

RTM8030 User's Guide

Advanced TCA®

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Revision History

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1.0	first release	December 2007
1.1	Sensor name modifications, added Jumper JP4, MTBF value changed	July 2008
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Kontron reserves the right to make changes without notice in product or component design as warranted by evolution in user needs or progress in engineering or manufacturing technology. Changes that affect the operation of the unit will be documented in the next revision of this user's guide.

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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 and Notes.

- Always use caution when handling/operating the computer. Only qualified, experienced, authorized electronics service personnel should access the interior of the computer. 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.



When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

- Turn off the computer and any peripherals.
- Disconnect the computer and peripherals from power sources or subsystems to prevent electric shock or system board damage. This does not apply to when hot-swapping parts.
- Follow the guidelines provided in "Preventing Electrostatic Discharge" on the following page.
- Disconnect telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.



CAUTION

Do not attempt to service the system yourself, except as explained in this user's guide. Follow installation and troubleshooting instructions closely.



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 procedures, 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.

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.

You can find the latest release of this User's Guide at:

<http://www.kontron.com> or at: <ftp://ftp.kontron.ca/support/>

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
- Appendix A, Connector Pinout
- Appendix B, Software Update
- Appendix C, Getting Help

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 sections.	
	BIOS Settings: Indicate where you can set this option in the BIOS.	
	Software Usage: Indicates how you can access this feature through software.	
	CAUTION	
	WARNING	

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

Before any installation or setup, ensure that the board is unplugged from power sources or subsystems.

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, including AMC adapters.

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 A Devices

This equipment has been tested and found to comply with the limits for a Class A 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 generated, 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 experience radio/TV technician for help.



WARNING

This is a Class A 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.

CE Certification

The product described in this user's guide was tested in a representative system and is found to be compliant with the CE marking requirements. 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 extendible 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.

1. Product Description

1.1 Product Overview

The RTM8030 is a single slot (6HP) AdvancedTCA Rear Transition Module. This RTM provides additional connectivity to the AT8030 CPU front blade.

1.2 What's Included

This board is shipped with the following items:

- One RTM8030 board
- One CD-ROM containing documentations and drivers.
- Cables that have been ordered

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

1.3 Board Specifications

Table 1-1: Board Specifications

Features	Description
Compatible Products	<ul style="list-style-type: none"> AT8030
Compliance	<ul style="list-style-type: none"> PICMG3.0 R2.0 ECN002 SAS1R10 SFF-8470 IEEE 802.3z (fiber interface) IEEE 802.3 (copper interface) PICMG HPM.1
IPMI Features	<ul style="list-style-type: none"> Management Controller compliant to PICMG 3.0 and IPMI v1.5 rev 1.1. Management Controller is run time field reprogrammable without payload impact. Robust fail safe reprogramming implementation (which includes two firmware images) that could perform automatic or manual rollback if a problem occurs during critical reprogramming phase. Remote upgrade capability (via IPMB). Management Controller self test which can detect failure under its code integrity and trig an automatic rollback.
Supervisory	<ul style="list-style-type: none"> Hardware system monitor through IPMI (voltages, currents, temperature), temperature monitor / alarm; board temperature sensor, power failure.
Mechanical	<ul style="list-style-type: none"> 322.25 x 93.74 x 29 mm
Power Requirements	<ul style="list-style-type: none"> 10W Typical without hard drive. 20 W Typical with hard drive.
Environmental Temperature*	<p>Operating: 0-55°C/32-131°F with 30CFM airflow Storage and Transit: -40 to +70°C/-40 to 158°F</p>
Environmental Humidity*	<p>Operating: 15% to 90% @55°C/131°F non-condensing Storage and Transit: 5% to 95% @ 40°C/104°F non-condensing</p>
Environmental Altitude*	<p>Operating: 4,000 m / 13,123 ft Storage and Transit: 15,000 m / 49,212 ft</p>
Environmental Shock*	<p>Operating: 3G, half-sine 11ms, each axis Storage and Transit: 18G, half-sine 11ms, each axis</p>
Environmental Vibration*	<p>Operating: 5-200Hz. 0.2G, each axis Storage and Transit: 5 Hz to 20 Hz @ 1 m2/s3 (0.01 g2 /Hz) (flat) 20 Hz to 200 Hz @ -3 dB/oct (slop down)</p>
Reliability	<ul style="list-style-type: none"> MTBF: > 500 000 hours @ 40 C / 104 F (Telcordia SR-332, Issue 1) Whole board protected by active breaker USB voltage protected by an active breakers
Safety / EMC	<ul style="list-style-type: none"> Safety: CE Mark to EN 60950-1:2001. Meets or exceeds UL 60950-1/CSA C22.2 No 60950-1-07. Designed to meet GR-1089-CORE EMI/EMC: FCC 47 CFR Part 15, Class A; CE Mark to EN55022/EN55024/EN300386
Warranty	Two years limited warranty

* Designed to meet or exceed

1.4 Compliance

This product conforms to the following specifications:

- PICMG3.0 R2.0 ECN002 - Advanced Telecommunication Computing Architecture
- PICMG HPM.1
- SAS1R10 - Serial Attached SCSI - 1.1 Revision 10. (SAS-1.1)
- SFF-8470 (T10 Technical Committee and SCSI Trade Association)
- IEEE 802.3z (fiber interface)
- IEEE 802.3 (copper interface)

1.5 Hot-Swap Capability

The RTM8030 supports Full Hot Swap capability as per PICMG3.0R2.0. It can be removed from or installed in the system while it is on (without powering-down the system). Please refer to the PICMG3.0R2.0 specification for additional details. However, all managements the infrastructure is present for hot-swap, but the user must take the proper action to protect its data under the OS of the Front Board (such as unmount a SAS drive)

1.6 Interfacing with the Environment

1.6.1 RTM (rear transition module)

The RTM8030 is a single slot (6HP) AdvancedTCA Rear Transition Module. This module provides additional connectivity for AT8030 CPU front blade.

1.6.1.1 *Standard Compliance*

- PICMG3.0 R2.0 ECN002 - Advanced Telecommunication Computing Architecture
- PICMG HPM.1
- SAS1R10 - Serial Attached SCSI - 1.1 Revision 10. (SAS-1.1)
- SFF-8470 (T10 Technical Committee and SCSI Trade Association)

1.6.1.2 *SAS Feature*

- Compliant to SAS-1.1 Revision 10 / SFF-8470
- SAS signal integrity guarantee over a four meters cable

1.6.1.3 *Serial Port Feature*

- One (1) serial port available on the RTM face plate through one (1) RJ-45 connector dedicated for Port 0.
- One (1) serial port available on the RTM face plate through one (1) RJ-45 connector shared between Port 1 to Port 7.
- RS-232 signals level at RTM face plate connector.
- Serial port speed capability is: 9.6kbits/s to 115.2kbits/s.

1.6.1.4 *FRU Data EEPROM*

- FRU Data EEPROM size is 512Kbit and it includes board identification and serial number.

1.6.1.5 *Hot Swap*

The RTM8030 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 RTM8030 is removed. This procedure is identical to the AdvancedTCA AMC behavior.

1.6.1.5.1 *Inserting the RTM8030 into the slot*

The presence of the RTM is indicated by one signal. The front blade IPMC recognizes the RTM insertion when this signal is low. As soon as inserted, the MMC on the RTM turns the blue LED ON and enables the 3.3V_SUS to the RTM. Once the I2C link is working, the IPMC of the front blade accesses the serial EEPROM to retrieve

FRU data. After knowing the type of RTM inserted, the IPMC negotiates with System Manager in order to activate the +12V payload power. After RTM local voltages have been ramped up, the IPMC from the front blade enables the RTM Link.

After this the IPMC informs the CPU SW there is a functional RTM blade present via standard hot swap sensor.

1.6.1.5.2 Removing the RTM8030 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 first notifies the CPU SW of coming hot removal. After the CPU SW has disabled SAS links, it notifies the MMC that the RTM blade can be removed. The MMC then activates reset to the RTM blade (via the Expander), disables the RTM Link and turns OFF the payload +12V power. When it is safe to remove the RTM blade from the slot, the MMC turns the Blue / Hot Swap LED ON. Front Blade IPMC turns OFF the management power only when there is no RTM detected. (RTM8030 removed from the slot)

2. Board Features

2.1 Block Diagram

Figure 2-1: Block Diagram

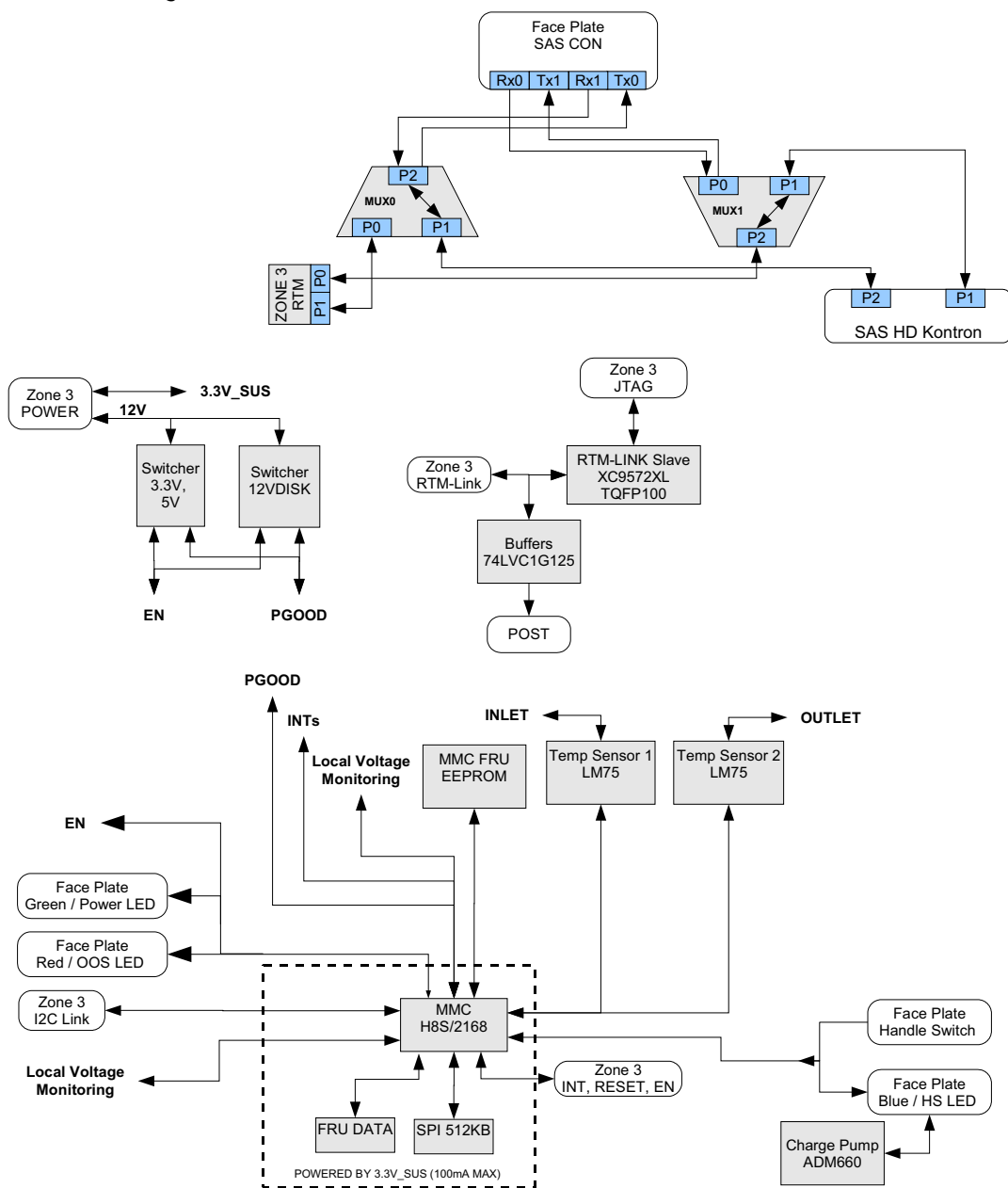
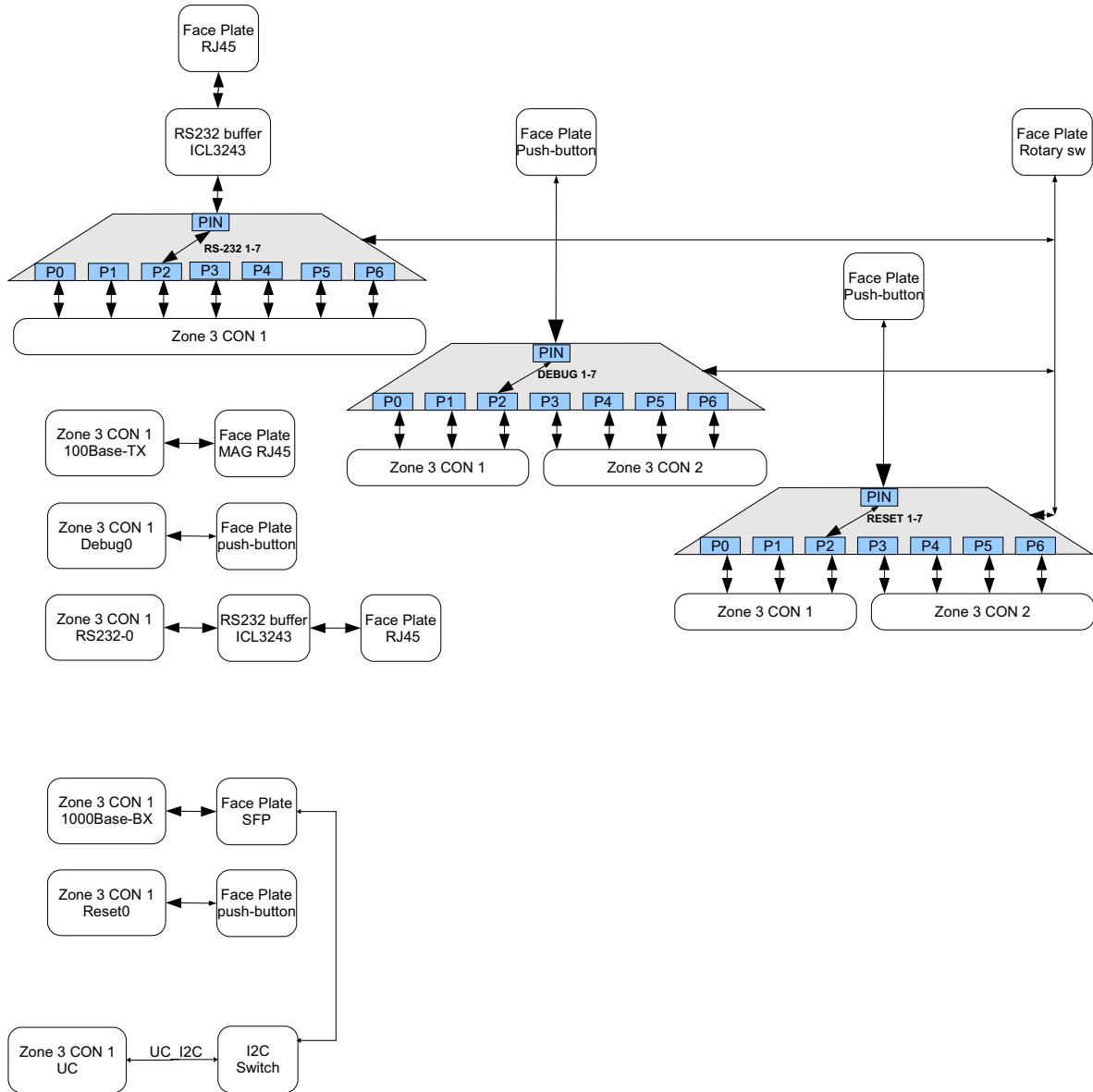


Figure 2-2: Connector Block Diagram



2.2 Rotary Binary Selector

The RTM8030 has a rotary binary selector which is composed of a binary coded rotary switch and a debouncing circuit. This binary selector controls the connection from the face plate Reset and RS232 Rx/Tx signals to the CPU blade through the zone 3 connector. The binary selector has 8 positions, from 0 to 7. Position 0 doesn't select any group signals. Positions 1 to 7 selects corresponding group signals. When the shaft has not reach a definite position, the position output is position 7.

When the rotary switch is at position 1, then:

Z3_RESET1# is connected to the faceplate "reset" switch (SW5).

Z3_RS232_RX1/TX1 are connected to the faceplate selectable RS232 connector (J6-C).

When the rotary switch is at position 2, then the Z3_RESET2# and Z3_RS232_RX/TX2 are connected to the switches SW4-SW5 and connector J6-C.

This connectivity pattern is the same up to position 7.

When the rotary switch is at position 0, then the switches SW4-SW5 and connector J6-C are not connected to any front blade signals.

The signal Z3_RESET0# is connected to the faceplate switch SW3.

The signals Z3_RS232_RX0/TX0 are connected to the faceplate RS232 connector (J6-B).

Figure 2-3:Reset Switch / RS-232 Port Selection

Reset Switch / RS-232 Port Selection		
Rotary Switch (SW1) Position	Reset Switch Activated	RS-232 Port Activated
0	SW5 Not Used	J6C Not Used
1	SW5 CPU1	J6C CPU1 COM1
2	SW5 CPU2	J6C CPU2 COM1
3	SW5 ES	J6C ES UART0
4	SW5 Not Used	J6C AMC Bay
5	SW5 Not Used	J6C CPU0 COM2
6	SW5 Not Used	J6C CPU1 COM2
7	SW5 Not Used	J6C CPU2 COM2
ANY	SW3 CPU0	J6B CPU0 COM1

2.3 USB 2.0 Interface

USB features include:

- Capability to daisy chain as many as 127 devices per interface
- Fast bi-directional
- Isochronous/asynchronous interface
- 480 MBPS transfer rate
- Standardization of peripheral interfaces into a single format
- Backward compatible with USB 1.1 devices

USB supports Plug and Play and hot-swapping operations (OS level). These features allow USB devices to be automatically attached, configured and detached, without reboot or running setup.

Table 2-1:USB Connector Pinout

Pin	Signal
1	VCC
2	DATA-
3	DATA+
4	GND



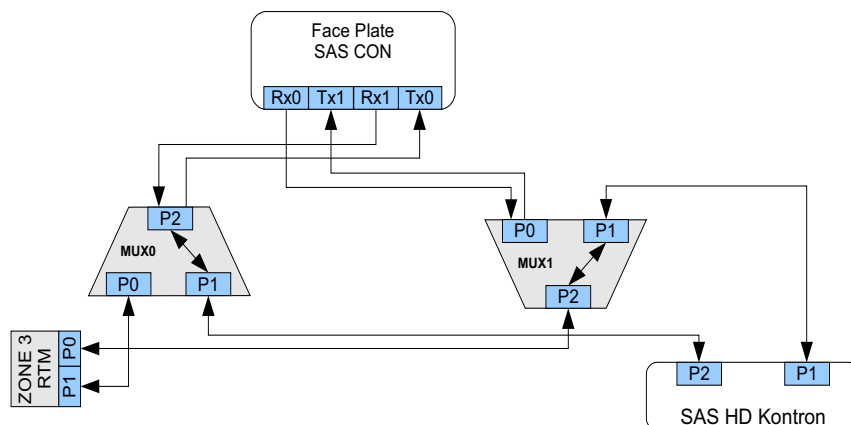
Signal Path:

The USB Port is available through the RTM front plate (J3).
The USB Port is connected to the CPU engine 0 of the AT8030.

2.4 SAS Link

The RTM8030 has one (1) 3Gbits/s SAS link available on the face plate through the SAS Hard Disk Connector or through the external SAS connector. This link is coming from the front blade through the zone 3 connector. A SAS signal conditioner (repeater) and multiplexer is needed to guarantee SAS signal integrity over the cable between two RTM blades. The maximum SAS cable length between two RTM blades is 4m. SAS links work after both RTM units have been powered up. SAS port mapping is drawn below:

Figure 2-4:SAS Block diagram



Jumper Settings:

JP4 must be installed to enable the SAS External Connector otherwise; the Onboard SAS HDD is enabled.

2.5 SAS Hard Drive Option

Kontron offers the option of adding a SAS hard drive on the RTM8030. This hard drive is located on the component side of the PCB, in the lower part of the RTM8030.



Note:

The SAS Hard Drive Option is connected to the CPU engine 0 of the AT8030.

2.6 Serial Port

The RTM8030 has two serial ports available on the RTM face plate. One serial port is permanent (always connected to the CPU engine 0) and the other one is selected between RS232 port1 to port7 by using the rotary binary selector. Serial ports are coming from the front blade through zone 3 connector. RS232 buffers are used on the RTM to convert LVTTTL level from zone 3 to RS232 level at the face plate connector. Both RS232 buffers are connected to the management power. Serial port works from 9 to 115 kbits/s. Both transceivers can detect a valid RS232 level signal on the face plate RxD input signal. Those RS232 detect signals are connected to the RTM-Link slave CPLD and the MMC.

Table 2-2:Serial Port Connector Pinout

Pin	Signal
1	N.C.
1	N.C.
3	TX#
4	GND
5	GND
6	RX#
7	N.C.
8	N.C.



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.



Signal Path:

RS232 port 0 is available on the RTM face plate through J6B. This port is always connected the CPU engine 0.
RS232 port 1-7 is available on the RTM face plate through J6C. Depending the the rotary switch position, the port will be connected to either CPU engine 1 or 2 or to the Unit computer.

2.7 Ethernet 100Base-TX Interface

The RTM8030 has one ethernet 100Base-TX interface accessible on the RTM face plate through a RJ45 connector. This port is the management port of the unit computer on the AT8030.

2.8 SFP

The RTM8030 has one SFP module connector available on the RTM face plate. The SFP module signals are coming from the front blade 1000Base-X interface through zone 3 connector.

2.9 Redundant MMC Flash Boot Block

The MMC microcontroller runs a firmware from its internal 256KB flash. It is programmed by an additional 8K boot block. It keeps the last two copies of the MMC firmware in dedicated flash memories. The boot block activates the MMC image and can rollback a firmware update in the MMC in case of problems.

The Boot Block itself uses code. Functions of the boot block are kept to a minimum and field updatable with payload impact.

2.10 Hardware Management Overview

The RTM communicates with the Module Management Controller (MMC) using the IPMB_L channel.

The memory subsystem of the MMC consists of an integrated flash memory to hold the MMC operation code and integrated RAM for data. The field replacement unit (FRU) inventory information is stored in the nonvolatile memory on an EEPROM connected via a local I2C interface to the MMC microcontroller. It is possible to store up to 4 KBytes within the FRU inventory information. Event generation over IPMB-L bus to reach the front board that forward it to the ShMc ensure that 'post-mortem' logging information is available even if the power of the RTM is disabled.

The onboard DC voltages and temperature are monitored by the MMC microcontroller device. The MMC will send an event to the front board if any of the thresholds are exceeded.

To increase the reliability of the RTM8030 management subsystem, an external watchdog supervisor only for the MMC is implemented. The MMC must strobe the external watchdog at 500 μ sec. intervals to ensure continuity of operation of the board's management subsystem. If the MMC ceases to strobe the watchdog supervisor, the watchdog resets the MMC. The watchdog timeout expires after one second if strobes are not generated. The external watchdog supervisor is not configurable and must not be confused with the IPMI v1.5 watchdog timer commands. This external watchdog of the MMC is implemented in a separate chip.

2.10.1 Sensor Data Record (SDR)

Every sensor on the RTM is associated with a Sensor Data Record (SDR). Sensor Data Records contain information about the sensors identification such as sensor type, sensor name, sensor unit. SDR also contain the configuration of a specific sensor such as threshold/hysteresis, event generation capabilities that specifies sensor behaviour. Some fields of the sensor SDR are configurable through IPMI v1.5 command and are set to built-in initial value. Finally one field which is the sensor owner must reflect the module addresses that allow a system management software to identify the owner of the SDR when it is scanned from the front board IPMC and merged within the IPMC Device SDR repository.

From IPMI perspective, the RTM8030 management controller is set up as a satellite management controller (SMC). It does support sensor devices, and use the IPMI static sensor population feature of IPMI v1.5 to

merge the hot swapped RTM sensor with the front board sensors population. The usual way the SHMC is informed about an RTM insertion is through the RTM Module Hot Swap sensor and a radial presence line on the RTM connector. All SDRs can be queried using Device SDR commands to the firmware. Module sensors that have been implemented are listed below.

2.10.2 Hardware Sensors

Table 2-3:IPMI Hardware Sensors

Sensor Name	Voltage/Signals Monitored	Scanning Enabled under Power State	Health LED (Green to Amber)
IPMI Info-1	Internal IPMC firmware diagnostic	*	N
IPMI Info-2	Internal IPMC firmware diagnostic	*	N
FRU Agent	Board FRU Data agent that verify FRU Data validity	*	N
Module HS	RTM HS State	*	N
IPMBL State	Operational state of IPMB-L	*	N
MMC Stor Err	Management sub-system health: non volatile memory error.	*	N
TempSensor1	Board Temperature Sensor	-	X
TempSensor2	Board Temperature Sensor	*	X
Vcc +3.3V	3.3 V	-	X
Vcc +3.3VSUS	3.3 V Suspend	*	X
Vcc +5V	5.0V	-	X
Vcc +12.0v	12.0 V	-	X
Vcc BlueLED	Voltage on blue LED board input power supply	*	X
Vcc +12VDisk	12.0V on HDD	-	X
Health Error	Board health sensors (aggregation of other sensors)	*	Asserted / Desserted
MMC Reboot	MMC reboot detection	*	N
Ver change	MMC firmware upgrade detection	*	N
Power Good	Actual power status	*	N
Pres SFP-A	SFP presence status	*	N
Overlcc SFPA	SFP Over Current Status	-	N
OverlccRS232	RS-232 Over Surrent status	-	N
Overlcc USB0	USB Over Current status	-	N

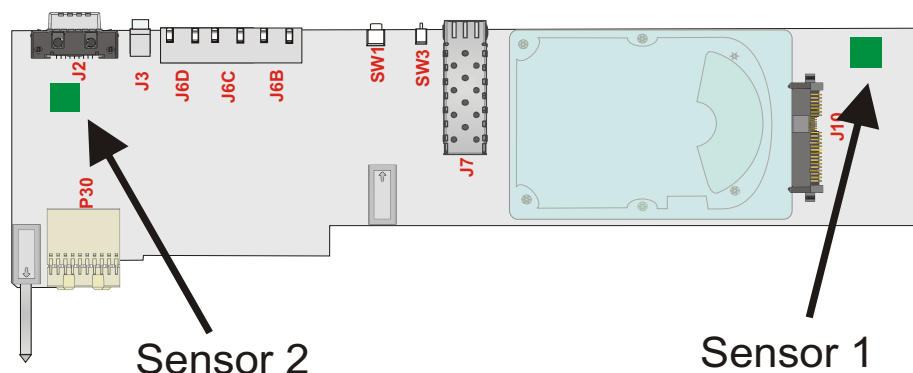
X Exceed critical threshold

* Power On/Off

- Power On

N No change

2.10.2.1 Temperature Sensor Locations



2.10.2.2 IPMB-L Link Sensor

The RTM8030 has an IPMB-L links to communicate with the processor board and other devices in the chassis chassis IPMB-0 bus. MMC monitors the bus for any link failure and sends the bus failure event to the front board upon the recovery occurs.

2.10.2.3 Module Hot Swap

Similar to an AMC, a Hot Swap module is implemented. The hot-swap event message conveys the current state of the module, the previous state and a cause of the state change as can be determined by the MMC. Refer to AMC.0 R2.0 specifications for further details on the module hot-swap state.

2.10.3 Field Replaceable Unit (FRU) Information

The FRU Information provides inventory data about the boards where the FRU Information Device is located. The part number or version number can be read through software.

FRU information in the RTM8030 includes data describing the RTM8030 board similar to AMC.0 R2.0 specification requirements. This information is retrieved by the RTM, enabling reporting of board-specific information through a standardized mechanism.

Table 2-4:Board Information Area

Board Information Area	
Field Description	Value (hex)
Format Version	0x01
Board Area Length	*Calculated
Language code	0x00
Manufacturing Date / Time	*Based on mfg. date
Board Manufacturer type/length	*Calculated
Board Manufacturer	"Kontron"
Board Product Name type/length	*Calculated
Board Product Name	"RTM8030"

Board Information Area	
Board Serial Number type/length	*Calculated
Board Serial Number	Manufacturer S/N
Board Part Number type/length	*Calculated
Board Customer Part Number	"T5704_XX"*
FRU File ID type/length	*Calculated
FRU File ID	"FRU5704_YY"***
No more fields	0xC1
Padding	0x00
Board Area Checksum	*Calculated

Table 2-5:Product Information Area

Product Information Area	
Field Description	Value (hex)
Format Version	0x01
Product Area Length	*Calculated
Language Code	0x00
Manufacturer Name type/length	*Calculated
Manufacturer Name	"Kontron"
Product Name type/length	*Calculated
Product Name	"RTM8030"
Product Part/Model Number type/length	*Calculated
Product Part/Model Number	"T5704_XX"*
Product Version type/length	*Calculated
Product Version	"XX"*
Product Serial Number type/length	*Calculated
Product Serial Number	Manufacturer S/N
Asset Tag type/length	0xC0
Asset Tag	
FRU File ID type/length	*Calculated
FRU File ID bytes	"FRU5704-YY"***
No more fields	0xC1
Padding	0x00
Product Info Area Checksum	*Calculated

Table 2-6: Type 16 Module Current Requirements Records

Type 16 – Module Current Requirements Record	
Record Type ID	C0h
Record format version	02h
Manufacturer ID	00315Ah (PICMG Record ID)
PICMG Record ID	16h (Module Power Descriptor table)
Record Format Version	00h
Current Draw	09h (0.9 Amps at 12 V => 10.8 Watts)

2.10.4 E-Keying

E-Keying has been defined in the AMC.0 R2.0 Specification to prevent module damage and prevent misoperation and also to verify port connection compatibility. The FRU data contains the RTM point-to-point connectivity record as described in Section 3.9.2 of the AMC.0 R2.0 specification. The records are formatted as per AMC.0 R2.0 but the I/O ports assignment are OEM since AMC.0 does not specify RTM.

The Set/Get AMC Port State IPMI commands defined by the AMC.0 specification are used for either granting or rejecting the E-keys.

Table 2-7: Type 19h - AMC Point-To-Point Connectivity Record

Type 19h - AMC Point-To-Point Connectivity Record	
Record Type ID	C0h
Record format version	02h
Record Length	N/A
Record Checksum	N/A
Header Checksum	N/A
Manufacturer ID	00315Ah à PICMG Record ID
PICMG Record ID	19h à AMC Point-To-Point Connectivity Record
Record Format Version	00h
OEM GUID Count	04h
OEM GUID List	
OEM GUID [F0]	Update Channel
OEM GUID [F1]	Serial
OEM GUID [F2]	100 BaseT
OEM GUID [F3]	USB
Record Type/Connected-device ID	89h à RTM
AMC Channel Descriptor Count	0Eh

Table 2-8: Type 19h - AMC Point-To-Point Connectivity Record

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Channel Descriptor	0FFFFFF0h (Ethernet Port)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	00h
AMC Channel Descriptor	0FFFFFF1h (Ethernet Port)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	01h
AMC Channel Descriptor	0FFFFFF2h (SAS)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	02h
AMC Channel Descriptor	0FFFFFF3h (SAS)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	03h
AMC Channel Descriptor	0FFFFFF4h (Ethernet Port 100BaseT)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	04h
AMC Channel Descriptor	0FFFFFFBh (Update Channel)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	0Bh

Table 2-9: Type 19h - AMC Point-To-Point Connectivity Record

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Channel Descriptor	0FFFFECh (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	0Ch
AMC Channel Descriptor	0FFFFEDh (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	0Dh
AMC Channel Descriptor	0FFFFEEh (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	0Eh
AMC Channel Descriptor	0FFFFEFh (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	0Fh
AMC Channel Descriptor	0FFFFF0h (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	10h
AMC Channel Descriptor	0FFFFF1h (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	11h

Table 2-10: Type 19h - AMC Point-To-Point Connectivity Record

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Channel Descriptor	0FFFFFF2h (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	12h
AMC Channel Descriptor	0FFFFFF3h (Serial)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	13h
AMC Channel Descriptor	0FFFFFF4h (USB)
Reserved (Bits 23-20)	0Fh
Lane 3 Port Number (Bits 19-15)	1Fh
Lane 2 Port Number (Bits 14-10)	1Fh
Lane 1 Port Number (Bits 9-5)	1Fh
Lane 0 Port Number (Bits 4-0)	14h

Table 2-11: Type 19h - AMC Point-To-Point Connectivity Record

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Link Descriptor	FC00005100h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à 1000 Base BX
AMC Link Type (Bits 19-12)	005h à AMC.2 Ethernet
AMC Link Designator (Bits 11-0)	0100h à AMC Channel 0, lane 0
AMC Link Descriptor	FC00005101h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à 1000 Base BX
AMC Link Type (Bits 19-12)	005h à AMC.2 Ethernet
AMC Link Designator (Bits 11-0)	0101h à AMC Channel 1, lane 0
AMC Link Descriptor	FC00207102h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Link Type Extension (Bits 23-20)	02h à Serially Attached SCSI/SATA
AMC Link Type (Bits 19-12)	007h à AMC.3 Storage
AMC Link Designator (Bits 11-0)	0102h à AMC Channel 2, lane 0
AMC Link Descriptor	FD00107102h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	01h -> Implements SATA Server Interface
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	01h à Serial ATA
AMC Link Type (Bits 19-12)	007h à AMC.3 Storage
AMC Link Designator (Bits 11-0)	0102h à AMC Channel 2, lane 0
AMC Link Descriptor	FC00207103h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	03h à Serially Attached SCSI/SATA
AMC Link Type (Bits 19-12)	007h à AMC.3 Storage
AMC Link Designator (Bits 11-0)	0103h à AMC Channel 3, lane 0
AMC Link Descriptor	FD00107103h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	01h -> Implements SATA Server Interface
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	01h --> Serial ATA
AMC Link Type (Bits 19-12)	007h à AMC.3 Storage
AMC Link Designator (Bits 11-0)	0103h à AMC Channel 3, lane 0

Table 2-12: Type 19h - AMC Point-To-Point Connectivity Record

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Link Descriptor	FC000F2104h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00h -> Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h -> None
AMC Link Type (Bits 19-12)	F2h: OEM GUID Definition (100 BaseT)
AMC Link Designator (Bits 11-0)	0104h à AMC Channel 4, lane 0
AMC Link Descriptor	FC000F0105h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00h -> Exact match
Link Grouping ID (Bits 31-24)	00h -> Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h -> None

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Link Type (Bits 19-12)	F0h : OEM GUID Definition (Update Channel)
AMC Link Designator (Bits 11-0)	0105h --> AMC Channel 5, lane 0
AMC Link Descriptor	FC000F1106h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)
AMC Link Designator (Bits 11-0)	0106h à AMC Channel 6, lane 0
AMC Link Descriptor	FC000F1107h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)
AMC Link Designator (Bits 11-0)	0107h --> AMC Channel 7, lane 0
AMC Link Descriptor	FC000F1108h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)
AMC Link Designator (Bits 11-0)	0108h à AMC Channel 8, lane 0
AMC Link Descriptor	FC000F1109h
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)
AMC Link Designator (Bits 11-0)	0109h --> AMC Channel 9, lane 0

Table 2-13: Type 19h - AMC Point-To-Point Connectivity Record

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Link Descriptor	FC000F110Ah
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)

Type 19h - AMC Point-To-Point Connectivity Record	
AMC Link Designator (Bits 11-0)	010Ah à AMC Channel 10, lane 0
AMC Link Descriptor	FC000F110Bh
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)
AMC Link Designator (Bits 11-0)	010Bh à AMC Channel 11, lane 0
AMC Link Descriptor	FC000F110Ch
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)
AMC Link Designator (Bits 11-0)	010Ch à AMC Channel 12, lane 0
AMC Link Descriptor	FC000F110Dh
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F1h : OEM GUID Definition (Serial)
AMC Link Designator (Bits 11-0)	010Dh à AMC Channel 13, lane 0
AMC Link Descriptor	FC000F310Eh
Reserved (Bits 39-34)	03Fh
AMC Asymmetric Match (Bits 33-32)	00b à Exact match
Link Grouping ID (Bits 31-24)	00h à Single Channel Link
AMC Link Type Extension (Bits 23-20)	00h à None
AMC Link Type (Bits 19-12)	F3h : OEM GUID Definition (USB)
AMC Link Designator (Bits 11-0)	010Eh à AMC Channel 14, lane 0

2.10.5 MMC Firmware Code

MMC firmware code is organized into boot code and operational code, both of which are stored in a flash module. Upon an MMC reset, the MMC executes the boot code and performs the following:

- 1 Self test to verify the status of its hardware and memory.
- 2 Performs a checksum of the operational code.
- 3 Set operational state that tells the boot block the firmware operate correctly.

Upon successful verification of the operational code checksum, the firmware will jump to the operational code.

2.10.6 MMC Firmware Upgrade Procedure

The upgrade procedure is compliant to PICMG HPM.1. MMC Firmware upgrades can be done by using IPMITOOL from [sourceforge](#) from the front blade or remotely on the chassis. It has been designed to upgrade through any IPMI interface without payload impact.

2.10.7 Boot Block Upgrade Procedure

Type the following to perform MMC firmware upgrade

```
ipmifwu -fb <file> -P /dev/ttyS0 -M rtm -p <ENTER>
```



Note:

During boot block firmware upgrade the MMC is held in reset

2.10.7.1 Hot-Swap Process

The RTM8030 has the ability to be hot-swapped in and out of the front board. The onboard MMC manages the RTM's power-up and power-down transitions. The list below illustrates this process for power down request.

- 1 Ejector latch is opened. HOT_SWAP_PB# assertion. MMC firmware detects the assertion of this signal.
- 2 MMC sends "Module Handle Open" event message to the front board. The corresponding M state of the front board moves from M4-> M5.
- 3 The front board moves from M5 -> M6 if the SHMC grants the request. The front board IPMC sends the FRU control requesting quiesced state to the RTM.
- 4 The firmware deasserts payload power and sends "Module Quiesced" event message to the front board where it transitions from M6 to M1 state.

2.10.7.2 Hot-Swap LED

The RTM8030 supports a blue Hot Swap LED mounted on the front panel. This LED indicates when it is safe to remove the RTM from the front board. The on-board MMC drives this LED to indicate the hot-swap state. The following states are possible:

Table 2-14:Hot-Swap LED Description

LED state	Description
OFF	M4 state; normal state when board is in operation.
ON	M1 state; ready for hot swap.
Short blink	M5 state; deactivation request
Long blink	M2 state; activation request.

When the RTM latch is disengaged from the faceplate, the hot swap switch embedded in the PCB will assert a "HOT_SWAP_PB#" signal to the MMC, and the MMC will send "Module Handle Open" event message to the front board which moves from the M4 state to the M5 state. At the M5 state, the front board will ask the SHMC (or Shelf Manager) for permission to move the RTM to the M6 state. Then the IPMC of the front board, through IPMB-L, will set the RTM Hot Swap LED to indicate this state with a short blink. Once permission is received from the SHMC or higher-level software, the front board will move to the M6 state.

The SHMC or higher level software can reject the request to move to the M6 state. If this occurs, the RTM will returns the Hot Swap LED to a solid off condition, indicating that the RTM has returned to M4 state.

If the RTM reaches the M6 state through an extraction request through the RTM handle latch, the MMC communicates to the front board that the module must discontinue operation in preparation for removal.

The Hot Swap LED continues to flash during this preparation time, just like it does at the M5 state. When main RTM payload power is successfully removed from the RTM slot, the Hot Swap LED remains lit, indicating it is safe to remove the RTM from the chassis.

2.11 Debugging Features

All LEDs are “user” overritable by using standard PICMG LED api.

2.11.1 Hot Swap LED (LED0)

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

2.11.2 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 during firmware upgrade and is user configurable if needed by a customer application.

2.11.3 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 RTM8030 voltage or temperature fails.

3. Installing the Board

3.1 Setting Jumper

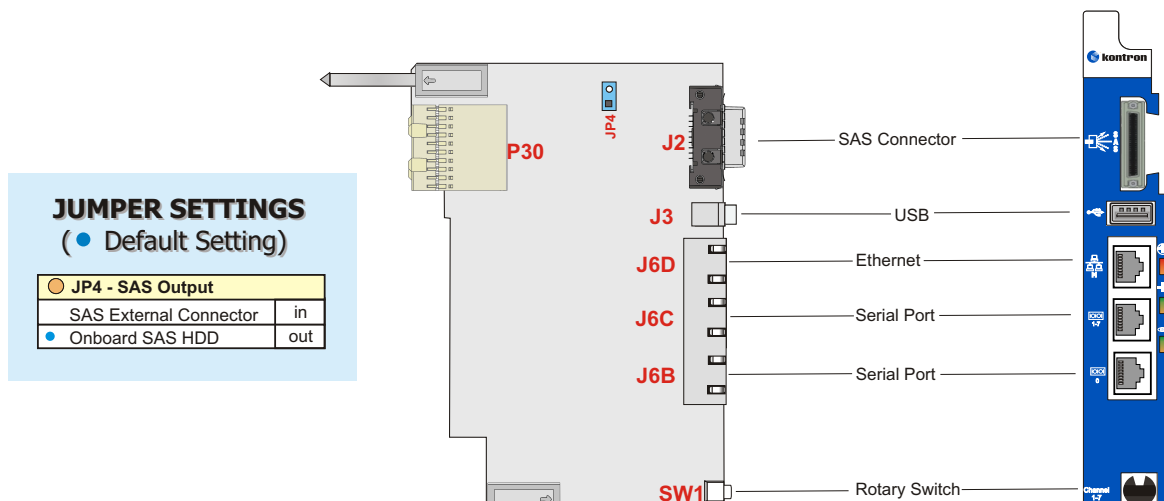
3.1.1 Jumper Description

Table 3-1: Jumper Description

Name	Description	Jumper
SAS Output	When JP4 is IN, the SAS External Connector is Enabled. When JP4 is OUT, the onboard SAS Hard Disk is Enabled.	JP4

3.1.2 Setting Jumper & Location

Figure 3-1: Setting Jumper & Location



3.2 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 frontplate to the enclosure to firmly attach the board to its enclosure.
- 4 Use extractor handles to disconnect and extract the board from its enclosure.



WARNING

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



3.2.1 Installing the RTM in the chassis

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 CPU board.
- 5 Using both ejector handles, engage the board in the CPU board connectors until both ejectors are locked.
- 6 Fasten screws at the top and bottom of the faceplate.

3.2.2 Removing the RTM from the chassis

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, this mean that the hot swap sequence is ready for board removal.
- 4 Use both ejectors to disengage the board from the CPU board.
- 5 Pull the board out of the chassis.

A. Connector Pinouts

A.1 Connectors and Headers Summary

Connector	Description
P30	RTM Connector
J2	SAS Faceplate Connector
J3	USB 2.0 Connector
J6B	Serial Port
J6C	Serial Port
J6D	Ethernet
J7	SFP (Ethernet)
J10	SAS Hard Disk Connector

A.2 AdvancedTCA I/O RTM Connector (P30)

Pin	ROW A	ROW B	ROW C	ROW D	ROW E	ROW F
1	V_12V_1	V_12V_5	V_12V_2	V_3V2_SUS	RTM_EJECT	RTM_PRSENT#
2	V_12V_3	V_12V_6	V_12V_4	IPMC_INT#	IPMC_SCL	IPMC_SDA
3	RS232_0_TX	RS232_0_RX	JTAG_TDI	JTAG_TDO	JTAG_TMS	JTAG_TCK
4	SOCA	SOCB	INT_0	INT_1	RTML_TX	RTML_RX
5	RS232_1_TX	RS232_1_RX	RS232_2_TX	RS232_2_RX	RS232_3_TX	RS232_3_RX
6	RS232_5_TX	RS232_5_RX	RS232_6_TX	RS232_6_RX	RS232_7_TX	RS232_7_RX
7	N.U.	N.U.	N.U.	N.U.	RESET_0#	RESET_1#
8	100BASE_TX+	100BASE_TX-	100BASE_RX+	100BASE_RX-	100BASE_CT	N.C.
9	SAS_0_TX+	SAS_0_TX-	SAS_0_RX+	SAS_0_RX-	SAS_1_TX+	SAS_1_TX-
10	1000BX_TX_1+	1000BX_TX1-	1000BX_RX1+	1000BX_RX1-	1000BX_TX2+	1000BX_TX2-

Pin	ROW G	ROW H	ROW AB	ROW CD	ROW EF	ROW GH
1	N.C.	RTM_EN#	GND	GND	GND	GND
2	USB_D+	USB_D-	GND	GND	GND	GND
3	JTAG_TRST	N.C.	GND	GND	GND	GND
4	RTML_CLK	RESET	GND	GND	GND	GND
5	RS232_4_TX	RS232_4_RX	GND	GND	GND	GND
6	UC_SCL	UC_SDA	GND	GND	GND	GND
7	RESET_2#	RESET_3#	GND	GND	GND	GND
8	N.C.	N.C.	GND	GND	GND	GND
9	SAS_1_RX+	SAS_1_RX-	GND	GND	GND	GND
10	1000BX_RX2+	1000BX_RX2-	GND	GND	GND	GND

A.3 SAS Faceplate Connector (J2)

Pin	Signal	Pin	Signal
S1	RX_0+	G1	GND
S2	RX_0-	G2	GND
S3	RX_1+	G3	GND
S4	RX_1-	G4	GND
S5	N.C.	G5	GND
S6	N.C.	G6	GND
S7	N.C.	G7	GND
S8	N.C.	G8	GND
S9	N.C.	G9	GND
S10	N.C.		
S11	N.C.	MTG1	CGND_1
S12	N.C.	MTG2	CGND_2
S13	TX_1-		
S14	TX_1+		
S15	TX_0-		
S16	TX_0+		

A.4 USB Port (J3)

Pin	Signal
1	VCC
2	DATA-
3	DATA+
4	GND

A.5 SERIAL PORT(J6B & J6C)

Pin	Signal
1	N.C.
2	N.C.
3	TX#
4	GND
5	GND
6	RX#
7	N.C.
8	N.C.

A.6 Ethernet(J6D)

Pin	Signal
1	TX+
2	TX-
3	RX+
4	N.C.
5	N.C.
6	RX-
7	N.C.
8	N.C.

A.7 SFP Channel (J7)

Pin	Signal	Pin	Signal	Pin	Signal
1	VEET_1	11	VEER_3	21	cGND_1
2	TX_FAULT	12	RD-	22	cGND_2
3	TX_DIS	13	RD+	23	cGND_3
4	MODDEF2	14	VEER_4	24	cGND_4
5	MODDEF1	15	VCCR	25	cGND_5
6	MODEFF0	16	VCCT	26	cGND_6
7	R_SEL	17	VEET_2	27	cGND_7
8	LOS	18	TD+	28	cGND_8
9	VEER1	19	TD-	29	cGND_9
10	VEER2	20	VEET_3	30	cGND_10
				31	cGND_11

A.8 SAS Hard Drive Connector (J10)

Pin	Signal	Pin	Signal
S1	GND	P1	3.3V
S2	PortA_TX+	P2	3.3V
S3	PortA_TX-	P3	3.3V
S4	GND	P4	GND
S5	PortA_RX-	P5	GND
S6	PortA_RX+	P6	GND
S7	GND	P7	5V
S8	GND	P8	5V
S9	PortB_TX+	P9	5V
S10	PortB_TX-	P10	GND
S11	GND	P11	Ready LED
S12	PortB_RX-	P12	GND
S13	PortB_RX+	P13	12V
S14	GND	P14	12V
		P15	12V

B. Software Update

B.1 MMC Firmware Update Procedure

The MMC Firmware update procedure is detailed in a ReadMe file included with the MMC Firmware package as well as the update utility. This package can be downloaded from our website <http://www.kontron.com> or from our FTP site <ftp://ftp.kontron.ca/Support>. The firmware update procedure is also compliant to PICMG HPM.1 which defines a standard way for update process.

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-kom@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.

- Fax

- 1 Make a copy of the request form on the following page.

- 2 Fill it out.

- 3 Fax it to us at: North America (450) 437-0304, EMEA +49 (0) 8341 803 339

- 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
6U	CompactPCI board size (3U = 100 mm by 160 mm, 6U = 233.35 mm by 160 mm). Refers to height.
8HP	Horizontal Pitch (1 HP = .2 inches, a CompactPCI board is 4HP, Dual width CompactPCI board is 8HP). Refers to width.
ACL	Access Control List. IP Access Control List.
ACPI	Advanced Configuration & Power Interface
ADC	Analog to Digital Converter
AdvancedMC	(Same as AMC). Advanced Mezzanine Card.
AER	Advanced Error Reporting. PCI Express device capability for more robust error reporting and is implemented with a specific PCI Express capability structure. See the PCI Express Base Specification.
AMC	(Same as AdvancedMC). Advanced Mezzanine Card.
AMC.0	Advanced Mezzanine Card Base Specification.
AMC.1	PCI Express and Advanced Switching on AdvancedMC. A subsidiary specification to the Advanced Mezzanine Card Base Specification (AMC.0).
AMC.2	Ethernet Advanced Mezzanine Card Specification. A subsidiary specification to the Advanced Mezzanine Card Base Specification (AMC.0).
AMC.3	Advanced Mezzanine Card Specification for Storage. A subsidiary specification to the Advanced Mezzanine Card Base Specification (AMC.0).
ANSI	American National Standards Institute
API	Application Programming Interface
APIC	Advanced Programmable Interrupt Controller
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ARP	Address Resolution Protocol
ASCII	American Standard Code for Information Interchange. ASCII codes represent text in computers, communications equipment, and other devices that work with text.
ASF	Alert Standard Format. A standard for how alerting and remote-control capabilities on network controllers work.
ATA	Advanced Technology Attachment
ATAPI	Advanced Technology Attachment Packet Interface
ATCA	Advanced Telecommunications Computing Architecture
ATX	Advanced Technology Extended. Form factor for computer case.
BBS	BIOS Boot Specification
BCD	Binary-Coded Decimal
BDA	BIOS Data Area
BER	Bit Error Ratio
BEV	Bootstrap Entry Vector
BI	Base Interface. Backplane connectivity defined by the ATCA.
BIOS	Basic Input/Output System
BIST	Built-in Self Test
BMC	Base Management Controller
BOM	Bill Of Material

Acronyms	Descriptions
BT	Block Transfer. An optional IPMI system management interface.
CAD	Computer-Aided Design
CB	Certification Body
CCB	Core Complex Bus (Inside PowerQuicc III CPU)
CD	Compact Disk
CDROM	(Same as CD-ROM). Compact Disk Read-Only Memory.
CD-ROM	(Same as CDROM). Compact Disk Read-Only Memory.
CFM	Cubic Foot per Minute
CISPR22	Comité International Spécial des Perturbations Radioélectriques publication 22. Special International Committee on Radio Interference publication 22.
CLI	Command-Line Interface
CLK1	AdvancedTCA based resource Synch clock group 1
CLK1A	AdvancedTCA based resource Synch clock group 1, bus A
CLK1B	AdvancedTCA based resource Synch clock group 1, bus A
CLK2	AdvancedTCA based resource Synch clock group 2
CLK2A	AdvancedTCA based resource Synch clock group 2, bus A
CLK2B	AdvancedTCA based resource Synch clock group 2, bus B
CLK3	AdvancedTCA based resource Synch clock group 3
CLK3A	AdvancedTCA based resource Synch clock group 3, bus A
CLK3B	AdvancedTCA based resource Synch clock group 3, bus B
CMIC	CPU Management Interface Controller
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.
CMP	Core Multi-Processing
COP	Common On-chip Processor. Common on-chip processor function.
COTS	Commercial-Off-The-Shelf
CPCI	Compact PCI
CPLD	Complex Programmable Logic Device
CP-TA	Communications Platforms Trade Association
CPU	Central Processing Unit. This sometimes refers to a whole blade, not just a processor component.
CPUID	CPU IDentification. Code that uniquely identify a processor type.
CRC	Cyclic Redundancy Check
CS1	Components Side 1 as describes in PICMG3.0.
CS2	Components Side 1 as describes in PICMG3.0.
CTCA	Compact Telecom Computing Architecture
CTS	Clear To Send
DC	Direct Current
DCM	Daughter Card Mezzanine
DDR	DDR SDRAM or Double-Data-Rate
DDR2	(Same as DDR-II). DDR2 SDRAM or Double-Data-Rate two (2) Synchronous Dynamic Random Access Memory.
DDR-II	(Same as DDR2). DDR2 SDRAM or Double-Data-Rate two (2) Synchronous Dynamic Random Access Memory.

Acronyms	Descriptions
DED	Double-bit Error Detect or Double-symbol Error Detect.
DFTG	Design For Testability Guidelines
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual In-line Memory Module
DIN	Deutsches Institut für Normung. German Institute for Standardization.
DMA	Direct Memory Access
DMI	Desktop Management Interface
DOS	Disk Operating System
DPLL	Digital Phase-Locked Loop
DRAM	Dynamic Random Access Memory
DSP	Digital Signal Processing
DTC	Data Transfer Controller
DTR	Data Terminal Ready
DTS	Digital Thermal Sensor in IA32 processors.
DUART	Dual Universal Asynchronous Receiver/Transmitter
DVD	Digital Video Disk
ECC	Error Checking and Correction
EDMA	Enhanced Direct Memory Access
EEPROM	Electrically Erasable Programmable Read-Only Memory
ECM	E500 Coherency Module.
EFI	Extensible Firmware Interface
EFT	Electric Fast Transient
EHCI	Enhanced Host Controller Interface. Specification for Universal Serial Bus specification, revision 2.0.
EIA	Electronic Industries Alliance
EISA	Extended Industry Standard Architecture. Superset of ISA, 32-bit bus architecture.
EIST	(Same as SpeedStep). Enhanced Intel SpeedStep Technology
EM64T	Extended Memory 64 Technology. Intel 64 is Intel's implementation of x86-64 used by 64-bit operating systems.
EMC	ElectroMagnetic Compatibility
EMI	ElectroMagnetic Interference
EMTM	Turbo mode and enhanced Multi Threaded Thermal Management
EOL	End Of Life
EPS	Engineering Product Specification
ERM	Electromagnetic compatibility and Radio spectrum Matters
ES	Ethernet Switch
ESD	ElectroStatic Discharge
ESI	Enterprise South bridge Interface. Interface to the I/O legacy bridge component of the Intel ICHx.
ETH	Same as Ethernet.
ETSI	European Telecommunications Standards Institute
FADT	Fixed ACPI Description Table
FAT	File Allocation Table. Usually followed by a number, ex.: FAT32, which defines the number of bits used to address clusters on a disk.

Acronyms	Descriptions
FC	Fibre Channel
FCC	Federal Communications Commission
FCPGA	Flip-Chip Pin Grid Array
FCS	First Customer Shipment. Refers to Kontron scheduling for boards.
FC-AL	Fibre Channel-Arbitrated Loop
FDD	Floppy Disk Drive
FI	Fabric Interface. Backplane connectivity defined by the ATCA.
FIFO	First In First Out
FML	Fast Management Link
FPGA	Field-Programmable Gate Array
FPL	FPGA-to-PLD Link. FPL is a 20 MHz serial link that exchange 32-bit of data in each direction between the FPGA and a companion PLD. Comes from Kontron Canada.
FRBx	Fault-Resilient Booting level [1-3]. A term used to describe system features and algorithms that improve the likelihood of the detection of, and recovery from, processor failures in a multiprocessor system.
FRB2	Fault-Resilient Booting, Level 2.
FRT	Free-Running Timer
FRU	Field Replaceable Unit. Any entity that can be replaced by a user in the field. Not all FRUs are hot swappable.
FSB	Front Side Bus
FTP	File Transfer Protocol
FW	FirmWare
FWH	FirmWare Hub. Boot flash connected to the LPC bus containing BIOS FW.
GA	Geographic Address
GARP	Generic Attribute Registration Protocol
Gb	Gigabit
GB	(Same as GByte) GigaByte.
GByte	(Same as GB) GigaByte.
GbE	Gigabit Ethernet
GHz	GigaHertz
GMRP	GARP Multicast Registration Protocol
GND	GrouND
GPCM	General-Purpose Chip select Machine
GPI	General Purpose Input
GPIO	General Purpose Input Output
GPO	General Purpose Output
GRUB	GRand Unified Bootloader
GUID	Globally Unique Identifier
GVRP	GARP VLAN Registration Protocol
HDD	Hard Disc Drive
HFM	High Frequency Mode. The highest operating speed for the processor.
HMS	Hardware Management System
HPM	PICMG Hardware Platform Management specification family

Acronyms	Descriptions
HPM.1	Hardware Platform Management IPM Controller Firmware Upgrade Specification
HW	HardWare
HWS	HardWare Specification
I2C	Inter Integrated Circuit bus
IA-32	(Same as IA32). Intel Architecture 32 bits
IA32	(Same as IA-32). Intel Architecture 32 bits
IBA	Intel Boot Agent
IC	Integrated Circuit
ICE	In-Circuit Emulator
ICH	I/O Controller Hub
ICT	In-Circuit Test
ID	IDentification
IDE	Integrated Drive Electronics
IEC	International Electrotechnical Commission
IICH	Integrated I/O Controller Hub
IMCH	Integrated Memory Controller Hub
IEEE	Institute of Electrical and Electronics Engineers
IERR	Internal ERRor. A signal from the Intel Architecture processors indicating an internal error condition.
IICH	Integrated I/O Controller Hub. Sub-part of the MICH chipset.
INT	INTerrupt
IMCH	Integrated Memory Controller Hub. Sub-part of the MICH chipset.
iMPACT	Xilinx iMPACT, a tool featuring batch and GUI operations, allows you to perform two basic functions: Device Configuration and File Generation.
IMVP-6	Intel Mobile Voltage Positioning. The Intel Mobile Voltage Positioning specification for the Intel® Core™ Duo Processor. It is a DC-DC converter module that supplies the required voltage and current to a single processor.
IO	(Same as I/O). Input Output
IOAPIC	(Same as IO-APIC). IO Advanced Programmable Interrupt Controller
IOH	I/O Hub
IO-APIC	(Same as IOAPIC). IO Advanced Programmable Interrupt Controller
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

Acronyms	Descriptions
ISA	Industry Standard Architecture. 16-bit (XT) bus architecture.
ISE	Xilinx electronic design automation (EDA) tools for use with its devices.
ISO	International Organization for Standardization
ITU	International Telecommunication Union
ITU-T	ITU Telecommunication standardization sector. ITU is International Telecommunication Union.
JEDEC	Joint Electron Device Engineering Council
JTAG	Joint Test Action Group
KB	KiloByte
KCS	Keyboard Controller Style. An IPMI system interface.
KCS-SMM	Keyboard Controller Style. BIOS private IPMI system interface.
KCS-SMS	Keyboard Controller Style. Application IPMI system interface.
KHz	KiloHertz
LAN	Local Area Network
LBA	Logical Block Addressing
LBC	Local Bus Controller (On PowerQuicc III CPU)
LED	Light-Emitting Diode
LFCS	Limited First Customer Shipment. Refers to Kontron scheduling for boards.
LFM	Low Frequency Mode. The lowest operating speed for the processor.
LIP	Loop Initialization Primitive. Related to FC arbitrated loop topology (an initial message needed for learning the loop addresses and acquiring one).
LPC	Low Pin Count port
LPT1	Line Print Terminal 1
LSB	Least Significant Byte
LUN	Logical Unit Number
LV	Low Voltage
LVMOS	Low-Voltage Complementary Metal Oxide Semiconductor
LVDS	Low-Voltage Differential Signaling
MAC	Media Access Controller address of a computer networking device.
MB	MegaByte
MBE	Multiple Bit Error
MBIST	(same as MemBIST). Memory Built-In Self-Test. Chipset feature for out-of-band memory testing and initialization.
MBR	Master Boot Record
MC	Management Controller
MCH	Memory Controller Hub
MemBIST	(same as MBIST). Memory Built-In Self-Test. Chipset feature for out-of-band memory testing and initialization.
MDn	Message Digest algorithm (n=2, 5)
MDI	Medium Dependent Interface. MDI port or uplink port.
MHz	MegaHertz
MICH	Memory controller Hub and I/O Controller Hub. Chipset that integrates IMCH and IICH in a single chip solution.
Microcode	Intel-supplied data block used to correct specific errata in the processor.

Acronyms	Descriptions
MII	Media Independent Interface
MIIM	Media Independent Interface Management
MLVDS	Multipoint Low-Voltage Differential Signaling
MMC	Module Management Controller. MMCs are linked to the IPMC.
MMIO	Memory-Mapped IO
MOSFET	Metal-Oxide-Semiconductor Field-Effect Transistor
MP	MultiProcessor
MPS	MultiProcessor Specification
MRC	Memory Reference Code. Chipset specific code provided by the manufacturer and integrated into the BIOS to test and initialize the system memory.
MSB	Most Significant Byte
MSI	Message Signaled Interrupts
MSR	Model Specific Register inside IA32 processors.
MTBF	Mean Time Between Failures
MTRR	Memory Type Range Register. CPU cache control registers.
MUX	MUltipleXer
NAND	Type of Flash Memory, used for mass storage.
NC	Not Connected
NDA	Non-Disclosure Agreement
NEBS	Network Equipment-Building System
NEDS	Network Equipment Development Standard
NMI	Non-Maskable Interrupt
NSI	North South Interface. Internal physical interface between the IMCH and IICH.
NV	Non-Volatile. Refers to persistent storage.
NVRAM	Non-Volatile Random Access Memory
NVS	Non-Volatile Storage
O&M	(Same as OAM/OA&M). Operations and Maintenance
OAM	(Same as OA&M/O&M). Operations, Administration and Maintenance
OA&M	(Same as OAM/O&M). Operations, Administration and Maintenance
OEM	Original Equipment Manufacturer
OMU	Operations and maintenance Unit
OOS	Out Of Service
OS	Operating System
OSI	Open Source Initiative
PAE	Physical Address Extension. Feature of x86 processors that allows for up to 64 gigabytes of physical memory to be used in 32-bit systems, given appropriate operating system support.
PAM	Programmable Attribute Map. Chipset registers that controls the steering of read and write cycles that address the BIOS area.
PCB	Printed Circuit Board
PCI	Peripheral Component Interconnect
PCI-32	Peripheral Component Interconnect 32 bits
PCI®	Peripheral Component Interconnect
PCIe	(Same as PCI-E). PCI-Express. Next generation I/O standard

Acronyms	Descriptions
PCI-E	(Same as PCIe). PCI-Express. Next generation I/O standard.
PCI-X	PCI + minor changes to the protocol and faster data rate.
PDP	Project Development Process
PDU	Power Distribution Unit
PECI	Platform Environment Control Interface
PECL	Positive Emitter-Coupled Logic
PEF	Platform Event Filtering. An IPMI subfunction.
PET	Platform Event Trap. An IPMI message type.
PEM	Power Entry Module
PERR	Parity ERRor. A signal on the PCI bus that indicates a parity error on the bus.
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.
PIC	Programmable Interrupt Controller
PICMG	PCI Industrial Computer Manufacturers Group
PICMG®	PCI Industrial Computer Manufacturers Group
PIR	Product Issue Report
PIU	Plug-In Unit
PLCC	Plastic Leaded Chip Carrier
PLD	Programmable Logic Device
PLL	Phase Lock Loop
PMC	PCI Mezzanine Card
PMM	POST Memory Manager
PNE	Platform for Network Equipment. A Carrier Grade Linux (4.0) platform.
POH	System Operating Power-On Hours.
POR	Power-On Reset
POST	Power-On Self-Test
PPP	Point-to-Point Protocol
PROM	Programmable Read-Only Memory
PTS	Prepare To Sleep. An ACPI method called before the OS makes a change to system power state level.
PWB	(Same as PCB). Printed Wiring Board
PWM	Pulse-Width Modulation
PXE	Preboot eXecution Environment
QPI	QuickPath Interconnect. Point-to-point interconnect between Intel processors and IOH.
RAID	Redundant Array of Independent Disks / Redundant Array of Inexpensive Disks.
RAKP	RMCP+ Authenticated Key-Exchange Protocol
RAM	Random Access Memory
RAS	Row Address Strobe, used in DRAM. May also refers to Reliability, Availability, Serviceability features of the chipset.
RASUM	Reliability, Availability, Serviceability, Usability and Manageability features of the chipset (AER and ECC are RASUM features).
RCRB	Root Complex Register Block registers. Chipset memory-mapped space for configuration registers.
RGMII	Reduced Gigabit Media Independent Interface

Acronyms	Descriptions
RHEL	Red Hat Enterprise Linux
RIMM	Rambus Inline Memory Module
RMCP	Remote Management Control Protocol
RMII	Reduced Media Independent Interface
RMON	Remote network MONitoring
RMS	Root Mean Square
RoHS	Restriction of the Use of Certain Hazardous Substances
ROM	Read Only Memory. Also refers to option ROM or expansion ROM code used during POST to provide services for specific controllers, such as boot capabilities.
RPP	Reliability Prediction Procedure
RS-232	(Same as RS232). Recommended Standard 232.
RS232	(Same as RS-232). Recommended Standard 232.
RSS	Receive Side Scaling
RTC	Real Time Clock
RTM	Rear Transition Module
RTM-Link	Rear Transition Module Link. Kontron 3-wire protocol.
RTS	Request To Send
S.M.A.R.T.	Self-Monitoring, Analysis, and Reporting Technology for IDE.
S0	ACPI OS System State 0. Indicates fully on operating state.
S5	ACPI OS System State 5. Indicates Soft Off operating state.
SAS	Serial Attached SCSI
SATA	Serial ATA
SBC	Single Board Computer
SBE	Single Bit Error
SCI	System Control Interrupt
SCL	Serial CLock
SCSI	Small Computer System Interface
SDH	Synchronous Digital Hierarchy
SDR	Sensor Data Record
SDRAM	Synchronous Dynamic Random Access Memory
SEC	Single-bit Error Correct
EEPROM	Serial EEPROM
SEL	System Event Log
SERDES	SERializer/DESerializer. Pair of functional blocks commonly used in high speed communications. These blocks convert data between serial data and parallel interfaces in each direction.
SERIRQ	Serial IRQ
SERR	System ERRor. A signal on the PCI bus that indicates a 'fatal' error on the bus.
SFP	Small Form-factor Pluggable
SGMII	Serial Gigabit Media Independent Interface. Standard interface used to connect a Gigabit Ethernet MAC-block to a PHY.
ShMC	Shelf Management Controller
SIMD	Single Instruction, Multiple Data
SIMM	Single In-line Memory Module

Acronyms	Descriptions
SIRQ	Serial Interrupt ReQuest
SLC	Single-Level Cell
SMART	Self-Monitoring, Analysis, and Reporting Technology, or S.M.A.R.T. A monitoring system for computer hard disks to detect and report on various indicators of reliability, in the hope of anticipating failures.
SMB	(Same as SMBus/SMBUS). System Management Bus.
SMBIOS	System Management BIOS
SMBUS	(Same as SMB/SMBus). System Management Bus.
SMBus	(Same as SMB/SMBUS). System Management Bus.
SMI	System Management Interrupt
SMM	System Management Mode
SMP	Symmetric MultiProcessing. SMP systems allow any processor to work on any task no matter where the data for that task are located in memory; with proper operating system support, SMP systems can easily move tasks between processors to balance the workload efficiently.
SMR	Special Modification Request. Indicates a customer specific change.
SMS	System Management Software
SMT	Surface Mount.
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SNTP	Simple Network Time Protocol
SO-CDIMM	Small Outline Clocked 72-bit Dual In-line Memory Module
SO-DIMM	Small Outline Dual In-line Memory Module
SOL	Serial Over LAN
SONET	Synchronous Optical NETWORKing
SPD	Serial Presence Detect. A standardized way to automatically access information about a computer memory module.
SPI	Serial Peripheral Interface
SpeedStep	(Same as EIST). Enhanced Intel SpeedStep Technology.
SRAM	Static Random Access Memory
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.
SSP	Serial SCSI Protocol
STM-1	Synchronous Transport Module 1
STP	Spanning Tree Protocol
SW	SoftWare
SWS	SoftWare Specification
TA	Ambient Temperature
TAP	Telocator Access Protocol. An IPMI Serial/Modem interface component.
TCC	Thermal Control Circuit
TCLKA	Telecom CLock A. AMC Clock Interface.
TCLKB	Telecom CLock B. AMC Clock Interface.
TCLKC	Telecom CLock C. AMC Clock Interface.

Acronyms	Descriptions
TCLKD	Telecom CLoCK D. AMC Clock Interface.
TCO	Total Cost of Ownership. Refers to a logic block in the Intel ICH products family. The watchdog timer (WDT) is one of the functions of that logic block.
TCP	Transmission Control Protocol
TDP	Thermal Design Power
TM	(Same as TM1). Thermal monitor. CPU Thermal based on clock throttling.
TM1	Thermal monitor 1. CPU Thermal based on clock throttling.
TM2	Thermal monitor 2. CPU Thermal based on Enhanced Intel SpeedStep Technology transitions.
TOLM	Top Of Low Memory. Highest DRAM available to system, below 4GB.
TPM	Trusted Platform Module
TX	Transmit
TXD	Transmit
UA	Upgrade Agent
UART	Universal Asynchronous Receiver Transmitter
UC	Unit Computer
UDP	User Datagram Protocol. An Internet Protocol.
UHCI	Universal Host Controller Interface. Specification for Universal Serial Bus specification, revision 1.0.
UL	Underwriters Laboratories inc
UPM	User Programmable Machine
USB	Universal Serial Bus
UUID	Universal Unique ID number.
VA	Volt-Amperes. Unit used for apparent power.
VAC	Volt Alternating Current. Volt unit used when alternating current.
VCC	Power supply
VCORE	Processor CORE power supply
VID	Voltage IDentification. The CPU uses VID pins to support automatic selection of power supply voltages.
VGA	Video Graphics Array
VLAN	Virtual Local Area Network
VLSI	Very-large-scale integration
VSUS	Power supply in suspend power
VT	Video Terminal
VTT	Power supply
WD	WatchDog
WDT	WatchDog Timer
WfM	Wired for Management
WWN	World Wide Name
WWPN	World Wide Port Name
XAUI	X (meaning ten) Attachment Unit Interface. A standard for connecting 10 Gigabit Ethernet (10GbE) ports.
XDP	eXtended Debug Port
XMC	Switched Mezzanine Card

