

CP-V D00-11

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1.0 PRODUCT DESCRIPTION

1.1 PURPOSE

The purpose of the D00 release of CP-V is to provide for distribution to the field of a major Development release, including support for Sigma 9 Multiprocessing and FECP. Many other areas have been enhanced and 436 SIDR fixes are included with this release.

1.2 Features/Areas of Enhancement

The major features of CP-V D00 and areas of development enhancements are described below.

1.2.1 Sigma 9 Multiprocessing Support

CP-V handles multiple Sigma 9 central processors as a pool of execution resources which operate within a common pool of main memory. One processor is designated the primary processor, and the others are called secondary processors. The primary processor schedules and handles I/O operations, schedules user tasks for execution, performs monitor service requests, and executes user tasks. (User tasks normally consist of a time slice of user problem program execution.) Secondary processors execute assigned user tasks in the CPU slave mode. A program is returned to the primary processor if it calls a monitor service, traps, or if its time slice expires. Thus the primary treats secondary processors as "compute peripherals".

Multiprocessing operation is totally transparent to user jobs; in fact, the user program is unaware of which processor currently is executing its procedure, and typically, all processors contribute time to the execution of a user job. After a slightly different system initialization procedure, the computer system operator sees no operational differences between multiprocessing and

mono-processing systems.

CP-V multiprocessing systems can continue operation in a degraded mode after the loss of any central processor in the system; depending upon the type of failure, operation may be continuous or may usually be resumed after an automatic system recovery process. Diagnosis and repair of the failed processor can thus be deferred to a maintenance period.

1.2.2 FECF Support

Software support of the Xerox model 3625 communications processor (FECF) is in this release. The software for the FECF has been designed to emulate the current 76xx series of communication gear. In addition, the FECF software will provide a set of RMA aids and automatic line adjustment features not available in the 76xx hardware. These include automatic line speed detection for dial up lines.

1.2.3 Transaction Processing Enhancements

- o Provision for a timesharing/ Transaction Processing switch capability for COC-supported communication lines.
- o Provision of new modified Transaction Processing Ghost Keyins to allow suspension of processing for specific transactions or report types; to provide QUEUE status information; to allow BT or 9T specification on SET commands for journals.
- o Improved error analysis and reporting in the TIC and TPC modules, particularly in the area of communications line support. Also, the Transaction Processing Reference Manual has

been revised in many areas to give the user a better understanding of the interrelationship between the various TP elements.

1.2.4 Disk Pack Swapping System Improvements

Improvements have been made for disk pack swapping systems to enhance their performance and reliability. Initialization of the disk pack swapping device allocates swap storage so that disk arm latency to access frequently called system ghosts is minimized and so that flawed tracks are avoided. Swap device arm positioning time is also reduced by swapping associated shared processors to and from the user's swap storage area, typically with a single arm movement. The swapper's (logical) channel busy time has been reduced to that time needed for the data transfer only. Thus file I/O operations to other disks on the swapper channel can be initiated during the latency times for a swap, and system I/O performance is improved.

1.2.5 File Management Enhancements

- o FIT modification/file rename. Options may be placed on the M:CLOSE CAL to rename and/or change the attributes (passwords, write accounts, etc.) of disk files.
- o Multiple UNDER names for EXECUTE files are supported.
- o Automatic private pack remount. Private packs mounted at the time of a crash will be automatically remounted without operator intervention in most cases.
- o The ERRLOG is now saved during HGP reconstruction.

- o FIX processor enhancements. New command, DUMP, allows dumping of the HGPs for either the public file system or a private pack set in a hexadecimal and/or formatted display.
- o OPEN file overhead reduced. The number of physical I/O's needed for most file opens has been reduced.

1.2.6 COC Enhancements

- o Autosave on line hangup. This feature preserves a user's program on line disconnect and provides a method for reconnection when he calls back. Files remain open and properly positioned so that the program may be continued as if it had never been interrupted. This feature can be authorized on a per user basis via the "AS" FAUTH mnemonic.
- o Terminal Coupling. This provides for the interconnection of two or more terminals so that the I/O of each is reproduced at all coupled terminals, while each user remains in control of his own program. Individual users may enable/disable coupling during an on-line session. Terminal coupling is accomplished through commands in TEL.
- o WHERE command. This command provides a means of displaying the line number of any user, given the account, name.
- o Half-duplex line support. Half-duplex COC lines are now supported raising the maximum speed on unconditioned dial-up lines from 300 baud to 1200 baud.
- o User controlled line timeout. The user can now specify the read timeout period and recover control after a timeout via an

abnormal return.

- o Condition reads. The user can specify that a read is CONDITIONAL. If there is typed-ahead input, the read progresses normally. If there is no typed-ahead, an abnormal return is taken.
- o Input and Output deletion. The user can specify on an M:READ or M:WRITE to his COC line that queued input and/or output is to be deleted. Also, BREAK and CONTROL-Y now delete output as well as input.
- o Enhanced CRT support. The user may temporarily halt output to his terminal by typing ESC H. Also, the CRT page size and end-of-page procedure may be defined. When the end of the page is reached, output will be halted. When the user wishes to continue, any one of a number of keys can be hit. Page erase/restore sequences for Tektronix and Teletype Model 40 scopes are provided.
- o Output ignore mode. If the user types ESC W, all COC output until the next unsatisfied read will be ignored (deleted). User input will be echoed.
- o Terminal block and unblock by seconds. The terminal block and unblock events will be reported based on the amount of queued output in seconds of printing, rather than simply in terms of characters queued. This is especially helpful in installations with more than one terminal type.
- o When additional on-line users are being disallowed, attempts to log on are greeted with an informative message:

NEW ON-LINE USERS NOT
CURRENTLY ALLOWED

followed by the most recently
broadcast SEND ALL or HEALING
message.

- c Installation-supplied translate tables. Via the addition of spare table entries and SKIIs, the addition of unsupported translate tables is now much easier.

1.2.7 RET Enhancements

Enhanced support for the IBM 2780 Remote Batch Terminal includes recovery procedures for card reader errors (input errors) and line printer errors (output errors). This support allows for the effective use of all remote processing commands except !RECONTINUE.

- o 3780 Support. Support for the IBM 3780 Remote Batch Terminal through the Xerox 7605 data set controller. CP-V can support IBM 3780 terminals with the following characteristics:
 - EBCDIC transmission code
 - Non-transparent line protocol
 - Multi-record 512-byte block transmission
 - Ei point configurations only

Operationally, the support closely parallels IBM 2760 and Xerox 7670 support, which is described in the CP-V Remote Processing Manual.

- o ISCL/RATLER. The ISCL/RATLER processor and system ghost job provide users with file access through an IRBT connection between two CP-V systems. With this facility a user can:

- Copy a file from another CP-V system
- Send a file to another CP-V system
- Delete a file on another CP-V system
- List files on another CP-V system

Access to ISCL/RATLER can be via on-line or batch modes through the ISCL processor. ISCL/RATLER utilizes CP-V HASP support through the Xerox 7605 Data Set Controller.

1.2.8 LOADER Improvements

- o The CP-V overlay loader has been enhanced to provide:
 - performance improvement results in LOAD times 1/2 to 1/10 of those previously required
 - DSECT handling is extended for library load modules. This allows DCBs to be stored in libraries.
- o LYNX processor. LYNX is a new interface to the LOADER for use in both batch and on-line modes. It provides a concise, LINK-style syntax allowing the user to take full advantage of the overlay loader capabilities previously available only via the !LOAD command in batch, as well as several new capabilities available only through the LYNX processor.

1.2.9 Miscellaneous User Area Enhancements

- o Load-and-link extensions. This new feature provides a mechanism whereby many programs can be used as subroutines of other programs

without change. The calling program can ^{regain} regain control after the called program exits or aborts. Also provided is a means of passing a single command line to the called program. In particular, PCL, BATCH, and EDIT may now be called as subroutines using this mechanism.

- o Normal mode option for FORTRAN DEEUG. This new TEL command, [DONT] DEBUG, allows the user to establish DEBUG as the assumed option for all calls to FORTRAN and the subsequent load operations.
- o M:CAL. The M:CAL service allows the user program to handle CAL3 instructions by directly connecting the user code to the CAL3 XPSD using the block J:XPSD in the user's JIT. This allows the user to affect fast mode changes (i.e., slave to master), and library function interfaces using CAL3 instructions. Users with CO privilege may specify master mode or interrupt inhibits in the new PSD.
- o A new real time feature allows the user to connect (via M:CONNECT/M:GJOBCON) to either the counter-1-equals-zero interrupt or the counter-2-equals-zero interrupt.
- o New TEL commands. Some other TEL changes are:
 - CANCEL now allows multiple job IDs on a single line
 - ERASE performs a !LDEV L1, (DELETE).... deletes unwanted output from a job
 - SWITCH equivalent of batch !SWITCH command. Also used to set

and display pseudo
sense switches

- PASSWORD changed to require old password in order to get a new password
- o New program abort TEL-DELTA interface. Allows user to invoke DELTA after a program abort even if DELTA was not previously associated. (;I will be correctly set to show the address causing the abort; allowing the user to examine/modify/continue the program.)
- o Changes to DELTA. ;H command to enable overlay breakpoints. When on, each segload causes DELTA to respond with 'SEGMENT segname LOADED' and prompt for input. ;E command (end everything) allows user to exit cleanly from DELTA. This is the equivalent of CONTROL-Y,QUIT.
- o EDIT change. COPY and MERGE destination files are automatically opened as the current EDIT file.

1.2.10 Miscellaneous System and Operational Improvements

- o !DELTA keyin. This new keyin is available for calling Executive DELTA. This keyin is useful if you are in a position where you can get KEYIN into execution and don't mind having KEYIN as the current user while debugging.
- o New form of !PRIO keyin allows the operator to change an executing user's execution priority.
- o PIGEON system ghost. This new system ghost handles all operator SEND keyins. The SEND keyin has been modified to allow the operator to send a message to an

individual user or to broadcast a message to all users. The SEND,ALL form also updates the timesharing user's top-of-page heading. In addition, a HEADING keyin has been added to allow only updating the top-of-page heading, replacing this previous use of the SEND keyin. Operator messages may be "turned off" by the individual user via the [DONT] SEND TEL command.

- o STATS and SUMMARY enhancements. Four new displays are available, and three of the existing displays have been extended to report information about multiprocessing, read ahead and file directory accesses. The new displays are:
 - EVNT which shows the average number of CALs and execution schedules/minute for the master and slave CPUs.
 - SCPU which shows the percentage of time spent in idle and execution states for each slave CPU.
 - RAHD which shows read ahead and file directory access information.
 - RESOURCE shows the number of various system resources such as; granules, CFU entries and monitor buffers in use at the end of each sample period.

The PARAMS, CPU and I/O displays are extended to include information such as: number of active CPUs, slave CPU quantum, ghost

execution and service times, file directory access attempts and hits and the number of file management buffer truncations.

The ability to obtain summary output sorted by user intensity has been deleted.

- o Privileged Processors. This is a new mechanism which provides a means to grant special system privileges to a processor. The processor must execute from :SYS in order to receive these privileges which are selected by options at the time it is loaded. Formerly, such privileges (maximum memory, JIT access, etc.) were only available to shared processors.
- o Concurrent Symbiont Output. This new symbiont output mode allows programs to produce output concurrent with execution, and potentially cuts in half the elapsed start to finish time for a job. It also permits large processing jobs to run which would otherwise overflow the symbiont space. This feature can be authorized on a per user basis via the **"WC"** FAUTH mnemonic.
- o LITERALS Module. The tables of constants, bit flags, and masks used by the monitor have been moved to a single module called LITERALS which is loaded so as to be in page zero and is therefore accessible by any user program. A new library of DEFs, :J2 provides convenient access.
- o GENMD modifications. Changes have been made to the GENMD processor which allows the specification of replaced instructions for comparison with the prior contents of the updated cell. An error is

given if these do not match.
 In addition, addressing
 functions are now allowed.
 Complete syntax is available
 by typing a "?" in response
 to GENMD's prompt for input.

- o S:OFFRF. A cell has been defined which, when non-zero inhibits the physical unloading of tape drives when a REMOVE is performed. This is handy for installations which have a large number of multiple job accesses to the same tapes. The cell can be modified through ANLZ.

1.3 Supporting Publications

The reference manuals which describe version D00 of CP-V are listed below. Note that all have new editions or revision packages since the C01 release.

CP-V BP Ref. Manual	90 17 64G
CP-V OPS Ref. Manual*	90 16 75H
CP-V SP Ref. Manual*	90 31 13B
CP-V SM Ref. Manual*	90 16 75H
CP-V TS Ref. Manual	90 09 07G
CP-V TS Users Guide	90 16 92D-4
CP-V RP Ref. Manual	90 30 26C
CP-V TP Ref. Manual	90 31 12A-2
CP-V Data Base Tech Manual	90 19 95D

*Corrections for these manuals are in the element 707000-91D00.

2.0 HARDWARE CONFIGURATION

CP-V runs in a minimum configuration of 64K words of memory; however, the minimum requirements are dependent on the options selected (for example, the TP option requires a minimum of 80K memory). Combinations of options may require more than the standard minimum for CP-V.

CP-V supports a larger than 128K memory on both the Sigma 9 and the Xerox 560. CP-V supports up to a 512K memory on the Sigma 9, and up to 256K memory on the Xerox 560.

CP-V Multi-Processing support is provided for a Sigma 9 with up to four (4) CPUs. Minimum memory recommendations for multi-processing are 128K for two CPUs, 192K for three CPUs, and 256K for four CPUs.

3.0 SIDRS CLOSED

The D00 release of CP-V contains 436 difficulty and improvement SIDR fixes. These SIDRs are itemized under the principal catalog numbers listed below.

SIDRS Against File Maintenance Processors (707001)

23366	26213
24386	26269
24410	26270
24552	26275
24726	26408
25068	26424
25122	26446
25173	26496
25434	26499
25437	26502
25496	26509
25525	26520
25533	26521
25604	26565
25623	26568
25682	26569
25927	26570
25949	26680
26168	26745
	26759

SIDRS Against File Management (707002)

11676	25520	25818
12266	25555	25857
12290	25556	25991
20208	25558	26001
23101	25563	26050
23759	25564	26120
24120	25574	26165
24172	25595	26257
24301	25607	26258
24485	25614	26264
24594	25642	26271
24876	25644	26516
24882	25683	26616
24910	25795	26674
25404	25796	26804
25415	25803	26821
25421		26822
25483		26823
		26847
		26896

SIDRs Against System Management (707003)

10322	
21377	25817
21927	25830
22412	25852
24062	25878
24132	25933
24455	25951
24588	25978
24759	26024
24769	26048
24868	26052
24873	26074
24874	26202
25420	23136
	26436
25436	26519
25501	26539
	26768
25578	26717
	26817
25654	26820
25717	

SIDRs Against Communications (707004)

09285
09304
09512
10873
11669
20224
21089
22697
22698
23930
23948
24576
24900
24904
25348
25696
25776
25789
25897
25903
26033
26111
26117
26513
26301
26311
26390

26514
26639
26756
26867

SIDRs Against Recovery (707005)

23593	26164
24877	26193
24914	
25229	26283
25484	26406
25515	26500
25562	26577
25581	26848
25736	
25821	
26093	
26094	

SIDRs Against Software Checks (707006)

22327
24561
26410
26699

SIDRs Against Operator Communications (707007)

21707
21729
22164
23790
23911
23912
24724
24890
25557
26553

SIDRs Against SYSGEN (707008)

22080	25733
24893	
24895	
24913	
24878	
24879	
24880	
25370	25743
25489	25826
25521	26139
25523	26196
25524	26222
25528	26259
25542	26260
25594	26419
25725	
25727	

SIDRs Against Debuggers (707009)

21968
23418
24682
25425
25554
25572
25731
26043
26070
26098
26784

SIDRs Against Loaders (707010)

10645	22731
11935	22829
20006	23238
20007	24325
20012	24735
20085	25292
20093	25432
20365	25516
21328	25561
21339	25616
21433	25769
21635	25921
21775	25952
22266	26049
22289	26194
22562	26211
	26793

SIDRs Against Symbionts (707011)

10578
25084
25543
25544
25641
25655
25693
25846
26137
26513

SIDRs Against Accounting and Performance (707012)

11856
23799
24902
25519
25548
25570
25680
25694
25877
25910
26354
26682

SIDRs Against Monitor Services (707013)

23677
25316
25695
25801
25928
25992
26309
26544

SIDRs Against Initialization (707014)

24573
24671
24875
24889
25537
25575
25715
25740
25816
25823
25939
26126

26282
26425
26708
26712

SIDRs Against Reliability (707015)

24081
24091
25807
25896
26256
26273
26431
26453
26495
26504

SIDRs Against CCI and TEL (707016)

09828	25666
11374	25742
22563	25794
24161	25819
24416	25870
24811	25923
24845	26000
24881	
24883	
25112	26012
25431	26051
25485	26250
25532	26467
25569	26732
25576	26765
	26792

SIDRs Against Utility Processors (707017)

10288
23436
23942
24170
24770
25275
25334
25546
25872
26073
26092
26095
26225
26285
26480
26665

26666
26671
26672
26681
26807
27025

SIDRs Against Miscellaneous Areas (707018)

24171	25689
24536	25738
24649	25766
24689	26170
24768	26180
	26334
24803	26363
24848	26450
24849	26532
25028	26527
25172	26739
25468	26869

SIDRs Against Transaction Processing (709019)

24168
24915
25323
25507
25508
25538
25539
25550
25577
25606
25653
25656
25673
25687
25709
25732
25734
25745
25746
25892
25911
25920
25948
25957
25959
25969
25970
25975
25976
25977

26017
26046
26169
26171
26640
26649
26738
26761
26766
26773
26780

4.0 RELEASE CONTENTS4.1 DOC Release Tapes - 707000-26/46/66

Two single volume FSAVE tape sets contain all the input necessary to generate a CP-V D00 system. These tapes contain the following accounts which will be described separately.

FSAVE tape SN 00D0, account :SYS, contains the following accounts:

:D00B0	Relocatable binary
X	Non-supported utility programs
CPVPROC	Standard processor load modules
COBLIE	COBOL library
RPGLIE	RPG library
CDEGLIB	COBOL Debug library
SORTLIB	SORT library

FSAVE tape SN 00D1, account :SYS contains the following accounts:

:D00CI	Compressed source
:D00SI	Symbolic updates

4.1.1 :D00B0

Binary files for all CP-V modules. In addition, all processors and control files needed to perform a D00 SYSGEN are included. The processor names begin with "\$\$" and the control file names begin with "\$". All CP-V assembly SYSTEMS (BPM, RTPROCS, etc.) are also included here in compressed format.

4.1.2 X

Account X contains a set of utility programs which are not supported, but which are used by Development Programming and tend to be useful to CP-V installations. The source for each program is included so that improvements or modifications can be made by an installation. All of the load modules created have (READ,NONE),(EXEC,ALL). Some files in account X which are particularly useful are these:

JOBMNSTK..... This file should be batched (with the E option) after a new system is generated in order to reload those programs in account X which load with MONSTK.

- JOB..... This file can be batched (with the E option) to compile and load all of the programs in account X.
- HELP..... The HELP program will describe each program in account X and give information about the use of each program. For information on how to use HELP, call it and type: ?
- TSS..... Time-Sharing Simulator. This program is useful for placing a simulated time-sharing work load on a CP-V DCO system without the need of additional computer hardware to process communication I/O.
- BOOK..... This program is described in BOOKHELP and provides access to the CP-V TS Users Guide from an on-line terminal.
- TERM..... TERM allows the user to:
- o set almost any specifiabile terminal attribute.
 - o set terminal attributes by specifying a terminal name.
 - o define new terminal names and their attributes.

For more info, call TERM.X and type: HELP

4.1.3 CPVPROC

Account CPVPROC contains the following standard processors. The \$CPYSTD file copies selected processors from the CPVPROC account to the :DCOSGEN account (others may be added by EDITing the \$CPYSTD file in the :DOOBO account).

<u>FILE NAME</u>	<u>PROCESSOR</u>	<u>VERSION</u>
\$.STDDEF	AP	--
\$.STDMET	META	--
:BLIE	FORT	FOO
:DIC	FORT	FOO

:LIB	FORT	F00
:PO	FORT	F00
:POO	FORT	F00
:P1	FORT	F00
:P11	FORT	F00
AP	AP	C00
APL	APL	C01
APLTRMSB	APL	C00
BASIC	EASIC	C02
COBOL	COBOL	E07
EASY	EASY	A00
ERRNOTES	RPG*	B01
FLAG	FLAG*	D00
FORT	Ext. FORTRAN IV	F00
FORTLIB	SYSTEM FORTLIB	A01
MERGE	MERGE*	F01
METASYM	METASYMBOL	H01
RPG	RPG*	E01
SORT	SORT*	F01
TEXT	TEXT	A02
SIML	1400 SIMULATOR*	E00

*These processor file names were excluded from the \$CPYSTD file and should be added if desired on the PO tape.

4.1.4

COBLIB

Account COBLIB contains the files which make up the COBOL library.

4.1.5

RPGLIB

Account RPGLIB contains the files which make up the RPG library.

4.1.6

CDBGLIB

Account CDBGLIB contains the files which make up the COBOL DEBUG LIBRARY.

4.1.7

SORTLIB

Account SORTLIB contains the files which make up the SORT library.

4.1.8

:DOOCI

Compressed files for all CP-V modules. DATADEF is included in :DOOCI for assembling module PART in the CONTROL processor. It is not a standard CP-V

release element and no development support of DATADEF is implied.

4.1.9 :DOOSI

Source updates for CP-V modules that were updated subsequent to the D00 compression assemblies.

4.2 707000-86 Starter PO Tape

The starter PO tape is available as a 'mini-CP-V' pack swapping system which will boot on any type of disk pack. The INSN of the starter tape is 'CPDG' and the account is :DOOSGEN. This PO tape should be used only to perform the initial SYSGEN.

4.3 707000-11 Program Description

This document contains a description of the new features of CP-V D00, a list of SIDRs closed, SYSGEN procedures, release contents, etc.

4.4 707000-91 Reference Manual Updates

This document contains last minute CP-V D00 manual updates and corrections. The manuals subject to these changes are listed in section 1.3.

4.5 707000-76 Quality Assurance and Control Test Tape

The QUAC Test Tape contains the CP-V D00 Test Case Library. Section 10.0 of this document describes the test procedures. The QUAC Test Tape is an FSAVE tape with an INSN = 00A0 and ACCOUNT = :SYS.

4.6 707000-56 Compressed Listing Tape

The compressed listing tapes contain listings of all supported modules of CP-V; the tapes,

which represent the contents of the :D00LO account, also contain the CP-V D00 technical manual data base. There are four single volume tapes in the set, all created under PCL, three contain the listings and the fourth contains the technical manual. The contents of the first three tapes are:

<u>SN/Acct</u>	<u>Content</u>
D0L0.:D00LO	Files ACCTSUM to FIN
D0L1.:D00LO	Files FIXARG to QREMAKE
D0L2.:D00LO	Files RA to 7446IO

The fourth tape is SN D0L3 account :D00LO. This tape contains a group of files used to produce the technical documentation that is also released on the microfiche. These files are made available to the user to produce documentation tailored to his needs if desired.

Included are the EXTRACT load module, its compressed source and the complete CP-V D00 comment data base. See Appendix A for instructions on the use of EXTRACT.

\$\$EXTRACT-	the documentation program load module
\$\$EXTRACTCI -	compressed source for EXTRACT
\$\$DB -	the complete D00 data base for EXTRACT as taken from the UTILIST LO files

Also included is a series of control files which can be used with EXTRACT to produce reports of special interest. These reports are included on the microfiche but not on the listing tapes.

\$CCI -	all CCI modules
\$CENTSYS -	central system modules
\$DEBUG -	debug modules
\$DISKFM -	file management modules
\$FILEMAINT -	FILL, FSAVE, FRES
\$HANDLER -	handler modules

\$INITREC - initialization and recovery
modules

\$LOADER - loader modules

\$PCL - PCL modules

\$REMOTE - remote processing modules

\$SYMCOUP - symbionts and cooperative
modules

\$TAPEFM - tape file management

4.7 707000-59 42 x Microfiche

This element consists of the listings of all CP-V modules as well as technical documentation produced from the listing commentary by the EXTRACT processor.

4.8 VOLINIT (706226-E00)

The E00 version of VOLINIT is a stand-alone program which initializes disk packs (writes headers and does surface checking). A description is in the CP-V Operations Reference Manual. Note: only the E00 version of VOLINIT may be used to prepare packs for CP-V. VOLINIT is not released with CP-V but may be ordered by the above catalog number.

5.0 SYSGEN CONSIDERATIONS

5.1 Introduction

This section describes SYSGEN processor changes as well as procedures to follow when doing a D00 SYSGEN.

5.2 PASS2 Changes

- o The FECP is supported via additions to the :DEVICE command syntax and the addition of a :FECP command.
- o Multiprocessing is supported via the addition of a :SCPU command.
- o The following new options to the :FAUTH command may be used to require SUPER authorization for these special features;
 - CJ Common Journal Usage, independent of Transaction Processing.
 - AS Auto Save feature on line hangup situations.
 - WC Commode symbiont output
- o The BLOCK/UNBLOCK keyword options (:IMC command) now specify seconds of output rather than number of characters. Recommended values are one (1) for UNBLOCK and 5-10 for BLOCK.
- o The following are new keywords on the :COC command:
 - COUPLE terminal coupling allowed
 - HD half duplex line(s)

5.3 PASS3 Change

Recovery is now loaded four pages above the end of the module INITRCVR (i.e., M:MON's start address).

5.4 How To SYSGEN CP-V D00

CP-V D00 may be generated under any currently supported CP-V system. One restriction is that the

current running system must have at least 30K of core available for loading the target monitor. If a 64K system does not have enough core available, the D00 starter system must be used as the host for doing the SYSGEN. The D00 starter system will run on any standard CP-V configuration (boot-time initialization adjusts for varying disk pack types). All of the D00 processors required to do a SYSGEN are contained in the :D00B0 account and should be executed from there. In that way it is immaterial what processors exist in :SYS of the host system.

All of the control files needed to perform a SYSGEN are included in the :D00B0 account with names beginning with "\$". Files whose names begin with '\$\$\$' are load modules used during the SYSGEN process. A PCL range copy may be used to obtain listings of the control files -
COPYALL.:D00B0/\$E,\$9 to LP(K).

The control files in :D00B0 are:

\$CPYSTD	the standard file used in GENJOB ¹ to copy processors into the SYSGEN account. Note that the processors are expected to be in account CPVPROC. Modify this file to match your installation's processor list.
\$P2BASIC	JCL & PASS2 data for a SIGMA 6/9 system with IRET, Transaction Processing, and Real Time included.
\$P2FECP	JCL and PASS2 data for a CP-V system utilizing an FECP.
\$P2X560	JCL and PASS2 data for a Xerox 560 system utilizing a 32 ¹⁴ swapper and NS peripherals.
\$P2MULTI	JCL and PASS2 data for the dual Sigma 9 Multiprocessing system used in production in El Segundo.
\$P2RMP	JCL and PASS2 data for a Xerox 560 system utilizing a RMP swapper (3275) with Transaction Processing and Real Time included.
\$P2MINI	JCL and PASS2 data for the D00 Starter System.

\$P2NOCOC JCL and PASS2 for a Batch Only system.

\$LOCCTS JCL and data to create the LOCCT files needed by PASS3.

\$GENJOB1
\$GENJOB2 JCL and data to perform all PASS3 loads.

\$DEFJOB JCL and data to write two PO tapes.

In addition, the :D00E0 account includes the following file:

DEVDMF The DEVDMF file is a stand-alone program that will make a device copy of any RAD or pack on magnetic tape. It is loaded using the stand-alone loader, LOADDEVDMF, from account X. It is described in the CP-V Operations Reference Manual, 90 16 75H. To obtain copies, use the following commands:

```
!PCL
COPY LOADDEVDMF.X TO CP(BIN)
COPY DEVDMF.:D00E0 TO CP(BIN)
END
```

Step 1 - (optional) Boot starter PO tape, keying in "IPFTC" upon request. The device addresses are as follows:

<u>NAME</u>	<u>ADDRESS</u>	<u>MODEL</u>
TY	A01	7012
LP	A02	7445
LP	A06	3465 (NS or 7446)
CR	A03	7140
9T	A80	7322 (Wang)
9T	A81	7322 (Wang)
9T	DF1	7333 (Potter)
9T	DF2	7333 (Potter)
9T	AC0	3345 (NS)
9T	AC1	3345 (NS)
DP	AE0	7271
DP	AE1	7271
ME	A10	7611

Change the address of the swapper, card reader, and printer (if necessary):

C/LL/DC ASSIGN OK (YES/NO) NO

CRA03 = CRndd

LPA02 = LPndd

DPAE0 = Pndd

The starter PO tape will boot on a system with any type standard supported disk packs (7242, 7271, 7275, 3275). It is necessary, however, to use reconfiguration cards in order to select the appropriate line printer and tape handlers. The easiest reconfiguration in this instance is to use :TYPE cards for each device type available, defining the complete system without using the :SAVE card. Example 1 shows this for a 560 system, being booted on a 3275 (RMP) disk pack. (Note that the :TYPE card for the disk packs specifies 7271, even though the device is actually a 3275. This is because the system was SYSGENed for 7271 packs. Special code has been added to enable a 7271 pack swapper system to run on any kind of disk pack. In this system it is normal for the message "HGP TRUNCATED - TOO BIG FOR ALLOCATED DATA" to be typed on the operator's console during system initialization.)

- Step 2 - LOGON under :SYS,LEE and use SUPER to modify the :SYS account for maximum privilege and core, plus tapes. Create the :DOOSGEN account. The SYSGEN will be performed in this account. Account authorization should include tapes, core, RAD, and disk. (See example 2.)
- Step 3 - Using FRES (see example 3), restore accounts :DOOBO and CPVPROC from the release tapes to secondary storage; these accounts contain all of the files necessary to perform the target SYSGEN.
- Step 4 - In account :DOOSGEN, PATCH \$LOCCTS.:DOOBO. This job will create all the needed LOCCTS in account :DOOSGEN.
- Step 5 - In account :DOOSGEN, copy the PASS2 control file from :DOOBO which most closely matches your installation. Use EDIT to modify the file to match the installation. Either

batch the job or run it on-line. Verify the results.

The following error warning messages may be expected in the PASS2 jobs:

NO:COC COMMAND - a batch only system being generated.

WARNING: BUFFERS <3*LINES

The action taken by PASS2 in each of these cases is correct; the messages are for information purposes only.

Step 6 - (optional) EDIT the standard file (\$CPYSTD.:DOOEO) to supply any additional processors from the appropriate accounts.

Step 7 - In account :DOOSGEN, BATCH \$GENJOB1.:DOOBO. This GENJOB will terminate by BATCHING a subsequent GENJOB. Verify all the GENJOB output.

The following PASS3 load maps will exhibit the anomalies listed under "remarks".

<u>Load Module</u>	<u>Remarks</u>
M:MON	PREF for MTAP160 in systems specifying no other tapes than 3345's (NS tapes).
FEC1 FEC2 FEC3 FEC4	All contain PREFs for FECPD#, SRU#
PPS	PREFs in a non-Real Time system.
PIGEON	PREFs in a non-COC system
RBBAT	PREFs for RB:FLAG, REB:HFE, REB:HIN, and REB:HCU if the system does not contain Remote Processing.
FIX	PREF for MODE in a Batch only system.
MOOSE	PREFs in mono-processing

systems only.

RATLER Loads with severity 4, DDEF
for ERRMSGE.

Two items to watch for are these:

- o The end of the monitor root (which is mapped one for one) must be less than .8000. In the example supplied, look for SUSPTERM \leq .8000.
- o If the released structure of the overlays have been altered, make sure that each is less than 3K in size (except for UMOV). PASS3 of M:MON reports the size of each overlay and this size must be 2.9K or less.

Step 8 - At this point, the :DOOSGEN account will contain everything necessary to generate a CP-V D00 PO tape. If other processors are desired on the PO tape by installations, they should be loaded in the :DOOSGEN account prior to DEFing the tape. (Note: All pre-P00 loaded processors and user-programs must be reloaded before they will execute under the DCO version of CP-V.)

Step 9 - If the installation desires the patch deck be included on the PO tape, restore the most recent patch file to :DOOSGEN and EDIT the file \$DEFJOB to include an ASSIGN command at lines 4.5 and 16.5:

```
!ASSIGN M:PATCH,(FILE,filename)
```

In account :DOOSGEN, BATCH \$DEFJOB.:DOOBO.
This will create two PO tapes, Serial
Number CPD0.

Step 10 - After booting the new CP-V PO tape, restore the library accounts from the release tapes. See Section 4 for the libraries supplied with the system.

5.5

How To Do A SYSGEN On and For A COC-LESS System

EDIT may be run as a ghost job from the OC. All steps are the same as above except as noted:

Step 1 - If the D00 Starter tape is used, add a

reconfiguration card to partition out the COC (i.e., :REMOVE A10).

Step 2-4 Run SUPER and FRES as ghost jobs from the OC. Be sure to type at least eight blanks after :DOOBO and CPVPROC when using FRES (see example 3). Use GJOB EDIT to insert a full name, account and priority into the various job cards which are contained in the JCL files in :DOOBO (\$GENJOB1, \$GENJOB2, \$LOCCTS, \$DEFJOB). Then use GJOB BATCH to submit \$LOCCTS.

Step 5 - Select the PASS2 control job \$P2NOCOC.:\$DOOBO and modify it to match the installation desired. Note that the file contains a modified LOCCT for M:MON, the CP-V monitor. This must be run after \$LOCCTS has finished.

Step 6 - Same.

Step 7 - Use GJOB BATCH to submit \$GENJOB1.

Step 8 - Same.

Step 9 - Use GJOB BATCH to submit \$DEFJOB.

Example 1 - Reconfiguration Deck for Starter Tape on a 560

```
:TYPE TY7012,A01
:TYPE LP3465,A02
:TYPE CR7140,A03
:TYPE 9T3345,A80,A81
:TYPE DP7271,EFO,EF1
:TYPE ME7611,A05
:END
*
!EOD
```

Example 2 - SUPER Setup for SYSGEN

Log on to :SYS,LBE

```
!SUPER
-M :SYS,LBE
--E$PR = C0; O$PR = C0
--OMCO = 64; BMCO = 64
--BM9T = 1; OM9T = 1
--BMPDISC = 32000; OMPDISK = 32000
--BMTSTORE = 32000; OMTSTORE = 32000
--EMPSTORE = 32000; OMPSTORE = 32000
```

```
--Carriage Return
-C      :DOOSGEN,CPV
--B$PR = 80; O$PR = 80
--BMCO = 64; OMCO = 64
--EM9T = 1; OM9T = 1
--EMPDISC = 32000; OMPDISC = 32000
--BMTSTORE = 32000; OMTSTORE = 32000
--BMTIME = 999; OMTIME = 999
--BMLO = 9999; OMLO = 9999
--Carriage Return
-E
!OFF
```

Example 3 - FRES Setup for SYSGEN

```
!JOB      :SYS,LBE,7
!LIMIT (9T,1),(CORE,50)
!FRES
+VOL
OODC
+SELECT
:DOOBO
CPVPROC
+END
```

6.0 INCOMPATIBILITIES

6.1 Accounting Change

All charge unit computation is carried internally in double precision, and the resultant change value is divided by ten thousand (10000). This requires a rescaling of the rates file in order to get comparable charges. No changes have been made to the structure of the rates file.

6.2 Password Field on !JOB Card

Batch jobs submitted locally or via remote batch must have the correct user password on the !JOB card. Jobs submitted via the !BATCH command do not require passwords.

The format for the !JOB command with a password is

```
!JOB acct,name[(ext.acctg.)][,pri];  
      [,wsn][,password]
```

For example, a !JOB card with password ZILCH is:

```
!JOB :SYS,LBE,F,,ZILCH.
```

7.0 RESTRICTIONS/KNOWN PROBLEMS

7.1 Disallowed Execution Priority

Execution priorities, as specified by SYSGEN and CONTROL, and modified by operator keyins must not be equal to X'FF'. The suggested (and default) value is X'FE'. If X'FF' is used it can result in a scheduling deadlock.

7.2 M:MON LOCCT Warning

Operation of the monitor is sensitive to the order of modules in the TREE for M:MON. New modules in D00 have order and location dependencies. LITERALS must fall wholly within page 0 (zero) of memory; TCATCH and TCATCHS, for multi-processing systems, must fall wholly within page 1 (one) of physical and virtual memory respectively.

8.C MAINTENANCE PROCEDURES

8.1 Patch Deck

In CP-V, corrections to problems are distributed to users via patches. Normally, only severity 1 or 2 problems will be patched. All others are closed as pending the next release.

A copy of the current patch deck which has been tested and used in a production environment is available as the file DOOPATCH, in account PATCH, on the dual Sigma 9 ("99") in El Segundo. This file is updated once a week and a patch area of 750 words is assumed. Each patch contains the date, SIDR number, and the card sequence number. New patches are also added to the beginning of the file CHRONO-DOO (also in account PATCH). This file contains all the patches in chronological order with explanatory notes about each set of patches. The patch files are distributed monthly to field offices on the Field Software Support Tape (FSST).

8.2 Problem Reporting

Difficulties encountered in CP-V DOO should be reported through the SIDR system. Use of the SIDR system is described in the PAL (Program Availability List) Manual.

The system catalog number for CP-V is 707000. Program catalog numbers to be used in submitting SIDRs should reflect the following functional areas:

<u>Prog.</u> <u>Cat. No.</u>	<u>Area Name</u>	<u>Included Functions</u>
707001	File Maintenance	BACKUP/FILL, FSAVE/ RESTORE
707002	File Management	All File Management functions for public and private files
707003	System Management	Scheduler, STEP, Memory Management,

		Swapper, SEGLOAD, LDLNK, ALLOCAT, GERM, and Real-Time
707004	Communications	COC and Remote Processing
707005	Recovery	RECOVERY, ANALYZE
707006	Software Checks	All software checks
707007	Operator Comm.	KEYIN
707008	SYSGEN	PASS1, PASS2, PASS3, LOCCT, and DEF
707009	DEBUG Tools	DELTA, XDELTA, PMD, swaps and user dump facilities
707010	LOADERS	LOAD, LINK, LYNX
707011	SYMBIONT	Symbionts and cooperatives
707012	Acctg. & Perf.	SUPER, ACCTSUM, LOGON, RATES, CONTROL, and UTSPM
707013	Monitor Services	PROCs, CALs, and CALPROC
707014	Initialization	SYSMAK, GHOST1, and DRSP
707015	Reliability	ELLA, ERRFIL, ERRLOG
707016	Command Proc.	CCI and TEL
707017	Utility Proc.	PCL, EDIT, DEFCON SYMCON, ERRMWR
707018	Miscellaneous	Error message file, Mailbox, and JIT
707019	Transaction Proc.	TP Terminal control, TP Queue initialization, management, and recovery

9.0 MONITOR SIZING9.1 General Core Requirements

The optional features of CP-V 000 are listed below with their resident monitor core requirements.

IRBT	IRBT Support	3 pages + 1 page* per IRET device
	2780/3780 & IRET Support	4-1/2 pages + 1 page* per 7605 device
	7670 & IRBT Support	4-1/2 pages + 1 page* per IRET device
	2780/3780 & 7670 & IRET Support	5-3/4 pages + 1 page* per 7605 device
	2780/3780 Support	2-1/2 pages + 1/2 page* per 7605 device
	7670 Support	1-1/2 pages
	2780/3780 & 7670 Support	3-3/4 pages + 1/2 page* per 7605 device
MP	Multi-Processing Support	1-1/2 pages + 1 page per active slave CPU
TP	TP Modules	2-1/2 pages
	Additional for Message Mode Lines	1-1/2 pages + 1 buffer page** per MOC line
	Additional for Queue	5 pages*

Also 2-5 pages of the TIC & TPC modules may be temporarily locked in memory during processing.

* These pages are subtracted from the maximum user size, but not from the swap space when the line is not logged on. Note that on large-core machines maximum user size is not affected by these pages since it is limited by other factors.

** These pages are only required when TP is active.

RA	Read Ahead	1 page
	For Table Size, see RASIZE description on :IMC option.	
RT	Real Time Modules	1-1/2 pages
	Additional for RESDF	number of pages specified by SYSGEN
	Additional for DYNRESDF	number of pages specified by SYSGEN*
FECF	Additional I/O Handler FECPIO	3/4 page

* These pages are subtracted from the maximum user size, but are not actually acquired until they are needed.

9.2 Monitor Table Sizes Based On SYSGEN ParametersKeyword

:SPROCS 9-1/2 words per shared processor entry
 + 1/2 word per entry if disk pack swapper
 + 1/2 word per entry if (BIG) specified
 (Maximum 10-1/2 words per entry)

:IMC 1 word per physical work page (PWP,n)*
 8-1/4 words per user (n+m+p) (MAXOL,n)+(MAXB,m)
 + 4-1/2 words per ghost job + (MAXG,p)
 22 words initially + 3 words per entry (RASIZE,n)
 + 1/4 word per entry if (BIG) specified

:COC 4 words per buffer (BUFFERS,n)
 6-3/4 words per line (LINES,n)
 1 word per buffer (RING,n)
 4 words per ECB (ECB,n)
 96 words per 2741 Translate Table
 1 byte per COC line (COUPLE)

:MON 2 words per entry (ENQ,n)
 34 words per MPOOL (MPOOL,n)
 40 words per CPOOL (CPOOL,n)
 9 words per IOQ (QUEUE,n)
 19 words per CFU (CFU,n)
 Patch space (n words) (MPATCH,n)
 1/4 word per physical page (CORE,n)
 + 1/4 word per physical page if (BIG) specified
 (m-X'62') words (ORG,m)
 308 words for Sigma 9 traps (SIG9)
 444 words for X560 traps (X560)
 45 words for Sigma 7 traps (SIG7) or (SIG6)
 1961 words for MINICOC (MINICOC)
 2718 words for COC (neither (TP) nor (MINICOC))
 3119 words for TPCOC (TP)*

* TP systems only.

:FECP	1/4 word per device on system + 36-3/4 words per FECP + 1-1/2 words per 7605 device emulated by FECP
:INTLB	1-1/4 words for every label (label,n,m)
:FRGD	12 words per entry (NINT,n) See RT size for RESDF and DYNRESDF
:SCPU	7 words per CPU **
:CHAN	2 words per CHANNEL (CIT entry)
:DEVICE	15 words per DEVICE (DCT entry) + 3-1/2 words per tape device (AVR tables) + 3-1/2 words per (PRIV) disk pack (AVR tables) + 8 words per public RAD or pack (HGP tables) + n words per private pack n = 20 for 7274 20 for 7271 35 for 7275 assuming default logical cylinder sizes + 5 words per RBT device + 7 words per RAD or disk pack model + 7 - 74 word CLIST per device PUNCH = 74 words DP = 12 words other = 6-8 words non-standard device- variable + 4 words per non-standard device type

** MP systems only

:RES 1/2 word per specified RES
 + 6-1/4 words per RES option
 + 1/4 word per (RES option)*
 (number of partitions)

:PART 6-3/4 words per partition

:LDEV 3/4 word per entry

:OPL 1-1/4 words per non-standard
 entry

:SDEVICE 3 words per symbiont device
 + (4-1/2 words)*(MXSTRM value)

10.0 CP-V D00 TEST PROCEDURES10.1 The Test Tape

The QUAC TEST tape (707000-76D00) is an FSAVE tape, INSN 00A0, containing the D00 test case library in account C7308398 and \$\$\$\$FILL. The test case library consists of job sequences and the files necessary to run them. Test cases are organized in groups which exercise a particular area of the system. These groups are described below.

88TPDMS	TP-DMS Sample Application
88TPSIM	TP-Simulator Tests
88TPTIC	TP-TIC/QUEUE Tests
88TPTPC	TP-TPC/QUEUE Tests
88TPPFM	TP-Performance Tests
99GROUP1	General Exerciser
99GROUPEB	Job Step Control
99GROUPEE	Multibatch Scheduler (partitions)
99GROUPEE1	Multibatch Scheduler (resources)
99GROUPEG	Swapper
99GROUPEGA	LDEV
99GROUPEIA	Monitor CALs
99GROUPEID	Shared Processors
99GROUPEJ	File Management
99GROUPEJA	ANS Tapes
99GROUPEJB	Private Pack Tests
99GROUPEKA	BACKUP, FILL, PURGE
99GROUPELH	DRSP
99GROUPENQ	ENQUEUE/DEQUEUE
99GROUPEPA	CCI
99GROUPEPQ	SUPER, CONTROL, SHOW
99GROUPEPRB	LOADER
99GROUPEPRMA	SYSICON/RMA
99GROUPEPRP	Restricted Processors
99GROUPEPRT	Real Time
99GROUPEPSA	PCL
99GROUPEPSC	BATCH
99GROUPEPT	Language Processors

A file 'LIBLIST' on the QUAC TEST tape contains the names and descriptions of the individual tests within each group. The test cases are identified by using the test name as the extended accounting information of the !JOB command. Tests that should abort are designated as such in the 'LIBLIST' file.

Most test cases are self-sufficient and rely on operator intervention only for tape mounting and key-in responses. Where operator intervention is required (as in the TP and RT tests), comprehensive instructions are displayed on the operator's console.

10.2 Use of the Test Tape

The following job is used to restore the QUAC TEST tape library, to authorize accounts, and initialize the system controls.

```
!JOB :SYS,LBE,7
!LIMIT (9T,1),(CORE,50)
!FRES
+VOL
OOAO
+END
!BATCH 99QUAC.C7308398
!FIN
```

Due to the special system control parameters necessary for certain tests, only one group should be run at a time. A group is entered into the batch stream with a:

```
!BATCH groupname.C7308398
```

command. For example, to enter the PCL test cases use:

```
!JOB :SYS,LEE,7
!BATCH 99GROUPSA.C7308398
!FIN
```

Test cases can be run selectively from within groups by using the DUCK program on-line. A description of how to use DUCK is in the file 'DUCKHELP' on the QUAC TEST tape. To run DUCK, copy it from account C7308398 into account :SYS and then !DUCK will start the program on-line.

10.3 Updating the Test Library

Test cases can be added or deleted by editing the relevant 88 or 99 GROUP. See the Time Sharing Reference Manual (90-09-07G) for Edit procedures. A new test tape can be generated by the following commands:

```
!JOB :SYS,LEE,7
!BATCH QUAC.C7308398
!FIN
```

Some tests require processors and libraries which are not distributed with the CP-V releases. A list of the processors and libraries included in the D00 release can be found in Section 4. The installation can create a test tape containing all the necessary processors by restoring the QUAC tape under its present system and running the following (sample) job:

```
!JOB
!LIMIT (9T,1)
!MESSAGE **USE OUTPUT TAPE#XXXX,RING IN**
!FSAVE
+DUMP
+VCL
OOAO
+SELECT
$$$$FILL
:SYS DICTNARY          (required for MANAGE)
:SYS DMSDUMP
:SYS DMSINIT          DMS Modules
:SYS DMSLOAD
:SYS EDMSDUMP
:SYS EDMSFDP
:SYS EDMSINIT        EDMS Modules
:SYS EDMSLOAD
:SYS EDMSSUMS
:SYS FILEUP          (required for MANAGE)
:SYS MANAGE
:SYS REPORT          (required for MANAGE)
:SYS RETRIEVE        (required for MANAGE)
C7308398
COBLIE
DMSLIB
EDMSLIB
+END
```

APPENDIX AEXTRACT

EXTRACT is a processor designed to produce tech manual type documentation and reports using specially formatted comments imbedded in the assembly listings. These special comments are all comment lines with a code letter in column two and asterisks in columns one and three as well as all REFs, DEFs and SREFs that have a non-blank comment field. A *,* is used for continuation.

The codes are:

- *M* a one line description of each module.
- *P* a paragraph or two describing in brief the purpose of a module and giving an overview of its operation.
- *F* a brief description of each major function within a module.
- *D* a detailed description of a routine in terms of such things as register usage, input, output, interfaces, etc.
- *E* a description of an error condition at the point where it is detected.
- *S* a description of a Screech Code at the point it is called.
- *O* an explanation of some communication with the operator at the point where it is sent.
- *C* a description of what has changed for this version of the operating system.
- *K* a description of some concept or term that is useful in understanding the operation of a module.
- *X* X-type comments are all REFs, DEFs and SREFs.

EXTRACT performs two major tasks; first, it calls all of the special comments from UTILIST compressed files of the assembly listings to form a data base, then it produces reports on the desired modules and codes from this data base.

EXTRACT commands have the form:

COMMAND (OPTION),(OPTION)...

The command may be continued at any point except within a word by ending the command with a semi-colon(;). Anything after the semi-colon will be ignored. The commands may be abbreviated to two letters and are:

EXTRACT create data base from UTILIST compressed files. The legal options are CODES, MODULES, DATA and SOURCE (see option descriptions to follow).

REPORT generate a report from the data base. The legal options are DATA, CODES, MODULES, SORT, ORDER, HEADING, LINES and FORMAT.

DELETE remove specified comments from data base. The smallest unit that can be deleted is all of one type from one module. The legal options are DATA, CODES and MODULES.

ADD add specified comments to an already existing data base. Due to the structure of the data base, it may be more efficient to EXTRACT the comments to be added into a second data base and use PCL to concatenate the two files. The legal options are DATA, CODES, MODULES, and SOURCE.

The options are as follows:

- o (DATA,name,account,password) - specifies the name of the data base. The running account is the default.
- o (CODES,code letter[,code letter]...) or (CODES,GLOSSARY) or (CODES,ALL) - specifies which types of special comments are selected for this command. The legal code letters are M,P,F,D,E,S,C,K,O,X. GLOSSARY is used only in selecting codes for the report command and causes all DEFs, Ms and Ks to be reported. ALL is the default.
- o (MODULES,name or range[,name or range]...) or (MODULES,EXDATA) or (MODULES,ALL) - specifies which modules are selected for this command. A maximum of ten names or ranges may be specified where a name is simply the name of a module and range is two module names separated by a dash (-), e.g., FILE1-FILE4. EXDATA implies that a file EXDATA exists in the running account and it contains a list of the modules to be used. ALL is the default.
- o (SOURCE,account) or (SOURCE,LT#xxxx,account) - gives the labeled tape serial number and account or simply the account of the UTILIST compressed LU files to be searched for comments.
- o (SORT,sort parameter[,sort parameter]...) - specifies the order for the selected comments to be reported. The four legal sort parameters are:

CODE	special comment type
MODULE	module name
LINE#	line number within the module
NAME	name of the module, routine, screech code or other item being described by the comments

The first parameter given is the primary sort key, the second one given is secondary, etc. SORT is required for all report commands.

- o (ORDER,code letter [,code letter]) - specified the order in which the requested codes are to be sorted. The default is alphabetical (C,D,E,F,K,M,O,P,S,X) and any codes specified in the CODES option but

not in the ORDER option will be ordered alphabetically after all those specified.

- o (HEADING,text1,sort parameter,text2) - gives a heading to appear at the top of each page of output. Text1 is a 1-8 character field that appears at the far left of the heading. The first four characters of the current value of the sort parameter that is requested will appear in columns 10-13 of the heading. Text 2 is a 1-80 character field that begins in column 15 and makes up the main body of the heading.
- o (LINES,xxx) - specifies the number of lines per page in the report.
- o (FORMAT,sort parameter [,sort parameter]...) - specifies that a top of form is to be issued when the value of the specified sort parameter changes.

EXAMPLES

To create a data base file named DATA..SAFE containing all comments from all the files in the running account:

```
>EX (DATA,DATA,,SAFE)
```

To create a data base DATA containing selected codes and modules from UTILIST compressed files on labeled tape #LIST:

```
>EX (DATA,DATA),(CODES,M,P,X),(MODULES,;
>FILE1,FILE3-FILE7),(SOURCE,LT#LIST)
```

To produce a report from a data base DATA on modules listed in the file EXDATA in the running account. The report is to contain codes M,P,F,D in that order and sorted so that the report is ordered by the names of the items described:

```
>RE (DATA,DATA),(CODES,D,M,P,F),(ORDER,M,P,F,D),;
>(MODULES,EXDATA),(SORT,NAME,CODE),(HEADING,;
>REPORT1,NAME, THIS IS REPORT ONE)
```

To produce a glossary from all the modules in the data base DATA sorted by code Ms first then Ks and DEFs, and ordered by module within each code and by name within each module. The report is to have 50 lines per page and each code group should start at the top of a new page.

```
>RE (DATA,DATA),(CODES,GLOSSARY),(SORT,CODE,;
>MODULE,NAME),(ORDER,M,K,S),(LINES,50),;
>(FORMAT,CODE)
```

To delete the P commands of module FILE1 from data base DATA:

```
>DE (DATA,DATA),(CODES,P),(MODULES,FILE1)
```

To add the F and D commands from a range of files in account :LIST to data base DATA:

```
>AD (DATA,DATA),(CODES,F,D),(MODULES,FILE2-FILE9);  
>,(SOURCE,:LIST)
```