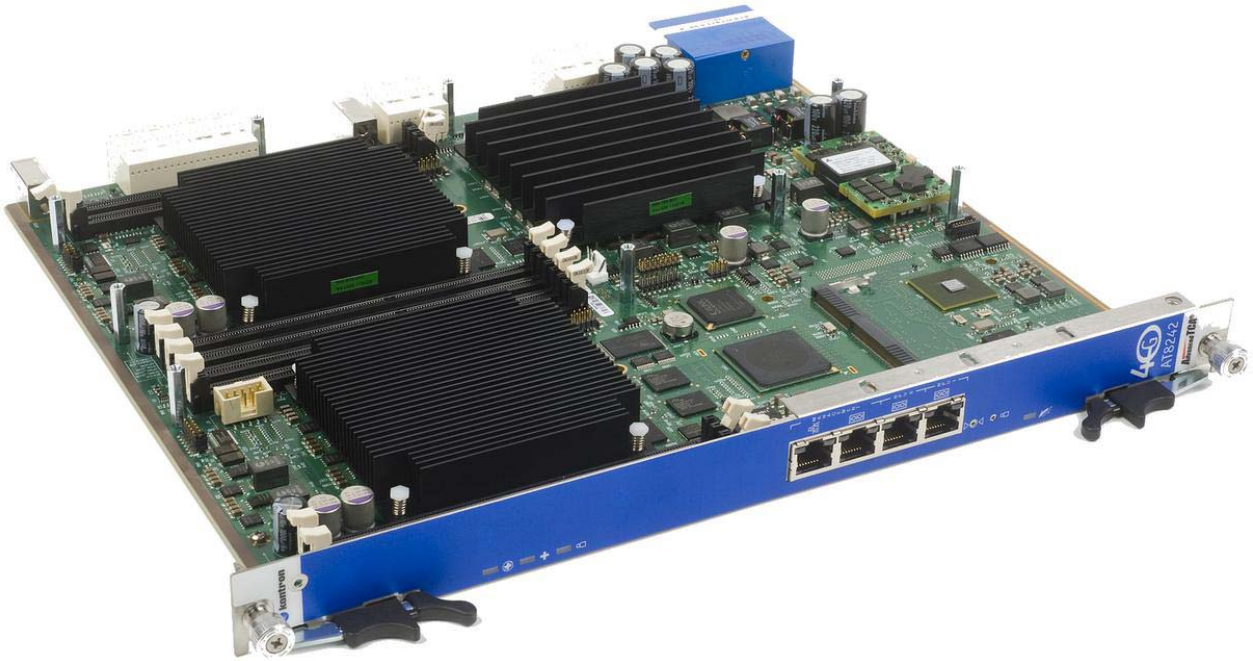
kontron

»Kontron User's Guide«

AdvancedTCA®



AT8242

Document Revision 1.1
January 2013

Revision History

Rev. Index	Brief Description of Changes	Date of Issue
1.0	Initial Release	August 2012
1.1	Minor fix in the following sections:board specification,Fabric interface, onboard connectors and headers, embedded Linux.	January 2013

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Safety Instructions

Before You Begin

Before handling the board, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety. Refer to the "Advisories" section in the Preface for advisory conventions used in this user's guide, including the distinction between Warnings, Cautions, Important Notes, and Notes.

- Always use caution when handling/operating the product. Only qualified, experienced, authorized electronics service personnel should access the interior of the product. The power supplies produce high voltages and energy hazards, which can cause bodily harm.
- Use extreme caution when installing or removing components. Refer to the installation instructions in this user's guide for precautions and procedures. If you have any questions, please contact Kontron Technical Support

WARNING

High voltages are present inside the chassis when the unit's power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

Preventing Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Kontron strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

Take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded. This will discharge any static electricity that may have built up in your body.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.
- Do not handle or store system boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.
- When you want to remove the protective foil (if present), make sure you are properly grounded and that you touch a metallic part of the board.

CAUTION

Removing the protective foil from the top and bottom cover might create static.
When you remove those protections, make sure you follow the proper ESD procedure.

Preface

How to Use This Guide

This user's guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

For the circuits, descriptions and tables indicated, Kontron assumes no responsibility as far as patents or other rights of third parties are concerned.

The following is a summary of chapter contents:

- Chapter 1, Product Description
- Chapter 2, Board Features
- Chapter 3, Installing the board
- Chapter 4, Hardware Management
- Chapter 5, Software Setup
- Chapter 6, Thermal Considerations
- Appendix A, Connector Pinout
- Appendix B, Software Update
- Appendix C, Getting Help
- Appendix D, Glossary

Customer Comments

If you have any difficulties using this user's guide, discover an error, or just want to provide some feedback, please send a message to: tech.writer@ca.kontron.com. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user's guide on our Web site. Thank you.

Advisory Conventions

Seven types of advisories are used throughout the user guides to provide helpful information or to alert you to the potential for hardware damage or personal injury. They are Note, Signal Paths, Jumpers Settings, BIOS Settings, Software Usage, Cautions, and Warnings. The following is an example of each type of advisory. Use caution when servicing electrical components.

Note:
Indicate information that is important for you to know.

Signal Path:
Indicate the places where you can find the signal on the board.

Jumper Settings:
Indicate the jumpers that are related to this section.

BIOS Settings:
Indicate where you can set this option in the BIOS.

Software Usage:
Indicates how you can access this feature through software.

CAUTION
Indicate potential damage to hardware and tells you how to avoid the problem.

WARNING
Indicates potential for bodily harm and tells you how to avoid the problem.

ESD Sensitive Device:
This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.
Please read also the section "Special Handling and Unpacking Instructions".

CE Conformity:
This symbol indicates that the product described in this manual is in compliance with all applied CE standards. Please refer also to the section "Regulatory Compliance Statements" in this manual.

Disclaimer: We have tried to identify all situations that may pose a warning or a caution condition in this user's guide. However, Kontron does not claim to have covered all situations that might require the use of a Caution or a Warning.

Unpacking

Follow these recommendations while unpacking:

- Remove all items from the box. If any items listed on the purchase order are missing, notify Kontron customer service immediately.
- Inspect the product for damage. If there is damage, notify Kontron customer service immediately.
- Save the box and packing material for possible future shipment.

Powering Up the System

If you encounter a problem, verify the following items:

- Make sure that all connectors are properly connected.
- Verify your boot devices.
- If the system does not start properly, try booting without any other I/O peripherals attached.

Make sure your system provides the minimum DC voltages required at the board's slot, especially if DC power is carried by cables.

If you are still not able to get your board running, contact our Technical Support for assistance.

Adapter Cables

Because adapter cables come from various manufacturers, pinouts can differ. The direct crimp design offered by Kontron allows the simplest cable assembly. All cables are available from Kontron Sales Department.

Storing Boards

Electronic boards are sensitive devices. Do not handle or store device near strong electrostatic, electromagnetic, magnetic or radioactive fields.

Regulatory Compliance Statements

FCC Compliance Statement for Class B Devices

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

WARNING

This is a Class B product. If not installed in a properly shielded enclosure and used in accordance with this User's Guide, this product may cause radio interference in which case users may need to take additional measures at their own expense.

Safety Certification

All Kontron equipment meets or exceeds safety requirements based on the IEC/EN/UL/CSA 60950-1 family of standards entitled, "Safety of information technology equipment." All components are chosen to reduce fire hazards and provide insulation and protection where necessary. Testing and reports when required are performed under the international IECEE CB Scheme. Please consult the "Kontron Safety Conformity Policy Guide" for more information. For Canada and USA input voltage must not exceed -60Vdc for safety compliance.

CE Certification

The product(s) described in this user's guide complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques. Although Kontron offers accessories, the customer must ensure that these products are installed with proper shielding to maintain CE compliance. Kontron does not offer engineering services for designing cabling systems. In addition, Kontron will not retest or recertify systems or components that have been reconfigured by customers.

Limited Warranty

Kontron grants the original purchaser of Kontron's products a TWO YEAR LIMITED HARDWARE WARRANTY as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron.

Kontron warrants their own products, excluding software, to be free from manufacturing and material defects for a period of 24 consecutive months from the date of purchase. This warranty is not transferable nor extendable to cover any other users or long- term storage of the product. It does not cover products which have been modified, altered or repaired by any other party than Kontron or their authorized agents. Furthermore, any product which has been, or is suspected of being damaged as a result of negligence, improper use, incorrect handling, servicing or maintenance, or which has been damaged as a result of excessive current/voltage or temperature, or which has had its serial number(s), any other markings or parts thereof altered, defaced or removed will also be excluded from this warranty.

If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

Kontron provides for repair or replacement of any part, assembly or sub-assembly at their own discretion, or to refund the original cost of purchase, if appropriate. In the event of repair, refunding or replacement of any part, the ownership of the removed or replaced parts reverts to Kontron, and the remaining part of the original guarantee, or any new guarantee to cover the repaired or replaced items, will be transferred to cover the new or repaired items. Any extensions to the original guarantee are considered gestures of goodwill, and will be defined in the "Repair Report" issued by Kontron with the repaired or replaced item.

Kontron will not accept liability for any further claims resulting directly or indirectly from any warranty claim, other than the above specified repair, replacement or refunding. In particular, all claims for damage to any system or process in which the product was employed, or any loss incurred as a result of the product not functioning at any given time, are excluded. The extent of Kontron liability to the customer shall not exceed the original purchase price of the item for which the claim exists.

Kontron issues no warranty or representation, either explicit or implicit, with respect to its products reliability, fitness, quality, marketability or ability to fulfil any particular application or purpose. As a result, the products are sold "as is," and the responsibility to ensure their suitability for any given task remains that of the purchaser. In no event will Kontron be liable for direct, indirect or consequential damages resulting from the use of our hardware or software products, or documentation, even if Kontron were advised of the possibility of such claims prior to the purchase of the product or during any period since the date of its purchase.

Please remember that no Kontron employee, dealer or agent is authorized to make any modification or addition to the above specified terms, either verbally or in any other form, written or electronically transmitted, without the company's consent.

Chapter 1

Product Description

1. Product Description

1.1 Product Overview

The AT8242 is a high performance L2 to L7 network services processor ATCA blade designed around the Cavium Octeon II architecture.

Dual Cavium Octeon II CN68XX Network processor

Up to 64 cores running at up to 1.5 Ghz providing 96,000 MIPS

Eight DDR3 DIMM sockets each supporting 32GB address range for up to 256GB

On board 320Gbps non-blocking L2-L3 switching and routing supporting at least 40Gbps to each Network processor

2x 1GbE Base Interface

2x 40G-KR4 Fabric Interface

84Gbps accessible through RTM

Independent management processor

1.2 What's Included

This board is shipped with the following items:

- One AT8242 board
- One RJ45-DB9 serial adaptor (1015-9404)

If any item is missing or damaged, contact the supplier.

1.3 Board Specifications

Table 1-1:Board Specifications

Features	Description
Dual Multicore Packet Processor Units	Dual Cavium Networks OCTEON II CN68xx MIPS64 v2 processors, each with up to 32-cores at up to 1.5 GHz depending on maximum power configuration; Interlaken lanes x 4 between the two OCTEON II processors
Memory	Eight (4 per processor) DDR3 DIMM sockets each supporting 32GB address range for up to 256GB for both processors once 32GB VLP DIMMs are available Up to 1333 MHz ECC DIMM eUSB Flash drive (16GB/32GB) per OCTEON II processor
Ethernet Multilayer Switch	Broadcom BCM56842 320Gbps Ethernet Multilayer Switch. Broadcom StrataXGS®IV high performance Ethernet Switch Architecture The BCM56842 switch provides 18 integrated WarpCores (72 SerDes) Each WarpCore is configurable to support the following options: One 40G-KR4, Four 10G-KR1/XFI/SFI, One 10G-XAUI, Four 1000Base-X/SGMII Managed by the Unit Computer through a PCIe x1 Gen1 (2.5 Gbps) One 1000Base-X link to the Unit Computer The switch represents the central point of the AT8242. It manages the connections to the NPUs, the RTM, the IPMC, the UC, the base interfaces and the fabric interfaces.
I/O Interfaces	Front: 2x RS232 - RJ45 ports, one to each OCTEON II processor Front: 1x RS232 - RJ45 port to the switch management processor Front: 1x 10/100/1000Base-T via RJ45 port to switch management processor
Switch Management Processor	Single core Freescale P2010 processor Manages the Broadcom Ethernet switch through a PCIe x1 Gen1 (2.5 Gbps) lane One serdes lane is routed between SM processor and Broadcom switch SM processor connected to: 1GB DDR3 ECC SODIMM; redundant NOR flash support
Telco Clock	Telco clock support provided
Rear Transition Module (RTM)	Two RTM options: RTM8242: 84 Gbps total available bandwidth; supports 8 SFP+ (FI) connectors, 4x GbE SFP (BI) connectors; RTM8940: up to 82Gbps: 2x 1G SFP (BI), 2x 40G QSFP (FI)* with LRM support, and optional Telco PLL (incl. optional SyncE support). * The second QSFP can be disabled to activate the 4x 10G SFP+ ports (FI)
IPMI Features	Designed with IPMC, Dual IPMB, IPMI v2.0 Extensive sensor monitoring and event generation on thresholds Two redundant IPMI firmware with rollover Serial over LAN (IPMI v2.0) connectivity to the two CN68xx processors and the Management Processor
Standards Compliance	This blade is compatible with the following standards: PICMG 3.0 R3.0 specification; PICMG 3.1 R1.0 specification; PICMG 3.1 R2.0 specification; IPMI v2.0, and RoHS compliant
Mechanical Characteristics	Single slot ATCA blade
Operation Power	Dual CN6880 1.2Ghz AAP with 32GB DDR3: Payload maximum 200W Dual CN6880 1.0Ghz CP with 32GB DDR3: Payload maximum 155W AT8242 Idle Power: 115W AT8242 Management Power: <15W RTM maximum power: <25W

Features	Description
Temperature	Meets test profile based on GR-63, EN 300 019-2-3 Class 3.1E, EN 300 019-2-2 Class 2.3 Operating short term: 0°C to +55 °C Operating long term: 0°C to +45 °C Non-operating: -40 °C to +85 °C
Humidity	The product meets test profile based on GR-63, EN 300 019-2-3 Class 3.1E, EN 300 019-2-2 Class 2.3 and EN 300 019-2-1 Class 1.2 Operating: 5%-93% (non-condensing) at 40°C Non-Operating: 5%-93% (non-condensing) at 40°C
Altitude	Designed to meet the following requirements according to Belcore GR-63, section 4.1.3: Operating: -300 m to 4,000 m (13123 ft) (GR63 4.1.3) at aisle-ambient temperature of 40 deg C; may require additional cooling above 1800m (5905ft) Non-Operating: -300 m to 14,000 m (45931.2 ft)
Shock and Vibration and Bump	Test profile based on EN 300 019-2-3, class 3.2 Shock profile: 11 ms half sine, 3 g, 3 shocks in each direction. Meets Operational Swept Sine Vibration: test profile based on GR-63, clause 5.4.2, and ETSI EN 300 019-2-3, class 3.2. (5 to 200 Hz at 0.2 g) Meets Operational Random Vibration: test profile based on ETSI EN 300 019-2-3, class 3.2 • 5 Hz to 10 Hz @ +12 dB/oct (slope up) • 10 Hz to 50 Hz @ 0.02 m2/s3 (0.0002 g2/ Hz) (flat) • 50 Hz to 100 Hz @ -12 dB/oct (slope down) • 30 minutes per each 3 axes Free Fall: designed to meet Bellcore GR-63, Section 5.3. • Packaged -1000 mm, six surfaces, three edges and four corners • Unpackaged - 100 mm, two sides and two bottom corners
Compliance / Regulatory	Designed to meet the following environmental, safety and EMC requirements: EN 300 019; Telcordia GR-63; Telcordia SR-3580 level 3; Telcordia GR-1089; Designed to meet Class B emissions limits, for a system-level goal of Class A with 6 dB margin
Electromagnetic Compatibility (EMC)and Interference (EMI)	Meets all emission and immunity requirements of FCC Part 15, GR-1089, EN 300 386, EN 55022 and EN 55024 Meets GR-1089 (3.1.2) radiated emissions requirements from 10 kHz to 10 GHz, class A Meets GR-1089 conducted emissions requirements from 10 kHz to 30 MHz, class A Meets all requirements of UL/CSA/EN/IEC 60950-1
Safety	Compliant with the Low Voltage Directive, EC Council Directive 2006/95/EC Meets electric strength requirements (5.2): Primary to Chassis 1 kV, Primary to secondary 1kV. (May be higher if maximum working voltage of converter is greater than 72 Vdc) Meets the Telcordia GR-63 material flammability requirement UL 94V-0, or V-1 with oxygen index of 28% or greater

1.4 Compliance

This product conforms to the following specifications:

- PICMG3.0 R3.0 (Advanced TCA Base Specification)
- PICMG3.1 R1.0 (Ethernet/Fiber Channel over AdvancedTCA)
- PICMG3.1 R2.0 (AdvancedTCA Ethernet specification(Draft))
- HPM.1
- IPMI 2.0

1.5 Hot-Plug Capability

The AT8242 supports Full Hot Swap capability as per PICMG3.0 R3.0 for the board itself. It can be removed from or installed in the system while it is on (without powering-down the system). Please refer to the PICMG3.0R3.0 specification for additional details about Hot Swap.

1.6 Interfacing with the Environment

1.6.1 RTM (rear transition module)

The RTM8242 is a single slot (6HP) AdvancedTCA Rear Transition Module. This module provides additional connectivity for AT8242 CPU front blade.

1.6.1.1 Standard Compliance

- PICMG3.0 R3.0 - Advanced Telecommunication Computing Architecture

1.6.1.2 Hot Swap

The RTM8242 supports hot swapping by using the switch connected to the face plate lower ejector. This switch indicates the coming hot swap action. The insertion of the RTM to a slot is always done over a non powered connector. During the extraction procedure, the management power is disabled only when the RTM8242 is removed. This procedure meets the AdvancedTCA AMC behavior.

1.6.1.2.1 Inserting the RTM8242 into the slot

The presence of the RTM is indicated by one signal. The front blade IPMC recognizes the RTM insertion when the signal is low. After recognizing the RTM, the IPMC turns the blue LED ON and enables the management power to the RTM. Once the IPMB-L link is working, the IPMC accesses the MMC to retrieve FRU data. After

knowing the type of RTM inserted, the IPMC negotiates with the shelf manager in order to activate the +12V payload power. After RTM local voltages have been ramped up, the RTM's MMC enables the RTM Link.

After this the front board IPMC informs the shelf manager there is a functional RTM blade present.

1.6.1.2.2 Removing the RTM8242 from the slot

The RTM_EJECT signal goes HIGH by opening the RTM lower ejector handle. This indicates to the front blade IPMC that a hot swap action is going to take place. The IPMC then negotiates the removal with the System manager and if it is granted, it proceeds with the removal process.

The IPMC proceeds to the deactivation by disabling ekey governed links, the IPMC then disables the RTM Link and turns OFF the payload +12V power. When it is safe to remove the RTM blade from the slot, the IPMC turns the Blue / Hot Swap LED ON. Front Blade IPMC turns OFF the management power only when there is no RTM detected. (RTM8242 removed from the slot)

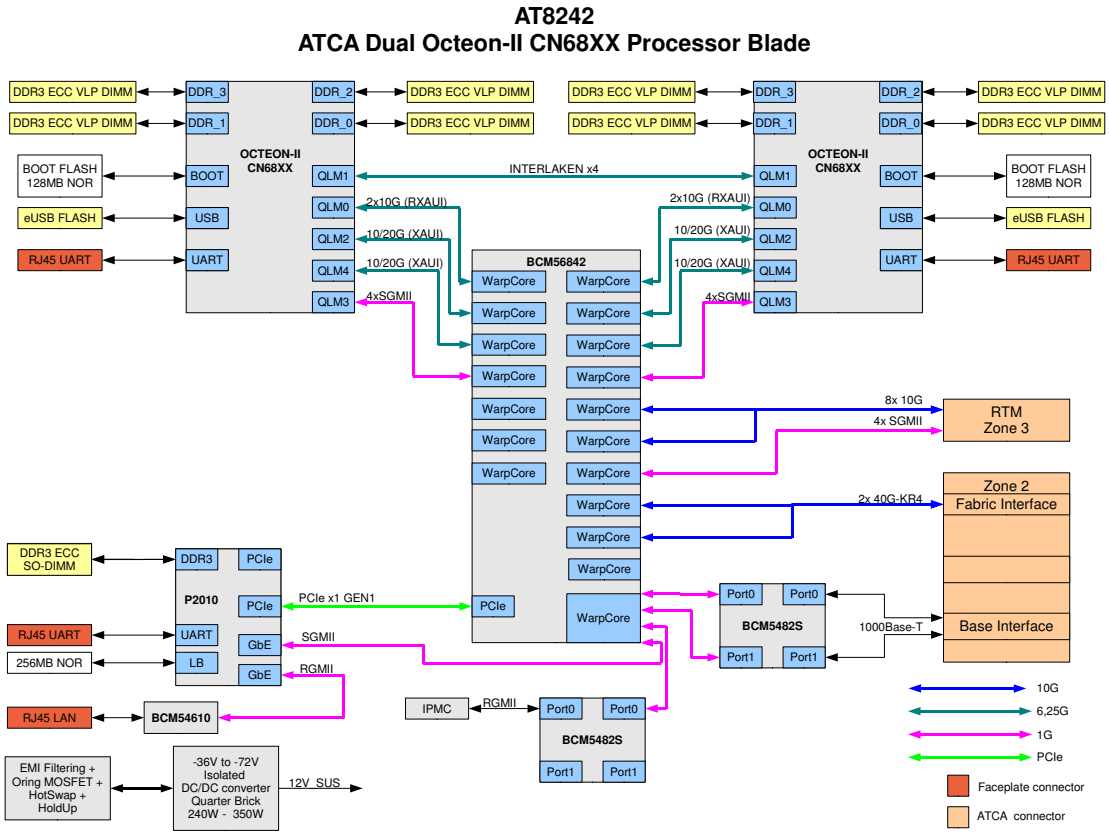
Chapter 2

Board Features

2. Board Features

2.1 Block Diagram

Figure 2-1:Block Diagram



2.2 Network Processors

2.2.1 Description

- Two Cavium Octeon II CN68XX.
- Each processor provides up to 32 cores running at up to 1.5 Ghz providing 96,000 MIPS.
- Four memory channels per processor; 1333 DDR3 UDIMM with ECC.
- Interlaken lanes x4 between the two OCTEON II processors

2.2.2 eUSB Flash Modules

Each NPU supports one Solid State Drive. Those modules are NAND flash disks modules with USB 2.0 interfaces.

Signal Path:
eUSB Flash Module Connector are available on J10 for the NPU0 and J11 for the NPU1

2.3 Unit Computer

2.3.1 Description

- Single core Freescale P2010 1GHz processor
- 1GB DDR3 SO-UDIMM, ECC
- 2x 128MByte NOR FLASH with dual Image Support
- 10/100/1000Base-T RJ45 connector on the front panel
- RTC Clock support

2.3.2 Real Time Clock

The AT8242 is a battery-less board. The real time clock integrated in the Unit Computer is powered by the suspend power when available. A SuperCap provides sufficient power to retain the real time clock for a typical duration of 2hrs. The real time clock precision is 100ppm or better.

2.4 Switch

2.4.1 Description

- Broadcom BCM56842 320Gbps Ethernet Multilayer Switch.
- Broadcom StrataXGS®IV high performance Ethernet Switch Architecture
- The BCM56842 switch provides 18 integrated WarpCores (72 SerDes)
- Each WarpCore is configurable to support the following options:
- One 40G-KR4, Four 10G-KR1/XFI/SFI, One 10G-XAUI, Four 1000Base-X/SGMII

- Managed by the Unit Computer through a PCIe x1 Gen1 (2.5 Gbps)
- One 1000Base-X link to the Unit Computer

The switch represents the central point of the AT8242. It manages the connections to the NPUs, the RTM, the IPMC, the UC, the base interfaces and the fabric interfaces.

Note:
The port mapping is defined to maximize the switch bandwidth within the WarpCore Groups. Adjustments to the port mapping could be possible; please contact Kontron Technical Support. Ultimately, a 480Gbps pin compatible upgrade without changes in the PCB layout would be possible.

2.4.2 Base Interface

Two SerDes lanes are routed from the on board switch to the Base Interface channels. These lanes support 10/100/1000Base-T/TX/T as per current PICMG 3.0 specification.

2.4.3 Fabric Interface

The Fabric Interfaces are connected to the Broadcom BCM56842 switch. Eight SerDes lanes are routed from the switch to the Fabric Interface channels. These lanes are configurable as two 40G-KR4 or two 10G-XAUI.

Table 2-1:Switch Port Assignment

CLI Ports	Description	Mode	Speed
0/1	ZONE2 - BASE1	SGMII	10/100/1000Base-T
0/2	ZONE2 - BASE2	SGMII	10/100/1000Base-T
0/3	P2010	1000BASE-X	1GbE
0/4	IPMC	1000BASE-X	1GbE
0/5	ZONE2 - FABRIC1	XAUI/KR4	10/40GbE
0/6	ZONE2 - FABRIC2	XAUI/KR4	10/40GbE
0/7	NP0 - QLM0_0	RXAUI	10GbE
0/8	NP0 - QLM0_1	RXAUI	10GbE
0/9	NP0 - QLM2	DXAUI	20GbE
0/10	NP0 - QLM3	1000BASE-X	1GbE
0/11	NP0 - QLM3	1000BASE-X	1GbE
0/12	NP0 - QLM3	1000BASE-X	1GbE
0/13	NP0 - QLM3	1000BASE-X	1GbE
0/14	NP0 - QLM4	XAUI	10GbE
0/15	NP1 - QLM0_0	RXAUI	10GbE
0/16	NP1 - QLM0_1	RXAUI	10GbE
0/17	NP1 - QLM2	DXAUI	20GbE
0/18	NP1 - QLM3	1000BASE-X	1GbE

CLI Ports	Description	Mode	Speed
0/19	NP1 - QLM3	1000BASE-X	1GbE
0/20	NP1 - QLM3	1000BASE-X	1GbE
0/21	NP1 - QLM3	1000BASE-X	1GbE
0/22	NP1 - QLM4	XAUI	10GbE
0/23	RTM - SFP4	1000BASE-X	1GbE
0/24	RTM - SFP3	1000BASE-X	1GbE
0/25	RTM - SFP2	1000BASE-X	1GbE
0/26	RTM - SFP1	1000BASE-X	1GbE
0/27	RTM - SFP+1	XFI/SFI/KR	1/10GbE
0/28	RTM - SFP+2	XFI/SFI/KR	1/10GbE
0/29	RTM - SFP+3	XFI/SFI/KR	1/10GbE
0/30	RTM - SFP+4	XFI/SFI/KR	1/10GbE
0/31	RTM - SFP+5	XFI/SFI/KR	1/10GbE
0/32	RTM - SFP+6	XFI/SFI/KR	1/10GbE
0/33	RTM - SFP+7	XFI/SFI/KR	1/10GbE
0/34	RTM - SFP+8	XFI/SFI/KR	1/10GbE

Table 2-2:Switch Port Mapping

Group	Warpcore	Lane#	Port Setting	Speed	Physical Connection
0	0	0	SGMII	10/100/1000Base-T	ZONE2 - BASE1
		1	SGMII	10/100/1000Base-T	ZONE2 - BASE2
		2	1000BASE-X	1GbE	P2010
		3	1000BASE-X	1GbE	IPMC
	1	4	XAUI	10GbE	NP0 - QLM4
		5			
		6			
		7			
	2	8	1000BASE-X	1GbE	NP0 - QLM3
		9	1000BASE-X	1GbE	NP0 - QLM3
		10	1000BASE-X	1GbE	NP1 - QLM3
		11	1000BASE-X	1GbE	NP1 - QLM3
	3	12	1000BASE-X	1GbE	RTM - 1G
		13	1000BASE-X	1GbE	RTM - 1G
		14	N/C		
		15			
	4	16	XAUI/KR4	10/40GbE	ZONE2 - FABRIC1
		17			
		18			
		19			

Group	Warpcore	Lane#	Port Setting	Speed	Physical Connection
1	5	20	N/C		
		21			
		22			
		23			
	6	24	1000BASE-X	1GbE	NP0 - QLM3
		25	1000BASE-X	1GbE	NP0 - QLM3
		26	1000BASE-X	1GbE	NP1 - QLM3
		27	1000BASE-X	1GbE	NP1 - QLM3
	7	28	XAUI/KR4	10/40GbE	ZONE2 - FABRIC2
		29			
		30			
		31			
	8	32	RXAUI	10GbE	NP1 - QLM0_0
		33			
		34	RXAUI	10GbE	NP1 - QLM0_1
		35			
2	9	36	N/C		
		37			
		38			
		39			
	10	40	1000BASE-X	1GbE	RTM - 1G
		41	1000BASE-X	1GbE	RTM - 1G
		42	N/C		
		43			
	11	44	XFI/SFI/KR	1/10GbE	RTM - SFP+3
		45	XFI/SFI/KR	1/10GbE	RTM - SFP+4
		46	XFI/SFI/KR	1/10GbE	RTM - SFP+1
		47	XFI/SFI/KR	1/10GbE	RTM - SFP+2
	12	48	DXAUI	20GbE	NP1 - QLM2
		49			
		50			
		51			
	13	52	XAUI	10GbE	NP1 - QLM4
		53			
		54			
		55			

Group	Warpcore	Lane#	Port Setting	Speed	Physical Connection
3	14	56	XFI/SFI/KR	1/10GbE	RTM - SFP+5
		57	XFI/SFI/KR	1/10GbE	RTM - SFP+6
		58	XFI/SFI/KR	1/10GbE	RTM - SFP+7
		59	XFI/SFI/KR	1/10GbE	RTM - SFP+8
	15	60	RXAUI	10GbE	NP0 - QLM0_0
		61			
		62	RXAUI	10GbE	NP0 - QLM0_1
		63			
	16	64	DXAUI	20GbE	NP0 - QLM2
		65			
		66			
		67			
	17	68	N/C		
		69			
		70			
		71			

2.5 Serial Interfaces

The AT8242 uses serial interfaces to manage the NPU0, NPU1 and the P2010. Since no video interface is provided on board, the only way to get visual information on the board is the serial console. They are 16C550 high-speed UART compatible and support 16-byte FIFO buffers for transfer rates from 9.6Kbps to 115.2Kbps. The default Serial port speed for OS shell access is 115.2 kbps.

Table 2-3:Serial Interface connector Pinout

Pin	Signal
1	RTS
2	DTR
3	TX#
4	GND
5	GND
6	RX#
7	DSR
8	CTS

Note:
Standard product uses a RJ-45 8 pins connector. RI (ring indicator) and DCD (data carrier detect) signals are not available.
The pinout is a custom one, not the same as RS-232D TIA/EIA-561.

2.6 Serial-Over-LAN (SOL)

The AT8242 supports Serial-Over-LAN on both Base Interfaces channels with a default speed of 115.2 kbps. There is one SOL instance dedicated to Unit Processor (P2010) and one SOL instance dedicated to each NPUs (Cavium). The communication on the Front Plate serial connection will take priority if a cable is present.

IPMI-Over-LAN allows Serial-Over-LAN (SOL) Payload traffic.

2.7 Web Interface

The AT8242 provides a Web interface. This interface provides the sensor list and their corresponding readings. It also provides a power control page for the Unit Processor (P2010). This page gives the possibility to initiate a graceful shutdown, a power down, a power cycle and a payload reset.

Note:
Power up is not supported by the Web interface because the Base Interface is not available without payload power.

The Web interface also provides a power control page for the NPUs (Cavium). This page gives the possibility to do a graceful shutdown, power down, power up, power cycle or a reset of each NPU independently (within its virtual AMC domain).

2.8 FPGA

The FPGA has many functions. One of them is to act as a companion chip to the IPMC. The states of all the critical signals controlled by the IPMC are memorized in the FPGA and are preserved while the IPMC firmware is being updated.

The FPGA is a RAM-based chip that is preloaded from a separate flash memory at power-up. Two such flash memory devices are provided; one that can only be programmed in factory and the other one that can be updated in the field. The factory flash is selected by inserting jumper JP1 pins 1-2. Field updates require a power-cycle of the board. The IPMI LED2 will blink amber if the factory flash is being used to signal a fail safe configuration.

The FPGA update complies to PICMG HPM.1 specification and is remotely updatable via any IPMC channel.

2.9 Redundant IPMC Firmware & BootBlock

The IPMC runs a firmware from SPI flash memory. The IPMC Boot Block saves the last two copies of the IPMC firmware image, manages bank states and can rollback to the previous firmware image in flash in case of update problem.

Note:
The IPMC has an external hardware watchdog.

2.10 LEDs Description

The following table lists the LED on the faceplate (not counting the RJ-45 Ethernet LED).

Table 2-4:Faceplate LEDs

LED Name	Color	Controlled by	Description
ATCA0	Blue	IPMC	Blade Hot Swap status
ATCA1	Amber/Red	IPMC	Blade OOS (out-of-service)
ATCA2	Amber/Green	IPMC	Healthy status
User LED	Amber/Green	IPMC	User LED

2.10.1 Hot Swap LED (LED0)

The Blue / Hot Swap LED indicates the hot swap status of the unit. The LED is ON when it is safe to remove the unit from the slot. During normal operation, this LED is OFF.

Solid On	(100 % on):	FRU Inactive
Long Blink	(90 % on):	FRU Activation Request
Solid Off	(0 % on):	FRU Activation In Progress / FRU Active
Short Blink	(10 % on):	FRU Deactivation Request / FRU Deactivation In Progress

2.10.2 Out Of Service (LED1)

The AdvancedTCA LED1 is red or amber and indicates an Out-of-Service (OOS) condition. During normal operation, the OOS LED is OFF. This LED is ON when IPMC is in reset or starting up, and is user configurable if needed by a customer application.

Solid On:	IPMC in reset or starting up

Application Defined: May be controlled by application using PICMG API

2.10.3 Healthy LED (LED2)

The AdvancedTCA LED2 is green or amber and indicates a healthy condition. The healthy LED indicates if the blade is powered up and all voltages and temperatures are within specifications. During normal operation, this LED is ON (green). This LED is also ON (amber) when one of the AT8242 voltage or temperature fails.

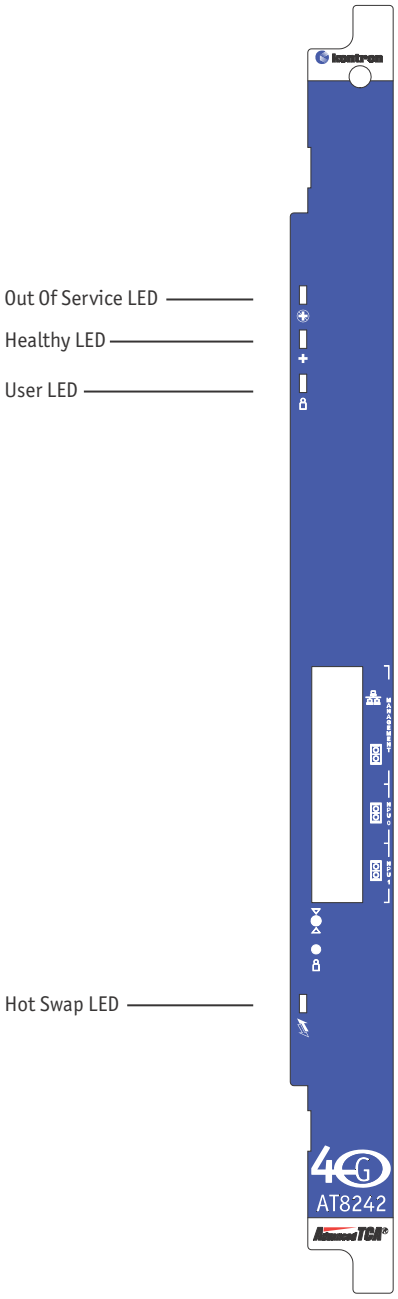
Off:	Payload power down
Green:	Health Ok
Amber:	Health Error (Critical)

Application Defined: May be controlled by application using PICMG API

2.10.4 User LED (LED3)

The AdvancedTCA LED3 is green and/or amber. This LED is controlled by the IPMC and can be used for specific applications.

Figure 2-2:Faceplate LEDs



Chapter 3

Installing the Board

3. Installing the Board

3.1 Setting Jumpers

3.1.1 Jumper Description

The jumpers description can be found on the Quick Reference Sheet.

3.1.2 Setting Jumper & Locations

The jumper settings and locations can be found on the Quick Reference Sheet.

3.2 Processors

This product ships with the processors and a thermal solution installed. The thermal solution is custom and critical for passive cooling. Cooling performance can greatly be affected if manipulation is not handled within Kontron facility: do not attempt any heat sink removal.

3.3 Memory

The AT8242 has 8 memory sockets (4 per processor). There is 1 DIMM per memory channel. The AT8242 accepts DDR3, VLP(very low-profile) (0.72 inch; 18.29mm), 1.5V, unbuffered, ECC, x8 memory with up to 2 ranks per DIMM. The DDR3 memory channels run at 1333MHz. The maximum addressable DDR3 SDRAM size is 32GBytes per DIMM for a populated 256GBytes maximum. The maximum memory size is limited by the thermal and current limits. Refer to the approved memory list for details. It is recommended that modules have thermal sensors for accurate temperature monitoring.

Only use validated memory with this product. Thermal issues or other problems may arise if you don't use recommended modules. At the time of publication of this user guide, the following memories have been qualified and approved. As the memory market is volatile, this list is subject to change, please consult your local technical support for an up to date list.

3.3.1 Memory List and Characteristics

Table 3-1:Approved Memory List

Manufacturer Part Number	Description	Company
VL31B5263E-K9S	4GB 512Mx72 DDR3 SDRAM VLP ECC UNBUFFERED DIMM 240-PIN	VIRTIUM TECHNOLOGY

Memory should have the following characteristics:

- DDR3 1333
- 1.5V
- Single or dual-rank modules are supported
- x8 memory with up to 2 ranks per DIMM
- Unbuffered & ECC
- Very Low Profiles (VLP) 0.72inches maximum heights (18.3mm)

WARNING

Because static electricity can cause damage to electronic devices, take the following precautions:

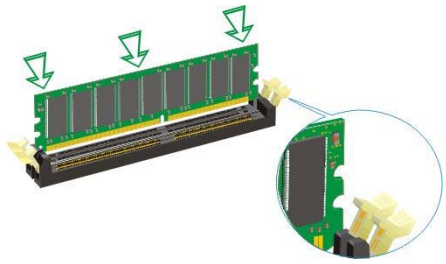
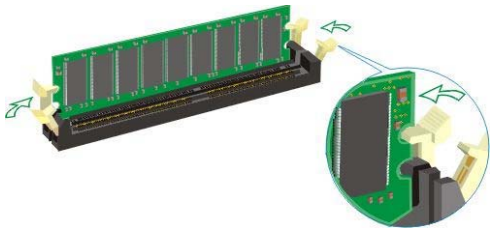
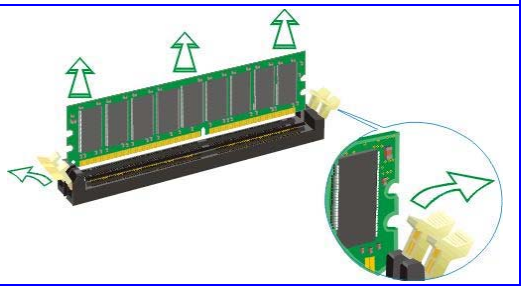
Keep the board in its anti-static package, until you are ready to install memory.

Wear a grounding wrist strap before removing the board from its package; this will discharge any static electricity that may have built up in your body.

Handle the board by the faceplate or its edges.

The NPU's DDR3 speed is set by default to 1066; the procedure to change it can be found under: “U-boot Memory Configurations” on page 72.

3.3.2 Installing Memory

On an anti-static plane, place the board so that you are facing the front plate connectors	
Remove the memory protection top cover.	
Insert the memory module into any available socket, aligning the notches on the module with the socket's key inserts.	
Push down the memory module until the retaining clips lock on each side.	
Repeat these steps to populate the other socket.	
To remove a memory module from a socket, push sideway the retaining clips on each side of the socket, to release the module. Pull out the memory from the socket.	

3.4 Onboard Connectors and Headers

Table 3-2:Onboard Connectors and Headers

Description	Connector	Comments
Memory Socket NPU0 Channel 1	J1	DDR3 UDIMM Memory Socket
Memory Socket NPU0 Channel 3	J2	DDR3 UDIMM Memory Socket
Memory Socket NPU0 Channel 2	J3	DDR3 UDIMM Memory Socket
Memory Socket NPU0 Channel 0	J4	DDR3 UDIMM Memory Socket
Memory Socket NPU1 Channel 1	J5	DDR3 UDIMM Memory Socket
Memory Socket NPU1 Channel 3	J6	DDR3 UDIMM Memory Socket
Memory Socket NPU1 Channel 2	J7	DDR3 UDIMM Memory Socket
Memory Socket NPU1 Channel 0	J8	DDR3 UDIMM Memory Socket
Debug Connector	J9	
eUSB Flash Connector NPU0	J10	
eUSB Flash Connector NPU1	J11	
Management/Console Port	J13	
UC Memory connector	J15	DDR3 SO-UDIMM Memory Socket
RTM Connectors	J31 & J32	
Base & Fabric Interface Connector	J20 & J23	
Power Connector	P10	
Reset Switch	SW1	
User Switch	SW2	
Handle Switch	SW3	

3.5 Board Hot Swap and Installation

Because of the high-density pinout of the hard-metric connector, some precautions must be taken when connecting or disconnecting a board to/from a backplane:

1 Rail guides must be installed on the enclosure to slide the board to the backplane.

2 Do not force the board if there is mechanical resistance while inserting the board.

3 Screw the front plate to the enclosure to firmly attach the board to its enclosure.

4 Use ejector handles to disconnect and extract the board from its enclosure.

WARNING

Always use a grounding wrist strap before installing or removing the board from a chassis.

3.5.1 Installing the Board in the Chassis

To install a board in a chassis:

1 Remove the filler panel of the slot or see "Removing the Board" below.

2 Ensure the board is configured properly.

3 Carefully align the PCB edges in the bottom and top card guide.

4 Insert the board in the system until it makes contact with the backplane connectors.

5 Using both ejector handles, engage the board in the backplane connectors until both ejectors are locked.

6 Fasten screws at the top and bottom of the faceplate.

3.5.2 Removing the Board

If you would like to remove a card from your chassis please follow carefully these steps:

1 Unscrew the top and the bottom screw of the front panel.

2 Unlock the lower handle latch. Depending on software state, this may initiate a clean shutdown of the operating system.

3 Wait until the blue LED is fully ON, indicating that the hot swap sequence has completed and board is ready for removal.

4 Use both ejectors to disengage the board from the backplane.

5 Pull the board out of the chassis.

3.5.3 Installing the RTM

To install the RTM:

1 Remove the filler panel of the slot.

2 Ensure the board is configured properly.

3 Carefully align the PCB edges in the bottom and top card guide.

4 Insert the board in the system until it makes contact with the processor board.

5 Using both ejector handles, engage the board in the processor board connectors until both ejectors are locked.

6 Fasten screws at the top and bottom of the faceplate.

3.5.4 Removing the RTM

To remove the RTM:

1 Unscrew the top and the bottom screw of the faceplate.

2 Unlock the lower handle latch.

3 Wait until the blue LED is fully ON, indicating that the hot swap sequence has completed and board is ready for removal.

4 Use both ejectors to disengage the board from the processor board.

5 Pull the board out of the chassis.

Chapter 4

Hardware Management

4. Hardware Management

4.1 Hardware Management Overview

The purpose of the hardware management system is to monitor, control, ensure proper operation and provide hot swap support of ATCA Boards. The hardware management system watches over the basic health of the system, reports anomalies, and takes corrective action when needed. The hardware management system can retrieve inventory information and sensor readings as well as receive event reports and failure notifications from boards and other Intelligent FRUs. The hardware management system can also perform basic recovery operations such as power cycle or reset of managed entities.

4.2 Hardware Management Functionality

The Front Blade Unit supports an “intelligent” hardware management system, based on the Intelligent Platform Management Interface Specification. The hardware management system of the Front Blade Unit provides the ability to manage the power and interconnect needs of intelligent devices, to monitor events, and to log events to a central repository.

4.2.1 Hardware Management Architecture

The AT8242 is made of three distinct entities: The switch management processor unit (along with the ethernet switch itself) and two network processor units. Each entity is independent and has its own power and reset domain. The logical hardware management architecture of the AT8242 is such that the blade acts as a pseudo-carrier, where each NPU engine is considered as a virtual AMC. Even though the NPU engines are not hot-swappable, they use the same API that would normally be associated to a distinct FRU, and they are both managed by their own virtual MMC.

The purpose of each virtual MMC instance is to have control over its associated engine payload power and reset domain, to monitor proper operation and maintain sensors relevant to the managed entity. The switch management processor unit is managed by the IPMC, which performs the same tasks over its entity. The IPMC is also responsible for proper interoperability with the shelf the AT8242 is installed in (i.e. Power negotiation and e-keying).

Each unit can perform transactions with its respective management controller using the KCS system interface. Communication between the IPMC and both virtual MMC instance is achieved using a virtual IPMB-L implementation, which allows transparently performing bridged transactions to the managed FRUs as if it was an actual IPMB. Only the IPMC can be accessed over IOL, using the Base Interface.

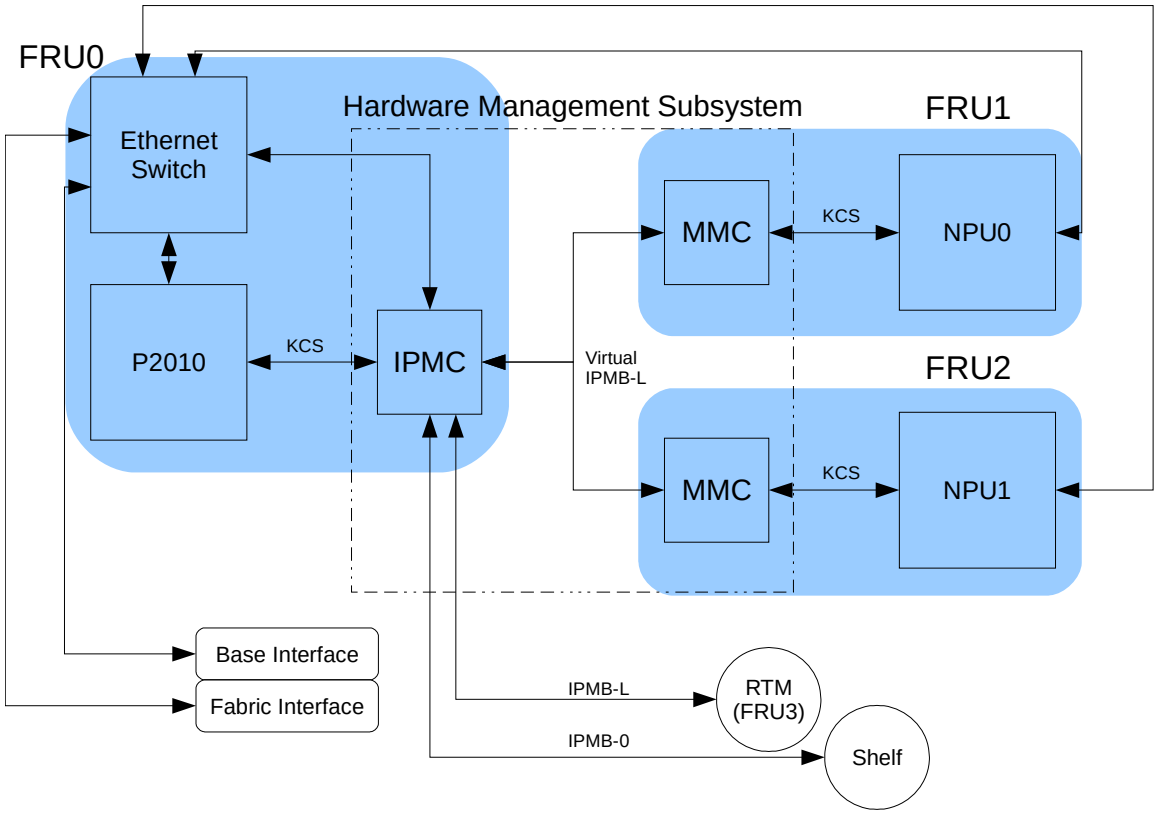
The following table lists each unit with its IPMB-L address.

Table 4-1:FRU ID and IPMB-L address information

AT8242 entity	FRU ID	IPMB-L Address
P2010 switch management unit	0	0x20
NPU0	1	0x7A
NPU1	2	0x7C
RTM	3	0xA6

The following figure shows the logical hardware management architecture for the AT8242.

Figure 4-1:AT8242 Hardware Management logical architecture



4.2.2 IPMC specific features

4.2.2.1 IPMC - ShMC interface

The principal management-oriented link within a Shelf is a two-way redundant implementation of the Intelligent Platform Management Bus (IPMB). IPMB is based on the inter-integrated circuit (I2C) bus and is part of the IPMI architecture. In AdvancedTCA Shelves, the main IPMB is called IPMB-0. Each entity attached to IPMB-0 does so through an IPM Controller, the distributed management controller of the IPMI architecture. Shelf Managers attach to IPMB-0 through a variant IPM Controller called the Shelf Management Controller (ShMC). AdvancedTCA IPM Controllers, besides supporting dual redundant IPMBs, also have responsibility for detecting and recovering from IPMB faults.

The reliability of the AdvancedTCA IPMB-0 is increased by using two IPMBs, with the two IPMBs referenced as IPMB-A and IPMB-B. The aggregation of the two IPMBs is IPMB-0. The IPM Controllers aggregate the information received on both IPMBs. An IPM Controller that has a message ready for transmit uses the IPMBs in a round robin fashion. An IPM Controller tries to alternate the transmission of messages between IPMB-A and IPMB-B.

If an IPM Controller is unable to transmit on the desired IPMB then it tries to send the message on the alternate IPMB. By using this approach, an IPMB can become unavailable and then available without the IPM Controller needing to take specific action.

4.2.2.2 IPMC - System Manager Interface

The Section 24 of [IPMI 2.0] describes how IPMI messages can be sent to and from the IPMC encapsulated in RMCP (Remote Management Control Protocol) packets datagrams. This capability is also referred to as "IPMI over LAN" (IOL). IPMI also defines the associated LAN-specific configuration interfaces for setting parameters such as IP addresses and other options, as well as commands for discovering IPMI-based systems. The Distributed Management Task Force (DMTF) specifies the RMCP format. This LAN communication path makes the Front Blade Unit reachable to the System Manager for any management action (IPMC firmware upgrade, query of all FRU Data, CPU reset etc.) without the need to go through the ShMC.

4.2.2.3 IPMC - System Event Log

The Kontron IPMC implementation includes a Local System Event Log device as specified in the Section 31 of [IPMI 2.0]. The local System Event Log is a non-volatile repository for the front board and all managed FRU events (Virtual AMC/RTM). The local SEL provides space for more than 5000 entries. However, even if blade events are logged into the local SEL, the IPMI platform event messages are still generated by the IPMC's Event Generator and sent to the centralized SEL hosted by the Shelf Manager through the IPMB-0 communication path - [PICMG 3.0] chapter 3.5; [IPMI 2.0] Section 29. Local SEL is useful for maintenance purposes and provides access to the events when the FRU is extracted from the Shelf.

4.2.3 Web Management Interface

4.2.3.1 Connecting to the Web Management Interface

To have access to the Web Management Interface, at least one of the IPMC LAN channels must be configured and accessible over the Base interface. Refer to section "Commands to configure IPMI over LAN" in the AT8242 CLI Reference Manual for more details.

To access the Web Management Interface:

- From a remote system, open a web browser.

- Type the IP address of the management controller in the browser.

- Default username and password are admin / admin

Note:
A maximum of 4 sessions can be opened simultaneously. Up to 5 users can be configured. An automatic logout will be done after 300 seconds of inactivity.

4.2.3.2 System

4.2.3.2.1 System Information

Once connected to the Web Management Interface, the first page displayed is the System Information. All board information is displayed on this page.

4.2.3.2.2 LAN Info

This page displays information on the IPMC LAN interfaces configuration. This configuration can be updated using this interface.

Note:
Configuration of the LAN interface being in use to access the Web Management Interface may lead to loss of connection.

4.2.3.2.3 System Tree

This page lists the IPMB addresses of the boards connected in the chassis.

4.2.3.3 Sensor

4.2.3.3.1 Reading

This page displays all board sensor readings. Values can be manually refreshed. Refer to sections “IPMC Sensors” on page 41 and “MMC sensors” on page 60 for a list of sensors for this board.

4.2.3.4 Event Log

4.2.3.4.1 Reading

This page displays System Event Log (SEL) information and the event list. The SEL can have up to 5119 entries, and it can be cleared or refreshed manually. Using the arrows under the table allows browsing through the event list.

4.2.4 Control

4.2.4.1 Remote Power / Reset

This page displays the current Hot-Swap state, Power state and power level of the board and its managed FRUs. It also allows performing power down, graceful shutdown, power cycle, power up and reset of all the FRUs.

Note:
Power up of FRU0 is not supported, as the Web Management Interface is not accessible when it is powered down.

4.2.5 Maintenance

4.2.5.1 Component Info

This page displays HPM Upgrade information and current components versions.

4.2.5.2 Component Upgrade

This page allows upgrading the FPGA and/or the IPMI firmware from the Web Management Interface using a HPM file. To proceed, here are the steps to follow:

- Click “Browse...” and select the HPM file to upload. Then, click on “File Upload”.

- When the file is uploaded, information on the HPM file is displayed. At this point, it is possible to select the component to upgrade if the file covers more than one component.

- Start the firmware upgrade by clicking “Start Upgrade Component(s)”. A progress bar will display the upgrade status for each component.

- If the upgrade is successful, the “Activate and Reboot Management” button will be displayed. Click on it to activate the new firmware.

4.2.5.3 Documentation

This page links to the product "Quick Reference Sheet". Use the download button to save a copy of the PDF document.

4.2.5.4 Users

This page is used to manage the authorized users. A maximum of five (5) users can be set. All users can be enabled or disabled. Privilege levels are defined in the table below.

Table 4-2:Privilege Level Description

Privilege Level	Description
Administrator	All BMC commands are allowed, including configuration settings. An Administrator can even execute configuration commands that would disable the channel that the Administrator is working on.
Operator	All BMC commands are allowed, except for configuration settings which can change the behavior of the out-of-band interfaces. For example, Operator privilege does not allow the capability to disable individual channels, or change user access privileges.
User	Only “basic” commands are allowed. These are primarily commands that read data and retrieve status. Commands that can be used to alter BMC configuration, write data to the management controllers, or perform system actions such as resets, power on/off, and watchdog activation are locked.
Callback	This may be considered the lowest privilege level. Only commands necessary to support initiating a callback are allowed.
No Access	No access is given to this user.

The User ID 1 is a user without name and password. This user can be enabled or disabled and has a privilege level set to “User” by default.

The User ID2 is pre-configured like an admin user. It has the “Administrator” privileges.

The User ID3 to User ID5 are configurable. By default they are set to “Disable”.

4.2.5.5 Logout

This button allows a safe logout of the management interface. An automatic logout will be done after 5 minutes of inactivity.

4.3 IPMC

4.3.1 Supported commands

The tables below list the IPMI commands supported by the IPMC. These tables are identical as the ones provided by PICMG 3.0. The last column states the Kontron support for the specific command.

Table 4-3:IPM Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
IPM Device "Global" Commands				M	M	
Get Device ID	20.1	App	01h	M	M	Yes
Cold Reset	20.2	App	02h	O	O	Yes
Warm Reset	20.3	App	03h	O	O	No
Get Self Test Results	20.4	App	04h	M	M	Yes

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Manufacturing Test On	20.5	App	05h	O	O	Yes
Set ACPI Power State	20.6	App	06h	O	O	No
Get ACPI Power State	20.7	App	07h	O	O	No
Get Device GUID	20.8	App	08h	O	O	Yes

Table 4-4:Watchdog Timer Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
BMC Watchdog Timer Commands				M	M	
Reset Watchdog Timer	27.5	App	22h	M	M	Yes
Set Watchdog Timer	27.6	App	24h	M	M	Yes
Get Watchdog Timer	27.7	App	25h	M	M	Yes

Table 4-5:Device Messaging Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
BMC Device and Messaging Commands				M	O	
Set BMC Global Enables	22.1	App	2Eh	M	O/M	Yes
Get BMC Global Enables	22.2	App	2Fh	M	O/M	Yes
Clear Message Flags	22.3	App	30h	M	O/M	Yes
Get Message Flags	22.4	App	31h	M	O/M	Yes
Enable Message Channel Receive	22.5	App	32h	O	O	Yes
Get Message	22.6	App	33h	M	O/M	Yes
Send Message	22.7	App	34h	M	M	Yes
Read Event Message Buffer	22.8	App	35h	O	O	Yes
Get BT Interface Capabilities	22.10	App	36h	M	O/M	No
Get System GUID	22.14	App	37h	O	O	Yes
Get Channel Authentication Capabilities	22.13	App	38h	O	O	Yes
Get Session Challenge	22.15	App	39h	O	O	Yes
Activate Session	22.17	App	3Ah	O	O	Yes
Set Session Privilege Level	22.18	App	3Bh	O	O	Yes

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Close Session	22.19	App	3Ch	O	O	Yes
Get Session Info	22.20	App	3Dh	O	O	Yes
Get AuthCode	22.21	App	3Fh	O	O	No
Set Channel Access	22.22	App	40h	O	O	Yes
Get Channel Access	22.23	App	41h	O	O	Yes
Get Channel Info	22.24	App	42h	O	O	Yes
Set User Access	22.26	App	43h	O	O	Yes
Get User Access	22.27	App	44h	O	O	Yes
Set User Name	22.28	App	45h	O	O	Yes
Get User Name	22.29	App	46h	O	O	Yes
Set User Password	22.30	App	47h	O	O	Yes
Activate Payload	24.1	App	48h			Yes
Deactivate Payload	24.2	App	49h			Yes
Get Payload Activation Status	24.4	App	4Ah			Yes
Get Payload Instance Info	24.5	App	4Bh			Yes
Set User Payload Access	24.6	App	4Ch			Yes
Get User Payload Access	24.7	App	4Dh			Yes
Get Channel Payload Support	24.8	App	4Eh			Yes
Get Channel Payload Version	24.9	App	4Fh			Yes
Get Channel OEM Payload Info	24.10	App	50h			No
Master Write-Read	22.11	App	52h	M	O/M	No
Get Channel Cipher Suites	22.15	App	54h			Yes
Suspend/Resume Payload Encryption	24.3	App	55h			Yes
Set Channel Security Keys	22.25	App	56h			No
Get System Interface Capabilities	22.9	App	57h			Yes

Table 4-6:Chassis Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Chassis Device Commands				O	O	
Get Chassis Capabilities	28.1	Chassis	00h	M	O	Yes
Get Chassis Status	28.2	Chassis	01h	O/M	O	Yes
Chassis Control	28.3	Chassis	02h	O/M	O	Yes
Chassis Reset	28.4	Chassis	03h	O	O	No
Chassis Identify	28.5	Chassis	04h	O	O	No
Set Chassis Capabilities	28.7	Chassis	05h	O	O	No
Set Power Restore Policy	28.8	Chassis	06h	O	O	No
Get System Restart Cause	28.11	Chassis	07h	O	O	No
Set System Boot Options	28.12	Chassis	08h	O	O	No
Get System Boot Options	28.13	Chassis	09h	O	O	No
Get POH Counter	22.12	Chassis	0Fh	O	O	No

Table 4-7:Event Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Event Commands				M	M	
Set Event Receiver	29.1	S/E	01h	M	M	Yes
Get Event Receiver	29.2	S/E	02h	M	M	Yes
Platform Event	29.3	S/E	03h	M	M	Yes

Table 4-8:PEF and Alerting Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
PEF and Alerting Commands				O	O	
Get PEF Capabilities	30.1	S/E	10h	M	M	Yes
Arm PEF Postpone Timer	30.2	S/E	11h	M	M	Yes
Set PEF Configuration Parameters	30.3	S/E	12h	M	M	Yes
Get PEF Configuration Parameters	30.4	S/E	13h	M	M	Yes

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Set Last Processed Event ID	30.5	S/E	14h	M	M	Yes
Get Last Processed Event ID	30.6	S/E	15h	M	M	Yes
Alert Immediate	30.7	S/E	16h	O	O	No
PET Acknowledge	30.8	S/E	17h	O	O	No

Table 4-9:Sensor Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Sensor Device Commands				O	M	
Get Device SDR Info	35.2	S/E	20h	O	M	Yes
Get Device SDR	35.3	S/E	21h	O	M	Yes
Reserve Device SDR Repository	35.4	S/E	22h	O	M	Yes
Get Sensor Reading Factors	35.5	S/E	23h	O	M	No
Set Sensor Hysteresis	35.6	S/E	24h	O	O	Yes
Get Sensor Hysteresis	35.7	S/E	25h	O	O	Yes
Set Sensor Threshold	35.8	S/E	26h	O	O	Yes
Get Sensor Threshold	35.9	S/E	27h	O	O	Yes
Set Sensor Event Enable	35.10	S/E	28h	O	O	Yes
Get Sensor Event Enable	35.11	S/E	29h	O	O	Yes
Re-arm Sensor Events	35.12	S/E	2Ah	O	O	No
Get Sensor Event Status	35.13	S/E	2Bh	O	O	No
Get Sensor Reading	35.14	S/E	2Dh	M	M	Yes
Set Sensor Type	35.15	S/E	2Eh	O	O	No
Get Sensor Type	35.16	S/E	2Fh	O	O	No

Table 4-10:FRU Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
FRU Device Commands				M	M	
Get FRU Inventory Area Info	34.1	Storage	10h	M	M	Yes
Read FRU Data	34.2	Storage	11h	M	M	Yes
Write FRU Data	34.3	Storage	12h	M	M	Yes

Table 4-11:SDR Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
SDR Device Commands				M	O	
Get SDR Repository Info	33.9	Storage	20h	M	M	
Get SDR Repository Allocation Info	33.10	Storage	21h	O	O	No
Reserve SDR Repository	33.11	Storage	22h	M	M	No
Get SDR	33.12	Storage	23h	M	M	No
Add SDR	33.13	Storage	24h	M	O/M	No
Partial Add SDR	33.14	Storage	25h	M	O/M	No
Delete SDR	33.15	Storage	26h	O	O	No
Clear SDR Repository	33.16	Storage	27h	M	O/M	No
Get SDR Repository Time	33.17	Storage	28h	O/M	O/M	No
Set SDR Repository Time	33.18	Storage	29h	O/M	O/M	No
Enter SDR Repository Update Mode	33.19	Storage	2Ah	O	O	No
Exit SDR Repository Update Mode	33.20	Storage	2Bh	M	M	No
Run Initialization Agent	33.21	Storage	2Ch	O	O	No

Table 4-12:SEL Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
SEL Device Commands				M	O	
Get SEL Info	31.2	Storage	40h	M	M	Yes
Get SEL Allcation Info	31.3	Storage	41h	O	O	Yes
Reserve SEL	31.4	Storage	42h	O	O	Yes
Get SEL Entry	31.5	Storage	43h	M	M	Yes
Add SEL Entry	31.6	Storage	44h	M	M	Yes
Partial Add SEL Entry	31.7	Storage	45h	M	M	No
Delete SEL Entry	31.8	Storage	46h	O	O	Yes
Clear SEL	31.9	Storage	47h	M	M	Yes
Get SEL Time	31.10	Storage	48h	M	M	Yes
Set SEL Time	31.11	Storage	49h	M	M	Yes
Get Auxiliary Log Status	31.12	Storage	5Ah	O	O	No
Set Auxiliary Log Status	31.13	Storage	5Bh	O	O	No

Table 4-13:LAN Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
LAN Device Commands				O	O	
Set LAN Configuration Parameters	23.1	Transport	01h	O/M	O/M	Yes
Get LAN Configuration Parameters	23.2	Transport	02h	O/M	O/M	Yes
Suspend BMC ARPs	23.3	Transport	03h	O/M	O/M	Yes
Get IP/UDP/RMCP Statistics	23.4	Transport	04h	O	O	Yes

Table 4-14:Serial/Modem Device Supported Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Serial/Modem Device Commands				O	O	
Set Serial/Modem Configuration	25.1	Transport	10h	O/M	O/M	No
Get Serial/Modem Configuration	25.2	Transport	11h	O/M	O/M	No
Set Serial/Modem Mux	25.3	Transport	12h	O	O	No
Get TAP Response Codes	25.4	Transport	13h	O	O	No
Set PPP UDP Proxy Transmit Data	25.5	Transport	14h	O	O	No
Get PPP UDP Proxy Transmit Data	25.6	Transport	15h	O	O	No
Send PPP UDP Proxy Packet	25.7	Transport	16h	O	O	No
Get PPP UDP Proxy Receive Data	25.8	Transport	17h	O	O	No
Serial/Modem Connection Active	25.9	Transport	18h	O/M	O/M	No
Callback	25.10	Transport	19h	O	O	No
Set User Callback Options	25.11	Transport	1Ah	O	O	No
Get User Callback Options	25.12	Transport	1Bh	O	O	No

Table 4-15:SOL Commands

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
SOL Commands				O	O	
SOL Activating	26.1	Transport	20h			Yes
Set SOL Configuration Params	26.2	Transport	21h			Yes
Get SOL Configuration Params	26.3	Transport	22h			Yes

Table 4-16:PICMG 3.0 Commands for IPMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
PICMG 3.0 AdvancedTCA Commands	PICMG 3.0 Table				M	
Get PICMG Properties	3-11	PICMG	00h		M	Yes
Get Address Info	3-10	PICMG	01h		M	Yes
Get Shelf Address Info	3-16	PICMG	02h		O	Yes
Set Shelf Address Info	3-17	PICMG	03h		O	No
FRU Control	3-27	PICMG	04h		M	Yes
Get FRU LED Properties	3-29	PICMG	05h		M	Yes
Get LED Color Capabilities	3-30	PICMG	06h		M	Yes
Set FRU LED State	3-31	PICMG	07h		M	Yes
Get FRU LED State	3-32	PICMG	08h		M	Yes
Set IPMB State	3-70	PICMG	09h		M	Yes
Set FRU Activation Policy	3-20	PICMG	0Ah		M	Yes
Get FRU Activation Policy	3-21	PICMG	0Bh		M	Yes
Set FRU Activation Policy	3-19	PICMG	0Ch		M	Yes
Get Device Locator Record ID	3-39	PICMG	0Dh		M	Yes
Set Port State	3-59	PICMG	0Eh		O/M	Yes
Get Port State	3-60	PICMG	0Fh		O/M	Yes
Compute Power Properties	3-82	PICMG	10h		M	Yes
Set Power Level	3-84	PICMG	11h		M	Yes
Get Power Level	3-83	PICMG	12h		M	Yes
Renegotiate Power	3-91	PICMG	13h		O	No
Get Fan Speed Properties	3-86	PICMG	14h		M If controls Shelf fans	No
Set Fan Level	3-88	PICMG	15h		O/M	No

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
Get Fan Level	3-87	PICMG	16h		O/M	No
Bused Resource	3-62	PICMG	17h		O/M	Yes
Get IPMB Link Info	3-68	PICMG	18h		O/M	Yes
Get Shelf Manager IPMB Address	3-38	PICMG	1Bh		M	No
Set Fan Policy	3-89	PICMG	1Ch		M	No
Get Fan Policy	3-90	PICMG	1Dh		M	No
FRU Control Capabilities	3-29	PICMG	1Eh		M	Yes
FRU Inventory Device Lock Control	3-42	PICMG	1Fh		M	No
FRU Inventory Device Write	3-43	PICMG	20h		M	No
Get Shelf Manager IP Addresses	3-36	PICMG	21h		M	No
Get Shelf Power Allocation	3-85	PICMG	22h		M	No
Get Telco Alarm Capability	3-93	PICMG	29h		O/M	No
Set Telco Alarm State	3-94	PICMG	2Ah		O/M	No
Get Telco Alarm State	3-95	PICMG	2Bh		O/M	No
Get Telco Alarm Location	3-95	PICMG	39h		O/M	No
Set FRU Extracted	3-25	PICMG	3Ah		M	No

Table 4-17:HPM Commands

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Carrier IPMC req.	Kontron support on IPMC
HPM.1 Commands	HPM.1 Table					
Get Target Upgrade Capabilities	3-3	PICMG	2Eh		M	Yes
Get Component Properties	3-5	PICMG	2Fh		M	Yes
Abort Firmware Upgrade	3-15	PICMG	30h		O	Yes
Initiate Upgrade Action	3-8	PICMG	31h		M	Yes
Upload Firmware Block	3-9	PICMG	32h		M	Yes
Finish Firmware Upload	3-10	PICMG	33h		M	Yes
Get Upgrade Status	3-2	PICMG	34h		O/M	Yes
Activate Firmware	3-11	PICMG	35h		M	Yes
Query Self-Test Results	3-12	PICMG	36h		O/M	Yes
Query Rollback Status	3-13	PICMG	37h		O/M	Yes
Initiate Manual Rollback	3-14	PICMG	38h		O/M	Yes

4.3.2 Sensor Data Records

Information that describes the IPMC capabilities is provided through two mechanisms: capabilities commands and Sensor Data Records (SDRs). Capabilities commands are commands within the IPMI command set that return fields providing information on other commands and functions the controller can handle.

Sensor Data Records are data records containing information about the type and number of sensors in the platform, sensor threshold support, event generation capabilities, and information on what types of readings the sensor provides. The primary purpose of Sensor Data Records is to describe the sensor configuration of the hardware management subsystem to system software.

The IPMC is required to maintain Device Sensor Data Records for the sensors and objects it manages. Access methods for the Device SDR entries are described in the [IPMI 2.0] specification, Section 35, "Sensor Device Commands."

After a FRU is inserted, the System Manager, using the Shelf Manager, may gather the various SDRs from the FRU's IPM Controller to learn the various objects and how to use them. The System Manager uses the "Sensor Device Commands" to gather this information. Thus, commands, such as "Get Device SDR Info" and "Get Device SDR," which are optional in the IPMI specification, are mandatory in AdvancedTCA systems.

Most of the current Shelf Manager implementation gathers the individual Device Sensor Data Records of each FRU into a centralized SDR Repository. This SDR Repository may exist in either the Shelf Manager or System Manager. If the Shelf Manager implements the SDR Repository on-board, it shall also respond to "SDR Repository" commands.

This duplication of SDR repository commands creates sometimes some confusion among AdvancedTCA users. It is mandatory for the IPMC to support the Sensor Device Commands for IPMC built-in SDR as described in the [IPMI 2.0] specification, Section 35, "Sensor Device Commands." For the ShMC, the same set of commands for the centralized SDR Repository must be supported but they are described in the [IPMI 2.0] specification, Section 33, "SDR Repository Commands."

4.3.2.1 IPMC Sensors

Table 4-18:IPMC Sensors

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
0	FRU0 Hot Swap	Discrete	ATCA Board FRU Hot Swap Sensor for FRU 0 (Front Board) Sensor type code = F0h PICMG Hot Swap Event Reading type code = 6Fh Sensor specific See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
1	FRU1 Hot Swap	Discrete	ATCA Board FRU Hot Swap Sensor for FRU 1 (Virtual AMC B1) Sensor type code = F0h PICMG Hot Swap Event Reading type code = 6Fh Sensor specific See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
2	FRU2 Hot Swap	Discrete	ATCA Board FRU Hot Swap Sensor for FRU 2 (Virtual AMC B2) Sensor type code = F0h PICMG Hot Swap Event Reading type code = 6Fh Sensor specific See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
3	FRU3 Hot Swap	Discrete	ATCA Board FRU Hot Swap Sensor for FRU 3 (RTM) Sensor type code = F0h PICMG Hot Swap Event Reading type code = 6Fh Sensor specific See PICMG 3.0 R3.0 Table 3-22, "FRU Hot Swap event message"
4	FRU0 Reconfig	Discrete	Sensor Population Change on Carrier Sensor type = 12h System Event Event Reading type code = 6Fh Sensor specific, only offset 0 is used -see AMC.0 R2.0 for event trigger -see IPMI v1.5 table 36.3, Sensor type code 12h for sensor definition
5	Temp Inlet	Threshold	Inlet Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
6	Temp Outlet	Threshold	Outlet Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
7	Temp IPMC	Threshold	IPM Controller Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
8	Temp Switch	Threshold	Switch Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
9	Temp SO-DIMM	Threshold	SO-DIMM Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
10	Brd Input Power	Threshold	Power consumption in watts of the complete blade (including managed FRU) Sensor type = 0Bh Other Unit-Based Sensor (Watt) Event Reading type code = 01h threshold base See IPMI v1.5 section 29.13.3 for threshold based event

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
11	RTM Power	Threshold	FRU 3 (RTM) Power consumption in watts Sensor type = 0Bh Other Unit-Based Sensor (Watt) Event Reading type code = 01h threshold base See IPMI v1.5 section 29.13.3 for threshold based event
12	Vcc +12V SUS	Threshold	Voltage on board 12V suspend (management) power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
13	Vcc +5V SUS	Threshold	Voltage on board 5V suspend (management) power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
14	Vcc +3.3V SUS	Threshold	Voltage on board 3.3V suspend (management) power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
15	Vcc +2.5V SUS	Threshold	Voltage on board 2.5V suspend (management) power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
16	Vcc +1.5V SUS	Threshold	Voltage on board 1.5V suspend (management) power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
17	Vcc +1.2V SUS	Threshold	Voltage on board 1.2V suspend (management) power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
18	Vcc +0.75V SUS	Threshold	Voltage on board 0.75V suspend (management) power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
19	Vcc +1.2V Early	Threshold	Voltage on board 1.2V early power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
20	Vcc +5V	Threshold	Voltage on board 5V payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
21	Vcc +2.5V	Threshold	Voltage on board 2.5V payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
22	Vcc +1.1V	Threshold	Voltage on board 1.1V payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
23	Vcc +1.05V	Threshold	Voltage on board 1.05V payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
24	Vcc +1.0V	Threshold	Voltage on board 1.0V payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
25	Vcc +1.0V Aux	Threshold	Voltage on board 1.0V Aux payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
26	Vcc Vtt	Threshold	Voltage on board Vtt payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
27	Vcc -48V Feed	Threshold	Voltage on -48v feed A/B board input power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
28	Vcc HUV	Threshold	Voltage on HUV board input power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
29	Vcc FVR	Threshold	Voltage on 2.048V Fixed Reference Voltage (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
30	SO-DIMM SPD Pres	Discrete	SO-DIMM Temperature Sensor Presence Sensor type = 25h Entity Presence Event Reading type code = 6Fh Sensor specific, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 25h for sensor definition
31	Fuse-Pres A Feed	Discrete	Fuse presence and fault detection -48 V on supply A Sensor type = 08h Power Supply Event Reading type code = 6Fh Sensor specific, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 08h for sensor definition
32	Fuse-Pres B Feed	Discrete	Fuse presence and fault detection -48 V on supply B Sensor type = 08h Power Supply Event Reading type code = 6Fh Sensor specific, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 08h for sensor definition
33	Power State	Discrete	Board Power State Sensor type = D1h Kontron OEM Power State Sensor Event Reading type code = 6Fh Sensor specific See OEM sensor table, Sensor type code D1h for sensor definition
34	Power Good	Discrete	Actual power good status Sensor type = 08h Power Supply Event Reading type code = 77h OEM See OEM sensor table, Event/Reading type code 77h for sensor definition

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
35	Board Reset	Discrete	Board reset type and sources Sensor type = CFh OEM (Kontron Reset Sensor) Event Reading type code = 03h Digital Discrete, offset 0,1 are used See OEM sensor table, Sensor type code CFh for sensor definition
36	POST Value	Discrete	Show current postcode value Sensor type = C6h OEM (Kontron POST value sensor) Event Reading type code = 6Fh Sensor specific, offset 0 to 7 and 14 are used See OEM sensor table, Sensor type code C6h for sensor definition
37	POST Error	Discrete	CPU Power On Self Test Error Sensor type = 0Fh System Firmware Progress Event Reading type code = 6Fh Sensor specific, offset 0 is used See IPMI v1.5 table 36.3, Sensor type code 0Fh for sensor definition
38	Boot Error	Discrete	Boot Error Sensor Type = 1Eh Boot Error Reading type code = 6Fh Sensor Specific, offset 0 is used See IPMI v1.5 table 36.3, Sensor type code 1Eh for sensor definition
39	Diag Status	Discrete	Diagnostic Status Sensor Type = C9h OEM (Kontron Diagnostic Status Sensor) Event Reading type code = 6Fh Sensor Specific, offset 0 to 2 are used See OEM sensor table, Sensor type code C9h for sensor definition
40	Fwupg Status	Discrete	System Firmware Update Status Sensor type = CAh OEM (Kontron OEM System firmware upgrade Status) Event Reading type code = 6Fh Sensor specific, offset 0 to 2 are used See OEM table, Sensor type code CAh for sensor definition
41	IPMI Watchdog	Discrete	IPMI Watchdog (payload watchdog) Sensor type = 23h Watchdog 2 Event Reading type code = 6Fh Sensor specific, offset 0,1,2,3,8 are used See IPMI v1.5 table 36.3, Sensor type code 23h for sensor definition
42	Ver Change IPMC	Discrete	IPMC Firmware Change Detection Sensor type = 2Bh Version Change Event Reading type code = 6Fh Sensor specific See IPMI v1.5 table 36.3, Sensor type code 2Bh for sensor definition
43	Ver Change FPGA	Discrete	FPGA Firmware Change Detection Sensor type = 2Bh Version Change Event Reading type code = 6Fh Sensor specific See IPMI v1.5 table 36.3, Sensor type code 2Bh for sensor definition
44	Health Error	Discrete	General health status, Aggregation of critical sensors. This list is flexible and could be adjusted based on customer requirements. Sensor type = 24h Platform Alert Event Reading type code = 03h Digital Discrete, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 24h for sensor definition
45	IPMB0 Link State	Discrete	IPMB-0 fault detection sensor Sensor type = F1h PICMG Physical IPMB-0 Event Reading type code = 6Fh Sensor specific See PICMG 3.0 R3.0 Table 3-69, “Physical IPMB-0 event message”
46	FRU0 IPMBL State	Discrete	IPMB-L branch from FRU0 fault detection sensor Sensor type = C3h OEM (Kontron OEM IPMB-L link state) Event Reading type code = 6Fh Sensor specific, offset 2 and 3 are used See OEM table, Sensor type code C3h for sensor definition

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
47	FRU3 IPMBL State	Discrete	IPMB-L branch from FRU3 fault detection sensor Sensor type = C3h OEM (Kontron OEM IPMB-L link state) Event Reading type code = 6Fh Sensor specific, offset 2 and 3 are used See OEM table, Sensor type code C3h for sensor definition
48	FRU Over Icc	Discrete	FRU Over Current Sensor Sensor type = CBh OEM (Kontron OEM FRU Over Current) Event Reading type code = 03h Digital Discrete, offset 0,1 are used See OEM table, Sensor type code CBh for sensor definition
49	FRU Sensor Error	Discrete	FRU Error during external FRU Sensor discovery Sensor type = CCh OEM (Kontron OEM FRU sensor error) Event Reading type code = 03h Digital Discrete, offset 0,1 are used See OEM table, Sensor type code CCh for sensor definition
50	FRU Pwr Denied	Discrete	FRU Power Denial Detection Sensor type = CDh OEM (Kontron FRU Power denied) Event Reading type code = 03h Digital Discrete, offset 0,1 are used See OEM table, Sensor type code CDh for sensor definition
51	FRU MngtPwr Fail	Discrete	FRU Management Power Fail Sensor type = D2h OEM (Kontron FRU Management Power Fail) Event Reading type code = 03h Digital Discrete, offset 0,1 are used See OEM table, Sensor type code D2h for sensor definition
52	FRU0 Agent	Discrete	FRU Information Agent - FRU0 Data Error Detection Sensor type = C5h OEM (Kontron FRU Info Agent) Event Reading type code = 0Ah Generic Discrete, offset 6,8 are used See OEM table, Sensor type code C5h for sensor definition
53	FRU1 Agent	Discrete	FRU Information Agent - FRU1 Data Error Detection Sensor type = C5h OEM (Kontron FRU Info Agent) Event Reading type code = 0Ah Generic Discrete, offset 6,8 are used See OEM table, Sensor type code C5h for sensor definition
54	FRU2 Agent	Discrete	FRU Information Agent - FRU2 Data Error Detection Sensor type = C5h OEM (Kontron FRU Info Agent) Event Reading type code = 0Ah Generic Discrete, offset 6,8 are used See OEM table, Sensor type code C5h for sensor definition
55	FRU3 Agent	Discrete	FRU Information Agent - FRU3 Data Error Detection Sensor type = C5h OEM (Kontron FRU Info Agent) Event Reading type code = 0Ah Generic Discrete, offset 6,8 are used See OEM table, Sensor type code C5h for sensor definition
56	EventRcv ComLost	Discrete	Detects communication with the event receiver (ShMC) has been lost Sensor type = 1Bh Cable/Interconnect Event Reading type code = 03h Digital Discrete See IPMI v1.5 table 36.2 and table 36.3 for sensor definition
57	IPMC Reboot	Discrete	IPMC reboot detection Sensor type = 24h Platform Alert Event Reading type code = 03h Digital Discrete, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 24h for sensor definition
58	IPMC Storage Err	Discrete	Management sub-system health: non volatile memory error Sensor type = 28h Management Subsystem Health Event Reading type code = 6Fh Sensor specific, offset 1 is used See IPMI v1.5 table 36.3, Sensor type code 28h for sensor definition

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
59	IPMC SEL State	Discrete	Specifies SEL status (Cleared/Almost Full/Full) Sensor type = 10h Event Logging Disable Event Reading type code = 6Fh Sensor specific, offset 2,4,5 are used See IPMI v1.5 table 36.3, Sensor type code 10h for sensor definition
60	Jumper Status	Discrete	Reflects on-board jumper presence Sensor type = D3h OEM (Kontron OEM Jumper Status) Event Reading type code = 6Fh Sensor specific, offsets 0 to 14 are used See OEM table, Sensor type code D3h for sensor definition
61	IPMI Info-1	Discrete	Internal Management Controller firmware diagnostic Sensor type = C0h Kontron OEM Firmware Info Event Reading type code = 70h Kontron OEM Internal Diagnostic See OEM table, Sensor type code C0h and Event/Reading type code 70h for sensor definition
62	IPMI Info-2	Discrete	Internal Management Controller firmware diagnostic Sensor type = C0h Kontron OEM Firmware Info Event Reading type code = 75h Kontron OEM Internal Diagnostic See OEM table, Sensor type code C0h and Event/Reading type code 75h for sensor definition

4.3.2.2 IPMC Health Indicator Sensor Aggregation

The following table shows the sensors involved in the Health Sensor Aggregation.

Table 4-19:IPMC Health Indicator Sensor Aggregation

IPMI Sensor ID	Sensor Name
5	Temp Inlet
6	Temp Outlet
7	Temp IPMC
8	Temp Switch
9	Temp SO-DIMM
10	Brd Input Power
11	RTM Power
12	Vcc +12V SUS
13	Vcc +5V SUS
14	Vcc +3.3V SUS
15	Vcc +2.5V SUS
16	Vcc +1.5V SUS
17	Vcc +1.2V SUS
18	Vcc +0.75V SUS
19	Vcc +1.2V Early
20	Vcc +5V
21	Vcc +2.5V
22	Vcc +1.1V
23	Vcc +1.05V

IPMI Sensor ID	Sensor Name
24	Vcc +1.0V
25	Vcc +1.0V Aux
26	Vcc Vtt
27	Vcc -48V Feed
28	Vcc HUV
29	Vcc FVR
31	Fuse-Pres A Feed
32	Fuse-Pres B Feed
34	Power Good
41	IPMI Watchdog

4.3.3 FRU Information

Table 4-20:Board Information Area

	Board Information Area
Board Mfg Date	Programmed with manufacturing date
Board Mfg	Kontron
Board Product	AT8242
Board Serial	Programmed with serial number
Board Part Number	Programmed with part number
Board FRU ID	FRU5311-xx
Board Extra	MAC=xx:xx:xx:xx:xx:xx/64

Table 4-21:Product Information Area

	Product Information Area
Product Manufacturer	Kontron
Product Name	AT8242
Product Part Number	Programmed with part number
Product Version	Programmed with board revision
Product Serial	Programmed with serial number
Product FRU ID	FRU5311-xx

4.3.3.1 ATCA Board E-Keying Information

The board E-keying information contains PICMG 3.0 R3.0 defined channel and link descriptors required for matchmaking computation by the ShMC.

E-keying information covering the Fabric Interface is based on PICMG 3.1 R2.0. This revision of the PICMG 3.1 specification introduces the Link Class field within the Link Descriptor, which was not previously defined. Backward compatibility with PICMG 3.1 R1.0 is insured by keeping Link Descriptors with a non-zero Link Class at the end of the list for each Fabric Interface channel. A ShMC supporting PICMG 3.1 R2.0 will re-order the Link Descriptors during E-keying negotiation and prioritize those having a higher signalling link class.

The following table gives E-keying capabilities as they appear in FRU data.

Table 4-22:E-Keying Capabilities

Field	Value
Record Type ID	C0h
Record Format Version	02h
Record Length	*Calculated
Record Checksum	*Calculated
Header Checksum	*Caculated
Manufacturer ID	00315Ah (PICMG Record ID)
PICMG Record ID	14h (Board Point-to-Point Connectivity Record)
Record Format Version	01h
OEM GUID Count	00h
Link Descriptor	00001101h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	0h: None
Link Type (Bits 19-12)	01h: PICMG 3.0 Base Interface 10/100/1000 BASE-T
Link Designator (Bits 11-0)	101h: Base Interface, Channel 1, Port 0
Link Descriptor	00001102h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	0h: None
Link Type (Bits 19-12)	01h: PICMG 3.0 Base Interface 10/100/1000 BASE-T
Link Designator (Bits 11-0)	102h: Base Interface, Channel 2, Port 0
Link Descriptor	00402F41h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	4h: Fixed 10GBASE-KX4
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	F41h: Fabric Interface, Channel 1, Port 0, 1, 2, 3
Link Descriptor	00102F41h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	1h: Fixed 10GBASE-BX4
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	F41h: Fabric Interface, Channel 1, Port 0, 1, 2, 3
Link Descriptor	00302141h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	3h: Fixed 1000BASE-KX
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	141h: Fabric Interface, Channel 1, Port 0

Field	Value
Link Descriptor	00002141h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	0h: Fixed 1000BASE-BX
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	141h: Fabric Interface, Channel 1, Port 0
Link Descriptor	00132F41h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	1h: Fixed 40GBASE-KR4
Link Class (bits 19-16)	3h: 10.3125Gbd Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	F41h: Fabric Interface, Channel 1, Port 0, 1, 2, 3
Link Descriptor	00032141h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	0h: Fixed 10GBASE-KR
Link Class (bits 19-16)	3h: 10.3125Gbd Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	141h: Fabric Interface, Channel 1, Port 0
Link Descriptor	00402F42h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	4h: Fixed 10GBASE-KX4
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	F42h: Fabric Interface, Channel 2, Port 0, 1, 2, 3
Link Descriptor	00102F42h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	1h: Fixed 10GBASE-BX4
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	F42h: Fabric Interface, Channel 2, Port 0, 1, 2, 3
Link Descriptor	00302142h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	3h: Fixed 1000BASE-KX
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	142h: Fabric Interface, Channel 2, Port 0
Link Descriptor	00002142h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	0h: Fixed 1000BASE-BX
Link Class (bits 19-16)	0h: Basic Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	142h: Fabric Interface, Channel 2, Port 0

Field	Value
Link Descriptor	00132F42h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	1h: Fixed 40GBASE-KR4
Link Class (bits 19-16)	3h: 10.3125Gbd Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	F42h: Fabric Interface, Channel 2, Port 0, 1, 2, 3
Link Descriptor	00032142h
Link Grouping ID (Bits 31-24)	00h: Single-channel link
Link Type Extension (Bits 23-20)	0h: Fixed 10GBASE-KR
Link Class (bits 19-16)	3h: 10.3125Gbd Signaling Link Class
Link Type (Bits 15-12)	2h: PICMG 3.1 Ethernet Fabric Interface
Link Designator (Bits 11-0)	142h: Fabric Interface, Channel 2, Port 0

4.3.3.2 Carrier Activation and Carrier Information Tables

Each NPU engine is seen as a virtual AMC, with its own power and reset domain. Even though they are not physically extractable, relevant carrier information records are present in FRU data as to insure proper compatibility with the AMC.0 R2.0 specification.

Table 4-23:Carrier Activation and Current Management

Field	Value
Record Type ID	C0h
Record Format Version	02h
Record Length	*Calculated
Record Checksum	*Calculated
Header Checksum	*Calculated
Manufacturer ID	00315Ah (PICMG Record ID)
PICMG Record ID	17h (Carrier Activation and Current Management Record)
Record Format Version	00h
Maximum Internal Current	50h (8 Amps at 12V => 96 Watts)
Allowance for Module Activation Readiness	02h
Module Activation and Power Descriptor Count	02h
Carrier Activation and Power Descriptor	7A28FFh
Local IPMB-L Address	7Ah
Maximum Module Current	28h (4 Amps at 12V => 48 Watts)
Reserved	FFh

Field	Value
Carrier Activation and Power Descriptor	7C28FFh
Local IPMB-L Address	7Ch
Maximum Module Current	28h (4 Amps at 12V => 48 Watts)
Reserved	FFh

Table 4-24:Carrier Information

Field	Value
Record Type ID	C0h
Record Format Version	02h
Record Length	*Calculated
Record Checksum	*Calculated
Header Checksum	*Calculated
Manufacturer ID	00315Ah (PICMG Record ID)
PICMG Record ID	1Ah (Carrier Information Table)
Record Format Version	00h
AMC.0 Extension Version	02h (AMC.0 R2.0)
Carrier Site Number Count	02h
Carrier Site Number	05h
Carrier Site Number	06h

4.4 Virtual MMC

4.4.1 Supported Commands

The tables below list the IPMI commands supported by both Virtual MMC instances. These tables are identical as the ones provided by AMC.0. The last column states the Kontron support for the specific command.

Table 4-25:IPM Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
IPM Device "Global" Commands				M	M	
Get Device ID	20.1	App	01h	M	M	Yes
Cold Reset	20.2	App	02h	O	O	Yes
Warm Reset	20.3	App	03h	O	O	No
Get Self Test Results	20.4	App	04h	M	O	Yes

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Manufacturing Test On	20.5	App	05h	O	O	Yes
Set ACPI Power State	20.6	App	06h	O	O	No
Get ACPI Power State	20.7	App	07h	O	O	No
Get Device GUID	20.8	App	08h	O	O	Yes

Table 4-26:Watchdog Timer Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
BMC Watchdog Timer Commands				M	O	
Reset Watchdog Timer	27.5	App	22h	M	O	Yes
Set Watchdog Timer	27.6	App	24h	M	O	Yes
Get Watchdog Timer	27.7	App	25h	M	O	Yes

Table 4-27:Device Messaging Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
BMC Device and Messaging Commands				M	O	
Set BMC Global Enables	22.1	App	2Eh	M	O	Yes
Get BMC Global Enables	22.2	App	2Fh	M	O	Yes
Clear Message Flags	22.3	App	30h	M	O	Yes
Get Message Flags	22.4	App	31h	M	O	Yes
Enable Message Channel Receive	22.5	App	32h	O	O	Yes
Get Message	22.6	App	33h	M	O	Yes
Send Message	22.7	App	34h	M	O	Yes
Read Event Message Buffer	22.8	App	35h	O	O	Yes
Get BT Interface Capabilities	22.10	App	36h	M	O	No
Get System GUID	22.14	App	37h	O	O	Yes
Get Channel Authentication Capabilities	22.13	App	38h	O	O	No
Get Session Challenge	22.15	App	39h	O	O	No
Activate Session	22.17	App	3Ah	O	O	No
Set Session Privilege Level	22.18	App	3Bh	O	O	No

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Close Session	22.19	App	3Ch	O	O	No
Get Session Info	22.20	App	3Dh	O	O	No
Get AuthCode	22.21	App	3Fh	O	O	No
Set Channel Access	22.22	App	40h	O	O	No
Get Channel Access	22.23	App	41h	O	O	No
Get Channel Info	22.24	App	42h	O	O	Yes
Set User Access	22.26	App	43h	O	O	No
Get User Access	22.27	App	44h	O	O	No
Set User Name	22.28	App	45h	O	O	No
Get User Name	22.29	App	46h	O	O	No
Set User Password	22.30	App	47h	O	O	No
Activate Payload	24.1	App	48h			No
Deactivate Payload	24.2	App	49h			No
Get Payload Activation Status	24.4	App	4Ah			No
Get Payload Instance Info	24.5	App	4Bh			No
Set User Payload Access	24.6	App	4Ch			No
Get User Payload Access	24.7	App	4Dh			No
Get Channel Payload Support	24.8	App	4Eh			No
Get Channel Payload Version	24.9	App	4Fh			No
Get Channel OEM Payload Info	24.10	App	50h			No
Master Write-Read	22.11	App	52h	M	O	No
Get Channel Cipher Suites	22.15	App	54h			No
Suspend/Resume Payload Encryption	24.3	App	55h			No
Set Channel Security Keys	22.25	App	56h			No
Get System Interface Capabilities	22.9	App	57h			Yes

Table 4-28:Chassis Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Chassis Device Commands				O	O	
Get Chassis Capabilities	28.1	Chassis	00h	M	O	Yes
Get Chassis Status	28.2	Chassis	01h	O/M	O	Yes
Chassis Control	28.3	Chassis	02h	O/M	O	Yes
Chassis Reset	28.4	Chassis	03h	O	O	No
Chassis Identify	28.5	Chassis	04h	O	O	No
Set Chassis Capabilities	28.7	Chassis	05h	O	O	No
Set Power Restore Policy	28.8	Chassis	06h	O	O	No
Get System Restart Cause	28.11	Chassis	07h	O	O	No
Set System Boot Options	28.12	Chassis	08h	O	O	No
Get System Boot Options	28.13	Chassis	09h	O	O	No
Get POH Counter	22.12	Chassis	0Fh	O	O	No

Table 4-29:Event Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Event Commands				M	M	
Set Event Receiver	29.1	S/E	01h	M	M	Yes
Get Event Receiver	29.2	S/E	02h	M	M	Yes
Platform Event	29.3	S/E	03h	M	M	Yes

Table 4-30:PEF and Alerting Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
PEF and Alerting Commands				O	O	
Get PEF Capabilities	30.1	S/E	10h	M	O	No
Arm PEF Postpone Timer	30.2	S/E	11h	M	O	No
Set PEF Configuration Parameters	30.3	S/E	12h	M	O	No
Get PEF Configuration Parameters	30.4	S/E	13h	M	O	No

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Set Last Processed Event ID	30.5	S/E	14h	M	O	No
Get Last Processed Event ID	30.6	S/E	15h	M	O	No
Alert Immediate	30.7	S/E	16h	O	O	No
PET Acknowledge	30.8	S/E	17h	O	O	No

Table 4-31:Sensor Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Sensor Device Commands				O	M	
Get Device SDR Info	35.2	S/E	20h	O	M	Yes
Get Device SDR	35.3	S/E	21h	O	M	Yes
Reserve Device SDR Repository	35.4	S/E	22h	O	M	Yes
Get Sensor Reading Factors	35.5	S/E	23h	O	O	No
Set Sensor Hysteresis	35.6	S/E	24h	O	O	Yes
Get Sensor Hysteresis	35.7	S/E	25h	O	O	Yes
Set Sensor Threshold	35.8	S/E	26h	O	O	Yes
Get Sensor Threshold	35.9	S/E	27h	O	O	Yes
Set Sensor Event Enable	35.10	S/E	28h	O	O	Yes
Get Sensor Event Enable	35.11	S/E	29h	O	O	Yes
Re-arm Sensor Events	35.12	S/E	2Ah	O	O	No
Get Sensor Event Status	35.13	S/E	2Bh	O	O	No
Get Sensor Reading	35.14	S/E	2Dh	M	M	Yes
Set Sensor Type	35.15	S/E	2Eh	O	O	No
Get Sensor Type	35.16	S/E	2Fh	O	O	No

Table 4-32:FRU Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
FRU Device Commands				M	M	
Get FRU Inventory Area Info	34.1	Storage	10h	M	M	Yes
Read FRU Data	34.2	Storage	11h	M	M	Yes
Write FRU Data	34.3	Storage	12h	M	M	Yes

Table 4-33:SDR Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
SDR Device Commands				M	O	
Get SDR Repository Info	33.9	Storage	20h	M	O	No
Get SDR Repository Allocation Info	33.10	Storage	21h	O	O	No
Reserve SDR Repository	33.11	Storage	22h	M	O	No
Get SDR	33.12	Storage	23h	M	O	No
Add SDR	33.13	Storage	24h	M	O	No
Partial Add SDR	33.14	Storage	25h	M	O	No
Delete SDR	33.15	Storage	26h	O	O	No
Clear SDR Repository	33.16	Storage	27h	M	O	No
Get SDR Repository Time	33.17	Storage	28h	O/M	O	No
Set SDR Repository Time	33.18	Storage	29h	O/M	O	No
Enter SDR Repository Update Mode	33.19	Storage	2Ah	O	O	No
Exit SDR Repository Update Mode	33.20	Storage	2Bh	M	O	No
Run Initialization Agent	33.21	Storage	2Ch	O	O	No

Table 4-34:SEL Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
SEL Device Commands				M	O	
Get SEL Info	31.2	Storage	40h	M	O	No
Get SEL Allcation Info	31.3	Storage	41h	O	O	No
Reserve SEL	31.4	Storage	42h	O	O	No
Get SEL Entry	31.5	Storage	43h	M	O	No
Add SEL Entry	31.6	Storage	44h	M	O	No
Partial Add SEL Entry	31.7	Storage	45h	M	O	No
Delete SEL Entry	31.8	Storage	46h	O	O	No
Clear SEL	31.9	Storage	47h	M	O	No
Get SEL Time	31.10	Storage	48h	M	O	No
Set SEL Time	31.11	Storage	49h	M	O	No
Get Auxiliary Log Status	31.12	Storage	5Ah	O	O	No
Set Auxiliary Log Status	31.13	Storage	5Bh	O	O	No

Table 4-35:LAN Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
LAN Device Commands				O	O	
Set LAN Configuration Parameters	23.1	Transport	01h	O/M	O	No
Get LAN Configuration Parameters	23.2	Transport	02h	O/M	O	No
Suspend BMC ARPs	23.3	Transport	03h	O/M	O	No
Get IP/UDP/RMCP Statistics	23.4	Transport	04h	O	O	No

Table 4-36:Serial/Modem Device Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Serial/Modem Device Commands				O	O	
Set Serial/Modem Configuration	25.1	Transport	10h	O/M	O	No
Get Serial/Modem Configuration	25.2	Transport	11h	O/M	O	No
Set Serial/Modem Mux	25.3	Transport	12h	O	O	No
Get TAP Response Codes	25.4	Transport	13h	O	O	No
Set PPP UDP Proxy Transmit Data	25.5	Transport	14h	O	O	No
Get PPP UDP Proxy Transmit Data	25.6	Transport	15h	O	O	No
Send PPP UDP Proxy Packet	25.7	Transport	16h	O	O	No
Get PPP UDP Proxy Receive Data	25.8	Transport	17h	O	O	No
Serial/Modem Connection Active	25.9	Transport	18h	O/M	O	No
Callback	25.10	Transport	19h	O	O	No
Set User Callback Options	25.11	Transport	1Ah	O	O	No
Get User Callback Options	25.12	Transport	1Bh	O	O	No

Table 4-37:SOL Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
SOL Commands				0	0	
SOL Activating	26.1	Transport	20h			No
Set SOL Configuration Params	26.2	Transport	21h			No
Get SOL Configuration Params	26.3	Transport	22h			No

Table 4-38:PICMG 3.0 ATCA Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
PICMG 3.0 AdvancedTCA Commands	PICMG 3.0 Table				M	
Get PICMG Properties	3-11	PICMG	00h		M	Yes
Get Address Info	3-10	PICMG	01h		N/A	No
Get Shelf Address Info	3-16	PICMG	02h		N/A	No
Set Shelf Address Info	3-17	PICMG	03h		N/A	No
FRU Control	3-27	PICMG	04h		M	Yes
Get FRU LED Properties	3-29	PICMG	05h		M	Yes
Get LED Color Capabilities	3-30	PICMG	06h		M	Yes
Set FRU LED State	3-31	PICMG	07h		M	Yes
Get FRU LED State	3-32	PICMG	08h		M	Yes
Set IPMB State	3-70	PICMG	09h		N/A	No
Set FRU Activation Policy	3-20	PICMG	0Ah		N/A	No
Get FRU Activation Policy	3-21	PICMG	0Bh		N/A	No
Set FRU Activation Policy	3-19	PICMG	0Ch		N/A	No
Get Device Locator Record ID	3-39	PICMG	0Dh		M	Yes
Set Port State	3-59	PICMG	0Eh		N/A	No
Get Port State	3-60	PICMG	0Fh		N/A	No
Compute Power Properties	3-82	PICMG	10h		N/A	No
Set Power Level	3-84	PICMG	11h		N/A	No
Get Power Level	3-83	PICMG	12h		N/A	No
Renegotiate Power	3-91	PICMG	13h		N/A	No
Get Fan Speed Properties	3-86	PICMG	14h		N/A	No
Set Fan Level	3-88	PICMG	15h		N/A	No
Get Fan Level	3-87	PICMG	16h		N/A	No
Bused Resource	3-62	PICMG	17h		N/A	No

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Get IPMB Link Info	3-68	PICMG	18h		N/A	No
Get Shelf Manager IPMB Address	3-38	PICMG	1Bh		N/A	No
Set Fan Policy	3-89	PICMG	1Ch		N/A	No
Get Fan Policy	3-90	PICMG	1Dh		N/A	No
FRU Control Capabilities	3-29	PICMG	1Eh		M	Yes
FRU Inventory Device Lock Control	3-42	PICMG	1Fh		O	No
FRU Inventory Device Write	3-43	PICMG	20h		O	No
Get Shelf Manager IP Addresses	3-36	PICMG	21h		O	No
Get Shelf Power Allocation	3-85	PICMG	22h		N/A	No
Get Telco Alarm Capability	3-93	PICMG	29h			No
Set Telco Alarm State	3-94	PICMG	2Ah			No
Get Telco Alarm State	3-95	PICMG	2Bh			No
Get Telco Alarm Location	3-95	PICMG	39h			No
Set FRU Extracted	3-25	PICMG	3Ah			No

Table 4-39:AMC.0 Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
AMC.0 Commands	AMC.0 Table					
Set AMC Port State	3-27	PICMG	19h		O/M	No
Get AMC Port State	3-28	PICMG	1Ah		O/M	No
Set Clock State	3-44	PICMG	2Ch		O/M	No
Get Clock State	3-45	PICMG	2Dh		O/M	No

Table 4-40:HPM.1 Supported Commands for MMC

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
HPM.1 Commands	HPM.1 Table					
Get Target Upgrade Capabilities	3-3	PICMG	2Eh			No
Get Component Properties	3-5	PICMG	2Fh			No
Abort Firmware Upgrade	3-15	PICMG	30h			No

	IPMI Spec. section	NetFn	CMD	IPMI BMC req.	Module MMC req.	Kontron support on MMC
Initiate Upgrade Action	3-8	PICMG	31h			No
Upload Firmware Block	3-9	PICMG	32h			No
Finish Firmware Upload	3-10	PICMG	33h			No
Get Upgrade Status	3-2	PICMG	34h			No
Activate Firmware	3-11	PICMG	35h			No
Query Self-Test Results	3-12	PICMG	36h			No
Query Rollback Status	3-13	PICMG	37h			No
Initiate Manual Rollback	3-14	PICMG	38h			No

4.4.2 MMC sensors

Table 4-41:MMC Sensors

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
0	IPMI Info-1	Discrete	Internal Management Controller firmware diagnostic Sensor type = C0h Kontron OEM Firmware Info Event Reading type code = 70h Kontron OEM Internal Diagnostic See OEM table, Sensor type code C0h and Event/Reading type code 70h for sensor definition
1	IPMI Info-2	Discrete	Internal Management Controller firmware diagnostic Sensor type = C0h Kontron OEM Firmware Info Event Reading type code = 75h Kontron OEM Internal Diagnostic See OEM table, Sensor type code C0h and Event/Reading type code 75h for sensor definition
2	FRU Agent	Discrete	FRU Information Agent - FRU Data Error Detection Sensor type = C5h Kontron OEM FRU Info Agent State Event Reading type code = 0Ah Generic Discrete, offset 6,8 are used See OEM Table, Sensor Type code C5h for sensor definition
3	ModuleHotSwap	Discrete	Module Hot-Swap Sensor type = F2h Module Hot-Swap Event Reading type code = 6Fh Sensor specific, offset 0,1,2,3,4 are used See AMC.0 R2.0 Section 3.6.6 Module Hot Swap Sensor for sensor definition
4	MMC Stor Err	Discrete	Management sub-system health: non volatile memory error. Sensor type = 28h Management Subsystem Health Event Reading type code = 6Fh Sensor specific, only offset 1 is used See IPMI v1.5 table 36.3, Sensor type code 28h for sensor definition
5	IPMI Watchdog	Discrete	IPMI Watchdog (payload watchdog) Sensor type = 23h Watchdog 2 Event Reading type code = 6Fh Sensor specific, offset 0,1,2,3,8 are used, See IPMI v1.5 table 36.3, Sensor type code 23h for sensor definition
6	CPU Reset	Discrete	Board reset type and sources Sensor type = CFh OEM (Kontron Reset Sensor) Event Reading type code = 03h Digital Discrete offset 0,1 are used See OEM sensor table, Sensor type code CFh for sensor definition

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
7	Temp Vcore	Threshold	Vcore switcher Temperature (Degrees Celcius) Sensor Type = 01h Temperature Event Reading Type Code = 01h Threshold based See Next section for Thresholds
8	Temp NPU	Threshold	CPU Temperature (Degrees Celcius) Sensor Type = 01h Temperature Event Reading Type Code = 01h Threshold based See Next section for Thresholds
9	Temp DIMM#1	Threshold	DIMM#1 Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
10	Temp DIMM#2	Threshold	DIMM#2 Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
11	Temp DIMM#3	Threshold	DIMM#3 Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
12	Temp DIMM#4	Threshold	DIMM#4 Temperature (Degrees) Sensor type = 01h temperature Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
13	Vcc Vcore	Threshold	Voltage on board NPU Vcore payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
14	Vcc Vddq	Threshold	Voltage on board Vddq payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
15	Vcc VttDdr0	Threshold	Voltage on board VttDdr0 payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
16	Vcc VttDdr1	Threshold	Voltage on board VttDdr1 payload power supply (Volts) Sensor type = 02h voltage Event Reading type code = 01h threshold based See IPMI v1.5 section 29.13.3 for threshold based event
17	DIMM#1 Pres	Discrete	DIMM#1 Temperature Sensor Presence Sensor type = 25h Entity Presence Event Reading type code = 6Fh Sensor specific, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 25h for sensor definition
18	DIMM#2 Pres	Discrete	DIMM#2 Temperature Sensor Presence Sensor type = 25h Entity Presence Event Reading type code = 6Fh Sensor specific, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 25h for sensor definition

ID	Sensor Name	Sensor Class	Description (Sensor Type, Event trigger)
19	DIMM#3 Pres	Discrete	DIMM#3 Temperature Sensor Presence Sensor type = 25h Entity Presence Event Reading type code = 6Fh Sensor specific, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 25h for sensor definition
20	DIMM#4 Pres	Discrete	DIMM#4 Temperature Sensor Presence Sensor type = 25h Entity Presence Event Reading type code = 6Fh Sensor specific, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 25h for sensor definition
21	Power State	Discrete	Board Power State Sensor type = D1h Kontron OEM Power State Sensor Event Reading type code = 6Fh Sensor specific See OEM sensor table, Sensor type code D1h for sensor definition
22	Power Good	Discrete	Actual power good status Sensor type = 08h Power Supply Event Reading type code = 77h OEM See OEM sensor table, Event/Reading type code 77h for sensor definition
23	Health Error	Discrete	General health status, Aggregation of critical sensors. This list is flexible and could be adjusted based on customer requirements. Sensor type = 24h Platform Alert Event Reading type code = 03h Digital Discrete, offset 0,1 are used See IPMI v1.5 table 36.3, Sensor type code 24h for sensor definition

4.4.3 MMC Health Indicator sensor

The following table shows the sensors involved in the Health Sensor Aggregation.

Table 4-42:MMC Health Indicator Sensor Aggregation Table

IPMI Sensor ID	Sensor Name
5	IPMI Watchdog
7	Temp Vcore
8	Temp NPU
9	Temp DIMM#1
10	Temp DIMM#2
11	Temp DIMM#3
12	Temp DIMM#4
13	Vcc Vcore
14	Vcc Vddq
15	Vcc VttDdr0
16	Vcc VttDdr1
22	Power Good

4.4.4 FRU Information

Table 4-43:Board Information Area

	Board Information Area
Board Mfg Date	Programmed with manufacturing date
Board Mfg	Kontron
Board Product	AT8242
Board Serial	Programmed with serial number
Board Part Number	Programmed with part number
Board FRU ID	FRU5311MMC-xx
Board Extra	MAC=xx:xx:xx:xx:xx:xx/64

Table 4-44:Product Information Area

	Product Information Area
Product Manufacturer	Kontron
Product Name	AT8242
Product Part Number	Programmed with part number
Product Version	Programmed with board revision
Product Serial	Programmed with serial number
Product FRU ID	FRU5311MMC-xx

4.4.4.1 Module Current Requirements

Each NPU engine is seen as a virtual AMC, with its own power and reset domain. Even though they are not physically extractable, the Module Current Requirements Record is present in FRU data as to insure proper compatibility with the AMC.0 R2.0 specification.

Table 4-45:Module Current Requirements

Field	Value
Record Type ID	C0h
Record Format Version	02h
Record Length	*Calculated
Record Checksum	*Calculated
Header Checksum	*Calculated
Manufacturer ID	00315Ah (PICMG Record ID)
PICMG Record ID	16h (Module Current Requirements)
Record Format Version	00h
AMC Module Current Draw	22h (3.4 Amps at 12V => 40.8 Watts)

4.5 OEM Sensor Tables

Table 4-46:Power Good Sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
77h OEM Kontron ATCA Power Good	08h Standard IPMI Power Supply	00h	Unused
		01h	5V
		02h	3.3V
		03h	2.5V
		04h	Unused
		05h	1.5V
		06h	1.2V
		07h	Vcore
		08h	Unused
		09h	1.1V
		10h	1.05V
		11h	Unused
		12h	Unused
		13h	Vddq
		14h	Unused
		15h	Unused

Table 4-47:Firmware Info 1 sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
70h OEM Kontron Firmware Info 1	C0h OEM Kontron Firmware Info	00h	Event Code Assert Trigger
		01h	Event Overflow Trig-ger
		02h to 0Eh	Code Assert Line (Binary Encoded)
		0Fh	Unused, Reserved

Table 4-48:Firmware Info 2 sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
75h OEM Kontron Firmware Info 2	C0h OEM Kontron Firmware Info	00h	Event Code Assert Trigger
		01h	Unused Trigger
		02h to 09h	Code Assert File Id (Binary Encoded)
		0Ah to 0Fh	Unused, Reserved

Table 4-49:IPMB-L Link State sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
6Fh Standard IPMI sensor specific	C3h OEM Kontron IPMB-L Link	02h IPMB-L Disable 03h IPMB-L Enable	Event Data 2: always 0 Event Data 3: bit[7:3]: always 0 bit [2:0]: 0h = no failure 1h = Unable to drive clock HI 2h = Unable to drive data HI 3h = Unable to drive clock LO 4h = Unable to drive data LO 5h = clock low timeout 6h = Under test (the IPM Controller is attempting to determine who is causing a bus hang) 07h = Undiagnosed Communication Failure

Table 4-50:FRUInfo Agent sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
0Ah Standard IPMI Discrete	C5h OEM Kontron FRU Info Agent	00h Device running 01h Device in test / Fia running 02h Power Off, FRU not present 06h Transition to degraded 08h Install Error	Event Data 2 is used a bit flag error Bit 7: unspecifiedError Bit 6: notPresentError Bit 5: multirecHeaderError Bit 4: multirecDataError Bit 3: timeout error Bit 2: ipmcError Bit 1: fruDataError Bit 0: commonHeaderError Event Data 3 is used a bit flag error Bit 7: SetClockState Not Supported Bit 6: SetClockState Error Bit 5: SetPortState Not Supported Bit 4: SetPortState Error Bit 3: Clock Internal mismatch Bit 2: Clock Match Error Bit 1: Internal mismatch Bit 0: Match Error, Not in single link matches

Table 4-51:POST Value sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
6Fh Standard IPMI sensor specific	C6h OEM Kontron POST Code Value	00h to 07h	POST code LOW byte value, no event generated on these offsets
		14h	POST Code Error Event Trigger Event Data 2: POST Low Nibble Event Data 3: POST High Nibble

Table 4-52:Diag Status sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
6Fh Standard IPMI sensor specific	C9h OEM Diagnostic Status	00h	Diagnostic Started
		01h	Diagnostic PASSED
		02h	Diagnostic FAILED

Table 4-53:Fwupg Status sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
6Fh Standard IPMI sensor specific	CAh OEM System Firmware Upgrade Status	00h	Upgrade Started
		01h	Upgrade PASSED
		02h	Upgrade FAILED

Table 4-54:FRU Over Icc sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
03h Standard IPMI Discrete	CBh OEM Kontron FRU Over Current	00h 01h State Asserted / State Deasserted	Event Data 2: 00h: Over Current on Management power. 01h: Over Current on Payload power. Event Data 3:FRU ID

Table 4-55:FRU Sensor Error sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
03h Standard IPMI Discrete	CCh OEM Kontron FRU Sensor Error	00h 01h State Asserted / State Deasserted	Event Data 2: undefined Event Data 3:FRU ID

Table 4-56:FRU Pwr Denied sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
03h Standard IPMI Discrete	CDh OEM Kontron FRU Power denied	00h 01h State Asserted / State Deasserted	Event Data 2: 00h : Explicit by shelf manager or application 01h : Decided by carrier based on fru information 03h : Timeout (shelf manager didn't grant power in time) FFh : Undefined Event Data 3:FRU ID

Table 4-57:Board Reset sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
03h Standard IPMI Discrete	CFh OEM Kontron Reset	00h 01h State Asserted / State Deasserted	Event Data 2: Reset Type 00h: Warm reset 01h: Cold reset 02h: Forced Cold [Warm reset reverted to Cold] 03h: Soft reset [Software jump] 04h: Hard Reset 05h: Forced Hard [Warm reset reverted to Hard] Event Data 3: Reset Source 00h: IPMI Watchdog [cold, warm or forced cold] (IPMI Watchdog2 sensors gives additionnal details) 01h: IPMI commands [cold, warm or forced cold] (chassis control, fru control) 02h: Processor internal checkstop 03h: Processor internal reset request 04h: Reset button [warm or forced cold] 05h: Power up [cold] 06h: Legacy Initial Watchdog / Warm Reset Loop Detection * [cold reset] 07h: Legacy Programmable Watchdog [cold, warm or forced cold] 08h: Software Initiated [soft, cold, warm of forced cold] 09h: Setup Reset [Software Initiated Cold] 0Ah: Power Cycle / Full Reset / Global Platform Reset FFh: Unknown

Table 4-58:Power State sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
6fh Standard IPMI sensor specific	D1h Kontron OEM Power state sensor	00h	Power ON
		01h	Power OFF
		02h	Power ON Request
		03h	Power ON In Progress
		04h	Power OFF Request
		05h	Graceful Power OFF Request
		06h	Power OFF In Progress
		07h	Synchronise Graceful Power OFF
		08h	Power OFF Now Request

Table 4-59:FRU MngtPwr Fail sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
03h Standard IPMI Discrete	D2h OEM Kontron FRU Manage-ment Power Fail sensor	00h 01h State Asserted / State Deasserted	Event Data 2: undefined Event Data 3:FRU ID

Table 4-60:Jumper Status sensor

Event/Reading Type Code	Sensor Type	Sensor Specific Offset	Event Trigger
6fh Standard IPMI sensor specific	D3h Kontron OEM Jumper Status Sensor	00h	Jumper 00 Present (JP1: 1-2)
		01h	Jumper 01 Present (JP1: 3-4)
		02h	Jumper 02 Present (JP1: 5-6)
		03h	Jumper 03 Present (JP1: 7-8)
		04h	Jumper 04 Present (JP1: 9-10)
		05h	Jumper 05 Present (JP1: 11-12)
		06h	Jumper 06 Present (JP1: 13-14)
		07h	Jumper 07 Present (JP2: 1-2)
		08h	Jumper 08 Present (JP2: 3-4)
		09h	Jumper 09 Present (JP2: 5-6)
		0Ah	Jumper 10 Present (JP2: 7-8)
		0Bh	Jumper 11 Present (JP2: 9-10)
		0Ch	Jumper 12 Present (JP2: 11-12)
		0Dh	Jumper 13 Present (JP2: 13-14)
		0Eh	Unused

Chapter 5

Software Setup

5. Software Setup

5.1 Cavium Embedded Software

5.1.1 BootLoader

Bootloader used on the AT8242 NPU is a modified version from u-boot version 2011.03 included in the OCTEON SDK. The following section describes most of the differences from the original u-boot that are used for the AT8242 Carrier.

Generic u-boot features are not described in this section. Please read the u-boot documentations if the requested information is not available in this manual.

5.1.1.1 Bootloader Serial Output Descriptions

Here is a typical bootloader display on Cavium NPU:

```
U-Boot 2011.03-KCI-1.00 (Development build, svnversion: u-boot:exported, exec:exported) (Build time: Jan 27 2012
- 08:51:20)


Skipping PCIe port 0 BIST, reset not done. (port not configured)
Skipping PCIe port 1 BIST, reset not done. (port not configured)
BIST check passed.
1)  KONTRON_T5311 board revision major:0, minor:0, serial #: 9009086567
OCTEON CN6880-AAP pass 1.1, Core clock: 1000 MHz, IO clock: 800 MHz, DDR clock: 533 MHz (1066 MHz data rate)
2)  AT8242: Reset Type: 01 cold reset, Source: 08 Software Initiated
Base DRAM address used by u-boot: 0x20f800000, size: 0x800000
DRAM: 8 GiB
Clearing DRAM...... done
3)  AT8242: IPMI POST watchdog started
4)  AT8242: NPU MAC address    : 00:a0:a5:01:04:40
5)  AT8242: Booting from user bank, protecting recovery u-boot.
Flash: 128 MiB
Net:   octeth0, octeth1, octeth2, octeth3, octeth4, octeth5, octeth6, octeth7
USB:   USB EHCI 1.00
scanning bus for devices... 1 USB Device(s) found
Type the command 'usb start' to scan for USB storage devices.


Hit any key to stop autoboot:  0
6)  AT8242: IPMI watchdog stopped
7)  AT8242-NPU1#
```

Table 5-1:Description of bootloader display

Specific Lines(in bold)	Description
1)	This line represent the board descriptions including PCB revision (**major:**) and the boar serial number (**serial #:**).
2)	This line represents the last known reset source of the Cavium NPU.
3)	This line identifies the start-up of the IPMI management watchdog.
4)	This line is the base MAC address of the NPU Ethernet interfaces.
5)	This line indicates the current active (booting) flash bank.
6)	This line identifies the start-up of the IPMI management watchdog.
7)	This line is the start of U-boot shell and also indicates the current NPU connected.

5.1.1.2 Logical Onboard Flash Partitions

The following table represent the logical partitioning for the onboard flash.

Bank	Flash Logical Name	Descriptions	Partitions Address	Size
User Bank	uboot	Active bootloader	0x17C00000 - 0x17CDFFFF	0xE0000
	env	Active bootloader configuration	0x17CE0000 - 0x17D1FFFF	0x40000
	kernel_rootfs	Active Linux and Root files sytem	0x17D20000 - 0x1A51FFFF	0x2800000
	user_jffs2	Active User files system	0x1A520000 - 0x1BBFFFFF	0x16E0000
Recovery Bank	uboot_backup	Backup bootloader	0x1BC00000 - 0x1BCDFFFF	0xE0000
	env_backup	Backup bootloader configuration	0x1BCE0000 - 0x1BD1FFFF	0x40000
	kernel_rootfs_backup	Backup Linux and Root files sytem	0x1BD20000 - 0x1E51FFFF	0x2800000
	user_jffs2_backup	Backup User files system	0x1E520000 - 0x1FBFFFFF	0x16E0000

5.1.1.3 Booting Embedded Linux Firmware From eUSB Device

Follow these instructions to boot Cavium Embedded Linux from onboard eUSB mass-storage:

1 - Make sure the eUSB mass-storage is formatted in FAT32 and copy any firmware to the eUSB mass-storage supported by the AT8242.

2 - Connect to the u-boot console for the AT8242 and power up the board under test.

3 - Press any key to stop autoboot and open u-boot console prompt.

4 - Start the USB controller, type this in u-boot prompt:

 # usb start

5 - Copy the firmware file from the eUSB storage device to board memory:

 # fatload usb 0:1 0x2000000 [firmware_file]

6 - Start the new firmware from memory:

 # bootoctlinux 0x2000000 console=ttyS0,115200 coremask=ffffffff

5.1.1.4 Booting Firmware Image From Onboard JFFS2 Flash Partition

First of all, select the JFFS2 partition, in AT8242 there is a flash partition named ''user_jffs2'' that can be used a storage space:

 # chpart user_jffs2

Note: This partition is also available in linux **/mnt** directory.

To list all files included in the jffs2 partition:

#ls

To load in the memory a file from the jffs2 partition (simple exec or linux binary):

 # fsload ${loadaddr} [file]

Next use ''bootoct'' or ''bootlinux'' u-boot command to boot the binary file from memory

5.1.1.5 U-boot Memory Configurations

Some of the memory configurations need to be done manually using u-boot environment variables.

The following are the possible memory configurations:

1 - Configuring the DDR clock / data rate:

 # setenv ddr_clock_hertz [CLOCK]

[CLOCK] = DDR clock in hertz, the real data rate will be de double of this value.

Here is an example:

 # setenv ddr_clock_hertz 533333333

Will configure the DDR clock at 533Mhz, the data rate will be 1066Mhz.

 # setenv ddr_clock_hertz 666666666

Will configure the DDR clock at 666Mhz, the data rate will be 1333Mhz.

2 - Configuring the memory window used in Linux environment:

 # setenv linuxmem [SIZE]

[SIZE] = size of memory in megabytes, here is an example:

 # setenv linuxmem 2048M

This will configure a memory window of 2GB for Embedded Linux.

5.1.1.6 Bootloader Environment Variables Specific to the AT8242

This table represents the u-boot environment variable specific for the AT8242:

Variables	Descriptions
frucontrol_cr	Cold reset the Cavium NPU.
boot_user	Select current boot image to user bank, reboot NPU.
boot_factory	Select current boot image to recovery bank, reboot NPU.
boardmacaddr	Current base MAC address (DO NOT CHANGE)
bootcmd	Command definition for booting linux from flash.
bootdelay	Delay before running “bootcmd”..
ethact	Network device used by U-Boot for network access.
bootloader_backup_update	Commands for updating U-boot in backup bank.
kernel_rootfs_backup_update	Commands for updating Embedded Linux and filesystem in backup bank.
kernel_rootfs_update	Commands for updating Embedded Linux and filesystem in active bank.
linuxcores	Number of Processor core(s) to be used in embedded linux.
linuxmem	Size of memory window to be used by embedded linux.
mtdparts	Logical Flash partitions definition.
erase_bootloader_backup	Erase backup boot loader.
erase_env	Erase active environment variables.
erase_env_backup	Erase backup environment variables.
erase_kernel_rootfs	Erase Embedded Linux and filesystem in active bank.
erase_kernel_rootfs_backup	Erase Embedded Linux and filesystem in backup bank.
pbmwd_timeout	Timeout until watchdog bite for U-boot loading.
poswd_timeout	Timeout until watchdog bite for Embedded Linux loading.
poswdsetup	Command to configure IPMI watchdog modes.

5.1.1.7 Bootloader Network Interfaces

The following table represents the logical u-boot network interfaces related to their physical Cavium NPU connection (QLM):

Cavium physical interfaces (QLM)	u-boot logical name(s)
RXAUI/QLM0	octeth0, octeth1
DXAUI/QLM2	octeth2
SGMII/QLM3	octeth3, octeth4, octeth5, octeth6
XAUI/QLM4	octeth7

5.1.2 OCTEON-SDK Board Support Package

5.1.2.1 Installation

5.1.2.1.1 Requirements

- Host with Linux operating system.

- Full installation of OCTEON SDK.

- Latest board support package from Kontron.

5.1.2.1.2 Instructions

1 - First of all, perform the full installation of Octeon SDK by following official Cavium instructions, the Octeon SDK version that needs to be installed is specified in README document of AT8242 Board support package.

2 - After installing the official OCTEON SDK, install the patch bundle from the board support package:

Copy the **patches** directory from the board support package to the root of the Octeon SDK.

Install the patch bundle included in board support package, two options are available:

OPTION 1: Using quilt utility

From the root of the Octeon SDK execute quilt utility:

 # quilt push -a

OPTION 2: Using shell command line

From the root of the Octeon SDK type:

 # for i in $(cat ./patches/series); do patch -p1 < ./patches/$i;done

3 – Complete the installation by copying all files in the **storage** directory of the board support package to [OCTEON_SDK]/linux/embedded_rootfs/storage.

5.1.3 Embedded Linux

5.1.3.1 Embedded Filesystem And Init Script Customizations

The sample embedded linux filesystem shipped with the AT8242 is an initramfs. That means that any file can be modified but will return to their original states after a Cavium NPU restart.

By default there is a flash partition that is automatically mounted to /mnt. This partition can be used to have permanent R/W storage space. All data stored in /mnt will be permanently saved to the flash (user_jffs2, /dev/mtd3).

You can also create custom initialization script by adding this in the user_jffs2 partition (/mnt):

 # mkdir /mnt/etc

 # vi /mnt/etc/rc.local

Add your init code in this file (shell script).

 # chmod +x /mnt/etc/rc.local

The script file /mnt/etc/rc.local will be executed at the end of each boot.

5.1.4 Building AT8242 Firmware Image

5.1.4.1 Preparation

From the root of OCTEON SDK directory, configure the SDK environment for OCTEON CN68XX device:

 # source env-setup OCTEON_CN68XX

5.1.4.2 Building U-Boot Firmware

Go to OCTEON SDK bootloader directory:

 # cd [OCTEON_SDK]/bootloader/u-boot

Select AT8242 board configuration:

 # make kontron_t5311_config

Build U-boot firmware:

 # make

The generated firmware file is located here: [OCTEON_SDK]/bootloader/u-boot/u-boot-octeon_kontron_t5311.bin

5.1.4.3 Building Linux Kernel and Root File System

Go to OCTEON SDL linux directory:

 # cd [OCTEON_SDK]/linux

Build linux kernel and rootfs file system:

 # make kernel

Without debug symbols:

 # make strip

The generated firmware file is located here: [OCTEON_SDK]/linux/kernel2.6/linux/vmlinux.64

5.1.5 Access To NFS Share From Cavium Embedded Linux

There is no portmap included in Cavium embedded Linux. To mount NFS share you need to disable the locking mechanism with the -o arguments, here is an example:

 # mount -o nolock [SHARE_ADDRESS] [MOUNT_POINT]

5.1.6 Cavium Ethernet Logical Names

The following table represents the logical Linux network interfaces related to their physical Cavium NPU connection (QLM):

Cavium physical interfaces (QLM)	Linux logical name(s)
RXAUI/QLM0	xaui0, xaui1
DXAUI/QLM2	xaui2
SGMII/QLM3	eth0, eth1, eth2, eth3
XAUI/QLM4	xaui3

5.1.7 Onboard Flash Access With Cavium Embedded Linux

The Linux environment use MTD support to access the Flash device, here are the MTD partitions:

Bank	Flash Logical Name	Descriptions	Partitions Address
User Bank	uboot	Active bootloader	/dev/mtd0
	env	Active bootloader configuration	/dev/mtd1
	kernel_rootfs	Active Linux and Root files sytem	/dev/mtd2
	user_jffs2	Active User files system	/dev/mtd3
Recovery Bank	uboot_backup	Backup bootloader	/dev/mtd4
	env_backup	Backup bootloader configuration	/dev/mtd5
	kernel_rootfs_backup	Backup Linux and Root files sytem	/dev/mtd6
	user_jffs2_backup	Backup User files system	/dev/mtd7

Update flash partition within Embedded Linux:

Erase Flash partition

 # flash_eraseall [mtd_device]

Program the flash partition

 # flashcp [firmware_file] [mtd_device]

Chapter 6

Thermal Considerations

6. Thermal Considerations

The following chapter provides system integrators with the necessary information to satisfy thermal and airflow requirements when using the AT8242.

6.1 Thermal Monitoring

To ensure optimal operation and long-term reliability of the AT8242, all on-board components must remain within the maximum temperature specifications. The most critical components on the AT8242 are the network processors, the switch, the unit computer and the memory modules. Operating the AT8242 above the maximum operating limits will result in application performance degradation (e.g. the network processors might throttles if it overheats) or may even damage the board. To ensure functionality at the maximum temperature, the blade supports several temperature monitoring and control features.

6.1.1 Heat Sinks

Multiple key components of the AT8242 are equipped with a specifically designed heat sink to ensure the best possible product for operational stability and long-term reliability. The physical size, shape, and construction of the heat sinks ensure the lowest possible thermal resistance. Moreover, the heat sinks were specifically designed to use forced airflow as found in ATCA systems.

6.1.2 Temperature Sensors

The AT8242 is equipped with 17 temperature sensors that are accessible via IPMI. Sensors are precisely positioned near critical components to accurately measure the on-board parts temperature. Temperature monitoring must be exercised to ensure highest possible level of system thermal management. An external system manager constitutes one of the best solution for thermal management, being able to report sensor status to end-user or manage events filters for example.

All sensors available on the AT8242, and its RTM if present, are listed into the Sensor Data Repository with their thresholds as defined by the PICMG 3.0 specification. The following extract (from the PICMG 3.0 Base Specification) details naming convention for thresholds as well as the meaning of each threshold level.

IPMI non-critical / PICMG 3.0 minor / telco minor:

Temperature is getting closer to operating limit; it is not really a "problem" yet. It's only a warning.

IPMI critical / PICMG 3.0 major / telco major:

Temperature is at or over normal operating limit, but not in destructive zone. Unit still operating but MTBF might be affected.

IPMI non-recoverable / PICMG 3.0 critical/ telco critical:

Temperature has reached a destructive level. Device might be damaged.

Most ATCA chassis react to temperature events in the following manner: When a minor threshold is reached, the shelf manager will incrementally increase airflow (fan speed) to bring the temperature below the crossed threshold. When a major threshold is reached, the shelf manager will increase the fans to maximum speed. When a critical threshold is reached, the shelf manager wills shutdown the blade to prevent damage. The shelf alarm panel, when available, can inform the operator with LEDs when an alarm (minor, major, critical) is raised. Refer to your chassis documentation to adapt and optimize your temperature monitoring application to chassis capabilities. See also System Airflow section for more information.

Below is the list of temperature sensors with their respective thresholds.

Table 6-1:IPMC Temperature Sensors Thresholds

Sensor ID	Lower Thresholds			Upper Thresholds		
	Lower Non-Recoverable	**Lower Critical**	**Lower Non-Critical**	**Upper Non-Critical**	**Upper Critical**	**Upper Non-Recoverable**
Temp Inlet	N/A	-5°C	0°C	60°C	70°C	75°C
Temp Outlet	N/A	N/A	N/A	75°C	85°C	100°C
Temp IPMC	N/A	-5°C	0°C	90°C	100°C	110°C
Temp Switch	N/A	-5°C	0°C	85°C	95°C	100°C
Temp SO-DIMM	N/A	-5°C	0°C	75°C	85°C	95°C

Table 6-2:MMC Temperature Sensors Thresholds (Same list for both NPU)

Sensor ID	Lower Thresholds			Upper Thresholds		
	Lower Non-Recoverable	**Lower Critical**	**Lower Non-Critical**	**Upper Non-Critical**	**Upper Critical**	**Upper Non-Recoverable**
Temp DIMM#4	-10°C	0°C	5°C	75°C	85°C	95°C
Temp DIMM#3	-10°C	0°C	5°C	75°C	85°C	95°C
Temp DIMM#2	-10°C	0°C	5°C	75°C	85°C	95°C
Temp DIMM#1	-10°C	0°C	5°C	75°C	85°C	95°C
Temp NPU	N/A	-5°C	0°C	91°C	101°C	106°C
Temp Vcore	N/A	N/A	N/A	75°C	85°C	95°C

6.1.3 Airflow blockers

It is highly recommended to use airflow blockers (ATCA slot) with the AT8242 to block any slot open to exterior air. Failure to do so would go against forced air principles applied on ATCA components, reducing system's cooling efficiency. Moreover, airflow blockers offer higher impedance to forced air than typical board, who tend to let more air into slots filled with AT8242 or other ATCA boards.

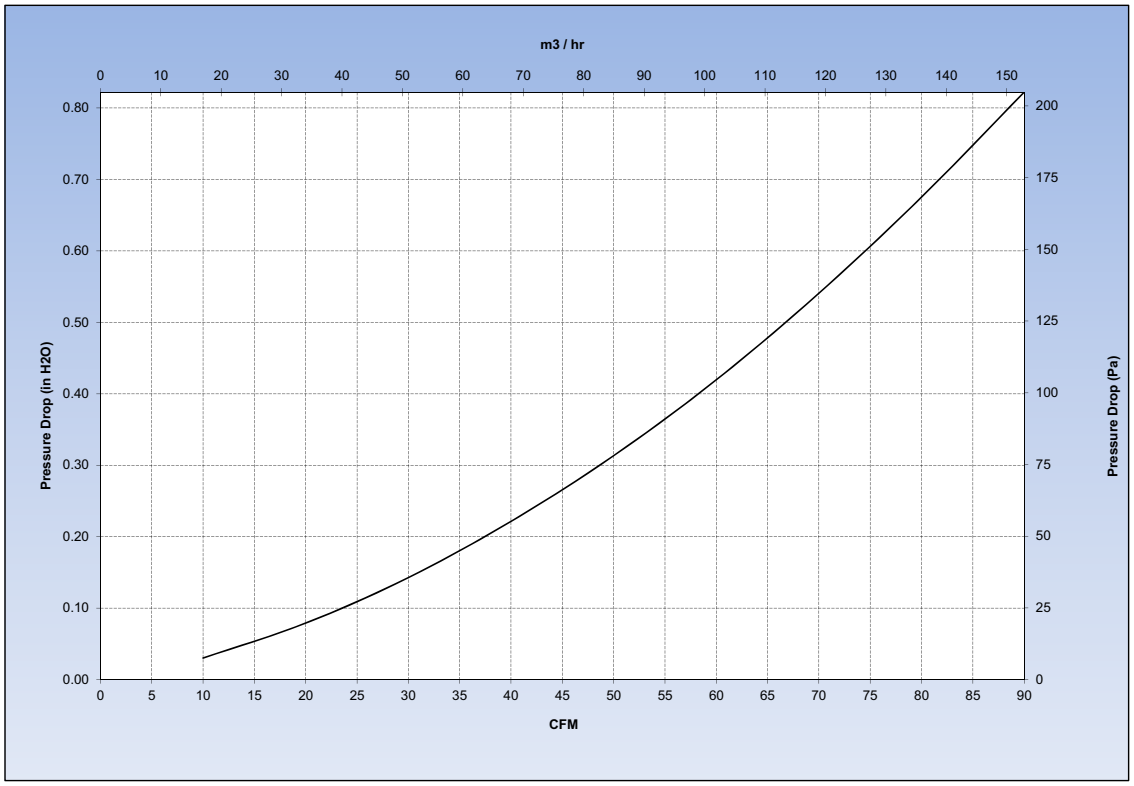
6.1.4 System Airflow

The airflow impedance (pressure) curve gives multiple information and tips about thermal operational range of the system carrying the AT8242. Once volumetric airflow capability of your chassis is known, the PQ curve can help determine the ambient (room) temperature setpoint that should be used for optimal operation. If you are using various models of ATCA blades into the same chassis, it is possible to find the best thermal fit. Having the volumetric airflow value for each chassis slot is it then possible to decide the layout using the pressure curves.

Table 6-3:Pressure curve AT8242

Test Point	Airflow (CFM)	Pressure drop (in H20)	Airflow (m³/h)	Pressure Drop (Pa)
1	5	0.010	8.5	2.5
2	10	0.030	17.0	7.4
3	20	0.080	34.0	19.8
4	30	0.144	51.0	35.8
5	40	0.222	68.0	55.2
6	50	0.314	85.0	78.2
7	60	0.420	101.9	104.7
8	70	0.540	135.9	134.7
9	80	0.674	152.9	168.3

Figure 6-1:Pressure Curve



6.1.5 Thermal Profile

It is important to follow the thermal profile to make sure the MTBF values are respected. The different component usage will influence the temperature that the product can handle. Figure below show the three major components behavior under 100% and 85% usage. One can easily obtain the maximum ambient temperature achievable with respect to the delivered slot airflow as well as the corresponding shelf class. Refer to the figure below for more details.

Figure 6-2:AT8242 Operating Limits 100% Usage

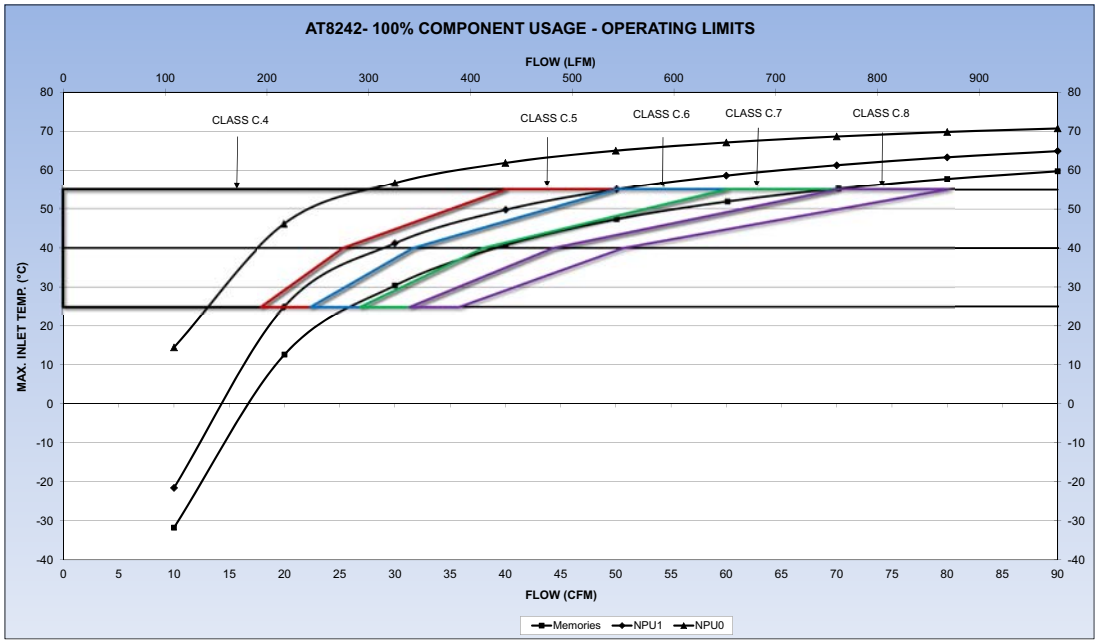
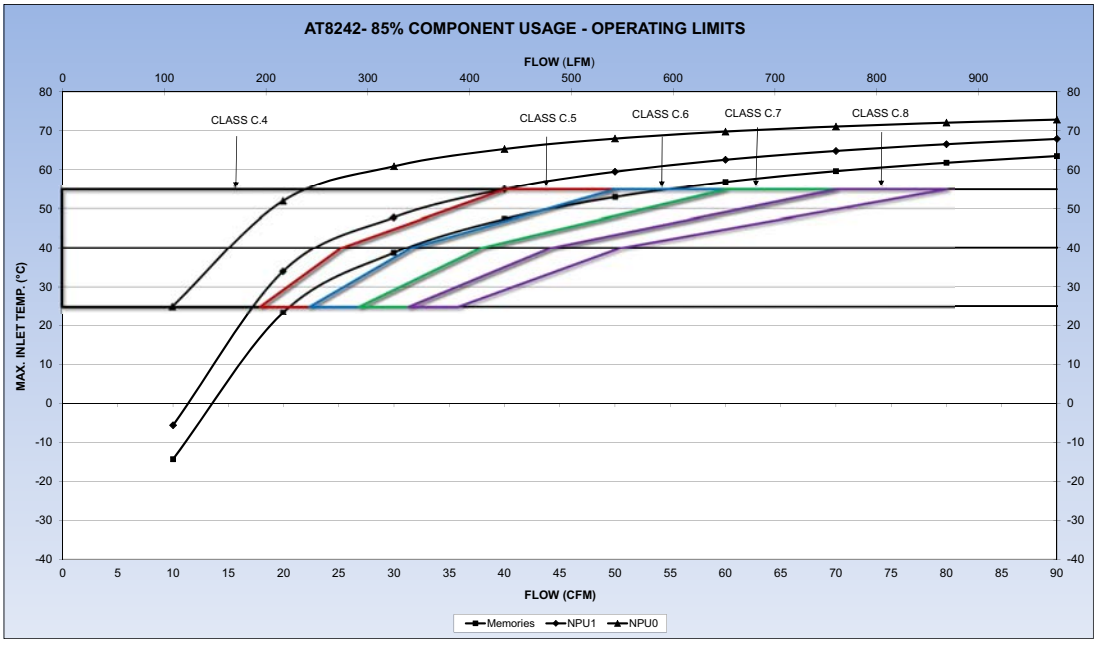
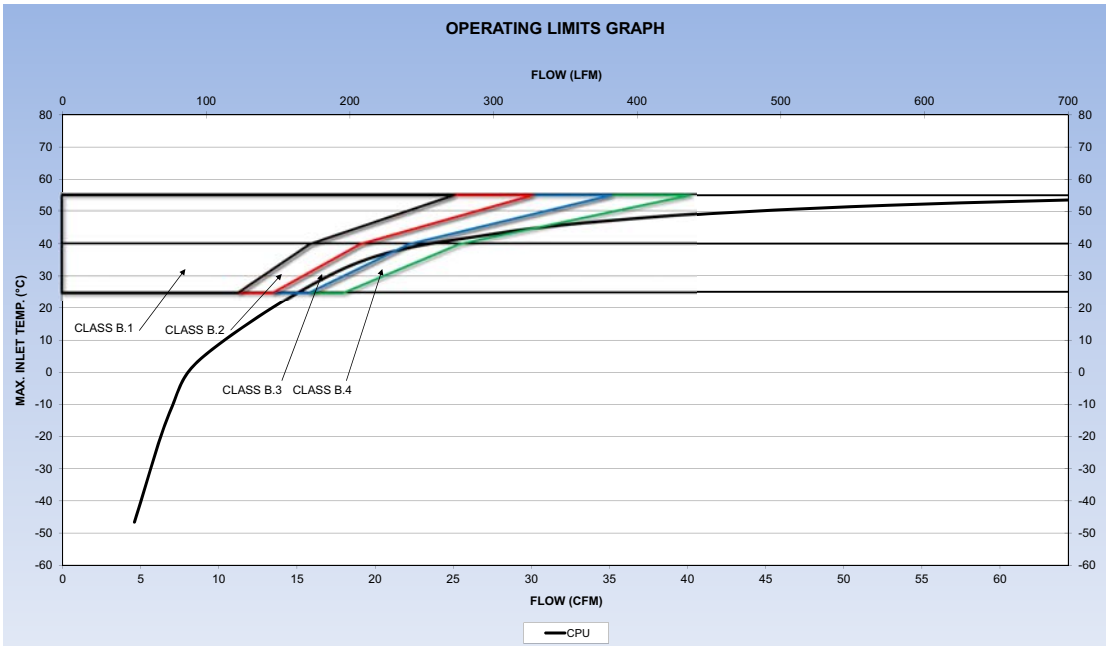


Figure 6-3:AT8242 Operating Limits 85% Usage



This nomenclature for Class C.X is under consideration by PICMG but not official at this time.

This section provides guidelines on how to use the data presented in the Operating Limits graph. The three horizontal lines represent the three key temperatures of ATCA specification, which are 25, 40 and 55°C. Additionally, four zones are shown. They correspond to the CP-TA shelf class. This method gives a quick way to tell if the product can operate within the cooling limits of each CP-TA shelf class. To determine which shelf class provides the product with sufficient cooling, the Product Operating Curve shall be above the class line within the 25°C to 55°C temperature range.



In the example shown here, the product needs at the minimum a Class B.4 shelf for ambient temperatures below 40°C. For ambient temperatures above 44°C, even the Class B.4 shelf does not provide sufficient cooling to maintain the product's components within their maximum temperature limits.

A. Connector Pinouts

The connectors pinouts can be found on the Quick Reference Sheet.

B. Software Update

The latest firmware versions are available from the Kontron Canada's FTP site(ftp.kontron.ca/support/main.html).

B.1 FPGA and IPMI Firmware upgrade

The FPGA and the IPMI firmware can be updated through the IPMC. They are updated using the HPM.1 Hardware Platform Management IPM Controller Firmware Upgrade specification revision 1.0. Kontron's IPMI firmware complies to PICMG HPM.1 R1.0. HPM commands are available from any of the IPMC messaging interfaces. However, using IOL is recommended in order to obtain a reasonable upload time, due to IPMI firmware image file size.

The images of both components can be packaged in the same HPM image (They can also be separated). Packaging the images together allows upgrading both components using only one upgrade instruction. Moreover, it ensures both upgraded components are compatible.

The following table lists the HPM component IDs implemented on the AT8242.

Table B-1:HPM Component IDs

Component ID	Description
0	IPMI Firmware
1	FPGA

Upgrade can be performed using a HPM upgrade agent such as ipmitool, or using the Web Interface.

B.2 Cavium NPU Firmware upgrade and recovery instructions

B.2.1 Updating Active Bootloader

The recommended upgrade method is to use a remote TFTP server.

Here are the instructions for upgrading Cavium Bootloader using network:

1 - Get access to the Network:

Static IP configuration:

 # setenv ipaddr 172.16.x.x

 # setenv netmask 255.255.255.0

 # setenv serverip 172.16.0.1

Dynamic IP Configuration:

 # bootp

2 - Grab the firmware file from TFTP Server:

 # tftp ${loadaddr} [uboot_file]

3 - Start bootloader firmware update:

 # bootloaderupdate

B.2.2 Upgrade Active Linux Kernel and Root Filesystem

The recommended upgrade method is to use a remote TFTP server.

1 - Get access to the network:

Using static IP address:

 # setenv ipaddr 172.16.x.x

 # setenv netmask 255.255.255.0

 # setenv serverip 172.16.0.1

Using dynamic IP address:

 # bootp

2 - Grab the firmware file from TFTP Server:

 # tftp ${loadaddr} [kernel_file]

3 - Start bootloader firmware update:

 # run kernel_rootfs_update

B.2.3 Firmware Recovery Mode

On the AT8242 both Cavium NPU have a secondary recovery bank in case of boot failure.

The boot failure is detected by the management controller, if the management controller detects that the bootloader failed to boot after 3 attempts, the management controller will switch the active detects bank to the recovery partitions.

If you see this message when booting the bootloader you need to perform user bank restoration the active bank:

AT8242: WARNING: ----------

AT8242: WARNING: Booting from recovery bank, protecting current u-boot.

AT8242: WARNING: ----------

Follow these steps to restore user bank:

The recommended method is to use a remote TFTP server.

1 - Get access to the network:

Using static IP address:

 # setenv ipaddr 172.16.x.x

 # setenv netmask 255.255.255.0

 # setenv serverip 172.16.0.1

Using dynamic IP address:

 # bootp

2 - Grab a working bootloader firmware file from TFTP Server:

 # tftp ${loadaddr} [kernel_file]

3 – Update the user bank using this command:

 # run bootloader_backup_update

4 – Select user bank and reboot the Cavium NPU:

 # run boot_user

C. Getting Help

If, at any time, you encounter difficulties with your application or with any of our products, or if you simply need guidance on system setups and capabilities, contact our Technical Support at:

North America	EMEA
Tel.: (450) 437-5682	Tel.: +49 (0) 8341 803 333
Fax: (450) 437-8053	Fax: +49 (0) 8341 803 339

If you have any questions about Kontron, our products, or services, visit our Web site at: www.kontron.com

You also can contact us by E-mail at:

North America: support@ca.kontron.com

EMEA: support-keu@kontron.com

Or at the following address:

North America	EMEA
Kontron Canada, Inc.	Kontron Modular Computers GmbH
4555, Ambroise-Lafortune	Sudetenstrasse 7
Boisbriand, Québec	87600 Kaufbeuren
J7H 0A4 Canada	Germany

C.1 Returning Defective Merchandise

Before returning any merchandise please do one of the following:

- Call

  1- Call our Technical Support department in North America at (450) 437-5682 and in EMEA at +49 (0) 8341 803 333. Make sure you have the following on hand: our Invoice #, your Purchase Order #, and the Serial Number of the defective unit.

  2- Provide the serial number found on the back of the unit and explain the nature of your problem to a service technician.

3- The technician will instruct you on the return procedure if the problem cannot be solved over the telephone.

4- Make sure you receive an RMA # from our Technical Support before returning any merchandise.

- E-mail

1- Send us an e-mail at: RMA@ca.kontron.com in North America and at: orderprocessing@kontron-modular.com in EMEA. In the e-mail, you must include your name, your company name, your address, your city, your postal/zip code, your phone number, and your e-mail. You must also include the serial number of the defective product and a description of the problem.

C.2 When Returning a Unit

- In the box, you must include the name and telephone number of a contact person, in case further explanations are required. Where applicable, always include all duty papers and invoice(s) associated with the item(s) in question.
- Ensure that the unit is properly packed. Pack it in a rigid cardboard box.
- Clearly write or mark the RMA number on the outside of the package you are returning.
- Ship prepaid. We take care of insuring incoming units.

North America	EMEA
Kontron Canada, Inc.	Kontron Modular Computers GmbH
4555, Ambroise-Lafortune	Sudetenstrasse 7
Boisbriand, Québec	87600 Kaufbeuren
J7H 0A4 Canada	Germany

D. Glossary

Acronyms	Descriptions
AdvancedMC	(Same as AMC). Advanced Mezzanine Card.
AMC	(Same as AdvancedMC). Advanced Mezzanine Card.
AMC.0	Advanced Mezzanine Card Base Specification.
ANSI	American National Standards Institute
API	Application Programming Interface
APIC	Advanced Programmable Interrupt Controller
ASCII	American Standard Code for Information Interchange. ASCII codes represent text in computers, communications equipment, and other devices that work with text.
ATCA	Advanced Telecommunications Computing Architecture
BI	Base Interface. Backplane connectivity defined by the ATCA.
BMC	Base Management Controller
CFM	Cubic Foot per Minute
CLI	Command-Line Interface
CLK1	AdvancedTCA bused resource Synch clock group 1
CLK1A	AdvancedTCA bused resource Synch clock group 1, bus A
CLK1B	AdvancedTCA bused resource Synch clock group 1, bus A
CLK2	AdvancedTCA bused resource Synch clock group 2
CLK2A	AdvancedTCA bused resource Synch clock group 2, bus A
CLK2B	AdvancedTCA bused resource Synch clock group 2, bus B
CLK3	AdvancedTCA bused resource Synch clock group 3
CLK3A	AdvancedTCA bused resource Synch clock group 3, bus A
CLK3B	AdvancedTCA bused resource Synch clock group 3, bus B
CMOS	Complementary Metal Oxide Semiconductor. Also refers to the small amount of battery (or capacitor) powered CMOS memory to hold the date, time, and system setup parameters.
CPLD	Complex Programmable Logic Device
CTS	Clear To Send
DDR3	DDR3 SDRAM or Double-Data-Rate three (3) Synchronous Dynamic Random Access Memory.
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual In-line Memory Module
DMA	Direct Memory Access
DMI	Desktop Management Interface
DTC	Data Transfer Controller
DTR	Data Terminal Ready
ECC	Error Checking and Correction
EMI	ElectroMagnetic Interference
ETH	Same as Ethernet.
eUSB	Embedded Universal Serial Bus
FCC	Federal Communications Commission
FI	Fabric Interface. Backplane connectivity defined by the ATCA.
FIFO	First In First Out

Acronyms	Descriptions
FPGA	Field-Programmable Gate Array
FRU	Field Replaceable Unit. Any entity that can be replaced by a user in the field. Not all FRUs are hot swappable.
Gb	Gigabit
GB	(Same as GByte) GigaByte.
GByte	(Same as GB) GigaByte.
GbE	Gigabit Ethernet
GHz	GigaHertz
GND	GrouND
HPM	PICMG Hardware Platform Management specification family
HPM.1	Hardware Platform Management IPM Controller Firmware Upgrade Specification
HW	HardWare
I2C	Inter Integrated Circuit bus
ICT	In-Circuit Test
ID	IDentification
IEEE	Institute of Electrical and Electronics Engineers
IO	(Same as I/O). Input Output
IOH	I/O Hub
IOL	IPMI-Over-LAN
IP	Internet Protocol
IPM	Intelligent Platform Management
IPMB	Intelligent Platform Management Bus
IPMB-0	Intelligent Platform Management Bus Channel 0, the logical aggregation of IPMB-A and IPMB-B.
IPMB-A	Intelligent Platform Management Bus A
IPMB-B	Intelligent Platform Management Bus B
IPMB-L	Intelligent Platform Management Bus Local
IPMC	Intelligent Platform Management Controller
IPMI	Intelligent Platform Management Interface
IPMIFWU	Intelligent Platform Management Interface FirmWare Update
IPv6	Internet Protocol version 6
IRQ	Interrupt ReQuest
JTAG	Joint Test Action Group
KHz	KiloHertz
LAN	Local Area Network
LED	Light-Emitting Diode
MAC	Media Access Controller address of a computer networking device.
MB	MegaByte
MHz	MegaHertz
MMC	Module Management Controller. MMCs are linked to the IPMC.
NC	Not Connected
OOS	Out Of Service
OS	Operating System

Acronyms	Descriptions
PHY	PHYsical layer. Generic electronics term referring to a special electronic integrated circuit or functional block of a circuit that takes care of encoding and decoding between a pure digital domain (on-off) and a modulation in the analog domain.
PICMG	PCI Industrial Computer Manufacturers Group
PICMG®	PCI Industrial Computer Manufacturers Group
POST	Power-On Self-Test
RAM	Random Access Memory
RHEL	Red Hat Enterprise Linux
RoHS	Restriction of the Use of Certain Hazardous Substances
RS-232	(Same as RS232). Recommended Standard 232.
RS232	(Same as RS-232). Recommended Standard 232.
RTC	Real Time Clock
RTM	Rear Transition Module
RTM-Link	Rear Transition Module Link. Kontron 3-wire protocol.
RTS	Request To Send
SEL	System Event Log
SFP	Small Form-factor Pluggable
ShMC	Shelf Management Controller
SMB	(Same as SMBus/SMBUS). System Management Bus.
SMBUS	(Same as SMB/SMBus). System Management Bus.
SMBus	(Same as SMB/SMBUS). System Management Bus.
SOL	Serial Over LAN
SPI	Serial Peripheral Interface
SSE2	Streaming SIMD Extension 2. SIMD is "Single Instruction, Multiple Data".
SSE3	Streaming SIMD Extension 3. SIMD is "Single Instruction, Multiple Data".
SSH	Secure SHell. A network protocol that allows data to be exchanged over a secure channel between two computers.
TCLKA	Telecom CLocK A. AMC Clock Interface.
TCLKB	Telecom CLocK B. AMC Clock Interface.
TCLKC	Telecom CLocK C. AMC Clock Interface.
TCLKD	Telecom CLocK D. AMC Clock Interface.
TX	Transmit
TXD	Transmit
UART	Universal Asynchronous Receiver Transmitter
USB	Universal Serial Bus
VCC	Power supply
VLAN	Virtual Local Area Network
XAUI	X (meaning ten) Attachment Unit Interface. A standard for connecting 10 Gigabit Ethernet (10GbE) ports.