

# VAX 10000

## Pocket Service Guide

Order Number EK-1000A-PG.001

This manual is intended for Digital service engineers. It supplies easy-to-access key information on VAX 10000 systems.

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# Preface

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## Intended Audience

This manual is written for the Digital service engineer.

## Document Structure

This manual has eight chapters:

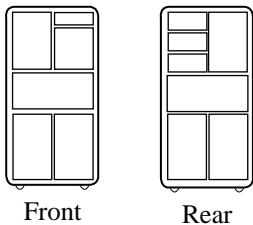
- **Chapter 1, Registers**, lists the registers in this system and provides an illustration of each.
- **Chapter 2, Addressing**, provides information on address space layout, addresses, and device types.
- **Chapter 3, Console**, contains a list of the console commands, syntax, and error messages.
- **Chapter 4, Diagnostics**, shows examples of running diagnostics on adapters and device controllers.
- **Chapter 5, FRU Locations**, identifies the field-replaceable units in the platform.
- **Chapter 6, Controls and Indicators**, discusses the controls and indicators on various components of the system.
- **Chapter 7, Restoring Corrupted ROMs**, provides instructions for restoring corrupted EEPROMs and for updating corrupted firmware.
- **Chapter 8, System Errors**, includes the machine check frame and the system parse trees.

## Conventions Used in This Document

The text shown in command syntax uses these conventions:

- **Bold text** indicates elements to be typed at the terminal.
- Brackets ([ ]) indicate that an element is optional.
- Braces ({} ) indicate a choice from the enclosed list.
- Angle brackets (<>) indicate that the enclosed text is not a literal depiction of the element but instead a reference to the kind of item that can appear in that position.

Icons such as those shown below are used in illustrations for designating part placement in the system described. A shaded area in the icon shows the location of the component or part being discussed.



## Document Titles

Table 1 lists the books in the VAX 10000 documentation set. Table 2 lists other documents that you may find useful.

Table 1 VAX 10000 Documentation

Title	Order Number
<b>Installation Kit</b>	EK-1000A-DK
<i>Site Preparation Guide</i>	EK-1000A-SP
<i>Installation Guide</i>	EK-100EA-IN
<b>Hardware User Information Kit</b>	EK-1001A-DK
<i>Operations Manual</i>	EK-1000A-OP
<i>Basic Troubleshooting</i>	EK-1000A-TS

Table 1 VAX 10000 Documentation (Continued)

Title	Order Number
<b>Service Information Kit</b>	EK-1002A-DK
<i>Pocket Service Guide</i>	EK-1000A-PG
<i>Advanced Troubleshooting</i>	EK-1001A-TS
<i>Platform Service Manual</i>	EK-1000A-SV
<i>System Service Manual</i>	EK-1002A-SV
<b>Reference Manuals</b>	
<i>Console Reference Manual</i>	EK-70C0B-TM
<i>KA7AA CPU Technical Manual</i>	EK-KA7AA-TM
<i>MS7AA Technical Manual</i>	EK-MS7AA-TM
<i>I/O System Technical Manual</i>	EK-70I0A-TM
<i>Platform Technical Manual</i>	EK-7000A-TM
<b>Upgrade Manuals</b>	
<i>KA7AA CPU Installation Card</i>	EK-KA7AA-IN
<i>MS7AA Memory Installation Card</i>	EK-MS7AA-IN
<i>DWLMA XMI PIU Installation Guide</i>	EK-DWLMA-IN
<i>H7237 Battery PIU Installation Guide</i>	EK-H7237-IN
<i>H7263 Power Regulator Installation Card</i>	EK-H7263-IN
<i>BA654 Disk PIU Installation Guide</i>	EK-BA654-IN
<i>DWMBB VAXBI PIU Installation Guide</i>	EK-DWMBB-IN
<i>Removable Media Installation Guide</i>	EK-TFRRD-IN

Table 2 Related Documents

Title	Order Number
<b>General Site Preparation</b>	
<i>Site Environmental Preparation Guide</i>	EK-CSEPG-MA
<b>System I/O Options</b>	
<i>CIXCD Interface User Guide</i>	EK-CIXCD-UG
<i>DEC FDDIcontroller 400 Installation/Problem Solving</i>	EK-DEMFA-IP
<i>DEC LANcontroller 400 Installation Guide</i>	EK-DEMNA-IN
<i>DEC LANcontroller 400 Technical Manual</i>	EK-DEMNA-TM
<i>DSSI VAXcluster Installation and Troubleshooting Manual</i>	EK-410AA-MG
<i>InfoServer 150 Installation and Owner's Guide</i>	EK-INFSV-OM
<i>KFMSA Module Installation and User Manual</i>	EK-KFMSA-IM
<i>KFMSA Module Service Guide</i>	EK-KFMSA-SV
<i>RF Series Integrated Storage Element User Guide</i>	EK-RF72D-UG
<i>TF85 Cartridge Tape Subsystem Owner's Manual</i>	EK-OTF85-OM
<b>Operating System Manuals</b>	
<i>VMS Upgrade and Installation Supplement: VAX 7000-600 and VAX 10000-600 Series</i>	AA-PRAHA-TE
<i>VMS Network Control Program Manual</i>	AA-LA50A-TE
<b>VAXclusters and Networking</b>	
<i>HSC Installation Manual</i>	EK-HSCMN-IN
<i>SC008 Star Coupler User's Guide</i>	EK-SC008-UG
<i>VAX Volume Shadowing Manual</i>	AA-PBTVA-TE
<b>Peripherals</b>	
<i>Installing and Using the VT420 Video Terminal</i>	EK-VT420-UG
<i>LA75 Companion Printer Installation and User Guide</i>	EK-LA75X-UG

# Chapter 1

---

## Registers

This chapter is a compilation of the major registers in components of the VAX 10000 system. Each section consists of a list of the registers in the component including register name, mnemonic, and address and illustrations of the major registers. Sections include:

- KA7AA Registers
  - LSB Required Registers
  - CPU-Specific Registers
  - Internal Processor Registers
  - Gbus Registers
- MS7AA Registers
- I/O Port Registers
- DWLMA Registers
  - LSB Registers
  - XMI Registers

## 1.1 KA7AA Registers

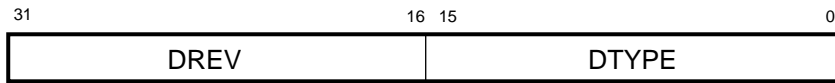
Table 1-1 LSB Required Registers

Mnemonic	Register Name	Byte Offset
LDEV	Device	BB <sup>1</sup> + 0000
LBER	Bus Error	BB + 0040
LCNR	Configuration	BB + 0080
LMMR0	Memory Mapping 0	BB + 0200
LMMR1	Memory Mapping 1	BB + 0240
LMMR2	Memory Mapping 2	BB + 0280
LMMR3	Memory Mapping 3	BB + 02C0
LMMR4	Memory Mapping 4	BB + 0300
LMMR5	Memory Mapping 5	BB + 0340
LMMR6	Memory Mapping 6	BB + 0380
LMMR7	Memory Mapping 7	BB + 03C0
LBESR0	Bus Error Syndrome 0	BB + 0600
LBESR1	Bus Error Syndrome 1	BB + 0640
LBESR2	Bus Error Syndrome 2	BB + 0680
LBESR3	Bus Error Syndrome 3	BB + 06C0
LBECR0	Bus Error Command 0	BB + 0700
LBECR1	Bus Error Command 1	BB + 0740
LIOINTR	I/O Interrupt	BSB <sup>2</sup> + 0000
LIPINTR	Interprocessor Interrupt	BSB + 0040

<sup>1</sup> BB is the node space base address of the CPU module in hex.  
<sup>2</sup> BSB is the broadcast space base address, which is FE00 0000.

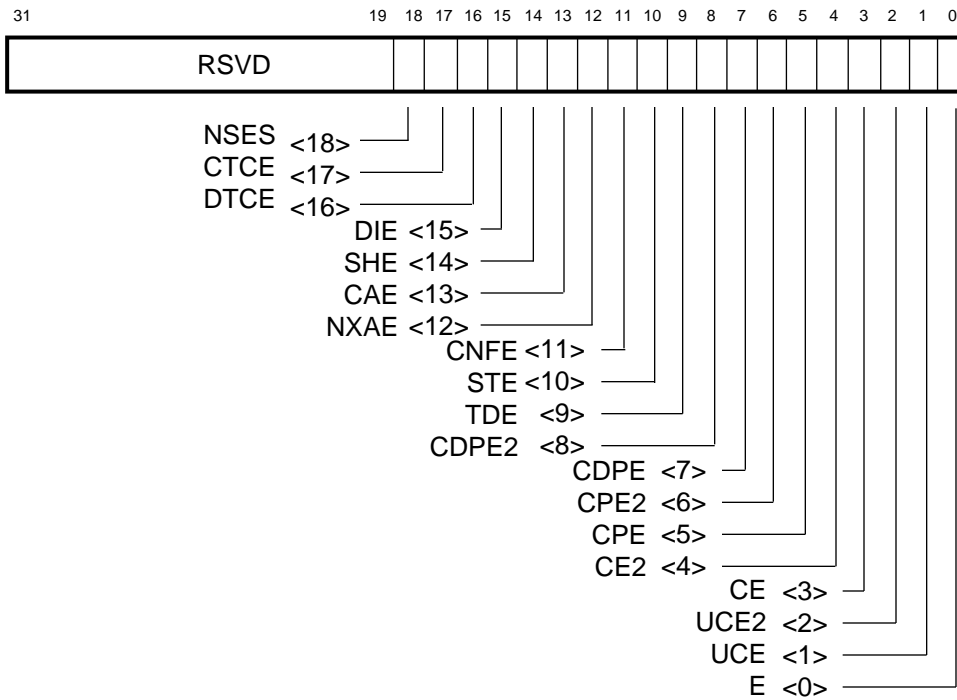


Figure 1-1 LDEV — Device Register



BXB-0100-92

Figure 1-2 LBER — Bus Error Register



BXB-0101-92

Figure 1-3 LCNR — Configuration Register

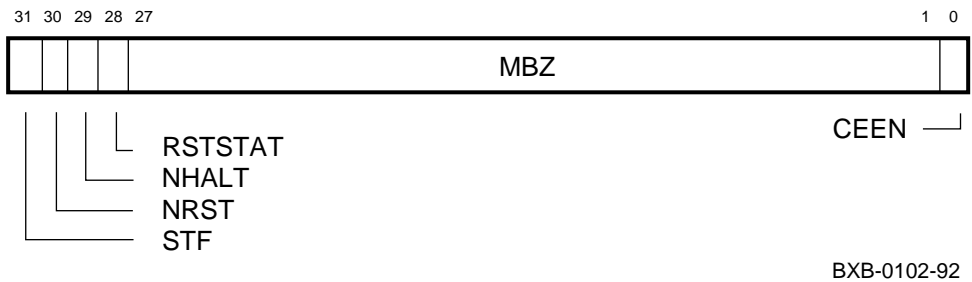


Figure 1-4 LMMR0-7 — Memory Mapping Registers

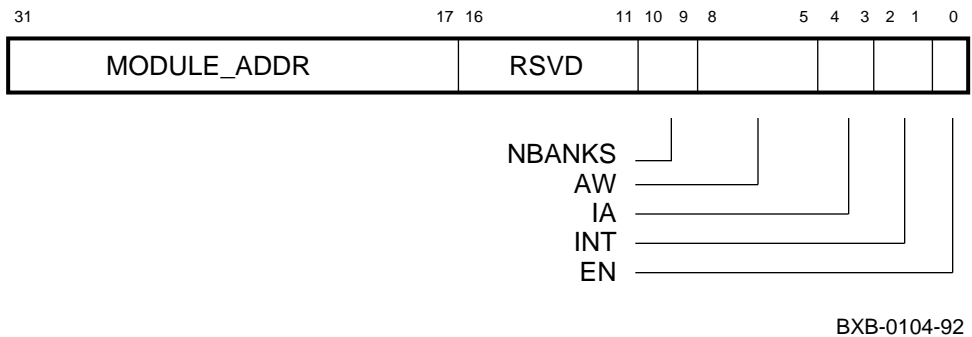


Figure 1-5 LBESR0-3 — Bus Error Syndrome Registers

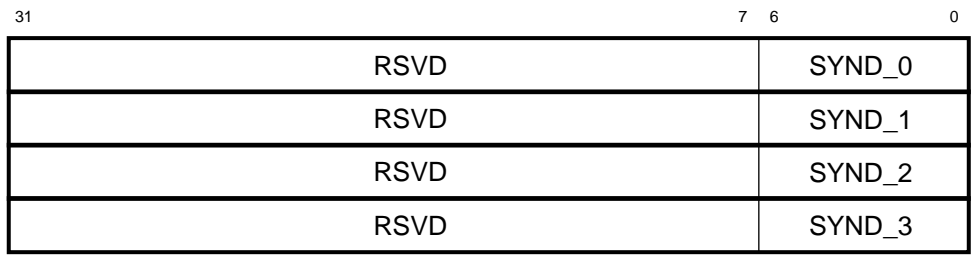


Figure 1-6 LBECR0-1 — Bus Error Command Registers

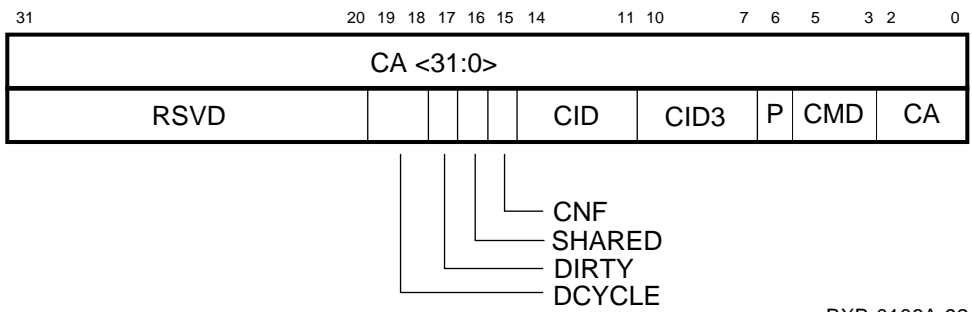


Figure 1-7 LIOINTR — I/O Interrupt Register

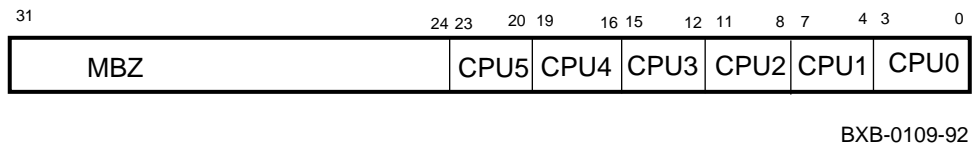


Figure 1-8 LIPINTR — Interprocessor Interrupt Register

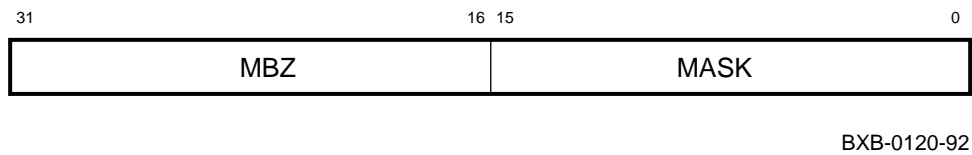
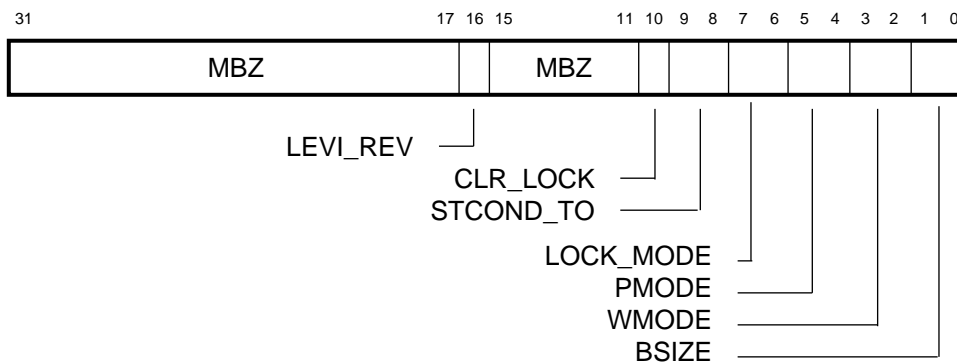


Table 1-2 KA7AA-Specific Registers

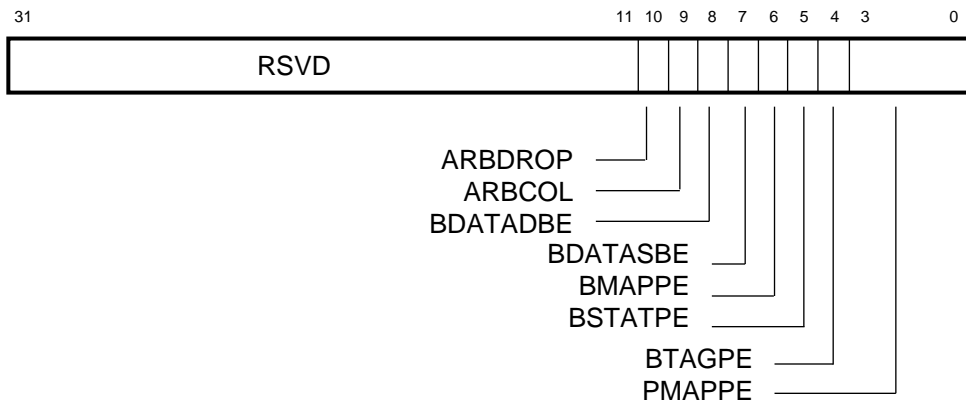
Mnemonic	Register Name	Byte Offset
LMODE	Mode	BB + 0C00
LMERR	Module Error	BB + 0C40
LLOCK	Lock Address	BB + 0C80
LDIAG	LSB Diagnostic Control	BB + 0D00
LTAGA	Tag Address	BB + 0D40
LTAGW	Tag Write Data	BB + 0D80
LCON0	Console Communication 0	BB + 0E00
LCON1	Console Communication 1	BB + 0E40
LPERF	Performance Counter Control	BB + 0F00
LCNTR0	Performance Counter 0	BB + 0F40
LCNTR1	Performance Counter 1	BB + 0F80
LMISSADDR	Last Miss Address	BB + 0FC0

Figure 1-9 LMODE — Mode Register



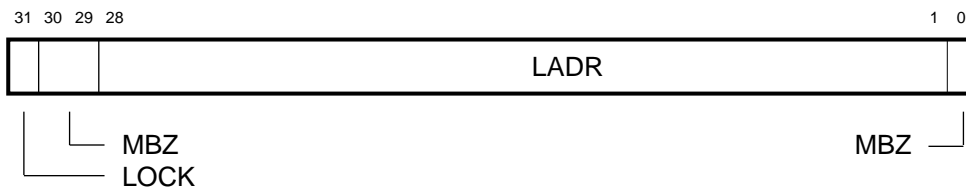
BXB-0130-92

Figure 1-10 LMERR — Module Error Register



BXB-0122-92

Figure 1-11 LLOCK — Lock Address Register



BXB-0126-92

Figure 1-12 LDIAG — LSB Diagnostic Control Register

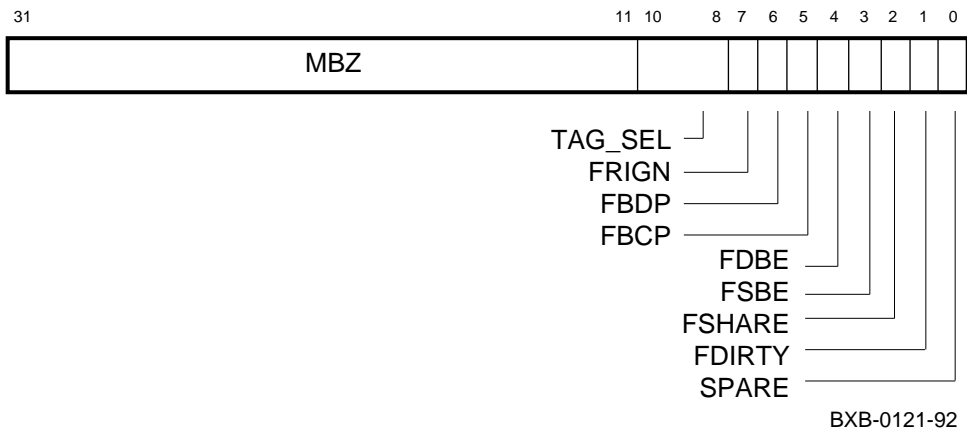


Figure 1-13 LTAGA — Tag Address Register

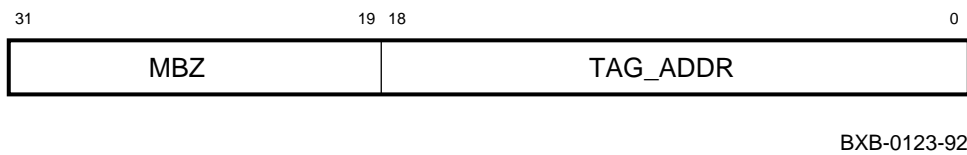


Figure 1-14 LTAGW — Tag Write Data Register

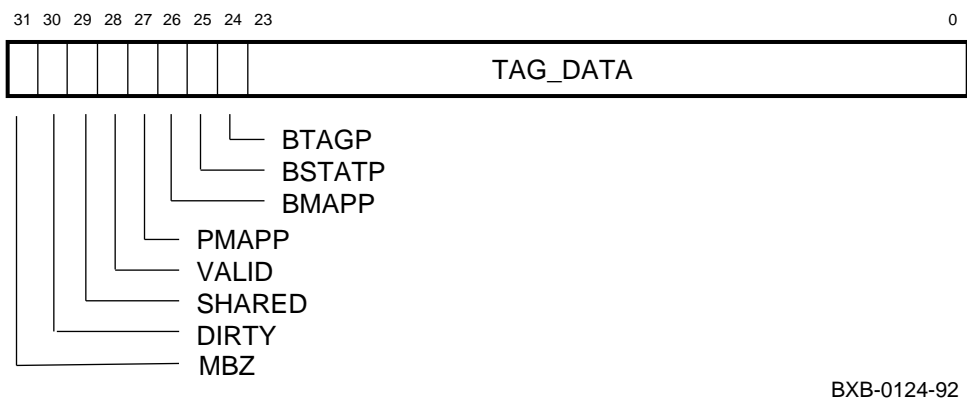
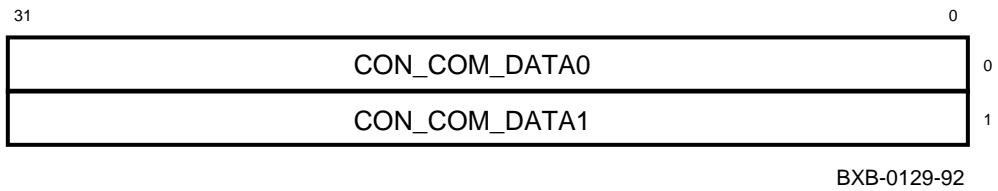
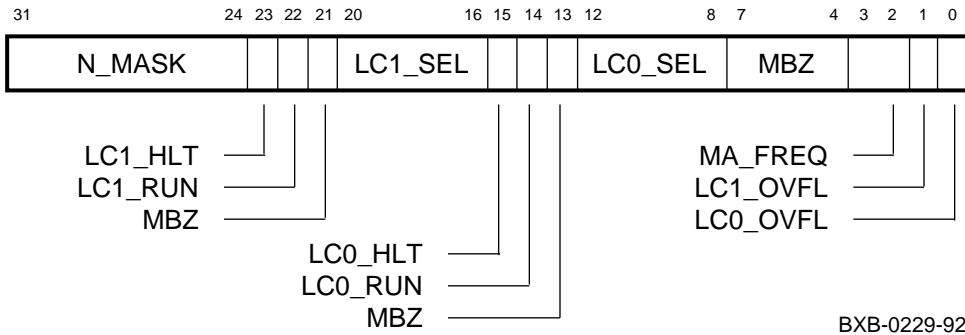


Figure 1-15 LCON0,1 — Console Communication Registers



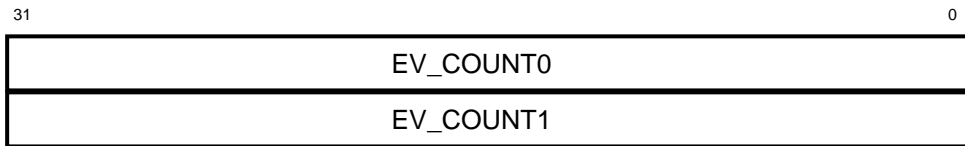
BXB-0129-92

Figure 1-16 LPERF — Performance Counter Control Register



BXB-0229-92

Figure 1-17 LCNTR0,1 — Performance Counter Registers



BXB-0228-92

Figure 1-18 LMISSADDR — Last Miss Address Register

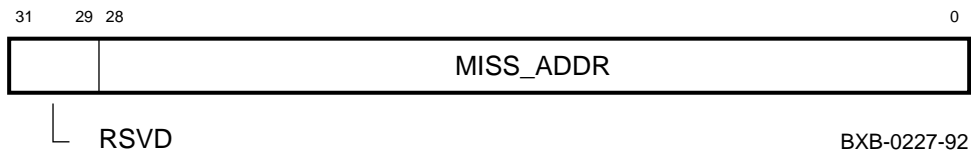




Table 1-3 KA7AA Internal Processor Registers

Mnemonic	Register Name	Address		Type
		Dec	Hex	
KSP	Kernel Stack Pointer	0	0	R/W
ESP	Executive Stack Pointer	1	1	R/W
SSP	Supervisor Stack Pointer	2	2	R/W
USP	User Stack Pointer	3	3	R/W
ISP	Interrupt Stack Pointer	4	4	R/W
P0BR	P0 Base	8	8	R/W
P0LR	P0 Length	9	9	R/W
P1BR	P1 Base	10	A	R/W
P1LR	P1 Length	11	B	R/W
SBR	System Base	12	C	R/W
SLR	System Length	13	D	R/W
CPUID	CPU Identification <sup>1</sup>	14	E	RO
PCBB	Process Control Block Base	16	10	R/W
SCBB	System Control Block Base	17	11	R/W
IPL	Interrupt Priority Level <sup>1</sup>	18	12	R/W
ASTLVL	AST Level <sup>1</sup>	19	13	R/W
SIRR	Software Interrupt Request	20	14	WO
SISR	Software Interrupt Summary <sup>1</sup>	21	15	R/W
ICCS	Interval Clock Control/Status <sup>1</sup>	24	18	R/W
NICR	Next Interval Count	25	19	WO
ICR	Interval Count	26	1A	RO
TODR	Time-of-Day	27	1B	R/W
MCESR	Machine Check Error Summary	38	26	WO
SAVPC	Console Saved PC	42	2A	RO
SAVPSL	Console Saved PSL	43	2B	RO

<sup>1</sup> Initialized on reset.

Table 1-3 KA7AA Internal Processor Registers (Continued)

Mnemonic	Register Name	Address		Type
		Dec	Hex	
MAPEN	Memory Management Enable <sup>1</sup>	56	38	R/W
TBIA	Translation Buffer Invalidate All	57	39	WO
TBIS	Translation Buffer Invalidate Single	58	3A	WO
PME	Performance Monitor Enable <sup>1</sup>	61	3D	R/W
SID	System Identification	62	3E	RO
TBCHK	Translation Buffer Check	63	3F	WO
LMBOX	Mailbox	121	79	R/W
INTSYS	Interrupt System Status <sup>2</sup>	122	7A	R/W
PMFCNT	Performance Monitoring Facility Count	123	7B	R/W
PCSCR	Patchable Control Store Control <sup>2</sup>	124	7C	R/W
ECR	Ebox Control	125	7D	R/W
MTBTAG	Mbox TB Tag Fill <sup>2</sup>	126	7E	WO
MTBPTE	Mbox TB PTE Fill <sup>2</sup>	127	7F	WO
BIU_CTL	BIU Control	160	A0	WO
DIAG_CTL	Diagnostic Control	161	A1	WO
BC_TAG	B-Cache Error Tag	162	A2	RO
BIU_STAT	BIU Status	164	A4	W1C
BIU_ADDR	BIU Address	166	A6	RO
FILL_SYND	Fill Syndrome	168	A8	RO
FILL_ADDR	Fill Address	170	AA	RO
IPR_STR_COND	STxC Pass Fail/CEFSTS	172	AC	R/W

<sup>1</sup> Initialized on reset.  
<sup>2</sup> Testability and diagnostic use only; not for software use in normal operation.

Table 1-3 KA7AA Internal Processor Registers (Continued)

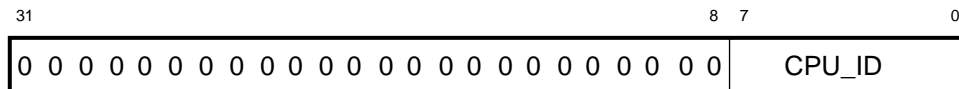
Mnemonic	Register Name	Address		Type
		Dec	Hex	
BEDECC	Software ECC	174	AE	WO
CHALT	Console Halt	176	B0	R/W
SIO	Serial I/O	178	B2	R/W
SOE-IE	SROM_OE_Serial I.E.	180	B4	WO
QW_PACK	Pack to QW	184	B8	WO
CLR_IO_PACK	Clear I/O Pack	185	B9	WO
VMAR	VIC Memory Address	208	D0	R/W
VTAG	VIC Tag	209	D1	R/W
VDATA	VIC Data	210	D2	R/W
ICSR	Ibox Control and Status	211	D3	R/W
BPCR	Ibox Branch Prediction Control <sup>2</sup>	212	D4	R/W
BPC	Ibox Backup PC	214	D6	RO
BPCUNW	Ibox Backup PC with RLOG Unwind <sup>3</sup>	215	D7	RO
MP0BR	Mbox P0 Base <sup>2</sup>	224	E0	R/W
MP0LR	Mbox P0 Length <sup>2</sup>	225	E1	R/W
MP1BR	Mbox P1 Base <sup>2</sup>	226	E2	R/W
MP1LR	Mbox P1 Length <sup>2</sup>	227	E3	R/W
MSBR	Mbox System Base <sup>2</sup>	228	E4	R/W
MSLR	Mbox System Length <sup>2</sup>	229	E5	R/W
MMAPEN	Mbox Map Enable <sup>2</sup>	230	E6	R/W
PAMODE	Physical Address Mode	231	E7	R/W
MMEADR	Memory Management Exception Address	232	E8	RO

<sup>2</sup> Testability and diagnostic use only; not for software use in normal operation.  
<sup>3</sup> Chip use only; not for software use.

Table 1-3 KA7AA Internal Processor Registers (Continued)

Mnemonic	Register Name	Address		Type
		Dec	Hex	
MMEPTE	Memory Management Exception PTE Address	233	E9	RO
MMESTS	Memory Management Exception Status	234	EA	RO
TBADR	Translation Buffer Parity Address	236	EC	RO
TBSTS	Translation Buffer Parity Status	237	ED	R/W
PCADR	P-Cache Parity Address	242	F2	RO
PCSTS	P-Cache Parity Status	244	F4	R/W
PCCTL	P-Cache Control	248	F8	R/W
PCTAG	P-Cache Tag	0180 0000 to 0180 1FE0 (hex)		R/W
PCDAP	P-Cache Data Parity	01C0 0000 to 01C0 1FF8 (hex)		R/W

Figure 1-19 CPUID —CPU Identification Register



BXB-0182-92

Figure 1-20 ICCS — Interval Clock Control and Status Register

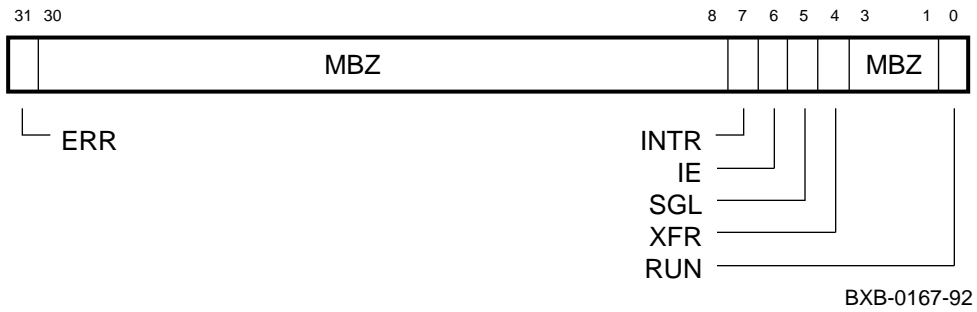


Figure 1-21 NICR — Next Interval Count Register



Figure 1-22 ICR — Interval Count Register

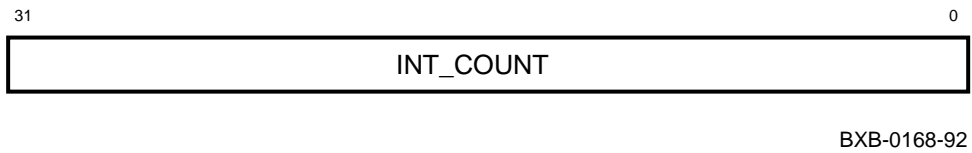


Figure 1-23 TODR — Time-of-Day Register

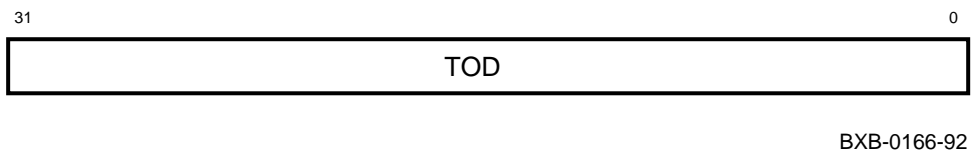
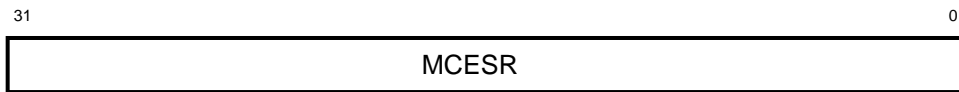
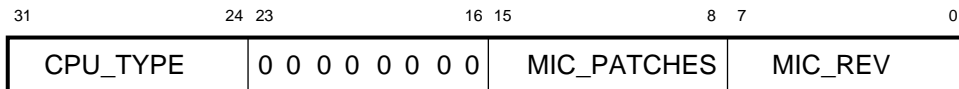


Figure 1-24 MCESR — Machine Check Error Summary Register



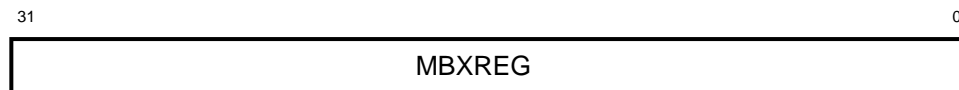
BXB-0236-92

Figure 1-25 SID — System Identification Register



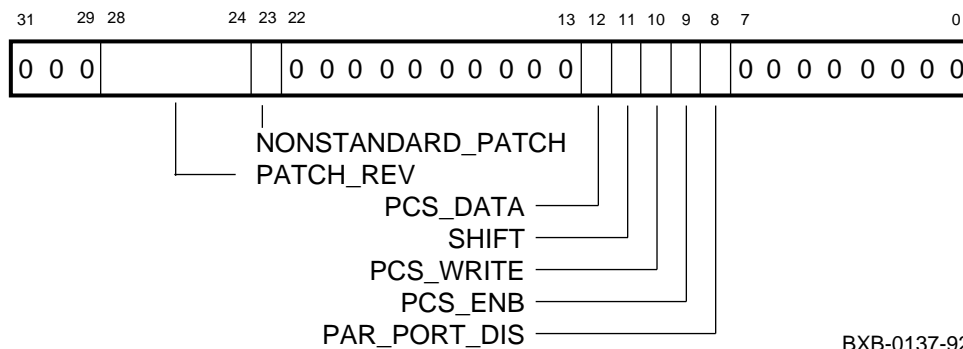
BXB-0180-92

Figure 1-26 LMBOX — LSB Mailbox Register



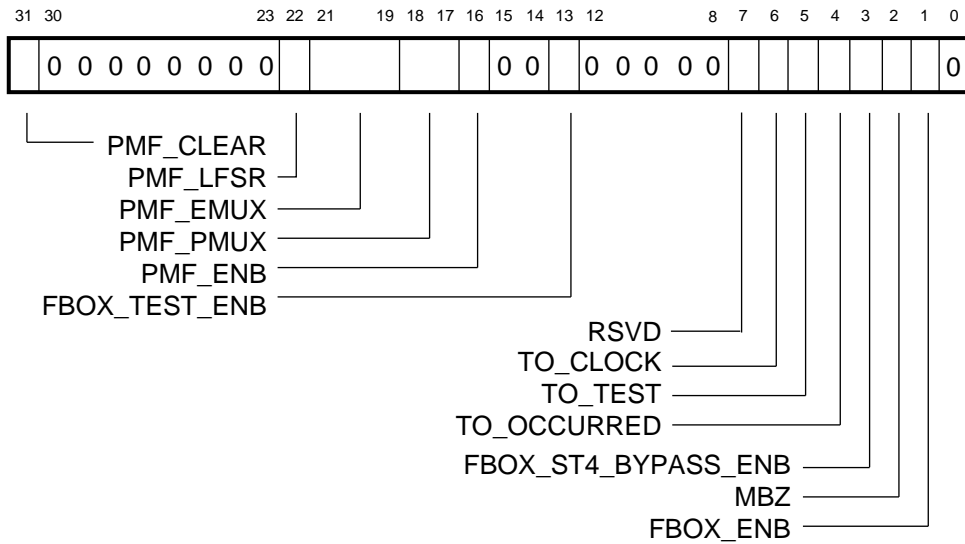
BXB-0175-92

Figure 1-27 PCSCR — Patchable Control Store Control Register



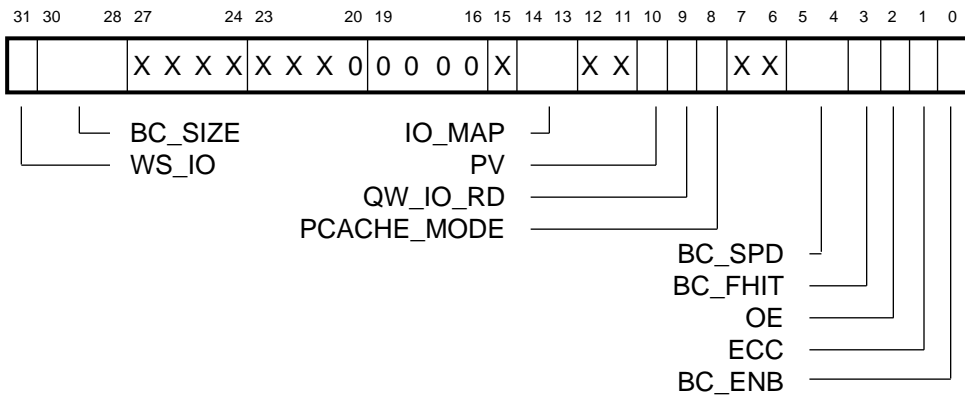
BXB-0137-92

Figure 1-28 ECR — Ebox Control Register



BXB-0138-92

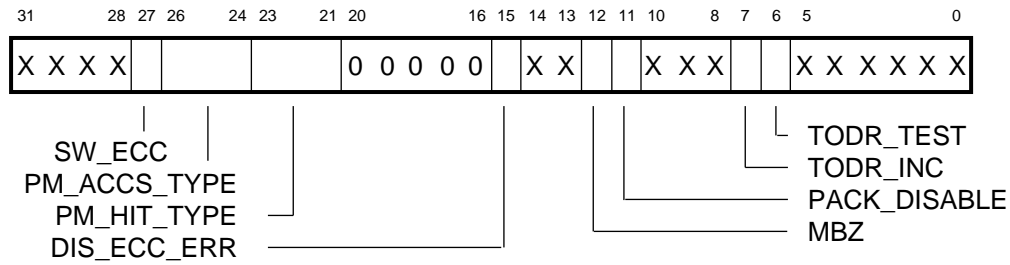
Figure 1-29 BIU\_CTL — BIU Control Register



NOTE: X bits read inverted values from DIAG\_CTL

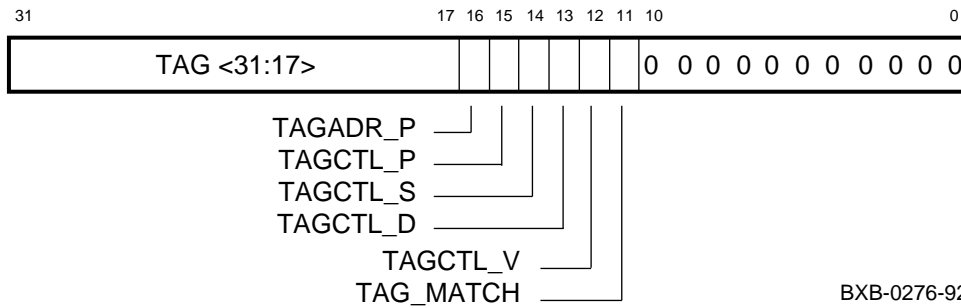
BXB-0213-92

Figure 1-30 DIAG\_CTL — Diagnostic Control Register



BXB-0212-92

Figure 1-31 BC\_TAG — Diagnostic Control Register



BXB-0276-92



Figure 1-32 BIU\_STAT — BIU Status Register

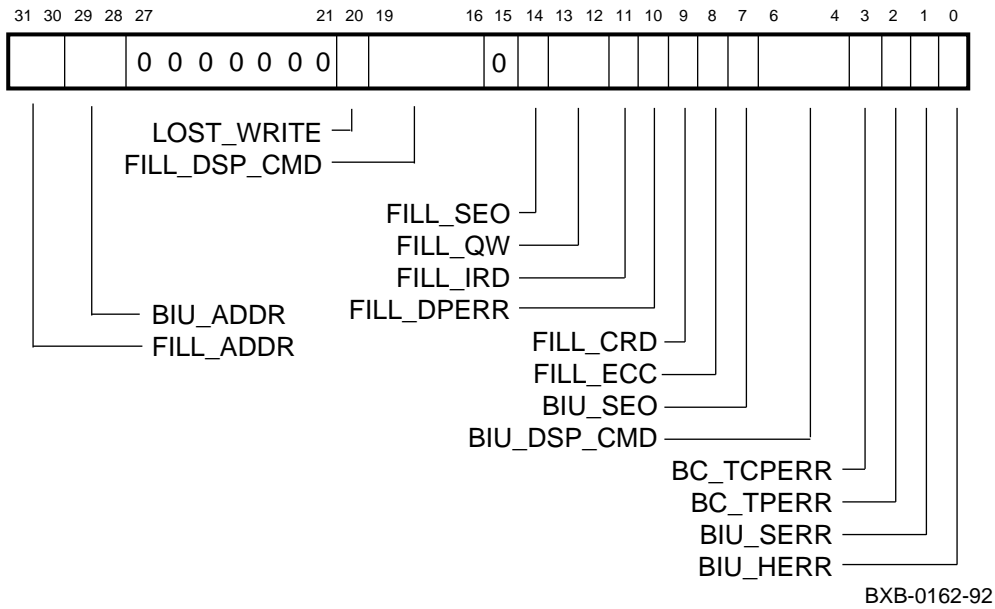


Figure 1-33 BIU\_ADDR — BIU Address Register

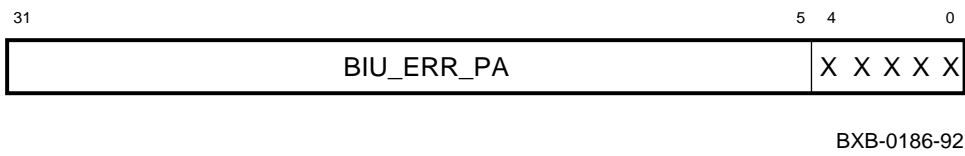


Figure 1-34 FILL\_SYND — Fill Syndrome Register

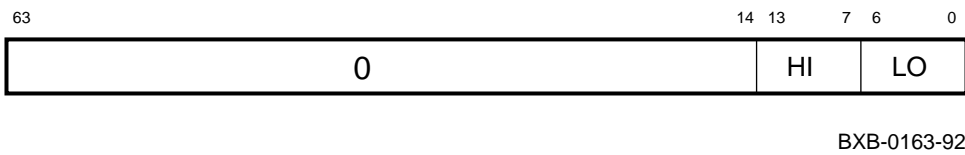
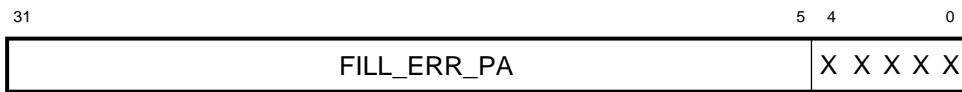
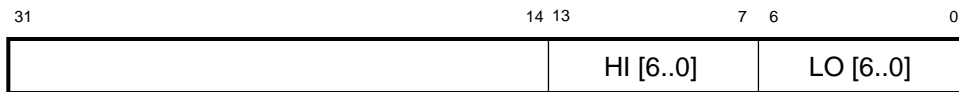


Figure 1-35 FILL\_ADDR — Fill Address Register



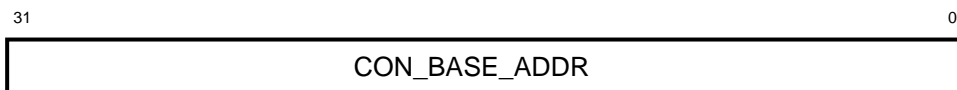
BXB-0187-92

Figure 1-36 BEDCC — Software ECC Register



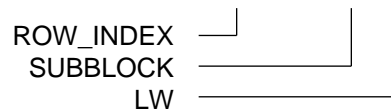
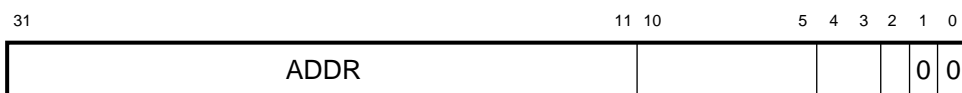
BXB-0262-92

Figure 1-37 CHALT — Console Halt Register



BXB-0170-92

Figure 1-38 VMAR — VIC Memory Address Register



BXB-0132-92

Figure 1-39 VTAG — VIC Tag Register

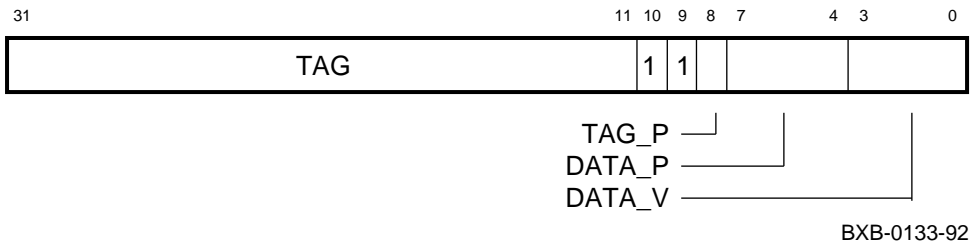


Figure 1-40 VDATA — VIC Data Register

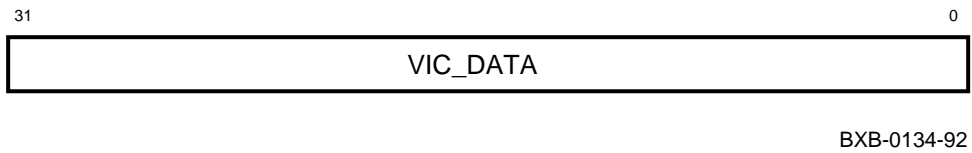


Figure 1-41 ICSR — Ibox Control and Status Register

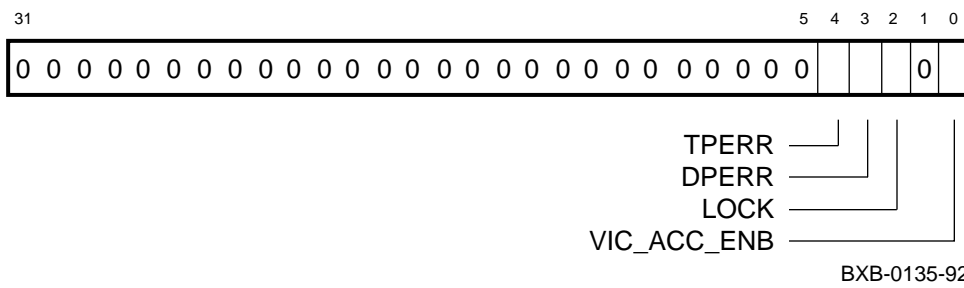
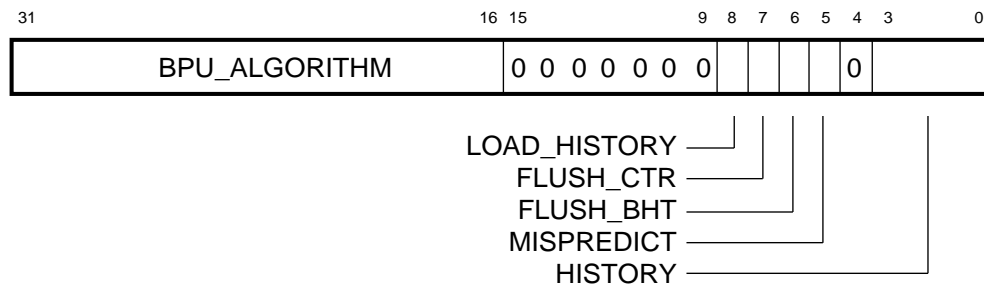
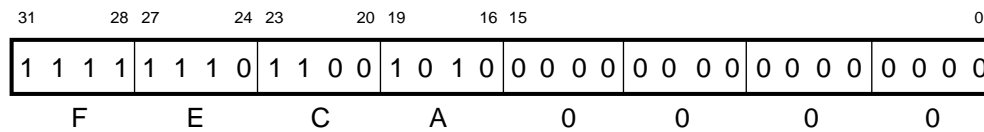


Figure 1-42 BPCR — Ibox Branch Prediction Control Register

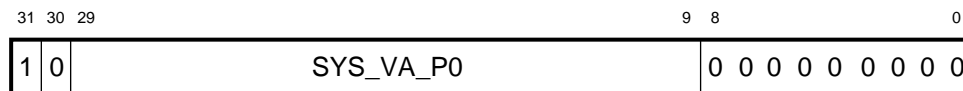


As part of the power-up sequence, the microcode will write FECA0000, which is the following bit pattern:



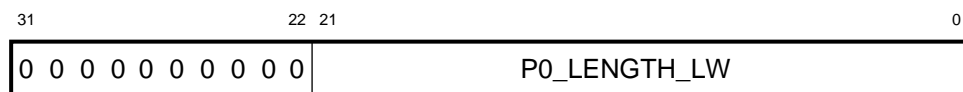
BXB-0136-92

Figure 1-43 MP0BR — Mbox P0 Base Register



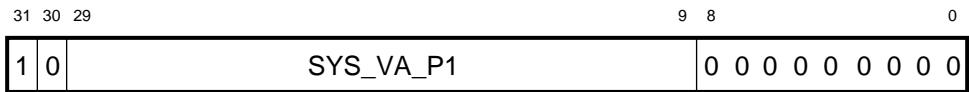
BXB-0139-92

Figure 1-44 MP0LR — Mbox P0 Length Register



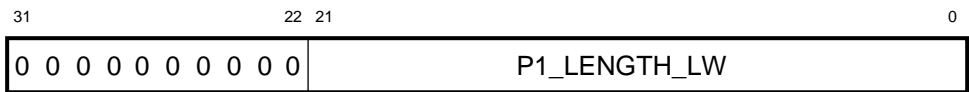
BXB-0140-92

Figure 1-45 MP1BR — Mbox P1 Base Register



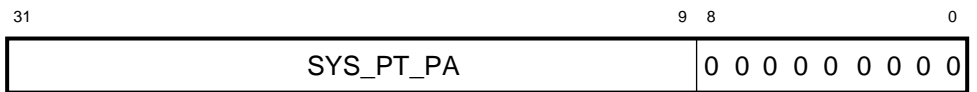
BXB-0141-92

Figure 1-46 MP1LR — Mbox P1 Length Register



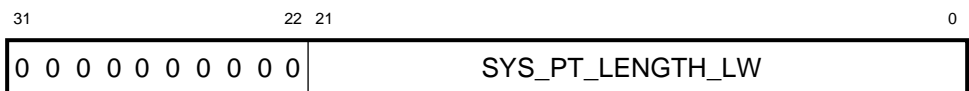
BXB-0142-92

Figure 1-47 MSBR — Mbox System Base Register



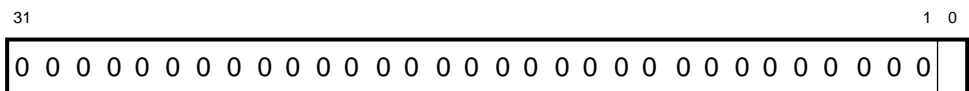
BXB-0143-92

Figure 1-48 MSLR — Mbox System Length Register



BXB-0144-92

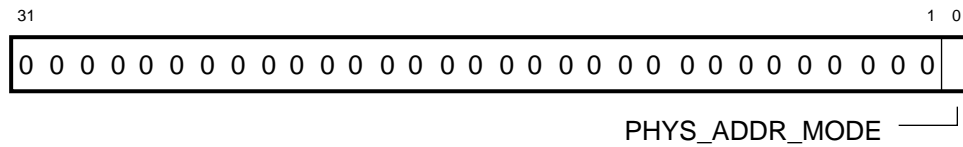
Figure 1-49 MMAPEN — Mbox Map Enable Register



MEM\_MNG\_ENB

BXB-0145-92

Figure 1-50 PAMODE — Physical Address Mode Register



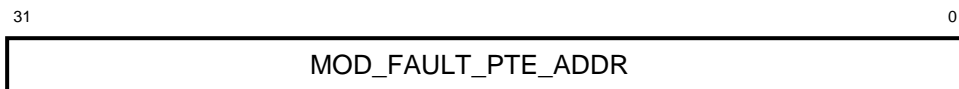
BXB-0146-92

Figure 1-51 MMEADR — Memory Management Exception Address Register



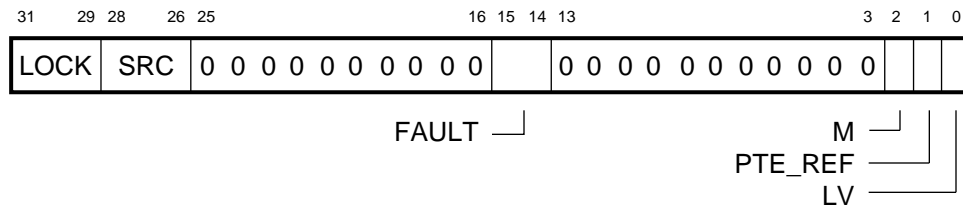
BXB-0147-92

Figure 1-52 MMEPTE — Memory Management Exception PTE Address Register



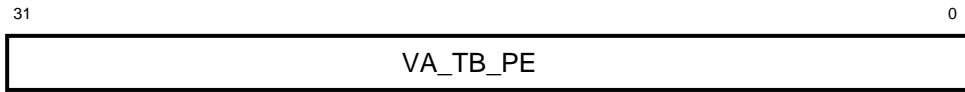
BXB-0148-92

Figure 1-53 MMESTS — Memory Management Exception Status Register



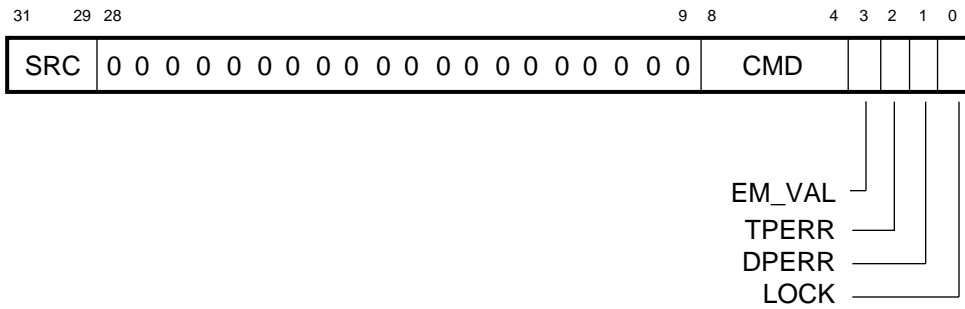
BXB-0149-92

Figure 1-54 TBADR — Translation Buffer Parity Address Register



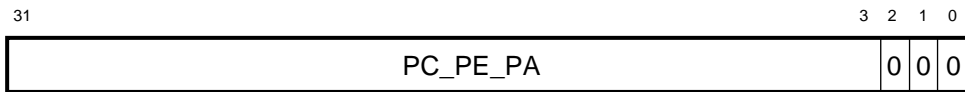
BXB-0150-92

Figure 1-55 TBSTS — Translation Buffer Parity Status Register



BXB-0151-92

Figure 1-56 PCADR — P-Cache Parity Address Register



BXB-0152-92

Figure 1-57 PCSTS — P-Cache Parity Status Register

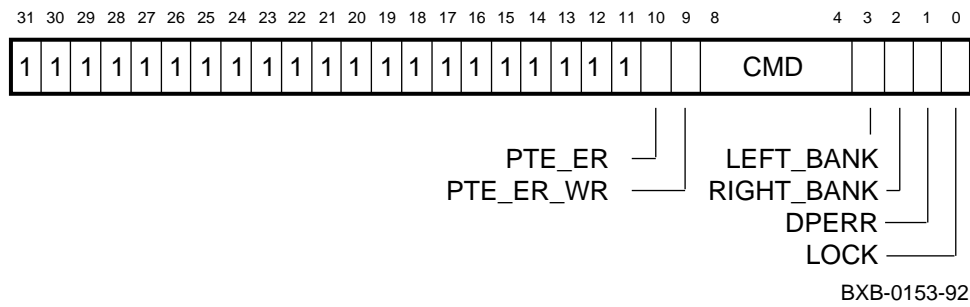


Figure 1-58 PCCTL — P-Cache Control Register

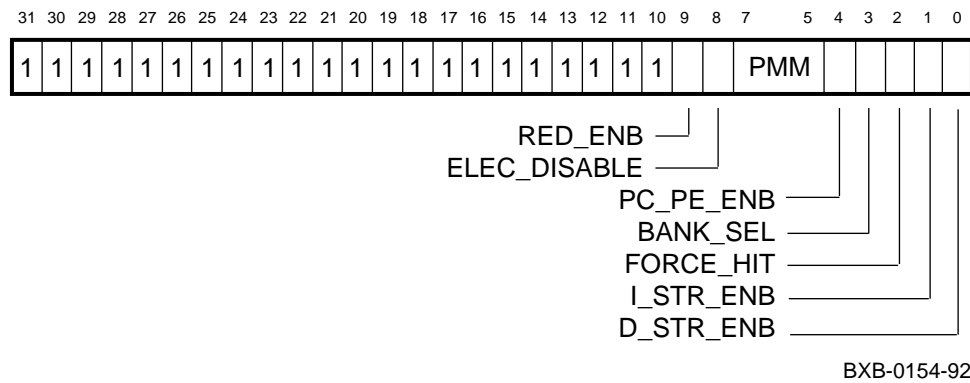


Figure 1-59 PCTAG — P-Cache Tag Registers

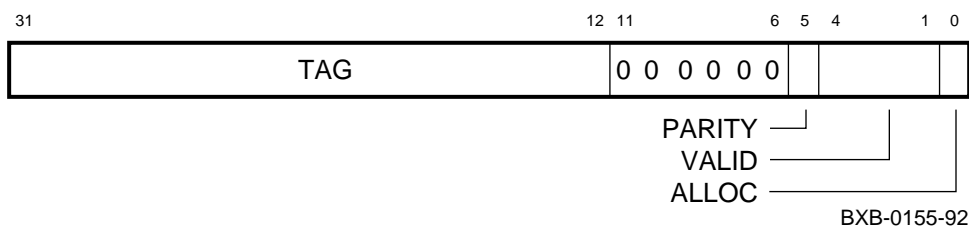
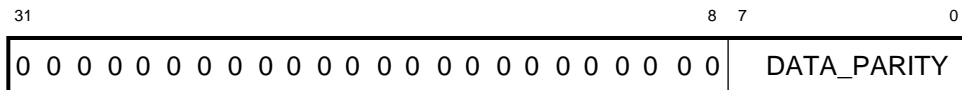




Figure 1-60 PCDAP — P-Cache Data Parity Registers

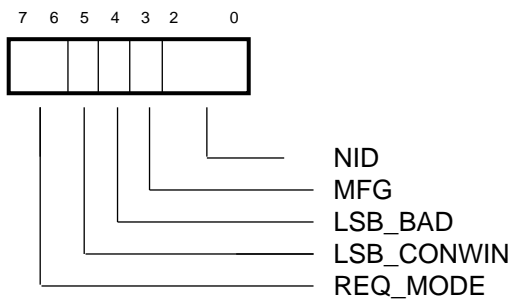


BXB-0156-92

Table 1-4 Gbus Registers

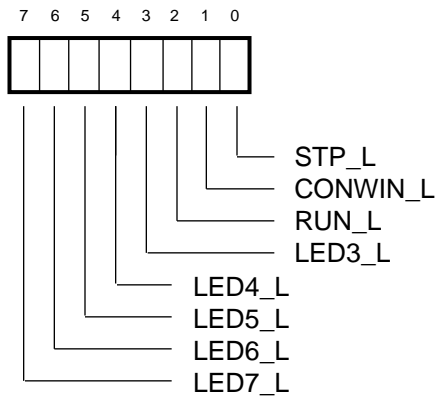
Register	Address	Type
Gbus\$WHAMI	F700 0000	RO
Gbus\$LEDs	F700 0040	R/W
Gbus\$PMask	F700 0080	R/W
Gbus\$Intr	F700 00C0	R/W
Gbus\$Halt	F700 0100	R/W
Gbus\$LSBRST	F700 0140	R/W
Gbus\$Misc	F700 0180	R/W
Gbus\$RMode	F780 0000	R/W
Gbus\$LTagRW	F780 0100	R/W

Figure 1-61 Gbus\$WHAMI Register



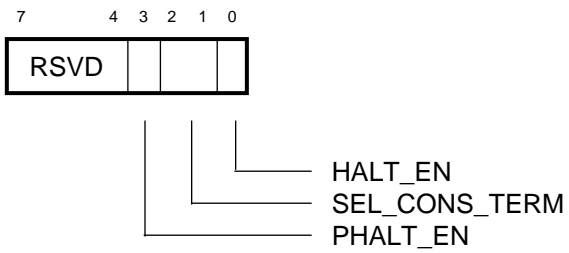
BXB-0243-92

Figure 1-62 Gbus\$LEDs Register



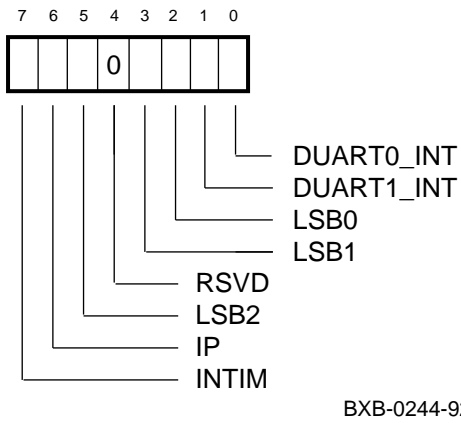
BXB-0240-92

Figure 1-63 Gbus\$PMask Register

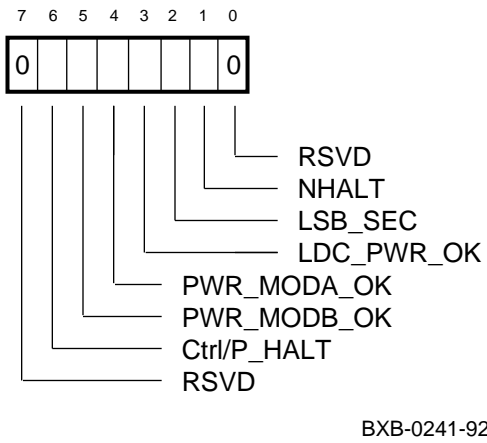


BXB-0242-92

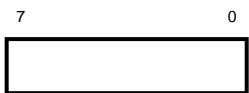
**Figure 1-64 Gbus\$Intr Register**



**Figure 1-65 Gbus\$Halt Register**

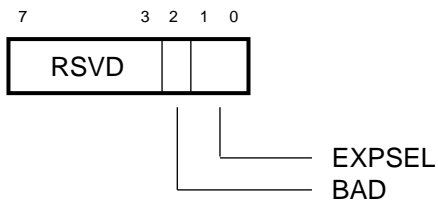


**Figure 1-66 Gbus\$LSBRST Register**



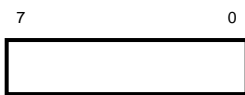
BXB-0264-92

**Figure 1-67 Gbus\$Misc Register**



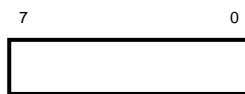
BXB-0239-92

**Figure 1-68 Gbus\$RMode Register**



BXB-0264-92

**Figure 1-69 Gbus\$LTagRW Register**



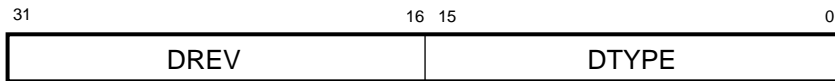
BXB-0264-92

## 1.2 MS7AA Registers

Table 1-5 MS7AA Registers

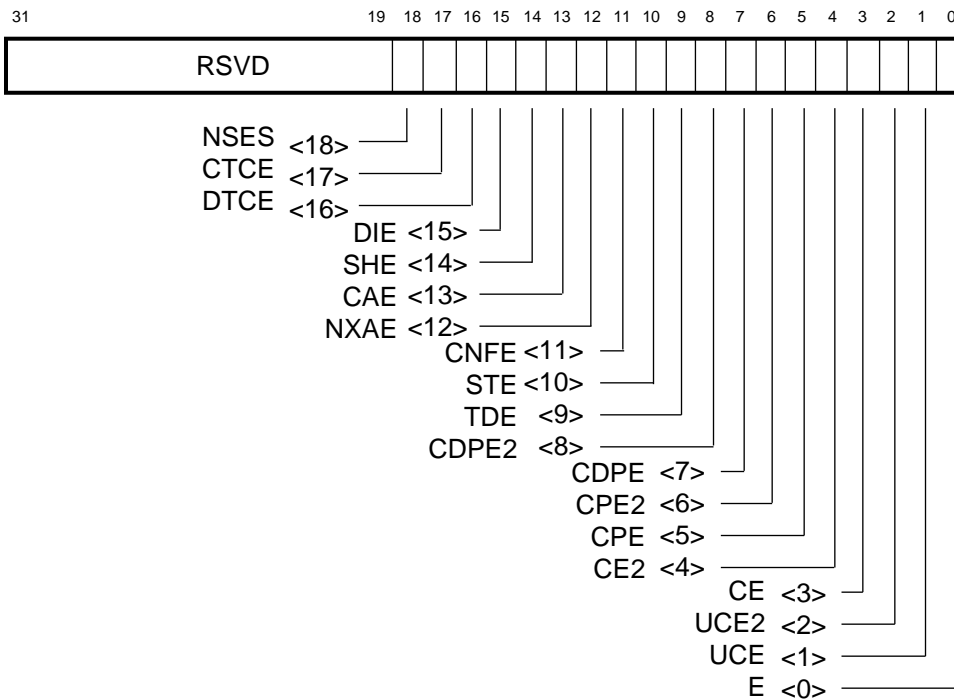
Mnemonic	Register Name	Address Byte Offset
LDEV	Device	BB + 0000
LBER	Bus Error	BB + 0040
LCNR	Configuration	BB + 0080
IBR	Information Base Repair	BB + 00C0
LBESR0	Error Syndrome 0	BB + 0600
LBESR1	Error Syndrome 1	BB + 0640
LBESR2	Error Syndrome 2	BB + 0680
LBESR3	Error Syndrome 3	BB + 06C0
LBECR0	Error Command 0	BB + 0700
LBECR1	Error Command 1	BB + 0740
MCR	Memory Configuration	BB + 2000
AMR	Address Mapping	BB + 2040
MSTR0	Memory Self-Test 0	BB + 2080
MSTR1	Memory Self-Test 1	BB + 20C0
FADR	Failing Address	BB + 2100
MERA	Memory Error A	BB + 2140
MSYNDA	Memory Error Syndrome A	BB + 2180
MDRA	Memory Diagnostic A	BB + 21C0
MCBSA	Memory Check Bit Substitute A	BB + 2200
MERB	Memory Error B	BB + 4140
MSYNDB	Memory Error Syndrome B	BB + 4180
MDRB	Memory Diagnostic B	BB + 41C0
MCBSB	Memory Check Bit Substitute B	BB + 4200

Figure 1-70 LDEV — Device Register



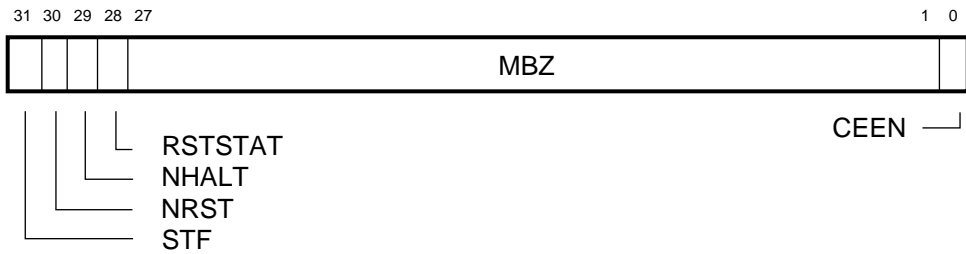
BXB-0100-92

Figure 1-71 LBER — Bus Error Register



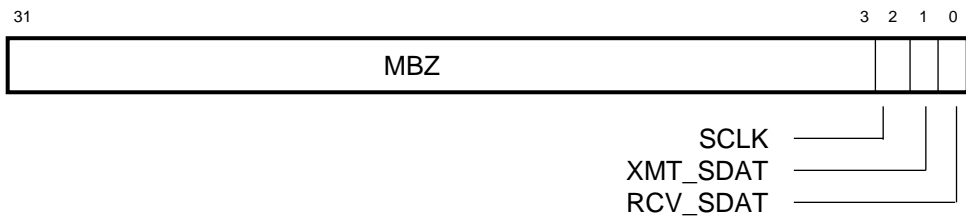
BXB-0101-92

**Figure 1-72 LCNR — Configuration Register**



BXB-0102-92

**Figure 1-73 IBR — Information Base Repair Register**



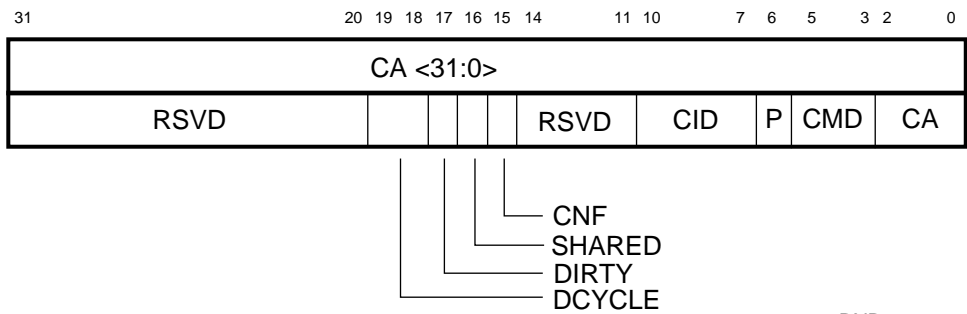
BXB-0218-92

**Figure 1-74 LBESR0-3 — Error Syndrome Registers**

31	7 6	0
RSVD	SYND_0	
RSVD	SYND_1	
RSVD	SYND_2	
RSVD	SYND_3	

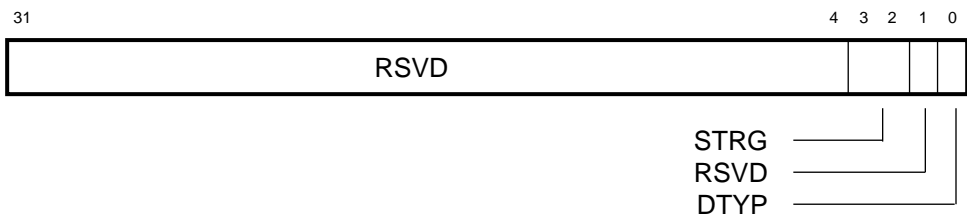
BXB-0105-92

Figure 1-75 LBECR0, 1 — Bus Error Command Registers



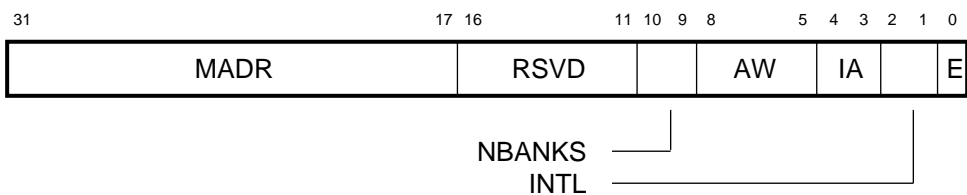
BXB-0106-92

Figure 1-76 MCR — Memory Configuration Register



BXB-0217-92

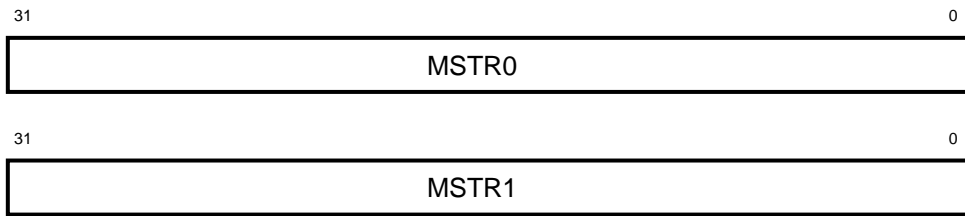
Figure 1-77 AMR — Address Mapping Register



BXB-0216-92

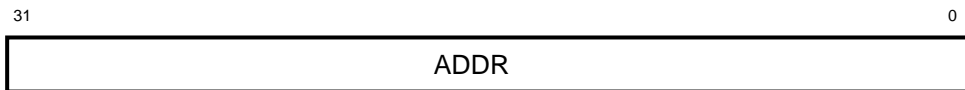


Figure 1-78 MSTR0, 1 — Memory Self-Test Registers



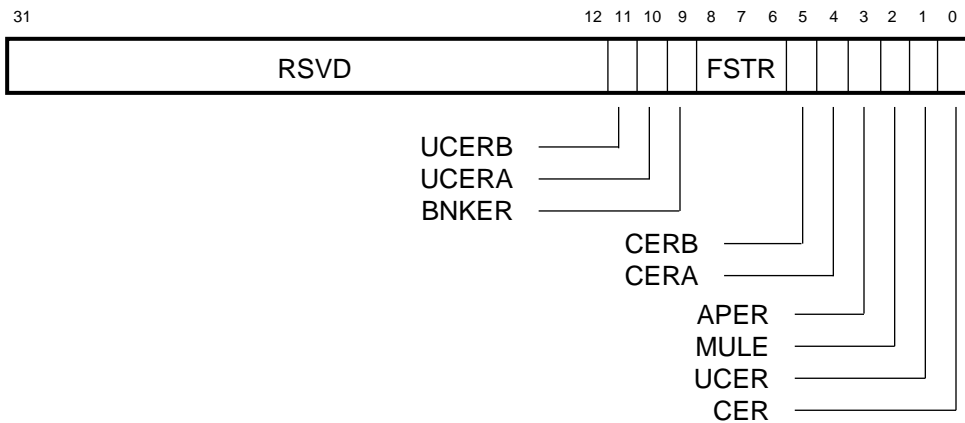
BXB-0215-92

Figure 1-79 FADR — Failing Address Register



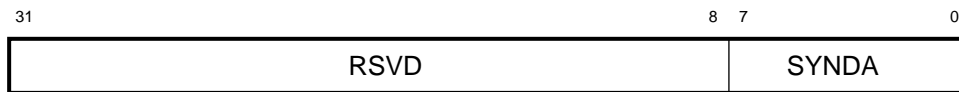
BXB-0214-92

Figure 1-80 MERA — Memory Error Register A



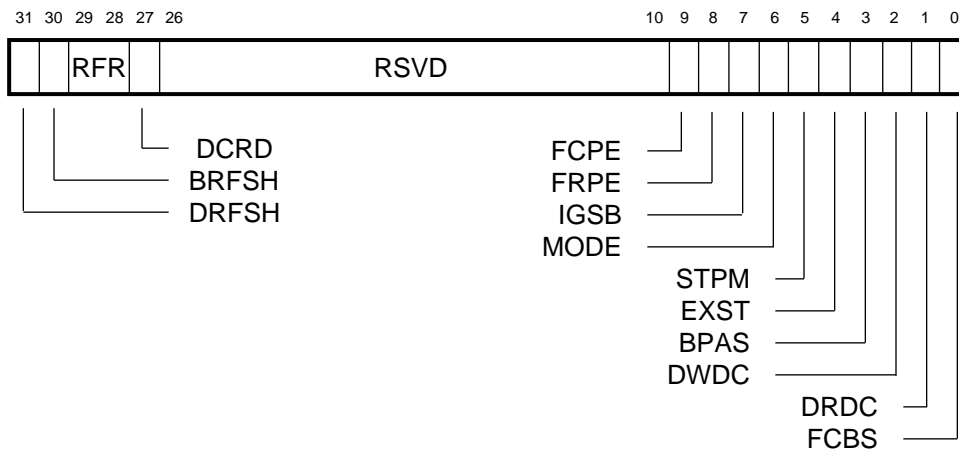
BXB-0219 -92

Figure 1-81 MSYNDA — Memory Error Syndrome Register A



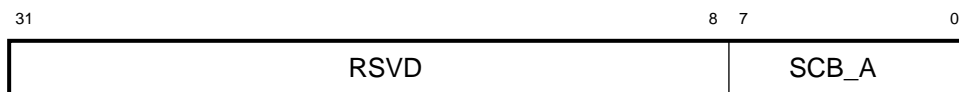
BXB-0223-92

Figure 1-82 MDRA — Memory Diagnostic Register A



BXB-0225-92

Figure 1-83 MCBSA — Memory Check Bit Substitute Register A



BXB-0221-92

Figure 1-84 MERB — Memory Error Register B

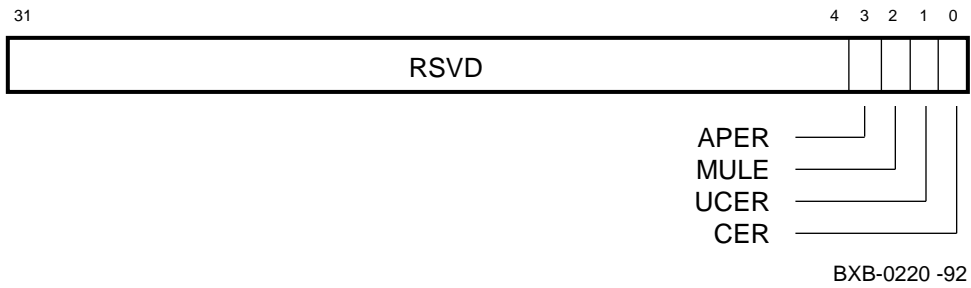


Figure 1-85 MSYNDB — Memory Error Syndrome Register B

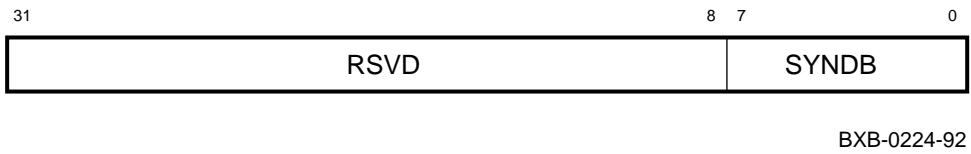


Figure 1-86 MDRB — Memory Diagnostic Register B

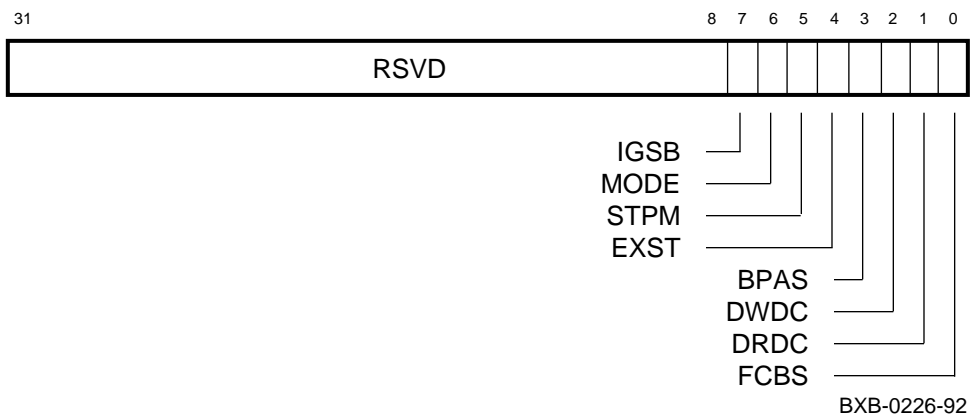
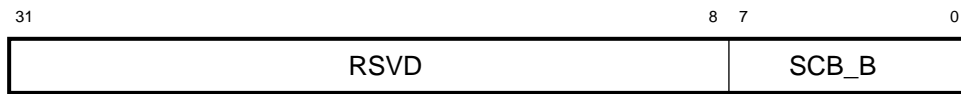


Figure 1-87 MCBSB — Memory Check Bit Substitute Register B



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## 1.3 I/O Port Registers

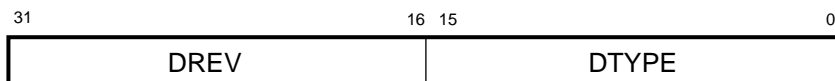
Table 1-6 I/O Port Registers

Mnemonic	Register Name	Physical Address	Software Address
LDEV	Device	50 0000	A00 0000
LBER	Bus Error	50 0002	A00 0040
LCNR	Configuration	50 0004	A00 0080
IBR	Information Base Repair	50 0006	A00 00C0
LMMR0	Memory Mapping 0	50 0010	A00 0200
LMMR1	Memory Mapping 1	50 0012	A00 0240
LMMR2	Memory Mapping 2	50 0014	A00 0280
LMMR3	Memory Mapping 3	50 0016	A00 02C0
LMMR4	Memory Mapping 4	50 0018	A00 0300
LMMR5	Memory Mapping 5	50 001A	A00 0340
LMMR6	Memory Mapping 6	50 001C	A00 0380
LMMR7	Memory Mapping 7	50 001E	A00 03C0
LBESR0	Bus Error Syndrome 0	50 0030	A00 0600
LBESR1	Bus Error Syndrome 1	50 0032	A00 0640
LBESR2	Bus Error Syndrome 2	50 0034	A00 0680
LBESR3	Bus Error Syndrome 3	50 0036	A00 06C0
LBECR0	Bus Error Command 0	50 0038	A00 0700
LBECR1	Bus Error Command 1	50 003A	A00 0740
LILID0	Interrupt Level 0 IDENT	50 0050	A00 0A00
LILID1	Interrupt Level 1 IDENT	50 0052	A00 0A40
LILID2	Interrupt Level 2 IDENT	50 0054	A00 0A80
LILID3	Interrupt Level 3 IDENT	50 0056	A00 0AC0
LCPUMASK	CPU Interrupt Mask	50 0058	A00 0B00

Table 1-6 I/O Port Registers (Continued)

Mnemonic	Register Name	Physical Address	Software Address
LMBPR0	Mailbox Pointer 0	50 0060	A00 0C00
LMBPR1	Mailbox Pointer 1	50 0062	A00 0C00
LMBPR2	Mailbox Pointer 2	50 0064	A00 0C00
LMBPR3	Mailbox Pointer 3	50 0066	A00 0C00
IPCNSE	I/O Port Chip Node-Specific Error	50 0100	A00 2000
IPCVR	I/O Port Chip Vector	50 0102	A00 2040
IPCMSR	I/O Port Chip Mode Selection	50 0104	A00 2080
IPCHST	I/O Port Chip Hose Status	50 0106	A00 20C0
IPCDR	I/O Port Chip Diagnostic	50 0108	A00 2100

Figure 1-88 LDEV — Device Register



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Figure 1-89 LBER — Bus Error Register

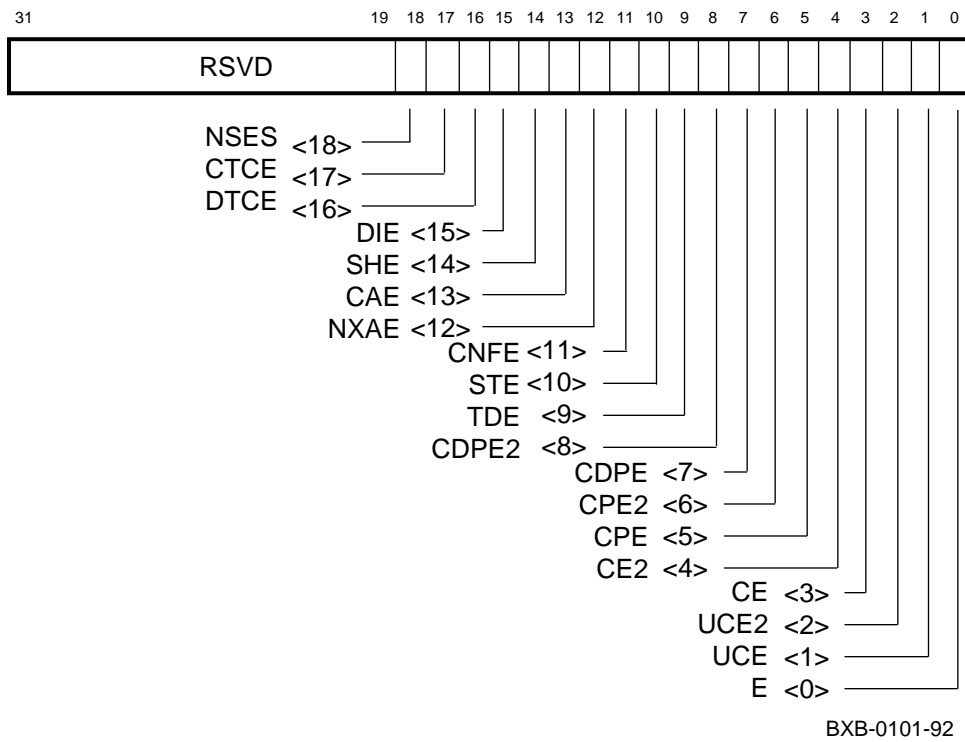


Figure 1-90 LCNR — Configuration Register

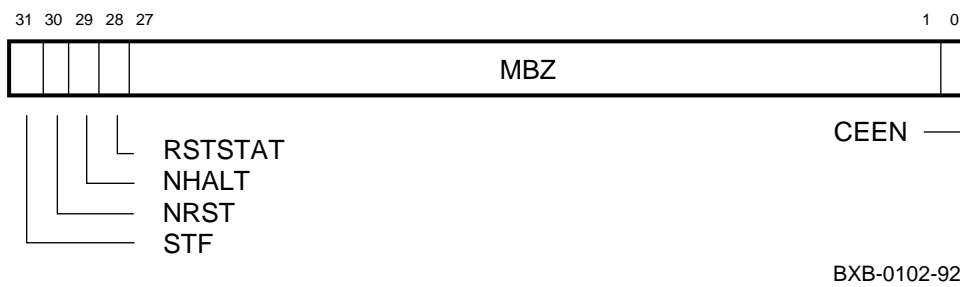


Figure 1-91 IBR — Information Base Repair Register

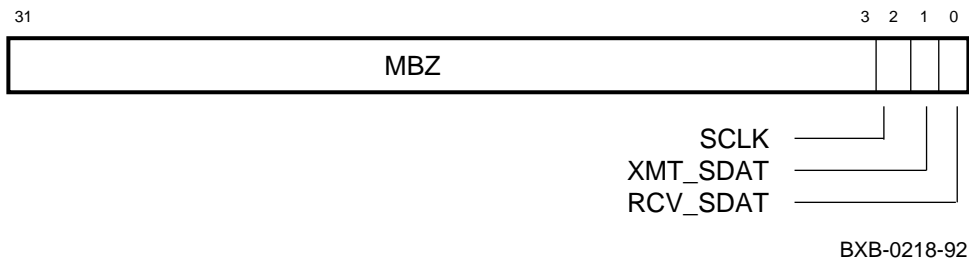


Figure 1-92 LMMR0-7 — Memory Mapping Registers

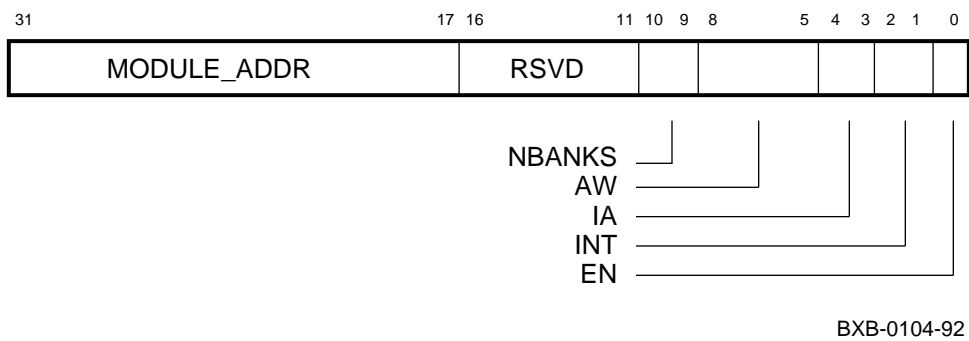


Figure 1-93 LBESR0-3 — Bus Error Syndrome Registers

31		7	6		0
RSVD			SYND_0		
RSVD			SYND_1		
RSVD			SYND_2		
RSVD			SYND_3		

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Figure 1-94 LBECR0,1 — Bus Error Command Registers

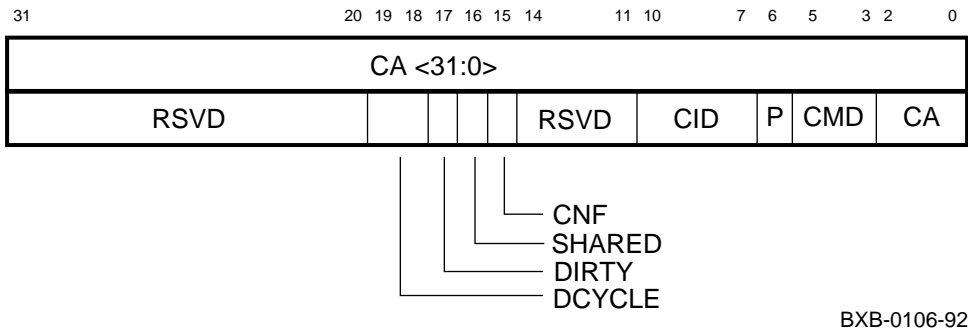


Figure 1-95 LILID0-3 — Interrupt Level 0-3 IDENT Registers

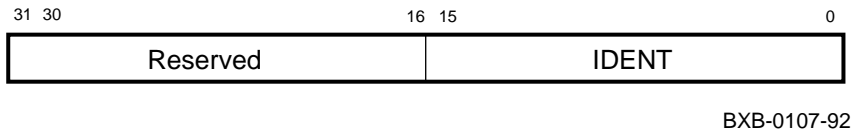


Figure 1-96 LCPUMASK — CPU Interrupt Mask Register

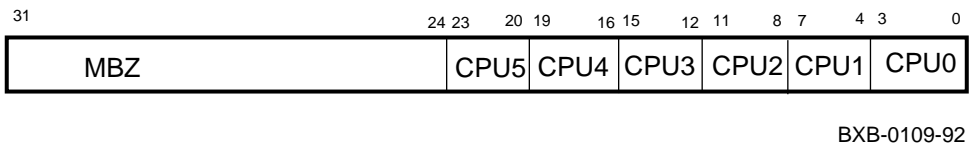
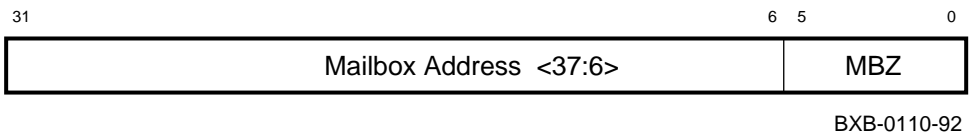
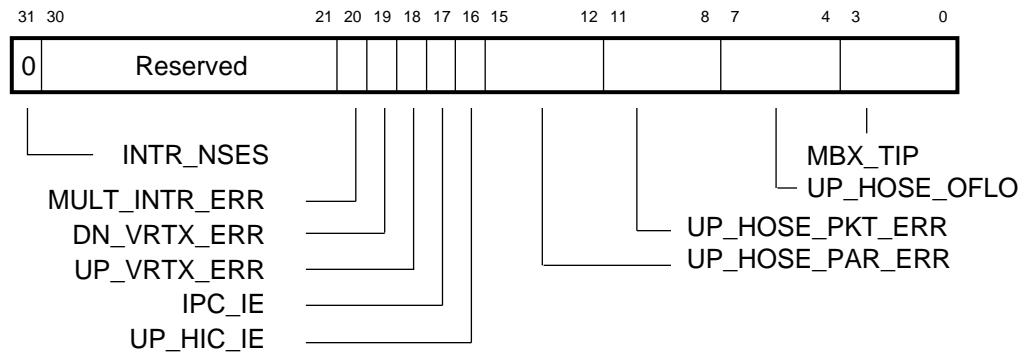


Figure 1-97 LMBPR0-3 — Mailbox Pointer Registers

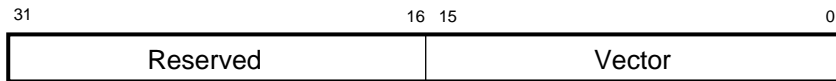


**Figure 1-98 IPCNSE — I/O Port Chip Node-Specific Error Register**



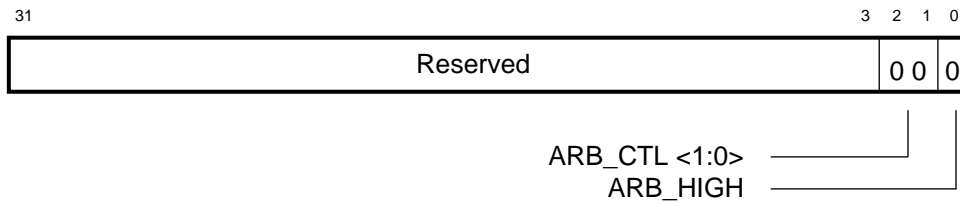
BXB-112-92

**Figure 1-99 IPCVR — I/O Port Chip Vector Register**



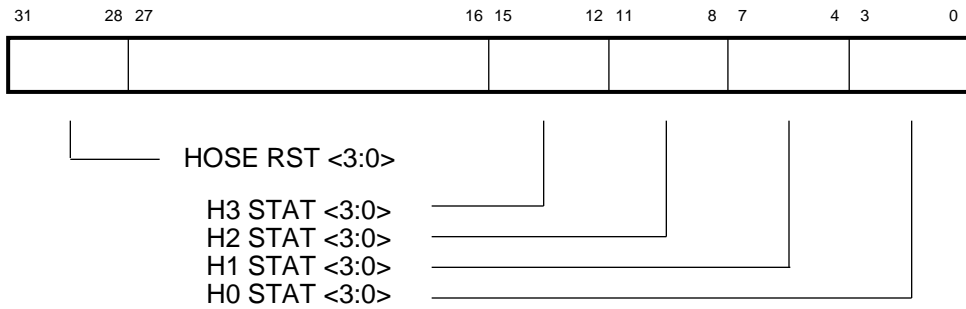
BXB-0108-92

**Figure 1-100 IPCMSR — I/O Port Chip Mode Selection Register**



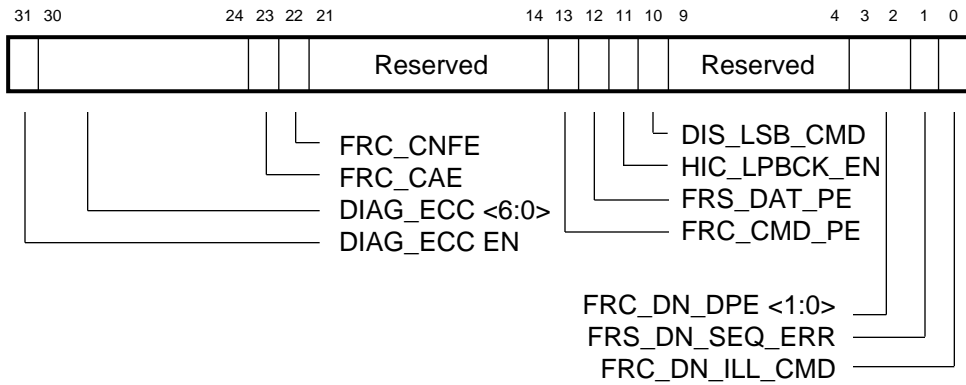
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Figure 1-101 IPCHST — I/O Port Chip Hose Status Register



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Figure 1-102 IPCDR — I/O Port Chip Diagnostic Register



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## 1.4 DWLMA Registers

Table 1-7 LSB Registers

Mnemonic	Register Name	Address
LDIAG	Diagnostic	BB + 40
IMSK	Interrupt Mask	BB + 44
LEVR	Error Vector	BB + 48
LERR	Error	BB + 4C
LGPR	General Purpose	BB + 50
IPR1	Interrupt Pending 1	BB + 54
IPR2	Interrupt Pending 2	BB + 58
IIPR	Interrupt in Progress	BB + 5C

Figure 1-103 LDIAG — Diagnostic Register

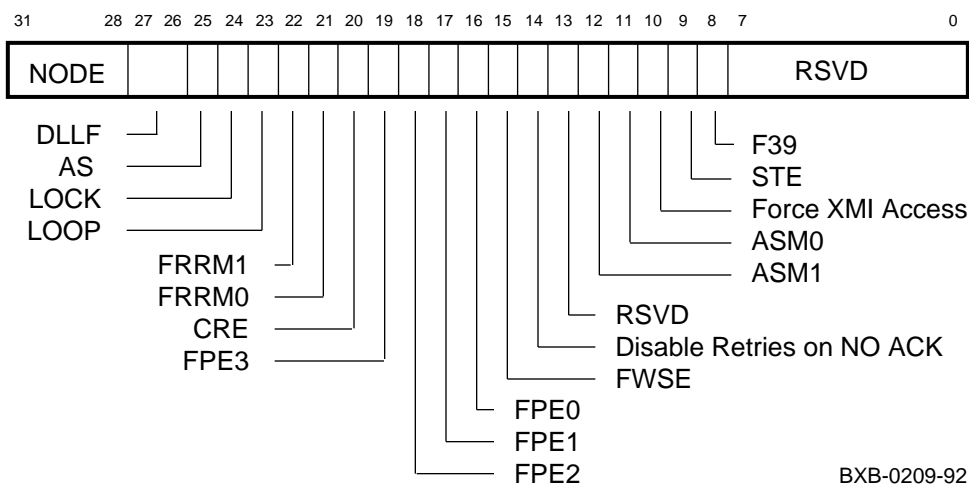


Figure 1-104 IMSK — Interrupt Mask Register

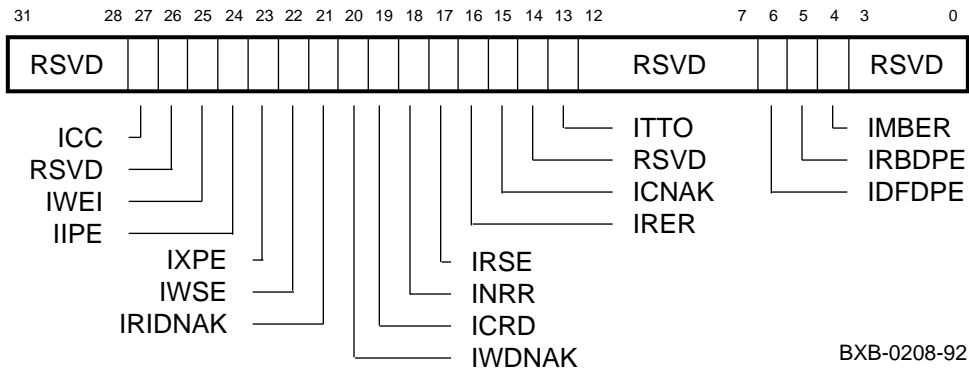


Figure 1-105 LEVR — Error Vector Register

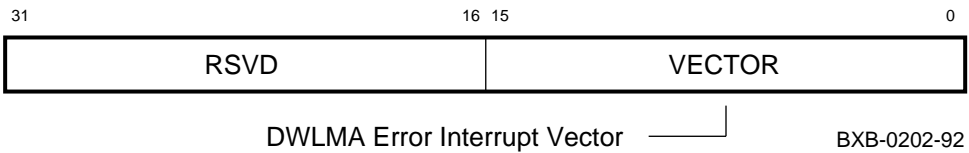


Figure 1-106 LERR — Error Register

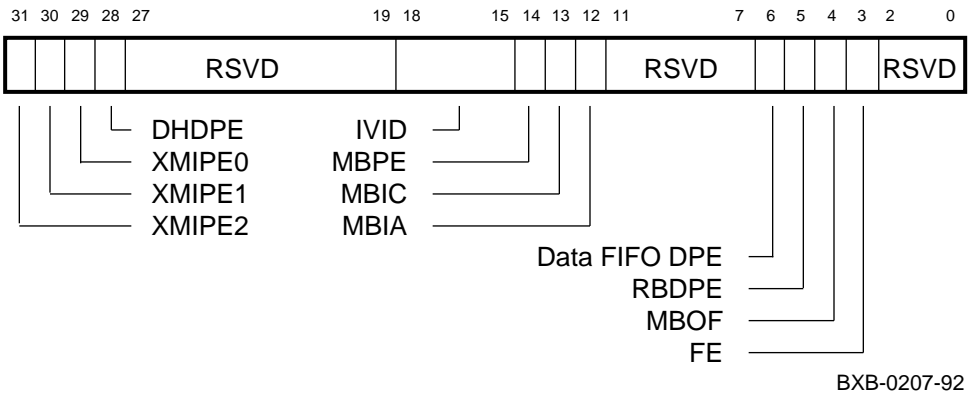
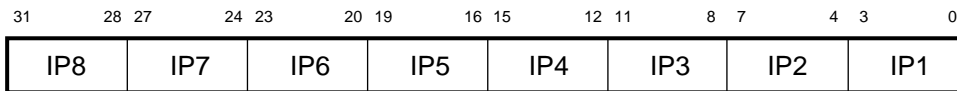


Figure 1-107 LGPR — General Purpose Register



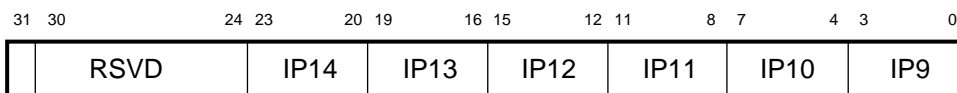
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Figure 1-108 IPR1 — Interrupt Pending Register 1



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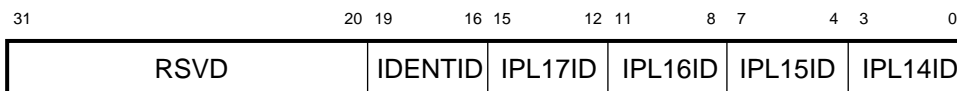
Figure 1-109 IPR2 — Interrupt Pending Register 2



└─ DWLMA Error Interrupt Pending

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Figure 1-110 IIPR — Interrupt in Progress Register



BXB-0206-92

**Table 1-8 XMI Registers**

Mnemonic	Register Name	Address
XDEV	Device	BB + 00
XBER	Bus Error	BB + 04
XFADR	Failing Address	BB + 08
IBR	Information Base Repair	BB + 10
XFAER	Failing Address Extension	BB + 2C

**Figure 1-111 XDEV — Device Register**

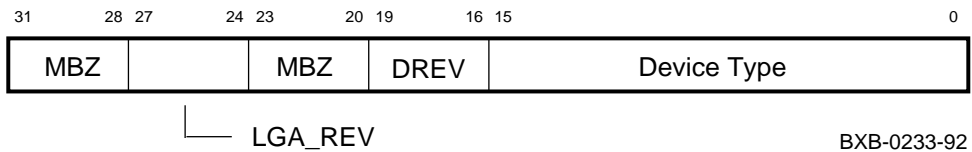
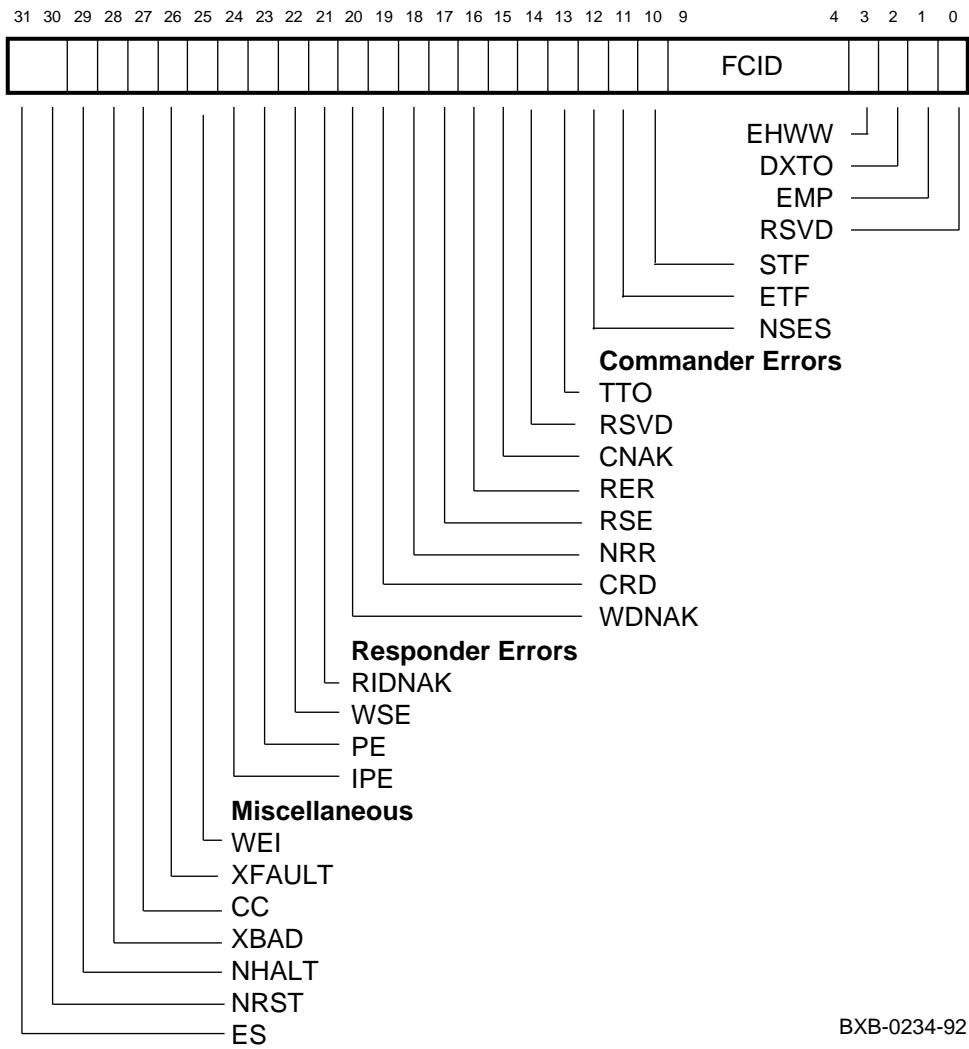


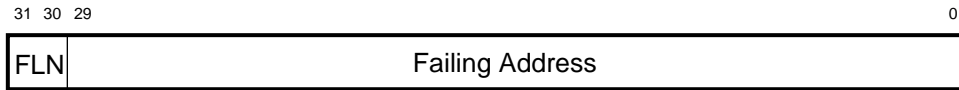
Figure 1-112 XBER — Bus Error Register



BXB-0234-92

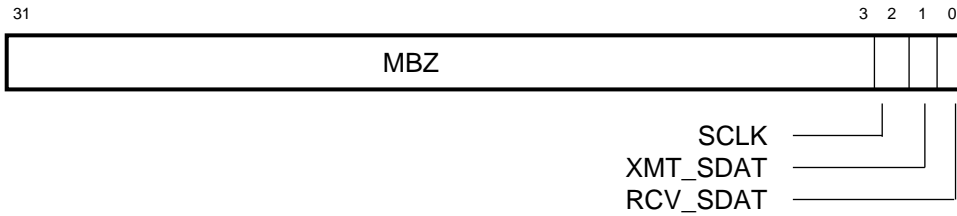


Figure 1-113 XFADR — Failing Address Register



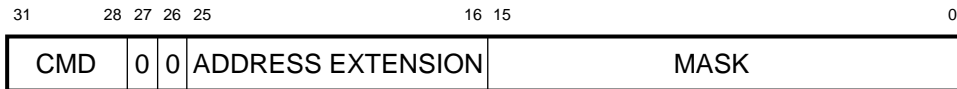
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Figure 1-114 IBR — Information Base Repair Register



BXB-0218-92

Figure 1-115 XFAER — Failing Address Extension Register



BXB-0230-92



# Chapter 2

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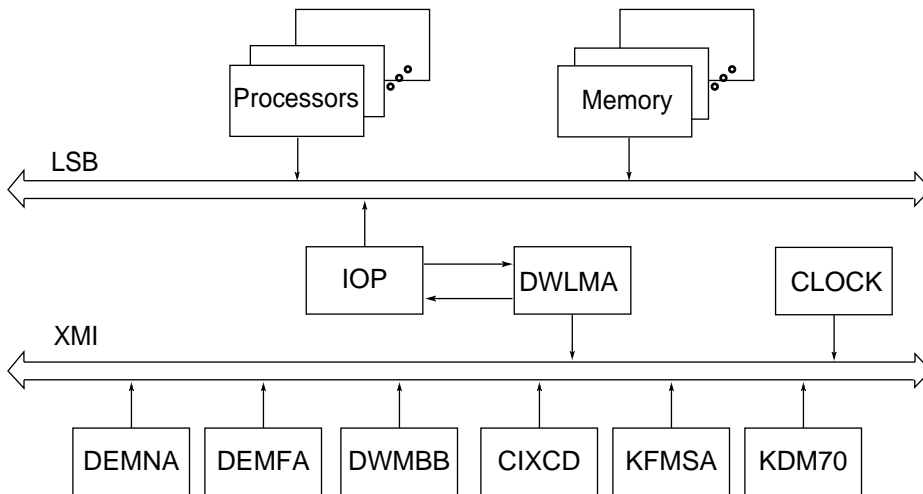
## Addressing

This chapter includes an overview of the VAX 10000 system and addressing information for the buses used in the system. Sections include:

- VAX 10000 Block Diagram
- LSB Address Space
- XMI Addresses
- VAXBI Addresses

## 2.1 VAX 10000 Block Diagram

Figure 2-1 VAX 10000 Block Diagram



BXB-0054-92

## 2.2 LSB Address Space

Figure 2-2 Virtual Address Space Layout

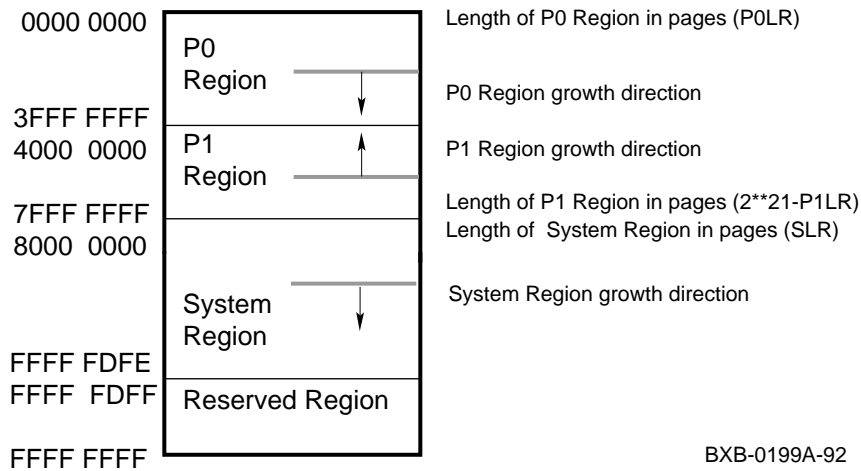


Figure 2-3 Physical Address Space Layouts

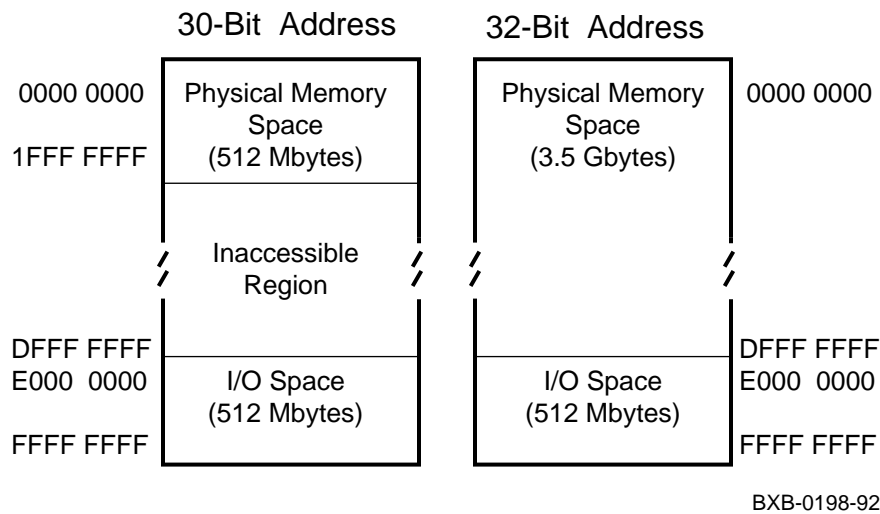


Figure 2-3 shows 30-bit addressing mode on the left and 32-bit addressing mode on the right.

Table 2-1 Address Mapping from 30-Bit Mode to 32-Bit Mode

30-Bit Mode Address	32-Bit Mode Address
0000 0000 — 1FFF FFFF	0000 0000 — 1FFF FFFF
2000 0000 — 3FFF FFFF	E000 0000 — FFFF FFFF

Table 2-2 LSB Node Base Addresses

Node	Module	Base Physical Address (BB)
0	CPU 0	F800 0000
1	Processor or memory	F840 0000
2	Processor or memory	F880 0000
3	Processor or memory	F8C0 0000
4	Memory	F900 0000
5	Memory	F940 0000
6	Memory	F980 0000
7	Memory	F9C0 0000
8	IOP	FA00 0000
Broadcast Space Base	BSB	FE00 0000

**For more information:**

***KA7AA CPU Technical Manual***

**Table 2-3 Device Type Codes**

Device	Code (hex)
KA7AA	8002
MS7AA	4000
IOP	2000
DWLMA	102A
CIXCD	0C05
DEMFA	0823
DEMNA	0C03
DWMBB	2002
KDM70	0C22
KFMSA	0810

## 2.3 XMI Addresses

Table 2-4 XMI Node Addresses

Node	Mailbox Base Physical Address (BB)	XMI Base Physical Address (BB)
1	6180 0000	80 0180 0000
2	6188 0000	80 0188 0000
3	6190 0000	80 0190 0000
4	6198 0000	80 0198 0000
5	61A0 0000	80 01A0 0000
6	61A8 0000	80 01A8 0000
7	61B0 0000	80 01B0 0000
8	61B8 0000	80 01B8 0000
9	61C0 0000	80 01C0 0000
10	61C8 0000	80 01C8 0000
11	61D0 0000	80 01D0 0000
12	61D8 0000	80 01D8 0000
13	61E0 0000	80 01E0 0000
14	61E8 0000	80 01E8 0000



## 2.4 VAXBI Addresses

To examine a VAXBI register from the VAX 10000 console (see Example 2-1), you need three pieces of information:

1. The XMI number (0–3) to which the VAXBI bus is connected.
2. The base address of the VAXBI node (see Table 2-5).
3. The offset of the VAXBI register to be examined (see Table 2-6).

The address of the register to be examined is expressed in this form:

`xmin:220xxyyy`

where:      $n$  = the XMI number  
           $xx$  = the base address of the VAXBI node  
           $yyy$  = the address offset of the VAXBI register

To calculate the address of the VAXBI register, add 2200 0000 plus the base address of the VAXBI node (Table 2-5) plus the address offset of the VAXBI register (Table 2-6).

*NOTE: You must look at the node ID plug on the backplane of the VAXBI card cage to determine the node ID of the VAXBI option.*

### Example 2-1 Examining the Device Register of VAXBI Node 7

```
>>> e xmi1:2200E000
xmi1: 2200E000 131C010E
>>>
```

**Table 2-5 Base Addresses of VAXBI Nodes**

<b>Node ID</b>	<b>Base Address</b>
<b>0</b>	<b>0000 0000</b>
<b>1</b>	<b>0000 2000</b>
<b>2</b>	<b>0000 4000</b>
<b>3</b>	<b>0000 6000</b>
<b>4</b>	<b>0000 8000</b>
<b>5</b>	<b>0000 A000</b>
<b>6</b>	<b>0000 C000</b>
<b>7</b>	<b>0000 E000</b>
<b>8</b>	<b>0001 0000</b>
<b>9</b>	<b>0001 2000</b>
<b>A</b>	<b>0001 4000</b>
<b>B</b>	<b>0001 6000</b>
<b>C</b>	<b>0001 8000</b>
<b>D</b>	<b>0001 A000</b>
<b>E</b>	<b>0001 C000</b>
<b>F</b>	<b>0001 E000</b>

**Table 2-6 Address Offsets of VAXBI Registers**

<b>Mnemonic</b>	<b>Register Name</b>	<b>Address Offset</b>
DTYPE	Device	bb <sup>1</sup> + 00
VAXBICSR	VAXBI Control and Status	bb + 04
BER	Bus Error	bb + 08
EINTRSCR	Error Interrupt Control	bb + 0C
INTRDES	Interrupt Destination	bb + 10
IPINTRMSK	IPINTR Mask	bb + 14
FIPSDDES	Force-Bit IPINTR/STOP Destination	bb + 18
IPINTRSRC	IPINTR Source	bb + 1C
SADR	Starting Address	bb + 20
EADR	Ending Address	bb + 24
BCICSR	BCI Control and Status	bb + 28
WSTAT	Write Status	bb + 2C
FIPSCMD	Force-Bit IPINTR/STOP Command	bb + 30
UINTRCSR	User Interface Interrupt Control	bb + 40
GPR0	General Purpose Register 0	bb + F0
GPR1	General Purpose Register 1	bb + F4
GPR2	General Purpose Register 2	bb + F8
GPR3	General Purpose Register 3	bb + FC
SOSR	Slave-Only Status	bb + 100
RXCD	Receive Console Data	bb + 200

<sup>1</sup> bb is the base address of the VAXBI node (the address of the first location of the nodespace).



## Chapter 3

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### Console

This chapter contains an overview of the console command set and command syntax. It includes a section on device naming and examples of the use of selected commands. Sections include:

- Console Commands
- Environment Variables
- Device Naming Conventions
- Command Syntax
- Boot Command
- Cdp Command
- Show Configuration Command
- Show Device Command
- Show Network Command
- Show Power Command

## 3.1 Console Commands

Table 3-1 Console Commands

Command	Description
<b>boot</b>	Boots the operating system
<b>build eeprom</b>	Creates a new EEPROM image
<b>cdp</b>	Performs basic configuration management of DSSI devices
<b>clear</b>	Clears the specified EEPROM option, removes a boot specification environment variable, or clears the terminal screen
<b>continue</b>	Resumes processing at the point it was interrupted by Ctrl/P
<b>crash</b>	Restarts the operating system and generates a memory dump
<b>create</b>	Creates an environment variable
<b>deposit</b>	Stores data in a specified location
<b>examine</b>	Displays contents of a memory location, a register, or a device
<b>help</b>	Provides basic information on the console commands when the system is in console mode
<b>initialize</b>	Initializes the entire system or a specified device or subsystem
<b>repeat</b>	Repeats a command; stop by entering Ctrl/C
<b>set</b>	Records the current system configuration in the EEPROM, sets the selected EEPROM option, modifies an environment variable, or connects to another console or service
<b>show</b>	Displays the last saved configuration, device information for a disk or tape adapter, selected EEPROM information, current state of an environment variable, memory module information, information about network devices, or system power status

Table 3-1 Console Commands (Continued)

Command	Description
<b>start</b>	Begins execution of an instruction at specified address; does not initialize the system
<b>stop</b>	Stops a specified processor
<b>test</b>	Tests a specified device, a subsystem, or the entire system (default)
<b>update</b>	Copies the contents of the EEPROM or FEPRoMs on the boot processor to the EEPROM or FEPRoMs on the specified secondary processor(s)
# or !	Introduces a comment

Table 3-2 Boot Command Options

Option	Meaning
<b>-file &lt;file&gt;</b>	Boots from the file <file>
<b>-flags &lt;val&gt;</b>	Boot flags that qualify the bootstrap. If omitted, the value of the environment variable <b>boot_flags</b> is used.

Table 3-3 Cdp Command Options

Option	Meaning
<b>-a</b>	Sets device allocation class, <b>allclass</b>
<b>-i</b>	Selects interactive mode; set all parameters
<b>-n</b>	Sets device node name, <b>nodename</b> (up to 16 characters)
<b>-o</b>	Overrides warning messages
<b>-u</b>	Sets device unit number, <b>unitnum</b>
<b>-sa allclass</b>	Sets <b>allclass</b> for all DSSI devices in the system to the specified value
<b>-sn</b>	Sets <b>nodename</b> to either RFhscn or TFhscn h is the device hose number (0–3) s is the device slot number (1–14) c is the device channel number (0, 1) n is the device node ID number (0–6)
<b>-su unitnum</b>	Sets the starting <b>unitnum</b> for the first DSSI device in the system to the specified value. Subsequent DSSI unit numbers are incremented from this base.

Table 3-4 Clear EEPROM Command Options

Option	Meaning
<b>diag_sdd</b>	Removes from EEPROM failure information logged by symptom-directed diagnosis
<b>diag_tdd</b>	Removes from EEPROM failure information logged by test-directed diagnosis
<b>log</b>	Removes from EEPROM all failure information (symptom-directed diagnosis, test-directed diagnosis, and operating system)
<b>symptom</b>	Removes from EEPROM all failure information on operating system



Table 3-5 Create Command Option

Option	Meaning
<b>-nv</b>	Stores the nonvolatile environment variable in EEPROM

Table 3-6 Deposit and Examine Command Options

Option	Meaning
<b>-b</b>	Defines data size as a byte
<b>-d</b>	Disassembles instruction at current address ( <b>examine</b> command only)
<b>-h</b>	Defines data size as a hexword
<b>-l</b>	Defines data size as a longword; initial default
<b>-o</b>	Defines data size as an octaword
<b>-q</b>	Defines data size as a quadword
<b>-w</b>	Defines data size as a word
<b>-n val</b>	Number of consecutive locations to modify
<b>-s val</b>	Address increment size. Default is data size.
<b>-u</b>	Allows access to console private memory, while disabling virtual address protection checks
<b>space:</b>	Device name and address space, as follows:
<b>&lt;dev_name&gt;</b>	Device name: xmi0, ka7aa1, or demna0
<b>gpr</b>	Defines the address space as the general register set, R0 through R15. Data size is always a longword.
<b>ipr</b>	Defines the address space as the internal processor registers (IPRs). Data size is always a longword.
<b>psl</b>	Defines the address space as the processor status longword (PSL).
<b>pmem</b>	Defines the address space as physical memory; initial default
<b>vmem</b>	Defines the address space as virtual memory. All access and protection checking occur.

Table 3-7 Set EEPROM Command Options

Option	Meaning
<b>field</b>	Records the LARS report number and comment
<b>manufacturing</b>	Records manufacturing information: module serial number and module part number
<b>serial</b>	Records system serial number

Table 3-8 Set Host Command Options

Option	Meaning
<b>-bus b</b>	DSSI bus on which the node resides
<b>-dup</b>	Remote node is a DUP server

Table 3-9 Show EEPROM Command Options

Option	Meaning
<b>diag_sdd</b>	Displays failure information logged by symptom-directed diagnosis
<b>diag_tdd</b>	Displays failure information logged by test-directed diagnosis
<b>field</b>	Displays LARS number and comment
<b>manufacturing</b>	Displays manufacturing information: module serial number and module part number
<b>serial</b>	Displays system serial number
<b>symptom</b>	Displays failure information logged on operating system

Table 3-10 Show Power Command Options

Option	Meaning
<b>-h</b>	History status — the value of each parameter at the last system shutdown
<b>-s</b>	Current status (default)
<b>main</b>	Power status of the main cabinet (default)
<b>right</b>	Power status of the expander cabinet to the right of the main cabinet
<b>left</b>	Power status of the expander cabinet to the left of the main cabinet

Table 3-11 Test Command Options

Option	Meaning
<b>-write</b>	Selects writes to media as well as reads (read-only is the default). Applicable only to disk testing (ignored otherwise).
<b>-nowrite</b> <b>"list"</b>	Used with <b>-write</b> to prevent selected devices or groups of devices from being written to.
<b>-omit "list"</b>	Specifies device not to test; takes a single device or device list as a qualifier
<b>-t time</b>	Run time in seconds for the <b>test</b> command, following system sizing and configuration; default for system test is 600 seconds (10 minutes).
<b>-q</b>	"Quiet" option prevents testing start and stop informational messages from being displayed on the console terminal. Error messages are always reported.

Table 3-12 Update Command Options

Option	Meaning
<b>-flash</b>	Updates the FEPROMs on the specified secondary processor
<b>-eeprom</b>	Updates the EEPROM on the specified secondary processor

**For more information:**

***Console Reference Manual  
Advanced Troubleshooting***

## 3.2 Environment Variables

An environment variable is a name and a value association maintained by the console program. The value associated with an environment variable is an ASCII string (up to 127 characters) or an integer. Certain environment variables are typically modified by the user to tailor the recovery behavior of the system on power-up and after system failures. Volatile environment variables are initialized by a system reset; others are nonvolatile across system failures.

Environment variables can be created, modified, displayed, and deleted using the console **create**, **set**, **show**, and **clear** commands. A default value is associated with any variable that is stored in EEPROM. This default value is used if the EEPROM is unreadable.

Table 3-13 Environment Variables

Variable	Attribute	Function
<b>auto_action</b>	Nonvolatile	The action the console will take following an error halt. Values are: <b>restart</b> —Automatically restart. If restart fails, boot the operating system. <b>boot</b> —Automatically boot the operating system <b>halt</b> —Enter console mode (default)
<b>baud</b>	Nonvolatile	Sets the console terminal port baud rate. Allowable values are 300, 600, 1200, 2400, 4800, and 9600 (default)
<b>bootdef_dev</b>	Nonvolatile	The default device or device list from which booting is attempted when no device name is specified by the <b>boot</b> command.
<b>boot_file</b>	Nonvolatile	The default file name used for the primary bootstrap when no file name is specified by the <b>boot</b> command, if appropriate.
<b>boot_osflags</b>	Nonvolatile	Additional parameters to be passed to the system during booting if none are specified by the <b>boot</b> command with the <b>-flags</b> qualifier.

Table 3-13 Environment Variables (Continued)

Variable	Attribute	Function
<b>boot_reset</b>	Nonvolatile	Resets system and displays self-test results during booting. Default is <b>on</b> .
<b>cpu</b>	Volatile	Selects the current boot processor
<b>cpu_enabled</b>	Nonvolatile	A bitmask indicating which processors are enabled to run (leave console mode). Default is <b>0xff</b> .
<b>cpu_primary</b>	Nonvolatile	A bitmask indicating which processors are enabled to become the next boot processor, following the next reset. Default is <b>0xff</b> .
<b>d_harderr</b>	Volatile	Determines action taken following a hard error. Values are <b>halt</b> (default) and <b>continue</b> . Applies only when using the <b>test</b> command.
<b>d_report</b>	Volatile	Determines level of information provided by the diagnostic reports. Values are <b>summary</b> (default) and <b>full</b> . Applies only when using the <b>test</b> command.
<b>d_softerr</b>	Volatile	Determines action taken following a soft error. Values are <b>continue</b> (default) and <b>full</b> . Applies only when using the <b>test</b> command.
<b>dump_dev</b>	Nonvolatile	Complete device specification of the device to which operating system are written (if supported by the operating system). Default value is <b>null</b> .
<b>enable_audit</b>	Nonvolatile	When set to <b>on</b> (default), enables the generation of audit trail messages. When set to off, audit trail messages are suppressed. Console initialization sets this to <b>on</b> .

Table 3-13 Environment Variables (Continued)

Variable	Attribute	Function
<b>interleave</b>	Nonvolatile	The memory interleave specification. Values must be <b>default</b> , <b>none</b> , or an explicit interleave list. Default value is <b>default</b> .
<b>language</b>	Nonvolatile	Determines whether system displays message numbers or message text in English (default).

**For more information:**  
***Console Reference Manual***

### 3.3 Device Naming Conventions

Device names are used in several console commands. A device name is expressed in the form **ddccuuuu.node.channel.slot.hose**. Fields are separated by periods. Table 3-14 lists the field definitions.

Table 3-14 Device Name Fields

Field	Size	Definition
<b>dd</b>	2	Protocol used to access the device: du MSCP disk (CI, SI, DSSI) mu MSCP tape (CI, SI, DSSI) ex XMI Ethernet fx XMI FDDI
<b>cc</b>	2 (max)	Controller letter (a-zz) assigned by console, based on the system configuration
<b>uuuu</b>	4 (max)	Unit number of the device (0-9999) determined by the I/O channel number and the XMI slot number of the adapter
<b>node</b>	3 (max)	Node number (0-255) of the device on a remote (CI or DSSI) bus. If the remote bus is a CI, this is the CI node number of the HSC; if it is a DSSI, this is the node number of the disk.
<b>channel</b>	1	Channel number (0-1); used only if the adapter is a KFMSA
<b>slot</b>	2 (max)	XMI slot number (1-14) of the adapter
<b>hose</b>	1	Hose number (0-3) that connects to the I/O bus

**For more information:**

***Console Reference Manual***  
***Operations Manual***



## 3.4 Command Syntax

**b[oot]** [-f**l**ags] <parameters> [-f**i**le] <filename> <device\_name>  
**b[u]ild** ee[**prom**]  
**cdp** [-{**a,i,n,o,u**}] [-s**n**] [-s**a** <val>] [<dssi\_device>]  
**cl[ear]** ee[**prom**] <option>  
**cl[ear]** <envar>  
**cl[ear]** s**c**[reen]  
**c[ontinue]**  
**cr[ash]**  
**cr[eat]**e [-n**v**] <envar> [<value>]  
**d[eposit]** [-{**b,w,l,q,o,h,u**}] [{-n **val**, -s **val**}] [<space>:]<adrs> <data>  
**e[xamine]** [-{**b,w,l,q,o,h,d,u**}] [{-n **val**, -s **val**}] [<space>:]<adrs>  
**h[elp]** [<option>]  
**i[nitialize]** [<device\_name>]  
**r[ep**eat] [<command>]  
**se[t]** c[on**figuration**]  
**se[t]** ee[**prom**] [<option>]  
**se[t]** <envar> [<value>]  
**se[t]** h[ost] [-d**up**] [-b**us** <b>] n**ode** [<task>]  
**se[t]** p[ow**er**] -b <value> <option>  
**sh[ow]** c[on**figuration**]  
**sh[ow]** dev[**ice**] [<dev\_name>]  
**sh[ow]** ee[**prom**] [<option>]  
**sh[ow]** <envar>  
**sh[ow]** m[em**ory**]  
**sh[ow]** ne[t**work**]  
**sh[ow]** p**ower** [{-h, -s}] [{**main**, **right**, **left**}]  
**s[ta**rt] <address>  
**sto**p] <cpu\_device\_name>  
**t[est]** [-w**rite**] [-n**owrite** <list>] [-o**mit** <list>] [-t <time>] [-q] [<dev\_arg>]  
**up**d[ate] [-{e[**prom**], f[**lash**]}] [<device\_name>]  
comment (# , !)

Table 3-15 Console Special Characters

Character	Function
Return	Carriage return; ends a command line
Backslash	Line continuation
<ⓧ	Delete key; deletes previously typed character
Help	By itself, displays first-level help. When pressed after part of a command, displays options available.
Ctrl/A, F14	Toggles between insertion and overstrike modes
Ctrl/B, ↑	Recalls previous command
Ctrl/C	Terminates running process
Ctrl/D, ←	Moves cursor left one position
Ctrl/E	Moves cursor to end of line
Ctrl/F, ⇒	Moves cursor right one position
Ctrl/H, BS, F12	Moves cursor to beginning of line
Ctrl/J	Deletes word
Ctrl/O	Stops output to console terminal for current command. Toggles between enable and disable.
Ctrl/P	In console mode, acts like Ctrl/C. In program mode, causes the boot processor to halt and begin running the console program.
Ctrl/Q	Resumes output to console terminal
Ctrl/R	Redisplays the current line
Ctrl/S	Stops output to console terminal
Ctrl/U	Deletes entire line
*	Wildcarding for some commands
" "	Quotes for <b>set</b> environment variable name
#, !	Comment specifier

**For more information:**

***Console Reference Manual  
Advanced Troubleshooting***

## 3.5 Boot Command

### Example 3-1 Boot Command — Booting from an InfoServer

```
P00>>> show network
polling for units on demna0, slot 3, xmi0...
exa0.0.0.3.0 08-00-2B-0B-BB-ED
P00>>> boot exa0 -file ISL_LVAX_BL10
Initializing...
F E D C B A 9 8 7 6 5 4 3 2 1 0 NODE #
      A M . . . . . P P TYP
      O + . . . . . + + ST1
      . . . . . E B BPD
      O + . . . . . + + ST2
      . . . . . E B BPD
      + + . . . . . + + ST3
      . . . . . E B BPD

      . . . . + . + . . . . + . + C0 XMI +
      . . . . + . + . . . . + . + C1 XMI +
      . . . . . . . . . . . . . C2
      . . . . . . . . . . . . . C3

      . A0 . . . . . ILV
      .256 . . . . . 256MB
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
Booting...
Connecting to boot device exa0 -flags 0,0,0
-file ISL_LVAX_BL10
Created boot device: exa0.0.0.3.0
Resulting file is mopdl:ISL_LVAX_BL10/exa0.0.0.3.0
.....
Load complete!
Network Initial System Load Function
Version 1.1
FUNCTION          FUNCTION
  ID
  1 - Display Menu
  2 - Help
  3 - Choose Service
  4 - Select Options
  5 - Stop
Enter a function ID value: 3
  OPTION          OPTION
  ID
  1 - Find Services
  2 - Enter known Service Name
Enter an Option ID value: 1
Working
```

### Example 3-1 Boot Command — Booting from an InfoServer (Continued)

```
Servers found: 2
Service Name Format:
    Service Number
    Service Name
    Server Name
    Ethernet ID

#1
VMS054
ESS_08002B0BBBED
08-00-2B-0B-BB-ED
#2
CD_BIN_83371
ESS_08002B0BBBED
08-00-2B-0B-BB-ED
#3
INFO3$RZ57
INFO3
08-00-2B-26-A6-98
#4
CD_DOC_0050
INFO3
08-00-2B-16-04-98
Enter a Service number or <CR> for more: 1
    [operating system banner appears]
```

Table 3-16 Sample Boot Commands

Boot From	Sample Boot Command
Local device	<b>boot dua2.2.0.1.0</b>
InfoServer on Ethernet	<b>boot exa0 -file ISL_LVAX_BL10</b>
InfoServer on FDDI	<b>boot fxa0 -file ISL_LVAX_BL10</b>
CI VMScluster	<b>boot -fl 4,0 dua20.14.0.2.0</b>
Shadow set	<b>b -fl 8DAC,2,0 dua3500.14.0.12.1, dua63.14.0.12.1</b>
DSSI VMScluster	<b>boot -flags 3,0 dub1.1.0.6.0</b>

**For more information:**

***Console Reference Manual***  
***Operations Manual***

## 3.6 Cdp Command

### Example 3-2 Cdp Command

```
P00>>> show device                # Display I/O device
                                     # information.
polling for units on kfmsa0, slot 0, xmi0...
dua5.0.0.13.0  BASHFL$DIA5      RF71
polling for units on cixcd0, slot 14, xmil...
dub44.1.0.13.0  $1$DIA44 (BLANK4) RF71

P00>>> cdp -i                      # -i entered to select
                                     # interactive mode - set all
                                     # parameters; no changes made.
dua5.0.0.13.0:
Node Name [BASHFL]?
Allocation Class [0]?
Unit Number [5]?
dub44.1.0.13.0:
Node Name [BLANK4]?
Allocation Class [1]
Unit Number [44]?

P00>>> cdp -n dua5                 # -n dua5 entered to set device
                                     # node name of dua5; no change
                                     # made.
dua5.0.0.13.0:
Node Name [BASHFL]?                # Press Return to exit.

P00>>> cdp -a                       # -a entered to set device
dua5.0.0.13.0:                     # allocation class, allclass,
Allocation Class [0]?               # for all DSSI devices; no
dub44.1.0.13.0:                   # changes made.
Allocation Class [1]?
```

**For more information:**  
***Console Reference Manual***

## 3.7 Show Configuration Command

### Example 3-3 Show Configuration Command

```
P00>>> show config
```

	Name	Type	Rev	Mnemonic
LSB				
0+	KA7AA	(8002)	0000	ka7aa0
1+	KA7AA	(8002)	0000	ka7aa1
7+	MS7AA	(4000)	0000	ms7aa1
8+	IOP	(2000)	0001	iop0
C0 XMI				
8+	DWLMA	(102A)	0104	dwlma0
C+	KDM70	(0C22)	1E11	kdm700
E+	DEMNA	(0C03)	0802	demna0
C1 XMI				
2+	KFMSA	(0810)	A2A6	kfmsa0
8+	DWLMA	(102A)	0104	dwlma1
A+	CIXCD	(0C05)	4611	cixcd0
C+	KDM70	(0C22)	1E11	kdm701
E+	DEMNA	(0C03)	0802	demna1

**For more information:**

***Console Reference Manual***

## 3.8 Show Device Command

### Example 3-4 Show Device Command

```
P00>>> show device
polling for units on cixcd0, slot 2, xmi0...
dua73.13.0.2.0      $200$DUA73   (HSC000)    RA70
dua77.13.0.2.0      $200$DUA77   (HSC000)    RA70
dua20.14.0.2.0      $100$DUA20   (HSC000)    RA82
dua21.14.0.2.0      $100$DUA21   (HSC000)    RA82
dua22.14.0.2.0      $100$DUA22   (HSC000)    RA82
dua23.14.0.2.0      $100$DUA23   (HSC000)    RA82
dua24.14.0.2.0      $100$DUA24   (HSC000)    RA82
dua72.14.0.2.0      $100$DUA72   (HSC000)    RA82
dua73.14.0.2.0      $100$DUA73   (HSC000)    RA82
dua90.14.0.2.0      $100$DUA90   (HSC000)    RA90
dua91.14.0.2.0      $100$DUA91   (HSC000)    RA90
dua92.14.0.2.0      $100$DUA92   (HSC000)    RA90
dua93.14.0.2.0      $100$DUA93   (HSC000)    RA90
P00>>>
```

**For more information:**

***Console Reference Manual***



## 3.9 Show Network Command

### Example 3-5 Show Network Command

```
P00>>> show network
polling for units on demna0, slot 1, xmi0...
exa0.0.0.1.0: 08-00-2B-25-D5-96
polling for units on demna1, slot 2, xmi1...
exb0.0.0.2.1: 08-00-2B-25-D5-BB
P00>>>
```

**For more information:**  
***Console Reference Manual***

## 3.10 Show Power Command

### Example 3-6 Show Power Command

```
P00>>> show power
Power Supply Status: Full Current
Cabinet: Main          Regulator :      A      B      C
-----
Primary Micro Firmware Rev :      2.2      2.2      2.2
Secondary Micro Firmware Rev :      2.2      2.2      2.2
Power Supply State :      NORMAL      NORMAL      NORMAL
AC Line Voltage (V RMS) :      111.65      112.28      105.29
DC Bulk Voltage (VDC) :      227.02      227.02      227.02
48V DC Bus Voltage (VDC) :      48.69      48.69      48.75
48V DC Bus Current (ADC) :      4.05      3.02      2.88
48V Battery Pack Voltage (VDC) :      58.17      58.17      58.44
24V Battery Pack Voltage (VDC) :      29.08      29.12      29.29
Battery Pack Charge Current (IDC) :      .48      .38      .40
Ambient Temperature (Degree C) :      23.38      23.63      24.51
Elapsed Time (Hours) :      3090.00      2950.00      3060.00
Remaining Battery Capacity (Minutes) :      16.00      16.00      16.00
Battery Cutoff Counter (Cycles) :      7.00      8.00      3.00
Battery Configuration :      8 Batteries      8 Batteries      8 Batteries
Heatsink Status :      NORMAL      NORMAL      NORMAL
Battery Pack Status :      OVR 24HRS      OVR 24HRS      OVR 24HRS
Last UPS Test Status :      PASSED      PASSED      PASSED

LDC POWER Status      : 0
PIU Primary Status    : 0
PIU Secondary Status  : 0

P00>>>
```

In this example, the bottom three lines of the output, showing PIU power status, apply only to the main cabinet.

Table 3-17 lists the abbreviations used in four lines of the Show Power command: Power Supply State, Heatsink Status, Battery Pack Status, and Last UPS Test Status.

**For more information:**  
***Console Reference Manual***

Table 3-17 Abbreviations Used in Show Power Command Output

Abbreviation	Meaning
<b>Power Supply State</b>	
NORMAL	Normal AC operation
BBU MODE	UPS mode
BRKR OPEN	Breaker open
NO AC IN	No AC voltage
KEYSW OFF	Keyswitch off
NON FATAL	Nonfatal fault
FATAL	Fatal fault
SPARE	
<b>Heatsink Status</b>	
BROKEN	Broken
FAULT	Fault (red zone)
WARNING	Warning
NORMAL	Normal operation
<b>Battery Pack Status</b>	
NO BATTERY	Battery pack not installed
BATT FLT	Battery pack failure
BBU INH	UPS inhibit
CHG INH	Charger inhibit
BATT EOL	Battery at end of life
DISCHARG	Battery discharged
DISCHG'G	Discharging
CHARGING	Charging
OVER 24HRS	Charge mode longer than 24 hours
FULL CHG'D	Fully charged

Table 3-17 Abbreviations Used in Show Power Command Output  
(Continued)

Abbreviation	Meaning
<b>Last UPS Test Status</b>	
NO BATTER	Battery pack not installed
NOT READY	Battery pack not ready (only if test requested)
ABORTED	Test aborted
TESTING	Test in progress
FAILED	Test failed
PASSED	Test passed

## Chapter 4

---

# Diagnostics

Diagnostics are run using console commands. This chapter contains examples of diagnostic sessions. Sections include:

- Test Command
- Set Host Command — Running DUP-Based Diagnostics and Utilities
- Set Host Command — Running Diagnostics on a Remote XMI Adapter

## 4.1 Test Command

### Example 4-1 Test Command — System Test

```
P00>>> test -t 120
Configuring system...
Default system exerciser selected for run time of 120 seconds
Type Ctrl/C to abort

Starting floating point exerciser on ka7aa0 (id #57)
Starting floating point exerciser on ka7aal (id #58)
Starting memory exerciser, running on ka7aa0 (id #59)
Starting memory exerciser, running on ka7aal (id #60)
Starting multiprocessor exerciser on ka7aa* (id #61)
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #62)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #63)
Starting network exerciser on exc0.0.0.4.1 in external mode (id #64)
Starting network exerciser on fxa0.0.0.2.1 in external mode (id #65)
Starting network exerciser on fxb0.0.0.3.2 in external mode (id #66)
Starting device exerciser on dual0.14.0.1.0 (id #67)
Starting device exerciser on dub0.15.0.2.0 (id #68)
Starting device exerciser on duc0.0.0.3.0 (id #69)
Starting device exerciser on dud0.0.0.E.0 (id #70)
Starting device exerciser on dual1.14.0.1.0 (id #71)
Starting device exerciser on dub1.15.0.2.0 (id #72)
Starting device exerciser on duc1.1.0.3.0 (id #73)
Starting device exerciser on dud1.1.0.E.0 (id #74)
Starting device exerciser on dual2.14.0.1.0 (id #75)
Starting device exerciser on dub2.15.0.2.0 (id #76)
Starting device exerciser on dual3.14.0.1.0 (id #77)
Starting device exerciser on dub19.15.0.2.0 (id #78)
Stopping device exerciser on dual0.14.0.1.0 (id #67)
Stopping device exerciser on dub0.15.0.2.0 (id #68)
Stopping device exerciser on duc0.0.0.3.0 (id #69)
Stopping device exerciser on dud0.0.0.E.0 (id #70)
Stopping device exerciser on dual1.14.0.1.0 (id #71)
Stopping device exerciser on dub1.15.0.2.0 (id #72)
Stopping device exerciser on duc1.1.0.3.0 (id #73)
Stopping device exerciser on dud1.1.0.E.0 (id #74)
Stopping device exerciser on dual2.14.0.1.0 (id #75)
Stopping device exerciser on dub2.15.0.2.0 (id #76)
Stopping device exerciser on dual3.14.0.1.0 (id #77)
Stopping device exerciser on dub3.15.0.2.0 (id #78)
Starting device exerciser on dua20.14.0.1.0 (id #79)
Starting device exerciser on dub4.15.0.2.0 (id #80)
Starting device exerciser on dua21.14.0.1.0 (id #81)
Starting device exerciser on dub5.15.0.2.0 (id #82)
Starting device exerciser on dua22.14.0.1.0 (id #83)
Starting device exerciser on dub6.15.0.2.0 (id #84)
Starting device exerciser on dua23.14.0.1.0 (id #85)
```

## Example 4-1 Test Command — System Test (Continued)

```
Starting device exerciser on dua30.14.0.1.0 (id #86)
Test time has expired...
```

```
Stopping floating point exerciser on ka7aa0 (id #57)
Stopping floating point exerciser on ka7aa1 (id #58)
Stopping memory exerciser on ka7aa0 (id #59)
Stopping memory exerciser on ka7aa1 (id #60)
Stopping multiprocessor exerciser (id #61)
Stopping network exerciser on exa0.0.0.4.0 (id #62)
Stopping network exerciser on exb0.0.0.5.0 (id #63)
Stopping network exerciser on exc0.0.0.4.1 (id #64)
Stopping network exerciser on fxa0.0.0.2.1 (id #65)
Stopping network exerciser on fxb0.0.0.3.2 (id #66)
Stopping device exerciser on dua20.14.0.1.0 (id #79)
Stopping device exerciser on dub4.15.0.2.0 (id #80)
Stopping device exerciser on dua21.14.0.1.0 (id #81)
Stopping device exerciser on dub5.15.0.2.0 (id #82)
Stopping device exerciser on dua22.14.0.1.0 (id #83)
Stopping device exerciser on dub6.15.0.2.0 (id #84)
Stopping device exerciser on dua23.14.0.1.0 (id #85)
Stopping device exerciser on dua30.14.0.1.0 (id #86)
Done testing...
```

The following devices were not tested:

```
dua36.14.0.1.0
dua37.14.0.1.0
dua38.14.0.1.0
.
.
dua77.15.0.1.0
```

```
P00>>>
```

## Example 4-2 Test Command — Write/Read/Compare Test of All Disks Not Associated with Controller "a"

```
P00>>> test -nowrite "dua*" -write -t 120
Configuring system...
Default system exerciser selected for run time of 120 seconds
Type Ctrl/C to abort

You have selected destructive testing of the following devices:
  dub0.0.0.2.0
  dub1.1.0.2.0
  dub2.2.0.2.0
  dub3.3.0.2.0
  duc0.0.0.3.0
  duc1.1.0.3.0
  dud0.0.0.E.0
  dud1.1.0.E.0

Are you sure you want to perform writes to these disks? [yes/(no)] yes
User data on all selected devices may be lost. Continue? [yes/(no)] yes

Testing...

Starting floating point exerciser on ka7aa0 (id #213)
Starting floating point exerciser on ka7aa1 (id #214)
Starting memory exerciser, running on ka7aa0 (id #215)
Starting memory exerciser, running on ka7aa1 (id #216)
Starting multiprocessor exerciser on ka7aa* (id #217)
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #218)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #219)
Starting network exerciser on exc0.0.0.4.1 in external mode (id #220)
Starting network exerciser on fxa0.0.0.2.1 in external mode (id #221)
Starting network exerciser on fxb0.0.0.3.2 in external mode (id #222)
Starting device exerciser on dual0.14.0.1.0 (id #223)
Starting device exerciser in DESTRUCT mode on dub0.15.0.2.0 (id #224)
Starting device exerciser in DESTRUCT mode on duc0.0.0.3.0 (id #225)
Starting device exerciser in DESTRUCT mode on dud0.0.0.E.0 (id #226)
Starting device exerciser on dual1.14.0.1.0 (id #227)
Starting device exerciser in DESTRUCT mode on dub1.15.0.2.0 (id #228)
Starting device exerciser in DESTRUCT mode on duc1.1.0.3.0 (id #229)
Starting device exerciser in DESTRUCT mode on dud1.1.0.E.0 (id #230)
Starting device exerciser on dual2.14.0.1.0 (id #231)
Starting device exerciser in DESTRUCT mode on dub2.15.0.2.0 (id #232)
Starting device exerciser on dual3.14.0.1.0 (id #233)
Starting device exerciser in DESTRUCT mode on dub3.15.0.2.0 (id #234)
Stopping device exerciser on dual0.14.0.1.0 (id #223)
Stopping device exerciser on dub0.15.0.2.0 (id #224)
Stopping device exerciser on duc0.0.0.3.0 (id #225)
Stopping device exerciser on dud0.0.0.E.0 (id #226)
Stopping device exerciser on dual1.14.0.1.0 (id #227)
```



## Example 4-2 Test Command — Write/Read/Compare Test of All Disks Not Associated with Controller "a" (Continued)

```
Stopping device exerciser on dub1.15.0.2.0 (id #228)
Stopping device exerciser on duc1.1.0.3.0 (id #229)
Stopping device exerciser on dud1.1.0.E.0 (id #230)
Stopping device exerciser on dual2.14.0.1.0 (id #231)
Stopping device exerciser on dub2.15.0.2.0 (id #232)
Stopping device exerciser on dual3.14.0.1.0 (id #233)
Stopping device exerciser on dub3.15.0.2.0 (id #234)
Starting device exerciser on dua20.14.0.1.0 (id #235)
Starting device exerciser in DESTRUCT mode on dub4.15.0.2.0 (id #236)
Starting device exerciser on dua21.14.0.1.0 (id #237)
Starting device exerciser in DESTRUCT mode on dub5.15.0.2.0 (id #238)
Starting device exerciser on dua22.14.0.1.0 (id #239)
Starting device exerciser in DESTRUCT mode on dub6.15.0.2.0 (id #240)
Starting device exerciser on dua23.14.0.1.0 (id #241)
Starting device exerciser on dua30.14.0.1.0 (id #242)
Test time has expired...
```

```
Stopping floating point exerciser on ka7aa0 (id #213)
Stopping floating point exerciser on ka7aa1 (id #214)
Stopping memory exerciser on ka7aa0 (id #215)
Stopping memory exerciser on ka7aa1 (id #216)
Stopping multiprocessor exerciser (id #217)
Stopping network exerciser on exa0.0.0.4.0 (id #218)
Stopping network exerciser on exb0.0.0.5.0 (id #219)
Stopping network exerciser on exc0.0.0.4.1 (id #220)
Stopping network exerciser on fxa0.0.0.2.1 (id #221)
Stopping network exerciser on fxb0.0.0.3.2 (id #222)
Stopping device exerciser on dua20.14.0.1.0 (id #235)
Stopping device exerciser on dub4.15.0.2.0 (id #236)
Stopping device exerciser on dua21.14.0.1.0 (id #237)
Stopping device exerciser on dub5.15.0.2.0 (id #238)
Stopping device exerciser on dua22.14.0.1.0 (id #239)
Stopping device exerciser on dub6.15.0.2.0 (id #240)
Stopping device exerciser on dua23.14.0.1.0 (id #241)
Stopping device exerciser on dua30.14.0.1.0 (id #242)
Done testing...
```

```
P00>>>
```

### Example 4-3 Test Command — Destructive Exercising Selected, Then Aborted

```
P00>>> test -w -n "dua*"
Configuring system...
Default system exerciser selected for run time of 600 seconds
Type Ctrl/C to abort

You have selected destructive testing of the following devices:

dub0.0.0.2.0
dub1.1.0.2.0
dub2.2.0.2.0
dub3.3.0.2.0
duc0.0.0.3.0
duc1.1.0.3.0
dud0.0.0.E.0
dud1.1.0.E.0

Are you sure you want to perform writes to these disks? [yes/(no)] no
Testing aborted...

P00>>>
```

### Example 4-4 Output from Test Command — Quiet Qualifier Set

```
P00>>> test -q -t 300
Configuring system...
Default system exerciser selected for run time of 300 seconds
Type Ctrl/C to abort

Done testing...

P00>>>
```

## Example 4-5 Test Command — Detection of Memory Data Compare Error

```
P00>>> set d_report full
P00>>> test ms7aa*
Configuring system...
Testing ms7aa*
Type Ctrl/C to abort

Starting memory exerciser, running on ka7aa0 (id #77)
Starting memory exerciser, running on ka7aa1 (id #78)
Starting memory exerciser, running on ka7aa2 (id #79)

*** Hard Error - Error #23 on FRU: ka7aa0
Data compare error

      ID  Program          Device      Pass Hard/Soft Test      Time
-----
00000078  mem_ex          memory      433    1    0    4 10:23:51

Expected value: FFFFFFFE0
Received value: FFF7FFE0
Failing addr:  047C87C8

*** End of Error ***

Testing aborted - halt-on-error selected...

Stopping memory exerciser on ka7aa1 (id #77)
Stopping memory exerciser on ka7aa2 (id #79)

Done testing...

P00>>>
```

## Example 4-6 Test Command — Use of Wildcard

```
P00>>> test dem*a*
Configuring system...
Testing dem*a*
Type Ctrl/C to abort

Initializing DEMNA0
Initializing DEMNA1
Initializing DEMFA0
DEMNA0 self-test passed
DEMNA1 self-test passed
DEMFA0 self-test passed
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #144)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #145)
Starting network exerciser on fxa0.0.0.2.1 in external mode (id #146)
Test time has expired...

Stopping network exerciser on exa0.0.0.4.0 (id #144)
Stopping network exerciser on exb0.0.0.5.0 (id #145)
Stopping network exerciser on fxa0.0.0.2.1 (id #146)
Done testing...

P00>>>
```

## Example 4-7 Test Command — Test All Devices Associated with XMIO

```
P00>>> test xmi0 -omit demna2
Configuring system...
Testing xmi0
Type Ctrl/C to abort

KA7AA0 running module tests on DWLMA0
DWLMA0 module tests passed
Initializing DEMNA0
Initializing DEMNA1
Initializing CIXCD0
Initializing KDM700
Initializing DEMFA0
DEMNA0 self-test passed
DEMNA1 self-test passed
CIXCD0 self-test passed
KDM700 self-test passed
DEMFA0 self-test passed
Starting network exerciser on exa0.0.0.4.0 in internal mode (id #31)
Starting network exerciser on exb0.0.0.5.0 in external mode (id #32)
Starting network exerciser on fxa0.0.0.e.0 in external mode (id #33)
Starting device exerciser on dua0.0.0.6.0 (id #34)
Starting device exerciser on dub0.0.0.a.0 (id #35)
Starting device exerciser on dual.1.0.6.0 (id #38)
Starting device exerciser on dub1.1.0.a.0 (id #39)
Starting device exerciser on dua2.2.0.6.0 (id #42)
Starting device exerciser on dub2.2.0.a.0 (id #43)
Starting device exerciser on dua3.3.0.6.0 (id #44)
Starting device exerciser on dub3.3.0.a.0 (id #45)
Test time has expired...

Stopping network exerciser on exa0.0.0.4.0 (id #31)
Stopping network exerciser on exb0.0.0.5.0 (id #32)
Stopping network exerciser on fxa0.0.0.e.0 (id #33)
Stopping device exerciser on dua0.0.0.6.0 (id #34)
Stopping device exerciser on dub0.0.0.a.0 (id #35)
Stopping device exerciser on dual.1.0.6.0 (id #38)
Stopping device exerciser on dub1.1.0.a.0 (id #39)
Stopping device exerciser on dua2.2.0.6.0 (id #42)
Stopping device exerciser on dub2.2.0.a.0 (id #43)
Stopping device exerciser on dua3.3.0.6.0 (id #44)
Stopping device exerciser on dub3.3.0.a.0 (id #45)
Done testing...

P00>>>
```

## 4.2 Set Host Command — Running DUP-Based Diagnostics and Utilities

### Example 4-8 Set Host Command — Running DUP-Based Diagnostics and Utilities

```
P00>>> show device kdm700
polling for units on kdm700, slot 12, xmi0...
dua32.0.0.12.0      DUA32                      RA70
dua34.0.0.12.0      DUA34                      RA70
dua77.0.0.12.0      DUA77                      RA70

P00>>> set host -dup dua32.0.0.12.0
dup: starting DIRECT on kdm70_a.0.0.12.0 ( )

DIRECT      1  D Directory Utility

ILEXER      1  D InLine Exerciser

Task? ilexer
dup: starting ILEXER on kdm70_a.0.0.12.0 ( )

***
*** ILEXER (InLine Exerciser) V 001 *** 17-NOV-1992 10:21:57 ***
***

Enable Bad Block Replacement (Y/N) [N] ?

Available Disk Drives: D0032 D0034 D0077

Available Tape Drives: NONE

Select next drive to test (Tnnnn/Dnnnn) [] ? d0032
Write enable drive (Y/N) [N] ?

*** Available tests are:

1. Random I/O
2. Seek Intensive I/O
3. Data Intensive I/O
4. Oscillatory Seek
```

## Example 4-8 Set Host Command — Running DUP-Based Diagnostics and Utilities (Continued)

```
Select test number (1:4) [1] ?
Select start block number (0:547040) [0] ?
Select end block number (0:547040) [547040] ? 500
Select data pattern number 0=ALL (0:15) [0] ?
Select another drive (Y/N) [] ?

*** No default is allowed.

Select another drive (Y/N) [] ? n
Select execution time limit, 0=Infinite, minutes (0:65535) [0] ? 1
Select report interval, minutes (0:65535) [1] ? 1
Select hard error limit (0:32) [0] ?
Report soft errors (Y/N) [N] ? y

Execution Performance Summary at 17-NOV-1992 10:23:57

D0032    193832346    4315    9713    0    0    0    0

Execution Performance Summary at 17-NOV-1992 10:23:57

D0032 * 193832346    4320    9723    0    0    0    0

***
*** ILEXER is exiting.
***

Task?
```

## 4.3 Set Host Command — Running Diagnostics on a Remote XMI Adapter

### Example 4-9 Set Host Command — Running Diagnostics on a Remote XMI Adapter, Failing Case

```
P00>>> set host demna0
Connecting to remote node, ^Y to disconnect.
t/r

RBDE> ST0/TR

;Selftest      3.00

; T0001 T0002 T0003 T0004 T0005 T0006 T0007 T0008 T0009 T0010
; T0011 T0012 T0013 T0014 T0015 T0016 T0017 T0018

;      F      E      0C03      1
;      HE      XNAGA      XX      T0018
;      03 00000000 0000A000 00000000 20150004 20051D97 08

;      F      E      0C03      1
;      HE      XNAGA      XX      T0018
;      05 00020000 80020000 00000000 20150204 200524A4 01

;      F      E      0C03      1
;00000000 00000002 00000000 00000000 00000000 00000000 00000000

RBDE> ^Y
P00>>>
```



### Example 4-10 Set Host Command — Running Diagnostics on a Remote XMI Adapter, Passing Case

```
P00>>> set h demna0
Connecting to remote node, ^Y to disconnect.
t/r

RBDE> ST0/TR

;Selftest      3.00

; T0001 T0002 T0003 T0004 T0005 T0006 T0007 T0008 T0009 T0010
; T0011 T0012 T0013 T0014 T0015 T0016 T0017 T0018

;          P          E          0C03          1
;00000000 00000000 00000000 00000000 00000000 00000000 00000000

RBDE> ^Y
P00>>>
```



## Chapter 5

---

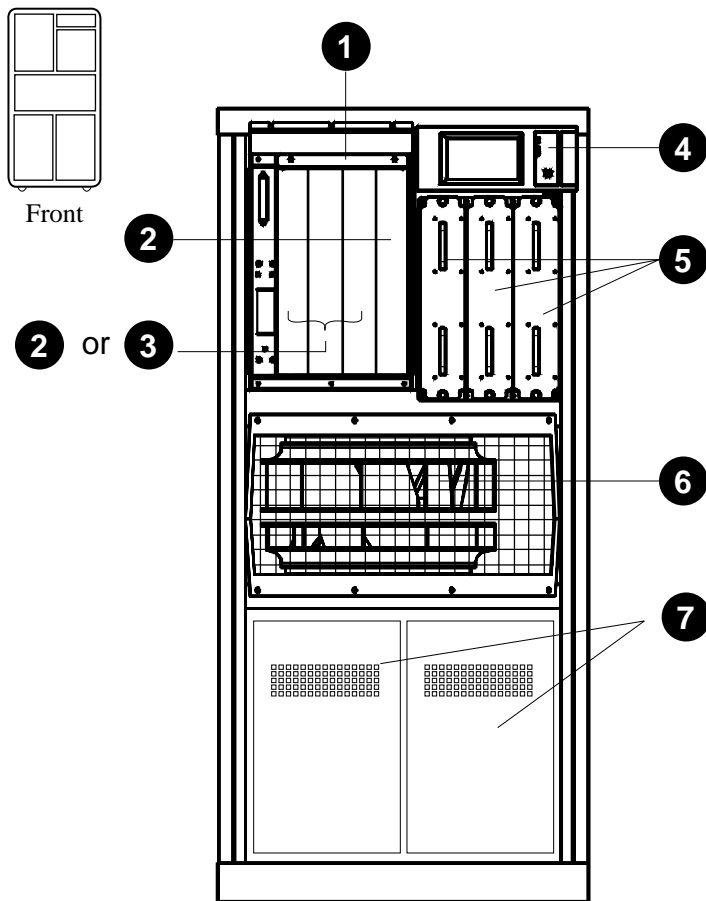
### FRU Locations

This chapter shows the location of these field-replaceable units:

- **FRUs in the Main Cabinet**
  - FRUs Accessible from the Front of the Cabinet
  - FRUs Accessible from the Rear of the Cabinet
- **FRUs in the Expander Cabinet**
- **Platform Cables**
- **FRUs in the XMI Plug-In Unit**
- **FRUs in the Disk Plug-In Unit**
- **FRUs in the Main Cabinet Battery Plug-In Units**
- **FRUs in the Battery Cabinet Plug-In Units**

## 5.1 FRUs in the Main Cabinet

Figure 5-1 Main Cabinet (Front) Showing FRU Locations



BXB-0021N-93

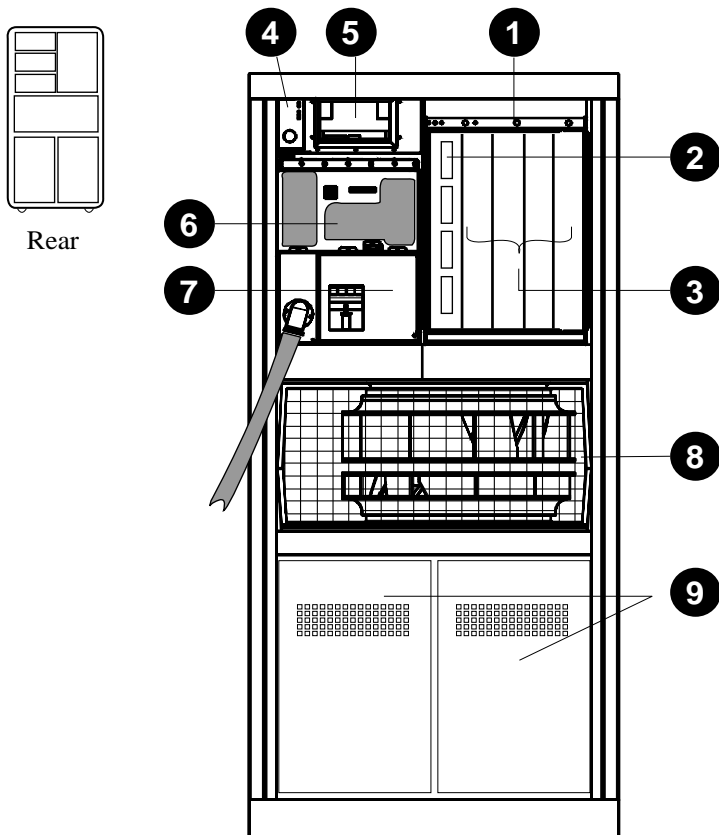
- ❶** 70-28574-01      LSB centerplane and card cage <sup>1, 2</sup>
- ❷** E2045-AA          CPU module <sup>2</sup>
- ❸** E2043-AA or      Memory module 64 Mbytes <sup>2, 3</sup>  
     E2043-BA or      Memory module 128 Mbytes <sup>2, 3</sup>  
     E2043-CA or      Memory module 256 Mbytes <sup>2, 3</sup>  
     E2046-AA          Memory module 512 Mbytes <sup>2, 3</sup>
- ❹** 54-20306-01      Control panel <sup>2</sup>
- ❺** 30-33796-01 or    Power regulators (three in each main cabinet and  
     30-33796-02      expander cabinet)
- ❻** 12-35173-01      Blower <sup>1</sup>
- ❼** H7237-AA          Battery plug-in units <sup>1</sup> (see pages 5-14 and 5-15)

<sup>1</sup> Removal and replacement of this FRU requires access to both the front and the rear of the cabinet.

<sup>2</sup> This FRU is in the main cabinet only (cannot be located in an expander cabinet).

<sup>3</sup> This FRU can be located in either the front or the rear of the cabinet.

Figure 5-2 Main Cabinet (Rear) Showing FRU Locations



BXB-0032N-93

- ❶ 70-28574-01      LSB centerplane and card cage <sup>1, 2</sup>
  - ❷ E2044-AA          IOP module <sup>2</sup>
  - ❸ E2043-AA or      Memory module 64 Mbytes <sup>2, 3</sup>  
E2043-BA or      Memory module 128 Mbytes <sup>2, 3</sup>  
E2043-CA or      Memory module 256 Mbytes <sup>2, 3</sup>  
E2046-AA          Memory module 512 Mbytes <sup>2, 3</sup>
  - ❹ 54-20300-01      Cabinet control logic module (CCL)
  - ❺ TF85-AA            Removable media device <sup>1</sup>
- Includes these FRUs:
- TK85                Disk drive
  - 54-19089-01      DSSI controller module
  - 54-20868-01      Local disk converter
  - 17-03123-01      LDC to CCL signal
  - 17-03164-01      LDC to TF power +5/+12
  - 17-03348-01      DSSI signal to bulkhead (TK85)
  - 17-03443-01      Power LDC to bulkhead
  - 17-03444-01      Signal LDC to bulkhead
  - 17-03448-01      DSSI bus TF to bulkhead
  - 17-03505-01      5V VTERM power
  - 17-03508-01      48V power regulator to bulkhead
  - ❻ 30-35143-01      DC distribution box
  - ❼ 30-33798-01 or    AC input box  
30-33798-02 or  
30-33798-03
  - ❽ 12-35173-01      Blower <sup>1</sup>
  - ❾ H7237-AA          Battery plug-in units <sup>1</sup> (see pages 5-14 and 5-15)

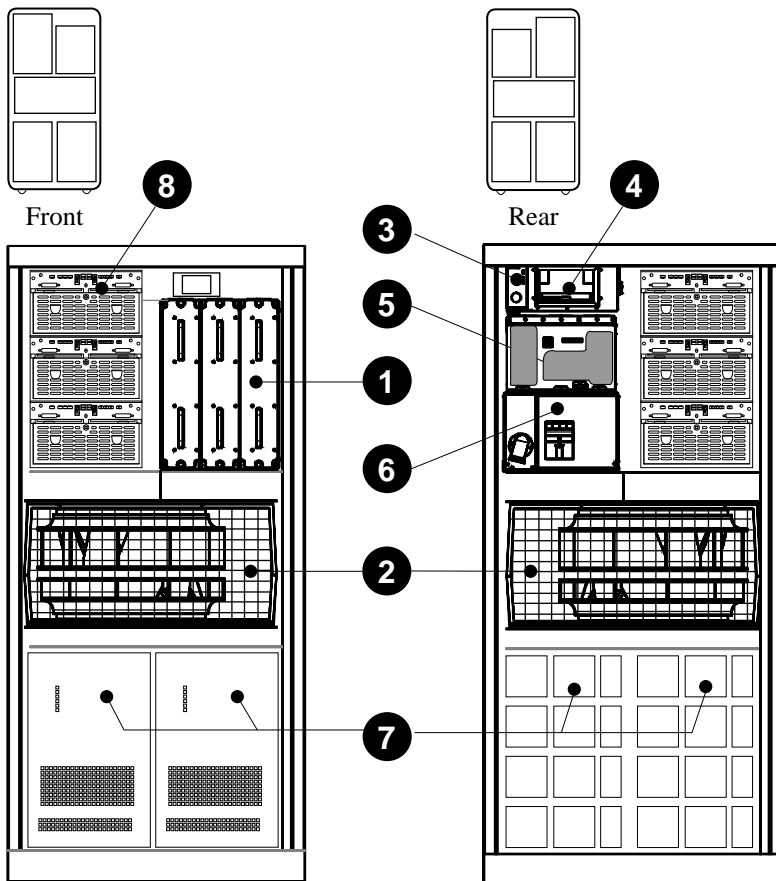
<sup>1</sup> Removal and replacement of this FRU requires access to both the front and the rear of the cabinet.

<sup>2</sup> This FRU is in the main cabinet only (cannot be located in an expander cabinet).

<sup>3</sup> This FRU can be located in either the front or the rear of the cabinet.

## 5.2 FRUs in the Expander Cabinet

Figure 5-3 Expander Cabinet Showing FRU Locations



BXB-0032P-93



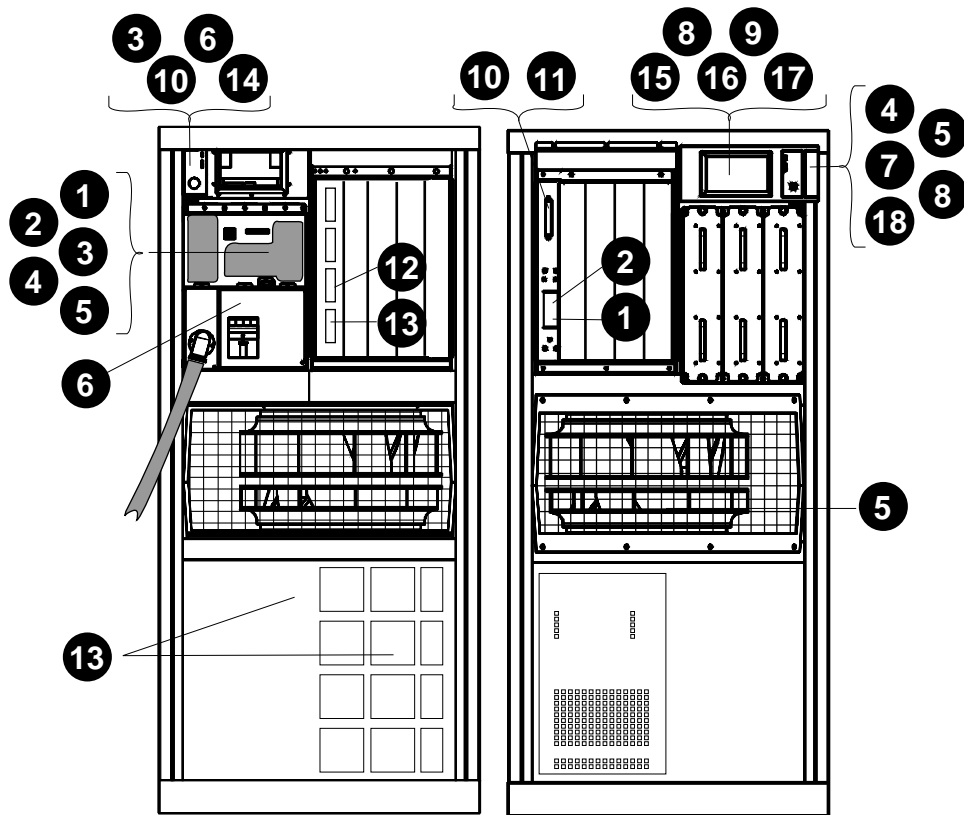
- ❶ 30-33796-01 or 30-33796-02 Power regulators (three)
- ❷ 12-35173-01 Blower
- ❸ 54-20300-01 Cabinet control logic module (CCL)
- ❹ TF85-AA Removable media device <sup>1</sup>
  - Includes these FRUs:
  - TK85 Disk drive
  - 54-19089-01 DSSI controller module
  - 54-20868-01 Local disk converter
  - 17-03123-01 LDC to CCL signal
  - 17-03164-01 LDC to TF power +5/+12
  - 17-03348-01 DSSI signal to bulkhead (TK85)
  - 17-03443-01 Power LDC to bulkhead
  - 17-03444-01 Signal LDC to bulkhead
  - 17-03448-01 DSSI bus TF to bulkhead
  - 17-03505-01 5V VTERM power
  - 17-03508-01 48V power regulator to bulkhead
- ❺ 30-35143-01 DC distribution box
- ❻ 30-33798-01 or 30-33798-02 or 30-33798-03 AC input box
- ❼ DWLMA-BA XMI PIUs <sup>1</sup> (see page 5-11 for FRUs in this PIU)
- ❽ BA654-AA Disk PIU <sup>2</sup> (see page 5-13)

<sup>1</sup> Removal and replacement of this FRU requires access to both the front and the rear of the cabinet.

<sup>2</sup> This FRU can be located in either the front or rear of the top portion of the cabinet.

### 5.3 Platform Cables

Figure 5-4 Platform Cabinet (Rear and Front) Showing Cables



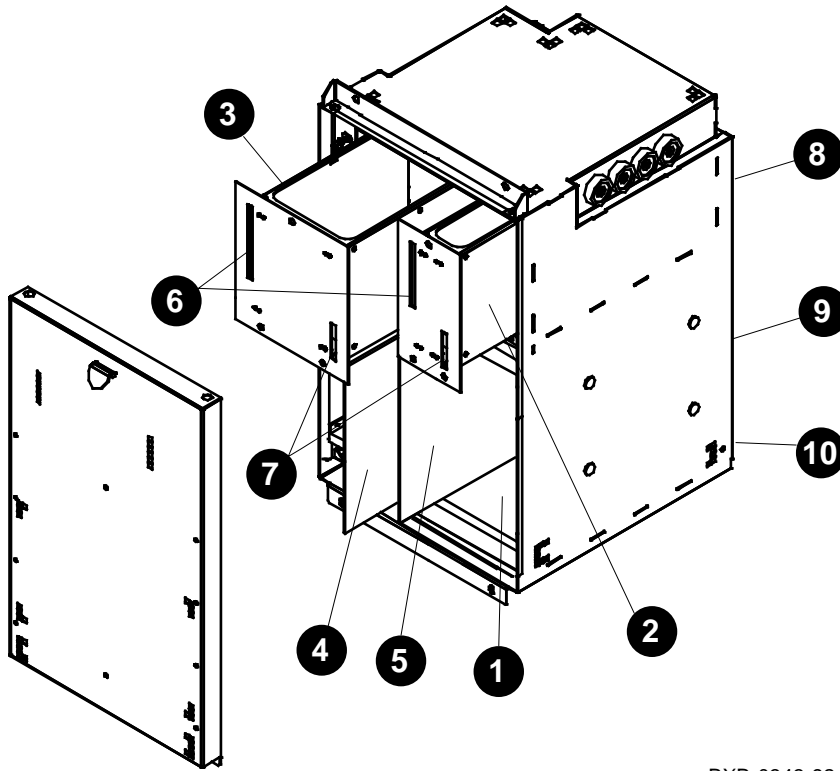
BXB-0021D-92

- ❶ 17-03118-01 48V LSB power (gray)
- ❷ 17-03118-02 48V LSB power (yellow)
- ❸ 17-03119-01 48V power/signal to PIU
- ❹ 17-03127-01 AC to LDC
- ❺ 17-03126-01 48V power/sense to blower
- ❻ 17-03124-01 AC to CCL signal
- ❼ 17-03120-01 Control panel to CCL signal
- ❽ 17-03123-01 LDC to CCL signal
- ❾ 17-03164-01 +5/+12 LDC to tape power
- ❿ 17-03121-01 CCL to LSB bulkhead signal
- ⓫ 17-03122-01 LSB bulkhead to LSB backplane
- ⓬ 17-03085-01 I/O cable, long (to expander cabinet — 114 in)
- ⓭ 17-03085-02 I/O cable, short (53 in; expander cabinet only)
- ⓮ 17-03201-01 DEC power bus
- ⓯ 17-03348-01 DSSI bulkhead signal
- ⓰ 17-03443-01 LDC bulkhead power
- ⓱ 17-03444-01 LDC bulkhead signal
- ⓲ 17-03511-01 Control panel to CCL in expander cabinet

See pages 5-15 and 5-17 for part numbers and descriptions of battery cables.

## 5.4 FRUs in the XMI Plug-In Unit

Figure 5-5 XMI Plug-In Unit (Front) Showing FRU Locations



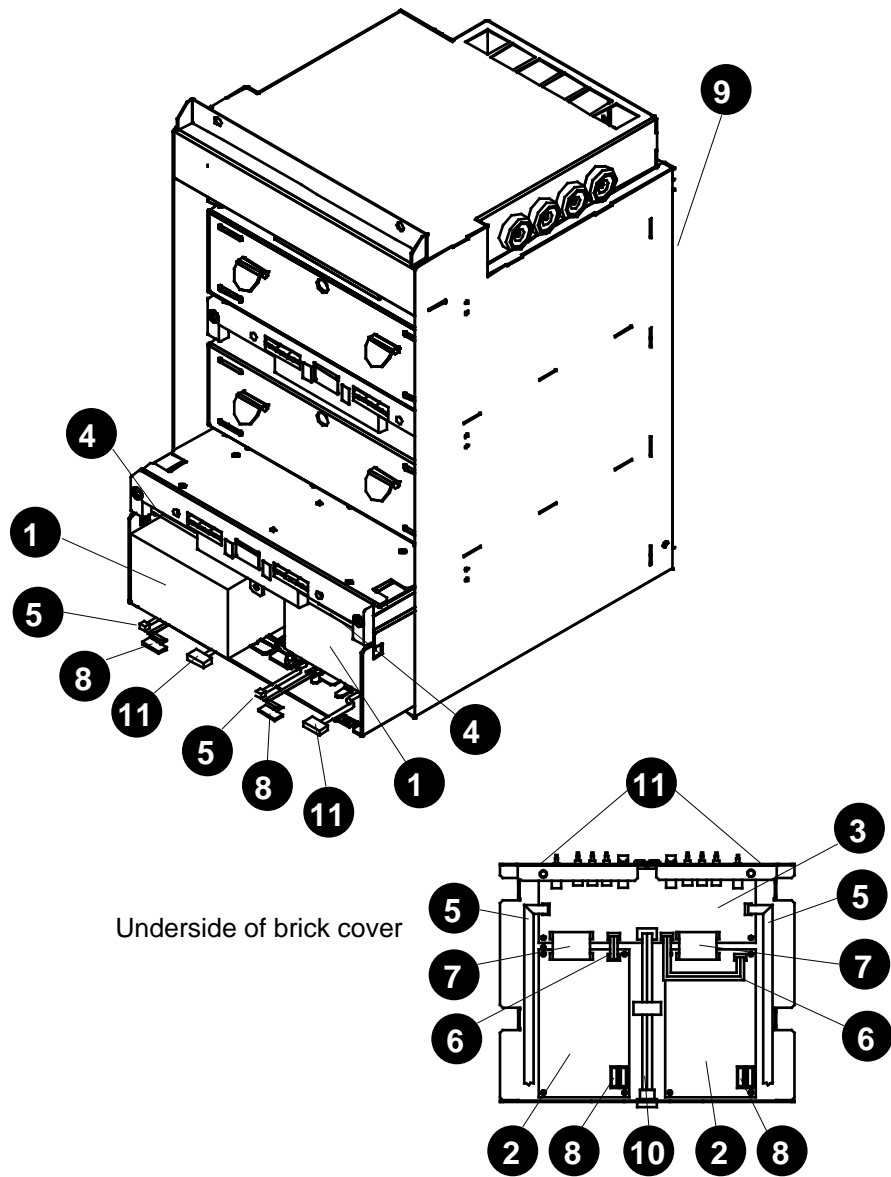
BXB-0343-92

- ❶ 70-30396-01 XMI backplane assembly
  - ❷ 30-36010-01 Module A (power regulator)
  - ❸ 30-36009-01 Module B (power regulator)
  - ❹ T2028-AA DWLMA module (LSB to XMI — slot 8)
  - ❺ T2030-YA Clock and arbitration module (slot 7)
- These FRUs can reside in any<sup>1</sup> XMI slot except 7 or 8:
- T2020-00 XMI to NI controller
  - T2027-00 XMI to FDDI controller
  - T2080-YA XMI to CI controller
  - T2036-AA XMI to DSSI controller
- ❻ 17-03162-01 Signal cable
  - ❼ 17-03163-01 48V power cable
  - ❽ 17-03202-01 Power distribution cable (rear of PIU)
  - ❾ 17-03416-01 +5VB jumper (rear of PIU)
  - ❿ 17-03533-01 Bulkhead to XMI signal (rear of PIU)

<sup>1</sup> A module with an XMI corner must be in slot 1 or 14. For more information, see the *Platform Service Manual*.

## 5.5 FRUs in the Disk Plug-In Unit

Figure 5-6 Disk Plug-In Unit (Front) Showing FRU Locations



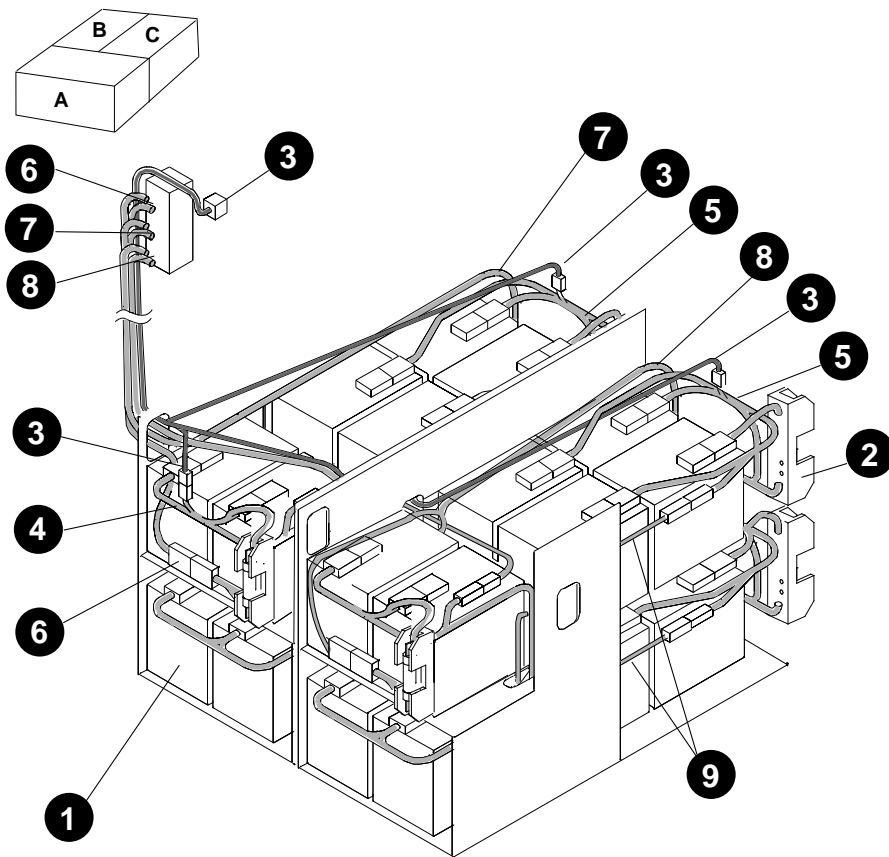
BXB-0345-92

- ❶ RF73-EA            RF73 disk drive
- Includes these FRUs:
- 54-19119-01        RF73-EA ECM module
- 70-28814-01        RF73 HDA
- ❷ 54-20868-01        Local disk converter (LDC)
- ❸ 54-21664-01        Disk control panel
- ❹ 17-02382-0x        DSSI brick jumper cable (BC21Q-xx)
- ❺ 17-03417-01        RF73 signal
- ❻ 17-03418-01        LDC power
- ❼ 17-03419-01        LDC signal
- ❽ 17-03420-01        RF73 power
- ❾ 17-03422-01        Signal and power
- ❿ 17-03423-01        Disk control panel to bulkhead
- ⓫ 17-03424-01        DSSI bus

- ❶ through ❸, ❺ through ❽, ❿, and ⓫ are in each brick.
- ❹ connects the bricks to each other.
- ❾ runs up the center rear of the PIU.

## 5.6 FRUs in the Main Cabinet Battery Plug-In Units

Figure 5-7 Main Cabinet Battery Plug-In Units (Rear) Showing FRU Locations



BXB-0442-93

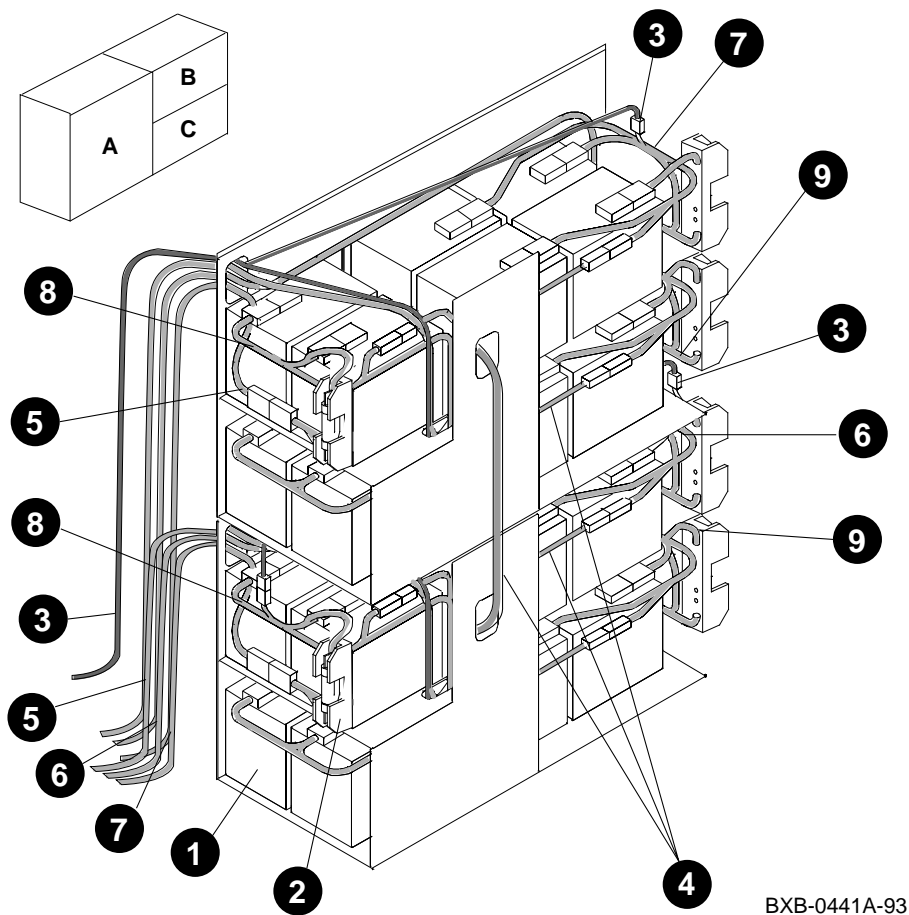
*NOTE: The battery plug-in units are shown in Figures 5-7 and 5-8 without their enclosures.*



- ❶ 12-36168-02 Battery
- ❷ 12-39982-01 Fuse (LPN-RK-90)
- ❸ 17-03421-01 Battery sensor cable (short)
- ❹ 17-03492-01 Intermediate cable, battery block A
- ❺ 17-03493-01 Intermediate cable, battery block B or C
- ❻ 17-03497-01 Power regulator A to battery block A
- ❼ 17-03497-02 Power regulator B to battery block B
- ❽ 17-03497-03 Power regulator C to battery block C
- ❾ 17-03495-01 Battery sensor cable (long)

## 5.7 FRUs in the Battery Cabinet Plug-In Units

Figure 5-8 Battery Cabinet Plug-In Units (Rear) Showing FRU Locations



- ❶ 12-36168-02 Battery
- ❷ 12-39982-01 Fuse (LPN-RK-90)
- ❸ 17-03495-01 Battery sensor cable (long)
- ❹ 17-03496-01 Balancing cables  
17-03496-02
- ❺ 17-03497-04 Power regulator A to battery block A
- ❻ 17-03497-05 Power regulator B to battery block B
- ❼ 17-03497-06 Power regulator C to battery block C
- ❽ 17-03492-01 Intermediate cable, battery block A
- ❾ 17-03493-01 Intermediate cable, battery block B or C



## Chapter 6

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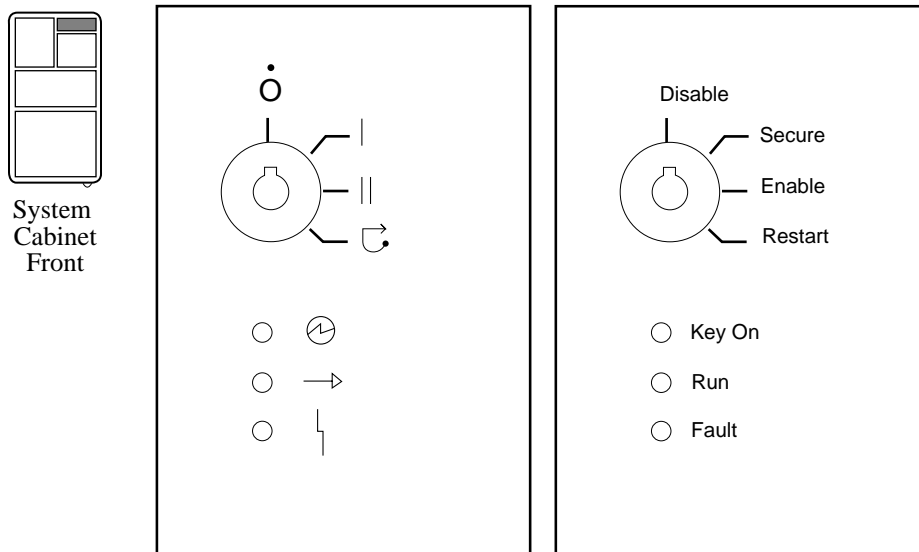
# Controls and Indicators

This chapter describes controls and indicators on these system components:

- <cont\_panel>
- TF85 Removable Media Device
- Cabinet Control Logic Module
- Power Regulator
- AC Input Box
- IOP Module
- KA7AA Processor Module
- BA651 XMI PIU Power Regulators
- BA654 Disk PIU
- DWLMA Module

## 6.1 Control Panel

Figure 6-1 Control Panel



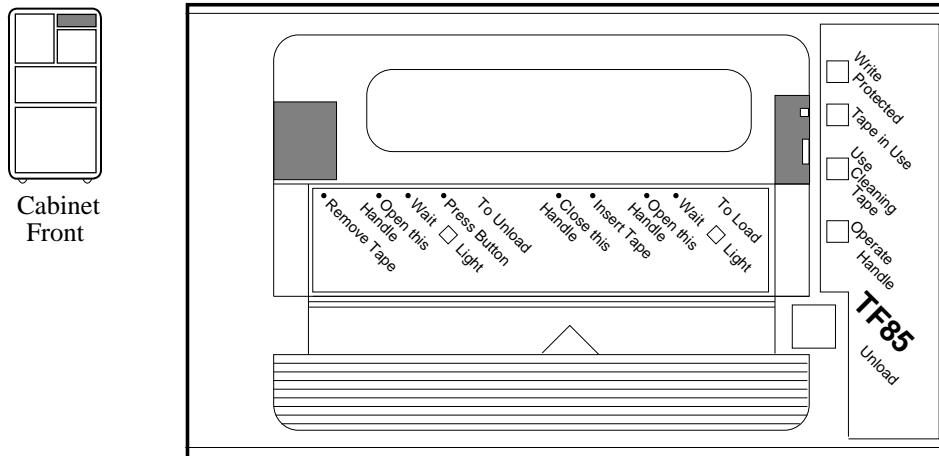
BXB-0015D-93

Table 6-1 Control Panel Indicator Lights

Light	State	Meaning
Key On (Green)	On	Power supplied to entire system; blower running.
	Off	Power supplied only to CCL module.
Run (Green)	On	Primary processor is running the operating system or user programs.
	Off	Primary processor is in console mode.
Fault (Yellow)	On	Fault on LSB, XMI, or an I/O bus.
	Slow flash	Power sequencing in progress or airflow error.
	Fast flash	Power system error, airflow error, or detected transition to keyswitch in Disable position.
	Off	The system passed self-test.

## 6.2 TF85 Removable Media Device

Figure 6-2 TF85 Controls and Indicators



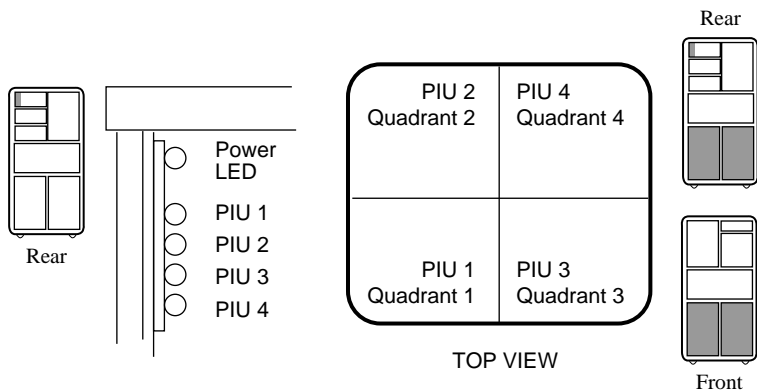
BXB0017B-93

Table 6-2 TF85 Lights

Light	Color	State	Meaning
Write Protected	Orange	On	Tape write protected
		Off	Tape write enabled
Tape in Use	Yellow	Steady	Drive ready
		Blinking	Drive in use
Use Cleaning Tape	Orange	On	Drive needs cleaning
		Off	No cleaning needed
Operate Handle	Green	On	OK to operate handle
		Off	Do not operate handle
		Blinking	Defective cartridge. Pull handle to the open position and remove cartridge. Try another cartridge.
All four lights		Blinking	Drive fault. Reset by pressing the Unload button.

### 6.3 Cabinet Control Logic Module

Figure 6-3 CCL Module LEDs



BXB-0044J-92

*NOTE: Cabinet control logic modules prior to revision K04 include a pressure switch. Revisions K04 and after do not include that switch.*

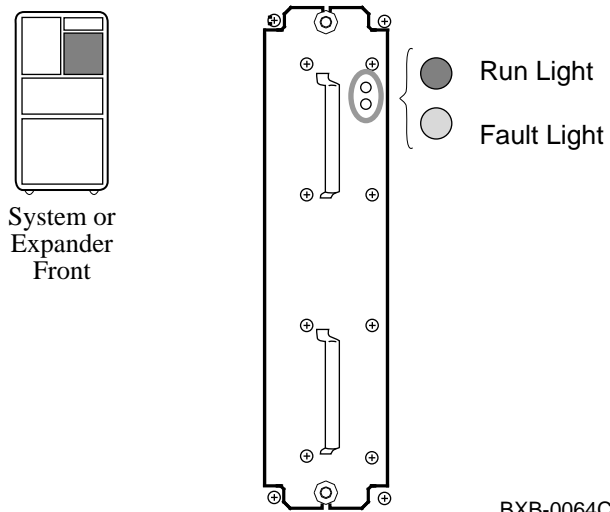
Table 6-3 CCL Module LEDs

LED	Meaning
Power LED	Power is present on the CCL module.
PIU 1 – 4	Power is present in the PIU regulators in the quadrant indicated. (Q1 is to the left when viewing the cabinet from the front, Q2 is behind Q1, Q3 is in the front right, and Q4 is behind Q3.)



## 6.4 Power Regulator

Figure 6-4 Power Regulator LEDs



BXB-0064C-92

Table 6-4 Power Regulator Lights

Run Light (Green)	Fault Light (Yellow)	Meaning
Off	Off	No AC power
Off	On	Fatal fault
Fast flash	Off	AC power present and keyswitch in Disable position
On	Fast flash	Nonfatal fault or battery at end of life
On	Slow flash	Battery discharge mode
On	Off	Normal operation

## 6.5 AC Input Box

Figure 6-5 AC Input Box — Indicators on Circuit Breaker

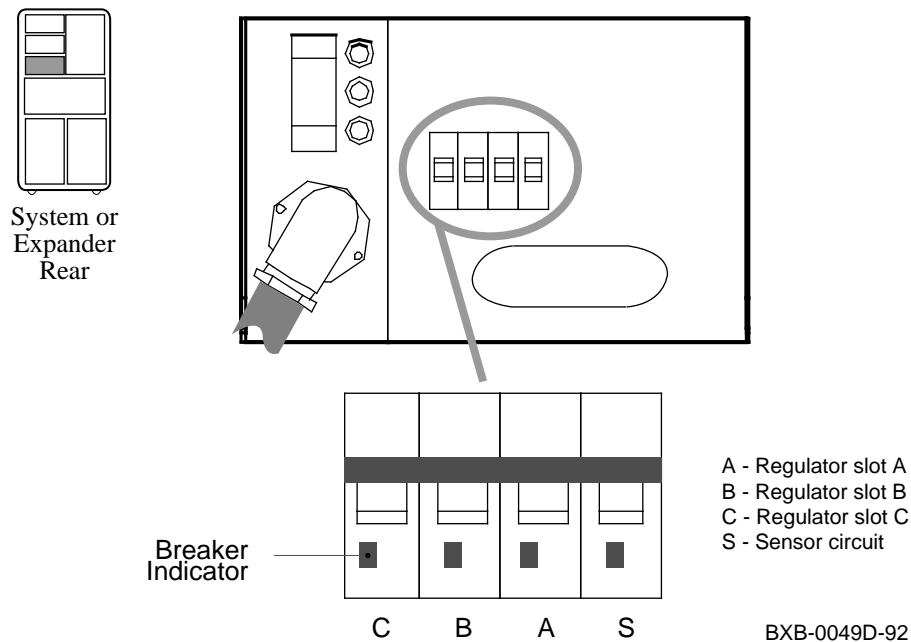


Table 6-5 AC Input Box — Indicators on Circuit Breaker

Color	Meaning
Red	Pole is in on position; not tripped.
Green	Pole is in off position or tripped due to an overload.

*NOTE: In the Japanese version (30-33798-03), all poles trip if one does, causing all indicators to turn green.*

## 6.6 IOP Module

Figure 6-6 IOP (E2044-AA) Module LED

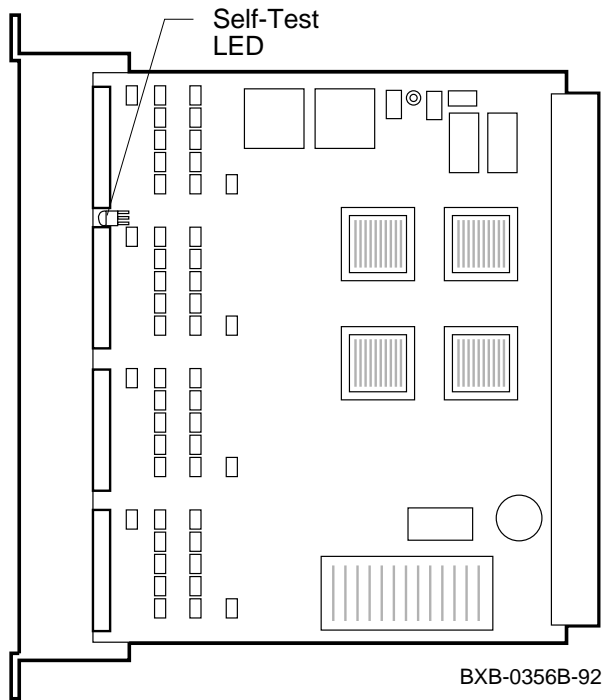
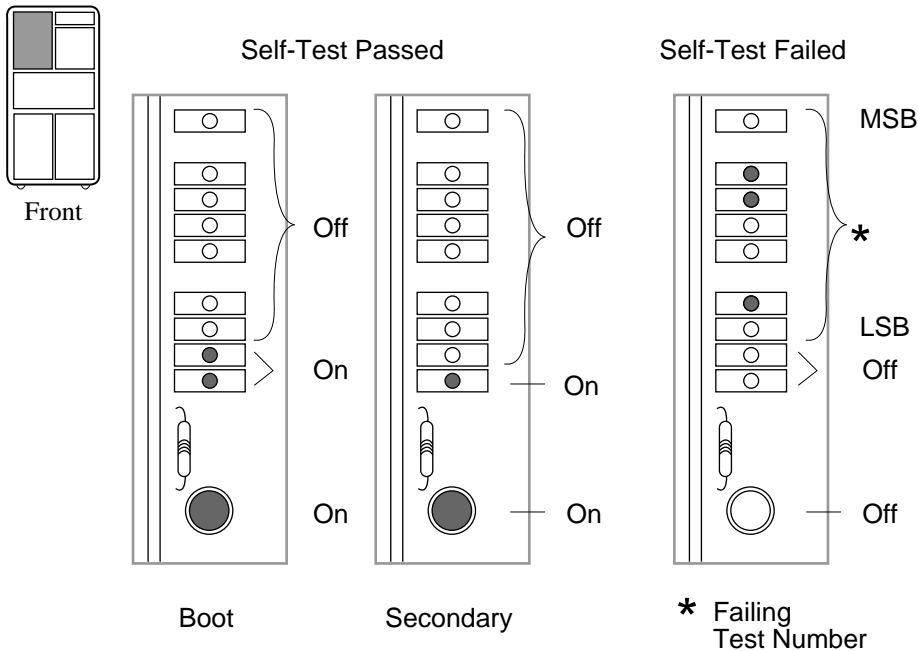


Table 6-6 IOP (E2044-AA) Module LED

Condition	Meaning
On	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• All IOP-specific and I/O adapter tests passed.</li> <li>• An I/O adapter test failed, and the error was isolated to the adapter.</li> </ul>
Off	<p>One of the following:</p> <ul style="list-style-type: none"> <li>• An IOP-specific test failed.</li> <li>• An I/O adapter test failed, and the error could not be isolated to the adapter.</li> <li>• The processor module failed.</li> </ul>

## 6.7 KA7AA Processor Module

Figure 6-7 Processor (E2045) LEDs After Self-Test



BXB-0090D-92

Each module on the LSB has an on-board DC-to-DC converter. If the converter on one module is defective, the 2V reference voltage is disabled for all nodes, preventing any node from using the LSB. Table 6-8 indicates which module has the defective converter based on the state of the STP LEDs of all modules in the LSB.

Use Table 6-8 when the Fault light on the control panel is on (see Section <cont\_panel>) and the console prompt is displayed but the self-test map is not. This indicates that the LSB is good, but access to the bus is not possible.

**Table 6-7 Processor (E2045) LEDs After Self-Test**

Test Result	LEDs
Self-test passed — boot processor	STP LED and two LEDs above it are on. All others are off.
Self-test passed — secondary processor	STP LED and one LED above it are on. All others are off.
Self-test failed	STP LED and two LEDs above it are off. Failing test number <sup>1</sup> is in top seven LEDs: 1 – 55    SROM/self-test tests 1 – 55 56 – 65    CPU/memory interaction tests 1 – 10 66 – 72    Multiprocessor tests 1 – 7

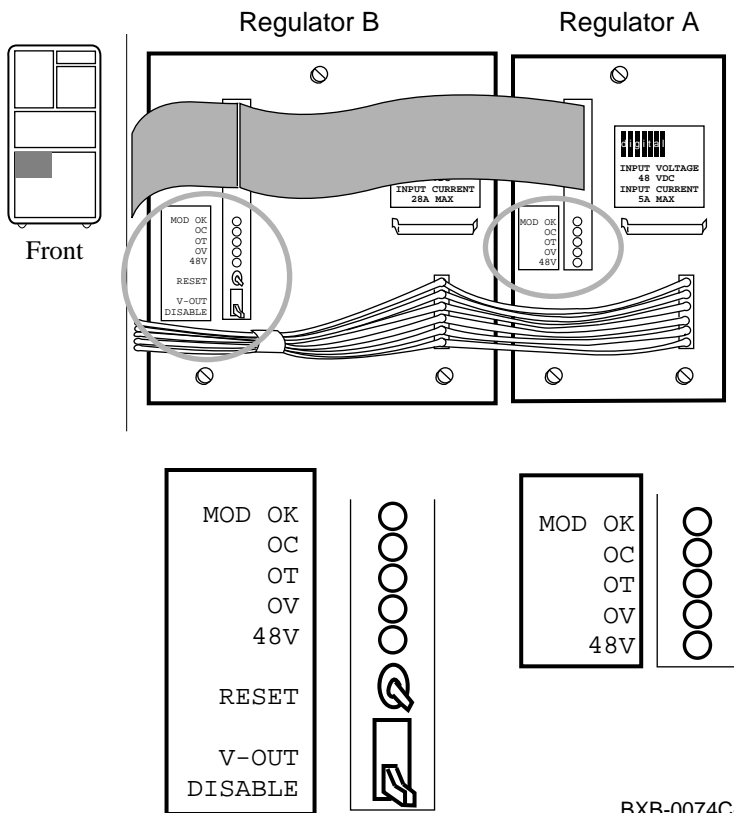
<sup>1</sup> The failing test number is in binary-coded decimal.

**Table 6-8 Self-Test LEDs Indicating Defective DC-to-DC Converter**

Processor Modules	Memory Modules	IOP Module	Defective Converter on This Module
One module's STP LED is off; all others are on.	All STP LEDs are on.	STP LED is off.	Processor module with STP LED off
All STP LEDs are on.	One module's STP LED is off; all others are on.	STP LED is off.	Memory module with STP LED off
All STP LEDs are on.	All STP LEDs are on.	STP LED is off.	IOP module

## 6.8 BA651 XMI PIU Power Regulators

Figure 6-8 XMI PIU Power Regulators



BXB-0074C-92

**Table 6-9 XMI PIU Power Regulator Lights (Regulators A and B)**

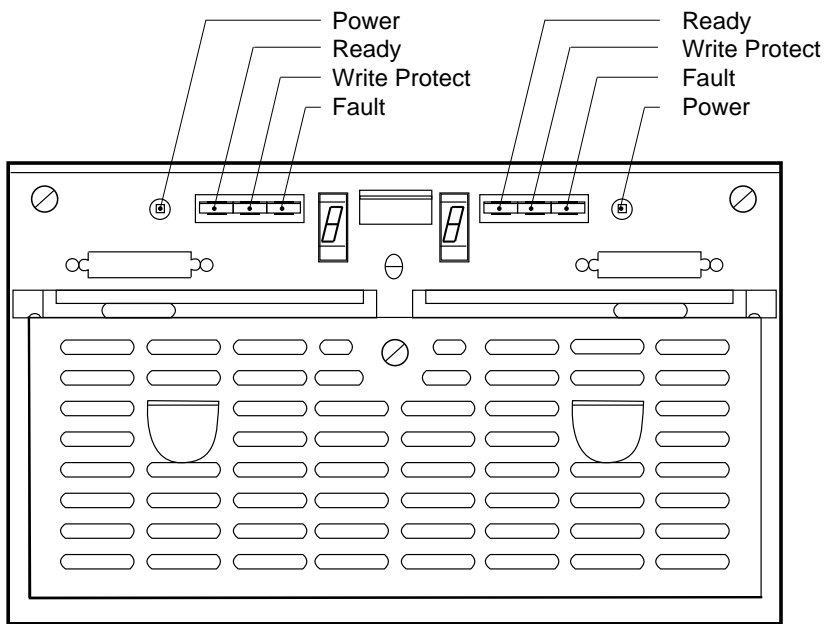
Light	Color	State	Meaning	Does light latch?
MOD OK	Green	On	Regulator is working.	No
		Off	Regulator is not working.	
OC	Yellow	On	Overcurrent condition	Yes
OT	Yellow	On	Overtemperature condition	Yes
OV	Yellow	On	Overvoltage condition	Yes
48V	Green	On	48V is present.	No

**Table 6-10 XMI PIU Power Switches (Regulator B)**

Switch	Function
Reset	Momentary switch resets all lights on regulators A and B.
Enable/Disable	When this switch is in the Disable position, the output of both PIU power supplies is inhibited.

## 6.9 BA654 Disk PIU

Figure 6-9 Disk Brick Control Panel



BXB-0045A-92

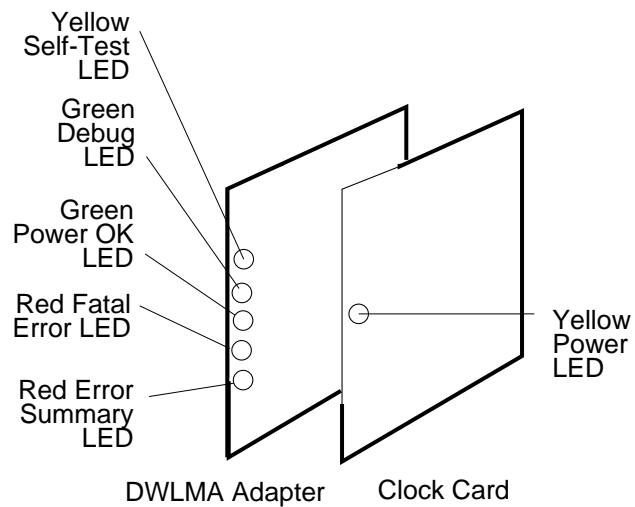


**Table 6-11 Disk Brick Controls and Indicators**

<b>Control</b>	<b>Pushbutton Position</b>	<b>Light</b>	<b>Function</b>
<b>Power (Green)</b>	<b>In</b>	<b>On</b>	<b>DC power present</b>
	<b>Out</b>	<b>Off</b>	<b>DC power not present</b>
<b>Ready (Green)</b>	<b>In</b>	<b>On</b>	<b>ISE is on-line</b>
	<b>Out</b>	<b>Off</b>	<b>ISE is off-line</b>
<b>Wrt Prot (Yellow)</b>	<b>In</b>	<b>On</b>	<b>Write-protect enabled</b>
	<b>Out</b>	<b>Off</b>	<b>Write-protect disabled</b>
<b>Fault (Red)</b>	<b>Momentary switch</b>	<b>On</b>	<b>Fault condition</b>
		<b>Off</b>	<b>Normal operation</b>
		<b>Slow flash</b>	<b>ISE calibrations in progress</b>
		<b>Fast flash</b>	<b>Disk control panel failure</b>

## 6.10 DWLMA Module

Figure 6-10 DWLMA (T2028-AA) Module LEDs



BXB-0361A-92

Table 6-12 DWLMA (T2028-AA) Module LEDs

LED	Color	Desired Condition
STP — Self-Test Passed	Yellow	On
DBGDIS — Debug Disable	Green	On
POK — Power OK	Green	On
FTLERR — Fatal Error	Red	Off
ES — Error Summary	Red	Off

## Chapter 7

---

# Restoring Corrupted ROMs

The following list tells you how to determine when to use these sections of this chapter:

- **Restoring a Corrupted EEPROM**  
Use this section when the message "EEPROM image failed to verify" is displayed on the console terminal.
- **Restoring Corrupted Firmware on an Adapter**  
Use this section when an adapter fails self-test and the problem is corrupted firmware.
- **Restoring Corrupted Firmware on a CPU**  
Use this section when you power up the system and the prompt VAX-7000/10000-FRRC> is displayed on the console terminal.

## 7.1 Restoring a Corrupted EEPROM

### Example 7-1 Using the Build EEPROM Command to Restore a Corrupted EEPROM

```
EEPROM image failed to verify
EEPROM environment parameters not set up
Fail to update EEPROM envar on CPU 1
>>> build eeprom
Creating new EEPROM image
System Serial Number> ga01234567
Module Serial Number> sgo0000001
Module Unified 2-5-2.4 Part Number> 80-E2045-AA-0E04
>>> initialize
```

*NOTE: See Chapter 3 for more information on the console commands for the EEPROM.*

**For more information:**

***System Service Manual***  
***Console Reference Manual***

## 7.2 Restoring Corrupted Firmware on an Adapter

If an adapter fails self-test, use this procedure to determine if the firmware is corrupted, and if it is, to update the firmware:

1. Boot the console CD-ROM (Example 7-2).
2. Use the LFU **display** or **show** command to indicate (by returning the mnemonic "unknown") if firmware has been corrupted (Example 7-3).
3. Use the LFU **update** command to write the new firmware (Example 7-4).
4. Exit (Example 7-5).

### Example 7-2 Booting LFU

```
P00>>> boot exa0 -flags 0,0,0 -file ISL_LVAX_V01
Resulting file is mopdl:ISL_LVAX_V01/exa0
..... Load complete!
      [boot information]
```

```
Network Initial System Load Function
Version 1.1
```

```
FUNCTION          FUNCTION
ID
1      -          Display Menu
2      -          Help
3      -          Choose Service
4      -          Select Options
5      -          Stop
Enter a function ID value: 3
OPTION          OPTION
ID
1      -          Find Services
2      -          Enter known Service Name
Enter an Option ID value: 1
```

```
Working
Servers found:: 3
Service Name Format:
Service Number
Service Name
Server Name
Ethernet ID
#1
INFO4$RZ57
INFO4
08-00-2B-26-A6-98
```

## Example 7-2 Booting LFU (Continued)

```
#2
6000_DIAG_H
INFO3
08-00-2B-16-04-D4
#3
VAX7000_V01
OPUS_ESS
08-00-2B-18-A9-75
```

Enter a Service Number or <CR> for more: 3

```
          Copyright Digital Equipment Corporation
                1992
                All Rights Reserved.
Loadable Environment Rev: V1.0-1625      Jul 12 1992  10:50:56
```

```
***** Loadable Firmware Update Utility *****
Version 2.1                                16-jun-1992
```

---

Function	Description
Display	Displays the system's configuration table.
Exit	Return to loadable offline operating environment.
List	Lists the device types and firmware revisions supported by this revision of LFU.
Modify	Modifies port parameters and device attributes.
Show	Displays device mnemonic, hardware and firmware revisions.
Update	Replaces current firmware with loadable data image.
Verify	Compares loadable and device images.
? or Help	Scrolls the function table.

---

Function?

### Example 7-3 LFU Display and Show Commands

```
Function? disp
      Name  Type   Rev   Mnemonic  FW Rev   HW Rev
LSB
0+   KA7AA  (8002) 0000 ka7aa0    1.0     E04
1+   KA7AA  (8002) 0000 ka7aa1    1.0     E04
7+   MS7AA  (4000) 0000 ms7aa1    N/A     A01
8+   IOP    (2000) 0001 iop0      N/A     A

C0 XMI                                xmi0
8+   DWLMA  (102A) A5A6 dwlma0    N/A     A
C+   KDM70  (0C22) 1E11 kdm700    3.0
E+   DEMNA  (0C03) 060B demna0    6.8

C1 XMI                                xmi1
1+   ?????? (0000) 0000 unknown0
8+   DWLMA  (102A) A5A6 dwlma1    N/A     A
A+   CIXCD  (0C05) EB11 cixcd0    69.0    A01
```

```
Function? sho *
```

	Firmware Revision	Hardware Revision	
ka7aa0 +	1.0	E04	
ka7aa1 +	1.0	E04	
ms7aa0	--	--	not supported.
iop0	--	--	not supported.
xmi0	--	--	not supported.
kdm700	3.0	Cannot be read	
demna0	--	--	not supported.
unknown0	--	--	Updates only.
cixcd0 +	69.0	A01	

'+' indicates the update firmware revision is greater than the adapter's firmware revision.

```
Function?
```

## Example 7-4 LFU Update Command

```
Function? update unknown0
Enter device name or 'exit' to skip this device.
Device name? cixcd
Hardware revision? A01
WARNING: updates may take several minutes to complete for each device
                DO NOT ABORT!
unknown0 Updating to 70.0... Reading Device... Verifying 70.0...
PASSED.

Function?
```

## Example 7-5 LFU Exit Command

```
Function? exit

Initializing...

F E D C B A 9 8 7 6 5 4 3 2 1 0 NODE #
A M . . . . . P P TYP
o + . . . . . + + ST1
. . . . . E B BPD
o + . . . . . + + ST2
. . . . . E B BPD
+ + . . . . . + + ST3
. . . . . E B BPD

. . . . + . + . + . . . + . C0 XMI +
. . . . + . + . + . . . + . C1 XMI +
. . . . . . . . . . . . . C2
. . . . . . . . . . . . . C3

. A0 . . . . . ILV
.256 . . . . . 256MB
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GA01234567
P00>>>
```

**For more information:**

***System Service Manual***  
***Operations Manual***



## 7.3 Restoring Corrupted Firmware on a CPU

Use this procedure when the prompt VAX-7000/10000-FRRC> appears at the console terminal after power-up. (This prompt appears only if the console terminal is set at 9600 baud.) This prompt indicates that the firmware in the FEPROMs on the processor module has been corrupted.

The following must be available for you to use this procedure:

- A source system that can logically connect, through the console port, to the system that has the corrupted firmware.
  - The source system can be on site or remote.
  - The source system must have access to an InfoServer.
  - The program Kermit must reside on the source system.
- The VAX 7000/10000 console CD-ROM with the file VAX7000\_10000\_CONSOLE\_IMAGE.GROM.

Do the following to restore the corrupted firmware. All work is done at the source system, and the procedure takes approximately 10 minutes.

1. Set up the source system (Example 7-6):
  - a. Set the speed of the terminal at which you are working to 9600 baud.
  - b. Bind the CD-ROM volume name to a virtual disk container.
  - c. Mount the InfoServer.
2. Make a physical connection from the source system to the system with the corrupted firmware. For example, use an RS232 cable to connect from a DMB32 on the source system to the console port on the system with the corrupted firmware.
3. Run Kermit (Example 7-7) and set the parameters as shown in the response to the **show all** command in the example.
4. Connect to the system with the corrupted firmware and downline load the correct code (Example 7-8).

### Example 7-6 Preparing the Source System to Restore Corrupted Firmware on a CPU

```
$ set term/speed=9600/perm txa3:
$ mcr ess$ladcp
LADCP> bind VAX7000_V01
VAX7000_V01 is bound to DAD104
LADCP> exit
$ mount/ov=id dad104
$ dir dad104:[sys0.sysexe]
Directory DAD104:[SYS0.SYSEXE]
VAX7000_1000_CONSOLE_IMAGE.GROM
```

### Example 7-7 Running Kermit and Setting Parameters

```
$ kermit
Kermit-32> set file type binary
Kermit-32> set retry packet 5
Kermit-32> set send time 5
Kermit-32> show all
VMS Kermit-32 version 3.3.111

Block check type           One character checksum
Debugging                  OFF
Delay                      5 (sec)
Server sends NAKs every 75 seconds while waiting for a
command
Escape character           035 (octal)
File type                  BINARY
File naming                Normal form
Handshaking character     None
Incomplete file disposition Discard
Line used                  (Optional)
Local echo                 OFF
Parity type                None

Retry maximums
Initial connection        5 (dec)
Sending a packet          5 (dec)

Send parameters
Packet length             80 (dec)
Padding length            0 (dec)
```

### Example 7-7 Running Kermit and Setting Parameters (Cont)

Padding character	000 (octal)
Time out	5 (sec)
End of line character	015 (octal)
Quoting character	043 (octal)
Start of packet	001 (octal)
Receive parameters	
Packet length	80 (dec)
Padding length	0 (dec)
Padding character	000 (octal)
Time out	5 (sec)
End of line character	015 (octal)
Quoting character	043 (octal)
8-bit quoting character	046 (octal)
Start of packet	001 (octal)
Transmit parameters	
Delay	0.0 (sec)
Echo	OFF
Repeat quoting character	176 (octal)

### Example 7-8 Downline Loading Code to Corrupted FEPROMs

```
Kermit-32> connect txa5:
VAX-7000/10000-FRRC> r          !Prepare system to receive
VAX-7000/10000-FRRC> Ctrl/C    !Return to Kermit
Kermit-32> send vax7000_10000_console_image.grom
                                !Transmit code
Kermit-32> connect            !Reconnect to target system
VAX-7000/10000-FRRC> c          !Verify checksum of image
VAX-7000/10000-FRRC> p          !Copy program image to
                                !FEPROMs
VAX-7000/10000-FRRC> i          !Reset node
VAX-7000/10000-FRRC> Ctrl/C    !Return to Kermit
Kermit-32> exit                !Return to DCL
$
```

**For more information:**  
***System Service Manual***



# Chapter 8

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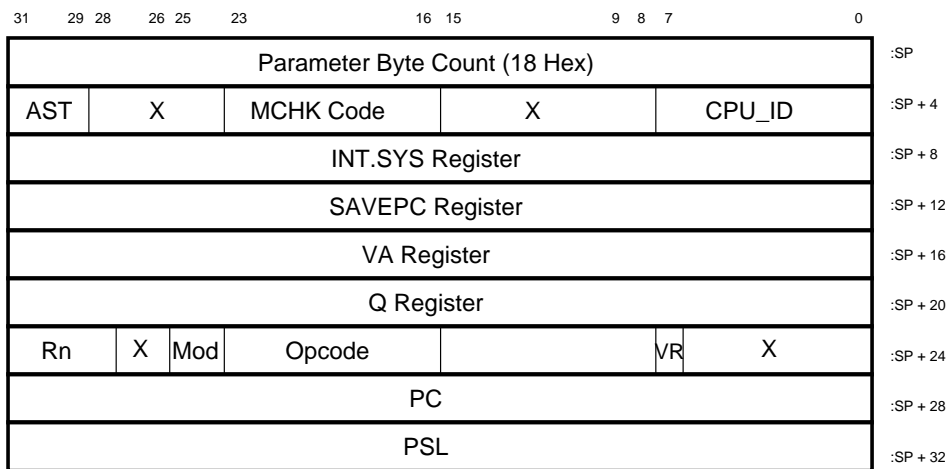
## System Errors

This chapter includes information on the machine check frame and the parse trees. Sections include:

- Machine Check Frame
- Machine Check Parse Tree
- Hard Error Parse Tree
- Soft Error Parse Tree
- I/O Port Parse Tree
- DWLMA Parse Tree

## 8.1 Machine Check Frame

Figure 8-1 Machine Check Exception Frame



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**For more information:**

***KA7AA CPU Technical Manual  
Advanced Troubleshooting***

Table 8-1 Machine Check Stack Frame Fields

Longword Bits	Contents
SP+0 <31:0>	Byte count. The size of the stack frame in bytes, not including the PC, PSL, or the byte count longword. Stack frame PC and PSL values should always be referenced using this count as an offset from the stack pointer.
SP+4 <31:29>	AST LVL. The current value of the register.
<23:16>	Machine check code. The reason for the machine check, as listed in Table 8-2.
<7:0>	CPUID. Contains the current value of the CPUID register.
SP+8 <31:0>	INT.SYS register. The value of the INT.SYS register, which is read onto the A-bus by the microcode.
SP+12 <31:0>	SAVEPC register. The SAVEPC register, which is loaded by microcode with the PC value in certain circumstances. It is used in error handling for PTE read errors with PSL <FPD> set in this stack frame.
SP+16 <31:0>	VA register. The contents of the Ebox VA register, which may be loaded from the output of the ALU.
SP+20 <31:0>	Q register. The contents of the Ebox Q register, which may be loaded from the output of the shifter.
SP+24 <31:28>	Rn. The value of the Rn register, which is used to obtain the register number for the CVTPL and EDIV instructions. In general, the value of this field is unpredictable.
<25:24>	Mod. A copy of the current mode field, PSL <CUR_MOD>.
<23:16>	Opcode. Bits <7:0> of the instruction opcode. The FD bit is not included.

Table 8-1 Machine Check Stack Frame Fields (Continued)

Longword Bits	Contents
<7>	VR. The VAX Restart bit, which is used to communicate restart information between the microcode and the operating system. When set, this bit indicates that no architectural state has been changed by the instruction that was executing when the error was detected. When clear, it indicates that architectural state was modified by the instruction.
SP+28	<31:0> PC. The value of the program counter at the time of the fault.
SP+32	<31:0> PSL. The value of the processor status longword at the time of the fault.

Table 8-2 Machine Check Codes in the Stack Frame

Code	Description	Restart Condition
01	Unknown memory management fault parameter returned by Mbox	$(VR^1 = 1)$ or $(PSL<FPD>^2 = 1)$
02	Illegal interrupt ID value returned in INT.SYS	$(VR = 1)$ or $(PSL<FPD> = 1)$
03	Illegal microcode dispatch	$(VR = 1)$ or $(PSL<FPD> = 1)$
04	Illegal combination of state bits detected during string instruction	$(PSL<FPD> = 1)$
05	Asynchronous hardware error	Recovery is generally not possible.
06	Synchronous hardware error	Recovery and retry are possible.

<sup>1</sup> VR is the VAX restart bit in the machine check stack frame.  
<sup>2</sup> FPD (First Part Done) is PSL <27>.



## 8.2 Machine Check Parse Tree

Figure 8-2 Machine Check Parse Tree

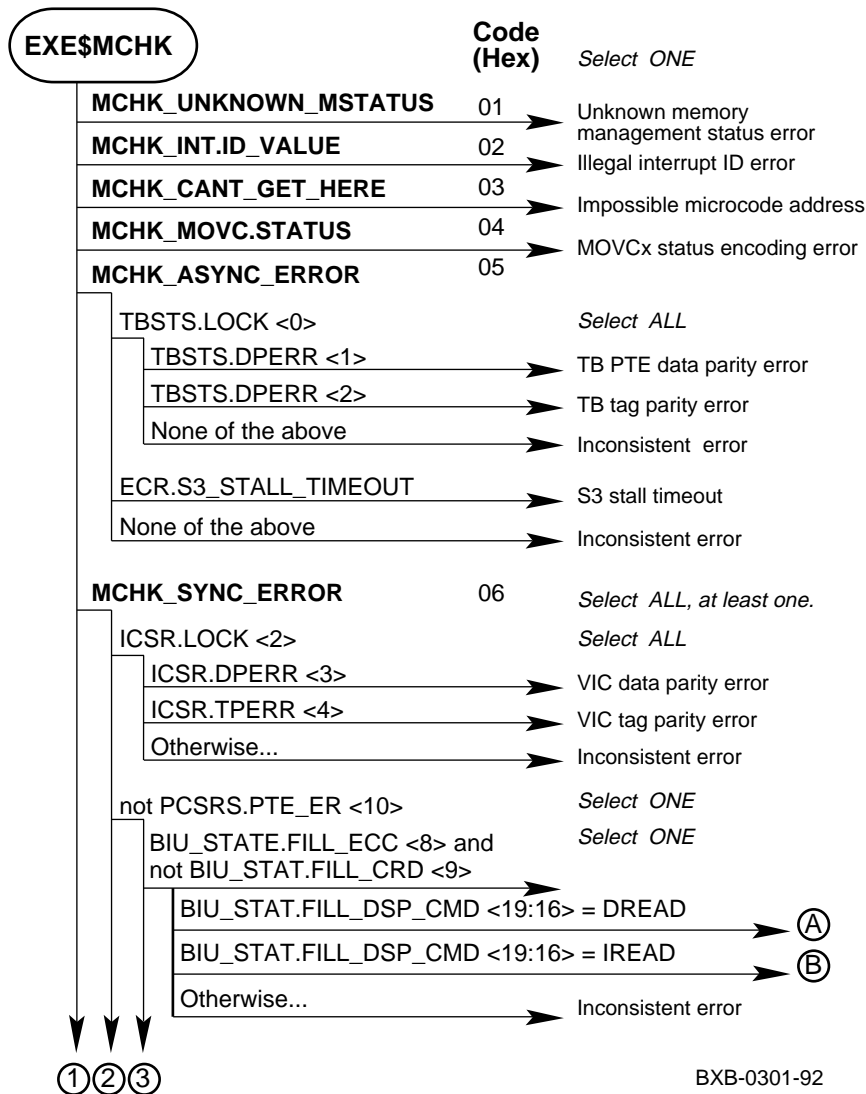
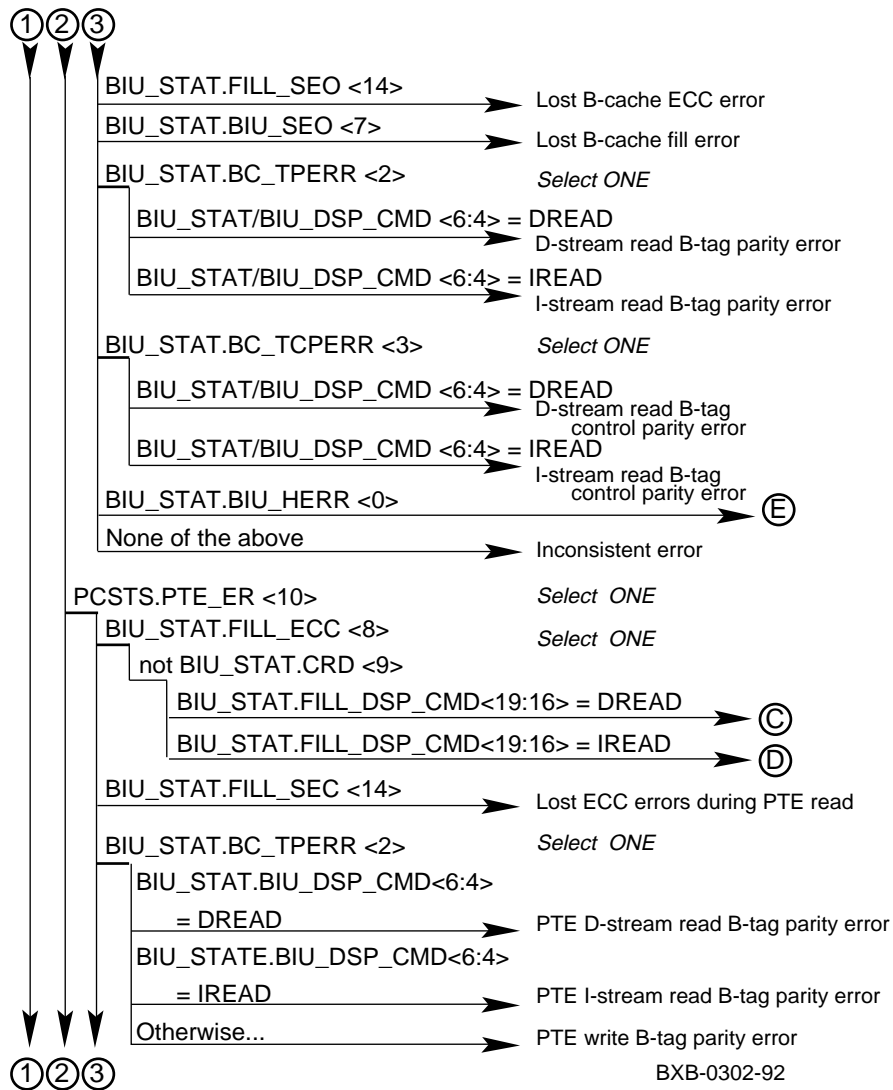


Figure 8-2 Machine Check Parse Tree (Continued)



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Figure 8-2 Machine Check Parse Tree (Continued)

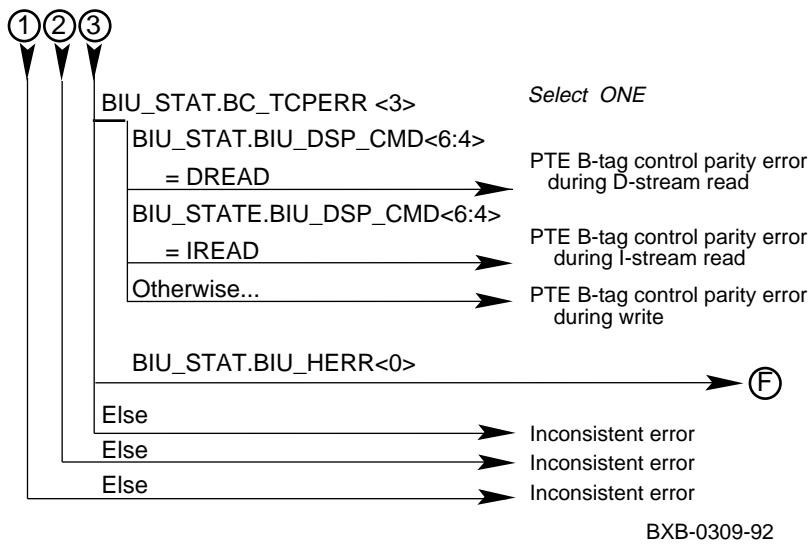


Figure 8-2 Machine Check Parse Tree (Continued)

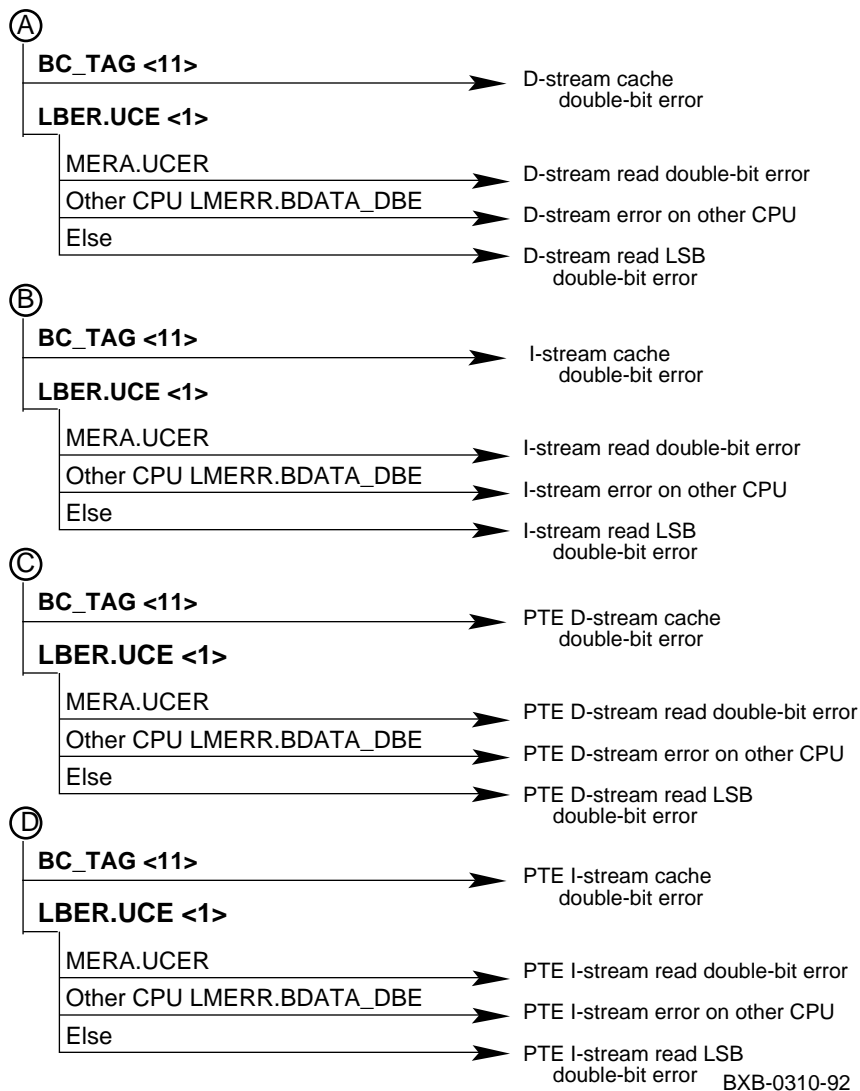
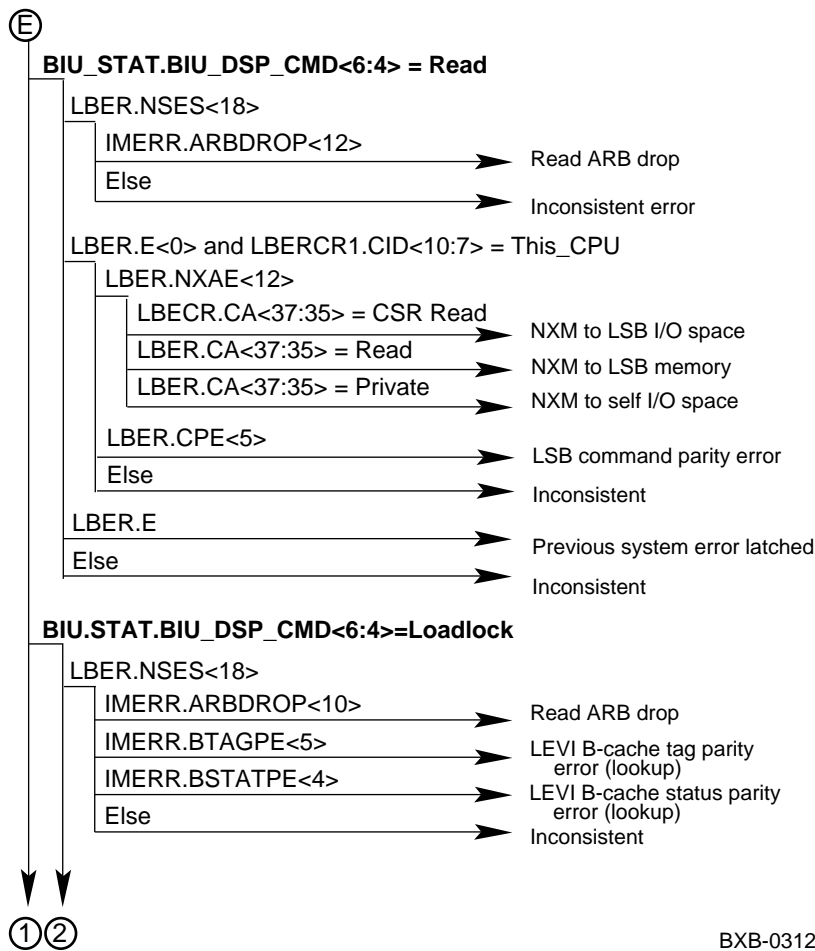


Figure 8-2 Machine Check Parse Tree (Continued)



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Figure 8-2 Machine Check Parse Tree (Continued)

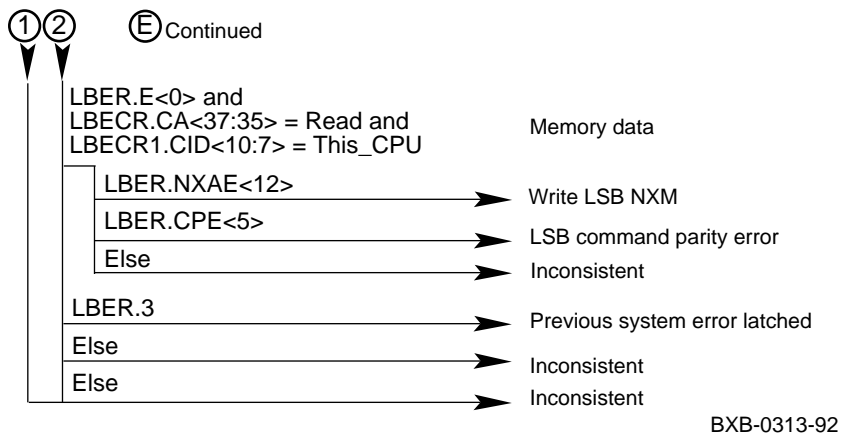
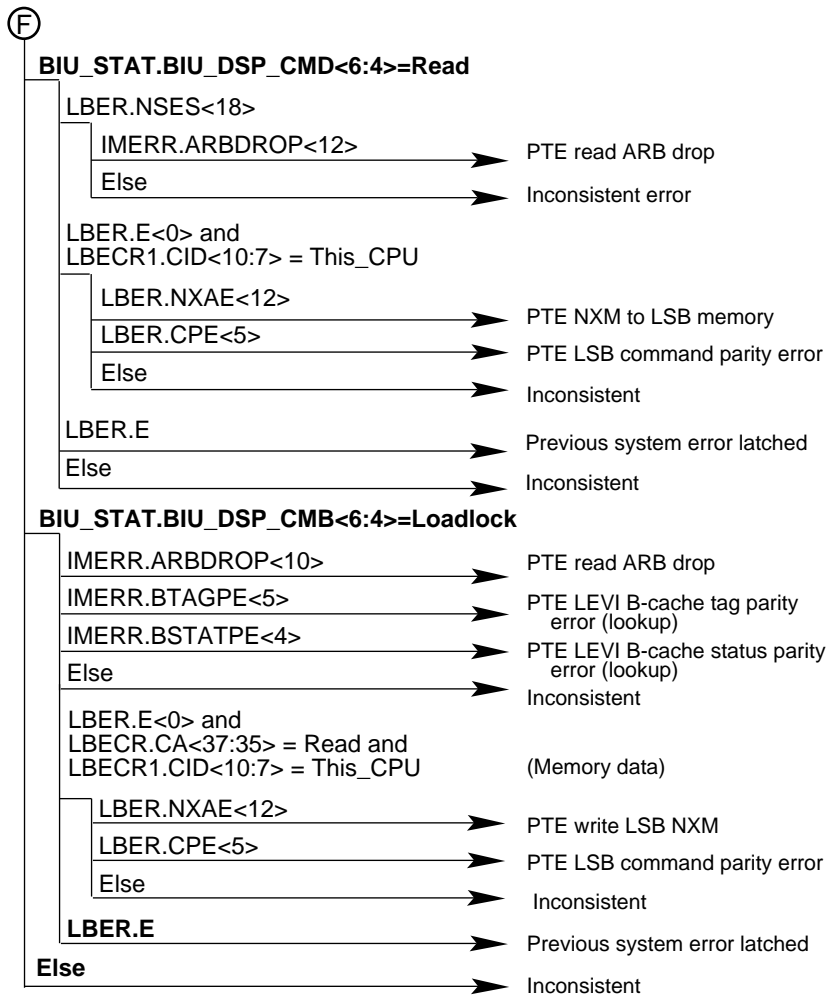


Figure 8-2 Machine Check Parse Tree (Continued)



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### 8.3 Hard Error Parse Tree

Figure 8-3 Hard Error Parse Tree

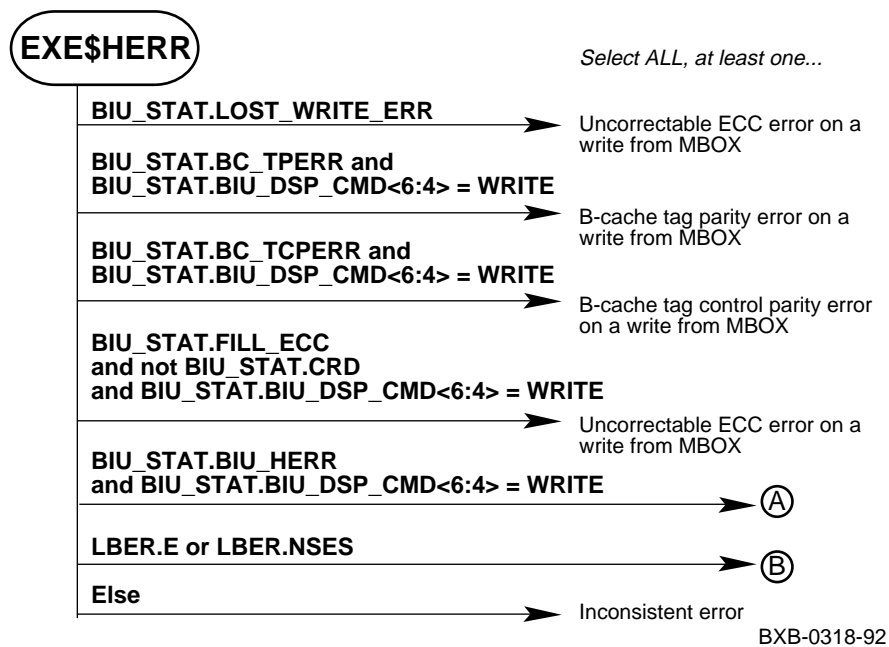




Figure 8-3 Hard Error Parse Tree (Continued)

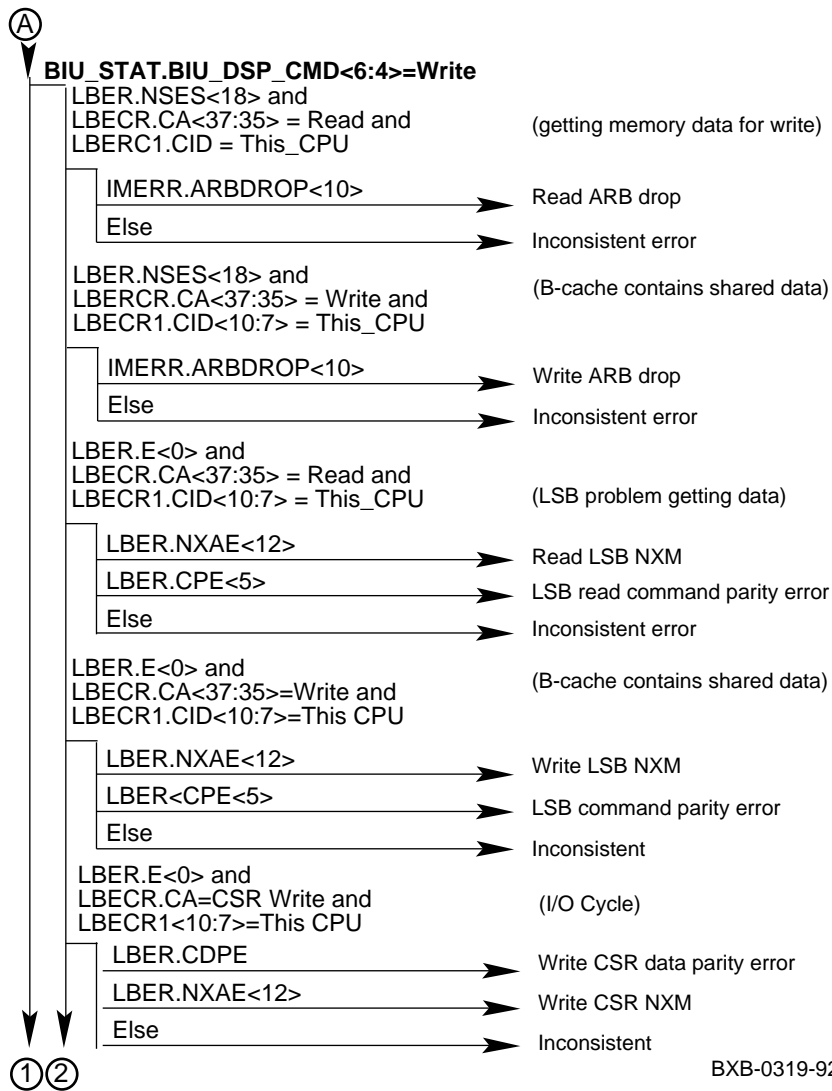
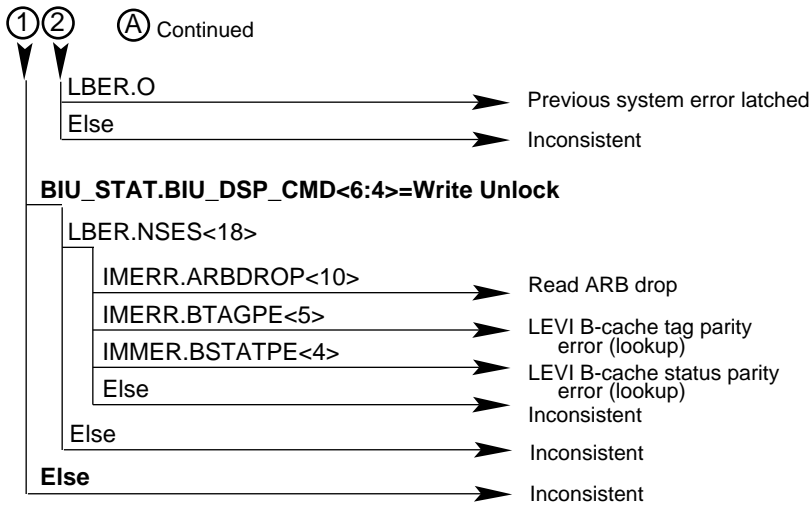


Figure 8-3 Hard Error Parse Tree (Continued)



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Figure 8-3 Hard Error Parse Tree (Continued)

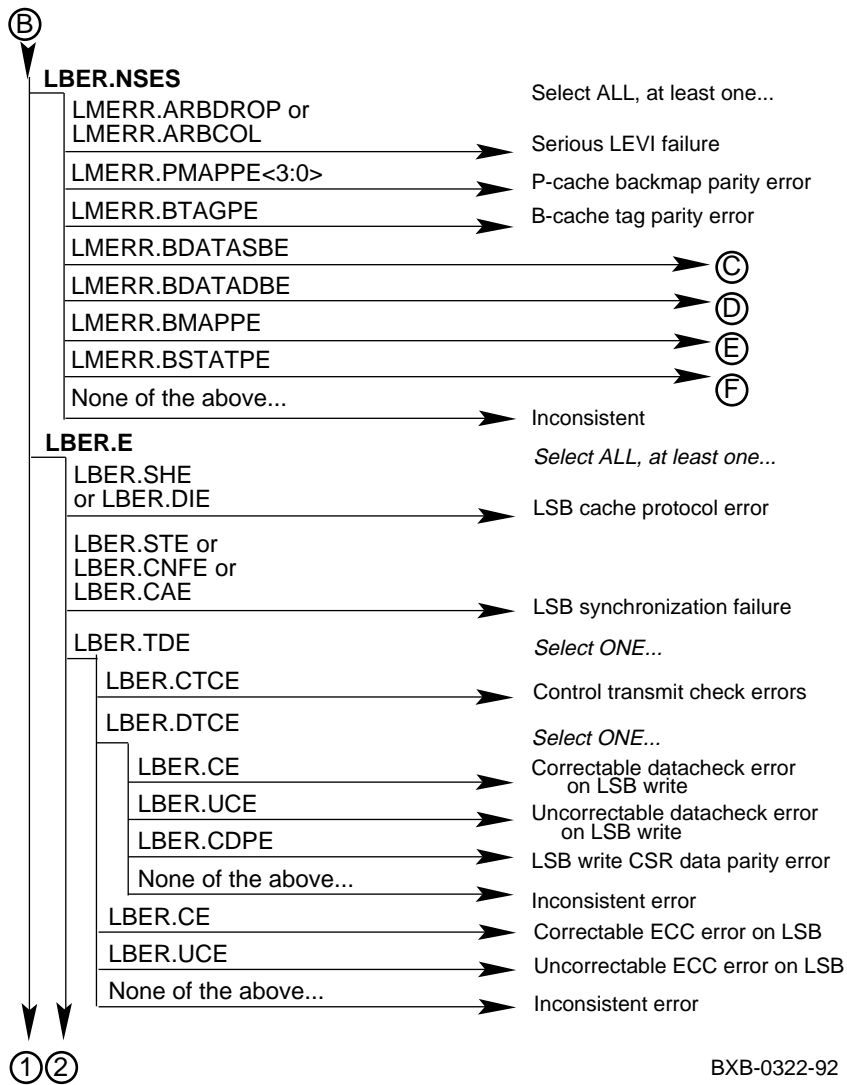


Figure 8-3 Hard Error Parse Tree (Continued)

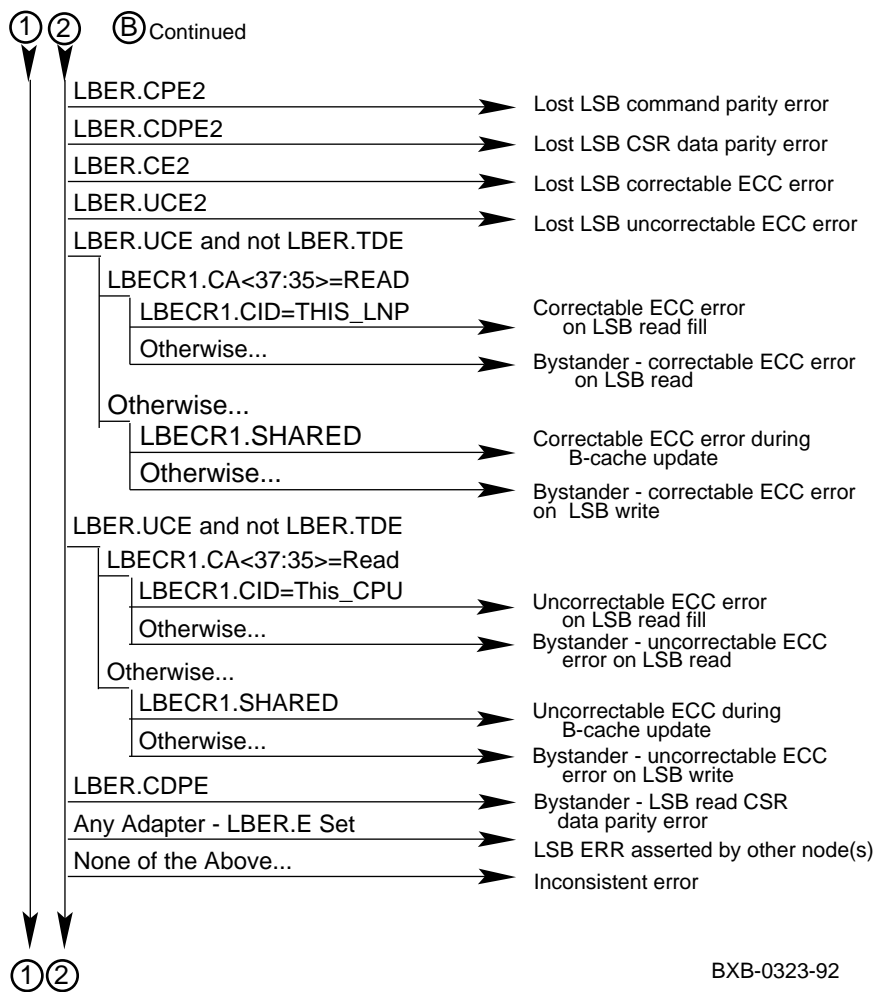
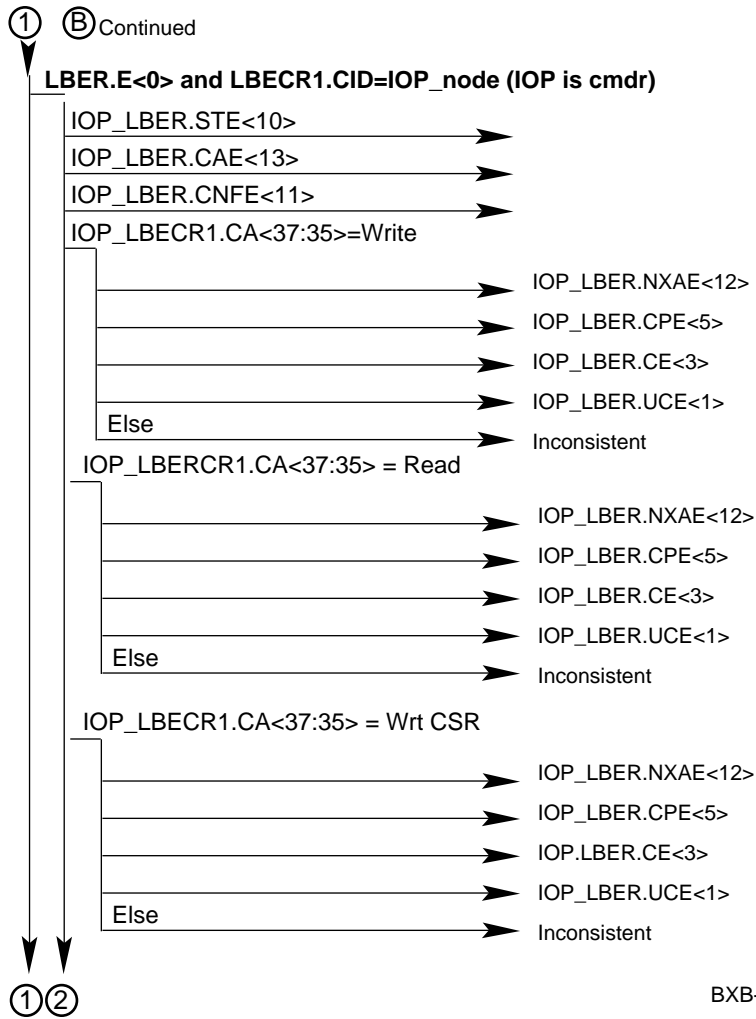
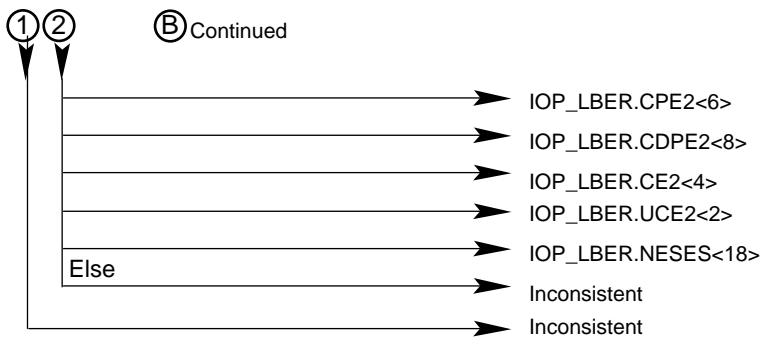


Figure 8-3 Hard Error Parse Tree (Continued)



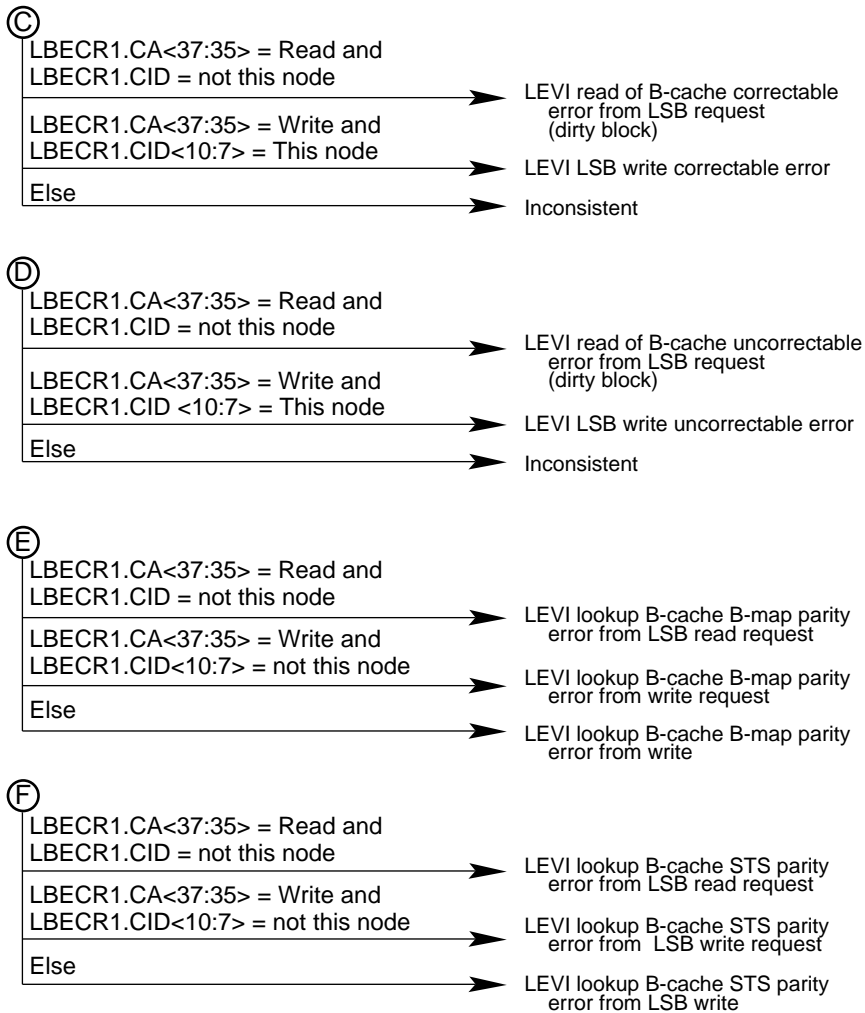
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Figure 8-3 Hard Error Parse Tree (Continued)



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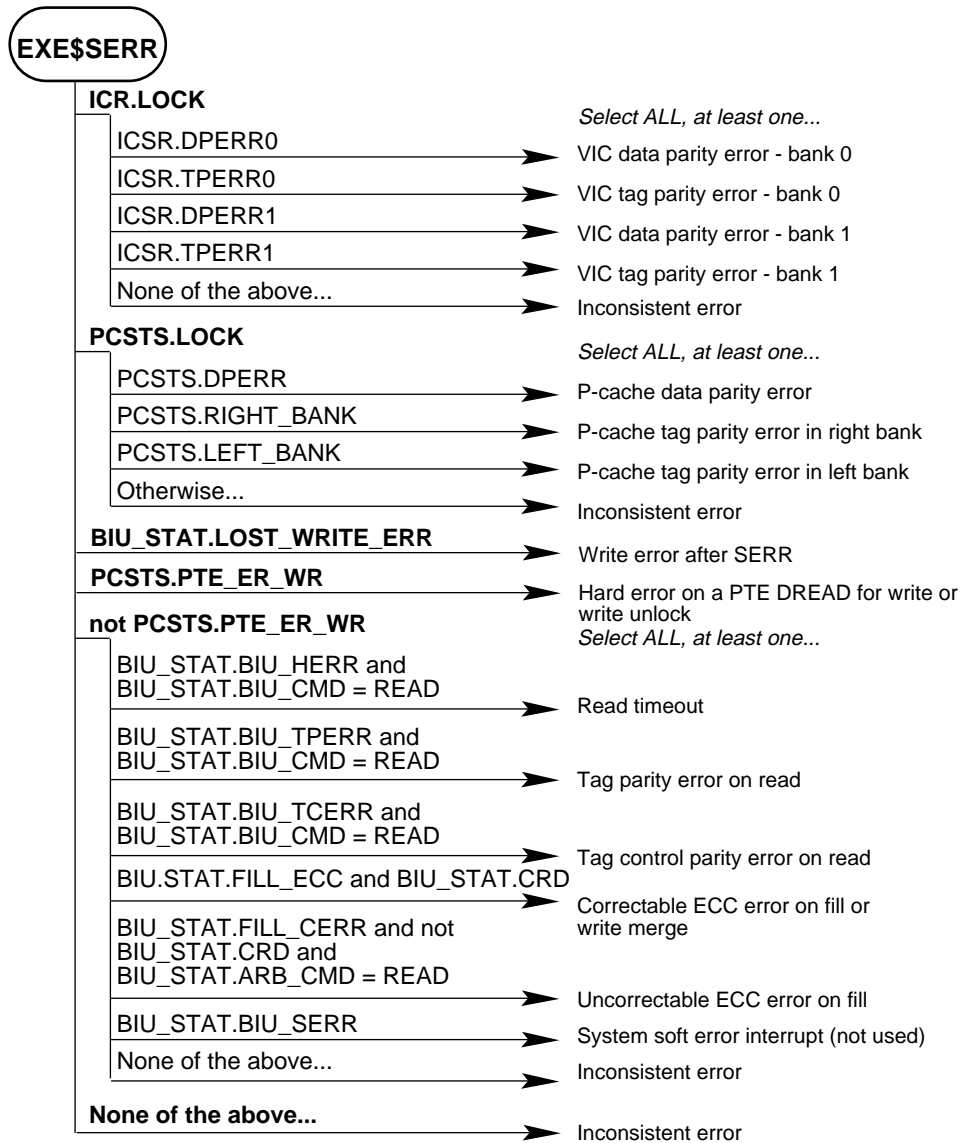
Figure 8-3 Hard Error Parse Tree (Continued)



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## 8.4 Soft Error Parse Tree

Figure 8-4 Soft Error Parse Tree



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## 8.5 I/O Port Parse Tree

Figure 8-5 IOP Error Parse Tree

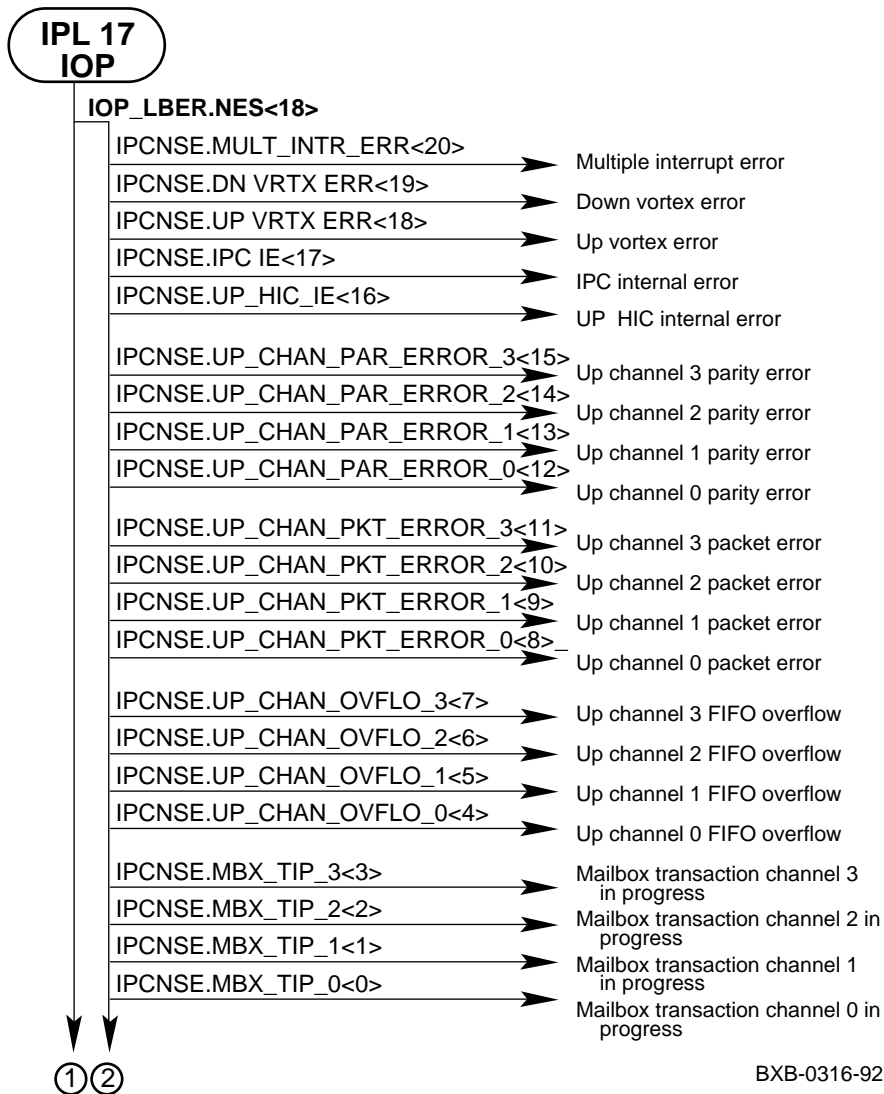
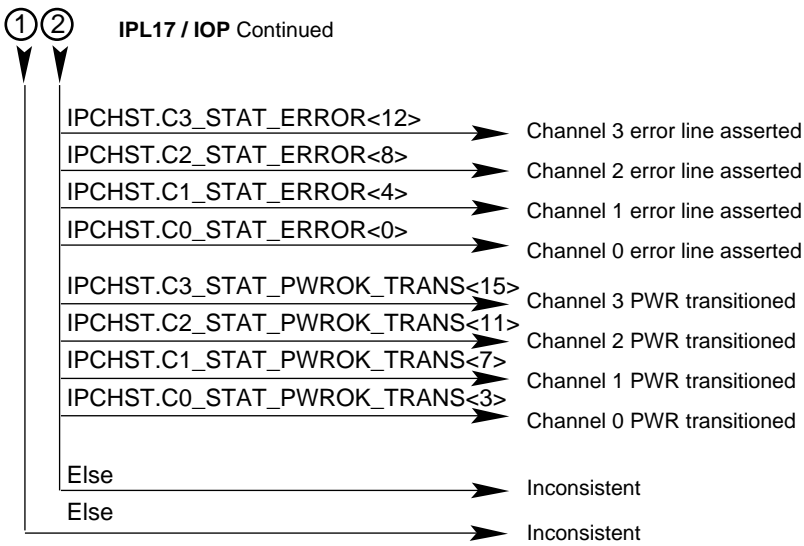


Figure 8-5 IOP Error Parse Tree (Continued)



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## 8.6 DWLMA Parse Tree

Figure 8-6 DWLMA Parse Tree

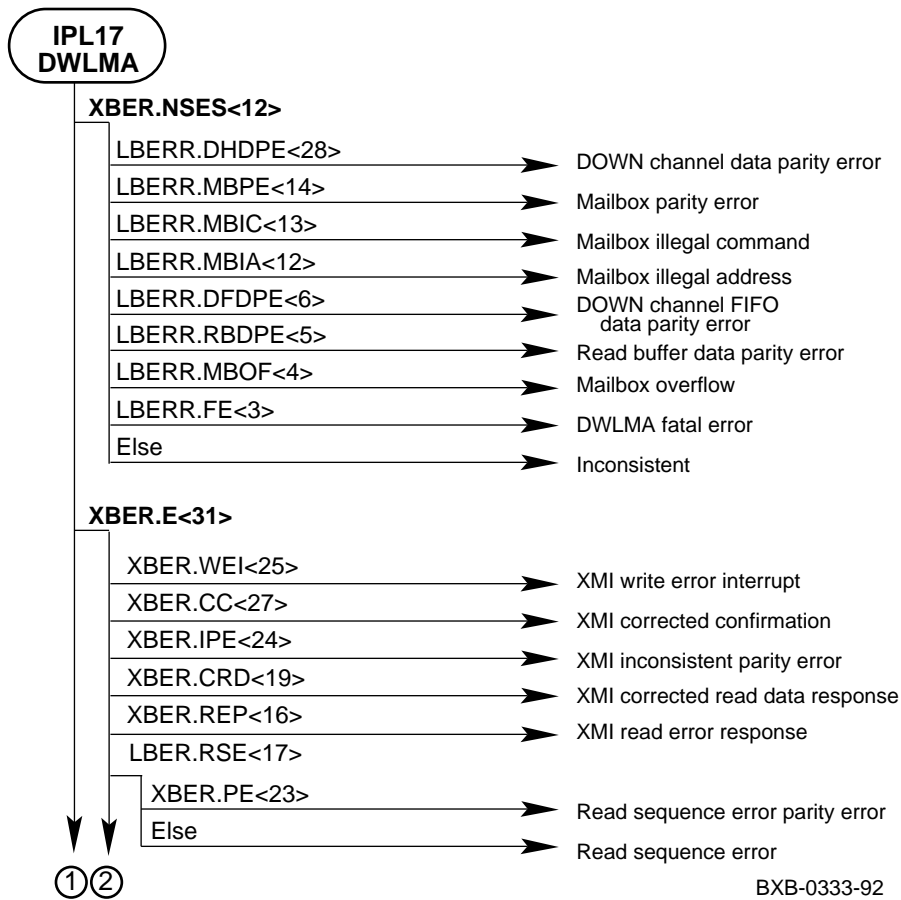
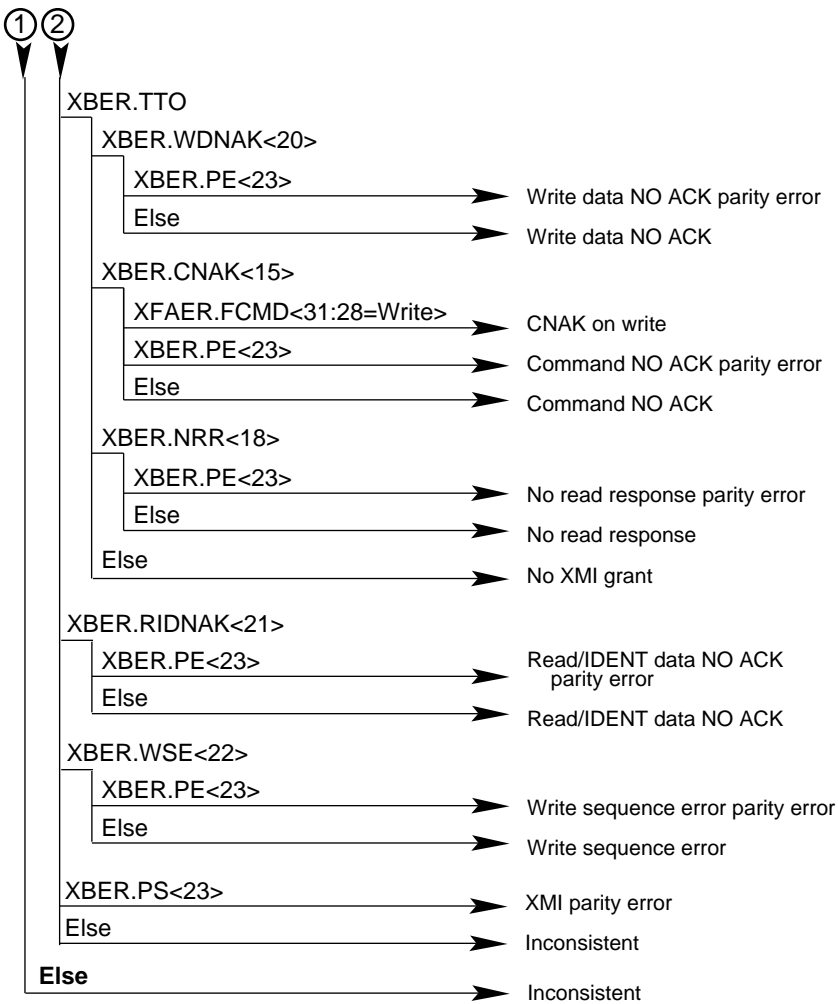


Figure 8-6 DWLMA Parse Tree (Continued)



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