



XXDP + DEC/X11 Programming Card

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XXDP + DEC/X11 BOOTSTRAPS

Method	DLDP +	DXDP +	DYDP +
Toggle	LA	LA	LA
	010000	001000	002000
	DEP	DEP	DEP
	012737	005000	012701
	000014	012701	177170
	174400	177170	012700
	000001	105711	100240
	LA	001776	005002
	010000	012711	012705
	START	000003	000200
	WAIT A	005711	012704
	FEW SEC	001776	000401
	HALT	100405	012703
	LA	105711	177172
	000000	100004	030011
	START	116120	001776
		000002	100440
		000770	012711
		000000	000407
		005000	030011
		000110	001776
		LA	100433
		001000	110413
		START	000304
			030011
			001776
			110413
			000304
			030011
			001776
			100422
			012711
		000403	
		030011	
		001776	
		100415	
		010513	
		030011	
		001776	
		100411	
		010213	
		060502	
		060502	
		122424	
		120427	
		000007	
		003737	
		005000	
		005007	
		000000	
		LA	
		002000	
		START	

Method	DKDP+	DTDP+	MTDP+	MMDP+
BM792	LA 773100 SR 777406	LA 773100 SR 777344		
MR11-DB	LA 773110 START	LA 773120 START	LA 773136 START	
BM873-YA	LA 773010 START	LA 773120 START	LA 773050 START	
BM873-YB	LA 773030 START	LA 773070 START	LA 773110 START	LA 773150 START
Toggle	LA 010000 DEP 012737 000005 177404 000001 LA 010000 START wait 1 sec LA 000000 START	LA 777342 DEP 004003 DT rewinds EXAMINE DEP 000001 LA 000216 DEP 012737 000005 177342 000777 LA 000216 START	LA 010000 DEP 005137 172524 012737 060011 172522 000777 012737 060003 172522 000777 LA 010000 START wait 1 sec HALT LA 010014 START wait 1 sec HALT LA 000000 START 012711	LA 010000 DEP 012737 001300 172472 012737 177777 172446 012737 000031 172440 105737 172452 100375 012737 177400 172442 005037 172444 042737 000007 172452 012737 000071 172440 105737 172440 000100 000375 000137 000000 LA 010000 START

CTDP+	DPDP+	DBDP+	DSDP+
LA 773300 START			
	LA 773154 START		
LA 773230 START	LA 773100 START		
LA 773524 START	LA 773350 START	LA 773320 START	LA 773000 START
LA 001000 DEP 012700 177500 005010 010701 062701 000052 012702 000375 112103 112110 100413 130310 001776 105202 100772 116012 000002 120337 000000 001767 000000 000755 005710 100774 005007 017640 002415 112024 LA 001000 START	LA 001000 DEP 012705 176716 012715 177400 012745 000005 105715 100376 005007 LA 001000 START	LA 010000 DEP 012700 176700 012710 000023 005060 000034 005060 000006 012760 177400 000002 012710 000071 105710 100316 005007 LA 010000 START	LA 0010000 DEP 012705 172044 012745 177400 012745 000071 032715 100200 001775 100762 005007 001000 START

XXDP+ MONITOR COMMANDS

NOTE: Items in parentheses are optional.

R FILNAM (ADDR)	Load and start program at specified address. (Address defaults to XFR address of program.)
L FILNAM	Load program.
S (ADDR)	Start program at specified address. (Address defaults to XFR address of program.)
C FILNAM(/QV)	Execute chain file. (/QV gives optional quick verify mode.)
D(/L/F)	Directory (optional on printer(/L) or in short form (/F).)
F	Set console fill count.
E #	Enable alternate system device.
H(/L)	HELP File (optional on printer.)

XXDP+ MONITOR ERRORS

? BAD VALUE	A nonnumeric value was entered as a number.
? CKSUM ERR	Checksum error occurred during a load.
? LOOKUP ERROR FILENAME	Nonexistent file or device driver. The filename searched for is printed.
? ODD ADR	Invalid address. Must be an even address.
? RD-DEV ERR	Device error on input device.

UPD2 COMMANDS

NOTE: If no DEV: is specified, defaults to system device (booted device).

CLR	Clear memory.
ZERO DEV:	Zero device.
SAVM DEV:	Save monitor to disk.
SAVE (DEV:)FILNAM.SAV	Save monitor to tape.
XFR	Set transfer address.
LOAD (DEV:)FILNAM.EXT	Load program.
DUMP (DEV:)FILNAM.EXT	Dump program.
CORE	Display core limits for dump.
HICORE ADDR	Set HICORE limit for dump.
LOCORE ADDR	Set LOCORE limit for dump.
DIR (DEV:)(FILNAM.EXT)	Directory (optional for a particular file).
PATCH (DEV:)FILNAM.EXT	Patch device file.
ASG DEV: = #	Assign logical name.
READ (DEV:)FILNAM.EXT	Read file for validity.
PIP (DEV:)FILNAM.EXT = (DEV:)FILNAM.EXT(/F)	Transfer file. (The /F switch (for "fast") causes UPD2 to write files to tape without checking to see whether they are already present, thus potentially duplicating the name.)

EOT (DEV:)	Write end of tape mark.
DEL DEV: FILNAM.EXT	Delete file.
REN (DEV:)FILNAM.EXT = (DEV:)FILNAM.EXT	Rename file.
DO FILNAM.EXT	Execute command file. (It must be on system device, and must not contain "EXIT" CMD.)
DRIVER DEV:	Load R/W driver into core.
BOOT (DEV:)	Boot system.
PRINT (DEV:)FILNAM.EXT	Print file (on LPT).
TYPE (DEV:)FILNAM.EXT	Type file (on TTY).
MOD (ADDR)	Modify core.
COPY DEV: = DEV:	Copy volume (need like devices).
EXIT	Return control to monitor.

UPD1 COMMANDS

Same as UPD2, but only the following commands may be used:

CLR
XFR
MOD
LOAD
DUMP
CORE
HICORE
LOCORE
DEL
BOOT

UPD1/UPD2 ERRORS

? INVALID DEVICE	Invalid device specified for command given.
? INVALID ADDRESS	Invalid address. Must be even and within existing LOCORE and HICORE limits.
? INVALID NAME	Invalid file name. No special characters allowed. A through Z and 0 through 9 are only valid characters. Also occurs if wild cards are used in a command that does not allow it.
? NON-EXISTENT FILE	Nonexistent file. File does not exist in device directory.
? DELETE OLD FILE	Delete old file before giving command that would create file with same name.
? RD/WT DEV ERR	Device error on either input or output device. Check that output device is write-enabled.
? CHECKSUM ERROR	Checksum error during LOAD command.
? END-OF-MEDIUM	End-of-medium. Occurs during input operations when the program attempts to input and the file is at an end. Serious problem. File in storage is probably wiped out.
? PROGRAM OVERFLOW	Program is too large to load within existing buffer space.
? INVALID COMMAND	Command entered not recognized by the utility program.
? "DO" FILE MUST BE ON SYSTEM DEVICE	Command file for the DO command must be on the system or load device.
? LOGICAL DEVICE NOT ASSIGNED	Command used a logical device mnemonic that had not been assigned to a physical device mnemonic via the ASG command.
? NO DEVICE DEFAULTS ALLOWED	Device mnemonic is missing from a command that requires it.

XTECO COMMANDS

DIR (DEV:)(FILNAM.EXT)	Directory (optional, of specific file).
PRINT (DEV:)FILNAM.EXT	Print file (on LPT).
TYPE (DEV:)FILNAM.EXT	Type file (on TTY).
EDIT (DEV:)FILNAM.EXT = (DEV:)FILNAM.EXT	Edit ASCII file (optionally, change DEV: or FILNAM.EXT).
TECO (DEV:)FILNAM.EXT	Edit single file in place (no name or device changes).
TEXT (DEV:)FILNAM.EXT	Create new text file.
(-)(#)C	Move pointer by characters.
(-)(#)L	Move pointer by lines.
J	Move pointer to start of text in memory.
ZJ	Move pointer to end of text in memory.
S STRING	Search for character sequence.
N STRING	Search to end-of-file for sequence.
(#)T	Type lines of text.
(#)D	Delete characters.
(#)K	Delete lines of text.
I	Insert text.
A	Append more text from file into memory.
ESC	Terminate command.
ESC ESC	Terminate last command and execute any command.
↑C	Return to command mode, abort current file.
↑U	Restart command sequence, clear buffer.

RUBOUT	Ignore last character typed.
EXIT	Return control to monitor.
↑O	Stop terminal output.
EX	Output file and return to non-edit mode.

XTECO ERRORS

Error messages generated by XTECO are included in those generated by the update programs.

In addition, one error message is generated by XTECO when a search for a character string (by either the S or N command) fails. In that case XTECO types:

NOT FOUND (ASCII STRING)

PATCH COMMANDS

BOOT DEV:	Boot specified device.
CLEAR	Clear input table.
EXIT	Return to XXDP + monitor.
GETM DEV:FILNAM.EXT	Load DECX11 map file into memory.
GETP DEV:FILNAM.EXT	Load saved input table.
KILL ADDR	Delete specified address from input table.
MOD ADDR	Enter specified address in input.
MOD MON MODNAM ADDR MOD CP X MODNAM ADDR	Table and specify new contents.
PATCH DEV:FILNAM.EXT = DEV:FILNAM.EXT	Patch specified input file to produce specified output file.
SAVP DEV:FILNAM.EXT	Save input table.
TYPE	Print input table on terminal.

PATCH ERRORS

? ADDRESS NOT FOUND	The specified address does not exist as an entry in the input table.
? CHECKSUM ERROR ON INPUT FILE	A checksum occurred while attempting to read the specified input file.
? COMMAND NEEDS ARGUMENT	The command typed by the operator requires an argument, but none was given.
? DELETE OLD FILE	The specified output filename already exists.
? END-OF-FILE	While reading a file, the end of the file was encountered before it was expected.
? END-OF-MEDIUM	An end-of-medium indication was detected during a file transfer, probably indicating a hardware error.
? FILE NOT FOUND	The specified input filename does not exist.
? INPUT TABLE EMPTY	The specified command cannot be executed because there are no entries in the input table.
? INPUT TABLE FULL	The input table is full and cannot accept any more entries.
? INVALID COMMAND	The specified command does not exist.
? INVALID CPU SPECIFICATION	The specified multiprocessor CPU does not exist.
? INVALID FILE NAME	The specified filename does not have the correct format.
? INVALID MODULE NAME	A DEC/X11 module name was incorrectly specified.

? MODULE NAMES NOT
ALLOWED WITHOUT
MAP FILE

The operator attempted to specify a module name in the MOD command without first loading the proper MAP FILE.

MODULE NAME
NOT FOUND

The specified module name does not exist within the DEC/X11 runtime exerciser.

? MUST BE EVEN

The operator attempted to specify an odd number as an address.

? MUST BE OCTAL

The operator attempted to type a nonoctal number.

? NEED NUMBER

The operator omitted a numeric value from a command that expected one.

? NO DEVICE
DEFAULTS

Default device names are not allowed.

? NOT ENOUGH
ROOM TO
LOAD DRIVER

The driver for the specified device will not fit into memory.

? NUMBER TOO BIG

The value typed was too large for its intended purpose.

? OPTION MODULE NAME
NOT FOUND

The specified multiprocessor CPU does not exist.

? WRONG MAP FILE
FOR MONITOR
TYPE

The MAP FILE in memory does not have the specified monitor type.

NONSTANDARD CSR

If your system device has a nonstandard CSR, patch location 20 of the monitor and location 24 of the read/write driver to the correct value. In patching the monitor, it is necessary to patch the .SYS file, then do a SAVM to the disk.

MONITOR AND DEVICE DRIVER NAMING CONVENTIONS

Device Mnemonic	Monitor File	Driver File	Devices Supported
CT	HMCT???.SYS	HDCT???.SYS	TA11/TU60
DB	HMDB???.SYS	HDDB???.SYS	RP04/5/6
DD	HMDD???.SYS	HDDD???.SYS	DL11/TU58
DK	HMDK???.SYS	HDDK???.SYS	RK11/RK05
DL	HMDL???.SYS	HDDL???.SYS	RL11/RL01
DM	HMDM???.SYS	HDDM???.SYS	RK611/RK06/7
DR	HMDR???.SYS	HDDR???.SYS	RM02/3
DS	HMDS???.SYS	HDDS???.SYS	RS03/4
DT	HMDT???.SYS	HDDT???.SYS	TC11 DECTAPE
DX	HMDX???.SYS	HDDX???.SYS	RX11/RX01
DY	HMDY???.SYS	HDDY???.SYS	RX211/RX02
MM	HMMM???.SYS	HDMM???.SYS	TM02/TM03 TAPES
MT	HMMT???.SYS	HDMT???.SYS	TM11 TAPES
KB		HDKB???.SYS	PPT RDR (LOW SP)
PT		HDPT???.SYS	PPT PCH (LOW SP)
PR		HDPR???.SYS	PPT RDR (HIGH SP)
PP		HDPP???.SYS	PPT PCH (HIGH SP)

Tape monitors must be given the extension .SAV when placed at the start of a magtape for booting, and .SYS when residing in the normal file area on either tape or disk.

PROGRAM NAMING CONVENTIONS

Example: DCFPKA#

D=	Diagnostic program, is not used in naming a program.
C=	A = 11/05, 15, 20 Processors B = 11/40 Processor C = 11/45 Processor E = 11/70 Processor F = 11/34 Processor G = 11/04 Processor K = 11/44 Processor V = 11/03,23 Processors Q = 11/60 Processor Z = ALL Processors x = DECX/11 Exerciser software
FP=	Option designation
K=	A through Z = Program designation 0 through 9 = Overlay designation
A=	A through Z = Revision designation
#=	# = MCN Level 0 = No MCN issued.

FORMATTING

TC11/TU56 L YPTC??(CR)
Tape on drive zero.
(Remote and write enabled)
Write all and write T&M enabled.
S 600 (CR)
1ST pass tape halts.
Disable T&M.
Press CONTINUE
3rd pass tape halts.
Formatting complete.
Disable write all.

RK11/RK05 L ZRKI?? (CR)
Mount disk(s) in drive(s).
Write enabled.
S 200 (CR)
Program types heading.
Type 3 (CR).
Set SR bit(s) to correspond to drive #(s).
Press CONTINUE.
Program types drive number(s).
Program types "PACK GOOD".
Formatting complete.

RP11/RP03 L ZRPD?? (CR)
Disk pack on drive zero.
S 200 (CR)
Program types "UNIT."
Type 0(CR).

PROGRAM TYPES: Set the FORMAT ENABLE switch.
Set the RP 11 WRITE ENABLE switch.
Set the SELECTED UNIT WRITE ENABLE
switch.
Strike any teletype key when ready.

PROGRAM TYPES: Reset the FORMAT ENABLE switch.
Strike any teletype key when ready.

 Test complete.

RH11/RP04 L ZRPL?? (CR)
Disk pack on drive zero.
Disable WRITE PROTECT.
S 200 (CR)

Program types: You type:

DRIVE 0 (CR)
22 SECTOR D
PROGRAM MODE D
STARTING CYL, TRK D
ENDING CYL, TRK D
SELECT PATTERN D

FORMAT COMPLETE

CREATING A NEW XXDP + MEDIUM (OTHER THAN MAGTAPE OR CASSETTE)

NOTE: For DD, substitute device name; For ??, substitute revision and patch level.

- ZERO DD1: Zero directory on new medium.
- LOAD
DD0:HMDD?? .SYS Load device monitor.
- SAVM DD1: Save in monitor area of new medium.
- DUMP
DD1:HMDD?? .SYS Save in program area of new medium.
- LOAD
DD0:HDDD?? .SYS Load device driver.
- DUMP
DD1:HDDD?? .SYS Save in program area of new medium.
- PIP DD1:HUDI?? .SYS =
DD0:HUDI?? .SYS Transfer directory program.
- PIP DD1:HSAA?? .SYS =
DD0:HSAA?? .SYS Transfer diagnostic supervisor.
- PIP DD1:UPD? .BIN =
DD0:UPD? .BIN Transfer update utilities.
- PIP DD1:XTECO .BIN =
DD0:XTECO .BIN Transfer XTECO utility.

PIP as many other monitor and driver files as desired.

CREATING A NEW XXDP + MEDIUM ON CASSETTE

- ZERO CT1: Zero directory on new medium.
- LOAD
CT0:HMCT?? .SYS Load device monitor.
- SAVE
CT1:HMCT?? .SAV Save in monitor area of new medium.
- DUMP
CT1:HMCT?? .SYS Save in program area of new medium.
- LOAD
CT0:HDCT?? .SYS Load device driver.
- DUMP
CT1:HDCT?? .SYS Save in program area of new medium.
- PIP CT1:HUDI?? .SYS =
CT0:HUDI?? .SYS Transfer directory program.

- PIP CT1:HSAA??.SYS =
CT0:HSAA??.SYS Transfer diagnostic supervisor.
- PIP CT1:UPD?.BIN =
CT0:UPD?.BIN Transfer update utilities.
- PIP CT1:XTECO.BIN =
CT0:XTECO.BIN Transfer XTECO utility.

PIP as many other monitors and driver files as desired.

CREATING A NEW XXDP + MEDIUM ON MAGTAPE

NOTE: MT is for TM11 magtapes, MM is for TM02/TM03; both must be SAVED. This example assumes the system device is MT0, and new media is MT1.

- ZERO MT1: Zero directory on new medium.
- LOAD
 MT0:HMMT??.SYS Load device monitor.
- SAVE
 MT1:HMMT??.SAV Save in monitor area of new medium.
- LOAD
 MT0:HMMM??.SYS Load device monitor.
- SAVE
 MT1:HMMM??.SAV Save in monitor area of new medium.
- DUMP
 MT1:HMMM??.SYS Save in program area of new medium.
- LOAD
 MT0:HMMT??.SYS Load device monitor.
- DUMP
 MT1:HMMT??.SYS Save in program area of new medium.
- PIP MT1:HUDI??.SYS =
 MT0:HUDI??.SYS Transfer directory program.
- PIP MT1:HSAA??.SYS =
 MT0:HSAA??.SYS Transfer diagnostic supervisor.
- PIP MT1:UPD?.BIN =
 MT0:UPD?.BIN Transfer update utilities.
- PIP MT1:XTECO.BIN =
 MT0:XTECO.BIN Transfer XTECO utility.

PIP as many other monitors and driver files as desired.

DEC/X11

GETTING STARTED

Needed	XXDP + medium with DECX/11 Monitor Library and DECX/11 Device Option Modules. OR Paper tape with DEC/X11 Monitor Library and Device Option Module paper tapes.
Required Software	DEC/X11 Monitor Library (XMON???.LIB) DEC/X11 Device Option Module (X?????.OBJ) Configurator/Linker program (DXCL)

NOTE: DEC/X11 should be used with XXDP+ for ease (much easier than paper tapes). DEC/X11 should reside on medium which contains XXDP+ monitor for ease of booting.

Loading Under XXDP+	<ul style="list-style-type: none">• Boot appropriate XXDP+ monitor.• Monitor will self-start and identify itself.• Run configurator/linker program.
Loading Under Papertape	<ul style="list-style-type: none">• Load the absolute loader.• Load the appropriate configurator/linker program.• The linker will self-start.
Reference Documentation	<ul style="list-style-type: none">• DEC/X11 User's Manual.• DEC/X11 Cross-Reference Manual.• XXDP+ User's Manual.

CONFIGURATOR/LINKER COMMANDS

Legend for configurator/linker commands

ADDR - Maximum 6-digit octal address

DEVI - Input device

DEVO - Output device

FILNAM.EXT - Should only be a .BIC or .BIN extension

MODNAM - 4-character option module name

MONFIL.LIB - Monitor library

NUMBER - Maximum 5-digit octal number

NOTE: Option module name ABCD is filename XABCD.OBJ.

Configure Mode Commands Entered by CNF OR CNF/NP

BR1 (NUMBER)	Enter BR1 level.
BR2 (NUMBER)	Enter BR2 level.
CL	Clear configuration table.
CTRL C	Abort current prompting sequence.
DVA (ADDR)	Enter device address.
DVC (NUMBER)	Enter device count.
EX	Exit configure mode.
KI	Delete current entry in configuration table.
MDL	Type current module entry contents.
MDL MODNAM	Enter module name in configuration table.
MOD ADDR	Open location for modification.
MON MONNAM	Enter monitor name in configuration table.
NXT	Point to next entry in configuration table, and type contents.
POINT (MODNAM)	Find module name and type entry contents.
SR1 (NUMBER)	Enter SR1 value.
SR2 (NUMBER)	Enter SR2 value.

SR3 (NUMBER) Enter SR3 value.

SR4 (NUMBER) Enter SR4 value.

VCT (ADDR) Enter device vector address.

Configure Mode Switch

/NP During configure mode, inhibit operator prompts.

Nonconfigure Mode Commands

BOOT (DEV:) Loads block 0 of device starting at LOC 000000 (Boots the device).

CHECK
DEVI:FILNAM.EXT Checks file for checksums and correct object format.

CNF Enter configure mode.

FILL To change, fill parameters for console device.

GETC
DEVI:FILNAM.CNF Get configuration table from device specified (CNF is the suggested extension).

LINK DEVO:FILNAM.BIC<DEVI:MONFIL.LIB

Link and output exerciser onto device specified, from device and monitor library specified. (.EXT can only be a .BIN or .BIC extension).

PRINTC List configuration table on lineprinter.

PRINTM
DEVI:FILNAM.MAP Retrieve load map from device specified, and list on lineprinter (MAP is the suggested extension).

SAVC
DEVO:FILNAM.CNF Store configuration table on device specified (CNF is the suggested extension).

SAVM
DEVO:FILNAM.MAP Store load map on device specified (MAP is the suggested extension).

TYPEC List configuration table on console.

TYPEM
DEVI:FILNAM.MAP Retrieve load map from device specified and list on console (MAP is the suggested extension).

Link Command Switches

/LP	Direct output to lineprinter.
/MLP	Direct link map to be printed on lineprinter.
/MP	Direct link map to be printed on console.
/SZ	Inhibit checksum error if file sync not found, allowing retry.

SYSTEM SIZE INFORMATION

Core Size	User Response
4K	20000
8K	40000
12K	60000
16K	100000
20K	120000
24K	140000
28K OR GREATER	160000 (MAX. INPUT)

CONFIGURATOR/LINKER ERRORS

CKSMER	Checksum error when reading a formatted binary block, fatal error.
DEVFUL	Output device full.
EOM	End-of-medium, or end-of-file.
ERR01	Symbol table error, program error.
ERR02	Global search failure in RLD.
ERR03	PC MOD command not in RLD.
ERR04	OBJ module does not start with GSD, BAD module.
ERR05	First entry in GSD not OBJ module name, BAD module.
ERR06	Cannot find section name specified in RLD.
ERR07	Module name is missing from symbol table.
ERR09	Jump table index out of range.
ERR12	Load module output error.
IN DEVERR	Input device error

INV ADR/DATA	Invalid address or data
INVCMD	Invalid command
INVDEV	Invalid device
INVNAM	Invalid name
INVSU	Invalid switch
NEXFIL	File specified does not exist on medium.
OUT DEVERR	Output device error.
OVERFLOW	Block size of input file too large for program's input buffer.
? CNF TABLE FULL	Configuration table full. Only 20 or 40 entries allowed (depending on configurator/linker used).
? COR EXCD	Core exceeded; the run-time exerciser exceeds the core size of the system.
? INVCMD NOT IN CNF MODE	Command must be given while in configure mode.
? NOT Found	Occurs during POINT command while making or editing a configuration table; pointed to either nonexistent name or pointer is past its entry in the C-table.

RUN-TIME EXERCISER COMMANDS

Legend for RTE Commands

NAME -	5-character device option module name.
ADDRESS -	A number that designates a location where information is stored.
NUMBER -	For SWR: A number 16 bits or less. For FILL: two octal numbers. The first code the octal code for ASCII character to be followed by nulls. The second is the number of nulls to be outputted.

NOTE: Denotes commands that are only valid in command mode (CMD>).

COFF	Disable system's cache memory.
CON	Enable system's cache memory.
DES	Deselect all option modules.

DES NAME	Deselect specified option module.
EXAM	Output contents of last location examined.
EXAM ADDRESS	Output contents of location specified.
EXAM NAME ADDRESS	Output specified location of named module.
FILL	Output current fill character/fill count.
FILL NUMBER NUMBER	Replace contents of fill character/fill count location and output same.
* KTOFF	Disable memory management.
* KTON	Enable memory management.
LPOFF	Disable terminal output to lineprinter.
LPON	Enable terminal output to lineprinter.
MAP	Type map of modules in exerciser, indicate module starting address and module status.
MAP NAME	Same operation as above, but only output map for module specified.
* MOD	Used to examine and/or modify the contents of last location modified. After examination or modification LF opens next location, CR closes.
* MOD ADDRESS	Same operation as above: opens address specified.
* MOD NAME ADDRESS	Same operation as above, opens location specified by both the module name and its associated relative address argument.
* MOFF	Disable UNIBUS map (Map Box).
* MON	Enable UNIBUS map (Map Box).
POFF	Disable parity memory and/or ECC memory.
PON	Enable parity memory and/or ECC memory.
ROTOFF	Disable write buffer rotation.
ROTON	Enable write buffer rotation.

* RUN	Start run-time exerciser. Only those modules selected and eligible to run are started.
* RUN ADDRESS	Same operation as above, plus optional address causes the relocatable portion of the RTE to relocate to specified address and start.
* RUNL	Start exerciser and inhibit relocation. Only those modules selected and eligible to run are started.
* RUNL ADDRESS	Same operation as above, plus the relocatable portion of the RTE will relocate to the specified address and stay locked. No further relocation will occur.
SEL	Select all option modules for execution.
SEL NAME	Select specified module for execution.
SUM	Output summary message for each module in run-time exerciser.
SUM NAME	Output summary message for module named.
SWR	Output present contents of software switch register.
SWR NUMBER	Replace contents of SWR with specified number. The command will output changed contents of SWR.

Valid Characters

A THROUGH Z	Any alpha character
0 THROUGH 9	Any numeric character
SPACE	Space key
LF	Line feed key
CR	Carriage return key - Normal terminator
RUBOUT OR DELETE	RUBOUT KEY

Control Characters

CTRL C	CTRL and C Keys: Abort and go to CMD mode (ΛC).
CTRL U	CTRL and U Keys: Delete current keyboard input string (ΛU).
CTRL O	CTRL and O Keys: Suppress current message being printed (ΛO).

SOFTWARE SWITCH REGISTER

Bit	Operation
SR00 = 0	Disable printing of one-character NULL message.
SR00 = 1	Enable printing of one-character NULL message.
SR08 = 0	Cycle the exerciser once through all memory, then allow random relocation.
SR08 = 1	Cycle the exerciser through memory by the constant offset value, while inhibiting random relocation.
SR09 = 0	Print the RELOCATED TO message.
SR09 = 1	Inhibit the RELOCATED TO message.
SR10 = 0	Report only the first three data errors occurring within a transferred block.
SR10 = 1	Report all data errors.
SR12 = 0	Inhibit the END-OF-PASS printouts.
SR12 = 1	Permit the END-OF-PASS printouts.
SR13 = 0	Permit the error and module printouts.
SR13 = 1	Inhibit the error and module printouts.
SR14 = 0	Drop a module after its 20th hard error or 40th soft error. ("MODULE DROPPED" message is printed prior to actually dropping module.)
SR14 = 1	Inhibit the dropping of the module after the 20th hard error, or 40th soft error.
SR15 = 0	Inhibit dropping the module after one error.
SR15 = 1	Drop the module after one error, and following a "MODULE DROPPED" printout.

RTE ERRORS

INVALID COMMAND - TEXT	Command not recognized by monitor. Will include the command in message where text is the illegal command.
INVALID COMMAND IN RUN MODE	Command not supported in BSY mode.
INVALID MODULE NAME	Specifies nonexistent module.
INVALID ADDRESS	Specifies nonexistent address.
MUST BE EVEN ADDRESS	Odd address specified.
INVALID OR MISSING ARGUMENT	Specifies that either an argument is improperly included, or is missing.
NOT AN OCTAL NUMBER	Nonoctal number specified.
NUMBER TOO LARGE	Number argument exceeds the allowable maximum (16 bits).

OPTION MODULE INTERFACE SPECIFICATIONS

MODNAME (LOC. 0)	Module name (ASCII) (5 bytes).
XFLAG (LOC. 5)	Module has done end-of-pass in this bit 8 = 1 area of memory (1 byte).
ADDR (LOC. 6)	Address of first register of device to be tested (1 word).
VECTOR (LOC. 10)	Device's vector (1 word).
BR1 (LOC. 12)	1ST BR level (1 byte).
BR2 (LOC. 13)	2ND BR level (1 byte).
DVID1 (LOC. 14)	Device count. Each bit set indicates a unit # or drive # to be tested. Maximum of 16 (1 word).
SR1, SR2, SR3 SR4 (LOC'S 16-24)	Internal switch registers for module (4 words).

STAT (LOC. 26) Module status word (1 word) defined as follows:

BIT 15 = 1	Module is IOMOD
BIT 15 = 1, BIT 12 = 1	Module is IOMODX
BIT 15 = 1, BIT 12 = 1, BIT 10 = 1	Module is IOMODR
BIT 15 = 1, BIT 10 = 1	Module is IOMODP
BIT 15 = 0, BIT 9 = 1	Module is NBKMOD
BIT 15 = 0, BIT 4 = 1	Module is BKMOD
BIT 15 = 0, BIT 9 = 0, BIT 4 = 0	Module is SBKMOD
BIT 14 = 1	Module selected
BIT 14 = 0	Module not selected
BIT 13 = 1	Module dropped during run
BIT 13 = 0	Module not dropped during run
BIT 11 = 1	Module active (Module running)
BIT 11 = 0	Module not active (Module not running)

NOTE: Low byte - processor status assumed when running BKMOD module. BIT 4 = 1 indicates BKMOD, not T-BIT set. (BIT 11 is always = 0 for BKMODS.)

INIT (LOC. 30)	Module start address (1 word)
SPOINT (LOC. 32)	Address in stack pointer when module first starts (1 word)
PASCNT (LOC. 34)	Module's pass counter (1 word)
ICONT (LOC. 36)	Number of iterations per pass (1 word)
ICOUNT (LOC. 40)	Number of module iterations completed this pass (1 word)
SOF CNT (LOC. 42)	Total number of soft errors so far (1 word)
HRDCNT (LOC. 44)	Total number of hard errors so far (1 word)
SOFPAS (LOC. 46)	Total number of soft errors this pass (1 word)
HRDPAS (LOC. 50)	Total number of hard errors this pass (1 word)

SYSCNT (LOC. 52)	Total number of system errors caused by executing this module (1 word)
RANUM (LOC. 54)	Contains random number when module asks monitor for random number (1 word)
RES1 (LOC. 56)	Reserved for monitor use (1 word)
RES2 (LOC. 60)	Reserved for monitor use (1 word)
SVR0 - SVR6 (LOC. 62-76)	Locations to save module's registers codes and stack pointer when control given back to monitor (7 words)
CSRA (LOC. 100)	Address of failing device's CSR (1 word)
SBADR/ACSR (LOC. 102)	Data error address of good data / contents of failing device CSR (1 word)
WASADR/ASTAT (LOC. 104)	Data error-contains address of bad data / contents of status register of failing device (1 word)
ERRTYP/ASB (LOC. 106)	Error type code / expected good data (1 word)
AWAS (LOC. 110)	Actual bad data (1 word)
RSTRT (LOC. 112)	Module's restart address (1 word)
WDTO (LOC. 114)	Number of words transferred to memory per iteration (1 word)
WDFR (LOC. 116)	Number of words transferred from memory per iteration (1 word)
INTR (LOC. 120)	Number of interrupts per iteration (1 word)
IDNUM (LOC. 122)	Module identification number (1 word)

NOTE: Following words are only available in IOMODX and IOMODP:

RBUFVA (LOC. 124)	Module's read buffer virtual address (1 word)
RBUFPA (LOC. 126)	Module's read buffer physical address - low 16 bits (1 word)
RBUFEA (LOC. 130)	Module's read buffer extended address bits; shifted to position 4 and 5 (1 word)
RBUFSZ (LOC. 132)	Module's read buffer size (1 word)

WBUFPA (LOC. 134)	Module's write buffer physical address, low 16 bits; assigned by monitor when servicing GWFBUF trap call (1 word)
WBUFEA (LOC. 136)	Assigned write buffer extended address bits; shifted to bits 4 and 5 (1 word)
WBUFRQ (LOC. 140)	Write buffer size requested by module (in words) (1 word)
WBUFSZ (LOC. 142)	Write buffer size allocated to module by monitor (in words) (1 word)
FREE (LOC. 144)	Reserved for future use by monitor (1 word)

NOTE: End of IOMODX and IOMODP special area.

STACK AREA	Module stack (Module runs and operates on own stack.) (32 words)
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Legend for Printed Messages

MMMMM	Five-character module name
DDDDD	Decimal number
HH:MM:SS	Hours: minutes: seconds
CCCCCC	Register contents
SSSSSS	Status word
AAAAAA	Address
AAAAAAAA	22-bit address
XXXXXX	Data
NNNNNN	Octal number code

ERROR MESSAGES

SYSTEM ERROR	Message description
VECTOR AAAAAA	04 if bus error trap; 10 if reserved instruction trap.
PC + AAAAA	PC placed on stack at time of failure.
ADDR AAAAAAAA	Physical address of error
PSW SSSSSS	Processor status word
SP AAAAAA	Virtual address in SP at time of failure

ERCT DDDDD	System error count for current run
AT MMMMM AAAAA	Module name and assembled PC address (if failure in module)

NOTES:

- 1. If system was in command mode, it will remain in command mode.**
- 2. If system was in run or chain mode, it will restart in run mode; also, pass and error counts will not be cleared.**

For an 11/60, the following data is included with the basic system error message:

11/60 ERROR LOG	Message description
JAM AAAAAA	JAM register of status content
SRV CCCCCC	Service register of status content
PBA AAAAAA	Physical bus address
CUA AAAAAA	Microprogram address
FLG/INT CCCCCC	Flag register of status/last vector serviced
WHAMI SSSSSS	Processor option status bits
CDATA XXXXXX	Cache memory data word
CTAG/CPU CCCCCC	Cache memory tag data/hit register contents.

For an 11/70, the following data is included with the basic system error message:

11/70 ERROR LOG	Message description
MEMERREG CCCCCC	Memory system error register content
CPUERREG CCCCCC	CPU error register content
ADDR AAAAAAAA	If parity error, 22-bit address of failing location

Soft Error

MMMMM	Name of failing module
PA AAAAAAA	22-bit physical address of SOFERS call
APC AAAAAA	Assembled PC address of SOFERS call
PASS DDDDD	Pass number at error time
SOFT ERR DDDDD	Total number of soft errors encountered by this module
CSRA AAAAAA	Control status register address
CSRC CCCCC	Control status register content
STATC SSSSS	Status word from device status register
ERRTYP NNNNN	Octal number defining type of error

Hard Error

MMMMM	Name of failing module
PA AAAAAAA	22-bit physical address of HRDERS call
APC AAAAAA	Assembled PC address of HRDERS call
PASS DDDDD	Pass number at error time
HARD ERR DDDDD	Total number of hard errors encountered by this module
CSRA AAAAAA	Control status register address
CSRC CCCCC	Control status register content
STATC SSSSS	Status word from device status register
ERRTYP NNNNN	Octal number defining type of error

NOTES:

- 1. An extended soft or hard error message can occur in which the above and up to thirty-two additional values may be output (see note 2).**
- 2. For the meaning of the ERRTYP codes, as well as the extended error values, refer to the failing module listing.**

Data Error	Report data errors excluding IODMDX, IOMODP modules
PA AAAAAAAAA	22-bit physical address of DATERS call
APC AAAAA	Assembled PC address of DATERS call
PASS DDDDD	Pass number at error time
ERR DDDDD	Error count for current run
CSRA AAAAA	Control status register address
S/B XXXXXX	Good expected data
WAS XXXXXX	Bad obtained data
WRADR AAAAA	Write address of expected data
RDADR AAAAA	Read address of obtained data
Check Data Error	Report data errors for IOMODX, IOMODP modules
MMMMM	Name of failing module
PA AAAAAAAAA	22-bit physical address of CDATAS call
APC AAAAA	Assembled PC address of CDATAS call
PASS DDDDD	Pass number at error time
ERR DDDDD	Error count for current run
CSRA AAAAA	Control status register address
S/B XXXXXX	Good expected data
WAS XXXXXX	Bad obtained data
WRADR AAAAA	Write address of expected data
RDADR AAAAA	Read address of obtained data
"MMMMM HAD DDDDD ERRORS OUT OF DDDDD WORDS READ"	
Total number of errors during the transfer	

NOTES:

- 1. All errors within a block are counted as one error via ERR DDDDD.**
- 2. The count is not indicated until each error is separately reported. If SR10=0, only three such errors will be reported.**

Memory Management Abort/Trap

KT TRAP	Message description
SR0 CCCCCC	Contents of status register 0
SR2 CCCCCC	Contents of status register 2
SR1 CCCCCC	Contents of status register 1
SR3 CCCCCC	Contents of status register 3

Memory Parity Errors (MAIN, CACHE, ECC)

TRAP THROUGH VECTOR 114	Message description
CSR AAAAAA	Control status register address
CONTENTS SSSSSS	Control status register content

Bad Vector Error

BAD VECTOR: AAAAAA	Bad vector address; Does not point to service routine
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STANDARD MESSAGES

End-of-Pass Message

MMMMM	Name of module
END PASS DDDDD	Number of passes
RUNTIME: HH:MM:SS	Total system runtime
PSTIME: HH:MM:SS	Time of last pass

Summary Message

SUMMARY AT RUNTIME: HH:MM:SS	Total system runtime
MMMMM	Name of module
AT VA: AAAAA	Virtual address of module
STAT: SSSSS	Module status word
PASS DDDDD	Number of passes

HRDERRS DDDDD	Number of hard errors
SFTERRS DDDDD	Number of soft errors
SYSTEM ERRORS: DDDDD	Number of system errors
POWER FAILS: DDDDD	Number of power failures

Header Message

MMMMM	Name of module
PA: AAAAAAAAA	22-bit physical address of module
APC: AAAAAA	Assembled PC address of module
PASS DDDDD	Total number of passes of module

Module Dropped Message

MMMMM	Name of dropped module
DROPPED AT APC: AAAAAA	Virtual address where ends call occurred

NOTE: The module is dropped following the printout, and will not restart for the remainder of the run.

Module Hung Message

MMMMM IS HUNG/DROPPED	Module has exceeded allocated time without doing an end-of-pass. Must have a system clock to check for a hung module.
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Map Message

MMMMM	Module name
AT VA: AAAAAA	Virtual address of module
STAT: SSSSSS	Module status word

Relocation Message

RELOCATED TO

AAAAAAAAA

22-bit physical relocation address

Write Buffer Rotation Message

WRITE BUFFER ROTATION ON

WRITE BUFFER ROTATION OFF

Memory Management Message

KT ON

KT OFF

Cache Memory Message

CACHE ON

CACHE OFF

UNIBUS Map Box Message

MAP ON

MAP OFF

NOTE: Map box and KT must share the same status condition (i.e., either OFF or ON.)

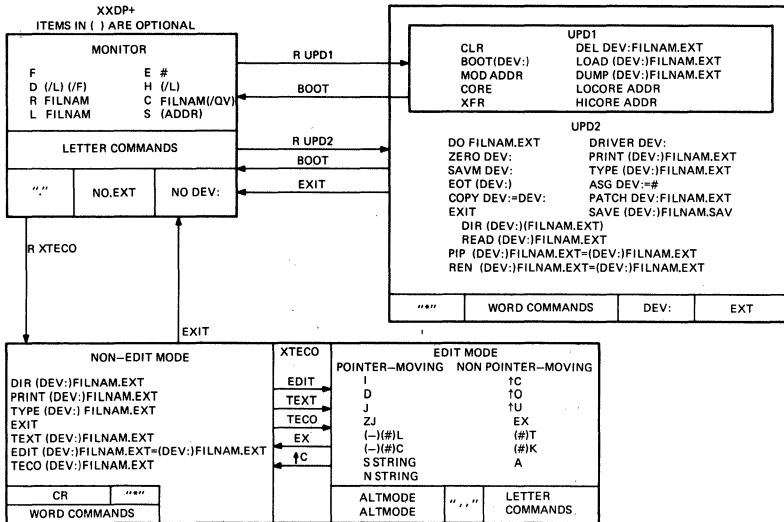
Parity/ECC Message

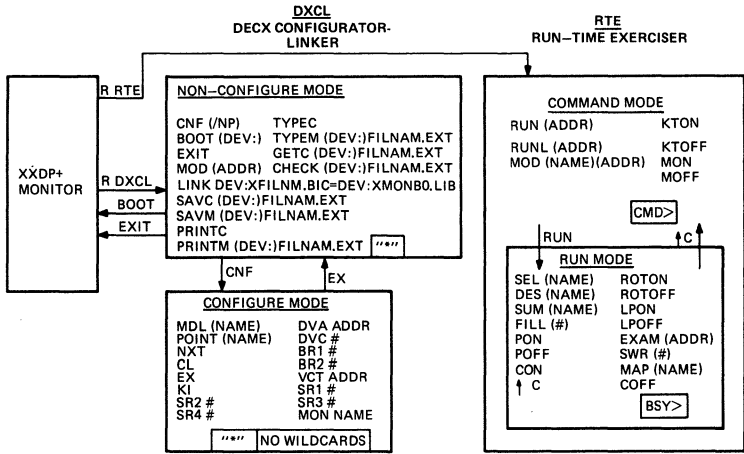
PARITY MEMORY ON

ECC MEMORY ON

PARITY MEMORY OFF

ECC MEMORY OFF





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