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RSX-11M
Crash Dump Analyzer
Reference Manual

Order No. AA-5581A-TC

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First Printing, December 1977

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RSX-11M Version 3.1

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CONTENTS

			Page
PREFACE			v
	0.1	MANUAL OBJECTIVES AND READER ASSUMPTIONS	v
	0.2	DOCUMENT STRUCTURE	v
	0.3	ASSOCIATED DOCUMENTS	v
CHAPTER	1	INTRODUCTION	1-1
	1.1	SYSTEM REQUIREMENTS	1-1
	1.2	OBTAINING A CRASH DUMP	1-2
	1.3	RUNNING CDA	1-3
	1.4	CDA COMMAND STRINGS	1-3
	1.5	INDIRECT COMMAND FILES	1-5
	1.6	BASIC CDA OUTPUT LISTING	1-6
CHAPTER	2	SWITCHES	2-1
	2.1	ANALYSIS SWITCHES	2-1
	2.1.1	/ACT (Task Control Blocks for active tasks)	2-2
	2.1.2	/ALL (all analysis routines)	2-2
	2.1.3	/CLQ (clock queue)	2-2
	2.1.4	/DEV (all devices in system)	2-3
	2.1.5	/DUMP:a:b (list physical memory)	2-3
	2.1.6	/HDR (headers for memory-resident tasks)	2-3
	2.1.7	/PCB (Partition Control Blocks)	2-3
	2.1.8	/POOL (System pool)	2-3
	2.1.9	/TASK=name:a:b (task virtual address space)	2-3
	2.1.10	/STD (System Task Directory)	2-3
	2.2	FUNCTION SWITCHES	2-4
	2.2.1	/BL:n (identify starting block number)	2-4
	2.2.2	/EXIT:n (exit after n errors)	2-5
	2.2.3	/LIMIT:n (limit output listing)	2-5
	2.2.4	/MEMSIZ:n (establish size of binary output file)	2-5
	2.2.5	/KMR (assign kernel mapping register values)	2-6
	2.2.6	/-SP (do not spool)	2-6
	2.2.7	/STB (preceding file contains the Executive Symbol Table)	2-6
CHAPTER	3	ANALYSIS LISTINGS	3-1
	3.1	SYSTEM INFORMATION	3-1
	3.1.1	Volatile Registers	3-1
	3.1.2	Kernel Stack	3-3
	3.1.3	System Common	3-3
	3.1.4	System Common Labeled Dump	3-5
	3.1.5	Pool Statistics	3-6
	3.1.6	Error Log Buffers	3-7
	3.2	OPTIONAL INFORMATION	3-8
	3.2.1	Active Tasks	3-8
	3.2.2	Active Tasks (MCR)	3-12

			Page
	3.2.3	Task Headers	3-14
	3.2.4	Partition Information	3-16
	3.2.5	Device Information	3-20
	3.2.6	System Task Directory	3-26
	3.2.7	Pool Dump	3-26
	3.2.8	Task Dump	3-28
	3.2.9	Clock Queue	3-30
APPENDIX A		ERROR MESSAGES	A-1
APPENDIX B		SYSTEM DATA STRUCTURES AND SYMBOLIC DEFINITIONS	B-1
INDEX			Index-1

FIGURES

FIGURE	3-1	Volatile Registers	3-2
	3-2	Kernel Stack	3-3
	3-3	System Common	3-4
	3-4	System Common Labeled Dump	3-6
	3-5	Pool Statistics	3-7
	3-6	Error Log Buffers	3-8
	3-7	Active Tasks (Truncated)	3-11
	3-8	Active Task (MCR)	3-13
	3-9	Task Headers (Truncated)	3-16
	3-10	Partition Information	3-17
	3-11	Partition Control Blocks and Attachment Descriptors	3-20
	3-12	Device Information and I/O Packet (Truncated)	3-25
	3-13	System Task Directory (Truncated)	3-26
	3-14	Pool Dump (Truncated)	3-27
	3-15	Task Dump (Truncated)	3-29
	3-16	Clock Queue	3-31

TABLES

TABLE	1-1	File Default Values	1-4
	2-1	Summary of CDA Analysis Switches	2-1
	2-2	Summary of CDA Function Switches	2-4

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

			Default Value	
File	Device	UFD	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

(Continued on next page)

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:

000400  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  100230  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)

CURRENT TASK = DMOT2 (2)      TCB ADDRESS = 067220 (3)
$SYSID = 18 (4)      $EXSIZ = 120000 (5)      $SYSIZ = 16384./512K (6)      $SYUIC = [4,54] (7)
$STKDP = 000000 (8)      $COMEF: <33-48> 000000 (9)  <49-64> 000000
LOAD DEVICE = DB0 (10)      LBN = 00700411 (11)      FILE SIZE = 496. (12)

SYSTEM FEATURE MASK = 000377 (13)

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

SYSTEM COMMON ($CMBEG THRU $CMEND): (14)

    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
    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)

```
RSX-11M CRASH DUMP ANALYZER       V3.1       11-NOV-77   14:30       PAGE 4
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  001200
$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
      000000  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  000000  176000
      077777  000000  000000  100000  000077  000700  160000  177777
      003777  000000  000000  017400  000000  000000  000000  170000 (6)
      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
```

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 RSX-11M Error Logging Reference Manual, 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 (2)     PAR = FCPPAR (3)     PCB ADDRESS = 117670 (4)

  LOAD ADDRESS = 00130000 (5)     LOAD DEVICE = LB0 (6)     LBN = 00677200 (7)

  PRI = 149. (8)     I/O COUNT = 0. (9)     UIC = [1,1] (10)     TI = C00 (11)
  MAX SIZE = 000400 (12)     EVENT FLAGS = <1-16> 000002  <17-32> 040004 (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
    -------------

    RECEIVE BLOCK ADDRESS (18) = 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
    ---------

    AST BLOCK ADDRESS (20) = 142420     A.CBL (21) = 020012

    A.BYT (22) = 000020     A.AST (23) = 174646     A.NPR (24) = 000001

    000000    000000  020012  000020  174646  000001  000124 (25)

    RECEIVE BY REFERENCE QUEUE
    --------------------------

    RRQ ADDRESS (26) = 153644     SENDER TCB (27) = 116330

    EVENT FLAG MASK (28) = 000001     EVENT FLAG MASK ADDR (29) = 146420

    REGION ID OF RECEIVER (30) = 000006

    OFFSET IN PARTITION (31) = 000000

    LENGTH TO MAP (32) = 003000     ACCESS RIGHTS (33) = 000003

    000000    000000  116330  000001  146420  000006  000000  003000  000003
    000020    000000  000000  000000  000000  000000  000000  000000  000000  (34)
```

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

```
RSX-11M CRASH DUMP ANALYZER       V3.1       22-SEP-77   10:10       PAGE 17
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    000300  000240  000000  131574  050712  100346  000000  000000
    000020    115276  000001  040000  054604  114760  000000  000020  051300
    000040    001640  076653  063740  117734  000100  116060  064104  064104
    000060    000400  000000  000000  115344  000000  115350  000000  000000


  RECEIVE QUEUE
  *************

  MCR INPUT BUFFER (1) ADDRESS = 100346    UCB = (2) 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
  ******************

  BUFFER ADDRESS = (5) 103620    TCB = (6) 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:

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)
******

  HEADER ADDRESS = 077010 (2)      TCB ADDRESS = 070260 (3)

  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)

  H.WND (9) = 077116    H.GARD (10) = 077160    H.VEXT (11) = 000000    H.SPRI (12) = -5.

  DSW (13) = 000001     H.FCS (14) = 000000     H.FORT (15) = 000000    H.OVLY (16) = 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.

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

```
RSX-11M CRASH DUMP ANALYZER       V3.1        11-NOV-77   14:30       PAGE 12
PARTITION INFORMATION

                              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

```
RSX-11M CRASH DUMP ANALYZER       V3.1      22-SEP-77   10:10       PAGE 30
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.

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

```
RSX-11M CRASH DUMP ANALYZER       V3.1       21-SEP-77   13:44       PAGE 31
DEVICE INFORMATION

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

```
RSX-11M CRASH DUMP ANALYZER        V3.1        11-NOV-77   14:30        PAGE 105
POOL DUMP

                                S Y S T E M     P O O L

    * = NEXT WORD ALLOCATED                FIRST FREE BLOCK ($CRAVL) = 053340
    + = NEXT WORD IS IN $PKAVL LIST                  $PKAVL = 055760
    - = NEXT WORD IS IN $PKAVL AND ALSO IN $CRAVL

053410      041104    000000    053464    000010  ¦JXD      M8D    H¦¦DB   4W  ¦
053420      053464    000004 *  053750 *  045400  ¦M8D   D  NBX L   ¦¦4W   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,w$  ¦
053470      064450    110473    000000    000000  ¦P3  WI$           ¦¦(f       ¦
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   8O   FW¦¦        ¦
053550    * 000124 *  002400 *  040252 *  000401  ¦ BD   2  JM4   FQ¦¦T    *e   ¦
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           ¦¦*e       ¦
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           ¦¦  a       ¦
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     ¦¦    fH   ¦
053750    * 055660 *  044406 *  000000 *  040346  ¦NZ2 K$N       JON¦¦0[ I   f#¦
053760    * 000000 *  000000 *  000000 *  004000  ¦               AKH¦¦        ¦
053770      054114    000004 *  000000 *  000062  ¦NED   D        AJ¦¦LX    2  ¦
054000    * 000000 *  131574 *  007537 *  000000  ¦     ... BRO     ¦¦  ¦3.    ¦
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¦¦ Vp    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) TCB ADDRESS = 105230 (3) HEADER ADDRESS = 071530

WINDOW BLOCKS:

(4) PAR	(5) VIRT LIMITS	(6) ATT DESC	(7) WND SIZE	(8) OFFSET	(9) 1ST PDR	(10) NO.	(11) 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¦¦r r   *  ¦
120010    000424  000424  170017  120634    ¦ F6  F6 8P0 Y4L¦¦     p ¦¦
120020    120362  000000  000000  000000    ¦Y0B              ¦¦r       ¦
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  .F0 ND.¦¦\    /<X¦
120130    000100  000000  000612  037406    ¦ AX       I4 JCN¦¦0     ?¦
120140    170000  122276  120522  122314    ¦8P  ZNN Y2R ZN.¦¦ p>$R¦L$¦
120150    120424  122020  120470  000000    ¦Y06 ZJ  Y12     ¦¦ ¦ $8¦  ¦
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

      (1)                  (2)                 (3)
   ADDRESS = 052324    REQUEST TYPE = 6    TCB = 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 }(6)
   000020    000000  052344  040240  001000  000000  160130  064754  000000 }

   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.

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

```
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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

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;

        .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

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

```
        .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
```

RSX-11M Crash Dump Analyzer
Reference Manual
AA-5581A-TC

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