



# 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  |

[illegible]

| CTDP +                                                                                                                                                                                                                                                                                                                               | DPDP +                                                                                                                                 | DBDP +                                                                                                                                                                                                       | DSDP +                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LA<br>773300<br>START                                                                                                                                                                                                                                                                                                                |                                                                                                                                        |                                                                                                                                                                                                              |                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                      | LA<br>773154<br>START                                                                                                                  |                                                                                                                                                                                                              |                                                                                                                                                             |
| LA<br>773230<br>START                                                                                                                                                                                                                                                                                                                | LA<br>773100<br>START                                                                                                                  |                                                                                                                                                                                                              |                                                                                                                                                             |
| LA<br>773524<br>START                                                                                                                                                                                                                                                                                                                | LA<br>773350<br>START                                                                                                                  | LA<br>773320<br>START                                                                                                                                                                                        | LA<br>773000<br>START                                                                                                                                       |
| LA<br>001000<br>DEP<br>012700<br>177500<br>005010<br>010701<br>062701<br>000052<br>012702<br>000375<br>112103<br>112110<br>100413<br>130310<br>001776<br>105202<br>100772<br>116012<br>000002<br>120337<br>000000<br>001767<br>000000<br>000755<br>005710<br>100774<br>005007<br>017640<br>002415<br>112024<br>LA<br>001000<br>START | LA<br>001000<br>DEP<br>012705<br>176716<br>012715<br>177400<br>012745<br>000005<br>105715<br>100376<br>005007<br>LA<br>001000<br>START | LA<br>010000<br>DEP<br>012700<br>176700<br>012710<br>000023<br>005060<br>000034<br>005060<br>000006<br>012760<br>177400<br>000002<br>012710<br>000071<br>105710<br>100316<br>005007<br>LA<br>010000<br>START | LA<br>0010000<br>DEP<br>012705<br>172044<br>012745<br>177400<br>012745<br>000071<br>032715<br>100200<br>001775<br>100762<br>005007<br>LA<br>001000<br>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<br>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<br>(DEV:)FILNAM.SAV                       | Save monitor to tape.                                                                                                                                                              |
| XFR                                            | Set transfer address.                                                                                                                                                              |
| LOAD<br>(DEV:)FILNAM.EXT                       | Load program.                                                                                                                                                                      |
| DUMP<br>(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<br>(DEV:)(FILNAM.EXT)                      | Directory (optional for a particular file).                                                                                                                                        |
| PATCH<br>(DEV:)FILNAM.EXT                      | Patch device file.                                                                                                                                                                 |
| ASG DEV: = #                                   | Assign logical name.                                                                                                                                                               |
| READ<br>(DEV:)FILNAM.EXT                       | Read file for validity.                                                                                                                                                            |
| PIP (DEV:)FILNAM.EXT =<br>(DEV:)FILNAM.EXT(/F) | Transfer file.<br>(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<br>DEV:FILNAM.EXT                         | Delete file.                                                                          |
| REN<br>(DEV:)FILNAM.EXT =<br>(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<br>(DEV:)FILNAM.EXT                     | Print file (on LPT).                                                                  |
| TYPE<br>(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<br>ON SYSTEM DEVICE | Command file for the DO command must be on the system or load device.                                                                                                            |
| ? LOGICAL DEVICE<br>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<br>ALLOWED         | Device mnemonic is missing from a command that requires it.                                                                                                                      |

## XTECO COMMANDS

|                                                |                                                             |
|------------------------------------------------|-------------------------------------------------------------|
| DIR<br>(DEV:)(FILNAM.EXT)                      | Directory (optional, of specific file).                     |
| PRINT<br>(DEV:)FILNAM.EXT                      | Print file (on LPT).                                        |
| TYPE<br>(DEV:)FILNAM.EXT                       | Type file (on TTY).                                         |
| EDIT<br>(DEV:)FILNAM.EXT =<br>(DEV:)FILNAM.EXT | Edit ASCII file (optionally, change DEV:<br>or FILNAM.EXT). |
| TECO<br>(DEV:)FILNAM.EXT                       | Edit single file in place (no name or<br>device changes).   |
| TEXT<br>(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<br>any command.          |
| ↑C                                             | Return to command mode, abort current<br>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<br>DEV:FILNAM.EXT                            | Load DECX11 map file into memory.                            |
| GETP<br>DEV:FILNAM.EXT                            | Load saved input table.                                      |
| KILL ADDR                                         | Delete specified address from input table.                   |
| MOD ADDR                                          | Enter specified address in input.                            |
| MOD MON<br>MODNAM ADDR<br>MOD CP X<br>MODNAM ADDR | Table and specify new contents.                              |
| PATCH DEV:FILNAM.EXT =<br>DEV:FILNAM.EXT          | Patch specified input file to produce specified output file. |
| SAVP<br>DEV:FILNAM.EXT                            | Save input table.                                            |
| TYPE                                              | Print input table on terminal.                               |

## **PATCH ERRORS**

|                                           |                                                                                                        |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------|
| <b>? ADDRESS NOT FOUND</b>                | The specified address does not exist as an entry in the input table.                                   |
| <b>? CHECKSUM ERROR<br/>ON INPUT FILE</b> | A checksum occurred while attempting to read the specified input file.                                 |
| <b>? COMMAND NEEDS<br/>ARGUMENT</b>       | The command typed by the operator requires an argument, but none was given.                            |
| <b>? DELETE OLD FILE</b>                  | The specified output filename already exists.                                                          |
| <b>? END-OF-FILE</b>                      | While reading a file, the end of the file was encountered before it was expected.                      |
| <b>? END-OF-MEDIUM</b>                    | An end-of-medium indication was detected during a file transfer, probably indicating a hardware error. |
| <b>? FILE NOT FOUND</b>                   | The specified input filename does not exist.                                                           |
| <b>? INPUT TABLE<br/>EMPTY</b>            | The specified command cannot be executed because there are no entries in the input table.              |
| <b>? INPUT TABLE FULL</b>                 | The input table is full and cannot accept any more entries.                                            |
| <b>? INVALID COMMAND</b>                  | The specified command does not exist.                                                                  |
| <b>? INVALID CPU<br/>SPECIFICATION</b>    | The specified multiprocessor CPU does not exist.                                                       |
| <b>? INVALID FILE NAME</b>                | The specified filename does not have the correct format.                                               |
| <b>? INVALID MODULE<br/>NAME</b>          | 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<br>B= 11/40 Processor<br>C= 11/45 Processor<br>E= 11/70 Processor<br>F= 11/34 Processor<br>G= 11/04 Processor<br>K= 11/44 Processor<br>V= 11/03,23 Processors<br>Q= 11/60 Processor<br>Z= ALL Processors<br>x=DECX/11 Exerciser software |
| FP= | Option designation                                                                                                                                                                                                                                                   |
| K=  | A through Z = Program designation<br>0 through 9 = Overlay designation                                                                                                                                                                                               |
| A=  | A through Z = Revision designation                                                                                                                                                                                                                                   |
| #=  | # =MCN Level<br>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 RP11 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  
22 SECTOR  
PROGRAM MODE  
STARTING CYL, TRK  
ENDING CYL, TRK  
SELECT PATTERN

0 (CR)  
D  
D  
D  
D  
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+

- Boot appropriate XXDP + monitor.
- Monitor will self-start and identify itself.
- Run configurator/linker program.

## Loading Under

## Papertape

- Load the absolute loader.
- Load the appropriate configurator / linker program.
- The linker will self-start.

## Reference

## Documentation

- 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 XABCD0.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<br>DEVI:FILNAM.EXT | Checks file for checksums and correct object format. |
|--------------------------|------------------------------------------------------|

|     |                       |
|-----|-----------------------|
| CNF | Enter configure mode. |
|-----|-----------------------|

|      |                                                |
|------|------------------------------------------------|
| FILL | To change, fill parameters for console device. |
|------|------------------------------------------------|

|                         |                                                                                 |
|-------------------------|---------------------------------------------------------------------------------|
| GETC<br>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<br>DEVI:FILNAM.MAP | Retrieve load map from device specified, and list on lineprinter (MAP is the suggested extension). |
|---------------------------|----------------------------------------------------------------------------------------------------|

|                         |                                                                                 |
|-------------------------|---------------------------------------------------------------------------------|
| SAVC<br>DEVO:FILNAM.CNF | Store configuration table on device specified (CNF is the suggested extension). |
|-------------------------|---------------------------------------------------------------------------------|

|                         |                                                                      |
|-------------------------|----------------------------------------------------------------------|
| SAVM<br>DEVO:FILNAM.MAP | Store load map on device specified (MAP is the suggested extension). |
|-------------------------|----------------------------------------------------------------------|

|       |                                      |
|-------|--------------------------------------|
| TYPEC | List configuration table on console. |
|-------|--------------------------------------|

|                          |                                                                                               |
|--------------------------|-----------------------------------------------------------------------------------------------|
| TYPEM<br>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                                                                                                                                               |
| INVSW                       | 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<br>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<br>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.<br>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<br>ADDRESS  | Output specified location of named module.                                                                                                 |
| FILL                  | Output current fill character/fill count.                                                                                                  |
| FILL NUMBER<br>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<br>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.<br>*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 -<br>TEXT      | Command not recognized by monitor.<br>Will include the command in message<br>where text is the illegal command. |
| INVALID COMMAND IN<br>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<br>ARGUMENT | Specifies that either an argument is<br>improperly included, or is missing.                                     |
| NOT AN OCTAL NUMBER            | Nonoctal number specified.                                                                                      |
| NUMBER TOO LARGE               | Number argument exceeds the allowable<br>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<br>= 1 area of memory (1 byte).                            |
| ADDR (LOC. 6)                      | Address of first register of device to be<br>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<br>unit # or drive # to be tested. Maximum<br>of 16 (1 word). |
| SR1, SR2, SR3<br>SR4 (LOC'S 16-24) | Internal switch registers for module (4<br>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)   |
| SOFCNT (LOC. 42) | Total number of soft errors so far (1 word)                |
| HRDCNT (LOC. 44) | Total number of hard errors so far (1 word)                |
| SOPPAS (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)                                    |
| RANNUM (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<br>(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<br>(LOC. 104)  | Data error-contains address of bad data / contents of status register of failing device (1 word)          |
| ERRTYP/ASB<br>(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 GWBUF 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) |
|------------|------------------------------------------------------------------|

**Legend for Printed Messages**

|          |                            |
|----------|----------------------------|
| MMMMM    | Five-character module name |
| DDDDD    | Decimal number             |
| HH:MM:SS | Hours: minutes: seconds    |
| CCCCC    | 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<br>(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 DDDDDD    | Pass number at error time                              |
| SOFT ERR DDDDD | Total number of soft errors encountered by this module |
| CSRA AAAAAA    | Control status register address                        |
| CSRC CCCCCC    | Control status register content                        |
| STATC SSSSSS   | Status word from device status register                |
| ERRTYP NNNNNN  | 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 DDDDDD    | Pass number at error time                              |
| HARD ERR DDDDD | Total number of hard errors encountered by this module |
| CSRA AAAAAA    | Control status register address                        |
| CSRC CCCCCC    | Control status register content                        |
| STATC SSSSSS   | Status word from device status register                |
| ERRTYP NNNNNN  | 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.**

|                                                  |                                                     |
|--------------------------------------------------|-----------------------------------------------------|
| <b>Data Error</b>                                | Report data errors excluding IODMDX, IOMODP modules |
| PA AAAAAAAAA                                     | 22-bit physical address of DATERS call              |
| APC AAAAAA                                       | Assembled PC address of DATERS call                 |
| PASS DDDDD                                       | Pass number at error time                           |
| ERR DDDDD                                        | Error count for current run                         |
| CSRA AAAAAA                                      | Control status register address                     |
| S/B XXXXXX                                       | Good expected data                                  |
| WAS XXXXXX                                       | Bad obtained data                                   |
| WRADR AAAAAA                                     | Write address of expected data                      |
| RDADR AAAAAA                                     | Read address of obtained data                       |
| <b>Check Data Error</b>                          | Report data errors for IOMODX, IOMODP modules       |
| MMMMM                                            | Name of failing module                              |
| PA AAAAAAAAA                                     | 22-bit physical address of CDATAS call              |
| APC AAAAAA                                       | Assembled PC address of CDATAS call                 |
| PASS DDDDD                                       | Pass number at error time                           |
| ERR DDDDD                                        | Error count for current run                         |
| CSRA AAAAAA                                      | Control status register address                     |
| S/B XXXXXX                                       | Good expected data                                  |
| WAS XXXXXX                                       | Bad obtained data                                   |
| WRADR AAAAAA                                     | Write address of expected data                      |
| RDADR AAAAAA                                     | 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<br>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 |
|--------------------|-------------------------------------------------------|

## **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: AAAAAA                | 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: AAAAAAA | 22-bit physical address of module |
| APC: AAAAA  | Assembled PC address of module    |
| PASS DDDDD  | Total number of passes of module  |

### Module Dropped Message

|                           |                                          |
|---------------------------|------------------------------------------|
| MMMMM                     | Name of dropped module                   |
| DROPPED AT APC:<br>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<br>HUNG/DROPPED | Module has exceeded allocated time without doing an end-of-pass. Must have a system clock to check for a hung module. |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------|

### Map Message

|              |                           |
|--------------|---------------------------|
| MMMMM        | Module name               |
| AT VA: AAAAA | Virtual address of module |
| STAT: SSSSS  | Module status word        |

### **Relocation Message**

RELOCATED TO

AAAAAAA

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.)**

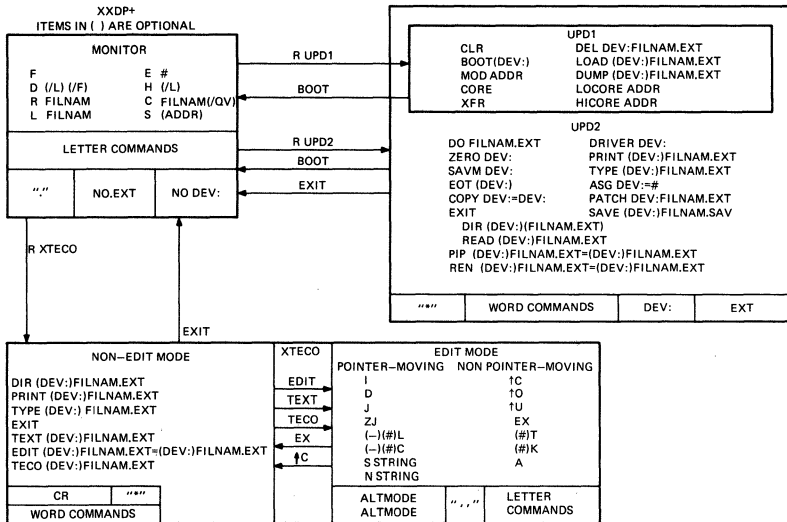
### **Parity/ECC Message**

PARITY MEMORY ON

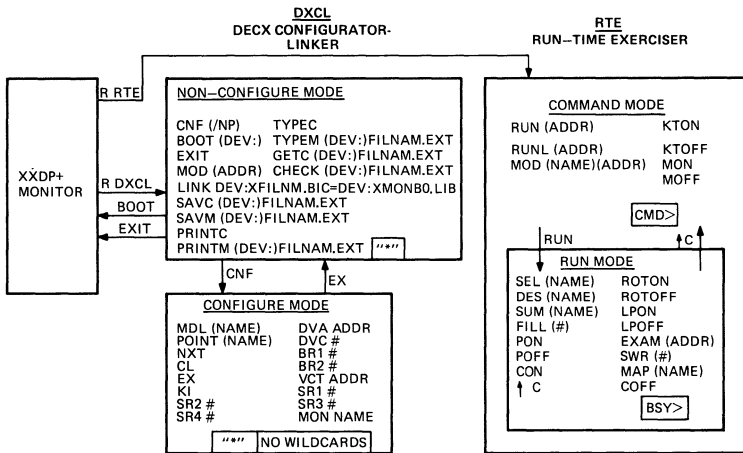
ECC MEMORY ON

PARITY MEMORY OFF

ECC MEMORY OFF



# DEC/X11 Command Chart



TK-6151

