal (instead of the EST ordinal number). The octal address can be obtained by using the DIS E display (section 7 of the operator's guide).

The format of the nonstandard EST entry is:

```
EQord=value.
```

ord 1 or 2 octal digit EST ordinal of equipment; 0 through 75_8

value 1 to 20 octal digit value; this value is entered in the EST word for the specified ordinal.

4.3.3 DUMMY EQUIPMENT EST ENTRY

EST ordinals 76_8 and 77_8 are EST entries that are automatically reserved by the system; they cannot be used for other assignments and are the only dummy entries allowed in the EST.

Even though they are automatic dummy entries, they do not appear as EQ assignments when the CMRDECK is displayed. If it is desirable that they be displayed along with the CMRDECK, they can be entered using the following format.

```
EQord=type,status,,,.
```

ord EST ordinal of dummy equipment; 76_8 for TE; 77_8 for NE

type Equipment type:

TE	Equipment type for 76_8
NE	Equipment type for 77_8

status Specifies whether equipment is available for use

ON	Available
OFF	Equipment is ignored during system operation

76_8 ENTRY

If a file-volume serial number association is established with an ASSIGN, LABEL, REQUEST, or VSN control card, the system automatically enters EQ76 in the file's FNT/FST entry. When a tape having the desired volume serial number is assigned to the file, the system replaces EQ76 in the file's FNT/FST entry with the EST ordinal of the tape unit on which the tape is mounted. If a file which has had the file-volume serial number association established by a VSN control card is returned prior to attempting to assign tape equipment to the file, the FNT/FST entry is cancelled.

77_8 ENTRY

77_8 is used internally by the system to signify that a file is assigned but that there is no space on the device. If a read is tried, end of information status (EOI) occurs. If a write is tried, an infinite sync occurs; the data is discarded.

For example, it can be used with the permanent file utility to validate the integrity of a permanent file device without taking the time to actually create a dump file on tape. In this case, when the permanent file utility issues the request for an archive file, enter the DSD command n.ASSIGN77. (Refer to part IV, section 2.2.) This causes all dump data to be discarded even though the permanent file device is read and informative messages about the permanent file device are issued to the system console. These messages are described in part IV, section 2.

4.3.4 SYSTEM CONSOLE DISPLAY EQUIPMENT EST ENTRY

KRONOS 2.1 requires at least one system console to be available for use.

```
EQord=DS,status,controller,unit,channel.
```

ord — 1 or 2 octal digit EST ordinal of display; 1 through 75_8; most sites set to 10

DS — 6612 display console equipment type

status — 2 or 3 digit indicator of whether equipment is available for system use

ON	Available
OFF	Can only use console for the DSD commands

controller — 1 or 2 digit number of system console controller; 0 through 7

unit — Not applicable to the system console EQ entry; enter 0 or leave a blank space

channel — 1 or 2 octal digit number of channel to which console equipment is connected; 0 through 13_8, 20 through 33_8; most configurations use channel 10

Example: EQ10=DS,ON,7,,10.

4.3.5 UNIT RECORD EQUIPMENT EST ENTRY

The recommended unit record equipment requirement is one line printer and one card reader.

```
EQord=type,status,controller,unit,channel.
```

ord — 1 or 2 octal digit EST ordinal of equipment; 1 through 75_8

type — 2-digit equipment type; the following unit record equipment is supported with KRONOS 2.1.

Equipment	Type
Card reader	
405-3447/3649	CR
Card punch	
415-3446/3644	CP
Line printer	
501-3256/3659	LP
505-3256/3659	LP
512-1—3555-1	LP or LQ

status — Specifies whether equipment is available for system use.

ON	Available
OFF	Unit is ignored during system operation

controller — 1 - digit controller number for equipment; 0 through 7

unit — Not applicable for unit record equipment; enter a 0 or a comma

channel — 1 or 2 octal digit number of channel to which equipment is connected; 0 through 13_8, 20 through 33_8

Example:
```
EQ11=CR,ON,4,,12.
EQ12=CP,ON,5,,12.
EQ20=LP,ON,6,,12.
```

4.3.6 MAGNETIC TAPE EQUIPMENT EST ENTRY

The minimum number of magnetic tape devices that KRONOS 2.1 requires is two 607's, 657's, or 659's.

EQord=MT-n, status, controller, unit, $chan_1$, $chan_2$, $chan_3$, $chan_4$, option

ord — 1 or 2 octal digit EST ordinal of equipment; 1 through 75_8; most sites use 50_8. Refer also to the MT-n parameter.

MT-n — Equipment type; n is total number of magnetic tape units connected to controller. The system automatically generates n number of EST entries with consecutive EST ordinals beginning with the ordinal specified in the first parameter. The n units begin with the unit number specified in the unit parameter. The following magnetic tape equipment is supported with KRONOS 2.1.

Controller	Units	n
3x2x	604/607	1-16
3518-1/2/3	657/659	1-8
3528-1/2/3	657/659	1-8

To clear an MT-n assignment, enter an EQord=0 entry for all n units.

status — Indicates whether equipment is available for access

ON	Available for access
OFF	Unit is ignored during system operation

controller — 1-digit controller number of magnetic tape device; must be 4 through 7

unit — 1 or 2 octal digit number of lowest numbered magnetic tape unit to be processed; units must have consecutive physical unit numbers; 0 through 17_8

$chan_{1-4}$	1 or 2 octal digit number of channel to which equipment is connected; 0 through 13_8, 20 through 33_8 A controller can be connected to from one to four channels, depending upon the controller model. When more than one channel access is available to some tapes, the configuration for all units that may be accessed by multiple channels must be the same. Also, all other tapes to be supported must be on one of the multiple channels. For example, an installation site has a 3528-3 and a 3228. If the 3528-3 is accessed through channels 7 and 13, then the 3228 must be on either channel 7 or 13. Also, if another 3528-3 is added, it must be on channels 7 and 13.
option	Optional hardware feature parameter. 0 or omitted — No significance 1 — Status 2 hardware feature not available 2 — Set option to 2 if the conversion memory (code conversion) feature is not available; this would only be used for 3518-1 and 3528-1.

4.3.7 MULTIPLEXER EQUIPMENT EST ENTRY

There are four types of EST entries for communication equipment.

- Time-sharing and Transaction Subsystem entries
- Time-sharing and Transaction Subsystem stimulator entries
- Export/Import 1.0 entry
- Cyberlink Interchange 1.0 entry

TIME-SHARING AND TRANSACTION SUBSYSTEMS ENTRIES

The format is:

```
EQord=TT,status,controller,0,channel,0,lines.
```

ord	1 or 2 digit EST ordinal of multiplexer; 1 through 75_8
TT	Equipment type for time-sharing and transaction subsystems; 6671 or 6676
status	Specifies whether the equipment is available for use ON — Available OFF — Equipment is ignored during system operation

controller	1 or 2 digit number of multiplexer controller; can be 0 through 7
0	Indicates that this is not an EST entry for the stimulator
channel	1 or 2 octal digit number of channel to which multiplexer equipment is connected; 0 through 13_8, 20 through 33_8
0	Parameter is not used
lines	1, 2, or 3 octal digit number of lines available

6671	1 through 20_8 (16 lines is maximum); if 0 is specified, a channel hang occurs.
6676	0 through 100_8; the terminal driver scans only the number of lines specified. For example, if the lines parameter is set to 3, the driver only scans lines 1 through 3. Specifying fewer lines also saves central memory space in TELEX. The driver scans all 64 (0 through 100_8) lines if the parameter is omitted.

Examples:

EQ30=TT,OFF,0,0,4,0,20.	6676 described with 20 of 64 lines available; multiplexer not available for use
EQ41,TT,OFF,7,0,3,0,10.	6671 to be used for time-sharing subsystem terminals; 10 of 16 lines are available; multiplexer not available for use

Standard operation of the 6676 and the 6671 data set controllers allows communication with terminals at a line speed of 10 characters per second (cps). There are options that allow other line speeds to be connected to the 6676. KRONOS 2.1 supports all of these up to 600 baud.

KRONOS 2.1 also supports the 6676 option to communicate with terminals that issue the 9-bit code. These are usually referred to as correspondence type terminals.

However, when configuring the data sets to the 6676, be sure that the proper terminals are always connected to the proper lines; that is, 10 cps terminals to 10 cps lines and 30 cps terminals to 30 cps lines.

SUBSYSTEM STIMULATOR EST ENTRIES

The time-sharing stimulator is described in part IV, section 5; the transaction stimulator is described in the KRONOS 2.1 Transaction Sybsystem Reference Manual.

The stimulator EST entry format is:

```
EQord=TT,status,controller,no.,channel,0,lines.
```

ord — 1 or 2 octal digit EST ordinal of multiplexer; 1 through 75_8

TT — Equipment type for time-sharing stimulator or transaction subsystem

status — Specifies whether the equipment is available for use

ON	Available
OFF	Equipment is ignored during system operation

controller — 1 or 2 octal digit number of multiplexer controller; can be 0 through 7

no. — Designates the subsystem

1 Time-sharing stimulator

2 Transaction Subsystem stimulator; indicates to system that communication with 1TD is to be direct, without functioning the channel.

4 Transaction subsystem stimulator with the communications stimulating a 6671 multiplexer.

channel — 1 or 2 octal digit number of channel to which multiplexer equipment is connected; 0 through 13_8, 20 through 33_8

lines — Number of lines to stimulate; must be less than 1000_8. 100_8 is default indicated with 0 entry. For the transaction subsystem stimulator, the value specified must be the same as the number of lines specified in NETWORK or SIMFILE.

If no. parameter is 4, the lines parameter must be 1 through 100_8 (limitation of 64 lines).

Examples:

EQ37=TT,ON,7,1,2,0,0.	Time-sharing subsystem stimulator EST entry that allows 100_8 terminals to be stimulated using channel 2 as communications channel
EQ41,TT,ON,7,2,5,0,0.	Transaction subsystem stimulator EST entry that allows 100_8 lines to be stimulated.

EXPORT/IMPORT 1.0 EQUIPMENT EST ENTRY

```
EQord=ST,status,controller,0,channel.
```

ord	1 or 2 octal digit EST ordinal of multiplexer; 1 through 75_8
ST	Equipment type for 6671 multiplexer used as a synchronous low or medium speed remote batch terminal
status	Specifies whether the equipment is available for use ON Available OFF Equipment is ignored during system operation
controller	1 or 2 digit number of multiplexer controller; can be 0 through 7
0	Not used
channel	1 or 2 octal digit number of channel to which multiplexer equipment is connected; 0 through 13_8, 20 through 33_8

Example:

EQ40=ST,OFF,7,0,3.	6671 described with 16 lines available; multiplexer not available for use

CYBERLINK INTERCHANGE 1.0 EST ENTRY

```
EQord=SA,status,controller,0,channel.
```

ord	1 or 2 octal digit EST ordinal of multiplexer; 1 through 75_8
SA	6673/6674 data set controller equipment type
status	Specifies whether the equipment is available for use ON Available OFF Equipment is ignored during system operation
controller	1 or 2 digit number of multiplexer controller; can be 0 through 7
0	Parameter not used by Cyberlink 1.0
channel	1 or 2 octal digit number of channel to which multiplexer equipment is connected; 0 through 13_8, 20 through 33_8

Examples:

EQ15=SA,ON,1,0,4.	Specifies that a 6674 to be used for Cyberlink is available
EQ21=SA,OFF,0,0,3.	Specifies that a 6674 to be used for Cyberlink is not available

4.4 MASS STORAGE EQUIPMENT ASSIGNMENTS

This section describes the following mass storage assignments.

Mass storage equipment EST entry	EQ	section 4.4.2
ECS equipment EST entry	EQ	section 4.4.3
Temporary files device assignment	TEMP	section 4.4.4
Permanent files device assignment	PF	section 4.4.5, 4.4.6
System library device assignment	SYSTEM	section 4.4.7
Alternate system library device assignment	ASR	section 4.4.8
Default family name assignment	FAMILY	section 4.4.9
Removable device assignment	REMOVE	section 4.4.10
Initialization command	INITIALIZE	section 4.4.11

4.4.1 KRONOS 2.1 MASS STORAGE CONCEPTS

The following descriptions and chart summarize the KRONOS 2.1 mass storage terminology and the kinds of mass storage assignments that can be specified in the CMRDECK. Other terms are defined along with the CMRDECK descriptions in the following sections.

ALTERNATE SYSTEM DEVICE

Whereas a system device contains all routines in the system library, an alternate system device contains copies of selected system library routines. The ASR entry in CMRDECK (part II, section 4.4.8) specifies which mass storage devices are to contain system library routines; the *AD LIBDECK entry (part III, section 1.1.5) on the deadstart tape specifies which system library routines are to reside on these mass storage devices. During system processing, the routines on the alternate system device are used instead of the ones on the system device.

This feature is valuable because it allows each routine in the system library to reside on the mass storage device that is most appropriate to its use. For example, if the system device is a 6638, a routine that is frequently used could use ECS, which has a faster transfer rate, as an alternate system device instead of the system device.

ALTERNATE PERMANENT FILE FAMILY

There can be more than one permanent file family in a system. One is always the default permanent file family that is specified with the FAMILY CMRDECK entry as the default family. If another system's permanent file family is introduced to that system, it is an alternate permanent file family. It can be added without interrupting the default permanent file family's operation.

This is a useful feature if a site has more than one system or has groups of installations. If one system fails, its permanent files can be accessed from another system.

As an example, a site with two systems might run with the following mass storage configuration.

System	Ord	Device	Access Used	Contents
X	0	6638	A	Direct access files
X	1	841-4	A	Master device, indirect access files
Y	0	6638	B	Direct access files
Y	1	841-4	B	Master device, indirect access files

If system Y became inoperative, the B accesses for the 6638 and the 841-4 could be connected to system X. This could be done without interrupting system X's operations.

The CMRDECK entries in system X would be:

```
EQ0=DB,ON,1,0,0.          (defines access A)
EQ1=MD-4,ON,4,0,2.        (defines access A)
EQ2=DB,OFF,1,0,1.         (defines access B)
EQ3=MD-4,OFF,4,0,3.       (defines access B)
REMOVE=2,3.               (allows introduction of access B into system X during
                           operation)
```

The CMRDECK in system Y would be:

```
EQ0=DB,ON,1,0,1.          (defines access B)
EQ1=MD-4,ON,4,0,3.        (defines access B)
EQ2=DB,OFF,1,0,0.         (defines access A)
EQ3=MD-4,OFF,4,0,2.       (defines access A)
REMOVE=2,3.               (allows introduction of access A into system Y during
                          operation)
```

To allow for introduction of an alternate permanent file family:

1. The equipment to be introduced or removed must be defined in the CMRDECKs for both systems. Note the previous example.

2. Specify all of the equipment that may be introduced or removed during system processing as removable.

3. When it is desired to introduce the equipment into a system, use the ON operator command to indicate that the equipment that is set to the OFF position in the system in operation is now available. This introduces the alternate permanent file family.

AUXILIARY DEVICE

An auxiliary device is a mass storage device that is not part of a family. It is a supplementary permanent file storage device that may be privately owned (PRIVATE) or may be shared by many users (PUBLIC). On the PF entry for an auxiliary device (for a pack device as well as a fixed device without packs), a pack name is specified instead of a family name.

An auxiliary device can reside on a removable or nonremovable device.

Refer to the KRONOS 2.1 Reference Manual and the KRONOS 2.1 Operator's Guide for detailed descriptions of PRIVATE and PUBLIC.

Example:

An 854 to be used as an auxiliary device could be defined as follows:

```
EQ3=DD,ON,5,2,7.
PF=3,X,name.
```

FAMILY DEVICE

A family device can be a removable device or a nonremovable device. The only distinction is that a nonremovable device containing permanent files can also contain a copy of the system library and/or temporary files. Refer to the alternate permanent file system description.

On the PF entry, the family concept is only important if two systems' permanent files are to run on the same system. A user can only use one family of permanent files; if he doesn't specify one, the default FAMILY entry is used.

A family device can contain direct and/or indirect access files. These files are defined in the KRONOS 2.1 Reference Manual. The files that will be allowed are set with the type parameter on the PF entry.

MASTER DEVICE

The master device is a device in a permanent file family that contains all permanent file catalog entries and indirect access files for a specific user. The user's master device must be available on the running system if permanent file access is required, unless all access is to be to an auxiliary device. The user index (refer also to part IV, section 2.1) and family name uniquely describe a user's master device. To access an auxiliary device, the user must specify the pack name as part of each permanent file request.

Each master device is organized into five logical sections.

1. Allocation information: The device label contains information describing the device, such as family name and user mask, as well as locations of permit and catalog information and indirect access files. Refer to the INITIALIZE entry.

   The track reservation table (TRT) is the key to allocating information on this device and to describing the physical layout of data on the device. Refer also to part II, section 4.5, and part IV, section 2.1.

2. Catalog information: The catalogs for a master device are allocated so as to contain catalog entries for a specific group of user indices. A particular catalog track may contain entries for many users, the number depending upon the number of catalog tracks defined for the device. The user index provides the mechanism for differentiating between user's files on a particular catalog track. Refer to part IV, section 2.1, for a more detailed description.

3. Permit information: A user can allow other users to access his permanent files. This can be done by implicitly or explicitly permitting the user to access a particular file. Refer to the permanent file commands in the KRONOS 2.1 Reference Manual. Information describing the permission for all permanent files is in the permit file. Catalog entries contain a relative sector address within this permit file for permissions that have been granted for the file.

4. Indirect access files: The master device for a user contains all of his indirect access files. These files can be accessed by commands that generate working copies for manipulation by the user.

5. Direct access files: Direct access files are files that can be accessed from their location on mass storage. A working copy is not generated, so any updates or alterations made to the file are permanent. Direct access files can reside on the family master device or on any other device in the family.

MULTISPINDLE DEVICE

To accommodate files that are larger than one device, there is the multispindle device assignment. Up to eight spindles can be included in the EQ definition of one logical device. This definition must occur when the device is first defined. All spindles must be available for access whenever the device is accessed.

For example, an 841-4 to be used as one device could be defined in the CMRDECK as:

```
EQ3=MD-4,ON,3,1,2.
```

Refer to section 4.4.2 (type and unit parameters) for specific information on assigning multispindle devices.

NONREMOVABLE MASS STORAGE DEVICE

This is a device that cannot be physically removed during system operation. It can contain a copy of the system library, which means it is a system device; it can also be available for temporary files. It may or may not contain permanent files.

REMOVABLE MASS STORAGE DEVICE

A removable mass storage device is any mass storage device than can be logically or physically introduced or removed during system operation without causing system malfunction.

A device is specified as removable with the REMOVE entry in the CMRDECK. During deadstart, a removable device is recovered just as any other mass storage device, if the status is ON. If the device is not available, then the status is displayed for the operator (E,M display).

Removable devices can contain permanent files, but cannot contain the system library or temporary files because a device containing active files (such as local or common files) cannot be removed from the system. It can be an auxiliary device or an alternate permanent file family device.

SYSTEM DEVICE

The system device is a nonremovable device on which the system library resides. It may also contain permanent and temporary files.

TEMPORARY FILE DEVICE

The temporary file device is a nonremovable mass storage device on which temporary system files (nonpermanent files) reside. They include:

CM	Common files
LI	Library files
LO	Local files
SY	System files
TE	Timed/event rollout files
RO	Rollout files

Table II-4-1 summarizes the various functions that a particular mass storage device can serve. For example, if a device is an alternate system device (column on the left), then it cannot be a system device; it can contain temporary files, direct access files, and indirect access files; it can be a master device or a nonmaster device; it cannot be removable; and it can be either an auxiliary device or a family device.

TABLE II-4-1. MASS STORAGE DEVICE FUNCTIONS

	Other Possible Functions										
	Alternate system device	System device	Contain temporary files	Contain direct access files	Contain indirect access files	Master device	Nonmaster device	Removable device	Nonremovable device	Auxiliary device	Family device
System device	no	---	yes	yes	yes	yes	yes	no	yes	yes	yes
Alternate system device	---	no	yes	yes	yes	yes	yes	no	yes	yes	yes
Device containing temporary files	yes	yes	---	yes	yes	yes	yes	no	yes	yes	yes
Device containing direct access files	yes	yes	yes	---	yes	yes	yes	yes	yes	yes	yes
Device containing indirect access files	yes	yes	yes	yes	---	yes	no	yes	yes	yes	yes
Auxiliary device	yes	yes	yes	yes	yes	yes	no	yes	yes	---	no
Default family device	yes	yes	yes	yes	yes	yes	yes	no	yes	no	---

4.4.2 MASS STORAGE EQUIPMENT EST ENTRY

The purpose of the mass storage EQ entries is to describe all mass storage peripheral equipment. KRONOS 2.1 requires that at least 6 million words of mass storage be available.

There can be up to 16 logical mass storage devices (up to 16 mass storage EST entries). (This number can be changed at assembly time by modifying the NMSD parameter described in part III, section 1.1.3.) Each 841, 844, 853, or 854 entry, however, may refer to more than one physical unit. For example, the 844-2 may be defined as two units with two EQ entries, or it could be defined as one unit with one EQ entry.

The 6603 can have only one entry. Define a 6638 with one entry if it is a half-size 6638; define it with two entries if it is a full-size 6638. The 821 has two fixed units and must always have two EQ entries; they cannot be accessed as one unit.

A unit is a dual access unit if it is accessed by one computer system through two different controller-channel access routes. To define a unit as dual access with its EQ entry, specify two channel parameters. Only one controller number entry is necessary because both controllers must have the same number.

If any of the following entries are to be made for a device, they must follow the device's EQ entry: ASR, TEMP, REMOVE, PF, INITIALIZE. If a device's EQ entry is redefined, then any of those entries must also be redefined.

The format of the entry is:

EQord=type,status,controller,unit,$chan_1$,$chan_2$,R.

ord — 1 or 2 octal digit EST ordinal of mass storage equipment; 0 through 17_8

When assigning the mass storage equipment to EST ordinals, note the following information concerning system devices. A system device is one which contains a copy of the system library from the deadstart tape. There are two times to specify which mass storage devices are to be system devices.

With word 14, bits 0 through 5, of deadstart panel

1. When setting the deadstart panel (part II, section 2)
2. When the deadstart options are selected to be displayed (part II, section 3.9)

With the SYSTEM entry

1. When the CMRDECK is selected to be displayed (SYSTEM entry description in section 4.4.6)

Word 14, bits 0 through 5, allow only the mass storage equipment that is assigned to ordinals 0 through 5 to be specified as system devices.

The SYSTEM entry allows any mass storage devices (of the same equipment type) assigned to ordinals 0 through 17_8 to be system devices.

type

2, 3, or 4 digit equipment type; the following mass storage equipment is supported with KRONOS 2.1; n is the number of units connected to a controller.

Equipment	Type	n
813/814—3234	DF	
821—3553-1	DH	
841—3553-1	MD-n	1-8
844—7054-1	DI-n	1-8
853/854—3234	DD	
853/854—3234 (group)	DD-n	1-8
863—3647	DC	
6603	DA	
6638	DB	

The 841, 844, 853, and 854 units can be defined in different ways. Each unit can be defined separately with separate EQ entries just as with the other mass storage units.

If more continuous storage is needed than is possible with one unit, then more than one unit of an equipment type can be defined to the system as one logical device with one EQ entry. In this case, the type parameter identifies the number of consecutively numbered units defined with the EQ entry, and the unit parameter identifies the lowest numbered unit of n consecutively numbered units.

For example, an 844-2 with units 0 and 1 to be accessed as two units would be defined as:

```
EQord=DI-1,status,controller,0,channel.
EQord=DI-1,status,controller,1,channel.
```

An 844-2 with units 0 and 1 to be accessed as one continuous unit would be defined as:

```
EQord=DI-2,status,controller,0,channel.
```

An advantage to accessing the units as one continuous unit is that less space in CMR is used (624_8 words for the 844). A disadvantage is that if either unit malfunctions or is destroyed, both units are affected.

status

Specifies whether or not the equipment is available for access.

ON	Available
OFF	The device is not accessed during system operation. Set to the OFF position if the equipment is malfunctioning and access is not desirable

If the equipment is removable and is not available at deadstart, the system determines that it is unavailable, even if its EQ entry is set to the ON position. Device is not initialized if INITIALIZE is entered until it is set to ON status. During system operation, the operator may initiate access to this device by entering the ON command.

If the equipment can be used with either of two different systems (removable devices, not dual access), define the EQ entry for the system to which it is currently available for access as ON; define the EQ entry for the system to which it is not currently available for access as OFF.

controller

1 or 2 digit controller number; 0 through 7

Controller Name	Number
3234/3553-1/3647	4-7
6603/6638	0-7
7054-1	0

If a unit has dual access, then both of its controllers must have the same controller number for both channels.

unit

1 or 2 digit unit number; 0 through 7

If the EQ entry is defining more than one unit of a multispindle device, the unit entry refers to the lowest numbered unit of n units that have consecutive physical unit numbers. Refer to the type parameter description.

When more than one unit of a multispindle device are defined separately as removable devices, there must be enough consecutively numbered physical units to accommodate the largest sized device that is to be used during system operation. For example, if there are four units of an 841 that are to be removable, and there is an MD-3 pack, then at least three of these units must have consecutive physical unit numbers. The equipment assignments for these four single-unit devices might be:

```
EQ3=MD-1,OFF,5,2,7.
EQ4=MD-1,OFF,5,3,7.
EQ5=MD-1,OFF,5,4,7.
EQ6=MD-1,OFF,5,5,7.
REMOVE=3,4,5,6.
```

This parameter does not pertain to the 6603 or to the 6638; set to 0 or omit with a comma for this equipment.

$chan_{1-2}$

1 or 2 octal digit number of channel or channels to which controller is connected; 0 through 13_8, 20 through 33_8

Enter two channel parameters for dual access; the second channel cannot be 0.

Equipment	Number of Channels
841—3553-1	1 or 2
844—7064-1	1 or 2
853/854—3234	1 or 2
813/814—3234	1
821—3553-1	1 or 2
6603	1
6638	1
863—3647	1

If only one channel parameter is entered, it is the last parameter in the EQ entry; commas are not necessary to indicate that the last two parameters are not used.

R — Optional parameter for a dual access unit. The two controllers must have the same controller number (0 through 7) when R is part of the EQ entry. A release unit reserve function occurs whenever a channel is dropped. KRONOS 2.1 will not usually release controller reservations when an I/O operation is complete (or a single access device unless R is specified).

If the R parameter is omitted from dual access (two channels specified) EQ entry, the second channel automatically sets the R option.

4.4.3 ECS EQUIPMENT EST ENTRY

There are two possible ECS configurations. The coupler is part of the mainframe and allows a CPU (or two if dual CPUs are available) to communicate with ECS. The distributive data path (DDP) is standard with a CDC CYBER system and optional with a 6000 system. It allows any PPU in the system as well as the CPU directly to communicate with ECS. KRONOS 2.1 supports up to three DDPs.

The format of the entry is:

```
EQord=type,status,size,chan1,chan2.
```

ord — 1 or 2 octal digit EST ordinal of ECS; 0 through 17_8

type — ECS equipment type

DE	DDP is not available
DP	DDP is available

status — Specifies whether or not ECS is available for access

ON	Available
OFF	Equipment is ignored during system operation

size — 3 or 4 octal digit number representing size of ECS unit

Size	ECS Available
400	128K (1 bank)
1000	256K (2 banks)
2000	512K (4 banks)
4000	1024K (8 banks)
10000	2058K (16 banks)

$chan_{1-2}$ 1 or 2 octal digit number of channel or channels to which the DDP is connected; 0 through 13_8, 20 through 33_8

If the equipment type is DE, do not specify a channel parameter. If a channel parameter is included in a DE entry, the system recognizes it as a DP entry.

If the equipment type is DP, specify either one or two channels. The second channel cannot be 0. If a DDP is present, program loads of CPU programs residing in ECS will still occur via the CPU. A DDP must be connected to a channel by itself.

Example:

```
EQ4=DE,OFF,1000.
EQ5=DP,ON,2000,2,3.
```

4.4.4 TEMP: TEMPORARY FILES DEVICE ASSIGNMENT

To assign a mass storage device (nonremovable device only) as available for temporary files, add a TEMP entry for that device to the CMRDECK. Do not add a TEMP entry for a device with an EQ entry set to OFF or which already has a REMOVE assignment. Temporary files include:

CM	Common files
LI	Library files
LO	Local files
SY	System files
TE	Timed/event rollout files
RO	Rollout files

This assignment was indicated with the EQ entry status (ON/OFF) parameter in KRONOS 2.0.

```
TEMP=ord,...,ord.
```

ord 1 or 2 octal digit EST ordinal of mass storage device; 0 through 17_8; one or more ordinals may be specified with one entry.

4.4.5 PF: PERMANENT FILES DEVICE ASSIGNMENT

If a mass storage unit is to be defined for permanent files, enter a PF entry for that unit in the CMRDECK anywhere after the unit's EQ entry.

The PF entry information becomes part of the unit's label when the unit is initialized; this label is always recovered during subsequent deadstarts. In this case, it is not necessary that the PF entry be part of the CMRDECK on the configured deadstart tape; if it is, it is ignored. However, if the unit is to be initialized (with the INITIALIZE entry in CMRDECK) the system requires a PF entry in order to create the label.

If the unit is a family device, the format is:

```
PF=ord,I/D,mask,name,device.
```

If the unit is an auxiliary device, the format is:

```
PF=ord,X,name.
```

ord — 1 or 2 octal digit EST ordinal of mass storage device; 0 through 17_8

I,D,X — This parameter specifies the type of files that the unit is to contain.

- I — Unit can only contain indirect access files; master device
- D — Unit can contain only direct access files if its mask parameter is set to 0; it could not in this case be a master device

  It could contain indirect and direct access files if the mask parameter is set to 1 through 377_8; it is a master device in this case.
- X — Unit is an auxiliary device and can contain both direct and indirect access files. X must be specified on a unit's PF entry if any of the auxiliary device commands are to be used for the device.

Refer to Table II-4-2 for dependencies.

mask — 1, 2, or 3 octal digit parameter specifying the unit's mask; range is 0 through 377_8; omit if auxiliary device. Set according to information in part IV, section 2.1.

The device mask for a permanent file device defines the groups of users whose catalogs reside on the device for a particular family.

name — 1 through 7 alphanumeric character parameter designating either name of family to which unit belongs or its pack name if it is an auxiliary device.

The family name describes the permanent file devices available to a user. A family may consist of 1 through 63 logical devices; however, the master devices within the family must have user masks totaling 377_8 if all possible user indices are to be accommodated. Usually a system runs with one family of permanent file devices available. But additional families can be activated on a system in order to allow the users of these additional families to access their permanent files through an alternate system. This might be helpful if one system were to supply backup service to another system.

The pack name for a device specifies the unique 7-character name associated with an auxiliary device. An auxiliary device is a self-contained permanent file device which means that all files (direct and indirect access) represented by the catalogs on the device reside on that device. To access a file from an auxiliary device, the pack name must be specified as part of the permanent file request. The pack name is used instead of the usual algorithm for determining catalog location (user masks and family name). Any user who knows the pack name and has appropriate permissions and validations may access files on an auxiliary device.

device — 1 or 2 octal digit number of device in family; must be a unique number in family (1 through 77_8); omit if auxiliary device.

All permanent files that exist on devices other than the master device (where the catalog entry resides) will have a device number in the catalog entry indicating which alternate device within the family contains the file. Auxiliary devices do not have device numbers.

Examples:

```
PF=2,I,125,LINE1,3.
PF=17,X,UFO.
```

TABLE II-4-2. PF ENTRY

Type of PF Device	Files Permitted on Device	PF Entry Parameter Settings			
		type	mask	name	device
Auxiliary †	Indirect and/or direct	X	omit	pack	omit
Family	Direct only	D	0	family	$1\text{-}77_8$
	Indirect only (master device)	I	$1\text{-}377_8$	family	$1\text{-}77_8$
	Indirect and direct (master device)	D	$1\text{-}377_8$	family	$1\text{-}77_8$

†If a user number is specified for an auxiliary device, use the INITIALIZE command after deadstart. Refer to the operator's guide for procedure.

4.4.6 KRONOS 2.0 PERMANENT FILE CONVERSION TO KRONOS 2.1

Permanent files created under KRONOS 2.0 systems that are updated through PSR level 10 may be recovered by KRONOS 2.1 systems.

If the permanent file devices are not reconfigured under 2.0 or 2.1, the installations can alternate between 2.0 and 2.1 systems without reloading permanent files. Auxiliary devices are not accessible under 2.0 systems.

The only difference in the EQ entries is that under 2.0, the status parameter referred to whether or not the device was available for temporary files; under 2.1, it refers to whether or not the device is available for access. The TEMPord. entry (section 4.4.4) specifies whether or not the device is to be used for temporary files under 2.1.

Only the identical EQ entries are necessary in the 2.1 CMRDECK to recover permanent files created with 2.0 systems. The PF entry is not required to recover KRONOS 2.1 permanent files. However, the PF entries are identified in the following example to indicate what the PF entry characteristics are for 2.1.

To determine the permanent file definitions needed for the KRONOS 2.1 CMRDECK, use the following information.

The KRONOS 2.0 PF entry format was:

```
PF=ord,status,file type,mask.
```

The KRONOS 2.1 PF entry format is:

```
PF=ord,file type,mask,name,device.
```

status — Delete the status parameter on the KRONOS 2.1 PF entry

file type — The 2.0 variables were D for device dedicated to indirect access permanent files and S for devices with direct and indirect access permanent files.

To use the permanent files created under a 2.0 system with a 2.1 system, convert the parameters as follows:

2.0 parameter	2.1 parameter
S	D
D	I

mask — Same as for 2.0 and 2.1

name — Omit for 2.1 because there was no family or pack name under 2.0. No pack or family name can be specified as long as there is to be an alteration between 2.0 and 2.1 systems.

device — Catalog ordinal of 2.0 device biased by 40_8

Example:

If 2.0 CMRDECK is:

```
EQ0=DB,ON,1,0,0.
EQ1=DB,ON,1,0,1.
EQ2=MD-4,OFF,4,0,2.
EQ3=MD-2,ON,4,4,2.

PF=1,ON,S,.
PF=2,ON,D,377.
PF=3,ON,S,.
```

2.1 CMRDECK is:

```
EQ0=DB,ON,1,0,0.
EQ1=DB,ON,1,0,1.
EQ2=MD-4,ON,4,0,2.
EQ3=MD-2,ON,4,4,2.
TEMP=0,1,3.
PF=1,D,,,40.
PF=2,I,377,,41.
PF=3,D,,,42.
```

4.4.7 SYSTEM: SYSTEM LIBRARY DEVICE ASSIGNMENT

The SYSTEM entry specifies which mass storage devices are to contain copies of the KRONOS 2.1 system library. A system device can be any mass storage device as well as ECS.

Throughput can be greatly improved by specifying more than one system device. For example, if two system devices are specified and they are on different channels, the time required to access system programs can be reduced by as much as one half. When the channel for one system device is busy, the other is accessed.

Note the following restrictions.

- The SYSTEM entry can be typed only at deadstart when the CMRDECK is displayed; it cannot be included in a CMRDECK on the deadstart tape.
- The EQ entry for a system device cannot have the status set to OFF.
- There cannot be a REMOVE entry in the CMRDECK for a device to be specified as a SYSTEM device.
- If more than one device is specified as a system device, all devices specified must be of the same type (such as all DB or all MD-n, with n the same for all devices).
- If no devices are specified as system devices, the system library resides on the mass storage device defined by EST ordinal 0.
- If an ASR entry is made for a device with a SYSTEM entry, the ASR entry is ignored.

These devices can also be specified in word 14, bits 0 through 5, either at the deadstart panel (part II, section 2.4) or when the deadstart options are displayed (part II, section 3.11). Word 14 restricts the number of devices that can be specified as system devices to six (those defined in EST ordinals 0 through 5). The SYSTEM entry supersedes the word 14 settings.

The format is:

```
SYSTEM=ord,...,ord.
```

ord — EST ordinal of the unit to contain a copy of the system library on the deadstart tape; 0 through 17_8; the EQ entry must be set to ON status. One or more ordinals may be specified with one SYSTEM entry.

4.4.8 ASR: ALTERNATE SYSTEM LIBRARY DEVICE ASSIGNMENT

This entry specifies which mass storage devices are to be alternate system devices. An alternate system device is a mass storage device other than a system device on which duplicate copies of ABS, OVL, and PP type routines can be placed by the system for faster access than is possible from a system device or because they are frequently used programs.

The procedure for selecting the routines to be placed on the alternate device is in part III, section 1.1.5.

Note the following restrictions.

The format is:

```
ASR=ord,...,ord.
```

ord — 1 or 2 octal digit EST ordinal of mass storage device to be used as an alternate system device, 0 through 17_8.

1. Device must be a mass storage device, including ECS.
2. Device cannot be a removable device.
3. Device cannot be a system device. If a SYSTEM entry is made for the same device after an alternate device entry, the SYSTEM entry supersedes the alternate SYSTEM entry.

4.4.9 FAMILY: FAMILY NAME ASSIGNMENT

If there is only one permanent file family in the active system, specifying a family name is not necessary. However, when more than one family of permanent file devices are active in a system, the user must identify the family to which he belongs whenever he logs in or initiates a job. If he does not, the system assumes the default family.

The FAMILY entry in the CMRDECK defines the default family. It must follow the EQ entry for the permanent file device.

Note the following restrictions.

1. The status parameter for a system device's EQ entry cannot be set to OFF.
2. There cannot be a REMOVE entry in the CMRDECK for a device to be specified as a FAMILY device.

```
FAMILY=ord.
```

ord — 1 or 2 digit EST ordinal number of the mass storage device that the system automatically uses to determine the user's family when the user does not specify a family name at login or job initiation.

4.4.10 REMOVE: REMOVABLE DEVICE ASSIGNMENT

If a mass storage device is to be considered removable, it must be specified as such at deadstart with the REMOVE entry. This allows it to be introduced or removed during system operation.

Note the following restrictions.

1. A device specified as removable cannot also have an ASR, SYSTEM, TEMP, or FAMILY assignment.
2. A device assigned to EST ordinal 0 cannot be specified as removable.

```
REMOVE=ord,...,ord.
```

ord — 1 or 2 octal digit EST ordinal of mass storage device that is removable; 0 through 17_8; one or more ordinals may be specified with one REMOVE entry.

4.4.11 INITIALIZE: INITIALIZATION ENTRY

In order to use a mass storage device that is defined with an EQ entry, it must have a label. A label is written on a device when it is initialized, using either the INITIALIZE entry in the CMRDECK at deadstart time or the INITIALIZE command during system operation (refer to the operator's guide).

A mass storage device's label is contained on a logical track (usually track 0). It contains information about the allocation and characteristics of a device (and its units, if there is more than one unit on a device). This information is in the form of: a label sector for the first unit, a TRT for the device, and a label sector for each unit.

Initialization does not automatically occur at each deadstart because mass storage device labels are recovered during all deadstarts. Therefore, initialize a device only in the following situations.

1. To add a new mass storage device (no label exists on the device). Use the INITIALIZE entry.
2. If parts of the label on a permanent file device have been destroyed by maintenance operations (permanent files having been dumped to another device before diagnostics were run), use the INITIALIZE entry during deadstart to write a new label. Then reload the permanent files.
3. If a device (usually auxiliary or alternate permanent file family device) is added to a system during operation, use the INITIALIZE command (refer to the operator's guide) to initialize it if it does not have a valid label on it when it is added to the system.

The INITIALIZE entry has the following characteristics.

1. It can only be entered at the system console when the CMRDECK is displayed during a level 0 deadstart. It can be entered anywhere after the EQ entry for the device.

   If it is placed in the deadstart tape CMRDECK, the system issues the error message ILLEGAL ENTRY when the CMRDECK is read from the tape.

2. It assumes that no valuable information exists on the device and creates a new label. When the new label is created, all previously existing information on the device, including permanent files, is lost.

3. If the EQ status for the device, is OFF when INITIALIZE is entered, initialization of the device occurs whenever the device is set to ON status using the DSD ON operator command during normal system operation.

4. If the device is not a master device, INITIALIZE only writes a label; if it is a master device, then it also initializes the catalog track and writes EOIs at the beginning of the permit track, the indirect access track (data chain), and each catalog track.

5. During a deadstart initialization, all flaw reservations specified for a device are lost and must be reentered. Refer to part II, section 4. 5.

6. Always use the INITIALIZE operator command instead of the INITIALIZE CMRDECK entry to specify a user number for a private auxiliary device.

The entry format is:

```
INITIALIZE,ord,tracks.
```

ord — 1 or 2 octal digit EST ordinal of mass storage device to be initialized; 0 through 17_8

If the ordinal refers to a family permanent file device, then family name, device number, and mask (if it is a master device) are specified on the PF entry.

If it is an auxiliary device, the pack name is specified on the PF entry.

tracks — Optional 1, 2, or 3 octal digit parameter that specifies the number of catalog tracks allowed for a master device if the default number is not to be used; 1 through 200_8; must be a power of 2; omit if not a master device. Note that the fewer the catalog tracks available, the longer each permanent file request will take since the catalog search will be longer.

The defaults for each mass storage equipment type are:

Device	Equipment Type	Default No. Catalog Tracks
813/814	DF	100
821	DH	100
841	MD	20
844	DI	20
853/854	DD	4
863	DC	2
6603	DA	10
6638	DB	10
ECS	DE	2
ECS with DDP	DP	2
	Private device	1

4.5 TRACK RESERVATIONS

These entries identify areas of mass storage that are unusable (flawed areas) and prevent the system from accessing them. The information in the entries is used by the system to build the TRT for each device which resides in CMR and also in the mass storage device label.

Flaws can be entered at three different times.

- During deadstart when the CMRDECK is displayed
- During system operation using the FLAW entry that is defined in the operator's guide
- When configuring a deadstart tape

The formats described in this section are those for entering flaws during deadstart or on the deadstart tape.

- Use the CTK entry to clear all reservations on a device.
- Use the RTK entry to specify the physical address of a flaw. (If that reservation already exists, it remains in effect.)
- Use the TTK entry to cancel a particular RTK entry. (If that reservation does not exist, TTK makes that reservation instead of cancelling.)
- Use the STK entry to specify the logical address of a flaw. (If that reservation already exists, it remains in effect.)

Obtain flaw addresses from the customer engineer or the system analyst, or run the MST (mass storage test) on the device to determine the bad areas. The MST specifies the physical address of flaws.

The total number of reservations for all mass storage devices in the system cannot exceed 255_8.

4.5.1 CTK: CLEAR DEVICE TRACK RESERVATIONS

The CTK entry clears all flaw reservations that were previously made with RTK, STK, or TTK entries. This is the only way to cancel reservations made with STK entries. Reservations made with an RTK or a TTK entry can be cancelled with a duplicate TTK entry as well as with a CTK entry.

The difference is that a CTK entry cancels all track reservations on a device, whereas a TTK cancels individual physical track reservations.

Entering EQord=0 (part II, section 4.3.1) does not clear flaw entries for that equipment.

```
CTK=ord,...,ord.
```

ord — 1 or 2 octal digit EST ordinal of mass storage device; 0 through 17_8; one or more ordinals may be specified with one CTK entry.

4.5.2 TTK: CANCEL PHYSICAL ADDRESS ENTRIES

To cancel a flaw made with an RTK entry, enter the identical information with a TTK entry. If, however, the flaw did not exist before the TTK is entered, the area specified is reserved in the same way as with an RTK entry. A TTK entry can be cancelled with a duplicate TTK entry.

```
TTK=ord,address.
```

ord	1 or 2 octal digit EST ordinal of device; 0 through 17_8
address	Physical address of mass storage area to be cancelled; refer to the formats for each mass storage device as shown by the RTK entry descriptions that follow.

4.5.3 STK: RESERVE LOGICAL AREAS ON ANY MASS STORAGE DEVICE

Use this entry to specify the logical address of a flaw. If the track was reserved previously, that reservation remains in effect.

```
STK=ord,track.
```

ord	1 or 2 octal digit EST ordinal; 0 through 17_8
track	4 octal digit logical track to be reserved; 4000 through 7777_8

4.5.4 6603 DISK SYSTEM TRACK RESERVATION ENTRY

Use the following entry to reserve a track on a 6603 disk system.

```
RTK=ord,Ttrack,Ggroup,Ssector.
```

ord	1 or 2 octal digit EST ordinal of 6603 disk system; 0 through 17_8
track	1, 2, or 3 octal digit physical track number to be reserved; 0 through 200_8
group	1 or 2 octal digit head group number; 0 through 10_8
sector	1, 2, or 3 octal digit sector number; 0 through 144_8

4.5.5 6638 DISK SYSTEM TRACK RESERVATION ENTRY

Use this entry format to reserve tracks on the 6638 disk system.

```
RTK=ord,Ptrack,Hgroup,Ssector.
```

ord	1 or 2 octal digit EST ordinal of 6638; 0 through 17_8
track	1 or 2 octal digit number of track to be reserved; 0 through 40_8
group	1 or 2 octal digit head group number; 0 through 40_8
sector	1 or 2 octal digit sector number; 0 through 44_8

Examples:

```
RTK=0,P11,H17,S34.
RTK=0,P21,H1,S3.
RTK=1,P31,H12,S44.
RTK=1,P34,H26,S45.
```

4.5.6 863 DRUM RESERVATION ENTRY

Use the following entry to reserve areas on the 863 drum.

```
RTK=ord,Uunit,Ggroup.
```

ord	1 or 2 octal digit 863 EST ordinal; 0 through 17_8
unit	1 or 2 octal digit unit number; 0 through 10_8
group	1, 2, or 3 octal digit head group number; 0 through 100_8

4.5.7 853/854 DISK STORAGE DRIVE RESERVATION ENTRY

Use the following entry to reserve areas on the 853 or 854 disk storage drive.

```
RTK=ord,Ccylinder.
```

ord	1 or 2 octal digit 853 or 854 EST ordinal; 0 through 17_8
cylinder	1, 2, or 3 octal digit cylinder area; 0 through 310_8

Enter flaws for an 853/854 according to how it is to be used (whether as two DD-1's or as one DD-2, for example).

4.5.8 ECS RESERVATION ENTRY

Use this entry to prevent the system from using blocks (tracks) of ECS.

```
RTK=ord,Aaddress.
```

ord	1 or 2 octal digit EST ordinal of ECS; 0 through 17_8
address	1 through 6 octal digit logical address in a track of ECS; track containing absolute address is reserved

Example:

```
RTK=4,A714140.
```

4.5.9 813/814 DISK FILE RESERVATION ENTRY

Use the following entry to reserve areas on a 813 or 814 disk file.

```
RTK=ord,Ccylinder,Ttrack.
```

ord	1 or 2 octal digit 813 or 814 EST ordinal; 0 through 17_8
cylinder	1 through 3 octal digit cylinder number; 0 through 200_8
track	1 through 5 octal digit track number; 0 through 10000_8

Example:

```
RTK=2,C0,T2435.
RTK=2,C100,T30.
RTK=3,C10,T4011.
RTK=3,C21,T1162.
```

4.5.10 821 DATE FILE RESERVATION ENTRY

Use the following entry to reserve areas of an 821 data file.

```
RTK=ord,Ccylinder.
```

ord	1 or 2 octal digit 821 EST ordinal; 0 through 17_8
cylinder	1 through 4 octal digit cylinder number; 0 through 2000_8

4.5.11 841 MULTIPLE DISK DRIVE RESERVATION ENTRY

Use the following entry to reserve areas of an 841 multiple disk drive.

```
RTK=ord,Ccylinder,Ssector.
```

ord	1 or 2 octal digit 841 EST ordinal; 0 through 17_8
cylinder	1 through 4 octal digit cylinder number; 0 through 2000_8
sector	1 through 4 octal digit sector number; 0 through 2411_8

Enter flaws for an 841 according to how it is to be used (whether as two MD-1's or as one MD-2, for example).

4.5.12 844-2 DISK STORAGE SUBSYSTEM RESERVATION ENTRY

Use the following entry to reserve areas of an 844 disk.

```
RTK=ord,Ccylinder,Ttrack,Ssector.
```

ord	1 or 2 octal digit 844-2 EST ordinal; 0 through 17_8
cylinder	1 through 3 octal digit cylinder number; 0 through 632_8
track	1 or 2 octal digit track number; 0 through 22_8
sector	1 or 2 octal digit sector number; 0 through 27_8

Enter flaws for an 844-2 according to how it is to be used (whether as two DI-1's or as one DI-2, for example).

5.1 GENERAL DESCRIPTION

Two displays pertaining to the IPRDECK can be displayed atlernately by pressing the right blank key. The first is the IPRINST display. It lists the valid IPRDECK entries that are described throughout this section. The second display is the current IPRDECK. The IPRDECK contains system installation parameters that describe the mode of system operation. There can be up to 4096_{10} IPRDECKS on a deadstart tape. If there are more than one on the tape, specify the deck to be used during a particular deadstart with the IPD-entry in the CMRDECK (part II, section 4.2).

IPRDECK modification is accomplished by entering the appropriate changes or additions from the console keyboard. These entries can be made when either IPRINST or IPRDECK is being displayed. Each console entry supercedes the value currently specified in the IPRDECK. However, the modified IPRDECK remains in effect only until the next deadstart is performed. That is, changes to the IPRDECK are not recovered across deadstart unless a new deadstart tape is created to reflect those changes (refer to part III, section 1.1.2).

Most of the IPRDECK entries are also valid DSD commands that can be used to make the same changes during system operation. These DSD assignments are not retained on any level of recovery deadstart.

RELEASED FORMAT OF IPRINST

```
IPRINST
INSTALLATION PARAMETER ENTRIES.

CERTAIN INSTALLATION PARAMETERS REFER TO THE JOB ORIGIN
TYPE *OT*.  *OT* MAY BE REPLACED BY THE FOLLOWING -
     SY   SYSTEM        BC   BATCH
     EI   E/I 200       TX   TELEX

ACCOUNT.  TOGGLE ACCOUNT CARD IGNORE SWITCH.
AUTOROLL. TOGGLE AUTO ROLL DISABLE.
DEBUG.    TOGGLE DEBUG SWITCH.
LOCK.     TOGGLE CONSOLE LOCK STATUS.
PRIORITY. TOGGLE PRIORITY EVALUATION DISABLE.
VALID.    TOGGLE JOB VALIDATION DISABLE.
BATCHIO.  TOGGLE AUTO STATUS OF *BATCHIO*.
EI200.    TOGGLE AUTO STATUS OF *EI200*.
MAGNET.   TOGGLE AUTO STATUS OF *MAGNET*.
TELEX.    TOGGLE AUTO STATUS OF *TELEX*.
TRANEX.   TOGGLE AUTO STATUS OF *TRANEX*.

DELAY,T1XXX,T2XXX,...,TNXXX.
          SET DELAY TIME *TN* = XXX.
     TN = AR     AUTO RECALL (MILLISECONDS)
          CS     CPU JOB SWITCH (MILLISECONDS)
          CR     CPU PROGRAM RECALL (MILLISECONDS)
PU PROGRAM RECALL (MILLISECONDS)
          JA     JOB ADVANCE (MILLISECONDS)
          JS     JOB SCHEDULER (SECONDS)
```

```
QUEUE,OT,QT,Q1XXX,Q2XXX,...,QNXXX.
          SET QUEUE PARAMETERS *QN* = XXXX, FOR QUEUE *QT* OF
          JOB ORIGIN *OT*.
     QT = IN   INPUT      QN = OP   ORIGINAL PRIORITY
T = IN   INPUT      QN = OP   ORIGINAL PRIORITY
N = OP   ORIGINAL PRIORITY
          RO   ROLLOUT          LP   LOWER BOUND FOR PRIORITY AGE
          OT   OUTPUT           UP   UPPER BOUND FOR PRIORITY AGE
                                IN   AGE INCREMENT

TCSC=CC.
          SET ASSUMED MAGNETIC TAPE CHARACTER SET CONVERSION.
     CC = 63   63 CHAR SET      64   64 CHAR SET
TCVM=CC.
          SET ASSUMED MAGNETIC TAPE CONVERSION MODE.
     CC = NL   NONE             AS   ASCII
          US   USASI            EB   EBCDIC

TDEN=CC.
          SET ASSUMED TAPE DENSITY ACCORDING TO CC.
     CC = NL   NONE             HI   556
          LO   200              HY   800
          HD   800              PE   1600

DSD,X,CCC-CCC
          SET INITIAL KEYBOARD COMMAND = CCC-CCC IF
          RECOVERY MODE X IS SELECTED.
          ONLY THOSE CHARACTERS THAT MAKE THE ENTRY UNIQUE
          ARE REQUIRED.

SERVICE,OT,P1XXX,P2XXX,...,PNXXX.
          SET JOB SERVICE PARAMETERS *PN* = XXXX, FOR JOB
          ORIGIN *OT*.
     PN = PR     INITIAL CPU PRIORITY
          CP     CPU TIME SLICE (MILLISECONDS*64)
          CM     CENTRAL MEMORY TIME SLICE (SECONDS)
          NJ     MAXIMUM NUMBER OF JOBS
          FL     MAXIMUM FIELD LENGTH FOR ANY JOB
          AM     MAXIMUM FIELD LENGTH FOR ALL JOBS
          FC     NUMBER OF FILES IN CATALOG
          FS     INDIVIDUAL INDIRECT ACCESS FILE SIZE
          CS     CUMULATIVE INDIRECT ACCESS FILE SIZE

MSAL,F1XX,F2XX,...FNXX.
          ASSIGN JOB FILE TYPE *FN* TO MASS STORAGE EQ XX.
     FN = IN   INPUT            OT   OUTPUT
          RO   ROLLOUT          LG   LGO
          LO   LOCAL(SCRATCH)
```

FORMAT OF RELEASED IPRDECKS

```
IPRDECK
TDEN=HY.
LOCK.
EI200.
VALID.
TRANEX.
QUEUE,SY,IN,OP6600,LP700,UP3000.
QUEUE,SY,RO,OP6000,LP100,UP1000.
QUEUE,SY,OT,OP400,LP100,UP7700.
SERVICE,SY,PR1,CP100,CM20.
QUEUE,BC,IN,OP2400,LP2000,UP4010.
QUEUE,BC,RO,OP2400,LP1010,UP4004.
QUEUE,BC,OT,OP200,LP100,UP7000.
SERVICE,BC,PR30,CP400,CM200.
QUEUE,EI,IN,OP3400,LP2400,UP4010.
QUEUE,EI,RO,OP3400,LP1400,UP4006.
QUEUE,EI,OT,OP200,LP100,UP7600.
SERVICE,EI,PR30,CP400,CM200.
QUEUE,TX,IN,OP4000,LP3770,UP7006.
QUEUE,TX,RO,OP4004,LP3740,UP7000.
QUEUE,TX,OT,OP200,LP100,UP7000.
SERVICE,TX,PR30,CP40,CM10.
QUEUE,MT,IN,OP6774,LP6700,UP7400.
QUEUE,MT,RO,OP6774,LP4000,UP7400.
QUEUE,MT,OT,OP6000,LP100,UP7700.
SERVICE,MT,PR31,CP400,CM60.
DELAY,JS1,CS10,AR1000.
DSD,0,MAI:X.ISF.
DSD,3,AUTO.
```

```
IPRDCK1
TDEN=HY.
LOCK.
EI200.
VALID.
TRANEX.
BATCHIO.
TELEX.
MAGNET.
QUEUE,SY,IN,OP6600,LP700,UP3000.
QUEUE,SY,RO,OP6000,LP100,UP1000.
QUEUE,SY,OT,OP400,LP100,UP7700.
SERVICE,SY,PR1,CP100,CM20.
QUEUE,BC,IN,OP2400,LP2000,UP4010.
QUEUE,BC,RO,OP2400,LP1010,UP4004.
QUEUE,BC,OT,OP200,LP100,UP7000.
SERVICE,BC,PR30,CP400,CM200.
QUEUE,EI,IN,OP3400,LP2400,UP4010.
QUEUE,EI,RO,OP3400,LP1400,UP4006.
QUEUE,EI,OT,OP200,LP100,UP7600.
SERVICE,EI,PR30,CP400,CM200.
QUEUE,TX,IN,OP4000,LP3770,UP7006.
QUEUE,TX,RO,OP4004,LP3740,UP7000.
QUEUE,TX,OT,OP200,LP100,UP7000.
SERVICE,TX,PR30,CP40,CM10.
QUEUE,MT,IN,OP6774,LP6700,UP7400.
QUEUE,MT,RO,OP6774,LP4000,UP7400.
QUEUE,MT,OT,OP6000,LP100,UP7700.
SERVICE,MT,PR31,CP400,CM60.
DELAY,JS1,CS10,AR1000.
DSD,0,AUTO:X.ISF.
DSD,3,AUTO.
```

```
IPRDCK2
TDEN=HY.
LOCK.
VALID.
ACCOUNT.
AUTOROLL.
PRIORITY.
BATCHIO.
TELEX.
EI200.
TRANEX.
MAGNET.
QUEUE,SY,IN,OP6600,LP700,UP3000.
QUEUE,SY,RO,OP6000,LP100,UP1000.
QUEUE,SY,OT,OP400,LP100,UP7700.
SERVICE,SY,PR1,CP100,CM20.
QUEUE,BC,IN,OP2400,LP2000,UP4010.
QUEUE,BC,RO,OP2400,LP1010,UP4004.
QUEUE,BC,OT,OP200,LP100,UP7000.
SERVICE,BC,PR30,CP400,CM200.
QUEUE,EI,IN,OP3400,LP2400,UP4010.
QUEUE,EI,RO,OP3400,LP1400,UP4006.
QUEUE,EI,OT,OP200,LP100,UP7600.
SERVICE,EI,PR30,CP400,CM200.
QUEUE,TX,IN,OP4000,LP3770,UP7006.
QUEUE,TX,RO,OP4004,LP3740,UP7000.
QUEUE,TX,OT,OP200,LP100,UP7000.
SERVICE,TX,PR30,CP40,CM10.
QUEUE,MT,IN,OP6774,LP6700,UP7400.
QUEUE,MT,RO,OP6774,LP4000,UP7400.
QUEUE,MT,OT,OP6000,LP100,UP7700.
SERVICE,MT,PR31,CP400,CM60.
DELAY,JS1,CS10,AR1000.
```

5.2 ACCOUNT.

Format	Default	Significance
ACCOUNT.	enabled	Use ACCOUNT. and VALID. to specify whether or not ACCOUNT card processing and account validation are to occur during system operation. The default status of ACCOUNT. is to check the job stream for an ACCOUNT card. This is the usual status if running under a production environment. The system assumes the ACCOUNT feature is enabled if there is no ACCOUNT entry in the current IPRDECK.

The ACCOUNT. status relates with the status of VALID. (part II, section 5.3) as follows:

	ACCOUNT. enabled	ACCOUNT. disabled
VALID. enabled	An ACCOUNT entry in the job stream must follow the JOB entry; it will be validated. If a CHARGE entry is required†, it must follow the ACCOUNT entry; it will also be validated.	It is necessary that a job stream include an ACCOUNT entry, which is issued to the dayfile but is not validated.
VALID. disabled	It is not necessary that a job stream include an ACCOUNT entry but it is validated if it is available in the job stream. If a CHARGE entry is required†, it must follow the ACCOUNT entry; it will be validated, if available.	It is not necessary that a job stream include an ACCOUNT entry. If it is available in the job stream, it is issued to the dayfile; but it is not validated.

5.3 VALID.

Format	Default	Significance
VALID.	enabled	Use this entry to enable or disable user validation. Disabling this option causes the ACCOUNT card to be ignored even if it is present. This allows jobs to run with no VALIDUX (account validation) file. Account validation is normally enabled when running in a production environment. Refer to the ACCOUNT. and VALID. relationship in section 5.2 The system assumes that VALID. is enabled if there is no entry in the current IPRDECK.

† When an ACCOUNT entry is validated, part of the validation parameters indicate whether a user is required to have a CHARGE entry.

5.4 AUTOROLL.

Format	Default
AUTOROLL.	enabled

Significance

Enter to reverse the current status (enabled or disabled) of the autoroll feature.

enabled	Allows automatic job rollout of jobs. This should be the mode of operation if time-sharing is to be supported by the system.
disabled	No automatic job rollout. This setting may be advantageous in a batch environment.

The system assumes that AUTOROLL. is enabled if there is no entry in the current IPRDECK.

5.5 BATCHIO.

Format	Default
BATCHIO.	enabled

Significance

Use this entry to reverse the status (enabled or disabled) of BATCHIO.

enabled	BATCHIO is initialized.
disabled	BATCHIO is not initialized. This status is advantageous when not running local batch, because it frees a control point for other use.

The system assumes that BATCHIO. is enabled if there is no entry in the current IPRDECK.

5.6 DEBUG.

Format	Default
DEBUG.	disabled

Significance

Use this entry to select or clear debug mode, depending upon the current status.

enabled	Debug mode is selected. The message DEBUG appears in the header of the left screen display. Debug mode provides system origin privileges to validated users and allows modifications to be made to the running system.
disabled	Debug mode is cleared. It is not recommended to allow debug mode in a normal production environment.

The system assumes that debug mode is disabled if there is no entry in the current IPRDECK.

5.7 JOB CONTROL INFORMATION

The QUEUE, SERVICE, and DELAY entries in IPRDECK relate to job control. The following is general information concerning job control.

5.7.1 QUEUE CONTROL

The first three words in each job control area are for the control of jobs in the queues. These words contain the values used for job aging as follows:

Byte 0	Original (entry) queue priority; specified in OP parameter of QUEUE entry
Byte 1	Lower bound for priority aging; specified in LP parameter of QUEUE entry
Byte 2	Upper bound for priority aging; specified in UP parameter of QUEUE entry
Byte 3	Priority increment; specified in IN parameter of QUEUE entry

If the priority is below the lower bound or above the upper bound, the job is never aged. As long as the job remains in the queue and is within the limits, it is aged upward in the following manner. Every time the aging program ISP is activated, the value in byte 4 is incremented by one. This value is then checked against the priority increment (byte 3), and when they match, the priority for all jobs is incremented by one.

The aging program is activated according to the cycle time contained in byte 4 of the job scheduler control word, JSCL; refer to a listing of SYSTEXT. This parameter (JS in DELAY entry), along with the queue control parameters, is set in IPRDECK. However, all of these parameters can be changed dynamically with the QUEUE and DELAY commands. The job scheduler cycle time is normally set to 1 second in IPRDECK.

Another queue control feature is the ability to specify the entry priority for jobs in the queue. This is the value that the Export/Import 1.0, BATCHIO, and TELEX programs use when they enter jobs into the queue. The entry value can be set to give better service to a particular origin type or a particular queue within an origin type.

Some additional comments about the meaning of entry priority for the rollout queue are necessary. This is not the priority given to jobs when they are rolled out; they retain the priority assigned to them at a control point (refer to section 5.7.2). The entry priority for the rollout queue is meaningful only for time-sharing jobs. This is the priority that a terminal job is assigned when reentering the queue after terminal input/output has been performed.

5.7.2 CONTROL POINT CONTROL

The fourth word in the job control area directs the control of a job while it resides at a control point in central memory. This word contains the following values.

Byte 0	Initial CPU priority set at job initiation or user login; specified in PR parameter in SERVICE entry
Byte 1	CPU time slice in milliseconds divided by 64; specified in CP parameter in SERVICE entry
Byte 2	Central memory time slice in seconds; specified in CM parameter in SERVICE entry
Bytes 3 and 4	Not used

A job leaves a central memory control point because:

A job completes or aborts.

Terminal input/output is required.

The control point is made available for a higher priority job.

The first category is self-explanatory; the second is discussed in section 5.7.3.

The third category is the mechanism that ensures reasonable service to all users in the system. In a system servicing a large number of users, restrictions must be placed on the memory time and CPU time each job type can use within a certain period of time. The control point control word specifies the amount of central processor or central memory time each type of job may use when it is at a control point. This is used to ensure that one job does not monopolize system resources.

If a job exceeds either of these resource allocations, and its queue priority is in the range $100_8 \leq qp \leq 7760_8$, the queue priority is set to the lower bound priority for input or rollout files of that origin type. This value normally is less than the entry priority for input and rollout jobs. Thus, any job in the queue with a priority higher than the entry priority forces the resource-bound job to be rolled out. The rolled-out job normally ages until its priority is higher than the priorities of jobs entering the queue and is again scheduled to a control point.

Whenever a TELEX job exceeds its resource allocation, a check is made to determine whether the job has generated output. If no output is available, the job priority is dropped. If output is available, the job is rolled out. This causes the output to be sent to the terminal. This feature ensures that if a compute-bound terminal job is the only job in the system, output will be provided as it is generated rather than only when the output buffer becomes full.

Once a job is scheduled, it is desirable to use the resources allocated before another job forces it out. If a job maintained its queue priority when assigned to a control point, it would be possible for another job to age past that job before having an opportunity to use its time slice. For this reason, when a job is assigned to a control point and is within the queue aging range, it is given a priority equal to the upper bound for the origin and queue type. However, if the entry priority at the time of scheduling is greater than the upper bound priority, the job retains that value.

5.7.3 MEMORY CONTROL

The maximum memory allowed for any job type can be controlled by use of the fifth word in the job control area. This word has the following format.

Byte 0	Maximum number of jobs; NJ parameter in SERVICE entry. This parameter for TELEX origin jobs is the maximum number of terminals allowed to log in at any one time.
Byte 1	Maximum field length divided by 100_8 for any job; FL parameter in SERVICE entry
Byte 2	Maximum field length divided by 100_8 for all jobs of that type; AM parameter in SERVICE entry
Bytes 3 and 4	Not used

Byte 0 only has meaning for TELEX origin jobs. Byte 1 for TELEX origin jobs is the maximum field length any job is given even though the user is validated for more, the user requests more, or the system calculates a higher value (such as in the algorithm used for FORTRAN or BASIC jobs). Byte 1 for all origin types except TELEX origin type jobs and byte 2 for all origin types influence scheduling in the following way. Initially, the scheduler attempts to find the highest priority job which meets the constraints specified in both byte 1 and byte 2. However, if the scheduler is unable to schedule a job and has explicitly rejected one or more jobs because of these constraints, a second attempt to schedule a job is made. During this second attempt, any job that requires other jobs to be rolled out is not scheduled. Otherwise, the constraints are ignored. This means that the constraints are applied as long as there are enough jobs of each origin type. However, if core is unused because batch jobs are at a maximum and no other jobs are available, the scheduler will attempt to schedule the batch jobs.

All of these parameters can be changed at the site using the SERVICE, QUEUE, and DELAY commands.

5.7.4 EXAMPLES OF JOB CONTROL PARAMETERS

A theoretical set of job control parameters is illustrated in Figure II-5-1. The following discussion indicates the significance of the values chosen and how they relate to each other.

Note that this is not a recommended set of parameters but strictly an example to aid the local site in selecting its parameters.

JOB ORIGIN TYPE	QUEUE TYPE	QUEUE PRIORITY: ENTRY PRIORITY	QUEUE PRIORITY: LOWER BOUND PRIORITY	QUEUE PRIORITY: UPPER BOUND PRIORITY	INCREMENT	TIME SLICE: CPU	TIME SLICE: CM	INITIAL CPU PRIORITY
SYSTEM	INPUT	6600	700	3000	1	100	20	1
	ROLLOUT	6000	100	1000	2			
	OUTPUT	400	100	7700	1			
BATCH	INPUT	2400	2000	4010	1	400	200	30
	ROLLOUT	2400	1010	4004	1			
	OUTPUT	200	100	7000	2			
EXPORT/ IMPORT	INPUT	3400	2400	4010	1	400	200	30
	ROLLOUT	3400	1400	4006	1			
	OUTPUT	200	100	7600	1			
TELEX	INPUT	4000	3770	7006	1	40	10	30
	ROLLOUT	4004	3740	7000	1			
	OUTPUT	200	100	7000	1			
MULTI-TERMINAL	INPUT	6774	6700	7400	1	400	60	31
	ROLLOUT	6774	4000	7400	1			
	OUTPUT	6000	100	7700	1			

DELAY PARAMETERS

JS	CR	AR	JA	CS
1	10	200	10	10

Figure II-5-1. Example of Theoretical Job Control Parameters

The system input queue entry priority is higher than all other entry priorities except for that of the multiterminal origin type because it is assumed that any operator-initiated job should receive prompt attention. A system job rolls out any normal local batch or Export/Import job. Most system jobs are coded to adjust their priorities correctly, once execution begins.

All of the input queue lower bound limits are higher than the rollout queue lower bound limits so that a job that completes execution in two CPU time slices receives faster service than a job that takes longer. This occurs because the first time a job reaches the end of its time slice, its priority is set to the input queue lower bound for the corresponding job origin type. If the job exceeds its time slice again, its priority is set to the corresponding rollout queue lower bound priority for this and all subsequent rollouts.

Currently, none of the rollout queue entry priorities has significance except for TELEX origin jobs. The TELEX rollout queue entry priority is given to a job coming into the rollout queue after being swapped out of central memory for either input or output. The TELEX input queue entry priority is given to a job when it is entered into the system. Thus, because the TELEX rollout queue entry priority is higher than the input queue priority, a job that is interacting with the user is given a slight preference.

When a job reaches the end of its time slice, the critical priority ratios are the input queue entry priorities compared to the input queue lower bound priorities, and the rollout queue entry priorities compared to the rollout queue lower bound priorities. In this example, these ratios are especially significant to the terminal user.

- The first time a job exceeds the time slice and is swapped out, it waits 8 seconds (TELEX input queue entry priority minus the input queue lower bound priority) until the aging program makes its priority equal to the priority of new jobs entering the queue. However, if there are jobs in the queue that have completed terminal I/O, the job waits 12 seconds (TELEX rollout entry priority minus input queue lower bound priority). This is only true if there are other jobs in the TELEX input queue.

- The second and each succeeding time a job exceeds its time slice, its priority is set to the TELEX rollout queue lower bound priority. Once a job's priority has been lowered, the job is swapped out only if a job of higher priority is in the queue (except for the case of TELEX jobs with output available.) Thus, it is penalized more severely in relation to other jobs that do not exceed their time slices. A compute-bound TELEX job is given preference over a compute-bound Export/Import or batch job. This can be seen by comparing the rollout queue lower bound priorities in Figure II-5-1 for the various job origin types.

The range between the entry priority and the upper bound priority for all job types in the output queue is quite large. The increment for the output queue is higher than for the other queues. Thus, jobs in the output queue age more slowly, and printer output can wait in the queue for hours.

The queue priorities for batch and remote batch (Export/Import) jobs are set to give remote batch jobs a preference. For example, the first time an Export/Import job exceeds its resource allocation, its priority is lowered to that of entering batch jobs. Thus, only batch jobs that have been waiting in the queue are given preference.

The time slices for the various origin types reflect the following objectives.

- To prevent system jobs with their high entry priority from monopolizing system resources.

- To prevent too much swapping activity from diagnostics running as system origin jobs.

- To allow most batch jobs to run to completion in one time slice. There is no problem with the time slices for batch jobs compared to terminal jobs, because with the priorities shown, a terminal job generally causes a batch job to roll out.
- To ensure reasonably good service to all terminal users without swapping too often, the time slices for TELEX origin jobs are set low. These parameters are especially critical to good terminal performance. In some cases, it may be desirable to change these parameters during operation, depending on the system load, job size, etc.
- To allow completion of multiterminal jobs if at all possible.
- Batch jobs have a larger time slice because there is little to be gained from swapping batch jobs.

The CPU priorities reflect the following objectives.

- System jobs are run at the lowest priority. This is done to handle the background CPU and memory diagnostics.
- Multiterminal origin type jobs run at the highest priority in the system. This is done because it is desirable to complete these jobs quickly, and in general, they use little CPU time.
- All other jobs run at the same priority. It is generally not desirable to run one class of jobs at a higher priority than another because the system would swap in jobs which simply occupy memory until they exceed the central memory time slice.

5.8 QUEUE

Format

QUEUE, ot, qt, qp_1xxxx, . . . , qp_nxxxx.

Significance

Use this entry to specify the queue priorities associated with the input, rollout, and output queues for each job origin type.

ot	Job Origin Type
SY	System
BC	Local batch
TX	TELEX
EI	Export/Import (remote batch)
MT	Multiterminal

qt	Job Queue Type
IN	Input
RO	Rollout
OT	Output

qp	Queue Priority
LPxxxx	Lowest priority at which a job can enter the queue and still be aged (MNPS $\leq$ xxxx $\leq$ MXPS). The released values for MNPS and MXPS are 0100 and 7760 octal, respectively.

OPxxxx	Original (entry) priority. This is the priority associated with the job when it initially enters the specified queue. The value of xxxx is normally within the boundaries specifed by LP and UP.
UPxxxx	Highest priority a job can reach in the specified queue; aging stops when this priority is reached. The job is also given this priority when initially assigned to a control point. The value of xxxx is normally greater than LP and OP but cannot exceed MXPS.
INxxxx	Number of scheduler cycles before incrementing the job priority by one.

5.9 SERVICE

Format

SERVICE, ot, $p_1$xxxx, . . . , $p_n$xxxx.

Significance

Use this entry to specify the service limits associated with each job origin type.

ot	Job Origin Type
SY	System
BC	Local batch
TX	TELEX
EI	Export/Import (remote batch)
MT	Multiterminal

pi	Service Limits
PRxx	CPU priority ($01 \leq xx \leq 70_8$). Jobs with highest priority get CPU first. All job origin types except SY and MT are normally set to the same CPU priority. System jobs (SY) are run at the lowest CPU priority. Multiterminal (MT) jobs are normally set to a higher CPU priority since they require little CPU time.
CPxx	CPU time slice (milliseconds * 64). This parameter specifies maximum amount of time a job of the specified origin type can use the CPU before its queue priority is set to the lower boundary.

CMxxxx Central memory time slice in seconds. This parameter specifies the maximum amount of time a job of the specified origin type can remain at a control point before it becomes eligible to be rolled out. The value of xxxx can range from 0 to 7777 octal.

NJxxxx Maximum number of jobs. For TELEX origin jobs, this parameter specifies the number of terminals that can be logged into the system. The NJ parameter has no meaning for other job origin types.

FLxxxx Maximum field length/100 for any job of the specified job origin type. Jobs with field length requirements that exceed this value are not scheduled to a control point. It is important to note that this parameter only affects the scheduling of jobs to a control point. Jobs currently assigned to a control point that exceed this value are not aborted. However, if the job is rolled out, it will not be scheduled back to a control point. This parameter is typically used to limit the memory requirement for jobs of a specific job origin type during certain hours of the day. For example, the FL parameter may be used to specify a maximum field length for all batch origin jobs between the hours of 2:00 and 4:00 in the afternoon.

AMxxxx Maximum field length/100 for all jobs of the specified job origin type. This parameter is used to partition central memory by limiting the total field length available to each job origin type. For example, if scheduling a job to a control point exceeds the field length specified for its job origin type, it may not be scheduled until the required field length is available. This means that a lower priority job from a

different origin may be scheduled first. However, a job that would normally exceed the field length for its job origin type can be scheduled to a control point if there are not enough jobs to fill the field length specified for another job origin type. The system always attempts to use central memory to its greatest capacity.

FCxxxxxx — Number of permanent files allowed. The value of xxxx can range from 1 to 777777 octal. The value entered is rounted down to the nearest 100_8.

CSxxxxxx — Cumulative size in PRUs allowed for all indirect access permanent files. The maximum value that can be entered is 777777 octal. This value is multiplied by 100 octal to determine the actual limit allowed.

FSxxxxxx — Size in PRUs allowed for individual indirect access permanent files. The maximum value that can be entered is 777777 octal. This value is rounded down to the nearest 1000 octal PRUs.

5.10 DELAY

Format

DELAY,$t_1$xxxx,...,$t_n$xxxx.

Significance

Use this entry to specify the system delay parameters.

t_i	Delay
JSxxxx	Job scheduler interval in seconds. This parameter specifies the interval at which the job scheduler and priority increment routines are called. Note that the scheduler may also be called at other times.
CRxxxx	CPU program recall period in milliseconds. This parameter specifies the amount of time a job remains in recall when an RCL request is placed in RA+1.

ARxxxx — PPU auto recall interval in milliseconds. This parameter specifies the time interval at which PPUs in auto recall are recalled.

JAxxxx — Job advance interval in milliseconds. This parameter specifies the time interval at which the system checks to determine if the advance job routine (1AJ) has been called.

CSxxxx — CPU job switch interval in milliseconds. This parameter specifies the amount of time the CPU executes any one job if several jobs of equal CPU priority all require the CPU.

5.11 DSD

Format

DSD, level, command...

Significance

Use this entry to specify the initial commands to be executed by the DSD program when the deadstart is complete.

level — Level of deadstart (0, 1, 2, or 3).

command — DSD command to be executed for the level of deadstart specified.

Several commands can be specified by separating them with a unique character, such as a colon.

Example:

DSD, 0, MAI:X.ISF.

5.12 EI200.

Format	Default
EI200.	enabled

Significance

Use this entry to specify whether or not Export/Import 1.0 is to be initialized.

enabled — Export/Import is initialized.

disabled — Export/Import is not initialized. This status is advantageous if not running remote batch because another control point and PPU are then available for use.

If running only local batch jobs, disable Export/Import and the Time-Sharing Subsystem (TELEX entry).

The system assumes that Export/Import is to be initialized if there is no entry in the current IPRDECK.

5.13 LOCK.

Format	Default
LOCK.	unlocked

Significance

Use this entry to specify whether the 6612 system console is to be locked or unlocked.

locked — The 6612 is locked. This software function prevents entry of the restricted commands noted. All other DSD commands can be entered when the console is locked.

The console is normally locked when the system is being used in a production environment.

unlocked — All DSD commands can be entered when the console is unlocked; the following commands are restricted to entry only when the console is unlocked.

DEBUG.
DATE.yy/mm/dd.
TIM.hh.mm.ss.
DISABLE,VALIDATION.
ENABLE,VALIDATION.
STEP.
STEP,xx.
n.STEP.
n.STEP,xx.
UNSTEP.
All memory entry commands
All channel control commands

The system assumes that the system console is unlocked if there is no LOCK. entry in the current IPRDECK.

5.14 MAGNET.

Format	Default
MAGNET.	initialized

Significance

Use this entry to specify whether or not the magnetic tape subsystem (MAGNET) is to be initialized.

If magnetic tape operations are not used, disabling MAGNET frees a control point for other use.

The system assumes that MAGNET is to be initialized if there is no MAGNET. entry in the current IPRDECK.

5.15 MSAL

Format

MSAL, C, $f_1$xx, . . . , $f_n$xx.

Significance

Use this entry to assign job files of type f_i to mass storage device defined by EST ordinal xx. The mass storage device specified must be nonremovable, and its current status must be ON.

If the C parameter is entered, any values specified in a previous MSAL entry in the IPRDECK are cleared. If the C parameter is omitted, and an MSAL entry was specified in the IPRDECK, the new values are added to those already specified.

f_i	File Type
LO	Local
IN	Input
OT	Output
RO	Rollout
LG	LGO

5.16 PRIORITY.

Format	Default
PRIORITY.	enabled

Significance

Use this entry to specify whether or not priority aging is to be used.

enabled	Priority aging is active.
disabled	Priority aging does not occur.

5.17 REMOVABLE PACKS.

Format	Default
REMOVABLE PACKS.	enabled

Significance

Use this entry to enable or disable automatic label checking for mass storage devices defined as removable.

enabled	Automatic label checking occurs. This status must be available to perform label verification before removable devices can be accessed.
disabled	Any removable devices introduced into the system will not be recognized.

The system assumes that this feature is enabled if there is no entry in the current IPRDECK.

5.18 TDEN

Format	Default
TDEN=density	800 bpi

Significance

Use this entry to set system tape density. When the density is set, any tape unit accessed is automatically set to this density unless specified otherwise by a magnetic tape request.

HI	556 bpi (7 track)
HY	800 bpi (7 track)
LO	200 bpi (7 track)
NL	None
HD	800 cpi (9 track)
PE	1600 cpi (9 track)

The system assumes that the density is HY if there is no TDEN entry in the current IPRDECK.

5.19 TELEX.

Format	Default
TELEX.	enabled

Significance

Use this entry to specify whether or not the Time-Sharing Subsystem is to be initialized.

If not running time-sharing, disabling TELEX frees a control point and PPU for other uses.

The system assumes that TELEX is to be initialized if there is no TELEX. entry in the current IPRDECK.

5.20 TRANEX.

Format	Default	Significance
TRANEX.	enabled	Use this entry to enable or disable the Transaction Subsystem (TRANEX). If the Transaction Subsystem is not being used, disabling TRANEX frees a control point for other use. The system assumes that TRANEX is enabled if there is no TRANEX entry in the current IPRDECK.

5.21 TCSC

Format	Default	Significance
TCSC=cc.	63	Use this entry to specify the magnetic tape character set conversion to be assumed during system operation. 63 — 63-character set 64 — 64-character set The system assumes 63-character set conversion if there is no TCSC entry in the current IPRDECK.

5.22 TCVM

Format	Default	Significance
TCVM=cc.	AS	Use this entry to set the tape conversion mode to be assumed during system operation. NL — None AS — ASCII 9-track conversion US — USASI 9-track conversion EB — EBCDIC 9-track conversion

KRONOS 2.1 1

The KRONOS 2.1 base package consists of the following products; modification information for these products is in the sections indicated.

Operating System: KRONOS 2.1 operating system, Export/Import 1.0, Modify 1.0, Text Editor, Time-Sharing Subsystem	part III, section 1.1
COMPASS 3.0	part III, section 1.2
Record Manager 1.0	part III, section 1.3
Direct Access 1.0	part III, section 1.4
Indexed Sequential 2.0	part III, section 1.5
Update	part III, section 1.6
SCOPE 3.4 Texts	part III, section 1.7

The maintenance tools, which must be ordered separately, are described in part III, section 1.8

1.1 OPERATING SYSTEM

1.1.1 RELEASE DESCRIPTION

HARDWARE REQUIREMENT

The minimum hardware requirement for KRONOS 2.1 is:

CDC CYBER 70/Model 72-12
Seven PPUs
6.0 million words of mass storage
One line printer
One card reader
Two 607, 657, or 659 magnetic tape units

The released KRONOS 2.1 system must be modified to run on a 32K system. To accomplish this, modifications to CMRDECK are required (such as table sizes, number of control points, and buffer sizes) and also to LIBDECK (such as central memory resident programs). Refer to CMRDECK in part II, section 4, and to LIBDECK in part III, section 1.1.5. Generally, the minimum configuration only supports the Time-Sharing Subsystem (including the Time-Sharing Executive (TELEX), BASIC 2.1, Time-Sharing FORTRAN and Text Editor). To use additional subsystems and products, such as Export/Import 1.0 and KRONOS Transaction Subsystem, additional memory is necessary.

The target hardware configuration for KRONOS 2.1 is:

CDC CYBER 70/model 73-14
Ten PPUs
One 512 line printer
One 405 card reader
One 415 card punch
One 844-2 disk system (or one 6638 disk (with 10037) plus one 841-3 disk system)
Four 65x magnetic tape units (x = 7 or 9)
Two 6676 and one 6671 communication multiplexers

CORRECTIONS

All appropriate corrective code through the KRONOS 2.0 PSR level 12 minitape release is included in the release of KRONOS 2.1.

DEFICIENCIES

The deficiencies for the KRONOS 2.1 system will be supplied with the release materials.

1.1.2 INSTALLATION PROCEDURE

The general procedure to install, modify, and update the KRONOS 2.1 operating system (as well as Export/Import 1.0, Modify, Text Editor, and Time-Sharing Subsystem) is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). Note the following additional procedure. The materials necessary to do so are:

KPL2 contains the jobs to modify, update, install, and verify installation; the job required for the operating system is KR1.

KR1	Use to modify installation parameters, modify CMRDECKs, IPRDECKs, and LIBDECK, add PSR updates to source code, and create a new deadstart tape and KPL1.
BCS2	Use to collect the binary card deck for the 844-2 subsystem controlware program BCS and generate directives for later use as input to the procedure file GENSYS. Note the additional information and alternate procedure in this section on the 844-2 subsystem controlware.
INS1	Use to update installation decks on KPL2.

KPL1 contains the source code.

ADDITIONAL PROCEDURE

Note the following additional information when modifying the KRONOS 2.1 system.

1. If modifying a parameter listed in part II, section 1.1.3, list its deck to obtain its sequence number.

2. Run a job similar to the following example to place modifications on the SYSMOD file and to create files CMRDECK, IPRDECK, and LIBDECK for job KR1.

```
JOB,CM10000,P30,T100.
ACCOUNT card.
COPYBR,INPUT,SYSMOD.
COPYBR,INPUT,CMRDECK.
COPYBR,INPUT,IPRDECK.
COPYBR,INPUT,LIBDECK.
SAVE,SYSMOD,CMRDECK,IPRDECK,LIBDECK.
7/8/9
*DECK COMSPFM
*D,nnn.
 DFPT EQU  3RDI1
*EDIT COMSPFM
*DECK PPCOM
*D,nnn.
 NPFS EQU  3
*EDIT PPCOM
.
.
.
7/8/9
CMRDECK
EQ0=DB,ON,1,0,3.
EQ20=LP,ON,5,0,12.
.
.
.
7/8/9
IPRDECK
SERVICE,TX,NJ100.
.
.
.
7/8/9
LIBDECK
*CM PP/PFM,CIO,1AJ
*PROC TEXT/PFD
.
.
.
6/7/8/9
```

Local modifications and installation parameter (assembly constants) changes from part III, section 1.1.3

Entire CMRDECK using entries from part II, section 4

Entire IPRDECK using entries from part II, section 5

Entire LIBDECK using entries from part III, section 1.1.5

3. If adding a CMRDECK, IPRDECK, or LIBDECK, add the appropriate cards as indicated in job KR1 in part III, section 1.1.4. If adding all three decks, the cards would be:

```
GET(CMRDECK, IPRDECK, LIBDECK)
.
.
.
*FILE  CMRDECK
*FILE  IPRDECK
*FILE  LIBDECK
```

4. Run job KR1 to add the modifications to the deadstart tape, as described in part I, section 3.2.

844-2 SUBSYSTEM CONTROLLWARE

DESCRIPTION OF RELEASED CONTROLWARE

The 844-2 subsystem controlware that is released on the KRONOS 2.1 deadstart tape is identified by card deck part number 5382700. It is appropriate for the following controllers.

An 844-2 controller with a serial number above DT209C167

An 844-2 controller with a serial number below DT209167 that includes FCO CA32618

If the controller serial number is below DT209C167, but FCO CA32618 is not available, it is necessary to obtain from Software Distribution and install on the deadstart tape (using BCS2) controlware that contains a one-card modification. The one-card modification allows the controlware to run without FCO CA32618.

Figure III-1-1 illustrates which controlware supports the 844-2 controllers. SA refers to a single-access controller; DA refers to a dual-access controller. For example, if a single-access controller with serial number DT209C166 is available and the controlware does not include FCO CA32618, then the controlware with modification must be ordered. All other combinations are supported by the released version of the controlware.

Controller Serial Number (DT209Cnnn)	Controlware with Modification (must be ordered)		Controlware without Modification (as released on deadstart tape)	
If nnn is 166 or less, and FCO CA32618 is not included in controlware	SA	yes	SA	no
	DA	no	DA	yes
If nnn is 166 or less, and FCO CA32618 is included in controlware	SA	yes	SA	yes
	DA	no	DA	yes
If nnn is 167 or higher, and FCO CA32618 is included in the controlware	SA	yes	SA	yes
	DA	no	DA	yes

Figure III-1-1. 844-2 Subsystem Controlware Requirements

PROCEDURE TO IDENTIFY AVAILABLE CONTROLWARE

If it is necessary to determine which controlware card deck is available, examine either the last two data cards in the card deck or examine the specific memory locations in the controller's high core using the buffer controller maintenance console.

When examining the cards in the card deck, note that each hexadecimal word of the controller's core memory is punched in two successive columns. The higher order character is first in each pair of columns. On each card, columns 1 and 2 are word count and checksum; column 76 is unused; and columns 79 and 80 are a sequence number.

Columns on Last Card	Memory Locations Contained in Columns	Contents of Controller Memory Locations
14 and 15	0FFD	Product ID (hexadecimal equivalent of 710A, for example)
12 and 13	0FFC	Right four digits of the eight-digit controlware part number
10 and 11	0FFB	Left four digits of the eight-digit controlware part number
8 and 9	0FFA	Program code only
6 and 7	0FF9	Start of FCO list; each location contains the hexadecimal equivalent of a decimal FCO number. The list ends with 00.
4 and 5	0FF8	
3 of last card and 77 of previous card	0FF7	
75 and 76 of previous card	0FF6	
.	.	
.	.	
.	.	

ALTERNATE PROCEDURE TO MODIFY BCS

It is possible to use the following procedure, instead of job BCS2, to update the 844-2 BCS controlware on the deadstart tape.

1. Type the following at the system console, pressing (CR) after each entry.

   ```
   X.DIS.
   COMMON(ZZZPSBF,ZZZZLDF)
   COMMON(SYSTEM)
   GTR(SYSTEM,BCS)PPU/BCS
   ASSIGN(CR,CR)
   ```

2. Place the following deck in the system card reader; ready the unit.

   ```
   844-2 controlware deck
   7/8/9
   *REPLACE  PPU/BCS
   6/7/8/9
   ```

3. Type the following at the system console, pressing (CR) after each entry.

```
COPYBR(CR,X)
COPYBR(CR,ZZZZLDF)
RETURN(CR)
REWIND(X)
O26.
READ.BCS.
```

4. Move the insert (by repeatedly pressing the left parenthesis key) to follow the line containing the right parenthesis in column 1.

5. Type the following at the system console, pressing (CR) after each entry.

```
DEL.          This deletes the remainder of the BCS record in the system
              library (all except the 77 and 52 tables).
READN.X.
REWIND.
DIS.
COPYBR(X,ZZZPSBF)
DROP.
```

1.1.3 INSTALLATION PARAMETERS

CMRDECK, IPRDECK, LIBDECK, and other installation parameters listed in this section can all be modified using the KR1 job.

CMRDECK modifications are described in part II, section 4; IPRDECK modifications are described in part II, section 5; and LIBDECK modifications are described in part III, section 1.1.5.

The following parameters are listed alphabetically according to the deck they are in.

COMSACC PARAMETERS

List CALLSYS to obtain a listing of COMSACC.

Parameter	Released Default Value	Significance
APFN	VALIDUX	This is a micro definition that specifies the name of the file that is the KRONOS 2.1 version of the KRONOS 2.0 VALIDUS file. Refer to part IV, section 1.1, for further information on VALIDUX.
AUFN	VALINDX	This is a micro definition that specifies the name of the available user indices file. This file was part of VALIDUS under KRONOS 2.0; it is a separate file under KRONOS 2.1. Refer to part IV, section 1.1, for further information on VALINDX.

COMSEXP PARAMETERS

List CALLSYS to obtain a listing of COMSEXP.

N.PORTS	20_8	The number of ports that are to be used on a 6671 multiplexer. If the terminals have a baud rate that is higher than 2400, decrease N.PORTS which decreases the cycle time. For example, to change from 2400 baud to 4800 baud, change N.PORTS to 6 to decrease the cycle time.
N.TIME	3 milliseconds	Every N.TIME milliseconds, the system services the number of ports specified in N.PORTS. For example, the released values of N.PORTS and N.TIME indicate that the system services 20_8 ports every 3 milliseconds at 2400 baud. Changing N.PORTS to 6 and N.TIME to 1 enables the system to service 6 ports every millisecond at 4800 baud.

Parameter	Released Default Value	Significance
T. HUNG	400_{10} milliseconds	This is the line timeout delay.

COMSPFM PARAMETERS

List CALLSYS to obtain a listing of COMSPFM.

DFPT	MD1	When accessing an auxiliary device with permanent file commands, the permanent file manager checks that the equipment type specified with the R parameter and the pack name are the same as it found when it scanned the equipment. If R is not specified, the equipment type defined with DFPT is assumed. If the default is used for another equipment type, the error message ILLEGAL DEVICE REQUEST occurs.
NFRNG1 through NFRNG7 FSRNG1 through FSRNG7 CSRNG1 through CSRNG7		These parameters control the permanent file access for individual users. There are seven ranges for each classification. The default values and further explanation are in part IV, section 1.1.

COMSPRO PARAMETERS

List CALLSYS to obtain a listing of COMSPRO.

PPFN	PROFILO	This micro definition specifies the PROFILE routine's data base file name. It is further explained in part IV, section 1.2.
PPWD	SECURUS	This micro definition specifies the PASSWORD routine's data base file name.
PUSN	SYSTEMX	This micro definition specifies the catalog location of the PROFILE routine's data base.

COMSREM PARAMETERS

List CALLSYS to obtain a listing of COMSREM.

UITS	100_8 CPU seconds	This parameter specifies the default CPU time limit for any particular terminal job's activity, if it is not specified with the SETTL command (described in Time-Sharing User's Reference Manual).

Parameter	Released Default Value	Significance
VSPL	20_8	VSPL specifies the minimum number of spare pots allowed per 64 terminal users; VMPL specifies the maximum number of spare pots allowed per 64 users. A pot is an eight-central-memory-word internal working buffer in TELEX. These two parameters could be reduced for small configurations in order to make more core available for user jobs. If the number of pots used is below the minimum default value, the system requests more central memory. If the number of pots used is above the maximum value, the system requests the release of central memory. Caution should be exercised when changing this parameter because lost data can occur if system activity increases.
VMPL	40_8	

COMSSSJ PARAMETER

List CALLSYS to obtain a listing of COMSSSJ.

ART	4 minutes	This value specifies the default for the NA parameter on the ATTACH control card or command. It specifies the amount of time that a job will wait in the wait queue for a direct access file to become available before trying to access it again.

COMSDSL PARAMETER

List CALLSYS to obtain a listing of COMSDSL.

LTKL	20_8	If a mass storage device is not initialized during deadstart (using the INITIALIZE entry described in part II, section 4.4.11), the system searches the device for a label that may or may not be in track 0. This parameter specifies the number of tracks the system will search before determining that the device has a bad label or no label. When it reaches that track number (in the released system, track 20_8), it stops searching for a label. If the device is a system device, the system writes a new label; if it is not a system device, the error code LE (label error) and U status (unavailable) are entered in the MST, and the device must be initialized after deadstart. MST is the mass storage table described in the KRONOS 2.1 Operator's guide.

MTR PARAMETER

List MTR to obtain a listing of this deck.

Parameter	Released Default Value	Significance
MSLC	998_{10}	MSLC is an equate in MTR that determines the number of channel 14 clock microseconds that will be considered a millisecond for system time-keeping purposes. This parameter usually does not require change.

PPCOM PARAMETERS

List SYSTEXT to obtain a listing of PPCOM.

NMSD	20_8	NMSD defines the maximum number of EST ordinals that can define mass storage devices. Therefore, in the released system, ordinals 0 through 17_8 can define mass storage devices.
NROS	2	This parameter specifies the number of rollout/rollin operations that can occur simultaneously. This value should be the same as the number of channels specified as available for swapping so that the PPUs do not wait to access channels. The number of channels available for swapping is determined by the TEMP entry in CMRDECK (part II, section 4.4.4) and the MSAL entry in IPRDECK (part II, section 5), or DSD command (KRONOS 2.1 Operator's Guide). TEMP designates the number of mass storage devices that can contain temporary files. MSAL designates the mass storage devices to be used for rollout.
NPFS	4	This is the number of permanent file accesses (PFMs) that are allowed simultaneously. This value should be only slightly larger than the number of channels that are connected to mass storage devices containing permanent file catalogs so that the PPUs do not wait to access channels. For example, a system's permanent files may be split between two devices on two different channels. In this case, NPFS should be set to either 3 or 4.

RESEX PARAMETER

List RESEX to obtain a listing of RESEX.

Parameter	Released Default Value	Significance
PL	2 minutes	This is the length of time that a job waiting for an auxiliary device is kept in the timed/event queue before retrying assignment.
TL	1 minute	This is the length of time that a tape request is kept in the timed/event queue for a tape to become available before retrying assignment.

1.1.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

KR1

```
KR1
KR1,CM61000,P30,T7000.
*ACCOUNT CARD.
*GET,MOD=SYSMOD.
COMMON,OPL.
MODIFY,Z,F,N,C=0,LO=E./*READ,MOD,*
RETURN,OPL.
CATALOG,NPL,R.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL1,W,FI=KRONOS*2P1,MT,D=HY,F=I)
COPYEI,NPL,KPL1,V.
RETURN,KPL1.
RENAME,OPL=NPL.
MODIFY,Z,Q,CS=0,CB=SYST./*EDIT,SYSTEXT
MODIFY,Z,Q,CG=SYST./*EDIT,ADC.VFYLIB
MODIFY,Z,Q,CG=SYST,CB=REL./*EDIT,CPUREL.WRITEB
COMMON,SYSTEM.
GTR,SYSTEM,OLD.ULIB/SYSLIB
LIBEDIT,B=REL,I=0,L=0.
LIBGEN,F=NEW,P=SYSLIB.
MODIFY,Z,L=0./*EDIT,GENFILS.GENVAL
REWIND,SYST,LGO,SYSLIB.
LIBEDIT,P=SYSTEM,N=NSYS,B=0,L=0.
CATALOG,NSYS,R,U.
REQUEST,NDS,LB=KU,F=I.
COPYEI,NSYS,NDS,V.
*WEOR
*FILE      SYST
*FILE      LGO
*FILE      COMPILE
*FILE      SYSLIB
*WEOF
```

If adding a CMRDECK, IPRDECK, and LIBDECK, add the following cards as indicated.

GET(CMRDECK,IPRDECK,LIBDECK)

```
*FILE      CMRDECK
*FILE      IPRDECK
*FILE      LIBDECK
*WEOF
```

BCS2

```
BCS2
BCS2,CM15000,T77.
*ACCOUNT CARD
COMMENT.  THIS JOB ADDS THE 844 BUFFER CONTROLLER BINARY DECK
COMMENT.  TO THE SYSTEM COMMON FILE ZZZPSBF FROM THE
COMMENT.  DISTRIBUTED BINARY CARD DECK. (PART NUMBER 53088900).
COMMENT.  IT ALSO ADDS THE NECESSARY LIBEDIT DIRECTIVES TO THE
COMMENT.  SYSTEM COMMON FILE ZZZZLDF.
COMMON,ZZZPSBF,ZZZZLDF.
SETCORE.
RBR,INPUT,BCS.   ADD 77 AND 52 TABLE
WBR,ZZZPSBF.
COPYBR,INPUT,ZZZZLDF.
WRITEF(ZZZPSBF)
BKSP,ZZZPSBF.
*WEOR
*          844 FIRMARE DECK.
*WEOR
*REPLACE PPU/BCS
*WEOF
```

INS1

```
INS1
INS1,CM45000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB MODIFYS THE INSTALLATION DECKS RELEASE TAPE AND
*CREATES A NEW KPL2 PROGRAM LIBRARY.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL2,R,FI=INSTALLDECKS*2P1,MT,D=HY,F=I)
COPY,KPL2,OPL.
UNLOAD,KPL2.
RETURN,KPL2.
MODIFY,F,N,C=0,LO=E.
CATALOG,NPL,R.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL2,W,FI=INSTALLDECKS*2P1,MT,D=HY,F=I)
COPY,NPL,KPL2,V.
*WEOR
*/         PLACE *INSTALL DECKS* MODSET HERE.
*WEOF
```

1.1.5 LIBDECK

LIBDECK is a directive record on the deadstart tape. It is read by SYSEDIT during the system load to determine the following types of information.

Information Defined in LIBDECK	LIBDECK Entry
Which system library records are to reside in the central memory resident library	*CM
Which system library records are to reside on system devices; this is the default residence for routines with no storage area specified in LIBDECK	*MS
Which system library records are to reside on alternate system devices (as well as the system device)	*AD
What the default user libraries for overlay programs are	*LIBRARY
Which records are procedure files	*PROC
Which programs should use SCOPE 3.4 parameter processing	*SC

The LIBDECK released on the KRONOS 2.1 deadstart tape is:

```
LIBDECK
*CM         PP/CIO,2CA,2CB,2CC,2CD,2CE,2CF,2CG,2CH
*CM         PP/1AJ,TCS,3AE,LDR
*CM         PP/1CJ,1MA,0BF,0DF,0AV,0RP
*CM         PP/LFM
*CM         PP/1RI,3RH,1RO,3RP,3RQ
*CM         PP/PFM,3PA,3PB,3PD,3PG,3PI
*CM         PP/1TA,1TO,3TI,3TJ
*CM         PP/1MT,3MD,3MF,3ML
*CM         PP/CHK,CLL
*CM         PP/1LS
*CM         PP/1IO,1SJ,1SP,1BA
*CM         PP/1DL,9AX,9A2,9A3                    (DSD RELATED)
*LIBRARY    BASLIB/BASIC
*PROC       LIBMOD
*PROC       GENVAL
*PROC       GENHELP
*PROC       GENFILS
*PROC       GENINSD
*PROC       GENSYS
*SC         OVL/FILE,UPDATE,COMPASS
*SC         OVL/RUN23,RUN,ALGOL,COBOL,FTN,SIMI5,SIMULA,SORTMRG
```

MODIFICATION OF LIBDECK

When determining the residence of system library routines, it is necessary to consider how the programs are used in relation to the characteristics of the hardware.

Concerning the program usage:

1. How large the programs are
2. How often the programs are used

Concerning hardware characteristics:

1. What the storage capacity is
2. What the transfer rate is
3. What the access time is

The following are general guidelines:

1. Large programs (such as the FORTRAN Extended compiler) require a large capacity, high transfer rate storage area.

2. Small programs (such as PFILES, FILES, and most PPU programs) require smaller capacity storage areas.

3. Programs that are frequently used (such as TSRUN, BASIC, PFM, 1AJ, CIO, 1ST, and 1MT) require storage areas with a high transfer rate and access time.

4. Programs that are infrequently used (for example, overlays to PFM such as 3PF, the DEFINE processing overlay, and IMS and MSI, device initialization overlays) require a storage area with lower transfer rate and less fast access time.

For example:

1. Central memory has the best accessibility of any of the possible storage areas. However, the more space that is reserved for system library routines, the less space is available for user programs.

2. ECS is a high transfer (especially to central memory) storage area. It could be used for highly used CPU programs, such as TSRUN and PPU programs.

3. The 6638 is a high transfer rate, medium positioning time device. It could be used as a system device.

4. The 841 is a low transfer rate, fast positioning time device. It could be used for small, highly used programs, such as PPU overlays.

5. The 844 is a fast positioning time, medium transfer rate device. It could be used as a system device or as an alternate system device for PPU programs.

LIBDECK DIRECTIVES

The directives that can be in LIBDECK are described. Other valid input directives to SYSEDIT (*DELETE and *IGNORE, for example) are described in section 5 of the KRONOS 2.1 Reference Manual.

*CM DIRECTIVE

Specify the system library routines that are to reside in central memory resident with this directive. These routines will reside in RPL (resident peripheral library) and RCL (resident central library).

The format of the directive is:

```
*CM, ty/rec1, ty2/rec2, ..., tyn/recn.
```

ty_i/rec_i Identifies the routine's record type and record name

Central memory has the best accessibility of all storage devices. There are some programs that will automatically reside in central memory. These are:

1. Mass storage drivers
2. Those programs specified in the internal tables of SLL (SYSEDIT service routine) such as 1DD and 0DF

In addition, it is suggested that high usage PPU and CPU programs, such as PFILES, CONTROL, 1MT, and PFM, reside in central memory.

Note that any addition to central memory allows less space for user jobs.

*MS DIRECTIVE

This directive identifies which system library routines are to reside on the system device. It is the default residence for routines; any routine not specified as *CM will automatically reside on the system device, even if *MS is not entered in the LIBDECK. System device routines may also be placed on an alternate system device with a *AD assignment.

The format of the directive is:

```
*MS, ty1/rec1, ty2/rec2, ..., tyn/recn.
```

ty_i/rec_i Identifies the routine's record type and record name

*AD DIRECTIVE

The purpose of the alternate system device feature is to place copies of specific system library routines on particular mass storage devices so that they will be accessed from a device other than the system device. For example, it is advantageous:

1. To place frequently used system library routines in ECS for faster access than is possible from the system device.

2. To place PPU routines on a mass storage device that has better latency than does the system device (for example, if the system device is a 6638, placing PPU routines on an 841).

Once a routine is on an alternate system device, it is accessed from that device instead of from the system device (*MS LIBDECK entries), except in some cases of error recovery. These exception are:

1. If there is an unrecoverable error for a PPU routine on an alternate system device, all of the PPU routines will subsequently be accessed from the system device instead of from any of the alternate system devices.

2. If there is an unrecoverable error for a CPU routine on an alternate system device, only that routine will subsequently be accessed from the system device.

Specify the devices that are to be used as alternate system devices with the ASR entry in the CMRDECK (part II, section 4.4.8); specify the routines that are to reside on each alternate system device in LIBDECK.

The format of the *AD LIBEDIT directive to SYSEDIT is:

*AD, nn, $ty_1/rec_1, ty_2/rec_2, \ldots, ty_n/rec_n$.

nn Indicates the equipment to be used as an alternate system device; use either the equipment 1 or 2 octal digit EST ordinal or its 2-character equipment type.

The equipment can be any nonremovable mass storage device (including ECS) except for a system device.

If the equipment is not specified in the CMRDECK with the ASR entry, the *AD entry is ignored without an error indication when the system is loaded.

ty_i/rec_i Identifies the routine's record type and record name

ty_i Record type of routine

ABS	CPU multiple entry point overlay
OVL	CPU overlay
PP	6000 series PPU absolute

If a record type other than ABS, OVL, or PP is specified, the message ILLEGAL CM/AD RESIDENCE, MUST BE PP, OVL, OR ABS is issued to the output device; the run is aborted.

rec_i Record name of routine

A routine is allowed on only one alternate system device.

Note the following additional qualifications.

1. Once a routine is placed on an alternate system device, SYSEDIT may be used to prohibit access to the routine; however, the space for that routine is not released until LIBDECK is modified and the system is reloaded.
2. IF ECS is an alternate system device, all CPU routines residing there will be loaded directly by central monitor function LCEM. This causes the transfer of a program for ECS directly to the load address.
3. If DDP is available, PPU programs residing on ECS will be loaded via DDP, and CPU programs will be loaded via the CPU access to ECS.

*LIBRARY DIRECTIVE

Use the *LIBRARY directive to specify user libraries from which to satisfy externals for those product set binaries that do not contain LDSET tables (such as BASIC binaries). The LDSET control card can also be used to specify additional libraries. It is described in section 5 of the KRONOS 2.1 Reference Manual.

Any binaries generated by a common product (such as COBOL 4.0 or FORTRAN Extended 4.0) contain LDSET loader tables identifying the user libraries that satisfy externals.

The format of the directive is:

```
*LIBRARY,ulib/ovl1,ovl2,...,ovln.
```

ulib Name of user library for the overlays specified

ovl_i Overlay program

*PROC DIRECTIVE

Specifying a TEXT record as a procedure file allows a user to use the CALL statement to insert this file (consisting of a group of control cards) at a specific location in his job's control card stream.

The system obtains the procedure file (specified with the lfn parameter in the CALL statement) by:

1. Searching for a local file, lfn
2. Searching the system library for lfn
3. Attempting to retrieve a working copy of an indirect access file

Procedure files and the CALL statement are defined in section 4 of the KRONOS 2.1 Reference Manual.

The format of the directive is:

*PROC, rec_1, rec_2, ..., rec_n.

rec_i Record name of routine to be defined as a procedure file

*SC DIRECTIVE

Use this directive to specify that the control card images in a certain program are to be processed in SCOPE format rather than KRONOS format. The formats are defined under control card format in section 4 of the KRONOS 2.1 Reference Manual.

The format of the directive is:

*SC, ty_1/rec_1, ty_2/rec_2, ..., ty_n/rec_n.

ty_i/rec_i Identifies the routine's record type and record name that is to be processed in SCOPE format

1.1.6 GENHELP PROCEDURE FILE

GENHELP is a procedure file on the system that is used to generate the file of terminal command explanations for the program HELP. This program is executed using the terminal command HELP (described in the KRONOS 2.1 Time-Sharing User's Reference Manual). It provides the terminal user with information and explanations of all the time-sharing commands. This program accesses the file of explanations, which is stored in the permanent file library, whenever a user requests information about a command. To initiate the procedure file to build this HELP library file, run the following job.

JOB, CM60000, T100	Refer to the KRONOS 2.1 Reference Manual for control card format
ACCOUNT, usernum, passwrd.	
CALL(GENHELP)	Initiates the procedure file
7/8/9	
*BUILD HELPPL	LIBEDIT input directive (refer to KRONOS 2.1 Reference Manual)
6/7/9	

The procedure file GENHELP is as follows:

GENHELP	File name card
RETURN(HLP)	Release file HLP
MODIFY(Z, C=HLP)/*NOSEQ/*EDIT, CMDFILE	Get Modify input directives following the right parenthesis. Edit the deck CMFILE and write unsequenced compile output to file HLP.
LIBEDIT(P=HLP, B=0)	Get compile input from file HLP, directive input from file INPUT, build and append a directory to the compile input, and write it to file NEW. There is no replacement file.
SUI, 377776.	Set special permanent file library user index.
DEFINE(CMFILE/CT=PU, M=R) REWIND(NEW) COPYBF(NEW, CMDFILE)	Specify that CMDFILE be a direct access file with read-only permission and place it in the permanent file library.

1.1.7 LIBMOD PROCEDURE FILE PROCEDURE

LIBMOD, a record on the release tape, is a procedure file used to update user libraries. A copy of this file is as follows:

```
LIBMOD
RETURN(Q1,Q2)                          Return files for user later.
GTR(OLD,Q1)ULIB/LIB                    Get the selected user library.
LIBEDIT(P=Q1,B=LGO,N=Q2)               Replace the routines.
LIBGEN(F=Q2,P=LIB)                     Generate a new user library.
LIBEDIT(P=OLD,N=NEW,B=LIB,I=0,L=0)     Generate a new system file.
```

Before calling this file, file LGO must be created with the routines to be changed. The following is a detailed explanation in example form of each step in the calling sequence.

```
CALL(LIBMOD(LIB=SYSBLIB,OLD=SYSTEM,LGO=CHGS)
RETURN      Make sure files Q1 and Q2 are cleared
            so these file names can be used later.
GTR         Get the user library record SYSLIB from
            SYSTEM and write it to file Q1.
LIBEDIT     Take the changes to be made to SYSLIB
            from the local file CHGS, combine them,
            and write the result to file Q2.
LIBGEN      Get the updated record from Q2, generate
            an updated library, and write it to file
            SYSLIB.
LIBEDIT     Get the updated library record from
            SYSLIB, replace the record SYSLIB on
            SYSTEM with it, and write a new system
            file to file NEW.
```

1.1.8 SYSTEM ORGANIZATION NOTES

To become more familiar with the operation of KRONOS, use Modify (refer to the Modify Reference Manual) and DOCMENT (refer to the KRONOS 2.1 Reference Manual) to obtain documentation of the programs from the system program library file (KPL1).

To use these programs, load the OPL from KPL1 into mass storage with the STAGE control card using the following sequence.

```
JOB card                                  Refer to the KRONOS 2.1 Reference
                                          Manual for format

ACCOUNT, usernum, passwrd.

STAGE(OPL, VSN=xxxxxx)                    xxxxxx is the VSN of the released KPL1
   :                                      tape
   :
6/7/8/9
```

The following are uses of Modify to obtain information and documentation of the system. (The job display program DIS is described in the KRONOS 2.1 Operator's Guide.) In most cases, the OPL deckname, which is the name required on an *EDIT directive for Modify, will be the same as the program name on the deadstart tape. For most overlay decks, such as 9AA, 9AB, etc., the deck in which they are contained is shown in the COMMENTS area of a system CATALOG listing. For instance, for 9AA, the comments read:

```
DSD - DISPLAY A - DAYFILE MESSAGES
```

Therefore, edit the dynamic system display program DSD to obtain a listing of the overlay deck 9AA.

The following examples specify uses of Modify.

Example 1. An assembly listing of the peripheral and central processor communication areas can be very useful to a person seeking detailed information about KRONOS. To obtain this information, edit SYSTEXT.

The PPU systems communications listing (PPCOM) contains the following information: system constants, PPU memory location assignments, PPU resident and mass storage driver entry points, monitor function values , the contents of low central memory locations, and so forth.

The central program communications macros listing (CPCOM) contains the following information: the contents of a program control area, system request macros, general purpose macros, macros for creation of FETs, and macros to control local file action.

To obtain this listing, at the system console:

```
Type  X.MODIFY(X, CL, Z)/*EDIT, SYSTEXT
Press CR
```

Any control card that requires no input, such as the MODIFY and STAGE commands, may be entered directly from the console and are executed as a normal job.

Example 2: Enter the following from the card reader to obtain external documentation for the job display program (DIS) and the time-sharing executive program.

```
JOB, CM50000, T77.

ACCOUNT, usernum, passwrd.

MODIFY(LO=E, Z)/*EDIT, DIS/*EDIT, TELEX

DOCMENT.                                  This statement gets the
                                          source from the COMPILE
                                          file (from Modify) and
                                          generates the external
                                          documentation.

6/7/8/9
```

Example 3: Use the following procedure to obtain an assembly listing of the file editing program Modify from a terminal and direct the output to a central site line printer.

Perform standard terminal login (refer to the KRONOS 2.1 Time-Sharing User's Guide).

```
BATCH, 50000                              Specify the batch subsystem
                                          with a 50K field length when
                                          the Time-Sharing Subsystem
                                          requests SYSTEM.

MODIFY(Z, X, CL=NEW, CB=0)/*EDIT, MODIFY  The system returns the
                                          message ASSEMBLY
                                          COMPLETE.

DISPOSE, NEW=PR.                          Direct the output file to a
                                          line printer.
```

The KRONOS system prompts each line of input by printing a slash (/) in column 1 at the terminal. This is done only in the batch subsystem to inform the user that another control card is expected.

When the terminal user is accessing system program decks, the user number and password combination under which this is performed must be validated to access common files. If it is not validated, the message ILLEGAL USER ACCESS will be printed at the terminal. (Refer to part IV, section 1, for validation information.)

Refer to the Modify Reference Manual for further information on listing various programs. The following three parameters can be especially helpful.

X Specifies that the INPUT file containing the Modify directives is to be rewound and the COMPASS assembler is to be called automatically to process the COMPILE file. This parameter cannot be used when running batch jobs because the control cards, the first record on the INPUT file, are read as directive cards, and the message DIRECTIVE ERRORS is issued.

Q Also specifies that the COMPASS assembler is to be called, but does not cause a rewind of the INPUT file. Thus, this parameter should be used instead of the X parameter when running batch jobs for assembly listings.

Z Specifies that the Modify directives will follow immediately after the terminator character following the Modify parameters. The special character following the terminator will be taken as the character which separates multiple directive entries (example 2). Note that the last directive is not followed by a terminator character. If a terminator is used, it will be read as part of the directive and will cause an error message.

1.1.9 CATALOG OF SYSTEM

```
      CATALOG OF A            FILE    1                                73/06/14. 00.51.04.      PAGE      4
REC   NAME      TYPE          LENGTH  CKSUM     DATE          COMMENTS

52    7DC       PP (7510)       42    2131  73/06/11. 73/05/05.            3637/3436/863 ERROR PROCESSOR.
53    6DD       PP (0600)       45    1603  73/06/11. 73/05/05.            3234/853/854 DRIVER.
54    7DD       PP (7510)       43    2661  73/06/11. 73/05/05.            3234/853/854 ERROR PROCESSOR.
55    6DE       PP (0600)       32    6654  73/06/11. 73/05/05.            ECS DRIVER.
56    7DE       PP (7510)       25    6103  73/06/11. 73/05/05.            ECS ERROR PROCESSOR.
57    6DF       PP (0600)       43    7273  73/06/11. 73/05/05.            3234/813/814 DRIVER.
58    7DF       PP (7510)       41    1237  73/06/11. 73/05/05.            3234/813/814 ERROR PROCESSOR.
59    6DH       PP (0600)       45    0447  73/06/11. 73/05/05.            3553/821 DRIVER.
60    7DH       PP (7510)       41    3050  73/06/11. 73/05/05.            3553/821 ERROR PROCESSOR.
61    6DI       PP (0600)       45    1376  73/06/11. 73/05/24.            7054/844-N DRIVER.
62    7DI       PP (7510)       45    4320  73/06/11. 73/05/24.            7054/844-N ERROR PROCESSOR.
63    7S1       PP (7510)       45    0414  73/06/11. 73/05/24.            7054/844-N ERROR PROCESSOR.
64    6MD       PP (0600)       47    7176  73/06/11. 73/05/05.            3553-1/841-N DRIVER.
65    7MD       PP (7510)       43    4437  73/06/11. 73/05/05.            3553-1/841-N ERROR PROCESSOR.
66    6DP       PP (0600)       40    3271  73/06/11. 73/05/05.            DDP/ECS DRIVER.
67    7DP       PP (7510)       26    5121  73/06/11. 73/05/05.            DDP/ECS ERROR PROCESSOR.
68    9A3       PP (6200)       33    4134  73/06/11. 73/05/24.            DSD - CHANNEL COMMANDS.
69    SLL       PP (1100)      730    6055  73/06/11. 71/01/31. 73/05/24. SYSTEM LIBRARY LOADER.
70    LSL       PP (1553)      116    1367  73/06/11. 72/03/03. 73/05/08. STL - COPY SYSTEM TAPE.
71    SYSEDIT   ABS           3675    5715  73/06/11. 71/02/14. 73/05/24. SYSTEM LIBRARY FILE MANAGER.
       SYSEDIT
       RFL=
       SSJ=
72    LIBDECK   TEXT           106    3564
                LIBDECK
                *CM         PP/C10,2CA,2CB,2CC,2CD,2CE,2CF,2CG,2CH
                *CM         PP/1AJ,TCS,3AE,LDR
                *CM         PP/1CJ,1MA,0BF,0DF,0AV,0RP
                *CM         PP/LFM
                *CM         PP/1RI,3RH,1RO,3RP,3RQ
                *CM         PP/PFM,3PA,3PB,3PD,3PG,3PI
                *CM         PP/1TA,1TO,3TI,3TJ
                *CM         PP/1MT,3MD,3MF,3ML
                *CM         PP/CHK,CLL
                *CM         PP/1LS
                *CM         PP/1IO,1SJ,1SP,1BA
                *CM         PP/1DL,9AX,9A2,9A3                    (DSD RELATED)
                *LIBRARY    BASLIB/BASIC
                *PROC       LIBMOD
                *PROC       GENVAL
                *PROC       GENHELP
                *PROC       GENFILS
                *PROC       GENINSD
                *PROC       GENSYS
                *SC         OVL/FILE,UPDATE,COMPASS
                *SC         OVL/RUN23,RUN,ALGOL,COBOL,FTN,SIM15,SIMULA,SORTMRG

73    (00)          SUM =    35623

74    1AJ       PP (1100)      100    5347  73/06/11. 73/05/24.            ADVANCE JOB STATUS.
75    LDR       PP (1100)       47    4751  73/06/11. 73/05/24.            1AJ - LOAD CENTRAL PROGRAM.
76    TCS       PP (1100)      614    3306  73/06/11. 73/05/24.            1AJ - TRANSLATE CONTROL STATEMENT.
77    3AA       PP (1353)      222    1046  73/06/11. 73/05/24.            1AJ - BEGIN JOB.
78    3AB       PP (1353)      174    6441  73/06/11. 73/05/24.            1AJ - PROCESS ERROR FLAG.
79    3AC       PP (5060)       24    0206  73/06/11. 73/05/24.            3AC - SEARCH PERIPHERAL LIBRARY.
80    3AD       PP (1377)      101    7652  73/06/11. 73/05/24.            1AJ - SEARCH FOR OVERLAY.
```

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS	
81	3AE	PP (5060)	200	5136	73/06/11.	73/05/24.	3AE - LOAD COPY ROUTINES.
82	3AF	PP (5060)	134	5276	73/06/11.	73/05/24.	3AF - SPECIAL ENTRY POINT PROCESSING.
83	1CJ	PP (1100)	305	3111	73/06/11.	71/02/20. 73/05/08.	COMPLETE JOB.
84	1RI	PP (1100)	262	6171	73/06/11.	73/05/24.	ROLLIN JOB.
85	3RG	PP (5075)	32	5105	73/06/11.	73/05/24.	1RI - PROCESS SPECIAL ENTRY POINT JOBS.
86	3RH	PP (5075)	207	2414	73/06/11.	73/05/24.	1RI - PROCESS TXOT JOBS.
87	1RO	PP (1100)	270	3034	73/06/11.	73/05/24.	ROLLOUT JOB.
88	3RP	PP (4712)	240	1374	73/06/11.	73/05/24.	1RO - PROCESS TXOT JOBS.
89	3RQ	PP (4712)	33	1154	73/06/11.	73/05/24.	1RO - PROCESS MTOT JOBS.
90	1RP	PP (1100)	32	4664	73/06/11.	73/05/24.	PPR - RELOAD PP RESIDENT.
91	1SJ	PP (1100)	241	6271	73/06/11.	71/02/20. 73/05/24.	JOB SCHEDULER.
92	3SA	PP (3066)	52	0262	73/06/11.	71/02/20. 73/05/24.	1SJ - INITIATE SUB-SYSTEMS.
93	1SP	PP (1100)	173	5270	73/06/11.	73/05/24.	EVALUATE PRIORITIES.
94	(00)	SUM =	4435				
95	1DL	PP (1100)	66	5752	73/06/11.	70/12/13. 73/05/08.	DISPLAY OVERLAY LOADER.
96	1DS	PP (1100)	662	2111	73/06/11.	73/05/05.	DSD REQUEST PROCESSOR.
97	9AA	PP (0000)	45	2217	73/06/11.	73/05/24.	DSD - DISPLAY A - DAYFILE MESSAGES.
98	9AB	PP (0000)	46	2143	73/06/11.	73/05/24.	DSD - DISPLAY B - SYSTEM STATUS.
99	9AC	PP (0000)	22	1021	73/06/11.	73/05/24.	DSD - DISPLAYS F, G - CENTRAL MEMORY.
100	9AD	PP (0000)	56	1606	73/06/11.	73/05/24.	DSD - DISPLAY E - EQUIPMENT STATUS TABLE.
101	9AE	PP (0000)	73	7373	73/06/11.	73/05/24.	DSD - DISPLAY E - MASS STORAGE DEVICES.
102	9AF	PP (0000)	62	6572	73/06/11.	73/05/24.	DSD - DISPLAY E - RESOURCE MOUNTING PREVIEW.
103	9AG	PP (0000)	77	6547	73/06/11.	73/05/24.	DSD - DISPLAY E - MAGNETIC TAPES.
104	9AH	PP (0000)	63	2425	73/06/11.	73/05/24.	DSD - DISPLAY H - FILE NAME TABLE.
105	9AI	PP (0000)	55	1317	73/06/11.	73/05/24.	DSD - DISPLAY I - BATCHIO STATUS.
106	9AJ	PP (0000)	47	3461	73/06/11.	73/05/24.	DSD - DISPLAY J - CONTROL POINT STATUS.
107	9AK	PP (0000)	45	3150	73/06/11.	73/05/24.	DSD - DISPLAY K - CENTRAL PROGRAM BUFFER.
108	9AL	PP (0000)	32	1722	73/06/11.	73/05/24.	DSD - DISPLAY N - FILE DISPLAY.
109	9AM	PP (0000)	66	0511	73/06/11.	73/05/24.	DSD - DISPLAY O - TRANSACTION TERMINAL STATUS.
110	9AN	PP (0000)	50	6067	73/06/11.	73/05/24.	DSD - DISPLAY O - SUB CONTROL POINT STATUS.
111	9AO	PP (0000)	77	4036	73/06/11.	73/05/24.	DSD - DISPLAY O - TASK LIBRARY DIRECTORY.
112	9AP	PP (0000)	62	2343	73/06/11.	73/05/24.	DSD - DISPLAY P - PP REGISTERS.
113	9AQ	PP (0000)	42	1316	73/06/11.	73/05/24.	DSD - DISPLAY Q - INPUT/OUTPUT/ROLLOUT QUEUES.
114	9AR	PP (0000)	77	1316	73/06/11.	73/05/24.	DSD - DISPLAY R - REMOTE BATCH STATUS.
115	9AS	PP (0000)	52	5774	73/06/11.	73/05/24.	DSD - DISPLAY S - SYSTEM CONTROL INFORMATION.
116	9AT	PP (0000)	75	1436	73/06/11.	73/05/24.	DSD - DISPLAY T - TIME SHARING STATUS.
117	9AU	PP (0000)	51	1430	73/06/11.	73/05/24.	DSD - DISPLAY Y. - MONITOR FUNCTIONS.
118	9AV	PP (0000)	72	5560	73/06/11.	73/05/24.	DSD - DISPLAY Z - DIRECTORY.
119	9AW	PP (6200)	22	6207	73/06/11.	73/05/24.	DSD - N. SYNTAX TABLE - CHARACTERS A-C, E-N.
120	9AX	PP (6200)	27	7761	73/06/11.	73/05/24.	DSD - N. SYNTAX TABLE. CHARACTERS O-*.
121	9AY	PP (6200)	13	1257	73/06/11.	73/05/24.	DSD - SYSTEM SYNTAX TABLE, *EN*.
122	9AZ	PP (6200)	25	7523	73/06/11.	73/05/24.	DSD - SYSTEM SYNTAX TABLE, *C,D*
123	9A0	PP (6200)	32	2162	73/06/11.	73/05/24.	DSD - SYSTEM SYNTAX TABLE, *I,K,L,M,O*
124	9A1	PP (6200)	37	3761	73/06/11.	73/05/24.	DSD - SYSTEM SYNTAX TABLE, *P,R,S,T,U,V,W*
125	9A2	PP (6200)	34	6206	73/06/11.	73/05/24.	DSD - CENTRAL MEMORY CHANGES.
126	9A4	PP (6200)	41	3713	73/06/11.	73/05/24.	DSD - SEND DAYFILE MESSAGES.
127	9A5	PP (6200)	40	0711	73/06/11.	73/05/24.	DSD - CONTROL POINT REQUESTS.
128	9A6	PP (6200)	26	3631	73/06/11.	73/05/24.	DSD - SUB - SYSTEMS REQUESTS.
129	9A7	PP (6200)	44	0542	73/06/11.	73/05/24.	DSD - TELEX MESSAGE REQUESTS.
130	9A8	PP (6200)	24	5570	73/06/11.	73/05/24.	DSD - BATCHIO REQUESTS.
131	9A9	PP (6200)	24	2336	73/06/11.	73/05/24.	DSD - SYSTEM REQUESTS.
132	9BA	PP (6200)	35	1432	73/06/11.	73/05/24.	DSD - SYSTEM REQUESTS.
133	9BB	PP (6200)	27	6125	73/06/11.	73/05/24.	DSD - JOB CALL REQUESTS.
134	9BC	PP (6200)	21	1264	73/06/11.	73/05/24.	DSD - SYSTEM CONTROL REQUESTS.
135	9BD	PP (6200)	32	6525	73/06/11.	73/05/24.	DSD - ENABLE SYNTAX TABLE.

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
136	9BE	PP (6200)	33	5117	73/06/11. 73/05/24.	DSD - DISABLE SYNTAX TABLE
137	9BF	PP (6200)	16	2722	73/06/11. 73/05/24.	DSD - ENABLE/DISABLE REQUESTS.
138	9BG	PP (6200)	26	7464	73/06/11. 73/05/24.	DSD - JDB CONTROL REQUESTS.
139	9BH	PP (6200)	33	2724	73/06/11. 73/05/24.	DSD - JOB CONTROL REQUESTS.
140	9BI	PP (6200)	42	6130	73/06/11. 73/05/24.	DSD - JDB CONTRDL REQUESTS.
141	9BJ	PP (6200)	43	2237	73/06/11. 73/05/24.	DSD - DISPLAY CHANGE REQUESTS.
142	9BK	PP (6200)	35	1714	73/06/11. 73/05/24.	DSD - FILE CONTROL REQUESTS.
143	9BL	PP (6200)	16	6621	73/06/11. 73/05/24.	DSD - FILE CONTROL REQUESTS.
144	9BM	PP (6200)	35	3342	73/06/11. 73/05/24.	DSD - RESDURCE CONTROL COMMANDS.
145	9BN	PP (6200)	34	6551	73/06/11. 73/05/24.	DSD - ASSIGN VSN TO UNIT.
146	9BO	PP (6200)	22	5632	73/06/11. 73/05/24.	DSD - ENTER TIME.
147	9BP	PP (6200)	42	0677	73/06/11. 73/05/24.	DSD - ENTER DATE.
148	DIS	PP (1100)	1216	3156	73/06/10. 73/05/24.	JDB DISPLAY
149	9EA	PP (6605)	37	6671	73/06/10. 73/05/24.	DIS - DISPLAY A. - DAYFILE.
150	9EB	PP (6605)	16	2354	73/06/10. 73/05/24.	DIS - DISPLAY E. CENTRAL MEMORY 4 GRDUPS DF 5.
151	9EC	PP (6605)	75	5022	73/06/10. 73/05/24.	DIS - DISPLAYS F AND G. CENTRAL MEMORY 4 GROUPS O
152	9ED	PP (6605)	24	3564	73/06/10. 73/05/24.	DIS - DISPLAY H. - FILE NAME TABLE.
153	9EE	PP (6605)	43	3616	73/06/10. 73/05/24.	DIS - DISPLAY J. - SYSTEM STATUS.
154	9EF	PP (6605)	41	1115	73/06/10. 73/05/24.	DIS - DISPLAY K. - EQUIPMENT STATUS TABLE.
155	9EG	PP (6605)	52	0651	73/06/10. 73/05/24.	DIS - DISPLAY L. - FILE NAME TABLE.
156	9EH	PP (6605)	56	4276	73/06/10. 73/05/24.	DIS - DISPLAY P. - PP REGISTERS.
157	9EI	PP (6605)	32	1514	73/06/10. 73/05/24.	DIS - DISPLAY Q. - INPUT/DUTPUT/ROLLOUT QUEUES.
158	9EJ	PP (6605)	26	3672	73/06/10. 73/05/24.	DIS - DISPLAY V. CENTRAL MEMORY BUFFER.
159	9EK	PP (6605)	46	5223	73/06/10. 73/05/24.	DIS - DISPLAY Y. - MONITOR FUNCTIDNS.
160	9EL	PP (6605)	66	6501	73/06/10. 73/05/24.	DIS - DISPLAY Z. - DIRECTDRY.
161	9EM	PP (7266)	24	2440	73/06/10. 73/05/24.	DIS - CPU COMMANDS.
162	9EN	PP (7266)	60	7546	73/06/10. 73/05/24.	DIS - STATEMENT ENTRY.
163	9EO	PP (7266)	30	4650	73/06/10. 73/05/24.	DIS - ENTER REGISTER.
164	9EP	PP (7266)	30	6472	73/06/10. 73/05/24.	DIS - ENTER X REGISTER.
165	9EQ	PP (7266)	45	3201	73/06/10. 73/05/24.	DIS - ENTER MEMORY.
166	9ER	PP (7266)	47	1354	73/06/10. 73/05/24.	DIS - ENTER INSTRUCTION.
167	9ES	PP (7266)	23	0664	73/06/10. 73/05/24.	DIS - CPU PRDGRAM INTERFACE COMMANDS.
168	9ET	PP (7266)	44	5014	73/06/10. 73/05/24.	DIS - FIELD LENGTH CHANGES.
169	9EU	PP (7266)	21	4330	73/06/10. 73/05/24.	DIS - MISCELLANEDUS COMMANDS.
170	9EV	PP (7266)	37	1350	73/06/10. 73/05/24.	DIS - MISCELLANEDUS COMMANDS.
171	9EW	PP (7266)	43	7351	73/06/10. 73/05/24.	DIS - INTERPRET KEYSET MESSAGE.
172	9EX	PP (7266)	24	3147	73/06/10. 73/05/24.	DIS - INTERPRET MDRE MESSAGES.
173	9EY	PP (7266)	24	4100	73/06/10. 73/05/24.	DIS - CALL PPU PRDGRAM.
174	026	PP (1100)	1243	3736	73/06/11. 73/05/24.	CDNSOLE TEXT EDITOR.
175	9GA	PP (6201)	70	0314	73/06/11. 73/05/24.	026 - FILE CDMMANDS.
176	9GB	PP (6201)	66	2016	73/06/11. 73/05/24.	026 - LINE ENTRY AND DATA MOVE.
177	9GC	PP (6201)	62	0415	73/06/11. 73/05/24.	D26 - DISPLAY, TAB, DUP AND SCAN CDNTROL.
178	9GD	PP (6201)	50	1444	73/06/11. 73/05/24.	D26 - LINE SEARCH COMMANDS.
179	9GE	PP (6201)	76	1175	73/06/11. 73/05/24.	D26 - RECDRD SEARCH COMMANDS.
180	9GF	PP (6201)	67	5417	73/06/11. 73/05/24.	D26 - REPLACE COMMANDS.
181	9GG	PP (6201)	55	3504	73/06/11. 73/05/24.	D26 - MISC. CDMMANDS.
182	ADC	PP (1100)	1137	0516	73/06/10. 71/01/09. 72/05/19.	ANDY CAPP DISPLAY.
183	BAT	PP (1100)	1170	4076	73/06/10. 71/03/02. 73/05/08.	BASEBALL GAME.
184	CHD	PP (1100)	751	3142	73/06/10. 71/01/09. 73/05/08.	CHESS DISPLAY DRIVER.
185	CHESS	OVL 00,00	27076	2520	02/10/70.	
186	DDG	PP (1100)	337	3774	73/06/11. 73/05/05.	SNDDPY WWI FLYING ACE.
187	9ZA	PP (3105)	750	4017	73/06/11. 73/05/05.	ACE - DISPLAY DATA.
188	DSI	PP (1100)	635	3375	73/06/11. 71/01/09. 73/05/08.	6612/DD60 DISPLAY ALIGNMENT TEST.
189	GYR	COS	5145	1712		
190	WRM	PP (1100)	463	2443	73/06/11. 71/01/09. 72/05/19.	WORM(S) DISPLAY.
191	(00)	SUM =	53543			

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
192	PFILES	ABS	1024	5526	73/06/11. 73/05/24.	PERMANENT FILE MANIPULATOR.
	APPEND					
	ATTACH					
	CHANGE					
	DEFINE					
	GET					
	PACKNAM					
	PERMIT					
	PURGE					
	REPLACE					
	SAVE					
	RFL=					
	SDM=					
193	PFATC1	OVL 01,00	2023	3161	73/06/11. 73/05/24.	PFATC1 - CATALOG PF ARCHIVE TAPE.
194	PFCAT1	OVL 01,00	3651	5126	73/06/11. 73/05/24.	PFCAT1 - CATALOG PERMANENT FILE DEVICE.
195	PFCOPY1	OVL 01,00	2066	2552	73/06/11. 73/05/24.	PFCOPY1 - COPY ARCHIVE FILE UTILITY.
196	PFDUMP1	OVL 01,00	4656	0404	73/06/11. 73/05/24.	PFDUMP1 - PERMANENT FILE DUMP.
197	PFLOAD1	OVL 01,00	6723	2604	73/06/11. 73/05/24.	PFLOAD1 - PERMANENT FILE LOAD.
198	PFS	ABS	2350	0545	73/06/11. 73/05/24.	PERMANENT FILE SUPERVISOR.
	PFS					
	PFLOAD					
	PFDUMP					
	PFCAT					
	PFATC					
	PFCOPY					
	RFL=					
	SSJ=					
199	PURGALL	ABS	620	6722	73/06/11. 73/05/05.	PURGALL - PURGE ALL PERMANENT FILES.
	PURGALL					
	RFL=					
200	CMS	PP (1100)	335	4601	73/06/10. 73/05/05.	MASS STORAGE MANAGER
201	IMS	PP (1100)	417	1637	73/06/11. 73/05/05.	INITIALIZE MASS STORAGE.
202	MS1	ABS	3140	7023	73/06/11. 73/05/24.	MASS STORAGE DEVICE INITIALIZATION.
	MS1					
	FLAW					
	RFL=					
	SSJ=					
203	PFM	PP (1100)	437	2040	73/06/11. 73/05/24.	PFM - PERMANENT FILE MANAGER.
204	3PA	PP (1372)	774	7572	73/06/11. 73/05/24.	PFM - COMMAND PROCESSING
205	3PB	PP (4705)	134	6471	73/06/11. 73/05/24.	PFM - SAVE,REPLACE,APPEND COMMAND PROCESSING.
206	3PC	PP (2046)	23	4046	73/06/11. 73/05/24.	PFM - APPEND PROCESSING.
207	3PD	PP (4705)	170	2356	73/06/11. 73/05/24.	PFM - ATTACH PROCESSING.
208	3PE	PP (1372)	345	5200	73/06/11. 73/05/24.	PFM - CATALOG LIST ROUINTES.
209	3PF	PP (4705)	167	7533	73/06/11. 73/05/24.	PFM - DEFINE PROCESSING.
210	3PG	PP (4705)	74	3777	73/06/11. 73/05/24.	PFM - PERMIT/PURGE PROCESSING.
211	3PH	PP (1372)	236	3042	73/06/11. 73/05/24.	PFM - ERROR PROCESSING.
212	3PI	PP (7000)	54	1467	73/06/11. 73/05/24.	PFM - AUXILIARY ROUTINES.
213	3PJ	PP (4705)	64	0531	73/06/11. 73/05/24.	PFM - CHANGE PROCESSING.
214	PFU	PP (1100)	736	3304	73/06/11. 73/05/24.	PF UTILITY PROCESSOR.
215	3UA	PP (3655)	357	7462	73/06/11. 73/05/24.	PFU - PFLOAD ROUTINES
216	1CK	PP (1100)	232	4734	73/06/11. 73/05/05.	SYSTEM CHECK PDINT.
217	(00)	SUM =	41112			
218	CHK	PP (1100)	20	3346	73/06/10. 70/09/03.	CHECK STATUS OF OUTPUT FILE.
219	CLL	PP (1100)	103	0063	73/06/10. 70/12/20. 73/05/08.	*COS* FORMAT LIBRARY LOADER.

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE		COMMENTS
220	CPM	PP (1100)	320	3126	73/06/10.	73/05/24.	CONTROL POINT MANAGER.
221	EXU	PP (1100)	107	4064	73/06/11.	70/12/20. 73/05/08.	EXECUTE *COS* FORMAT PROGRAM.
222	LFM	PP (1100)	204	2270	73/06/11.	73/05/24.	LOCAL FILE MANAGER.
223	3LA	PP (1534)	44	6216	73/06/11.	73/05/24.	LFM - ERROR PROCESSOR.
224	3LB	PP (1534)	64	6423	73/06/11.	73/05/24.	LFM - LOCAL FILE FUNCTIONS.
225	3LC	PP (1534)	277	0040	73/06/11.	73/05/24.	LFM - EQUIPMENT REQUESTS.
226	3LD	PP (1534)	106	7103	73/06/11.	73/05/24.	LFM - COMMON FILE FUNCTIONS.
227	3LE	PP (1534)	107	6241	73/06/11.	73/05/24.	LFM - FILE DISPOSAL FUNCTIONS.
228	3LF	PP (1534)	117	6400	73/06/11.	73/05/24.	LFM - CONTROL STATEMENT FILE FUNCTIONS.
229	SFM	PP (1100)	636	4114	73/06/11.	73/05/24.	SYSTEM FILE MANAGER.
230	SFP	PP (1100)	47	2502	73/06/11.	72/09/25.	SCOPE FUNCTION PROCESSOR.
231	2SA	PP (1141)	144	2676	73/06/11.	73/05/24.	72/09/25. SFP - STS - STATUS PROCESSOR
232	2SB	PP (1141)	737	7540	73/06/11.	73/05/24.	72/09/25. SFP - EMG - SDA/SIS MESSAGE GENERATOR
233	2SC	PP (1141)	206	6355	73/06/11.	73/05/24.	72/09/25. SFP - RPV - REPRIEVE CENTRAL PROGRAM
234	2SD	PP (1141)	36	1475	73/06/11.	73/05/24.	72/09/25. SFP - PFE - EXTEND/ALTER FUNCTION
235	2SE	PP (1141)	142	5213	73/06/11.	73/05/24.	72/09/25. SFP - ACE - ADVANCE CONTROL CARD
236	2SF	PP (1141)	25	0414	73/06/11.	73/05/24.	72/09/25. SFP - PRM - PERMISSION CHECKING FUNCTION
237	2SG	PP (1141)	15	1254	73/06/11.	73/05/24.	72/09/25. SFP - SRP - SPECIAL REQUEST PROCESSING
238	2SH	PP (1141)	77	0031	73/06/11.	73/05/24.	72/09/25. SFP - ERP - ERROR PROCESSOR
239	(00)	SUM =	4520				
240	ACCFAM	ABS	435	2062	73/06/11.	73/05/24.	ACCOUNT AND FAMILY CARD PROCESSOR. COPYRIGHT
	ACCOUNT						
	FAMILY						
	VAL=						
	SDM=						
	RFL=						
	SSJ=						
241	CHARGE	ABS	766	5275	73/06/11.	73/05/05.	JOB PROFILE VALIDATION PROGRAM.
	CHARGE						
	ARG=						
	SDM=						
	VAL=						
	RFL=						
	SSJ=						
242	ISF	ABS	625	4416	73/06/11.	73/05/05.	INITIALIZE SYSTEM FILES.
	ISF						
	RFL=						
	SSJ=						
243	MODVAL	ABS	11335	5553	73/06/11.	73/05/24.	ACCOUNT FILE MANAGER.
	MODVAL						
	LIMITS						
	PASSWOR						
	SDM=						
	RFL=						
	SSJ=						
244	PROFILE	ABS	4364	3171	73/06/11.	73/05/24.	PROJECT PROFILE MANAGER.
	PROFILE						
	ARG=						
	RFL=						
	SSJ=						
245	SFS	OVL 01*00	1577	2447	73/06/11.	73/05/24.	SPECIAL SYSTEM FILE SUPERVISOR.
246	0AV	PP (0000)	142	0324	73/06/11.	73/05/05.	VERIFY USER ACCOUNT NUMBER.
247	2TJ	PP (2000)	122	5041	73/06/11.	70/12/13. 73/05/24.	TRANSLATE JOB CARD.
248	(00)	SUM =	22254				

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS	
249	1BA	PP (1100)	64	5361	73/06/11.	73/05/05.	BATCHIO AUXILLARY PROCESSOR.
250	3BA	PP (2000)	33	6407	73/06/11.	73/05/05.	1BA - ACCOUNTING.
251	3BB	PP (2000)	313	7501	73/06/11.	73/05/05.	1BA - INITIAL PRINT DATA.
252	3BC	PP (2000)	133	3214	73/06/11.	73/05/05.	1BA - INITIAL PUNCH DATA.
253	1CD	PP (1301)	1060	0642	73/06/11.	70/09/12. 73/05/24.	BATCHID COMBINED DRIVER.
254	110	PP (1100)	147	4231	73/06/11.	73/05/05.	BATCHID MANAGER.
255	3IA	PP (2104)	175	6277	73/06/11.	73/05/05.	1ID - SUBROUTINES.
256	31B	PP (3214)	234	1404	73/06/11.	72/12/28.	1ID - LDAD 3555/512 IMAGE MEMORY.
257	2LP	PP (2000)	253	2510	73/06/11.	70/12/13. 73/05/08.	3256/501 - 3555/512 LINE PRINTER DRIVER.
258	2PC	PP (2000)	267	0722	73/06/11.	70/12/13. 73/05/08.	3446/415 CARD PUNCH DRIVER.
259	2RC	PP (2000)	350	1055	73/06/11.	70/12/13. 73/05/08.	3447/405 CARD READER DRIVER.
260	(00)	SUM =	3557				
261	E200CP	OVL 00*00	604	6233	73/06/11.	70/11/11. 73/05/08.	EXPORT CPU SECTION.
262	XSP	PP (1100)	174	4677	73/06/11.	71/01/31. 73/05/08.	EI-200 SERVICE PROCESSOR
263	1ED	PP (1100)	1004	4034	73/06/11.	70/10/09. 73/05/24.	EI-200 6671 DRIVER
264	1LS	PP (1100)	120	7135	73/06/11.	73/05/24.	EI-200 EXPORT EXECUTIVE.
265	9IA	PP (2000)	555	6615	73/06/11.	73/05/24.	1LS - FUNCTION PROCESSOR
266	9IB	PP (6000)	112	7607	73/06/11.	73/05/24.	1LS - SEARCH OUTPUT QUEUE* INITIATE PRINT
267	91C	PP (6000)	111	7142	73/06/11.	73/05/24.	1LS - PROCESS NEXT JOB
268	91D	PP (2000)	25	6133	73/06/11.	73/05/24.	1LS - CENTRAL MEMORY MANAGER
269	91E	PP (2000)	64	4367	73/06/11.	73/05/24.	1LS - INITIALIZE EXPORT
270	91F	PP (2401)	121	5412	73/06/11.	73/05/24.	1LS - ABORT EXPORT
271	91G	PP (1100)	35	1723	73/06/11.	73/05/24.	1LS - INITIALIZE LOCAL RPL
272	91H	PP (7000)	77	1417	73/06/11.	73/05/24.	1LS - RESIDENT SUBROUTINES
273	(00)	SUM =	3512				
274	(00)	SUM =	0				
275	STIMULA STIMULA RFL=	ABS	15666	7176	73/06/05.	73/05/05. 73/05/09.	LOW SPEED INTERACTIVE TERMINAL STIMULATOR.
276	TELEX	OVL 00*00	4061	0353	73/06/11.	71/03/02. 73/05/24.	TTY EXECUTIVE INITILIZATION VERSION #VERS1
277	TELEX1	OVL 01*00	5651	3202	73/06/11.	71/03/02. 73/05/24.	TTY EXECUTIVE PROCESSOR.
278	TELEX2	OVL 00*00	653	4005	73/06/11.	71/03/02. 73/05/24.	TTY EXECUTIVE TERMINATION.
279	TLX	PP (1100)	34	3331	73/06/11.	73/05/05.	TERMINAL ACTION PROCESSOR.
280	1TA	PP (1100)	263	7002	73/06/11.	73/05/24.	TELEX AUXILIARY FUNCTION PROCESSOR.
281	3TA	PP (2571)	17	6677	73/06/11.	73/05/24.	1TA - ADJUST *TELEX* FIELD LENGTH.
282	3TB	PP (2571)	53	1563	73/06/11.	73/05/24.	1TA - RETURN TERMINAL JOB.
283	3TC	PP (2571)	135	6320	73/06/11.	73/05/24.	1TA - CREATE ROLLOUT FILE.
284	3TD	PP (2571)	173	7506	73/06/11.	73/05/24.	1TA - TERMINAL LOGOUT PROCESSOR.
285	3TE	PP (2571)	74	3114	73/06/11.	73/05/24.	1TA - TERMINAL RECOVERY PROCESSOR
286	3TF	PP (2571)	151	7453	73/06/11.	73/05/24.	1TA - SECONDARY FILE DESCRIPTIONS.
287	3TG	PP (2571)	36	7307	73/06/11.	73/05/24.	1TA - CPU TIME STATUS COMMAND.
288	3TH	PP (2571)	207	1130	73/06/11.	73/05/24.	1TA - RECOVERY FILE PROCESSOR.
289	3TI	PP (2571)	151	3737	73/06/11.	73/05/24.	1TA - JOB SCHEDULING.
290	3TJ	PP (2571)	107	0206	73/06/11.	73/05/24.	1TA - GATHER STATISTICS.
291	3TK	PP (2571)	63	2273	73/06/11.	73/05/24.	1TA - CLEAN UP SALVARE FILE.
292	3TL	PP (2571)	16	0314	73/06/11.	73/05/24.	1TA - INITIATE PRIMARY FILE.
293	3TM	PP (2571)	44	3745	73/06/11.	73/05/24.	1TA - CHECK JOB STATUS.
294	1TD	PP (4705)	476	3714	73/06/11.	73/05/11. 73/06/07.	1TD - INITIALIZATION AND COMPLETION.
295	2TD	PP (1100)	1105	3602	73/06/11.	73/05/11. 73/06/07.	LOW SPEED INTERACTIVE TERMINAL DRIVER.
296	9JA	PP (0000)	70	0254	73/06/11.	73/05/11. 73/06/07.	1TD - *ASCII* TERMINAL.
297	9JB	PP (0000)	70	2131	73/06/11.	73/05/11. 73/06/07.	1TD - CORRESPONDENCE/TEXT.
298	9JC	PP (0000)	70	1775	73/06/11.	73/05/11. 73/06/07.	1TD - CORRESPONDENCE/APL.
299	9JD	PP (0000)	70	0735	73/06/11.	73/05/11. 73/06/07.	1TD - MEMOREX 1240/APL.

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
300	1TO	PP (1100)	310	3557	73/06/11. 71/01/31. 73/05/24.	TERMINAL INPUT/OUTPUT.
301	1TS	PP (1100)	311	2114	73/06/05. 73/05/05.	INTERACTIVE TERMINAL STIMULATION DRIVER.
302	(00)	SUM =	35557			
303	BLANK	ABS	1327	3315	73/06/11. 73/05/24.	BLANK TAPE LABELING PROGRAM. COPYRIGHT CONTROL D
	BLANK					
	ARG=					
	RFL=					
	SSJ=					
304	MAGNET	OVL 00•00	755	2047	73/06/11. 73/05/24.	MAGNETIC TAPE EXECUTIVE.
305	MAGNET1	OVL 00•00	275	6033	73/06/11. 73/05/24.	MAGNETIC TAPE EXECUTIVE TERMINATION.
306	RESEX	ABS	5016	0355	73/06/11. 73/06/01.	RESOURCE EXECUTIVE. COPYRIGHT CONTROL DATA CORP.
	ASSIGN					
	LABEL					
	REQUEST					
	RESOURC					
	VSN					
	LFM					
	PFM					
	REQ					
	ARG=					
	OMP=					
	RFL=					
	SSJ=					
307	1LT	PP (1100)	2	4615	73/06/11. 73/05/24.	1LT - LONG RECORD PROCCESOR.
308	1MT	PP (1100)	216	5726	73/06/11. 73/05/24.	PPU MAGNETIC TAPE EXECUTIVE.
309	3MA	PP (2377)	316	1455	73/06/11. 73/05/24.	1MT - INITIALIZE TAPE EXECUTIVE.
310	3MB	PP (6603)	170	6120	73/06/11. 73/05/24.	1MT - ERRLOG MESSAGE PROCESSOR.
311	3MC	PP (2377)	405	5150	73/06/11. 73/05/24.	1MT - LOAD CONVERSION MEMORY.
312	3MO	PP (6603)	72	6211	73/06/11. 73/05/24.	1MT - CONTROL POINT/CODED PRESET.
313	3ME	PP (2161)	250	1372	73/06/11. 73/05/24.	1MT - USER JOB OPERATIONS.
314	3MF	PP (2161)	216	4100	73/06/11. 73/05/24.	1MT - READ FUNCTION PROCESSOR.
315	3MG	PP (2660)	3	1420	73/06/11. 73/05/24.	1MT - READ LONG BLOCK PROCESSOR.
316	3MH	PP (7301)	66	0173	73/06/11. 73/05/24.	1MT - READ - CODED PROCESSOR. 73/05/24.
317	3MI	PP (3047)	465	7120	73/06/11. 73/05/24.	1MT - READ LABEL PROCESSOR.
318	3MJ	PP (2411)	105	3042	73/06/11. 73/05/24.	1MT - TAPE POSITIONING OPERATIONS.
319	3MK	PP (3777)	65	5766	73/06/11. 73/05/24.	1MT - READ ERROR PROCESSOR.
320	3ML	PP (2161)	225	5360	73/06/11. 73/05/24.	1MT - WRITE FUNCTION PROCESSOR.
321	3MM	PP (2656)	3	3433	73/06/11. 73/05/24.	1MT - WRITE LONG BLOCK PROCESSOR.
322	3MN	PP (7301)	75	7120	73/06/11. 73/05/24.	1MT - WRITE - CODED PROCESSOR.73/05/24.
323	3MO	PP (3052)	227	1160	73/06/11. 73/05/24.	1MT - WRITE LABEL PROCESSOR.
324	3MP	PP (4002)	64	2743	73/06/11. 73/05/24.	1MT - WRITE ERROR PROCESSOR.
325	(00)	SUM =	13542			
326	CATALOG	ABS	1344	3232	73/06/11. 71/02/12. 73/05/24.	CATALOG FILE.
	CATALOG					
	RFL=					
327	CATLIST	ABS	1744	0007	73/06/11. 71/03/02. 73/05/08.	CATALOG PERMANENT FILES.
	CATLIST					
	RFL=					
328	CONTROL	ABS	214	5402	73/06/11. 73/05/24.	JOB CONTROL PROCESSOR.
	COMMENT					
	MODE					
	NOEXIT					
	ONEXIT					
	ONSW					

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
	OFFSW					
	RFL					
	ROLLOUT					
	SETPR					
	SETTL					
	SUI					
	SWITCH					
	USECPU					
	RFL=					
329	CTL2	ABS	1064	4777	73/06/11. 73/05/24.	CONTROL STATEMENT BRANCH PROCESSOR.
	CALL					
	EXIT					
	GOTO					
	RFL=					
330	CTL3	ABS	763	2465	73/06/11. 73/05/24.	CONTROL REGISTER AND CONDITIONAL TESTING.
	DISPLAY					
	IF					
	SET					
	RFL=					
	ARG=					
331	COPYB	ABS	1173	3017	73/06/11. 73/05/24.	BINARY FILE COPIES.
	COPY					
	COPYBF					
	COPYBR					
	COPYEI					
	COPYX					
	RFL=					
332	COPYC	ABS	602	5257	73/06/11. 71/03/02.	CODED FILE COPIES.
	COPYSBF					
	COPYCF					
	COPYCR					
	RFL=					
333	COPY67	ABS	410	4302	73/06/11. 70/06/06. 71/02/14.	COPY 6600 TAPES TO 7600 FORMAT.
	COPY67					
	RFL=					
334	COPY76	ABS	400	7661	73/06/11. 70/06/06. 71/02/14.	COPY 7600 TAPES TO 6600 FORMAT.
	COPY76					
	RFL=					
335	CPMEM	ABS	4630	2317	73/06/11. 72/12/10.	CONTROL POINT MEMORY UTILITIES.
	DMD					
	DMP					
	LBC					
	LOC					
	PBC					
	RBR					
	WBR					
	DMP=					
	MFL=					
336	DAYFILE	ABS	556	5755	73/06/11. 71/03/01. 73/05/07.	DUMP DAYFILES.
	DFD					
	AFD					
	ELD					
	DAYFILE					
	RFL=					
337	DOCMENT	OVL 00,00	3301	6452	73/06/11. 70/08/25. 71/12/05.	INTERNAL/EXTERNAL DOCUMENTATION PROGRAM.

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS	
338	EDIT	ABS	3213	4010	73/06/11.	73/05/05.	TIME SHARING TEXT EDITOR
	EDIT						
	RFL=						
339	FILES	ABS	574	0557	73/06/11.	73/05/24.	LOCAL FILE MANIPULATOR.
	BKSP						
	COMMON						
	DISPOSE						
	EVICT						
	LOCK						
	OUT						
	RELEASE						
	RENAME						
	REWIND						
	RETURN						
	SKIPEI						
	SKIPF						
	SKIPFB						
	SKIPR						
	SETID						
	UNLOAD						
	UNLOCK						
	WRITEF						
	WRITER						
	RFL=						
340	HELP	ABS	2337	5235	73/06/11.	71/03/02. 73/05/23.	PROCESS HELP FOR TS USER.
	HELP						
	RFL=						
341	GTR	ABS	1513	1216	73/06/11.		
	GTR						
	COPYRF						
342	LIBEDIT	OVL 00.00	4117	1603	73/06/11.	70/06/06. 73/05/24.	LIBRARY EDITING PROGRAM.
343	LIST80	ABS	1222	5553	73/06/11.	01/20/70. 71/02/14.	COMPRESS COMPASS LISTINGS.
	LIST80						
	RFL=						
344	LO72	ABS	3140	2317	73/06/11.	70/08/01.	COMPRESS OUTPUT FILES.
	LO72						
	RFL=						
345	MSORT	OVL 00.00	255	5502	73/06/11.	71/03/01. 71/12/05.	MULTI-TERMINAL SORT ROUTINE.
346	PACK	ABS	367	3611	73/06/11.	71/01/06. 73/05/23.	PACK - PACK FILE TO ONE RECORD.
	PACK						
	RFL=						
347	RESEQ	ABS	1405	6614	73/06/11.	71/02/28. 73/05/08.	TIME SHARING RESEQUENCE ROUTINE.
	RESEQ						
	RFL=						
348	SORT	OVL 00.00	720	5525	73/06/11.	71/03/01. 72/03/06.	FILE SORT ROUTINE
349	STAGE	ABS	770	5511	73/06/11.	71/01/06. 73/05/07.	STAGE TAPE FILES TO DISK.
	STAGE						
	RFL=						
350	SUBMIT	ABS	1436	0367	73/06/11.	71/02/12. 73/05/08.	ENTER JOB IN INPUT QUEUE.
	SUBMIT						
	RFL=						
351	TDUMP	OVL 00.00	1057	0160	73/06/11.	73/05/05.	TDUMP - FILE DUMP.
352	VALNET	OVL 00.00	5753	7721	73/06/11.	72/06/14.	VALIDATE TERMINAL DESCRIPTION FILE.
353	VERIFY	ABS	1452	0207	73/06/11.	73/05/05.	VERIFY FILES.
	VERIFY						
	RFL=						

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
354	VFYLIB	OVL 00,00	1545	5722	73/06/11.	73/05/24. 69/05/07. VERIFY LIBRARY FILES.
355	OUT	PP (1100)	27	4610	73/06/11.	70/09/12. 72/05/19. RELEASE OUTPUT FILES.
356	SMP	PP (1100)	156	1277	73/06/11.	71/07/27. 73/05/08. SAMPLE CPU P-REGISTER.
357	(00)	SUM =	62566			
358	COMPASS	OVL 00,00	664	6310	73/05/10.	CYBER 70/ MODEL 76 COMPREHENSIVE ASSEMBLER PROGRAM VERSION 3.73130.
359	COMP2$	OVL 01,00	22326	4215	73/05/10.	CYBER 70/ MODEL 76 COMPREHENSIVE ASSEMBLER PROGRAM VERSION 3.73130.
360	KRONREF	OVL 00,00	1646	5646	5332	73/06/11. 70/10/26. 72/09/21. KRONOS SYSTEM CROSS REFERENCE PROGRAM.
361	OPLEDIT	OVL 00,00	3017	2063	73/06/11.	07/20/69. 73/05/07. OPL EDITING PROGRAM.
362	MODIFY	OVL 00,00	6475	6423	73/06/11.	70/06/06. 73/05/08. SOURCE LIBRARY EDITOR - VER 2.0.
363	UPDATE	OVL 00,00	13445	0423	73/05/10.	
364	UPMOD	OVL 00,00	1720	5601	73/06/11.	70/06/06. 73/05/07. UPDATE TO MODIFY CONVERSION PROGRAM.
365	(00)	SUM =	54161			
366	SYSTEXT	OVL 01,01	5127	3733	73/06/10.	70/12/13. SYSTEM COMMUNICATION TEXT.
367	(00)	SUM =	5127			
368	CPCTEXT	OVL 01,01	4423	4224	73/05/05.	SYSTEM TEXT FOR CPU PROGRAMS USING *CPC*.
369	CPUTEXT	OVL 01,01	3714	3465	73/05/10.	SYSTEM TEXT FOR CPU PROGRAMS USING MACE I/O.
370	IOTEXT	OVL 01,01	7235	3653	73/06/08.	
371	IPTEXT	OVL 01,01	335	5605	73/05/05.	INSTALLATION PARAMETER SYSTEM MACROS.
372	LDRTEXT	OVL 01,01	676	5557	73/05/05.	LOADER REQUEST SYSTEM MACROS.
373	PFMTEXT	OVL 01,01	1060	1200	73/05/05.	PERMANENT FILE SYSTEM MACROS.
374	PPTEXT	OVL 01,01	5130	6341	73/05/05.	PPU PROGRAM SYSTEM TEXT.
375	SCPTEXT	OVL 01,01	10124	5623	73/05/05.	SCOPE 3 SYSTEM TEXT.
376	TXT6RM	OVL 01,01	12047	7533	73/06/08.	
377	(00)	SUM =	51432			
378	FILE	OVL 00,00	1557	1050	73/06/08.	FILE
379	LINK	OVL 01,00	210	5252	73/06/11.	73/05/24. LINK - CONTROL CARD LOAD.
380	LDR=	OVL 00,00	3060	1730	73/06/11.	73/05/24. CPU RELOCATABLE PROGRAM LOADER.
381	LINKCTL LDSET LOAD MAP NOMAP LIBRARY REDUCE SETCORE	ABS	674	0732	73/06/11.	73/05/24. LINK - CONTROL CARD PROCESSING.
382	MAP=	OVL 01,00	1137	2356	73/06/11.	73/05/24. LINK - WRITE LOAD MAP.
383	OVG=	OVL 01,00	2473	5766	73/06/11.	73/05/24. LINK - OVERLAY GENERATION.
384	LIBGEN	OVL 01,00	3067	3561	73/06/11.	73/05/24. LINK - GENERATE USER LIBRARY.
385	SYSLIB	ULIB	1420	1124	73/06/11.	
495	(00)	SUM =	36250			
496	LIBMOD	TEXT	17	6625		
497	GENFILS	TEXT	25	5267		
498	GENINSD	TEXT	17	0475		
499	GENSYS	TEXT	106	6625		
500	GENVAL	TEXT	11	3262		
501	GENHELP	TEXT	37	5635		
502	(00)	SUM =	241			
503	DMQ DMQ RFL=	ABS	776	3253	73/06/11.	71/11/24. 73/05/08. DUMP QUEUES

REC	NAME	TYPE	LENGTH	CKSUM	DATE	COMMENTS
504	DFSORT	OVL 00.00	34713	3712	73/06/05.DFSORT	
505	FTNTRAN	OVL 00.00	44536	4773	73/06/05.FTNTRAN	
506	PSAMP	OVL 00.00	12126	4330	73/06/05.PSAMP	
507	LDI	ABS	421	7327	73/06/11. 71/02/12. 72/09/21.	LOAD JOBS TO INPUT QUEUE.
	LDI					
	RFL=					
508	LDQ	ABS	704	0620	73/06/11. 71/11/24. 73/05/08.	LOAD FILES TO QUEUES
	LDQ					
	RFL=					
509	(00)	SUM =	116122			
510	ALS	ABS	377	0333	72/02/04.	
	ALS					
	RFL=					
511	CT3	ABS	3311	4361	72/02/04.	
	CT3					
	RFL=					
512	CU1	ABS	5564	7737	72/02/04.	
	CU1					
	RFL=					
513	CU3	COS	57200	4256		
514	FD1	COS	300	0674		
515	FST	ABS	505	1672	72/02/04.	
	FST					
	RFL=					
516	LPT	ABS	2730	4136	73/06/11. 70/07/25. 71/07/27.	LINE PRINTER TEST
	LPT					
	RFL=					
517	MST	OVL 00.00	1305	6260	73/06/11. 71/02/02. 73/05/08.	MASS STORAGE TEST.
518	MY1	COS	51	0310		
519	MY2	OVL 00.00	107	1531	73/06/11. 70/12/20.	CNETRAL MEMORY TEST 2.
520	RAN	ABS	1144	6444	72/02/04.	
	RAN					
	RFL=					
521	RX7	COS	200	6434		
522	(00)	SUM =	77662			
523	RUN2P3	ULIB	24	2307	73/06/13.	
526	(00)	SUM =	346			
527	SYSIO	ULIB	1062	3767	73/06/13.	
703	SYSMISC	ULIB	2076	7162	73/06/13.	
914	(00)	SUM =	155036			
915	(00)	SUM =	0			
916	(00)	SUM =	0			
917	(00)	SUM =	0			
918	(00)	SUM =	0			
919	(00)	SUM =	0			
920	(00)	SUM =	0			

CATALOG OF A 1 73/06/14. 00.51.04. PAGE 15

REC	NAME	TYPE	FILE LENGTH	CKSUM	DATE	COMMENTS
921	(00)	SUM =	0			
922	(00)	SUM =	0			
923	(00)	SUM =	0			
924	(00)	SUM =	0			
925	(00)	SUM =	0			
926	SYSTEM	OPLD	1433	4762	73/06/14.	
927	* EOF *	SUM =	1140247			

1.2 COMPASS 3.0

1.2.1 RELEASE DESCRIPTION

COMPASS 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.

HARDWARE REQUIREMENTS

COMPASS 3.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length requirement to run COMPASS 3.0 is $42,000_8$.

CORRECTIONS

COMPASS 3.0 includes all eligible PSR corrective code published through PSR Summary 348.

DEFICIENCIES

Modification CPS020 from PSR Summary 351 must be available in COMPASS 3.0 if it is to operate under KRONOS 2.1. This modification is included in the binary code on KPL5 and on the deadstart tape, but it is not included in the source code on PL2. Therefore, add this modification the first time that the COMPASS 3.0 source code is modified and/or updated.

```
*/ $$CPS020         9     COMPASS
*IDENT     CPS020      RHG.     73/03/20.
*/         PSR                  COMPASS 3.0  SCOPE 3.4 KRONOS 2.1.
*/         PREVENT *I/O SEQUENCE ERROR* ON SCRATCH FILE.
*/
*DELETE COMPASS.4822
 PRT3      RECALL R
           SX6     CBUF         WRITE COMPASS TO DISK
*COMPILE COMPASS
*/     THERE ARE     9 CORRECTION CARDS INCLUDING THIS COMMENT.
```

1.2.2 INSTALLATION PROCEDURE

The deadstart tape contains the KRONOS 2.1 version of COMPASS 3.0. The procedure to modify and update COMPASS 3.0 is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for COMPASS 3.0, the following materials are necessary.

KPL2 contains the jobs to modify and update; the jobs required for COMPASS 3.0 are CMP1 and CMP2.

CMP1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
CMP2	Use to collect the COMPASS binary code and generate directive files for later use as input to the procedure file GENSYS.

KPL5 contains COMPASS 3.0 binary code.

PL2 contains COMPASS 3.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.1.2.

1.2.3 INSTALLATION PARAMETERS

The installation parameter definitions are in alphabetic order on pages 5 through 8 of the COMPASS 3.0 assembly listing. The following are parameters that an installation may change.

Program	Released Default Value	Significance
INTMUL	0	Specifies the integer multiply instruction usage 0 Integer multiply OPDEF feature 1 Integer multiply hardware feature To change the released value, use the following modification. *D CMP30.114 INTMUL EQU 1
MODEL	74	Specifies the CDC CYBER 70 Series model on which COMPASS runs. To run COMPASS 3.0 under KRONOS 2.1, change this parameter to 76. To change the released value, use the following modification. *D CMP30.152 MODEL MICRO 1,,*76* Make this change when using the CMP1 job to generate a new program library from PL2.
TIMEMSG	1	Indicates whether or not COMPASS 3.0 issues a dayfile message giving the total CPU time at the end of a batch of assemblies. 0 COMPASS does not issue message 1 COMPASS issues message

1.2.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

CMP1

```
CMP1
CMP1,CM51000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF COMPASS 3.0 ON KPL5.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=COMPASS3P0*3P4,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
SKIPEI,NEWPL.
RETURN,OLDPL.
COMPASS,I,S=IPTEXT,B=COMTEXT,L=0.
COMPASS,I,S=IPTEXT,G=COMTEXT,B=NEWPL,L=0.
WRITEF,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL5,W,FI=COMPASS3P0*3P4,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL5,V.
*WEOR
*/        PLACE *COMPASS* MODSET HERE.
*WEOF
```

CMP2

```
CMP2
CMP2,CM15000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL5,R,FI=COMPASS3P0*3P4,MT,D=HY,F=SI)
SKIPF,KPL5.
COPYBF,KPL5,COMPASS.
UNLOAD,KPL5.
RETURN,KPL5.
COMMON,ZZZZLDF,ZZZPSBF.
CATALOG,COMPASS,R.
COPYBF,COMPASS,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
*WEOR
*ADD      LIB13,OVL/COMPASS-COMP2$
*WEOF
```

1.3 RECORD MANAGER 1.0

1.3.1 RELEASE DESCRIPTION

Record Manager 1.0 modules are in two parts, basic access modules and sequential and word addressable I/O modules. Basic access modules control selective loading based upon 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. The suffix for the sequential and word addressable I/O modules is the file type, such as SQ, WA, or DA.

The I/O macro text included with the Record Manager program library is IOTEXT. It consists of, but is not limited to, the macros included in the following table. (Some auxiliary macros exist that are not supported at the user level.)

Macro Name	System	Reference	COMDECK
FILE	6RM	Record Manager Ref. Man.	6RMCOM
FETCH			
STORE			
OPENM			
CLOSEM			
GET			
GETP			
GETN	IS/DA		
PUT	6RM		
PUTP			
REPLACE			
DELETE			
ENDFILE			
SKIPdu d=F/B, u=L/P/F			
SEEK	IS/DA		
REWINDM	6RM		
WEOR			
WTMK			
GETL			
PUTL			
CLOSEL			
CHECK			

HARDWARE REQUIREMENTS

Record Manager 1.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The Record Manager field length will vary from 5000_8 to $16,000_8$ if it is used.

CORRECTIONS

Record Manager 1.0 includes all eligible PSR corrective code published through PSR Summary 348.

DEFICIENCIES

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

Checksumming of I type blocks is not available.

Calls to the 7000 Record Manager are not available.

Modification RM40089 from PSR Summary 351 must be available in Record Manager 1.0 if it is to operate under KRONOS 2.1. This modification is included in the binary code on KPL6 and on the deadstart tape, but it is not in the source code on PL3. Therefore, add this modification the first time the source code is modified and/or updated.

```
*IDENT RM40089
*/   THIS CODE IS FOR SIS 2.0 UNDER SCOPE 3.4
*/ ********************
*/
*/ KRONOS MODS TO ENABLE SIS VER 2.0 TO RUN UNDER KRONOS 2.1
*/
*/ ********************
*D,6RMRMIO.201
          SX1     X1+4          LIMIT = LWA + 4
*D,6RMRMIO.204
          SX7     X7-4          LWA
*D,6RMRMIO.228
          SX7     X7+3          END OF DATA + 4
*I,6RMRMIO.257
          ZR      X7,*+1
          SX7     X7-2
*/ TWJ - 03/22/73
*/ FIX KRONOS 2.1 3 WORD LOOK AHEAD
*/ APPLIES TO 3.4 6RM
*INSERT C6RMMGRM.33
 ΞFGΞ     EQU     4
*DELETE C6RMMGRM.230
          SX4     X4+ΞFGΞ
*DELETE C6RMMGRM.250
          SX4     X4+ΞFGΞ
*DELETE C6RMMGRM.276
          SX4     X4+ΞFGΞ
*DELETE C6RMMGRM.296
          SX4     X4+ΞFGΞ
*DELETE   IMS0128.334,IMS0128.335
*0   2.   FIND AMOUNT OF SPACE REQUESTED (NSP) - ADD 4 TO IT. THE USERS
*         REQUEST IS INCREASED BY FOUR WORDS TO AVOID A BUFFER ARGUMENT
*DELETE IMS0128.337
*         AINS NSP+4. SAVE NEXT AVAILABLE ID (NID) IN B2. NEXT STEP
*DELETE C6RMMGRM.410
          SB4     X4+ΞFGΞ
*DELETE RM9704.10
          SX6     B4-ΞFGΞ
*C 6RMMGRM
*COMPILE 6RMRMIO,C6RMMGRM
```

1.3.2 INSTALLATION PROCEDURE

The deadstart tape contains the released version of Record Manager 1.0. The procedure to modify and update Record Manager is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for Record Manager, the following materials are necessary.

KPL2 contains the jobs to modify and update, and verify installations; the jobs required for Record Manager 1.0 are SIXRM1, SIXRM2, and SIXRM3.

SIXRM1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
SIXRM2	Use to collect the Record Manager binary code and generate directive files for later use as input to the procedure file GENSYS.
SIXRM3	Use to verify that the product is correctly installed.

KPL4 contains SCOPE 3.4 texts' binary and source code.

KPL6 contains Record Manager 1.0 binary code.

PL3 contains Record Manager 1.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.1.3.

1.3.3 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

=<parameter>=        EQU  <user-value>
```

Use the following Update IDENTS format to set installation parameters.

*IDENT	URM<mmddyy>
mm	month
dd	day
yy	year

Parameter	Mnemonic Update ID	Released Default value	Significance
DBG	DBG	Off	Causes extensive debug code to be assembled if defined.
MCTL	MCTL	100 decimal	Memory catalog table length. MCTL/2 is the maximum number of files allowed open at one time.

Record Manager routines that reference SCOPE 3.4 system text IPARAMS are listed in part III, section 1.7.3.

1.3.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

SIXRM1

```
SIXRM1
SIXRM1,CM60000,T2000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB UPDATES AND CREATES THE BINARY OF 6RM
COMMENT.  AND COPIES THE OLDPL AND BINARY OF IS AND DA TO THE
COMMENT.  NEWPL.  THE NEWPL WILL CONSIST OF NINE FILES
COMMENT.  THE FIRST FILE WILL BE THE 6RM NEWPL
COMMENT.  THE SECOND FILE WILL BE THE BINARIES OF THE TEXTS
COMMENT.  THE THIRD FILE WILL BE THE BINARY OF THE 6RM I/O MODULES
COMMENT.  THE FOURTH FILF WILL BE THE ABS. BINARY OF THE FILE PROGRAM
COMMENT.  THE FIFTH WILL BE THE RELOCATABLE BINARY OF THE FILE PROGRAM
COMMENT.  THE LAST  FOUR FILES WILL BE THE PLS AND BINARIES
COMMENT.  OF IS AND DA.
*VSN CARD.
LABEL(OLDPL,R,FI=SCOPE3P4TEXTS*2P1,MT,D=HY,F=SI)
REWIND,OLDPL.
UPDATE(Q,P=OLDPL,N=RANPL,C=0)
UNLOAD(OLDPL)
RETURN(OLDPL)
*VSN CARD.
LABEL(OLDPL,R,FI=RM*3P4,F=SI,MT,D=HY)
REWIND,OLDPL.
UPDATE(F,P=OLDPL,N=NEWPL,W,X,R=C)
SKIPF,NEWPL.
REWIND,OLDPL.
COMPASS,I,L=0,B=TXTS,S=IPTEXT,X=RANPL.
GTR(TXTS,TEXTS)OVL/IOTEXT-TXT6RM
COMPASS,I,L=0,G=TEXTS/TXT6RM,S=PFMTEXT,B=IOMODS.
COMPASS,I,L=0,G=TEXTS/TXT6RM,B=FILEC.
RETURN,COMPILE.
LDSET(LIB=SYSIO,REWIND)
LOAD(FILEC)
REWIND,IOMODS,FILE,FILEC,TEXTS.
COPYBF,TEXTS,NEWPL.
COPYBF,IOMODS,NEWPL.
COPYBF,FILE,NEWPL.
COPYBF,FILEC,NEWPL.
SKIPF,OLDPL,5.
COPYBF,OLDPL,NEWPL,4.
UNLOAD,OLDPL.
RETURN,OLDPL.
REWIND,NEWPL.
*VSN CARD.
LABEL(KPL6,W,FI=RM*3P4,D=HY,MT,F=SI)
REWIND,KPL6.
COPYEI,NEWPL,KPL6,V.
CATALOG,KPL6,R,N=0.
UNLOAD,KPL6.
*WEOR
*C CPCTEXT
*WEOR
*/  PLACE 6RM MODIFICATIONS HERE
*WEOF
```

SIXRM2

```
SIXRM2
SIXRM2,CM45000,T2000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB ADDS THE 6RM V1.0 BINARIES TO THE SYSTEM COMMON FILE
COMMENT.  ZZZPSBF FROM THE KPL6 RELEASE TAPE.  THE FILE PROGRAM AND
COMMENT.  THE RECORD MANAGER TEXTS ARE ADDED AS OVERLAYS.  THE 6RM
COMMENT.  I/O MODULES ARE ADDED TO THE USER LIBRARY -SYSIO-.
COMMENT.  EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT.  JOB SIXRM1 MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT.  TO COMMON FILE ZZZZLDF FOR GENERARING A NEW SYSTEM DEADSTART.
COMMENT.
*VSN CARD.
LABEL(KPL6,R,FI=RM*3P4,MT,D=HY,F=SI)
SKIPF,KPL6.
COPYBF,KPL6,RM.          IOTEXT,TXT6RM
COPYBF,KPL6,IOMODS.       6RM I/O MODULES
BKSP,RM.
COPYBF,KPL6,RM.           FILE PROGRAM
UNLOAD,KPL6.
RETURN,KPL6.
CATALOG,RM,R.
COMMON,ZZZPSBF,ZZZZLDF.
COPYBF,RM,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSIO
IF(EF=0)GOTO,10.
SET(R3=1)
COMMON,SYSTEM.
GTR(SYSTEM,OLD)ULIB/SYSIO
10,LIBEDIT,N=LGO,B=IOMODS,L=0.
LIBGEN,F,P=SYSIO.
CATALOG,SYSIO,U,R.
RETURN,NEW.
LIBEDIT,P=ZZZPSBF,B=SYSIO,L=0.
RELEASE,ZZZPSBF.
RETURN,ZZZPSBF.
RENAME,ZZZPSBF=NEW.
COMMON,ZZZPSBF.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
IF(R3≠0)COPYBR,,ZZZZLDF.
*WEOR
*BEFORE *,REL/*
*WEOR
*BEFORE *,ULIB/SYSIO
*WEOR
*ADD      LIB15,OVL/IOTEXT,TXT6RM
*ADD      LIB16,OVL/FILE
*WEOR
*ADD      LIB21,ULIB/SYSIO
*WEOF
```

SIXRM3

```
SIXRM3
SIXRM3,CM60000,T30.
*ACCOUNT CARD.
COMMENT. ******************
COMMENT.
COMMENT.  6RM INSTALLATION VERIFICATION TEST
COMMENT.
COMMENT. **********************
LIBRARY(SYSIO)
COMPASS(S=IOTEXT)
LGO.
COMMENT.  ****** 6RM TEST PASSED ******
EXIT.
COMMENT.  ****** 6RM TEST FAILED ******
*WEOR
          IDENT    P3BIN
          ENTRY    P3
          SST
*
*         BINARY FILE ******
*         1 RECORD,  512 WORDS,  WORDS ARE NUMBERED IN ASCENDING ORDER
*
          LIST     G
FIT       FILE     LFN=TAPE,BFS=513,FWB=BFS,MRL=512,FET=FET,WSA=WSA,CM=N
,O,BT=I,RT=W,MNR=10,MBL=5120,LT=UL
BFS       BSSZ     517
FET       BSSZ     13
WSA       BSSZ     514
RL        BSSZ     1
P3        BSS      0
          OPENM    TAPE,I-O
          SB1      1                        INCREMENT
          SB2      513
          SB3      B0                       COUNTER
          SB4      WSA
          SB4      B4-B1
DO        SB3      B3+B1
          SX7      B3                       SET WORD TO NUMBER IN SEQUENCE
          SA7      B4+B3                    STORE IN BUFFER
          LE       B3,B2,DO
          STORE    TAPE,MRL=5120            MAXIMUM LENGTH OF RECORD IN CHA
PPPP      PUT      TAPE,WSA,5120,,,         WRITE 5120 CHARACTERS
          SX7      B0
          SA7      WSA
          SA7      WSA+511                  LAST WORD
          REWINDM  TAPE
GGGG      GET      TAPE,WSA,RL,,,
*                                           NOW, CHECK THE FIRST AND LAST W
*                                           WORD OF THE FILE
```

```
          SB2       512
          SB1       1
          SA1       WSA
          SB5       X1
          NE        B5,B1,ERROR          IS THE FIRST WORD = 1
          SA1       WSA+511               LAST WORD
          SB5       X1
          NE        B5,B2,ERROR           IS LAST WORD = 512
          CLOSEM    TAPE,R,FILE
          ENDRUN
ERROR     BSS    0
SS    0
          MESSAGE   MSG0,,R
          ABORT     01
MSG0      DIS       ,*DATA NOT WRITTEN CORRECTLY - TEST FAILED*
          END       P3
*WEOR
```

Dayfile information from running the installation verification program should appear similar to the following.

```
01.20.12.SIXRM3,CM60000,T30.
01.20.12.*ACCOUNT CARD.
01.20.12.ACCOUNT,USER1.
01.20.13.COMMENT. ******************
01.20.13.COMMENT.
01.20.13.COMMENT.  6RM INSTALLATION VERIFICATION
01.20.13.TEST
01.20.13.COMMENT.
01.20.13.COMMENT. **********************
01.20.14.LIBRARY(SYSIO)
01.20.14.COMPASS(S=IOTEXT)
01.20.23.    3.989  CPU SECONDS  ASSEMBLY TIME.
01.20.23. ASSEMBLY COMPLETE.   50200B  CM USED.
01.20.23.LGO.
01.20.24.COMMENT.  ****** 6RM TEST PASSED ******
```

1.4 DIRECT ACCESS 1.0

1.4.1 RELEASE DESCRIPTION

Direct Access (DA) operates as a functional module of Record Manager 1.0. It provides all the routines necessary to create, update, and access random files on mass storage. It consists of a related set of central processor routines that are loaded, as required, in the user's field length.

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

A direct access file created by DA can only be processed by DA. (Do not confuse a file created by DA 1.0 with the KRONOS direct access permanent file concept.)

HARDWARE REQUIREMENTS

DA 1.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. Refer to the field length requirements for Record Manager in part III, section 1.3.1.

CORRECTIONS

DA 1.0 includes all eligible PSR corrective code published through PSR Summary 348.

DEFICIENCIES

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

The create utility requires that Sort/Merge 4.0 be installed. If Sort/Merge is not available, comparable DA files can be created through explicit Record Manager 1.0 calls at the expense of appreciably greater creation time.

1.4.2 INSTALLATION PROCEDURE

The deadstart tape contains the released version of Direct Access 1.0. The procedure to modify and update DA is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for DA, the following materials are necessary.

KRONOS 2.1 deadstart tape

KPL2 contains the jobs to modify and update, and verify installation; the jobs required for DA 1.0 are DA1, DA2, and DA3.

DA1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.

DA2	Use to collect the DA binary code and generate directive files for later use as input to the procedure file GENSYS.
DA3	Use to verify that the product is correctly installed.

KPL6 contains DA 1.0 binary code.

PL3 contains DA 1.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.1.3.

1.4.3 INSTALLATION PARAMETERS

DA contains a single parameter value that is effective when the user does not supply his own setting.

Parameter	Released Default Value	Significance
BLKHDL EQU	1	Specifies block header length (CM words); possible range of values is 1 through 31. If the value specified is not within this range, the following message is issued. INSTALLATION PARAM BLKHDL OUTSIDE 1-31 RANGE When modifying this parameter, the update sequence number is SDACOM.38.

1.4.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

DA1

```
DA1
DA1,CM60000,T1000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB UPDATES AND CREATES THE BINARY OF DA
COMMENT.  AND COPIES 6RM AND IS TO THE NEW KPL6.
COMMENT.  THE NEW KPL6 WILL CONSIST OF NINE FILES.
COMMENT.  THE FIRST SEVEN FILES WILL BE THE OLDPLS AND BINARIES
COMMENT.  OF 6RM AND IS
COMMENT.  FILE EIGHT WILL BE THE DA NEWPL
COMMENT.  FILE NINE WILL BE THE BINARY OF DA
*VSN CARD.
LABEL(OLDPL,R,FI=RM*3P4,MT,D=HY,F=SI)
REWIND,OLDPL.
COPYBF,OLDPL,NEWPL,7.          COPY 6RM AND IS TO NEW KPL7.
UPDATE(F,P=OLDPL,N=NEWPL,W,X,R=C)
UNLOAD,OLDPL.
RETURN,OLDPL.
COMPASS,I,L=0,S=TXT6RM.
COPYBR,COMPILE,NIL.            SKIP MSD PP PROGRAM
COMPASS,I,L=0,S=IOTEXT.
COMPASS,I,L=0,S=IOTEXT,S=CPCTEXT,S=LDRTEXT,S=SMTEXT.
REWIND,LGO.
SKIPF,NEWPL.
COPYBF,LGO,NEWPL.
*VSN CARD.
LABEL(KPL6,W,FI=RM*3P4,D=HY,MT,F=SI)
REWIND,KPL6,NEWPL.
COPYEI,NEWPL,KPL6,V.
CATALOG,KPL6,R,N=0.
UNLOAD,KPL6.
*WEOR
*/ PLACE DA MODIFICATIONS HERE
*WEOF
```

DA2

```
DA2
DA2.CM55000,T2000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB ADDS THE  DA V1.0 BINARIES TO THE SYSTEM COMMON FILE
COMMENT.  ZZZPSBF FROM THE KPL6 RELEASE TAPE.  THE DA I/O MODULES ARE
COMMENT.  ADDED TO THE USER LIBRARY -SYSIO-.
COMMENT.  EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT.  JOB  DA1  MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT.  TO COMMON FILE ZZZZLDF FOR GENERARING A NEW SYSTEM DEADSTART.
COMMENT.
*VSN CARD.
LABEL(KPL6,R,FI=RM*3P4,MT,D=HY,F=SI)
SKIPF,KPL6,8.
COPYBF,KPL6,SDA.
UNLOAD,KPL6.
RETURN,KPL6.
COMMON,ZZZPSBF,ZZZZLDF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSIO
IF(EF=0)GOTO,10.
SET(R3=1)
COMMON,SYSTEM.
GTR(SYSTEM,OLD)ULIB/SYSIO
10,LIBEDIT,N=LGO,B=SDA,L=0.
LIBGEN,F,P=SYSIO.
CATALOG,SYSIO,U,R.
RETURN,NEW.
LIBEDIT,P=ZZZPSBF,B=SYSIO,L=0.
RELEASE,ZZZPSBF.
RETURN,ZZZPSBF.
RENAME,ZZZPSBF=NEW.
COMMON,ZZZPSBF.
SKIPEI,ZZZPSBF.
IF(R3≠0)COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
*WEOR
*BEFORE *,REL/*
*WEOR
*BEFORE   *,ULIB/SYSIO
*WEOR
*ADD      LIB21,ULIB/SYSIO
*WEOF
```

```
DA3
DA3,CM60000,T20
*ACCOUNT CARD.
LIBRARY(SYSIO)
COMPASS(S=IOTEXT)
COMMENT. *** INSTALLATION TEST ***
COMMENT. LANGUAGE- COMPASS
COMMENT. PRODUCT- SDA
SWITCH(1)
LGO.
COMMENT. ***********TEST PASSED ***************
REWIND,ZZZZZEF.
REWIND(OUTPUT)
EXIT.
COMMENT. ***********TEST FAILED ************
REWIND,ZZZZZEF.
COPYBF(ZZZZZEF,OUTPUT)
*WEOR
          IDENT  INSTALL
          ENTRY  START
          SST
*
*
          FILE   LFN=CREATE,BFS=000,FET=XFET,HMB=10,FO=DA,FWB=000000,FLM
,=70,KA=XKA,KL=10,KP=0,MBL=64,MNR=30,MRL=52,PM=R,RKP=0,RKW=0,WSA=XWSA
 START    BSS    0
          OPENM  CREATE,NEW,R
          SX6    B0
 LOOP     SB1    1
          SA6    XWSA              STORE RECORD IN WSA
          SA6    A6+B1
          SA6    A6+B1
          SA6    A6+B1
          PUT    CREATE,,40
          SA2    COUNT
          SX6    X2+1              INCREMENT COUNTER
          SA6    A2
          SX3    60
          IX3    X3-X6
          NZ     X3,LOOP
3,LOOP
          CLOSEM CREATE
          OPENM  CREATE,I-O,R
 LOOP2    GETN   CREATE
          SA1    EXKEY             LOAD EXPECTED KEY
          SA2    XWSA              LOAD RECORD FROM WSA
          SA3    A2+1
          SA4    A3+1
          SA5    A4+1
          IX0    X1-X2
          NZ     X0,ERR            COMPARE AGAINST EXPECTED VALUE
          IX0    X1-X3
          NZ     X0,ERR
          IX0    X1-X4
          NZ     X0,ERR
```

```
            IX0     X1-X5
            NZ      X0,ERR
            SX6     X1+10               INCREMENT EXPECTED KEY
            SA6     A1
            SA2     COUNT2
            SA5     A4+1
            IX0     X1-X2
            NZ      X0,ERR
            SX2     X1+10
            IX0     X2-X3
            NZ      X0,ERR
            IX0     X2-X4
            NZ      X0,ERR
            IX0     X2-X5
            NZ      X0,ERR
            SX6     X1+1
            SA6     A1
            SX0     X6-60
            NZ      X0,LOOP5
            CLOSEM  CREATE
 BB         BSS     0
            ENDRUN
 ERR        MESSAGE ER,,RECALL
            ENDRUN
 ER         DATA    10LTEST FAILE
            DATA    1CD
 XWSA       BSSZ    4
SSZ   4
            DATA    -0
 XKA        BSSZ    1
 FLAG       BSSZ       1SSZ       1
 COUNT      BSSZ    1
 COUNT2     BSSZ    1
 COUNT3     BSSZ    1
 EXKEY      BSSZ    1
 BUFFER     BSSZ    200
XFET        BSSZ    10
            END     START
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
01.22.27.DA3,CM60000,T20
01.22.27.*ACCOUNT CARD.
01.22.28.ACCOUNT,USER1.
01.22.31.LIBRARY(SYSIO)
01.22.32.COMPASS(S=IOTEXT)
01.22.44.     9.445  CPU SECONDS  ASSEMBLY TIME.
01.22.44. ASSEMBLY COMPLETE.   50200B  CM USED.
01.22.44.COMMENT. *** INSTALLATION TEST ***
01.22.44.COMMENT. LANGUAGE- COMPASS
01.22.44.COMMENT. PRODUCT- SDA
01.22.45.SWITCH(1)
01.22.45.LGO.
01.23.17.COMMENT. ***********TEST PASSED ********
01.23.17.*******
01.23.17.REWIND,ZZZZZEF.
01.23.17.REWIND(OUTPUT)
```

1.5 INDEXED SEQUENTIAL 2.0

1.5.1 RELEASE DESCRIPTION

Indexed Sequential 2.0 (IS) operates as a functional module of Record Manager 1.0. It 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 can be processed only by IS.

There are two utility routines called by control cards for indexed sequential files. SISTAT prints the statistics for an existing IS file; ESTMATE produces estimates of block and buffer sizes from input cards containing IS file descriptions.

Interface routines allow the execution of IS 1.0 programs that exist in either source language or binary format.

HARDWARE REQUIREMENTS

IS 2.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. Refer to the field length requirements for Record Manager in part III, section 1.3.1.

CORRECTIONS

IS 2.0 includes all eligible PSR corrective code published through PSR Summary 348.

DEFICIENCIES

If IS is used in a program with overlays, it should be included in the main overlay. The IS routines must be overlayed.

1.5.2 INSTALLATION PROCEDURE

The deadstart tape contains the released version of IS 2.0. The procedure to modify and update IS is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for IS, the following materials are necessary.

KPL contains the jobs to modify and update, and verify installation; the jobs required for IS 2.0 are IS1, IS2, and IS3.

IS1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
IS2	Use to collect the IS binary code and generate directive files for later use as input to the procedure file GENSYS.
IS3	Use to verify that the product is correctly installed.

KPL6 contains IS 2.0 binary code.

PL3 contains IS 2.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.1.3.

1.5.3 INSTALLATION PARAMETERS

This system contains parameter values that are effective when the user does not supply settings. 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:

Parameter	Released Default Value	Significance
DAHDRSZW EQU	1	Specifies data block header size in words; range is 1 through 31; location is SISCOMM.12
DFBKGFAC EQU	2	Specifies default data record blocking factor; range is 1 through 4095; location is SISCOMM.16
DFDAPADP EQU	0	Specifies data block padding factor; range is 0 through 99; location is SISCOMM.17
DFERRLIM EQU	26	Specifies maximum number of trivial errors +1; for IS 1.0 programs only; range is 1 through 32,767; location is SISCOMM.18
DFIBKSZW EQU	511	Specifies default index block size in words; range is 1 through 23,767; location is SISCOMM.19
DFINPADP EQU	5	Specifies default index padding factor; range is 0 through 99; location is SISCOMM.20
DFNRLVLS EQU	1	Specifies default number of index levels; range is 1 through 63; location is SISCOMM.21
KEYLIMIT EQU	255	Specifies maximum key size in characters; range is 1 through 511; location is SISCOMM.31
TOTFILES EQU	10	Specifies maximum number of active IS files per run; defines an internal table size in words; no practical limit; location is SISCOMM.338

1.5.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

IS1

```
IS1
IS1,CM65000,T2000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB UPDATES AND CREATES THE BINARY OF IS
COMMENT.  THE NEW KPL6 WILL CONSIST OF NINE FILES.
COMMENT.  THE FIRST FIVE FILES WILL BE 6RM
COMMENT.  FILE SIX WILL BE THE IS NEWPL
COMMENT.  FILE SEVEN WILL BE THE IS BINARY
COMMENT.  THE LAST TWO FILES WILL BE THE PL AND BINARY OF DA.
*VSN CARD.
LABEL(OLDPL,R,FI=RM*3P4,MT,D=HY,F=SI)
REWIND,OLDPL.
COPYBF,OLDPL,NEWPL,5.          COPY 6RM TO NEW KPL7.
UPDATE(F,P=OLDPL,N=NEWPL,W,R=C)
SKIPF,NEWPL.
COMPASS,I,L=0,B=NEWBIN,S=TXT6RM,S=IPTEXT.
COMPASS,I,L=0,B=NEWBIN,S=TXT6RM.

RFL,64000.
COMPASS,I,L=0,B=NEWBIN,S=TXT6RM,S=IOTEXT.
RFL,20000.
REWIND,NEWBIN.
COPYBF,NEWBIN,NEWPL.
SKIPF,OLDPL,2.
COPYBF,OLDPL,NEWPL,2.
UNLOAD,OLDPL.
RETURN,OLDPL.
*VSN CARD.
LABEL(KPL6,W,FI=RM*3P4,MT,D=HY,F=SI)
REWIND,KPL6,NEWPL.
COPYEI,NEWPL,KPL6,V.
CATALOG,KPL6,R,N=0.
UNLOAD,KPL6.
*WEOR
*/  ADD IS MODIFICATIONS HERE
*WEOF
```

IS2

```
IS2
IS2,CM55000,T2000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB ADDS THE  IS V2.0 BINARIES TO THE SYSTEM COMMON FILE
COMMENT.  ZZZPSBF FROM THE KPL6 RELEASE TAPE.   THE ESTMATE AND SISTAT
COMMENT.  PROGRAMS ARE ADDED AS OVERLAYS.  THE -IS-
COMMENT.  I/O MODULES ARE ADDED TO THE USER LIBRARY -SYSIO-.  THE
COMMENT.  PROGRAM -RUNCALL- IS ADDED TO THE USER LIBRARY -RUN2P3-.
COMMENT.  EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT.  JOB  IS1  MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT.  TO COMMON FILE ZZZZLDF FOR GENERARING A NEW SYSTEM DEADSTART.
COMMENT.
COMMENT.  W A R N I N G -- THE S I S UTILITIES  -E S T M A T E -
COMMENT. AND - S I S T A T - WILL NOT BE GENERATED PROPERLY
COMMENT. IF JOB -F4LIB2- WAS NOT RUN PRIOR TO THIS JOB AND
COMMENT. THE USER LIBRARY - F O R T R A N - IS NOT ON THE
COMMENT. SYSTEM.
COMMENT.
*VSN CARD.
LABEL(KPL6,R,FI=RM*3P4,MT,D=HY,F=SI)
SKIPF,KPL6,6.
COPYBF,KPL6,SIS.
UNLOAD,KPL6.
RETURN,KPL6.
GTR(SIS,RUN)REL/RUNCALL
GTR(SIS,ESTM)REL/ESTMATE
GTR(SIS,SIST)REL/SISTAT
COMMON,ZZZPSBF,ZZZZLDF.
COMMON,SYSTEM.
NOEXIT.
GTR(ZZZPSBF,FORLIB)ULIB/FORTRAN
IF(EF=0)GOTO,1.
SET(EF=0)
SET(R3=1)
GOTO,2.
1,LIBGEN(F=FORLIB,P=FORTRAN)
2,SET(EF=0)
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSIO
IF(EF=0)GOTO,10.
SET(R1=1)
GTR(SYSTEM,OLD)ULIB/SYSIO
10,LIBEDIT(B=SIS,L=0,N=LGO)
LIBGEN,F,P=SYSIO.
CATALOG,SYSIO,U,R.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
SET(R3=0)
SET(EF=0)
BKSP,ZZZPSBF.
REWIND,ESTM,SIST.
LIBRARY(FORTRAN)
LINK,F=ESTM,B=UTIL,P=SYSIO.
LINK,F=SIST,B=UTIL,P=SYSIO.
CATALOG,UTIL,R.
COPYBF,UTIL,ZZZPSBF.
BKSP,ZZZPSBF.
RETURN,OLD,LGO.
GTR(ZZZPSBF,OLD,,,S)ULIB/RUN2P3
IF(EF=0)GOTO,20.
COMMON,SYSTEM.
```

```
SET(R2=1)
GTR(SYSTEM,OLD)ULIB/RUN2P3
20,LIBEDIT,N=LGO,B=RUN,L=0.
LIBGEN,F,P=RUN2P3.
CATALOG,RUN2P3,U,R.
RETURN,NEW,LGO.
REWIND,SYSIO,RUN2P3.
COPYEI,SYSIO,LGO.
BKSP,LGO.
COPYEI,RUN2P3,LGO.
REWIND,LGO.
LIBEDIT,P=ZZZPSBF,L=0.
RELEASE,ZZZPSBF.
RETURN,ZZZPSBF.
RENAME,ZZZPSBF=NEW.
COMMON,ZZZPSBF.
SKIPEI,ZZZPSBF.
IF(R1≠0)COPYBR,,ZZZZLDF.
IF(R1=0)SKIPR,.
IF(R2≠0)COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
*WEOR
*IGNORE    REL/RUNCALL,ESTMATE,SISTAT
*BEFORE *,REL/*
*WEOR
*ADD       LIB29,OVL/ESTMATE,SISTAT
*WEOR
*BEFORE    *,REL/RUNCALL
*WEOR
*BEFORE    *,ULIB/SYSIO
*BEFORE    *,ULIB/RUN2P3
*WEOR
*ADD       LIB21,ULIB/SYSIO
*WEOR
*ADD       LIB20,ULIB/RUN2P3
*WEOF
```

```
IS3
IS3,CM60000,T20.
*ACCOUNT CARD.
COMMENT.    ******** S I S   V 1     ************
COMMENT.    ******** VALIDATION      ************
***********
COMPASS(S=CPCTEXT)
LIBRARY(SYSIO)
LGO.
COMMENT.    ***** T E S T  P A S S E D  *******
EXIT.
REWIND,SISMESS.
COPYBF(SISMESS,OUTPUT)
COMMENT.  ***** TEST FAILED *******
*WEOR
          IDENT  V1INSTL
          ENTRY  START

 SISFILE  SETFET DATREC,20,20,CMBUF,500

 START    SB1    1
          SETKEY SISFILE,KEYLOC,0,S,10
          SETBLKI  SISFILE,0,63
          SETBLKD  SISFILE,0,0,127
          SETCOLL  SISFILE,DC,CD
          SETERR SISFILE,ERRCODE
          OPENNEW  SISFILE
          SX4    20
          PX6    B0,X4
          SA6    RECSIZE            INITIALIZE RECORD SIZE
 LL0      INSERT  SISFILE,RECSIZE
          SA1    COUNT
          SX6    X1-1               DECREMENT RECORD COUNT
          SA6    A1
          ZR     X6,LL1
6,LL1
          SA1    KEYLOC
          SX6    X1+1
          SA6    KEYLOC             INCREMENT KEY
          SA1    DATREC
          SX6    X1+1
          SA6    A1                 INCREMENT DATA RECORD
          SA6    DATREC+1
          EQ     LL0
 LL1      TERMNAT  SISFILE

          SA1    KEY1
          BX6    X1
          SA6    KEYLOC             RESET KEY
          OPENOLD  SISFILE,R
          SEEKS   SISFILE
          SEEKL  SISFILE
          ACCESSK  SISFILE,RECSIZE
```

```
          SX1     1
          PX6     B0,X1
          SA6     P1                  INITIALIZE REPOS PARAMETER
          REPOS   SISFILE,P1
          ACCESSN  SISFILE,RECSIZE
          REPLACE  SISFILE,RECSIZE
          DELETE  SISFILE
                  FORCEW  SISFILE
                  TERMNAT  SISFILE
                  ENDRUN
          DATREC  DATA    1
                  DATA    1
          KEYLOC  DATA    10LKAAAAAAAAA
          CMBUF   BSSZ    500
          ERRCODE BSSZ    1
          DC      DATA    77303132333435360000B
                  DATA    37404243444546470000B
                  DATA    50515254555657600000B
                  DATA    61626365666770710000B
                  DATA    72737475761621200000B
                  DATA    22241417250023130000B
                  DATA    04025364260341050000B
                  DATA    06072710011112150000B
          CD      DATA    55746165606770710000B
                  DATA    73757657527745530000B
                  DATA    47465056515464720000B
                  DATA    01020304050607100000B
                  DATA    11661213141516170000B
                  DATA    20212262232425260000B
                  DATA    27303132633334350000B
                  DATA    36374041424544000000B
          RECSIZE BSSZ    1
          COUNT   DATA    10
          KEY1    DATA    10LKAAAAAAAAA
          P1      BSS     1
                  END     START
        *WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
01.05.14.IS3,CM60000,T20.
01.05.14.*ACCOUNT CARD.
01.05.15.ACCOUNT,USER1.
01.05.16.COMMENT.    ******** S I S   V 1    *****
01.05.16.*******
01.05.16.COMMENT.    ******** VALIDATION     *****
01.05.16.*******
01.05.19.COMPASS(S=CPCTEXT)
01.05.29.     5.170  CPU SECONDS  ASSEMBLY TIME.
01.05.29. ASSEMBLY COMPLETE.   43600B  CM USED.
01.05.29.LIBRARY(SYSIO)
01.05.29.LGO.
01.05.39.COMMENT.    ***** T E S T  P A S S E D  *
01.05.39.******
```

1.6 UPDATE

1.6.1 RELEASE DESCRIPTION

HARDWARE REQUIREMENTS

Update requires the same minimum hardware requirements as does KRONOS 2.1.

CORRECTIONS

Update can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length requirement to run Update is $35,000_8$.

DEFICIENCIES

None.

1.6.2 INSTALLATION PROCEDURE

The deadstart tape contains the released version of Update. The procedure to modify and update Update is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for Update, the following materials are necessary.

KPL2 contains the jobs to modify and update; the jobs required for Update are UPD1 and UPD2.

UPD1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
UPD2	Use to collect the Update binary code and generate directive files for later use as input to the procedure file GENSYS.

KPL7 contains the Update binary code.

PL1C contains the Update source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.1.4.

1.6.3 INSTALLATION PARAMETERS

The following Update features are available or unavailable through assembly options and may be modified by deleting the appropriate entry in the range UPDATE.703 through UPDATE.711. Specify these changes in the installation deck UPD1.

An attempt to use features when the option is not assembled causes Update to issue error messages. For example, when PMODKEY is not set, the PULLMOD card is not recognized as a legal directive.

Parameter	Released Default Value	Significance
DECLKEY	Enabled	Enables DECLARE directive
PMODKEY	Enabled	Enables PULLMOD card and G option
AUDITKEY	Enabled	Allows audit functions
EDITKEY	Enabled	Allows merge and edit
OLDPLKEY	Enabled	Enables Update to read both old-style and new-style old program libraries
EXTOVLP	Enabled	Enables detection of four types of overlap involving two or more cards in a correction set.
DYNAMFL	Enabled	Declares dynamic table expansion. When this option is assembled, Update automatically expands tables as required and dynamically requests KRONOS to change the user field length to accommodate the additional table area. At the end of the run, the field length is reduced to that requested by the user.

1.6.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

UPD1

```
UPD1
UPD1,CM54000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF UPDATE 1.2 ON KPL7.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=UPDATE1P2,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
SKIPEI,NEWPL.
RETURN,OLDPL.
COMPASS,I,S=IPTEXT,B=NEWPL,L=0.
WRITEF,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL7,W,FI=UPDATE1P2,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL7,V.
*WEOR
*/        PLACE *UPDATE* MODSET HERE.
*WEOF
```

UPD2

```
UPD2
UPD2,CM15000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL7,R,FI=UPDATE1P2,MT,D=HY,F=SI)
SKIPF,KPL7.
COPYBF,KPL7,UPDATE.
UNLOAD,KPL7.
RETURN,KPL7.
COMMON,ZZZZLDF,ZZZPSBF.
COPYBR,,ZZZZLDF.
CATALOG,UPDATE,R.
COPYBF,UPDATE,ZZZPSBF.
BKSP,ZZZPSBF.
*WEOR
*ADD       LIB13,OVL/UPDATE
*WEOF
```

1.7 SCOPE 3.4 SYSTEM TEXTS

1.7.1 RELEASE DESCRIPTION

KPL4 consists of the SCOPE 3.4 COMDECKs that comprise the eight text decks and additional programs required to install and maintain the common product set.

HARDWARE REQUIREMENTS

Maintenance of KPL4 requires the same minimum hardware requirements as does KRONOS 2.1.

CORRECTIONS

KPL4 includes all eligible PSR corrective code published through PSR Summary 348.

DEFICIENCIES

None.

1.7.2 INSTALLATION PROCEDURE

The deadstart tape contains the released version of SCOPE 3.4 Texts. The procedure to modify or update SCOPE 3.4 Texts is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for SCOPE 3.4 Texts, the following materials are necessary.

KPL2 contains the jobs to modify and update; the jobs required for SCOPE 3.4 Texts are SCP1 and SCP2.

SCP1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
SCP2	Use to collect the SCOPE 3.4 Texts binary code and generate directive files for later use as input to the procedure file GENSYS.

KPL4 contains the SCOPE 3.4 Texts binary and source code.

The tapes are described in detail in part I, section 2.1.1.

CAUTION

The KRONOS modifications contained in job SCP1 is in the binary code on KPL4 and on the KRONOS 2.1 deadstart tape. It is not in the source code on KPL4, in order to prevent any future modification conflicts with SCOPE 3.4 PSR summaries. These modifications contain the changes to SCOPE 3.4 COMDECK COMCSYS; it resolves incompatibilities between SCOPE 3.4 and KRONOS 2.1.

1.7.3 INSTALLATION PARAMETERS

General installation parameters related to the common product set are defined within the COMDECK IPARAMS.

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 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.

The following list constitutes the extent of installation changeable symbols in IPARAMS. Those parameters preceded by an asterisk (*) have been changed for KRONOS 2.1 and are reflected in IPARAMS.

Parameter	Released Default Value	Significance
IP.CMU	0	If nonzero, compare/move unit hardware is present. The following common product routines reference IP.CMU. Record Manager 1.0: TXTERM COBOL 4.0: DCSLEMV DCCPWA CCCCBIO CDSBLIT DDLFCNT CCADVAN DCSLESC DDSESC2 DDSBSC6 DDSBSC7 DDDSPLY CCCADD CONSTAN CDTRUBL DDCVBD DBN1SA DDBN DBN6SA DENESS BN1CSA DBN1CS BN6DSA DBN6DS DB1DDA DBN1DD DB6DDA DBN6DD CBN1SB BN1SBA DCEXAMO DDBCDCM DDSCM CONV1 CONTROL SAVEREG SNAP SCAN2 ITEMCOP SAD LEXDATA PASS1B 01B CONCRDI LEXXY PASS1B1 C1B1 PASS1C PASS1D LEXFRCC PASS1E DIG C1E REF PASS1F ART MNEMON PASS1G TROUT1G DISCIO PASS1H GOTCGEN GENPLIM PRFOPS TCLIMB GENLOC GENSTO PASS2 CHECK GENARTH GENMOVE GENIF LIT02 GENCISF SUBSCR GREPORT Sort/Merge 4.0: KYCFL KEYCCD BUFALL TRNSRT TSC TMC FMC FMIP FMOP FSRTGET MRGCON MRGDSN SRTCCN SRTPUT SRTGET

Parameter	Released Default Value	Significance
*IP.CSET	IP.C63	Defines character set to be used throughout the system. The following common product routines reference IP.CSET. FORTRAN Extended 4.0 Compiler: SISCPEN FORTRAN Extended 4.0 Library: KCCER= KRAKER COBOL 4.0: DCSLBMV CONV1 GENMOVE GENIF Sort/Merge 4.0: ENDPRO ALGOL 3.0: ALG1 SIMSCRIPT 3.0: SIMLLA SIM1 SIMURUN SIMLB01 FORTRAN 2.3: INPLTS READMS BACKSP BUFFEI BUFFEO ENDFIL IOCHEC IFENDF INPUTB INPUTC IOCHEK KCDER KRAKER OUTPTB OUTPTC REWINM SIC$
IP.IMUL	0	If nonzero, integer multiply hardware is present. The following common product routines reference IP.IMUL. COBOL 4.0: DCSLBMV DDOPWA CCCOBIO DDSBLIT DDUPCNT DDADVAN DCSLESC DDSESC2 DDSBSC6 DDSBSC7 DDDSPLY DDDADD DDNSTAN DDTRUBL DDDVBD DBN1SA DDEN DEN6SA DBN6SS BN1DSA DBN1DS BN6DSA DBN6DS DB1DDA DBN1DD DB6DDA DBN6DD DBN1SB BN1SBA DDEXAMO DDBDDDM DDSDM CONV1 CONTROL SAVEREG SNAP SCAN2 ITEMDOP SAD LEXDATA PASS1B 01B DDNDFD1 LEXXY PASS1B1 01E1 PASS1C PASS1D LEXPROC PASS1E DIG 01E REF PASS1F AFT MNEMDN PASS1G TROUT1G DISCID PASS1H GDTDGEN GENPLIM PRFOPS TDLIMB GENLOD GENSTO PASS2 CHECK GENARTH GENMOVE GENIF LIT02 GENDISP SUBSCR GREPORT

Parameter	Released Default Value	Significance
IP.TYPE	6600	Determines the type of central processor to be used by the system for generation of optimal code. Acceptable values are 6400 (CDC CYBER Model 72) or 6600 (CDC CYBER Model 74) The following common product routines reference IP.TYPE. COBOL 4.0: DDSUBMV DDOPWA CCCOBIO CDSBLIT DDUPCNT DLADVAN DDSUBSC DDSBSC2 DDSBSC6 CDSBSC7 DDDSPLY DDCADD DDNSTAN DDTRUBL DDDVBD CBN1SA DDBN DBN6SA DBNBSS BN1DSA DBN1DS BN6DSA DBN6DS DB1DDA DBN1DD DB6DDA DBN6DD CBN1SB BN1SBA DDEXAMO DDBDDDM DDSDM CONV1 CONTRDL SAVEREG SNAP SCAN2 ITEMCOP SAD LEXDATA PASS1B 01B DDNDRDI LEXXY PASS1B1 01B1 PASS1C PASS1D LEXPROC PASS1E DIG 01E REF PASS1F ART MNEMDN PASS1G TRDUT1G DISDIC PASS1H GDTDGEN GENPLIM PRFOPS TDLIMB GENLOD GENSTO PASS2 DHECK GENARTH GENMOVE GENIF LIT02 GENDISP SUBSCR GREPORT
*OS.NAME	KRONOS	The common product routine that references OS.NAME is FTNXAS$ from the FORTRAN Extended 4.0 compiler.
*OS.VER	2.1	The common product routine that references OS.VER is FTNXAS$ from the FORTRAN Extended 4.0 compiler.

1.7.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

SCP1

```
SCP1
SCP1,CM55000,P30,T1000.
*ACCOUNT CARD
*THIS JOB CREATES NEW PROGRAM LIBRARIES
*AND BINARIES OF SCOPE 3.4 SYSTEMS TEXTS
*AND ASSORTED LIBRARY ROUTINES ON KPL4.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=SCOPE3P4TEXTS*2P1,MT,D=HY,F=SI)
UPDATE,F,N,W,R,X.
SKIPF,OLDPL.
UPDATE,F,N=PL1B,W,R=N,C=0.
UPDATE,F,P=PL1B,R=P,X,L=0.
UNLOAD,OLDPL.
REWIND,COMPILE.
RETURN,OLDPL.
SKIPEI,NEWPL.
COMPASS,I,S=0,L=0.
GTR(LGO,IP)OVL/IPTEXT
COPYBF,PL1B,NEWPL.
GTR(LGO,CPU)OVL/CPUTEXT
COPYBF,LGO,NEWPL.
BKSP,NEWPL.
COMPASS,I,S=0,B=NEWPL,L=0.
COMPASS,I,G=IP,G=CPU,B=NEWPL,L=0.
WRITEF,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL4,W,FI=SCOPE3P4TEXTS*2P1,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL4,V.
*WEOR
*/          PLACE *SCOPE 3.4 PL1A* MODSET HERE.
*WEOR
*/          PLACE *SCOPE 3.4 PL1B* MODSET HERE.
*WEOR
*IDENT     KRONOS
*D,COMCSYS.135,COMCSYS.146
            BX6     X6+X1
            SA6     MSGA
            MX1     0
            AX6     18
            SX6     X6+
            ZR      X6,MSG2
            SX1     3
            AX6     1
            ZR      X6,MSG2
            AX1     1
 MSG2       BX6     X1
```

```
X6    X1
          SA1     MSGA
          SA6     A1
          MX6     42
          BX6     -X6*X1
          SA1     A6
          LX6     -18
          BX1     X1+X6
          LX1     37
          EQ      MSG1
*I,SYSEQ.24
          ENTRY   CIO=
*I,SYSEQ.27
*CALL     COMCCIO
OMCCIO
*WEOF
```

SCP 2

```
SCP2
SCP2,CM45000,P30,T1000.
*ACCOUNT CARD
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL4,R,FI=SCOPE3P4TEXTS*2P1,MT,D=HY,F=SI)
SKIPF,KPL4,2.
COPYBF,KPL4,BIN.
RETURN,KPL4.
GTR(BIN,TEXTS)OVL/*
GTR(BIN,LIB)REL/*
CATALOG,TEXTS,R.
COMMON,ZZZZLDF,ZZZPSBF.
COPYBF,TEXTS,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSIO
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R3=1)
GTR(SYSTEM,OLD)ULIB/SYSIO
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=SYSIO,NX=1.
CATALOG,SYSIO,R,U.
LIBEDIT,P=ZZZPSBF,B=SYSIO,C,L=0.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
IF(R3≠0)COPYBR,,ZZZZLDF.
*WEOR
*BEFORE   *,REL/*
*WEOR
*BEFORE   *,ULIB/SYSIO
*WEOR
*ADD      LIB15,OVL/CPCTEXT-PFMTEXT
*WEOR
*ADD      LIB21,ULIB/SYSIO
*WEOF
```

1.8 MAINTENANCE TOOLS

1.8.1 RELEASE DESCRIPTION

The maintenance tools include the Time-Sharing Stimulator (STIMULA and 1TS), the dayfile sort program (DFSORT), the FORTRAN Translator (FTNTRAN), the P register analyzer (PSAMP), and the object libraries for COBOL 3.0, FORTRAN Extended 3.0, and Sort/Merge 3.0.

The procedure to use the Time-Sharing Stimulator is in part IV, section 5.

DFSORT is used to sort the dayfile for the purpose of running accounting programs that expect DAYFILE to be sorted by specific keys.

FTNTRAN translates or converts source programs written in G.E. FORTRAN to source programs acceptable to Time-Sharing FORTRAN.

PSAMP analyzes the P register.

The object libraries allow relocatable binary code created under KRONOS 2.0 to satisfy external symbols from the version 3.0 libraries. These libraries do not use Record Manager for input/output; they retain calls to CIO. These routines are only included to allow the use of 2.0 binary decks during the 2.0 to 2.1 transition phase.

Use of the version 3.0 object libraries under KRONOS 2.1 requires an LDSET (LIB=SYSMISC/SYSIO) control card before the job's EXECUTE control card.

HARDWARE REQUIREMENTS

Maintenance tools can be maintained on the same minimum hardware configuration as KRONOS 2.1.

CORRECTIONS

The version 3.0 object libraries include all eligible PSR corrective code published through PSR Summary 348.

DEFICIENCIES

None.

1.8.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update the maintenance tools information is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for the maintenance tools, the following materials are necessary.

KPL1 contains the KRONOS 2.1 system source code; it is required for job MTN1 only.

KPL2 contains the jobs to modify, update, and install; the jobs required for the maintenance tools are MTN1, MTN2, F3L1, F3L2, C3L1, C3L2, S3L1, and S3L2.

MTN1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code for STIMULA, 1TS, DFSORT, and FTNTRAN.
MTN2	Use to collect the STIMULA, 1TS, DFSORT, FTNTRAN, and PSAMP binary code and generate directive files for later use as input to the procedure file GENSYS.
F3L1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code for FORTRAN Extended 3.0 object library. This job must be run on a KRONOS 2.0 system with FORTRAN Extended 3.0.
F3L2	Use to collect the FORTRAN Extended 3.0 object library binary code and generate directive files for later use as input to the procedure file GENSYS.
C3L1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code for COBOL 3.0 object library.
C3L2	Use to collect the COBOL 3.0 object library binary code and generate directive files for later use as input to the procedure file GENSYS.
S3L1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code for Sort/Merge 3.0 object library.
S3L2	Use to collect the Sort/Merge 3.0 object library binary code and generate directive files for later use as input to the procedure file GENSYS.

KPL3 contains the binary and source code for STIMULA, 1TS, DFSORT, FTNTRAN, PSAMP, FORTRAN Extended 3.0 object library, COBOL 3.0 object library, and Sort/Merge 3.0 object library.

The tapes are described in detail in part I, sections 2.1.1 and 2.1.5.

1.8.3 INSTALLATION PARAMETERS

None.

1.8.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

MTN1

```
MTN1
MTN1,T1000,CM64000.
*ACCOUNT CARD.
COMMENT.  THIS JOB MODIFYS AND CREATES THE BINARIES OF THE
COMMENT.  FIVE MAINTENANCE PROGRAMS -- 1TS, STIMULA, FTNTRAN,
COMMENT.  DFSORT, AND PSAMP.
COMMENT.  THE NEW KPL3 WILL CONTAIN 8 FILES.
COMMENT.  FILES 1 AND 2 --- PL AND BINARIES FOR MAINTENANCE TOOLS.
COMMENT.  FILES 3 AND 4 --- V3.0 FTN PL AND BINARIES FOR OBJECT LIBRARY.
COMMENT.  FILES 5 AND 6 --- V3.0 COBOL PL AND BINARIES FOR OBJECT LIBARY
COMMENT.  FILES 7 AND 8 --- V3.0 SORT PL AND BINARY FOR OBJECT LIBRARY.
COMMENT.  THE FIRST FILE OF THE NEW KPL3 WILL BE THE NEWPL
COMMENT.  OF THE FIVE MAINTENANCE TOOLS PROGRAMS ONLY.
COMMENT.  THE SECOND FILE WILL BE THE ABSOLUTE BINARIES OF
COMMENT.  THE FIVE MAINTENANCE TOOLS PROGRAMS ONLY.
COMMENT.  FILES 3 - 8 WILL BE COPIED FROM THE OLD KPL3.
COMMENT.
REQUEST(OLDPL,LB=KU,F=X,D=HY)
REWIND,OLDPL.
COPYBF,OLDPL,MTNPL.
SKIPF,OLDPL.
COPYBF,OLDPL,NKPL3,6.
UNLOAD,OLDPL.
RETURN,OLDPL.
*GET(MOD=MTNMOD)
COMMON,OPL.
MODIFY,Z,N,LO=E./*OPLFILE MTNPL/*EDIT 1TS.PSAMP
COMPASS,I,L=0.
RUN23,S,,,COMPILE,,BIN.
RETURN,OUTPUT.
LINK,F=BIN,B.
REWIND,LGOB.
COPYBF,LGOB,LGO.
REWIND,LGO,NPL,NKPL3.
REQUEST(KPL3,LB=KU,F=X,D=HY)
REWIND,KPL3.
COPYBF,NPL,KPL3.
COPYBF,LGO,KPL3.
COPYBF,NKPL3,KPL3,6.
REWIND,KPL3,NKPL3,NPL,LGO.
VERIFY,NPL,KPL3.
VERIFY,LGO,KPL3.
VERIFY,NKPL3,KPL3,N=6.
CATALOG,KPL3,R,N=0.
UNLOAD,KPL3.
*WEOR
*READ MOD,*
*WEOF
```

MTN2

```
MTN2
MTN2,T1000,CM45000.
*ACCOUNT,CARD.
COMMENT.  THIS JOB ADDS THE BINARIES OF THE FIVE MAINTENANCE TOOLS
COMMENT.  PROGRAMS -(1TS, STIMULA, FTNTRAN, DFSORT AND PSAMP) TO
COMMENT.  THE SYSTEM COMMON FILE ZZZPSBF FROM THE LATEST
COMMENT.  KPL3 TAPE.  EITHER THE RELEASED VERSION OR THE
COMMENT.  LATEST VERSION CREATED BY JOB MTN1 MAY BE USED.
COMMENT.  IT ALSO ADDS THE NECESSARY DIRECTIVES TO
COMMENT.  TO COMMON FILE ZZZZLDF FOR GENERARING A NEW SYSTEM DEADSTART.
REQUEST(KPL3,LB=KU,F=X,D=HY)
SKIPF,KPL3.
COPYBF,KPL3,MAINT.
REWIND,MAINT.
UNLOAD,KPL3.
RETURN,KPL3.
COMMON,ZZZPSBF,ZZZZLDF.
COPYBF,MAINT,ZZZPSBF.
CATALOG,MAINT,R.
BKSP,ZZZPSBF.
COPYBR,,ZZZZLDF.
*WEOR
*ADD       LIB10,ABS/STIMULA,PP/1TS
*ADD       LIB18,OVL/DFSORT,FTNTRAN,PSAMP
*WEOF
```

F3L1

```
F3L1
F3L1,CM60000,T1000.
*ACCOUNT CARD.
COMMENT. T H I S  J O B  C A N  O N L Y  R U N  W I T H  F T N  V 3 . 0
COMMENT. A N D  W I L L  P R O D U C E  I N C O R R E C T
COMMENT. R E S U L T S  I F  R U N  W I T H  F T N  V  4 . 0 .
COMMENT. THIS JOB UPDATES AND ASSEMBLES THE FTN EXTENDED V3.0 OBJECT
COMMENT. LIBRARY ROUTINES AND CREATES A NEW KPL3.
COMMENT. THE NEW KPL3 WILL CONTAIN 8 FILES.
COMMENT. FILES 1 AND 2 --- PL AND BINARIES FOR THE MAINTENANCE PROGRAMS
COMMENT.                   -lTS, STIMULA, FTNTRAN, DFSORT, AND PSAMP.
COMMENT. FILES 3 AND 4 --- V3.0 FTN PL AND BINARIES FOR OBJECT LIBRARY.
COMMENT. FILES 5 AND 6 --- V3.0 COBOL PL AND BINARIES FOR OBJECT LIB.
COMMENT. FILES 7 AND 8 --- V3.0 SORT PL AND BINARY FOR OBJECT LIBRARY.
REQUEST(OLDPL)
COPYBF,OLDPL,NKPL3,2.
UPDATE,F,W,N=NKPL3,R=C.
SKIPF,OLDPL,2.
FTN(SYSEDIT=IDENT,I=COMPILE,S=IPTEXT,L=0)
REWIND,LGO.
WRITEF,NKPL3.
COPYBF,LGO,NKPL3.
COPYBF,OLDPL,NKPL3,4.
UNLOAD,OLDPL.
RETURN,OLDPL.
REQUEST(KPL3)
REWIND,NKPL3.
COPYBF,NKPL3,KPL3,8.
CATALOG,KPL3,R,N=8.
UNLOAD,KPL3.
*WEOR
*/        PLACE * FTN V3.0 LIBARY* MODSET HERE.
*WEOF
```

```
F3L2
F3L2,CM45000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB ADDS THE FTN V3.0 OBJECT LIBRARY TO THE SYSTEM
COMMENT. COMMON FILE ZZZPSBF FROM THE KPL3 RELEASE TAPE.
COMMENT. EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT. JOB F3L1 MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT. TO COMMON FILE ZZZZLDF FOR GENERATING A NEW SYSTEM DEADSTART.
REQUEST(KPL3,LB=KU,F=X,D=HY)
SKIPF,KPL3,3.
COPYBF,KPL3,LIB.
UNLOAD,KPL3.
RETURN,KPL3.
COMMON,ZZZPSBF,ZZZZLDF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSMISC
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R1=1)
GTR(SYSTEM,OLD)ULIB/SYSMISC
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=SYSMISC.
CATALOG,SYSMISC,R,U.
RETURN,NEW.
LIBEDIT,P=ZZZPSBF,B=SYSMISC,L=0.
RELEASE,ZZZPSBF.
RETURN,ZZZPSBF.
RENAME,ZZZPSBF=NEW.
COMMON,ZZZPSBF.
SKIPEI,ZZZPSBF.
COMMON,ZZZZLDF.
IF(R1=1)COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/SYSMISC
*WEOR
*ADD       LIB21,ULIB/SYSMISC
*WEOF
```

C3L1

```
C3L1
C3L1,CM60000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB UPDATES AND ASSEMBLES THE COBOL V3.0 OBJECT
COMMENT. LIBRARY ROUTINES AND CREATES A NEW KPL3.
COMMENT. THE NEW KPL3 WILL CONTAIN 8 FILES.
COMMENT. FILES 1 AND 2 --- PL AND BINARIES FOR THE MAINTENANCE PROGRAMS
COMMENT.                   -1TS, STIMULA, FTNTRAN, DFSORT, AND PSAMP.
COMMENT. FILES 3 AND 4 --- V3.0 FTN PL AND BINARIES FOR OBJECT LIBRARY.
COMMENT. FILES 5 AND 6 --- V3.0 COBOL PL AND BINARIES FOR OBJECT LIB.
COMMENT. FILES 7 AND 8 --- V3.0 SORT PL AND BINARY FOR OBJECT LIBRARY.
REQUEST(OLDPL)
COPYBF,OLDPL,NKPL3,4.
UPDATE,F,W,N=NKPL3,R=C.
SKIPF,OLDPL,2.
COMPASS,I,S=CPCTEXT,S=IPTEXT,L=0.
REWIND,LGO.
WRITEF,NKPL3.
COPYBF,LGO,NKPL3.
COPYBF,OLDPL,NKPL3,2.
UNLOAD,OLDPL.
RETURN,OLDPL.
REQUEST(KPL3)
REWIND,NKPL3.
COPYBF,NKPL3,KPL3,8.
CATALOG,KPL3,R,N=8.
UNLOAD,KPL3.
*WEOR
*/        PLACE *COBOL V3.0 LIBRARY* MODSET HERE.
*WEOF
```

C3L2

```
C3L2
C3L2,CM45000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB ADDS THE COBOL V3.0 OBJECT LIBRARY TO THE SYSTEM
COMMENT. COMMON FILE ZZZPSBF FROM THE KPL3 RELEASE TAPE.
COMMENT. EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT. JOB C3L1 MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT. TO COMMON FILE ZZZZLDF.
REQUEST(KPL3,LB=KU,F=X,D=HY)
SKIPF,KPL3,5.
COPYBF,KPL3,LIB.
UNLOAD,KPL3.
RETURN,KPL3.
COMMON,ZZZPSBF,ZZZZLDF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSMISC
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R1=1)
GTR(SYSTEM,OLD)ULIB/SYSMISC
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=SYSMISC.
CATALOG,SYSMISC,R,U.
RETURN,NEW.
LIBEDIT,P=ZZZPSBF,B=SYSMISC,L=0.
RELEASE,ZZZPSBF.
RETURN,ZZZPSBF.
RENAME,ZZZPSBF=NEW.
COMMON,ZZZPSBF.
SKIPEI,ZZZPSBF.
IF(R1=1)COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/SYSMISC
*WEOR
*ADD       LIB21,ULIB/SYSMISC
*WEOF
```

S3L1

```
S3L1
S3L1,CM60000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB UPDATES AND ASSEMBLES THE SORT/MERGE V3.0 OBJECT
COMMENT. LIBRARY ROUTINES AND CREATES A NEW KPL3.
COMMENT. THE NEW KPL3 WILL CONTAIN 8 FILES.
COMMENT. FILES 1 AND 2 --- PL AND BINARIES FOR THE MAINTENANCE PROGRAMS
COMMENT.                   -1TS, STIMULA, FTNTRAN, DFSORT, AND PSAMP.
COMMENT. FILES 3 AND 4 --- V3.0 FTN PL AND BINARIES FOR OBJECT LIBRARY.
COMMENT. FILES 5 AND 6 --- V3.0 COBOL PL AND BINARIES FOR OBJECT LIB.
COMMENT. FILES 7 AND 8 --- V3.0 SORT PL AND BINARY FOR OBJECT LIBRARY.
REQUEST(OLDPL)
COPYBF,OLDPL,NKPL3,6.
UPDATE,F,W,N=NKPL3,R=C.
SKIPF,OLDPL,2.
COMPASS,I,S=CPCTEXT,S=IPTEXT,L=0.
REWIND,LGO.
WRITEF,NKPL3.
COPYBF,LGO,NKPL3.
UNLOAD,OLDPL.
RETURN,OLDPL.
REQUEST(KPL3)
REWIND,NKPL3.
COPYBF,NKPL3,KPL3,8.
CATALOG,KPL3,R,N=8.
UNLOAD,KPL3.
*WEOR
*/        PLACE *SORT V3.0 LIBRARY* MODSET HERE.
*WEOF
```

S3L2

```
S3L2
S3L2,CM45000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB ADDS THE SORT V3.0 OBJECT LIBRAY TO THE SYSTEM
COMMENT. COMMON FILE ZZZPSBF FROM THE KPL3 RELEASE TAPE.
COMMENT. EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT. JOB S3L1 MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT. TO COMMON FILE ZZZZLDF.
REQUEST(KPL3,LB=KU,F=X,D=HY)
SKIPF,KPL3,7.
COPYBF,KPL3,LIB.
UNLOAD,KPL3.
RETURN,KPL3.
COMMON,ZZZZLDF,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSMISC
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R1=1)
GTR(SYSTEM,OLD)ULIB/SYSMISC
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=SYSMISC.
CATALOG,SYSMISC,R,U.
RETURN,NEW.
LIBEDIT,P=ZZZPSBF,B=SYSMISC,L=0.
RELEASE,ZZZPSBF.
RETURN,ZZZPSBF.
RENAME,ZZZPSBF=NEW.
COMMON,ZZZPSBF.
SKIPEI,ZZZPSBF.
IF(R1=1)COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/SYSMISC
*WEOR
*ADD       LIB21,ULIB/SYSMISC
*WEOF
```

2.1 RELEASE DESCRIPTION

2.1.1 HARDWARE REQUIREMENTS

ALGOL 3.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length to run ALGOL 3.0 is $27,000_8$.

2.1.2 CORRECTIONS

ALGOL 3.0 includes all eligible PSR corrective code published through PSR Summary 348.

2.1.3 DEFICIENCIES

The KRONOS control card REDUCE cannot be used when ALGOL programs are executed because they use the space following the program as the stack area for all variables and for input-output buffers.

Segment mode loading (ALGOL control card options S, U, R, and G) is deactivated; attempts to use these options result in job termination.

2.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update (ALGOL 3.0) is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape).

To use these procedures to install, modify, and/or update ALGOL 3.0, the following release materials are necessary.

KPL2 contains the job to modify, update, install, and verify installation; the jobs required for ALGOL 3.0 are ALG1, ALG2, and ALG3.

ALG1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
ALG2	Use to collect the ALGOL 3.0 binary code and generate directive files for later use as input to the procedure file GENSYS.
ALG3	Use to verify that the product is correctly installed.

KPL8 contains the ALGOL 3.0 binary code.

PL18 contains the ALGOL 3.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.2.

2.3 INSTALLATION PARAMETERS

Installation options are available in the following areas.

Default compiler options

Default execution-time options

Parameter	Released Default Value	Significance
ALGOL	L,X,F	The default compiler options are handled by the 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, modify the macro parameters as follows: *DELETE,V3CCARD.115 ALGOL default options *COMPILE,ALGOL,ALGO
OPTIONS	S=0,D=0,C=61,E=V	The default execution time options are handled by the macro OPTIONS. The parameters are execution time options 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=V To change these defaults, modify the parameters as follows: *DELETE,V3DEFB0.156 OPTIONS default options *COMPILE,ALGLB00

ALGOL 3.0 routines that reference SCOPE 3.4 COMDECK IPARAMS are listed in part III, section 1.7.3.

2.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

2.4.1 ALG1

```
ALG1
ALG1,CM56000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF ALGOL 3.0 ON KPL8.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=ALGOL3P0*3P4,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
RETURN,OLDPL.
COMPASS,I,S=CPCTEXT,S=IPTEXT,L=0.
COMPASS,I,S=SCPTEXT,S=CPCTEXT,S=IPTEXT,B=LIB,L=0.
UPDATE,Q,P=NEWPL,L=0.
MAP.
SKIPEI,NEWPL.
COMPASS,I,S=0,B=NEWPL,L=0.
LINK,F,B=NEWPL.
SKIPEI,NEWPL.
REWIND,LIB,LGO.
WRITEF,NEWPL.
COPYBF,LIB,NEWPL.
COPYBF,LGO,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL8,W,FI=ALGOL3P0*3P4,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL8,V.
*WEOR
*/          PLACE *ALGOL* MODSET HERE.
*WEOR
*IDENT      KALG
*B          AL30053.1
            IDENT  ALGTEXT
            STEXT
*D          ALGSYS2.1,ALGSYS2.3
*C          ALGTEXT
*WEOF
```

2.4.2 ALG2

```
ALG2
ALG2,CM45000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL8,R,FI=ALGOL3P0*3P4,MT,D=HY,F=SI)
SKIPF,KPL8.
COPYBF,KPL8,ALGOL.
COPYBF,KPL8,LIB.
UNLOAD,KPL8.
RETURN,KPL8.
CATALOG,ALGOL,R.
COMMON,ZZZZLDF,ZZZPSBF.
COPYBF,ALGOL,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSMISC
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R3=1)
GTR(SYSTEM,OLD)ULIB/SYSMISC
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=SYSMISC.
CATALOG,SYSMISC,R,U.
LIBEDIT,P=ZZZPSBF,B=SYSMISC,C,L=0.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
IF(R3≠0)COPYBR,,ZZZZLDF.
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/SYSMISC
*WEOR
*ADD       LIB15,OVL/ALGTEXT
*ADD       LIB24,OVL/ALGOL-ALG5
*WEOR
*ADD       LIB21,ULIB/SYSMISC
*WEOF
```

2.4.3 ALG3

```
ALG3
ALG3,CM56000,P30,T100.
*ACCOUNT CARD.
ALGOL(L,X)
LGO.
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
VERIFY
≠BEGIN≠
≠PROCEDURE≠ TELLEM(STRING).; ≠STRING≠ STRING.;
      OUTPUT(61,≠(≠50S≠)≠,STRING).;
TELLEM(≠(≠ALGOL IS BEST≠)≠).;
≠END≠
          ≠EOP≠
*WEOR
CHANNEL,END
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.32.02.ALG3,CM56000,P30,T100.
00.32.02.ACCOUNT,USER1.
00.32.03.*ACCOUNT CARD.
00.32.03.ALGOL(L,X)
00.32.05.
00.32.05.LGO.
00.32.07.*END OF JOB.
```

3.1 RELEASE DESCRIPTION

APL 1.0 consists of three modules: APLSYS, APLB, and APLT. APLSYS is the overlay loader and is resident in the running system. APLB and APLT are overlay files used to process batch and terminal input; they are direct access permanent files accessed under user number LIBRARY.

3.1.1 HARDWARE REQUIREMENTS

APL 1.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length requirement to run APL 1.0 is $20,000_8$.

3.1.2 CORRECTIONS

APL 1.0 is a new product; therefore, there are no corrections.

3.1.3 DEFICIENCIES

None.

3.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update APL 1.0 is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures the following materials are necessary.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for APL 1.0 are APL1, APL2, and APL3.

APL1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
APL2	Use to collect the APL binary code and generate directive files for later use as input to the procedure file GENSYS.
APL3	Use to verify that the product is correctly installed.

KPL9 contains the APL 1.0 binary and source code.

These materials are described in detail in part I, sections 2.1.1 and 2.3.

3.3 INSTALLATION PARAMETERS

None.

3.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

3.4.1 APL1

```
APL1
APL1,CM54000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF APL 1.0 ON KPL9.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=APL1P0*2P1,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
RETURN,OLDPL.
COMPASS,I,S=0,B=APLTEXT,L=0.
SKIPEI,NEWPL.
COMPASS,I,G=APLTEXT,B=NEWPL,L=0.
SKIPR,COMPILE.
WRITEF,NEWPL.
COMPASS,I,G=APLTEXT,B=OLD,L=0.
LIBEDIT,B=0,L=0.
MAP.
LINK,F=NEW,B=NEWPL.
SKIPEI,NEWPL.
WRITEF,NEWPL.
LIBEDIT,B=0,L=0.
LINK,F=NEW,B=NEWPL.
SKIPEI,NEWPL.
REWIND,OLD.
WRITEF,NEWPL.
COPYBF,OLD,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL9,W,FI=APL1P0*2P1,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL9,V.
*WEOR
*/          PLACE *APL* MODSET HERE.
*WEOR
*D          REL/BAT
*WEOR
*D          REL/TTY
*WEOF
```

3.4.2 APL2

```
APL2
APL2,CM15000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL9,R,FI=APL1P0*2P1,MT,D=HY,F=SI)
SKIPF,KPL9.
COPYBF,KPL9,APL.
COPYBF,KPL9,ZZZADAF,2.
UNLOAD,KPL9.
RETURN,KPL9.
COMMON,ZZZZCCF,ZZZZLDF,ZZZPSBF.
COPYBR,,ZZZZCCF.
COPYBR,,ZZZZLDF.
COMMON,ZZZADAF.
CATALOG,APL,R.
CATALOG,ZZZADAF,R,N=2.
COPYBF,APL,ZZZPSBF.
BKSP,ZZZPSBF.
*WEOR
COMMON,ZZZADAF.
SUI,377776.
PURGE,APLB,APLT/NA.
DEFINE,APLT,APLB/M=R,CT=S.
REWIND,ZZZADAF.
COPYBF,ZZZADAF,APLT.
COPYBF,ZZZADAF,APLB.
RELEASE,ZZZADAF.
*WEOR
*ADD      LIB22,ABS/APLSYS
*WEOF
```

3.4.3 APL3

```
APL3
APL3.
*ACCOUNT CARD.
APL.
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
)LOAD EQ
$LP TRIG
$QD $IS C $IS .1 $ML $NG21+$I041
$LP
$LP $NG7  ARCTANH  DOMAIN IS  1$GT$MDB
$TP2 20$RO B,R$IS $NG7$CIB$IS(1$GT$MDC)/C
$LP
$LP       ARCTANH(-Z)=-ARCTANH(Z)
(L$IS$NG7$CI-B)=R$IS -$NG7$CIB
$TP3 20$ROB,L,R
$LP
$LP $NG6  ARCCOSH  DOMAIN IS  1$GE$MDB
$LP $NG6  ARCCOSH  DOMAIN IS  1$GE$MDB
$TP 2 21 $RO B,R $IS $NG6$CI B $IS (1$GE$MDC)/C
```

```
$LP
$LP        ARCCOSH(-Z) = ARCCOSH(Z)
(L $IS $NG6$CI-B)=R $IS $NG6$CIB
$TP 3 21 $RO B,L,R
$LP
$LP  ARCSINH  $NG5
$TP 2 41 $RO B,R $IS $NG5$CI B $IS C
$LP
$LP  ARCSINH(-Z)= -ARCSINH(Z)
(L $IS $NG5$CI-B) =  R $IS-$NG5$CI B
$TP 3 41 $RO B,L,R
$LP
$LP  $NG3 ARCTAN(-Z) = -ARCTAN(Z)
$LP
(L $IS $NG3$CI -B) = R $IS -$NG3$CI B $IS C
$TP 3 41 $RO  B,L,R
$LP
$LP  $NG2 ARCCOS(-Z)= PI-ARCCOS(Z)  DOMAIN IS 1$GE$MD B
(L $IS $NG2$CI-B)=R $IS ($CI1)-$NG2$CI B $IS (1$GE$MDC)/C
$TP 3 21 $RO B,L,R
$LP
$LP  $NG1 ARCSIN(-Z)= -ARCSIN(Z)  DOMAIN IS 1$GE$MDB
(L $IS $NG1$CI -B) = R $IS -$NG1$CI B $IS (1$GE$MDC)/C
$TP 3 21 $RO B,L,R
$LP  1  SIN(-Z) = -SIN(Z)
(L $IS 1$CI -B) = R $IS -1$CI B $IS C
$TP 3 41 $RO B,L,R
$LP
$LP  2  COS(-Z)= COS(Z)
(L $IS 2$CI-B) = R $IS 2$CI B $IS C
$TP 3 41 $RO B,L,R
$LP
$LP  3  TAN(-Z) = -TAN(Z)
(L $IS 3$CI -B) = R $IS 3$CI B $IS C
$LP
$LP  5  SINH(-Z)= -SINH(Z)
(L $IS 5$CI-B) = R $IS-5$CI B $IS C
$TP 3 41 $RO B,L,R
$LP  6  COSH(-Z)= COSH(Z)
(L $IS 6$CI -B) = R $IS 6$CI B $IS C
$LP
$LP  7  TANH(-Z) = -TANH(Z)
(L $IS 7$CI -B) = R $IS - 7$CI B $IS C
)SYSTEM
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.26.29.APL3.
00.26.29.ACCOUNT,USER1.
00.26.29.*ACCOUNT CARD.
00.26.30.APL.
00.26.33.*END OF JOB.
```

Available with a later release.

5.1 RELEASE DESCRIPTION

5.1.1 HARDWARE REQUIREMENTS

BASIC 2.1 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length required to run BASIC 2.1 is $30,000_8$.

5.1.2 CORRECTIONS

BASIC 2.1 includes all eligible PSR corrective code for BASIC 2.0 published through KRONOS release level 12.

5.1.3 DEFICIENCIES

None.

5.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update BASIC 2.1 is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for BASIC 2.1, the following materials are necessary.

KPL1 contains the KRONOS 2.1 source code.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for BASIC 2.1 are BAS1, BAS2, and BAS3.

BAS1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
BAS2	Use to collect the BASIC binary code and generate directive files for later use as input to the procedure file GENSYS.
BAS3	Use to verify that the product is correctly installed.

KPL11 contains the BASIC 2.1 binary and source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.5.

5.3 INSTALLATION PARAMETERS

The default base for arrays is set to 1. It can be changed to 0 with the following modification set.

```
*IDENT,BSDFLT
*/CHANGE ARRAY BASE DEFAULT
*DELETE BASEST.2
*BDFLT   DATE 0.0     DEFAULT ARRAY BASE
```

In the released version of BASIC 2.1, the unary minus operation is performed following exponentiation. Thus, -2**2=-4. To perform unary minus first, remove the corrective identifier BA30003 with the *YANK directive.

In the released version of BASIC 2.1, a maximum of 15_{10} user files including INPUT and OUTPUT, are allowed. It can be changed with the following modification set.

```
*IDENT NUMFIL
*/CHANGE DEFAULT MAX. NO. OF FILES
*D,BFILMT.1
NUMFILES  EQU  x       NUMBER OF FILES
```

5.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1. The KRONOS 2.1 system program library must be staged (KPL1).

5.4.1 BAS1

```
BAS1
BAS1,CM55000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF BASIC 2.1 ON KPL11.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=BASIC2P1*2P1,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
SKIPEI,NEWPL.
COMMON,OPL.
RETURN,OLDPL.
COMPASS,I,L=0,X=OPL.
GTR(LGO,LIB)REL/BASOGEN=BASMOPR
LIBGEN,F=LIB,P=BASLIB.
REWIND,BASLIB.
MAP.
LINK,F,B=NEWPL.
SKIPEI,NEWPL.
COPYBF,BASLIB,NEWPL.
REWIND,LIB,LGO.
COPYBF,LIB,NEWPL.
COPYBF,LGO,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL11,W,FI=BASIC2P1*2P1,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL11,V.
*WEOR
*/          PLACE *BASIC* MODSET HERE.
*WEOF
```

5.4.2 BAS2

```
BAS2
BAS2,CM15000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL11,R,FI=BASIC2P1*2P1,MT,D=HY,F=SI)
SKIPF,KPL11.
COPYBF,KPL11,BASIC.
UNLOAD,KPL11.
RETURN,KPL11.
COMMON,ZZZPSBF,ZZZZLDF,ZZZZSDF.
COPYBR,,ZZZZLDF.
COPYBR,,ZZZZSDF.
CATALOG,BASIC,R,U.
COPYBF,BASIC,ZZZPSBF.
BKSP,ZZZPSBF.
*WEOR
*ADD       LIB23,OVL/BASIC-ULIB/BASLIB
*WEOR
*LIBRARY   BASLIB/BASIC
*WEOF
```

5.4.3 BAS3

```
BAS3
BAS3,CM40000,P30,T100.
*ACCOUNT CARD.
*THIS SIMPLE PROGRAM VERIFIES CORRECT
*INSTALLATION OF BASIC 2.1.
BASIC,L.
BASIC,L,B,N.
LGO.
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
20  PRINT=BASIC INSTALLED CORRECTLY=
30  PRINT
40  PRINT=THIS DECK USED COMPILE AND EXECUTE MODE=
100 END
*WEOR
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 2.1=
100 END
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.28.17.BAS3,CM40000,P30,T100.
00.28.17.ACCOUNT,USER1.
00.28.17.*ACCOUNT CARD.
00.28.18.*THIS SIMPLE PROGRAM VERIFIES CORRECT
00.28.18.*INSTALLATION OF BASIC 2.1.
00.28.20.BASIC,L.
00.28.20.INPUT    --006000
00.28.22.BASIC,L,B,N.
00.28.22.INPUT    --006000
00.28.23.LGO.
00.28.24.*END OF JOB.
```

6.1 RELEASE DESCRIPTION

6.1.1 HARDWARE REQUIREMENTS

COBOL 4.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length necessary to run COBOL 4.0 is $52,000_8$.

6.1.2 CORRECTIONS

COBOL 4.0 includes all eligible PSR corrective code published through PSR Summary 348.

6.1.3 DEFICIENCIES

Modification CL40304 from PSR Summary 355 must be available in COBOL 4.0 if it is to operate under KRONOS 2.1. This modification is included in the binary code on KPL12, but it is not in the source code on PL9. Therefore, add this modification the first time that the source code is modified and/or updated.

```
*IDENT    CL40304
*/        DFN    APPLIES TO COBOL 4.0
*/               DO NOT CALL D00 FOR KRONOS
*INSERT FEAT33R.254   AT END OF DDTRUBL
          IFNE   OPSYSV,SCOPE34
          SA4    =6LR NBR
          SB2    4
          LX6    48
          MX7    0
          MX1    57
 CNVLPAA  BSS    0
          LX6    3              CONVERT MESSAGE NUMBER IN X6 TO DISP CODE
          BX2    -X1*X6
          SX2    X2+33B
          LX7    6
          IX7    X7+X2
          SB2    B2-B1
          NZ     B2,CNVLPAA
          IX7    X7+X4          PUT IN MESSAGE PART
          SA7    D.ETD
          SA2    D.ETD+2        GET FIRST PARAMETER
          SA3    =0005555555555555555
          SB3    54
          BX6    X2
          NZ     X2,SHFLP
          SA3    =XD.BLANK
          BX6    X3
          EQ     STX6
```

```
 SHFLP     BSS     0            CHANGE BIN ZERO TO BLANKS
           BX5     -X1*X2
           NZ      X5,DONEXX
           AX2     6
           SB3     B3-6
           EQ      SHFLP
 DONEXX    BSS     0
           AX3     X3,B3
           BX6     X6+X3
 STX6      BSS     0
           SA6     A2
           MESSAGE  ERRMSG,,R
           MX6     0
           SA6     D.ETD+2      CLEAR INSERT
           ELSE
*INSERT FEAT33R.260
           ENDIF
*INSERT FEAT33R.261
           IFNE    OPSYSV,SCOPE34,1
 ERRMSG    DATA    10HCOBOL ERRO
*INSERT FEAT33R.262
           IFNE    OPSYSV,SCOPE34,1
           DATA    10H. PARAM =
           IFEQ    OPSYSV,SCOPE34,1
*C DDTRUBL
*INSERT FEAT33Q.20  CONTROL.1204
           IFEQ    OPSYS,KRONOS,1
 OVLFLG    DATA    1            FORCE SORTL NOT TO BE USED
           IFNE    OPSYS,KRONOS,1
*COMPILE CONTROL
*DELETE ART.1979
           VFD     12/4300B,12/2,36/0
*COMPILE ART
*/    THERE ARE    62 CORRECTION CARDS INCLUDING THIS COMMENT.
```

6.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update COBOL is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for COBOL 4.0, the following materials are necessary.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for COBOL are CBL1, CBL2, and CBL3.

CBL1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
CBL2	Use to collect the COBOL binary code and generate directive files for later use as input to the procedure file GENSYS.
CBL3	Use to verify that the product is correctly installed.

KPL12 contains the COBOL 4.0 binary code.

PL9 contains the COBOL 4.0 source code.

These materials are described in detail in part I, sections 2.1.1 and 2.6.

6.3 INSTALLATION PARAMETERS

The COBOL compiler uses symbol definitions from IPTEXT for IP.CMU, IP.IMUL, and IP.TYPE. Refer to part III, section 1.7.3 for a list of routines that reference these IPARAMS. To override these installation parameter values, make the following changes in the COMDECK ASSEMOP when COBOL is assembled.

Feature	Required Change
Generate code optimized for a 6600	*D ASSEMOP.3, 4
Generate code optimized for a 6400	*D ASSEMOP.3
Generate integer multiply instruction code	*D ASSEMOP.6, 7
Generate noninteger multiply instruction code	*D ASSEMOP.6
Generate CMU instructions	*D ASSEMOP.9, 10
Generate non-CMU instructions	*D ASSEMOP.9

6.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

6.4.1 CBL1

```
CBL1
CBL1,CM60000,P30,T3500.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF COBOL 4.0 ON KPL12.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=COBOL4P0*3P4,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
SKIPEI,NEWPL.
RETURN,OLDPL.
COMPASS,I,S=0,B=CETXT,L=0.
COMPASS,I,S=IOTEXT,S=IPTEXT,G=CETXT,B=LIB,L=0.
COMPASS,I,S=IOTEXT,S=IPTEXT,G=CETXT,B=REL,L=0.
SKIPR,COMPILE.
COMPASS,I,S=CPCTEXT,L=0.
REWIND,CETXT,LIB.
COPYBR,CETXT,NEWPL.
MAP.
LINK,F=REL,P=SYSIO,B=NEWPL.
SKIPEI,NEWPL.
LINK,F,P=SYSIO,B=NEWPL.
SKIPEI,NEWPL.
WRITEF,NEWPL.
COPYBF,LIB,NEWPL.
COPYBF,REL,NEWPL.
COPYBF,LGO,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL12,W,FI=COBOL4P0*3P4,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL12,V.
*WEOR
*/          PLACE *COBOL* MODSET HERE.
*WEOF
```

6.4.2 CBL2

```
CBL2
CBL2,CM45000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL12,R,FI=COBOL4P0*3P4,MT,D=HY,F=SI)
SKIPF,KPL12.
COPYBF,KPL12,COBOL.
COPYBF,KPL12,LIB.
UNLOAD,KPL12.
RETURN,KPL12.
CATALOG,COBOL,R.
COMMON,ZZZZLDF,ZZZPSBF.
COPYBF,COBOL,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/COBOL
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R3=1)
GTR(SYSTEM,OLD)ULIB/COBOL
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=COBLIB,N=COBOL.
CATALOG,COBLIB,R,U.
LIBEDIT,P=ZZZPSBF,B=COBLIB,C,L=0.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
IF(R3≠0)COPYBR,,ZZZZLDF.
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/COBOL
*WEOR
*ADD       LIB15,OVL/COBERTX
*ADD       LIB25,OVL/COBOL-COPYCL
*WEOR
*ADD       LIB25,ULIB/COBOL
*WEOF
```

6.4.3 CBL3

```
CBL3
CBL3,CM60000,P30,T100.
*ACCOUNT CARD.
*THIS SIMPLE PROGRAM VERIFIES CORRECT
*INSTALLATION OF COBOL 4.0.
COBOL(LX)
LGO.
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
000010 IDENTIFICATION DIVISION.
000020 PROGRAM-ID. COBOL-VERIFICATION-PROGRAM.
000030 ENVIRONMENT DIVISION.
000040 CONFIGURATION SECTION.
000050 SOURCE-COMPUTER. 6400.
000060 OBJECT-COMPUTER. 6400.
       SPECIAL-NAMES.
           CONSOLE IS SCOP.
000110 DATA DIVISION.
000900 PROCEDURE DIVISION.
000910 START.
           DISPLAY ≠  COBOL 4.0 EXISTS UNDER KRONOS 2.1  ≠ UPON SCOP.
           STOP RUN.
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.33.15.CBL3,CM60000,P30,T100.
00.33.15.ACCOUNT,USER1.
00.33.15.*ACCOUNT CARD.
00.33.16.*THIS SIMPLE PROGRAM VERIFIES CORRECT
00.33.16.*INSTALLATION OF COBOL 4.0.
00.33.16.COBOL(LX)
00.33.17.COMPILING COBOL-V
00.33.20. 000 E AND 000 T/U  DIAGNOSTICS ISSUED
00.33.20.    0530008 SCM USED
00.33.20.       .223 CP SECONDS COMPILATION TIME
00.33.20.END COBOL
00.33.20.LGO.
00.33.22.  COBOL 4.0 EXISTS UNDER KRONOS 2.1
00.33.22.*END OF JOB.
```

7.1 RELEASE DESCRIPTION

Cyberlink Interchange is a subsystem of the KRONOS 2.1 operating system. Cyberlink adds remote computer capability to KRONOS 2.1 and a link to CDC CYBERNET Data Center services. The CYBERNET computers use the SCOPE 3.4 operating system. Both operating systems run on CDC CYBER 70/Models 72, 73, and 74 computers. The remote link provides flexibility both in workload leveling and sharing of hardware, software, and data base resources.

Cyberlink consists of program modules written in COMPASS. It appears as a remote terminal to MARC IV EXPORT when running at a control point within the KRONOS 2.1 operating system.

KRONOS Cyberlink can simulate up to three remote terminals concurrently. For each terminal (or line) supported, two simultaneous data streams (as well as an operator message data path) are possible between the KRONOS and SCOPE operating systems.

7.1.1 HARDWARE REQUIREMENTS

The minimum configuration for Cyberlink is the same as the minimum configuration for KRONOS 2.1 with the addition of one 6673 or 6674 multiplexer coupled on a dedicated I/O channel. The 6673 multiplexer can support at most two communication lines, whereas the 6674 multiplexer contains hardware capable of supporting up to four such lines. QSE 11241 is required for the 6673 or 6674 multiplexer in order to support voice grade (2-9.6 kilohertz) communications.

KRONOS 2.1 connects to the Data Center services SCOPE system through a communication link that consists of two DATAPHONE 303 data sets and one TELEPAK A communication line or their logical and physical equivalent. Voice grade communications consists of two DATAPHONE 203 data sets and one four-wire communications line for their logical and physical equivalent.

7.1.2 CORRECTIONS

None.

7.1.3 DEFICIENCIES

If Cyberlink is connected to the same remote site on more than one line, the line will not be allowed to login because of current job identification and recovery techniques.

It is not known how three active lines may affect operation because Cyberlink has not been actively tested supporting more than two active lines.

Unless absolutely necessary, it is not suggested that the line driver 1CY be operated in synchronous mode when more than one line is active. All lines must wait for the slowest line to complete every communications cycle. This adversely affects efficient operation, with the result that lines may be unnecessarily shut down.

Synchronous communications simultaneous with Cyberlink rollin/rollout activation is not a supported feature.

When KRONOS 2.1 is operating with more than one VALIDUX file (more than one family of permanent files is being concurrently supported), then Cyberlink is unable to properly distinguish jobs submitted by users from different families having the same user index. Therefore, it is possible for users to gain access to jobs that do not actually belong to them.

It is recommended not to run SCOPE 3.4 dependent jobs through Cyberlink because of problems in correctly recovering the job.

7.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update Cyberlink is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for Cyberlink, the following materials are necessary.

KPL2 contains the jobs to modify and update, install, and verify installation; the jobs required for Cyberlink are CYB1, CYB2, and CYB3.

CYB1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
CYB2	Use to collect the Cyberlink binary code and generate directive files for later use as input to the procedure file GENSYS.
CYB3	Use to verify that the product is correctly installed.

KPL13 contains the Cyberlink binary and source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.7.

7.3 INSTALLATION PARAMETERS

The Cyberlink subsystem is designed to allow variation from installation to installation in order to meet the needs of different installations. This variation is possible by changing Cyberlink installation parameters. All installation parameters are in COMSCYB (the common deck that may be listed with the nonexecutable deck CYBDEF). The parameters are catagorized as follows.

Type of Installation Parameter	Description
1. Installation parameters that must be changed by all installations	Section 7.3.1
2. Installation parameters that will probably need to be changed in order to configure Cyberlink to a particular installation's hardware or system operating environment	Section 7.3.2
3. Installation parameters that affect Cyberlink's external characteristics regarding KRONOS 2.1 (such as timing relays, rollout/rollin characteristics, and B display characteristics)	Section 7.3.3
4. Installation parameters that affect the internal characteristics of Cyberlink regarding the line driver (such as timeout delays and retransmission counts)	Section 7.3.4

Type 3 and 4 installation parameters allow fine tuning of Cyberlink's total operational characteristics and should be changed only by system analysts who are fully aware of the specific ramifications of any given change. The most important type 3 and 4 parameters are listed and discussed in sections 7.3.2 and 7.3.4; all type 1 and 2 parameters are listed and described in sections 7.3.1 and 7.3.2. A listing of Cyberlink installation parameters is in section 7.3.5.

7.3.1 TYPE 1: INSTALLATION PARAMETERS REQUIRING CHANGE

Every installation using Cyberlink is assigned a unique station identification code. This code consists of four alphanumeric characters preceded by a check character that is used during Cyberlink login to validate the station identification code. The three parameters CHECK, REGION, and UNIQUE define the valid station identification code; they are in COMSCYB. The default vales in COMSCYB for these parameters do not allow Cyberlink to be used until they are modified.

Parameter	Released Default Value	Significance
CHECK	1Rc	One right-justified character (c) that is the valid check character for the station identification code
REGION	2Rxx	Two characters (xx) that define the first two characters of the four-character station identification code
UNIQUE	2Ryy	Two characters (yy) that define the last two characters of the four-character station identification code

7.3.2 TYPE 2: INSTALLATION PARAMETERS THAT MAY BE CHANGED

The following parameters are ones that may be changed to properly configure Cyberlink for a specific installation. They are in the order in which they appear in the common deck COMSCYB. This order does not imply any hierarchy of importance or effect. Many of these parameters are micros that are correctly defined by using the following format.

```
parameter    MICRO    1,,*default value string*
```

The asterisks are delimiters for the default value string and must be included in the micro definition. All parameters of this nature are indicated by the word MICRO preceding the default value.

Parameter	Released Default Value	Significance
IP. LINES	MICRO 0H,1H	IP. LINES defines the ports available on each multiplexer as well as the relative speed of each port. H implies high speed; L implies low speed. The numeric digit for each line indicator can have the value 0, 1, 2, or 3; this designates logically one of four ports for the 6674 multiplexer. Values 2 and 3 are illegal as logical line designators for a 6673 multiplexer because the 6673 multiplexer has only two possible ports. Cyberlink is capable of supporting up to three active lines on a multiplexer, so that up to three numeric digit/line speed character designators may be specified in IP. LINES. Even though three lines, at the most, can be supported, these three lines may be any three ports of a 6674 multiplexer. The following example defines port 0 for high speed, port 1 for low speed; it might be used for either a 6673 or 6674 multiplexer. IP. LINES MICRO 1,,*0H, 1L* The following example defines port 0 for low speed, ports 2 and 3 for high speed; it implies the existence of a 6674 multiplexer. IP. LINES MICRO 1,,*0L, 2H, 3H* The following example defines port 2 for high speed; it implies the existence of a 6674 multiplexer because it is the third of four logical ports that is defined, even though only one line is indicated. IP. LINES MICRO 1,,*2H*
IP. DMUX	MICRO 0	When this parameter is defined, it specifies the logical multiplexer number that is assumed during initialization if the operator uses the default initialization procedure.
IP. DPORT	MICRO 0	If IP. DMUX is defined, IP. DPORT defines the default port (0-3) that is used at initialization if the operator uses default initialization; it must be one of the numeric values contained in IP. LINES.

Parameter	Released Default Value	Significance
IP.DFLT	0	If IP.DFLT is nonzero, Cyberlink bypasses operator requests for the active configuration and assumes the values IP.DMUX and IP.DPORT for defining the port or ports to activate. If zero, the default values are used only if the operator enters END in response to the initialization configuration request, thus indicating that the defaults are acceptable.
IP.DDCM	0	If both IP.DFLT and IP.SYNC are nonzero, then IP.DDCM nonzero causes the creation of a central memory buffer area for the residence of the peripheral processor line driver code while the line driver is bouncing. If IP.DDCM is equal to zero, then this central memory buffer is not provided and the line driver must be reloaded from its library residence, whether in central memory or on disk, during each bounce. It is desirable to provide this CM buffer for the line driver if it is necessary for the line driver to bounce, because a degradation in overall performance will occur otherwise.

7.3.3 TYPE 3: INSTALLATION PARAMETERS THAT AFFECT EXTERNAL CYBERLINK CHARACTERISTICS

The type 3 parameters that are listed below are in the order in which they appear in the common deck COMSCYB; no specific relative order is implied.

Parameter	Released Default Value	Significance
IP.RJBS	25D	IP.RJBS defines the maximum number of jobs allowed at any remote site at any one time. This parameter affects the static field length of Cyberlink while running, as well as the job recovery file format.
IP.CLEV	20D	This parameter defines the maximum number of minutes that a lost job is held for resubmission and possible recovery.
IP.LCEV	39D*60D	IP.LCEV defines the maximum number of minutes that a returned job is held in the user access lock queue (that is, file type LCFT) before being evicted. The default value is 39 hours.

Parameter	Released Default Value	Significance
IP.NOACT	1*60D+30D	IP.NOACT defines the number of seconds Cyberlink must remain idle before it is rolled out. If IP.NOACT=0, Cyberlink roll-out is inhibited. The default value is 1.5 minutes.
IP.RWAIT	3*60D	IP.RWAIT defines the number of seconds Cyberlink will remain rolled out when jobs are currently at the remote station. Jobs are prevented from returning while Cyber-link is rolled out. The default value is 3 minutes.
IP.RSTAY	5*60D	IP.RSTAY defines the number of seconds Cyberlink will remain rolled out when no jobs are currently at a remote station. The default value is 5 minutes.
IP.ISTAY	4*60D	IP.ISTAY defines the number of seconds Cyberlink will remain active after login before rollout may be resumed. The de-fault value is 4 minutes.
IP.MHOLD	3	IP.MHOLD defines the maximum number of seconds to allow a line message to flash on the B display before automatically clearing it (AUTOCLEAR function). If IP.MHOLD=0, the AUTOCLEAR function is disabled. The value of IP.MHOLD may be effectively dynami-cally changed by means of a console command during Cyberlink operation. The default value is 3 seconds.
IP.SYNC	0	If IP.SYNC is nonzero, then Cyberlink's line driver (program deck 1CY) is assembled so that all communication lines are syn-chronized with regard to their logical cycli-cal operation. This implies that the basic functional cycle TRANSMIT-RECEIVE-PROCESS must be actually completed by all lines currently active before the next simi-lar cycle may begin for any line. This, in fact, causes all lines to always wait for the the slowest line to complete its basic func-tional cycle before continuing. In most cases, synchronous operation of the line driver is not suggested. The one advantage that synchron-ous operations does allow is that the periphe-ral processor in which 1CY is executing may be released between each cycle for a brief

Parameter	Released Default Value	Significance
		period of time to allow other system routines to execute. However, considerable degradation of throughput on all lines results from the line driver bouncing in this fashion. If IP.SYNC is equal to zero, the line driver is assembled so that all communication lines operate asynchronously. This effectively allows all lines to communicate at maximum speed, because no line need wait on any other as described for synchronous operation. However, the peripheral processor in which 1CY is executing must be dedicated, and hence, is unavailable for any other system task. Cyberlink defaults to asynchronous operation in order to maximize communication effectiveness.

7.3.4 TYPE 4: INSTALLATION PARAMETERS THAT AFFECT INTERNAL CYBERLINK CHARACTERISTICS

The type 4 installation parameters discussed below affect the internal timing of the Cyberlink line driver only. They determine the amount of wait time and corresponding number of retransmission retrys before a communication link is considered inoperable. Conditions that cause a timeout and subsequent shutdown of a given line may arise from many different causes. These range from hardware failures at the local site (for example, in the 6673 or 6674 multiplexer) to transmission errors introduced by the leased communication lines to system failures at a remote installation. Whatever the cause, Cyberlink attempts a graceful disconnection and cleanup in addition to informative messages to the B display and system dayfile. Recovery is generally possible by means of a reactivation of the communication link which has just been broken. All of the following internal timing parameters are reinitialized after any successful communication so that momentary, but recoverable, errors do not cause unnecessary abnormal shutdown at a later time (that is, errors that are not fatal are not allowed to propagate through time).

Parameter	Released Default Value	Significance
TIMLIMIT	10D	TIMLIMIT defines the effective wait time while Cyberlink is expecting to receive from the remote site before communications with that site are considered disrupted. The actual period of time involved depends upon the number of lines being supported by Cyberlink; because each line is serviced in round-robin fashion, more active lines imply a longer wait period. The receive-first-byte code must be entered unsuccessfully 4096 times for each decrement of TIMLIMIT. If the value of TIMLIMIT reaches zero, communications are considered to be disrupted and Cyberlink leaves its receive code (for the line in question) and goes into a transmission cycle in an attempt to recover synchronization with the remote site.

Parameter	Released Default Value	Significance
FRTCONT	2	FRTCONT defines the number of times that retransmission is attempted (following a previous timeout on TIMLIMIT) before communication with a remote site is considered lost.
SEQERCNT	60D	If a sequence error occurs (that is, the sequence bit as sent by the remote site is not as expected), a transmission error is indicated and Cyberlink attempts to recover by retransmitting its previous data. SEQERCNT defines the number of attempted retransmits before communication is considered lost.
ERRLIMIT	20D	ERRLIMIT defines the number of attempted retransmissions following any error other than receive timeout or sequence bit errors before communication with a remote site is considered lost.

7.3.5 INSTALLATION PARAMETER LISTING

```
          INSTALLATION PARAMETERS CONTROL THE FUNCTIONS PERFORMED
          BY CYBERLINK THAT MAY DIFFER BETWEEN INSTALLATIONS TOGETHER
          WITH SPECIFICATIONS RELATING TO THE SITE CONFIGURATION
          THE PARAMETERS ARE NORMALLY RANKED FOR MOST CHANGED TO LEAST
          CHANGED



          THE FOLLOWING VALUES DEFINE THE CYBERLINK LOGIN ID AND
          CHECK DIGITS AS ASSIGNED VIA DATA SERVICES .
          NOTE...THESE VALUES MUST BE OBTAINED FROM DATA SERVICES
                 THE RELEASE VALUES ARE NOT VALID ID AND WILL PROHIBIT
                 CYBERLINK FROM CONNECTING TO A CYBERNET MACHINE


CHECK     EQU    1RC          LOGIN CHECK DIGIT
REGION    EQU    2RXX         LOGIN REGION CODE
UNIQUE    EQU    2RYY         LOGIN UNIQUE STATION IDENTIFIER

          THE FOLLOWING MICRO DEFINES ALL VALID REMOTE STATION ID,S
          ONLY STATIONS WITH THESE ID,S WILL BE ABLE TO CONNECT WITH
          CYBERLINK

LINES     MICRO  1,,$RK66,RC66,NY66,WA66,TC66,PA66,LA66,HO*H$
```

```
          THE FOLLOWING DEFINES THE CONFIGURATION OF PORTS ON THE
          6673/4 MUX TOGETHER WITH THE DEFAULTS (IF ANY) FOR PORT
          CONFIGURATION

          IP.MUXES DEFINES THE LOGICAL MUX NUMBER(S) FOR THE MUX(ES)
                 PRESENT IN THIS INSTALLATION
          IP.LINES DEFINES THE PORTS AVAILABLE AS WELL AS THE SPEED OF
                 EACH (I.E., HIGH SPEED OR LOWER SPEED).  EACH PORT
                 IS DESIGNATED BY ITS LOGICAL NUMBER (0-3) FOLLOWED BY
                 THE CHARACTER -H-, IF HIGH SPEED, OR -L-, IF LOWER
                 SPEED.  THE NUMBER OF PORTS DEFINED AFFECTS THE FIELD
                 LENGTH REQUIRED.
                 NOTE.  CURRENTLY, -1CY- ALLOWS AT MOST THREE LINES
          IP.DMUX-IF DEFINED-AT ALL INDICATES THE MUX NUMBER (CURRENTLY
                 0 ONLY) THAT WILL BECOME THE DEFAULT MUX IF NO OPERATOR
                 CHANGE IS MADE I.E-END-ENTERED FOR CONFIGURATION
                 DISCRIPTION AT INITIALIZATION
          IP.DPORT DEFINES THE PORTS TO BE USED ON MUX IP.DMUX SHOULD
                 THE OPERATOR CHOOSE DEFAULTS AT INITIALIZATION.
                 IP.PORT CAN BE ANY VALUE OR VALUES DEFINED IN IP.LINES
          IP.DFLT-IF DEFINED ≠ 0 WILL BYPASS OPERATOR REQUEST FOR
                 CONFIGURATION AND WILL ASSUME THE DEFAULTS IP.DMUX AND
                 IP.DPORT - IF DEFINED = 0  THE DEFAULTS IP.DMUX AND
                 IP.DPORT ARE USED ONLY IF THE OPERATOR ENTERS THE INPUT
                 -END- TO THE CONFIGURATION REQUEST AT INITIALIZATION
          IP.DDCM DEFINES THE DEFAULT DRIVER RESIDENCE TO BE USED ONLY
                 IF IP.DFLT ≠ 0.  IP.DDCM = 0 INDICATES THAT THE
                 DEFAULT RESIDENCE OF THE LINE DRIVER IS NOT CM BUFFERED
                 IP.DDCM ≠ 0 INDICATES TO CREATE A BUFFER FOR THE
                 LINE DRIVER RESIDENCE
                 NOTE -- THIS PARAMETER ONLY HAS MEANING IF THE DRIVER
                 IS ASSEMBLED IN SYNC MODE AND IP.DFLT ≠ 0

IP.MUXES MICRO   1,,*0*       DEFINE LOGICAL MUX 0 PRESENT

IP.LINES MICRO   1,,*0H,1H*

IP.DMUX  MICRO   1,,*0*       DEFINE DEFAULT TO MUX 0

IP.DPORT MICRO   1,,*0*       DEFINE DEFAULT TO PORT 0

IP.DFLT  EQU     0            ASK OPERATOR FOR CONFIGURATION CHANGES

IP.DDCM  EQU     0            DEFAULT DRIVER RESIDENCE TO NOT CM BUFFERED


          IP.RJBS DEFINE THE MAXIMUM NUMBER OF JOBS ALLOWED AT ANY
                 REMOTE SITE AT ANY ONE TIME - THIS PARAMETER CONTROLS
                 THE SIZE OF THE JOB TABLE AND RECOVERY BLOCK -IF
                 CHANGED THE CYBERLINK FIELDLENGTH WILL ALSO CHANGE
                 AND ANY RECOVERY FILE MUST BE REINITIALIZED
```

```
IP.RJBS  EQU    25D          ALLOW 25 JOBS AT REMOTE STATION

         THE FOLLOWING VALUES SET THE AGE TIMES FOR CYBERLINK FILES
         IP.AGECL DEFINES THE TIME BETWEEN AGEING OF CYBERLINK FILES
                (MINUTES)
         IP.CLEV DEFINES THE NUMBER OF MINUTES A FILE WILL WAIT FOR
                OPERATOR RE-SUBMISSION AFTER A LOST IN CYBERNET IS
                INDICATED TO THE OPERATOR
         IP.LCEV DEFINES THE NUMBER OF MINUTES A FILE RETURNED FROM
                CYBERNET WILL WAIT IN QUEUE BEFORE BEING EVICTED FROM
                THE SYSTEM.  THE USER MUST RETRIEVE THE FILE BEFORE THE
                TIME HAS ELAPSED
         ALL VALUES MUST BE LESS THAN 4096

IP.AGECL EQU    2            AGE EVERY 2 MINUTES

IP.CLEV  EQU    20D          HOLD JOB LOST 20 MINUTES FOR RE-SUBMITS

IP.LCEV  EQU    39D*60D      HOLD USER RETURNED FILES FOR 39 HOURS ONLY


         THE FOLLOWING VALUES SET THE EXISTENCE OF CYBERLINK ROLLOUT
         AND THE TIMES FOR ROLLIN/ROLLOUT
         IP.NOACT IF ≠ 0 DEFINES THAT ROLLOUT EXISTS AND SETS THE
                NUMBER OF SECONDS AFTER ALL ACTIVITY CEASES BEFORE
                ROLLOUT IS TRIGGERED - IF = 0 NO ROLLOUT CODE ASSEMBLES
         IP.RWAIT DEFINES THE NUMBER OF SECONDS CYBERLINK WILL REMAIN
                ROLLED OUT WHEN THERE ARE JOBS AT THE REMOTE STATIONS
         IP.RSTAY DEFINES THE NUMBER OF SECONDS CYBERLINK WILL REMAIN
                ROLLED OUT WHEN NO JOBS ARE AT THE REMOTE STATIONS
         IP.ISTAY DEFINES THE NUMBER OF SECONDS CYBERLINK WILL REMAIN
                ROLLED IN AFTER A LOGIN HAS OCCURED AFTER INITIALIZATIO

IP.NOACT EQU    1*60D+30D    WAIT 1.5 MIN BEFORE ROLLOUT

IP.RWAIT EQU    3*60D        WAIT 3 MIN BEFORE ROLLIN (JOBS AT REMOTE)

IP.RSTAY EQU    5*60D        WAIT 5 MIN BEFORE ROLLIN (NO JOBS AT REM)

IP.ISTAY EQU    4*60D        WAIT 4 MIN BEFORE ROLLOUT (INI LOGIN)


         THE FOLLOWING DEFINES CLOCK VALUES FOR EVENTS
         IP.CLOG DEFINES THE MAX SECONDS TO WAIT FOR A LOGIN OR
                SHUTDOWN BEFORE ASSUMMING A LOGON
         IP.JSTAT DEFINES THE NUMBER OF MINUTES BETWEEN INTERNAL
                JOB STATUS REQUESTS ARE ISSUED TO ASSURE JOB STILL AT
                REMOTE STATION
         IP.BDREF DEFINES NUMBER OF SECONDS BEFORE UPDATING B DISPLAY
         IP.KDREF DEFINES NUMBER OF SECONDS BEFORE UPDATING DYNAMIC
                K DISPLAYS
         IP.FNSRC DEFINES NUMBER OF SECONDS BETWEEN FNT SEARCHES FOR
```

```
          TRANSMIT FILES
        IP.CPRES DEFINES NUMBER OF SECONDS BEFORE UNCONDITIONAL
          RESTART OF CP IS REQUESTED
        IP.MHOLD DEFINES NUMBER OF SECONDS BEFORE AN AUTO ACKNOWLEDGE
          OF NON ERROR MESSAGES WILL BE PERFORMED IF = 0 ALL
          MESSAGES REQUIRE A MANUAL ACKNOWLEDGE

IP.CLOG   EQU   2*60D        WAIT 2 MIN FOR LOGON MESSAGE

IP.JSTAT  EQU   20D          STAT JOBS AT REMOTE EVERY 20 MINUTES

IP.BDREF  EQU   4            REFRESH B DISPLAY EVERY 4 SECONDS

IP.KDREF  EQU   4            REFRESH K DISPLAY EVERY 4 SECONDS

IP.FNSRC  EQU   10D          SEARCH FOR TRANSMIT FILES EVERY 10 SECONDS

IP.CPRES  EQU   4            UNCODITIONAL RESTART OF CP EVERY 4 SECONDS

IP.MHOLD  EQU   3            SET AUTO ACKNOWLEDGE TO EVERY 3 SECONDS


        THE FOLLOWING DEFINES FEATURE PARAMETERS TO ACTIVATE/
          DEACTIVATE CERTAIN FEATURES OR SET INITIAL FEATURES
        IP.TYIN DEFINES THE SUPPORT OF INPUT FILES VIA CYBERLINK
          AND THE FILE TYPE THAT CYBERLINK WILL CONSIDER AS
          AN INPUT FILE - THIS TYPE IS THEN PLACED INTO THE
          KRONOS INPUT QUEUE AND PROCESSED AS A BATCH JOB.
          THE VALUES FOR IP.TYIN ARE-
          0 NO INPUT FILES SUPPORTED
          1 PUNCH  WILL ENTER INPUT
          2 PUNCHB WILL ENTER INPUT
          3 P80    WILL ENTER INPUT
          4 FILMPR WILL ENTER INPUT
          5 FILMPL WILL ENTER INPUT
          6 PLOT   WILL ENTER INPUT
          7 APTPT  WILL ENTER INPUT
        IP.TYPF DEFINES SUPPORT OF RECEIVING PERMANENT FILES
          USER FILES RECEIVED WITH THIS DISPOSITION ARE PLACED AS
          DIRECT ACCESS FILES UNDER THE USERS USER INDEX- IF
          THIS TYPE FILE IS RECEIVED IT WILL ENTER THE INPUT
          QUEUE AS A SYSTEM CLASS JOB AND USEING THE PROGRAM
          -PFLINK-THE FILE WILL BE CREATED OR APPENDED AS A
          DIRECT ACCESS FILE UNDER THE CORRECT USER INDEX- THE
          VALUE OF IP.TYPF CAN BE ANY VALUE WHICH COULD BE USED
          FOR IP.TYIN HOWEVER CANNOT BE THE SAME VALUE USED
          TO DEFINE IP.TYIN EXCEPT 0 IN WHICH CASE THE FEATURE
          IS NOT SUPPORTED- IF IP.TYPF IS DEFINED AS 0 THE
          -ALL- PERMANENT DISPOSITION ACCEPTIABLE ON THE SUBMIT
          CARD -SUBMIT(LFN,H,P)- WILL ALSO NOT BE SUPPORTED
        IP.PSTYP IF = 0 THE INITIAL B DISPLAY WILL BE SET AT LINE
          MODE DISPLAY IF = 1 THE INITIAL B DISPLAY WILL BE SET
          TO LINE ACTIVITY DISPLAY
```

```
          IP.KDSP IF = 0 THE CYBERLINK K DISPLAYS WILL NOT BE SUPPORTED
                  IF ≠ 0 DEFINES THE INITIAL DISPLAY SET AFTER
                  INITIALIZATION THE VALUES ARE
                 1 COMMAND DISPLAY
                 2 DAYFILE PAGE DISPLAY
                 3 LINE FILES DISPLAY
                 4 QUEUE DISPLAY
          IP.CMSG DEFINES THE MESSAGES WHICH WILL BE SENT TO THE
                 DAYFILE FOR AUDIT TRAIL CONTROL
                 0 NO LINE AUDIT MESSAGES
                 1 LINE MESSAGES
                 2 ALL MESSAGES BUT CYBERLINK CONSOLE ENTRIES
                 3 ALL MESSAGES INCLUDING CONSOLE ENTRIES
          IP.MSCLR IF ≠ 0 INDICATES THAT ANY OPERATOR CYBERLINK CONSOLE
                 MESSAGE ENTERED WILL ALSO ACT AS A MANUAL ACKNOWLEDGE
                 IF ANY MESSAGE REQUIRES AN ACKNOWLEDGE -IF = 0 ALL
                 CONSOLE INPUTS WILL HAVE NO EFFECT TOWARD AN ACKNOW-
                 LEDGEMENT
          IP.MSAGE DEFINES THE MAXIMUM STACK PRIORITY A WARNING MESSAGE
                 MAY OBTAIN WHILE QUEUED BEFORE BEING FORCED TO THE
                 B DISPLAY
          IP.DSIZE DEFINES THE MAXIMUM NUMBER OF LINES DISPLAYED FOR
                 A GIVEN K DISPLAY PAGE SIZE.
          IP.FHDR IF ≠ 0 THE ONE RECORD HEADER SENT FOR ALL FILES AT
                 THE START OF A FILE WILL NOT BE WRITTEN ON DISK
                 HENCE, RECEIVED FILES CONTAIN ONLY WHAT THE USER
                 PLACED THERE WITH NO ADDED RECORDS.
          IP.SYNC IF ≠ 0 DEFINES ASSEMBLY FOR SYNCHRONOUS COMMUNICATION
                  IF = 0 ASSEMBLY WILL BE ASYNCHRONOUS COMMUNICATIONS
          IP.BONCE ONLY USED IF IP.SYNC ≠ 0 - IF = 0 THE INITIAL STATE
                 OF THE SYNCHRONOUS DRIVER WILL BE DEDICATED - IF ≠ 0
                 THE INITIAL STATE WILL BE UNDEDICATED
          IP.CIO THIS PARAMETER IS ONLY USED IF RUNNING CYBERLINK ON
                 KRONOS 2.0  IF DEFINED ≠ 0 CIO WILL BE USED FOR ALL
                 DISK I/O - IF DEFINED = 0 THE I/O WILL BE PROCESSED
                 VIA THE STACK PROCESSOR 1SL

IP.TYIN   EQU   4          DEFINE FILMPR FOR INPUT FILE

IP.TYPF   EQU   0          DEACTIV PERMANENT FILES=5 WHEN ACTIVE

IP.DSTYP  EQU   1          SET INITIAL B DISPLAY TO LINE ACTIVITY

IP.KDSP   EQU   1          SET K DISPLAY INITIALY TO COMMAND DISPLAY

IP.CMSG   EQU   2          SEND ALL BUT CONSOL ENTRIES TO DAYFILE

IP.MSCLR  EQU   1          ANY CONSOL INPUT WILL ACT AS ACKNOWLEDGE

IP.MSAGE  EQU   2000B      FORCE WARNING TO DISPLAY AT PRIORITY 2000

IP.DSIZE  EQU   35D        35 LINES/PAGE ON K DISPLAY
```

```
                CYCLIC ERRORS
        SEQERCNT MAXIMUM NUMBER OF RETRANSMITS ON SEQUENCE ERRORS

        FRTCONT MAXIMUM NUMBER OF RETRANSMITS ON TIMLIMIT EXCEEDED
                ERRORS

TIMLIMIT EQU     10D          WAIT APROX 25 SECONDS FOR INPUT

ERRLIMIT EQU     20D          RETRANS 20 TIMES ON NORMAL ERRORS

SEQERCNT EQU     60D          RETRANS 60 TIMES ON SEQUENCE ERRORS

FRTCONT  EQU     2            RETRANS 2 TIMES ON WAIT INPUT TIMEOUT

        THE FOLLOWING DEFINE THE DEBUG AND TRACE CONTROL FOR
        COMMUNICATION AND SOFTWARE CHECKOUT
        DEBUG   IF ≠ 0 WILL TRIGGER THE DEBUG CODE
                IF = 1 CP DEBUG CODE IS ACTIVATED
                IF .GT. 1 BOTH CP AND PP CODE IS ACTIVATED
        DELAY   IS USED ONLY IF DEBUG IS .GT. 1 AND DEFINES THE
                NUMBER OF MICRO SECONDS TO DELAY NON EXISTANT LINES
                IN THE LINE DRIVER.  THIS SETS SIMULATED TIMING OF
                MULTI LINES
        TRACE   IF -DEFINED- A TRACE OF AN ACTIVE LINE - THE TRACE IS
                WRITTEN TO THE PP MESSAGE BUFFER IN A CIRCULAR FASHION
                (SEE ROUTINE -ERRTRC- IN 1CY FOR TRACED VALUES.
                NOTE- ONLY ONE LINE SHOULD BE ACTIVE WHEN TRACE IS D
                DEFINED FOR TIMING REASONS AND READABILITY

DEBUG    EQU     0            DEACTIVATE DEBUG

DELAY    EQU     0            SET NO SIMULATED DELAY WHEN DEBUG ON

(TRACE   EQU     1)           NO TRACE IN DRIVER-NOT DEFINED-
```

```
IP.FHDR  EQU    1           STRIP ALL EXPORT HEADERS FROM USERS OUTPUT
IP.SYNC  EQU    0           ASSEMBLE ASYNCHRONOUS COMMUNICATIONS
IP.BONCE EQU    0           SET INITIAL SYNCHRONOUS COMMUNICATION DEDIC
IP.CIO   EQU    1           IF KRONOS VERSION 2.0 SET CIO FOR I/O


         THE FOLLOWING CONTROL THE BUFFER SIZES AND ALLOCATION OF
         IO BUFFERS
         IP.BPRU IS THE NUMBER OF PRU,S ALLOCATED FOR EACH I/O
                 BUFFER ACTIVE
         IP.BMIN IS THE MINIMUM NUMBER OF BUFFERS HELD AVALIABLE IN
                 THE POOL AT ALL TIMES

IP.BPRU  EQU    6           REQUEST 6 PRU,S FOR I/O BUFFER
IP.BMIN  EQU    0           DO NOT HOLD ANY BUFFERS IN RESERVE

         THE FOLLOWING PARAMETERS CONTAIN PARAMETERS WHICH ARE
         NORMALLY ONLY DEVELOPMENT INSTALLATION CONTROLLED
         IP.VSNO DEFINES THE CYBERLINK VERSION NUMBER
         KRONVS DEFINES THE KRONOS VERSION NUMBER - 0 FOR KRONOS 2.0
                - 1 FOR KRONOS 2.1
         CONFIG DEFINES TO EXPORT THE LOGIN CONFIGURATION
            BIT 0 CARD READER
            BIT 1 LINE PRINTER
            BIT 2 CARD PUNCH
            BIT 3 MAG TAPE
            BIT 4 2ND LINE PRINTER
            BIT 5 DIVERT PUNCH TO REMOTE STATION
            BIT 6 SEND HEADERS FOR ALL FILES
            BIT 10 CYBERLINK COMMUNICATION STATION
            BIT 11 COMPRESS/DECOMPRESS DATA
         WRTRIG DEFINES THE NUMBER OF WORDS THAT MUST BE IN BUFFER
                BEFORE BUFFER IS DUMPED
         RDTRIG DEFINES MINIMUM NUMBER OF WORDS IN BUFFER BEFORE
                TRIGGERING MORE INPUT
         PRUSIZE DEFINES NUMBER OF WORDS/PRU ON MASS STORAGE
         IP.BSIZE DEFINES THE NUMBER WORDS PER I/O BUFFER

IP.VSNO  MICRO  1,,*V1.0*
KRONVS   EQU    1           SET ASSEMBLY FOR KRONOS 2.1
CONFIG   EQU    2107B       SET FULL CYBERLINK CONFIGURATION
WRTRIG   EQU    200B        DUMP BUFFERS WHEN 200 WORDS IN BUFFER
```

```
RDTRIG   EQU    300B          READ DATA WHEN ONLY 300 WORDS LEFT IN BUFFE

PRUSIZE  EQU    100B          I/O PRU SIZE

IP.BSIZE EQU    IP.BPRU*PRUSIZE


         THE FOLLOWING DEFINE CONTROL PARAMETERS -JOB ID,PRIORITIES
               ETC FOR FILES DISPOSED DIRECTLY TO DIRECT ACCESS
               PERMANENT FILES-SUPPORTED ONLY IF IP.TYPF ≠ 0.
               IF -PFID-=0 NO SUBMIT TIME PERMANENT FILES ARE
               SUPPORTED AT ALL ONLY DISPOSITION TYPE FILES WILL BE
               SUPPORTED

PFEPR    EQU    30B           CPU PEIORITY OF PF INPUT JOB
PFFL     EQU    2500B/100B    INITIAL FL OF PF INPUT JOB
PFQPR    EQU    7760B         QUEUE PRI OF PF INPUT JOB


         THE FOLLOWING CONTROLS THE PERMANENT AND LOCAL FILE NAMES
         AND DEVICE FOR THE RECOVERY FILE
         IF THE MICRO PFDEVICE IS DEFINED IT DEFINES THE DEVICE THE
         RECOVERY FILE WILL BE PLACED ON IF NOT DEFINED THEN ANY
         DIRECT ACCESS FILE DEVICE WILL BE USED


INDLFN   MICRO  1,,*ALTLFN* ALTERNAT RECOVERY LFN

INDPFN   MICRO  1,,*ALTPFN* ALTERNATE RECOVERY PFN

CHKLFN   MICRO  1,,*PRILFN* PRIMARY RECOVERY LFN

CHKPFN   MICRO  1,,*PRIPFN* PRIMARY RECOVERY PFN

CHKPSWD  MICRO  1,,*CLINK*  RECOVERY PASSWORD


         THE FOLLOWING DEFINES THE ROLLOUT FILE NAME


ROLLLFN  MICRO  1,5,*CROLL* ROLLOUT FILE LFN


         THE FOLLOWING DEFINES PARAMETERS TO CONTROL THE LINE DRIVER
         RETRANSMISSIONS AND RECOVERY ATTEMPTS
         TIMLIMIT DEFINES THE MAXIMUM NUMBER OF WAITLOOPS BEFORE THE
               TIME COUNT ON WAITING FOR FIRST BYTE OVER THE LINE
               IS ADVANCED-EACH TIME LIMIT IS EQUIVALANT TO 4096
               ENTRIES INTO THE INPUT ROUTINE-IF TIMLIMIT IS EXCEEDED
               A RE-TRANSMIT IS ATTEMPTED

         ERRLIMIT MAXIMUM NUMBER OF RETRANSMITS ON MUX AND DATA AND
```

7.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

7.4.1 CYB1

```
CYB1
CYB1,CM54000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF CYBERLINK 1.0 ON KPL13.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL13,R,FI=CYBERLINK1P0*2P1,MT,D=HY,F=I)
COPYBF,KPL13,CYBPL.
UNLOAD,KPL13.
*GET,MOD=CYBMOD.
COMMON,OPL.
RETURN,KPL13.
MODIFY,N,LO=E.
SKIPEI,NPL.
COMPASS,I,B=NPL,L=0,X=OPL.
WRITEF,NPL.
CATALOG,NPL,R.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL13,W,FI=CYBERLINK1P0*2P1,MT,D=HY,F=I)
COPYEI,NPL,KPL13,V.
*WEOR
*OPLFILE  CYBPL
*READ     MOD,*
OD,*
*EDIT     COMSCYB.QFETCH
OMSCYB.QFETCH
*WEOF
```

7.4.2 CYB2

```
CYB2
CYB2,CM15000,P30,T1000.
*ACCOUNT CARD.
*CYBERLINK 1.0 BINARIES PROVIDED ON
*RELEASE TAPE KPL13 CANNOT BE USED,
*SINCE A VALID LOCAL STATION ID MUST BE
*OBTAINED FROM DATA SERVICES DIVISION
*AND ASSEMBLED INTO CYBERLINK VIA CYB1.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL13,R,FI=CYBERLINK1P0*2P1,MT,D=HY,F=I)
SKIPF,KPL13.
COMMON,ZZZPSBF,ZZZZLDF.
SKIPR,KPL13.
COPYBF,KPL13,ZZZPSBF.
RETURN,KPL13.
BKSP,ZZZPSBF.
COPYBR,,ZZZZLDF.
*WEOR
*ADD       LIB33,PP/1CY-ABS/QFETCH
*WEOF
```

7.4.3 CYB3

```
CYB3
CYB3,CM5000,P30.
*ACCOUNT CARD.
COPYBF,,TRANS.
SUBMIT(TRANS,H,B)
*WEOR
*$CHARGE CARD.
CYBT,P10.
FTN(G)
*WEOR
      PROGRAM EX1A(INPUT,OUTPUT)
      READ 1,INVAL
      PRINT 2,INVAL
1     FORMAT(I2)
2     FORMAT(* COMPILATION AND EXECUTION AT REMOTE STATION*/
     1 10X,* VALUE READ IS *,I3)
 10X,* VALUE READ IS *,I3)
      END
*WEOR
99
*WEOF
```

7.5 ADDITIONAL INFORMATION

7.5.1 CYBERLINK LIBRARY

The Cyberlink subsystem as released on the Modify library consists of several peripheral processor (PPU) and central processor (CPU) program decks. One common deck is included, as well as one deck that provides a listing of the common deck. A brief description of the Cyberlink library deck follows; two of the decks (1CY and 1SL) consist of several overlays, all of which are noted.

Deck	Significance
COMSCYB	Cyberlink common deck.
CYBDEF	Nonexecutable program included for the purpose of obtaining a listing of the common deck COMSCYB; this listing is obtained by assembling CYBDEF.
1CY	Primary communication routines that interface with a 6673 or 6674 multiplexer over a dedicated I/O channel; PPU program. The following is a complete list of overlays assembled by COMPASS from program deck 1CY.
	1CY — Line driver basic routines (for example, initialization and restart code)
	2CY — Line driver channel routines
	5CY — Directive/status processor (for example, routines necessary to encode/decode communication protocol)
	2DC — Routines necessary to generate Cyberlink statistics and drop the line driver from its peripheral processor.
	1CS — Routines required to load the line driver from its central memory buffer; assembles only if the driver is designated as operating in a synchronous mode (refer to section 7.3.3 description of IP.SYNC) and with a central memory buffer provided for the driver in Cyberlink's field length.

Deck	Significance	
1SL	System interface executive and stack processing routines; PPU program deck. The following is a complete list of overlays assembled by COMPASS from program deck 1SL.	
	1SL	Main control routines
	4JL	Job lost processor
	3SR	Buffer allocation processor
	3IM	Routines necessary to process executive messages
	3IL	Routines necessary to idle down an abnormally terminated line
	3CM	Routines necessary to process external commands
	3FN	Find file processor
	2AR	Verify I/O parameters
	2OP	Open transmit file
	2CL	Close, close/unload, and evict files processor
	3EV	Routines to process the PURGEFILE and RE-SUBMIT commands
	2JE	Job card error processor
	3RL	Routines necessary to recover Cyberlink files
	3CK	Checkpointing routines
	3D1	Routines to initiate command display
	3D2	Routines to initiate dayfile display
	3D3	Routines to initiate files display
	3D4	Routines to initiate queues display

Deck	Significance
INH	Cyberlink initialization routines; PPU program deck
CFM	Support software function manager that is used by routines QSTATUS and QFETCH; PPU program deck
CYBLINK	Cyberlink central processor executive; CPU program deck
QSTATUS	QSTATUS command processor; returns to the user a report on job files (as well as any returned output files) submitted to Cyberlink; CPU program deck
CLINKPF	Places received files into user permanent file catalog; CPU program deck
QFETCH	QFETCH command processor; allows the user to access returned output files, specifically those files originating from a teletypewriter with file type LCFT (locked to all except originating user); CPU program deck

Cyberlink may also call the following KRONOS system routines.

0BF	Create FTN/FST entry for a file
2TJ	Verify job card parameters
CIO	System input/output processor

The programs 1SL and 1CS should reside in the central memory library as they are recalled on a periodic recall. This is accomplished by adding the correct SYSEDIT directive (*CM) to the LIBDECK when building the deadstart tape. Refer to part III, section 1.1.5.

7.5.2 NONDEDICATED OPERATION

The operation of Cyberlink in nondedicated mode introduces critical time response problems. MARCIV EXPORT requires a response maximum in the order of 3 seconds. With Cyberlink in nondedicated mode, the line driver releases the peripheral processor after completion of a communications cycle for all active lines and is recalled at a period of AR* milliseconds. The AR (automatic recall) parameter is described in part II, section 5.6. If the system is under load, the actual recall time could exceed the theoretical delay recall AR by several orders. If the response limits are exceeded before recall of the line driver, MARCIV EXPORT may shut down the line due to no response (or at best will now be out of synchronization with the Cyberlink line driver). It is recommended, therefore, that the value of AR be not greater than 400 milliseconds to ensure reliable operation of Cyberlink while it is functioning in nondedicated mode.

7.5.3 FIELD LENGTH REQUIREMENTS

The central memory field length required by Cyberlink varies according to the values of the installation parameters and the number of active lines. In general, the approximate field length may be calculated from the following formula (all values are octal):

FL = n + k* 462B+nlinmx* 75B+bact * PRUSIZE * IP.BPRU + cm * 1300B

n	Equivalent to 1700 if Cyberlink is rolled in or 300 if Cyberlink is rolled out.
k	Equals 1 if the K displays are activated (IP.KDSP ≠ 0)
n.linmx	Equals the highest port defined available on the 6673 or 6674 multiplexer
bact	Equals the number of active buffers (0 if no lines transmitting or receiving)
cm	Equals 1 if the line driver is placed in central memory resident at initialization time; otherwise cm=0. If Cyberlink is rolled out, cm=0 in all cases.

In addition to the above field length required at the control point, placing 1SL and 1CS in system central residents requires approximately 370B words.

FORTRAN 2.3 8

8.1 RELEASE DESCRIPTION

8.1.1 HARDWARE REQUIREMENTS

FORTRAN 2.3 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length requirement to run FORTRAN 2.3 is $40,000_8$.

8.1.2 CORRECTIONS

FORTRAN 2.3 includes all eligible PSR corrective code published through PSR Summary 348.

8.1.3 DEFICIENCIES

The following modification must be available in FORTRAN Run if it is to operate under KRONOS 2.1. It will be released in a future PSR summary under the IDENT FT30169A.

```
*IDENT      FT30169A
*/          APPLIES TO MODSET FT30169
*/          RELEASED AT PSR LEVEL 344.
*D,FT30169. 11
            BX6       X1
```

8.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update FORTRAN 2.3 is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for FORTRAN 2.3, the following materials are necessary.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for FORTRAN 2.3 are RUN1, RUN2, and RUN3.

RUN1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
RUN2	Use to collect the FORTRAN 2.3 binary code and generate directive files for later use as input to the procedure file GENSYS.
RUN3	Use to verify that the product is correctly installed.

KPL14 contains the FORTRAN 2.3 binary code.

PL21 contains the FORTRAN 2.3 source code.

PL2 contains the COMPASS 3.0 source code.

The tapes are described in detail in part I, sections 2.1.1, 2.1.2, and 2.8.

8.3 INSTALLATION PARAMETERS

In the standard release of FORTRAN 2.3, 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, remove the identifier RM1567B by using the *YANK directive. If the identifier RM1567A is removed by *YANK, the code associated with binary blocking will not be assembled.

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. (The trigger value must be less than 100.) For example, to change the triggering percentage to 50 percent:

```
*DELETE, SCU316M.94
TRIGGER MICRO 1,0,/50/
*COMPILE SIO$
```

The default text used for COMPASS assemblies is CPCTEXT in the released version; it must be changed for KRONOS 2.1. The modification is in the released binary code; but it must be added to the source code the first time it is modified and/or updated. The format of the modification is:

```
*D, R400014.1
CC8         DATA            OLSYSTEXT
```

Two user libraries (SYSLIB and RUN2P3) can be used with the FORTRAN 2.3 compiler. The arithmetic routines are the same in these two libraries; however, the I/O routines are not the same. RUN2P3 contains the SCOPE 3.4 object time I/O routines. SYSLIB contains object time I/O routines developed in conjunction with KRONOS using the KRONOS system I/O common decks. The user library RUN2P3 supports binary blocking. SYSLIB does not support binary blocking. However, the routines in SYSLIB, using the KRONOS common decks, provide interactive I/O to a terminal and take advantage of the CEJ option if it is available. RUN2P3 is the user library used with the FORTRAN 2.3 compiler in the released system. The user library can be changed to SYSLIB through use of the LDSET control card. SYSLIB is the default user library for all loads when unsatisfied externals exist after the primary user library has been used to satisfy the unsatisfied externals. FORTRAN 2.3 can be called using either the RUN23 or RUN control cards.

Refer to part III, section 1.7.3 for a list of FORTRAN 2.3 routines that reference the SCOPE 3.4 COMDECK IPARAMS.

8.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

8.4.1 RUN1

```
RUN1
RUN1,CM55000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB UPDATES AND CREATES THE BINARY OF RUN 2.3.
COMMENT. THE FIRST FILE OF THE NEW KPL14 WILL BE THE NEWPL.
COMMENT. THE 2ND FILE WILL BE THE ABS. BINARY OF THE RUN 2.3 COMPILER.
COMMENT. THE THIRD FILE WILL BE THE RELOCATABLE BINARY OF THE
COMMENT. LIBRARY ROUTINES.
*VSN CARD.
LABEL(PL2,R,FI=COMPASS3P0*3P4,MT,D=HY,F=SI) LATEST COMPASS PL.
UPDATE,A,P=PL2,R,N=COMPCOM,I=0.
UNLOAD,PL2.
RETURN,PL2.
*VSN CARD.
LABEL(OLDPL,R,FI=RUN2P3*3P4,MT,D=HY,F=SI)   LATEST FORTRAN 2.3 PL.
UPDATE(F,N,W,X)
UNLOAD,OLDPL.
SKIPF,NEWPL.
RETURN,OLDPL.
COMPASS(I,S=CPCTEXT,S=IPTEXT,L=0,B=REL)      ACGOER - RECOVR$
COMPASS(I,S=CPCTEXT,S=IPTEXT,L=0,B=NEWPL.    RUN - Q8QDIAGP
SKIPEI,NEWPL.
WRITEF,NEWPL.
GTR(REL,LIB,,NR)REL/GETBA,SIO$
REWIND,REL.
COPYBR,REL,LIB,58.
SKIPR,REL,1.
COPYBR,REL,LIB,10.
SKIPR,REL,1.
COPY,REL,LIB.
REWIND,LIB.
COPYBF,LIB,NEWPL.              RELOCATABLE BINARY OF LIBRARY ROUTINES.
REWIND,NEWPL.
*VSN CARD.
LABEL(KPL14,W,L=RUN2P3*3P4,MT,D=HY,F=SI)     SCRATCH FOR NEW KPL14.
COPYEI,NEWPL,KPL14.
CATALOG,KPL14,R,N.
UNLOAD,KPL14.
*WEOR
*/         PLACE *FORTRAN 2.3* MODSET HERE.
*WEOF
```

8.4.2 RUN2

```
RUN2
RUN2,CM45000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB ADDS THE RUN V2.3 BINARIES TO THE SYSTEM COMMON
COMMENT. FILE ZZZPSBF FROM THE KPL14 RELEASE TAPE.
COMMENT. EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED
COMMENT. BY JOB RUN1 MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT. TO COMMON FILE ZZZZLDF.
*VSN CARD.
LABEL(KPL14,R,FI=RUN2P3*3P4,MT,D=HY,F=SI)   LATEST FORTRAN 2.3 PL.
SKIPF,KPL14,1.                SKIP OLDPL
COPYBF,KPL14,RUN.             ABSOLUTE BINARY OF OVERLAYS.
COPY,KPL14,RLIB.                RELOCATABLE ROUTINES FOR RUN2P3.
UNLOAD,KPL14.
RETURN,KPL14.
GTR(RLIB,SLIB)REL/GETBA,SIO$
REWIND,RLIB.
GTR(RLIB,MLIB,,NR)REL/DBLE-IBAIEX,LEGVAR-SQRT,TAN,ALNLOG-DVCHK
REWIND,RLIB.
GTR(RLIB,MLIB,,NR)REL/IDINT,OVERFL,RANF-RBAREX,TANH
REWIND,RLIB,MLIB,SLIB.
CATALOG,RUN,R.
COMMON,SYSTEM.
LIBEDIT(P=RUN,B=0)
SKIPR,NEW,1.
COPY,RUN,NEW.
REWIND,NEW.
COMMON,ZZZPSBF,ZZZZLDF.
COPYBF,NEW,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSIO
IF(EF=0)GOTO,10.
SET(R1=1)
GTR(SYSTEM,OLD)ULIB/SYSIO
10,LIBEDIT,N=LGO,B=SLIB,L=0.
LIBGEN,F,P=SYSIO,NX=1.
CATALOG,SYSIO,R,U.
SET(EF=0)
RETURN,OLD,LGO.
GTR(ZZZPSBF,OLD,,,S)ULIB/RUN2P3
IF(EF=0)GOTO,20.
SET(R2=1)
GTR(SYSTEM,OLD)ULIB/RUN2P3
20,LIBEDIT,N=LGO,B=RLIB,L=0.
LIBGEN,F,P=RUN2P3.
CATALOG,RUN2P3,R,U.
SET(EF=0)
RETURN,OLD,LGO.
GTR(ZZZPSBF,OLD)ULIB/SYSLIB
IF(EF=0)GOTO,30.
SET(R3=1)
GTR(SYSTEM,OLD)ULIB/SYSLIB
30,LIBEDIT,B=RLIB,N=LGO,L=0.                UPDATE SYSLIB.
LIBGEN,F,P=SYSLIB.
CATALOG,SYSLIB,R,U.
```

```
RETURN,LGO,NEW.
COPYEI,SYSIO,LGO.
BKSP,LGO.
COPYEI,RUN2P3,LGO.
BKSP,LGO.
COPYEI,SYSLIB,LGO.
REWIND,LGO.
LIBEDIT,P=ZZZPSBF,L=0.
RELEASE,ZZZPSBF.
RETURN,ZZZPSBF.
RENAME,ZZZPSBF=NEW.
COMMON,ZZZPSBF.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
IF(R1=1)COPYBR,,ZZZZLDF.
IF(R1=0)SKIPR,INPUT,1.
IF(R2=1)COPYBR,,ZZZZLDF.
*WEOR
*RENAME    OVL/RUN,RUN23
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/SYSIO
*BEFORE    *,ULIB/RUN2P3
*BEFORE    *,ULIB/SYSLIB
*WEOR
*ADD       LIB20,OVL/RUN23-Q8DIAGP
*WEOR
*ADD       LIB21,ULIB/SYSIO
*WEOR
*ADD       LIB20,ULIB/RUN2P3
*WEOR
*ADD       LIB16,ULIB/SYSLIB
*WEOF
```

8.4.3 RUN3

```
RUN3
VRUN,CM55000,T200.
*ACCOUNT CARD.
COMMENT. THIS SIMPLE PROGRAM VERIFIES CORRECT INSTALLATION OF
COMMENT.   RUN 2.3
RUN(G)
COMMENT.   END OF JOB
EXIT.
COMMENT.      JOB FAILED
OB FAILED
*WEOR
       PROGRAM   SIMPLE (OUTPUT)
       REAL      A(1,10), B(10,2), C(1,2), D(1,2)
       DATA      D(1,1), D(1,2)  / 385.0, 5885.0 /
```

```
      DO  10  I=1, 10
        A(1,I) = I
   10 CONTINUE

      DO  30  J=1, 2
        DO  20  I=1, 10
          B(I,J) = I + 100*(J - 1)
   20   CONTINUE
   30 CONTINUE

      DO  60  I=1, 1
        DO  50  J=1, 2
          T = 0.0
          DO  40  K=1, 10
            T = T + A(I,K)*B(K,J)
   40     CONTINUE
          C(I,J) = T
   50   CONTINUE
   60 CONTINUE

      IF (C(1,1) .NE. D(1,1))  GO TO  70
      IF (C(1,2) .NE. D(1,2))  GO TO  70
      CALL REMARK(22HCOMPUTATION SUCCESSFUL)
      STOP


   70 PRINT 1000, C, D
 1000 FORMAT (#1    FAILURE#/*0 C-ARRAY IS *2F20.5/*0  SHOULD BE *2F20.
     . 5)
      CALL REMARK (7HFAILURE)
      CALL EXIT
      END
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
01.14.48.VRUN,CM55000,T200.
01.14.48.*ACCOUNT CARD.
01.14.48.ACCOUNT,USER1.
01.14.48.COMMENT. THIS SIMPLE PROGRAM VERIFIES CO
01.14.48.RRECT INSTALLATION OF
01.14.48.COMMENT.    RUN 2.3
01.14.50.RUN(G)
01.14.51.LGO
01.14.53.COMPUTATION SUCCESSFUL
01.14.53.STOP
01.14.54.COMMENT.    END OF JOB
```

9.1 RELEASE DESCRIPTION

9.1.1 HARDWARE REQUIREMENTS

FORTRAN Extended 4.0 requires at least 49K of memory for maintenance purposes. The minimum field length required to run FORTRAN Extended 4.0 is $45,000_8$.

9.1.2 CORRECTIONS

FORTRAN Extended 4.0 includes all eligible PSR corrective code published through PSR Summary 348.

9.1.3 DEFICIENCIES

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 the loader directive LDSET (LIB=FORTRAN/SYSO) at appropriate points in the control card section of the job deck.

Binary blocked and/or random indexed files created under FORTRAN 3.0 cannot be handled directly by FORTRAN 4.0; they must be converted to a file structure accepted by FTN 4.0.

To run FORTRAN Extended 4.0 under KRONOS 2.1, it is necessary to add the modification FC40065, FC40083, and FCL0197 from PSR Summary 351 to the source code. This modification is included in the binary code on KPL15B, but it is not in the source code on PL8.

```
*PURGE    FEAT30G
*IDENT    FC40065
*INSERT     FE20033.40
          BX2    X1
*INSERT      FEAT30.3481
 SQ2AF    SA2    A1+B5        RESET RLIST2(J)
*DELETE     SQUEEZE.325,SQUEEZE.325
          COMUTMM SQ2AF
*DELETE      FEAT30.3490,FEAT30.3490
          EQ     SQ2AF
*DELETE      FEAT30.3492,FEAT30.3492
          EQ     SQ2AF
*DELETE     SQUEEZE.340,SQUEEZE.340
 LDMATCH  COMUTMM SQ2AF
*DELETE      FEAT30.3496,FEAT30.3496
          EQ     SQ2AF
*DELETE      USEDEF.98,USEDEF.98
      IH=TEMP.AND.7777B
          IH = SYMBOL( SYM1-2*IH+1) .A. SHIFT(1,DIM(X))
      IH=SHIFT(IH,30-DIM(X))
      USE(USELOC)=TEMP.OR.MODE.OR.IH
*IDENT    FC40083
*INSERT       ARITH.216
 PROGRAM  EQU    56B
*INSERT      FEAT30.1092
          SA3    ALLARR
          NZ     X3,SSP6      IF DEBUGGING ALL ARRAYS
*DELETE      FEAT30.1097,FEAT30.1100
          NZ     X3,SSP6      IF ANY DEBUGGING OF THIS ARRAY
*INSERT     F600105.90
          BX3    X2
          AX2    59
          BX2    X2-X3
*INSERT      FEAT30.1432
          SA3    PROGRAM
          UX2    B3,X3
          ZR     B3,IFL.2     IF A MAIN PROGRAM
*INSERT      FEAT30.1435
          SA1    =X0.CEP
          ADDREF X1,REF
*INSERT       POST.392
          SA3    =XX1R
          MI     X3,RJX.F     IF X1 IS LOCKED
          MX6    0
          SA6    =XX1SCR      X1SCR = 0
          PX6    X6
          SA6    =XX1S        USES[X1S] = 0
 RJX.F    BSS    0
*DELETE       POST.468,POST.468
          SA6    PARCEL.
*INSERT       JAM.913
          ZR     X6,GETRDF1   IF DEF HAS NO USES
*DELETE       JAM.922,JAM.922
 GETRDF1  SA1    ISSUED
          ZR     X1,CHOOSE
*DELETE       OPTB.56,OPTB.56
 X1R      ENTRY.
*INSERT       OPTB.87
          ENTRY  X1S,X1SCR
*DELETE       OPTB.239,OPTB.239
          BX6    -X0*X2
```

```
*DELETE     FEAT30B.68,FEAT30B.68
           KSHFT = SHIFT(1,56)
*DELETE     FEAT30B.70,FEAT30B.70
           IF( SHIFT(TEMP1,3) .GT. 0 ) GO TO 1510
*/ $$FCL0197     42    BUGCTL
*ID FCL0197
*/         MODS TO BUGCTL TO ELIMINATE THE CALL TO THE PP ROUTINE DSP
*/         IN NON SCOPE 3.4 SYSTEMS.
*I,BUGCTL.7
 =MD       IFC    LT, #MODEL# 75
           IPARAMS
 =MD       ELSE
 OS.NAME   MICRO  1,,=SCOPE =
 OS.VER    MICRO  1,,=2.0 =
 =MD       ENDIF
*I,BUGCTL.20
 =SD       IFC    EQ,=#OS.NAME##OS.VER#=SCOPE 3.4 =
*D BUGCTL.22
 =SD       ENDIF

*D BUGCTL.37
*I BUGCTL.40

 =SD       IFC    EQ,=#OS.NAME##OS.VER#=SCOPE 3.4 =
           BX6    X6-X6
*I BUGCTL.41
 =SD       ENDIF
*I BUGCTL.49
           SA7    DBGFIT.
*D BUGCTL.58
*D BUGCTL.60,BUGCTL.61
           BX4    X0*X6        FILE NAME
           SX7    X6           FIT ADDRESS
           SA7    DBGFIT.

 =SD       IFC    EQ,=#OS.NAME##OS.VER#=SCOPE 3.4 =
*D BUGCTL.64
*D BUGCTL.65
*D BUGCTL.68
*D BUGCTL.70,BUGCTL.77
           SYSTEM DSP,RECALL,DSPTBL
*I BUGCTL.80
 =SD       ELSE
 BGC3B     BSS    0
 =SD       ENDIF
*C BUGCTL

 =MD       IFC    LT, #MODEL# 75
           IPARAMS
 =MD       ELSE
 OS.NAME   MICRO  1,,/SCOPE /
 =MD       ENDIF
*I FORSYS=.225
 =SD       IFC    EQ,/#OS.NAME#/KRONOS/
 Q8PL      CON    0LPL+54B     TEST FOR PL     =
 =SD       ELSE
*I FORSYS=.226
 =SD       ENDIF
*C FORSYS=
*/         THERE ARE  42 CORRECTIONS CARDS INCLUDING THIS COMMENT.
```

9.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update FORTRAN Extended is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for FORTRAN Extended, the following materials are necessary.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for FORTRAN Extended are FTNC1, FTNC2, FTNC3, F4LIB1, and F4LIB2.

FTNC1	Use to modify installation parameters or to add PSR updates to compiler overlay source code and to create a new tape (current KPL) containing updated source and binary code.
FTNC2	Use to collect the compiler overlay binary code and generate directive files for later use as input to the procedure file GENSYS.
FTNC3	Use to verify that the compiler overlays are correctly installed.
F4LIB1	Use to modify installation parameters or to add PSR updates to FORTRAN Extended library routines and to create a new tape (current KPL) containing updated source and binary code.
F4LIB2	Use to collect the library routines' binary code and generate directive files for later use as input to the procedure file GENSYS.

KPL15A contains the FORTRAN Extended 4.0 compiler overlay binary code.

KPL15B contains the FORTRAN Extended 4.0 library routines' binary code.

PL7 contains the FORTRAN Extended 4.0 compiler overlay source code.

PL8 contains the FORTRAN Extended 4.0 library routines' source code.

PL2 contains the COMPASS 3.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.9.

9.3 INSTALLATION PARAMETERS

FORTRAN Extended 4.0 routines that reference COMDECK IPARAMS are listed in part III, section 1.7.3.

The amount of core needed to compile jobs can be altered by modifying the size of compiler tables and scratch file buffers. Parameters that 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 the FORTRAN Extended 4.0 program library.

Parameter	Released Default Value	Significance
CCABT	Abort	Abort job on FTN control card error
CTIMO	Time message sent	Compiler message issued to control point dayfile (CPU seconds necessary for compilation)
LMAX	57	Lines per page listing limit (not applicable to intermixed COMPASS programs)

File names used by the compiler are:

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 indicated.

Control Card Option	Released Default Value	Significance
A	No abort	Abort to EXIT(S) card if fatal compilation error occurs
B	Produces object code on standard file (LGO)	Produce object code file
C	C is not set	Use COMPASS assembler for compiler-generated code. If C is not selected, the FORTRAN assembler is used. (FORTRAN assembler saves about 60 percent of CPU time compared with COMPASS assembler.)
D	No debug mode	Debug mode of compilation
E	No file for editing	Format file for editing (COMPASS card image file is produced with *DECK cards for each program unit, suitable as input for UPDATE)
G	No compile and go	Compile and go option
I = lfn	lfn = INPUT lfn = COMPILE	Select compiler input file I Not specified I Specified without lfn
list = lfn	lfn = OUTPUT list = L	Select compiler listing file and listing options as follows:

Control Card Option	Released Default Value	Significance
	L	L List source code
	No list	O List COMPASS card images
	No list	X List ANSI violation diagnostics
	No list	N Suppress informative diagnostics
	No list	R (equivalent to long reference map option R=2)
		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.
	1	0 No reference map 1 Short reference map 2 Full cross reference map 3 Full cross reference map plus common and equivalence information
OPT=level	OPT=1	Select level of optimization: 0 Lowest optimization 1 Slightly above FORTRAN Extended 2.0 optimization 2 Program unit flow analysis used in optimization.
Q	Q is not set	Program verification option
ROUND=s	No rounding	s = */+- Select 1-4 of these operators to round arithmetic
SYSEDIT=ss		The following is intended for system programmer usage.
	None	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.
T	No error checking	Maximum error checking in mathematical library routines (basic external functions).
V		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.
S	SYSTEXT	Specifies system text files to be used for intermixed COMPASS programs.

Control Card Option	Released Default Value	Significance
GT	SYSTEXT	Specifies system text files (sequential binary file) to be used for intermixed COMPASS programs.
Z	None	Forces all subroutine calls with no parameters to pass a parameter list consisting of a zero word.
PL	5000	Selects maximum number of allowable records on the OUTPUT file.
XT	OLDPL	Specifies external text (XTEXT) to be used for intermixed COMPASS programs.
	OPL	XT specified without lfn.

9.3.1 OPTIONS

The following listing is the options portion of FORTRAN Extended 4.0.

```
****                                                                           F600250     2
***        O P T I O N S - FORTRAN EXTENDED INSTALLATION PARAMETERS.           F600250     3
*                                                                              F600250     4
*                                                                              F600250     5
*          THE PARAMETERS DEFINED IN THIS DECK DETERMINE THE SPECIFIC          F600250     6
*          CONFIGURATION OF THE FORTRAN EXTENDED COMPILER.  WHEN INSTAL-       F600250     7
*          LING THE COMPILER, PARAMETERS SHOULD BE REVISED AS NECESSARY        F600250     8
*          TO DESCRIBE THE INSTALLATION*S EXACT HARDWARE CONFIGURATION         F600250     9
*          AND SPECIFIC FUNCTIONAL REQUIREMENTS.                               F600250    10
*                                                                              F600250    11
*          ADDITIONAL INSTALLATION OPTION PARAMETERS WILL BE FOUND IN          F600250    12
*          THE PROGRAM DECK  < FTN > .                                         F600250    13


*          **************************************************************** F600250    15
*          *                                                              * F600250    16
*          *                                                              * F600250    17
*          *   I N S T A L L A T I O N   W A R N I N G   N O T I C E      * F600250    18
*          *                                                              * F600250    19
*          *                                                              * F600250    20
*          *      AN ASTERISKED BOX SIMILAR TO THIS ENCLOSES EACH         * F600250    21
*          *      PARAMETER THAT IS INTENDED TO BE CHANGED WHEN           * F600250    22
*          *      INSTALLING THE FORTRAN EXTENDED COMPILER.               * F600250    23
*          *                                                              * F600250    24
*          *      NO OTHER PARAMETER IN THE *OPTIONS* DECK SHOULD         * F600250    25
*          *      BE CHANGED.                                             * F600250    26
*          *                                                              * F600250    27
*          *      CONTROL DATA CORPORATION ACCEPTS NO RESPONSIBILITY      * F600250    28
*          *      FOR SATISFACTORY PERFORMANCE OF THE FORTRAN             * F600250    29
*          *      EXTENDED COMPILER IF THIS NOTICE IS DISREGARDED.        * F600250    30
*          *                                                              * F600250    31
*          *                                                              * F600250    32
*          **************************************************************** F600250    33


***        PROCESSOR NAME AND VERSION NUMBER                                   F600307     2

LPNAME     MICRO  1,7,/FTN    /       LANGUAGE PROCESSOR NAME                  F600307     4
VER        MICRO  1,3,/4.0/                                                    F600307     5
```



```
***        CENTRAL PROCESSOR MODEL / SERIES DECLARATIONS.                      F600250    35
                                                                               F600250    36
                                                                               F600250    37
*          **************************************************************** F600250    38
*          *                                                              * F600250    39
*          *      TO INSTALL FORTRAN EXTENDED ON A CYBER 70/ MODEL XX     * F600250    40
*          *      PROCESSOR, SET THE FOLLOWING SYMBOL TO THE APPRO-       * F600250    41
*          *      PRIATE MODEL NUMBER, AND DELETE THE SUBSEQUENT          * F600250    42
*          *      SYMBOL [ MACHINE. ].                                    * F600250    43
*          *                                                              * F600250    44
*          *                                                              * F600250    46
*          *      REFERENCES -- FTN, FTNTEXT.                             * F600250    47
*          **************************************************************** F600250    48
```

```
         *          ************************************************************** F600250    50
         *          *                                                             * F600250    51
         *          *      TO INSTALL FORTRAN EXTENDED ON A 6X00 / 7X00           * F600250    52
         *          *      PROCESSOR, SET THE FOLLOWING SYMBOL TO THE APPRO-      * F600250    53
         *          *      PRIATE SERIES NUMBER, AND DELETE THE PRECEDING        * F600250    54
         *          *      SYMBOL [ CYBERMOD ].                                   * F600250    55
         *          *                                                             * F600250    56
6600     MACHINE.   EQU    66003        6X00 / 7X00 SERIES NUMBER                   F600250    57
         *          *                                                             * F600250    58
         *          *      REFERENCES -- FAX, FTN, FTNMAC, OPTB, REFMAP.          * F600250    59
         *          ************************************************************** F600250    60


         C          IF     DEF,CYBERMOD                                             F600250    62
         C          ELSE                                                            F600250    70
                    IFLT   MACHINE.,6600B,2                                         F600250    71
                    IFEQ   MACHINE.,6600B,2                                         F600250    74
  74     CYBERMOD   EQU    74B                                                      F600250    75
         S          SKIP                                                            F600250    76
         S          ENDIF                                                           F600250    79
                                                                                    F600250    80
         *          [MACHINE.] REFERENCES -- FAX, FTN, FTNMAC, OPTB, REFMAP.        F600250    81
                                                                                    F600250    82
6600     MACHINE    EQU    MACHINE.     FORMER NAME OF SYMBOL                       F600250    83

6600     TARGET     OCTMIC MACHINE.                                                 F600307     7
         TARGET     MICRO  1,2,/≠TARGET≠/                                           F600307     8
         X          MICRO  1,1,/≠TARGET≠/                                           FC40002     1
         Y          MICRO  2,1,/≠TARGET≠/                                           FC40002     2
         Y          MICRO  ≠X≠*10-59+≠Y≠,1,/012345XXXXXXXXXXXXXX/                   FC40002     3
         VALID      MICRO  1,,/≠X≠≠Y≠/                                              FC40002     4


         **         DEFINE ≠MODEL≠ MICRO.                                           F600250    85
                                                                                    F600250    86
  74     MODEL      OCTMIC CYBERMOD                                                 F600250    87
                                                                                    F600250    88
         *          [≠MODEL≠] REFERENCES -- FTN, FTNTEXT.                           F600250    89


F T N T E X T  -  FORTRAN EXTENDED ASSEMBLY TEXT        COMPASS 3.73129    73/05/22. 02.23.04.    PAGE     5
O P T I O N S  -  FORTRAN EXT INSTALLATION PARAMETERS   OPTIONS

         *          ************************************************************** F600250    91
         *          *                                                             * F600250    92
         *          *      EARLY MODEL 6600 PARAMETER (STORE OUT OF ORDER).       * F600250    93
         *          *                                                             * F600250    94
         *          *      WHEN THE TARGET, I.E., OBJECT TIME, CPU IS A 6600      * F600250    95
         *          *      CLASS A, B OR C MACHINE, SERIAL NUMBER 1*47, THAT      * F600250    96
         *          *      LACKS FCO 20436, SET THE FOLLOWING PARAMETER TO ZERO.  * F600250    97
         *          *      (FCO 20436 RESOLVES A STORE OUT OF ORDER PROBLEM.)     * F600250    98
         *          *                                                             * F600250    99
   1     STOR6600   EQU    1                                                      * F600250   100
         *          *                                                             * F600250   101
         *          *      REFERENCES -- OPTB.                                    * F600250   102
         *          ************************************************************** F600250   103
```

```
                *         ************************************************************ F600250   105
                *         *                                                          * F600250   106
                *         *      HARDWARE INTEGER MULTIPLY FEATURE.  VALUES ARE --   * F600250   107
                *         *                                                          * F600250   108
                *         *      1 = INTEGER MULTIPLY INSTALLED.                     * F600250   109
                *         *      0 = INTEGER MULTIPLY NOT INSTALLED.                 * F600250   110
                *         *                                                          * F600250   111
                *         ************************************************************ F600250   112
                *         *                                                          * F600250   113
                *         *      (CPTIMULT) - DEFINE AVAILABILITY AT COMPILE TIME.   * F600250   114
                *         *                                                          * F600250   115
0     CPTIMULT  EQU     0           INTEGER MULTIPLY NOT AVAIL AT COMPILE TIME   F600250   116
                *         *                                                          * F600250   117
                *         *      REFERENCES -- FTNTEXT.                              * F600250   118
                *         ************************************************************ F600250   119
                *         *                                                          * F600250   120
                *         *      (OBJIMULT) - DEFINE AVAILABILITY AT OBJECT TIME.    * F600250   121
                *         *                                                          * F600250   122
0     OBJIMULT  EQU     0           INTEGER MULTIPLY NOT AVAIL AT OBJECT TIME    F600250   123
                *         *                                                          * F600250   124
                *         *      REFERENCES -- ARITH, OOPRE, MACROX, MACRS.          * F600260   1
                *         ************************************************************ F600250   126


                **        7OM (DATA MANAGER) APPLICABILITY.  DENOTES WHETHER OR NOT 7OM  F600250   141
                *         WILL BE USED, BASED ON THE PROCESSOR MODEL.  SINCE THE SYMBOL  F600250   142
                *         IS MORE CONVENIENT IN A NEGATIVE SENSE, IT IS DEFINED AS --    F600250   143
                *                                                                        F600250   144
                *         1       7OM DOES NOT APPLY (MODEL 74 OR LOWER / 6X00 SERIES).  F600250   145
                *         0       7OM APPLIES (MODEL 75 OR HIGHER / 7X00 SERIES).        F600250   146
                                                                                         F600250   147
                          IFC     GE, *MODEL* 75 ,3                                      F600250   148
1     NEOM      EQU     1                                                              F600250   152
```



```
                MODEL     IFC     LT, *MODEL* 75                                 F600250   154
0     CPERM     EQU     0           DO NOT ASSEMBLE 6RM                          F600250   165
                MODEL     ENDIF                                                  F600250   168


               *          ************************************************************ F600250   170
                *         *                                                          * F600250   171
                *         *      FILE CONTAINING COMPASS RANDOM PL WITH /COMPCOM/.    * F600250   171
                *         *                                                          * F600250   172
                PLCMPS    MICRO   1,, COMPCOM                                        F600270   1
               *          *                                                        * F600250   174
               *          ************************************************************ F600250   175


                PLRM      IFNE    CPERM*NEOM,0                                   F600250   177
                PLRM      ENDIF                                                  F600250   185
```

```
                      *         ************************************************************ F600250   187
                      *         *                                                          * F600250   188
                      *         *      CHARACTER APPENDED TO FILE NAMES FOR UNIQUENESS.     * F600250   189
                      *         *                                                          * F600250   190
                       C        MICRO  1,,/E/                                               F600250   191
                      *         *                                                          * F600250   192
                      *         *      REFERENCES -- BUGCTL,DBGFET,FTNMAC,LISTIO,PH1CTL.   * F600250   193
                      *         ************************************************************ F600250   194
F T N I E X T  -  FORTRAN EXTENDED ASSEMBLY TEXT              COMPASS 3.73129      73/05/22. 02.23.04.      PAGE     7
O P T I O N S  -  FORTRAN EXT INSTALLATION PARAMETERS         OPTIONS

                      *         ************************************************************ F600250   196
                      *         *                                                          * F600250   197
                      *         *      F I X E D   L E N G T H   T A B L E S.              * F600250   198
                      *         *                                                          * F600250   199
                      *         ************************************************************ F600250   200
                      *         *                                                          * F600250   201
                      *         *      LENGTH OF INTERMEDIATE STORAGE AREA FOR ALL CON-    * F600250   202
                      *         *      STANTS IN ANY ONE SOURCE STATEMENT.  EACH CONSTANT  * F600250   203
                      *         *      BEGINS ON A NEW WORD BOUNDARY, AND IS PACKED AS TEN * F600250   204
                      *         *      DISPLAY-CODED CHARACTERS PER WORD.                  * F600250   205
                      *         *                                                          * F600250   206
                  454  CONSTORS EQU    300D                                                F600250   207
                      *         *                                                          * F600250   208
                      *         *      REFERENCES -- SCANNER.                              * F600250   209
                      *         ************************************************************ F600250   210
                      *         *                                                          * F600250   211
                      *         *      LENGTH OF SAVED OPERATOR STACK.                     * F600250   212
                      *         *                                                          * F600250   213
                  240  MXOSE    EQU    160D                                                F600250   214
                      *         *                                                          * F600250   215
                      *         *      REFERENCES -- ARITH.                                * F600250   216
                      *         ************************************************************ F600250   217
                      *         *                                                          * F600250   218
                      *         *      LENGTH OF SAVED FUNCTION RESULT TABLE.              * F600250   219
                      *         *                                                          * F600250   220
                  132  MXFRSTB  EQU    90D                                                 F600250   221
                      *         *                                                          * F600250   222
                      *         *      REFERENCES -- ARITH.                                * F600250   223
                      *         ************************************************************ F600250   224
                      *         *                                                          * F600250   225
                      *         *      LENGTH OF <ARLIST> BUFFER.                          * F600250   226
                      *         *                                                          * F600250   227
                 3200  ARLSZ    EQU    3200B                                               F600250   228
                      *         *                                                          * F600250   229
                      *         *      REFERENCES -- PS1CTL.                               * F600250   230
                      *         ************************************************************ F600250   231


                      *         ************************************************************ F600250   233
                      *         *                                                          * F600250   234
                      *         *      SELECT DIVISION BY RECIPROCAL MULTIPLICATION.       * F600250   235
                      *         *                                                          * F600250   236
                      *         *      WHEN THE FOLLOWING PARAMETER IS ZERO, <ARITH> WILL  * F600250   237
                      *         *      ATTEMPT TO REPLACE X/C BY X*(1/C), WHERE [X] IS AN  * F600250   238
                      *         *      EXPRESSION AND [C] IS A CONSTANT (REDUCTION IN      * F600250   239
                      *         *      STRENGTH).  SET NON-ZERO TO DEFEAT THE FEATURE.     * F600250   240
                      *         *                                                          * F600250   241
                    0  NOINVERT EQU    0                                                   F600250   242
                      *         *                                                          * F600250   243
                      *         *      REFERENCES -- ARITH.                                * F600250   244
                      *         ************************************************************ F600250   245
```

```
                  *         ****************************************************************** F600250    247
                  *         *                                                                * F600250    248
                  *         *       ERROR LISTING LINE LIMIT.                                * F600250    249
                  *         *                                                                * F600250    250
        144       ERRMAX    EQU     1000D                                                      F600250    251
                  *         *                                                                * F600250    252
                  *         *       REFERENCES -- ERPRO, LSTPRO.                             * F600250    253
                  *         ****************************************************************** F600250    254
```

```
***       MICROS TO DEFINE THE DEFAULT CONTROL CARD OPTIONS.                        F600250   1162
*                                                                                   F600131    154
*                             OPTIONS  SELECTED      NOT SELECTED    FILE           F600131    155
 CC.A      MICRO  1,, 0         A           1             0           NA            FE20005      1
* CHANGE *LGO* MICRO BELOW      B=LFN  ALWAYS            NA          LFN            F600131    157
 CC.G      MICRO  1,, 0         G          -1             0           NA            F600131    158
 CC.C      MICRO  1,, 0         C          -1             0           NA            F600131    159
 CC.D      MICRO  0             D          NA             0          LFN            F600131    160
 CC.E      MICRO  1,, 0         E          -1             0                         F600131    161
 CC.GT     MICRO  1,,$SYSTEXT$  GT=LFN ALWAYS            NA          LFN            F600250   1163
* CHANGE *COMPS* MICRO BELOW    E=LFN  ALWAYS            NA          LFN            F600131    162
* CHANGE *INPUT* MICRO BELOW    I=LFN  ALWAYS            NA          LFN            F600131    163
 CC.I      MICRO  1,,$COMPILE$  I                                                   F600261      1
 CC.L      MICRO  1,, 1         L           1             0           NA            F600250   1164
 CC.LCM    MICRO  1,, 0        LCM         -1             0           NA            F600162      1
 CC.O      MICRO  1,, 0         O          -1             0           NA            F600131    165
 CC.X      MICRO  1,, 0         X          -1             0           NA            F600131    166
 CC.N      MICRO  1,, 0         N          -1             0           NA            F600131    167
* CHANGE *OUTPUT* MICRO BELOW   L=LFN  ALWAYS            NA          LFN            F600131    168
 CC.PL     MICRO  1,, 5000      PL=N        N          5000           NA            F600215      1
 CC.Q      MICRO  1,, 0         Q          -1             0           NA            F600158      1
 CC.R      MICRO  1,, 1         R=     0, 1, 2, OR 3     NA           NA            F600131    169
 CC.S      MICRO  1,,$SYSTEXT$  S=LFN  ALWAYS            NA          LFN            F600131    170
 CC.T      MICRO  1,, 0         T          -1             0           NA            F600131    171
 CC.XT     MICRO  1,,$OPL$      XT                                                  F600296      1
 CC.Z      MICRO  1,, 0         Z          -1             0           NA            F500159      4
 CC.OPT    MICRO  1,, 1         OPT=   0, 1, OR 2        NA           NA            F600131    172
 CC.ROUND  MICRO  1,, 0BS19     ROUND= 1BS19 FOR /                                  FE30787      1
*                                      2BS19 FOR *                                  FE30787      2
*                                      4BS19 FOR -                                  FE30787      3
*                                     10BS19 FOR +                                  FE30787      4
 CC.IDENT  MICRO  1,, 0         SYSEDIT=IDENT                                       F600131    177
*                                          -1             0          NA             F600131    178
 CC.FILES  MICRO  1,, 1         SYSEDIT=FILES                                       F600138      7
*                                           0             1           NA            F600138      8
          IFC    EQ,/#CC.OPT#/0/,1                                                  FE20041      1
```

```
                ***                                                                    FTN         59
                *         ASSEMBLY OPTIONS                                             FTN         60
                *                                                                      FTN         61
                          IFEQ    TEST,0                                               FTN         62
                          RMT                                                          FTN         63
                 W=SBW    EQU     CCERR              W=SPY BIN WIDTH                   FTN         64
                 M=LFN    EQU     CCERR              MACROX PATCH FACILITY             FTN         65
                          RMT                                                          FTN         67
                          ENDIF                                                        FTN         71
                                                                                       FTN         72
                                                                                       FTN         73
                ***                                                                    F600138      9
                *         LOCAL ASSEMBLY OPTIONS REFERENCED ONLY IN ≠FTN≠              F600138     10
                *                                                                      F600138     11
           1     CCABT    EQU     1                  SET TO NON ZERO VALUE FOR ABORT ON FTN        75
                *                                    CONTROL CARD ERRORS               FTN         76
                 EM       IFNE    CPERM,0                                              F600250   1165
                                                                                       F600250   1166
                          ENTRY   LMAX                                                 F600250   1167
                                                                                       F600250   1168
                 EM       ENDIF                                                        F600250   1169
                                                                                       F600250   1170
          71     LMAX     EQU     57D                LINES / PAGE                      FTN         77
                PSR       MICRO   1,4,/P348/                                           PSRLEVEL     1
           1     CTIMO    EQU     1                                                    F600240      1
                *                                    =0 NO MESSAGE                     F600131    184
                *                                    =1 ISSUE DAYFILE MESSAGE FOR CPU  F600131    185
                *                                       COMPILATION TIME               F600131    186


        6600     CDC6466  OCTMIC MACHINE.            MACHINE THAT CODE IS GENERATED FOR F600131   188
                                                                                       FTN         82
                 K        MICRO   1,,/BS9/           *1000B                            FTN         85
                 TV       MICRO   1,,*1/2*           TRIGGER VALUE                     FTN         86
           1     TVS      EQU     1                  LOG2( 1/TV )                      FTN         87
                                                                                       F600077      2
                ***                                                                    F600077      3
                *         MIN.FL,MIN.DFL = MINIMUM FIELD LENGTH TO EXECUTE IN.         F600077      4
                *         MIN.FL = MAX(LWA LOAD)+400B+1000B ROUNDED UP TO NEXT 1000B   F600077      5
                *         WHERE:                                                       F600077      6
                *          MAX(LWA LOAD) = LAST WORD ADDR OF THE OVERLAY LOADS         F600077      7
                *          400B IS FOR MINIMUM RLIST AND COMPS BUFFERS                 F600077      8
                *          1000B IS FOR WORKING STORAGE                                F600077      9
                *         CURRENTLY PASS 1 ( THE 1.1 OVERLAY ) IS THE LARGEST          F600077     10
                *                                                                      F600077     12
                *         FOR FL > MIN.FL+3K STANDARD SIZE BUFFERS (L.RLIST,L.COMPS)   F600077     13
                *         ARE ALLOCATED FOR RLIST AND COMPS.                           F600077     14
                *                                                                      F600077     15
       42000     MIN.FL   EQU     42≠K≠+TEST*2000B   MINIMUM FL FOR EXECUTION          F600322      1
       61000     MIN.DFL  EQU     MIN.FL+17≠K≠       MINIMUM FL IF D OPTION SELECTED   F600077     17
                                                                                       F600077     18
       42000     MIN.FL   OCTMIC MIN.FL                                                F600077     19
                 MIN.FL   MICRO   1,2,/≠MIN.FL≠/                                       F600077     20
       61000     MIN.DFL  OCTMIC MIN.DFL                                               F600077     21
                 MIN.DFL  MICRO   1,2,/≠MIN.DFL≠/                                      F600077     22
```

```
                  *          DEFAULT FILE NAMES                                                    FTN         94
                                                                                                   FTN         95
                   INPUT     MICRO  1,,$INPUT$                                                     FTN         96
                   OUTPUT    MICRO  1,,$OUTPUT$                                                    FTN         97
                   LGO       MICRO  1,,$LGO$           BINARY FILE NAME                            FTN         98
                   COMPS     MICRO  1,,$COMPS$         COMPASS IMAGES                              FTN         99
                   RLIST     MICRO  1,,$ZZZZZRL$       INTERMEDIATE CODE SCRATCH FILE              F600172     20
                   RMAP      MICRO  1,,$ZZZZZRM$       REFERENCE MAP SCRATCH FILE                  F600172     21
                   OPT       MICRO  1,,$ZZZZZOP$       SUPER MODE SCRATCH FILE                     F600172     22
                             IFNE   TEST,0,3                                                       F600172     23
                   RLIST     MICRO  1,,$RLIST$         SCRATCH FILE NAME ( IN TEST MODE )          F600081      2
                   RMAP      MICRO  1,,$FTNRMAP$                                                   F600172     24
                   OPT       MICRO  1,,$FTNOPT$                                                    F600172     25


                  *          DEFAULT BUFFER SIZES                                                  FTN        105
                  *           MAY BE ADJUSTED BY FTN, DEPENDING ON FIELD LENGTH AND                FTN        106
                  *           CONTROL CARD OPTIONS                                                 FTN        107
                                                                                                   FTN        108
                                                                                                   F600250   1173
                   BUFL      MICRO  1,, 1002B   MINIMUM BUFFER SIZE                                F600250   1174
                                                                                                   F600250   1175
                             RMT                                                                   F600250   1176
                   L.INPUT   EQU    IBUFL                                                          F600250   1177
                   L.OUTPUT  EQU    OBUFL                                                          F600250   1178
                             RMT                                                                   F600250   1179
                                                                                                   F600250   1180
          1002     L.COMPS   EQU    ≠BUFL≠      COMPASS SOURCE IMAGE BUFFER LENGTH                 F600250   1181
          2004     L.LGO     EQU    ≠BUFL≠*2    BINARY OUTPUT BUFFER LENGTH                        F600250   1182
          2004     L.OPT     EQU    ≠BUFL≠*2    MAX OPT (OPT=2) SCRATCH FILE BUFFER LENGTH         F600250   1183
          2004     L.RLIST   EQU    ≠BUFL≠*2    INTERMED LANG (R-LIST) FILE BUFFER LENGTH          F600250   1184
          1002     L.RMAP    EQU    ≠BUFL≠      LONG REFERENCE MAP (R=3) BUFFER LENGTH             F600250   1185
                                                                                                   FTN        116
                  *          THE LENGTH≠S OF THE ≠INPUT≠ AND ≠LGO≠ BUFFERS MUST BE                 FTN        117
                  *          .GT. 1000B SINCE THEY MAY BE ON TAPE.                                 FTN        118
                                                                                                   FTN        119
             3     NOPTLVL   EQU    3                  NUMBER OF LEVELS OF OPTIMIZATION            FTN        120
```

9.3.2 COMPILER PROGRAM LIBRARY STRUCTURE

When a full update is performed on the program library, eight records are produced on the compile file as follows:

	Contents	Overlay Level	Deck Names Needed to Compile
1.	FTNMAC		FTNMAC
2.	FTNTEXT		FTNTEXT
3.	Controller	(0,0)	FTN
		(1,0)	LSTPRO.SNAP
	Pass 1--normal	(1,1)	PS1CTL.PH1CTL
	Pass 2	(1,2)	CLOSE2.MACROX
		(1,3)	PS2CTL
4.	Pass 1-1/2	(1,5)	PASS15.CHECK
5.	Pass 1--debug	(1,4)	DBGPHCT.SAVREGS
6.	Debug COPYL deck		FORMDBG
7.	RDUMP		MACROR.RDUMPCP
8.	CMPAR		CMPAR

FTNMAC

This routine is a text collection of the macros necessary to assemble an 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 SYSEDIT. 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 that 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)

This overlay 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 F 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 LIBEDIT 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 OLD file for LIBEDIT 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 FTN 4.0 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).

9.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

9.4.1 FTNC1

```
FTNC1
FTNC1,CM65000,T7000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB UPDATES THE FORTRAN EXTENDED COMPILER AND CREATES
COMMENT.  A NEW KPL15A WITH PROGRAM LIBRARY AND COMPILER BINARIES.
COMMENT.
COMMENT.  THE CONTENTS OF THE NEW KPL15A ARE --
COMMENT.          FILE 1 -- FORTRAN COMPILER PROGRAM LIBRARY
COMMENT.          FILE 2 -- RELOCATABLE BINARIES OF THE NON DEBUG
COMMENT.                    OVERLAYS
COMMENT.          FILE 3 -- RELOCATABLE BINARIES OF THE DEBUG OVERLAYS
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.  COMMON DECK COMPCOM WHICH IS NECESSARY FOR COMPASS/FTN
COMMENT.  INTERFACE.
COMMENT.
COMMENT.  W A R N I N G -- THIS JOB DOES A SYSEDIT OF THE FIRST FIVE
COMMENT.  COMPASS GENERATED OVERLAYS.  THIS IS NECESSARY SO THAT THESE
COMMENT.  OVERLAYS CAN BE USED TO COMPILE FORTRAN CODE IN THE LAST
COMMENT.  TWO OVERLAYS.  THIS SYSEDIT MAY CONFLICT WITH A
COMMENT.  CONCURRENTLY RUNNING TIMESHARING SUBSYSTEM (TELEX, ETC... ).
COMMENT.
*VSN CARD.
LABEL(OLDPL,R,FI=COMPASS3P0*3P4,MT,D=HY,F=SI)
UPDATE(Q,P=OLDPL,N=COMPCOM,C=0)
UNLOAD(OLDPL)
RETURN,OLDPL.
*VSN CARD.
LABEL(OLDPL,R,FI=FTN4P0COMP*3P4,MT,D=HY,F=SI)
REWIND,OLDPL.
UPDATE(F,P=OLDPL,N=NEWPL,W,R=C)
REWIND,NEWPL.
SKIPF,NEWPL.
UNLOAD(OLDPL)
RETURN,OLDPL.
COMPASS,I,L=0,B=FTNMAC,S=0.
COMPASS,I,L=0,B=FTNTEXT,S=0.
COMPASS,I,L=0,B=SYSMAIN,S=IPTEXT,G=FTNTEXT.
REWIND,SYSMAIN.
MAP.
RFL,70000.
LOAD,SYSMAIN.
SYSEDIT,I=0,B=FTN.
RETURN,FTN.
RFL,65000.
```

```
FTN,I,L=0,GT=FTNTEXT,S=0,OPT=1,B=SYSOPT.
FTN,I,L=0,GT=FTNTEXT,S=0,OPT=1,B=FDEBUG.
FTN,I,L=0,GT=FTNTEXT,S=0,OPT=1,B=FDEBUG.
REWIND,SYSMAIN,SYSOPT,FDEBUG.
COPYBR,FDEBUG,SYSDBG.
NOEXIT.
LIBEDIT,P=FDEBUG,R,B=SYSMAIN,I=0,N=SYSDBGA.
REWIND,SYSMAIN,SYSOPT,SYSDBGA.
COPYBF,SYSDBGA,SYSDBG.
REWIND,SYSDBG.
COPYBF,SYSMAIN,SYSFTN.
BKSP,SYSFTN.
COPYBF,SYSOPT,SYSFTN.
REWIND,SYSFTN.
COPYBF,SYSFTN,NEWPL.
BKSP,SYSFTN.
COPYBF,SYSDBG,SYSFTN.
REWIND,SYSFTN.
RETURN,FTN.
RFL,76000.
LOAD(SYSFTN)
RFL,30000.
REWIND,SYSFTN,FTN,FTNMAC.
COPYBF,SYSFTN,NEWPL.
COPYBR,FTNMAC,NEWPL.
COPYBF,FTN,NEWPL.
CATALOG,NEWPL,R,N=0.
*VSN CARD.
LABEL(KPL15A,W,FI=FTN4P0COMP*3P4,MT,D=HY,F=SI)
REWIND,KPL15A.
COPYEI,NEWPL,KPL15A,V.
*WEOR
*C COMPCOM
*WEOR
*/  PLACE FTN4.0 MODIFICATIONS HERE
*WEOF
```

9.4.2 FTNC2

```
FTNC2
FTNC2,CM55000,T1000,P30.
*ACCOUNT CARD.
COMMENT. THIS JOB ADDS THE FTN V4.0 COMPILER BINARY TO THE SYSTEM
COMMENT. COMMON FILE ZZZPSBF FROM THE KPL15A RELEASE TAPE.
COMMENT. EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT. JOB FTNC1 MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT. TO COMMON FILE ZZZZLDF FOR GENERATING A NEW SYSTEM DEADSTART.
COMMENT.
*VSN CARD.
LABEL(KPL15A,R,FI=FTN4P0COMP*3P4,MT,D=HY,F=SI)
REWIND,KPL15A.
SKIPF,KPL15A,3.
COPYBF,KPL15A,FTNC.
UNLOAD,KPL15A.
RETURN,KPL15A.
CATALOG,FTNC,R.
```

```
COMMON,ZZZPSBF,ZZZZLDF.
COPYBF,FTNC,ZZZPSBF.
BKSP,ZZZPSBF.
COPYBR,,ZZZZLDF.
*WEOR
*ADD       LIB26,OVL/FTNMAC-PASS14$
*WEOF
```

9.4.3 FTNC3

```
FTNC3
FTNC3,CM55000,T200.
*ACCOUNT CARD.
COMMENT.  THIS PROGRAM VERIFIES CORRECT INSTALLATION OF
COMMENT.  FORTRAN EXTENDED 4.0.
FTN(G,OPT=1)
BKSP(INPUT)
RETURN(LGO)
FTN(G,OPT=2)
BKSP(INPUT)
RETURN(LGO)
FTN(G,OPT=0)
COMMENT.    FTN 4.0 INSTALLED.
EXIT.
COMMENT.  FTN 4.0 VERIFICATION FAILED.
*WEOR
      PROGRAM   SIMPLE (OUTPUT)
      REAL      A(1,10), B(10,2), C(1,2), D(1,2)
      DATA      D(1,1), D(1,2)  / 385.0, 5885.0 /

      DO  10  I=1, 10
        A(1,I) = I
  10  CONTINUE

      DO  30  J=1, 2
        DO 20  I=1, 10
          B(I,J) = I + 100*(J - 1)
  20    CONTINUE
  30  CONTINUE

      DO  60  I=1, 1
        DO  50  J=1, 2
          T = 0.0
          DO  40  K=1, 10
            T = T + A(I,K)*B(K,J)
  40      CONTINUE
          C(I,J) = T
  50    CONTINUE
  60  CONTINUE

      IF (C(1,1) .NE. D(1,1))  GO TO  70
      IF (C(1,2) .NE. D(1,2))  GO TO  70
      CALL REMARK(22HCOMPUTATION SUCCESSFUL)
      STOP
```

```
  70  PRINT 1000, C, D
 1000 FORMAT (≠1    FAILURE≠*0 C-ARRAY IS *2F20.5/*0  SHOULD BE *2F20.
     .5)
5)
      CALL REMARK (7HFAILURE)
      CALL EXIT
      END
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
01.05.08.FTNC3,CM55000,T200.
01.05.08.*ACCOUNT CARD.
01.05.08.ACCOUNT,USER1.
01.05.09.COMMENT.  THIS PROGRAM VERIFIES CORRECT
01.05.09.INSTALLATION OF
01.05.09.COMMENT.  FORTRAN EXTENDED 4.0.
01.05.09.FTN(G,OPT=1)
01.05.10.       .391 CP SECONDS COMPILATION TIME
01.05.10.LGO
01.05.12.COMPUTATION SUCCESSFUL
01.05.12.     STOP
01.05.12.BKSP(INPUT)
01.05.12.RETURN(LGO)
01.05.13.FTN(G,OPT=2)
01.05.17.       .618 CP SECONDS COMPILATION TIME
01.05.17.LGO
01.05.18.COMPUTATION SUCCESSFUL
01.05.18.     STOP
01.05.19.BKSP(INPUT)
01.05.19.RETURN(LGO)
01.05.19.FTN(G,OPT=0)
01.05.22.       .275 CP SECONDS COMPILATION TIME
01.05.22.LGO
01.05.24.COMPUTATION SUCCESSFUL
01.05.24.     STOP
01.05.24.COMMENT.     FTN 4.0 INSTALLED.
```

9.4.4 F4LIB1

```
F4LIB1
F4LIB1,CM60000,T3000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB UPDATES AND CREATES THE BINARIES OF THE FTN 4.0
COMMENT.  OBJECT LIBRARY ROUTINES AND CREATES A NEW KPL15B.
COMMENT.  THE FIRST FILE OF THE NEW KPL15B WILL BE THE NEWPL.
COMMENT.  THE SECOND FILE WILL BE THE BINARIES OF THE LIBRARY ROUTINES.
COMMENT.
*VSN CARD.
LABEL(OLDPL,R,FI=FTNLIBS*3P4,MT,D=HY,F=SI)
REWIND,OLDPL.
UPDATE(F,P=OLDPL,N=NEWPL,W,R=C)
SKIPF,NEWPL.
UNLOAD(OLDPL)
RETURN,OLDPL.
COMPASS,I,L=0,S=IOTEXT,S=IPTEXT,B=LIBRARY.
FTN,I,L=0,S=IOTEXT,S=IPTEXT,B=LIBRARY.   FTN DEBUG LIBRARY
REWIND,LIBRARY.
COPYBF,LIBRARY,NEWPL.
*VSN CARD.
LABEL(KPL15B,W,FI=FTNLIBS*3P4,MT,D=HY,F=SI)
CATALOG,NEWPL,R,N=0.
REWIND,NEWPL,KPL15B.
COPYEI,NEWPL,KPL15B,V.
UNLOAD,KPL15B.
*WEOR
*/  PLACE FTN 4.0 LIBRARY MODIFICATIONS HERE
*WEOF
```

9.4.5 F4LIB2

```
F4LIB2
F4LIB2,CM50000,T1000,P30.
*ACCOUNT CARD.
COMMENT.  THIS JOB ADDS THE FTN V4.0 OBJECT LIBRARY TO THE SYSTEM
COMMENT.  COMMON FILE ZZZPSBF FROM THE KPL15B RELEASE TAPE AS THE USER
COMMENT.  LIBRARY -FORTRAN-.
COMMENT.  EITHER THE RELEASED VERSION OR THE LATEST VERSION CREATED BY
COMMENT.  JOB F4LIB1 MAY BE USED. IT ALSO ADDS THE NECESSARY DIRECTIVES
COMMENT.  TO COMMON FILE ZZZZLDF FOR GENERARING A NEW SYSTEM DEADSTART.
COMMENT.
*VSN CARD.
LABEL(KPL15B,R,FI=FTNLIBS*3P4,MT,D=HY,F=SI)
REWIND,KPL15B.
SKIPF,KPL15B.
COPYBF,KPL15B,LGO.
LIBGEN,F,P=FORTRAN.
COMMON,ZZZPSBF,ZZZZLDF.
CATALOG,FORTRAN,U,R.
COPYBR,,ZZZZLDF.
COPYBF,FORTRAN,ZZZPSBF.
BKSP,ZZZPSBF.
*WEOR
*ADD       LIB26,ULIB/FORTRAN
*WEOF
```

10.1 RELEASE DESCRIPTION

10.1.1 HARDWARE REQUIREMENTS

PERT/Time 1.2 requires three tape units and 65K central memory to run.

10.1.2 CORRECTIONS

PERT/Time 1.2 includes all eligible PSR corrective code published through PSR Summary 348.

10.1.3 DEFICIENCIES

No user file can be named TAPE1 through TAPE6 because these file names are used internally.

10.2 INSTALLATION PROCEDURE

The procedure to update PERT/Time 1.2 is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for PERT/Time, the following materials are necessary.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for PERT/Time 1.2 are PRT1 and PRT3.

PRT1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
PRT3	Use to verify that the product is correctly installed.

KPL16 contains the PERT/Time 1.2 binary code.

PL13 contains the PERT/Time 1.2 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.10.

The installation deck PRT1 compiles PERT/Time 1.2, forms the necessary overlays, and writes these overlays on the tape containing the PERT/Time program library. PERT/Time must be executed from this overlay tape; it cannot be executed from the running system.

To execute from the overlay tape (KPL16), run a job similar to the following.

```
PERT, T1000, CM10000.
ACCOUNT(usernum, password)
LABEL(KPL16, R, FI=PERT*3P4, MT, D=HY, F=SI)
COPYBF(KPL16, KPL16)
COPYBF(KPL16, PERT66)
PERT66.
7/8/9
  :
  :
7/8/9
  :
  :
6/7/8/9
```

PERT networks

If a master tape is made, insert the following after card 3.

```
REQUEST, TAPE6, 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, insert a RESOURC card before the REQUEST card.

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.)

10.3 INSTALLATION PARAMETERS

None.

10.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

10.4.1 PRT1

```
PRT1
PRT1,CM55000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF PERT 1.2 ON KPL16.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=PERT*3P4,MT,D=HY,F=SI)
ASSIGN,NE,X.
UPDATE,F,N,W.
UNLOAD,OLDPL.
SKIPEI,NEWPL.
RETURN,OLDPL.
RUN,S,,,COMPILE,X.
MAP.
LINK,P=RUN2P3,B=NEWPL.
SKIPEI,NEWPL.
REWIND,LGO.
WRITEF,NEWPL.
COPYBF,LGO,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL16,W,FI=PERT*3P4,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL16,V.
UNLOAD,KPL16.
*WEOR
*/        PLACE *PERT/TIME* MODSET HERE.
*WEOF
```

10.4.2 PRT3

```
PRT3
PRT3,CM100000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
*THIS SIMPLE PROGRAM VERIFIES CORRECT
*INSTALLATION OF PERT/TIME.
LABEL(KPL16,R,FI=PERT*3P4,MT,D=HY,F=SI)
COPYBF,KPL16,KPL16.
COPYBF,KPL16,PERT66.
UNLOAD,KPL16.
RETURN,KPL16.
PERT66.
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
K         9         64          3         5          0
L         1          7
M
XC36 PERT VERIFICATION PROGRAM                333
Y091764091764      1     0CLASSIFICATION
W  123456                                                          503
A          00     01   00   00   00A091764                          0123456789000RG1
A   19     01     01                091764EVENT  1
A          01     02   50   80   90                                    01       ORG4
A          01     03   10   40   50                                0012345678900RG3
A          01     04   40   50   80                                    51       ORG1
A   28     02     02                111364EVENT  2
A          02     05   10   40   90                                    02       ORG4
A          02     09   40   40   60                                    31       ORG1
A   38     03     03                101664EVENT  3
A          03     05   20   40   70                                    03       ORG4
A          03     06   20   40   70                                    01       ORG1
A   48     04     04                102664EVENT  4
A          04     07   20   20   40                                    53       ORG2
A          04     08   20   40   50                                    52       ORG1
A   57     05     05                121464EVENT  5
A          05     10   20   40   60                                0234567185600RG5
A   67     06     06                111664EVENT  6
A          06     10   20   30   40                                    03       ORG1
A          06     11   20   30   40                                    81       ORG2
A   77     07     07                111664EVENT  7
A          07     11   30   60   90                                    52       ORG2
A   87     08     08                112364EVENT  8
A          08     12   30   40   70                                    54       ORG1
A   9      09     09                122464EVENT  9
A          09     13   00   00   00                                    31       ORG1
A  106     10     10                010865EVENT 10
A          10     15   30   50   70                                    01       ORG2
A  116     11     11                122464EVENT 11
A          11     16   20   30   70                                    81       ORG2
```

```
A 126   12   12                 122464EVENT 12
A       12   14   20   30   50                                       51   ORG5
A 136   13   13                 122464EVENT 13
A       13   18   10   10   20                                       71   ORG4
A 145   14   14                 011865EVENT 14
A       14   17   30   50   50                                       41   ORG2
A 155   15   15                 021265EVENT 15
A       15   19   10   30   40                                       61   ORG5
A       15   22   20   70  110                                       71   ORG1
A 165   16   16                 012365EVENT 16
A       16   20   20   50   60                                       82   ORG2
A 17    17   17                 022265EVENT 17
A       17   21   20   25   30                                       42   ORG1
A 185   18   18                 011165EVENT 18
A       18   22   50   60   80                                       72   ORGJ
A 194   19   19                 030565EVENT 19
A       19   20   00   00   00                                       82   ORG2
A 204   20   20                 030565EVENT 20
A       20   22   50   80   90                                       71   ORG4
A       20   25  100  150  170                                       11   ORG1
A       20   27  120  130  180                                       21   ORG4
A 214   21   21                 031565EVENT 21
A       21   24   25   30   40                                       41   ORG2
A 224   22   22                 050365EVENT 22
A       22   23                                                      72   ORG2
A 234   23   23                 050365EVENT 23
A       23   26   30   40   60                                       22   ORG2
A       23   27   30   50   80                                       21   ORG1
A 244   24   24                 040665EVENT 24
A       24   25   30   50  110                                       42   ORG5
A 253   25   25                 061865EVENT 25
A       25   27   40   50   90                                       11   ORG1
A 263   26   26                 060465EVENT 26
A       26   27   20   30   40                                       23   ORG5
A 273   27   27                 080265EVENT 27
Z
#WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.31.20.PRT3,CM100000,P30,T1000.
00.31.20.ACCOUNT,USER1.
00.31.21.*ACCOUNT CARD.
00.31.21.VSN,KPL16=0KPL16.
00.31.22.*THIS SIMPLE PROGRAM VERIFIES CORRECT
00.31.22.*INSTALLATION OF PERT/TIME.
00.31.22.LABEL(KPL16,R,FI=PERT*3P4,MT,D=HY,F=SI)
00.31.23.MT51, ASSIGNED TO KPL16  , VSN=0KPL16.
00.31.24.COPYBF,KPL16,KPL16.
00.31.27.COPY COMPLETE.
00.31.28.COPYBF,KPL16,PERT66.
00.31.32.COPY COMPLETE.
00.31.33.UNLOAD,KPL16.
00.31.33.RETURN,KPL16.
00.31.34.PERT66.
00.31.58.STOP
00.31.58.*END OF JOB.
```

11.1 RELEASE DESCRIPTION

SIMSCRIPT 3.0 consists of a compiler and an execution library. All deck names used in both the compiler and the execution library are listed below. They are contained in a single Update record, and they are ordered to make generation of an overlay tape as easy as possible.

The first 73 decks (ADEF through ASML) belong to the SIMSCRIPT 3.0 compiler and are written in SIMSCRIPT.

ADEF contains the definition deck necessary to compile the compiler. It must always be written on the COMPILE file when any compiler routine written in SIMSCRIPT is to be recompiled.

MAINAD through WASM (15 decks) represent the definition processor part of the compiler (overlay 1.0).

DEFINE through REFL (52 decks) represent the translator part of the compiler (overlay 2.0).

ASMBL through ASML (5 decks) represent the assembler phase of the compiler (overlay 3.0).

The deck TREND$ marks the end of the SIMSCRIPT language routines; it contains a *WEOR.

The following 38 decks (SIMI5 through ALLOUT) belong to the SIMI5 compiler and are written in COMPASS.

SIMI5 through XXERROR represent the root segment of the compiler (overlay 0,0).

XX$DEFS through CONUM are part of the definition processor overlay (overlay 1,0).

XX$TRAN through PACKIT are part of the translator overlay (overlay 2,0).

XX$FAKE represents overlay 2,1.

XX$ASMB through ALLOUT are part of the assembler overlay (overlay 3,0).

The deck UTEND$ marks the end of the compiler routines written in COMPASS; it contains a *WEOR.

The 26 decks from XX$MAIN through XX$FMT represent the SIMI5 execution library and are written in COMPASS.

Loader control cards are included in the following decks: SIMI5, XX$DEFS, XX$TRAN, XX$FAKE, and XX$ASMB.

The SIMI5 compiler automatically generates the following LDSET table to reference the necessary libraries.

SIMLIB	Should contain the SIMI5 execution library
FORTRAN	
SYSIO	

11.1.1 HARDWARE REQUIREMENTS

SIMSCRIPT 3.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length required to run SIMSCRIPT 3.0 is $55,000_8$.

11.1.2 CORRECTIONS

SIMSCRIPT 3.0 includes all eligible PSR corrective code published through PSR Summary 348.

11.1.3 DEFICIENCIES

None.

11.2 INSTALLATION PROCEDURE

The procedure to install and update SIMSCRIPT 3.0 is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for SIMSCRIPT 3.0, the following materials are necessary.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for SIMSCRIPT 3.0 are SMS1, SMS2, and SMS3.

SMS1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
SMS2	Use to collect the SIMSCRIPT 3.0 binary code and generate directive files for later use as input to the procedure file GENSYS.
SMS3	Use to verify that the product is correctly installed.

KPL17 contains the SIMSCRIPT 3.0 binary code.

PL27 contains the SIMSCRIPT 3.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.11.

11.3 INSTALLATION PARAMETERS

There are no installation parameters.

SIMSCRIPT 3.0 routines that reference SCOPE 3.4 Texts IPARAMS are listed in part III, section 1.7.3.

11.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1

11.4.1 SMS1

```
SMS1
SMS1,CM60000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF SIMSCRIPT 3.0 ON KPL17.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=SIMI53P0*3P4,MT,D=HY,F=SI)
UPDATE,F,N,W,C=0.
UNLOAD,OLDPL.
UPDATE,F,P=NEWPL,L=0.
RETURN,OLDPL.
SIMI5,I=COMPILE,D=0,B=SIMTR,L=0.
COMPASS,I,S=CPCTEXT,B=SIMUT,L=0.
COMPASS,I,S=IOTEXT,B=SIMLB,L=0.
REWIND,SIMUT,SIMTR.
COPYX,SIMUT,LGO,REL/CONUM.
COPYX,SIMTR,LGO,REL/WASM.
COPYX,SIMUT,LGO,REL/PACKIT.
COPYX,SIMTR,LGO,REL/REFL.
COPYBF,SIMUT,LGO.
BKSP,LGO.
COPYBF,SIMTR,LGO.
SKIPEI,NEWPL.
MAP.
LINK,F,P=SYSIO,B=NEWPL.
SKIPEI,NEWPL.
LIBGEN,F=SIMLB,P=SIMLIB.
REWIND,SIMLIB,SIMLB,LGO.
COPYBF,SIMLIB,NEWPL.
COPYBF,SIMLB,NEWPL.
COPYBF,LGO,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL17,W,FI=SIMI53P0*3P4 MT,D=HY,F=SI)
COPYEI,NEWPL,KPL17,V.
*WEOR
*/          PLACE *SIMSCRIPT* MODSET HERE.
*WEOR
*IDENT     KRONOS
*I,XX$NIT.10
            RJ      =XLOADER     FORCE REDUCE(-)
*WEOF
```

11.4.2 SMS2

```
SMS2
SMS2,CM15000,P30,T1000.
*ACCOUNT CARD
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL17,R,FI=SIMI53P0*3P4,MT,D=HY,F=SI)
SKIPF,KPL17.
COPYBF,KPL17,SMSCRPT.
RETURN,KPL17.
COMMON,ZZZZLDF,ZZZPSBF.
CATALOG,SMSCRPT,R.
COPYBR,,ZZZZLDF.
COPYBF,SMSCRPT,ZZZPSBF.
BKSP,ZZZPSBF.
*WEOR
*ADD       LIB27,OVL/SIMI5-ULIB/SIMLIB
*WEOF
```

11.4.3 SMS3

```
SMS3
SMS3,CM60000,P30,T1000.
*ACCOUNT CARD.
*THIS SIMPLE PROGRAM VERIFIES CORRECT
*INSTALLATION OF SIMSCRIPT.
SIMI5.
LGO.
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
+                                                                RRAY I
      MAIN  MAGIC REPORT
      DIMENSION ARRAY(25,25)
      DO, FOR N = (3)(5)(2)
      LET I = N
      LET J =(N+1)/2
      DO, FOR K = (1)(N*N)
      STORE K IN ARRAY(I,J)
      IF K EQ K/N*N, GO 1
      IF J EQ N,LET J = 0
      IF I EQ N, LET I = 0
      LET I = I+1
      LET J = J+1
      GO 2
    1 LET I = I-1
    2 LOOP
      CALL MAGIC(N,(N*N+1)*N/2,ARRAY)
      LOOP
      STOP
      END
```

```
        FUNCTION RRAY (V,I,J)
        DIMENSION V(25,25)
        STORE V(I,J) IN RRAY
        RETURN
        END
        REPORT MAGIC(N,KSUM,V)
                                                                              X
     21          FOR I = (1)(N)
                                                                              X
X                               THIS IS A *** BY *** MAGIC SQUARE.  ALL OF
THE ROWS,COLUMNS AND DIAGONALS SUM TO          *                        12    X
 X                  N   N   KSUM
                                                                              X
X                        CONTINUATION OF THE *** BY *** MAGIC SQUARE
                                                                       22
 X                N   N

X          *     *     *     *     *     *     *     *     *     *     *
      *    *     *     *     *     *     *     *     *     *       1      *
 X        21(RRAY(V,I,J))
                                                                              X
  X              FOR J = (1)(N)
                                                                              X
                 END
       END
*WEOR
1X        0
                                                              SYSTEM SPEC. CARD
                                                          END OF INITIALIZATION.
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.39.45.SMS3,CM60000,P30,T1000.
00.39.46.ACCOUNT,USER1.
00.39.46.*ACCOUNT CARD.
00.39.47.*THIS SIMPLE PROGRAM VERIFIES CORRECT
00.39.47.*INSTALLATION OF SIMSCRIPT.
00.39.50.SIMI5.
00.40.03.LGO.
00.40.08.    STOP  SIMI5
00.40.09.*END OF JOB.
```

12.1 RELEASE DESCRIPTION

12.1.1 HARDWARE REQUIREMENTS

SIMULA 1.0 can be maintained on the same hardware configuration as KRONOS 2.1. The minimum field length to run SIMULA 1.0 is $30,000_8$.

12.1.2 CORRECTIONS

SIMULA 1.0 includes all eligible PSR corrective code published through PSR Summary 348.

12.1.3 DEFICIENCIES

Code procedures and direct files are not implemented.

The KRONOS 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, and G) is deactivated; attempts to use these options result in job termination.

SIMULA expects compiler input to conform to the KRONOS 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.

12.2 INSTALLATION PROCEDURE

The procedure to install and update SIMULA 1.0 is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for SIMULA, the following materials are necessary.

KPL2 contains the jobs to update, install, and verify installation; the jobs required for SIMULA are SIM1, SIM2, and SIM3.

SIM1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
SIM2	Use to collect the SIMULA binary code and generate directive files for later use as input to the procedure file GENSYS.
SIM3	Use to verify that SIMULA is correctly installed.

KPL18 contains the SIMULA 1.0 binary code.

PL19 contains the SIMULA 1.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.12.

12.3 INSTALLATION PARAMETERS

None.

12.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

12.4.1 SIM1

```
SIM1
SIM1,CM56000,P30,T1400.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF SIMULA 1.0 ON KPL18.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=SIMULA1P0*3P4,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
SKIPEI,NEWPL.
RETURN,OLDPL.
COMPASS,I,S=IPTEXT,L=0.
MAP.
LINK,B=NEWPL.
SKIPEI,NEWPL.
WRITEF,NEWPL.
COMPASS,I,S=IPTEXT,B=NEWPL,L=0.
WRITEF,NEWPL.
REWIND,LGO.
COPYBF,LGO,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL18,W,FI=SIMULA1P0*3P4,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL18,V.
*WEOR
*/          PLACE *SIMULA* MODSET HERE.
*WEOF
```

12.4.2 SIM2

```
SIM2
SIM2,CM45000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL18,R,FI=SIMULA1P0*3P4,MT,D=HY,F=SI)
SKIPF,KPL18.
COPYBF,KPL18,SIMULA.
COPYBF,KPL18,LIB.
UNLOAD,KPL18.
RETURN,KPL18.
CATALOG,SIMULA,R.
COMMON,ZZZZLDF,ZZZPSBF.
COPYBF,SIMULA,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/SYSMISC
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R3=1)
GTR(SYSTEM,OLD)ULIB/SYSMISC
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=SYSMISC.
CATALOG,SYSMISC,R,U.
LIBEDIT,P=ZZZPSBF,B=SYSMISC,C,L=0.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
IF(R3≠0)COPYBR,,ZZZZLDF.
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/SYSMISC
*WEOR
*ADD       LIB28,OVL/SIMULA-SIM5
*WEOR
*ADD       LIB21,ULIB/SYSMISC
*WEOF
```

12.4.3 SIM3

```
SIM3
SIM3,CM56000,P30,T100.
*ACCOUNT CARD.
*THIS SIMPLE PROGRAM VERIFIES CORRECT
*INSTALLATION OF SIMULA 1.0.
SIMULA(L,X)
LGO.
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
≠COMMENT≠ VALIDATION PROGRAM
IF SIMULA IS WELL IMPLEMENTED ON THE SYSTEM, FOLLOWING LINES MUST OCCUR
         LIBRARY 0 EXISTS
         LIBRARY 1 EXISTS
         LIBRARY 2 EXISTS
         LIBRARY 3 EXISTS
         GARBAGE COLLECTOR EXISTS;

SIMULATION ≠BEGIN≠ ≠REF≠(LINK) Z; ≠TEXT≠ T; ≠REAL≠ X;
   ≠PROCEDURE≠ PRINT(T); ≠TEXT≠ T; ≠BEGIN≠ OUTTEXT(T); OUTIMAGE ≠END≠;

                                        PRINT(↓LIBRARY 0 EXISTS↓);
X..= COS(0)+SQRT(4);                    PRINT(↓LIBRARY 1 EXISTS↓);
Z..- ≠NEW≠ LINK;                        PRINT(↓LIBRARY 2 EXISTS↓);
X..= LINE;
T..- TEXT(↓ABC↓);                       PRINT(↓LIBRARY 3 EXISTS↓);
GARBAGE(0);                             PRINT(↓GARBAGE COLLECTOR EXISTS↓)
≠END≠
         FINIS
*WEOR
DATASET,END
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.32.36.SIM3,CM56000,P30,T100.
00.32.36.ACCOUNT,USER1.
00.32.37.*ACCOUNT CARD.
00.32.37.*THIS SIMPLE PROGRAM VERIFIES CORRECT
00.32.37.*INSTALLATION OF SIMULA 1.0.
00.32.37.SIMULA(L,X)
00.32.40.LGO.
00.32.42.*END OF JOB.
```

13.1 RELEASE DESCRIPTION

Sort/Merge 4.0 runs in conjunction with KRONOS 2.1 and Record Manager 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 that are in core only when necessary. For example, a disk sort does not require the tape merge overlay modules. This product is designed to optimize speed and core space as well as to utilize Record Manager 1.0 capabilities.

13.1.1 HARDWARE REQUIREMENTS

Sort/Merge 4.0 can be maintained on the same minimum hardware configuration as KRONOS 2.1. If the tape sort option is used, additional magnetic tape units are required: polyphase requires three; balanced requires four. The minimum field length requirement to run Sort/Merge 4.0 is 25,000$_8$.

13.1.2 CORRECTIONS

Sort/Merge 4.0 includes all eligible PSR corrective code published through PSR Summary 348.

13.1.3 DEFICIENCIES

The following modification must be available in Sort/Merge 4.0 if it is to operate under KRONOS 2.1. Corrective code similar to the following will be released at PSR level 357 under the IDENT ST40083.

```
*IDENT    SORTMOD
*/        THE FOLLOWING IS A MODIFICATION        IN SORT TO ELIMINATE
*/        A BUFFER ARG. ERROR IN SORT LEVEL 348. USE S=IOTEXT,S=CPUTEXT.
*D,MRGCON.788,819
*D,MRGCON.601,608
          SB3     X5
          BX0     X4
          SB5     B1
          BX3     X1
 GNM.5    SA2     X3+B5
          SX2     X2
          EVICT   X2
          SB5     B5+B1
          LE      B5,B3,GNM.5
          SB5     B1
 GNM.6    SA2     X3+B5
          SX2     X2
          RECALL  X2
          SB5     B5+B1
          LE      B5,B3,GNM.6
          BX2     X3
*C MRGCON
```

13.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update Sort/Merge is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for Sort/Merge, the following materials are necessary.

KPL2 contains the jobs to modify, update, install, and verify installation; the jobs required for Sort/Merge are SRM1, SRM2, and SRM3.

SRM1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
SRM2	Use to collect the binary code and generate directive files for later use as input to the procedure file GENSYS.
SRM3	Use to verify that the product is correctly installed.

KPL19 contains the Sort/Merge 4.0 binary code.

PL10 contains the Sort/Merge 4.0 source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.13.

13.3 INSTALLATION PARAMETERS

Sort/Merge 4.0 will assemble to use the CMU hardware, depending upon IP.CMU from IPTEXT. (Refer to part III, section 1.7.3 for definition of IP.CMU.) To override this parameter, make the following changes.

To install Sort/Merge 4.0 without CMU code:

```
*I FEAT24B.4
  BDP.INST    EQU    BDP.NO
```

To install Sort/Merge 4.0 with CMU code:

```
*I FEAT24B.4
  BDP.INST    EQU    BDP.YES
```

13.4 INSTALLATIONS JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

13.4.1 SRM1

```
SRM1
SRM1,CM56000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF SORT 4.0 ON KPL19.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(OLDPL,R,FI=SORT4P0*3P4,MT,D=HY,F=SI)
UPDATE,F,N,W,X.
UNLOAD,OLDPL.
SKIPEI,NEWPL.
RETURN,OLDPL.
COMPASS,I,S=IOTEXT,S=CPUTEXT,S=IPTEXT,B=REL,L=0.
GTR(REL,LIB,,NR)REL/DSMCON-MACPRO,SOCHKR
GTR(REL,LIB,,NR)REL/ENDPRO,EXTRACT,KYCPL-BUFALL
GTR(REL,LIB,,NR)REL/TRNSRT,TSC-NEXRCM
GTR(REL,LIB,,NR)REL/FMC-FSRTGET,MRGCON-SRTGET
REWIND,REL,LIB.
COPYX,REL,REL,TEXT/OVERLAY,3.
COPY,REL,LGO.
MAP.
COMPASS,I,S=0,B=NEWPL,L=0.
LINK,F,P=SYSIO,B=SMC.
REWIND,SMC.
COPYX,SMC,NEWPL,OVL/DUMMY,2.
COPYBF,SMC,NEWPL.
COPYBF,LIB,NEWPL.
COPYBF,LGO,NEWPL.
REWIND,NEWPL.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL19,W,FI=SORT4P0*3P4,MT,D=HY,F=SI)
COPYEI,NEWPL,KPL19,V.
*WEOR
*/         PLACE *SORT/MERGE* MODSET HERE.
*WEOF
```

13.4.2 SRM2

```
SRM2
SRM2,CM45000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL19,R,FI=SORT4P0*3P4,MT,D=HY,F=SI)
SKIPF,KPL19.
COPYBF,KPL19,SORTMRG.
COPYBF,KPL19,LIB.
UNLOAD,KPL19.
RETURN,KPL19.
COMMON,ZZZZLDF,ZZZPSBF.
CATALOG,SORTMRG,R.
COPYBF,SORTMRG,ZZZPSBF.
NOEXIT.
GTR(ZZZPSBF,OLD,,,S)ULIB/COBOL
IF(EF=0)GOTO,10.
COMMON,SYSTEM.
SET(R3=1)
GTR(SYSTEM,OLD)ULIB/COBOL
10,LIBEDIT,N=LGO,B=LIB,L=0.
LIBGEN,F,P=COBOL.
CATALOG,COBOL,R,U.
LIBEDIT,P=ZZZPSBF,B=COBOL,C,L=0.
SKIPEI,ZZZPSBF.
COPYBR,,ZZZZLDF.
BKSP,ZZZPSBF.
IF(R3≠0)COPYBR,,ZZZZLDF.
*WEOR
*BEFORE    *,REL/*
*WEOR
*BEFORE    *,ULIB/COBOL
*WEOR
*ADD       LIB15,OVL/SMTEXT
*ADD       LIB30,OVL/SORTMRG-SORT40
*WEOR
*ADD       LIB25,ULIB/COBOL
*WEOF
```

13.4.3 SRM3

```
SRM3
SRM3,CM54000,P30,T500.
*ACCOUNT CARD.
*DIRECTIVE FORMAT 1 VERIFICATION DECK - SORT/MERGE 4.0
*JOB SORTS 10 RECORDS - ASCENDING ORDER
FILE(INPUT,RT=Z,BT=C,FL=80,ERL=1)
FILE(OUTPUT,RT=Z,BT=C,FL=80,ERL=1)
SORTMRG(7C)
*DIRECTIVE FORMAT 2 VERIFICATION DECK - SORT/MERGE 4.0
*JOB SORTS 10 RECORDS - ASCENDING ORDER
SORTMRG(6C)
*MACRO SORT VERIFICATION DECK -        SORT/MERGE 4.0
*JOB SORTS 10 RECORDS - ASCENDING ORDER
COMPASS,S=SMTEXT,S=IOTEXT.
LDSET(LIB=COBOL/SYSIO)
LGO.
*WEOR
       SORT      VAR=DISK
       FILE      INPUT=INPUT(N)
NPUT=INPUT(N)
       FILE      OUTPUT=OUTPUT(N)
UTPUT=OUTPUT(N)
       FIELD     A(1,5,LOGICAL)
       KEY       A(A)
       END
*WEOR
M1111IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M2222IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M6666IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M3333IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M4444IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M7777IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M5555IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M9999IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M8888IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M8765IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
*WEOR
SORT(1,1,80,,1)
FILE(INPUT,S,B,,N,N)
FILE(OUTPUT,O,B,,N,N)
KEY(A,C,1,5)
RECORD(I,U,80)
END
*WEOR
M1111IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M2222IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M6666IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M3333IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M4444IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M7777IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M5555IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M9999IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M8888IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M8765IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
*WEOR
```

```
          IDENT   START
          SST
          ENTRY   START
 START    BSS     0
          SORT    VAR=DISK
          FILES   (INPUT,INPUT),(OUTPUT,OUTPUT)
          KEY     1,I,5,0,LOGICAL,A
          ENDRUN
          FILE    LFN=INPUT,RT=Z,BT=C,FL=80,FET=FT1,ERL=I
          FILE    LFN=OUTPUT,RT=Z,BT=C,FL=80,FET=FT2,ERL=1
 FT1      BSSZ    13
 FT2      BSSZ    13
          END     START
*WEOR
MII11IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M2222IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M6666IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M3333IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M4444IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M7777IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M5555IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M9999IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M8888IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
M8765IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.40.38.SRM3,CM54000,P30,T500.
00.40.38.ACCOUNT,USER1.
00.40.39.*ACCOUNT CARD.
00.40.39.*DIRECTIVE FORMAT 1 VERIFICATION DECK -
00.40.39.SORT/MERGE 4.0
00.40.39.*JOB SORTS 10 RECORDS - ASCENDING ORDER
00.40.41.FILE(INPUT,RT=Z,BT=C,FL=80,ERL=1)
00.40.42.FILE(OUTPUT,RT=Z,BT=C,FL=80,ERL=1)
00.40.43.SORTMRG(7C)
00.40.44.          1 NON-FATAL DIRECTIVE ERRORS
00.40.47. ** INSERTIONS DURING INPUT    *********0
00.40.47. ** DELETIONS DURING INPUT     *********0
00.40.47. ** TOTAL RECORDS SORTED       ********10
00.40.47. ** INSERTIONS DURING OUTPUT   *********0
00.40.47. ** DELETIONS DURING OUTPUT    *********0
00.40.47. ** TOTAL RECORDS OUTPUT       ********10
00.40.47. **END SORT RUN
00.40.48.*DIRECTIVE FORMAT 2 VERIFICATION DECK -
00.40.48.SORT/MERGE 4.0
00.40.48.*JOB SORTS 10 RECORDS - ASCENDING ORDER
00.40.48.SORTMRG(6C)
00.40.52. ** INSERTIONS DURING INPUT    *********0
00.40.52. ** DELETIONS DURING INPUT     *********0
00.40.52. ** TOTAL RECORDS SORTED       ********10
00.40.52. ** INSERTIONS DURING OUTPUT   *********0
00.40.52. ** DELETIONS DURING OUTPUT    *********0
00.40.52. ** TOTAL RECORDS OUTPUT       ********10
00.40.52. **END SORT RUN
00.40.52.*MACRO SORT VERIFICATION DECK -
00.40.52.SORT/MERGE 4.0
00.40.52.*JOB SORTS 10 RECORDS - ASCENDING ORDER
00.40.52.COMPASS,S=SMTEXT,S=IOTEXT.
00.41.19.     3.765  CPU SECONDS  ASSEMBLY TIME.
00.41.19. ASSEMBLY COMPLETE.   53200B  CM USED.
00.41.19.LDSET(LIB=COBOL/SYSIO)
00.41.19.LGO.
00.41.27.
00.41.27.
00.41.28. ** INSERTIONS DURING INPUT    *********0
00.41.28. ** INSERTIONS DURING INPUT    *********0
00.41.28. ** TOTAL RECORDS SORTED       ********10
00.41.28. ** INSERTIONS DURING OUTPUT   *********0
00.41.28. ** DELETIONS DURING OUTPUT    *********0
00.41.28. ** TOTAL RECORDS OUTPUT       ********10
00.41.28. **END SORT RUN
```

14.1 RELEASE DESCRIPTION

14.1.1 HARDWARE REQUIREMENTS

Time-Sharing FORTRAN can be maintained on the same minimum hardware configuration as KRONOS 2.1. The minimum field length to run Time-Sharing FORTRAN is $44,000_8$.

14.1.2 CORRECTIONS

Time-Sharing FORTRAN 1.0 contains corrective code through KRONOS 2.0 level 12 PSR release.

14.1.3 DEFICIENCIES

None.

14.2 INSTALLATION PROCEDURE

The procedure to install and update Time-Sharing FORTRAN is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for Time-Sharing FORTRAN, the following materials are necessary.

KPL2 contains the jobs to update, install, and verify installation; the jobs required for Time-Sharing FORTRAN are TSR1, TSR2, and TSR3.

TSR1	Use to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
TSR2	Use to collect the Time-Sharing FORTRAN binary code and generate directive files for later use as input to the procedure file GENSYS.
TSR3	Use to verify that the product is correctly installed.

KPL20 contains the Time-Sharing FORTRAN binary and source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.14.

14.3 INSTALLATION PARAMETERS

None.

14.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1.

14.4.1 TSR1

```
TSR1
TSR1,CM62000,P30,T1000.
*ACCOUNT CARD.
*THIS JOB CREATES A NEW PROGRAM LIBRARY
*AND BINARIES OF TSRUN 1.0 ON KPL20.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(TSRUNPL,R,FI=TSRUN1P0*2P1,MT,D=HY,F=I)
COPYBF,TSRUNPL,RPL.
*GET,MOD=TSRMOD.
UNLOAD,TSRUNPL.
RETURN,TSRUNPL.
MODIFY,N,Q.
CATALOG,NPL,R.
REWIND,LGO.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL20,W,FI=TSRUN1P0*2P1,MT,D=HY,F=I)
COPYBF,NPL,KPL20.
COPY,LGO,KPL20.
REWIND,KPL20,NPL,LGO.
VERIFY,NPL,KPL20.
VERIFY,LGO,KPL20.
REWIND,KPL20.
*WEOR
*OPLFILE   RPL
*READ      MOD,*
OD,*
*EDIT      VOMCFTE.RETURN
*WEOF
```

14.4.2 TSR2

```
TSR2
TSR2,CM15000,P30,T1000.
*ACCOUNT CARD.
*VSN CARD FOR AUTO TAPE ASSIGNMENT.
LABEL(KPL20,R,FI=TSRUN1P0*2P1,MT,D=HY,F=I)
SKIPF,KPL20.
COPYBF,KPL20,TSRUN.
UNLOAD,KPL20.
RETURN,KPL20.
COMMON,ZZZZLDF,ZZZPSBF.
COPYBR,,ZZZZLDF.
CATALOG,TSRUN,R.
COPYBF,TSRUN,ZZZPSBF.
BKSP,ZZZPSBF.
*WEOR
*ADD       LIB31,OVL/TSRUN-COS/RETURN
*WEOF
```

14.4.3 TSR3

```
TSR3
TSR3,CM55000,P30,T200.
*ACCOUNT CARD.
*THIS SIMPLE PROGRAM VERIFIES
*CORRECT INSTALLATION OF TSRUN.
TSRUN(G)
*END OF JOB.
EXIT.
*JOB FAILED.
*WEOR
00010       PROGRAM    SIMPLE (OUTPUT)
00020       REAL       A(1,10), B(10,2), C(1,2), D(1,2)
00030       DATA       D(1,1), D(1,2)  / 385.0, 5885.0 /
00040       DO  10  I=1, 10
00050         A(1,I) = I
00060   10  CONTINUE
00070       DO  30  J=1, 2
00100         DO  20  I=1, 10
00110           B(I,J) = I + 100*(J - 1)
00120   20    CONTINUE
00130   30  CONTINUE
00140       DO  60  I=1, 1
00150         DO  50  J=1, 2
00160           T = 0.0
00170           DO  40  K=1, 10
00200             T = T + A(I,K)*B(K,J)
00210   40      CONTINUE
00220           C(I,J) = T
00230   50    CONTINUE
00240   60  CONTINUE
00250       IF (C(1,1) .NE. D(1,1))  GO TO  70
00260       IF (C(1,2) .NE. D(1,2))  GO TO  70
00270       CALL REMARK(23H1COMPUTATION SUCCESSFUL)
00300       STOP
00310   70  PRINT 1000, C, D
00320 1000  FORMAT (*1    FAILURE*/*0 C-ARRAY IS *2F20.5/*0  SHOULD BE *
00330+2F20.5)
00340       CALL REMARK (7HFAILURE)
00350       CALL EXIT
00360       END
*WEOF
```

Dayfile information from running the installation verification program should appear similar to the following.

```
00.28.53.TSR3,CM55000,P30,T200.
00.28.53.ACCOUNT,USER1.
00.28.53.*ACCOUNT CARD.
00.28.53.*THIS SIMPLE PROGRAM VERIFIES
00.28.53.*CORRECT INSTALLATION OF TSRUN.
00.28.53.TSRUN(G)
00.28.55.UNUSED COMPILER SPACE---007600
00.28.55.SIMPLE  --003400
00.28.55.*END OF JOB.
```

15.1 RELEASE DESCRIPTION

The released version of KRONOS Transaction Subsystem 1.0 consists of three parts. These parts are listed along with their OPL deck names. All deck names are on a single Modify OPL.

Programs	OPL Deck Names
Transaction Subsystem 1.0 programs that interface with KRONOS 2.1	COMBACM through TRANSIM
User libraries to link user's programs to the Transaction Subsystem. These user libraries are:	
BDMI user library	BDMI through TSIM
TRANLIB user library	CALLTSK through TSIM
Task library containing four Transaction Subsystem tasks to interface with other user-developed tasks.	ITASK through OFFTASK

15.1.1 HARDWARE REQUIREMENTS

Transaction Subsystem can be maintained on the same minimum hardware configuration as does KRONOS 2.1. To run the Transaction Subsystem, the Time-Sharing Executive must be active. The minimum field length requirements for the Transaction Subsystem, excluding the Time-Sharing Executive, is $24,000_8$.

15.1.2 CORRECTIONS

The Transaction Subsystem is a new product; therefore, there are no corrections.

15.1.3 DEFICIENCIES

Journalling to tape is not implemented in the released system.

15.2 INSTALLATION PROCEDURE

The procedure to install, modify, and update Transaction Subsystem is in part I, section 3.1 (General Procedure) and section 3.2 (Procedure to Create a New Deadstart Tape). To use these procedures for the Transaction Subsystem, the following materials are necessary.

KPL1 contains the KRONOS 2.1 program library.

KPL2 contains the jobs to modify, update, and install; the jobs required for Transaction Subsystem are KTS1 and KTS2.

KTS1	Use to modify installation parameters or to add PSR updates to source code and to create a new tape (current KPL) containing updated source and binary code.
KTS2	Use to collect the binary code and generate directive files for later use as input to the procedure file GENSYS.

KPL21 contains Transaction Subsystem binary and source code.

The tapes are described in detail in part I, sections 2.1.1 and 2.15.

When using the procedures mentioned above to install the Transaction Subsystem, note the following additional requirements.

1. When creating VALIDUX, assign a user index, a user number and a password to the Transaction Subsystem.
2. When modifying installation parameters, include these assignments in KTS1 by modifying the three parameters described in part III, section 15.3.4.
3. After the Transaction Subsystem is installed on the deadstart tape, but before it is used, create a task library permanent file containing the four tasks required by the Transaction Subsystem. These tasks, which are on the release tape KPL21, are:

ITASK	Task supervisor
KDIS	TRANEX K display driver
MSABT	Message sender for abnormally terminating tasks
OFFTASK	Inactive task controller

To create a task library containing these tasks, run a job similar to the following.

```
JOB,CM55000.
ACCOUNT card.                    Use the user number and password assigned
                                 to the Transaction Subsystem previously.
VSN card for KRONOS OPL
LABEL(KPL1,R,FI=KRONOS*2P1,MT,D=HY,F=I)
COPYEI (KPL1,OPL)
```

```
UNLOAD (KPL1)
RETURN (KPL1)
VSN card for KPL21
LABEL (KPL21,R,FI=TRANSACTSYS*2P1,MT,D=HY,F=I)
                                        Transaction Subsystem OPL
COPYEI (KPL21,KTSPL)
UNLOAD (KPL21)
RETURN (KPL21)
MODIFY (LO=E)
COMPASS(I, L=0)
DEFINE (TASKLIB/CT=PU)
PERMIT (TASKLIB,usernumber=W)  Usernumber must be same as specified
                                        on the ACCOUNT card.
LIBTASK,CR.
7/8/9
*OPLFILE      KTSPL
*EDIT         ITASK,FDIS,MSABT,OFFTASK
7/8/9
*ITASK        S.
6/7/8/9
```

15.3 INSTALLATION PARAMETERS

The following parameters may be changed in deck TRANEX to fit the requirements of a specific installation. The parameters preceded by an asterisk (*) are critical scheduling values and should be changed with caution.

15.3.1 COMPILE TIME CONSTANTS

Parameter and Released Default Value			Significance
*TMDTL	EQU	100B	Milliseconds between time dependent loop routines; TRANEX 571.
KDSTL	EQU	1000B	Milliseconds between K-display updates; TRANEX 572.
*RCLTL	EQU	20B	Milliseconds for task recall; TRANEX 573.
*SCHTL	EQU	60B	Milliseconds between timed scheduler runs; TRANEX 574.

Parameter and Released Default Value			Significance
CORTL	EQU	1000	Milliseconds between core usage checks; TRANEX 575.
TSKTL	EQU	10	Maximum number of time slices per task; TRANEX 585.
TSL	EQU	200	Exchange jump function time slice; TRANEX 581.
MAXSM	EQU	63+1	Maximum number of words of journal; TRANEX 587.
FCML	EQU	100B	Free core memory reduce limit; TRANEX 590.
MAXBW	EQU	3	Maximum task branch count; TRANEX 591.
MAXRA	EQU	10000	Number of legal RA+1 requests; TRANEX 592.

The following millisecond counts may exceed 131,000 and therefore require a word to contain their value.

Parameter and Released Default Value			Significance
TACTL	CON	2*60*1000	Milliseconds between activity checks; TRANEX 580.
SJTTL	CON	20*60*1000	Milliseconds between periodic journalling; TRANEX 581.
ITRTL	CON	1500D	Milliseconds to idle before rolling out; TRANEX 582.
TROTL	CON	10*60*1000	Millisecond duration of rollout; TRANEX 583.

15.3.2 DSDUMP DEFAULT PARAMETERS

Parameter and Released Default Value			Significance
DFWA	EQU	100B	Default FWA for task dump; TRANEX 600.
DLWA	EQU	300B	Default LWA for task dump; TRANEX 602.
DEXP	EQU	1	Default exchange package dump; TRANEX 604.
DDMB	EQU	0	Default data manager buffer dump; TRANEX 606.
DORT	EQU	0	Default origin type for task; TRANEX 608.
DORC	EQU	BCOT	Default origin code; TRANEX 610.
DQDS	EQU	0	Default queue destination value; TRANEX 611.

15.3.3 INITIALIZATION TIME OF K-DISPLAY OPTION

Parameter and Released Default Value			Significance
NSCP	EQU	12	Number of subcontrol points; TRANEX 622.
MINSCP	EQU	2	Minimum number of subcontrol points; TRANEX 624.
NCMB	EQU	4	Number of communication blocks; TRANEX 631.
MINCMB	EQU	4	Minimum number of communication blocks; TRANEX 633.
MAXCMB	EQU	40	Maximum number of communication blocks; TRANEX 634.
MAXCMBM	DECMIC	MAXCMB	Maximum number of C.B.S.; TRANEX 637.
SCMFL	EQU	100000B	Default maximum field length for TRANEX: TRANEX 642.

Parameter and Released Default Value			Significance
MINRFL	EQU	3000B	Minimum amount of FL to request; TRANEX 643.
IFL=	EQU	50000B	Initial field length; TRANEX 644.
MINMFL	EQU	40000B	Minimum limit of a maximum running field length; TRANEX 647.
MAXMFL	EQU	300000B	Maximum limit for running field length; TRANEX 648.
IMDM	EQU	2	Number of sets of data manager buffers; TRANEX 653.
MINMDM	EQU	1	Minimum for multiple value; TRANEX 655.
MAXMDM	EQU	4	Maximum for multiple value; TRANEX 656.

15.3.4 DEFAULT USER NUMBER/PASSWORD AND USER INDEX

Change the following parameters to correspond to the user number, password, and user index assigned to the Transaction Subsystem.

Parameter and Released Default Value			Significance
USNM	MICRO	1,7,/KB100DC/	TRANEX user number; TRANEX 557.
PWDM	MICRO	1,,//	TRANEX password; TRANEX 558.
TRUI	EQU	16B	User index for Transaction Subsystem; TRANEX 559.

15.4 INSTALLATION JOBS

The following jobs are included to indicate the format of the released installation jobs. They are released with the initial release of KRONOS 2.1 and may be modified in subsequent updates of KRONOS 2.1

15.4.1 KTS1

```
KTS1
KTS1,CM62000,T2000.
*ACCOUNT,CARD.
COMMENT. THIS JOB MODIFIES AND CREATES THE KRONOS TRANSACTION
COMMENT. SUBSYSTEM BINARY AND USER LIBRARIES. THE FIRST FILE OF THE NEW
COMMENT. KPL21 WILL BE THE NEWPL. THE SECOND FILE WILL BE THE
COMMENT. ABSOLUTE BINARY OF THE SUBSYSTEM AND USER LIBRARIES.
COMMENT. THE THIRD FILE WILL BE THE RELOCATABLE BINARY OF THE
COMMENT. LIBRARY ROUTINES.
COMMENT. THE KRONOS OPL IS ASSUMED TO BE STAGED AS *OPL*.
COMMON(OPL)      KRONOS OPL.
*VSN CARD.
LABEL(KTSPLIN,R,FI=TRANSACTSYS*2P1,MT,D=HY,F=I)     LATEST KPL21.
ATEST KPL21.
COPYBF,KTSPLIN,KTSPL.
VERIFY,KTSPLIN,KTSPL,R.
UNLOAD,KTSPLIN.
RETURN,KTSPLIN.
MODIFY,N,LO=E,C=0.            CREATE NEW PROGRAM LIBRARY.
MODIFY,LO=E,NR.
MODIFY,LO=E,NR.
REWIND,COMPILE.
COMPASS,I,L=0.                KTS SUBSYSTEM PROGRAMS.
COMPASS,I,L=0,B=LIB.          KTS LIBRARY ROUTINES.
GTR(LIB,TRLIB)REL/CALLTSK-TSIM
LIBGEN,F=TRLIB,P=TRANLIB.
LIBGEN,F=LIB,P=BDMLIB.
REWIND,LGO,LIB,TRANLIB,BDMLIB.
COPYBF,LGO,KTS.
BKSP,KTS.
COPYBF,TRANLIB,KTS.
BKSP,KTS.
COPYBF,BDMLIB,KTS.
*VSN CARD.
LABEL(KPL21,W,FI=TRANSACTSYS*2P1,MT,D=HY,F=I)     SCRATCH FOR NEW KPL21.
REWIND,KTS,NPL.
COPYBF,NPL,KPL21.
COPYBF,KTS,KPL21.
COPYBF,LIB,KPL21.
REWIND,KPL21,NPL,KTS,LIB.
VERIFY,KPL21,NPL.
VERIFY,KPL21,KTS.
VERIFY,KPL21,LIB.
UNLOAD,KPL21.
*WEOR
*OPLFILE  KTSPL
*/        PLACE *TRANSACTION SUBSYSTEM* MODSET HERE.
*EDIT     COMBACM.OFFTASK
```

```
OMBACM.OFFTASK
*WEOR
*OPLFILE  NPL
*/        EDIT KTS SUBSYSTEM PROGRAMS.
*EDIT     CS1.TRANSIM
*WEOR
*OPLFILE  NPL
*/        EDIT KTS USER LIBRARY ROUTINES.
*EDIT     BDMI.TSIM
DMI.TSIM
*WEOF
```

15.4.2 KTS2

```
KTS2
KTS2,CM45000,T1000.
*ACCOUNT CARD.
COMMENT. THIS JOB ADDS THE TRANSACTION SUBSYSTEM BINARIES TO THE
COMMENT. SYSTEM COMMON FILE ZZZPSBF FROM KPL21. EITHER THE RELEASED
COMMENT. VERSION OR THE LATEST VERSION CREATED BY JOB KTS1 MAY BE USED.
COMMENT. IT ALSO ADDS THE NECESSARY DIRECTIVES TO COMMON FILE ZZZZLDF.
*VSN CARD.
LABEL(KPL21,R,FI=TRANSACTSYS*2P1,MT,D=HY,F=I)     LATEST KPL21.
SKIPF,KPL21,1.
COMMON,ZZZZLDF,ZZZPSBF.
COPYBF,KPL21,ZZZPSBF.
BKSP,ZZZPSBF.
COPYBR,,ZZZZLDF.
UNLOAD,KPL21.
*WEOR
*ADD       LIB9,PP/CS1-ULIB/BDMLIB
*WEOF
```

USER VALIDATION 1

The user validation capability of the KRONOS Time-Sharing System is based on two special system files, VALIDUS and PROFILO. These files are used to define and control:

- who can use the system
- what they can use (hardware and software)
- to what extent they can use it

A special system file is one which contains data necessary to control various aspects of system activity. (As a rule, this is privileged information requiring secrecy.) These files are maintained as direct access permanent files under the system user index 377777B. (User index is defined in section 2.1.) These files can only be accessed by special system jobs.

Special system jobs are system routines which can only be initiated by the analyst at his control point. They execute with benefit of file security and access to resources and system functions without user validation restrictions.

The system-bound security of VALIDUS and PROFILO ensures that they will not be accessed by individual users either for curiosity or tampering.

System file security does not preclude the customer from establishing operational parameters for his own users. The analyst in creating and updating PROFILO can establish master users who may add, modify, and delete charge and project admissions for their own people. The master users are customer supervisors who manage the projects involved and are in the best position to determine what should be used and by whom it should be used.

The VALIDUS account file† is created and managed by MODVAL, the account file manager. The PROFILO project profile file†† is created and managed by PROFILE, the project profile manager. These two managers are system program modules that, with input directives, constitute special system jobs used as system file processors. Special system jobs call the special file supervisor (SFS) which provides routines, table management, data manipulation, and I/O processing.

An input directive contains the parameters used to define access information. The basic format of each parameter designation is

identifier = data

identifier	Specifies the control field within the file to be set
data	Specifies what value is to be set in that field

A brief overview of the creation and use of validation files is given in Figure IV-1-1.

†VALIDUS is referred to as the account file since it contains the account numbers of users requesting admission to the system. It should not be confused with the account dayfile.

††PROFILO is referred to as the project profile file since the project validations it contains form a usage profile for each account (user) number.

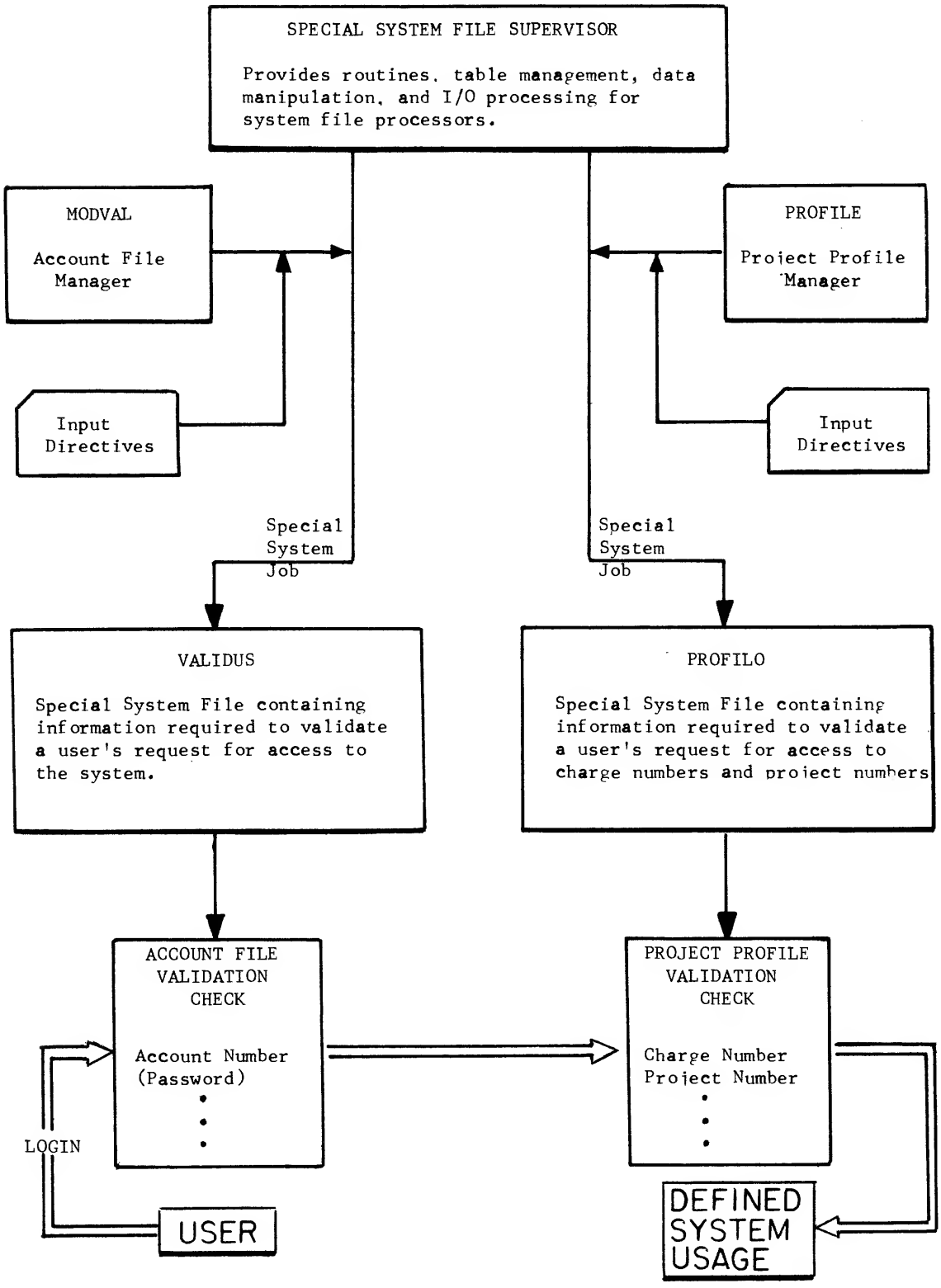


Figure IV-1-1. Creation and Use of Validation Files

1.1 VALIDUS (VALIDUX)† SPECIAL SYSTEM FILE

The VALIDUS special system file contains the account numbers that validate individual user access to the KRONOS Time-Sharing System. A second level of security, the password, can also be specified. In addition, VALIDUS defines the extent to which each account can make use of the system's resources. These specifications include:

- Equipment usage
  - Maximum number of magnetic tapes this account may use
  - Maximum number of disk packs this account may use
  - Maximum number of mass storage tracks (for future use)
  - On what master device the permanent files and catalog for each account will be stored
- File usage
  - Maximum number of permanent files allowed
  - Maximum number of files while running
  - Ability to create direct access permanent files
  - Ability to create indirect access permanent files
  - Maximum size of indirect access permanent files or cumulative size of all indirect access permanent files
- Machine usage
  - Maximum CPU time
  - Maximum CM space
- System usage
  - System origin capability
  - May access system files
- Terminal usage
  - Which terminals are valid for individual users
  - Terminal type
  - Transmission mode
  - Parity
  - Delay count

Priorities and the number of deferred batch jobs can also be specified.

† The term VALIDUX is used with KRONOS 2.1 release. This text uses VALIDUS, the term associated with 2.0.

1.1.1 MODVAL ACCOUNT FILE MANAGER

The account file manager, MODVAL, is used to create and manage the VALIDUS account file. This can be done either from the system console (system origin job) or by batch.

VALIDUS is a direct access permanent file. From the console, it can be created and updated via the K display. Batch input must first establish local files and then copy onto the direct access file.

1.1.2 MODVAL CONSOLE INPUT

All batch input directives (section 1.1.3) are available for console input. In addition, the following are provided specifically for console input.

K.I,accnumb	Inquire option relative to the user identified by the account number accnumb. Information is given on the second MODVAL display (Figure 1-3). This option cannot be used for data entry.
K.U,accnumb	Update modification for the account number accnumb which is on the existing VALIDUS file. Modification data is input following the input of this directive.
K.C,accnumb	The account number accnumb is entered on a VALIDUS file that is being created. The following input line(s) can contain identifiers for this account number.
K.D,accnumb	The account number accnumb is deleted from the existing VALIDUS file.

Information for the previous options is provided on two MODVAL displays (Figures IV-1-2 and IV-1-3) for each account number specification. For the option types, identifiers must be entered on separate lines following the account number specification.

K./accnumb,ident=data	This slash (/) directive is used to update accnumb as with the U option; however, if accnumb is not found, a new account number is created automatically. It is possible under this option to switch control directly from one account number to another without returning to the initial MODVAL display (Figure IV-1-2). If the / directive is used exclusively, data entry is analogous to batch input; that is, the card image can be entered with account number and identifier on the same line.

```
                        VALIDUS

     CREATED     72/05/01.
     UPDATED     72/06/05.

INPUT DIRECTIVES ARE THE SAME AS BATCH INPUT DIRECTIVES.
THE FOLLOWING DIRECTIVES ARE ALSO PROVIDED —

     /AN   -  TERMINATE INPUT FOR PRESENT ACCOUNT
              NUMBER IF ANY AND UPDATE VALIDUS FILE.
              INITIATE ACTION ON ACCOUNT NUMBER *AN*.
     I,AN  -  INQUIRE OPTION.  THIS DISPLAY ONLY.
     C,AN  -  CREATE OPTION.  THIS DISPLAY ONLY.
     U,AN  -  UPDATE OPTION.  THIS DISPLAY ONLY.
     D,AN  -  DELETE OPTION.  THIS DISPLAY ONLY.
     END   -  COMPLETE UPDATE OR INQUIRE OF ACTIVE USER.
              FROM THIS DISPLAY, END RUN.
     DROP  -  TERMINATE INPUT FOR ACTIVE USER.
     STOP  -  TERMINATE INPUT FOR ACTIVE USER.  IF ANY,
              END RUN.
           AN  =  1-7 CHARACTER ACCOUNT NUMBER.

DATA ENTRY FORMAT IS OF THE FORM MT=XX, PR=XX, TL=XXXX,
ETC.  ALL NUMERIC FIELDS ARE ASSUMED TO BE DECIMAL
UNLESS A POST-RADIX IS SPECIFIED.  FOR EXAMPLE —

                        4000B

   ACCESS WORD IDENTIFIERS STARTING AT BIT 0 ARE -
   CPWC CTPC CLPF CSPF CSOJ CASF CAND CCNR CSRP CSTP

   CREATING PGMMODS.
```

Figure IV-1-2. First MODVAL Display

```
                    ACCOUNT PGMMODS

    CREATED     72/07/08.        UPDATED     72/0708.

    FIELD                  TYPE          CONTENTS

PASSWORD            0-7  CHARACTERS     PW = ABCDE
USER INDEX          1-377777B           UL = 117B

ANSWER BACK         0-10 CHARACTERS     AB = AAAAA
                                             BBBBB
                                             CCCCC
                                             DDDDD
MAG TAPES           0-63                MT =     6
REMOVABLE PACKS     0-63                RP =     3
TIME LIMIT          0-511               TL =   100
JOB PRIORITY        0-63                PR =    30
CENTRAL MEMORY      0-40000B            CM = 10000B IN 100s
NUMBER OF FILES     0-192               NF =    30
MASS STORAGE        0-2048              MS =   100
DEFERRED BATCH      0-63                DB =    10
INDIRECT FILES      0-777777B           FC = SYSTEM
INDIRECT SPACE      0-777777B           CS =  50000
INDIRECT SIZE       0-777777B           FS = UNLIMITED
TERMINAL PARITY     3-4  CHARACTERS     PA = EVEN
NUMBER OF RUBOUTS   0-37B               RO = SYSTEM
TRANSMISSION        4    CHARACTERS     PX = HALF
TERMINAL TYPE       3-6  CHARACTERS     TT = TTY
PROJECT NUMBER      0-10 CHARACTERS     PN = 310032

ACCESS WORD         3-4  CHARACTERS     AW = 000000000000000000131
```

Figure IV-1-3. Second MODVAL Display

These five console options can be used by the analyst to access VALIDUS with the MODVAL manager according to the following general procedure.

1. The analyst types

   A, B.

   X. MODVAL. (CR)

2. The B display will appear on the right screen. This display gives a listing of the control points and what is assigned to each. The analyst notes the control point to which MODVAL is assigned. To the right of this entry will appear the flashing message.

   REQUEST K DISPLAY

3. The analyst types in

   K, n. (CR)

   where n is the control point number noted on the B display.

4. The first MODVAL display will appear on the left screen. This is a listing of the options for manipulating the account file VALIDUS (Figure IV-1-2).

5. The analyst types in one of the five console options. This is either

   K. option, accnumb (CR)

   or

   K. /accnumb, ident=data (CR)

   If a delete (K. D, accnumb) is entered, the account number accnumb is deleted from the account file VALIDUS at this point. No further action is needed for this option.

6. For a create, update, or inquire option, the second MODVAL display (Figure IV-1-3) replaces the first on the left screen.

   For a create (either by C or /), the new account number will appear with default values for the parameters. If the ident is included with the slash (/), it will appear on the display but will not, at this point, be entered on the file.

   For an update (either by U or /), the existing account number will appear with current parameters. If a modification identifier is included with a / input, the new value will appear on the screen but will not be entered on the file. From here the analyst would have to go to step 7.

   For an inquire, the display contains the information requested and the procedure would stop at this step.

7. For a C or U option, the ident is now typed in with the format

   K. ident=data (CR)

8. To initiate action on the create or update entry, the analyst types

   END (CR)

   If the analyst does not want this entry on the file, he can either type

   DROP (CR)

   and erase the entry without terminating this run, or he can type

   STOP (CR)

   and terminate the run without action on this entry.

   In the case of DROP, the first MODVAL display (Figure IV-1-2) will return to the left screen and the analyst can enter more account numbers and their associated parameters.

   To terminate any run without erasure, the operator types

   END. (CR)

   Table IV-1-1 summarizes the basic input coding for console options.

TABLE IV-1-1. INPUT CODING FOR CONSOLE OPTIONS

Create	Update	Inquire	Delete
K. C, accnumb K. ident=data K. END	K. U, accnumb K. ident=data K. END	K. I, accnumb K. END	K. D, accnumb
K. /accnumb, ident=data K. END			

1.1.3 MODVAL BATCH INPUT

Batch jobs that call the MODVAL account manager cannot make use of direct access permanent files, such as VALIDUS, that are under the system user index 377777B. Accordingly, batch input to VALIDUS requires the use of user permanent files and local copies. The local versions are ultimately copied onto the direct access VALIDUS file via the console as a system origin job.

The following files are used by MODVAL in batch processing.

Default Name	Use
INPUT	Contains the input data directives that will be used to create or update the account file VALIDUS.
NEWVAL	The interim copy of the new account file that is to be created or reformatted.
VALIDUS	The old account file that is to be updated or reformatted.
SOURCE	Receives the source input for each account number.
VALINDX	Contains all the available user indices (definition in section 2.1) for the present VALIDUS file. It is always used in conjunction with one of the account files: new=NEWVAL, old=VALIDUS.
OUTPUT	File to receive output listings.

For a batch create under MODVAL, two stages of operation are necessary.

1. Input at the card reader is used by MODVAL to create a local copy of a new account file. This copy is saved as an indirect or direct access permanent file.

2. From the console, the analyst gets or attaches the new account file, defines the direct access file VALIDUS, and copies the new version onto the old direct access file.

For an update and other operations that deal with a preexisting VALIDUS file, three stages of operation are necessary.

1. The VALIDUS file is attached via the console. A local copy is made. The copy is saved, or defined and copied, as a permanent file.

2. The batch input gets or attaches this copy of VALIDUS. The MODVAL control card and input parameters are executed. Either the local copy is modified and then replaced (indirect) or the modifications are entered on the attached file (direct).

3. From the console, the modified version is retrieved and then copied onto the direct access VALIDUS file.

While MODVAL batch input is more involved than input made exclusively at the console, it will prove faster and more convenient when a long list of account numbers with many identifiers is to be entered.

MODVAL CONTROL CARD

Batch input accesses the MODVAL account file manager by means of the MODVAL control card. The following is the format of the card.

MODVAL(p1,p2,...,pi,...,pn)

where the pi's are specific combinations of the following identifiers.

I = input	Local file name of the file that will contain input data or source data. Default is INPUT.
P = validus	Local file name of the copy of the old account file that is to be updated or reformatted. Default is VALIDUS.
N = newval	Local file name of the interim file that will become the newly created account file. Default is NEWVAL.
S = source	File that will receive source data for each account number. Default is SOURCE.
U = valindx	File containing the available user indices for the current VALIDUS file. Default value is VALINDX.
L = output	File to receive list output. Default is OUTPUT.
CV	Convert VALIDUS option. Suppresses automatic creation of system and library user indices and allows the creation of two account numbers having the same user index during a create run. This allows source input from KRONOS 2.0 MODVAL to be used as input for a creation run under KRONOS 2.1 MODVAL. It is also used in the conversion from KRONOS 2.1 MODVAL to KRONOS 2.0 MODVAL to suppress the identifiers not used in KRONOS 2.0 (refer to example 13 in section 1.1.4).
D	If specified, MODVAL will not abort when directive errors are detected.
OP=C	Create option. Processes the input file and creates the interim account file (N-newval) and the file of associated user indices (U=valindx).
OP=C,LO=E	Initiates the create as above, and then lists errors encountered in processing (refer to Error Messages to Output File, section 1.1.7).
OP=U	Update option. Updates the local copies of validus and valindx with data on input file. This option can be used with certain other options (for example, OP=URS). It is the default for jobs other than system origin jobs.

OP=U, LO=E

Initiates the update as above, and then lists the errors encountered in processing (refer to Error Messages to Output File, section 1.1.7).

OP=Z

Card update option. This is like the update option except that directives are included on the MODVAL card image. The Z parameter in this option must be used alone.

OP=Z, LO=E

Initiates the card update as above, and then lists the errors encountered in processing (refer to Error Messages to Output File, section 1.1.7).

OP=R

Reformats the account file by purging all files of each deleted user. Until this option is selected, all files of deleted users remain in the permanent file system even though they cannot be accessed. This allows redefinition of a user (with UI identifier on data input directive) if an error was made in deleting him.

OP=I

Inquire option. Gives a listing of validation parameters for the account specified by the last ACCOUNT card or by terminal login. This option must occur alone. The following is a sample list.

```
  AB =,
  AB =,
  AB =,
  AB =,
MT =              4,
RP =              4,
TL =           7777B,
PR =             70B,
CM =           1000B,
NF =             20,
MS =            100,
  PN =,
DB =             10,
FC =         SYSTEM,
CS =         SYSTEM,
FS =         SYSTEM,
PA = EVEN          ,
RO =             31,
PX = HALF          ,
TT = TTY           ,
AW = 0000000000000000177
```

OP=L
or
OP=L, LO=A

Reads the validation file, sorts the copy by account number, and writes it to the output file for listing according to the format in Figure IV-1-4.

OP=L, LO=N

Reads the validation file, sorts the copy by user index, and writes it to the output file for listing according to the format in Figure IV-1-4.

OP=L,LO=L	Reads the information on the local file identified in the parameter list, sorts by account number, and writes it to the output file for listing according to the format in Figure IV-1-4.
OP=L,LO=AL	Same as LO=L since A is a default value.
OP=L,LO=NL	Reads the information on the local file identified in the parameter list, sorts the copy by user index, and writes it to the output file for listing according to the format in Figure IV-1-4.
OP=L,LO=EN or OP-L,LO	File will be sorted by user index.
OP=C,LO=EN U Z or OP=C,LO U Z	Produces a list of errors for the C, U, or Z processing. In this case, MODVAL will use whichever applies.

```
ACCOUNT     USER       CREATION   LAST MOD
NUMBER      INDEX        DATE       DATE

USERAAA        1     yy.mm.dd.  yy.mm.dd.
USERBBB        2     yy.mm.dd.  yy.mm.dd.
USERCCC        3     yy.mm.dd.  yy.mm.dd.
   .           .         .          .
   .           .         .          .
   .           .         .          .
LIBRARY   377776     yy.mm.dd.  yy.mm.dd.
SYSTEMX   377777     yy.mm.dd.  yy.mm.dd.
```

Figure IV-1-4. Format of File Listing

INPUT DIRECTIVE

The input directive is used to enter account numbers under a create run (OP=C) and to modify existing account numbers under an update run (OP=U). Format of the input directive is

/accnumb,ident1=data1,ident2=data2,...

where accnumb is the one-to seven-character account number being referenced and each ident=data is a system usage definition for this number.

In addition to the standard separators (period, comma, parens, dollar-sign, etc.), end-of-card and end-of-line are recognized. Thus, if an input directive item occurs last on a card, none of the standard separators are needed.

Example: the following is acceptable.

/ROBERTR, AW=CSPF

AW=CLPF

However, data cannot lap from card to card.

Example: the following is not acceptable.

/ROBERTR, AW=CSPF,AW=

CLPF.

The following is a list of identifiers and their descriptions.

Identifier	Description
PW = passwrd	passwrd is a one-to seven-character alphanumeric password. Blanks are significant. If this identifier is omitted, the system assigns a password of all blanks. In the latter case, the user will have to enter a null password at login.
UI = nnnnnnr	This identifier specifies the user index to be assigned to this user. If this entry is not supplied, the system assigns the next available user index. nnnnnnr consists of six numeric characters followed by a radix. Blanks are suppressed. The maximum value is 377777B. This identifier cannot be used with the K display or update option.

Identifier	Description
AB = answerback	answerback is a one-to ten-character answerback code. Blanks are significant. The answerback code restricts the user to a particular terminal. Up to four answerback entries are permissible per account number. If this identifier is omitted, the system supplies an answerback code of all blanks which gives this user access through any terminal.
MT = nnr	This identifier specifies the number of magnetic tapes allowed. nnr consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77B. If this identifier is omitted, the system supplies a value of 0.
RP = nnr	This identifier specifies the number of removable disk packs allowed. nnr consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77B. If this identifier is omitted, the system supplies a value of 0.
TL = nnnnr	This identifier specifies the maximum CPU time (in units of 10 octal seconds) that a user may run. nnnnr consists of four numeric characters followed by a radix. Blanks are suppressed. The maximum value is 7777B. The default value is 7777B units of 10 octal seconds.
PR = nnr	This identifier specifies the maximum priority at which a user can run a job. (Normally, the job origin type determines the priority.) nnr consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77B. The default value is 12B.
CM = nnnnr	This identifier specifies the maximum central memory space a user is allowed in units of 100 octal words. nnnnr consists of four numeric characters followed by a radix. Blanks are suppressed. The maximum value is 4000B. The default value is 1000B.
NF = nnnnr	This identifier specifies the maximum number of files a user is allowed when running. nnnnr consists of four numeric characters followed by a radix. Blanks are suppressed. The maximum value is 300B. The default value is 24B. Because the code that checks this identifier can add significant overhead to the system, it is not implemented as part of this release.
MS = nnnnr	This identifier specifies the maximum number of mass storage tracks a user is allowed when running. nnnnr consists of four numeric characters followed by a radix. Blanks are suppressed. The maximum value is 4000B. (However, this is not in the system as yet.)

Identifier	Description
DB = nnr	This identifier indicates the number of deferred batch jobs the user is allowed to have in the system at one time. nnr consists of two numeric characters followed by a radix. Blanks are suppressed. The maximum value is 77B. The default value is one.
AW = xxxx	xxxx is a four-character designation that toggles a particular bit in the access word. For each bit that is set, special permission is allowed to that user. The bit is set when the first identifier is encountered and cleared if the identifier is used again. A maximum of 60 entries per record is allowed. Blanks are suppressed. There are ten access bits defined in the system. • CPWC (bit 0) User may change his password • CTPC (bit 1) User may use the ACCESS commands • CLPF (bit 2) User may create direct access permanent files • CSPF (bit 3) User may create indirect access permanent files • CSOJ (bit 4) User may have system origin capability from any job origin if the debug option is turned on by the operator • CASF (bit 5) User may access system files (common) • CAND (bit 6) User may request nonallocatable devices (for example, magnetic tape units) • CCNR (bit 7) Allows use of system without entry of charge or project number • CSRP (bit 8) User may issue auxiliary device commands • CSTP (bit 9) User may access special transaction functions

Identifier	Description
	The default values are CPWC, CLPF, CCNR, and CSPF. To set or clear all bits in the access word, the following commands can be entered. • ALL — Sets all 60 bits in the access word • NUL — Clears all 60 bits in the access word The following identifiers can only be used in update and K display options. • DAC — Deletes the account number from the VALIDUS file • FUI=nnnnnnr — Forces the user index to be inserted or changed. Parameters are the same as for the UI=nnnnnnr
CAB = oldab, newab	Indicates that the answerback code is to be changed. The entry consists of two fields: the first (oldab) indicates the answerback code that is to be changed and the second (newab) indicates the new code. An entry consists of one-to ten-alphanumeric characters. Blanks are not suppressed. Four or less answerback changes are permitted per record.
PN = project number	A one-to ten-alphanumeric identifier available to the local site. No blank suppression. One entry per record is permitted.

The following three specifications control permanent file access for the individual user. Ordinarily this is specified by origin type.

Identifier	Description
FC = n	File count indicating the maximum number of permanent files allowed the user. n may assume the following values.

n	Upper Limit Allowed (Octal)
0	Use job origin control.
1	100
2	200
3	400
4	1000
5	5000
6	10000
7	Unlimited

If FC is not specified, 0 will be assumed.

CS = n

Cumulative size for all indirect access files for this user. n specifies the upper limit allowed.

n	Upper Limit Allowed (Octal Count of PRUs)
0	Use job origin control.
1	1000
2	2000
3	5000
4	10000
5	50000
6	100000
7	Unlimited

If CS is not specified, 0 will be assumed.

FS = n

File size allowed for an individual indirect access permanent file. n may assume the following values.

n	Upper Limit Allowed (Octal Count of PRUs)
0	Use job origin control. No controls are enacted.
1	10
2	20
3	30
4	40
5	50
6	60
7	Unlimited

If FS is not specified, 0 will be assumed.

The following four specifications manipulate fields describing the user's terminal.

Identifier	Description
PX = xxxx	Specifies transmission mode. Only one entry should occur per account number record. Since the terminal operates in full or half duplex mode, either of the following values are available for xxxx.

Value	Explanation
FULL	System enters echoplex mode automatically.
HALF	System does not enter echoplex mode automatically.

RO = nnr

nnr consists of two numeric characters followed by a radix. Blanks are suppressed. This is the rubout count which is the character count delay associated with the user's terminal. One value from 0 to 37B may be entered for each account number record. A value of 37B denotes that the system will use the default number for the user's terminal type.

PA = xxxx

xxxx specifies terminal parity. The terminal operates with even or odd parity. One of the following two values may be entered for each account number record.

EVEN

ODD

TT = xxxxxx

xxxxxx specifies the terminal type. One of the following values may be specified for each account number.

Value	Explanation
TTY	Teletype or other ASCII compatible terminal
MEMAPL	Memorex 1240 with APL print
COR	Correspondence with standard print
CORAPL	Correspondence with APL print

1.1.4 PASSWOR CONTROL CARD

If the access word (section 1.1.3) for a particular user has the zero bit set (AW=CPWC), this user may change his password by using the PASSWOR control card. The format of the card is

PASSWOR (oldpass,newpass)

The passwords are one to seven characters.

PASSWOR ERROR MESSAGES

ERROR IN PASSWOR ARGUMENTS.

Invalid control card arguments.

Action: Correct and rerun.

ILLEGAL CONTROL CARD.

User is not permitted to change password.

Action: User must acquire validation.

1.1.5 LIMITS CONTROL CARD

Each user can obtain a listing of all the limiting parameters that apply to his user number by means of the LIMITS control card. MODVAL processes this card exactly as the OP=I option. The format of the card is

LIMITS.

The explanation of the inquire option under MODVAL Control Card (section 1.1.3) gives a sample listing.

LIMITS ERROR MESSAGE

ERROR IN LIMITS ARGUMENTS.

Invalid control card arguments. This card has no arguments associated with it.

1.1.6 EXAMPLES OF MODVAL USAGE

The examples in this section give representative commands for exercising the MODVAL options both at the console and by batch input. System files are under index 377777.

Example 1:

Example 1 is a create at the console with the C,accnumb format. MODVAL is called and the B display indicates the control point for the job (n). This is entered via the K display. Following this is an entry of three account numbers with a password ident for each.

```
X.MODVAL.
K,n.
K.C,ACCN201
K.PW=ADMIT1
K.END
K.C,ACCN202
K.PW=ADMIT2
K.END
K.C,ACCN203
K.PW=ADMIT3
K.END
K.END.
```

Example 2:

In example 2, the previous parameters are entered at the console with the / format.

```
X.MODVAL.
K,n.
K./ACCN201,PW=ADMIT1
K./ACCN202,PW=ADMIT2
K./ACCN203,PW=ADMIT3
K.END
K.END.
```

Example 3:

In example 3, the same entries are made as a batch job with default values used for the file names. The following is the card input.

```
JOBCR1.
ACCOUNT(ANLST)
MODVAL(OP=C)
SAVE(NEWVAL)
```

```
SAVE(VALINDX=VAL)
7/8/9
/ACCN201,PW=ADMIT1
/ACCN202,PW=ADMIT2
/ACCN203,PW=ADMIT3
6/7/8/9
```

This produces indirect access permanent files. These will be made direct access permanent files in the system from the console. The system index (377777) must be specified. The third parameter on the COPY command initiates verification of the files after execution of the copy. Input at the console is:

```
X.DIS
ACCOUNT,ANLIST.
```

or SUI,xxxx. where xxxx is the user index for ANALST.

```
GET,NEWVAL.
GET,VAL.
SUI,377777.
```

If a VALIDUS file already exists on the system, it will be necessary, at this point, to enter

```
ISF(R=VALIDUS).
PURGE(VALIDUS,VALINDX).
```

```
DEFINE,VALIDUS.
DEFINE,VALINDX.
COPY,NEWVAL,VALIDUS,V.
COPY,VAL,VALINDX,V.
```

Example 4:

In example 4, the previous create is run with file names supplied. It is assumed that the following indirect access file is on mass storage before the batch deck is submitted.

```
FILE PUTIN
/ACCN201,PW=ADMIT1
/ACCN202,PW=ADMIT2
/ACCN203,PW=ADMIT3
```

Input at the card reader is:

```
JOBCR2.
ACCOUNT,ANLST.
GET,PUTIN.
MODVAL,OP=C,I=PUTIN,N=VALNEW.
SAVE,VALNEW.
SAVE,VALINDX=VALX.
6/7/8/9
```

After this job is executed, the following entries are made at the console.

```
X.DIS.
ACCOUNT,ANLST.
```

or SUI, xxxx. where xxxx is the user index for ANALST.

```
GET,VALNEW.
GET,VALX.
SUI,377777.
```

If a VALIDUS file already exists on the system, it will be necessary, at this point, to enter

```
ISF(R=VALIDUS).
PURGE(VALIDUS,VALINDX).
```

```
DEFINE,VALIDUS.
DEFINE,VALINDX.
COPY,VALNEW,VALIDUS,V.
COPY,VALX,VALINDX,V.
```

Example 5:

Example 5 is an update at the console with the U, accnumb format. The first two account numbers entered via the previous creates have their password changed.

```
X.MODVAL.
K,20.
K.U,ACCN201
```

```
K. PW=ENTER1
K. END
K. U, ACCN202
K. PW=ENTER2
K. END
K. END.
```

Example 6:

In example 6, the previous parameters are entered at the console with the / format.

```
X. MODVAL.
K, 20.
K. /ACCN201, PW=ENTER1
K. /ACCN202, PW=ENTER2
K. END
K. END.
```

Example 7:

In example 7, the previous update is entered by means of batch input. First, the direct access permanent files VALIDUS and VALINDX are copied to permanent files (direct or indirect) that can be accessed by the batch input and used in the MODVAL control card. This is done at the console as follows:

```
X. DIS.
SUI, 377777.
ISF(R=VALIDUS)
ATTACH(VALIDUS, VALINDX)
COPY(VALIDUS, VAL)
COPY(VALINDX, VALX)
RETURN(VALIDUS, VALINDX)
ISF.
ACCOUNT(ANLST)
SAVE(VAL, VALX)
```

The batch input is:

```
JOBUP.
ACCOUNT(ANLST)
GET(VAL,VALX)
MODVAL(OP=U,P=VAL,U=VALX)
REPLACE(VAL,VALX)
7/8/9
/ACCN201,PW=ENTER1
/ACCN202,PW=ENTER2
6/7/8/9
```

The modified files are returned to the system at the console. The M=W in the ATTACH is needed to establish write permission relative to the direct access files.

```
X.DIS.
ACCOUNT(ANLST)
GET(VAL,VALX)
SUI,377777.
ISF(R=VALIDUS)
ATTACH(VALIDUS,VALINDX/M=W)
COPY(VAL,VALIDUS)
COPY(VALX,VALINDX)
ISF.
```

If the OP=Z option is used, it is not necessary to provide an input file and SAVE it under 377777. The Z option makes the changes directly as follows:

```
X.DIS.
MODVAL(OP=Z)/ACCN201,PW=ENTER1
    (one account at a time)
```

Example 8:

In example 8, a delete is done from the console only.

```
X.MODVAL

K,20.

K.D,ACCN203

K.END.
```

Example 9:

In example 9, reformatting of the account file is initiated from the console. The DIS is used and card images are typed in (no K display). The OUTPUT file will have a listing of the purged indices.

```
X.DIS.

SUI,377777.

ISF(R=VALIDUS)

ATTACH(VALIDUS,VALINDX/M=W)

MODVAL(OP=R)

REWIND(VALIDUS,NEWVAL)

COPY(NEWVAL,VALIDUS)

OUT.

ISF.
```

Example 10:

In example 10, to reformat the account file with batch input, the direct access files have indirect access copies made via the console.

```
X.DIS.

SUI,377777.

ISF(R=VALIDUS)

ATTACH(VALIDUS,VALINDX)

COPY(VALIDUS,VAL)

COPY(VALINDX,VALX)

RETURN(VALIDUS,VALINDX)
```

```
ISF.
ACCOUNT(ANLST)
SAVE(VAL,VALX)
```

Then, from the card reader:

```
JOBREF.
ACCOUNT(ANLST)
GET(VAL,VALX)
MODVAL(OP=R,P=VAL,U=VALX)
SAVE(NEWVAL)
REPLACE(VALX)
6/7/8/9
```

Then, from the console:

```
X.DIS.
ACCOUNT(ANLST)
GET(NEWVAL,VALX)
SUI,377777.
ISF(R=VALIDUS)
ATTACH(VALIDUS, VALINDX/M=W)
COPY(NEWVAL,VALIDUS,V)
COPY(VALX,VALINDX,V)
ISF.
```

Instead of the ATTACH, in which each COPY would write over an old file, it would be possible to use

```
PURGE(VALIDUS,VALINDX)
DEFINE(VALIDUS,VALINDX/M=W)
```

and then copy onto the empty files.

Example 11:

In example 11, the account file is returned to source code via the console.

```
X.DIS.
SUI,377777.
ISF(R=VALIDUS)
ATTACH(VALIDUS,VALINDX)
MODVAL(OP=S)
SAVE(SOURCE)
```

Later, this source code file could be used to create a new VALIDUS file with

```
GET(SOURCE)
MODVAL(OP=C,I=SOURCE)
```

Example 12:

In example 12, to return the account file to source code via batch, the following procedure is followed.

From the console:

```
X.DIS.
SUI,377777.
ISF(R=VALIDUS)
ATTACH(VALIDUS,VALINDX)
COPY(VALIDUS,VAL)
COPY(VALINDX,VALX)
RETURN(VALIDUS,VALINDX)
ISF.
ATTACH(VALIDUS,VALINDX)
COPY(VALIDUS,VAL)
COPY(VALINDX,VALX)
ACCOUNT(ANLST)
SAVE(VAL,VALX)
```

From the card reader:

```
JOBSRS
ACCOUNT(ANLST)
GET(VAL,VALX)
MODVAL(OP=S,P=VAL,U=VALX)
SAVE(SOURCE)
```

From the console:

```
X.DIS.
ACCOUNT(ANLST)
GET(SOURCE)
SUI,377777.
SAVE(SOURCE)
```

Example 13:

In example 13, a KRONOS 2.0 VALIDUS file is converted to KRONOS 2.1 format. The analyst first deadstarts a KRONOS 2.0 system and then enters the following sequence of commands at the console.

```
X.DIS.
SUI(377777)
GET(VALIDUS)
DEFINE(SOURCE)
MODVAL(OP=S,P=VALIDUS)
DROP.
```

When the VALIDUS file is successfully converted to source, the analyst should deadstart a KRONOS 2.1 system. After bringing up a DIS package, the following sequence of commands should be entered.

```
X.DIS.
SUI(377777)
ATTACH(INPUT=SOURCE)
PURGE(VALIDUS,VALINLK,SOURCE)
```

```
DEFINE(VALIDUS,VALINDX)

MODVAL(OP=C,N=VALIDUS,CV)

DROP.

X.ISF.
```

The CV parameter allows use of a source dump of VALIDUS to create a new 2.1 VALIDUS file.

If it is desired to reverse the conversion sequence (that is, starting from 2.1 and converting to 2.0), the CV parameter should be used on the 2.1 MODVAL call to dump to SOURCE to suppress 2.1 source identifiers not recognizable by KRONOS 2.0 MODVAL. After a KRONOS 2.1 deadstart, the following sequence of commands should be entered.

```
X.DIS.

SUI(377777)

ISF(R=VALIDUS)

ATTACH(VALIDUS)

DEFINE(SOURCE)

MODVAL(OP=S,CV)

DROP.
```

Then, the analyst should deadstart a KRONOS 2.0 system and enter the following commands.

```
X.DIS.

SUI(377777)

ATTACH(INPUT=SOURCE)

PURGE(VALIDUS,VALINDX,SOURCE)

MODVAL(OP=C)

SAVE(NEWVAL=VALIDUS)

DEFINE(VALINLK)

DROP.

X.ISF.
```

1.1.7 DIAGNOSTICS FOR MODVAL

DAYFILE ERROR MESSAGES

DATA BASE ERROR.

Error in a control word in the validation file is in error. If error persists, call an analyst.

SYSTEM ERROR.

Internal malfunction due to either software or hardware. Consult an analyst immediately.

ILLEGAL PASSWORD

Old password not found. Correct and rerun.

ERROR IN MODVAL ARGUMENTS.

Invalid control card arguments. Correct and rerun.

MODVAL ABORTED.

Control point error flag is set. Consult dayfile listing for reason.

DIRECTIVE ERRORS.

Errors were encountered on the input file for either a create or an update. Check the output file for specific errors.

ILLEGAL CONTROL CARD.

User is not validated to change password.

ERROR MESSAGES TO OUTPUT FILE

Corrective action is governed by the severity of the errors. The job may be rerun or the new validation file corrected at the user's discretion.

**** ERROR IN ACCOUNT NUMBER.

Illegal data was encountered where account number was expected.

Action: Illegal data is disregarded and MODVAL goes to the next account entry.

**** DUPLICATE ACCOUNT NUMBER.

The account number encountered is a duplicate of an account number previously entered. This can only happen on a create run.

Action: The first entry is used.

**** ERROR IN IDENTIFIER.

Illegal parameter identifier encountered.

Action: That particular account number is disregarded. If entry is from K display, only that line of input is disregarded.

**** ERROR IN NUMERIC DATA.

Indicates any of the following:

1. Numeric data not numeric
2. Data exceeds maximum
3. No data present

Action: This account number entry is disregarded. If entry is from K display, only that line of input is disregarded.

**** ERROR IN ALPHANUMERIC DATA.

Indicates any of the following:

1. No data present
2. Data for AW identifier unrecognized
3. Number of characters exceeds maximum allowed

Action: This account number entry is disregarded. If entry is from K display, only that line of input is disregarded.

**** USER INDEX PREVIOUSLY DEFINED

No more than one account number can be assigned to any user index with the UI identifier.

Action: This account number entry is disregarded unless the CV parameter (suppression of automatic creation of system and library user indices) is selected. Then the duplication is flagged on the output file and processing continues normally.

**** NO USER INDICES AVAILABLE.

No more user indices are available for automatic assignment. The FUI directive (force user index to be inserted or changed) must be used to specify user indices.

Action: This account number is disregarded. If entry is from K display, only that line of input is disregarded.

INFORMATIVE MESSAGES

CATALOG COMPLETE.

A list run is complete.

nnn USER INDICES PURGED.

All files under nnn user indices were purged via the reformat option. This can occur only with a system origin job.

LEVEL-1 INDEX BLOCKS LINKED.

If account file can be reformatted to eliminate block linkage, searches will be faster for account numbers residing in linked blocks and nonexistent account numbers which would have resided in linked blocks.

CREATING account.

User number account is being created.

UPDATING account.

User number account is being updated.

The following informative messages are self-explanatory.

CREATION COMPLETE.

UPDATE COMPLETE.

REFORMAT COMPLETE.

CONVERSION TO SOURCE COMPLETE.

INQUIRY COMPLETE.

1.2 PROFILO SPECIAL SYSTEM FILE

The special system file PROFILO contains the information required to control a user's access to the system. This access is defined not only by charge numbers and project numbers, but also by time limits (time in, time out, CP time, and connect time). In addition, all exercise of this access by individual users is written by the system to the accounting dayfile, thereby affording the customer a time-log as a basis for his account billing.

Because company secrecy is involved, programs that access PROFILO must run as special system jobs.

PROFILO affords three levels of job accounting.

Charge Number	This is the primary division of the customer's job structure. It is a 1 to 10 character billing identifier. Charge numbers can only be entered onto PROFILO by the analyst in a system origin job.
Project Number	This is an optional second level division of the charge number. It is a 1 to 20 character identifier of a particular company project. The project number can be followed by time-access parameters that apply to this project. Project numbers and their associated parameters can be entered and changed by company supervisors who have been declared master users in the creation of the current PROFILO file.
User Number	The third level is a 1 to 7 character identifier of the individual user who is allowed access to a designated company project. This is the same user (account) number that VALIDUS furnishes to verify system access (section 1.1). User numbers are entered and deleted by the master user. A user can be validated for more than one project in the same charge category or in different ones.

Although charge, project, and user numbers can be entered by the analyst at the console, practical dictates of an industrial situation usually require the analyst to create only a shell of the PROFILO file, that is, he enters just the charge numbers and the associated master users. This relatively constant information is furnished by the customer. Following this, the master users will update the PROFILO file with projects and users that are under their direct cognizance. Then, if a user's validation for system access includes bit 7 of the access word being clear (AW=CCNR, section 1.1.3), this user must enter valid charge and project numbers.

This two-stage structuring of a PROFILO file is illustrated in Figure IV-1-5.

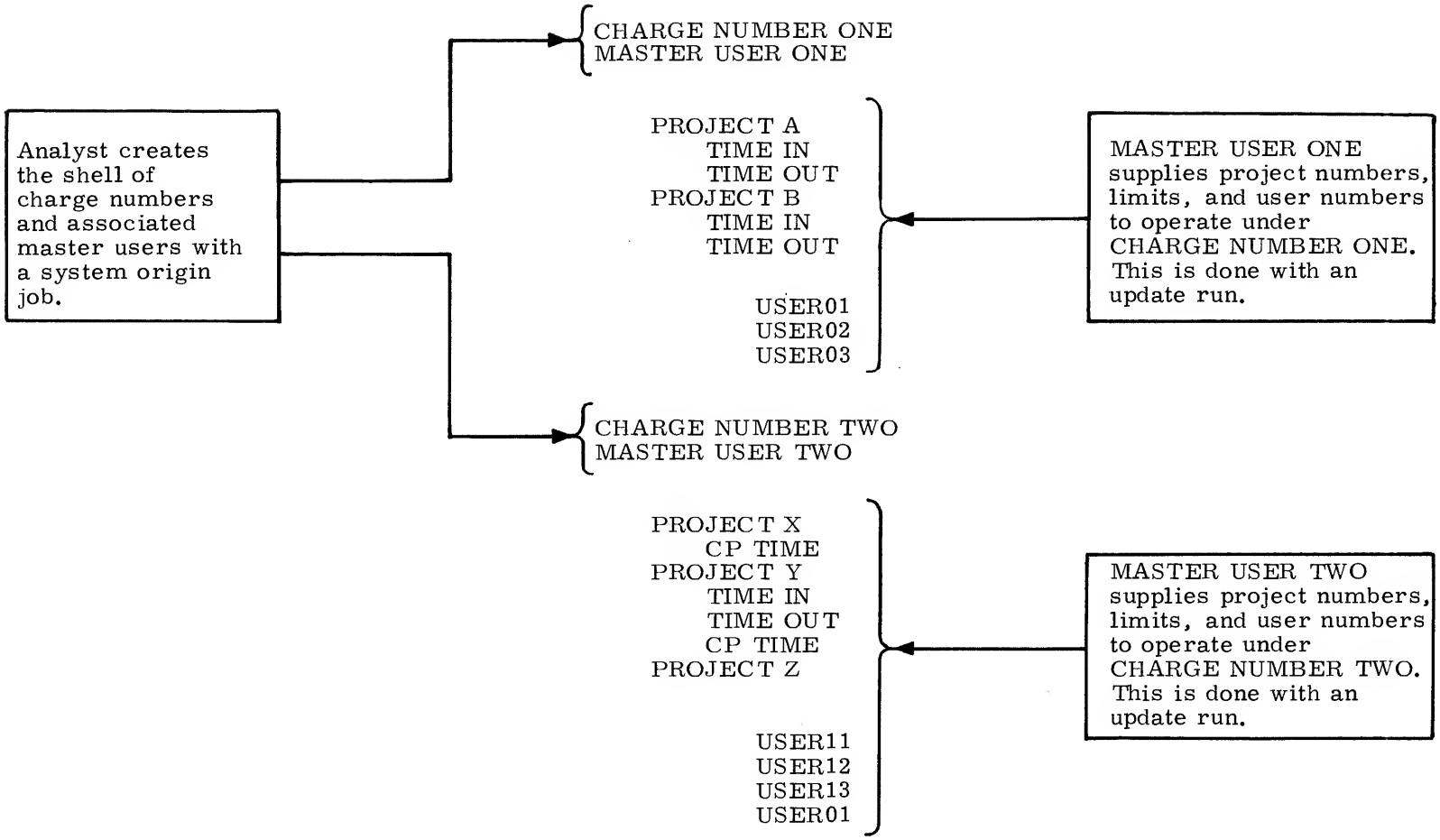


Figure 1-5. Representative structuring of a PROFILO file

1.2.1 PROFILE PROJECT PROFILE MANAGER

The project profile manager, PROFILE, uses the special system file supervisor (SFS) to create and manage the project profile file, PROFILO. Creation of PROFILO can only be done from the console via a system origin job (section 1.2.3). Access and modification of an existing PROFILO file can be done from console, card reader (section 1.2.4), or from a time-sharing terminal (section 1.2.5), depending on the option. In all cases, options are called into execution with the PROFILE control statement. The format of the statement is

PROFILE(p1,p2,...,pi,...,pn)

where the pi's are the identifications used in defining project profile operations and files.

IDENTIFICATIONS ONLY THE ANALYST CAN USE

Identification	Description
OP=C	C indicates a create option. Input directives are processed so as to create a new PROFILO file. Directives are entered either through the K display or input file.
OP=K	K display option. All other options are cleared and instructions must be entered via the K display. K is the default value for a system origin job. Hence, if no parameters are specified and the call statement is simply PROFILE. the K option is automatically selected.
OP=R	R indicates a restructure run that rebuilds a copy of the current PROFILO file, discarding any deleted entries and reconstructing the directory to reduce file access. The existing PROFILO file is replaced with this restructured file.
OP=S	S indicates a source run that returns the PROFILO file to source format (directive images) and places this source code on the source file (either S=source or SOURCE). This source file is used as the input for a later create or update.
S=source	source identifies the file to receive PROFILO source data for the option OP=S. Default is SOURCE.

Identification	Description
OP=L, LO=F	Produces a full listing of the whole PROFILO file. Figure IV-1-6 is an example.
OP=L, LO=C	Produces a listing of charge numbers only for the whole PROFILO file. Figure IV-1-7 is an example.
OP=L, LO=P	Produces a complete charge number and project number listing for the whole PROFILO file. Figure IV-1-8 is an example.
OP=L	Default is LO=F.

IDENTIFICATIONS THE ANALYST AND MASTER USER CAN BOTH USE

Identification	Description
I=Input	Identifies the file that contains input data for a create (OP=C) and an update (OP=U). Default is INPUT.
L=output	Identifies the file to receive output listings. Default is OUTPUT.
P=profile	Project profile file. Default is PROFILO.
OP=U	Updates the project profile file with directives supplied by the input file.
OP=T	Time-share update. Processing is the same as OP=U but preliminary instructions are suppressed at the terminal.
OP=I, CN=xxxx.	Charge number inquire. All project numbers valid for charge number CN are written to the output file. Figure IV-1-9 is an example.
OP=I, CN=xxxx, PN=yyyy.	Project number inquire. The control values and all valid user numbers for project number yyyy are written to the output file. Figure IV-1-10 is an example.

```
PROFILO FULL FILE LIST      OF FULL FILE.                PAGE     1
        CHARGE NUMBER       MASTER USER          73/06/28. 00.26.56.

     1. CHARGNULL!          NULL
     2. CHARGNULL2
     3. CHARG001            PROFILE

          CONTROLS FOR PROJECT NUMBER PN10
         CREATE =  73/06/28.     CP =          64
         MODDED =  73/06/28.     AP =           0
             TI =  00.00.00.     CT =          64
             TO =  00.00.00.     AT =           0

          CONTROLS FOR PROJECT NUMBER PN11
         CREATE =  73/06/28.     CP =          64
         MODDED =  73/06/28.     AP =           0
             TI =  00.00.00.     CT =          64
             TO =  00.00.00.     AT =           0

          CONTROLS FOR PROJECT NUMBER PN12
         CREATE =  73/06/28.     CP =          64
         MODDED =  73/06/28.     AP =           0
             TI =  17.00.00.     CT =          64
             TO =  24.00.00.     AT =           0

            USER NUMBERS VALID TO USE PN12
        USER1     USER2

          CONTROL FOR PROJECT NUMBER PROJECTNUM0001
         CREATE =  73/06/28.     CP =          64
         MODDED =  73/06/02.     AP =           0
             TI =  08.00.00.     CT =          64
             TO =  17.00.00      AT =           0

            USER NUMBERS VALID TO USE PROJECTNUM0001
        ABCUSER   USERA     1234567

     4. CHARG0002           PROFILE

          CONTROLS FOR PROJECT NUMBER PN20
         CREATE =  73/06/28.     CP =          64
         MODDED =  73/06/28.     AP =           0
             TI =  00.00.00.     CT =          64
             TO =  00.00.00.     AT =           0

          CONTROLS FOR PROJECT NUMBER PN21
         CREATE =  73/06/28.     CP =          64
         MODDED =  73/06/28.     AP =           0
             TI =  06.40.00.     CT =          64
             TO =  07.05.00.     AT =           0
```

Figure IV-1-6. Full File List (OP=L, LO=F)

```
PROFILO CHARGE NUMBER LIST OF FULL FILE.                    PAGE     1
        CHARGE NUMBER       MASTER USER              72/10/02. 00.27.11.

     1. CHARGNULL1          NULL
     2. CHARGNULL2
     3. CHARG0001           PROFILE
     4. CHARG0002           PROFILE
     5. CHARG0003           PROFILE
```

Figure IV-1-7. Full File Charge Number List (OP=L, LO=C)

```
PROFILO PROJECT NUMBER LIST OF FULL FILE.                   PAGE     1
        CHARGE NUMBER       MASTER USER              72/10/02. 00.27.06.

     1. CHARGNULL1          NULL
     2. CHARGNULL2
     3. CHARG0001           PROFILE

          VALIDATED PROJECT NUMBERS ARE -
        PN10                            PN11
        PN12                            PROJECTNUM0001

     4. CHARG0002           PROFILE

          VALIDATED PROJECT NUMBERS ARE -
        PN20                            PN21
        PN22                            PROJECTNUM0002

     5. CHARG0003           PROFILE

          VALIDATED PROJECT NUMBERS ARE -
        PROJECTNUM0003
```

Figure IV-1-8. Full File Project Number List (OP=L, LO=P)

```
VALIDATED PROJECT NUMBERS ARE -

    PROJ01                                  PROJ02
    PROJ03                                  PROJ04
    PROJ05                                  PROJ06
    PROJ07
```

Figure IV-1-9. Charge Number Only List (OP=I, CN=xxxx)

```
  CONTROLS FOR PROJECT NUMBER PROJ02

CREATE  = 73/04/11.          CP =          200
MODDED  = 72/04/12.          AP =           10
     TI  = 08.00.00.         CT =          100
     TO  = 12.00.00          AT =            5

  USER NUMBERS VALID TO USE PROJ02
        USERABC     USER123
```

Figure IV-1-10. Project Number List (OP=I, CN=xxxx, PN=PROJ02)

Identification	Description
OP=L, LO=FM	Full file of everything accessible on the PROFILO file by the master user. (A sample listing is given in Figure 1-11.)
OP=L, LO=CM	Charge number list of all charge numbers accessible on the PROFILO file by the master user. (A sample listing is given in Figure 1-12.)
OP=L, LO=PM	Project number list of all project numbers accessible on the PROFILO file by the master user. (A sample listing is given in Figure 1-13.)

1.2.2 CHARGE CONTROL CARD

The system routine CHARGE provides validation of a user's charge and project number for access to defined segments of his company's resources within the system. A call to CHARGE will be required for either a master user or a project-level user if bit 7 (AW-CCNR) in his access word is not set (section 1.1.1). Operation of the CHARGE routine is flowcharted in Figure 1-14.

If validation fails, the job is aborted and an appropriate error message is issued to the dayfile (section 1.2.6). If the user is at a terminal, this message is returned to the terminal.

If validation is successful, the following two events occur.

1. Accounting information for all system resources used up to this point is written to the accounting dayfile. This includes:

   - Accumulated CPU time for the job
   - Central memory usage expressed in kilo-word-hours (the product of field length multiplied by time)
   - Mass storage usage expressed as kilo physical records transferred
   - Magnetic tape usage expressed as kilo physical records transferred

   The message format is:

```
1                        21    26            37
↓                        ↓     ↓             ↓
 yy.mm.dd.  hh.mm.ss.CPC  xxxxxx.xxx SEC.
 yy.mm.dd.  hh.mm.ss.CMC  xxxxxx.xxx KWH.
 yy.mm.dd.  hh.mm.ss.MSC  xxxxxx.xxx KPR.
 yy.mm.dd.  hh.mm.ss.MTC  xxxxxx.xxx KPR.
```

```
PROFILO FULL FILE LIST        OF MASTER USER        PROFILE

        CHARGE NUMBER                                72/10/02.  00.35.38.

    1.  CHARG0001

          CONTROLS FOR PROJECT NUMBER PN10
        CREATE  =  72/10/02.          CP  =          64
        MODDED  =  72/10/02.          AP  =           0
             TI  =  00.00.00          CT  =          64
             TO  =  00.00.00          AT  =           0

          CONTROLS FOR PROJECT NUMBER PN11
        CREATE  =  72/10/02.          CP  =          64
        MODDED  =  72/10/02.          AP  =           0
             TI  =  00.00.00.         CT  =          64
             TO  =  00.00.00.         AT  =           0

          CONTROLS FOR PROJECT NUMBER PN12
        CREATE  =  72/10/02.          CP  =          64
        MODDED  =  72/10/02.          AP  =           0
             TI  =  17.00.00.         CT  =          64
             TO  =  24.00.00.         AT  =           0

           USER NUMBERS VALID TO USE PN12
       USER1      USER2

          CONTROLS FOR PROJECT NUMBER PROJECTNUM0001
        CREATE  =  72/10/02.          CP  =          64
        MODDED  =  72/10/02.          AP  =        2048
             TI  =  08.00.00.         CT  =         200
             TO  =  17.00.00.         AT  =       20000

            USER NUMBERS VALID TO USE PROJECTNUM0001
      ABCUSER    USERA       1234567


    2.  CHARG0002

          CONTROLS FOR PROJECT NUMBER PN20
        CREATE  =  72/10/02.          CP  =          64
        MODDED  =  72/10/02.          AP  =           0
             TI  =  00.00.00.         CT  =          64
             TO  =  00.00.00.         AT  =           0

          CONTROLS FOR PROJECT NUMBER PN21
        CREATE  =  72/10/02.          CP  =          64
        MODDED  =  72/10/02.          AP  =           0
             TI  =  06.40.00          CT  =          64
             TO  =  07.04.00.         AT  =           0
```

Figure IV-1-11. Master User Full File List (OP=L, LO=FM)

```
/PROFILE,OP=L,LO=CM

  PROFILO CHARGE NUMBER LIST OF MASTER USER        PROFILE

          CHARGE NUMBER                             72/10/02.  00.33.38.

       1.  CHARG0001
       2.  CHARG0002
       3.  CHARG0003
 LIST COMPLETE.
/
```

Figure IV-1-12. Master User Charge Number List (OP=L, LO=CM)

```
PROFILO PROJECT NUMBER LIST OF MASTER USER        PROFILE

        CHARGE NUMBER                             72/10/02.  00.34.19.

      1.  CHARG0001

            VALIDATED PROJECT NUMBERS ARE -
          PN10                                    PN11
          PN12                                    PROJECTNUM0001

      2.  CHARG0002

            VALIDATED PROJECT NUMBERS ARE -
          PN20                                    PN21
          PN22                                    PROJECTNUM0002

      3.  CHARG0003

            VALIDATED PROJECT NUMBERS ARE -
          PROJECTNUM0003

 LIST COMPLETE.
/
```

Figure IV-1-13. Master User Project Number List (OP=L, LO=PM)

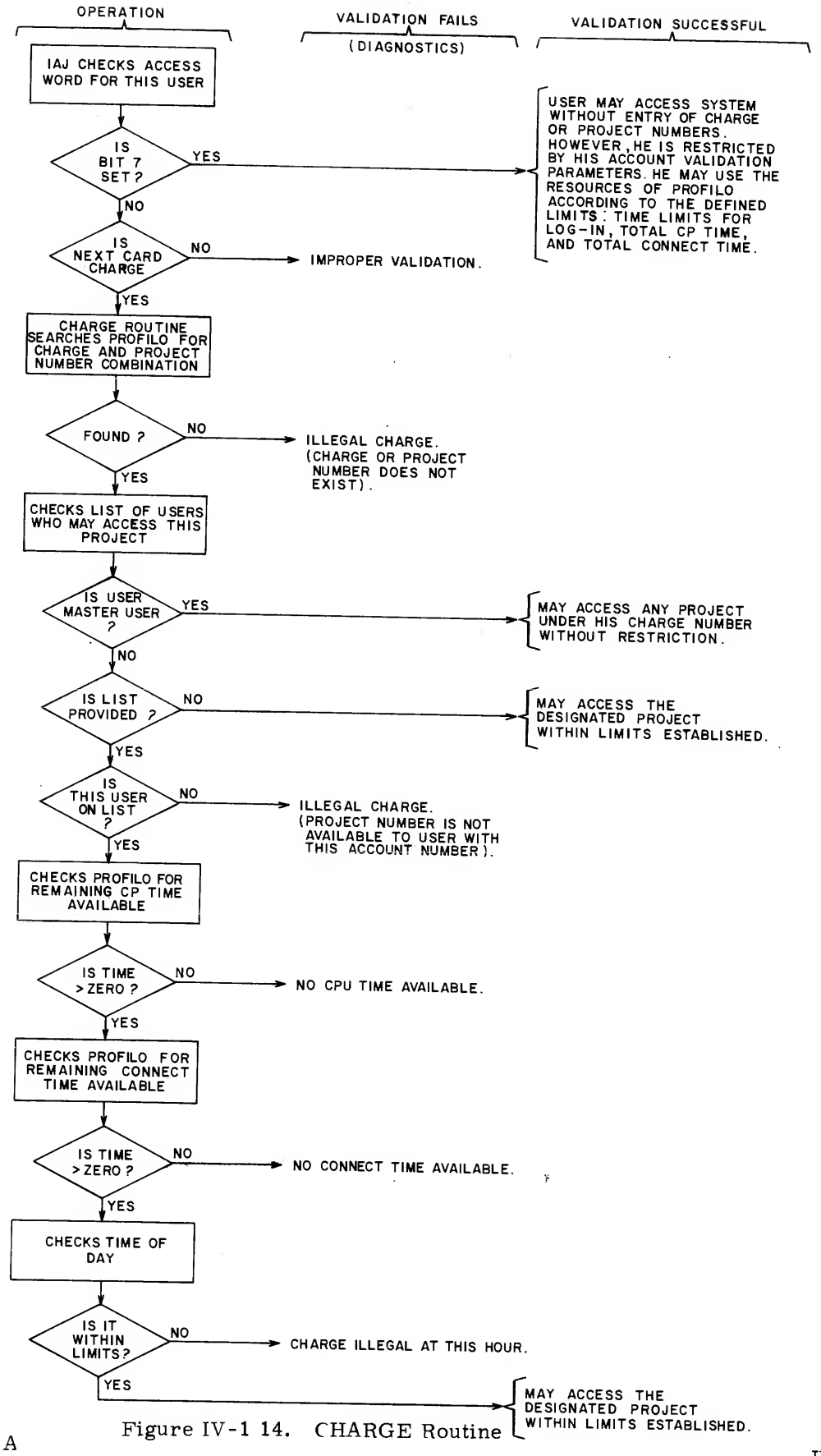


Figure IV-1 14. CHARGE Routine

Values indicated for resources are cumulative.

2. This charge number and this project number are written to the accounting dayfile to be used for accounting purposes for this job. The format of this entry is:

```
1                          21      27
↓                          ↓       ↓
yy.mm.dd.  hh.mm.ss.CH     chargenumbr,projectnumber
```

The CHARGE routine is called from a terminal as either a response to the teletype login request

RECOVER/CHARGE:

or after login by typing in the CHARGE control statement.

The CHARGE routine is called from a batch job by the appearance of the CHARGE control statement after an ACCOUNT card.

The format of the CHARGE control statement is:

CHARGE(chargenmbr, projectnumber)

chargenmbr	Charge number (1 to 10 alphanumeric characters)
projectnumber	Project number (1 to 20 alphanumeric characters)

BATCH USAGE OF CHARGE

When a batch job is submitted, the second card is the ACCOUNT card which gives the account number used in validating a user for system access (VALIDUS). Associated with this number is the access word which determines whether or not this user must supply charge and project numbers. If validation control indicates that these are required, the card following the ACCOUNT card must be a CHARGE card with acceptable charge and project numbers. If additional projects and/or charges are referenced in the job, these references must be accomplished by use of another charge card. If additional ACCOUNT cards (new users) appear in the input, each one that identifies a user requiring job profile validation must be followed by a CHARGE card with the requisite charge and project numbers.

CHARGE APPLICATION AT A TERMINAL

When any user logs in at a teletype, the access word associated with his account number is checked to see if he is required to enter a charge number and a project number. If not, the teletype will print out at login:

```
TERMINAL      nn
RECOVER/SYSTEM:
```

The user then types in the subsystem he wishes to use and proceeds with unrestricted access to resources.

If charge and project are required, the teletype will print out at login:

```
TERMINAL      nn
RECOVER/CHARGE:
```

This user will not be allowed to enter any commands (except CHARGE, LOGIN, HELLO, GOODBYE, and BYE) until he enters valid charge and project numbers. He will then be allowed access to that particular project under that particular charge under whatever restrictions are currently in force for that project.

If later, while still logged-in, this user wishes to access another project (under this charge or another) for which he is validated, he enters the CHARGE control statement with the appropriate charge and project numbers.

DIAGNOSTICS FOR CHARGE (ERROR MESSAGES)

ILLEGAL CHARGE

1. Charge or project number does not exist.
2. Project number is not available to a user with this account number.

DATA BASE ERROR

Error in validation file structure detected. Contact an on-site analyst immediately.

CHARGE ABORTED.

External job abort.

ILLEGAL CONTROL CARD.

No terminator was found on control card.

CHARGE FILE BUSY.

File is not available for charge purposes. Wait and try again.

NO CPU TIME AVAILABLE.

Central processor time allowed under this project number has been expended.

NO CONNECT TIME AVAILABLE.

Teletype connect time allowed under this project number has been expended.

CHARGE ILLEGAL AT THIS HOUR.

This project number cannot be used at this time of day.

1.2.3 PROFILE CONSOLE INPUT

A PROFILO file can only be created by calling PROFILE from the console (system origin job). Likewise, an existing PROFILO file can be restructured, returned to source, or read to an output file as a full-file listing only from the console. The remaining operations (update, inquire, and master user listings) can be executed from console, batch (section 1.2.4), or a terminal (section 1.2.5).

A new PROFILO file can be created via the console by means of the DIS display. A pre-established input file of control values is called and the PROFILE command with OP=C is entered. The following example, given an input file (INPUT) with control values for structuring a new PROFILO file, is a create run from the console.

```
X.DIS.
SUI,377777.
GET(INPUT)
PROFILE(OP=C)
```

The K display can be used for both a create and an update. With the K option, directives are entered directly via the console instead of from an input file. If directives are entered for an existing charge and project number, the control values are changed according to the directive; if the charge number and project number are not found, they are considered new ones and are added to the PROFILO file, if it exists, or are used to create a new one, if it does not exist.

The K display is called with:

```
X.PROFILE.
```

The B display will indicate the control point to which PROFILE is located. A flashing message on that line will be:

```
REQUEST K DISPLAY
```

The analyst types in

```
K,n.
```

where n is the control point number for PROFILE. This brings the K display for PROFILO to the left screen (Figure IV-1-15). The analyst is now ready to create or update. The following example illustrates an update input stream to follow the above.

```
                                PROFILO


ALL INPUT DIRECTIVES ARE THE SAME AS THE REGULAR UPDATE
DIRECTIVES.  THE FOLLOWING COMMANDS ARE ALSO PROVIDED.
/CN    -  BEGIN ACTION ON CHARGE NUMBER *ON*
END    -  TERMINATES INPUT OF DIRECTIVES FOR THE SELECTED
          CHARGE NUMBER, AND UPDATES PROFILO IF SO DIRECTED.
DROP   -  TERMINATES INPUT OF DIRECTIVES FOR THE SELECTED
          CHARGE NUMBER, AND PREVENTS ANY UPDATE OF INFORMA-
          TION FOR THE CURRENT PROJECT NUMBER.
STOP   -  END OF PROCESSING.


                    CHARGE NUMBER      ABCCHARGEN

                    PROJECT NUMBER     PROJECTNUMBER1234567

                    MASTER USER        USERABC
                       CREATED         72/06/06.
                       LAST MOD        72/06/08.

OPT      VALUE      DESCRIPTION
TI   =     0800     TIME IN - 4 CHARS NUMERIC
TO   =     1700     TIME OUT - 4 CHARS NUMERIC
CP   =    10000     CP TIME
AP   =      563     ACCU:MULATED CP TIME
CT   =      100     CONNECT TIME
AT   =       47     ACCUMULATED CONNECT TIME
```

Figure IV-1-15. PROFILO K Display (Left Screen Only)

```
K./CHARJNUM1          [The "/" is used when PROFILE is updating
                       a particular charge number. Otherwise it is
K.MU=MUSE1             not used. ]

K.END

K./CHARJNUM2

K.MU=MUSE2

K.END

K.STOP
```

INPUT DIRECTIVES

The input stream for a PROFILE create or update is divided into charge numbers and associated charge number entries. All directives relative to a charge number must appear within the range of that charge number, that is, until another charge number appears or the end of the input stream is encountered. This implies that a charge number should appear only once in an input stream.

The directives within a charge number entry are further divided into master user, project number, and associated project number entries. The project number entry contains the data identifiers that establish the control values for this project and the list of user numbers that may access this project.

Figure IV-1-16 diagrams a typical input stream.

The card image for a charge number must begin with a / in column 1. The one-to ten-characters following the / are the charge number name. This name is terminated with a separator. Separators consist of all special characters (except /), end-of-line, and end-of-card. Directives may follow the separator.

All data within a charge number entry is free format to column 72. Directives cannot be split between cards or lines. Blanks are ignored.

The format of a data identifier is

```
ident = data
```

where ident is the two-character designation of the limiting parameter and data is the value applied to the project under which this identifier appears. The following are the available identifiers for PROFILE input.

Identifier	Description
MU	Master user number which has the ability to update, inquire, and make listings for the projects entered under the same charge number as this master user. This master user number must be specified on the ACCOUNT card for batch input (section 1.2.4) or when logging in (for Time-Sharing, section 1.2.5) in order for the master user to exercise the project-oriented privileges specified.

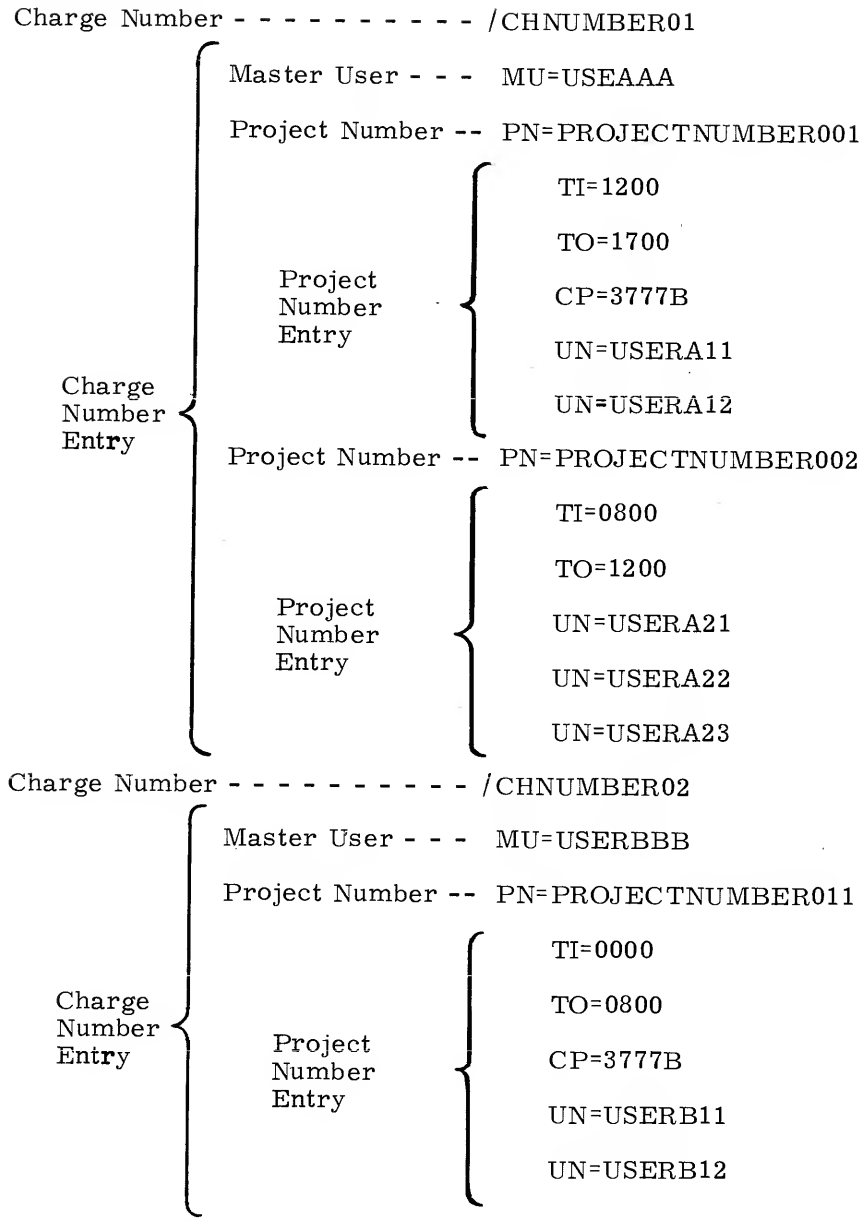


Figure 1-16. Typical Input Stream for Use With PROFILE

Identifier	Description
	The master user number is 1 to 7 alphanumeric characters. There can be only one master user per charge number.
PN	Project number. This is a 1-to 20-character alphanumeric designation of a particular customer activity. Every project number must be associated with a charge number.
UN	User number. A one-to 7-alphanumeric identification of the individual or individuals who will have access to the project or projects under which this user number is entered. It is also the identification used by VALIDUS to establish system access (section 1.1.1). Under KRONOS, all files are cataloged by user number (section 2.1). If no user numbers are specified for a project, then all user numbers are allowed to use it.
TI	Time of day before which the validated user cannot use this project number. This is expressed in four-digit military time notation. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. Maximum value is 2400D.
TO	Time of day after which the validated user cannot use this project number. This is expressed in four-digit military time notation. A radix may follow to indicate decimal (D) or octal (B). If the radix is omitted, decimal is assumed. Maximum value is 2400D.
CP	Total amount of central processor time in CP seconds that this project number is allowed to accumulate. Time may be one to ten numeric digits. A radix may be added. Default value is 100B.
AP	Total amount of central processor time in CP seconds that this project number has accumulated. Time may be one to ten numeric digits. A radix may be added. If this value is entered on a create or update run, it will establish an arbitrary origin from which further counting will start. Appearing on a display, it indicates the actual time recorded. This value is not currently updated by the system.

Identifier	Description
CT	Total amount of accumulated time in seconds that users are allowed to be connected to this project. Time may be one to ten numeric digits. A radix may be added. Default value is 100B.
AT	Connect time in seconds that this project number has accumulated. Time may be one to ten numeric digits. A radix may be added. If this value is entered on a create or update run, it will establish an arbitrary origin from which further counting will start. Appearing on a display, it indicates the actual time recorded. This value is not currently updated by the system.
DC	Delete charge number. This directive may appear only on an update run from the console (system origin job). It removes the specified charge number from the current PROFILO file. This automatically removes all projects and users under this charge. It does not affect a user's access under another charge number.
DP	Delete project number. This directive can appear only in an update run. It removes the designated project from the charge number entry under which it was entered.
DU	Delete user number. This directive can appear only on an update run. It removes the designated user number from the specific project under which it was entered. It does not affect any access it may have under other projects.

Default on all directives is zero unless specified otherwise.

1.2.4 PROFILE BATCH INPUT

A master user can initiate an update, inquire, or listing of the projects under his charge number via card reader input. The following is an example of a batch update in which master user MASTR1 adds a time-in (TI) and a time-out (TO) to one of his projects (PROJ2).

```
JOBUPDA
ACCOUNT(MASTR1)
PROFILE(OP=U)
7/8/9
```

/CHARJNUM1

PN=PROJ2

TI=1400

TO=1800

6/7/8/9

1.2.5 PROFILE EXECUTION FROM A TERMINAL

A master user can initiate an update, inquire, or listing of the projects under his charge number from a time-sharing terminal. To do this he must have his master user status validated at login. After this validation is affirmed, the master user must enter the BATCH subsystem in order to use the PROFILE directive.

The following is an example of a login by master user MASTR1. †

```
 73/04/10.  13.56.20.
KRONOS TIME SHARING SYSTEM - VER. 2.1.
USER NUMBER: MASTR1     (CR)
PASSWORD
[redacted]    (CR)
TERMINAL:          32, TTY
```

At this point, the system will either respond with

RECOVER/CHARGE:

or with

RECOVER/SYSTEM:

For further illustration, assume this master user wants to add limiting identifiers to project PROJ2 which is one of the projects under CHARJ1. If the system had responded with the first reply, the sequence that follows is:

```
RECOVER/CHARGE: CHARGE, CHARJ1, PROJ2
READY.
BATCH  (CR)
$RFL, 20000
/
```

If CHARGE was not required, the sequence is:

```
RECOVER/SYSTEM: BATCH  (CR)
READY.
/CHARGE(CHARJ1, PROJ2)  (CR)          [only if needed]
/
```

The master user is now ready to enter the identifiers under an update.

---

† In the representation of terminal printout, user responses are underscored. Also, each carriage return (CR) is by the user.

UPDATE FROM A TERMINAL

The time-sharing master user can initiate an update by issuing the command PROFILE(OP=U). Once initiated, the following block of information is output.

```
FOLLOWING ARE THE VALID INPUT DIRECTIVES
FOR UPDATE -
   PN = PROJECT NUMBER
   UN = USER NUMBER
   TI  = TIME IN
   TO = TIME OUT
   CP = MAXIMUM CENTRAL PROCESSOR TIME
   AP = ACCUMULATED CENTRAL PROCESSOR TIME
   CT = MAXIMUM CONNECT TIME
   AT = ACCUMULATED CONNECT TIME
   DC = CHARGE NUMBER TO DELETE
   DP = PROJECT NUMBER TO DELETE
   DU = USER NUMBER TO DELETE
A BLANK INPUT LINE TERMINATES THE
UPDATING OF THE GIVEN CHARGE NUMBER.
```

This informative printout can be suppressed by using the control card option OP=T instead of OP=U. In all other regards, the operation of T is identical to U.

If charge and project numbers are required, the example would run as follows:

```
ENTER CHARGE NUMBER
? CHARJ1  CR
ENTER PROJECT NUMBER
? PROJ2  CR
```

The master user can then enter his update parameters according to the following:

```
? TI=0800  CR
? TO=1200  CR
?  CR
/
```

INQUIRE FROM A TERMINAL

The master user can request information on his current charge number and its project numbers by means of an inquire from a terminal. To do this, he enters the BATCH subsystem and issues the command

```
PROFILE(OP=I, CN=charge, PN=project)
```

where charge is his charge number and project is the particular project for which he wants information.

If the charge number has not been supplied, PROFILE outputs

```
ENTER CHARGE NUMBER
```

when it processes the command. The user must type in the appropriate charge number. If a null line is entered, it is treated as an end-of-file (end processing).

If a project number validation is needed and has not been supplied, PROFILE outputs

ENTER PROJECT NUMBER

to the terminal and waits for the user to type in the project number for which he wants information. If a null line is entered, it indicates the end of processing for the current charge number.

If the CN appears alone, all valid project numbers for that CN are printed. PROFILE then requests the next charge number, that is, it prints out

ENTER CHARGE NUMBER

If this master user is validated for an additional charge number, he can enter it at this time (with the CHARGE directive). If not, he enters a null line as an end-of-file.

If both CN and PN are entered on the PROFILE command, all valid user numbers for that project are printed out. PROFILE then requests the next project number with

ENTER PROJECT NUMBER

The master user can then enter another project number under his charge to get a listing of its user numbers, or he can type a null line to indicate end of processing for the current charge number.

LIST FROM A TERMINAL

The master user can request an FM, CM, or PM listing from a terminal. These listings are explained in section 1.2.1. Sample listings are given in Figures IV-1-11, IV-1-12, and IV-1-13.

As with an update and an inquire, the master user must enter the BATCH subsystem to use this option.

1.2.6 DIAGNOSTICS FOR PROFILE

PROFILE SYSTEM ERROR MESSAGES

DATA BASE ERROR.

Erroneous control word on attached PROFILO file.

LEVEL-3 DATA BASE ERROR.

Erroneous control word in format of file on data level.

PROFILE DAYFILE MESSAGES

ERROR IN PROFILE ARGUMENTS.

Error on control card.

NO INPUT FILE.

No directives present.

PROFILE ABORTED.

Error flag set at control point.

DIRECTIVE ERRORS.

Examine output file to determine reason for error. Check diagnostics to output file listed in the next section.

ILLEGAL PROFILE INQUIRE.

User not allowed to access control information for charge number supplied.

PROFILO CREATED.

Creation run completed.

PROFILO UPDATED.

Update run completed.

FILE NOT AVAILABLE CURRENTLY.

PROFILO file busy. Try again later.

INQUIRY COMPLETE.

Inquire run completed.

REFORMAT COMPLETE.

Reformat completed.

PROFILO TO SOURCE.

Source run completed.

LIST COMPLETE.

List of PROFILO completed.

PROFILE DIAGNOSTICS TO OUTPUT FILE

**** ERROR IN CHARGE NUMBER

Format error in charge number; does not have 1 to 10 alphanumeric characters.

Action: Charge number entry is disregarded and PROFILO skips to next charge number entry in the input stream.

**** DUPLICATE CHARGE NUMBERS

This error can occur only on a create run. Two charge entries referring to the same charge number have been found. (Two charge number entries with the same charge number are legal for an update run.)

Action: All charge number entries after the first one with that charge number are disregarded. All other charge number entries that do not have duplicate charge numbers are processed normally.

**** DIRECTIVE ERROR

This error can occur only on a create run. A delete directive (DC, DP, or DU) was encountered on this create run.

Action: The delete directive is ignored while all other directives are processed.

**** DUPLICATE PROJECT NUMBER

This error can occur only on a create run. Two or more project number entries within a charge number entry refer to the same project number. (It is illegal to enter the same project number more than once for a particular charge number during a create run.)

Action: All duplicate project number entries after the first one are disregarded. All other project number entries that do not have duplicate project numbers are applied normally.

**** DUPLICATE USER NUMBER

This error can occur in two possible situations.

1. The same user number (UN) directive appears more than once with a project number.

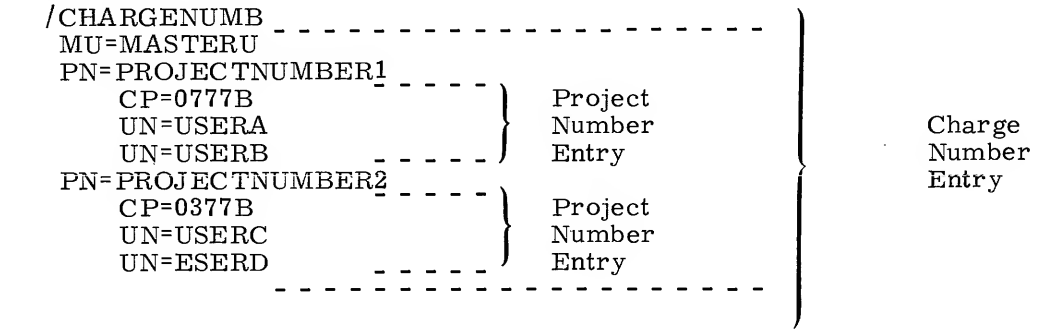
2. An update attempts to add a user number that already exists under the project number.

Action: The entire project number entry containing the duplicate user number is disregarded.

**** ERROR IN IDENTIFIER

An unrecognized directive identifier is encountered.

Action: Depends on the position of the error within the input stream of directives. There are four possible conditions. The following sample input stream is used to illustrate the four possible actions.



1. If the error occurs within a project number entry, that entire project number entry is disregarded.

2. If the error occurs in one of the directives MU, DC, or DP (but not PN) within the first charge number entry, only the erroneous directive is disregarded.

3. If the error is in the first PN directive, the entire project number entry will eventually be disregarded since the directives immediately following that PN will be treated as directives coming ahead of the first PN directive and will, accordingly, be ignored.

4. If the error occurs in any PN directive after the first one, it is treated as an error within the preceding project number entry. Both the project number entry under the erroneous project number and the project number entry under the preceding project number are disregarded.

**** USER NOT VALID TO UPDATE

The user number of the person attempting the PROFILE update run is not the master user number for that charge number entry. This error can only occur during an update run.

Action: The unacceptable charge number entry is disregarded and PROFILE skips to the next charge number entry in the input stream.

**** MULTIPLE MASTER USER NUMBER

More than one master user (MU) directive is encountered within a charge number entry in the input stream. This error can only occur during a create run.

Action: All master user number directives after the first one are disregarded.

**** ERROR IN NUMERIC DATA

This error occurs when numeric data exceeds the maximum limit for that value, or when nonnumeric data is encountered.

Action: The entire project number entry containing the directive with the numeric data error is disregarded.

**** ERROR IN PROJECT NUMBER

The data field of the project number directive (PN) contains a format error (not 1-to 20 alphanumeric characters).

Action: The project number entry associated with the erroneous project number is disregarded.

**** ERROR IN USER NUMBER

The data field of the user number directive (UN) contains a format error (not one to seven alphanumeric characters).

Action: The entire project number entry containing the erroneous UN directive is disregarded.

**** ERROR IN MASTER USER NUMBER

The data field of the master user directive (MU) contains a format error (not one to seven alphanumeric characters or an asterisk).

Action: Entire charge entry is disregarded and PROFILE skips to next charge entry.

PERMANENT FILE UTILITIES 2

Five utility processors maintain the KRONOS permanent file system. This maintenance includes the dumping and loading of permanent files, the cataloging of files in the system and on an archive tape, and the copying of specific files to a control point. The designations and functions of the five utilities are as follows:

PFDUMP	Dump permanent files. A permanent file utility that copies files stored on a permanent file device to a backup storage file (archive tape). Files created by this dump may be reloaded by the PFLOAD utility.
PFLOAD	Load permanent files. Load files from a backup storage file (archive tape) onto a permanent file device.
PFCAT	Catalog permanent file device. Catalogs permanent file catalog tracks and generates a report. The possible reports are: • Listing of catalog file with files grouped by user index • Statistical report of device usage
PFATC	Catalog archive tape. Catalogs permanent file archive file(s).
PFCOPY	Copy archive file(s) to control point. Extracts files from an archive file and copies them to a control point.

These five utility processors are overlays called by the permanent file supervisor (PFS). This supervisor cracks the parameters in the utility command and loads the correct processing overlay. The overlay performs its specific operation in interaction with the permanent file utility routine (PFU) which manages the catalogs, permits, data allocation on a device, and the data transfer between device and overlay. An overview of this procedure is given in Figure IV-2-1.

Operation of these utilities can be initiated from console, batch, or a terminal (TTY). However, in all cases the job containing the utility control card must be system origin type or have system origin privileges.

The call and operation of each of these utilities are explained in the following sections. These explanations require some familiarity with the following terms.

Archive File (Tape)

User Index

Device Mask

Mass Storage Table

Catalog Track

Catalog Entry

Track Reservation Table

Minimal definitions are given in the next section.

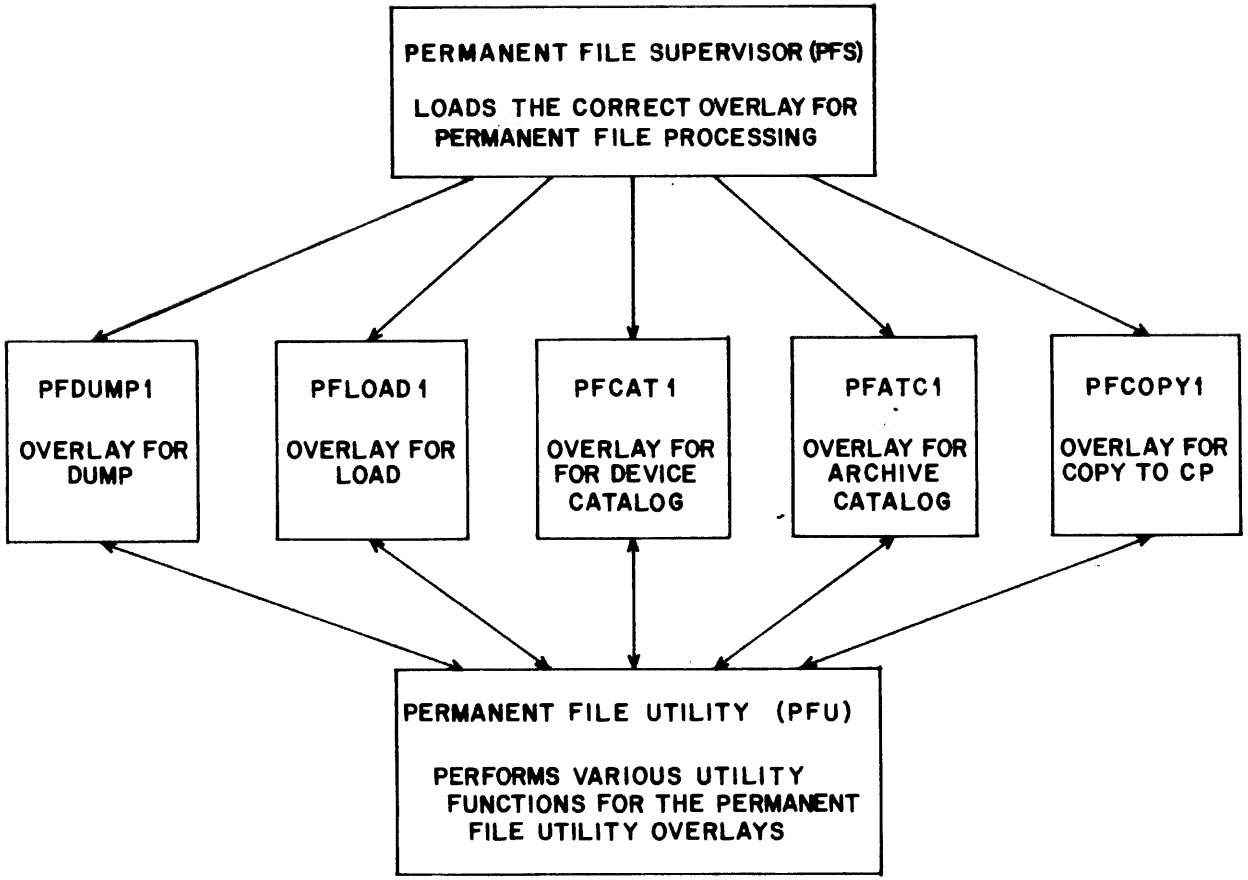


Figure IV-2-1. Functional Overview of the Permanent File Utility Overlays

2.1 DEFINITIONS

2.1.1 ARCHIVE FILE (TAPE)

The permanent files accumulated on mass storage can be dumped in whole or in part to a backup tape (or other mode of backup gear) as insurance against a device going down or to free a device temporarily as a scratch file for preventive maintenance. Each dump of permanent files is made to an archive file. Each archive file is part of a multirecord file in which each physical record represents one of the permanent files that was part of the dump that created that archive file.

If two or more archive files are created on one type of backup device (for example, tape), these archive files constitute a multifile archive file and can be so referenced by the parameters in the permanent file utility commands (Figure IV-2-2).

The archive file can be loaded back onto the permanent file system in whole or in part. It can also be used to generate reports, or the individual files can be referenced for selective use.

2.1.2 USER INDEX

A 17-bit user index is associated with each account number created on the VALIDUX file. This index is entered through MODVAL (section 1.1.1) with the UI identifier on the account-number input directive (/accnumb,UI=xxxxxx), or MODVAL, by default, supplies the next available index.

Whenever this account submits a job, the related user index is placed in the control point area along with the account number, job name, and other parameters that link hardware, files, and job. The permanent file manager uses the index to identify the master device and catalog track for this account. It does this with two masking operations involving the index and two sets of device parameters obtained from the mass storage table in CMR. The device parameters are device mask and number of catalog tracks.

One operation correlates the rightmost character in the user index (bits 0 through 2) with the bit settings of the device mask for each device in the configuration. The other operation performs a logical AND between the remaining portion of the index and the number of catalog tracks on the device to determine which track contains this user's catalog.

The identification of the master device is covered in the Device Mask definition; the identification of the catalog track on that device is covered in the following section.

The number of tracks on a device is established when the device is initialized or by default. Default values are:

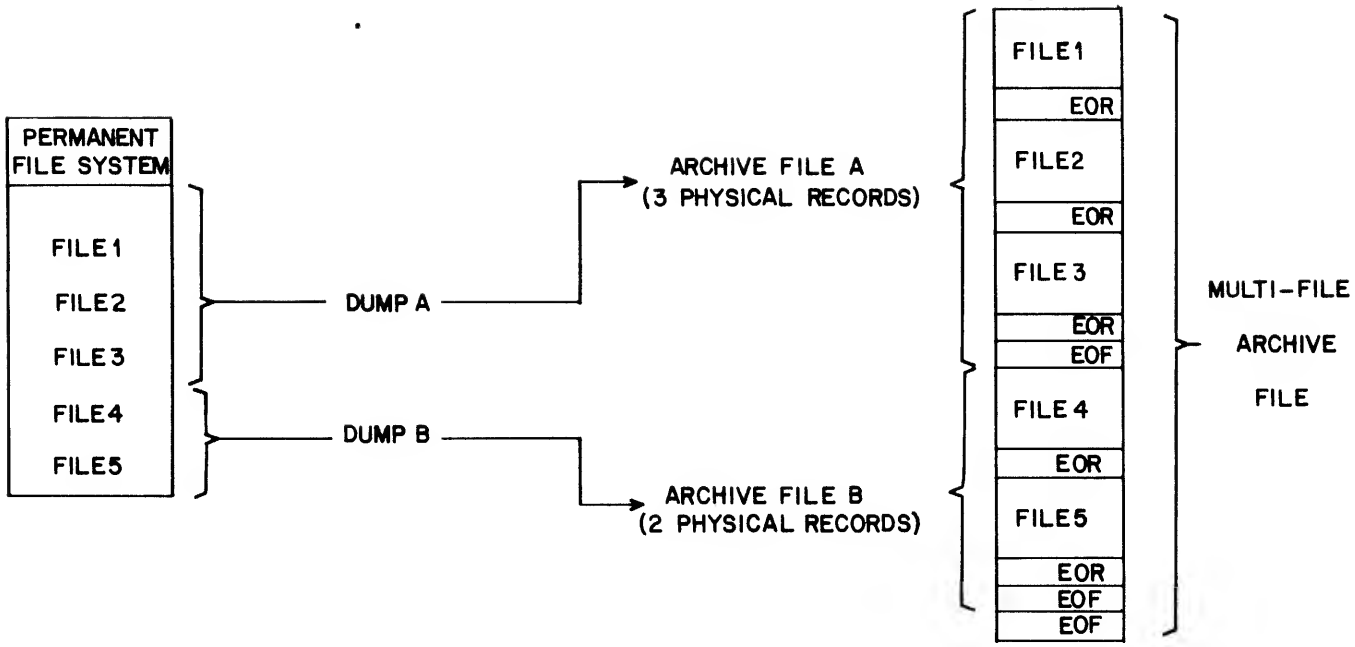


Figure IV-2-2. Example of Multifile Archive File Structure

Type of Device	Default Number of Catalog Tracks
DA 6608	10
DB 6638	10
DC 863	2
DD 854	4
DE ECS	2
DF 814	100
DH 821	100
DI 844	20
DP DDP path to ECS	2
MD 841	20
Private device	1

Whether initialized or defaulted, this number is a power of 2 up through 200B. Thus, the following are admissible numbers of tracks.

1, 2, 4, 10B, 20B, 40B, 100B, 200B

When these numbers are reduced by one, the following octal values are produced.

0, 1, 3, 7, 17B, 37B, 77B, 177B

In binary form, these values are:

```
          0
          1
         11
        111
      1 111
     11 111
    111 111
1 111 111
```

These serve as masks with all bits set (except for the first), and when ANDed with bits 3 through 9 of the user index, produce the track number for that particular user on that particular device.

Example:

Given a configuration of two devices with device masks 221B and 156B, and with 40B and 20B tracks respectively, a user who has the user index 14224 will have the assignment of master device and catalog track as illustrated in Figure IV-2-3.

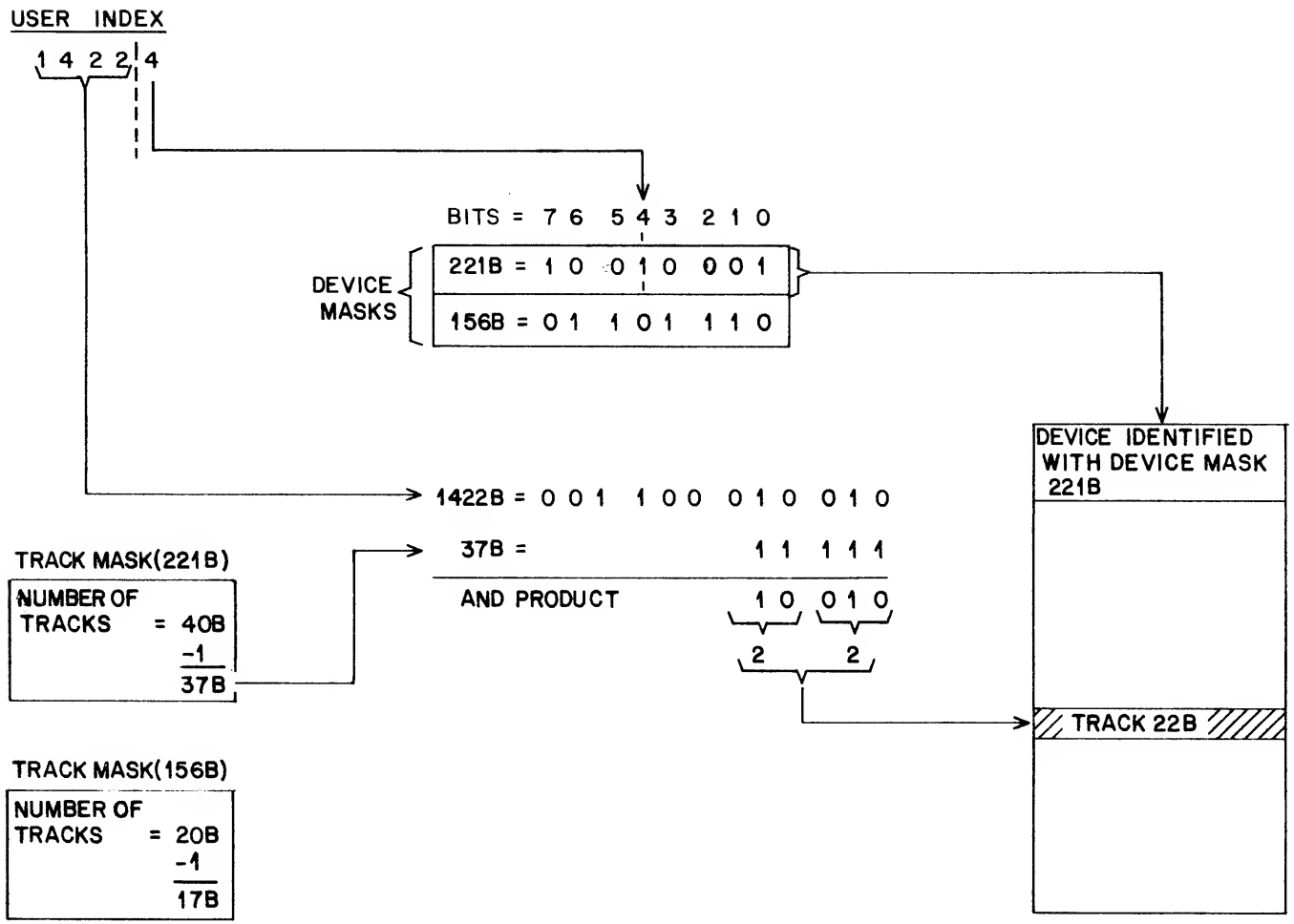


Figure IV-2-3. Example of Masking Operations With User Index

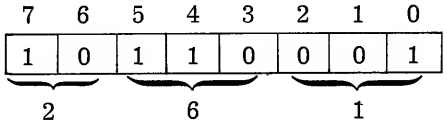
2.1.3 DEVICE MASK

An 8-bit quantity used to identify the group of users who have this particular device as their master device; that is, it is the device that contains their file catalogs, all their indirect access files, and may contain some or all of their direct files (direct files are put on the device with the most space available unless a device is specified by the user).

If a bit is set in the mask, all user indices ending in that bit-position value have this device as their master device.

Example:

The device identified by the mask 261B will be the master device (have catalogs and permanent files) for users whose indices end in 0, 4, 5, and 7, since the bit setting in the mask is:



Within a family, the sum of all the device masks must total exactly 377B and each bit must be accounted for only once.

Example:

For a family of three devices, appropriate device masks are:

```
1 0  0 1 0  0 0 1   =  221B
0 0  1 0 0  0 1 0   =  042B
0 1  0 0 1  1 0 0   =  114B

1 1  1 1 1  1 1 1   =  377B
```

If the sum of the device masks is less than 377B, this means that one or more bits have not been accounted for and any user index ending in that ordinal will reference no device. When such a user tries to write a permanent file, he will get the message

DEVICE UNAVAILABLE

Example:

For a family of four devices, the following masks were designated by the EQ entry at deadstart.

```
0 1  1 0 0  0 1 0   =  142B
0 0  0 1 0  0 0 0   =  020B
0 0  0 0 1  0 0 0   =  010B
1 0  0 0 0  1 0 0   =  204B

1 1  1 1 1  1 1 0   =  376B
```

Users whose index ends in zero have no master device.

If the sum of the masks for one family is greater than 377B, there is at least one duplication of master device for a single index.

Example:

For the following family of four devices:

```
1 0  0 0 1  0 1 0  =  212B
0 1  0 0 0  1 1 0  =  106B
0 0  1 0 0  0 0 0  =  040B
0 0  0 1 0  0 0 1  =  021B

1 1  1 1 1  1 1 1  =  401B
             1
```

User indices that end in 1 reference two master devices, one with the mask 212B and one with the mask 106B.

It is a necessary but not sufficient condition that all masks for one family total 377B. Consider the following example of three devices in one family.

Example:

```
1 0  1 1 0  0 0 1  =  261B
0 1  0 0 1  1 0 1  =  115B
0 0  0 0 0  0 0 1  =  001B

1 1  1 1 1  1 - -     377B
```

Indices that end in zero reference all three devices in the family. Indices that end in one reference no device.

When masks are assigned at deadstart, two rules must be observed.

1. The sum of the masks must be exactly 377B for each family.
2. Each bit position must be set exactly once from the devices in one family.

2.1.4 MASS STORAGE TABLE

The configuration of mass storage devices currently available to the system is defined by the CMR mass storage table. Each logical device in this configuration has an entry in this table that contains the following information.

Device status

Number of current users

Number of catalog tracks

Device mask

Location of start of permission data

Location of start of catalog tracks

Location of start of indirect access files

Interlock status

Family (pack) name

Device number

User number for private auxiliary device

Available space on device

Logical description of device

These appear on the E,M display on the console.

2.1.5 CATALOG TRACK

Users are assigned by groups to catalog tracks on a permanent file device according to user index and device mask (refer to previous definitions). A catalog track contains the catalog entries (definition following) that locate and define each permanent file created by these users.

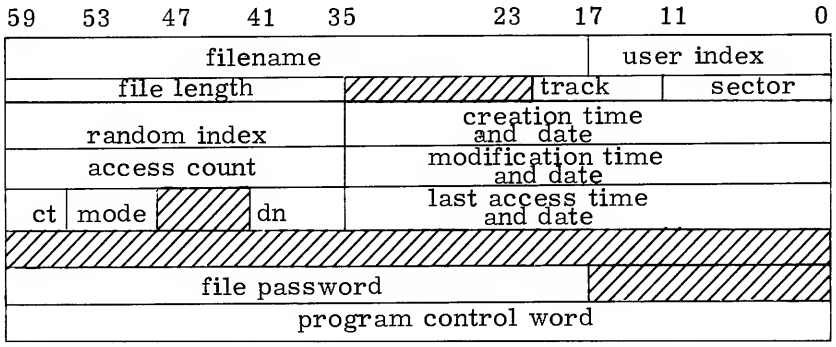
The device which contains a user's catalog track is his master device. This same master device contains all of the indirect access files created by this user; it may contain some or all of his direct access files. (Direct access files are put on a device in his family with the most space available unless the user specifies their destination.)

The end of a catalog track is indicated by an EOI on the device. All catalog tracks are linked in the track reservation table and appear as one logical chain. When catalog entries exceed the logical track, a continuation track is reserved at the end of the catalog track chain in the track reservation table. The disk linkage bytes for the overflowed track point to the continuation track.

2.1.6 CATALOG ENTRY

Files in the permanent file system are referenced by dynamically updated catalog entries on the catalog tracks (previous definition) of master devices. Whenever a user creates a direct or indirect access file, a catalog entry that specifies the characteristics of the file, access information about the file, and the location of the file is entered on the catalog track of his master device. As he modifies the file, the catalog entry is updated to reflect the modification.

The format of a catalog entry is as follows:



filename	Permanent file name
user index	User index of file creator
file length	Length of the file in PRUs
track	Beginning track of the file
sector	Beginning sector of the file
random index	Random disk address of first permit sector
creation date and time	yymmddhhmmss in octal when this file was first entered on the permanent file system. The year (yy) is biased by 70.
access count	Total number of times this file has been accessed
modification date and time	yymmddhhmmss in octal when this file was last modified. The year (yy) is biased by 70.
ct	File category (private, semiprivate, or public)
mode	Mode of access for semiprivate and public files. 0 Write, read, execute, append, modify, and/or purge 1 Read and/or execute 2 Append 3 Execute 4 Negate previous permission 5 Modify 6 Read and/or execute, allow modify 7 Read and/or execute, allow append
dn	Device number (0 through 77_8). This is only present when a direct access file resides on a device other than the master device for the user. The device number identifies this other device which is in the same family of devices.
last access date and time	yymmddhhmmss in octal when this file was last accessed. The year is biased by 70.
file password	Optional password
program control word	User control information (FET=11)

2.1.7 TRACK RESERVATION TABLE

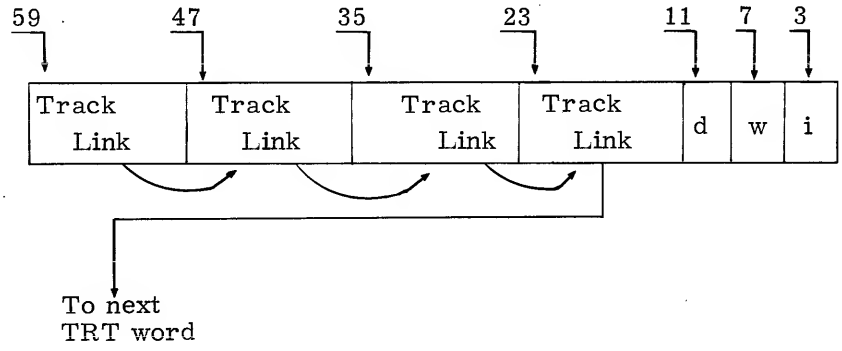
Every device in a permanent file system has a label track (usually track 0) which contains a label sector describing the device (family name, device mask, location of permit information, catalog information, and indirect files) and a number of PRUs containing the track reservation table (TRT). The TRT describes the physical layout of data on the device and is the key to allocating information on the device.

The TRT contains single-word entries that define track linkage and bit-setting controls for those tracks (Figure IV-2-4). Each word has four 12-bit linkage bytes and three sets of 4-bit control settings that match the four bytes (Figure IV-2-5).

The numbering of the 12-bit linkage bytes or cells corresponds to the numbering of tracks on the device, with the first track starting at 4000. The entry in a cell references the next cell and its associated track. This next track either continues the information or starts a new sequence depending on the first-track bit setting.

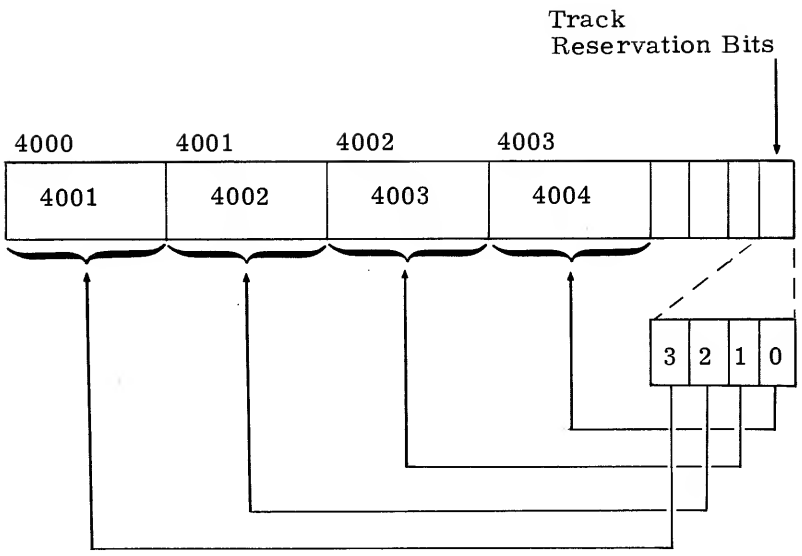
Figures IV-2-4 and IV-2-5 show a sequential linkage of tracks; in Figure IV-2-5, from track 4000 to track 4001 to 4002 to 4003. This numerical sequence is purely illustrative. The linkage could just as well have been:

4000 ⟶ 4002 ⟶ 4015 ⟶ 4012



Track Link	Address of the next track that is a logical continuation of this file. The track links are shown as sequential within a word, but this is not a requirement.)
d	Bit settings for identifying the first track of a permanent file chain
w	Bit settings for establishing interlock of a track
i	Bit settings for track reservation

Figure IV-2-4. Track Reservation Table Word



Matching of four reserve track bit settings with corresponding track link bytes. The same correspondence holds for the interlock bits (4 through 7) and the first-track bits (8 through 11).

Figure IV-2-5. Bit Settings for Track Link Bytes

The first group of control settings (bits 8 through 11) is used to identify those tracks which begin a sequence of permanent file information. If any one of these bits is set, the associated track link byte references a track that is the first track of a chain that may extend across a number of tracks. This chain can be a direct access file, an indirect access file data chain, a catalog chain, or a permit chain.

The second group of control settings (bits 4 through 7) is used to interlock tracks. If any one of these bits is set, the associated byte references a track that cannot be accessed so long as this bit remains set.

Interlocking capability is necessary since the permanent file manager may be processing several requests directed at the same file simultaneously. Without interlock, these requests could overlap.

Example:

Three indirect access file (FILE1, FILE2, and FILE3) are stored sequentially on a master device. User AA enters the command:

```
GET,FILE2
```

The system initiates retrieval to produce a working copy. Halfway through the retrieval, user BB enters the command:

PURGE,FILE2

This leaves a hole where FILE2 resided. User CC then enters the command:

SAVE,FILE4

File4 is put in the hole between FILE1 and FILE3, the area where the GET is being processed. Accordingly, user AA ends up with the first half of FILE2 followed by data from FILE4.

The previous problem is avoided by interlocking the catalog track that contains a file whenever it is accessed. Interlocking the track rather than the whole device allows users of another group (catalog track) to access their files. (It is possible to interlock the entire device, as in PFLOAD (section 2.4.2).)

The third group of control settings (bits 0 through 3 is used to identify reserved tracks. A track is reserved either because it has data written on it or it is a flawed track. A flawed track is removed from availability by reservation at deadstart or by subsequent initialization.

2.2 CALLING THE UTILITIES

Any of the permanent file utilities can be called from console (K display), card input (batch), or terminal (TTY). For both batch and terminal use of the permanent file utilities, the user must have system origin privileges and DEBUG must be on.

2.2.1 INPUT FROM CONSOLE

Input from the console requires the following sequence of entries and responses.

1. The analyst types in

   X.PFS. (CR)

   The B display indicates the control point to which PFS is assigned. To the right of the entry appears the flashing message:

   REQUEST *K* DISPLAY

2. The analyst types in

   K,n. (CR)

   where n is the control point number noted on the B display. The permanent file utilities left K display (Figure IV-2-6) appears on the left screen.

3. The analyst types in

   KK. (CR)

   This brings the permanent file utilities right K display (Figure IV-2-7) to the right screen. This will give a description of the permanent file utility options available.

4. The request for the desired utility is entered with

   K.uo. (CR)

   where uo is one of the following.

uo.	Description
DU	Dump permanent files
LD	Load permanent files
CA	Catalog permanent files
AT	Catalog archive tape
CP	Copy archive file to control point

```
*** PERMANENT FILE UTILITY OPTIONS ***

OPTION    CURRENT VALUE    DESCRIPTION

UT                         UTILITY DESIRED

ENTER K.UO.    WHERE *UO* IS
  AT - TAPE CAT    CA - DEVICE CAT
  CP - TAPE COPY   DU - DUMP   LD - LOAD
```

Figure IV-2-6. Permanent File Utilities Left K Display (before UT is entered)

*** PERMANENT FILE UTILITY OPTION DESCRIPTION ***

OPTION	DESCRIPTION
UT *UTILITY*	*LD* - PFLOAD *DU* - PFDUMP *CA* - PFCAT *AT* - PFATC *CP* - PFCOPY
LO *LIST OPTION*	T - TAPE CATALOGS C - PERMANENT FILE DEVICE CATALOGS E - ERRORS S - SUMMARY
OP *UTILITY OPTIONS*	C - CREATION* A - LAST ACCESS* M - LAST MODIFICATION* I - INDIRECT ACCESS* D - DIRECT ACCESS** B - BEFORE P - PURGE AFTER DUMP R - REPLACE N - NONINITIAL LOAD Q - ADD CATALOG AND PERMIT RECOVERY E - EXTRACT CIR O - OMIT CIR

NOTE: OPTIONS ARE ENTERED AS FOLLOWS -

K.LO = TCS. or

K.OP = CIBP

*ONLY ONE TYPE OF DATE MAY BE SPECIFIED
**ONLY ONE ACCESS OPTION MAY BE SPECIFIED

Figure IV-2-7. Permanent File Utilities Right K Display

The parameters available under the chosen utility appear on the left screen. Figure IV-2-8 shows the left screen after the DU utility has been called (1). The TCE appearing after the LIST OPTION (2) indicates that:

T Files processed
C Catalog files
E Errors

are the listings available under dump.

The CAMIDBP (3) appearing after the UTILITY OPTION indicates that:

C Creation
A Last access
M Last modification
I Indirect files
D Direct files
B Before date and time
P Purge after dump

are the options available for the dump utility.

5. The desired parameters are entered with the command

   K.p1,p2,...,pn (CR)

   where the pi are selected from the parameter list on the left screen. The selected parameters replace the default values listed on the left screen.

6. To initiate execution, the analyst types

   K.GO. (CR)

   The lower lines of the left display (4) disappears and is replaced by:

   DEVICE MASK
   DATE TIME

   Values appear with these identifiers as processing continues.

2.2.2 BATCH INPUT

The deck structure for card input to call a permanent file utility is:

JOB card
ACCOUNT card
PFutil(p1,p2,...,pn)

where util is one of the following utility options.

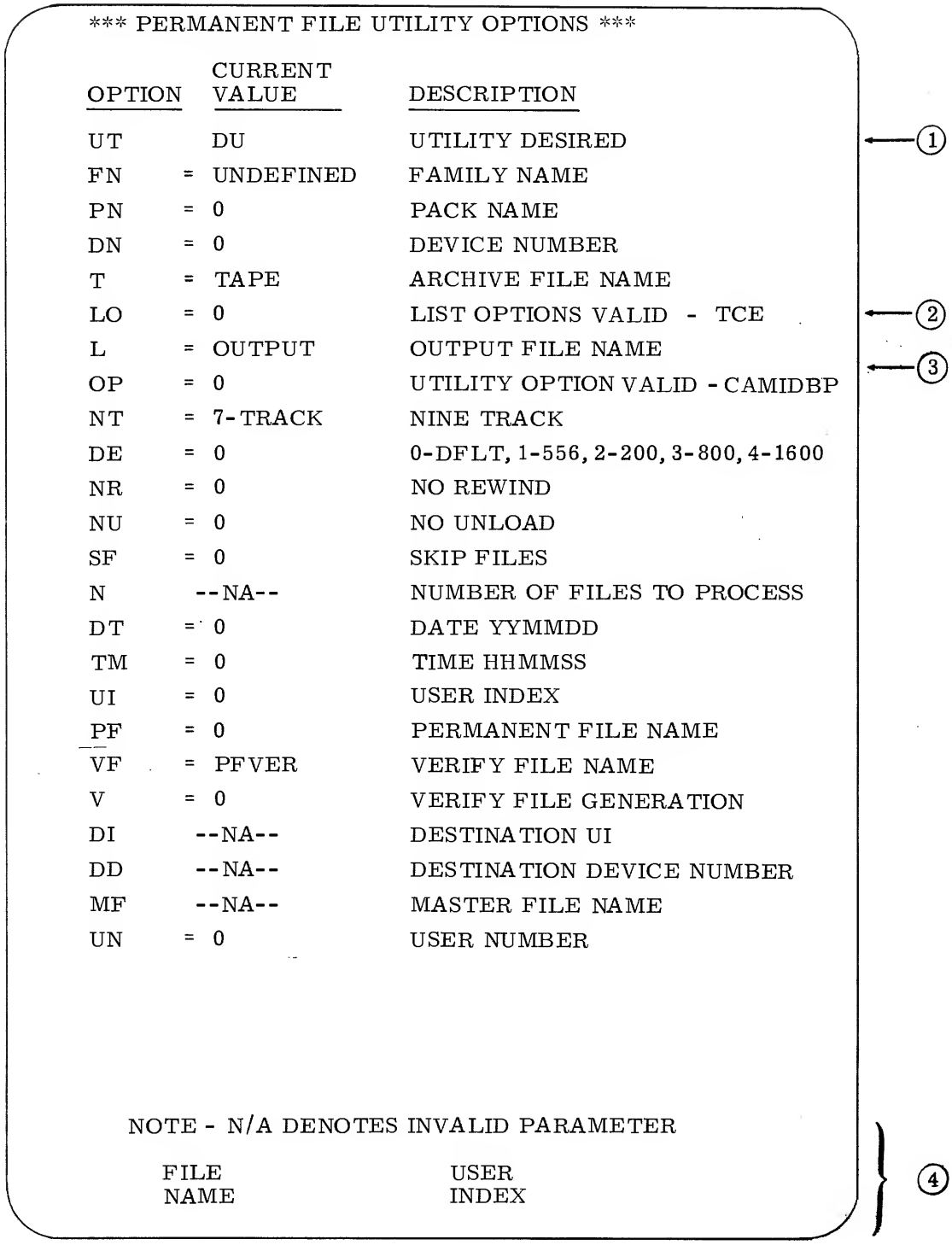


Figure IV-2-8. Permanent File Utilities Left K Display (after UT is entered). The circled numbers are identified in the text.

util	Description
DUMP	Dump permanent files
LOAD	Load permanent files
CAT	Catalog permanent files
ATC	Catalog archive tape
COPY	Copy archive file to control point

The pi are the parameters desired for this option (section 2.3).

When this control card is read, the K display appears. However, since parameters were entered on the control card, they cannot be entered via the K display.

Exception: If there is an error in parameters detected at initiation of a utility, control is returned to PFS and parameters may then be entered via the K display.

2.2.3 TERMINAL INPUT

The format of terminal input for calling the permanent files utilities is substantially the same as that for batch input. At login, the analyst enters the BATCH subsystem, calls the desired utility, and enters the appropriate parameters with the command

PFutil(p1,p2,...,pn)

where util and the pi are the same as for batch input.

2.3 PARAMETERS FOR THE UTILITY CONTROL STATEMENTS

The parameters available for the permanent file utility control statements are listed in this section. Each entry in the list includes the name, the parametric designation, and the range of characters or digits required. Following the list is a description of each parameter. The descriptions are in the same order as the list.

2.3.1 LIST OF UTILITY PARAMETERS

Family name (FN), 1 to 7 characters

Pack name (PN), 1 to 7 characters

Device number (DN), 2 octal digits

Utility option (OP), 1 to 7 characters

Archive file name (T), 1 to 7 characters

Nine-track (NT), (NT sets the option)

Density (DE), 1 decimal digit

No rewind (NR), (NR sets the option)

No unload (NU), (NU sets the option)

Skip files (SF), 2 decimal digits

Number of files to process (N), 2 decimal digits

Date (DT), 6 decimal digits (yymmdd) where yy = year, mm = month, and dd = day

Time (TM), 6 decimal digits (hhmmss) where hh = hour, mm = minute, and ss = second

User index (UI), 6 octal digits

Destination index (DI), 6 octal digits

Permanent file name (PF), 1 to 7 characters

Verify file name (VF), 1 to 7 characters

Verify (V), (V sets option)

Output file name (L), 1 to 7 characters

List option (LO), 1 to 7 characters

Destination device (DD), 2 octal digits

Master file (MF), 1 to 7 characters

User number (UN), 1 to 7 characters

2.3.2 DESCRIPTIONS OF UTILITY PARAMETERS

FN = family name	Identifies the family of permanent file devices to be dumped, loaded, or cataloged. This is not required if only one family of devices is active in the system. Default is normal system family name.
PN = packname	Name of the auxiliary device to be dumped, loaded, or cataloged. The device must be mounted and available. Default is no name.
DN = device number	Identifies one specific device within the system (or family) that is to be dumped, loaded, or cataloged. This is used only when a part of the permanent file system is to be processed. If this parameter is omitted, all permanent file devices in the system (or family) may have their files processed. Default is zero. This entry will be assumed octal unless a nonoctal digit is encountered or a D radix is used. If UI is specified, DN does not have to be specified as the utility will locate the proper device.
OP = utility options	This parameter specifies the options which control the processing of files by the utility called. Character strings are permissible under defined conditions. Many of the options require additional parameters to complete the definition of the selection. Default is zero. Only one of the following three options may be used at a time. Each requires TM and DT parameters to establish a dividing time after which all files that meet the criteria of the option are singled out for processing. If the B parameter is added, the time before is specified.

C Make selection according to time of creation.

A Make selection according to time of last access.

M Make selection according to time of last modification.

Only one of the following two options may be used at any time. These may be used in conjunction with the previous temporal options.

I Select indirect access files only.

D Select direct access files only.

The following parameter is used only with C, A, or M. DT and TM are optional. C, A, or M must be specified.

B Specifies before time in selection of files according to event.

The following option is used only with a dump.

P Purge after dump. All files included in the dump are purged after the dump is completed.

The following four options are used only with a load.

R Select replace option. Files being loaded from an archive tape replace those files in the permanent file system for which there is a one-to-one matching of file names. Normally, if a file already exists in the permanent file system, PFLOAD skips loading of the same-name file from the archive tape (refer to N option).

N Non-initial load. On a non-initial load, PFLOAD reads the catalogs of files on the permanent file system and matches them with the archive catalog. If a file already exists in the permanent file system, the archive counterpart is skipped. If the file does not exist in the permanent file system, the file is added to the catalog and the data stored.

This process is reversed by the R option which purges a file in the permanent file system and replaces it with an archive file whenever a name match is found.

Ordinarily the non-initial load would be the default if R were omitted. However, the N parameter is required to satisfy the check made by PFLOAD to be sure the analyst wants to load a master device that already contains permanent files.

E Extract CIR only. PFLOAD reads the CIR from the designated tape and generates a random file and directory. However, none of the files after the CIR on the archive file are processed. Instead, the utility requests the next archive file.

O Omit CIR read. PFLOAD does not read the CIR for the specified archive file but processes the records in this archive file. After processing, PFLOAD terminates normally and does not request another archive file.

The following parameter is valid only for PFCOPY.

Q Select leading records. When specified, the archive file that is copied to a control point includes two header records, one with the catalog entry for the file and the second with the permit information for the file.

T = archive file name

Name of the file that a utility is using to store or read archive files. Although usually a physical tape, it can be a mass storage device. Default name is TAPE.

NT = nine track

Specifies a 9-track archive tape. Default value is 7-track.

DE = density

Specifies the density of the recording on the archive tape. Available values for density are the following.

0 Default

1 556 bpi

2 200 bpi

3 800 bpi

4 1600 bpi

NR = no rewind

The following rewinds are automatic.

	Rewind Before Processing	Rewind After Processing
PFDUMP	X	
PFLOAD	X	X
PFATC	X	X
PFCOPY	X	X

The NR parameter cancels out all rewinds for the operation in which it is specified.

Default is rewind.

NOTE

Positioning of a file should take into account that the first step in processing the file is to read (or write) the file label.

NU = no unload

When PFDUMP has finished creating an archive tape, it automatically unloads that tape; that is, the whole physical tape is returned to the take-up reel and vacuum released. At this point, the reel is either removed or physically reloaded for further use. The NU parameter inhibits this action.

The NR and NU parameters can be used to generate several dumps on one archive tape. As an example, the following control statement outlines could be used to generate three dumps on one archive tape.

PFDUMP(...NU)	PFDUMP automatically rewinds before but not after processing. It also automatically unloads after processing. The NU cancels this unload and leaves the tape positioned at the end of this first dump.
PFDUMP(...NR, NU)	The NR keeps PFDUMP from rewinding before the dump. This second dump is written after the first. NU inhibits unload and leaves the tape positioned after this second dump.

	PFDUMP(...NR)	NR keeps PFDUMP from rewinding before the dump. This third dump is added to the other two. Since NU is not specified, the tape is automatically unloaded.

SF = select number of files to skip

Specifies the number of archive files to skip before processing begins. Default is zero (no skip). This parameter is assumed decimal unless B radix is used (refer to example under N).

N = select number of files to process

Specifies the number of archive files on an archive tape to process. If set to zero, one file will be processed. Default is zero. This parameter is assumed decimal unless B radix is used.

Example of the use of SF and N:

Given an archive tape AT with six archive files, F1, F2, F3, F4, F5, and F6. It is desired to load F4 and F5. The control statement

```
PFLOAD(T=AT,SF=3,N=2)
```

causes the utility to skip F1, F2, and F3, and begin processing with F4 (SF=3). The utility processes F4 and F5 (N=2).

DT = select date

Specifies the date to be used with C, A, M, or B option. Format is yymmdd. Value is in octal. Default is zero.

TM = select time

Specifies the time to be used with C, A, M, or B option. Format is hhmmss. Value is in octal. Default is zero.

UI = select user index

This parameter limits processing to files located under this user index. It can be further restricted by using it with other options. This parameter is assumed octal unless D radix or nonoctal digit is used. Default is zero. If DN=0, utilities will locate proper device to process. This parameter is usually entered to make use of the R utility option.

If UI is specified, DN does not have to be specified as the utility will locate the proper device.

DI = select destination user index

When specified, all files being processed by PFLOAD are loaded to this user index. The parameter is assumed octal unless D radix or nonoctal digit is used. Default is zero.

PF = select permanent file name

Specifies the permanent file name for which processing is desired. This parameter is associated with the UI option and is ignored if UI is not specified. Default is no name.

VF = verify file name

Indicates the name of a file on which PFDUMP stores a duplicate of the archive file it creates. This file may be on mass storage or on tape. Default name is PFVER.

V = select verify file

Indicates to PFDUMP that it is to produce a verification file that is a duplicate of the archive file it creates. Default is no verify file written.

If NU parameter is specified, neither the archive file nor the verify file are unloaded. Thus, multifile verify files can be generated along with multifile archive files.

Example:

The following sequence of commands creates a two-file archive tape (AA) and a matching verify tape (BB). The VERIFY command compares the accuracy of the duplication.

PFDUMP(T=AA, VF=BB, V, NU)	The dump is written on archive file AA. A duplicate is written on the verify file BB. PFDUMP does not rewind after processing and an NR is not needed.
PFDUMP(T=AA, VF=BB, V, NU, NR)	This writes a second dump after the first on both the archive (AA) and the verify (BB). The NR is necessary to inhibit the rewind before the dump.
VERIFY(AA, BB, N=O, A, R)	Performs a binary compare of AA and BB. If words do not match, this command lists: Record number Word number within the record Words from both files that do not match

N=O specifies that the verify terminates on the first empty file. A specifies an abort if a mismatch is found.

R rewinds both files before and after the verify.

L = name of output file

This parameter specifies the name of the file on which reports are to be written. The default name is OUTPUT.

LO = list option

The string of characters listed in this option specify the type of output records desired from the permanent file utilities. Default is LO=E (list errors).

- T List all files processed
- C List all files in catalog for system
- E List errors
- S List cumulative statistics for catalog

These options are specified as a character string.

Example: LO = TES

DD = select destination device number

This parameter is used only by PFLOAD and specifies the device number where files are to be loaded when their original device is no longer defined in the system. Default is zero. The parameter is assumed octal unless D radix is affixed or a nonoctal digit appears.

Example:

Files have been dumped from device 3 to archive tape AB. It is desired to reload these files. The control statement

PFLOAD(T=AB, DD=5, DN=4)

is executed. The utility tries to load the files on archive tape AB on device 3, the source device. If device 3 is no longer defined in the system, it will load them on device number 5 which is the specified default device. All files on dump tape AB which resided on the master device are loaded to device number 4.

MF = select master file name

This parameter is used only with PFCOPY and specifies to the utility that all the files extracted from the designated archive tape are to be copied to a control point under one file name, the master file name. Default is no name. Normally, the archive files are copied as individual files retaining their permanent file name. With the MF capability, it is possible to extract a file of one name from an archive file and change the name as a local file.

UN = select user number

This parameter specifies the user number which is associated with the packname parameter. This user number must match information in the mass storage table (MST) for the specified packname. Default is no name. If UN is specified and PN is not, the utility will convert UN to a user index. If, in addition, DN is not specified, the utility will locate the proper device in the family.

2.4 PERMANENT FILE UTILITY ROUTINES

This section and its subsections describe the five permanent file utility routines. The parameters available to each of the routines are listed in Table IV-2-1.

TABLE IV-2-1. PERMANENT FILE UTILITY PARAMETERS

	PFLOAD	PFDUMP	PFCAT	PFATC	PFCOPY
FN = family name	FN	FN	FN		
PN = pack name	PN	PN	PN		
DN = device number	DN	DN	DN		
T = archive file name	T	T		T	T
LO = list option	LO=	LO=	LO=	LO=	LO=
T - files processed	T	T	T	T	T
C - catalog files	C	C		C	
E - errors	E	E	E	E	E
S - summary			S		
L = output file name	L	L	L	L	L
OP = utility option	OP=	OP=	OP=	OP=	OP=
C - creation	C	C	C	C	C
A - last access	A	A	A	A	A
M - last modification	M	M	M	M	M
I - indirect	I	I	I	I	I
D - direct	D	D	D	D	D

TABLE IV-2-1. PERMANENT FILE UTILITY PARAMETERS (Cont'd)

	PFLOAD	PFDUMP	PFCAT	PFATC	PFCOPY
	OP=	OP=	OP=	OP=	OP=
B - before date and time	B	B	B	B	B
P - purge after dump		P			
R - replace	R				
N - noninitial	N				
E - extract CIR	E				
O - omit CIR	O				
Q - catalog and permit records					Q
NT = nine track	NT	NT		NT	NT
DE = density	DE	DE		DE	DE
NR = no rewind	NR	NR		NR	NR
NU = no unload		NU			
SF = number of files to skip	SF	SF		SF	SF
N = number of files to process	N			N	N
DT = date	DT	DT	DT	DT	DT
TM = time	TM	TM	TM	TM	TM
UI = user index	UI	UI	UI	UI	UI
PF = permanent file name	PF	PF	PF	PF	PF
DI = destination user index	DI				
VF = verify file name		VF			
V = verify		V			
DD = destination device number	DD				
MF = master file name					MF
UN = user number	UN	UN	UN	UN	UN

2.4.1 PERMANENT FILE DUMP UTILITY (PFDUMP)

PFDUMP is a utility that copies permanent files to backup storage (an archive file). This backup can be reloaded by the PFLOAD utility (section 2.4.2) or its permanent file copies can be selectively accessed by other utilities for cataloging and copying.

Three types of dumps are available. These are determined by the options selected. The choice of options depends on the purpose of the dump. The following are descriptions of these three types and what they accomplish.

SELECTIVE PERMANENT FILE SYSTEM DUMP

If the purpose of the dump is to select and copy those permanent files with a specified update relevance (modified after some recent date), a selective dump will be used; that is, the option OP=M is specified along with a time origin (DT=date and TM=time). This produces an archive file with copies of all permanent files modified after this specified time. This selection can be further restricted by use of additional parameters available to the PFDUMP utility. For example, if the select indirect access files only option is included (OP=MI), only the indirect access files modified after the specified time origin (DT, TM) are copied by this dump. Normal procedure would follow up this dump with successive selective dumps (usually with periodic advancement of the time origin). This produces a series of archive files containing successive time-levels of updating for all the files in the defined category. These archive files can then be incrementally loaded to return the most recently modified versions to the permanent file system.

The incremental load proceeds back through the archive files in the reverse order in which they are created (that is, it starts with the most recent) and loads each file the first time it appears. Thereafter, a reappearance of that file is skipped. This produces a load of all the latest modifications within the specified category.

Each selective dump puts a record (or records) at the beginning of the archive file it creates that contains catalog images of all files active in the permanent file system when dump took place. This makes it possible to incrementally load these files on a system basis or a device basis.

The catalog image record is explained later in this section; the incremental load is treated in section 2.4.2.

PARTIAL PERMANENT FILE SYSTEM DUMP

If no specification of time and date of last modification is made (OP≠M), but some other option is selected, then the dump is classed as partial. Thus, a dump that copied all files created after a certain date (OP=C) or that copied files accessed after a specified date (OP=A) would be a partial dump. Likewise, the specification of direct access files only (OP=D) or indirect access files only (OP=I) would constitute a partial dump.

A partial dump may specify device or it may copy all files in the system that meet the criteria of the option.

FULL PERMANENT FILE SYSTEM DUMP

If no options are selected (OP=0), and either no device is specified (DN=0) or a master device is specified (DN=master device), then a full dump is initiated by the utility. A full dump copies all files in the system or on the specified master device.

Table IV-2-2 shows the defining characteristics of the three kinds of dump.

TABLE IV-2-2. PFDUMP TYPES

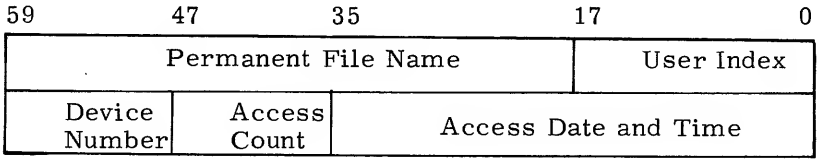
Selective Dump	Partial Dump	Full Dump
OP=M	OP=C A I D P O, DN=^{0} master device	OP=0, DN=^{0} master device

CATALOG IMAGE RECORD (CIR)

Each selective dump (OP=M) writes a catalog image record (CIR) at the beginning of the archive file on which the permanent files are dumped. There is an entry in the CIR for every permanent file in the system at the time of the dump (not just the files included in the dump).

This record of catalog images is used by a PFLOAD to reinstate files in the permanent file system with the parametric status and description they had when dumped.

Each entry in the CIR is two words. The following is the format of the entry.



The first word of the entry describes the file uniquely in the system. In the second word, the device number is used only to identify direct access files. The access count is the number of times this file was accessed as of the access date and time.

When a file is loaded, this CIR information is placed in the permanent file catalog of the device being loaded. No other information can be changed over dumps and loads without updating modification time and date.

An example involving selective dumping is given in section 2.4.2.

2.4.2 PERMANENT FILE LOAD UTILITY TABLE (PFLOAD)

Archive files produced by the PFDUMP utility (section 2.4.1) can be loaded back onto the permanent file system with the PFLOAD utility. The load can reestablish the permanent file system exactly as it was at the time of the dump or it can introduce additional restrictions and load only a desired subset of the files on an archive tape.

Execution of the PFLOAD utility involves three checks.

1. A check of the archive tape to determine which files are eligible for load under the option specified.

2. A check of the additional parameters in the load command (UI, PF, UN, etc.) to filter out the eligible files that meet these criteria.

3. A check of the device or devices to be loaded to identify the files they may already contain and thereby determine which files from the archive tape are actually loaded.

The following paragraphs detail these three steps.

CHECK OF THE ARCHIVE TAPE

There are two possible ways to select load files from an archive tape; either an incremental load is used as a measure of selection or it is not. If an incremental load is used, the archive file must be checked against a CIR created by a selective dump. (The CIR gives identifying information on every file in the system at the time the selective dump was made.) Use of a CIR to select archive files for loading is known as an incremental load since it builds up (increments) an accumulation of the most recently modified versions of the files extracted from the archive tapes used in the load. The usual procedure in such a case is to read the CIR from the most recent selective PFDUMP tape (this tape is the first reel of the incremental load process) and place it on a random file. Then the archive tapes are read in the reverse order in which they were dumped. Each file on an archive tape is compared with the CIR. If a match is found on the CIR, the file becomes a candidate for load (goes to parameter check, stage 2), and this entry is cleared out of the CIR. If no match is found, the file is skipped because it has either been purged or previously loaded.

If no incremental load is used, then there is no CIR matching and the whole archive tape is passed on to the next check (stage 2).

CHECK OF ADDITIONAL PARAMETERS

All files selected from an archive tape as candidates for load are further checked against the additional restrictions specified in the parameter list of the PFLOAD command. Candidate files that meet all criteria are passed on to the final device check; all others are skipped.

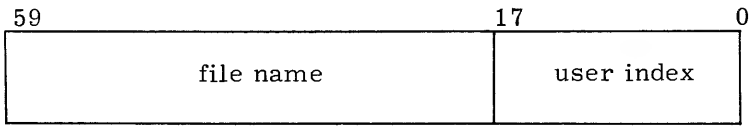
DEVICE CHECK

The final check made by the PFLOAD utility is of the device(s) being loaded. Either the device has been initialized and is clear of all files, or it has not been initialized and contains permanent files at the time of load. The utility always begins this final check with the assumption that the device should be initialized (unless the N option has been included), and if it finds that it is not, issues the diagnostic:

DEVICE NOT INITIALIZED

If the intention is to load an initialized device, the device must be initialized and the load reinitiated. If the intention is that the permanent files already on the file should remain there and only those files should be loaded which do not duplicate the ones already there (or should replace those there if the R options is specified), the PFLOAD command must include the noninitial parameter (OP=N). This additional check makes certain that it really is intended to load a device that already contains files.

The utility determines the catalog track where the selected archive files are to reside and builds an index file with a one-word entry for each file on the track. The following is the format of the entry.



The utility checks each candidate file against the index to see if it is already in the permanent file system. If the R parameter has not been specified, duplicates are skipped. If the R parameter has been specified, the archive duplicate replaces the one already in the permanent file system.

Example:

In this example, permanent files created and modified on three devices are dumped nine times. The action runs from May 1, 1973 (73.5.1) to May 10, 1973 (73.5.10). For simplification, the time of day (TM) is not shown.

Before the last dump, one of the devices goes down. The example then shows how this device can be loaded from the archive tapes.

The following are the three devices.

DEVICE 40 A master device containing indirect access files only. Users with this master device have their direct access files written on 41 or 42.

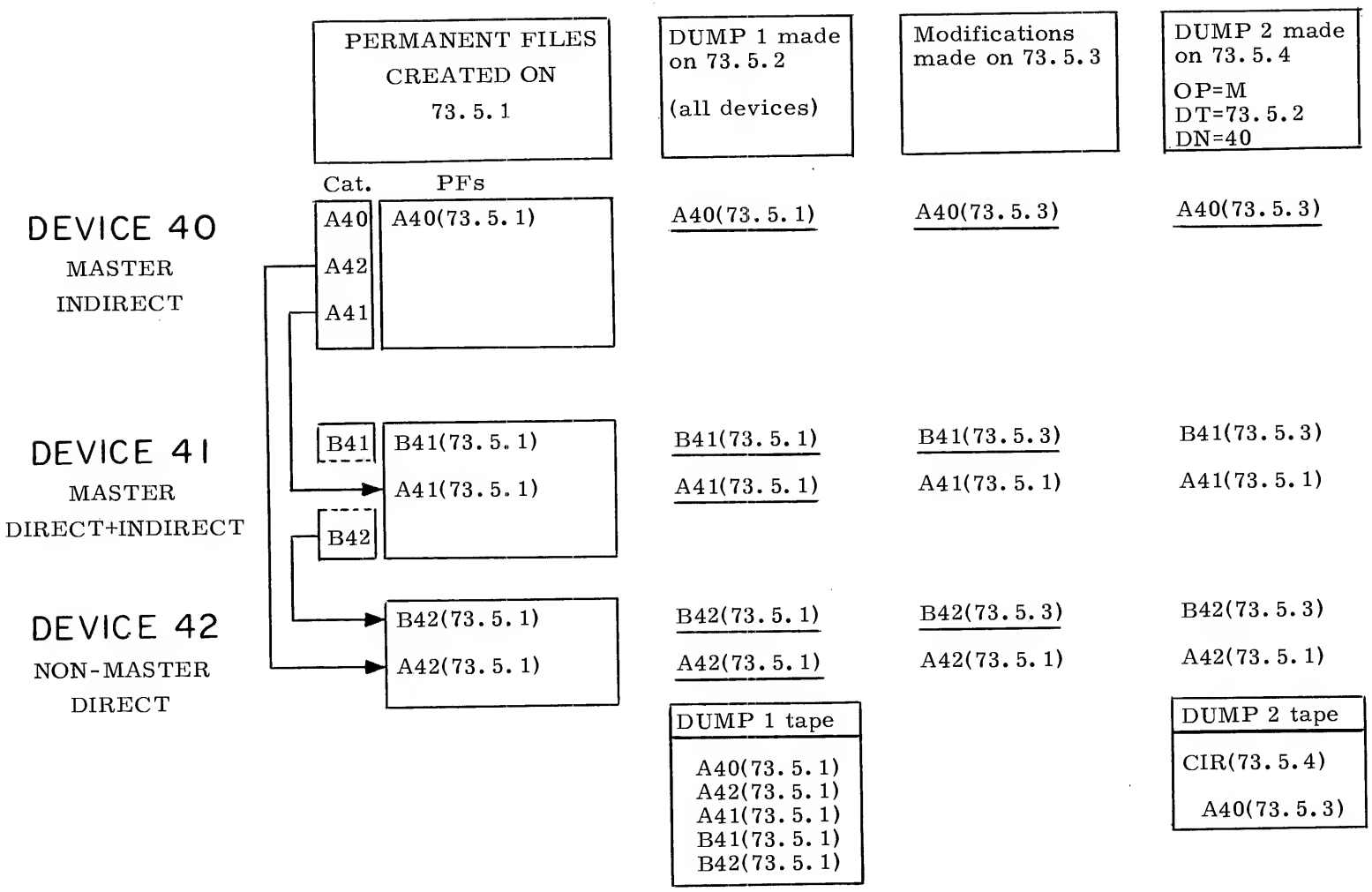
DEVICE 41 A master device containing indirect and direct access files. Direct access files cataloged on this device may be written on 42 or this device.

DEVICE 42 A nonmaster device containing direct access files only. All files written on this device will be cataloged on 40 or 41.

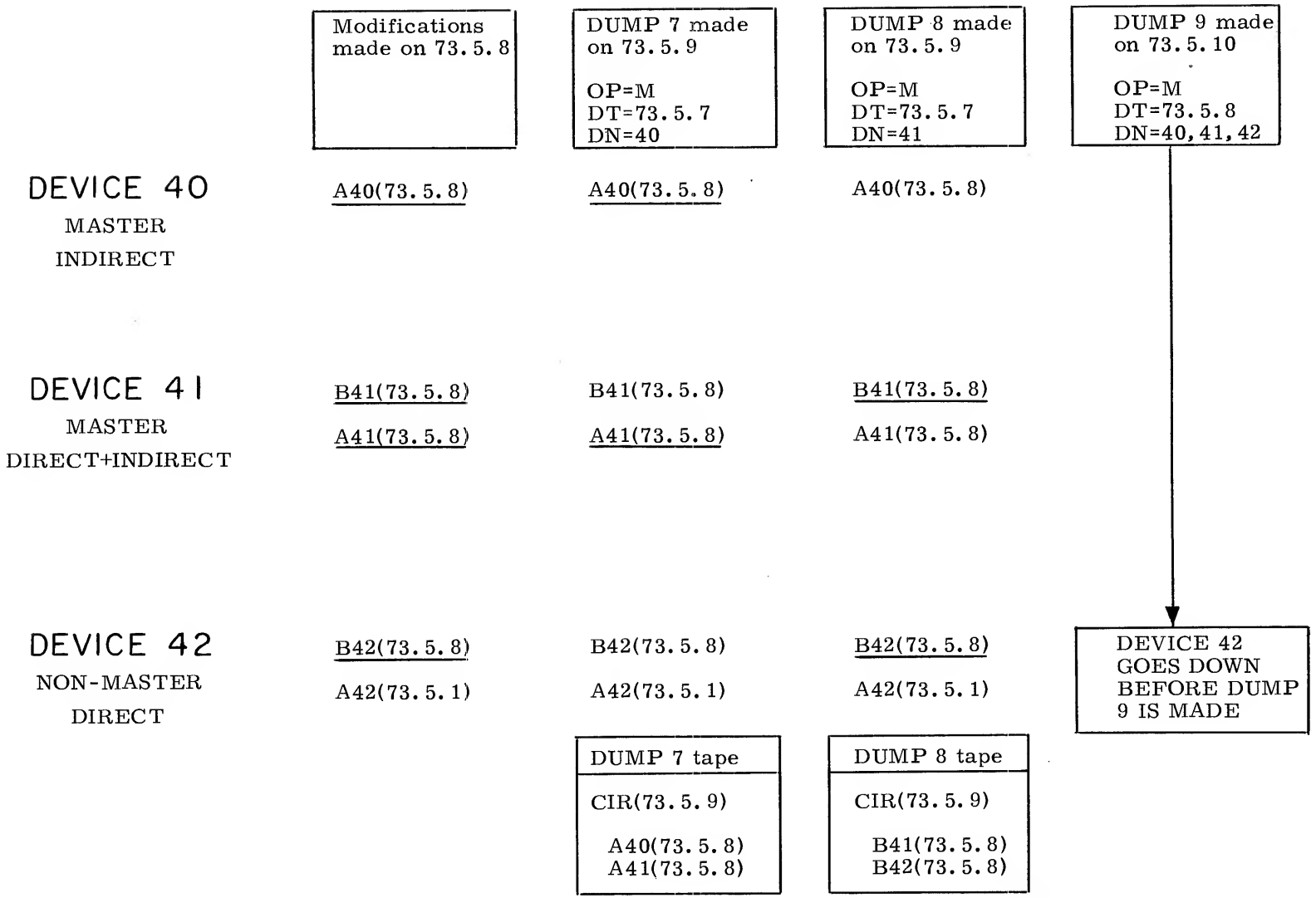
File names consist of a letter and a number. The letter identifies which device contains the catalog entry for this file (A=device 40 and B=device 41). The number is the same as the device on which the file is written.

Each file name is followed by a date in parentheses. This indicates either the day on which the file was created or when it was last modified.

The following illustration outlines the creation, modifications, and dumps that were made. There is one particular action per column. The top of the column identifies the action and the key parameters used by the utility. If an archive tape is produced, it is shown at the bottom of the column. All files in the system are listed in each column. Those files affected by the action are underscored.


PERMANENT FILES CREATED ON 73.5.1
DUMP 1 made on 73.5.2 (all devices)
Modifications made on 73.5.3
DUMP 2 made on 73.5.4 OP=M DT=73.5.2 DN=40
Cat.
PFs
DEVICE 40
MASTER
INDIRECT
A40
A42
A41
A40(73.5.1)
A40(73.5.1)
A40(73.5.3)
A40(73.5.3)
DEVICE 41
MASTER
DIRECT+INDIRECT
B41
B42
B41(73.5.1)
A41(73.5.1)
B41(73.5.1)
A41(73.5.1)
B41(73.5.3)
A41(73.5.1)
B41(73.5.3)
A41(73.5.1)
DEVICE 42
NON-MASTER
DIRECT
B42(73.5.1)
A42(73.5.1)
B42(73.5.1)
A42(73.5.1)
B42(73.5.3)
A42(73.5.1)
B42(73.5.3)
A42(73.5.1)
DUMP 1 tape
A40(73.5.1)
A42(73.5.1)
A41(73.5.1)
B41(73.5.1)
B42(73.5.1)
DUMP 2 tape
CIR(73.5.4)
A40(73.5.3)

	DUMP 3 made on 73.5.4 OP=M DT=73.5.2 DN=41	DUMP 4 made on 73.5.4 OP=M DT=73.5.2 DN=42	Modifications made on 73.5.5	DUMP 5 made on 73.5.6 OP=M DT=73.5.4 (all devices)	DUMP 6 made on 73.5.7 OP=M DT=73.5.4 DN=42
DEVICE 40 MASTER INDIRECT	A40(73.5.3)	A40(73.5.3)	A40(73.5.5)	A40(73.5.5)	A40(73.5.5)
DEVICE 41 MASTER DIRECT+INDIRECT	B41(73.5.3) A41(73.5.1)	B41(73.5.3) A41(73.5.1)	B41(73.5.5) A41(73.5.1)	B41(73.5.5) A41(73.5.1)	B41(73.5.5) A41(73.5.1)
DEVICE 42 NON-MASTER DIRECT	B42(73.5.3) A42(73.5.1)	B42(73.5.3) A42(73.5.1)	B42(73.5.5) A42(73.5.1)	B42(73.5.5) A42(73.5.1)	B42(73.5.5) A42(73.5.1)
	DUMP 3 tape CIR(73.5.4) B41(73.5.3) B42(73.5.3)	DUMP 4 tape CIR(73.5.4) B42(73.5.3)		DUMP 5 tape CIR(73.5.6) A40(73.5.5) B41(73.5.5) B42(73.5.5)	DUMP 6 tape CIR(73.5.7) B42(73.5.5)


Modifications made on 73.5.8
DUMP 7 made on 73.5.9
OP=M
DT=73.5.7
DN=40
DUMP 8 made on 73.5.9
OP=M
DT=73.5.7
DN=41
DUMP 9 made on 73.5.10
OP=M
DT=73.5.8
DN=40,41,42
DEVICE 40
MASTER
INDIRECT
A40(73.5.8)
A40(73.5.8)
A40(73.5.8)
DEVICE 41
MASTER
DIRECT+INDIRECT
B41(73.5.8)
A41(73.5.8)
B41(73.5.8)
A41(73.5.8)
B41(73.5.8)
A41(73.5.8)
DEVICE 42
NON-MASTER
DIRECT
B42(73.5.8)
A42(73.5.1)
B42(73.5.8)
A42(73.5.1)
B42(73.5.8)
A42(73.5.1)
DEVICE 42 GOES DOWN BEFORE DUMP 9 IS MADE
DUMP 7 tape
CIR(73.5.9)
A40(73.5.8)
A41(73.5.8)
DUMP 8 tape
CIR(73.5.9)
B41(73.5.8)
B42(73.5.8)

Actions during the 10 days in May in which the dumps and modifications were made runs as follows:

Date	Action
73.5.1	Five permanent files are created on this date. File A40 (indirect) is written on device 40 and cataloged on device 40. File A42 (direct) is written on device 42 and cataloged on device 40. File A41 (direct) is written on device 41 and cataloged on device 40. File B41 (indirect) is written on device 41 and cataloged on device 41. File B42 (direct) is written on device 42 and cataloged on device 41.
73.5.2	DUMP 1. A full permanent file system dump. No CIR is written on the archive file.
73.5.3	Three files (A40, B41, and B42) are modified on this date. This is indicated by the modification date in parentheses following the file name.
73.5.4	DUMP 2. This is a selective dump of device 40 that specifies permanent files modified are 73.5.3. The files for this device are the ones listed on its catalog track. The utility scans this catalog which contains entries for files A40, A42, and A41. File A40 is on device 40 and the other two are on the devices indicated by their names. Only file A40, which was modified on 73.5.3, qualifies for this dump. It is written on an archive tape after a CIR for this date (73.5.4). The CIR gives a current description of all five files in the permanent file system.
73.5.4	DUMP 3. This is a selective dump of device 41 that specifies all files modified after 73.5.2. The catalog for this device contains entries for files B41 and B42. Both files were modified on 73.5.3 and qualify for this dump. They are written on an archive file after a CIR for this date.
73.5.4	DUMP 4. This is a selective dump of device 42 that specifies all files modified after 73.5.2. The PFDUMP utility scans the catalogs on devices 40 and 41 to locate the files on 42. One file, B42 (75.5.3), falls in this category.
73.5.5	Three files are modifed on this date.
73.5.6	DUMP 5. This is a selective dump of each of the three devices. All files modified after 73.5.4 are specified by the DT option. Since no DN is specified, all devices are dumped in turn, producing a dump tape with three archive files.
73.5.7	DUMP 6. This selctive dump of device 42 specifies all files modified after 73.5.4. Since 42 is nonmaster, the dump routine scans the catalogs of the other two devices.

Date	Action
73.5.8	Four files are modified on this date.
73.5.9	DUMP 7. A selective dump of device 40 is made with DT=73.5.7. Two files qualify.
73.5.9	DUMP 8. A selective dump of device 41 is made with DT=73.5.7. The catalog on device 41 contains entries for files B41 and B42. File B41 is an indirect access file located on device 41, and file B42 is a direct access file located on device 42. Both files were modified after 73.5.7 and are dumped.
73.5.10	DUMP 9. A selective dump of devices 40, 41, and 42 is specified, but device 42 goes down before the dump is made.

To reestablish permanent files on device 42 with the most recent modifications available, the device is first initialized and then incrementally loaded, beginning with the most recent selective dump tape. Archive dump 8 is the most recent selective dump tape and accordingly contains the most recent CIR. This reel is assigned first and then the CIR read onto a random file. The dump tapes are read in reverse order with each file on each tape being checked against the CIR. Dump tapes 2 and 3 are omitted since they do not involve device 42.

For each catalog track on device 42 that is to receive file entries, PFLOAD builds and maintains an index file. Before each file can be loaded, PFLOAD checks the index file to see if the file has already been loaded. If it has, the archive duplicate is skipped; if not, the archive file is loaded and another entry goes into the index file.

After initialization of device 42, the loading runs as follows:

Archive File	Action
DUMP8 tape CIR(73.5.9) B41(73.5.8) B42(73.5.8)	The analyst assigns DUMP8 tape and enters the command: PFLOAD(T=DUMP8, DN=42) The utility reads the CIR from this tape onto a random file. It then looks for files for device 42 on this tape. B42 qualifies, and its entry in the CIR is removed. The file B42 is loaded on device 42. The catalog of this file on device 41 is created. After loading this file, the utility makes an entry in the index file as follows: B42 | user index The utility then requests the next reel.
DUMP7 tape CIR(73.5.9) A40(73.5.8) A41(73.5.8)	The analyst assigns this tape, and the utility reads the archive file and checks it against the CIR loaded from DUMP8 above. No match is found. The next reel is requested.

Archive File	Action
DUMP6 tape CIR(73.5.7) B42(73.5.5)	This tape is assigned and then compared with the CIR. B42 is a file from device 42. However, its entry in the CIR was removed when it was read from DUMP8.
DUMP5 tape CIR(73.5.6) A40(73.5.5) B41(73.5.5) B42(73.5.5)	This tape is assigned and then compared with the CIR. B42 is from device 42 but it has already been removed from the CIR and the utility skips this version.
DUMP4 tape CIR(73.5.4) B42(73.5.3)	This tape is assigned and compared with the CIR originally read from DUMP8 tape. It has been removed from the CIR and this file is skipped.
DUMP1 tape A40(73.5.1)	This tape, produced by a full dump, contains all the files that were on the permanent file system when the dump was made (73.5.1). These files are checked against CIR (73.3.9). A match is found with A42. This file is loaded. Device 42 now has the same files with the same update status that they had on 73.5.9 when the last selective dump was made.

2.4.3 CATALOG PERMANENT FILE DEVICE (PFCAT)

PFCAT is a permanent file utility program used to produce a cataloged directory of file information derived from catalog tracks on a permanent file device. The format of the directory depends on the parameters selected (refer to Table IV-2-1, section 2.4).

Figure IV-2-9 gives the beginning of a sample directory which was produced with the command

```
PFCAT(DN=1,L0=T,UN=ROBERTR)
```

2.4.4 CATALOG PERMANENT FILE ARCHIVE TAPE (PFATC)

PFATC is a permanent file utility program used to produce a cataloged directory of file information derived from an archive tape. The format of the directory depends on the parameters selected (refer to Table IV-2-1, section 2.4).

Figure IV-2-10 gives the beginning of a sample directory which was produced with the command

```
PFATC(L0=T,UI=1)
```

2.4.5 COPY ARCHIVE FILE UTILITY (PFCOPY)

PFCOPY is a permanent file utility that extracts files from an archive file and copies them to one or more files at a control point. The parameters available for this utility are given in Table IV-2-1, section 2.4.

2.5 DIAGNOSTICS

2.5.1 PERMANENT FILE SUPERVISOR (PFS)

OPERATOR MESSAGES

ENTERED PARAMETER IS ILLEGAL.

ILLEGAL FUNCTION.

DAYFILE MESSAGES

BOTH FAMILY AND PACK NAME.

Family and pack name may not both be specified.

FAMILY/PACK NOT FOUND.

Family or pack specified is not defined in the permanent file system.

USER NUMBER INVALID.

User number cannot be converted to user index correctly

PF SPECIFIED BUT UI NOT.

Filename has been designated but no associated user index is entered.

```
73/06/13.              KRONOS CATALOG FILE                    08.25.57.
DIRECTORY OF PERMANENT FILE DEVICE    1                       PAGE      3
CATALOG OF USER INDEX        144 ROBERTR
    FILE NAME ACCESS FILE-TYPE LENGTH OR CREATION LAST ACCESS LAST MOD
     PASSWORD MD/CNT INDEX  PERM. SUBSYS DATE/TIME DATE/TIME DATE/TIME
1 PROFLO  DIR. PRIVATE          5    * 73/04/28.  73/06/13.  73/04/28.
              29          WRITE        09.48.23.  00.26.26.  09.48.23.
2 PROFILO DIR. PRIVATE         55    * 73/05/11.  73/05/11.  73/05/11.
               1          WRITE        07.19.21.  07.42.07.  07.19.21.
                                .
                                .
                                .
```

Figure IV-2-9. Sample Directory Produced by PFCAT

```
P.F. ARCHIVE CATALOG OF - PFDUMP                              PAGE      1
          REEL -     1       EQ. MASK - 377                  73/06/13. 01.30.12.
FILE NAME ACCESS FILE-TYPE LENGTH OR CREATION LAST ACCESS LAST MOD
 PASSWORD MD/CNT INDEX  PERM. SUBSYS DATE/TIME DATE/TIME DATE/TIME
3 CATLG4    IND. PRIVATE          1   73/03/17.  73/05/01.  72/05/01.
              4     144   WRITE       06.33.05.  09.32.38.  09.32.38.
4 REC13     IND. PRIVATE          1   73/06/08.  73/06/08.  73/06/08.
              0     144   WRITE       06.14.07.  07.21.39.  07.21.39.
```

Figure IV-2-10. Sample Directory Produced by PFATC

2.5.2 PERMANENT FILE UTILITY PROCESSOR (PFU)

DAYFILE MESSAGES

PFU - PARAMETER ERROR.

Data in PFU call in error.

DUPLICATE FILE NAME.

File already used at control point.

REQUESTED FILE NOT AVAILABLE.

FNT Entry for file requested not found in FNT.

EQXX TRACK LIMIT.

No remaining tracks available on EQxx.

BUFFER CONTROL WORD ERROR.

Word count of sector to be read from central memory exceeds word count limit of a sector (100B).

DEVICE NOT INITIALIZED.

PFLOAD attempting to load to uninitialized master device.

NO DEVICE SPECIFIED.

Device number 0.

FET POINTERS OUT OF BOUNDS.

Out pointer is greater than limit pointer.

ALTERNATE DEVICE NOT FOUND.

PFU is unable to locate an alternate device in the system.

CATALOG TRACK NOT FOUND.

In attempting to interlock a catalog track, PFU could not find track.

OPERATOR DROP.

If PFU is unable to clear the utility interlock, the operator may drop the job.

NOT SYSTEM JOB.

Calling program is not system origin or does not have system origin privileges with debug set on.

2.5.3 PERMANENT FILE DUMP OVERLAY

INFORMATIVE OPERATOR MESSAGES

P. F. DEVICE (DEVICNM) DUMPED.

DUMPING (FILENAME) (USER INDEX)

PFDUMP YY/MM/DD. HH. MM. SS.

PFDUMP DEVICE (DEVICENM) FAMILY (FAMILYNAM).

PFDUMP DEVICE (DEVICENM) PACK (PACKNAM).

PFDUMP DEVICE MASK XXX.

DUMPING - DIRECT ACCESS FILES ONLY.

DUMPING - INDIRECT ACCESS FILES ONLY.

FILENAME XXXXXXX USER INDEX XXXXXX.

ALL FILES FOR USER INDEX XXXXXX

ACCESSED AFTER YY/MM/DD. HH. MM. SS.

CREATED AFTER YY/MM/DD. HH. MM. SS.

MODIFIED AFTER YY/MM/DD. HH. MM. SS.

NO FILES PROCESSED.

CHECK DAYFILE FOR ERRORS.

WAIT FOR CATALOG INTERLOCK.

GENERATING CATALOG IMAGE.

FATAL SYSTEM ERROR MESSAGES

These errors result in PFDUMP aborting.

CATALOG INDEX OUT OF RANGE

Catalog buffer location not in buffer range.

INITIALIZATION IN PROGRESS.

Device cannot be accessed because it is being initialized.

WPE UNRECOVERED - ABORT.

Operator has aborted PFDUMP when WPE UNRECOVERED was detected on archive file.

USER DOES NOT RESIDE ON MASTER DEVICE.

User index specified does not reside on device specified.

DEVICE SPECIFIED NOT FOUND.

Device to be processed not in system.

NO PF DEVICE IN EST.

No PF device is defined in the system.

NONFATAL SYSTEM ERROR MESSAGES

These errors cause PFDUMP to skip the dumping of the file to the archive tape.

STATUS ERR (FILENAME) (USER INDEX)

Bad device or status 0 for a direct access file. The file is skipped.

INDIRECT TOO LONG (FILENAM) (USERIN).

The file is truncated.

INDIRECT TOO SHORT (FILENAM) (USERIN).

The file is padded with EOFs.

DIRECT TOO LONG (FILENAME) (USERIN).

The file is truncated.

DIRECT TOO SHORT (FILENAME) (USERIN).

The file is padded with EOFs.

DAF BUSY (FILENAM) (USERIN).

DAF ZERO LENGTH (FILENAM) (USERIN).

BAD SYSTEM SECTOR (FILENAM) (USERIN).

PERMIT RI RANGE ERR (FILENAM) (USERIN).

UNRECOVERED PARITY ERROR -
ENTER K.GO TO CONTINUE.
K.END TO ABORT.

2.5.4 PERMANENT FILE LOAD OVERLAY

NONFATAL SYSTEM ERROR MESSAGES

CATALOG CONTROL WORD MISSING.

Encountered other than catalog control word on initial control word of archive record.

PERMITS PRESENT THAT SHOULD NOT BE.

Permit block found on tape but no previous permit random index found in catalog.

PERMITS MISSING.

No permit block present but there was a previous permit random index in the catalog, or entire permit block not read up yet and next word is not a permit control word.

NO DATA BLOCK.

Encountered other than data control word when expecting data for current file.

MISSING EOR.

Logical EOR missing. Invalid data.

NO EOI FOR FILE.

Next catalog found before physical EOR found for current file.

PARITY ERR (LFN) (U.I.).

Parity error encountered while loading file lfn. File skipped.

STATUS ERR (LFN) (U.I.).

Status error on DAF (lfn). File skipped.

FILE TRUNCATED (LFN) (U.I.)

File on archive tape is too short either with error padded EOFs or tape error. File is truncated and the length in the catalog is updated to reflect the smaller size.

TAPE ERROR (LFN) (U.I.)

Issued when certain of preceding errors occur. File is noted and skipped, and loading is resumed.

TAPE PARITY ERROR.

Parity error encountered. File name unknown. Tape skipped to next EOR.

ALTERNATE DEVICE NOT FOUND.

Device residency specified in catalog not available in this system and destination device is not specified. This message is accompanied by (STATUS ERROR).

FATAL SYSTEM ERROR MESSAGES

These errors result in PFLOAD being aborted.

NO USER INDEXES ON TAPE MATCH DEVICE MASK.

ILLEGAL CATALOG TRACK COUNT.

DESTINATION DEVICE NOT FOUND.

USER INDEX NOT ON DEVICE.

DEVICE SPECIFIED NOT FOUND.

NO PF DEVICE IN EST.

ERROR IN CATALOG IMAGE ON PFDUMP TAPE.

PARITY ERROR IN CATALOG IMAGE RECORD.

ANY LOADING TO THIS POINT IS
INCOMPLETE A REINITIALIZE
AND RELOAD IS REQUIRED.

PFLOAD ABORTED.

INFORMATIVE OPERATOR MESSAGES

PFLOAD DEVICE (NN) FAMILY (FAMILYNAM)

PFLOAD DEVICE (NN) PACK (PACKNAM)

PACKNAME (PACKNAM) LOADED.

P. F. DEVICE (DEVICNM) LOADED.

LOADING FROM (ARMASK) TO (DVMASK).

LOADING (FILENAM) (USERIN).

READING (FILENAM) (USERIN).

ALL FILES FOR USER INDEX (USERIN).

FILENAME (FILENAM) USER INDEX (USERIN).

CREATED AFTER YY/MM/DD. HH.MM.SS.

MODIFIED AFTER YY/MM/DD. HH.MM.SS.

ACCESSED AFTER YY/MM/DD. HH.MM.SS.

LOADING - INDIRECT ACCESS FILES ONLY.

LOADING - DIRECT ACCESS FILES ONLY.

..WAIT FOR TOTAL INTERLOCK..

NO FILES PROCESSED.

CHECK DAYFILE FOR ERRORS.

The action to be taken for the following five messages is to make a check to determine whether a dump tape is being assigned and that the proper label information being requested is in the label.

ASSIGN TAPE.

LABEL BAD.

TAPE LABEL IO ERROR.

REEL SEQUENCE ERROR.

FORMAT ERROR.

The following messages require K display input for incremental load operations.

TAPE SEQUENCE ERROR.

REENTER NL OR IL PARAMETERS IF DESIRED.

PROPER SELECTIVE DUMP TAPE NOT ASSIGNED.

ENTER E TO TERMINATE LOADING.
L TO LIST REMAINING FILES.
GO TO RESUME INCREMENTAL LOAD.

2.5.5 CATALOG PERMANENT FILE DEVICE OVERLAY

SYSTEM ERROR MESSAGES

PFCAT COMPLETE.

Catalog of permanent file device completed.

EQUIP. NOT IN PFCAT TABLE.

There is no entry in PFCATs tables for the equipment type being cataloged. Therefore, no percent device usage can be determined.

INDEX BUFFER LIMIT.

Index Buffer Length (INDBL) must be increased to accommodate all user indexes on a catalog track.

DEVICE ERROR.

Device number refers to a nonmaster device.

ILLEGAL DEVICE NUMBER.

Alternate device not defined in system.

DEVICE NOT FOUND.

Device specified to catalog cannot be located.

USER INDEX NOT ON DEVICE.

User index specified does not belong on device specified.

NO FILES PROCESSED.

No files were cataloged.

CHECK DAYFILE FOR ERRORS.

Nonfatal error(s) are in dayfile.

OPERATOR MESSAGES

CATALOGING (FILENAME) (USER INDEX).

Identification of user number being cataloged.

WRITING SUMMARY.

Summary report being generated.

CATALOGING COMPLETED.

PFCAT completed.

2.5.6 CATALOG PERMANENT FILE ARCHIVE TAPE OVERLAY

SYSTEM ERROR MESSAGES

CATALOG COMPLETE.

Completion of catalog.

PFATC ABORTED.

If error flag gets set.

OPERATOR MESSAGES

CATALOGING (FILE NAME) (USER INDEX).

Identification of current file being loaded.

ASSIGN TAPE.

Assign file to be cataloged.

PARITY ERR (LFN) (U.I.).

Parity error on file (lfn). (Refer to next message.)

TAPE PARITY ERROR.

Always follows above message and is present when file name is unknown.

PREMATURE END OF FILE.

End-of-file detected before end of dump control word.

NO FILES PROCESSED.

No files were cataloged.

CHECK DAYFILE FOR ERRORS.

One nonfatal error at least has been detected. Read dayfile.

2.5.7 PERMANENT FILE ARCHIVE FILE COPY OVERLAY

OPERATOR MESSAGES

END OF COPY.

Program complete.

READING (FILENAME) (USER INDEX).

COPYING (FILENAME) (USER INDEX).

DAYFILE MESSAGES - SYSTEM ERRORS

TAPE PARITY ERROR.

Parity error encountered. File name unknown. Tape skipped to end-of-file (physical EOR).

PARITY ERR (LFN) (U.I.).

Parity error on file lfn. File is skipped and execution resumed.

CATALOG CONTROL WORD MISSING.

Catalog control word expected but not found.

ASSIGN FILE.

Assign archive file.

PFCOPY ABORTED.

PFCOPY has encountered CP error. Device in catalog not correct.

DATA CONTROL WORD ERROR.

Data control word expected but not correct identification.

NO FILES PROCESSED.

No files have been copied.

CHECK DAYFILE FOR ERRORS.

A nonfatal error has been detected. Read dayfile.

TERMINAL NETWORK 3

Under the KRONOS Time-Sharing System, terminals are grouped into sets. Each set is connected to a multiplexer that maintains communication with central memory through a PPU. A collection of multiplexers and their associated terminals connected through one PPU constitutes a terminal network.

A terminal is either a time-sharing terminal or a transaction terminal. In either case, the multiplexer for the terminal is attached to the Time-Sharing Executive (TELEX) at control point 1. Under TELEX direction, communication can be made with other control points. The transaction terminal, under TELEX direction, extends communication to the Transaction Executive (TRANEX) at control point 2. Processing under TRANEX makes use of the Transaction Subsystem, an extension of the KRONOS 2.1 operating system.

From a time-sharing terminal, the user enters application programs and data to be processed in conjunction with whatever permanent files he may have established. From a transaction terminal, this basic activity is greatly enhanced by the added capabilities of data management, a library of tasks, and a preestablished data base. The data management structures use data, both from the data base and from an input transaction. The tasks are application programs employed by a particular user throughout many transactions. Tasks are called by the transaction executive to subcontrol points within the field length of the transaction executive (control point 2). A data base is a user-specified superstructure of data on mass storage. This data base is accessed by the data manager when referenced by a task or an input program. Figure IV-3-1 gives an overview of the Transaction Subsystem. The Transaction Subsystem Reference Manual gives a detailed treatment.

3.1 TERMINAL NETWORK DESCRIPTION

The configuration and operational parameters of a terminal network are specified in a terminal description file. This file is a sequence of directives, one for each multiplexer and one for each terminal. Each set of terminal directives immediately follows the directive for the multiplexer through which these terminals will communicate with the system.

The network description file is read and interpreted by the common deck COMCRTN. This produces a table for each multiplexer directive (TMDK table) and a table for each terminal directive (TTDK) table. These tables contain the keywords that constitute each description. TELEX and TRANEX use these tables to put the network on the air and exercise its capabilities.

3.2 DIRECTIVE FORMATS

A directive card may be up to 90 columns but only columns 1 through 72 interpreted. Any card containing an asterisk in column 1 is a comment card and is ignored.

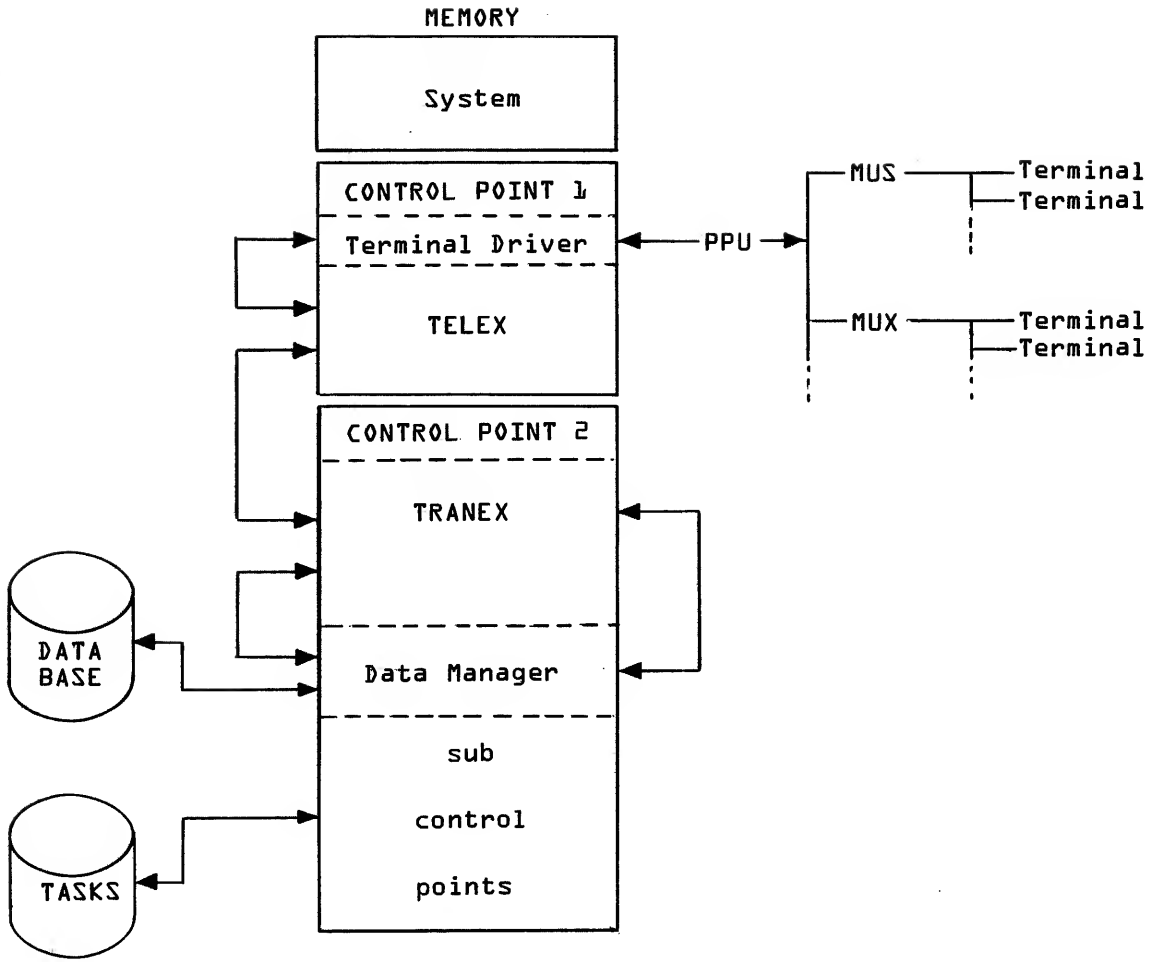


Figure IV-3-1. Organization of the Transaction Subsystem

3.2.1 MULTIPLEXER DEFINITION DIRECTIVE

The format of the multiplexer definition directive is:

```
//6671,CH=n1,EQ=n2.
```

or

```
//6676,CH=n1,EQ=n2.
```

depending on whether a 6671 or 6676 multiplexer is used. The CH equation gives the channel to which the multiplexer is attached, and the EQ equation gives the equipment number of the multiplexer. The channel range (n1) is 0 to 13B and 20B to 33B. The equipment number range (n2) is 0 to 7.

3.2.2 TERMINAL DEFINITION DIRECTIVE

The format of the terminal definition directive is:

```
/termnam,PN=n1,pi=ni,...
```

termnam	Mandatory, unique alphanumeric name (1 to 7 characters) that identifies the terminal
PN	Mandatory port number for which n1 has the decimal ranges 1 through 16 (6671 multiplexer) or 1 through 64 (6676 multiplexer)

The pi=ni have the following possible values.

Keyword	Description
PL=n	Port range limit. This is used in conjunction with PN to establish the range of ports that can be used with one multiplexer. This can only occur after the PN has been established. The range of n is PN+1 to 15 (6671 multiplexer) or PN+1 to 63 (6676 multiplexer). PN is the previously declared port number. As an example, the terminal definition `/TERMA,PN=2,PL=5` would connect terminal TERMA to port 2 and limit the remaining terminal definitions in this set to ports 3 through 7.
TT=aaa	Terminal type. aaa may be one of the following: AB Terminal will be identified by answerback. ID Terminal will be identified by terminal operator entry. NIX CYBERLOAN NIXDORF terminal.
LS=nnnn	Line speed. Declares the terminal line speed (character rate). nnnn is in characters/second. The range of values is 1 through 2047.

Keyword	Description
PC=nnnnnnnn.	Polling code. Defines the terminal polling code for a terminal that is on the same line as other terminals. This terminal code enables the terminal to identify its own data from that of the other terminals on this line. The range is 0 to 16777215 (24 bits).

A KRONOS Transaction Subsystem (KTS) terminal is defined with the previous arguments as well as the following which are unique to the Transaction Subsystem.

DB=aa	Data base name. Declares the 2-character data base name to be used by the terminal.
IS=aaa.	Initial status. Declares the terminal's initial on/off status. aaa may be ON or OFF. Default value is ON.
RS=n.	Data base read security. Declares the data base read security. n may range from 0 to 7. Default value is 0.
TT=*aaa	Declares the transaction terminal type. *aaa may be any of the following: *AB Terminal will be identified by answerback. *ID Terminal will be identified by terminal operator entry. *NIX CYBERLOAN NIXDORF terminal.
UA=nnnnnn.	User argument. Defines the contents of the user argument area. nnnnnn may range from 0 to 16777215 (24 bits). Default value is 0.
US=n.	Data base update security. Declares the data base update security. n may range from 0 to 7. Default value is 0.

3.3 VALNET VALIDATION PROGRAM

VALNET is a program used to validate the syntax and logic of a terminal network description file that was created with the common deck COMCRTN. Errors in the network description are diagnosed and error messages entered on a list file. If no errors are encountered, no list is produced. If the network description is error free, the analyst should then create a system file from the description file. This sytem file will be either SIMFILE or NETWORK depending on its use. Typical coding would be:

```
X.DIS

ACCOUNT,ANLST.

SUI=377777.

DEFINE,NETWORK/CT=L.

COPY(INPUT,NETWORK)
```

The control card used to call the VALNET program has the following format.

VALNET(p1, p2, p3)

pi

P Terminal network description file name

P	COMPILE file is diagnosed.
P=fn	File fn is diagnosed, where fn is the name supplied by the user.
	Default name is NETWORK.

L File to receive list of errors

L	LIST file receives error listing.
L=fn	File fn receives error listing, where fn is the name supplied by the user.
L=0	No list is produced.
	Default name is OUTPUT.

NR Do not rewind network description file before reading.

NR	Do not rewind.
	Default causes a rewind before reading.

3.3.1 VALNET OUTPUT LISTINGS

For each error encountered in a network description file, VALNET produces two lines of listing. These lines have the following format.

Error Line	
Card Number	Diagnostic Message

The error line is the faulty line, or in the case of an omission, a near subsequent line. As an example, the descriptive code

(line 3) /TERMA.

(line 4) /TERMB, PN=3.

is missing the mandatory port number in line 3. However, this is not diagnosed until line 4 is encountered. Line 4 is listed along with the appropriate diagnostic as follows:

```
TERMB, PN=3
CARD 04 TERMINAL DESCRIPTION ERROR.
```

List lines are formatted for 72 columns except for input lines that exceed this length.

3.3.2 DAYFILE MESSAGES ISSUED

NO DESCRIPTIONS FOUND.

No multiplexer and/or terminal descriptions were found on the description record.

FILE NAME CONFLICT.

The P file name (terminal network description) is the same as the L file name (error listing).

TERMINAL DESCRIPTION ERRORS.

Errors were found in the terminal description. Examine the listing for diagnostic messages.

VALNET ARGUMENT ERROR.

The VALNET control card contains unknown or incorrectly used arguments.

VALNET COMPLETE.

All descriptions have been validated as correct.

TABLE OVERFLOW.

Not enough storage was available to hold all terminal description table entries.

EXPRESS DEADSTART DUMP INTERPRETER 4

Deadstart procedures can dump all PPUs, central memory, and (optionally) extended core storage to a printer or to magnetic tape. The dump to magnetic tape is via the Express Deadstart dump (EDD). This tape can be read and listed at a future date by the express deadstart dump interpreter (DSDI). Information on the tape is sequenced according to Figure IV-4-1. The listings are formatted for a 136-column printer.

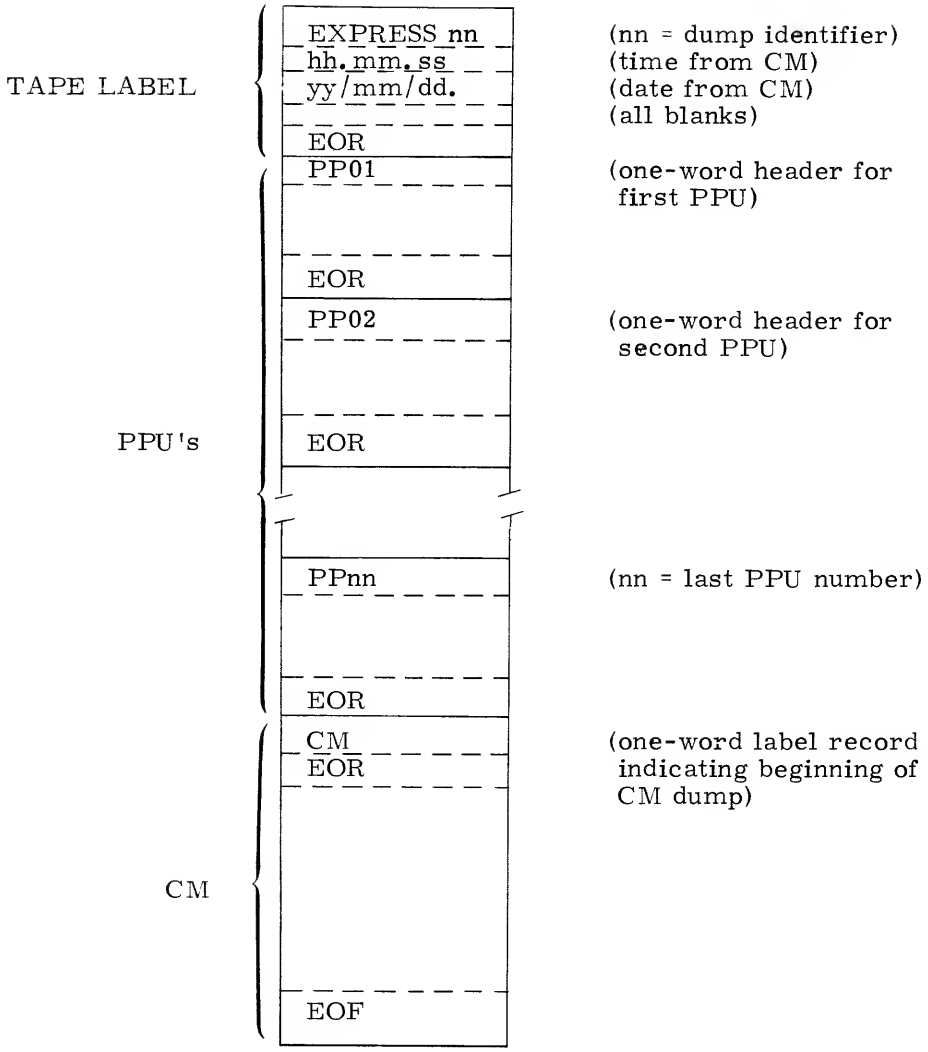
4.1 CALLING THE EXPRESS DEADSTART DUMP INTERPRETER

Processing of the express deadstart dump tape is initiated with the DSDI control card. The format of this card is:

DSDI(p1,p2,...,pn)

where each pi is either a keyword or a keyword equated to a value. The following is a listing of the keywords and values available.

Keyword	Definition
Q or none	Dumps all PPUs and central memory up through address 20000B. The PPUs will be in word format, and central memory will be in byte format.
F	Dumps all PPUs, central memory, and extended core storage. The PPUs will be in word format; central memory and extended core will be in byte format.
P	Dump the 10 lower PPUs (1 through 11B). Printout is in word format.
P=N	Dump PPU number N. Printout is in word format. This designation can be repeated within a single call. Example: DSDI(P=0, P=4) will produce a printout of PP00 and PP04.
U	Dump the 10 upper PPUs (20B through 31B). Printout is in word format.
C	Dump all of central memory in byte format.
C=L	Dump central memory from address 0 to address L in byte format.



NOTE

If ECS is present, it follows CM.

Figure IV-4-1. Dump Tape Format

Keyword	Definition
C=F-L	Dump central memory from address F to address L in byte format. To dump central memory in display code rather than byte format, the previous three calls become: CD CD=L CD=F-L
E	Dump all of extended core in byte format.
E=L	Dump extended core from address 0 to address L in byte format.
E=F-L	Dump extended core from address F to address L in byte format. To dump extended core in display code rather than byte format, the previous three calls become: ED ED=L ED=F-L
EF	Ensure that end of file is reached after dump.
PR	List PPU registers in word format.
CM=N	List control point N memory (that segment of CM containing the data from control point N). The listing is in byte format.
CMD=N	List control point N memory (that segment of CM containing the data from control point N). Listing is in display code.

All numeric values can be specified as octal or decimal with a B or D radix immediately following the number. If no radix is given, the number is octal.

Sample listings are given in Figure IV-4-2.

4.2 DIAGNOSTICS

4.2.1 DAYFILE MESSAGES

DSDI ARGUMENT ERROR

An unknown keyword was encountered.

DSDI NUMBERIC CONSTANT ERROR

A numeric value is not properly formed.

DSDI(P=4)

```
PP04    EXPRESS 00 06.03.00.  73/05/26          73/05/26. 06.22.54.

    00XX    0X    1X    2X    3X    4X    5X    6X    7X      01XX    0X    1X    2X    3X    4X    5X    6X    7X
      00  0003  0032  0030  6600  ----  3434  ----  0001        00  1477  3474  0141  2023  0100  5400  1401  5000
      01  1500  0002  7760  7600  0007  2030  ----  0100        01  1701  3051  0200  0620  0121  0324  0200  0633
      02  7304  7700  ----  ----  6100  ----  ----  1000        02  0576  1377  0424  0364  1014  2001  0336  5400
```

DSDI(C=100-200)

```
  CM DUMP FROM      100 TO   200  EXPRESS 00 06.04.00.  73/05/26.          73/05/26.  06.22.10.

100  0000 0000 0000 0000 0000   0000 0000 0000 0001 0000   0000 0000 0000 0000 0000   0100 0100 0100 0100 0100
104  0100 0100 0100 0100 0100   0100 0100 0100 0100 0100   0004 1651 0001 0204 7647   0000 0000 0000 0000 0000
110  0000 0000 0000 0000 0001   0000 0000 4513 0000 0000   0000 0000 0000 0000 0000   0000 0000 0000 0000 0000
114  0000 0000 0000 0000 0000   0000 0000 0000 0000 0000   0000 0000 0000 0000 0000   0000 0000 0000 0000 0000
     DUPLICATED LINES.
```

DSDI(CMD=1)

```
CP  1 DUMP FROM     0 TO    6000   EXPRESS 00 06.03.00. 73/05/26.          73/05/26. 06.23.33.

   0 0000000000000000000 0516040000400000001 3777000000000000000 3777000000000000000          END D  A4;      4;
   4 3777000000000000000 3777000000000000000 3777000000000000000 3777000000000000000 4;      4;      4;      4;
     DUPLICATED LINES.
```

Figure IV-4-2. Sample Listings Under DSDI

DSDI ARGUMENT CANT BE EQUATED

The Q, F, or U argument is equated to a value.

DUMP LABEL ERROR.

First record on dump file is not four words long.

DUMP FILE EMPTY.

First read on dump file produced an EOF and/or EOI.

EXPRESS DUMP COMPLETE.

Dump completed normally.

INCOMPLETE DUMP.

Indicates any one of the following conditions:

CM not present but dump requested.
ECS not present but dump requested.
EOF and/or EOI encountered during read of PPUs.
FWA of CM or ECS dump not present.

DUMP FORMAT ERROR.

Incorrect PPU number appears on dump file.

DUMP FWA .GT. LWA.

CM or ECS dump bounds are illegal.

4.2.2 LISTING ERROR MESSAGES

CONTROL POINT MEMORY DUMP IMPOSSIBLE

The low core field NCPL is unreasonable.

PP COMMUNICATIONS DUMP IMPOSSIBLE

The low core field PPUL is unreasonable.

TIME-SHARING STIMULATOR 5

The purpose of the time-sharing stimulator software package is to enter a hypothetical load of time-sharing jobs into the KRONOS 2.1 system in order to analyze the effects of such a load on response time and system reliability.

The procedure to use the time-sharing stimulator package includes:

1. Creating the hypothetical load of time-sharing jobs (called a session file); refer to section 5.1.
2. Artificially processing (stimulating) these jobs using stimulator commands at the system console; refer to section 5.2.

Multiple stimulator sessions are described in section 5.3; errors that can occur while using the stimulator software are described in section 5.4.

5.1 SESSION FILE CONSTRUCTION

A session file is an indirect access permanent file that contains the hypothetical time-sharing job load that is to be analyzed by the stimulator. A session file consists of a group of records; each record is a session and contains a hypothetical time-sharing job that is composed of various entries. When constructing a session file, terminate each entry with a teletypewriter carriage return, which is a V in display code (66 code). Note the following requirements.

1. Begin each session with the entry ANSWERBAC; this is a terminal type identifier to TELEX (the Time-Sharing Subsystem Executive).
2. Enter each session entry on a separate card.
3. Terminate each card entry with an 11-0 punch (display code 66).
4. After ANSWERBAC, enter a user number entry and a password entry.
5. Specify the time-sharing terminal commands and data.
6. End each session with the command BYE so that the login of the next session is performed correctly.
7. Enter an EOR after each session except for the last; enter an EOF, instead of an EOR, after the last session.

The following is an example of a session file.

5.2 SESSION FILE PROCESSING

Use the stimulator software to process the time-sharing session file. The procedure is:

1. There must be a Time-Sharing Subsystem Stimulator entry in the EST as described in part II, section 4.3.7.

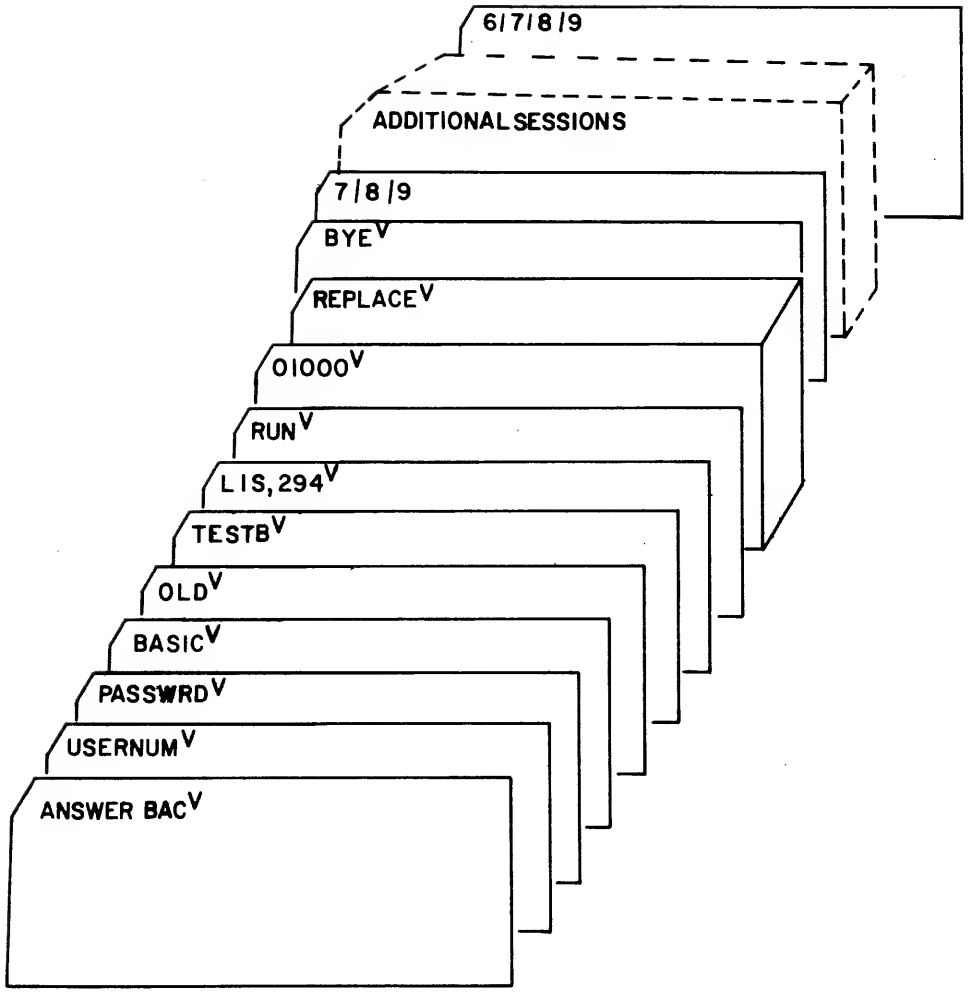


Figure IV-5-1. Sample Session File

V represents an 11-0 punch (display code 66).

2. Use DSD to bring the stimulator software to the control point 17.

   Type STIMULATOR
   Press CR

3. The stimulator requests the K display at control point 17.

4. Type K.17.
   Press CR

5. The following information appears on the left display.

```
ENTER STIMULATION FILE PARAMETERS IN FORM -

   P = VALUE

   F =          SESSION FILE NAME

   UI = OB      USER INDEX (OCTAL BASE ASSUMED)

   N = 1        NUMBER OF FILE ON SESSION FILE

   GO           BEGIN PROCESSING OF SESSION FILE
```

6. Type the session file parameters individually as indicated in the following format column or as a group on the same line in the format:

   K.F=lfn, UI=number, N=x, GO.

Format	Default	Significance
K.F=lfn	None	lfn is the indirect permanent file name of the session file.
K.UI=number	0	number is the user index of file lfn.
K.N=x	1	x is the number of files to skip on file lfn before data is read from the session file; range is 1 through 377777.
K.GO	None	Indicates to the stimulator that all the parameters have been entered.

7. The following information appears on the left display.

ENTER STIMULATION PARAMETERS IN FORM -

P = VALUE	(NUMERIC VALUES ARE ASSUMED DECIMAL BASE.) (SEE RIGHT SCREEN FOR SPECIAL PARAMETERS.)
NT = #	NUMBER OF TERMINALS TO STIMULATE (3-#)†
LS = 30	LINE SPEED IN CHARACTERS/SECOND (1-1000)
TT = 10	THINK TIME DELAY IN SECONDS (0-127)
TI = 8	UPPER BOUND OF RANDOM THINK TIME INCREMENT 0-64 (MUST BE A POWER OF 2). THINK TIME WILL VARY BETWEEN TT AND TT+TI.
AC = #	ACTIVATION COUNT (1-NT) (NUMBER OF TERMINALS TO ACTIVATE EVERY AD SECONDS)
AD = 0	ACTIVATION DELAY IN SECONDS (0-127)
RC = 0	NUMBER OF TIMES TO REPEAT STIMULATION
RO = OFF	OUTPUT RECOVERY (ON OR OFF)

8. To display the special parameters:

   Type KK
   Press (CR)

9. The following special parameters display appears on the right screen.

SPECIAL PARAMETERS.

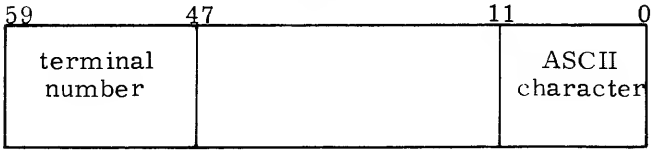
OPTION LS MAY HAVE PARAMETERS OF THE FORMS MIXED (T1/LS1, T2/LS2, ... , TN/LSN) WHERE LINE SPEEDS LSN ARE ASSIGNED TO TN NUMBER OF TERMINALS.

10. Type the stimulator parameters individually as indicated in the following format column or as a group on the same line in the format:

    K. NT=x, LS=y, TT=z, TI=a, AC=b, AD=c, RC=d, RO=ON, GO.

    Enter any special parameters (display in step 9) before the GO. entry.

† # is the number of terminals designated in the EST.

Format	Default	Significance
K.NT=x	Current EST value	# is the current maximum number of terminals on which the Time-Sharing Subsystem is initialized. It must be less than or equal to the number specified in the EST entry; the range is 3 through 7777_8.
K.LS=y	30 characters/second	y is the line speed at which the operator wishes to run the terminals; 1 through 1000 characters per second is the range.
K.TT=z	10 seconds	z is the number of seconds that each line is delayed before it is sent to the Time-Sharing Subsystem; 0 through 127 seconds.
K.TI=a	8	a must be less than or equal to 64 and must be a power of 2. If a is 0, the think time will vary between the values of Z (TT) and Z plus a.
K.AC=b	Current EST value	b is the number of terminals that are to be logged in every c seconds (refer to K.AD=c). The AC and AD parameters provide a method to stagger the I/O commands and data to the Time-Sharing Subsystem. The range is 1-# (value of NT).
K.AD=c	0 seconds	c is the delay time until the next login is allowed; range is 0 through 127 seconds.
K.RC=d	0	d is the number of times the sessions will be repeated for each terminal; range is 0 through 31.
K.RO=ON	OFF	When RO=ON, the output from the Time-Sharing Subsystem is recovered on file STIMOUT. The format of this file is:  When RO=OFF, the output is not recovered.
K.GO		Indicates to the stimulator that the parameters are entered.

The special parameter format is:

K.MIXED T1/x, T2/y,....., Tn/n	Each terminal (T1, T2, Tn) is assigned the designated terminal speed (x, y, n); line speed range is 1 through 1000 characters per second. If the special line speed parameters are not entered, the line speed for each terminal is taken from the LS parameter.

5.3 MULTIPLE SESSIONS

Each session on the session file is allocated to each terminal line. When each session has been allocated, the stimulator goes to the first session and reallocates the sessions to the next group of terminals. This procedure is repeated until all the terminals are allocated to a session. If a repeat count is not designated (RC parameter), the line is shut off when the session is finished. When the session completes, the repeat count is checked.

The repeat count corresponds to the number of times the first session is executed. Therefore, the current session is completed and then the next, until the last session is executed. The repeat count is decremented, and the first session is executed. If the repeat count is zero at this point, the line is shut off. If not, it will continue through the session until the first one is encountered again.

5.4 STIMULATOR MESSAGES

Message	Fatal (F) or Nonfatal (N)	Significance	Action
DATA LINE TOO LONG	N	Too many characters are in the data line.	Shorten the line.
EMPTY SESSION FILE	N	The session file was empty.	Resupply the correct file name, or put data into the file.
ERROR IN STIMULATOR ARGUMENTS	F	There is a parameter present other than the I parameter, or the parameter is in the wrong format.	
FILE NAME NOT SET	N	A GO was entered, and the file name was not set.	Set the file name.
FORMAT ERROR	N	A character from ≡ to ; (60-77) or a parameter larger than seven characters was detected.	Reenter correct data.
ILLEGAL DATA	N	The data contains an illegal display character. This is commonly caused by not having a carriage return code at the end of the line.	Fix the data.
ILLEGAL FILE NUMBER	N	File number is greater than 18 bits.	Reenter correct decimal file number.

Message	Fatal (F) or Nonfatal (N)	Significance	Action
ILLEGAL OPTION	N	An illegal keyboard entry was made.	Reenter the correct option.
ILLEGAL USER INDEX	N	User index is greater than 18 bits.	Enter the correct user index.
IMPROPER NUMERIC PARAMETER	N	Field was too large, too small, or alphabetic.	Reenter correct data.
MEMORY OVERFLOW	F	There is not enough field length for the managed tables for STIMULA.	
MEMORY REQUEST ERROR	F	STIMULA and 1TS do not agree on the correct field length.	This could be caused by a system failure.
NO STIMULATOR TERMINALS DEFINED	F	Time-Sharing Subsystem has not initialized using the stimulator EST.	
TELEX ABORT	F	Time-Sharing Subsystem aborted while the stimulation was running.	Look at the dayfile for the cause.
TELEX NOT ACTIVE	F	Time-Sharing Subsystem is at control point.	Bring Time-Sharing Subsystem to control point before running the stimulator.

INDEX

COMMENT SHEET

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