DEC 7000 AXP System Pocket Service Guide

Order Number EK–7700A–PG.001

This manual is intended for Digital service engineers. It supplies easy-to-access key information on DEC 7000 systems.

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Preface

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 examples.
- **Chapter 4, Self-Test and Diagnostics,** lists the tests in each self-test and 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 information on the EEPROM error logs and the system error log.

Conventions Used in This Document

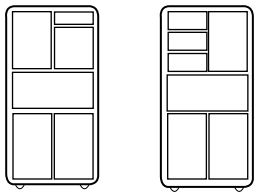
Terminology. The DEC 7000 AXP systems use the Alpha AXP architecture. References in text use DEC 7000 to refer to DEC 7000 AXP systems.

Book titles. In text, if a book is cited without a product name, that book is part of the hardware documentation. It is listed in Table 1 along with its order number.

Command syntax. 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. The icons 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 DEC 7000 documentation set. Table 2 lists other documents that you may find useful.

Table 1 DEC 7000 Documentation

Title	Order Number
Installation Kit	EK–7000B–DK
Site Preparation Guide	EK–7000B–SP
Installation Guide	EK–700EB–IN
Hardware User Information Kit	EK–7001B–DK
Operations Manual	EK–7000B–OP
Basic Troubleshooting	EK–7000B–TS
Service Information Kit—DEC 7000	EK–7002B–DK
Platform Service Manual	EK–7000A–SV
System Service Manual	EK–7002B–SV
Pocket Service Guide	EK–7700A–PG
Advanced Troubleshooting	EK–7701A–TS
Reference Manuals	
Console Reference Manual	EK–70C0B–TM
KN7AA CPU Technical Manual	EK–KN7AA–TM
MS7AA Memory Technical Manual	EK–MS7AA–TM
I/O System Technical Manual	EK–70I0A–TM
Platform Technical Manual	EK–7000A–TM

Table 1 DEC 7000 Documentation (Continued)

Title	Order Number
Upgrade Manuals	
KN7AA CPU Installation Card	EK–KN7AA–IN
MS7AA Memory Installation Card	EK–MS7AA–IN
KZMSA Adapter Installation Guide	EK–KXMSX–IN
DWLMA XMI PIU Installation Guide	EK–DWLMA–IN
DWMBB VAXBI PIU Installation Guide	EK–DWMBB–IN
H7237 Battery PIU Installation Guide	EK–H7237–IN
H7263 Power Regulator Installation Card	EK–H7263–IN
BA654 DSSI Disk PIU Installation Guide	EK–BA654–IN
BA655 SCSI Disk and Tape PIU Installation Guide	EK–BA655–IN
Removable Media Installation Guide	EK–TFRRD–IN

Table 2 Related Documents

Title	Order Number
General Site Preparation	
Site Environmental Preparation Guide	EK–CSEPG–MA
System I/O Options	
BA350 Modular Storage Shelf Subsystem Configuration Guide	EK–BA350–CG
BA350 Modular Storage Shelf Subsystem User's Guide	EK–BA350–UG
BA350-LA Modular Storage Shelf User's Guide	EK–350LA–UG
CIXCD Interface User Guide	EK–CIXCD–UG
DEC FDDIcontroller 400 Installation/Problem Solving	EK–DEMFA–IP
DEC LANcontroller 400 Installation Guide	EK–DEMNA–IN
DEC LANcontroller 400 Technical Manual	EK–DEMNA–TM
DSSI VAXcluster Installation and Troubleshooting Manual	EK–410AA–MG
InfoServer 150 Installation and Owner's Guide	EK–INFSV–OM
KDM70 Controller User Guide	EK–KDM70–UG
RRD42 Disc Drive Owner's Manual	EK–RRD42–OM
RF Series Integrated Storage Element User Guide	EK–RF72D–UG
TLZ06 Cassette Tape Drive Owner's Manual	EK–TLZ06–OM

Table 2 Related Documents (Continued)

Title	Order Number
Operating System Manuals	
Alpha Architecture Reference Manual	EY–L520E–DP
DEC OSF/1 Guide to System Administration	AA–PJU7A–TE
DECnet for OpenVMS Network Management Utilities	AA–PQYAA–TK
Guide to Installing DEC OSF/1	AA–PS2DA–TE
OpenVMS Alpha Version 1.0 Upgrade and Installation Manual	AA–PQYSA–TE
VMS Upgrade and Installation Supplement: VAX 7000–600 and VAX 10000–600 Series	AA–PRAHA–TE
VMS Network Control Program Manual	AA–LA50A–TE
VMSclusters and Networking	
HSC Installation Manual	EK–HSCMN–IN
SC008 Star Coupler User's Guide	EK–SC008–UG
VAX Volume Shadowing Manual	AA–PBTVA–TE
Peripherals	
Installing and Using the VT420 Video Terminal	EK–VT420–UG
LA75 Companion Printer Installation and User Guide	EK–LA75X–UG

Chapter 1

Registers

This chapter is a compilation of the major registers in components of the DEC 7000 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:

- KN7AA Registers
  - — LSB Required Registers
  - — CPU-Specific Registers
  - — KN7AA Internal Processor Registers
  - — AXP Internal Processor Registers
  - — Console Registers
- MS7AA Registers
- I/O Port Registers
- DWLMA Registers
- DWLAA Registers

For more information:

KN7AA CPU Technical Manual
MS7AA Memory Technical Manual
I/O System Technical Manual

1.1 KN7AA Registers

Table 1-1 LSB Required Registers

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

[1] BB is the LSB node space base address (in hex) of the CPU module (see Table 2-1, p. 2-4).

[2] BSB is the broadcast space base address in hex, 3 FE00 0000.

For bit definitions of these registers:
Index of *KN7AA CPU Technical Manual*

To examine these registers:
Example 3-8, page 3-22 of this manual

Figure 1-1 LDEV — Device Register

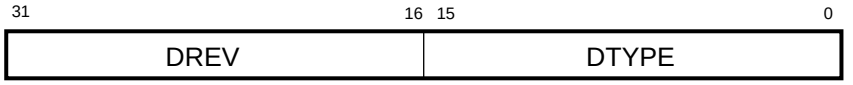


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Figure 1-2 LBER — Bus Error Register

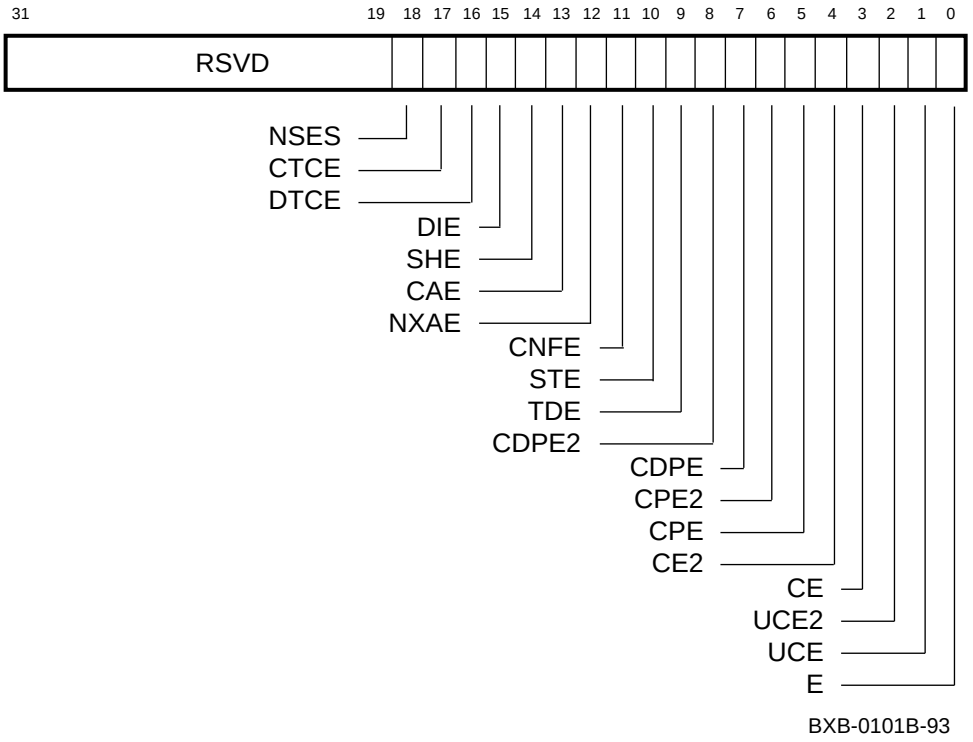

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Figure 1-3 LCNR — Configuration Register

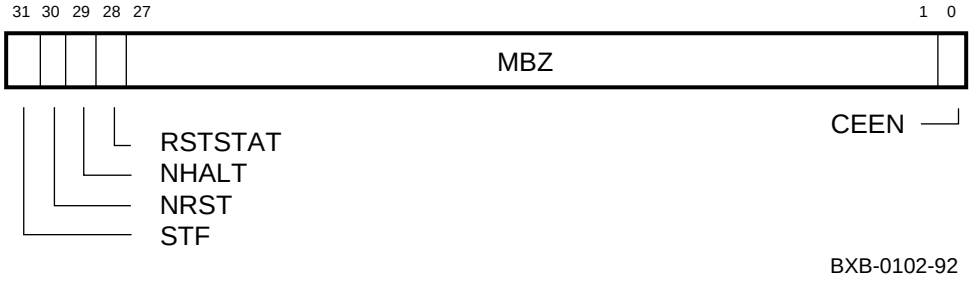

Figure 1-4 LMMR0–7 — Memory Mapping Registers

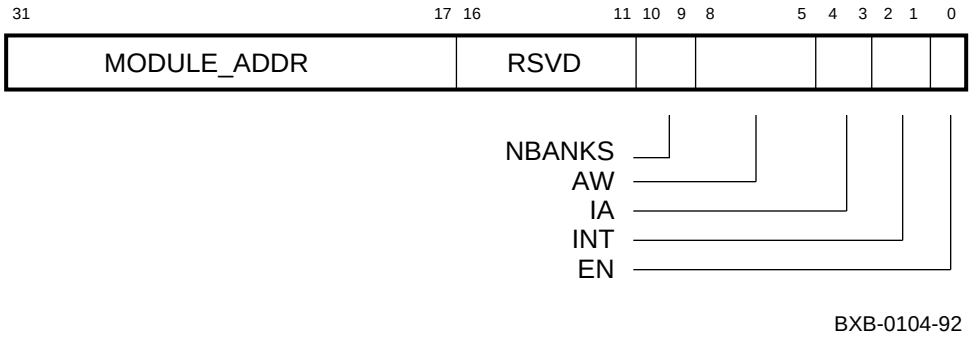

Figure 1-5 LBESR0–3 — Bus Error Syndrome Registers

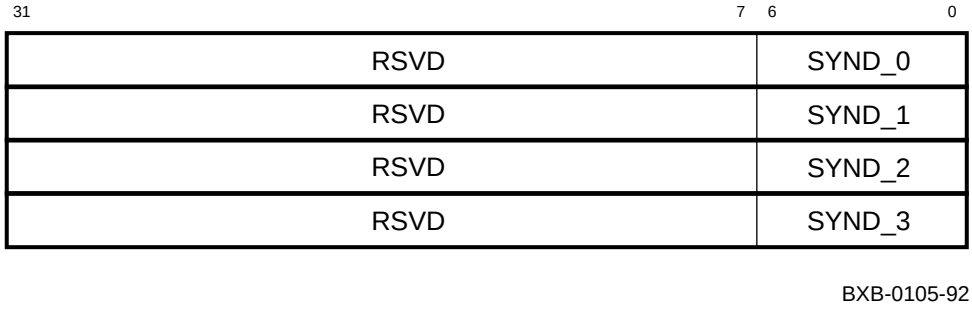

Figure 1-6 LBECR0–1 — Bus Error Command Registers

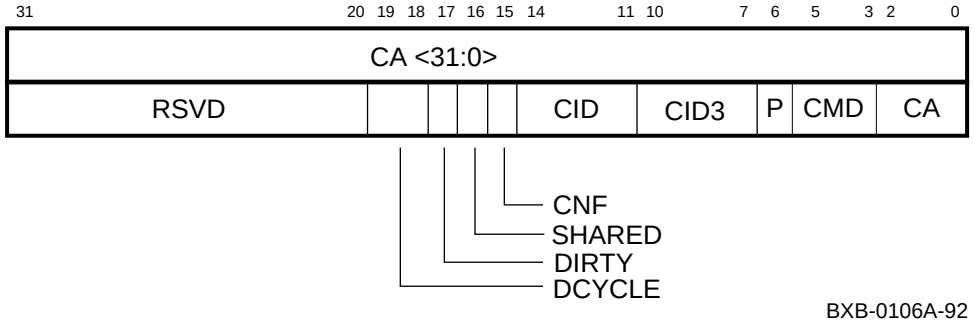

Figure 1-7 LIOINTR — I/O Interrupt Register

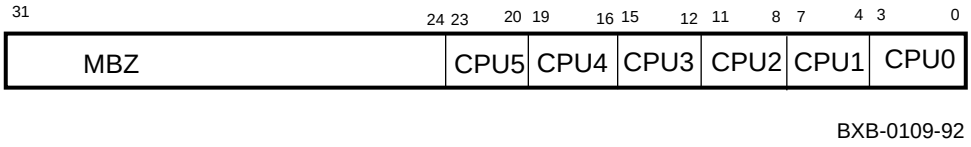

Figure 1-8 LIPINTR — Interprocessor Interrupt Register

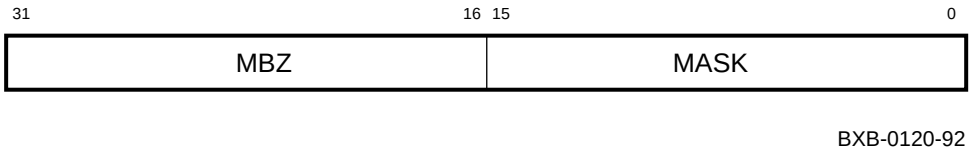

Table 1-2 CPU-Specific Registers

Mnemonic	Register Name	Offset	Access
LMODE	Mode	BB[1] + C00	R/W
LMERR	Module Error	BB + C40	R/W
LLOCK	Lock Address	BB + C80	RO
LDIAG	Diagnostic Control	BB + D00	R/W
LTAGA	Tag Address	BB + D40	R/W
LTAGW	Tag Write Data	BB + D80	R/W
LCON	Console Communication	BB + E00 BB + E40	R/W
LPERF	Performance Counter Control	BB + F00	R/W
LCNTR	Performance Counter	BB + F40 BB + F80	R/W
LMISSADDR	Last Miss Address	BB + FC0	RO

[1] BB is the LSB node space base address (in hex) of the CPU module (see Table 2-1, p. 2-4).

For bit definitions of these registers:
Index of *KN7AA CPU Technical Manual*

To examine these registers:
Example 3-8, page 3-22 of this manual

Figure 1-9 LMODE — Mode Register

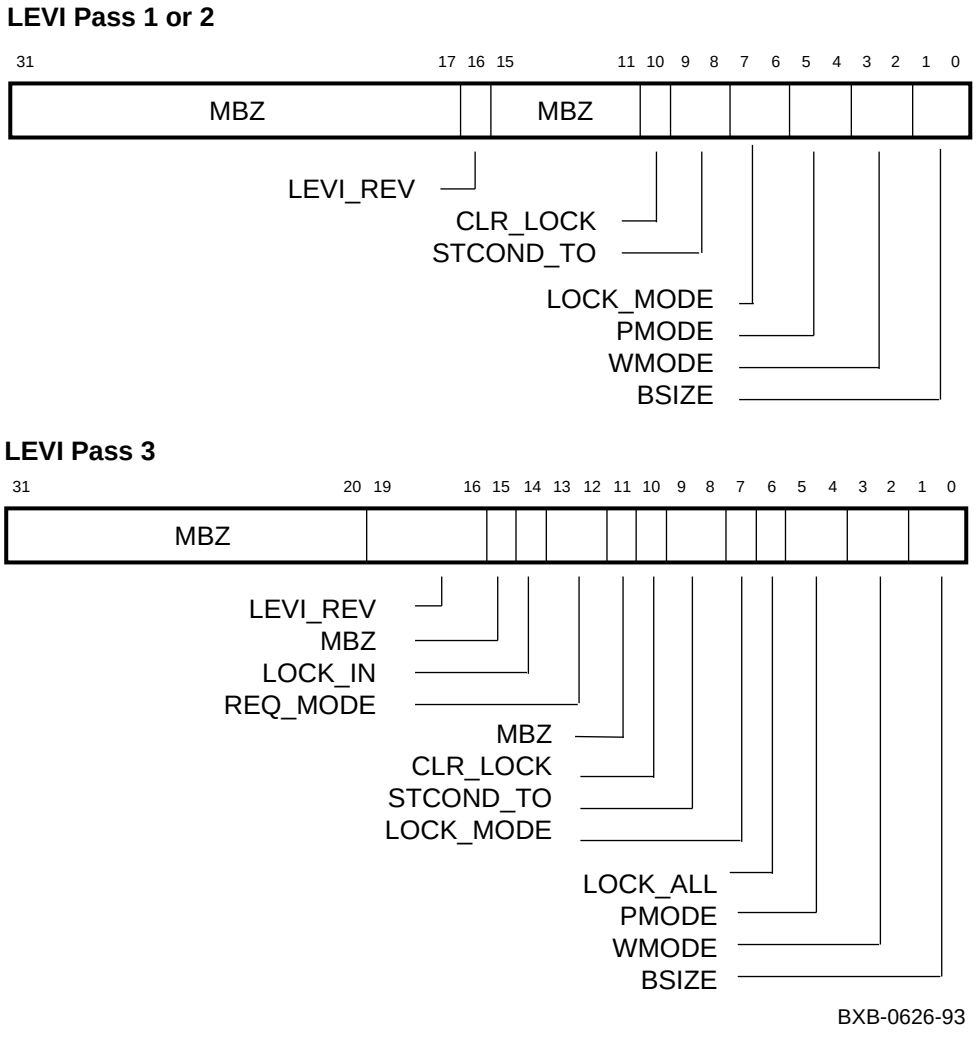

Figure 1-10 LMERR — Module Error Register

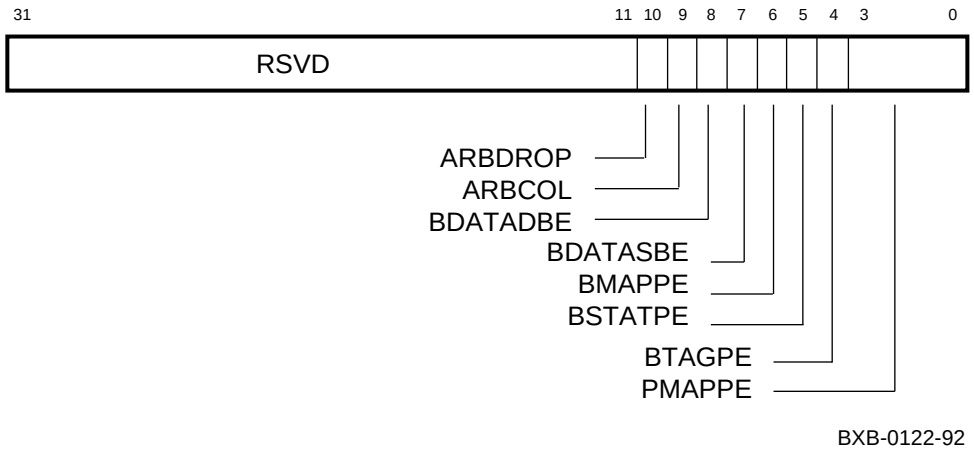

Figure 1-11 LLOCK — Lock Address Register

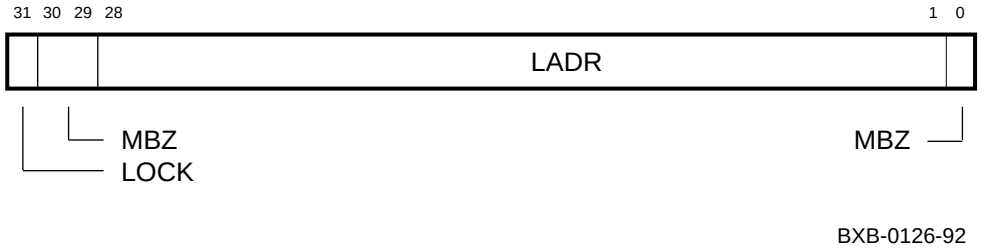

Figure 1-12 LDIAG — Diagnostic Control Register

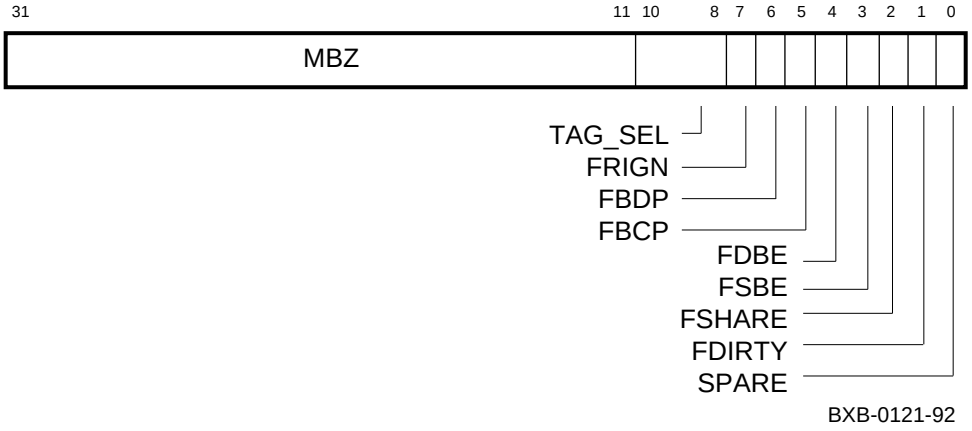

Figure 1-13 LTAGA — Tag Address Register

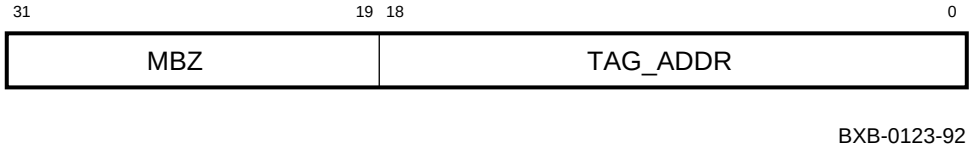

Figure 1-14 LTAGW — Tag Write Data Register

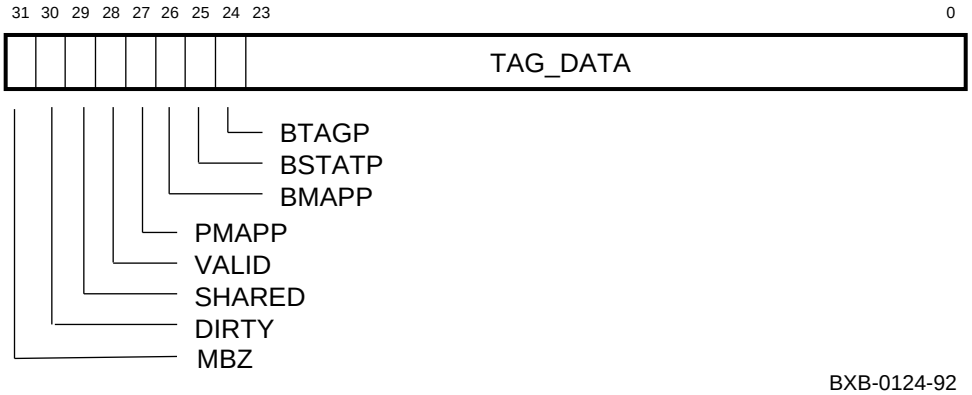

Figure 1-15 LCON — Console Communication Registers

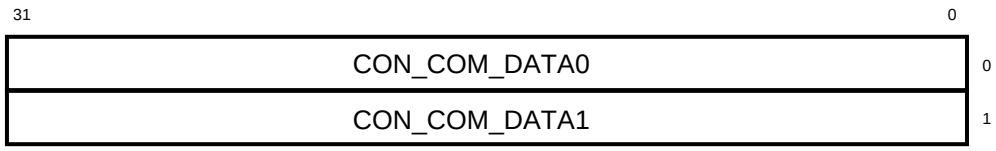

Figure 1-16 LPERF — Performance Counter Control Register

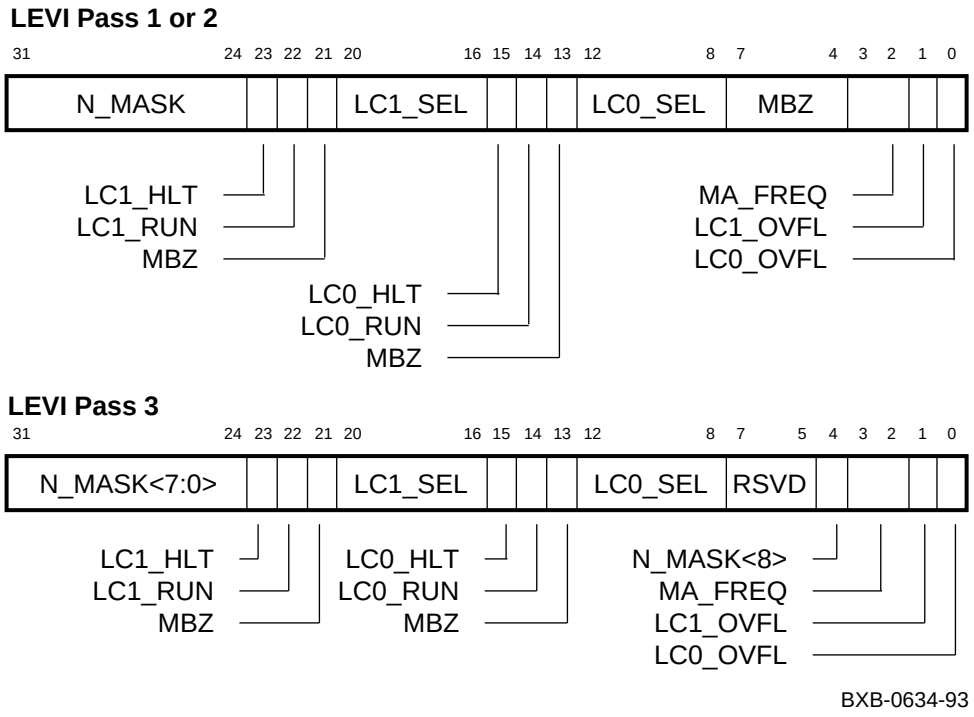

Figure 1-17 LCNTR — Performance Counter Registers

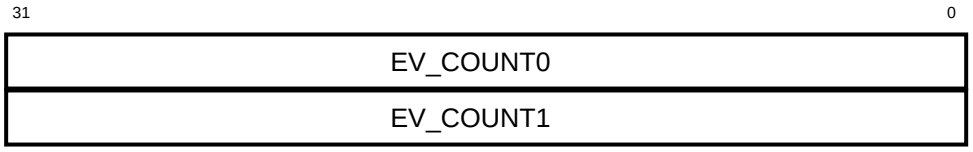

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Figure 1-18 LMISSADDR — Last Miss Address Register

LEVI Pass 1 or 2

LEVI Pass 3

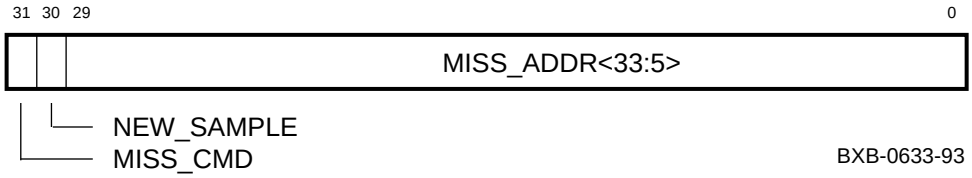

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Table 1-3 KN7AA Internal Processor Registers

Mnemonic	Register Name
TB_TAG	Translation Buffer Tag
ITB_PTE	Instruction Translation Buffer PTE
ICCSR	Instruction Cache Control/ Status
ITB_PTE_TEMP	Instruction Translation Buffer PTE_TEMP
EXC_ADDR	Exception Address
SL_RCV	Serial Line Receive
ITBZAP	Instruction Translation Buffer ZAP
ITBASM	Instruction Translation Buffer ASM
ITBIS	Instruction Translation Buffer IS
PS	Processor Status
EXC_SUM	Exception Summary
PAL_BASE	PAL Base Address
HIRR	Hardware Interrupt Request
SIRR	Software Interrupt Request
ASTRR	Asynchronous Trap Request
HIER	Hardware Interrupt Enable
SIER	Software Interrupt Enable
ASTER	AST Interrupt Enable
SL_CLR	Serial Line Interrupt Clear
SL_XMIT	Serial Line Transmit
TB_CTL	Translation Buffer Control
DTB_PTE	Data Translation Buffer PTE
DTB_PTE_TEMP	Data Translation Buffer PTE_TEMP
MMCSR	Memory Management CSR
VA	Virtual Address
DTBZAP	Data Translation Buffer ZAP
DTBASM	Data Translation Buffer ASM
DTBIS	Data Translation Buffer IS

Table 1-3 KN7AA Internal Processor Registers (Continued)

Mnemonic	Register Name
BIU_ADDR	Bus Interface Unit Address
BIU_STAT	Bus Interface Unit Status
DC_ADDR	D-Cache Address
DC_STAT	D-Cache Status
FILL_ADDR	Fill Address
ABOX_CTL	Abox Control
ALT_MODE	Alternate Processor Mode
CC	Cycle Counter
CC_CTL	Cycle Counter Control
BIU_CTL	Bus Interface Unit Control
FILL_SYND	Fill Syndrome
BC_TAG	B-Cache Tag
FLUSH_IC	Flush IC
FLUSH_IC_ASM	Flush IC_ASM
PAL_TEMP	PAL Temporary

For bit definitions of these registers:
Index of *KN7AA CPU Technical Manual*

These registers cannot be examined, but some are listed in response to the mchk command and some in error log reports.

Mchk command:
Example 3-15, page 3-27 of this manual

Error log:
Section 8.2, page 8-5 of this manual

Figure 1-19 TB_TAG — Translation Buffer Tag Register

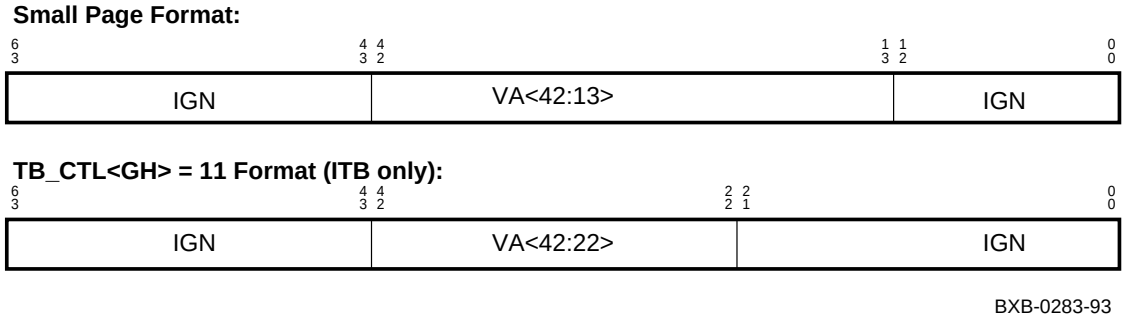


Figure 1-20 ITB_PTE — Instruction Translation Buffer PTE Register

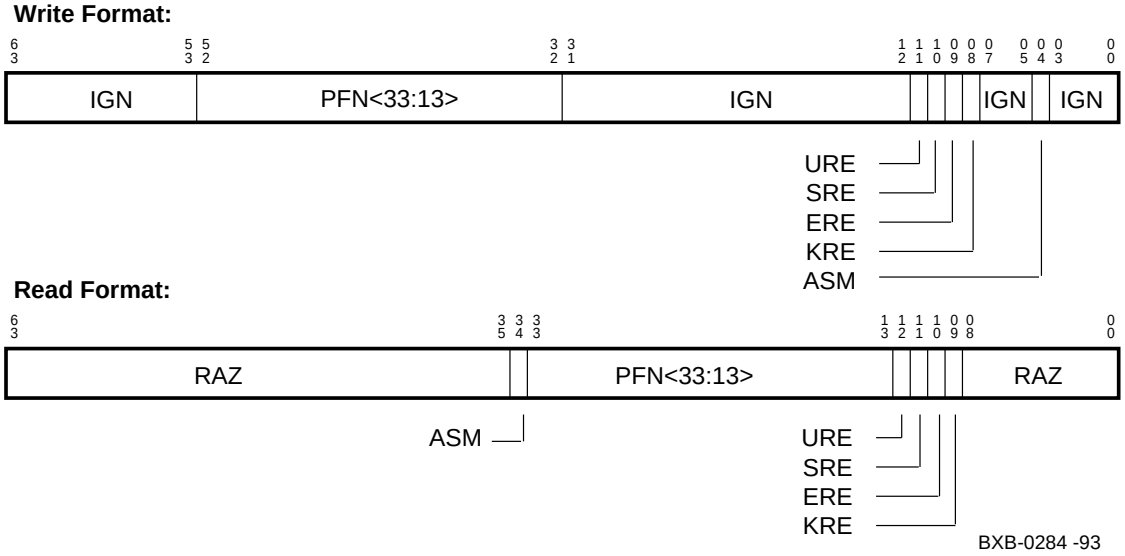


Figure 1-21 ICCSR — Instruction Cache Control/Status Register

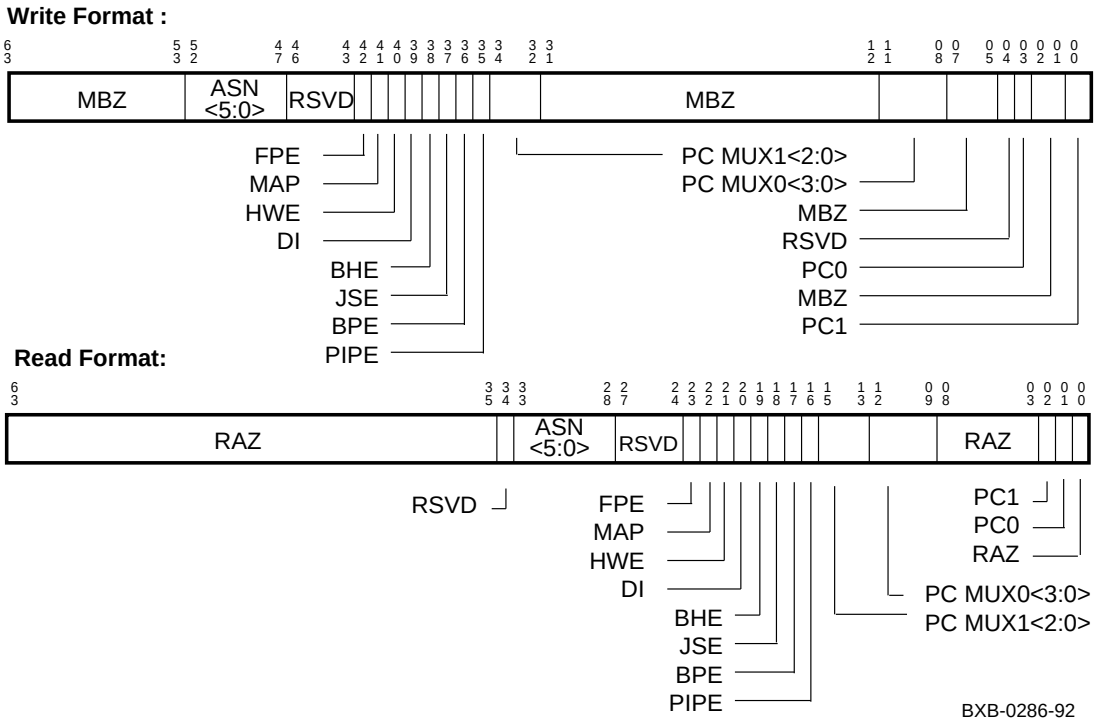


Figure 1-22 ITB_PTE_TEMP — Instruction Translation Buffer PTE_TEMP Register

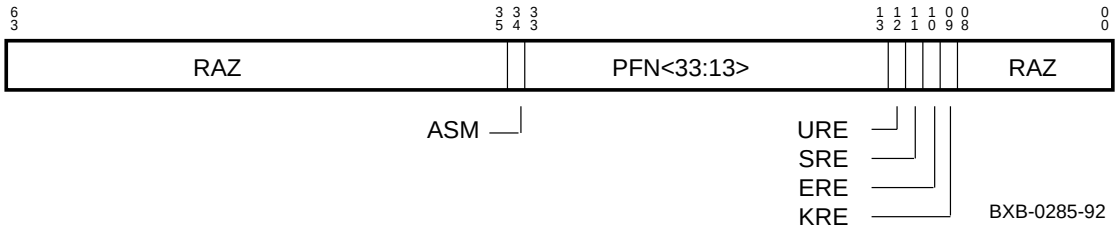


Figure 1-23 EXC_ADDR — Exception Address Register

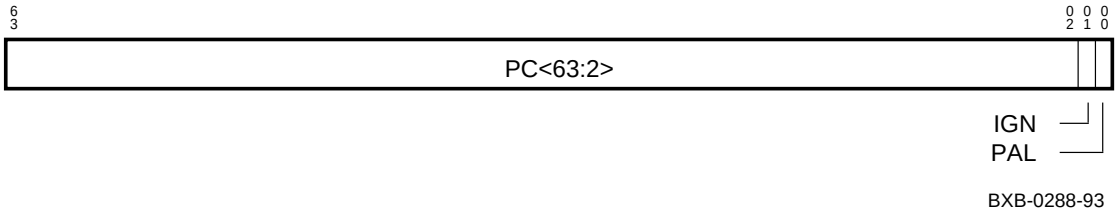


Figure 1-24 SL_RCV — Serial Line Receive Register

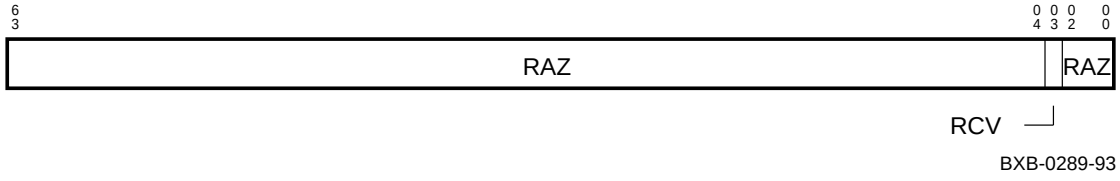


Figure 1-25 PS — Processor Status Register

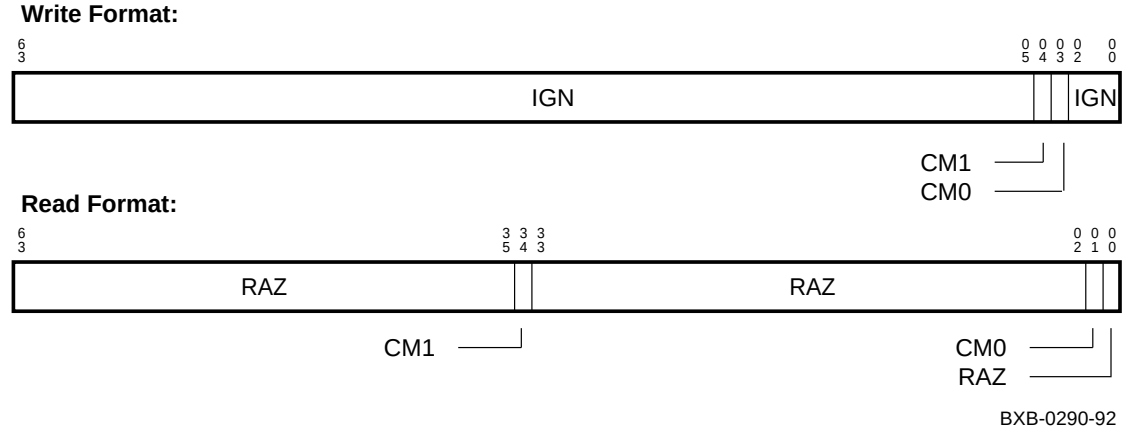


Figure 1-26 EXC_SUM — Exception Summary Register

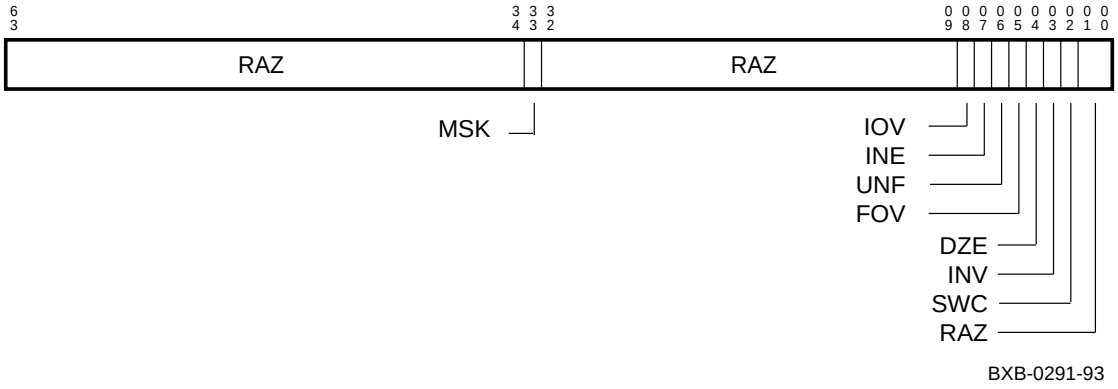


Figure 1-27 PAL_BASE — PAL Base Address Register

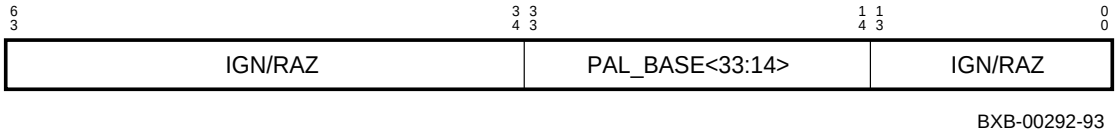


Figure 1-28 HIRR — Hardware Interrupt Request Register

Read Format:

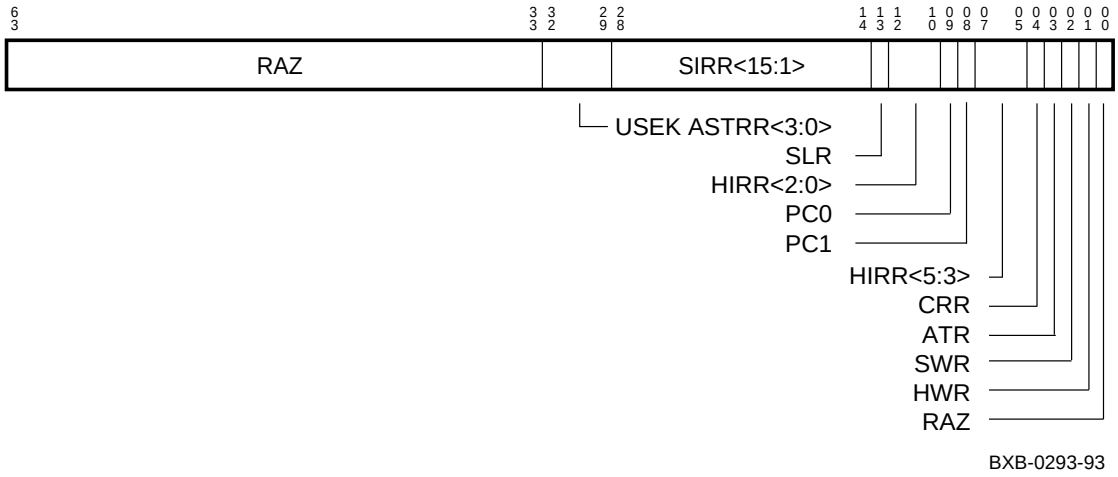


Figure 1-29 SIRR — Software Interrupt Request Register

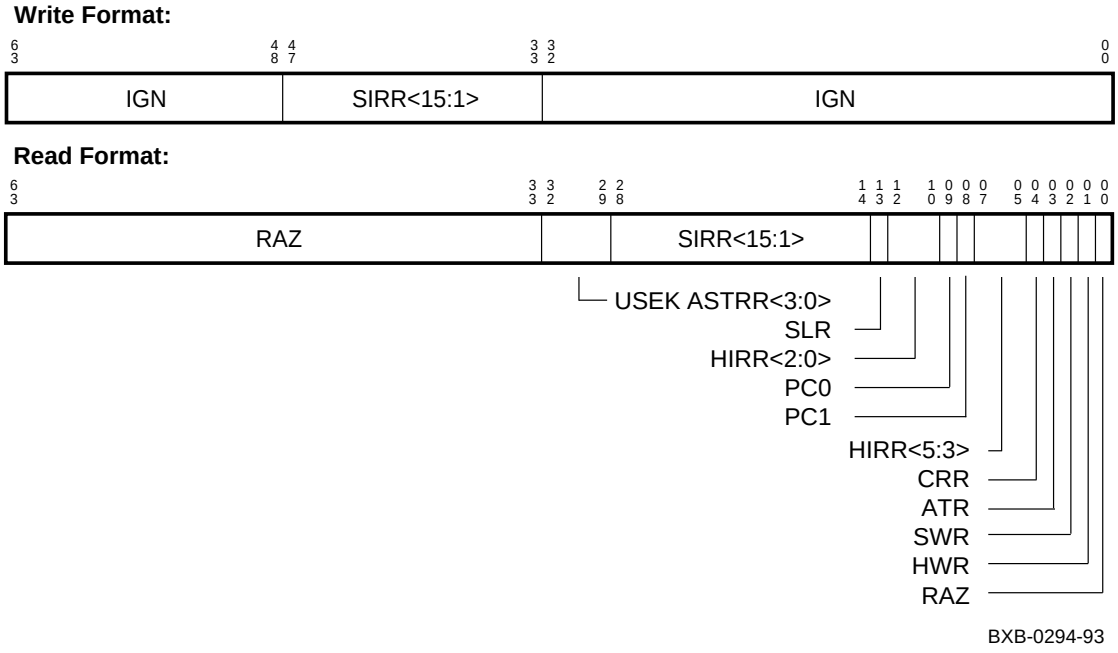


Figure 1-30 ASTRR — Asynchronous Trap Request Register

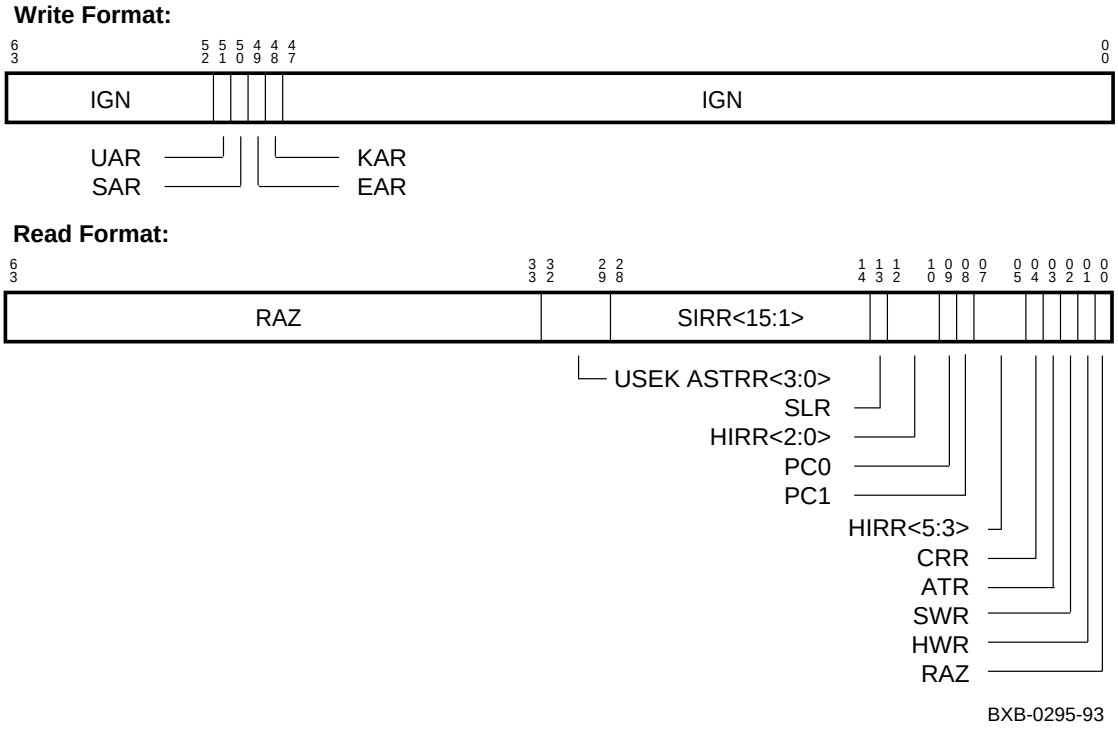


Figure 1-31 HIER — Hardware Interrupt Enable Register

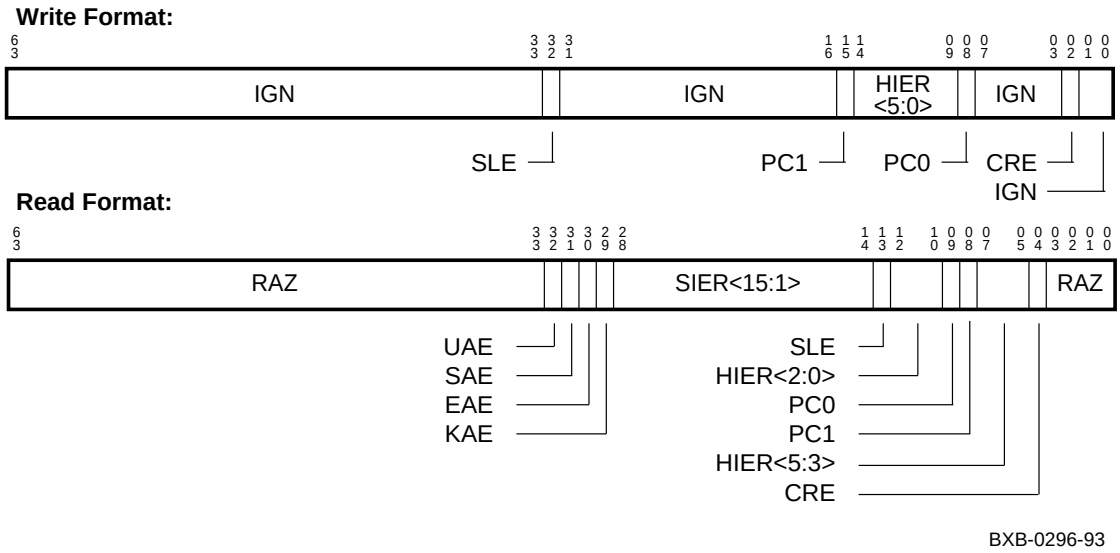


Figure 1-32 SIER — Software Interrupt Enable Register

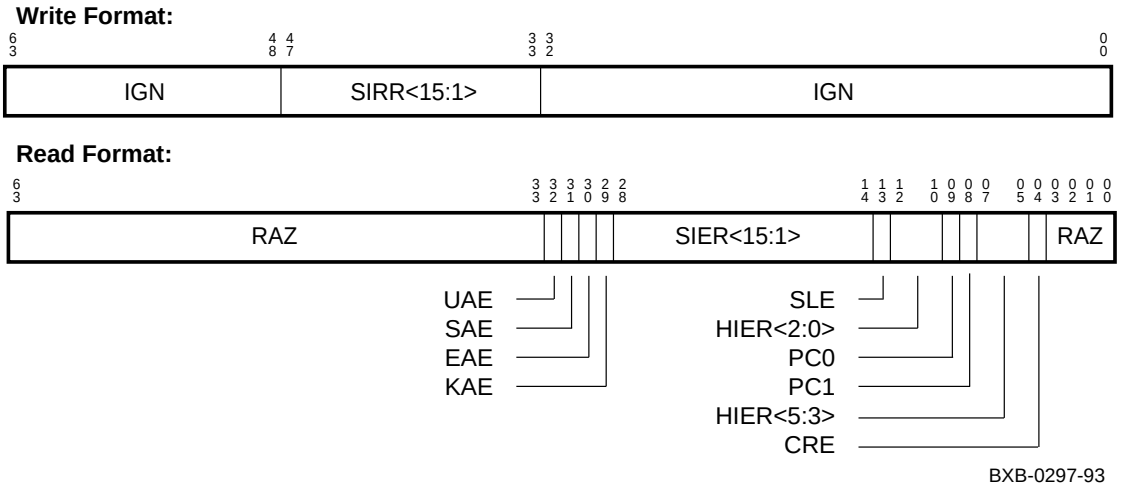


Figure 1-33 ASTER — AST Interrupt Enable Register

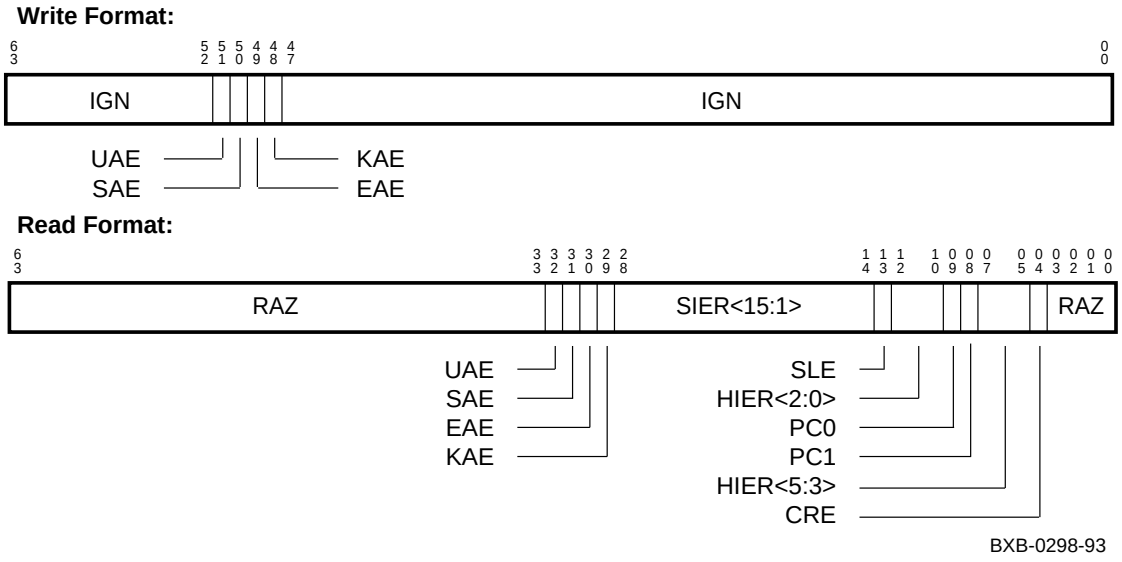


Figure 1-34 SL_CLR — Serial Line Interrupt Clear Register

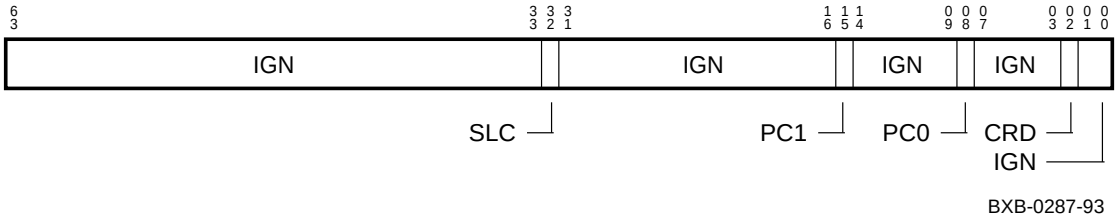


Figure 1-35 SL_XMIT — Serial Line Transmit Register

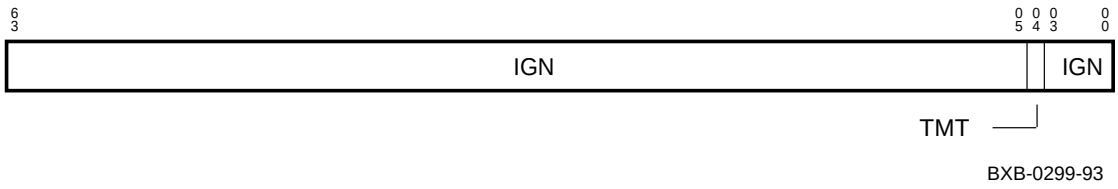


Figure 1-36 TB_CTL — Translation Buffer Control Register

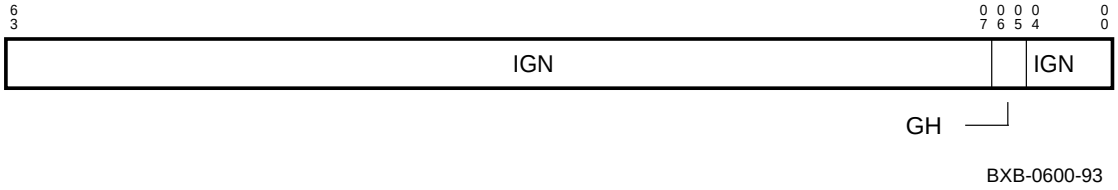


Figure 1-37 DTB_PTE — Data Translation Buffer PTE Register

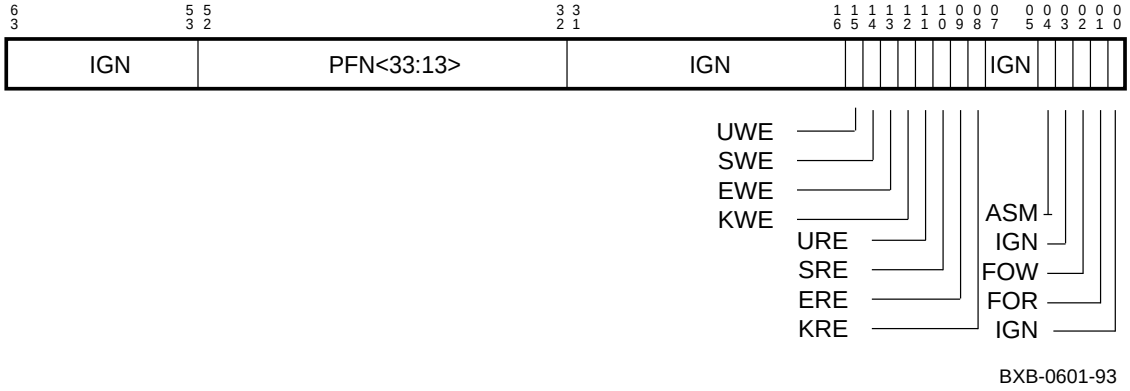


Figure 1-38 DTB_PTE_TEMP — Data Translation Buffer PTE_TEMP Register

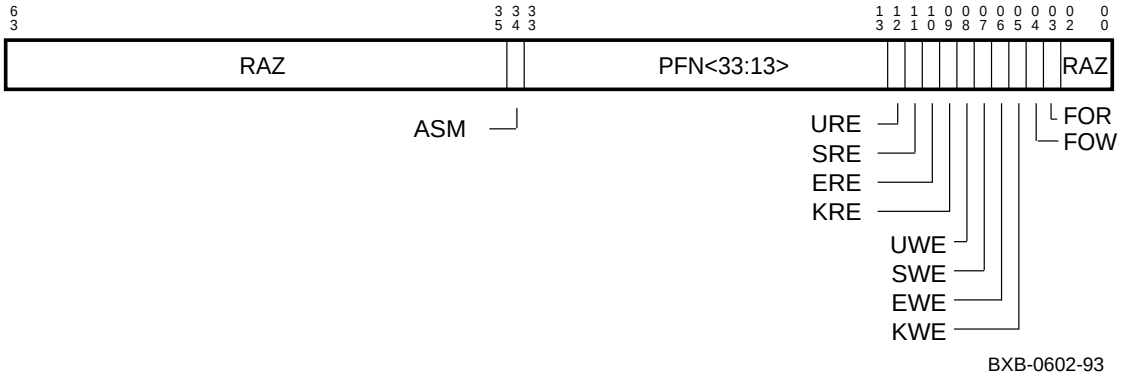


Figure 1-39 MMCSR — Memory Management CSR Register

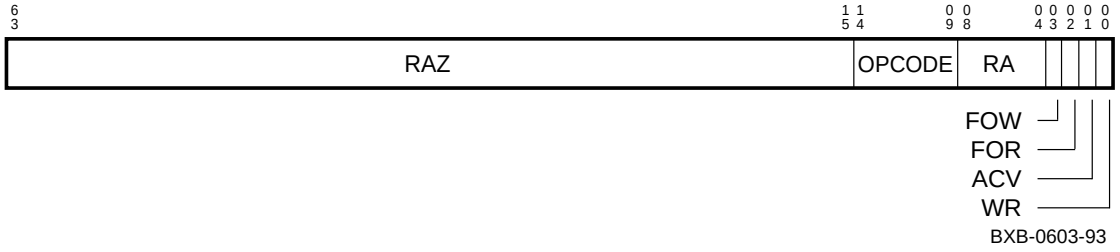


Figure 1-40 BIU_ADDR — Bus Interface Unit Address Register

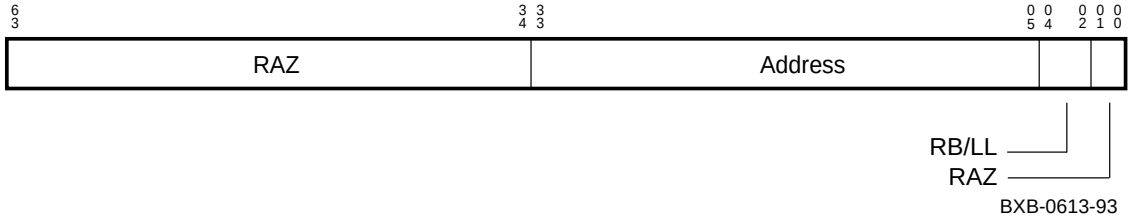


Figure 1-41 BIU_STAT — Bus Interface Unit Status Register

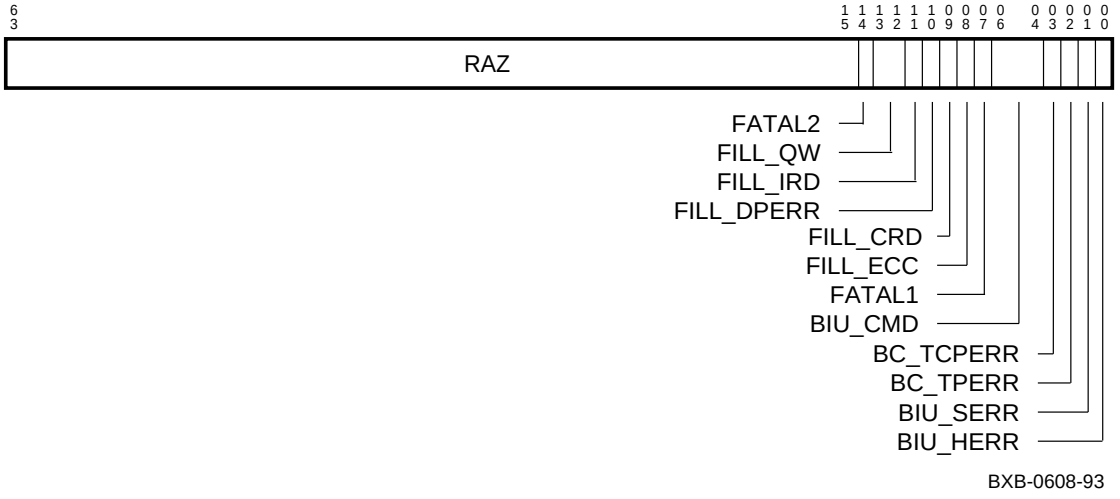


Figure 1-42 DC_ADDR — Data Cache Address Register

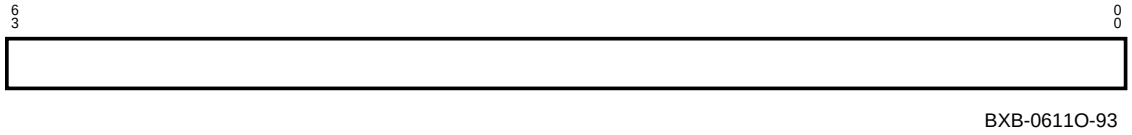


Figure 1-43 DC_STAT — Data Cache Status Register

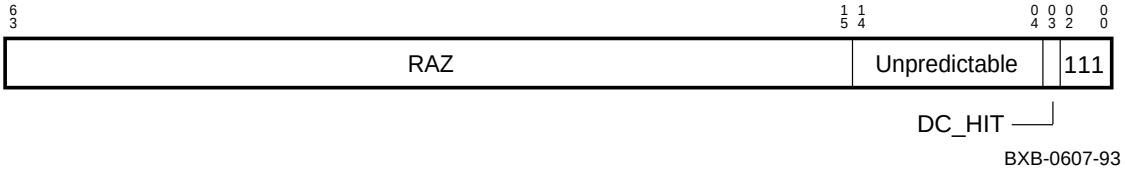


Figure 1-44 FILL_ADDR — Fill Address Register

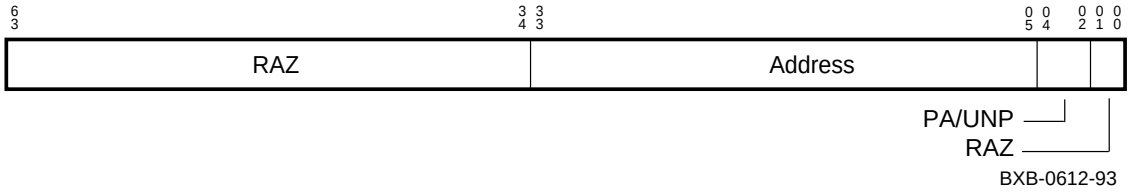


Figure 1-45 ABOX_CTL — Abox Control Register

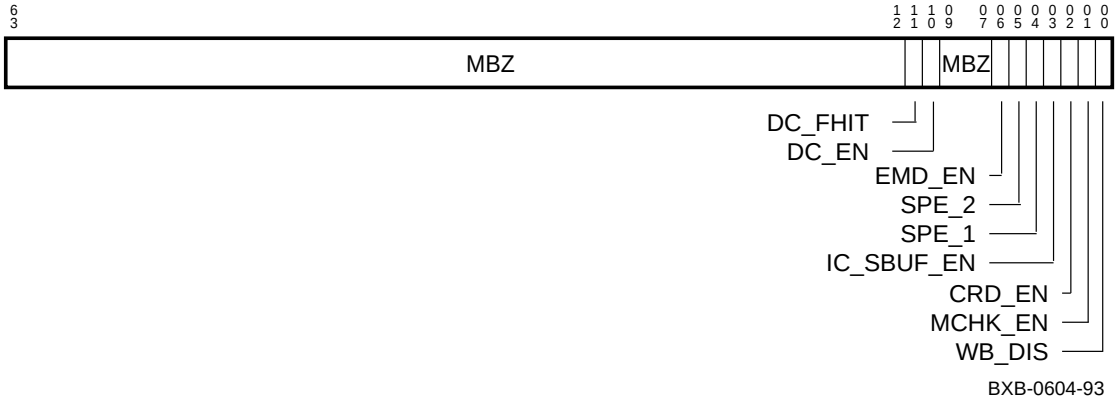


Figure 1-46 ALT_MODE — Alternate Processor Mode Register

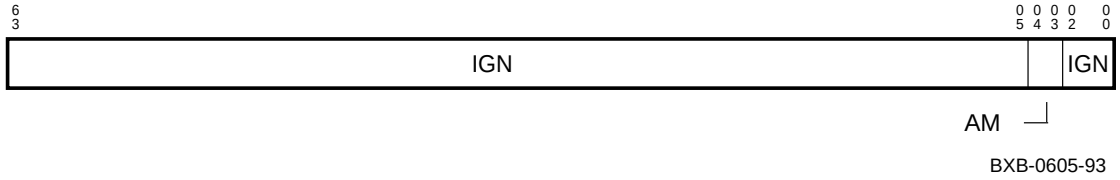
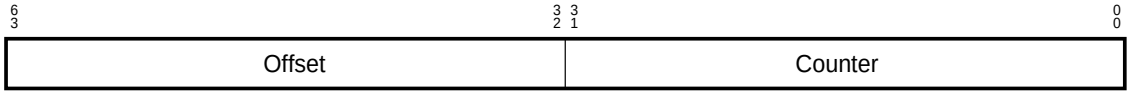


Figure 1-47 CC — Cycle Counter Register

Read Format:



Write Format:

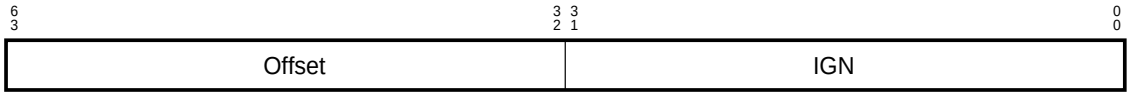


Figure 1-48 CC_CTL — Cycle Counter Control Register

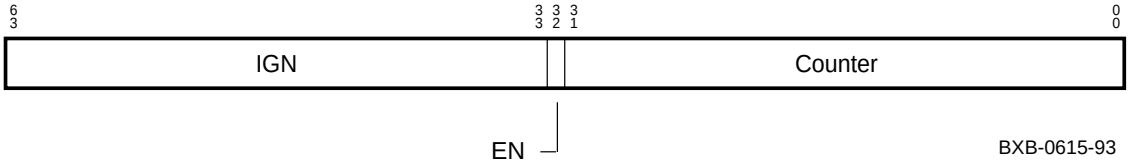


Figure 1-49 BIU_CTL — Bus Interface Unit Control Register

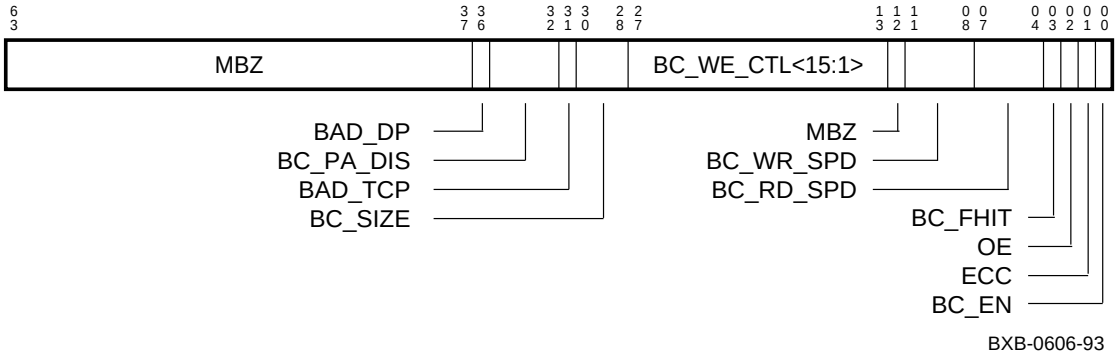


Figure 1-50 FILL_SYND — Fill Syndrome Register

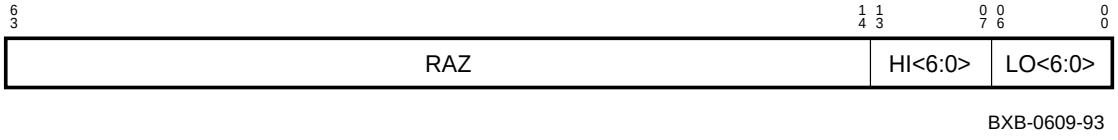


Figure 1-51 BC_TAG — B-Cache Tag Register

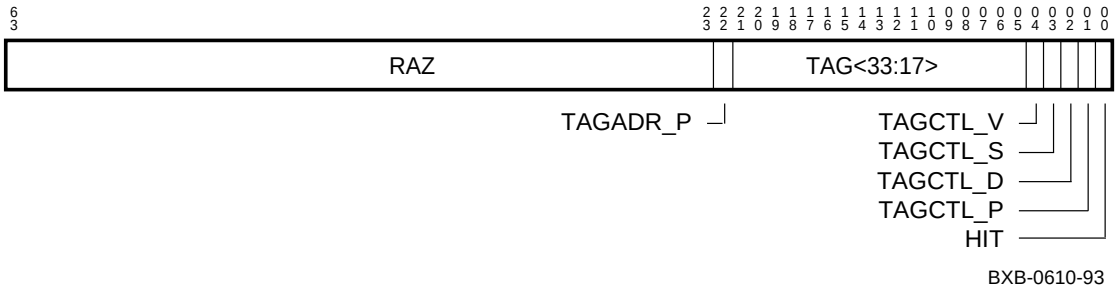


Table 1-4 AXP Internal Processor Registers

Mnemonic	Register Name	Access
ASN*	Address Space Number	R
ASTEN*	AST Enable	R/W
ASTSR*	AST Summary	R/W
DATFX	Data Align Trap Fixup	W
FEN*	Floating-Point Enable	R/W
IPIR	Interprocessor Interrupt Request	W
IPL*	Interrupt Priority Level	R/W
MCES*	Machine Check Error Summary	R/W
PERFMON	Performance Monitor	W
PCBB*	Privileged Context Block Base	R
PRBR*	Processor Base	R/W
PTBR*	Page Table Base	R
SCBB*	System Control Block Base	R/W
SIRR	Software Interrupt Request	W
SISR*	Software Interrupt Summary	R
TBCHK	Translation Buffer Check	R
TBIA	Translation Buffer Invalidate All	W
TBIAP	Translation Buffer Invalidate All Process	W
TBIS	Translation Buffer Invalidate Single	W
TBISD	Translation Buffer Invalidate Single Data	W
TBISI	Translation Buffer Invalidate Single Instr	W
KSP	Kernel Stack Pointer	None
ESP*	Executive Stack Pointer	R/W
SSP*	Supervisor Stack Pointer	R/W
USP*	User Stack Pointer	R/W
VPTB*	Virtual Page Table Base	R/W
WHAMI*	Who Am I	R

* These registers can be examined (see box next page); they are shown in the following figures.

Figure 1-52 ASN — Address Space Number Register

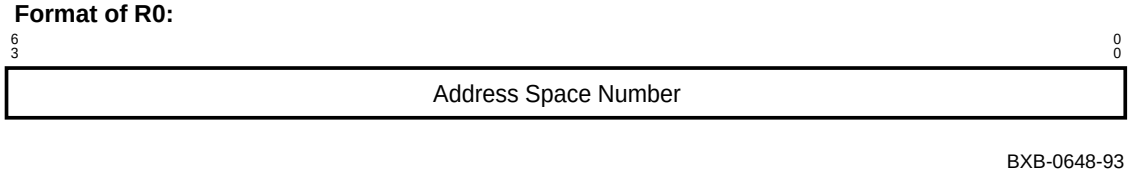
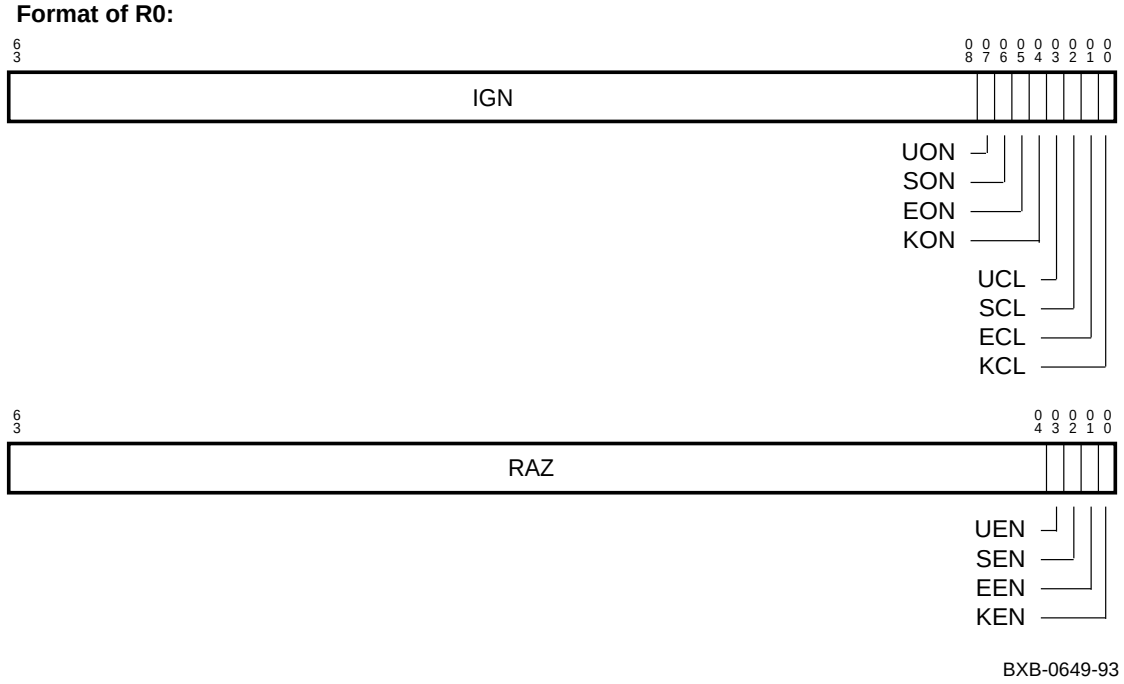


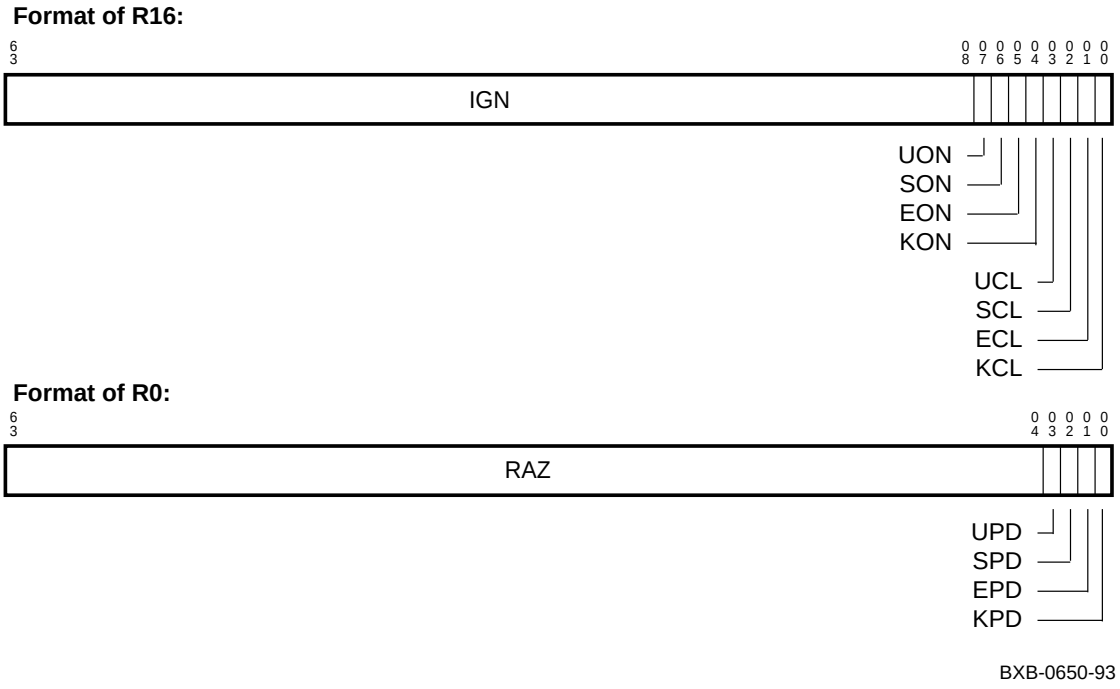
Figure 1-53 ASTEN — AST Enable Register



For bit definitions of these registers:
Alpha Architecture Reference Manual

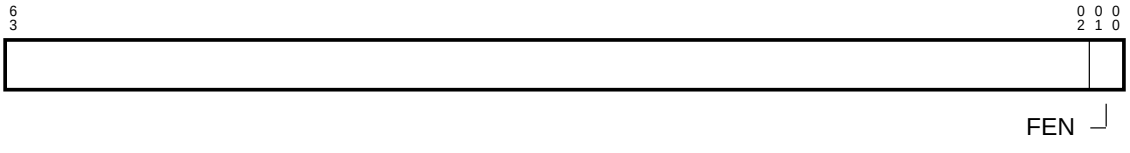
To examine these registers:
Example 3-9, page 3-22 of this manual

Figure 1-54 ASTSR — AST Summary Register



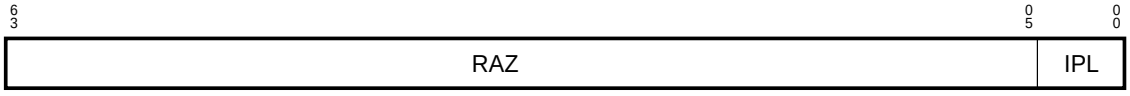
BXB-0650-93

Figure 1-55 FEN — Floating-Point Enable Register



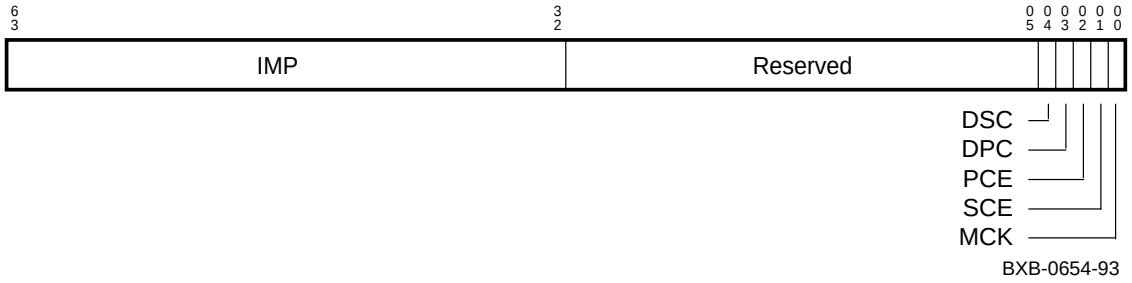
BXB-00652-93

Figure 1-56 IPL — Interrupt Priority Level Register



BXB-0653-93

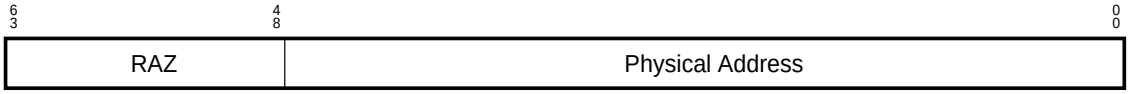
Figure 1-57 MCES — Machine Check Error Summary Register



BXB-0654-93

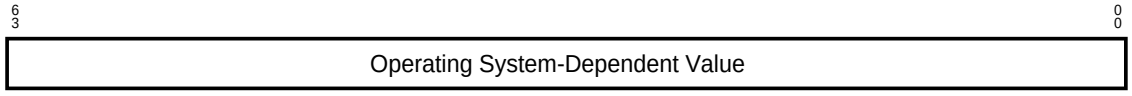
Figure 1-58 PCBB — Privileged Context Block Base Register

Format OF R0:



BXB-0655-93

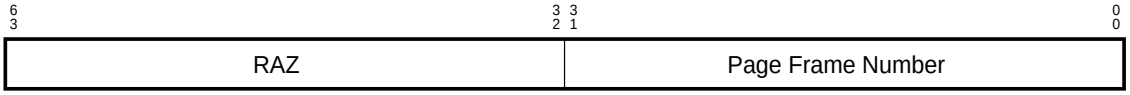
Figure 1-59 PRBR — Processor Base Register



BXB-0656-93

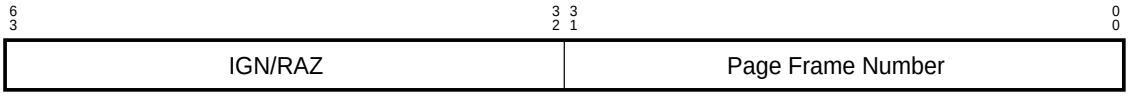
Figure 1-60 PTBR — Page Table Base Register

Format of R0:



BXB-0658-93

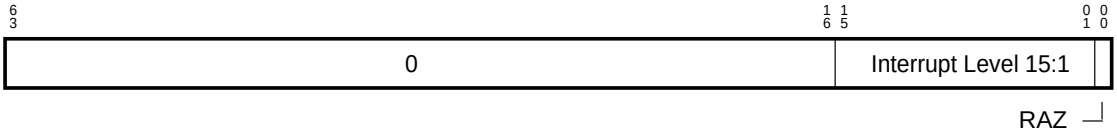
Figure 1-61 SCBB — System Control Block Base Register



BXB-0659-93

Figure 1-62 SISR — Software Interrupt Summary Register

Format of R0:

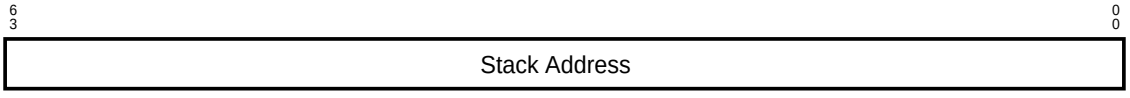


BXB-0660-93

Figure 1-63 ESP — Executive Stack Pointer Register

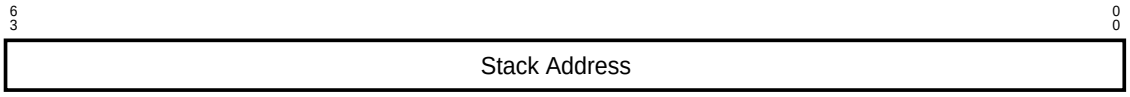
BXB-0651-93

Figure 1-64 SSP — Supervisor Stack Pointer Register



BXB-0651-93

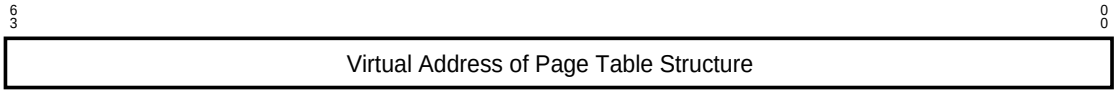
Figure 1-65 USP — User Stack Pointer Register



BXB-0651-93

Figure 1-66 VPTB — Virtual Page Table Base Register

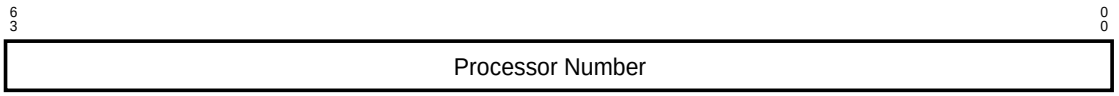
Format of R0:



BXB-0661-93

Figure 1-67 WHAMI — Who-Am-I Register

Format of R0:



BXB-0657-93

Table 1-5 Console Registers

Register	Address	Access
Gbus$WHAMI	3 F700 0000	RO
Gbus$LEDs	3 F700 0040	R/W
Gbus$PMask	3 F700 0080	R/W
Gbus$Intr	3 F700 00C0	R/W
Gbus$Halt	3 F700 0100	R/W
Gbus$LSBRST	3 F700 0140	R/W
Gbus$Misc	3 F700 0180	R/W
Gbus$RMode	3 F780 0000	R/W
Gbus$LTagRW	3 F780 0100	R/W

For bit definitions of these registers:
Index of *KN7AA CPU Technical Manual*

To examine these registers:
Example 3-10, page 3-22 of this manual

Figure 1-68 Gbus$WHAMI Register

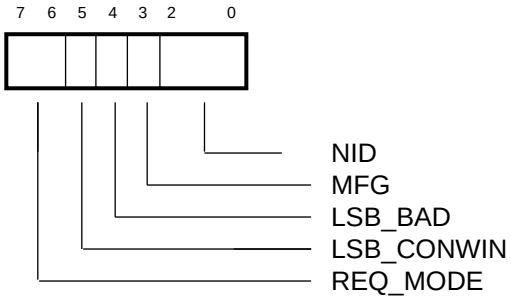


Figure 1-69 Gbus$LEDs Register

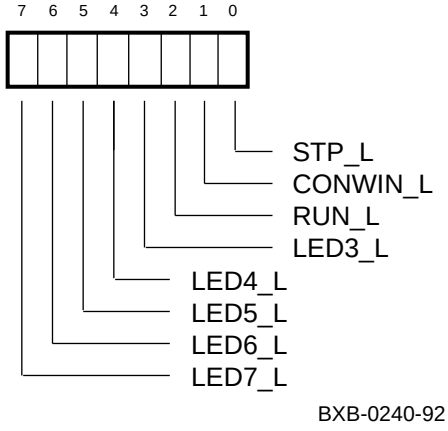


Figure 1-70 Gbus$PMask Register

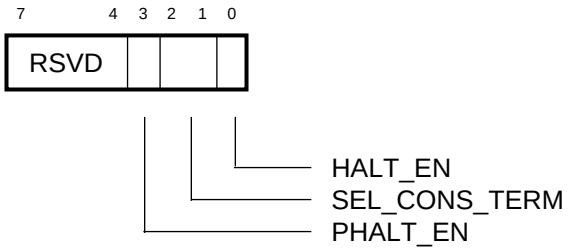


Figure 1-71 Gbus$Intr Register

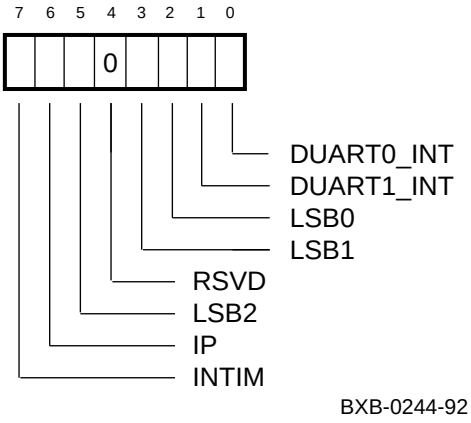
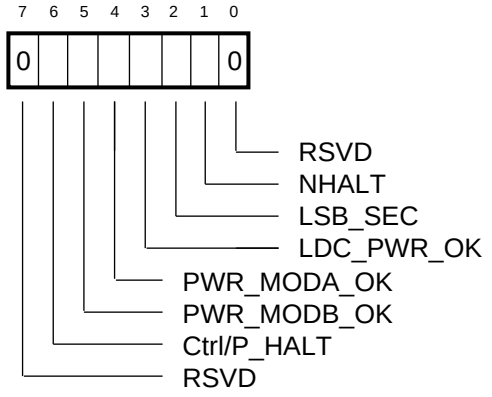
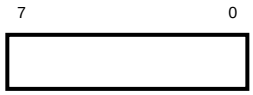


Figure 1-72 Gbus$Halt Register



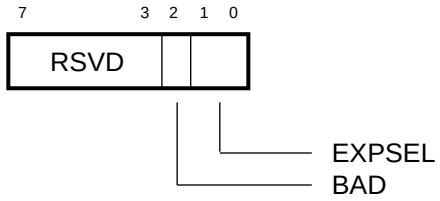
BXB-0241-92

Figure 1-73 Gbus$LSBRST Register



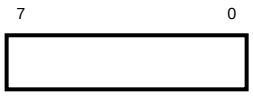
BXB-0264-92

Figure 1-74 Gbus$Misc Register



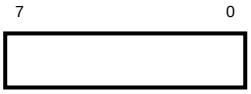
BXB-0239-92

Figure 1-75 Gbus$RMode Register



BXB-0264-92

Figure 1-76 Gbus$LTagRW Register



BXB-0264-92

1.2 MS7AA Registers

Table 1-6 MS7AA Registers

Mnemonic	Register Name	Offset
LDEV	Device	BB[1] + 0000
LBER	Bus Error	BB + 0040
LCNR	Configuration	BB + 0080
IBR	Information Base Repair	BB + 00C0
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
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 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 Syndrome B	BB + 4180
MDRB	Memory Diagnostic B	BB + 41C0
MCBSB	Memory Check Bit Substitute B	BB + 4200

[1]BB is the LSB node space base address (in hex) of the memory module (see Table 2-1, p. 2-4).

Figure 1-77 LDEV — Device Register

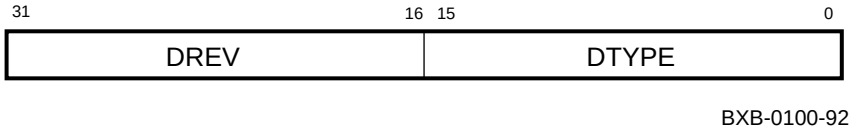
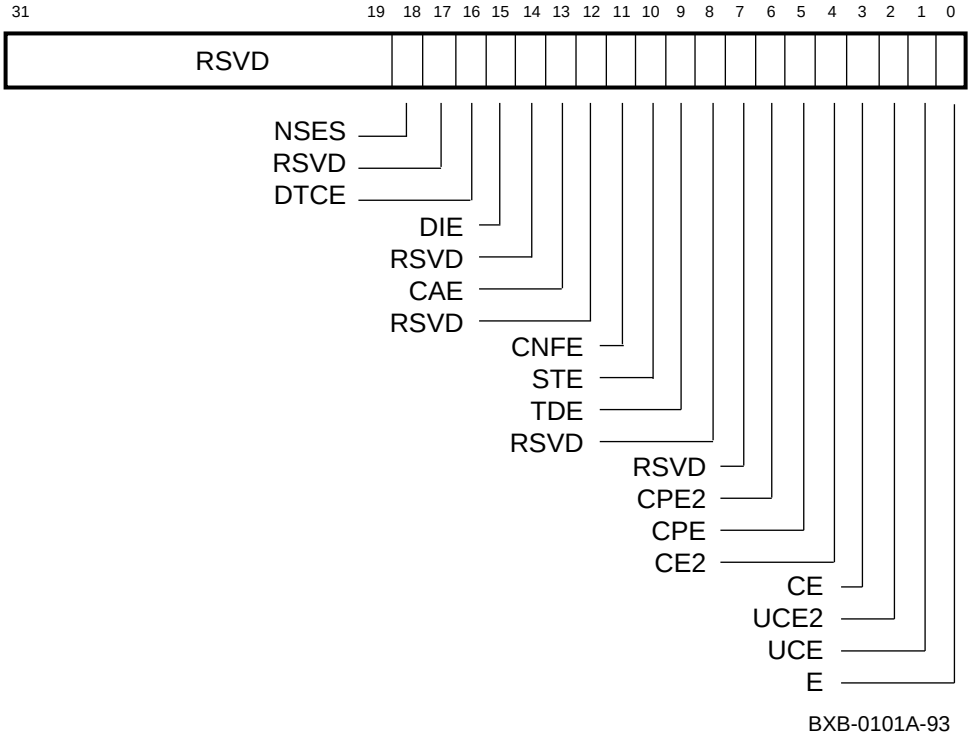


Figure 1-78 LBER — Bus Error Register



For bit definitions of these registers:
Index of *MS7AA Memory Technical Manual*

To examine these registers:
Example 3-11, page 3-23 of this manual

Figure 1-79 LCNR — Configuration Register

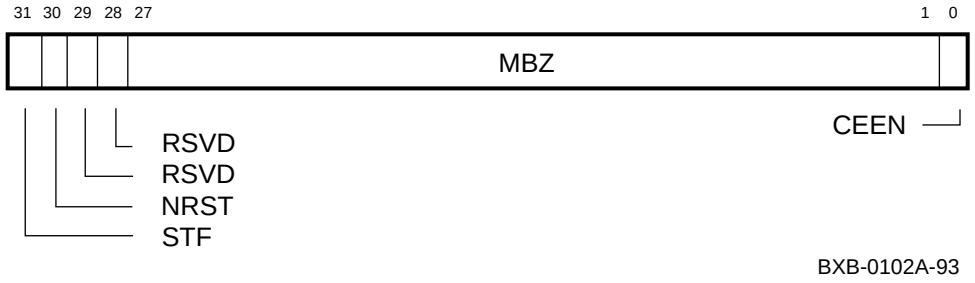


Figure 1-80 IBR — Information Base Repair Register

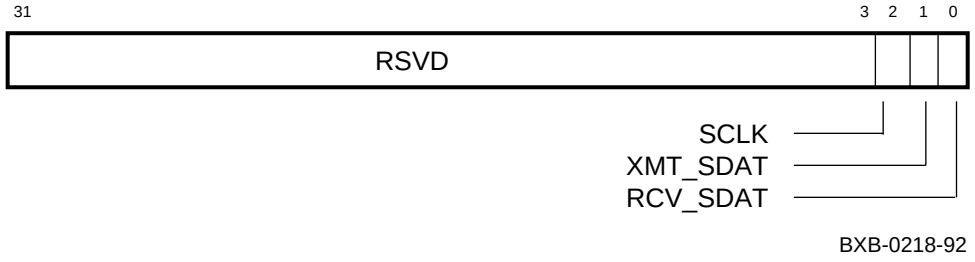


Figure 1-81 LBESR0–3 — Bus Error Syndrome Registers

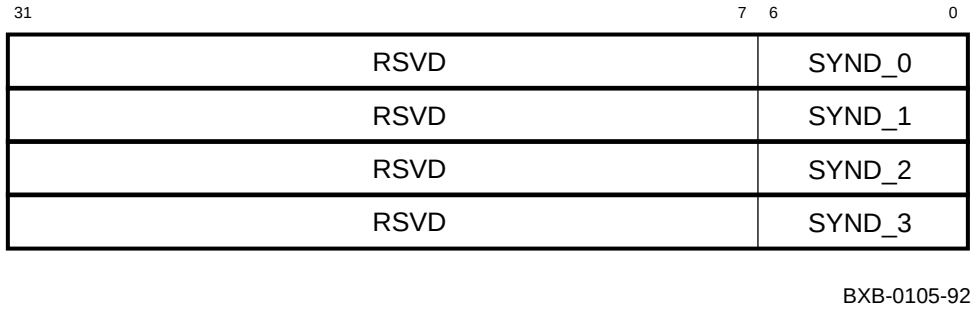


Figure 1-82 LBECR0–1 — Bus Error Command Registers

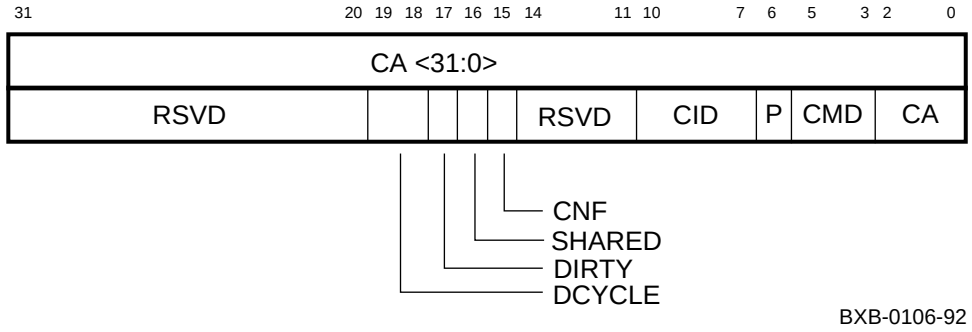


Figure 1-83 MCR — Memory Configuration Register

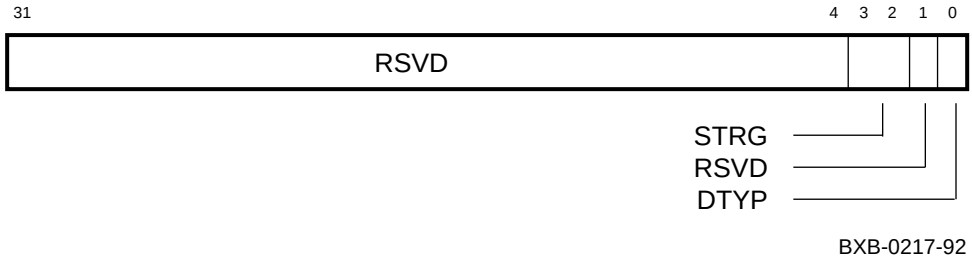


Figure 1-84 AMR — Address Mapping Register

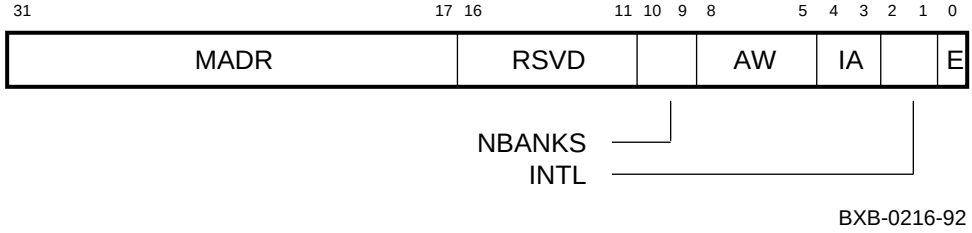


Figure 1-85 MSTR0–1 — Memory Self-Test Registers

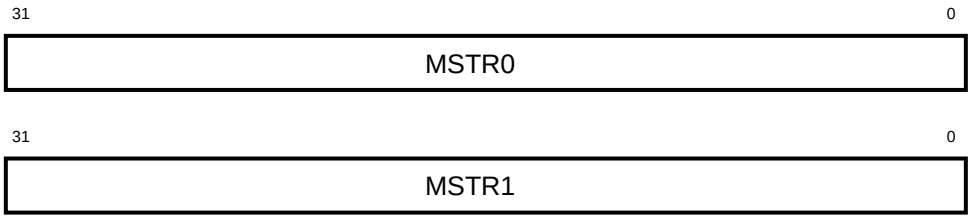


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Figure 1-86 FADR — Failing Address Register

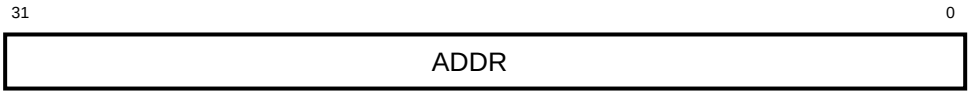

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Figure 1-87 MERA — Memory Error Register A

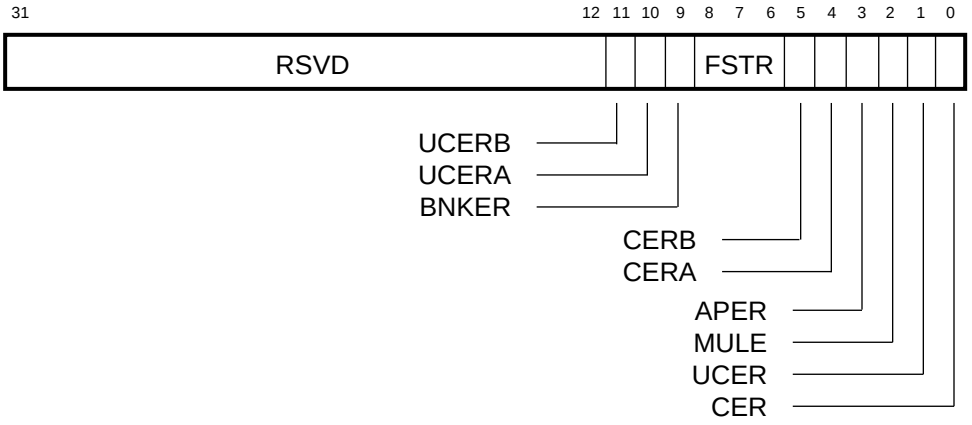

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Figure 1-88 MSYNDA — Memory Syndrome Register A

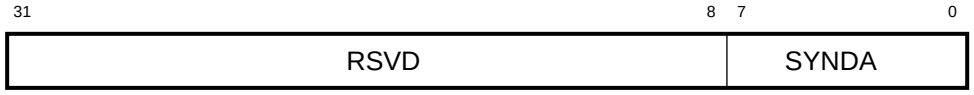

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Figure 1-89 MDRA — Memory Diagnostic Register A

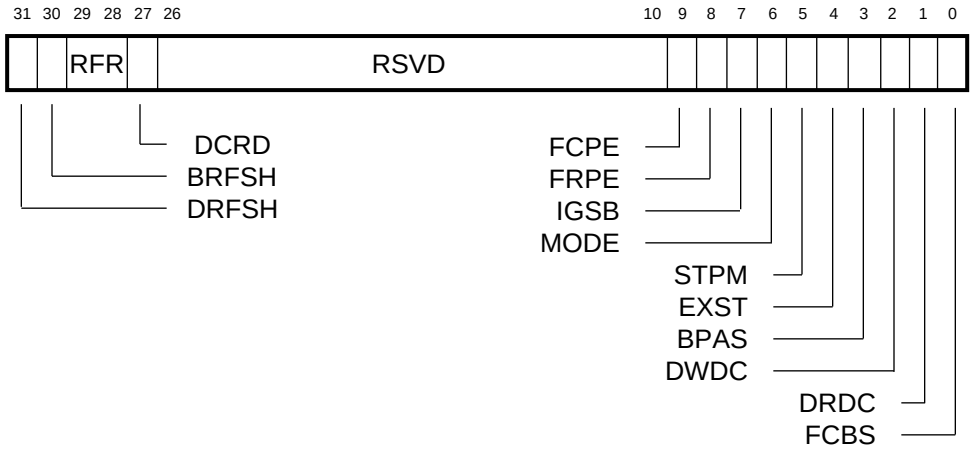

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Figure 1-90 MCBSA — Memory Check Bit Substitute Register A

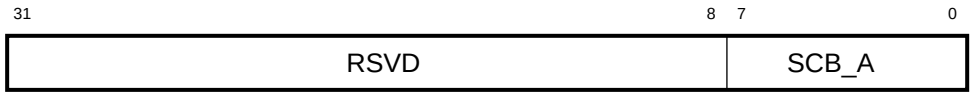

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Figure 1-91 MERB — Memory Error Register B

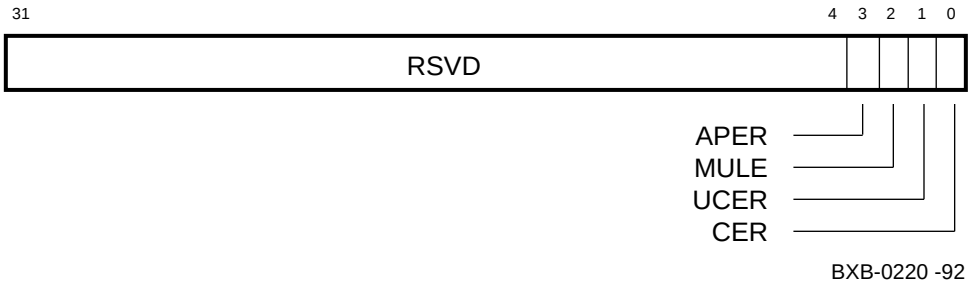


Figure 1-92 MSYNDB — Memory Syndrome Register B

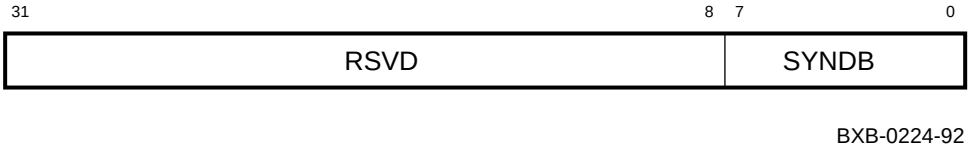


Figure 1-93 MDRB — Memory Diagnostic Register B

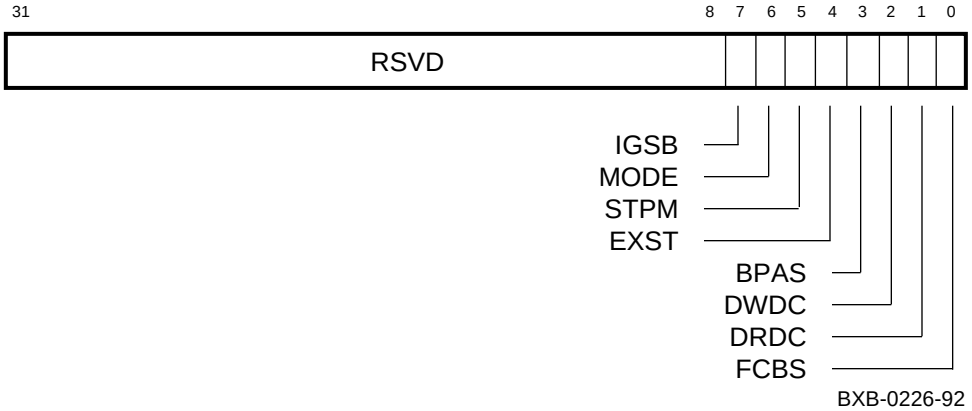
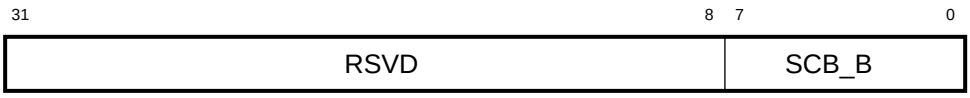


Figure 1-94 MCBSB — Memory Check Bit Substitute Register B



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1.3 I/O Port Registers

Table 1-7 I/O Port Registers

Mnemonic	Register Name	Offset	Access
LDEV	Device	BB[1] + 0000	R/W
LBER	Bus Error	BB + 0040	R/W
LCNR	Configuration	BB + 0080	R/W
IBR	Information Base Repair	BB + 00C0	R/W
LMMR0	Memory Mapping 0	BB + 0200	R/W
LMMR1	Memory Mapping 1	BB + 0240	R/W
LMMR2	Memory Mapping 2	BB + 0280	R/W
LMMR3	Memory Mapping 3	BB + 02C0	R/W
LMMR4	Memory Mapping 4	BB + 0300	R/W
LMMR5	Memory Mapping 5	BB + 0340	R/W
LMMR6	Memory Mapping 6	BB + 0380	R/W
LMMR7	Memory Mapping 7	BB + 03C0	R/W
LBESR0	Bus Error Syndrome 0	BB + 0600	RO
LBESR1	Bus Error Syndrome 1	BB + 0640	RO
LBESR2	Bus Error Syndrome 2	BB + 0680	RO
LBESR3	Bus Error Syndrome 3	BB + 06C0	RO
LBECR0	Bus Error Command 0	BB + 0700	RO
LBECR1	Bus Error Command 1	BB + 0740	RO
LILID0	Interrupt Level 0 IDENT	BB + 0A00	RTC
LILID1	Interrupt Level 1 IDENT	BB + 0A40	RTC
LILID2	Interrupt Level 2 IDENT	BB + 0A80	RTC
LILID3	Interrupt Level 3 IDENT	BB + 0AC0	RTC
LCPUMASK	CPU Interrupt Mask	BB + 0B00	R/W
LMBPR0	Mailbox Pointer 0	BB + 0C00	R/W
LMBPR1	Mailbox Pointer 1	BB + 0C00	R/W

[1] BB is the LSB node space base address (in hex) of the IOP module. The IOP module is node 8; BB is 3 FA00 0000.

Table 1-7 I/O Port Registers (Continued)

Mnemonic	Register Name	Offset	Access
LMBPR2	Mailbox Pointer 2	BB[1] + 0C00	R/W
LMBPR3	Mailbox Pointer 3	BB + 0C00	R/W
IPCNSE	I/O Port Chip Node-Specific Error	BB + 2000	R/W
IPCVR	I/O Port Chip Vector	BB + 2040	R/W
IPCMSR	I/O Port Chip Mode Selection	BB + 2080	R/W
IPCHST	I/O Port Chip Hose Status	BB + 20C0	R/W
IPCDR	I/O Port Chip Diagnostic	BB + 2100	R/W

[1] BB is the LSB node space base address (in hex) of the IOP module. The IOP module is node 8; BB is 3 FA00 0000.

For bit definitions of these registers:
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To examine these registers:
Example 3-12, page 3-24 of this manual

Figure 1-95 LDEV — Device Register

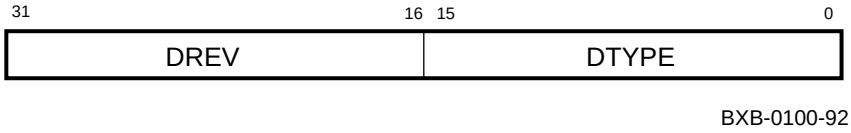

Figure 1-96 LBER — Bus Error Register

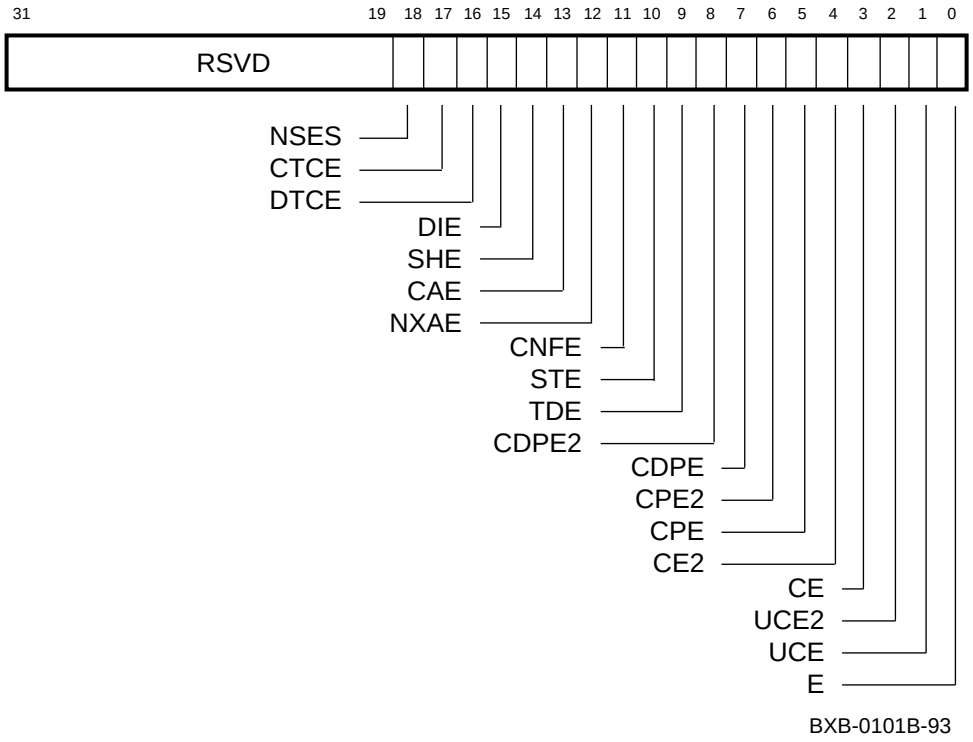

Figure 1-97 LCNR — Configuration Register

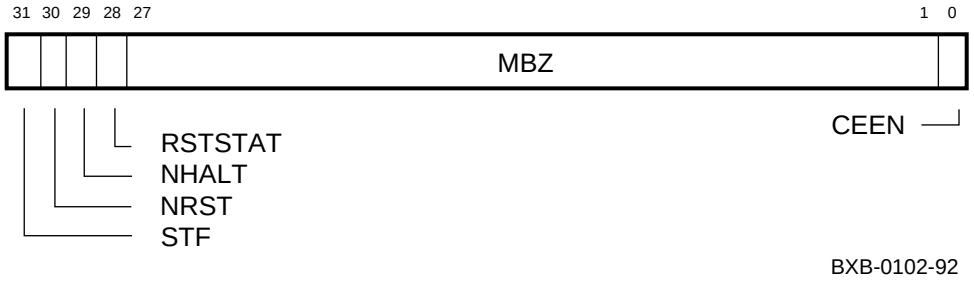

Figure 1-98 IBR — Information Base Repair Register

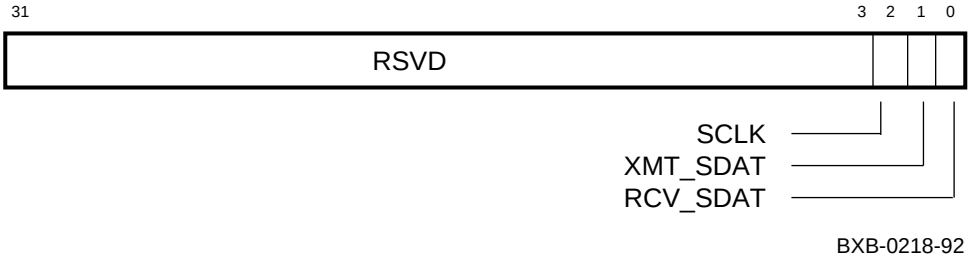

Figure 1-99 LMMR0–7 — Memory Mapping Registers 0–7

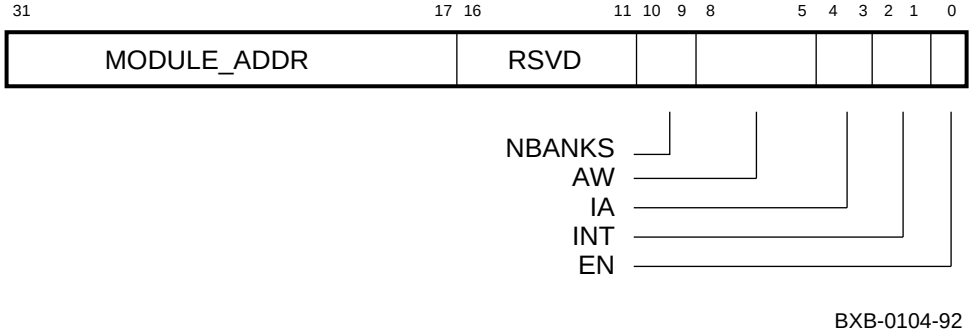

Figure 1-100 LBESR0–3 — Bus Error Syndrome Registers 0–3

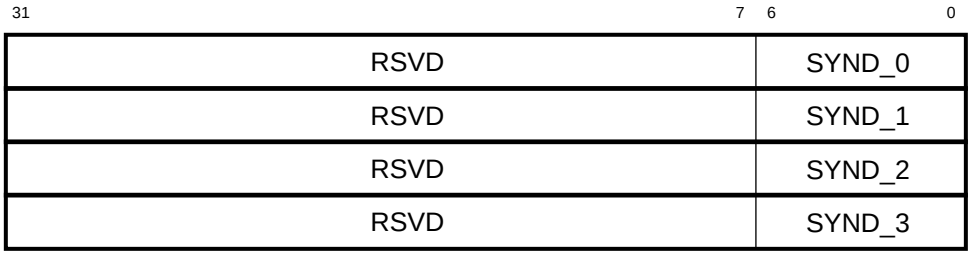

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Figure 1-101 LBECR0–1 — Bus Error Command Registers 0–1

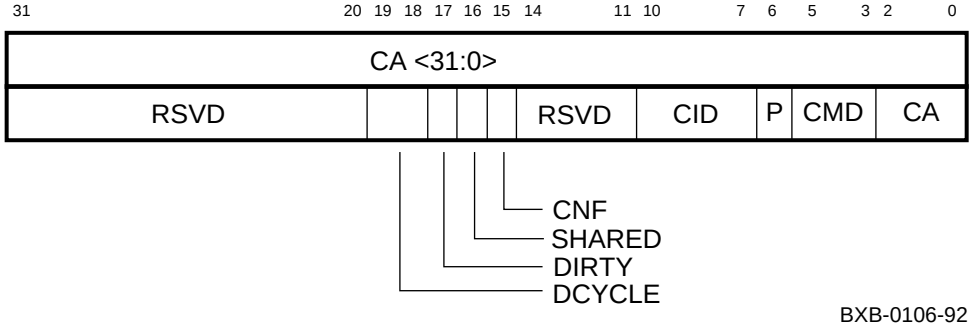

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Figure 1-102 LILID0–3 — Interrupt Level 0–3 IDENT Registers

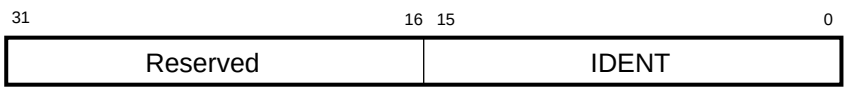

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Figure 1-103 LCPUMASK — CPU Interrupt Mask Register

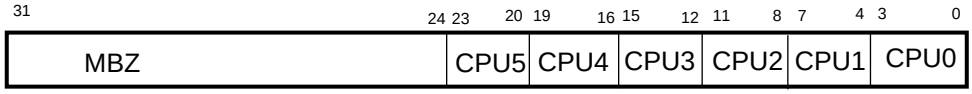

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Figure 1-104 LMBPR0–3 — Mailbox Pointer Registers 0–3

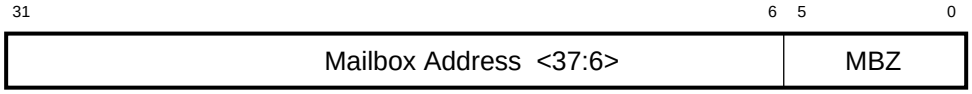

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Figure 1-105 IPCNSE — I/O Port Chip Node-Specific Error Register

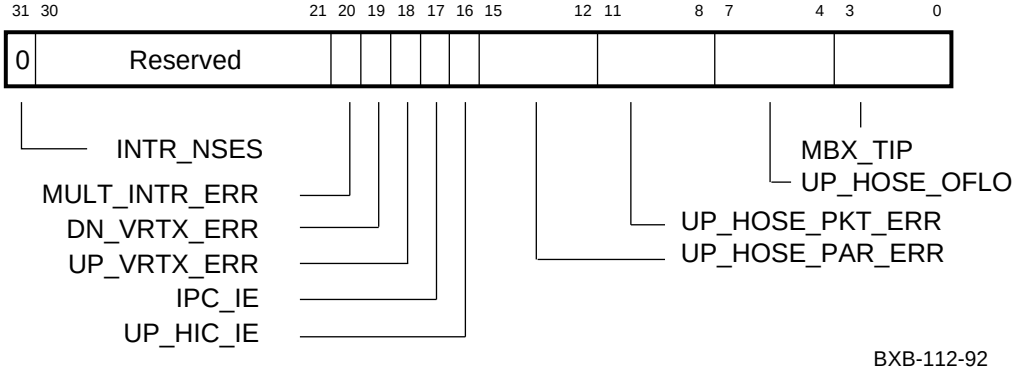

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Figure 1-106 IPCVR — I/O Port Chip Vector Register

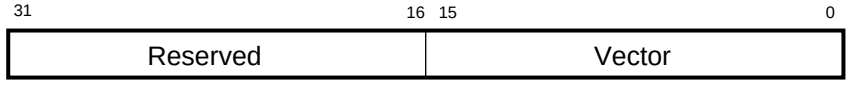

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Figure 1-107 IPCMSR — I/O Port Chip Mode Selection Register

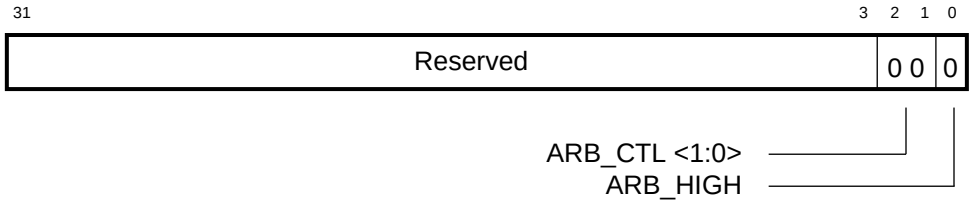
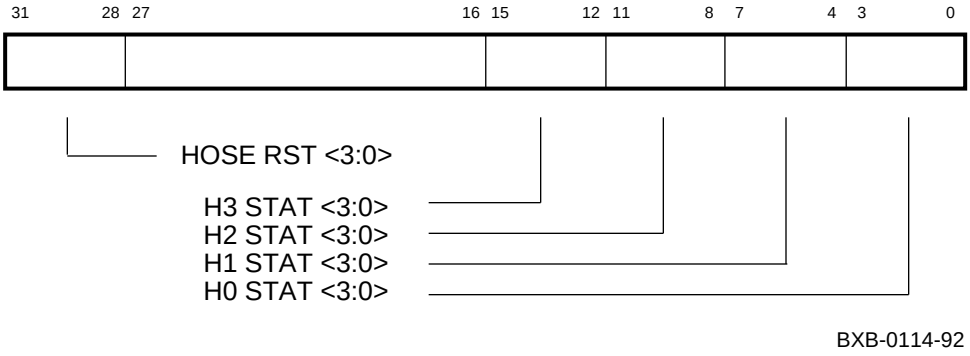
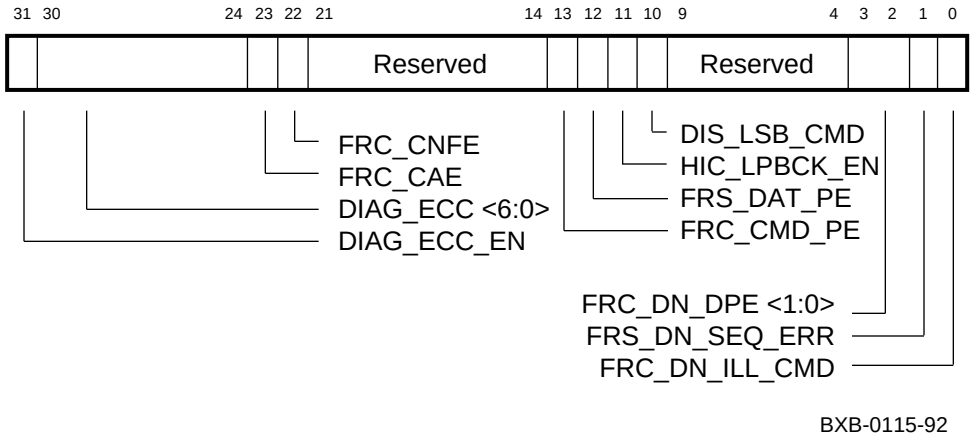


Figure 1-108 IPCHST — I/O Port Chip Hose Status Register



Each IPCHST status group (H3 – H0) includes these bits:
<3> PWROK transitional
<2> CBLOK current level
<1> PWROK current level
<0> ERROR transitional from 0 to 1

Figure 1-109 IPCDR — I/O Port Chip Diagnostic Register



1.4 DWLMA Registers

The DWLMA is the interface from the LSB to the XMI. The module designation is T2028–AA; it is in slot 8 of the XMI card cage.

Table 1-8 DWLMA Registers

Mnemonic	Register Name	Offset	Access
XMI Required Registers			
XDEV	Device	BB[1] + 00	R/W
XBER	Bus Error	BB + 04	R/W
XFADR	Failing Address	BB + 08	RO
XFAER	Failing Address Extension	BB + 0C	RO
IBR	Information Base Repair	BB + 10	R/W
Node-Specific Registers			
LDIAG	Diagnostic	BB + 40	R/W
IMSK	Interrupt Mask	BB + 44	R/W
LEVR	Error Vector	BB + 48	R/W
LERR	Error	BB + 4C	R/W
LGPR	General Purpose	BB + 50	R/W
IPR1	Interrupt Pending 1	BB + 54	RO
IPR2	Interrupt Pending 2	BB + 58	RO
IIPR	Interrupt in Progress	BB + 5C	RO

[1] BB is the XMI mailbox base physical address (in hex) of the DWLMA module (see Table 2-3, p. 2-6). The DWLMA module is node 8; BB is 61C0 0000.

For bit definitions of these registers:
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To examine these registers:
Example 3-13, page 3-25 of this manual

Figure 1-110 XDEV — Device Register

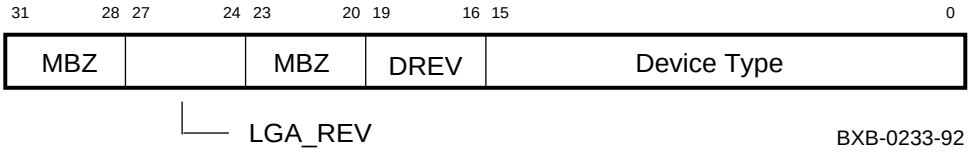

Figure 1-111 XBER — Bus Error Register

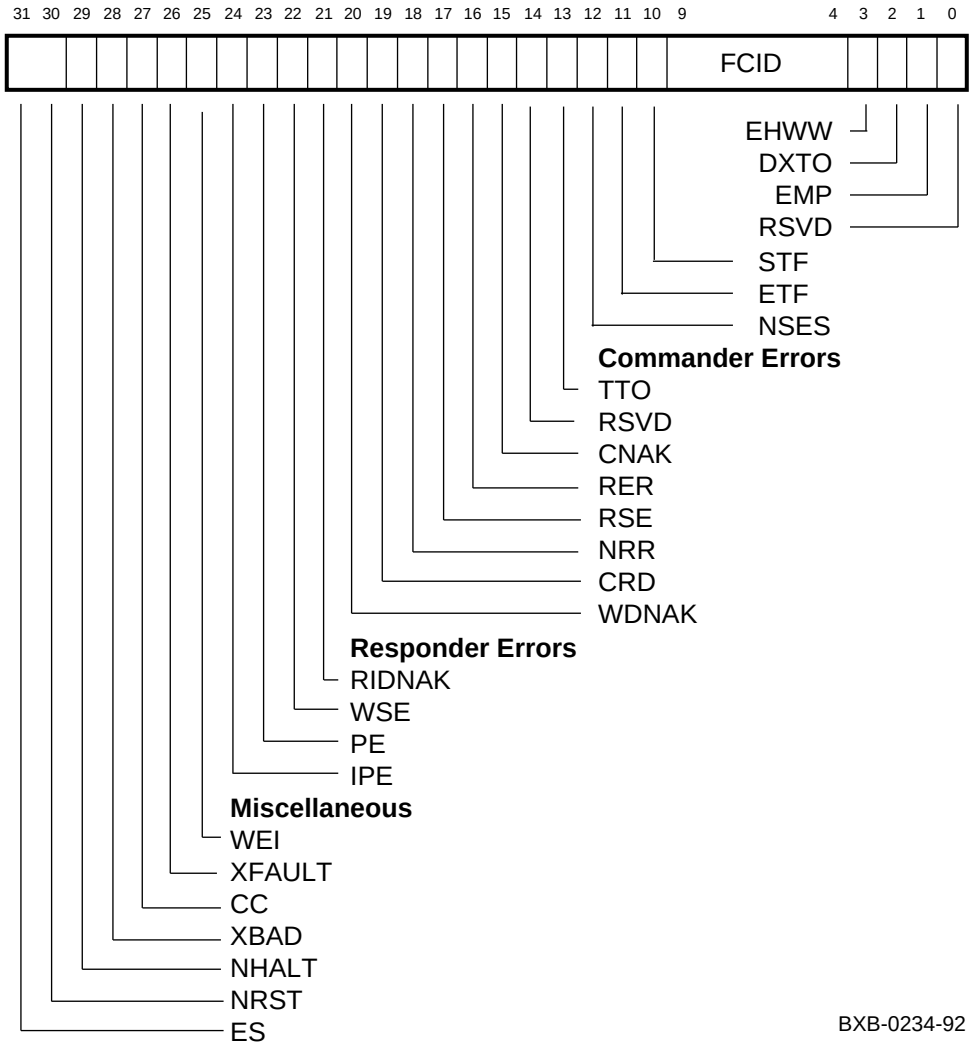

Figure 1-112 XFADR — Failing Address Register

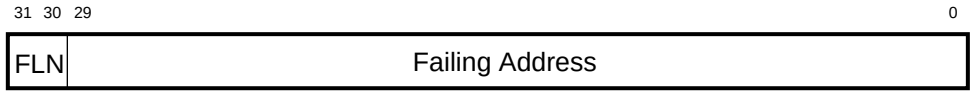

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Figure 1-113 XFAER — Failing Address Extension Register

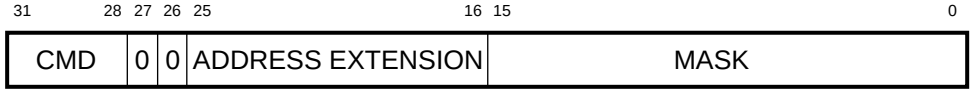

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Figure 1-114 IBR — Information Base Repair Register

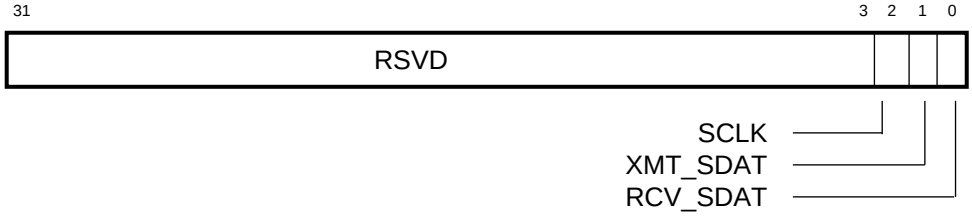

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Figure 1-115 LDIAG — Diagnostic Register

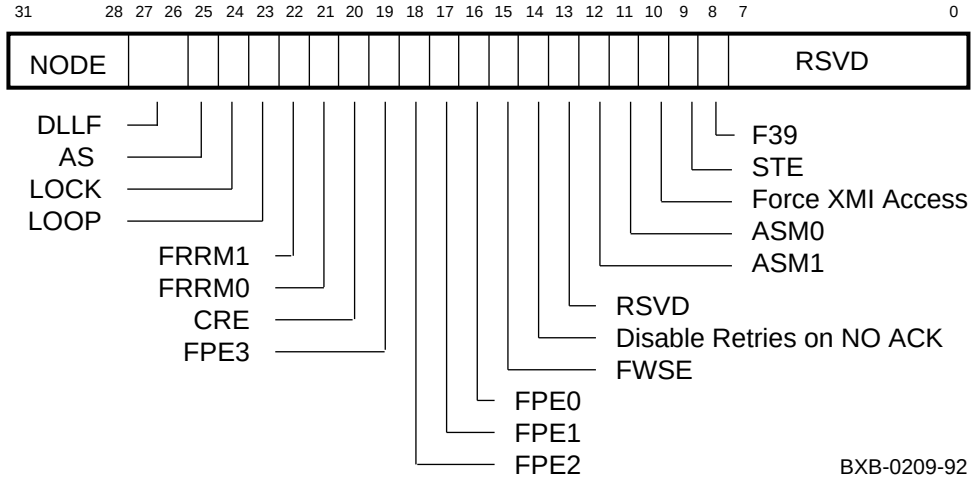


Figure 1-116 IMSK — Interrupt Mask Register

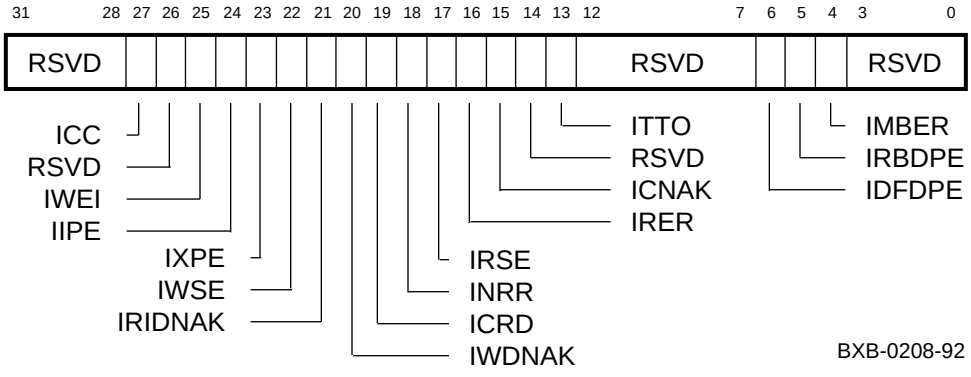


Figure 1-117 LEVR — Error Vector Register

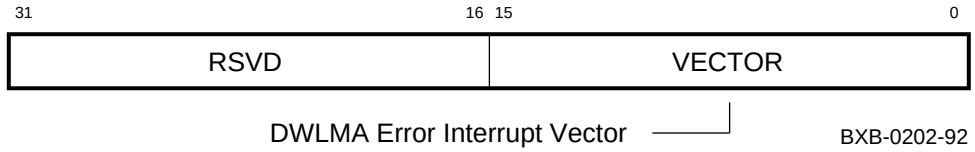


Figure 1-118 LERR — Error Register

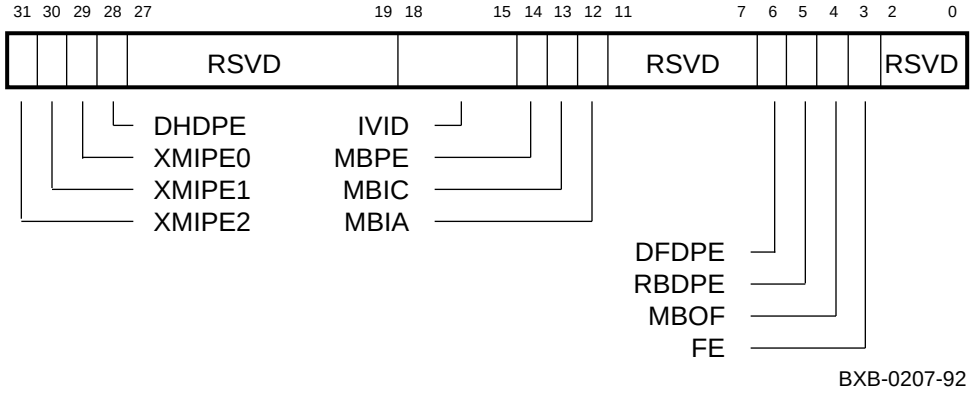


Figure 1-119 LGPR — General Purpose Register

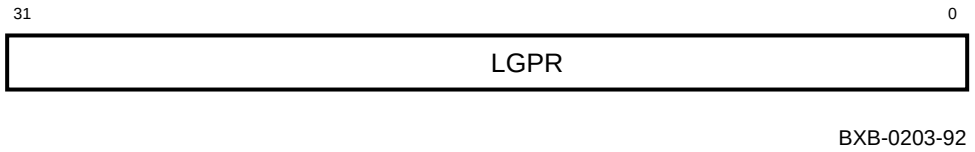


Figure 1-120 IPR1 — Interrupt Pending Register 1

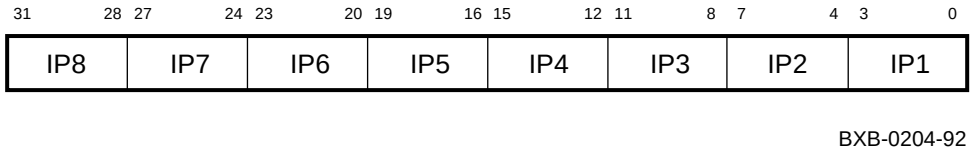


Figure 1-121 IPR2 — Interrupt Pending Register 2

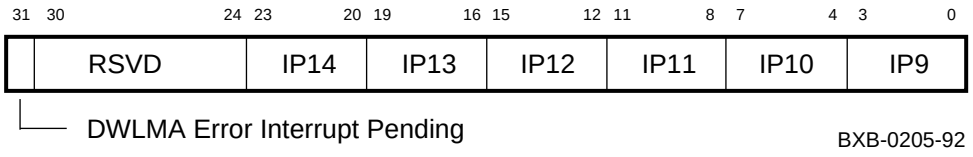
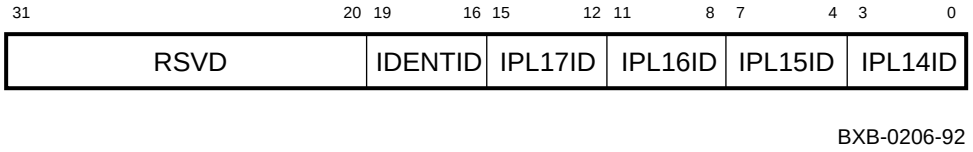


Figure 1-122 IIPR — Interrupt in Progress Register



1.5 DWLAA Registers

The DWLAA is the interface from the LSB to the Futurebus+. The module designation is B2003–AA; it is in slot 5 of the Futurebus+ card cage.

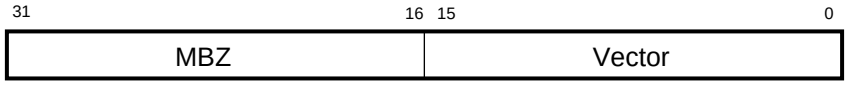
Table 1-9 DWLAA Registers

Mnemonic	Register Name	Offset	Access
FINT	Interrupt	BB[1] + 000	R/W
NID	Node Identification	BB + 004	R/W
STO	Split Timeout	BB + 008	R/W
ERRHI	Error High	BB + 00C	R/W
ERRLO	Error Low	BB + 010	R/W
FADRHI	Failing Address High	BB + 014	RO
FADRLO	Failing Address Low	BB + 018	RO
TTO	Transaction Timeout	BB + 01C	R/W
BZRTRY	Busy Retry	BB + 020	R/W
FCTL	Control	BB + 024	R/W
DIAG	Diagnostic Control	BB + 028	R/W
FGPR	General Purpose	BB + 02C	R/W
FERR	Error	BB + 030	R/W
IBR	Information Base Repair	BB + 034	R/W
DID	Device Identification	None[2]	RO
INT14	IPL14 Vector	BB + 800	RO
INT15	IPL15 Vector	BB + 804	RO
INT16	IPL16 Vector	BB + 808	RO
INT17	IPL17 Vector	BB + 80C	RO

[1] BB is the Futurebus+ node space base address (in hex) of the DWLAA module (see Table 2-7, p. 2-11). The DWLAA module is node 5; BB is FFFC A000.

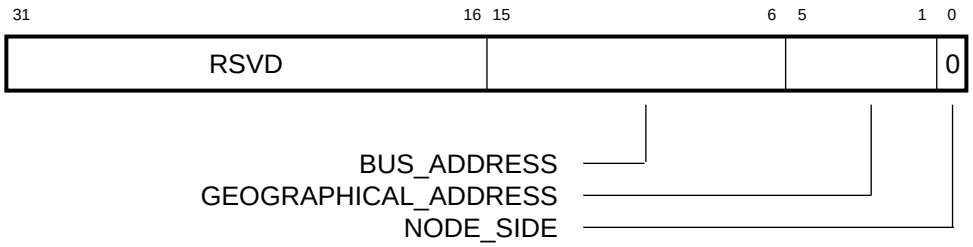
[2] The Device Identification Register is read via the WRU mailbox.

Figure 1-123 FINT — Interrupt Register



BXB-0246-92

Figure 1-124 NID — Node Identification Register



BXB-0247-92

Figure 1-125 STO — Split Timeout Register

BXB-0248-92

For bit definitions of these registers:
Index of *I/O System Technical Manual*

To examine these registers:
Example 3-14, page 3-26 of this manual

Figure 1-126 ERRHI — Error High Register

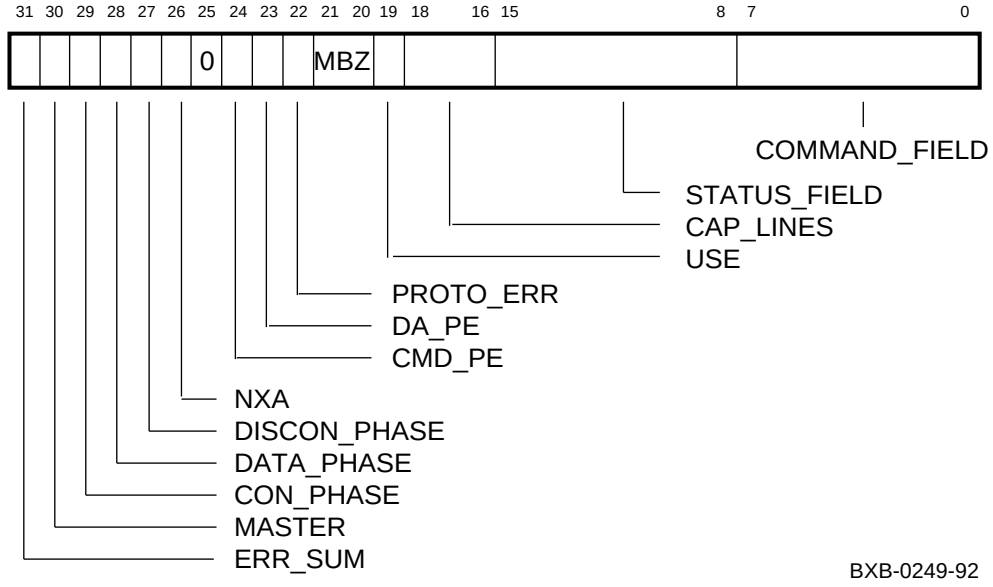


Figure 1-127 ERRLO — Error Low Register

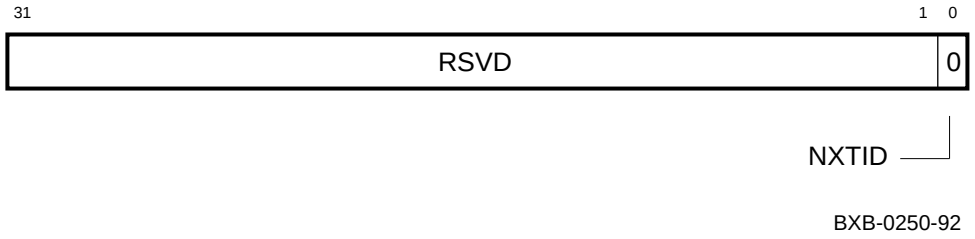
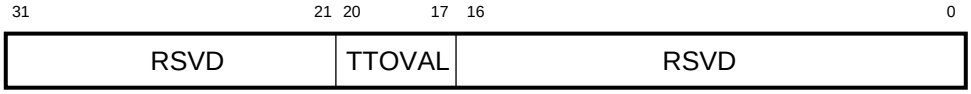


Figure 1-128 FADRHI — Failing Address High Register

Figure 1-129 FADRLO — Failing Address Low Register

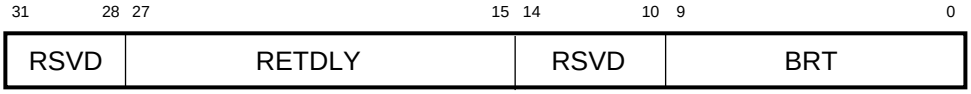
BXB-0214-92

Figure 1-130 TTO — Transaction Timeout Register



BXB-0252-92

Figure 1-131 BZRTRY — Busy Retry Register



BXB-0253-92

Figure 1-132 FCTL — Control Register

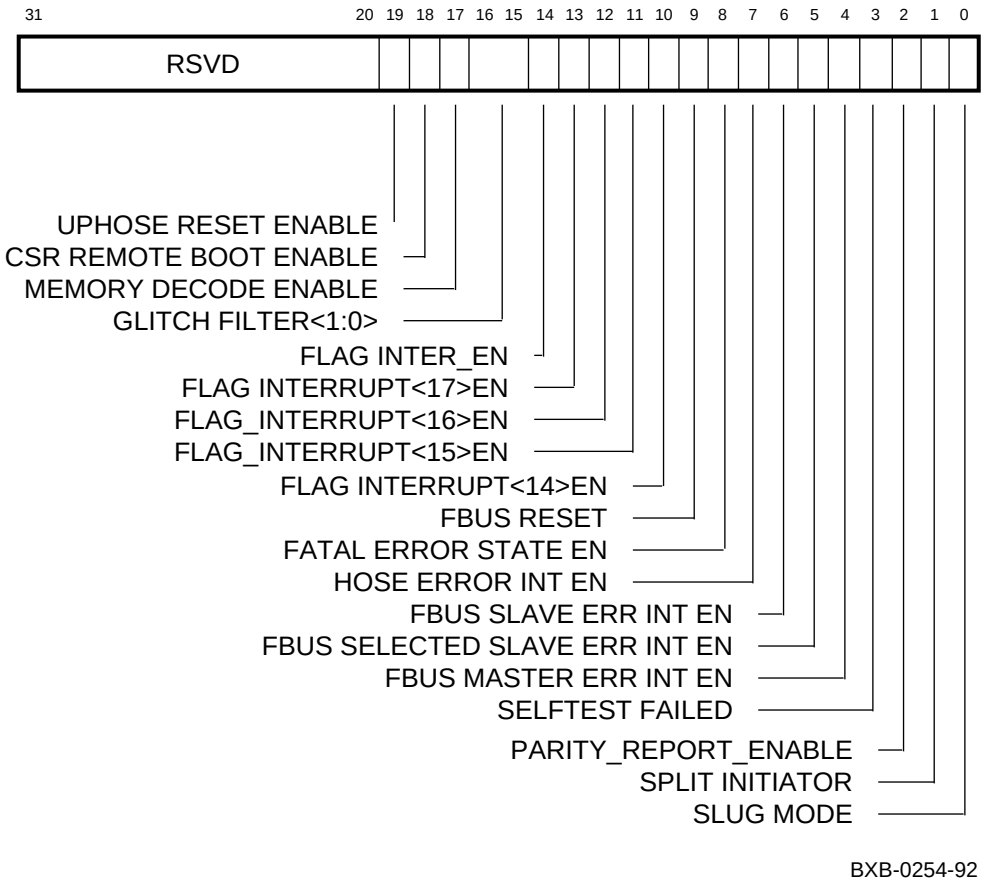


Figure 1-133 DIAG — Diagnostic Control Register

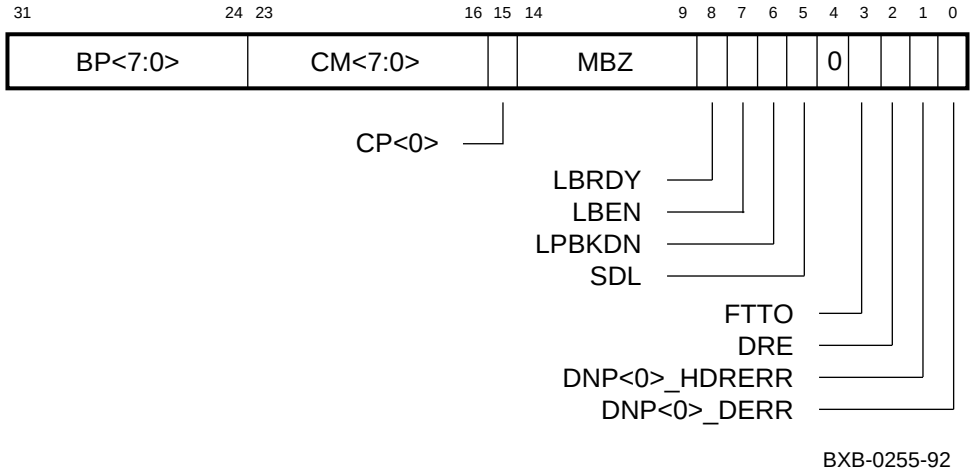


Figure 1-134 FGPR — General Purpose Register

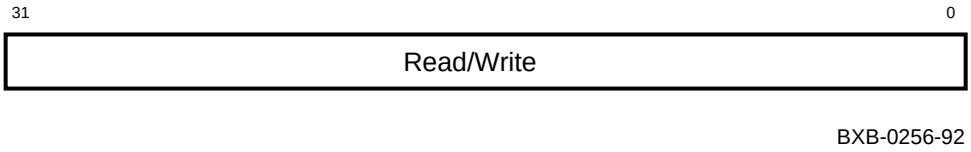


Figure 1-135 FERR — Error Register

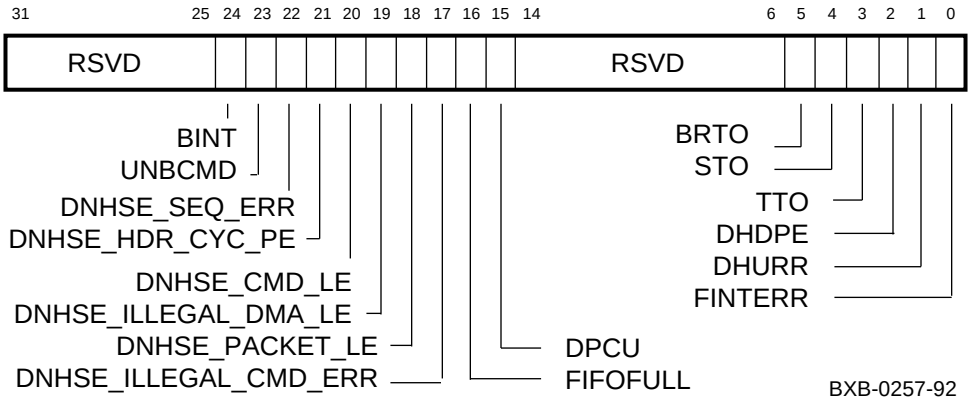


Figure 1-136 IBR — Information Base Repair Register

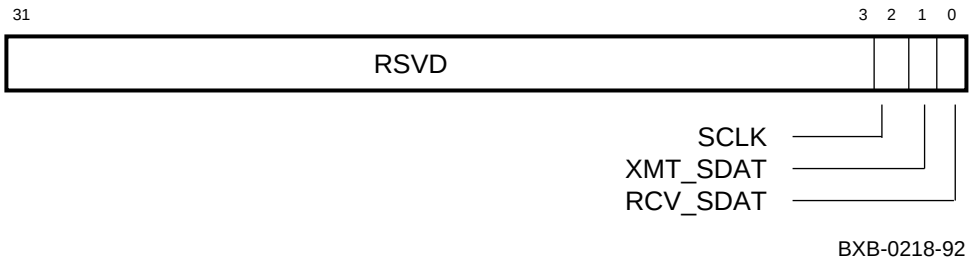


Figure 1-137 DID — Device Identification Register

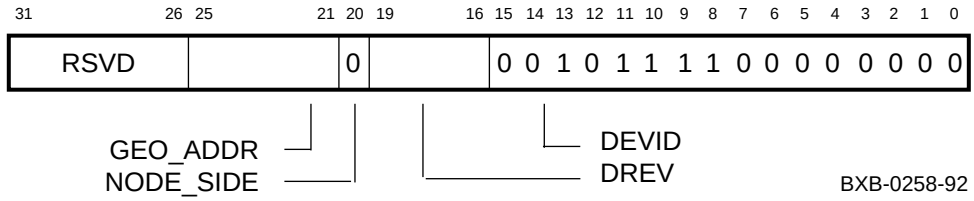
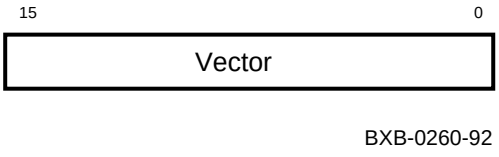


Figure 1-138 INT14–17 — IPL14–17 Vector Registers



Chapter 2

Addressing

This chapter includes an overview of the DEC 7000 system and addressing information for the buses used in the system. Sections include:

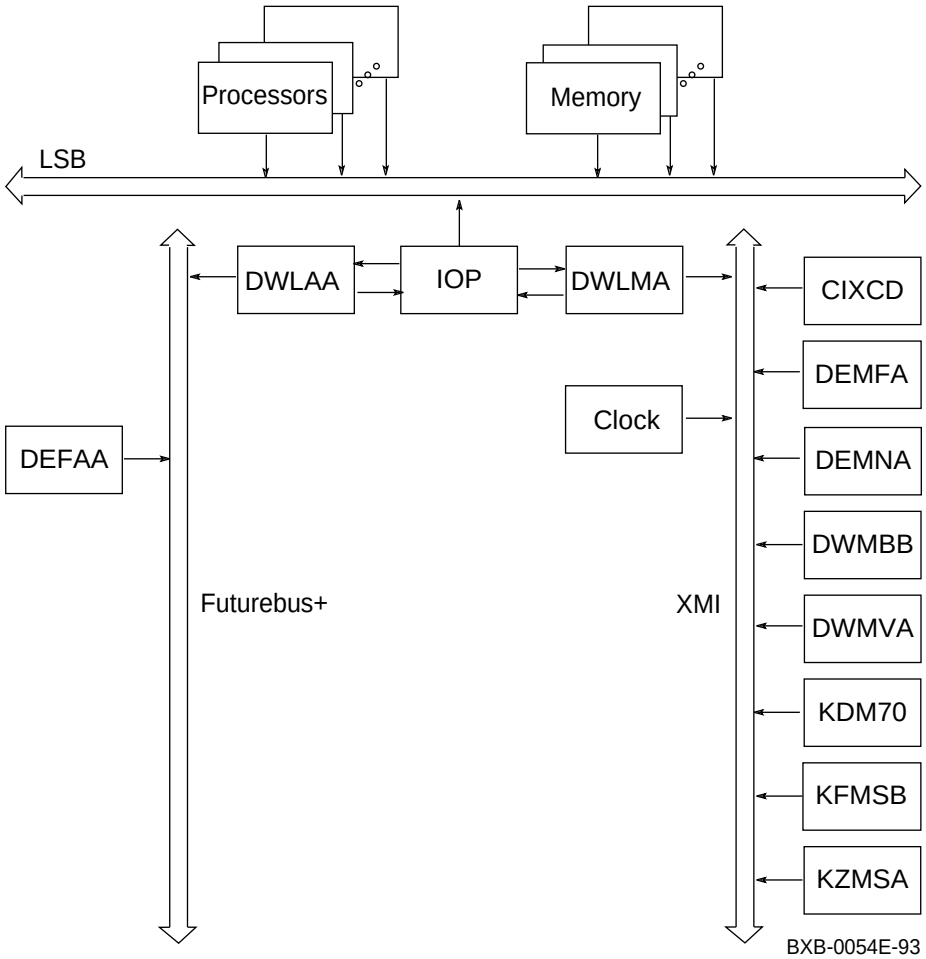
- DEC 7000 System Block Diagram
- LSB Address Space
- XMI Addresses
- VAXBI Addresses
- Futurebus+ Addresses

For more information:

KN7AA CPU Technical Manual

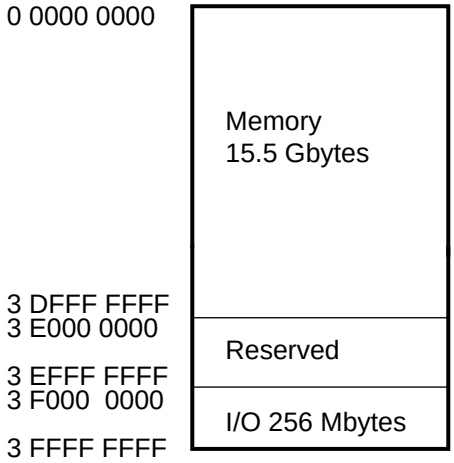
2.1 DEC 7000 System Block Diagram

Figure 2-1 Sample System Block Diagram



2.2 LSB Address Space

Figure 2-2 Virtual Address Space Layout



BXB-0199B-93

Table 2-1 LSB Node Base Addresses

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

For more information:

KN7AA CPU Technical Manual

Table 2-2 Device Type Codes

Device	Code (hex)
LSB	
KN7AA	8001
MS7AA	4000
IOP	2000
XMI	
CIXCD	0C05
DEMFA	0823
DEMNA	0C03
DWLMA	102A
DWMBB*	2002
DWMVA*	2002
KDM70	0C22
KFMSB	0C31
KZMSA	0C36
Futurebus+	
DEFAA	2006
DWLAA	2003

* DWMBB/A and DWMVA/A are the same module, T2018.

2.3 XMI Addresses

Table 2-3 XMI Node Addresses

Node	Mailbox Base Physical Address (BB)	XMI Base Physical Address (BB)
1	6188 0000	80 0188 0000
2	6190 0000	80 0190 0000
3	6198 0000	80 0198 0000
4	61A0 0000	80 01A0 0000
5	61A8 0000	80 01A8 0000
6	61B0 0000	80 01B0 0000
7	61B8 0000	80 01B8 0000
8	61C0 0000	80 01C0 0000
9	61C8 0000	80 01C8 0000
10	61D0 0000	80 01D0 0000
11	61D8 0000	80 01D8 0000
12	61E0 0000	80 01E0 0000
13	61E8 0000	80 01E8 0000
14	61F0 0000	80 01F0 0000

2.4 VAXBI Addresses

To examine a VAXBI register from the DEC 7000 console (see Example 2-1), you need four pieces of information:

1. The XMI channel number (0–3) to which the VAXBI bus is connected.
2. The address for the XMI slot of the DWMBB module (see Table 2-4).
3. The base address of the VAXBI node (see Table 2-5).
4. 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:

xmi*n*:*xxxyyzzz*

where: *n* = the XMI channel number
xxx = the XMI slot in which the DWMBB is installed
yy = the base address of the VAXBI node
zzz = the address offset of the VAXBI register

To calculate the address of the VAXBI register, add the address for the XMI slot (Table 2-4) 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 a VAXBI Register

```
>>> e xmi1:2200E000
        ❶  ❷ ❸ ❹

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

In the above example, the address for the **examine** command was derived in this way:

❶	*n*	xmi**1**	The VAXBI bus is connected to XMI1.
❷	*xxx*	**220**0 0000	The DWMBB module is installed in XMI slot 1.
❸	*yy*	000**0 E**000	The register to be examined is at VAXBI node 7.
❹	*zzz*	**000**	The register to be examined is DTYPE.

Table 2-4 Addresses of XMI Slots

XMI Slot	Address
1	2200 0000
2	2400 0000
3	2600 0000
4	2800 0000
5	2A00 0000
6	2C00 0000
7	2E00 0000
8	3000 0000
9	3200 0000
10	3400 0000
11	3600 0000
12	3800 0000
13	3A00 0000
14	3C00 0000

Table 2-5 Base Addresses of VAXBI Nodes

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

Table 2-6 Address Offsets of VAXBI Registers

Mnemonic	Register Name	Address Offset
DTYPE	Device	000
VAXBICSR	VAXBI Control and Status	004
BER	Bus Error	008
EINTRSCR	Error Interrupt Control	00C
INTRDES	Interrupt Destination	010
IPINTRMSK	IPINTR Mask	014
FIPSDES	Force-Bit IPINTR/STOP Destination	018
IPINTRSRC	IPINTR Source	01C
SADR	Starting Address	020
EADR	Ending Address	024
BCICSR	BCI Control and Status	028
WSTAT	Write Status	02C
FIPSCMD	Force-Bit IPINTR/STOP Command	030
UINTRCSR	User Interface Interrupt Control	040
GPR0	General Purpose Register 0	0F0
GPR1	General Purpose Register 1	0F4
GPR2	General Purpose Register 2	0F8
GPR3	General Purpose Register 3	0FC
SOSR	Slave-Only Status	100
RXCD	Receive Console Data	200

2.5 Futurebus+ Addresses

Table 2-7 Futurebus+ Node Addresses

Node	Address
1	FFFC 2000
2	FFFC 4000
3	FFFC 6000
4	FFFC 8000
5*	FFFC A000
6	FFFC C000
7	FFFC E000
8	FFFD 0000
9	FFFD 2000
10	FFFD 4000

* The DWLAA module (B2003–AA) is always in slot 5.

Chapter 3

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 Name Fields
- Command Syntax
- Command Examples
  - — Boot
  - — Cdp
  - — Examine
  - — Mchk
  - — Show Configuration
  - — Show Device
  - — Show Network
  - — Show Power

For more information:

Console Reference Manual
Advanced Troubleshooting
Operations Manual

3.1 Console Commands

Table 3-1 Console Commands

Command	Description
boot	Boot the operating system
build eeprom	Create a new or restore a corrupted EEPROM image
cdp	Perform basic configuration management of DSSI devices
clear	Clear the specified EEPROM option, remove an environment variable, or clear the terminal screen
continue	Resume processing at the point it was interrupted by Ctrl/P
crash	Restart the operating system; generate a memory dump
create	Create an environment variable
deposit	Store data in a specified location
examine	Display contents of a memory location, a register, or a device
help	Provide basic information on the console commands when the system is in console mode
initialize	Initialize the entire system or a specified device or subsystem
mchk	Dump internal state information for diagnosis of hardware failure
repeat	Repeat a command; stop by entering Ctrl/C
set	Record the current system configuration in the EEPROM, set the selected EEPROM option, modify an environment variable, connect to another console or service, or configure the system power regulators for battery backup
show	Display 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
start	Begin execution of an instruction at specified address; does not initialize the system
stop	Halt a specified processor
test	Test the entire system (default), a subsystem, or a specified device
update	Copy the contents of the EEPROM or FEPROMs on the boot processor to the EEPROM or FEPROMs on the specified secondary processor(s)
#	Introduce a comment

Table 3-2 Boot Command Options

Option	Meaning
-file <file>	Boot from the file **<file>**
-flags <val>	Boot flags that qualify the bootstrap. If omitted, the value of the environment variable **boot_osflags** is used.

Table 3-3 Cdp Command Options

Option	Meaning
-a	Set device allocation class, **allclass**
-i	Select interactive mode; set all parameters
-n	Set device node name, **nodename** (up to 16 characters)
-o	Override warning messages
-u	Set device unit number, **unitnum**
-sa allclass	Set **allclass** for all DSSI devices in the system to the specified value
-sn	Set **nodename** 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)
-su unitnum	Set the starting **unitnum** 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
diag_sdd	Remove from EEPROM failure information logged by symptom-directed diagnosis
diag_tdd	Remove from EEPROM failure information logged by test-directed diagnosis
log	Remove from EEPROM all failure information (symptom-directed diagnosis, test-directed diagnosis, and operating system)
symptom	Remove from EEPROM all failure information on operating system

Table 3-5 Create Command Option

Option	Meaning
-nv	Store the nonvolatile environment variable in EEPROM

Table 3-6 Deposit and Examine Command Options

Option	Meaning
-b	Define data size as a byte
-d	Disassemble instruction at current address (**examine** command only)
-h	Define data size as a hexword
-l	Define data size as a longword; initial default
-o	Define data size as an octaword
-q	Define data size as a quadword
-w	Define data size as a word
-n val	Number of consecutive locations to modify
-s val	Address increment size. Default is data size.
-u	Allow access to console private memory, while disabling virtual address protection checks

Table 3-7 Device Name and Address Space Options for Deposit and Examine Commands

Option	Meaning
<dev_name>	Device name; for example, xmi0, kn7aa0, or demna0
fpr	Define the address space as the floating-point register set, F0 through F31
gpr	Define the address space as the general register set, R0 through R31. The data size is always a longword.
ipr	Define the address space as the internal processor registers (IPRs). The data size is always a longword.
pt	Define the address space as the PAL temp register set, PT0 through PT31
pmem	Define the address space as physical memory
vmem	Define the address space as virtual memory. All access and protection checking occur.

Table 3-8 Location Symbols for Deposit and Examine Commands

Symbol	Meaning
+	The location immediately following the last location referenced in a **deposit** or **examine** command. For physical and virtual memory, the referenced location is the last location plus the size of the reference (1 for byte, 2 for word, 4 for longword). For other address spaces, the address is the last referenced address plus one.
–	The location immediately preceding the last location referenced in a **deposit** or **examine** command. For physical and virtual memory, the referenced location is the last location minus the size of the reference (1 for byte, 2 for word, 4 for longword). For other address spaces, the address is the last referenced address minus one.
*	The last location referenced in a **deposit** or **examine** command.
@	The location addressed by the last location referenced in a **deposit** or **examine** command.

Table 3-9 Set EEPROM Command Options

Option	Meaning
field	Record the LARS report number and comment
manufacturing	Record manufacturing information: module serial number and module part number
serial	Record system serial number

Table 3-10 Set Host Command Options

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

Table 3-11 Show EEPROM Command Options

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

Table 3-12 Show Power Command Options

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

Table 3-13 Test Command Options

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

Table 3-14 Update Command Options

Option	Meaning
-flash	Update the FEPROMs on the specified secondary processor
-eeprom	Update 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. 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.

Table 3-15 Environment Variables

Variable	Attribute	Function
auto_action	Non-volatile	The action the console will take following an error halt. Values are: **restart**—Automatically restart. If restart fails, boot the operating system. **boot**—Automatically boot the operating system. **halt**—Enter console mode (default).
baud	Non-volatile	Sets the baud rate of the console terminal port to 300, 600, 1200, 2400, 4800, or 9600 (default).
bootdef_dev	Non-volatile	The default device or device list from which booting is attempted when the **boot** command does not specify a device name.
boot_file	Non-volatile	The default file name used for the primary bootstrap when the **boot** command does not specify a file name.
boot_osflags	Non-volatile	Additional parameters passed to the system during booting if none are specified by the **-flags** qualifier to the **boot** command.
boot_reset	Non-volatile	Resets system and displays self-test results during booting. Default value is **on**.
cpu	Volatile	Selects the current boot processor.

Table 3-15 Environment Variables (Continued)

Variable	Attribute	Function
cpu_enabled	Non-volatile	A bitmask indicating which processors are enabled to run (leave console mode). Default is **0xFF**.
cpu_primary	Non-volatile	A bitmask indicating which processors are enabled to become the next boot processor after the next reset. Default is **0xFF**.
d_harderr	Volatile	Determines action taken following a hard error. Values are **halt** (default) and **continue**. Applies only when using the **test** command.
d_report	Volatile	Determines level of information provided by the diagnostic reports. Values are **summary** (default) and **full**. Applies only when using the **test** command.
d_softerr	Volatile	Determines action taken following a soft error. Values are **continue** (default) and **full**. Applies only when using the **test** command.
dump_dev	Non-volatile	Complete device specification of the device to which operating system dumps are written. Default value is **null**. (Not supported by all operating systems.)
enable_audit	Non-volatile	When set to on, allows audit trail messages to be displayed during booting.
interleave	Non-volatile	The memory interleave specification. Values must be **default**, **none**, or an explicit interleave list. Default value is **default**.
language	Non-volatile	Determines whether system displays message numbers or message text in English (default).

3.3 Device Name Fields

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 3-16 lists the field definitions.

Table 3-16 Device Name Fields

Field	Size	Definition
dd	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 dk SCSI disk mk SCSI tape
cc	2 (max)	Controller letter (a–zz) assigned by console, based on the system configuration
uuuu	4 (max)	Unit number of the device (0–9999)
node	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.
channel	1	Channel number (0–1); used only if the adapter has multiple channels
slot	2 (max)	XMI slot number (1–14) of the adapter
hose	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**] [**-fl**[**ags**] <parameters>] [**-fi**[**le**] <filename>] <device_name>

bu[**ild**] **ee**[**prom**]

cdp [-{**a**,**i**,**n**,**o**,**u**}] [**-sn**] [**-sa** <val>] [<dssi_device>]

cl[**ear**] **ee**[**prom**] <option>

cl[**ear**] <envar>

cl[**ear**] **sc**[**reen**]

c[**ontinue**]

cra[**sh**]

cr[**eate**] [**-nv**] <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>]

mchk [<node_id>]

r[**epeat**] [<command>]

se[**t**] **c**[**onfiguration**]

se[**t**] **ee**[**prom**] <option>

se[**t**] <envar> [<value>]

se[**t**] **h**[**ost**] {[**-dup**] [**-bus** <b>] **node** [<task>] or <device_adapter>}

se[**t**] **p**[**ower**] **-b** {**4**, **8**} {**main**, **left**, **right**}

sh[**ow**] **c**[**onfiguration**] [**-s**]

sh[**ow**] **dev**[**ice**] [<dev_name>]

sh[**ow**] **ee**[**prom**] <option>

sh[**ow**] {<envar**>, ***}

sh[**ow**] **m**[**emory**]

sh[**ow**] **ne**[**twork**]

sh[**ow**] **p**[**ower**] [{**-h**, **-s**}] [{**main**, **right**, **left**}]

s[**tart**] <address>

sto[**p**] <cpu_device_name>

t[**est**] [**-write**] [**-nowrite** <list>] [**-omit** <list>] [**-t** <time>] [**-q**] [<dev_arg>]

upd[**ate**] -{**e**[**eprom**], **f**[**lash**]} <device_name>

Table 3-17 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, ⇑	Recall previous command
Ctrl/C	Terminate running process
Ctrl/D, ⇐	Move cursor left one position
Ctrl/E	Move cursor to end of line
Ctrl/F, ⇒	Move cursor right one position
Ctrl/H, BS, F12	Move cursor to beginning of line
Ctrl/J	Delete word
Ctrl/O	Stop 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	Resume output to console terminal
Ctrl/R	Redisplay the current line
Ctrl/S	Stop output to console terminal
Ctrl/U	Delete entire line
*	Wildcarding for some commands
" "	Quotes for **set** environment variable name
#	Comment specifier

For more information:

Console Reference Manual
Advanced Troubleshooting

3.5 Command Examples

3.5.1 Boot

Example 3-1 Booting OpenVMS AXP from a CD-ROM

```
>>> show device

polling for units on kzmsa0, slot 1, xmi0...
dka100.1.0.1.0      dka100          RRD42
polling for units on kdm700, slot 6, xmi0...
dub1.1.0.6.0      DUB1       RA82
dub2.2.0.6.0      DUB2       RA90

>>> boot -flags 0,0 dka100.1.0.1.0

Booting...
Connecting to boot device dka100
initializing HWRPB at 2000
initializing page table at 1ee000
initializing machine state
jumping to bootstrap at 1fa000

OpenVMS AXP (TM) Operating System, Version V1.0
```

Example 3-2 Booting DEC OSF/1 AXP from a CD-ROM

```
>>> show device

polling for units on kzmsa0, slot 2, xmi0...
dka100.1.0.2.0      dka100          RRD42
polling for units on kdm700, slot 6, xmi0...
dub1.1.0.6.0      DUB1       RA82
dub2.2.0.6.0      DUB2       RA90

>>> boot dka100.1.0.2.0

Booting...
Connecting to boot device dka100.1.0.2.0
Created boot device: dka100.1.0.2.0
block 0 of dka100.1.0.2.0 is a valid boot block
reading 16 blocks from dka100.1.0.2.0
bootstrap code read in
base = 1fe000, start = 0
```

Example 3-2 Booting DEC OSF/1 AXP from a CD-ROM (Continued)

```
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
jumping to bootstrap at 1fe000

Resetting IO subsystem...

[I/O subsystem reset information, memory information displayed, I/O
bus adapters displayed, configured devices displayed, network
configuration information displayed]

The system is ready.

DEC OSF/1 Version 1.2 console
```

Example 3-3 Booting OpenVMS AXP from a Cluster

```
>>> show device

polling for units on cixcd0, slot 2, xmi0...
dua20.14.0.2.0     $100$DUA20    RA82
dua31.14.0.2.0     $100$DUA31    RA82
dua80.15.0.2.0     $100$DUA80    RA90

>>> boot -fl 4,0 dua20.14.0.2.0

Booting...
Connecting to boot device dua20
initializing HWRPB at 2000
initializing page table at 1ee000
initializing machine state
jumping to bootstrap at 1fa000

OpenVMS AXP (TM) Operating System, Version V1.0
```

For more information:

Boot command — *Operations Manual*
All other commands — *Console Reference*

Example 3-4 Booting DEC OSF/1 AXP from a CI Device

```
>>> show device

polling for units on cixcd0, slot 2, xmi0...
dua20.14.0.2.0     $100$DUA20    RA82
dua31.14.0.2.0     $100$DUA31    RA82
dua80.15.0.2.0     $100$DUA80    RA90

>>> boot dua31.14.0.2.0

Booting...
Connecting to boot device dua31.14.0.2.0
Connecting to boot device dua31.14.0.2.0
Created boot device: dua31.14.0.2.0
block 0 of dua31.14.0.2.0 is a valid boot block
reading 16 blocks from dua31.14.0.2.0
bootstrap code read in
base = 1fe000, start = 0
initializing HWRPB at 2000
initializing page table at 1f2000
initializing machine state
jumping to bootstrap at 1fe000

Resetting IO subsystem...

[I/O subsystem reset information, memory information displayed, I/O
bus adapters displayed, configured devices displayed, network
configuration information displayed]

The system is ready.

DEC OSF/1 Version 1.2 console
```

Example 3-5 Booting LFU from an InfoServer

```
>>> boot exa0 -file APB_015 -flag 0,80
Booting...
Connecting to boot device exa0
Requesting MOP Assistance Volunteer.....
MOP Assistance Volunteer found.
Loading...
.............................
Load complete!
Image size: 2144256
Host name: GALL
Host address: aa-00-04-00-0c-74
bootstrap code read in
base = 127e00, start = 0
boot device name = exa0.0.0.14.2
boot flags  0,0,0
boot device type = 69
controller ID = a
unit number = 0
node ID = 0
channel = 0
slot = 14
hose = 2
jumping to bootstrap at 127e00
Bootfile: [DEC7000]AXP7000_Vnn.APB
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 3-5 Booting LFU from an InfoServer (Continued)

```
#2
6000_DIAG_H
INFO3
08-00-2B-16-04-D4
#3
UPDATE
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 2.01                 16-jun-1992
```

Example 3-6 Booting LFU from an RRD42

```
>>>show device
polling for units on kzmsa, slot 1, xmi0...
dka100.1.0.1.0      dka100          RRD42
>>>boot dka100.1.0.1.0 -flag 0,80
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
                   .  .  .  .  .  D  .  .  B  BPD
                   o  +  .  .  .  +  .  .  +  ST2
                   .  .  .  .  .  D  .  .  B  BPD
                   +  +  .  .  .  +  .  .  +  ST3
                   .  .  .  .  .  D  .  .  B  BPD
   +  +  +  .  .  .  +  .  .  .  .  +  +  +     C0 XMI +
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C1
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C2
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C3
                   . A0  .  .  .  .  .  .  .  ILV
                   . 128 .  .  .  .  .  .  .  128MB
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
>>>
Booting...
Connecting to boot device dka100.1.0.1.0
block 0 of dka100 is a valid boot block
reading 7561 blocks from dka100.1.0.1.0
bootstrap code read in
base = lfe000, start = 0
initializing HWRPB at 2000
initializing page table at lf2000
initializing machine state
jumping to bootstarp at lfe000
Bootfile: [DEC7000]AXP7000_V04.APB

               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
```

3.5.2 Cdp

Example 3-7 Cdp Command

```
>>> show device

polling for units on kfmsb0, slot 0, xmi0...
dua5.0.0.13.0    BASHFL$DIA5       RF71
polling for units on cixcd0, slot 14, xmi1...
dub44.1.0.13.0   $1$DIA44 (BLANK4) RF71

>>> cdp -i                      # Interactive mode
dua5.0.0.13.0:
Node Name [BASHFL]?             # Press Return to go to next
Allocation Class [0]?           # field without making a
Unit Number [5]?                # change.
dub44.1.0.13.0:
Node Name [BLANK4]?
Allocation Class [1]?
Unit Number [44]?               # Press Return to exit.

>>> cdp -n dua5                 # Set device node name of dua5.
dua5.0.0.13.0:
Node Name [BASHFL]?             # Exit, no changes made.

>>> cdp -a                      # Set device allocation class.
dua5.0.0.13.0:
Allocation Class [0]?
dub44.1.0.13.0:
Allocation Class [1]?           # Exit, no changes made.
```

3.5.3 Examine

Example 3-8 Examine KN7AA Registers

```
P00>>> show config

        Name     Type    Rev   Mnemonic
  LSB
  0+    KN7AA    (8001)  0000  kn7aa0
  3+    KN7AA    (8001)  0000  kn7aa1
  7+    MS7AA    (4000)  0000  ms7aa0
  8+    IOP      (2000)  0003  iop0

  C0 XMI                       xmi0
  1+    DEMNA    (0C03)  0802  demna0
  8+    DWLMA    (102A)  0003  dwlma0
  B+    KZMSA    (0C36)  013F  kzmsa0
  D+    KDM70    (0C22)  2911  kdm700

P00>>> examine kn7aa0:80           # Examine Configuration Register of
kn7aa0: 00000080 00000001          # KN7AA0 (Offset = 80; see Table
                                   # 1-1)
P00>>> examine pmem:3f8000080      # Same as above; examine physical
pmem: 00000003F8000080 00000001    # memory address (See Tables 1-1
                                   # and 2-1)

P00>>> examine kn7aa1:fc0          # Examine Last Miss Address
kn7aa1: 00000FC0 000084FD          # Register of KN7AA1 (Offset = FC0;
                                   # see Table 1-2)
P00>>> examine pmem:3f8c00fc0      # Same as above; examine physical
pmem: 00000003F8C00FC0 000084FD    # memory address (See Tables 1-2
                                   # and 2-1)
```

Example 3-9 Examine AXP Internal Processor Registers

```
>>> examine ipl                    # Examine IPL (see Table 1-4)
ipr: 00000006 (   IPL) 000000000000001F
```

Example 3-10 Examine Console Registers

```
>>> examine pmem:3f7000000         # Examine Gbus$LEDs register
pmem: 00000003F7000000 00000020    # (Offset = 0; see Table 1-5)
```

Example 3-11 Examine MS7AA Registers

```
>>> show config

        Name     Type    Rev   Mnemonic
  LSB
  0+    KN7AA    (8001)  4000  kn7aa0
  7+    MS7AA    (4000)  0000  ms7aa0
  8+    IOP      (2000)  0006  iop0

  C0 XMI                       xmi0
  5+    DEMFA    (0823)  2513  demfa0
  8+    DWLMA    (102A)  0104  dwlma0
  C+    KDM70    (0C22)  2911  kdm700
  E+    DEMNA    (0C03)  0802  demna0

  C1 FBUS                      fbus0
  5+    DWLAA    (2003)  0000  dwlaa0
  6+    DEFAA    (2006)  0000  defaa0

>>> examine ms7aa0:21c0           # Examine Memory Diagnostic
ms7aa0: 000021C0 10000000        # Register A (Offset = 21C0; see
                                 # Table 1-6)
>>> examine pmem:3f98021c0       # Same as above; examine physical
pmem: 00000003F98021C0 10000000  # memory address (See Tables 1-6
                                 # and 2-1)
```

Example 3-12 Examine IOP Registers

```
>>> show config

        Name     Type    Rev   Mnemonic
  LSB
  0+    KN7AA    (8001)  4000  kn7aa0
  7+    MS7AA    (4000)  0000  ms7aa0
  8+    IOP      (2000)  0006  iop0

  C0 XMI                       xmi0
  5+    DEMFA    (0823)  2513  demfa0
  8+    DWLMA    (102A)  0104  dwlma0
  C+    KDM70    (0C22)  2911  kdm700
  E+    DEMNA    (0C03)  0802  demna0

  C1 FBUS                      fbus0
  5+    DWLAA    (2003)  0000  dwlaa0
  6+    DEFAA    (2006)  0000  defaa0

>>> examine iop0:0                # Examine I/O Port Chip Hose Status
iop0: 00000000 00062000           # Register (Offset = 0; see Table
                                  # 1-7)
>>> examine -l pmem:3fa000000     # Same as above; examine physical
pmem: 00000003FA000000 00062000   # memory address (See Tables 1-7
                                  # and 2-1)
```

Example 3-13 Examine DWLMA Registers

```
>>> show config

        Name     Type    Rev   Mnemonic
  LSB
  0+    KN7AA    (8001)  4000  kn7aa0
  7+    MS7AA    (4000)  0000  ms7aa0
  8+    IOP      (2000)  0006  iop0

  C0 XMI                       xmi0
  5+    DEMFA    (0823)  2513  demfa0
  8+    DWLMA    (102A)  0104  dwlma0
  C+    KDM70    (0C22)  2911  kdm700
  E+    DEMNA    (0C03)  0802  demna0

  C1 FBUS                      fbus0
  5+    DWLAA    (2003)  0000  dwlaa0
  6+    DEFAA    (2006)  0000  defaa0

>>> examine dwlma0:0              # Examine DWLMA Device Register
dwlma0: 00000000 0104102A         # (Offset = 0; see Table 1-8)
>>> examine xmi0:61c00000         # Same as above; examine address on
xmi0: 61C00000 0104102A           # XMI (See Tables 1-8 and 2-3)

>>> examine -n 4 dwlma0:0         # Examine all XMI required
dwlma0: 00000000 0104102A         # registers in Table 1-8
dwlma0: 00000004 00000202
dwlma0: 00000008 61902470
dwlma0: 0000000C 7000000F
dwlma0: 00000010 00000003
```

Example 3-14 Examine DWLAA Registers

```
>>> show config

        Name     Type    Rev   Mnemonic
  LSB
  0+    KN7AA    (8001)  4000  kn7aa0
  7+    MS7AA    (4000)  0000  ms7aa0
  8+    IOP      (2000)  0006  iop0

  C0 XMI                       xmi0
  5+    DEMFA    (0823)  2513  demfa0
  8+    DWLMA    (102A)  0104  dwlma0
  C+    KDM70    (0C22)  2911  kdm700
  E+    DEMNA    (0C03)  0802  demna0

  C1 FBUS                      fbus0
  5+    DWLAA    (2003)  0000  dwlaa0
  6+    DEFAA    (2006)  0000  defaa0

>>> examine dwlaa0:04             # Examine DWLAA Node Identification
dwlaa0: 00000004 0000FFCA         # Register (Offset = 04; see
                                  # Table 1-9)
>>> examine fbus0:fffca004        # Same as above; examine address on
fbus0: FFFCA004 0000FFCA          # FBUS (See Tables 1-9 and 2-7)

>>> examine -n d dwlaa0:0         # Examine all registers in
                                  # Table 1-9
dwlaa0: 00000000 00000000
dwlaa0: 00000004 0000FFCA
dwlaa0: 00000008 04000000
dwlaa0: 0000000C E4020000
dwlaa0: 00000010 00000000
dwlaa0: 00000014 00000000
dwlaa0: 00000018 00000000
dwlaa0: 0000001C 00080000
dwlaa0: 00000020 00800040
dwlaa0: 00000024 000F000E
dwlaa0: 00000028 EE010000
dwlaa0: 0000002C 00000001
dwlaa0: 00000030 00000000
dwlaa0: 00000034 00000007
```

3.5.4 Mchk

Example 3-15 Mchk Command

```
>>> mchk

pal                    V5.37-2/O1.28-2
pal_flags              0450010860000005
PTBR ipr: 0000000A (  PTBR) 0000000000000000
SCBB ipr: 0000000B (  SCBB) 0000000000000000
PCBB ipr: 00000008 (  PCBB) 0000000000001000
exc_addr pmem: 00006130 000000000003D258
iccsr pmem: 00006148 00000000009F0000
hirr pmem: 00006160 0000000000000342
mm_csr pmem: 00006168 0000000000005080
dc_stat pmem: 00006170 00000000000002E8
dc_addr pmem: 00006178 00000007FFFFFFFF
biu_stat pmem: 00006188 0000000000001850
biu_addr pmem: 00006190 0000000000006120
biu_ctl pmem: 00006198 0000000850006447
fill_syndrome pmem: 000061A0 0000000000000000
fill_addr pmem: 000061A8 000000000000DD10
va pmem: 000061B0 0000000000006190
lep_gbus pmem: 000061C0 0020000000000030
lber pmem: 000061CC 00000021
lmerr pmem: 000061D4 00000000
lbesr0 pmem: 000061D8 0000000C
lbesr1 pmem: 000061DC 0000000C
lbesr2 pmem: 000061E0 0000000C
lbesr3 pmem: 000061E4 0000000C
lbecr0 pmem: 000061E8 0000E064
lbecr1 pmem: 000061EC 00004000
vhit pmem: F8000F80 00000000
tag pmem: 00006008 00E005550000000F
dwlma0 XBE xmi0: 60000004 0000000100000202
dwlma0 LERR xmi0: 6000004C 0000000100000000

>>>
```

3.5.5 Show Configuration

Example 3-16 Show Configuration Command

```
>>> show config

      Name     Type      Rev       Mnemonic
LSB
0+    KN7AA    (8001)    0000      kn7aa0
6+    MS7AA    (4000)    0000      ms7aa0
7+    MS7AA    (4000)    0000      ms7aa1
8+    IOP      (2000)    0006      iop0

C0 XMI                             xmi0
1+    DEMNA    (0C03)    0802      demna0
4+    KDM70    (0C22)    1E11      kdm700
8+    DWLMA    (102A)    0104      dwlma0

C1 XMI                             xmi1
6+    DEMNA    (0C03)    0802      demna1
8+    DWLMA    (102A)    0104      dwlma1
D+    KDM70    (0C22)    1E11      kdm701
E+    KZMSA    (0C36)    413F      kzmsa0
```

3.5.6 Show Device

Example 3-17 Show Device Command

```
>>> show device

polling for units on kzmsa0, slot 1, xmi0...
dka100.1.0.1.0      dka100          RRD42
polling for units on kdm700, slot 6, xmi0...
dub1.1.0.6.0      DUB1       RA82
dub2.2.0.6.0      DUB2       RA90

>>>
```

3.5.7 Show Network

Example 3-18 Show Network Command

```
>>> show network

polling for units on demna0, slot 14, xmi0...
exa0.0.0.14.0: 08-00-2B-24-3F-E1
polling for units on demfa0, slot 1, xmi1...
fxa0.0.0.1.1: 08-00-2B-29-E0-FF

>>>
```

3.5.8 Show Power

Example 3-19 Show Power Command

```
P00>>> show power
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      111.49      104.34
               DC Bulk Voltage (VDC) :      227.02      227.02      227.02
            48V DC Bus Voltage (VDC) :       48.69       48.75       48.75
            48V DC Bus Current (ADC) :       30.17       29.68       29.58
      48V Battery Pack Voltage (VDC) :       50.85       50.72       47.91
      24V Battery Pack Voltage (VDC) :       25.56       25.56       23.95
   Battery Pack Charge Current (IDC) :        2.91        2.90        2.91
      Ambient Temperature (Degree C) :       26.22       24.80       24.75
                Elapsed Time (Hours) :      290.00      290.00      290.00
Remaining Battery Capacity (Minutes) :        8.00        8.00        8.00
     Battery Cutoff Counter (Cycles) :        1.00        1.00        1.00
                Battery Configuration :  4 Batteries  4 Batteries  4 Batteries
                      Heatsink Status :      NORMAL      NORMAL      NORMAL
                  Battery Pack Status :      CHARGING    CHARGING    CHARGING
                 Last UPS Test Status :      PASSED      PASSED      PASSED
LDC POWER Status     : OK
PIU Primary Status   : OK
PIU Secondary Status : OK
```

The cabinet in Example 3-19 has three power regulators. If the cabinet has fewer than three regulators, the appropriate column (A, B, or C) is left blank. The bottom three lines of the output, showing PIU power status, apply only to the main cabinet.

Table 3-18 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.

Table 3-18 Abbreviations Used in Show Power Command Output

Abbreviation	Meaning
Power Supply State	
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	
Heatsink Status	
BROKEN	Broken
FAULT	Fault (red zone)
WARNING	Warning
NORMAL	Normal operation
Battery Pack Status	
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 3-18 Abbreviations Used in Show Power Command Output (Continued)

Abbreviation	Meaning
Last UPS Test Status	
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

Self-Test and Diagnostics

Self-test is run when the system is powered up or reset. Diagnostics are run using console commands. This chapter contains a list of tests in each self-test and examples of diagnostic sessions. Sections include:

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

For more information:

Advanced Troubleshooting
Console Reference Manual

4.1 Self-Test

Table 4-1 SROM Tests

Test Number	Test Name
1	D-cache data RAM march test
2	Backup cache data line test
3	Backup cache data RAM march/address bus test
4	ECC data line test
5	ECC data RAM march test
6	Gbus accessibility test
7	B-tag data line test
8	B-cache tag store RAM march test
9	B-cache stat store RAM march test
10	B-map data line test
11	B-map RAM march test
12	D-map RAM march test
13	Watch chip interval timer test
14	TRANS code w/LEP Gbus ROM checksum test

Table 4-2 GROM Tests

Test Number	Test Name
15	Device register test
16	LSB bus error register test
17	CPU module error register test
18	Gbus/LEVI-A CSR read/write test
19	EV4 write buffer test
20	ECC logic test
21	Backup cache data line test

Table 4-2 GROM Tests (Continued)

Test Number	Test Name
22	Backup tag store RAM march test
23	B-stat RAM march test
24	B-map RAM march test
25	Backup cache data RAM march test
26	ECC data RAM march test
27	Backup cache to LEVI data path test
28	Backup cache to LEVI data line test
29	ECC logic shared test
30	LDxL/STxC test
31	Watch chip TOY registers test
32	LEP EEPROM test
33	DUART0 and DUART1 internal loopback interrupt and baud rate test
34	DUART2A ^P detect internal/external loopback interrupt and baud rate test
35	EV4 single-bit ECC error test
36	EV4 double-bit ECC error test
37	Backup tag store parity error test
38	Backup stat store parity error test
39	B-map parity error test
40	D-map parity error test
41	Invalidate logic test
42	LSB parity error during CSR data cycles test
43	LSB parity error during CSR C/A cycles test
44	Interrupts at IPL 14–17 test
45	Interprocessor interrupt test
46	Nonexistent address error test
47	Device register test

Table 4-2 GROM Tests (Continued)

Test Number	Test Name
48	Backup cache to LEVI data path test
49	Backup cache to LEVI data line test
50	ECC logic shared test

Table 4-3 CPU/Memory Tests

Test Number	Test Name
1	CPU/memory LDEV test
2	Single-bit ECC error test
3	Double-bit ECC error test
4	B-cache read fill test
5	CSR command parity error test
6	Column parity error test
7	Row parity error test
8	DRAM ECC error test
9	Address line walk test
10	Shared write through cache test

Table 4-4 Multiprocessor Tests

Test Number	Test Name
1	IP interrupts test
2	Shared updates test
3	LSB and victim writes test
4	LSB writes test
5	LSB writes 2 test
6	Invalidate test
7	Multiple concurrent Add Aligned Word Interlocked instructions test

Table 4-5 IOP Tests

Test Number	Test Name
1	Register write/read test
2	Unique register addressing test
3	Nonexistent LSB addressing test
4*	Node reset test
5	Forced CAE error test
6	Forced CNFE error test
7	Forced LSB CSR data parity error test
8	Loopback mailbox test
9*	Nonexistent mailbox address error test
10	Forced LSB command parity error test
11	IOP LSB arbitration test
12	Force Up Vortex parity errors test
13	Force Up Vortex sequence errors test
14*	Force Down Vortex parity errors test
15*	Force Down Vortex sequence errors test

* These tests are run only in user mode.

Table 4-5 IOP Tests (Continued)

Test Number	Test Name
16*	Force Down Vortex illegal command error test
17	Hose parity error test
18	Hose sequence error test
19	Hose illegal command error test
20*	Hose overflow error test
21	IOP internal interrupt test
22	Remote adapter GPR write read test
23*	LSB correctable ECC errors test
24*	EEPROM read 16 bytes test

* These tests are run only in user mode.

Table 4-6 DWLMA Tests

Test Number	Test Name
1	Force Down Hose parity test
2	Force Up Hose parity test
3	DWLMA register read/write test
4	Unique register addressing test
5*	Nonexistent internal addressing test
6	Mailbox illegal command test
7*	DWLMA reset test
8	Arb suppress mode test
9	XMI bus GPR write/read test
10	DWLMA XMI node space register read/write test
11	Node space unique register addressing test
12*	XMI node space nonexistent addressing test

* These tests are run only in user mode.

Table 4-6 DWLMA Tests (Continued)

Test Number	Test Name
13	Disable XMI timeout disable retries on NO ACK test
14	Nonsupported register offset test
15	XFADR and XFAER register test
16	Forced XMI read response test
17*	Force XMI parity error test
18*	DMA read data test
19*	DMA read length test
20*	DMA read tag<7:6> test
21*	More read stream termination test
22*	More read stream discard command queue test
23*	More read stream DHW pre-fetch test
24*	QW-length More stream read test
25*	Contiguous OW DMA read buffer addressing test
26	Contiguous HW DMA read buffer addressing test
27*	Random DMA read buffer addressing test
28	Arb suppress mode test
29*	Quadword-length More bypass test
30*	Masked DMA write test
31*	Unmasked DMA write test
32*	Flushing the More write tag sequential test
33*	Flushing the More write tag nonsequential test
34*	More write stream discard command queue test
35*	Unaligned HW More stream write test
36*	Unaligned OW More stream write test
37*	Contiguous DMA More write buffer addressing test
38	Contiguous non-More DMA write buffer addressing test

* These tests are run only in user mode.

Table 4-6 DWLMA Tests (Continued)

Test Number	Test Name
39	Random DMA write buffer addressing test
40	Quadword-length More bypass test
41*	Multiple DWLMA interrupt test
42*	DWLMA EEPROM read 16 bytes test

* These tests are run only in user mode.

Table 4-7 DWLAA Tests

Test Number	Test Name
1	Register initialize test
2	Register read/write test
3	Unique register addressing test
4*	Serial EEPROM test
5	Illegal CSR access test
6	Illegal MBOX command test
7	Down Hose header cycle parity error test
8	Down Hose data cycle parity error test
9	AD[63:0] transceiver loopback test
10	BP[7:0] transceiver loopback test
11	CM[7:0] transceiver loopback test
12*	Nonexistent address error test
13*	Futurebus transaction timeout test

* These tests are run only in user mode.

4.2 Test Command

Example 4-1 Test System

```
P00>>> test -t 120
Configuring system...
polling for units on kzmsa0, slot 1, xmi0...
dka1.1.0.1.2       DKA300                    RRD42
dka3.3.0.1.2       DKA300                    RZ73
polling for units on kzmsa1, slot 9, xmi0...
polling for units on kdm700, slot 10, xmi0...
due0.0.0.10.2      DUE0                      RA70
due1.0.0.10.2      DUE1                      RA70
due2.0.0.10.2      DUE2                      RA70
due3.0.0.10.2      DUE3                      RA70
polling for units on demna0, slot 12, xmi0...
exa0.0.0.12.2: 08-00-2B-25-D6-4C
Default system exerciser selected for runtime of 120 seconds
Type Ctrl/C to abort...
Starting memory exerciser, running on kn7aa* (id #9c)
Starting memory exerciser, running on kn7aa* (id #c6)
Starting memory exerciser, running on kn7aa* (id #f3)
Starting memory exerciser, running on kn7aa* (id #122)
Starting memory exerciser, running on kn7aa* (id #151)
Starting memory exerciser, running on kn7aa* (id #1d0)
Starting device exerciser on dka1.1.0.1.2 (id #236) in READ-ONLY mode
Stopping device exerciser on dka1.1.0.1.2 (id #236)
Starting device exerciser on dka3.3.0.1.2 (id #28e) in READ-ONLY mode
Stopping device exerciser on dka3.3.0.1.2 (id #28e)
Starting device exerciser on due0.0.0.10.2 (id #2e6) in READ-ONLY mode
Stopping device exerciser on due0.0.0.10.2 (id #2e6)
Starting device exerciser on due1.0.0.10.2 (id #33e) in READ-ONLY mode
Stopping device exerciser on due1.0.0.10.2 (id #33e)
Stopping memory exerciser, running on kn7aa* (id #f3)
Stopping memory exerciser, running on kn7aa* (id #c6)
Stopping memory exerciser, running on kn7aa* (id #1d0)
Stopping memory exerciser, running on kn7aa* (id #122)
Stopping memory exerciser, running on kn7aa* (id #151)
Stopping memory exerciser, running on kn7aa* (id #9c)
Done testing...
P00>>>
```

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

```
P00>>> test -nowrite "dka*" -write -t 120
Configuring system...
polling for units on kzmsa0, slot 1, xmi0...
dka1.1.0.1.2       DKA300                    RRD42
dka3.3.0.1.2       DKA300                    RZ73
polling for units on kzmsa1, slot 9, xmi0...
polling for units on kdm700, slot 10, xmi0...
due0.0.0.10.2      DUE0                      RA70
due1.0.0.10.2      DUE1                      RA70
due2.0.0.10.2      DUE2                      RA70
due3.0.0.10.2      DUE3                      RA70
polling for units on demna0, slot 12, xmi0...
exa0.0.0.12.2: 08-00-2B-25-D6-4C
Default system exerciser selected for runtime of 120 seconds
Type Ctrl/C to abort...

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

Testing...

Starting memory exerciser, running on kn7aa* (id #9c)
Starting memory exerciser, running on kn7aa* (id #c6)
Starting memory exerciser, running on kn7aa* (id #f3)
Starting memory exerciser, running on kn7aa* (id #122)
Starting memory exerciser, running on kn7aa* (id #151)
Starting memory exerciser, running on kn7aa* (id #1d0)
Starting device exerciser on due0.0.0.10.2 (id #2e6) in WRITE/READ mode
Stopping device exerciser on due0.0.0.10.2 (id #2e6)
Starting device exerciser on due1.0.0.10.2 (id #33e) in WRITE/READ mode
Stopping device exerciser on due1.0.0.10.2 (id #33e)
Starting device exerciser on due2.0.0.10.2 (id #379) in WRITE/READ mode
Stopping device exerciser on due2.0.0.10.2 (id #379)
Starting device exerciser on due3.0.0.10.2 (id #3b1) in WRITE/READ mode
Stopping device exerciser on due3.0.0.10.2 (id #3b1)
Stopping memory exerciser, running on kn7aa* (id #f3)
Stopping memory exerciser, running on kn7aa* (id #c6)
Stopping memory exerciser, running on kn7aa* (id #1d0)
Stopping memory exerciser, running on kn7aa* (id #122)
Stopping memory exerciser, running on kn7aa* (id #151)
Stopping memory exerciser, running on kn7aa* (id #9c)
Done testing...
P00>>>
```

Example 4-3 Destructive Exercising Selected, Then Aborted

```
P00>>> test -w -n "dka*"
Configuring system...
polling for units on kzmsa0, slot 1, xmi0...
dka1.1.0.1.2       DKA300                   RRD42
dka3.3.0.1.2       DKA300                   RZ73
polling for units on kzmsa1, slot 9, xmi0...
polling for units on kdm700, slot 10, xmi0...
due0.0.0.10.2      DUE0                     RA70
due1.0.0.10.2      DUE1                     RA70
due2.0.0.10.2      DUE2                     RA70
due3.0.0.10.2      DUE3                     RA70
polling for units on demna0, slot 12, xmi0...
exa0.0.0.12.2: 08-00-2B-25-D6-4C
Default system exerciser selected for runtime of 120 seconds
Type Ctrl/C to abort...

Are you sure you want to perform writes to the selected disks?
[yes/(no)] no

Testing aborted...

P00>>>
```

Example 4-4 Test Command — Quiet Qualifier Set

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

Done testing...
P00>>>
```

Example 4-5 Detection of Memory Data Compare Error

```
>>> set d_report full
>>> test ms7aa*
Memory subsystem test selected for runtime of 120 seconds
Type Ctrl/C to abort...
Starting memory exerciser, running on kn7aa0 (id #aa)
Still testing...
Still testing...


*** Hard Error - Error #23 on FRU: kn7aa0,ms7aa1
Data compare error

      ID  Program         Device     Pass Hard/Soft Test     Time
-------- -------- -------------- -------- --------- ---- --------
000000aa   mem_ex         memory      433    1    0    4 10:23:51

Expected value: FFFFFFE0
Received value: FFF7FFE0
Failing addr:   047C87C8

*** End of Error ***

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

Stopping memory exerciser on kn7aa0 (id #aa)
Done testing...
>>>
```

Example 4-6 Test Using Wildcard

```
>>> test dem*a*
Network exerciser selected for runtime of 120 seconds
Type Ctrl/C to abort...
Initializing demfa0
Initializing demna0
Initializing demna1
Self-test passed on device demfa0
Self-test passed on device demna0
Self-test passed on device demna1
Configuring demfa0
polling for units on demfa0, slot 5, xmi0...
fxa0.0.0.5.0: 08-00-2B-29-E0-FF
Configuring demna0
polling for units on demna0, slot 14, xmi0...
exa0.0.0.14.0: 08-00-2B-25-D7-C1
Configuring demna1
polling for units on demna1, slot 13, xmi1...
exb0.0.0.13.1: 08-00-2B-46-E8-84
Starting network exerciser on exa0.0.0.14.0 (id #144) in external
loopback mode
Starting network exerciser on exb0.0.0.13.1 (id #187) in external
loopback mode
Starting network exerciser on fxa0.0.0.5.0 (id #1b1) in external
loopback mode
Stopping network exerciser on exa0.0.0.14.0 (id #144)
Stopping network exerciser on exb0.0.0.13.1 (id #187)
Stopping network exerciser on fxa0.0.0.5.0 (id #1b1)
Done testing...
>>>
```

Example 4-7 Test All Devices Associated with XMI0

```
>>> test xmi0 -omit demna1
XMI subsystem test selected for runtime of 120 seconds
Type Ctrl/C to abort...
Starting DWLMA exerciser on dwlma0
Stopping DWLMA exerciser on dwlma0
Initializing demna0
Initializing demfa0
Initializing kdm700
Self-test passed on device demna0
Self-test passed on device demfa0
Self-test passed on device kdm700
Configuring demna0
exa0.0.0.14.0: 08-00-2B-25-D7-C1
Configuring demfa0
fxa0.0.0.5.0: 08-00-2B-29-E0-FF
Configuring kdm700
polling for units on kdm700, slot 12, xmi0...
due0.0.0.12.0      DUE0                      RA70
due1.0.0.12.0      DUE1                      RA70
due2.0.0.12.0      DUE2                      RA70
due3.0.0.12.0      DUE3                      RA70
Starting network exerciser on exa0.0.0.14.0 (id #181) in external
loopback mode
Starting network exerciser on fxa0.0.0.5.0 (id #192) in external
loopback mode
Starting device exerciser on due0.0.0.12.0 (id #2e6) in READ-ONLY mode
Starting device exerciser on due1.0.0.12.0 (id #33e) in READ-ONLY mode
Starting device exerciser on due2.0.0.12.0 (id #379) in READ-ONLY mode
Starting device exerciser on due3.0.0.12.0 (id #3b1) in READ-ONLY mode
Stopping device exerciser on due0.0.0.12.0 (id #2e6)
Stopping device exerciser on due1.0.0.12.0 (id #33e)
Stopping device exerciser on due2.0.0.12.0 (id #379)
Stopping device exerciser on due3.0.0.12.0 (id #3b1)
Stopping network exerciser on exa0.0.0.14.0 (id #181)
Stopping network exerciser on fxa0.0.0.5.0 (id #192)
Done testing...
>>>
```

4.3 Set Host Command — Running DUP-Based Diagnostics and Utilities

Example 4-8 Running KDM70 Inline Exerciser

```
>>> 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

>>> 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

 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.
```

Example 4-8 Running KDM70 Inline Exerciser (Continued)

```
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?
```

4.4 Set Host Command — Running Diagnostics on a Remote XMI Adapter

Example 4-9 Running DEMNA Self-Test (Failing Case)

```
>>> 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
>>>
```

Example 4-10 Running DEMNA Self-Test (Passing Case)

```
>>> 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
>>>
```

Chapter 5

FRU Locations

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

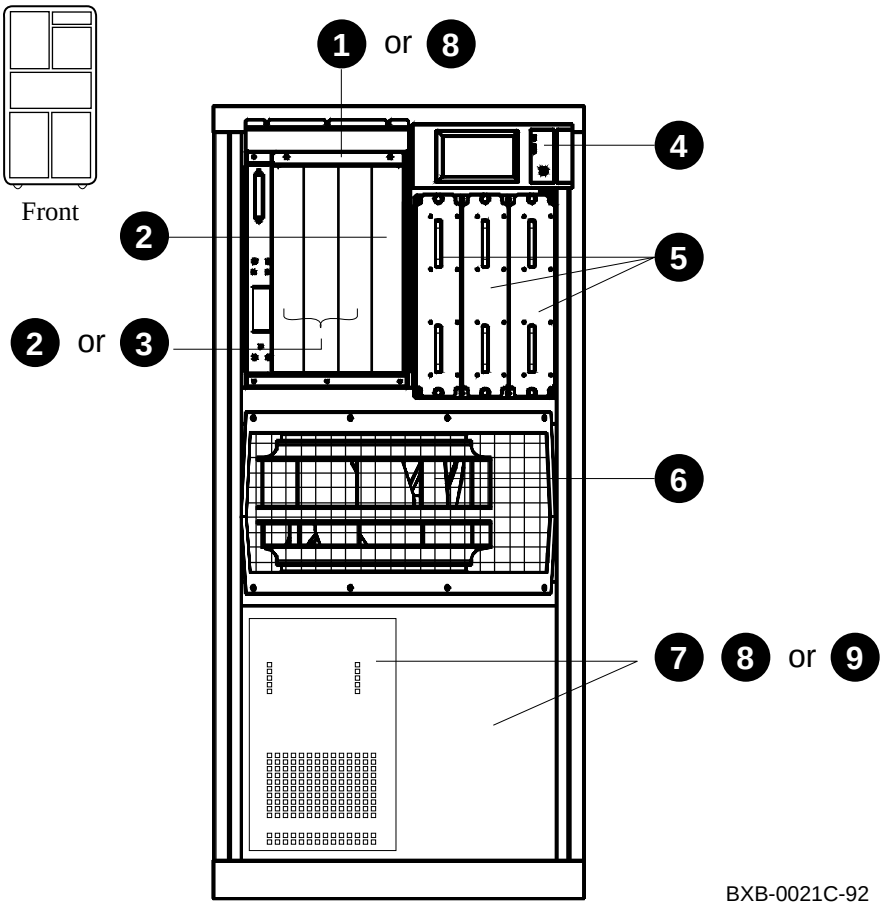
- FRUs Common to Every Platform
  - — FRUs Accessible from the Front of the Cabinet
  - — FRUs Accessible from the Rear of the Cabinet
- Platform Cables
- FRUs in the XMI Plug-In Unit
- FRUs in the VAXBI Plug-In Unit
- FRUs in the Futurebus+ Plug-In Unit
- FRUs in the SCSI Disk and Tape Plug-In Unit
- FRUs in the DSSI Disk Plug-In Unit
- FRUs in the Battery Plug-In Unit

For more information:

Platform Service Manual

5.1 FRUs Common to Every Platform

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



❶	70–28574–02	LSB centerplane and card cage[1, 2]
❷	E2040	CPU module[2]
❸	E2043–AA or	Memory module 64 Mbytes[2, 3]
	E2043–BA or	Memory module 128 Mbytes[2, 3]
	E2043–CA or	Memory module 256 Mbytes[2, 3]
	E2046–AA	Memory module 512 Mbytes[2, 3]
❹	54–20306–01	Control panel[2]
❺	30–33796–01 or 30–33796–02	Power regulator
❻	12–35173–01	Blower[1]
❼	DWLMA–xx[4] or	XMI plug-in unit[1] (see page 5-8)
	DWMBB–LA	VAXBI plug-in unit[1] (see page 5-10)
❽	BA655–AA or	SCSI disk plug-in unit[3, 5] (see page 5-14)
	BA654–AA	DSSI disk plug-in unit[3, 5] (see page 5-16)
❾	H7237–AA	Battery plug-in unit[1] (see page 5-18)

[1] Removal and replacement of this FRU requires access to both the front and the rear of the cabinet.

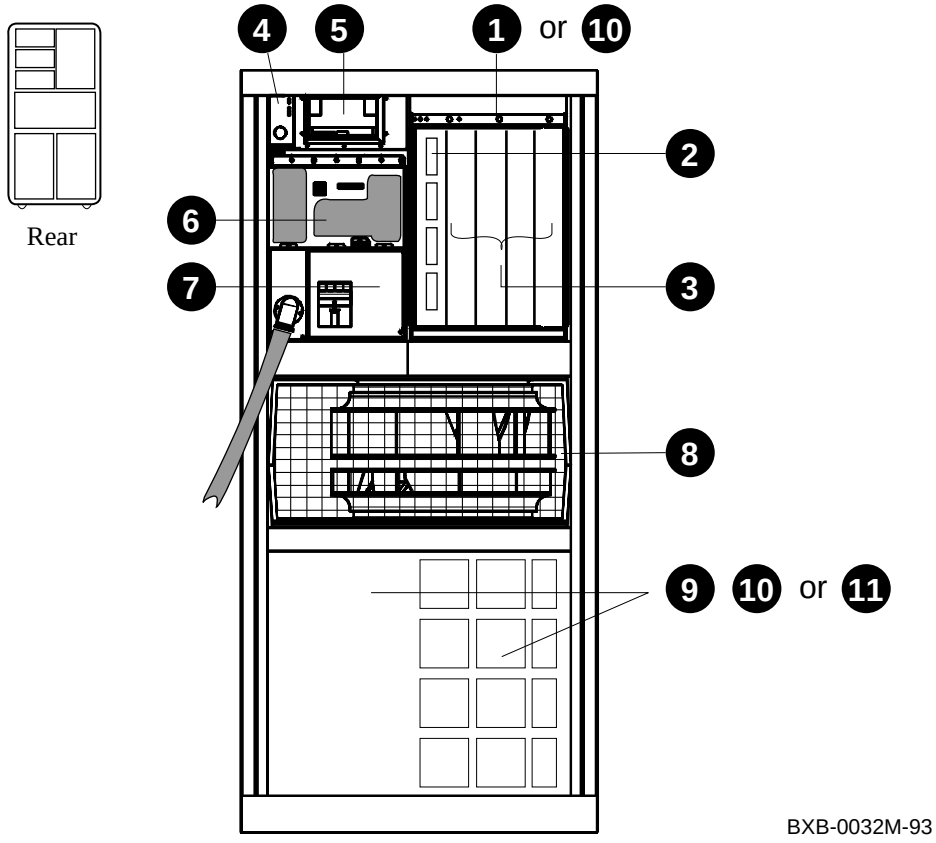
[2] This FRU is in the main cabinet only (cannot be located in the expander cabinet).

[3] This FRU can be located in either the front or the rear of the cabinet.

[4] Replace –xx with –AA if FRU is located in the main cabinet or with –BA if FRU is located in the expander cabinet.

[5] This FRU can be located in the bottom of the main cabinet or in the top or bottom of the expander cabinet.

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



❶	70–28574–02	LSB centerplane and card cage[1, 2]
❷	E2044–AA	IOP module[2]
❸	E2043–AA or	Memory module 64 Mbytes[2, 3]
	E2043–BA or	Memory module 128 Mbytes[2, 3]
	E2043–CA or	Memory module 256 Mbytes[2, 3]
	E2046–AA	Memory module 512 Mbytes[2, 3]
❹	E2040	CPU module[2]
❺	54–20300–01	Cabinet control logic module (CCL)
❻	RRD42	Removable media device [1]
❼	30–35143–01	DC distribution box[1]
❽	30–33798–01 or	AC input box
	30–33798–02 or	
	30–33798–03	
❾	12–35173–01	Blower[1]
❿	DWLMA–xx[4] or	XMI plug-in unit[1] (see page 5-8)
	DWMBB–LA or	VAXBI plug-in unit[1] (see page 5-10)
	DWLAA–xx[4]	Futurebus+ plug-in unit (see page 5-12)
⓫	BA655–AA or	SCSI disk plug-in unit[3, 5] (see page 5-14)
	BA654–AA	DSSI disk plug-in unit[3, 5] (see page 5-16)
	H7237–AA	Battery plug-in unit[1] (see page 5-18)

[1] Removal and replacement of this FRU requires access to both the front and the rear of the cabinet.

[2] This FRU is in the main cabinet only (cannot be located in the expander cabinet).

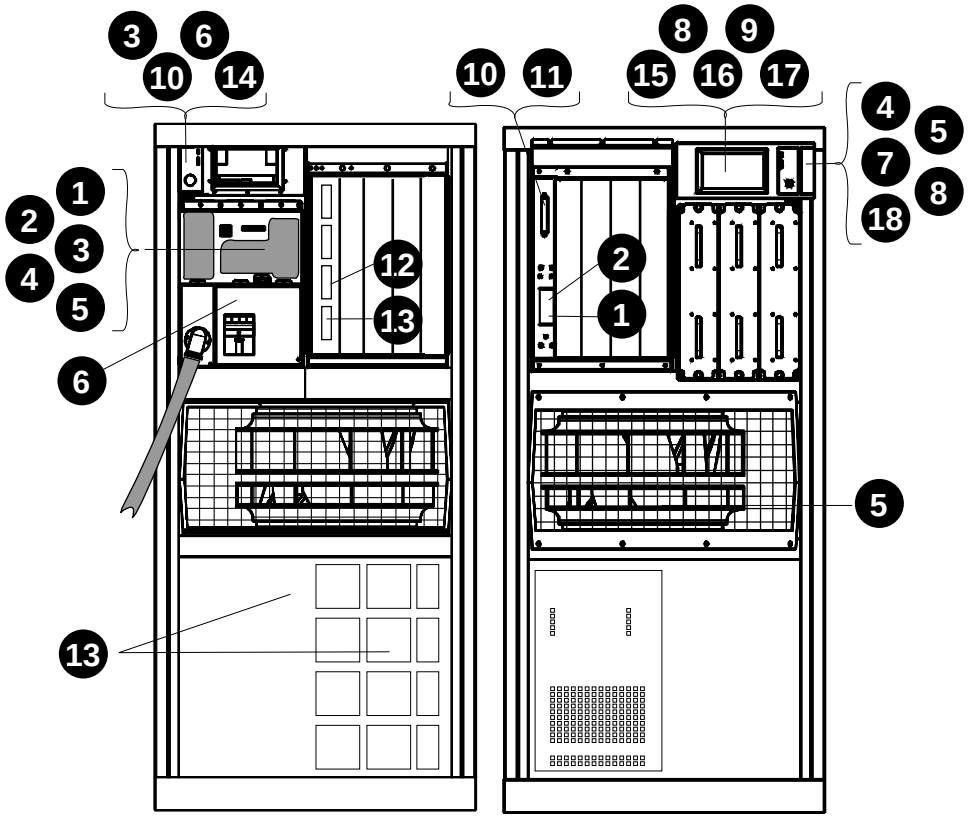
[3] This FRU can be located in either the front or the rear of the cabinet.

[4] Replace –xx with –AA if FRU is located in the main cabinet or with –BA if FRU is located in the expander cabinet.

[5] This FRU can be located in the bottom of the main cabinet or in the top or bottom of the expander cabinet.

5.2 Platform Cables

Figure 5-3 Platform Cabinet (Rear and Front) Showing Cables

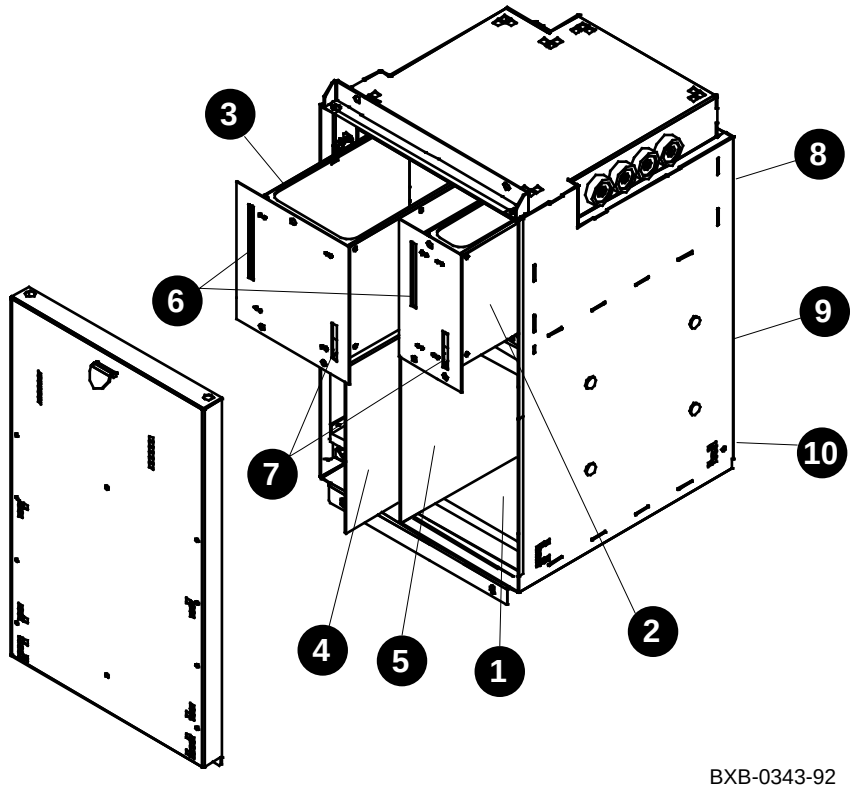


BXB-0021D-92

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	48V to LDC
❺	17–03126–01	48V power/sense to blower
❻	17–03124–01	AC box 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)
⓮	17–03201–01	DEC power bus
⓯	BC10U–09	SCSI cable to RRD42
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

5.3 FRUs in the XMI Plug-In Unit

Figure 5-4 XMI Plug-In Unit (Front) Showing FRU Locations



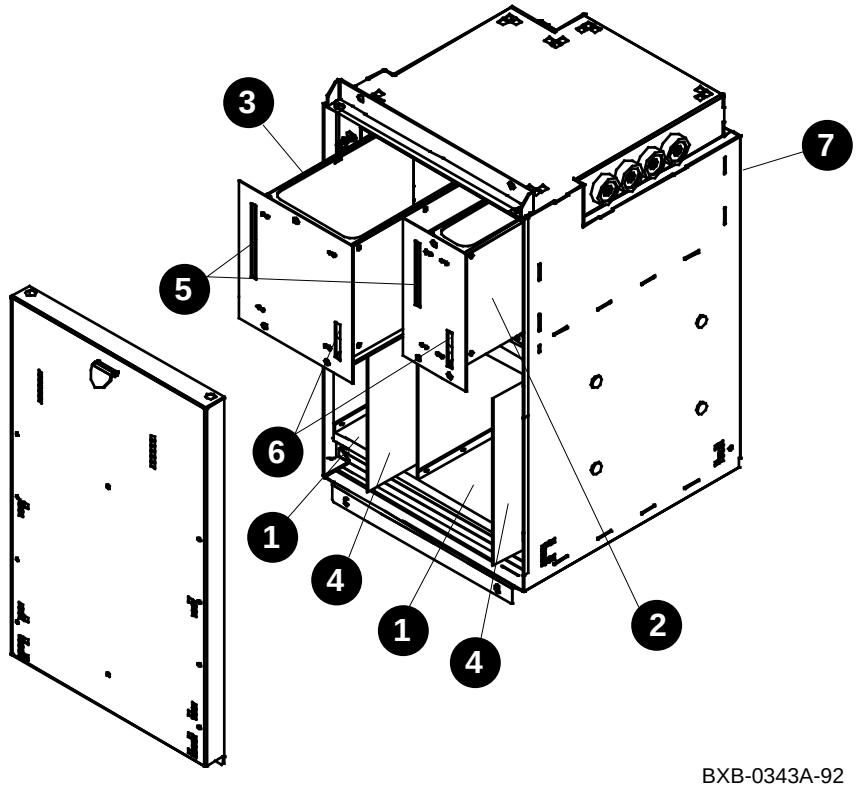
NOTE: Only the front half of the XMI PIU enclosure is shown.

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[1] XMI slot except 7 or 8:	
	T2020–00	DEMNA XMI to NI controller
	T2027–00	DEMFA XMI to FDDI controller
	T2080–YA	CIXCD XMI to CI controller
	T2029–AA	KZMSA XMI to SCSI controller
	T2029–AC	KFMSB XMI to DSSI controller
	If a DWMBB–LA is installed, this FRU must be in slot 1:	
	T2018	DWMBB/A XMI to VAXBI controller
	If a DWMBB–LB is installed, this FRU must be in slot 2:	
	T2018	DWMBB/A XMI to VAXBI controller
❻	17–03162–01	Signal cable
❼	17–03163–01	48V power cable
❽	17–03202–01	Power distribution cable (rear of PIU enclosure, front half)
❾	17–03416–01	+5VB jumper (rear of front half of PIU enclosure)
❿	17–03533–01	Bulkhead to XMI signal (rear of PIU enclosure, front half)

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

5.4 FRUs in the VAXBI Plug-In Unit

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

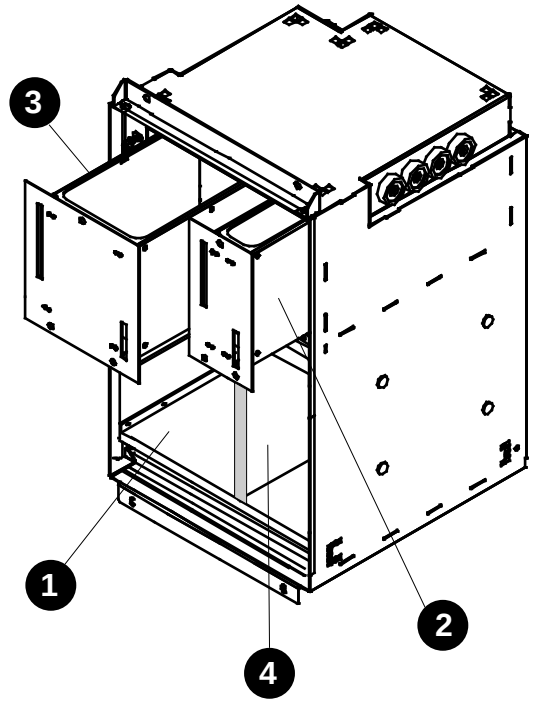


NOTE: Only the front half of the VAXBI PIU enclosure is shown

❶	70–24126–02	VAXBI backplane assembly
❷	30–36010–01	Module A (power regulator)
❸	30–36009–01	Module B (power regulator)
❹	T1043	DWMBB/B module (XMI to VAXBI), slot 7 (If the PIU has an optional second VAXBI [DWMBB-LB], the second T1043 is in slot 1.)
❺	17–03162–01	Signal cable
❻	17–03163–01	48V power cable
❼	17–03202–01	Power distribution cable (rear of front half of PIU enclosure)

5.5 FRUs in the Futurebus+ Plug-In Unit

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

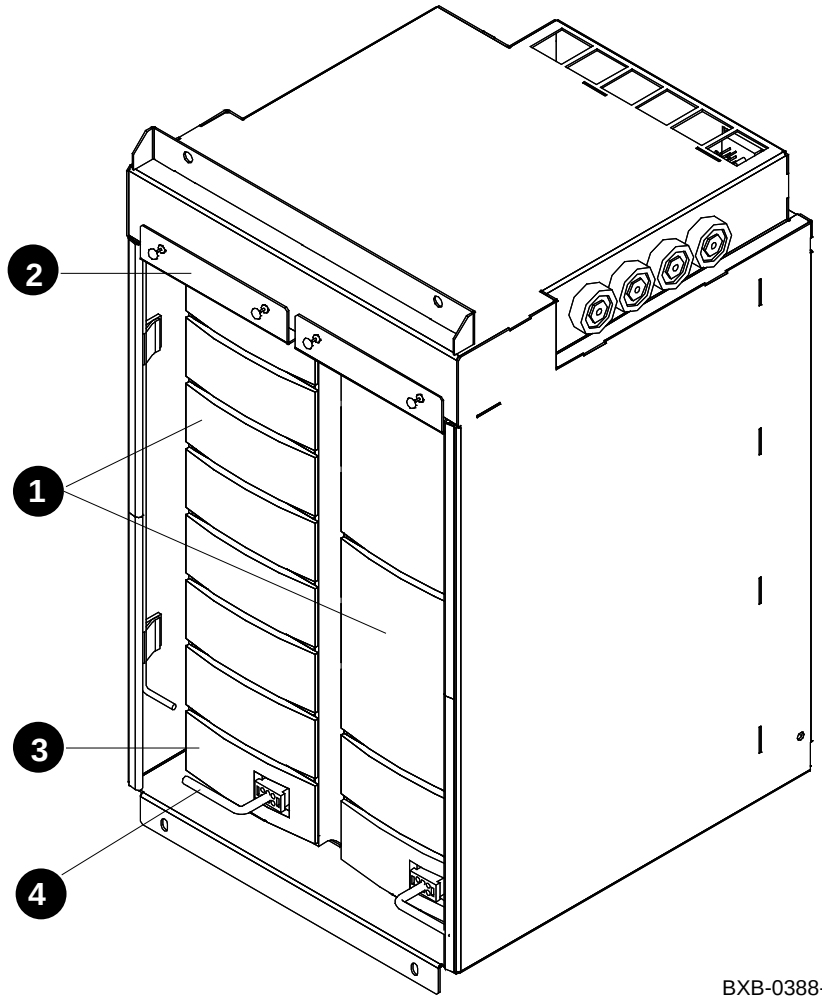


BXB-0343B-92

❶	54–21662–01	Futurebus+ backplane assembly
❷	30–36011–01	Module A2 (power regulator)
❸	30–36009–01	Module B (power regulator)
❹	B2003–AA	DWLAA module (LSB to Futurebus+ — slot 5)

5.6 FRUs in the SCSI Disk and Tape Plug-In Unit

Figure 5-7 SCSI Disk Plug-In Unit (Front) Showing FRU Locations



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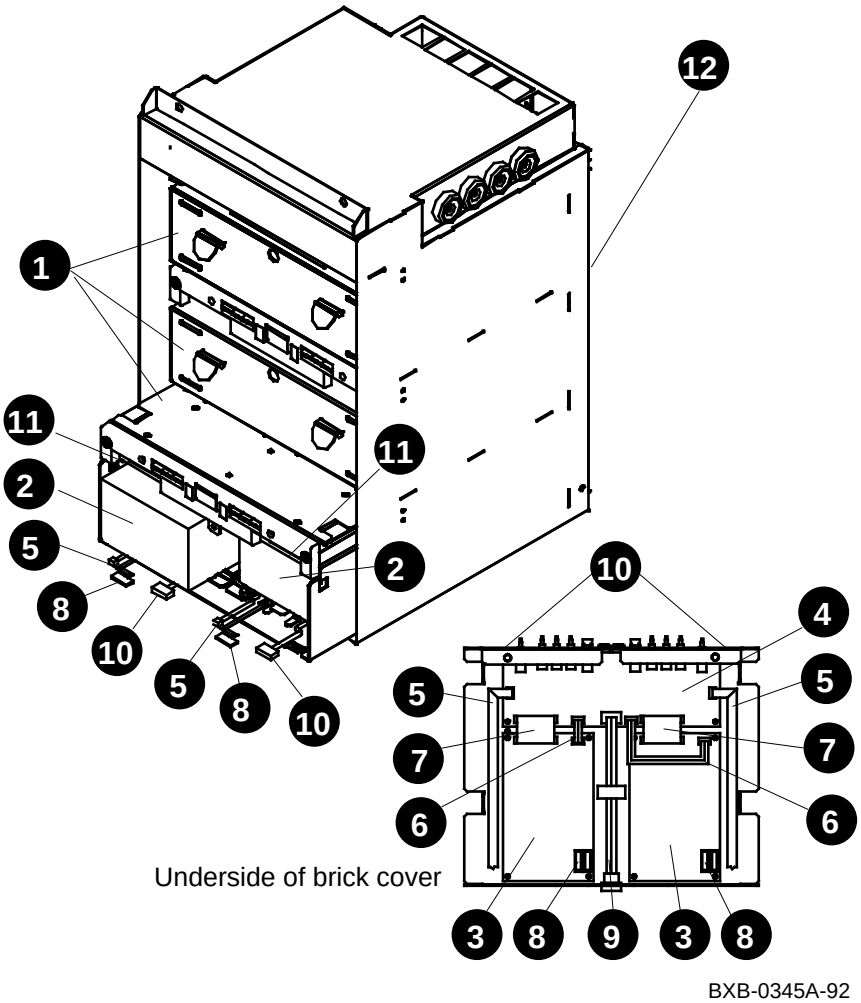
❶	RZ73–VA or RZ26–VA or TLZ06–VA	Disk drive 5.25-inch (3 slots) Disk drive 3.5-inch (1 slot) Tape drive 3.5-inch (1 slot)
❷	BA350–LA	Shelf
❸	H7430–AA	Shelf power supply
❹	17–03532–01	Power control/status signal cable

5.7 FRUs in the DSSI Disk Plug-In Unit

Figure 5-8 DSSI Disk Plug-In Unit (Front) Showing FRU Locations



❶	SF73–LA	Disk brick
❷	RF73–EA	Disk drive (two per brick)
	Includes these FRUs:	
	54–19119–01	RF73–EA ECM module
	70–28814–01	RF73 HDA
❸	54–20868–01	Local disk converter (LDC)
❹	54–21664–01	Disk control panel
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	17–03423–01	Disk control panel to bulkhead
❿	17–03424–01	DSSI bus
⓫	17–02382–0x	DSSI brick jumper cable (BC21Q-xx)
⓬	17–03422–01	Signal and power

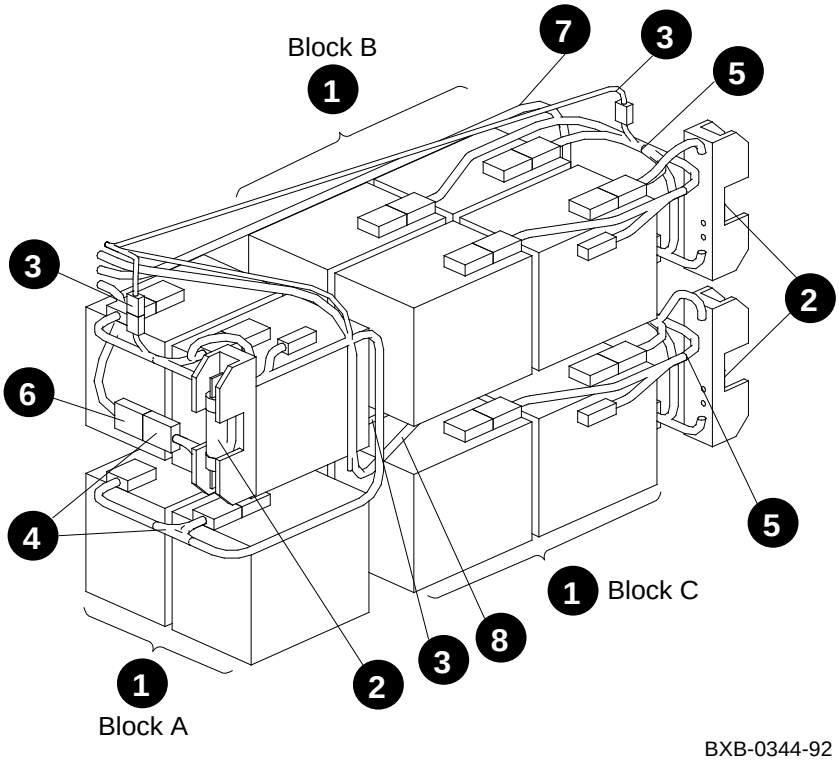
❷ through ❿ are in each brick.

⓫ connects the bricks to each other.

⓬ runs up the center rear of the PIU enclosure.

5.8 FRUs in the Battery Plug-In Unit

Figure 5-9 Battery Plug-In Unit (Rear) Showing FRU Locations



NOTE: The battery plug-in unit is shown without its enclosure.

❶	H7238–AA	Battery block (contains four 12–36168–02 batteries)
❷	12–39982–01	Fuse (LPN–RK–90)
❸	17–03421–01	Battery sensor cable
❹	17–03492–01	Intermediate cable, battery block A
❺	17–03493–01	Intermediate cable, battery block B or C
❻	17–03494–01	Power regulator A to battery block A
❼	17–03494–02	Power regulator B to battery block B
❽	17–03494–03	Power regulator C to battery block C

Chapter 6

Controls and Indicators

This chapter describes controls and indicators on these system components:

- Control Panel
- RRD42 Removable Media Device
- KN7AA Processor Module
- IOP Module
- Cabinet Control Logic Module
- System Power Regulator
- AC Input Box
- XMI, VAXBI, or Futurebus+ PIU Power Regulators
- DWLMA Module and Clock Card
- DWLAA Module
- SCSI Disk and Tape PIU
- DSSI Disk PIU

For more information:

Basic Troubleshooting
Advanced Troubleshooting

6.1 Control Panel

Figure 6-1 Control Panel

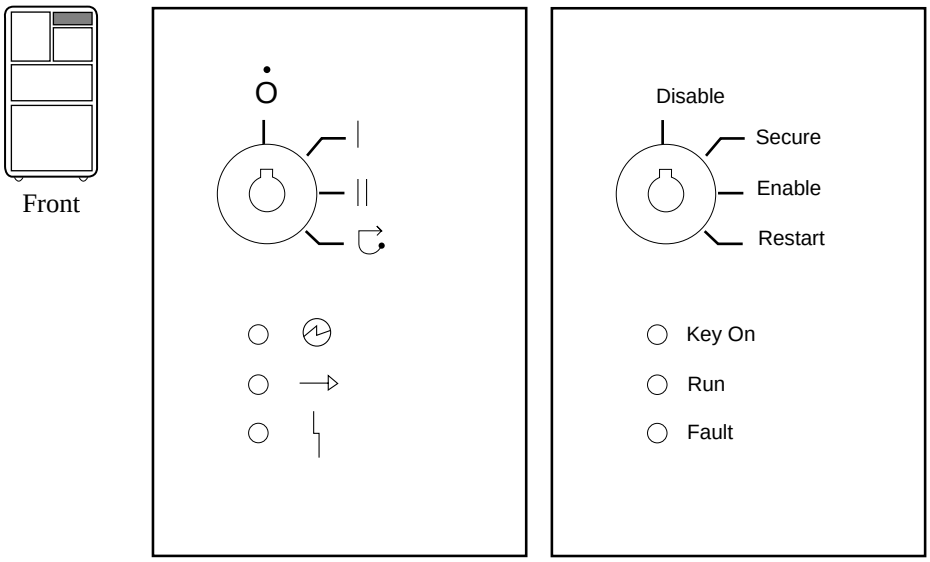


Table 6-1 Control Panel Indicator Lights

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 RRD42 Removable Media Device

Figure 6-2 RRD42 CD Drive Control Panel

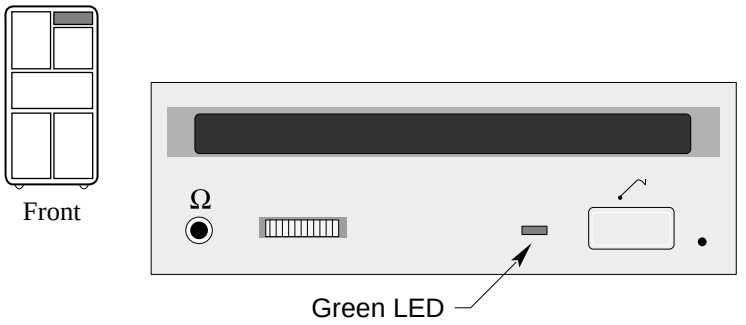


Table 6-2 RRD42 LED

LED	State	Condition
Green (Activity)	Off	No activity
	On	Data is being transferred

6.3 KN7AA Processor Module

Figure 6-3 Processor (E2040) LEDs After Self-Test

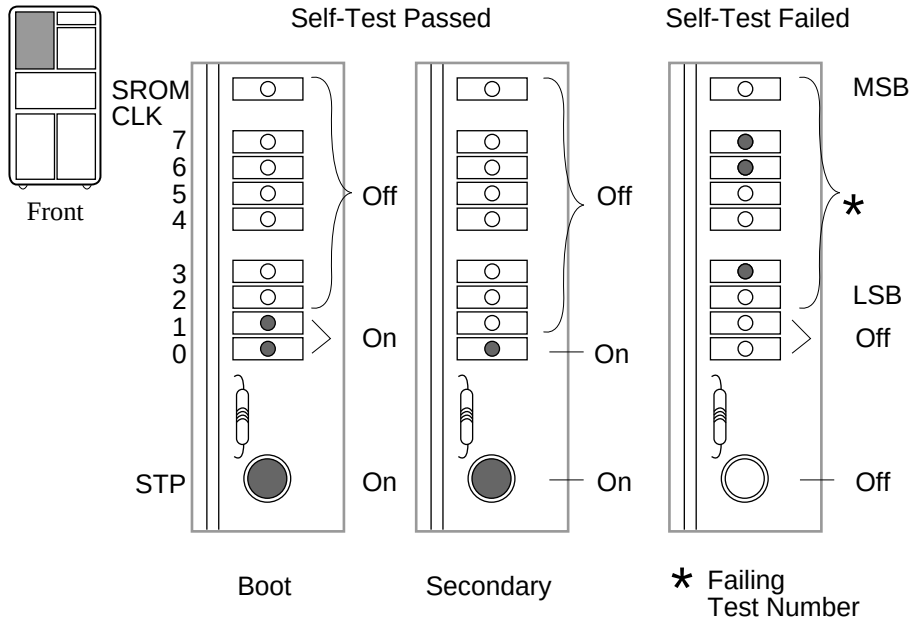


Table 6-3 Processor (E2040) LEDs After Self-Test

Test Result	LEDs
Self-test passed — boot processor	STP, 0, and 1 are on. All others are off.
Self-test passed — secondary processor	STP and 0 are on. All others are off.
Self-test failed	STP, 0, and 1 are off. Failing test number[1] is in the top seven LEDs: 1 – 14 SROM self-tests 1–14

[1] The failing test number is in binary-coded decimal. SROM CLK, 7, and 6 are the most significant digit of the test number; LEDs 5 through 2 are the least significant digit.

Table 6-3 Processor (E2040) LEDs After Self-Test (Continued)

Test Result	LEDs	
	15 – 50	GROM self-tests 15–50
	51 – 60	CPU/memory interaction tests 1–10
	61 – 67	Multiprocessor tests 1–7

Table 6-4 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

Defective DC-to-DC Converter

Each module on the LSB has an on-board DC-to-DC converter. If the converter on any module is unable to supply +5V, the 2V reference voltage is disabled for all nodes, preventing any node from using the LSB. Table 6-4 indicates which module has the defective converter based on the state of the STP LEDs of all modules in the LSB.

Use Table 6-4 when the Fault light on the control panel is on (see Section 6.1) 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.

6.4 IOP Module

Figure 6-4 IOP (E2044-AA) Module LED

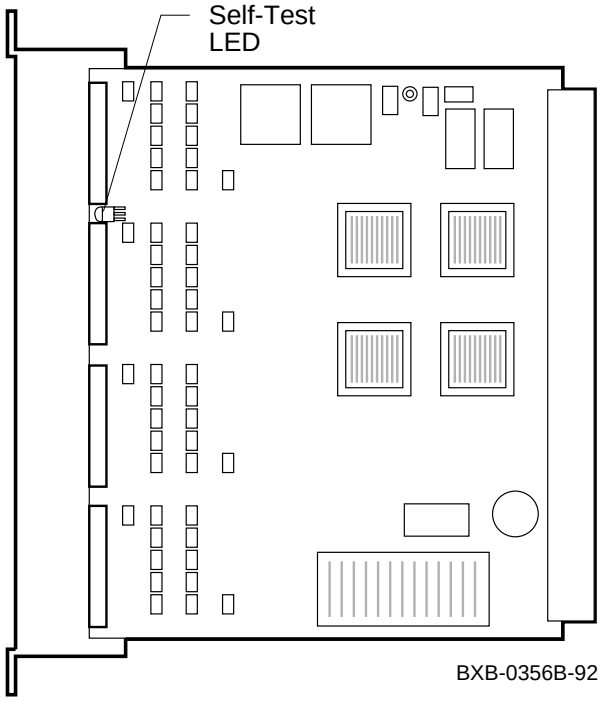


Table 6-5 IOP (E2044-AA) Module LED

Condition	Meaning
On	One of the following: • All IOP-specific and I/O adapter tests passed. • An I/O adapter test failed, and the error was isolated to the adapter.
Off	One of the following: • An IOP-specific test failed. • An I/O adapter test failed, and the error could not be isolated to the adapter. • The processor module failed.

6.5 Cabinet Control Logic Module

Figure 6-5 CCL Module LEDs

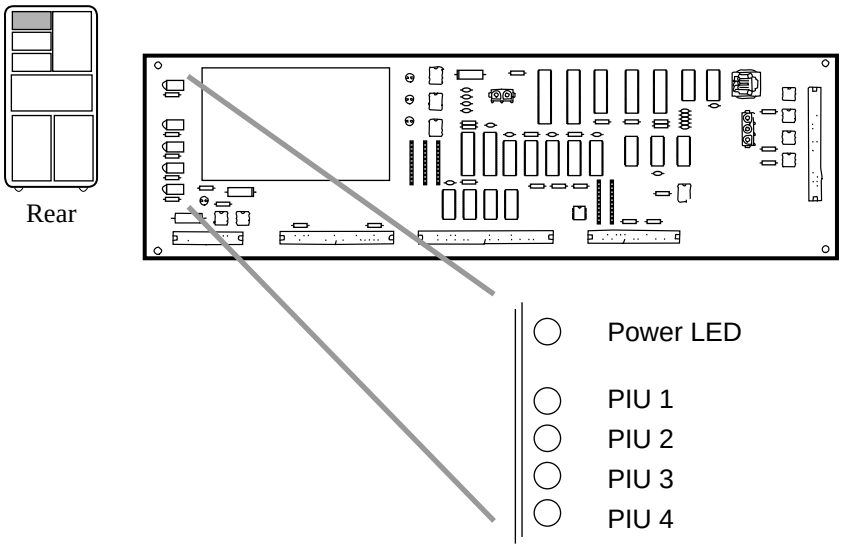


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Table 6-6 CCL Module LEDs

LED	Meaning
Power LED	Power is present on the CCL module.
PIU 1 – 4	PIU is present and power is enabled to the regulators in the PIU 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.)

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

6.6 System Power Regulator

Figure 6-6 System Power Regulator LEDs

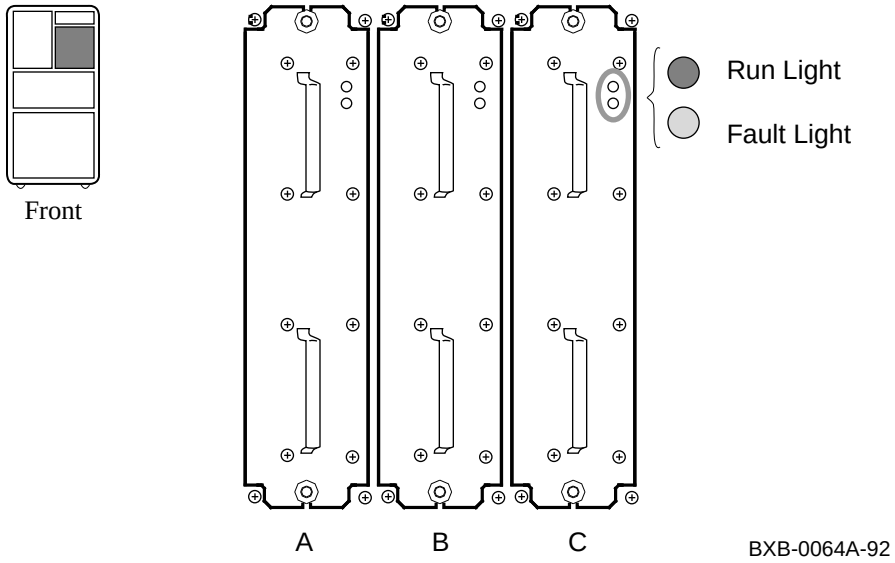

Table 6-7 System Power Regulator Lights

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

6.7 AC Input Box

Figure 6-7 AC Input Box — Indicators on Circuit Breaker

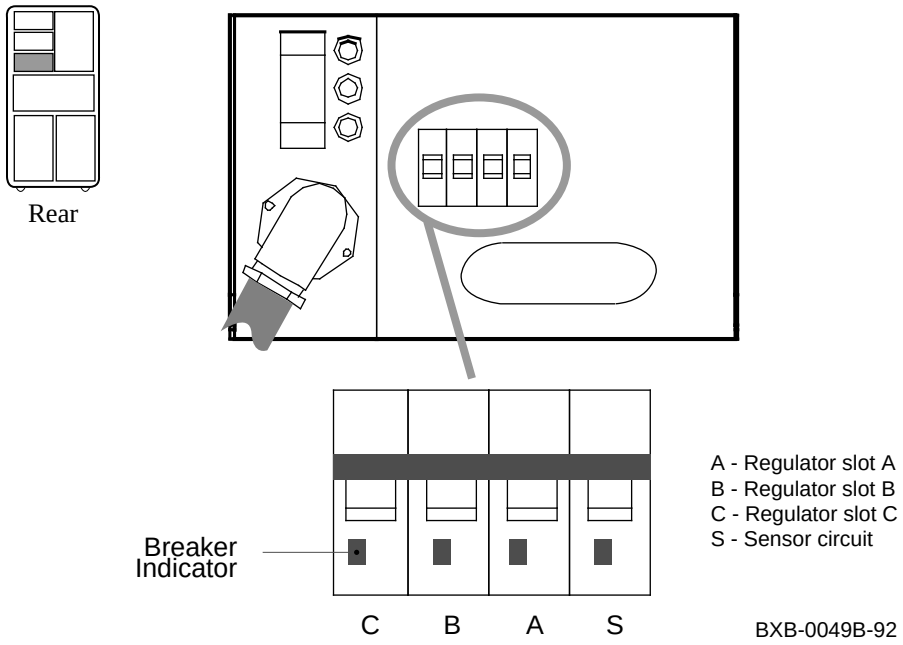

Table 6-8 AC Input Box — Indicators on Circuit Breaker

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 202V version (30–33798–03), all poles trip if one does, causing all indicators to turn green.

6.8 XMI, VAXBI, or Futurebus+ PIU Power Regulators

Figure 6-8 XMI, VAXBI, or Futurebus+ PIU Power Regulators

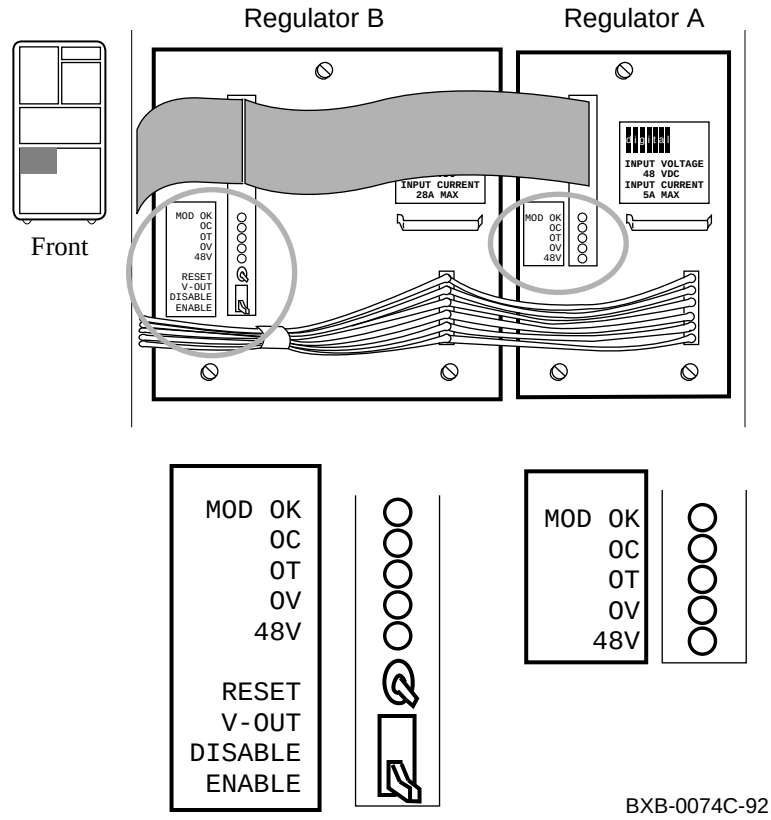

Table 6-9 XMI, VAXBI, or Futurebus+ PIU Power Regulator Lights (Regulators A and B)

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, VAXBI, or Futurebus+ 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 DWLMA Module and Clock Card

Figure 6-9 DWLMA Module and Clock Card LEDs

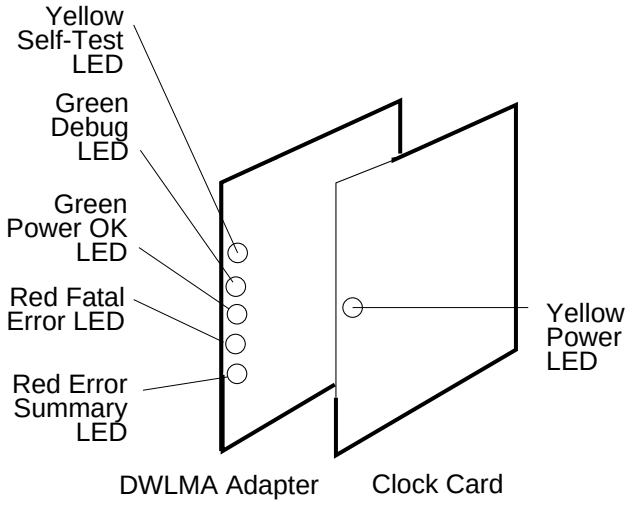

Table 6-11 DWLMA (T2028-AA) Module LEDs

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

The clock card, XMI node 7, has a yellow LED that lights to indicate that power is enabled in the XMI card cage. The POWER ENABLE H signal is looped through the clock card so that the XMI power system cannot be enabled unless the clock card is properly installed.

6.10 DWLAA Module

Figure 6-10 DWLAA Module LEDs

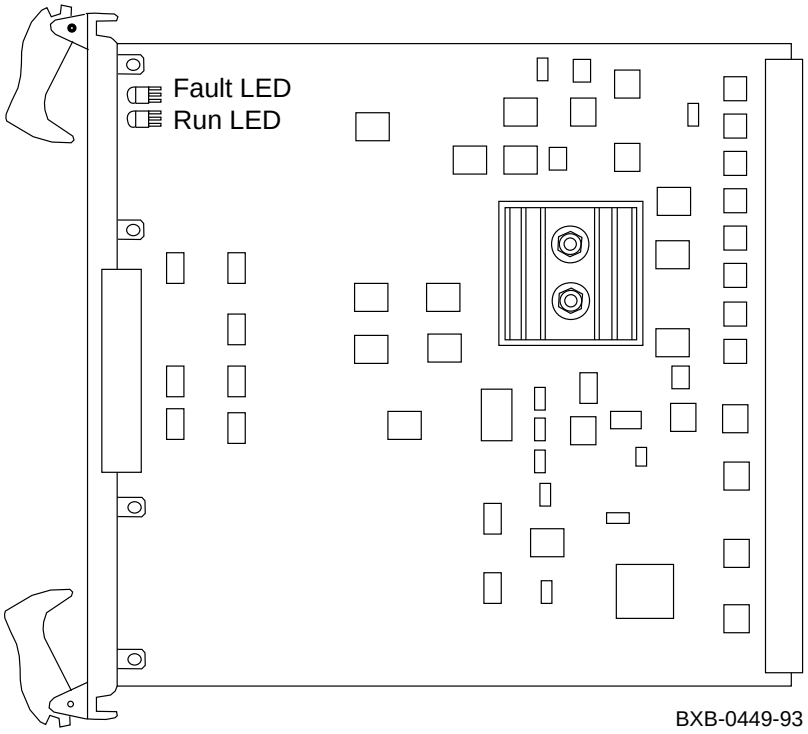

Table 6-12 DWLAA Module LEDs

Fault LED (Yellow)	Run LED (Green)	Meaning
Off	Off	No power to module
Off	On	Module has passed self-test and is operational on bus.
On	Off	Module is operational on bus but has detected a fatal error.
On	On	Self-test is in progress or has failed.

6.11 SCSI Disk and Tape PIU

Figure 6-11 SCSI Indicator LEDs

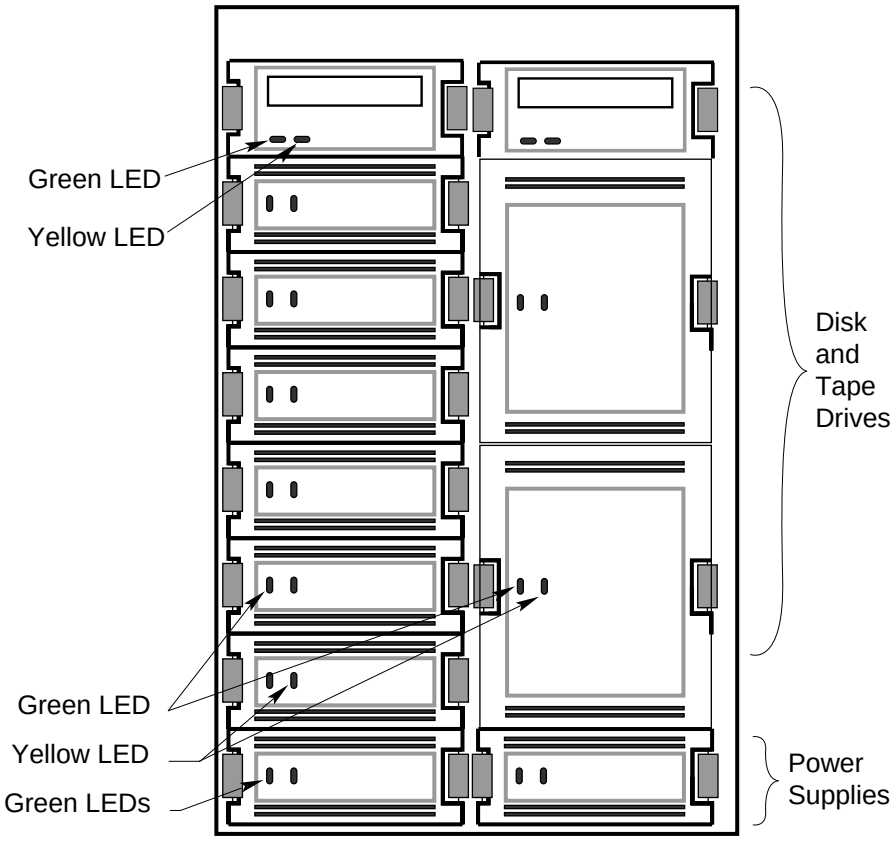

Table 6-13 SCSI Indicator LEDs

Indicator LED	LED State	Meaning
Disk Drive LEDs		
Green	Off	No activity
	Flashing	Activity
	On	Activity
Yellow	Off	Normal
	Flashing	Spin up/spin down
Tape Drive LEDs		
Green	Off	No tape
	Flashing	Self-test in progress or failed
	On	Normal
Yellow	Off	Write enable
	Flashing	Self-test in progress or failed
	On	Write protect
Power Supply LEDs		
Green (left)	Off	Shelf fault
	On	Shelf OK
Green (right)	Off	Power fault
	On	Power OK

6.12 DSSI Disk PIU

Figure 6-12 DSSI Disk Control Panel

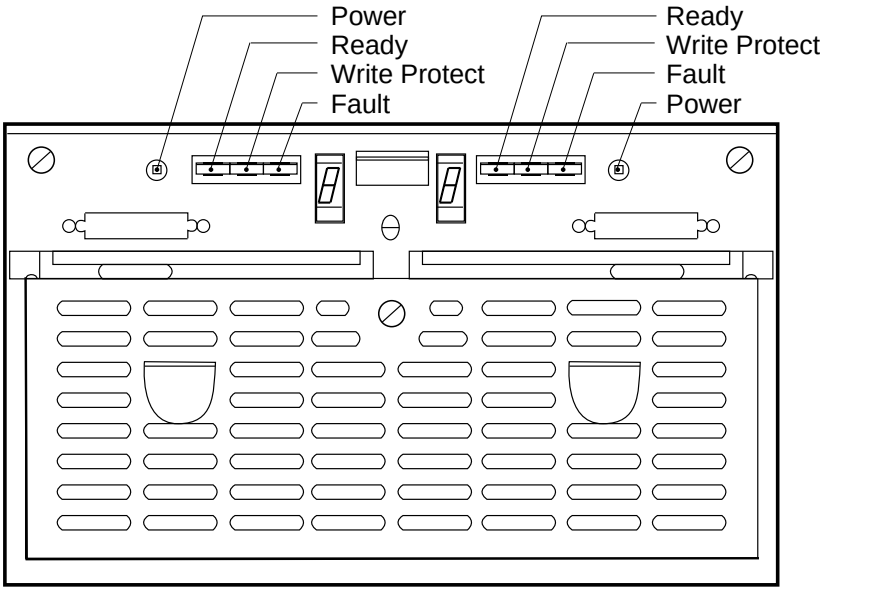

Table 6-14 Disk Brick Controls and Indicators

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

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 with the Update Command

  Use this section when the message “Firmware image checksum error on CPU node *n*” is displayed after the console display.

- Restoring Corrupted Firmware on a CPU with Flash ROM Recovery Code

  Use this section when you power up the system and the prompt AXP-7000/10000-FRRC> is displayed on the console terminal.

For more information:

System Service Manual
Console Reference Manual
Operations Manual

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
P00>>> build eeprom
Creating new EEPROM image
System Serial Number>     # Enter system serial number
Module Serial Number>     # Enter module serial number
Module Unified 2-5-2.4 Part Number> # Enter part number
P00>>> set cpu kn7aa1     # Move to next CPU (if corrupt)
P01>>> build eeprom
Creating new EEPROM image
System Serial Number>     # Enter system serial number
Module Serial Number>     # Enter module serial number
Module Unified 2-5-2.4 Part Number> # Enter part number
P01>>> 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 LFU (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>>> show device
polling for units on kzmsa, slot 1, xmi0...
dka100.1.0.1.0      dka100          RRD42
P00>>> boot dka100.1.0.1.0
Booting...
            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+    KN7AA  (8001)  0000  kn7aa0               M
7+    MS7AA  (4000)  0000  ms7aa1
8+    IOP    (2000)  0001  iop0

C0 XMI                     xmi0
8+    DWLMA  (102A)  A5A6  dwlma0
C+    KDM70  (0C22)  1E11  kdm700     3.0
E+    DEMNA  (0C03)  0802  demna0     8.2

C1 XMI                     xmi1
1+    ?????  (0000)  0000  unknown0
8+    DWLMA  (102A)  A5A6  dwlma1
A+    CIXCD  (0C2F)  0111  cixcd0     1.0      A01

Function? sho *

               Firmware        Hardware
               Revision        Revision

kn7aa0  +      1.0               M
ms7aa0          --              --
iop0            --              --
dwlma0          --              --
kdm700         3.0         Cannot be read
demna0         8.2         Cannot be read
unknown0        --              --          Updates only.
cixcd0         1.0             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
WARNING: updates may take several minutes to complete for each device
DO NOT ABORT!
unknown0 Updating to 1.0...Reading Device...Verifying 1.0...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
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C2
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C3

                   . A0  .  .  .  .  .  .  .  ILV
                   .128  .  .  .  .  .  .  .  128MB
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
P00>>>
```

For more information:

System Service Manual
Operations Manual

7.3 Restoring Corrupted Firmware on a CPU with the Update Command

The processor module in slot 3 in Example 7-6 has a corrupted GROM image. This is indicated by the D in the BDP lines and the message "Firmware image checksum error on CPU node 3." Use the console **update** command to update the firmware on the processor in node 3 from the boot processor's firmware.

Example 7-6 Restoring Corrupted Firmware on a CPU with the Update Command

```
P00>>> init
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
                   .  .  .  .  .  D  .  .  B  BPD
                   o  +  .  .  .  +  .  .  +  ST2
                   .  .  .  .  .  D  .  .  B  BPD
                   +  +  .  .  .  +  .  .  +  ST3
                   .  .  .  .  .  D  .  .  B  BPD
   +  +  +  .  .  .  +  .  .  .  .  +  +  +     C0 XMI +
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C1
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C2
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C3
                   . A0  .  .  .  .  .  .  .  ILV
                   . 128 .  .  .  .  .  .  .  128MB
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
Firmware image checksum error on CPU node 3
P00>>> update kn7aa1 -f
Update kn7aa1's FLASH ROMs [Y/(N)]? y
Updating kn7aa1's FLASH ROMs ............done
P00>>> update kn7aa1 -e
Update kn7aa1's EEPROM [Y/(N)]? y
Updating kn7aa1's EEPROM .........done
P00>>> init
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
```

Table 7-6 Restoring Corrupted Firmware on a CPU with the Update Command (Continued)

```
   +  +  +  .  .  .  +  .  .  .  .  +  +  +     C0 XMI +
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C1
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C2
   .  .  .  .  .  .  .  .  .  .  .  .  .  .     C3
                     . A0  .  .  .  .  .  .  .  ILV
                     . 128 .  .  .  .  .  .  .  128MB
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
P00>>>
```

For more information:

Console Reference Manual

7.4 Restoring Corrupted Firmware on a CPU with Flash ROM Recovery Code

Use this procedure if you see the prompt AXP-7000/10000-FRRC> 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 RRD42 or an InfoServer.
  - — The program Kermit must reside on the source system.
- The AXP 7000 console CD-ROM. This CD-ROM includes the file AXP7000_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 20–30 minutes.

1. Set up the source system (Example 7-7):
   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 7-8) 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 7-9).

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

```
$ set term/speed=9600/perm txa3:
$ mcr ess$ladcp
LADCP> bind AXP7000_V01
AXP7000_V01 is bound to DAD104
LADCP> exit
$ mount/ov=id dad104
$ dir dad104:[sys0.sysexe]
Directory DAD104:[SYS0.SYSEXE]
AXP7000_10000_CONSOLE_IMAGE.GROM
```

Example 7-8 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)
  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)
```

Example 7-8 Running Kermit and Setting Parameters (Continued)

```
  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 7-9 Downline Loading Code to Corrupted FEPROMs

```
Kermit-32> connect txa5:
AXP-7000/10000-FRRC> r              !Prepare system to receive
AXP-7000/10000-FRRC> Ctrl/] C       !Return to Kermit
Kermit-32> send dad104:[SYS0.SYSEXE]AXP7000_10000_console_image.grom
                                    !Transmit code
Kermit-32> connect                  !Reconnect to target system
AXP-7000/10000-FRRC> c              !Verify checksum of image
AXP-7000/10000-FRRC> p              !Copy program image to
                                    !FEPROMs
AXP-7000/10000-FRRC> i              !Reset node
>>> Ctrl/] C                        !Return to Kermit
Kermit-32> exit                     !Return to DCL
$
```

For more information:

System Service Manual

Chapter 8

System Errors

This chapter includes information on tools available for diagnosing system errors. Sections include:

- EEPROM Error Logs
- System Error Logs

For more information:

Advanced Troubleshooting

8.1 EEPROM Error Logs

The console command **show eeprom diag_tdd** can be used to identify the failing test when a processor fails during power-up. Example 8-1 shows a failing processor in a multiprocessor system (the passing CPUs have been removed from the system) and how to identify the failed test by using this command. Example 8-2 shows how to obtain multiple error log entries for a specific module.

Example 8-1 Sample Show EEPROM Diag_TDD Output

```
>>> init ❶
CPU00: Test Failure - Select primary CPU                ❷
F  E  D  C  B  A  9  8  7  6  5  4  3  2  1  0  NODE #
                    A  M  .  .  .  .  .  .  P  TYP
                    o  +  .  .  .  .  .  .  -  ST1
                    .  .  .  .  .  .  .  .  B  BPD
CPU00: Test Failure - Select primary CPU                    ❷
                    o  +  .  .  .  .  .  .  -  ST2
                    .  .  .  .  .  .  .  .  B  BPD
CPU00: Test Failure - Select primary CPU                    ❷
                    +  +  .  .  .  .  .  .  -  ST3
                    .  .  .  .  .  .  .  .  B  BPD

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

                    . A0  .  .  .  .  .  .  .  ILV
                    .128  .  .  .  .  .  .  .  128MB
Firmware Rev = V1.0-1625 SROM Rev = V1.0-0 SYS SN = GAO1234567
>>> show eeprom diag_tdd ❸
Diagnostic TDD Logging is enabled
Logging Control Field value = 0000
Actions logged = 1
Diagnostic TDD Log number 1
Diag = cpu_tst, SSN = GAO1234567,Detecting CPU Node = 1,Failing FRU
Node = 1, Firmware Rev = V1.0-1625, Time = 01/20/93 23:28:04,
Test = 15,Mode = 1,Error Number = 1,Error Type = 1,Error Count = 1  ❹
Data1/00000000FFFFFFFF,Data2/00000000FFFFFFFE,Data3/0000000000300000 ❺
>>>
```

❶ After removing the passing processors from the system, the user types the **init** command to power up the system.

❷ The message, `CPU00: Test Failure - Select primary CPU`, prompts the user to enter the node ID of the failing processor. Note that the CPU node ID appears in the error message (CPU00). Type 0 to obtain the full console display. If you do not type the node ID when prompted, the processor continues to hang.

NOTE: The user input in response to the message is not echoed at the console terminal.

❸ Type the command **show eeprom diag_tdd** to enable the diagnostic TDD error log. The error log header is displayed.

❹
- Test — the failing test number
- Mode — the operating mode (0=user mode, 1=power-up mode)
- Error Number — the failing error number
- Error Type — the type of error that occurred (0=fatal, 1=hard, 2=soft)
- Error Count — the number of errors that occurred

❺ The fields[1] show, in quadwords, the following:
- Data1 — the expected data
- Data2 — the received data
- Data3 — the failing address

[1]These fields are used primarily for expected, received, and failing address information. However, data in these fields may vary according to various diagnostic reports.

Example 8-2 Sample Multiple EEPROM Error Log Entries

```
P01>>> show seeprom diag_tdd ms7aa0 ❶
please wait ~1 min, reading ms7aa0

Diagnostic TDD Logging is enabled
OTF set
Logging Control Field value = 0000
Actions logged = 5 ❷

Diagnostic TDD Log number 1 ❸
Diag = cpumem, SSN = KS, Detecting CPU Node = 1, Failing FRU Node = 5,
Firmware Rev = X2.0-3290, Time = 01/24/82 21:05:11,
Test = 72, Mode = 1, Error Number = 28, Error Type = 1, Error Count = 1
Data1/0000000000000002, Data2/0000000000000000, Data3/0000000000000000

Diagnostic TDD Log number 2 ❸
Multiple FRU's identified for this error
Diag = mem_ex, SSN = KS, Detecting CPU Node = 1, Failing FRU Node = 5,
Firmware Rev = X2.0-3290, Time = 01/24/82 23:28:04,
Test = 2, Mode = 0, Error Number = 6, Error Type = 1, Error Count = 1
Data1/00000000AAAAAAAA, Data2/0000000055555555, Data3/0000000000A01E54

Diagnostic TDD Log number 3 ❸
Diag = cpumem, SSN = KS, Detecting CPU Node = 1, Failing FRU Node = 5,
Firmware Rev = X2.0-3290, Time = 01/24/82 21:04:12,
Test = 72, Mode = 1, Error Number = 28, Error Type = 1, Error Count = 1
Data1/0000000000000002, Data2/0000000000000000, Data3/0000000000000000

Diagnostic TDD Log number 4 ❸
Diag = cpumem, SSN = KS, Detecting CPU Node = 1, Failing FRU Node = 5,
Firmware Rev = X2.0-3290, Time = 01/24/82 21:05:02,
Test = 4, Mode = 1, Error Number = 1, Error Type = 1, Error Count = 1
Data1/AAAAAAAAAAAAAAAA, Data2/0000000000000000, Data3/000000000012BA80

Diagnostic TDD Log number 5 ❸
Diag = cpumem, SSN = KS, Detecting CPU Node = 2, Failing FRU Node = 5,
Firmware Rev = X2.0-3273, Time = 01/22/82 19:14:10,
Test = 4, Mode = 1, Error Number = 1, Error Type = 1, Error Count = 1
Data1/AAAAAAAAAAAAAAAA, Data2/0000000000000000, Data3/0000000000129100
P01>>> ❹
```

❶ The user types the command **show seeprom diag_tdd ms7aa0**.

❷ Five EEPROM error log actions are recorded for memory module ms7aa0, LSB node 5.

❸ Each EEPROM error log entry is displayed.

❹ The console prompt returns.

8.2 System Error Logs

Create an error log report with the command:

```
$ analyze/error_log
```

Table 8-1 Error Log Entries

Entry	Type	Description
Mchk 670	Processor machine check	This hard error is detected by the processor. Entries include backup cache probes, CPU fill ECC errors, and external LSB control-related errors.
Mchk 660	System machine check	This hard error is detected by a component other than the processor. Entries include error conditions related to the operation of the backup cache (LSB side), the Gbus, or the LSB.
Mchk 660	IOP	IPL 17 error. The IOP module detects errors on the LSB, vortex, and hoses. The IPCs (LSB interface chips) detect Up Vortex errors and LSB errors. The Up HIC (vortex-to-hose chips) detect Up Hose errors, and the Down HIC chips detect Down Hose errors.
Mchk 660	DWLMA	IPL 17 error. The DWLMA module detects errors in the XMI, the Down Hose, and the Up Hose. The DWLMA detects two types of errors: those that are fatal to the system and those that can be reset.
Mchk 660	DWLAA	IPL 17 error. The DWLAA module detects errors in the Futurebus+ and the Down Hose.
Mchk 660	Lastfail	Last error(s) detected before the system terminates the session.

Table 8-1 Error Log Entries (Continued)

Entry	Type	Description
Mchk 660	Memscan	Operating system poll of memory error registers shows an error.
Mchk 630	Processor correctable machine check	This single-bit ECC (soft) error occurs when a primary cache fill is in progress. Entries include errors in data sourced from the backup cache and errors caused by the EDAL.

Figure 8-1 670 Machine Check Entry Packet

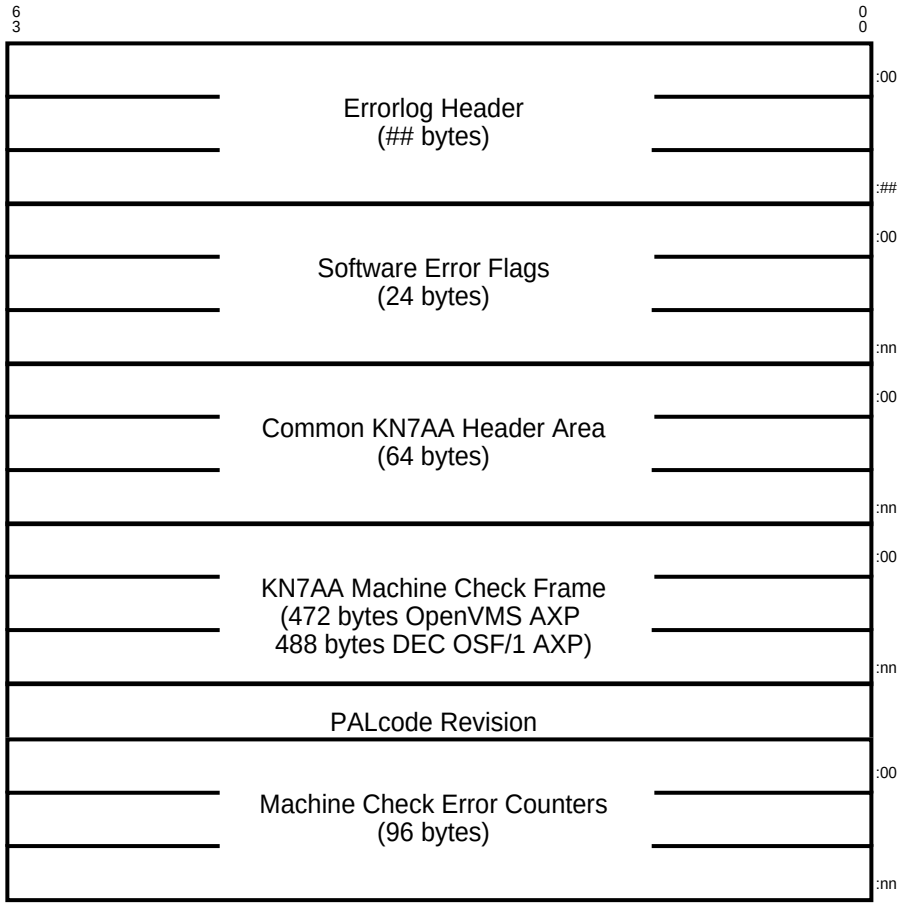

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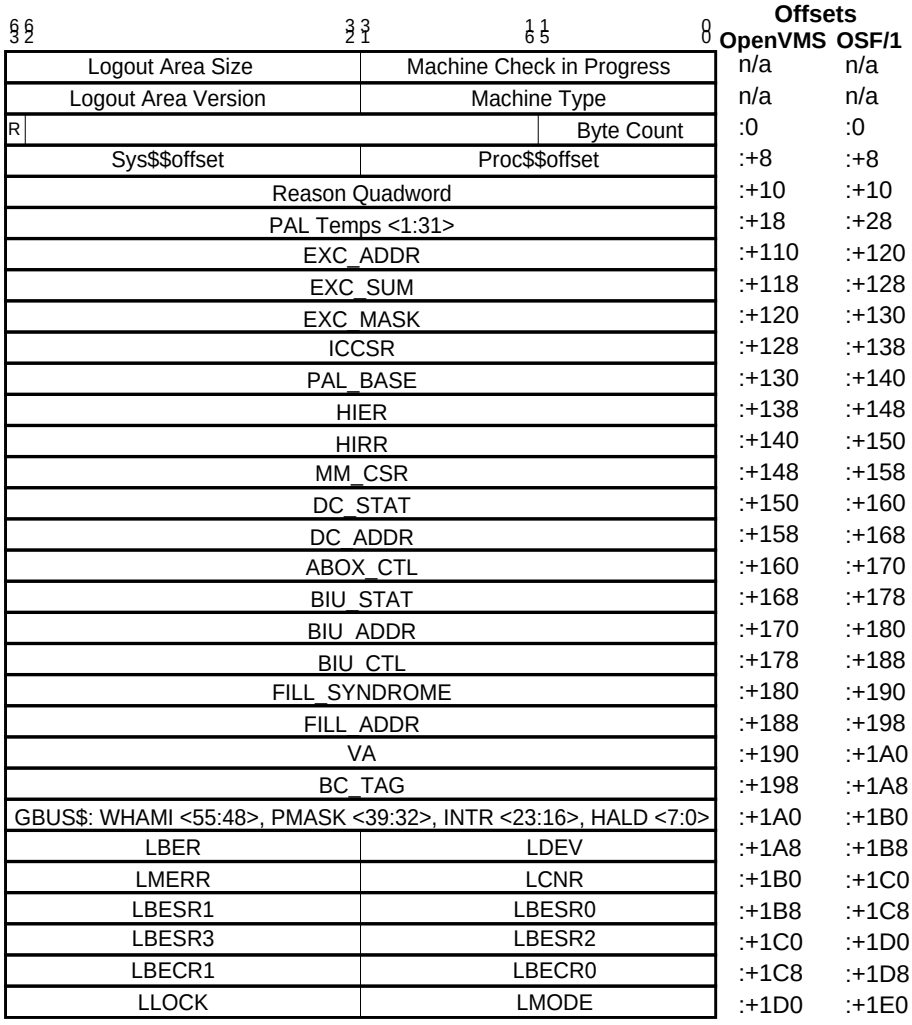
Figure 8-2 KN7AA Machine Check Frame



63–32	31–16	15–0	Offsets OpenVMS	Offsets OSF/1
Logout Area Size	Machine Check in Progress		n/a	n/a
Logout Area Version	Machine Type		n/a	n/a
R		Byte Count	:0	:0
Sys$$offset	Proc$$offset		:+8	:+8
Reason Quadword			:+10	:+10
PAL Temps <1:31>			:+18	:+28
EXC_ADDR			:+110	:+120
EXC_SUM			:+118	:+128
EXC_MASK			:+120	:+130
ICCSR			:+128	:+138
PAL_BASE			:+130	:+140
HIER			:+138	:+148
HIRR			:+140	:+150
MM_CSR			:+148	:+158
DC_STAT			:+150	:+160
DC_ADDR			:+158	:+168
ABOX_CTL			:+160	:+170
BIU_STAT			:+168	:+178
BIU_ADDR			:+170	:+180
BIU_CTL			:+178	:+188
FILL_SYNDROME			:+180	:+190
FILL_ADDR			:+188	:+198
VA			:+190	:+1A0
BC_TAG			:+198	:+1A8
GBUS$: WHAMI <55:48>, PMASK <39:32>, INTR <23:16>, HALD <7:0>			:+1A0	:+1B0
LBER	LDEV		:+1A8	:+1B8
LMERR	LCNR		:+1B0	:+1C0
LBESR1	LBESR0		:+1B8	:+1C8
LBESR3	LBESR2		:+1C0	:+1D0
LBECR1	LBECR0		:+1C8	:+1D8
LLOCK	LMODE		:+1D0	:+1E0

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Figure 8-3 630 Machine Check Entry Packet

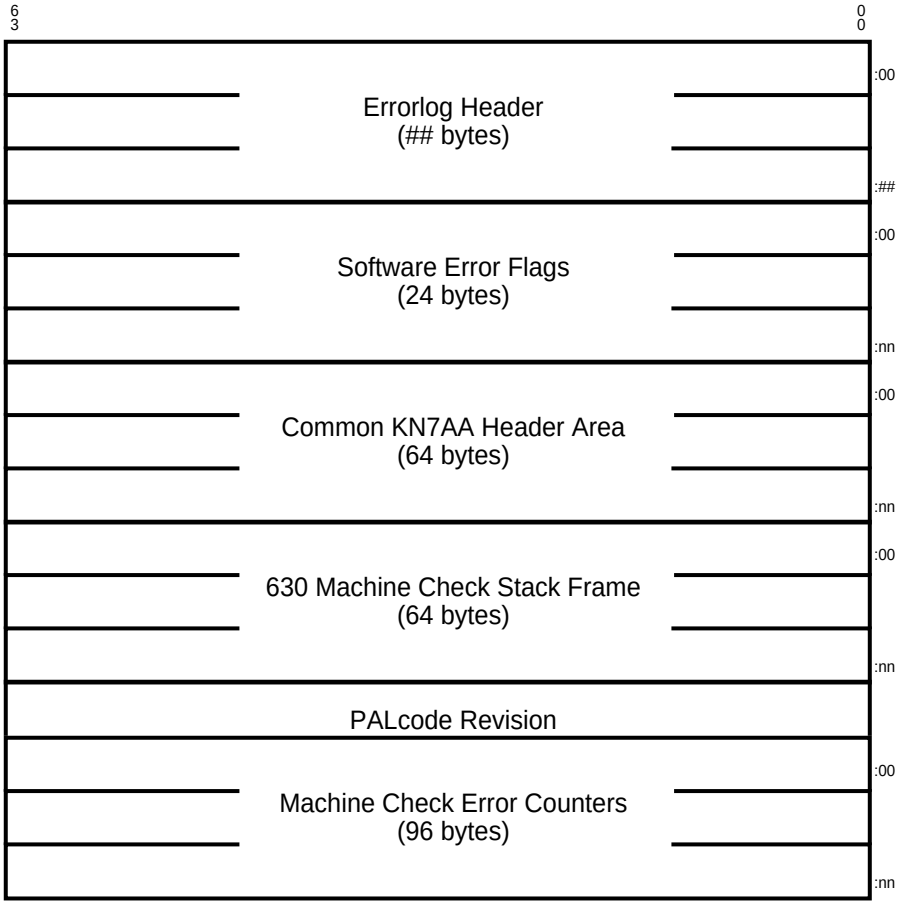

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Figure 8-4 630 Machine Check Frame for OpenVMS AXP

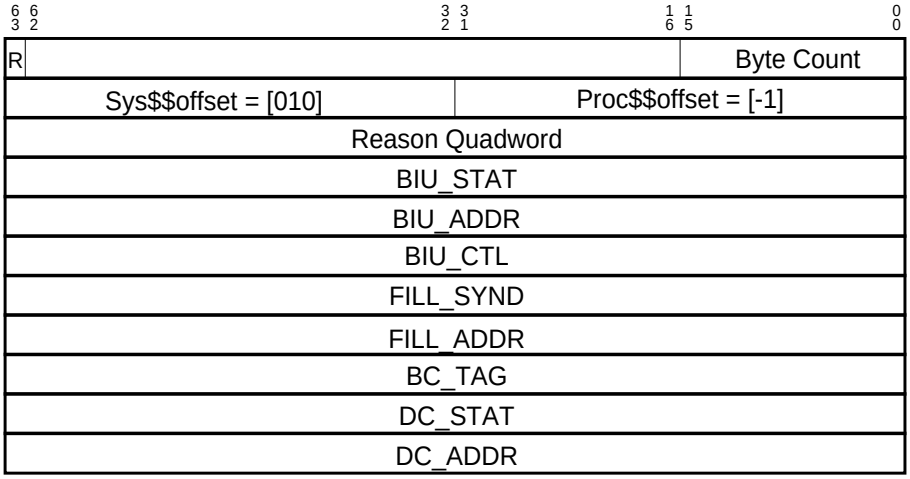

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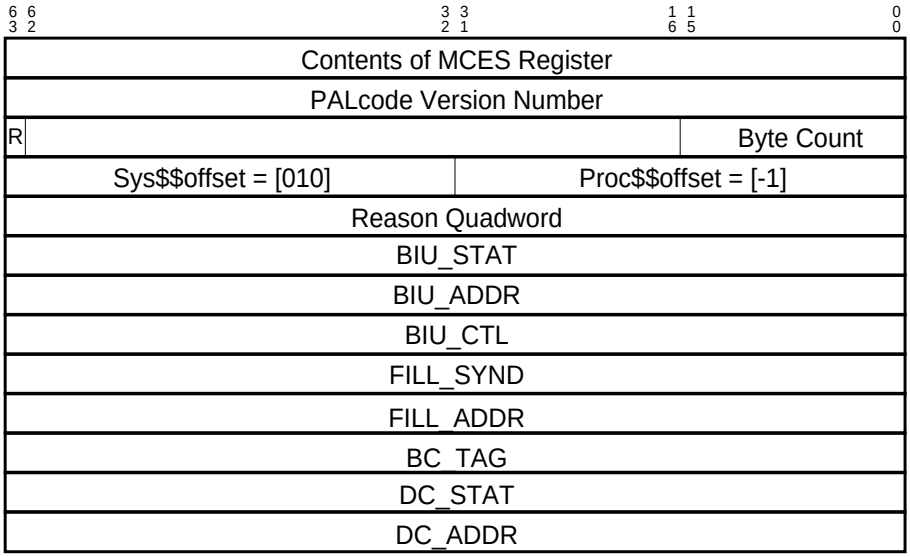
Figure 8-5 630 Machine Check Frame for DEC OSF/1 AXP



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