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RSX-11M
Crash Dump Analyzer
Reference Manual

Order No. AA-5581A-TC

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ASSIST-11	RTS-8	ITPS-10

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RSX-11M Version 3.1

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PREFACE

0.1 MANUAL OBJECTIVES AND READER ASSUMPTIONS

This manual describes the operation of the Crash Dump Analyzer. It is intended for you if you are an experienced Assembly Language Programmer with a working knowledge of the RSX-11M Executive data structures. It does not describe the operation of the RSX-11M Executive or the significance of the individual data structures.

Underlining is used in the examples of this manual to denote CDA generated text. Also, the term "offset mode" is used throughout Chapter 3. Offset mode means that the addresses shown are relative addresses from the beginning of the displayed data. They do not represent the physical or virtual addresses of the data.

0.2 DOCUMENT STRUCTURE

CHAPTER 1 explains the purpose of the Crash Dump Analyzer. It describes the minimum system configuration and the necessary procedures for obtaining a crash dump. It explains how to run CDA and describes the command string format. Finally, Chapter 1 describes indirect command files as they pertain to CDA.

CHAPTER 2 describes the switches associated with CDA. Two summary tables provide quick reference on switch operation. Expanded descriptions for each switch follow each table.

CHAPTER 3 consists of actual CDA output listings. Each entry of each listing is numbered to correspond to the numbered explanatory text preceding it. Cross reference information is provided where necessary.

APPENDIX A contains a short description of each CDA error message.

APPENDIX B consists of the RSX-11M system data structures as they appear in the source listings.

0.3 ASSOCIATED DOCUMENTS

Refer to the RSX-11M/RSX-11S Documentation Directory, for a brief description of each manual in the RSX-11M, Version 3.1, documentation set.
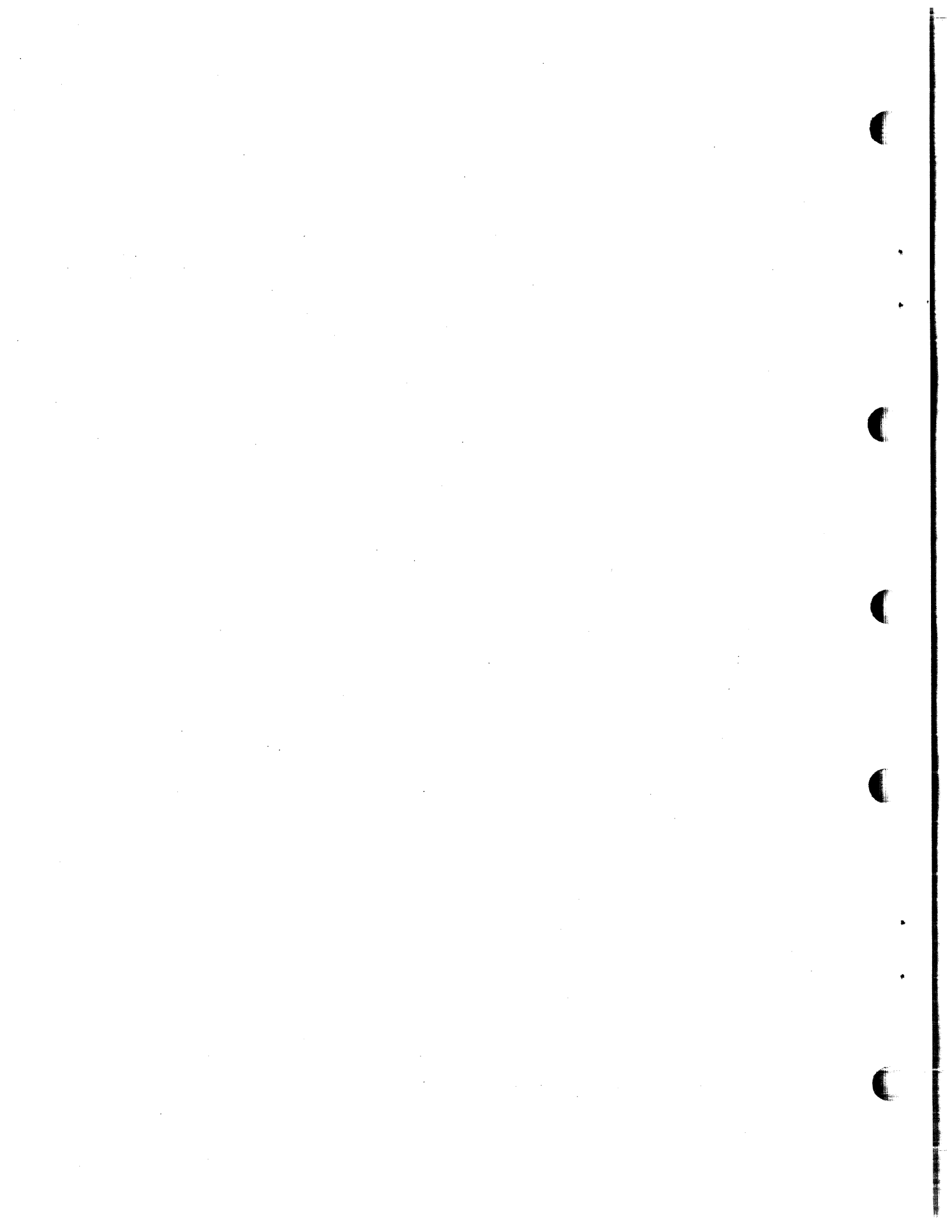
CHAPTER 1

INTRODUCTION

The Crash Dump Analyzer (CDA) is a specialized utility that helps you
establish the cause of system crashes. CDA reads the contents of the
memory dump created by the Executive Crash Dump Routine. It analyzes
the dump in accordance with the information contained in the Executive
Symbol Table file, RSX11M.STB. Finally, CDA outputs the dump to a
print device in a human-readable format for your evaluation.

CDA is a nonprivileged task that any nonprivileged user can run.

1.1 SYSTEM REQUIREMENTS

To obtain a crash dump suitable for input to CDA, you must build the
Executive Crash Dump Routine into your system at SYSGEN. You must
also have one of the following hardware units in addition to your
system disk.

    RK05 disk unit

    Magtape unit

    DECtape unit

You can build the Executive Crash Dump Routine into your system during
phase 1 of SYSGEN beginning with the query:

    DO YOU WANT CRASH DUMP ANALYSIS SUPPORT? [Y/N]:

If you select this option, code will be included in your system to
dump memory to one of the secondary storage devices listed above
following a system crash. Also, if you select this option, the
following dialogue will occur:

    ENTER OUTPUT DEVICE CSR ADDRESS [O R:160000:177700 D:177564]:

The output device is the device upon which you want notification of
system crashes to appear. The legal range of octal addresses for this
device is 160000 through 177700. If you do not specify an address in
response to this query (that is, you enter only a carriage return),
crash notifications will appear on your console terminal. The default
address for the console terminal is 177564.

The remaining dialogue relates to your secondary storage device.

    ENTER CRASH MEMORY DUMP DEVICE MNEMONIC [S]:

Your response to this query will be one of the following: DK for RK05, MM for TU16, TE16, or TU45 Magtape, MT for TU10, TE10, or TS03 Magtape, or DT for DECtape. The dialogue will continue with:

WHAT IS ITS CSR ADDRESS? [O R:160000:177700 D:device dependent]

The legal range of octal addresses for this device is also 160000 through 177700. If you do not specify an address for this device, the default address will be taken. The default address will be determined by which device you have chosen. The default addresses are: 177404 for DK, 172440 for MM, 172522 for MT, and 177342 for DT.

The final query is:

WHAT IS THE PHYSICAL UNIT NUMBER OF THE CRASH UNIT? [O R:0-7 D:0]:

The legal range of responses for this query is 0 through 7. If you do not specify a physical unit number, the default will be taken which is 0.

1.2 OBTAINING A CRASH DUMP

To obtain a crash dump, control of the processor must be transferred to the Executive Crash Dump Routine following a system crash. How this control is transferred depends on the way in which the crash occurred and whether or not you have built the Executive Debugging Tool (XDT) into your system at SYSGEN.

System crashes occur in three ways:

1. The processor encounters an unintentional halt instruction (000000).

2. An infinite loop condition occurs.

3. The processor encounters a program condition which causes it to trap.

When a program condition causes a processor trap and XDT is included in your system, control will transfer automatically to XDT. You can then type X at your terminal and XDT will transfer control to the crash dump routine. (Refer to the RSX-11M Guide to Writing an I/O Driver for a description of XDT.)

When XDT is not included in your system, a processor trap causes control to be transferred to the crash dump routine.

When a system crash is the result of an unintentional HALT instruction or an infinite loop condition, you must restart your processor at location 40.

NOTE

If you have included the register and stack dump option into your system at SYSGEN, the contents of the general registers and the Executive stack will always be output prior to entry into the crash dump routine.

Regardless of the manner in which control is transferred, once the crash dump routine is entered, it prints the following message on the crash notification device specified at SYSGEN:

    CRASH-CONT WITH SCRATCH MEDIA ON (device mnemonic)

You can then put the secondary crash dump device on-line and depress the CONT switch on the CPU console. The crash dump routine will dump memory to the crash dump device and halt the processor upon completion.

1.3 RUNNING CDA

You can run CDA as either an installed task or as an uninstalled task.

As an installed task, use the following format to return control to the Executive upon completion of the analysis:

    >CDA command string <CR>

To return control to CDA upon completion of the analysis, use the following format:

    >CDA <CR>
    CDA> command string <CR>

When you run CDA as an uninstalled task, control is always returned to CDA upon completion of the analysis. The commands for running CDA are:

    RUN $CDA <CR>
    CDA> command string <CR>

which requires that CDA.TSK be present in the UFD corresponding to the system UIC on device LB:. An alternate command is

    RUN CDA <CR>
    CDA> command string <CR>

which requires that CDA.TSK be present in the UFD corresponding to the current UIC on SY:.

1.4 CDA COMMAND STRINGS

You must use the following format to input commands to CDA:

    [list file/sw],[binary file/sw]=symbol file/STB,crash-input[/sw]

where:

    [list file]   is the optional human-readable CDA output listing.
                    This listing is described in Chapter 3 of this
                    manual.

    [binary file]   is an optional binary file. This file is a copy
                    of the binary data that was written to the crash
                    dump device by the crash dump routine. It allows
                    you to selectively create a historical record of
                    crash dumps. Also, if you specify this file
                    during an initial analysis, you can use it for

                    input to CDA at a later time. Since the crash dump routine will overwrite the information on your crash dump volume with each dump to it, this feature allows you to use a single volume for all crash dumps.

symbol file/STB
          is the symbol definition file for the crashed system. The /STB switch is an integral part of this file specification. You must use this file specification and switch in all CDA command strings.

crash-input   is the binary input to CDA. This specification can be either a device name (your secondary storage device), or a binary file specification that was created during a previous CDA run. If it is a binary file specification, the "binary file" field in the output must be left blank.

[/sw]   is an optional CDA switch. Each switch is associated with a specific file specifier and cannot be used alone or in conjunction with other file specifications. Each switch is described in detail in Chapter 2.

Output specifications to the left of the equal sign are position dependent. Therefore, when you include both output specifications, you must place them in the command string in the positions shown. If you omit the list file, you must place a comma before the binary file specification.

Input specifications to the right of the equal sign are position independent and can appear in either order.

Any of the specifications in the command string can appear in complete FILES-11 format -- that is, complete with device, UIC, filename, file type, and version number. When you omit any of the elements, CDA uses the defaults shown in Table 1-1. Note that not all of the elements in all specifications have defaults.

Table 1-1
File Default Values

File	Device	UFD	Default Value	
			File name	Type
listing file	SY:	current	none	.LST
binary file	SY:	current	none	.CDA
symbol file/STB	SY:	current	RSX11M	.STB
crash-input	SY:	current	none	.CDA

The following examples illustrate the CDA file default values. Assume that the user in these examples is logged in under UIC [301,356] and that the secondary storage device is DT1:. Also, assume that CDA is being operated as an installed task.

EXAMPLE 1:

```
CDA<CR>
CDA>19OCT77,19OCT77=RSX11M.STB/STB,DT1:
```

This command string will create:

1. A listing file, 19OCT77.LST, under UFD [301,356]

2. A binary file, 19OCT77.CDA, under UFD [301,356]

The binary input is read from DECtape Unit 1 and CDA analyzes it in accordance with the information contained in the symbol definition file RSX11M.STB under UFD [301,356].

EXAMPLE 2:

```
CDA<CR>
CDA>,19OCT77=[1,54]/STB,DT1:
```

This command string will create a binary file, 19OCT77.CDA, under UIC [301,356].

The binary input is read from DECtape Unit 1 and CDA analyzes it in accordance with the information contained in the symbol definition file RSX11M.STB under UFD [1,54].

EXAMPLE 3:

```
CDA<CR>
CDA>LP:=[1,54]/STB,19OCT77
```

This command string will create an output listing on device LP:.

The binary input is read from a previously created binary file, 19OCT77.CDA, and CDA analyzes it in accordance with the information contained in the symbol definition file, RSX11M.STB, under UFD [1,54].

1.5 INDIRECT COMMAND FILES

As with other utilities, you can enter command strings to CDA directly from the keyboard or indirectly through use of the indirect command file facility. CDA indirect command files are limited to one level of indirection. That is, an indirect command file must not contain a reference to another command file.

1.6 BASIC CDA OUTPUT LISTING

While the Crash Dump Analyzer provides many output listing options,
fundamental system information always appears on the first five pages
of output listing. These first five pages contain the following:

    Page 1 -- Volatile Registers

    Page 2 -- Kernel Stack

    Page 3 -- System Common

    Page 4 -- System Common Labeled Dump

    Page 5 -- Pool Statistics

Sections 3.1.1 through 3.1.5 of this manual describe these pages in
detail.

In addition to these pages, a sixth page, Error Log Buffers, will be
included in your output listing if error log information was in memory
at the time of the crash.   (Refer to the RSX-11M Error Logging
Reference Manual for more information). This page is described in
detail in Section 3.1.6 of this manual.

CHAPTER 2

SWITCHES

Switches provide you with the means to control Crash Dump Analyzer operation. There are two types -- Analysis switches and Function switches.

Analysis switches determine which CDA analysis routines will be applied to the crash-input.

Function switches provide a number of control options. For example, such switches might terminate an analysis after CDA has encountered a specified number of errors. Or, a switch might limit the number of pages of output listing.

Both types of switches are file specific. That is, each switch applies to a particular file and may not be used either alone or with any other file.

2.1 ANALYSIS SWITCHES

Table 2-1 summarizes the Analysis switches and gives a brief description of their effect. Following Table 2-1 is an expanded description of each switch.

Table 2-1
Summary of CDA Analysis Switches

Switch	Meaning	Applies to File
/ACT	Lists the contents of the Task Control Blocks for each active task	crash-input
/ALL	Lists the output of all analysis Routines	crash-input
/CLQ	Lists the contents of the clock queue	crash-input
/DEV	Lists information on all devices in the system	crash-input
/DUMP:a:b	Lists the contents of physical memory between address a and address b	crash-input

Table 2-1(Cont.)
Summary of CDA Analysis Switches

Switch	Meaning	Applies to File
/HDR	Lists the contents of the task headers for each task resident in memory	crash-input
/PCB	Lists the contents of each Partition Control Block	crash-input
/POOL	Lists the contents of the system pool	crash-input
/TASK=name:a:b	List the contents of task "name" between virtual address a and virtual address b	crash-input
/STD	Lists the contents of the System Task Directory for all tasks	crash-input

2.1.1 /ACT (Task Control Blocks for active tasks)

FILE: crash-input

EFFECT: CDA scans the System Task Directory and lists the contents of the Task Control Blocks for each active task.

2.1.2 /ALL (all analysis routines)

FILE: crash-input

EFFECT: CDA will apply all of its analysis routines (except those associated with memory and task dumps) to the specified crash-input. The output from these routines will be listed in the following order:

     1.   System Information
     2.   Active Tasks
     3.   Task Headers
     4.   Partition Information
     5.   Device Information
     6.   System Task Directory
     7.   Fixed Tasks
     8.   Pool Dump

2.1.3 /CLQ (clock queue)

FILE: crash-input

EFFECT: CDA lists the contents of the clock queue.

2.1.4   /DEV (all devices in system)

FILE: crash-input

EFFECT: CDA scans the system device tables and lists the contents of
         the control blocks for each device in the system.

2.1.5   /DUMP:a:b (list physical memory)

FILE: crash-input

EFFECT: CDA lists the contents of physical memory between the 18-bit
         octal addresses a and b inclusive.

2.1.6   /HDR (headers for memory-resident tasks)

FILE: crash-input

EFFECT: CDA scans the System Task Directory and lists the contents of
         the Task Headers for each task resident in memory.

2.1.7   /PCB (Partition Control Blocks)

FILE: crash-input

EFFECT: CDA outputs a map that lists all the occupants of memory and
         the contents of each Partition Control Block.

2.1.8   /POOL (System pool)

FILE: crash-input

EFFECT: CDA lists the system pool in octal, RAD50 and ASCII.

2.1.9   /TASK=name:a:b (task virtual address space)

FILE: crash-input

EFFECT: CDA lists the virtual address space of task   "name"   between
         the 16 bit virtual addresses a and b inclusive. If you do
         not specify addresses, CDA lists the tasks entire virtual
         address space.

2.1.10   /STD (System Task Directory)

FILE: crash-input

EFFECT: CDA scans the System Task Directory and lists the contents of
         all Task Control Blocks linked into it.

2.2 FUNCTION SWITCHES

Table 2-2 summarizes the Function switches and gives a brief description of their effect. Following Table 2-2 is an expanded description of each switch.

Table 2-2
Summary of CDA Function Switches

Switch	Meaning	Applies to File	Default
/BL:n	Identifies the starting block number of the crash-input device. The value of n must be less than 65535.	crash-input	n=100
/EXIT:n	Terminate analysis after encountering n analysis errors	list file	--
/LIMIT:n	Limit output listing to n pages	list file	n=300.
/MEMSIZ:n	Create a binary output file 4*n blocks long	binary file	124.K *
/KMR	Force the assignment of Page Address Register values for the crashed system	crash-input	--
/-SP	Do not spool analysis output listing.	list file	/SP
/STB	Identifies the file specification that contains the Executive Symbol Table	symbol file	--

* n can be expressed as an octal or decimal number. A dot [.] following the number denotes decimal.

2.2.1 /BL:n (identify starting block number)

FILE: crash-input

EFFECT: CDA reads the dump from the input device beginning at block n. If the crash dump device is not a disk or DECtape, CDA ignores this switch.

DEFAULT: n = 100 octal

2.2.2 /EXIT:n (exit after n errors)

FILE: list file

EFFECT: CDA maintains   an   error   count.   As   it   encounters
           inconsistencies in the system data structure, it increments
           this count.   If you specify the /EXIT:n switch,   CDA
           terminates analysis after   n   errors.   If you specify the
           /EXIT switch but do not specify n, CDA exits after 1 error.

DEFAULT: No exit

2.2.3 /LIMIT:n (limit output listing)

FILE: list file

EFFECT: The /LIMIT:n switch limits the number of pages of analysis
           output.   When CDA has generated n pages it terminates the
           analysis and prints a message on the   user   terminal
           indicating that it has done so.

DEFAULT: n = 300.pages

2.2.4 /MEMSIZ:n (establish size of binary output file)

FILE: binary file

EFFECT: This switch causes CDA to create a Binary Output File 4xn
           blocks long and to transfer nK words to it from the
           crash-input file. The value of n must be between 16. and
           124. inclusive.

           This switch is particularly useful when transferring raw
           binary crash dumps from disk or DECtape. Since disks and
           DECtapes have no physical EOFs, it is necessary to specify
           the size of the actual memory dump.

           When the crash input resides on magtape, the binary output
           file will be zero filled if the EOF is read before nK words
           have been transferred.

                                   NOTE

           Tasks above 124K physical memory (11/70 systems
           only) cannot be analyzed.

DEFAULT: n = 124.K

2.2.5 /KMR (assign kernel mapping register values)

FILE: crash-input

EFFECT: On mapped systems, when CDA reads incorrect Page Address
          Register (PAR) values from the crash stack, it aborts the
          analysis and prints an error message on the terminal.   In
          this event, you can use the /KMR switch to restart the
          analysis. When you specify /KMR, CDA is forced to use
          standard mapping values to convert kernel virtual addresses
          to physical memory addresses.

DEFAULT: CDA uses existing Page Address Registers.

2.2.6 /-SP (do not spool)

FILE: list file

EFFECT: CDA does not spool the analysis output listing to the line
          printer.   It creates an output listing file on the device
          indicated in the output file specification. If you have not
          specified a device, CDA creates the file on SY0:.

DEFAULT: /SP

2.2.7 /STB (preceding file contains the Executive Symbol Table)

FILE: symbol file (RSX11M.STB)

EFFECT: The /STB switch identifies the file containing the Executive
          Symbol Table.   This file must correspond to the crashed
          system. CDA opens the specified file and extracts the
          necessary symbol values. If it fails to find any required
          symbol values, CDA aborts the analysis and prints an error
          message on the terminal.

DEFAULT: RSX11M.STB

CHAPTER 3

ANALYSIS LISTINGS

The example CDA output listings in this chapter illustrate CDA operation. Each item of each listing is keyed to the brief explanatory text that precedes it. Cross references direct you to other documents that contain descriptions of the individual data structures.

NOTE

> These listings were extracted from
> several different crash dumps.
> Therefore, values that would normally
> correlate across the various listings
> will not necessarily correlate here.
> Those listings that would extend across
> several pages in an actual dump of a
> crashed system have been truncated and
> reflect only a typical printout format
> for that listing.

3.1 SYSTEM INFORMATION

The first five pages of every CDA output listing contain the system information described in Sections 3.1.1 through 3.1.5. When Error Log information is in memory at the time of the system crash, the example listing described in 3.1.6 will appear in CDA's output listing as Page 6 of System Information.

3.1.1 Volatile Registers

Figure 3-1 is an example listing that reflects the state of the hardware at the time of the crash. Refer to the appropriate PDP11 processor handbook for detailed information on these registers. Each item in the following list describes a correspondingly numbered item in Figure 3-1.

Item	Description
1.	Cause of crash
2.	Contents of Processor Status Word, kernel and user stack pointers following crash
3.	Program Counter and Processor Status Word that the system pushed onto the kernel stack just prior to system crash (These values will be valid only if the system trapped)

4.   General registers

5.   Contents of Memory Management Registers

6.   Contents of Page Address and Page Description Registers

7.   Unibus map registers (This field is suppressed if the processor is not an 11/70)

```
RSX-11M CRASH DUMP ANALYZER        V3.1       22-SEP-77   10:10       PAGE 1
VOLATILE REGISTERS


CAUSE OF CRASH:  MANUAL DUMP BY OPERATOR ①

AFTER CRASH:  PS=000340    SP(K)=000600    SP(U)=001442 ②

BEFORE CRASH:  PC=016766    PS=030000 ③

R0=000013   R1=100030   R2=000013   R3=000013   R4=000000   R5=063354 ④

MMR0=000001    MMR1=000000    MMR2=001572    MMR3=000060 ⑤
```

```
                 U S E R                          )          U N I B U S   M A P )
   I  S P A C E          D  S P A C E             |            1   00000000
   PDR       PAR         PDR       PAR            |            2   00020000
   077506   000000     000000    000000          |            3   00040000
   077406   000200     000000    000000          |            4   00060000
   077406   000400     000000    000000          |            5   00100000
   077406   000600     000000    000000          |            6   00352644
   077506   001000     000000    000000          |            7   00000000
   077506   004477     000000    000000          |            8   00000010
   077406   004677     000000    000000          |            9   00200010
   077406   177600     000000    000000          |           10   00000000
                                                 |           11   00000010
                                                 |           12   00000000
              S U P E R V I S O R                |           13   00000012
                                                 |           14   00000010
   I  S P A C E          D  S P A C E            |           15   00000000   > ⑦
   PDR       PAR         PDR       PAR           |           16   00000000
   000000   000000     000000    000000          |           17   00000000
   000000   000000     000000    000000     ⑥    |           18   00000000
   000000   000000     000000    000000          |           19   00000010
   000000   000000     000000    000000          |           20   00000000
   000000   000000     000000    000000          |           21   00020000
   000000   000000     000000    000000          |           22   00000000
   000000   000000     000000    000000          |           23   00000000
   000000   000000     000000    000000          |           24   00000000
                                                 |           25   00000000
                                                 |           26   00000000
              K E R N E L                        |           27   00000000
                                                 |           28   00000000
   I  S P A C E          D  S P A C E            |           29   00000000
   PDR       PAR         PDR       PAR           |           30   00000000
   077506   000000     000000    000000          |           31   00000000
   077506   000200     000000    000000          )
   077506   000400     000000    000000
   077506   000600     000000    000000
   077506   001000     000000    000000
   077406   004477     000000    000000
   077406   004677     000000    000000
   077506   177600     000000    000000
```

Figure 3-1 Volatile Registers

3.1.2 Kernel Stack

Figure 3-2 is an example listing that shows the contents of the kernel stack area beginning at V$$CTR and ending at $STACK. The kernel stack pointer will point to a location within this area.

```
RSX-11M CRASH DUMP ANALYZER        V3.1      22-SEP-77   14:10        PAGE 2
KERNEL STACK


KERNEL STACK:

    020440    000000    000000    000000    000000    000000    000000    000000    000000
    000420    000000    000000    000000    000000    000000    000000    000000    000000
    000440    000000    000000    000000    000000    000000    000000    000000    000000
    000460    000000    000000    000000    000000    000000    003002    122710    122455
    000500    126060    004462    076024    117450    022510    116330    002463    023704
    000520    003677    001732    122710    122467    002363    177574    122501    126060
    000540    062072    160040    127006    140046    001223    004462    067220    117450
    000560    022510    116330    000000    007436    000000    010250    046206    063354
    000600    016766    030000    022160    123650    002306    100030    000000    100100
    000620    063354    000000    063354    123666    170000
```

Figure 3-2 Kernel Stack

3.1.3 System Common

The example listing in Figure 3-3 provides a selective interpretation of some of the items in System Common. Each item in the list describes a correspondingly numbered item in Figure 3-3. (Refer to the RSX-11M Guide to Writing an I/O Driver for more information.)

Item	Description
1.	Time and date of crash
2.	The task that was running at the time of the crash. If no task was executing at the time of the crash, this field will contain NULL TASK. This condition could develop if all the active tasks are in a blocked state at the time of the crash
3.	The address of the first word of the task control block of the current task
4.	The contents of the 4-byte system ID indicating system base level
5.	The first address available for partitions (the last address of the Executive + 1)
6.	The system size in 32 word blocks and then in total words
7.	System UIC

8. Stack depth count

9. Contents of the global event flag words

10. Device from which the system was booted

11. Logical Block Number of the beginning of the system image

12. Size of system in blocks

13. The octal value of the system feature mask and the meaning of each set bit

14. Octal dump of System Common in offset mode from $CMBEG through $CMEND

RSX-11M CRASH DUMP ANALYZER   V3.1   22-SEP-77   10:10   PAGE 3
SYSTEM COMMON

CRASH OCCURRED AT 09:24:43 2-SEP-77 ①

                 ②   ③
CURRENT TASK = DMOT2   TCB ADDRESS = 067220
  ④   ⑤   ⑥   ⑦
$SYSID = 1B $EXSIZ = 120000 $SYSIZ = 16384./512K $SYUIC = [4,54]
  ⑧   ⑨
$STKDP = 000000 $COMEF: <33-48> 000000   <49-64> 000000
  ⑩   ⑪   ⑫
LOAD DEVICE = DB0   LBN = 00700411   FILE SIZE = 496.

SYSTEM FEATURE MASK = 000377

        BIT SET   MEANING
        -------   -------
          EXT   11/70 EXTENDED MEMORY SUPPORT
          MUP   MULTI-USER PROTECTION SUPPORT
          EXV   20K EXEC SUPPORTED
          DRV   LOADABLE DRIVER SUPPORT   ⑬
          PLA   PLAS SUPPORT
          CAL   DYNAMIC CHECKPOINT SPACE ALLOCATION
          PKT   PREALLOCATION OF I/O PACKETS
          EXP   EXTEND TASK DIRECTIVE SUPPORTED

SYSTEM COMMON (SCMBEG THRU SCMEND):

    000000   006230 030141 000000 000000 117734 170010 050732 000000
    000020   000000 000000 000000 000046 160607 000000 067220 000000
    000040   000000 000000 006312 160607 050756 116330 024577 020035
    000060   020037 020037 017440 017440 020040 006250 000001 006334
    000100   116330 000000 114260 120000 066304 000612 077406 000003
    000120   064072 000000 000000 023530 177777 000000 000000 006352
    000140   001377 014536 063776 063644 006216 077504 000000 000000 ⑭
    000160   000000 041061 020040 114460 000000 177546 177546 000000
    000200   002054 000000 000000 172000 010000 066560 000000 000000
    000220   006334 116330 000000 000001 000002 000004 000010 000020
    000240   000040 000100 000200 000400 001000 002000 004000 010000
    000260   020000 040000 100000 000000 006504 001000 000000 000000
    000300   000000 000000 040000 001400 100411 041104 000760 177777
    000320   000015 000037 000030 000074 000074 000074 000115 000011
    000340   000002 000011 000030 000053 000001 067420 005010 177777

Figure 3-3 System Common

3.1.4 System Common Labeled Dump

The example listing in Figure 3-4 represents some of the locations in System Common which have a label associated with them. The octal numbers represent the contents of those locations, not the addresses of the labels. The following lists the labels and their meanings.

$ABTIM	Absolute time counter
$ACTHD	Active task listhead
$CFLPT	Pointer to first checkpoint file
$CKCNT	Address of clock count register
$CKCSR	Clock Control Status Register (CSR)
$CKLDC	Clock load count
$CLKHD	Clock queue list head
$COPT	Pointer to console output Unit Control Block (UCB)
$CRAVL	Dynamic storage listhead
$DEVHD	Pointer to first Device Control Block (DCB)
$ERRPT	Pointer to error logger Task Control Block (TCB)
$ERRSQ	Universal error sequence number
$ERRSZ	Resident bytes of error logging data
$EXSIZ	Executive size
$FMASK	System feature mask
$FRKHD	Fork queue listhead
$HEADR	Pointer to current task header
$INTCT	Clock interrupt ticks count
$LDRPT	Pointer to loader TCB
$LOGHD	Logical device assignment list
$LSTLK	Lock word -- TCB address of owner
$MCRCB	MCR Command Block address
$MCRPT	Pointer to MCR TCB
$MXEXT	Last address in system common
$PARHD	Pointer to partition list
$PARPT	Parity address vector table pointer
$PKAVL	Pointer to first preallocated packet
$PKMAX	Maximum number of preallocated packets
$PKNUM	Number of preallocated packets in list

$PWRFL   Powerfail recovery request flag

$RQSCH   Schedule request TCB address

$SHFPT   Pointer to shuffer TCB

$SIGFL   Task waiting for significant event

$STKDP   Stack depth indicator

$SYUIC   System User Identification Code (UIC)

$TKNPT   Pointer to TKTN TCB

$TKPS   Ticks per second

$TKTCB   Pointer to current task TCB

$TSKHD   Pointer to System Task Directory (STD)

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SYSTEM COMMON LABELED DUMP

$ABTIM	111334	$ACTHD	053250	$CFLPT	053424	$CKCNT	177546
$CKCSR	177546	$CKLDC	000000	$CLKHD	052270	$COPT	052762
$CRAVL	053340	$DEVHD	044306	$ERRPT	064020	$ERRSQ	000000
$ERRSZ	000000	$EXSIZ	110000	$FMASK	100376	$FRKHD	000000
$HEADR	065524	$INTCT	177777	$LDRPT	053250	$LOGHD	055330
$LSTLK	000000	$MCRCB	000000	$MCRPT	105230	$MXEXT	031200
$PARHD	053214	$PARPT	013144	$PKAVL	055760	$PKMAX	000017
$PKNUM	007417	$PWRFL	000000	$RQSCH	005742	$SHFPT	104330
$SIGFL	000000	$STKDP	000000	$SYUIC	002054	$TKNPT	104510
$TKPS	000074	$TKTCB	060510	$TSKHD	053250		

Figure 3-4   System Common Labeled Dump

3.1.5 Pool Statistics

The example listing in Figure 3-5 contains information concerning the
System Pool. CDA derives items 2, 3, and 4 by scanning the free block
pointers of the pool. The minimum block size (Item 5) is derived from
the contents of $CRAVL-2. Each item in the following list describes
an item in Figure 3-5.

Item	Description
1.	Pool size in decimal bytes
2.	The largest block of contiguous words of pool space
3.	Total number of free bytes in pool

4.   Number of contiguous blocks not allocated

5.   Smallest possible block -- this is the minimum   number
     of bytes which may be requested

6.   Bit map in octal (block free if bit is set)

```
RSX-11M CRASH DUMP ANALYZER       V3.1      22-SEP-77   10:10        PAGE 5
POOL STATISTICS


POOL SIZE (BYTES) = 14158.①

LARGEST FREE BLOCK (BYTES) = 5516.②

TOTAL FREE BYTES = 6288.③

NUMBER OF FRAGMENTS = 30.④

MINIMUM BLOCK SIZE (BYTES) = 4.⑤


POOL BITMAP (CONSTRUCTED FROM LINKED POOL, BLOCK FREE IF BIT SET):
        000003  060400  000014  140000  003617  000000  000000  000000
        000000  000000  000000  000000  006000  000000  000040  017000
        000010  000000  000400  000000  000000  000000  000000  000000
        000000  000000  000376  000000  000000  003776  000000  000000
        000003  000000  000000  170000  007777  007700  000000  000000
        000000  000000  000000  000000  000000  000000  000000  000000
        000000  000000  000000  000000  000000  000000  000000  000000
        000000  000000  000000  000000  000000  000000  000000  000000
        000000  000000  000000  000000  000000  000000  000000  000000
        000000  000000  000000  077700  000004  000000  000370  000000
        177600  000177  000016  000000  174000  000037  000003  176000
        077777  000000  000000  100000  000077  000700  160000  177777
        003777  000000  000000  017400  000000  000000  000000  170000
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  177777  177777  177777
        177777  177777  177777  177777  177777  077777  100000  077777
        000000  000000  000000  000000  000000  000000  000000  000000
        000000  000000  000000  000000  000000  000000  000000  000000
        000000  000000  000000  000000  000000  000000  000000  000000
        000000  000000  000000  000000  000000  000000
```
⑥

Figure 3-5 Pool Statistics

3.1.6 **Error Log Buffers**

The listing shown in Figure 3-6 contains error logging information
that was residing in memory at the time of the crash. This data was
not written to the Error Logging file on disk and could be an
indication of the cause of the crash. (Refer to the <u>RSX-11M Error
Logging Reference Manual</u>, Version 3.1.)

Item	Description
1.	Address of error log buffer
2.	Error Code
3.	Time and date
4.	Dump of error log buffer in octal

```
RSX-11M CRASH DUMP ANALYZER        V3.1       19-SEPT-77    17:53          PAGE 6
ERROR LOG BUFFERS


            ①                            ②
   BUFFER ADDRESS = 116330     ERROR CODE = 000001

   TIME (D-M-Y  H:M:S) = 9-19-77  17:52:59 ③

   000000    116460  000022  000004  000115  000011  000023  000021  000064
   000020    000003  000000  000000  000004  000000  000000  020040  020040   ④
   000040    020040  020040
```

Figure 3-6   Error Log Buffers

3.2 OPTIONAL INFORMATION

CDA gives you additional information when you use the analysis switches described in Chapter 2. Figures 3-7 through 3-16 illustrate the kind of output CDA provides when you use these swtiches.

3.2.1 Active Tasks

The listing shown in Figure 3-7 contains active task information. The Receive Queue, AST Queue, and Receive by Reference Queue sections of this example will appear only when they apply. Otherwise, they are suppressed.

Item	Description
1.	Task name
2.	Address of Task Control Block for the task
3.	The name of the partition in which the task runs
4.	Address of the Partition Control Block
5.	The base address for the partition in which the task runs
6.	The device that contains task image
7.	The beginning Logical Block Number of the task on the device
8.	The running priority
9.	The number of outstanding QIO requests
10.	Current UIC. This is either the log-on UIC or the UIC specified with the MCR SET command

11.   Physical name of tasks pseudo device

12.   Maximum size of task image in 32. word blocks

13.   State of local event flags for task

14.   First status word (blocking bits). The 3-letter codes
       have the following meaning:

   -EXE - task not executing

   RDN - I/O run down in progress

   MSG - abort message being output

   NRP - task mapped to nonresident partition

   OUT - task is out of memory

   CKP - task is being checkpointed

   CKR - task checkpoint requested

15.   Second status word (state bits) -- the 3-letter codes
       have the following meaning:

   AST - Asynchronous System Trap (AST) in progress

   DST - AST recognition disabled

   -CHK - task not checkpointable

   CKD - checkpointing disabled

   SEF - stopped for event flag

   FXD - task fixed in memory

   TIO - task is engaged in terminal I/O

   CAF - dynamic checkpoint space allocation failure

   HLT - task is being halted

   ABO - task marked for abort

   STP - task stopped

   SPN - task suspended

   WFR - task in wait-for state

16.   Third status word (attribute bits) -- the 3-letter
       codes have the following meaning:

   ACP - task is an Ancillary Control Processor

   -PMD - absence of the -PMD code indicates that the task
          will be dumped if it is abnormally aborted

   REM - remove task on exit

   PRV - task is privileged

MCR - task requested as an external MCR function

SLV - task is a slave task

CTL - task was activated by a controlling task

RST - task is restricted

NSD - task does not allow send data

CAL - task has checkpoint space in task image

ROV - task has resident overlays

NET - network protocol level

17.   Octal dump of Task Control Block in offset mode

RECEIVE QUEUE (if task has one)

18.   Starting address of receive block

19.   Octal dump of receive queue in offset mode

AST QUEUE (if task has one)

20.   Address of AST block.

21.   A two byte indicator. The high order byte is an offset into the header of the AST control block. The low order byte is the length of the AST control block in bytes

22.   Number of bytes allocated on task stack

23.   Entry point of AST routine

24.   Number of AST parameters

25.   Octal dump of the AST block in offset mode

RECEIVE BY REFERENCE QUEUE (if task has one)

26.   Address of Receive by Reference queue block

27.   Address of the Task Control Block (TCB) for the task that initiated the Send by Reference

28.   Contents of event flag mask

29.   Address of event flag mask

30.   Pointer to created attachment descriptor

31.   Offset into partition as specified in window definition

32.   Length to be mapped

33.   The receiving task's access rights to region being mapped

34.   Octal dump of Receive by Reference queue in offset mode

RSX-11M CRASH DUMP ANALYZER   V3.1   22-SEPT-77   10:10   PAGE 17
ACTIVE TASKS

F11ACP ①

   TCB ADDRESS = 116060   PAR = FCPPAR   PCB ADDRESS = 117670
                ②   ③   ④
   LOAD ADDRESS = 00130000   LOAD DEVICE = LB0   LBN = 00677200
                 ⑤   ⑥   ⑦
   PRI = 149.   I/O COUNT = 0.   UIC = [1,1]   TI = C00
        ⑧   ⑨   ⑩   ⑪
   MAX SIZE = 000400   EVENT FLAGS = <1-16> 000002   <17-32> 040004
            ⑫   ⑬
   T.STAT: ⑭

   T.ST2:   STP ⑮

   T.ST3:   ACP -PMD PRV NSD CAL ⑯

     000000   000000 000225 000000 025167 003310 000000 116072 000000 ⎫
     000020   116076 000002 040004 063644 071344 000000 000020 150300 ⎬ ⑰
     000040   001625 077200 063740 117670 000400 067220 064300 064300 ⎪
     000060   000000 000000 000000 116144 000000 116150 000000 000000 ⎭

   RECEIVE QUEUE
   ----
                ⑱
   RECEIVE BLOCK ADDRESS = 124630

     000000   000000 077876 000000 123456 154321 111111 222222 333333 ⎫
     000020   000000 000000 000000 000000 000000 000000 000000 000000 ⎬ ⑲
     000040   000000 000000 000000 000000   ⎭

   AST QUEUE
   ----
                ⑳   ㉑
   AST BLOCK ADDRESS = 142420   A.CBL = 020012
              ㉒   ㉓   ㉔
   A.BYT = 000020   A.AST = 174646   A.NPR = 000001

     000000   000000 020012 000020 174646 000001 000124 ㉕

   RECEIVE BY REFERENCE QUEUE

              ㉖   ㉗
   RRQ ADDRESS = 153644   SENDER TCB = 116330
              ㉘   ㉙
   EVENT FLAG MASK = 000001   EVENT FLAG MASK ADDR = 146420
                 ㉚
   REGION ID OF RECEIVER = 000006
                 ㉛
   OFFSET IN PARTITION = 000000
              ㉜   ㉝
   LENGTH TO MAP = 003000   ACCESS RIGHTS = 000003

     000000   000000 116330 000001 146420 000006 000000 003000 000003 ⎫ ㉞
     000020   000000 000000 000000 000000 000000 000000 000000 000000 ⎭

Figure 3-7 Active Tasks (Truncated)

3.2.2 Active Task (MCR)

The active task listing for ...MCR has more information contained in it than the active task listing for other tasks. Figure 3-8 shows an example listing. The first seventeen items are the same as Figure 3-7. The items in the following list describe only the items that are different from the previous figure.

Item	Description
1.	Address of MCR input buffer
2.	Address of Unit Control Block of the requesting terminal
3.	Device name and unit number of the terminal that sent block to MCR (ASCII characters)
4.	Octal dump in offset mode
5.	Address of command buffer
6.	Address of Unit Control Block of the requesting terminal
7.	ASCII dump of command buffer
8.	Octal dump of command buffer in offset mode

```
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ACTIVE TASKS


...MCR
------

   TCB ADDRESS = 115260     PAR = SYSPAR     PCB ADDRESS = 117734

   LOAD ADDRESS = 00120000     LOAD DEVICE = LB0      LBN = 00676653

   PRI = 160.      I/O COUNT = 0.     UIC = [1,24]     TI = TT2

   MAX SIZE = 000100     EVENT FLAGS = <1-16> 000001  <17-32> 040000

   T.STAT:

   T.ST2:   STP

   T.ST3:   -PMD PRV  CLI  NSD  CAL


     000000    000000   000240   000000   131574   050712   100346   000000   000000
     000020    115276   000001   040000   054604   114760   000000   000020   051300
     000040    001640   976653   063740   117734   000100   116060   064104   064104
     000060    000000   000000   000000   115344   000000   115350   000000   000000


   RECEIVE QUEUE
   -------------
                     (1)                          (2)
   MCR INPUT BUFFER ADDRESS = 100346     UCB = 056352

   TT35:  PIP /LI (3)

     000000    000000   056352   044520   020120   046507   020111   020040   020040
     000020    020040   020040   020040   020040   020040   020040   020040   020040    (4)
     000040    020040   020040   020040   020040   020040   020040   020040   020040
     000060    020040   020040   020040   020040   020040   020040   020040   020040
     000100    020040   020040   020040   020040   020040   020040   020040   020040


   MCR COMMAND BLOCKS
   ------------------
                   (5)                        (6)
   BUFFER ADDRESS = 103620     TCB = 056352

   TEXT:  PIP /BR (7)

     000000    000000   056352   044520   020120   041507   051040   020040   020040
     000020    020040   020040   020040   020040   020040   020040   020040   020040    (8)
     000040    020040   020040   020040   020040   020040   020040   020040   020040
     000060    020040   020040   020040   020040   020040   020040   020040   020040
     000100    020040   020040   020040   020040   020040   020040   020040   020040
```

Figure 3-8   Active Task (MCR)

3.2.3 Task Headers

Figure 3-9 is an example of a task header listing. The following list describes its contents.

Item   Description

1.   Task name

2.   Pointer to the first word in the task header

3.   Pointer to the first word in the Task Control Block

4.   Contents of Processor Status Word and Program Counter

5.   Contents of the general registers

6.   Initial contents of the Processor Status Word, the Program Counter and the Stack Pointer

7.   The task header size in decimal bytes, the number of windows required to map the task, and the number of Logical Unit Numbers assigned to the task

8.   Current and default UIC

9.   Pointer to number of window blocks

10.   Pointer to header and guard word

11.   Work area extension vector pointer

12.   Priority difference for swapping

13.   Directive Status Word

14.   Address of File Control Services (FCS) impure area

15.   Address of FORTRAN impure area

16.   Address of overlay impure storage

LOGICAL UNIT TABLE

17.   Logical Unit Number

18.   Physical device name before redirect

19.   Window pointer in header

20.   The low-order byte of this word indicates the number of map entries active; the high-order byte has the following bit assignments:

ANALYSIS LISTINGS

WI.RDV=400 - read virtual address allowed if set

WI.WRV=1000 - write virtual block allowed if set

WI.EXT=2000 - extend allowed if set

WI.LCK=4000 - set if locked against shared access

WI.DLK=10000 - set if de-access lock enabled

WI.BPS=100000 - bypass access interlock if set

21. High byte of first virtual block number mapped by window

22. Address of File Control Block

23. File number

24. File sequence number

25. File Control Block status word

26. Number of accesses

27. Number of block locks

WINDOW BLOCKS

28. The name of the partition in thich the task runs

29. The virtual limits of the task

30. Address of attachment descriptor

31. Window size in 32 word blocks

32. Offset into partition

33. Address of the first Page Description Register (PDR) used to map the window

34. Number of PDRs used

35. The contents of the last PDR used

36. Octal dump of task header in offset mode

```
RSX-11M CRASH DUMP ANALYZER        V3.1      22-SEP-77   10:10        PAGE 21
TASK HEADERS


RMDEMO ①
------
                   ②                          ③
  HEADER ADDRESS = 077010      TCB ADDRESS = 070260

  PS=170010     PC=125072 ④

  R0=131560  R1=001601  R2=125032  R3=000110  R4=000060  R5=123353  SP=120352 ⑤

  INITIAL PS = 170017    INITIAL PC = 121464    INITIAL SP = 120352 ⑥

  HEADER SIZE = 106.    NO. OF WINDOWS = 1.    NO. OF LUNS = 2. ⑦

  CURRENT UIC = [4,54]      DEFAULT UIC = [4,54] ⑧
            ⑨              ⑩                    ⑪                    ⑫
  H.WND = 077116      H.GARD = 077160      H.VEXT = 000000      H.SPRI = -5.
            ⑬                    ⑭                    ⑮                    ⑯
  DSW = 000001        H.FCS = 000000       H.FORT = 000000      H.OVLY = 000000


  LOGICAL UNIT TABLE:

 ⑰  ⑱   ⑲      ⑳       ㉑       ㉒       ㉓       ㉔       ㉕       ㉖   ㉗
 #  DEV  WINDOW  W.CTL   W.VBN   W.FCB   F.FNUM  F.FSEQ  F.STAT  NAC  NLCK
 -  ---  ------  -----   -----   -----   ------  ------  ------  ---  ----
 1  TT12 000000
 2  TI0  000000


  WINDOW BLOCKS:

 ㉘          ㉙           ㉚        ㉛         ㉜       ㉝       ㉞    ㉟
 PAR        VIRT LIMITS  ATT DESC  WND SIZE  OFFSET  1ST PDR  NO.   LAST PDR
 ---        -----------  --------  --------  ------  -------  ---   --------
 GEN        120000 133577  064056   000136   000000   212     1     056406


  HEADER:

      000000    120352  000152  000002  070302  002054  002054  170017  121464 ⎫
      000020    120352  000000  000000  000000  000000  000000  000000  000000 ⎪
      000040    000000  000000  077116  000001  000000  000000  000000  000000 ⎬
      000060    000373  000000  000000  000000  000000  077160  000002  055524 ⎪ ㊱
      000100    000000  063620  000000  000001  067600  120000  133577  064056 ⎪
      000120    000136  000000  000612  056406  170010  125072  131560  001601 ⎭
      000140    125032  000110  000060  123353  000000
```

Figure 3-9 Task Headers (Truncated)

3.2.4 Partition Information

CDA outputs partition information in two segments. The listing shown
in Figure 3-10 is a composite of system partition information while
the listing shown in Figure 3-11 represents individual partition
information.   The following list describes elements of Figure 3-10.
Attachment Descriptors and Wait Queues are included with individual
partitions when they apply.

ANALYSIS LISTINGS

Item	Description
1.	Partition names
2.	Low and high physical memory addresses for the partitions
3.	Size of the partition
4.	Type of partition
5.	Task or tasks occupying the partition

```
                         M E M O R Y     M A P

        ①               ②                ③           ④              ⑤
    PARTITION     MEMORY   ALLOCATED     SIZE        TYPE        OCCUPIED BY
    =========     =================     ====        ====        ===========

    <EXEC>        00000000 00053410      00053410
    <POOL>        00053410 00110000      00034370

    LDR           00000000 00000000      00000000   MAIN TASK

    SYSPAR        00110000 00120000      00010000   MAIN TASK      ...MCR

    FCPPAR        00120000 00146000      00026000   MAIN TASK      F11ACP

    DRVPAR        00146000 00174000      00026000   MAIN SYS
                  00146000 00155700      00007700   SUB  DRIVER    TT:
                  00155700 00160000      00002100   SUB  DRIVER    DB:
                  00160000 00162700      00002700   SUB  DRIVER    DM:
                  00162700 00163700      00001000   SUB  DRIVER    DS:
                  00163700 00165100      00001200   SUB  DRIVER    DK:
                  00165100 00166200      00001100   SUB  DRIVER    DT:
                  00166200 00167400      00001200   SUB  DRIVER    DX:
                  00167400 00170400      00001000   SUB  DRIVER    LP:
                  00170400 00170500      00000100   SUB  DRIVER    NL:
                  00170500 00174000      00003300   SUB  DRIVER    MM:

    GEN           00174000 00760000      00564000   MAIN SYS
                  00174000 00207600      00013600   SUB  TASK      RMDEMO
                  00207600 00760000      00550200   <HOLE>
```

Figure 3-10 Partition Information

Each item in the following list describes an item in Figure 3-11.

Item   Description

PARTITION CONTROL BLOCK

1.   Partition name

2.   Pointer to first word of Partition Control Block

3.   Type of partition

4.   Name of main partition

5.   Physical base address of partition in 32. word blocks

6.   Partition size in 32. word blocks

7.   Pointer to the first word of the Task Control Block of attached task

8.   Partition protection word (mapped system only)

9.   Priority of attached task

10.   I/O count of attached task

11.   Partition status flags -- the 3-letter codes have the following meaning:

       OUT - partition is out of memory

       CKP - partition checkpoint in progress

       CKR - partition checkpoint is requested

      -CHK - partition is not checkpointable

       FXD - partition is fixed

       PER - parity error in partition

       LIO - marked by shuffler for long I/O

       NSF - partition cannot be shuffled

       COM - library or common block

       PIC - position independent library or common

       SYS - system controlled partition

       DRV - driver is loaded in partition

       DEL - partition should be deleted when not attached

       APR - starting Active Page Register (APR) number mask

12.   Octal dump of Partition Control Block in offset mode.

ATTACHMENT DESCRIPTOR

Item	Description
13.	Address of attachment descriptor
14.	Partition in which attachment occurs
15.	Name of attaching task
16.	Partition Control Block attachment queue thread word
17.	Task Control Block (TCB) attachment queue thread word
18.	Priority of task attached to this partition
19.	I/O count of attached task
20.	The number of times task is mapped through this attachment descriptor
21.	Attachment descriptor status byte -- the 3-letter codes have the following meaning: DEL - task has delete access EXT - task has extend access WRT - task has write access RED - task has read access
22.	Octal dump of attachment descriptors in offset mode
23.	Name of the task awaiting access to partition GEN
24.	Address of Task Control Block for the task
25.	TI: device for the task
26.	Tasks priority
27.	Second status word (state bits)--same as item 15 of Figure 3-7

```
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PARTITION INFORMATION

     ①        ②        ③      ④      ⑤       ⑥       ⑦        ⑧       ⑨    ⑩
  PARTITION  PCB ADR  TYPE   MAIN   BASE    SIZE    P.TCB     PRO     PRI  IOC
  ---------  -------  ----   ----   ----    ----    -----    ------   ---  ---
   SYSPAR    117734   MAIN  SYSPAR 001200  000100  115260   000000   0.   0.

     P.STAT: ⑪


     000000    117670  000000  075273  062072  000000  117734  001200  000100 ⎫
     000020    000000  117754  100200  115260  000000  100340  000000  064076 ⎬ ⑫
     000040    064076                                                         ⎭


     ATTACHMENT DESCRIPTORS:

        ⑬          ⑭         ⑮       ⑯       ⑰      ⑱    ⑲        ⑳
     ADDRESS    PARTITION  ATT TASK  A.PCBL  A.TCBL  PRI  IOC    MAP COUNT
     -------    ---------  --------  ------  ------  ---  ---    ---------
     064076      SYSPAR     ...MCR   000000  000000  160.  0.        0.

     A.STAT:  WRT RED ㉑


     000000    000000  000240  115260  000000  000003  117734 ㉒


PARTITION  PCB ADR  TYPE   MAIN   BASE    SIZE    P.TCB     PRO     PRI  IOC
---------  -------  ----   ----   ----    ----    -----    ---      ---  ---
  GEN      107560   MAIN   GEN   001740  005640  000000   000000   0.   0.

   P.STAT:  SYS


     000000    000000  000000  026226  000000  055254  107560  001740  005640
     000020    064024  077224  100200  000000  000040  000000  000000  000000
     000040    107616



     WAIT QUEUE:

        ㉓         ㉔       ㉕      ㉖              ㉗
      TASK     TCB ADR     TI    T.PRI     STATE BITS (T.ST2)
      ----     -------     --    -----     ------------------
     ...HEL    064024     TT25   150.
```

Figure 3-11 Partition Control Blocks and Attachment Descriptors

3.2.5 Device Information

CDA lists information on all devices known to the system. The listing
in Figure 3-12 shows a typical terminal device listing with an I/O
packet. The Terminal Status Word (item 15) and Additional Terminal
Status Word (item 16) will appear only in listings for terminal
devices. The section labeled I/O Request Packets will appear only for
devices that have an I/O request in progress or an I/O request
enqueued at the time of the system crash.   The following list
describes the items in Figure 3-12.

ANALYSIS LISTINGS

Item	Description
1.	Device name
2.	Address of first word of Unit Control Block (UCB)
3.	Address of first word of Device Control Block (DCB)
4.	Address of first word of Status Control Block (SCB)
5.	Pointer to Unit Control Block of redirect unit
6.	Pointer to Task Control Block (TCB) of Ancillary Control Processor (ACP)
7.	Name of attached task
8.	Pointer to the Unit Control Block (UCB) of owning terminal
9.	User Identification Code (UIC) used to log onto the system

10.   Unit status byte -- the 3-letter codes have the
       following meanings:

       BSY - unit is busy

       MNT - unit is mounted

       FOR - unit is mounted as a foreign volume

       MDM - unit is marked for dismount

11.   Unit status extension byte -- the three letter codes
       have the following meaning:

       OFL - unit offline

       RED - unit redirectable

       PUB - unit is public device

       UMD - unit attached for diagnostics

12.   Control Processing flags -- the 3-letter codes have
       the following meanings:

       ALG - byte alignment allowed

       NPR - device is a NPR device

       QUE - call driver before queuing

       PWF - always call driver at power fail entry point

       ATT - call driver on attach/detach

       KIL - always call driver at I/O kill

       LGH - transfer length mask bits

13.   First device characteristics word -- the 3-letter codes have the following meanings:

REC - record oriented device

CCL - carriage control device

TTY - terminal device

DIR - file structured device

SDI - single directory device

SQD - sequential device

MXD - mass bus device

UMD - user mode diagnostics supported

SWL - unit software write locked

PSE - pseudo device

COM - device is mountable as COM channel

F11 - Device is mountable as F11 device

MNT - device is mountable

14.   Second device characteristics word -- the 3-letter codes have the following meanings:

DH1 - unit is a DH11 multiplexer

DJ1 - unit is a DJ11 multiplexer

RMT - unit is remote

L8S - unit is a LA180S

NEC - solicited input not echoed

CRT - unit is a CRT

ESC - unit generates escape sequences

LOG - user logged on terminal

SLV - unit is a slave terminal

DZ1 - unit is a DZ11

HLD - terminal is in hold screen mode

AT. - MCR command AT. is being processed

PRV - unit is privileged terminal

L3S - unit is a LA30S terminal

VT5 - unit is a VT05B terminal

LWC - lower case to upper case conversion

UNIT CONTROL BLOCK

15.   Terminal status word -- the codes have the following meaning:

OUT/INP - busy terminal is in output/input mode

CRTY - carriage control at end of line

CRJT - carriage return just typed

EOLS - end of line seen

UIFP - unsolicited input fork pending

SOLI - solicited input

CTLO - output disabled

RUBP - rubout sequence in progress

16.   Additional terminal status -- the codes have the following meaning:

RPRM - current write is the prompt for a read-after-prompt QIO

BTWQ - break-through write is queued

BTWP - write is breaking through a read

CCPN - CNTRL C is pending under special circumstances

BAKS - sending exit hold-screen mode escape sequence

FKCR - last carriage return was to divide long line into multiple lines for CRT

ECHO - echo in progress

XOFF - when read is complete, the terminal driver will transmit an XOFF

UPND - output character buffer DHBUF holds byte suppressed by XOFF

CHAR - multi-echo buffer MBUFR holds an input character that has been received but not echoed

WESC - attached task wants escape sequences

ESCS - in the middle of an escape sequence

CCON - CNTRL C AST code is armed

MCTR - doing CNTRL R from tasks buffer

NCKP - solicited input request is from a noncheckpointable task

UOFF - output turned off by an XOFF

17.   Octal dump of Unit Control Block

DEVICE CONTROL BLOCK

18.   Octal dump of Device Control Block

STATUS CONTROL BLOCK

19.   Octal dump of Status Control Block

I/O REQUEST PACKETS

20.   Address of the first word of the I/O packet

21.   The name of the task requesting I/O

22.   The priority of the task requesting I/O

23.   Event flag number used to signal I/O completion

24.   Logical unit number used by requesting task

25.   I/O function codes (for detailed information on the
       legal I/O function codes for each device refer to the
       RSX-11M I/O Drivers Reference Manual)

26.   Status of the I/O request - current or queued

27.   Octal dump of I/O request packet in offset mode

TT0 ①
====

②   ③   ④   ⑤   ⑥   ⑦   ⑧   ⑨
UCB ADR   DCB ADR   SCB ADR   REDIRECT   ACP   ATT   OWNER   LOGIN UIC
-------   -------   -------   --------   ---   ---   -----   ----------
054300   054234   054400   PIPT0   NONE   [4,54]

U.STS: BSY ⑩

U.ST2: ⑪

U.CTL: QUE PWF ATT ⑫

U.CW1: TTY CCL REC ⑬

U.CW2: PRV ⑭

  UNIT CONTROL BLOCK:

  STATS: OUT CRTY CRJT EOLS ⑮

  ATERS: BTWQ BTWP BAKS FKCR ESCS ⑯

  054274   002054 000000 054234 054300 100070 000000 000007 000010 ⎫
  054314   000000 000204 054400 000000 004526 140126 177777 103400 ⎪
  054334   066020 006401 066020 000000 120053 000000 000000 002054 ⎬ ⑰
  054354   025400 000000 000000 006200 000000 000000   ⎭

  DEVICE CONTROL BLOCK:

  054234   054446 054300 052124 000000 000070 120110 161077 000030 ⎫
  054254   160000 000000 000007 000000 000001 000006 116650   ⎬ ⑱

  STATUS CONTROL BLOCK:

  054400   000000 054400 000000 122740 054300 054400 002174 100030 ⎫
  054420   001000 000000 000200 054370 063302 044131 054446 000003 ⎬ ⑲
  054440   061132   ⎭

  I/O REQUEST PACKETS:

  ⑳   ㉑   ㉒   ㉓   ㉔   ㉕   ㉖
  PACKET ADR   REQUESTOR   PRI   EFN   LUN   FUNCTION CODE   STATUS
  ----------   ---------   ---   ---   ---   -------------   ------
    103000   PIPT0   50.   32.   1.   IO.RLB   CURRENT

  000000   000000 020062 100560 105410 054300 001000 041640 002736 ⎫
  000020   140040 000000 000416 146060 000120 000000 000000 000000 ⎬ ㉗
  000040   000000 076630 000612 037406   ⎭

  Figure 3-12   Device Information and I/O Packet (Truncated)

3.2.6 System Task Directory

CDA scans the System Task Directory and outputs (for each task known to the system) the information contained in Figure 3-13. The information in this format is identical to the first seventeen items described in Figure 3-7 of this manual.

```
RSX-11M CRASH DUMP ANALYZER       V3.1      11-NOV-77   14:30      PAGE 73
SYSTEM TASK DIRECTORY


...MCR
------

  TCB ADDRESS = 105230     PAR = SYSPAR     PCB ADDRESS = 107734

  LOAD ADDRESS = 00110000    LOAD DEVICE = LB0    LBN = 00621265

  PRI = 160.    I/O COUNT = 0.    UIC = [1,24]    TI = TT27

  MAX SIZE = 000100    EVENT FLAGS = <1-16> 000001  <17-32> 040000

  T.STAT:

  T.ST2:    STP

  T.ST3:   -PMD PRV   NSD  CAL


    000000    000000  000240  000000  131574  050712  000000  105242  000000
    000020    105246  000001  040000  052002  104760  000000  000020  050300
    000040    001640  021265  053032  107734  000100  105750  054126  054126
    000060    000000  000000  000000  105314
```

Figure 3-13 System Task Directory (Truncated)

3.2.7 Pool Dump

As shown in the example (Figure 3-14), CDA prints the system pool in octal, RAD50, and ASCII. If a line is repeated more than nine times, CDA prints it once and then prints a message indicating the number of identical lines.

The symbols in Figure 3-14 have the following meanings:

* indicates that the next word is allocated (word is in $CRAVL)

+ indicates that the next word is allocated in another free list ($PKAVL)

                              NOTE

          $PKAVL is a list containing fixed size
          blocks. The blocks in this list are
          used for fast allocation. The length of
          these blocks is determined by I.LGTH.

- indicates that the next word is allocated in both $CRAVL and $PKAVL; this is an error condition

S Y S T E M   P O O L

```
    * = NEXT WORD ALLOCATED          FIRST FREE BLOCK (SCRAVL) = 053340
    + = NEXT WORD IS IN SPKAVL LIST              SPKAVL = 055760
    - = NEXT WORD IS IN SPKAVL AND ALSO IN SCRAVL


   053410     041104   000000   053464   000010   !JXD    M8D   H!!DB   4W   !
   053420     053464   000004 * 053750 * 045400   !M8D  D NBX L  !14W   hW K!
   053430   * 000000 * 000033 * 053354 * 000000   !       $ M6L   !!     1V   !
   053440   * 000000 * 002000 * 000000 * 001000   !      YX    L2!!            !
   053450   * 060510 * 111352 * 000000 * 000000   !OVX WTJ       !!Hs!         !
   053460   * 000002 * 060532   053654   000044   !  B OWB NAD   6!!   Za,WS  !
   053470     064450   110473   000000   000000   !P3  WIS       !!(!!        !
   053500     000010   064472   053654   000024   !  H P3R NAD   T!!  !!,W    !
   053510     044446   000000   053674   000014   !K.F    NAT   L!!&I  <W     !
   053520     000000   000000   000003   000000   !        C     !!           !
   053530   * 000002 * 054340 * 053600 * 135544   !  B NH2 N   /9L!! *X Wd)!
   053540   * 010000 * 000002 * 177777 * 000407   !BVP   B   80  FW!!         !
   053550   * 000124 * 002400 * 040252 * 000401   ! BD    2  JM4  FQ!!T   *@  !
   053560   * 000000 * 000030 * 160000 * 000000   !      X 53X   !!      *    !
   053570   * 000002 * 010370 * 000000 * 000001   !  B B.X       A!!  x       !
   053600   * 072024 * 000001 * 000001 * 000000   !RV6   A    A    !! t       !
   053610   * 000401 * 000000 * 000000 * 000000   ! FQ           !!           !
   053620   * 000022 * 000000 * 000000 * 000000   ! R            !!           !
   053630   * 040252 * 000401 * 000000 * 000000   !JM4   FQ        !!*@       !
   053640   * 000000 * 000000 * 000000 * 000001   !             A!!           !
   053650   * 000000 * 120000   053770   000060   !      YX  NC  AH!!   xW0   !
   053660     064450   107777   000000   000000   !P3  WAW       !!(!         !
   053670     000002   064472   053770   000040   !  B P3R NC   2!!  !!xW    !
   053700     105230   107741   000000   000000   !VG  W 3       !!  @        !
   053710     100000   105252   053770   000020   !TSH VGR NC   P!!  * xW    !
   053720     105230   104213   000000   000000   !VG  U35       !!           !
   053730     100000   105252 * 000000 * 050115   !TSH VGR      L37!!   *  MP!
   053740   * 000000 * 000000 * 044346 * 000000   !       KZV    !!  !H    !
   053750   * 055660 * 044406 * 000000 * 040346   !NZ2 KSN    JON!!0[ I  !@!
   053760   * 000000 * 000000 * 000000 * 004000   !          AKH!!            !
   053770     054114   000004 * 000000 * 000062   !NED  D    AJ!!LX   2  !
   054000   * 000000 * 131574 * 007537 * 000000   !      ... BRO   !!    13*   !
   054010   * 054006 * 000000 * 054012 * 000002   !NCN    NCR  B!! X   X    !
   054020   * 000000 * 046474 * 055570 * 100400   !    LNL NYP TYX!!  <Mx[  !
   054030   * 020000 * 050000 * 001462 * 024450   !ED2 L2   TR FWP!!  P2 ()!
   054040   * 053032 * 107560 * 000400 * 005742   !M1B V8   FP A6B!! VD  b  !
   054050   * 000000 * 054050 * 000000 * 000000   !     NDH      !!  (X     !
   054060   * 000000 * 054060 * 007403 * 001400   !     NDP BPC  SH!!  0X    !
   054070   * 000001 * 056344 * 000000 * 000000   ! A N4T       !!  d\     !
```

Figure 3-14 Pool Dump (Truncated)

3.2.8 Task Dump

CDA scans the active Task List and, provided the task is resident in memory, prints all or a portion of the tasks virtual address space. The example in Figure 3-15 and the following list illustrate this output.

Item	Description

1. Task name

2. Address of the first word of the Task Control Block for the task

3. Address of the first word of the task's header

WINDOW BLOCKS

4. Name of the partition in which the task resides

5. Lowest and highest virtual addresses available to the task

6. Address of the attachment descriptor

7. Size of window in 32. word blocks

8. Offset to task image within partition in 32. word blocks

9. First Page Description Register used to map the task

10. Number of Page Description Registers used to map task

11. Contents of the last Page Description Register used to map the task

12. Same as number 5 above

13. Physical starting address of the task

14. Dump of the task in octal, RAD50, and ASCII

```
RSX=11M CRASH DUMP ANALYZER        V3.1      15-NOV-77   10:42        PAGE 6
TASK DUMP




                          TASK DUMP OF ...MCR (1)
                          --------------------


                 (2)                              (3)
             TCB ADDRESS = 105230        HEADER ADDRESS = 071530



WINDOW BLOCKS:

   (4)        (5)          (6)        (7)       (8)       (9)     (10)      (11)
   PAR     VIRT LIMITS   ATT DESC  WND SIZE   OFFSET   1ST PDR   NO.   LAST PDR
   ---     -----------   --------  --------   ------   -------   ---   --------

   SYSPAR  120000 127777   054074    000100   000000   177612    1     037406



WINDOW #1 -- TASK VIRTUAL LIMITS 120000-127777 (12)
========================================================

   PHYSICAL STARTING ADDRESS = 110000 (13)
   -------------------------------------

      120000    120362  000162  100001  105252   !Y0B  B4 TSI VGR!!P P    * !
      120010    000424  000424  170017  120634   ! F6  F6 8PO Y4L!!     P !!
      120020    120362  000000  000000  000000   !Y0B          !!P       !
      120030    000000  000000  000000  000000   !            !!         !
      120040    000000  000000  071646  000001   !         RTF A!!    &s !
      120050    000000  000000  121174  000000   !         Y96  !!   !" !
      120060    000373  000000  000000  000000   ! FK          !!(      !
      120070    000000  071710  000004  052712   !    RU    D M/B!! Hs JU!
      120100    000000  053032  000000  053032   !    M1B      M1B!!  V  V!
      120110    000000  053006  000000  000001   ! .  M0V      A!!   V   !
      120120    107734  120000  127777  054074   !W . YX  .FO ND.!!\   /<X!
      120130    000100  000000  000612  037406   ! AX      I4 JCN!!*    ?!
      120140    170000  122276  120522  122314   !8P ZNN Y2R ZN.!! P>SR!LS!
      120150    120424  122020  120470  000000   !Y06 ZJ Y12   !! ! S8! !
      120160    000000  000000  000000  000000   !             !!       !

                   [ABOVE LINE REPEATED 10. TIMES]

      120310    000000  000000  006001  001010   !         A63  M !!      !
      120320    000004  000037  121200  000000   ! D   1 Z     !!    " !
```
                                                                          (14)

Figure 3-15 Task Dump (Truncated)

3.2.9 Clock Queue

The example in Figure 3-16 shows a clock queue listing. The following list explains the example.

Item	Description

1. Address of the clock queue entry

2. The type of time schedule request
    There are six types:

    Type 0 - mark time request

    Type 2 - request with periodic rescheduling

    Type 4 - single shot task request

    Type 6 - single shot internal system subroutine with system subroutine identification

    Type 10- single shot internal system subroutine without system subroutine identification

    Type 12- clear stop bit (shuffler)

3. Task Control Block address or system subroutine identification

4. The hour, minute and second that time request comes due

5. This field varies with each type of time schedule request. There are six types. For a Mark Time request the following labels apply:

    C.AST - AST address

    C.SRC - event flag mask word

    C.DST - event flag mask address

    Event Flag Number

    For a request with periodic rescheduling the labels are:

    C.RSI - reschedule internal

    C.UIC - scheduling UIC

    For a single shot task request the field contains only one label:

    C.UIC - scheduling UIC

For a single shot internal subroutine (both with and without system subroutine identification) the field contains:

> C.SUB – subroutine address

> C.AR5 – relocation base address (for loadable drivers)

6. Octal dump of clock queue in offset mode

RSX-11M CRASH DUMP ANALYZER   V3.1   29-SEP-77   16:45   PAGE 161
CLOCK QUEUE

ADDRESS ①= 052324   REQUEST ② TYPE = 6   TCB ③= 000000

TIME REQUEST BECOMES DUE = 5:55:28 ④

⑤ C.SUB = 127376   C.AR5 = 001600

```
000000     053374  000006  000000  051520  000000  127376  001600  000000 ⎫
000020     000000  052344  040240  001000  000000  160130  064754  000000 ⎬ ⑥
```

ADDRESS = 053374   REQUEST TYPE = 0   TCB = 063734

TIME REQUEST BECOMES DUE = 5:55:32

C.AST = 000000   C.SRC = 000002   C.DST = 063756   EVENT FLAG = 2.

```
000000     000000  001000  063734  051524  000000  000000  000002  063756
000020     053600  000010  053523  000004  000000  000062  057704  000000
```

Figure 3-16 Clock Queue
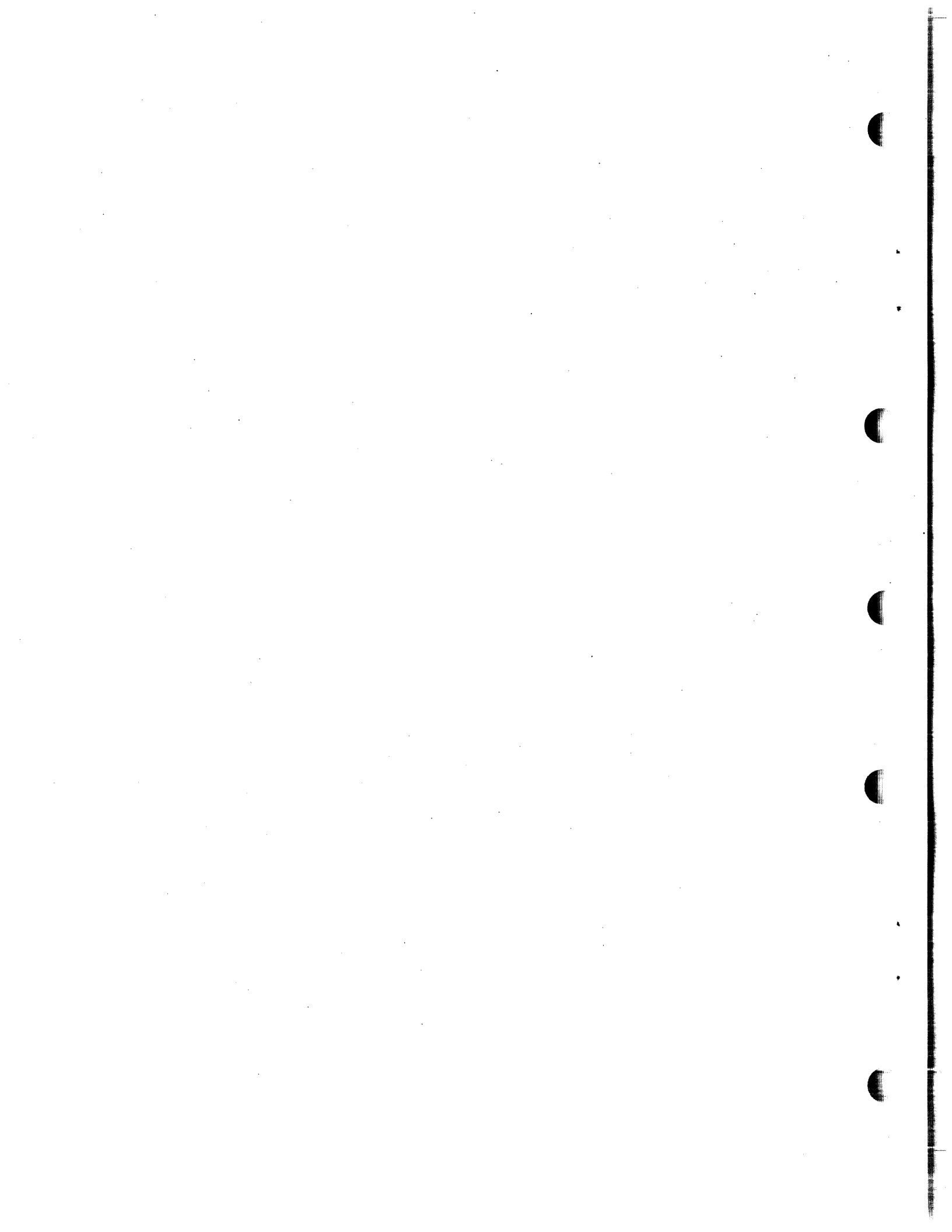
APPENDIX A

ERROR MESSAGES

CDA prints an error message on your terminal when it detects one of the error conditions described below. These error messages reflect operational conditions. Do not confuse these messages with the diagnostic analysis messages that CDA generates during the analysis, and prints in the analysis listing.

Note that not all of the messages listed below result in termination of the analysis. Some are informational in nature, while others are non-fatal errors.

CDA -- UNKNOWN GET COMMAND LINE ERROR

    Type: Fatal

    Meaning: Unrecognized error has occurred when CDA attempted to read a command line.

CDA -- COMMAND I/O ERROR

    Type: Fatal

    Meaning: The system returned an error when CDA attempted to read a command line.

CDA -- INDIRECT FILE OPEN FAILURE

    Type: Fatal.

    Meaning: CDA could not open an indirect command file specified as "@filename" in the CDA command line.

CDA -- INDIRECT COMMAND SYNTAX ERROR

    Type: Fatal

    Meaning: The name of the indirect command file (@filename) is syntactically incorrect.

CDA -- MAXIMUM INDIRECT FILE DEPTH EXCEEDED

    Type: Fatal

    Meaning: You have exceeded the maximum allowable number of nested indirect command files. (Only one level of indirection is permitted in CDA.)

CDA -- FAILED TO EXTEND PAGE BUFFER - n.   PAGES AVAILABLE

    Type: Informational

    Meaning: The "extend task" directive failed when CDA attempted
            to use it to expand the page buffer. This problem will
            cause the analysis to take longer, but the analysis
            will continue with a buffer of n pages, each 256 words
            long.

CDA -- FAILED TO ASSIGN LUN TO INPUT DEVICE ddu

    Type: Fatal

    Meaning: The ASSIGN LUN directive failed when CDA attempted to
            use it to attach the specified input device, before
            reading the crash dump from the device. The ASSIGN LUN
            will fail if the device name in the CDA command line is
            invalid.

CDA -- FAILED TO OPEN INPUT FILE filename

    Type: Fatal

    Meaning: One of the following conditions exists:

                1. Specified device does not exist.

                2. The volume is not mounted.

                3. A problem exists with the device.

                4. Specified UFD does not exist.

                5. Specified file does not exist.

                6. You do not have read access privileges.

CDA -- FAILED TO OPEN OUTPUT FILE filename

    Type: Fatal

    Meaning: One of the following conditions exist:

                1. Specified device does not exist.

                2. The volume is not mounted.

                3. A problem exists with the device.

                4. Specified UFD does not exist.

                5. The volume is full or the device is
                    write-protected.

                6. You do not have write access privilege to
                    UFD.

CDA -- COMMAND LINE SYNTAX ERROR

    Type: Fatal

    Meaning: CDA detected an error in the syntax of a CDA command line. CDA will point to the error within the command line.

CDA -- ILLEGAL SWITCH

    Type: Fatal

    Meaning: You have specified an unknown switch or have used a legal switch after the wrong file specification. CDA will point to the error within the command line.

CDA -- NO OUTPUT FILE SPECIFIED

    Type: Fatal

    Meaning: You have not specified an output file.

CDA -- ANALYSIS OUTPUT MUST BE DIRECTED TO AN EXPLICIT DEVICE OR FILE

    Type: Fatal

    Meaning: CDA requires an explicit output file specification. There are no default output file names.

CDA -- OUTPUT DUMP FILENAME MUST BE EXPLICIT

    Type: Fatal

    Meaning: See preceding message.

CDA -- CRASH DUMP MUST BE INPUT FROM AN EXPLICIT DEVICE OR FILE

    Type: Fatal

    Meaning: The crash dump input file specification must be explicit. There is no default file specification for the crash dump input.

CDA -- NO INPUT FILE SPECIFIED

    Type: Fatal

    Meaning: You did not supply an input file specification for the crash dump.

CDA -- DUMP ABORTED - KERNEL PAR'S CLOBBERED

    Type: Fatal

    Meaning: This message appears on mapped systems only. It indicates that the values contained in the PARs are invalid. To restart the analysis, you must specify the /KMR switch (see Section 2.2.5). This switch forces CDA to use standard mapping values when converting kernel virtual addresses to physical memory addresses.

CDA -- ERROR WRITING ANALYSIS FILE

    Type: Fatal

    Meaning: The system returned an error when CDA attempted to write a line into the analysis listing file. This could be caused by:

            1. A problem with the device.

            2. A full volume.

            3. A bad block on the volume.

CDA -- POOL LINK ERROR FOUND - CONTINUING

    Type: Analysis diagnostic

    Meaning: CDA detected a link error while scanning the pool free block pointers. This condition can be associated with the crash. It can also mean that you specified the wrong executive symbol table file. If the latter is true, the entire analysis will be meaningless, and you should abort CDA.

CDA -- TASK 'taskname' NOT IN MEMORY

    Type: Diagnostic

    Meaning: The above message can be caused by two conditions:

            1. You have requested a dump of a task which does not have an entry in the System Task Directory or

            2. The task has an entry in the System Task Directory, but, it is marked out of memory.

        You can verify the state of the task by examining a dump of the Task Control Blocks.

CDA -- PREMATURE END OF DUMP INPUT - filename BEING ZERO-FILLED

    Type: Informational

    Meaning: CDA reached the end of the medium (or end of file mark, if magtape) before the crash dump output file had been completely filled. If you expected the file to be completely filled by the dump, this condition could indicate a problem.

ERROR MESSAGES

CDA -- TRANSFER COMPLETE - ddu MAY BE UNLOADED

    Type: Informational

    Meaning: The transfer of the crash dump to the output file is finished; you may unload the crash dump device. This message occurs only when you have specified a binary file in the output of the command string to CDA.

CDA -- ERROR WRITING DUMP FILE filename

    Type: Fatal

    Meaning: The system returned an error when CDA attempted to write into the binary output file. This condition could be caused by:

           1. A problem with the device

           2. A full volume

           3. A bad block on the volume

CDA -- ERRORS DETECTED: n.

    Type: Informational

    Meaning: CDA has detected n analysis errors during the run.

CDA -- EXITING DUE TO ILLEGAL TRAP - SNAPSHOT DUMP BEING ATTEMPTED

    Type: Fatal

    Meaning: CDA has aborted after detecting an odd address or some other type of fault. If PMD is installed in the system, the system will generate a snapshot dump. This is an indication of a software problem. You should include any available dumps when you send SPRs to DIGITAL related to this type of failure.

CDA -- SYMBOL FILE filename HAS ILLEGAL FORMAT

    Type: Fatal

    Meaning: The specified executive symbol table file has an improper format, probably caused by entry of the wrong file name. However, this message could also indicate a problem with the device or medium on which the file is located.

CDA -- SYMBOL symbolname NOT DEFINED IN SYMBOL FILE

    Type: Fatal

    Meaning: CDA did not find a symbol that it required for the analysis in the specified executive symbol table file. You have probably entered the wrong filename or have mistakenly used the default filename.

CDA -- DEVICE DRIVER MISSING

    Type: Fatal

    Meaning: You have not loaded the driver for the crash dump input
              device.

CDA -- ERROR READING FILE filename

    Type: Fatal

    Meaning: The system returned an error when CDA attempted to read
              the crash dump file. This could be caused by:

                    1. A device error

                    2. A bad block on the volume

CDA -- ERROR READING SYMBOL FILE filename

    Type: Fatal

    Meaning: See preceding message.

CDA -- ANALYSIS TERMINATED AFTER n, PAGES

    Type: Informational

    Meaning: CDA terminated the analysis after generating n pages of
              analysis output. If the user has not specified the
              /LIMIT switch in the CDA command string, this message
              indicates that CDA has generated more than 300 pages of
              output.

APPENDIX B

SYSTEM DATA STRUCTURES AND SYMBOLIC DEFINITIONS

```
        .IIF NDF $$$YDF , .NLIST
;
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;
        .MACRO CLKDF$,L,B

;+
; CLOCK QUEUE CONTROL BLOCK OFFSET DEFINITIONS
;
; CLOCK QUEUE CONTROL BLOCK
;
; THERE ARE FIVE TYPES OF CLOCK QUEUE CONTROL BLOCKS. EACH CONTROL BLOCK HAS
; THE SAME FORMAT IN THE FIRST FIVE WORDS AND DIFFERS IN THE REMAINING THREE.
;
; THE FOLLOWING CONTROL BLOCK TYPES ARE DEFINED:
;-

C.MRKT='B'0                          ;MARK TIME REQUEST
C.SCHD='B'2                          ;TASK REQUEST WITH PERIODIC RESCHEDULING
C.SSHT='B'4                          ;SINGLE SHOT TASK REQUEST
C.SYST='B'6                          ;SINGLE SHOT INTERNAL SYSTEM SUBROUTINE (IDENT)
C.SYTK='B'8.                         ;SINGLE SHOT INTERNAL SYSTEM SUBROUTINE (TASK)
C.CSTP='B'10.                        ;CLEAR STOP BIT (CONDITIONALIZED ON SHUFFLING)


;
; CLOCK QUEUE CONTROL BLOCK TYPE IDEPENDENT OFFSET DEFINITIONS
;

        .ASECT
.=0
C.LNK:'L' .BLKW 1                    ;CLOCK QUEUE THREAD WORD
C.RQT:'L' .BLKB 1                    ;REQUEST TYPE
```

```
C.EFN:'L' .BLKB 1                    ;EVENT FLAG NUMBER (MARK TIME ONLY)
C.TCB:'L' .BLKW 1                    ;TCB ADDRESS OR SYSTEM SUBROUTINE IDENTIFICATION
C.TIM:'L' .BLKW 2                    ;ABSOLUTE TIME WHEN REQUEST COMES DUE


;
; CLOCK QUEUE CONTROL BLOCK-MARK TIME DEPENDENT OFFSET DEFINITIONS
;

.=C.TIM+4                            ;START OF DEPENDENT AREA
C.AST:'L' .BLKW 1                    ;AST ADDRESS
C.SRC:'L' .BLKW 1                    ;FLAG MASK WORD FOR 'BIS' SOURCE
C.DST:'L' .BLKW 1                    ;ADDRESS OF 'BIS' DESTINATION


;
; CLOCK QUEUE CONTROL BLOCK-PERIODIC RESCHEDULING DEPENDENT OFFSET DEFINITIONS
;

.=C.TIM+4                            ;START OF DEPENDENT AREA
C.RSI:'L' .BLKW 2                    ;RESCHEDULE INTERVAL IN CLOCK TICKS
C.UIC:'L' .BLKW 1                    ;SCHEDULING UIC


;
; CLOCK QUEUE CONTROL BLOCK-SINGLE SHOT DEPENDENT OFFSET DEFINITIONS
;

.=C.TIM+4                            ;START OF DEPENDENT AREA
        .BLKW    2                   ;TWO UNUSED WORDS
        .BLKW    1                   ;SCHEDULING UIC


;
; CLOCK QUEUE CONTROL BLOCK-SINGLE SHOT INTERNAL SUBROUTINE OFFSET DEFINITIONS
;
; THERE ARE TWO TYPE CODES FOR THIS TYPE OF REQUEST:'L'
;
;       TYPE 6=SINGLE SHOT INTERNAL SUBROUTINE WITH A 16 BIT VALUE AS AN IDENTIFIER.
;       TYPE 8=SINGLE SHOT INTERNAL SUBROUTINE WITH A TCB ADDRESS AS AN IDENTIFIER.
;

.=C.TIM+4                            ;START OF DEPENDENT AREA
C.SUB:'L' .BLKW 1                    ;SUBROUTINE ADDRESS
C.AR5:'L' .BLKW 1                    ;RELOCATION BASE (FOR LOADABLE DRIVERS)
        .BLKW    1                   ;ONE UNUSED WORD
C.LGTH='B'.                          ;LENGTH OF CLOCK QUEUE CONTROL BLOCK
        .PSECT

        .MACRO CLKDF$ X,Y
        .ENDM
        .ENDM

        .IIF NDF S$$YDF , .LIST
        .IIF     NDF S$$YDF , .NLIST
```

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        .MACRO DCBDF$,L,B


;+
;
; DEVICE CONTROL BLOCK
;
; THE DEVICE CONTROL BLOCK (DCB) DEFINES GENERIC INFORMATION ABOUT A DEVICE
; TYPE AND THE LOWEST AND HIGHEST UNIT NUMBERS. THERE IS AT LEAST ONE DCB
; FOR EACH DEVICE TYPE IN A SYSTEM. FOR EXAMPLE, IF THERE ARE TELETYPES IN A
; SYSTEM, THEN THERE IS AT LEAST ONE DCB WITH THE DEVICE NAME 'TT'. IF PART
; OF THE TELETYPES WERE INTERFACED VIA DL11-A'S AND THE REST VIA A DH11, THEN
; THERE WOULD BE TWO DCB'S. ONE FOR ALL DL11-A INTERFACED TELETYPES, AND ONE
; FOR ALL DH11 INTERFACED TELETYPES.
;-


        .ASECT
.=0
D.LNK:'L' .BLKW 1                    ;LINK TO NEXT DCB
D.UCB:'L' .BLKW 1                    ;POINTER TO FIRST UNIT CONTROL BLOCK
D.NAM:'L' .BLKW 1                    ;GENERIC DEVICE NAME
D.UNIT:'L' .BLKB 1                   ;LOWEST UNIT NUMBER COVERED BY THIS DCB
        .BLKB   1                    ;HIGHEST UNIT NUMBER COVERED BY THIS DCB
D.UCBL:'L' .BLKW 1                   ;LENGTH OF EACH UNIT CONTROL BLOCK IN BYTES
D.DSP:'L' .BLKW 1                    ;POINTER TO DRIVER DISPATCH TABLE
D.MSK:'L' .BLKW 1                    ;LEGAL FUNCTION MASK CODES 0-15.
        .BLKW   1                    ;CONTROL FUNCTION MASK CODES 0-15.
        .BLKW   1                    ;NOP'ED FUNCTION MASK CODES 0-15.
        .BLKW   1                    ;ACP FUNCTION MASK CODES 0-15.
        .BLKW   1                    ;LEGAL FUNCTION MASK CODES 16.-31.
        .BLKW   1                    ;CONTROL FUNCTION MASK CODES 16.-31.
        .BLKW   1                    ;NOP'ED FUNCTION MASK CODES 16.-31.
        .BLKW   1                    ;ACP FUNCTION MASK CODES 16.-31.
D.PCB:'L' .BLKW 1                    ;LOADABLE DRIVER PCB ADDRESS

        .PSECT


;+
; DRIVER DISPATCH TABLE OFFSET DEFINITIONS
;-

D.VINI='B'0                          ;DEVICE INITIATOR
D.VCAN='B'2                          ;CANCEL CURRENT I/O FUNCTION
D.VOUT='B'4                          ;DEVICE TIMEOUT
D.VPWF='B'6                          ;POWERFAIL RECOVERY

        .MACRO DCBDF$,X,Y
        .ENDM
        .ENDM

        .IIF    NDF S$$YDF , .LIST
        .IIF    NDF,S$$YDF,.NLIST
        .TITLE  F11TBL FILES 11 TABLE DEFINITIONS
        .IDENT  /0018/
;
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; ANDREW C. GOLDSTEIN   30 OCT 75 17:55
; PETER H. LIPMAN 12/27/73

        .MACRO F11DF$
;
; VOLUME CONTROL BLOCK
;
        .ASECT
.=0
V.TRCT: .BLKW   1                       ;TRANSACTION COUNT
V.IFWI: .BLKW   1                       ;INDEX FILE WINDOW
        .IF     DF,R$$11D
V.STD:  .BLKW   1                       ;STD OF TASK CHARGED WITH NODE
        .ENDC
V.FCB:  .BLKW   2                       ;FILE CONTROL BLOCK LIST HEAD
V.IBLB: .BLKB   1                       ;INDEX BIT MAP 1ST LBN HIGH BYTE
V.IBSZ: .BLKB   1                       ;INDEX BIT MAP SIZE IN BLOCKS
        .BLKW   1                       ;INDEX BIT MAP 1ST LBN LOW BITS
V.FMAX: .BLKW   1                       ;MAX NO. OF FILES ON VOLUME
V.WISZ: .BLKB   1                       ;DFLT SIZE OF WINDOW IN NO. OF RTRV PTRS
                                        ;VALUE IS < 128.
V.SBCL: .BLKB   1                       ;STORAGE BIT MAP CLUSTER FACTOR
V.SBSZ: .BLKW   1                       ;STORAGE BIT MAP SIZE IN BLOCKS
V.SBLB: .BLKB   1                       ;STORAGE BIT MAP 1ST LBN HIGH BYTE
V.FIEX: .BLKB   1                       ;DEFAULT FILE EXTEND SIZE
        .BLKW   1                       ;STORAGE BIT MAP 1ST LBN LOW BITS
        .IF     DF,R$$11M
V.VOWN: .BLKW   1                       ;VOLUME OWVER'S UIC
V.VPRO: .BLKW   1                       ;VOLUME PROTECTION
V.VCHA: .BLKW   1                       ;VOLUME CHARACTERISTICS
        .IFTF
V.FPRO: .BLKW   1                       ;VOLUME DEFAULT FILE PROTECTION
        .IFT
V.VFSQ: .BLKW   1                       ;VOLUME FILE SEQUENCE NUMBER
        .IFF
        .BLKW   1                       ;NOT USED
        .ENDC
V.FRBK: .BLKB   1                       ;NUMBER OF FREE BLOCKS ON VOLUME HIGH BYTE
V.LRUC: .BLKB   1                       ;COUNT OF AVAILABLE LRU SLOTS IN FCB LIST
        .BLKW   1                       ;NUMBER OF FREE BLOCKS ON VOLUME LOW BITS
        .IF     DF,R$$11D
V.LABL: .BLKB   12.                     ;VOLUME LABEL (ASCII)
        .ENDC
V.STAT: .BLKB   1                       ;VOLUME STATUS BYTE, CONTAINING THE FOLLOWING
        VC.IFW= 1                       ; INDEX FILE IS WRITE ACCESSED
        VC.BMW= 2                       ; STORAGE BITMAP FILE IS WRITE ACCESSED
V.FFNU: .BLKB   1                       ; FIRST FREE INDEX FILE BITMAP BLOCK
```

```
        V.LGTH:                         ;SIZE IN BYTES OF VCB


        ;
        ; FILE CONTROL BLOCK
        ;
                .ASECT
        .=0
        F.LINK: .BLKW   1               ;FCB CHAIN POINTER
                .IF     DF,R$$11D
        F.FEXT: .BLKW   1               ;POINTER TO EXTENSION FCB
        F.STD:  .BLKW   1               ;STD OF TASK CHARGED WITH NODE
                .ENDC
        F.FNUM: .BLKW   1               ;FILE NUMBER
        F.FSEQ: .BLKW   1               ;FILE SEQUENCE NUMBER
        F.RVN:  .BLKB   1               ;RELATIVE VOLUME NUMBER OF FILE
        F.FSQN: .BLKB   1               ;FILE SEGMENT NUMBER
        F.FOWN: .BLKW   1               ;FILE OWNER'S UIC
        F.FPRO: .BLKW   1               ;FILE PROTECTION CODE
        F.UCHA: .BLKB   1               ;USER CONTROLLED CHARACTERISTICS
        F.SCHA: .BLKB   1               ;SYSTEM CONTROLLED CHARACTERISTICS
        F.HDLB: .BLKW   2               ;FILE HEADER LOGICAL BLOCK NUMBER
                                        ;BEGINNING OF STATISTICS BLOCK
        F.LBN:  .BLKW   2               ;LBN OF VIRTUAL BLOCK 1 IF CONTIGUOUS
                                        ;0 IF NON CONTIGUOUS
        F.SIZE: .BLKW   2               ;SIZE OF FILE IN BLOCKS
        F.NACS: .BLKB   1               ;NO. OF ACCESSES
        F.NLCK: .BLKB   1               ;NO. OF LOCKS
                S.STBK=.-F.LBN          ;SIZE OF STATICS BLOCK
        F.STAT:                         ;FCB STATUS WORD

        F.NWAC: .BLKB   1               ;NUMBER OF WRITE ACCESSORS
                .BLKB   1               ;STATUS BITS FOR FCB CONSISTING OF
                FC.WAC=100000           ;SET IF FILE ACCESSED FOR WRITE
                FC.DIR=40000            ;SET IF FCB IS IN DIRECTORY LRU
                FC.CEF=20000            ;SET IF DIRECTORY EOF NEEDS UPDATING
                FC.FCO=10000            ;SET IF TRYING TO FORCE DIRECTORY CONTIG
        F.DREF: .BLKW   1               ;DIRECTORY EOF BLOCK NUMBER
        F.DRNM: .BLKW   1               ;1ST WORD OF DIRECTORY NAME
                .IF     DF,R$$11M
        F.FEXT: .BLKW   1               ;POINTER TO EXTENSION FCB
                .ENDC
        F.FVBN: .BLKW   2               ;STARTING VBN OF THIS FILE SEGMENT
        F.LKL:  .BLKW   1               ;POINTER TO LOCKED BLOCK LIST FOR FILE
        F.LGTH:                         ;SIZE IN BYTES OF FCB


        ;
        ; WINDOW
        ;
                .ASECT
        .=0
        W.CTL:  .BLKW   1               ;LOW BYTE = # OF MAP ENTRIES ACTIVE
                                        ;HIGH BYTE CONSISTS OF THE FOLLOWING BITS
                WI.RDV=400              ;READ VIRTUAL BLOCK ALLOWED IF SET
                WI.WRV=1000             ;WRITE VIRTUAL BLOCK ALLOWED IF SET
                WI.EXT=2000             ;EXTEND ALLOWED IF SET
                WI.LCK=4000             ;SET IF LOCKED AGAINST SHARED ACCESS
                WI.DLK=10000            ;SET IF DEACCESS LOCK ENABLED
                WI.EXL=40000            ;SET IF MANUAL UNLOCK DESIRED
                WI.BPS=100000           ;BYPASS ACCESS INTERLOCK IF SET
                .IF     DF,R$$11M
        W.VBN:  .BLKB   1               ;HIGH BYTE OF 1ST VBN MAPPED BY WINDOW
        W.WISZ: .BLKB   1               ;SIZE IN RTRV PTRS OF WINDOW (7 BITS)
                .BLKW   1               ;LOW ORDER WORD OF 1ST VBN MAPPED
        W.FCB:  .BLKW   1               ;FILE CONTROL BLOCK ADDRESS
```

```
          .ENDC
          .IF     DF,R$$11D
W.FCB:    .BLKW   1                    ;FILE CONTROL BLOCK ADDRESS
W.STD:    .BLKW   1                    ;STD OF TASK CHARGED WITH WINDOW NODE
W.VBN:    .BLKB   1                    ;HIGH BYTE OF 1ST VBN MAPPED BY WINDOW
W.WISZ:   .BLKB   1                    ;SIZE IN RTRV PTRS OF WINDOW (7 BITS)
          .BLKW   1                    ;LOW ORDER WORD OF 1ST VBN MAPPED
          .ENDC
W.RTRV:                                ;OFFSET TO 1ST RETRIEVAL POINTER IN WINDOW


;
; LOCKED BLOCK LIST NODE
;
          .ASECT
.=0
L.LNK:    .BLKW   1                    ;LINK TO NEXT NODE IN LIST
L.WI1:    .BLKW   1                    ;POINTER TO WINDOW FOR FIRST ENTRY
          .IF     DF,R$$11D
L.STD:    .BLKW   1                    ;POINTER TO STD OF TASK NODE CHARGED TO
L.VB1:    .BLKW   2                    ;STARTING VBN OF FIRST ENTRY
L.VB2:    .BLKW   2                    ;STARTING VBN OF SECOND ENTRY
L.CNT:    .BLKB   1                    ;COUNT FOR FIRST ENTRY
          .BLKB   1                    ;COUNT FOR SECOND ENTRY
          .IFF
L.VB1:    .BLKB   1                    ;HIGH ORDER VBN BYTE
L.CNT:    .BLKB   1                    ;COUNT FOR ENTRY
          .BLKW   1
          .ENDC
L.LGTH:
          .PSECT
          .MACRO  F11DF$
          .ENDM   F11DF$
          .ENDM   F11DF$
          .IIF    NDF,S$$YDF,.LIST
          .IIF NDF S$$YDF , .NLIST
```

```
          .MACRO  HDRDF$,L,B

;+
; TASK HEADER OFFSET DEFINITIONS
;-

          .ASECT
```

```
.=0
H.CSP:'L'.BLKW  1                    ;CURRENT STACK POINTER
H.HDLN:'L'.BLKW 1                    ;HEADER LENGTH IN BYTES
H.EFLM:'L'.BLKW 2                    ;EVENT FLAG MASK WORD AND ADDRESS
H.CUIC:'L'.BLKW 1                    ;CURRENT TASK UIC
H.DUIC:'L'.BLKW 1                    ;DEFAULT TASK UIC
H.IPS:'L'.BLKW  1                    ;INITIAL PROCESSOR STATUS WORD (PS)
H.IPC:'L'.BLKW  1                    ;INITIAL PROGRAM COUNTER (PC)
H.ISP:'L'.BLKW  1                    ;INITIAL STACK POINTER (SP)
H.ODVA:'L'.BLKW 1                    ;ODT SST VECTOR ADDRESS
H.ODVL:'L'.BLKW 1                    ;ODT SST VECTOR LENGTH
H.TKVA:'L'.BLKW 1                    ;TASK SST VECTOR ADDRESS
H.TKVL:'L'.BLKW 1                    ;TASK SST VECTOR LENGTH
H.PFVA:'L'.BLKW 1                    ;POWER FAIL AST CONTROL BLOCK ADDRESS
H.FPVA:'L'.BLKW 1                    ;FLOATING POINT AST CONTROL BLOCK ADDRESS
H.RCVA:'L'.BLKW 1                    ;RECEIVE AST CONTROL BLOCK ADDRESS
H.EFSV:'L'.BLKW 1                    ;EVENT FLAG ADDRESS SAVE ADDRESS
H.FPSA:'L'.BLKW 1                    ;POINTER TO FLOATING POINT/EAE SAVE AREA
H.WND:'L'.BLKW  1                    ;POINTER TO NUMBER OF WINDOW BLOCKS
H.DSW:'L'.BLKW  1                    ;TASK DIRECTIVE STATUS WORD
H.FCS:'L'.BLKW  1                    ;FCS IMPURE POINTER
H.FORT:'L'.BLKW 1                    ;FORTRAN IMPURE POINTER
H.OVLY:'L'.BLKW 1                    ;OVERLAY IMPURE POINTER
H.VEXT:'L'.BLKW 1                    ;WORK AREA EXTENSION VECTOR POINTER
H.SPRI:'L'.BLKB 1                    ;PRIORITY DIFFERENCE FOR SWAPPING
H.NML:'L'.BLKB  1                    ;NETWORK MAILBOX LUN
H.RRVA:'L'.BLKW 1                    ;RECEIVE BY REFERENCE AST CONTROL BLOCK ADDRESS
       .BLKW    3                    ;RESERVED WORDS
H.GARD:'L'.BLKW 1                    ;POINTER TO HEADER GUARD WORD
H.NLUN:'L'.BLKW 1                    ;NUMBER OF LUN'S
H.LUN:'L'.BLKW  2                    ;START OF LOGICAL UNIT TABLE


;+
; WINDOW BLOCK OFFSETS
;-


.=0
W.BPCB:'L'.BLKW 1                    ;PARTITION CONTROL BLOCK ADDRESS
W.BLVR:'L'.BLKW 1                    ;LOW VIRTUAL ADDRESS LIMIT
W.BHVR:'L'.BLKW 1                    ;HIGH VIRTUAL ADDRESS LIMIT
W.BATT:'L'.BLKW 1                    ;ADDRESS OF ATTACHMENT DESCRIPTOR
W.BSIZ:'L'.BLKW 1                    ;SIZE OF WINDOW IN 32W BLOCKS
W.BOFF:'L'.BLKW 1                    ;PHYSICAL MEMORY OFFSET IN 32W BLOCKS
W.BFPD:'L'.BLKB 1                    ;FIRST PDR ADDRESS
W.BNPD:'L'.BLKB 1                    ;NUMBER OF PDR'S TO MAP
W.BLPD:'L'.BLKW 1                    ;CONTENTS OF LAST PDR
W.BLGH:'L'                           ;LENGTH OF WINDOW DESCRIPTOR
       .PSECT

       .MACRO HDRDF$ X,Y
       .ENDM
       .ENDM

       .IIF NDF S$$YDF , .LIST
       .IIF NDF S$$YDF , .NLIST


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        .MACRO HWDDF$,L,B

;+
; HARDWARE REGISTER ADDRESSES AND STATUS CODES
;-

MPCSR='B'177746                 ;ADDRESS OF PDP-11/70 MEMORY PARITY REGISTER
MPAR='B'172100                  ;ADDRESS OF FIRST MEMORY PARITY REGISTER
PIRQ='B'177772                  ;PROGRAMMED INTERRUPT REQUEST REGISTER
PR0='B'0                        ;PROCESSOR PRIORITY 0
PR1='B'40                       ;PROCESSOR PRIORITY 1
PR4='B'200                      ;PROCESSOR PRIORITY 4
PR5='B'240                      ;PROCESSOR PRIORITY 5
PR6='B'300                      ;PROCESSOR PRIORITY 6
PR7='B'340                      ;PROCESSOR PRIORITY 7
PS='B'177776                    ;PROCESSOR STATUS WORD
SWR='B'177570                   ;CONSOLE SWITCH AND DISPLAY REGISTER
TPS='B'177564                   ;CONSOLE TERMINAL PRINTER STATUS REGISTER

;+
; EXTENDED ARITHMETIC ELEMENT REGISTERS
;-


        .IF DF E$$EAE

AC='B'177302                    ;ACCUMULATOR
MQ='B'177304                    ;MULTIPLIER-QUOTIENT
SC='B'177310                    ;SHIFT COUNT

        .ENDC

;+
; MEMORY MANAGEMENT HARDWARE REGISTERS AND STATUS CODES
;-


        .IF DF M$$MGE

KDSAR0='B'172360                ;KERNEL D PAR 0
KDSDR0='B'172320                ;KERNEL D PDR 0
KISAR0='B'172340                ;KERNEL I PAR 0
KISAR5='B'172352                ;KERNEL I PAR 5
KISAR6='B'172354                ;KERNEL I PAR 6
KISAR7='B'172356                ;KERNEL I PAR 7
KISDR0='B'172300                ;KERNEL I PDR 0
KISDR6='B'172314                ;KERNEL I PDR 6
KISDR7='B'172316                ;KERNEL I PAR 7
SISDR0='B'172200                ;SUPERVISOR I PDR 0

UDSAR0='B'177660                ;USER D PAR 0
```

```
UDSDR0='B'177620                        ;USER D PDR 0
UISAR0='B'177640                        ;USER I PAR 0
UISAR4='B'177650                        ;USER I PAR 4
UISAR5='B'177652                        ;USER I PAR 5
UISAR6='B'177654                        ;USER I PAR 6
UISAR7='B'177656                        ;USER I PAR 7
UISDR0='B'177600                        ;USER I PDR 0
UISDR4='B'177610                        ;USER I PDR 4
UISDR5='B'177612                        ;USER I PDR 5
UISDR6='B'177614                        ;USER I PDR 6
UISDR7='B'177616                        ;USER I PDR 7
UBMPR='B'170200                         ;UNIBUS MAPPING REGISTER 0
CMODE='B'140000                         ;CURRENT MODE FIELD OF PS WORD
PMODE='B'30000                          ;PREVIOUS MODE FIELD OF PS WORD
SR0='B'177572                           ;SEGMENT STATUS REGISTER 0
SR3='B'172516                           ;SEGMENT STATUS REGISTER 3

        .ENDC


;+
; FEATURE SYMBOL DEFINITIONS
;-

FE.EXT='B'1                             ;11/70 EXTENDED MEMORY SUPPORT
FE.MUP='B'2                             ;MULTI-USER PROTECTION SUPPORT
FE.EXV='B'4                             ;EXECUTIVE IS SUPPORTED TO 20K
FE.DRV='B'10                            ;LOADABLE DRIVER SUPPORT
FE.PLA='B'20                            ;PLAS SUPPORT
FE.CAL='B'40                            ;DYNAMIC CHECKPOINT SPACE ALLOCATION
FE.PKT='B'100                           ;PREALLOCATION OF I/O PACKETS
FE.EXP='B'200                           ;EXTEND TASK DIRECTIVE SUPPORTED
FE.LSI='B'400                           ;PROCESSOR IS AN LSI-11
FE.CEX='B'20000                         ;COM EXEC IS LOADED
FE.MXT='B'40000                         ;MCR EXIT AFTER EACH COMMAND MODE
FE.NLG='B'100000                        ;LOGINS DISABLED - MULTI-USER SUPPORT

        .MACRO HWDDF$   X,Y
        .ENDM
        .ENDM


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        .IIF NDF S$$YDF , .NLIST
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;
```

```
        .MACRO LCBDF$,L,B
;+
; LOGICAL ASSIGNMENT CONTROL BLOCK
;
; THE LOGICAL ASSIGNMENT CONTROL BLOCK (LCB) IS USED TO ASSOCIATE A
; LOGICAL NAME WITH A PHYSICAL DEVICE UNIT. LCB'S ARE LINKED TOGETHER
; TO FORM THE LOGICAL ASSIGNMENTS OF A SYSTEM. ASSIGNMENTS MAY BE ON
; A SYSTEM WIDE OR LOCAL (TERMINAL) BASIS.
;-


        .ASECT
.=0
L.LNK:'L' .BLKW 1               ;LINK TO NEXT LCB
L.NAM:'L' .BLKW 1               ;LOGICAL NAME OF DEVICE
L.UNIT:'L' .BLKB 1              ;LOGICAL UNIT NUMBER
L.TYPE:'L' .BLKB 1              ;TYPE OF ENTRY (0=SYSTEM WIDE)
L.UCB:'L' .BLKW 1               ;TI UCB ADDRESS
L.ASG:'L' .BLKW 1               ;ASSIGNMENT UCB ADDRESS
L.LGTH='B'.-L.LNK               ;LENGTH OF LCB
        .PSECT

        .MACRO LCBDF$,X,Y
        .ENDM
        .ENDM

        .IIF    NDF S$$YDF , .LIST

        .IIF    NDF S$$YDF , .NLIST


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;

        .MACRO PCBDF$  L,B,SYSDEF


;+
; PARTITION CONTROL BLOCK OFFSET DEFINITIONS
;-


        .ASECT
.=0
P.LNK:'L'.BLKW  1               ;LINK TO NEXT PARTITION PCB
P.PRI:'L'.BLKB  1               ;PRIORITY OF PARTITION
P.IOC:'L'.BLKB  1               ;I/O + I/O STATUS BLOCK COUNT
P.NAM:'L'.BLKW  2               ;PARTITION NAME IN RAD50
P.SUB:'L'.BLKW  1               ;POINTER TO NEXT SUBPARTITION
P.MAIN:'L'.BLKW 1               ;POINTER TO MAIN PARTITION
```

SYSTEM DATA STRUCTURES AND SYMBOLIC DEFINITIONS

```
        .IF NB SYSDEF

        .IF NDF M$$MGE

P.HDR:'L'                          ;POINTER TO HEADER CONTROL BLOCK

        .ENDC

        .IFTF

P.REL:'L'.BLKW  1                  ;STARTING PHYSICAL ADDRESS OF PARTITION
P.BLKS:'L'
P.SIZE:'L'.BLKW 1                  ;SIZE OF PARTITION IN BYTES
P.WAIT:'L'.BLKW 1                  ;PARTITION WAIT QUEUE LISTHEAD (2 WORDS)
P.SWSZ:'L'.BLKW 1                  ;PARTITION SWAP SIZE (SYSTEM ONLY)
P.BUSY:'L'.BLKB 2                  ;PARTITION BUSY FLAGS
P.OWN:'L'
P.TCB:'L'.BLKW  1                  ;TCB ADDRESS OF OWNER TASK
P.STAT:'L'.BLKW 1                  ;PARTITION STATUS FLAGS

        .IFT


        .IF DF M$$MGE

P.HDR:'L' .BLKW 1                  ;POINTER TO HEADER CONTROL BLOCK

        .ENDC

P.PRO:'L' .BLKW 1                  ;PROTECTION WORD [DEWR,DEWR,DEWR,DEWR]
P.ATT:'L' .BLKW 2                  ;ATTACHMENT DESCRIPTOR LISTHEAD

        .IF NDF P$$LAS

P.LGTH='B'P.PRO                    ;LENGTH OF PARTITION CONTROL BLOCK

        .IFF

P.LGTH='B'.                        ;LENGTH OF PARTITION CONTROL BLOCK

        .ENDC

        .IFF

        .PSECT

;+
; PARTITION STATUS WORD BIT DEFINITIONS
;-

PS.OUT='B'100000                   ;PARTITION IS OUT OF MEMORY (1=YES)
PS.CKP='B'40000                    ;PARTITION CHECKPOINT IN PROGRESS (1=YES)
PS.CKR='B'20000                    ;PARTITION CHECKPOINT IS REQUESTED (1=YES)
PS.CHK='B'10000                    ;PARTITION IS NOT CHECKPOINTABLE (1=YES)
PS.FXD='B'4000                     ;PARTITION IS FIXED (1=YES)
PS.PER='B'2000                     ;PARITY ERROR IN PARTITION (1=YES)
PS.LIO='B'1000                     ;MARKED BY SHUFFLER FOR LONG I/O (1=YES)
PS.NSF='B'400                      ;PARITION IS NOT SHUFFLEABLE (1=YES)
PS.COM='B'200                      ;LIBRARY OR COMMON BLOCK (1=YES)
PS.PIC='B'100                      ;POSITION INDEPENDENT LIBRARY OR COMMON (1=YES)
PS.SYS='B'40                       ;SYSTEM CONTROLLED PARTITION (1=YES)
PS.DRV='B'20                       ;DRIVER IS LOADED IN PARTITION (1=YES)
PS.DEL='B'10                       ;PARTITION SHOULD BE DELETED WHEN NOT ATTACHED (1=YES)
```

```
PS.APR='B'7                          ;STARTING APR NUMBER MASK

;+
; ATTACHMENT DESCRIPTOR OFFSETS
;-

        .ASECT
.=0
A.PCBL:'L'.BLKW  1                   ;PCB ATTACHMENT QUEUE THREAD WORD
A.PRI:'L'.BLKB   1                   ;PRIORITY OF ATTACHED TASK
A.IOC:'L'.BLKB   1                   ;I/O COUNT THROUGH THIS DESCRIPTOR
A.TCB:'L'.BLKW   1                   ;TCB ADDRESS OF ATTACHED TASK
A.TCBL:'L'.BLKW  1                   ;TCB ATTACHMENT QUEUE THREAD WORD
A.STAT:'L'.BLKB  1                   ;STATUS BYTE
A.MPCT:'L'.BLKB  1                   ;MAPPING COUNT OF TASK THRU THIS DESCRIPTOR
A.PCB:'L'.BLKW   1                   ;PCB ADDRESS OF ATTACHED TASK
A.LGTH='B'.                          ;LENGTH OF ATTACHMENT DESCRIPTOR


;+
; ATTACHMENT DESCRIPTOR STATUS BYTE BIT DEFINITIONS
;-

        .PSECT
AS.DEL='B'10                         ;TASK HAS DELETE ACCESS (1=YES)
AS.EXT='B'4                          ;TASK HAS EXTEND ACCESS (1=YES)
AS.WRT='B'2                          ;TASK HAS WRITE ACCESS (1=YES)
AS.RED='B'1                          ;TASK HAS READ ACCESS (1=YES)

        .ENDC

        .MACRO PCBDF$ X,Y,Z
        .ENDM
        .ENDM

        .IIF NDF S$$YDF , .LIST

        .IIF NDF S$$YDF , .NLIST
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        .MACRO PKTDF$,L,B

;+
; ASYNCHRONOUS SYSTEM TRAP CONTROL BLOCK OFFSET DEFINITIONS
; SOME POSITIONAL DEPENDENCIES BETWEEN THE OCB AND THE AST CONTROL BLOCK
; ARE RELIED UPON IN THE ROUTINE $FINXT IN THE MODULE SYSXT.
```

```
;-
        .ASECT
.=177774
A.KSR5:'L' .BLKW 1                    ;SUBROUTINE KISAR5 BIAS (A.CBL=0)
A.DQSR:'L' .BLKW 1                    ;DEQUEUE SUBROUTINE ADDRESS (A.CBL=0)
        .BLKW   1                     ;AST QUEUE THREAD WORD
A.CBL:'L' .BLKW 1                     ;LENGTH OF CONTROL BLOCK IN BYTES
A.BYT:'L' .BLKW 1                     ;NUMBER OF BYTES TO ALLOCATE ON TASK STACK
A.AST:'L' .BLKW 1                     ;AST TRAP ADDRESS
A.NPR:'L' .BLKW 1                     ;NUMBER OF AST PARAMETERS
A.PRM:'L' .BLKW 1                     ;FIRST AST PARAMETER


        .ASECT
.=0
        .BLKW   1                     ;AST QUEUE THREAD WORD
A.CBL:'L' .BLKW 1                     ;LENGTH OF CONTROL BLOCK IN BYTES
A.BYT:'L' .BLKW 1                     ;NUMBER OF BYTES TO ALLOCATE ON TASK STACK
A.AST:'L' .BLKW 1                     ;AST TRAP ADDRESS
A.NPR:'L' .BLKW 1                     ;NUMBER OF AST PARAMETERS
A.PRM:'L' .BLKW 1                     ;FIRST AST PARAMETER


;+
; I/O PACKET OFFSET DEFINITIONS
;-


        .ASECT
.=0
I.LNK:'L' .BLKW 1                     ;I/O QUEUE THREAD WORD
I.PRI:'L' .BLKB 1                     ;REQUEST PRIORITY
I.EFN:'L' .BLKB 1                     ;EVENT FLAG NUMBER
I.TCB:'L' .BLKW 1                     ;TCB ADDRESS OF REQUESTOR
I.LN2:'L' .BLKW 1                     ;POINTER TO SECOND LUN WORD
I.UCB:'L' .BLKW 1                     ;POINTER TO UNIT CONTROL BLOCK
I.FCN:'L' .BLKW 1                     ;I/O FUNCTION CODE
I.IOSB:'L' .BLKW 1                    ;VIRTUAL ADDRESS OF I/O STATUS BLOCK
        .BLKW   1                     ;I/O STATUS BLOCK RELOCATION BIAS
        .BLKW   1                     ;I/O STATUS BLOCK ADDRESS
I.AST:'L' .BLKW 1                     ;AST SERVICE ROUTINE ADDRESS
I.PRM:'L' .BLKW 1                     ;RESERVED FOR MAPPING PARAMETER #1
        .BLKW   6                     ;PARAMETERS 1 TO 6
        .BLKW   1                     ;USER MODE DIAGNOSTIC PARAMETER WORD
I.LGTH='B'.                           ;LENGTH OF I/O REQUEST CONTROL BLOCK
        .PSECT

        .MACRO PKTDF$ X,Y
        .ENDM
        .ENDM

        .IIF NDF S$$YDF , .LIST

        .IIF   NDF S$$YDF , .NLIST
```

```
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;

        .MACRO SCBDF$,L,B,SYSDEF

;+
; STATUS CONTROL BLOCK
;
; THE STATUS CONTROL BLOCK (SCB) DEFINES THE STATUS OF A DEVICE CONTROLLER.
; THERE IS ONE SCB FOR EACH CONTROLLER IN A SYSTEM. THE SCB IS POINTED TO
; BY UNIT CONTROL BLOCKS. TO EXPAND ON THE TELETYPE EXAMPLE ABOVE, EACH TELE-
; TYPE INTERFACED VIA A DL11-A WOULD HAVE A SCB SINCE EACH DL11-A IS AN IN-
; DEPENDENT INTERFACE UNIT. THE TELETYPES INTERFACED VIA THE DH11 WOULD ALSO
; EACH HAVE AN SCB SINCE THE DH11 IS A SINGLE CONTROLLER BUT MULTIPLEXES MANY
; UNITS IN PARALLEL.
;-

        .ASECT
.=177772
S.RCNT:'L' .BLKB 1              ;NUMBER OF REGISTERS TO COPY ON ERROR
S.ROFF;'L' .BLKB 1              ;OFFSET TO FIRST DEVICE REGISTER
S.BMSV:'L' .BLKW 1              ;SAVED I/O ACTIVE BITMAP AND POINTER TO EMB
S.BMSK:'L' .BLKW 1              ;DEVICE I/O ACTIVE BIT MASK
S.LHD:'L' .BLKW 2              ;CONTROLLER I/O QUEUE LISTHEAD
S.PRI:'L' .BLKB 1              ;DEVICE PRIORITY
S.VCT:'L' .BLKB 1              ;INTERRUPT VECTOR ADDRESS /4
S.CTM:'L' .BLKB 1              ;CURRENT TIMEOUT COUNT
S.ITM:'L' .BLKB 1              ;INITIAL TIMEOUT COUNT
S.CON:'L' .BLKB 1              ;CONTROLLER INDEX
S.STS:'L' .BLKB 1              ;CONTROLLER STATUS (0=IDLE,1=BUSY)
S.CSR:'L' .BLKW 1              ;ADDRESS OF CONTROL STATUS REGISTER
S.PKT:'L' .BLKW 1              ;ADDRESS OF CURRENT I/O PACKET
S.FRK:'L' .BLKW 1              ;FORK BLOCK LINK WORD
        .BLKW  1               ;FORK-PC
        .BLKW  1               ;FORK-R5
        .BLKW  1               ;FORK-R4

        .IF NB SYSDEF

        .IF DF L$$DRV & M$$MGE

        .BLKW  1               ;FORK-DRIVER RELOCATION BASE

        .ENDC

S.CCB:'L'                      ;MIXED MASSBUS CHANNEL CONTROL BLOCK
S.MPR:'L' .BLKW 6             ;11/70 EXTENDED MEMORY UNIBUS DEVICE C-BLOCK

        .IFF

        .PSECT

;+
; STATUS CONTROL BLOCK PRIORITY BYTE CONDITION CODE STATUS BIT DEFINITIONS
;-

SP.EIP='B'1                    ;ERROR IN PROGRESS (1=YES)
SP.ENB='B'2                    ;ERROR LOGGING ENABLED (0=YES)
SP.LOG='B'4                    ;ERROR LOGGING AVAILABLE (1=YES)
```

```
SPARE=10                                ;SPARE BIT
;+
; MAPPING ASSIGNMENT BLOCK (FOR UNIBUS MAPPING REGISTER ASSIGNMENT)
;-

        .ASECT
.=0
M.LNK:'L'   .BLKW 1                     ;LINK WORD
M.UMRA:'L'  .BLKW 1                     ;ADDRESS OF FIRST ASSIGNED UMR
M.UMRN:'L'  .BLKW 1                     ;NUMBER OF UMR'S ASSIGNED * 4
M.UMVL:'L'  .BLKW 1                     ;LOW 16 BITS MAPPED BY 1ST ASSIGNED UMR
M.UMVH:'L'  .BLKB 1                     ;HIGH 2 BITS MAPPED IN BITS 4 AND 5
M.BFVH:'L'  .BLKB 1                     ;HIGH 6 BITS OF PHYSICAL BUFFER ADDRESS
M.BFVL:'L'  .BLKW 1                     ;LOW 16 BITS OF PHYSICAL BUFFER ADDRESS
M.LGTH='B'.                             ;LENGTH OF MAPPING ASSIGNMENT BLOCK

        .ENDC

        .MACRO SCBDF$,X,Y,Z
        .ENDM
        .ENDM

        .IIF   NDF S$$YDF , .LIST

        .IIF NDF S$$YDF , .NLIST


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        .MACRO TCBDF$,L,B,SYSDEF

;+
; TASK CONTROL BLOCK OFFSET AND STATUS DEFINITIONS
;
; TASK CONTROL BLOCK
;-

        .ASECT
.=0
T.LNK:'L'  .BLKW 1                      ;UTILITY LINK WORD
T.PRI:'L'  .BLKB 1                      ;TASK PRIORITY
T.IOC:'L'  .BLKB 1                      ;I/O PENDING COUNT
T.CPCB:'L' .BLKW 1                      ;POINTER TO CHECKPOINT PCB
T.NAM:'L'  .BLKW 2                      ;TASK NAME IN RAD50
T.RCVL:'L' .BLKW 2                      ;RECEIVE QUEUE LISTHEAD
```

```
T.ASTL:'L' .BLKW 2              ;AST QUEUE LISTHEAD
T.EFLG:'L' .BLKW 2              ;TASK LOCAL EVENT FLAGS 1-32
T.UCB:'L' .BLKW 1               ;UCB ADDRESS FOR PSEUDO DEVICE 'TI'
T.TCBL:'L' .BLKW 1              ;TASK LIST THREAD WORD
T.STAT:'L' .BLKW 1              ;FIRST STATUS WORD (BLOCKING BITS)
T.ST2:'L' .BLKW 1               ;SECOND STATUS WORD (STATE BITS)
T.ST3:'L' .BLKW 1               ;THIRD STATUS WORD (ATTRIBUTE BITS)
T.DPRI:'L' .BLKB 1              ;TASK'S DEFAULT PRIORITY
T.LBN:'L' .BLKB 3               ;LBN OF TASK LOAD IMAGE
T.LDV:'L' .BLKW 1               ;UCB ADDRESS OF LOAD DEVICE
T.PCB:'L' .BLKW 1               ;PCB ADDRESS OF TASK PARTITION
T.MXSZ:'L' .BLKW 1              ;MAXIMUM SIZE OF TASK IMAGE (MAPPED ONLY)
T.ACTL:'L' .BLKW 1              ;ADDRESS OF NEXT TASK IN ACTIVE LIST
T.ATT:'L' .BLKW 2               ;ATTACHMENT DESCRIPTOR LISTHEAD
T.OFF:'L' .BLKW 1               ;OFFSET TO TASK IMAGE IN PARTITION
        .BLKB 1                 ;RESERVED
T.SRCT:'L' .BLKB 1              ;SREF WITH EFN COUNT IN ALL RECEIVE QUEUES
T.RRFL:'L' .BLKW 2              ;RECEIVE BY REFERENCE LISTHEAD


        .IF NB SYSDEF

        .IF NDF P$$LAS

T.LGTH='B'T.ATT                 ;LENGTH OF TASK CONTROL BLOCK

        .IFF

T.LGTH='B'.                     ;LENGTH OF TASK CONTROL BLOCK

        .ENDC

T.EXT='B'0                      ;LENGTH OF TCB EXTENSION

        .IFF

;+
; TASK STATUS DEFINITIONS
;
; FIRST STATUS WORD (BLOCKING BITS)
;-

TS.EXE='B'100000                ;TASK NOT IN EXECUTION (1=YES)
TS.RDN='B'40000                 ;I/O RUN DOWN IN PROGRESS (1=YES)
TS.MSG='B'20000                 ;ABORT MESSAGE BEING OUTPUT (1=YES)
TS.NRP='B'10000                 ;TASK MAPPED TO NONRESIDENT PARTITION (1=YES)
TS.RUN='B'4000                  ;TASK IS RUNNING ON ANOTHER PROCESSOR (1=YES)
TS.OUT='B'400                   ;TASK IS OUT OF MEMORY (1=YES)
TS.CKP='B'200                   ;TASK IS BEING CHECKPOINTED (1=YES)
TS.CKR='B'100                   ;TASK CHECKPOINT REQUESTED (1=YES)


;+
; TASK BLOCKING STATUS MASK
;-

TS.BLK='B'TS.CKP!TS.CKR!TS.EXE!TS.MSG!TS.NRP!TS.OUT!TS.RDN ;


;+
; SECOND STATUS WORD (STATE BITS)
;-

T2.AST='B'100000                ;AST IN PROGRESS (1=YES)
T2.DST='B'40000                 ;AST RECOGNITION DISABLED (1=YES)
T2.CHK='B'20000                 ;TASK NOT CHECKPOINTABLE (1=YES)
T2.CKD='B'10000                 ;CHECKPOINTING DISABLED (1=YES)
```

```
T2.BFX-'B'4000                    ;TASK BEING FIXED IN MEMORY (1=YES)
T2.FXD='B'2000                    ;TASK FIXED IN MEMORY (1=YES)
T2.TIO='B'1000                    ;TASK IS ENGAGED IN TERMINAL I/O
T2.CAF='B'400                     ;DYN CHECKPOINT SPACE ALLOCATION FAILURE
T2.HLT='B'200                     ;TASK IS BEING HALTED (1=YES)
T2.ABO='B'100                     ;TASK MARKED FOR ABORT (1=YES)
T2.STP='B'40                      ;TASK STOPPED (1=YES)
T2.STP='B'20                      ;TASK STOPPED (1=YES)
T2.SPN='B'10                      ;SAVED TS.SPN ON AST IN PROGRESS
T2.SPN='B'4                       ;TASK SUSPENDED (1=YES)
T2.WFR='B'2                       ;SAVED TS.WFR ON AST IN PROGRESS
T2.WFR='B'1                       ;TASK IN WAITFOR STATE (1=YES)


;+
; THIRD STATUS WORD (ATTRIBUTE BITS)
;-

T3.ACP='B'100000                  ;ANCILLARY CONTROL PROCESSOR (1=YES)
T3.PMD='B'40000                   ;DUMP TASK ON SYNCHRONOUS ABORT (0=YES)
T3.REM='B'20000                   ;REMOVE TASK ON EXIT   (1=YES)
T3.PRV='B'10000                   ;TASK IS PRIVILEGED (1=YES)
T3.MCR='B'4000                    ;TASK REQUESTED AS EXTERNAL MCR FUNCTION (1=YES)
T3.SLV='B'2000                    ;TASK IS A SLAVE TASK (1=YES)
T3.CLI='B'1000                    ;TASK IS COMMAND LINE INTERPRETER (1=YES)
T3.CTL='B'1000                    ;TASK WAS ACTIVATED BY A CONTROLLING TASK (1=YES)
T3.RST='B'400                     ;TASK IS RESTRICTED (1=YES)
T3.NSD='B'200                     ;TASK DOES NOT ALLOW SEND DATA
T3.CAL='B'100                     ;TASK HAS CHECKPOINT SPACE IN TASK IMAGE
T3.ROV='B'40                      ;TASK HAS RESIDENT OVERLAYS
T3.NET='B'20                      ;NETWORK PROTOCOL LEVEL

        .ENDC

        .MACRO TCBDF$ X,Y,Z
        .ENDM
        .ENDM

        .IIF NDF S$$YDF , .LIST

        .IIF    NDF S$$YDF , .NLIST


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        .MACRO UCBDF$,L,B
```

```
;+
; UNIT CONTROL BLOCK
;
; THE UNIT CONTROL BLOCK (UCB) DEFINES THE STATUS OF AN INDIVIDUAL DEVICE
; UNIT AND IS THE CONTROL BLOCK THAT IS POINTED TO BY THE FIRST WORD OF
; AN ASSIGNED LUN. THERE IS ONE UCB FOR EACH DEVICE UNIT OF EACH DCB. THE
; UCB'S ASSOCIATED WITH A PARTICULAR DCB ARE CONTIGUOUS IN MEMORY AND ARE
; POINTED TO BY THE DCB. UCB'S ARE VARIABLE LENGTH BETWEEN DCB'S BUT ARE
; OF THE SAME LENGTH FOR A SPECIFIC DCB. TO FINISH THE TELETYPE EXAMPLE ABOVE,
; EACH UNIT ON BOTH INTERFACES WOULD HAVE A UCB.
;-


         .ASECT
.=177774
U.LUIC:'L' .BLKW 1              ;LOGIN UIC - MULTI USER SYSTEMS ONLY
U.OWN:'L' .BLKW 1               ;OWNING TERMINAL - MULTI USER SYSTEMS ONLY
U.DCB:'L' .BLKW 1               ;BACK POINTER TO DCB
U.RED:'L' .BLKW 1               ;POINTER TO REDIRECT UNIT UCB
U.CTL:'L' .BLKB 1               ;CONTROL PROCESSING FLAGS
U.STS:'L' .BLKB 1               ;UNIT STATUS
U.UNIT:'L' .BLKB 1              ;PHYSICAL UNIT NUMBER
U.ST2:'L' .BLKB 1              ;UNIT STATUS EXTENSION
U.CW1:'L' .BLKW 1               ;FIRST DEVICE CHARACTERISTICS WORD
U.CW2:'L' .BLKW 1               ;SECOND DEVICE CHARACTERISTICS WORD
U.CW3:'L' .BLKW 1               ;THIRD DEVICE CHARACTERISTICS WORD
U.CW4:'L' .BLKW 1               ;FOURTH DEVICE CHARACTERISTICS WORD
U.SCB:'L' .BLKW 1               ;POINTER TO SCB
U.ATT:'L' .BLKW 1              ;TCB ADDRESS OF ATTACHED TASK
U.BUF:'L' .BLKW 1               ;RELOCATION BIAS OF CURRENT I/O REQUEST
       .BLKW    1               ;BUFFER ADDRESS OF CURRENT I/O REQUEST
U.CNT:'L' .BLKW 1               ;BYTE COUNT OF CURRENT I/O REQUEST
U.ACP='B'U.CNT+2               ;ADDRESS OF TCB OF MOUNTED ACP
U.VCB='B'U.CNT+4               ;ADDRESS OF VOLUME CONTROL BLOCK
U.CBF='B'U.CNT+2               ;CONTROL BUFFER RELOCATION AND ADDRESS
U.UIC='B'U.CNT+<9.*2>          ;TERMINAL UIC (TERMINALS ONLY)
         .PSECT


;+
; DEVICE TABLE STATUS DEFINITIONS
;
; DEVICE CHARACTERISTICS WORD 1 (U.CW1) DEVICE TYPE DEFINITION BITS.
;-

DV.REC='B'1                    ;RECORD ORIENTED DEVICE (1=YES)
DV.CCL='B'2                    ;CARRIAGE CONTROL DEVICE (1=YES)
DV.TTY='B'4                    ;TERMINAL DEVICE (1=YES)
DV.DIR='B'10                   ;FILE STRUCTURED DEVICE (1=YES)
DV.SDI='B'20                   ;SINGLE DIRECTORY DEVICE (1=YES)
DV.SQD='B'40                   ;SEQUENTIAL DEVICE (1=YES)
DV.MXD='B'100                  ;MASS BUS DEVICE (1=YES)
DV.UMD='B'200                  ;USER MODE DIAGNOSTICS SUPPORTED
DV.SWL='B'1000                 ;UNIT SOFTWARE WRITE LOCKED (1=YES)
DV.PSE='B'2000                 ;PSEUDO DEVICE (1=YES)
DV.COM='B'4000                 ;DEVICE IS MOUNTABLE AS COM CHANNEL (1=YES)
DV.F11='B'40000                ;DEVICE IS MOUNTABLE AS F11 DEVICE (1=YES)
DV.MNT='B'100000               ;DEVICE IS MOUNTABLE (1=YES)


;+
; TERMINAL DEPENDENT CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-

U2.DH1='B'100000               ;UNIT IS A MULTIPLEXER (1=YES)
U2.DJ1='B'40000                ;UNIT IS A DJ11 (1=YES)
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U2.RMT='B'20000              ;UNIT IS REMOTE (1=YES)
U2.L8S='B'10000              ;UNIT IS LA180S (1=YES)
U2.NEC='B'4000               ;DON'T ECHO SOLICITED INPUT (1=YES)
U2.CRT='B'2000               ;UNIT IS A CRT (1=YES)
U2.ESC='B'1000               ;UNIT GENERATES ESCAPE SEQUENCES (1=YES)
U2.LOG='B'400                ;USER LOGGED ON TERMINAL (0=YES)
U2.SLV='B'200                ;UNIT IS A SLAVE TERMINAL (1=YES)
U2.DZ1='B'100                ;UNIT IS A DZ11 (1=YES)
U2.HLD='B'40                 ;TERMINAL IS IN HOLD SCREEN MODE (1=YES)
U2.AT.='B'20                 ;MCR COMMAND AT. BEING PROCESSED (1=YES)
U2.PRV='B'10                 ;UNIT IS A PRIVILEGED TERMINAL (1=YES)
U2.L3S='B'4                  ;UNIT IS A LA30S TERMINAL (1=YES)
U2.VT5='B'2                  ;UNIT IS A VT05B TERMINAL (1=YES)
U2.LWC='B'1                  ;LOWER CASE TO UPPER CASE CONVERSION (1=YES)

;+
; RH11-RS03/RS04 CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-

U2.R04='B'100000             ;UNIT IS A RS04 (1=YES)

;+
; RH11-TU16 CHARACTERISTICS WORD 2 (U.CW2) BIT DEFINITIONS
;-

U2.7CH='B'10000              ;UNIT IS A 7 CHANNEL DRIVE (1=YES)

;+
; UNIT CONTROL PROCESSING FLAG DEFINITIONS
;-

UC.ALG='B'200                ;BYTE ALIGNMENT ALLOWED (1=NO)
UC.NPR='B'100                ;DEVICE IS AN NPR DEVICE (1=YES)
UC.QUE='B'40                 ;CALL DRIVER BEFORE QUEUING (1=YES)
UC.PWF='B'20                 ;CALL DRIVER AT POWERFAIL ALWAYS (1=YES)
UC.ATT='B'10                 ;CALL DRIVER ON ATTACH/DETACH (1=YES)
UC.KIL='B'4                  ;CALL DRIVER AT I/O KILL ALWAYS (1=YES)
UC.LGH='B'3                  ;TRANSFER LENGTH MASK BITS

;+
; UNIT STATUS BIT DEFINITIONS
;-

US.BSY='B'200                ;UNIT IS BUSY (1=YES)
US.MNT='B'100                ;UNIT IS MOUNTED (0=YES)
US.FOR='B'40                 ;UNIT IS MOUNTED AS FOREIGN VOLUME (1=YES)
US.MDM='B'20                 ;UNIT IS MARKED FOR DISMOUNT (1=YES)

;+
; CARD READER DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

US.ABO='B'1                  ;UNIT IS MARKED FOR ABORT IF NOT READY (1=YES)
US.MDE='B'2                  ;UNIT IS IN 029 TRANSLATION NODE (1=YES)

;+
; FILES-11 DEPENDENT UNIT STATUS BITS
;-

US.WCK='B'10                 ;WRITE CHECK ENABLED (1=YES)
US.SPU='B'2                  ;UNIT IS SPINNING UP (1=YES)

;+
; TERMINAL DEPENDENT UNIT STATUS BIT DEFINITIONS
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;-

US.DSB='B'10                        ;UNIT IS DISABLED (1=YES)
US.CRW='B'4                         ;UNIT IS WAITING FOR CARRIER (1=YES)
US.ECH='B'2                         ;UNIT HAS ECHO IN PROGRESS (1=YES)
US.OUT='B'1                         ;UNIT IS EXPECTING OUTPUT INTERRUPT (1=YES)


;+
; LPS11 DEPENDENT UNIT STATUS BIT DEFINITIONS
;-

US.FRK='B'2                         ;FORK IN PROGRESS (1=YES)
US.SHR='B'1                         ;SHAREABLE FUNCTION IN PROGRESS (0='B'YES)


;+
; ANSI MAGTAPE DEPENDENT UNIT STATUS BITS
;-

US.LAB='B'4                         ;UNIT HAS LABELED TAPE ON IT (1=YES)


;+
; UNIT STATUS EXTENSION (U.ST2) BIT DEFINITIONS
;-

US.OFL='B'1                         ;UNIT OFFLINE (1=YES)
US.RED='B'2                         ;UNIT REDIRECTABLE (0=YES)
US.PUB='B'4                         ;UNIT IS PUBLIC DEVICE (1=YES)
US.UMD='B'10                        ;UNIT ATTACHED FOR DIAGNOSTICS (1=YES)
        .MACRO UCBDF$,X,Y
        .ENDM
        .ENDM

        .IIF    NDF S$$YDF , .NLIST
```

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NOTE: This form is for document comments only. DIGITAL will
use comments submitted on this form at the company's
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on a Software Performance Report (SPR) form. If you
require a written reply and are eligible to receive
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Did you find errors in this manual? If so, specify by page.

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Please make suggestions for improvement.

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Is there sufficient documentation on associated system programs
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