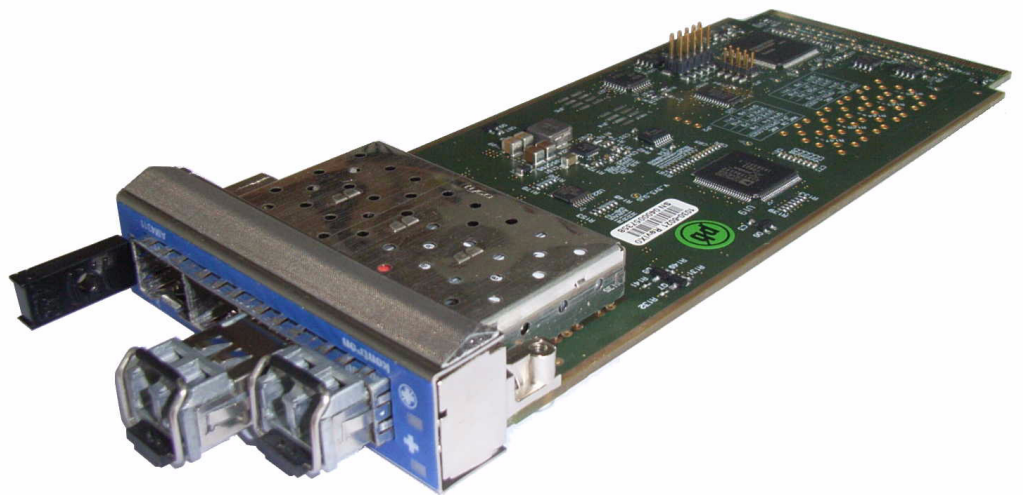


# User Guide AM4311



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## Revision History

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## Imprint

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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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## 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 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

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### 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.
- 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.





## Advisory Conventions

---

### CAUTION



This symbol and title indicate potential damage to hardware and tells you how to avoid the problem.




---

### CAUTION



Electric Shock

This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.




---

### WARNING



This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.



### 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".



### Note...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.



### 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.

---

## Safety Instructions

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

---

	<b>WARNING</b>	
	All operations on this device must be carried out by sufficiently skilled personnel only.	
<hr/>		
	<b>WARNING</b>	
	Do not connect a switch port to a telephone line.	
<hr/>		
	<b>WARNING</b>	
	For installation in a Hot-Plug system, observe the safety instructions specific to the system. Read the relevant documentation.	
<hr/>		
<b>CAUTION</b>		
<b>Electric Shock</b>		
	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.	
<hr/>		
	<b>Caution, Laser Light!</b>	
	Laser light from fiber-optic transmission cables and components can damage your eyes. The laser components plugged into the switch are Class 1 laser components. Class 1 laser is considered incapable of producing damaging radiation levels during normal operation or maintenance.	
	To avoid damaging your eyes and to continue safe operation in case of abnormal circumstances:	
	<ul style="list-style-type: none"><li>• Never look directly into the outlets of fiber-optic transmission components or fiber-optic cables with unprotected eyes.</li><li>• Never allow fiber-optic transmission path to operate until all the connections have been made.</li><li>• Always fit protective plugs to any unused ports of the switch.</li></ul>	

---

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## Special Handling and Unpacking Instructions



### 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.

### 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.
- Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board please re-pack it as nearly as possible in the manner in which it was delivered.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing mezzanines, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory back-up, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the board.

### 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 the Boards**

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

## General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron AG and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.

This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present their temperature restrictions must be taken into account.

---

## 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 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 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.

### *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.

## Two Year Warranty

Kontron AG 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 AG.

Kontron AG 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 Modular Computers GmbH 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 Modular Computers GmbH, 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 Modular Computers GmbH 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 Modular Computers GmbH liability to the customer shall not exceed the original purchase price of the item for which the claim exists.

Kontron Modular Computers GmbH 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 Modular Computers GmbH 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*

## **Introduction**



# 1. Introduction

The Advanced Mezzanine Card (AMC) described in this manual operates with the Advanced Telecommunications Computing Architecture (AdvancedTCA® or ATCA) and the Micro Telecommunications Computing Architecture (MicroTCA or uTCA) defined by the PCI Industrial Computer Manufacturers Group (PICMG). The main advantages of AdvancedTCA include high throughput, multi-protocol support, high-power capability, hot swappability, high scalability, and integrated system management. For further information regarding the AdvancedTCA/MicroTCA standards and their use, please consult the complete AdvancedTCA specification or visit the PICMG web site.

## 1.1 Board Overview

The AM4311 is a PICMG AMC.0 R1.0 compliant Advanced Mezzanine Card with 4x 1000Base-X SFP modules. The main application of this module is to direct-connect GbE ports from an AMC connector of an AMC carrier or a  $\mu$ TCA system to the front. The AM4311 selects 4 of 8 GbE ports from the Carrier. It can be used in  $\mu$ TCA as well as ATCA environments.

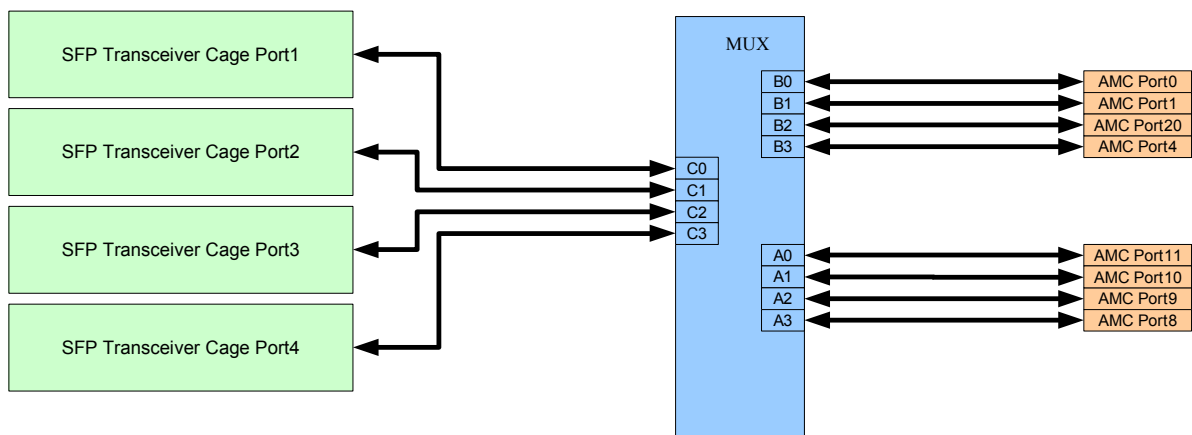
## 1.2 Board Diagrams

The following diagram provides additional information concerning board functionality and component layout.

### 1.2.1 Functional Block Diagram

The following figure shows the block diagram of the AM4311.

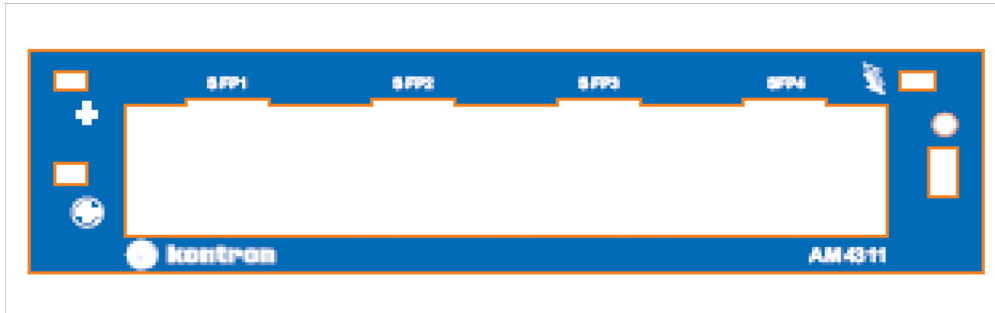
**Figure 1-1: AM4311 Functional Block Diagram**



The Uplink Infrastructure supports 4x 1000Base-X SFP uplink ports which are connected via a MUX to 8 AMC ports.

## 1.2.2 Front Panel

Figure 1-2: AM4311 Front Panel



### 1.2.2.1 Hot Swap LED (Blue LED)

The AM4311 board supports a blue Hot Swap LED mounted on the front panel. This LED indicates when it is safe to remove the Module. The on-board MMC drives this LED to indicate the hot swap state but is controlled by the carriers IPMC or the MicorTCA carrier manager.

The following states are possible:

Table 1-1: Blue LED State

LED state	Description
Solid Off (0 % on)	FRU activation in progress / FRU active
Solid On (100 % on)	FRU inactive
Short Blink (10 % on)	FRU deactivation request / FRU deactivation in progress
Long Blink (90 % on)	FRU activation request

### 1.2.2.2 Out-Of-Service (OOS) LED (LED1)

The AM4311 supports a green Activity LED mounted on the front panel. The position of this LED is near the bottom handle beside the health LED.

Table 1-2: OOS LED State

LED state	Description
ON	while executing the boot-block application
OFF	when starting execution of the IPMI firmware.
Blinking	while boot-block application is flashing a new IPMI firmware

### 1.2.2.3 Health LED (LED2)

The AM4311 Switch Board supports a Health LED mounted on the front panel. This sensor is built from an aggregation of critical sensors of the MMC. In normal condition, the Health error sensor is not asserted and the LED is green indicating normal operation. If the sensor is asserted for any reason, the LED is set to amber.

The following states are possible.

**Table 1-3: Health LED State**

LED state	Description
ON	normal state when board is in operation, and all sensors related are in range.
Off	payload is off
Amber	switched to AMBER when the payload is on and at least one sensor is out of range.

---

## 1.3 Technical Specifications

### 1.3.1 General

- Mechanical: Single, Mid-size AMC form factor
- Dimensions: 180.6 mm x 73.5 mm
- Board Weight: 100 g

### 1.3.2 AMC LEDs

- LED0 (blue) Ready for Hot Swap
- LED1 (red/green/yellow) Out of Service LED
- LED2 (green/amber/red) Healthy LED

### 1.3.3 Operating Voltages

- Management: 3.0V/3.6V
- Payload: 10VDC to 14VDC

### 1.3.4 Operation Power

- Management 0.5W
- Payload 4.0W max.

### 1.3.5 Temperature

This board is designed for operation from 0 °C to 60°C inlet air temperature.

- Air Flow: 20 CFM
- Operating: 0 °C to +60 °C
- Non-Operating: -40 °C to +85 °C

### 1.3.6 Humidity

The board is designed to meet Bellcore GR63, Section 4.1

- Operating: 15%-90% (non-condensing) at 0°C to 55°C
- Non-Operating: 5%-95% (non-condensing) at -40°C to 70°C

### 1.3.7 Altitude

The board is designed to meet the following requirements:

- Operating: 4000 m (13123 ft), may require additional cooling above 1800m (5905ft)
- Non-Operating: 15000 m (49212 ft)

### 1.3.8 Vibration

The board is designed to meet the following requirements according to IEC 60068-2-6, Bellcore GR-63, Section 4.4 and MIL-STD-810E, Method 514:

- Operating
  - 5Hz to 100Hz: 1G @ 0.25 Octave/minute
  - 100Hz to 500Hz: 1G @ 1 Octave/minute
  - 5Hz @ 0.01 g<sup>2</sup> /Hz to 20 Hz @ 0.02 g<sup>2</sup> /Hz (slope up)
  - 20Hz to 500 Hz @ 0.02 g<sup>2</sup> /Hz (flat)
  - 3.13 g RMS, 10 minutes per axis for all 3 axes
- Non-Operating
  - 5Hz to 50Hz: 0.5G @ 0.1 Octave/minute
  - 50Hz to 500Hz: 3G @ 0.25 Octave/minute

### 1.3.9 Shock

The board is designed to meet the following requirements IEC 60068-2-27 and MIL-STD-810E, Method 516:

- Operating: 30G/11 ms half sine
- Non-Operating: 50G, 170 inches/second trapezoidal

### 1.3.10 Safety

CB report to IEC 60950-1, complies with EN/CSA/UL 60950-1.

### 1.3.11 Electromagnetic Compatibility

The board is designed to meet or exceed the following specifications/requirements (assuming an adequate carrier/chassis):

- CFR 47, FCC Part 15, Subpart B
- Telcordia GR-1089-Core-Issue 3 and SR-3580 Issue 2
- EMC Directive 89/336/EEC (Europe)
- EN55022 (Europe)
- EN55024 (Europe)
- EN61000-4-2 + A1 + A2
- EN61000-4-3 + A1
- EN300 386 V1.3.3, Electro Magnetic Compatibility (EMC) Requirements for Public Telecommunication Network Equipment; Electromagnetic Compatibility (EMC) Requirements.

### 1.3.12 MTBF

MTBF is >170,000h@40°C, calculations based on Bellcore/Telcordia SR-332.

## 1.4 Standards Compliance

This board is compatible to the following standards:

- AMC.0 R2.0 Advance Mezzanine Card Base Specification
- AMC.2 R1.0 AMC Gigabit Ethernet
- IPMI v1.5
- IEEE 802.3

The AM4311 is RoHS compliant.

## 1.5 Related Publications

The following publications contain information relating to this product.

**Table 1-4: Related Publications**

PRODUCT	PUBLICATION
<b>MicroTCA™</b>	PICMG® MTCA.0 Micro Telecommunications Computing Architecture R1.0, July 6, 2006
<b>AMC</b>	PICMG® AMC.0, Advanced Mezzanine Card Specification R1.0
<b>IPMI</b>	IPMI - Intelligent Platform Management Interface Specification, v1.5
<b>All Kontron products</b>	Product Safety and Implementation Guide, ID 1021-9142

## *Chapter 2*

# **Functional Description**

## 2. Functional Description

### 2.1 Uplink Infrastructure

The Uplink Infrastructure supports 4x 1000Base-X SFP uplink ports which are connected via a MUX to 8 AMC ports.

The quad-lane 2:1 switch consists of four multiplexers and four demulti-plexers, one per lane. Each port is a 4-lane link, and each lane runs up to a 3.2 Gbps data rate independent of the other lanes. The lanes are switched independently by setting control bits using an IPMI OEM command, according to Table 2.1.

The SFP Transceiver cages are designed according SFP MSA.

**Table 2-1: Port Mapping**

SFP Port	Control Bit	
	0	1
SFP1	AMC P0	AMC P11
SFP2	AMC P1	AMC P10
SFP3	AMC P20	AMC P9
SFP4	AMC P4	AMC P8

The IMPI OEM command to change the port mapping is described in Section 2.5.2.2 "OEM Set Control State".

This segmentation allows several combinations for specific usage. Configuration of all possible variation is described in Section 2.5.3 "Configuring Port Settings".

Examples include:

AT8904M

- Base-Interface access on AMC port 0 and 1.
- Fabric-Interface access on AMC port 4 or 8.

AT8404M

- Base-Interface access on AMC port 0.
- Fabric-Interface link aggregation on AMC port P8, P9, P10 and P11

The default port assignment is listed in Table 2-2.

**Table 2-2: Default Port Assignment**

SFP Port	Port
SFP1	AMC P0
SFP2	AMC P1
SFP3	AMC P9
SFP4	AMC P8



## 2.2 MMC

The IPMI (Intelligent Platform Management Interface) consists of the FWUM (Firmware Upgrade Manager) and the MMC (Module Management Controller).

The FWUM controls the MMC firmware update. Two EEPROM banks are connected to the FWUM, one for the old firmware image and one for the new image. During an update, the new firmware image will be programmed in one of the two EEPROMs. This new image is then programmed into the MMC under control of the FWUM. If the MMC does not start correctly with the new image, the old image of the other EEPROM will be programmed in the MMC.

## 2.3 Board Sensors

The Management Controller includes many sensors for voltage or temperature monitoring and various others for pass/fail type signal monitoring.

Every sensor 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. SDRs also contain the configuration of a specific sensor such as thresholds, hysteresis, event generation capabilities, etc. that specify the sensor's behavior. Some fields of the sensor SDR are configurable through IPMI v1.5 command and are set to a built-in initial value.

Module sensors that have been implemented are listed in the sensor list below.

### 2.3.1 Sensor List

The sensor number is the number which identifies the sensor e.g. when using the IPMI command "Get Sensor Reading". Please note that 'ipmitool' accepts sensor numbers in decimal (e.g. '10') or hexadecimal (e.g. '0xa') notation.

Please note that the IPMI tool 'ipmitool' displays for command 'ipmitool sdr list' the contents of the sensor data record repository (SDRR) of the whole rack if the SDRR is generated. The generation of the SDRR has always to be done new after adding or subtracting any board to or from the rack.

For OEM (Kontron) specific sensor types and reading types in the following table, please refer to the next chapter.

**Table 2-3: Sensor List AM4311**

ID	Num	ID string	Sensor Type Code	Event Type Code / Event Offsets
0	Xx	B1:AM4311	NA (FRU Device Locator Record)	
1	0	B1:IPMI Info-1	C0h (OEM Kontron)	
2	1	B1:IPMI Info-2	C0h (OEM Kontron)	
3	2	B1:FRU Agent	C5h (OEM Kontron FRU Info Agent State)	0Ah (Discrete) Offset 6: transition to Degraded Offset 8: Install Error

**Table 2-3: Sensor List AM4311 (Continued)**

ID	Num	ID string	Sensor Type Code	Event Type Code / Event Offsets
4	3	B1:Module-HotSwap	F2h (Module Hot Swap)	6Fh (Sensor Specific) Offset 0: Module Handle Closed Offset 1: Module Handle Opened Offset 2: Quiesced Offset 3: Backend Power Failure Offset 4: Backend Power Shutdown Refer to AMC.0 R2.0 Section 3.6.6 Module Hot Swap Sensor.
5	4	B1:IPMBLState	C3h (OEM Kontron)	6Fh (Sensor Specific) Offset 0: IPMB-A disabled, IPMB-B disabled Offset 1: IPMB-A enabled, IPMB-B disabled Offset 2: IPMB-A disabled, IPMB-B enabled Offset 3: IPMB-A enabled, IPMB-B enabled
6	5	B1:Temp-Center	01h (Temperature)	01h (Threshold Based)
7	6	B1:Temp-Outlet	01h (Temperature)	01h (Threshold Based) Sensor is only readable when Payload Power is on.
8	7	B1:Temp-Inlet	01h (Temperature)	01h (Threshold Based) Sensor is only readable when Payload Power is on.
9	8	B1:Vcc 3.3V	02h (Voltage)	01h (Threshold Based) Sensor is only readable when Payload Power is on.
10	9	B1:Vcc 3.3V SUS	02h (Voltage)	01h (Threshold Based)
11	10	B1:Vcc 12V	02h (Voltage)	01h (Threshold Based) Sensor is only readable when Payload Power is on.
12	11	B1:Pres SFP-1	25h (Entity Present)	6Fh (Sensor specific) Offset 0: Entity Present Offset 1: Entity Absent Offset 2: Entity Disabled Sensor is only readable when Payload Power is on.
13	12	B1:Pres SFP-2	25h (Entity Present)	6Fh (Sensor specific) Offset 0: Entity Present Offset 1: Entity Absent Offset 2: Entity Disabled Sensor is only readable when Payload Power is on.
14	13	B1:Pres SFP-3	25h (Entity Present)	6Fh (Sensor specific) Offset 0: Entity Present Offset 1: Entity Absent Offset 2: Entity Disabled Sensor is only readable when Payload Power is on.

**Table 2-3: Sensor List AM4311 (Continued)**

ID	Num	ID string	Sensor Type Code	Event Type Code / Event Offsets
15	14	B1:Pres SFP-4	25h (Entity Present)	6Fh (Sensor specific) Offset 0: Entity Present Offset 1: Entity Absent Offset 2: Entity Disabled Sensor is only readable when Payload Power is on.
16	15	B1:Health Error	24h (Platform Alert)	03h (Generic Discrete) Offset 0: no critical sensors asserted Offset 1: one or multiple critical sensors are asserted See table: Health Sensor list for details.
17	16	B1:MMC Reboot	24h (Platform Alert)	03h (Generic Discrete) Offset 0: State Deasserted Offset 1: State Asserted
18	17	B1:Ver change	2Bh (Version Change)	

### 2.3.2 OEM sensor types and OEM sensor event/reading types

**Table 2-4: OEM Sensor List AM4311**

Sensor Type	Event/Reading type Code	Sensor Specific Offset	Event Trigger
C0h	03h Standard IPMI Discrete	Internal Management Controller firmware diagnostic	Internal error condition

**Table 2-4: OEM Sensor List AM4311 (Continued)**

Sensor Type	Event/Reading type Code	Sensor Specific Offset	Event Trigger
C3h OEM Kontron IPMI-L Link	6Fh Standard IPMI sensor specific	02h 03h	<p>IPMB-L Disable</p> <p>Event Data 2: always 0</p> <p>Event Data 3:</p> <p>bit[7:3]: always 0</p> <p>bit [2:0]:</p> <ul style="list-style-type: none"> <li>0h = no failure</li> <li>1h = Unable to drive clock HI</li> <li>2h = Unable to drive data HI</li> <li>3h = Unable to drive clock LO</li> <li>4h = Unable to drive data LO</li> <li>5h = clock low timeout</li> <li>6h = Under test (the IPM Controller is attempting to determine who is causing a bus hang)</li> <li>7h = Undiagnosed Communication Failure</li> </ul> <p>IPMB-L Enable</p> <p>Event Data 2: always 0</p> <p>Event Data 3:</p> <p>bit[7:3]: always 0</p> <p>bit [2:0]:</p> <ul style="list-style-type: none"> <li>0h = no failure</li> <li>1h = Unable to drive clock HI</li> <li>2h = Unable to drive data HI</li> <li>3h = Unable to drive clock LO</li> <li>4h = Unable to drive data LO</li> <li>5h = clock low timeout</li> <li>6h = Under test (the IPM Controller is attempting to determine who is causing a bus hang)</li> <li>7h = Undiagnosed Communication Failure</li> </ul>

**Table 2-4: OEM Sensor List AM4311 (Continued)**

Sensor Type	Event/Reading type Code	Sensor Specific Offset	Event Trigger
C5h OEM Kontron FRU Info Agent	6Fh Standard IPMI sensor specific	06h 08h	<p>Transition to degraded</p> <p>Event Data 2 is used a bit flag error</p> <ul style="list-style-type: none"> <li>Bit 7: unspecifiedError</li> <li>Bit 6: notPresentError</li> <li>Bit 5: multirecHeaderError</li> <li>Bit 4: multirecDataError</li> <li>Bit 3: timeout error</li> <li>Bit 2: ipmcError</li> <li>Bit 1: fruDataError</li> <li>Bit 0: commonHeaderError</li> </ul> <p>Event Data 3 is used a bit flag error</p> <ul style="list-style-type: none"> <li>Bit 7: reserved</li> <li>Bit 6: reserved</li> <li>Bit 5: SetPortState Not Supported</li> <li>Bit 4: SetPortState Error</li> <li>Bit 3: reserved</li> <li>Bit 2: reserved</li> <li>Bit 1: reserved</li> <li>Bit 0: Match Error, Not in single link matches</li> </ul> <p>Install Error</p> <p>Event Data 2 is used a bit flag error</p> <ul style="list-style-type: none"> <li>Bit 7: unspecifiedError</li> <li>Bit 6: notPresentError</li> <li>Bit 5: multirecHeaderError</li> <li>Bit 4: multirecDataError</li> <li>Bit 3: timeout error</li> <li>Bit 2: ipmcError</li> <li>Bit 1: fruDataError</li> <li>Bit 0: commonHeaderError</li> </ul> <p>Event Data 3 is used a bit flag error</p> <ul style="list-style-type: none"> <li>Bit 7: SetClockState Not Supported</li> <li>Bit 6: SetClockState Error</li> <li>Bit 5: SetPortState Not Supported</li> <li>Bit 4: SetPortState Error</li> <li>Bit 3: Clock Internal Mismatch</li> <li>Bit 2: Clock Match Error, Not a single clock matches</li> <li>Bit 1: Internal mismatch</li> <li>Bit 0: Match Error, Not in single link matches</li> </ul>

### 2.3.3 Sensor Thresholds

Following tables show sensor thresholds for temperature, voltage and current sensors.

**Table 2-5: Temperature Sensor Thresholds [°C]**

SENSOR Number / ID string	Lower critical	Lower non critical	Normal min	Nominal	Normal max	Upper non critical	Upper critical
ID=5: B4:Temp-Center	-	-	15	25	59	60	70
ID=6: B4:Temp-Outlet	-	-	15	25	59	60	70
ID=7: B4:Temp-Inlet	-	-	-	-	-	60	70

**Table 2-6: Voltage Sensor Thresholds**

SENSOR Number / ID string	Lower critical	Lower non critical	Normal min	Nominal	Normal max	Upper non critical	Upper critical
ID=8: B4:Board 3.3V	3.037	3.139	3.154	3.300	3.446	3.460	3.562
ID=9: B4:Board 3.3VSUS	3.037	3.139	3.154	3.300	3.446	3.460	3.562
ID=10: B4:Board 12V	10.561	10.797	10.856	11.977	13.157	13.216	13.452

## 2.4 Board FRU Information

This FRU information contains the IPMI defined Board and Product Information areas that hold the part number and serial number of the board and the Multirecord Information Area that contains the PICMG defined Point to Point Information records.

The Internal Use Area is preallocated to 256 bytes and is free for customer use. This FRU information responds to FRU ID #0, which is the ID for the MMC.

### 2.4.1 Structure and Functionality

The Management Controller provides 4 kB non-volatile storage space for FRU information.

Full low level access to read or write a module's FRU Information is provided by regular IPMI FRU Device commands. Please be careful when writing FRU information directly using standard IPMI commands because there is no write protection. Damaging the FRU Information e.g. may confuse a shelf management software which uses the FRU data.

### 2.4.2 Board Specific FRU Data

Supported are the following FRU data areas and data fields:

FRU Board Info Area

- Board Mfg: Kontron
- Board Product: AM4311
- Board Serial: 0400057367

- Board Part Number: S1500
- Board FRU ID: FRU-S1500-00

## FRU Product Info Area

- Product Manufacturer: Kontron
- Product Name: AM4311
- Product Part Number: S1500
- Product Version: 00
- Product Serial: 0400057367
- Product Asset Tag: 0000000000
- Product FRU ID: FRU-S1500-00

## 2.5 OEM Commands

### 2.5.1 Kontron-specific OEM commands

All Kontron-specific OEM commands are listed in Table 2-7 below.

**Table 2-7: Kontron-specific OEM Command Overview**

Command Name	NetFn	LUN	Command Number	MMC Requirement
OemApGetFirmwareSysUpTime	3	3Eh	03h	YES
OemApSetNvParam	3	3Eh	05h	YES
OemApFpgaWriteRead__	3	3Eh	08h	YES
OemApFormatStorage	3	3Eh	09h	YES
OemApSetSdrLocatorString	3	3Eh	0Ah	YES
OemApSetSerialNumber	3	3Eh	0Bh	YES
OemApGetSerialNumber	3	3Eh	0Ch	YES
OemApSetManufacturingDate	3	3Eh	0Dh	YES
OemApGetManufacturingDate	3	3Eh	0Eh	YES
OemApSetNvData	3	3Eh	0Fh	YES
OemApGetNvData	3	3Eh	10h	YES
OemApSetDeviceGuid	3	3Eh	11h	NO

### 2.5.1.1 OEM Get Firmware SysUp Time

Command Name	NetFn	LUN	Command Number
OemApGetFirmwareSysUpTime	3	3Eh	03h

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
Response Data	1	Completion Code
	2...5	System Up-Time in Seconds

### 2.5.1.2 OEM Set NV Param

Command Name	NetFn	LUN	Command Number
OemApSetNvParam	3	3Eh	05h

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5	Command flags: [7..2] – reserved [1] – is Set [0] – is Cold Reset Required
	6	Operation mode: [7..5] – reserved [4] – ipmbMode [3..1] – reserved [0] – controller mode
	7	KCS SMS IRQ
Response Data	1	Completion Code



### 2.5.1.3 OEM FPGA Write/Read

Command Name	NetFn	LUN	Command Number
OemApFpgaWriteRead__	3	3Eh	08h

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5	Register Address
	6	Read Count
	7	Write Data
	8	Write Mask
Response Data	1	Completion Code
	2...n	Read Data

### 2.5.1.4 OEM Format Storage

Command Name	NetFn	LUN	Command Number
OemApFormatStorage	3	3Eh	09h

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
Response Data	1	Completion Code

### 2.5.1.5 OEM Set SDR Location String

Command Name	NetFn	LUN	Command Number
OemApSetSdrLocatorString	3	3Eh	0Ah

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5...7	Manufacturer ID
	8...9	Product ID
	10...25	Device ID String
Response Data	1	Completion Code

### 2.5.1.6 OEM Set Serial Number

Command Name	NetFn	LUN	Command Number
OemApSetSerialNumber	3	3Eh	0Bh

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5...20	Serial Number String
Response Data	1	Completion Code

### 2.5.1.7 OEM Get Serial Number

Command Name	NetFn	LUN	Command Number
OemApGetSerialNumber	3	3Eh	0Ch

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
Response Data	1	Completion Code
	2...16	Serial Number String

### 2.5.1.8 OEM Set Manufacturing date

Command Name	NetFn	LUN	Command Number
OemApSetManufacturingDate	3	3Eh	0Dh

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5...7	Manufacturing Date
Response Data	1	Completion Code

### 2.5.1.9 OEM Get Manufacturing date

Command Name	NetFn	LUN	Command Number
OemApGetManufacturingDate	3	3Eh	0Eh

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
Response Data	1	Completion Code
	2...4	Manufacturing Date

### 2.5.1.10 OEM Set NV date

Command Name	NetFn	LUN	Command Number
OemApSetNvData	3	3Eh	0Fh

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5	NV Data Param ID
	6...N	RAW Data
Response Data	1	Completion Code

### 2.5.1.11 OEM Get NV Data

Command Name	NetFn	LUN	Command Number
OemApGetNvData	3	3Eh	10h

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5	NV Data Param ID
Response Data	1	Completion Code
	2...N	RAW Data

### 2.5.1.12 OEM Set Device GUID

Command Name	NetFn	LUN	Command Number
OemApSetDeviceGuid	3	3Eh	11h

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'K'
	2	Pass Code 1: ~'o'
	3	Pass Code 2: ~'n'
	4	Pass Code 3: ~'t'
	5...20	Device GUID
Response Data	1	Completion Code

## 2.5.2 Board-specific OEM commands

The board-specific OEM commands are listed in Table 2-8 below.

**Table 2-8: Board-specific OEM Command Overview**

Command Name	NetFn	LUN	Command Number	MMC Requirement
OemApGetReleaseInfo	30h	3 - OEM2	01h	YES
CmdSetControlState	3Eh	0 - BMC	20h	YES
CmdGetControlState	3Eh	0 - BMC	21h	YES
CmdGetSfpData	30h	3 - OEM2	10h	YES

### 2.5.2.1 OEM Get Release Information

Command Name	NetFn	LUN	Command Number
OemApGetReleaseInfo	3Eh	3 - OEM2	01h

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'S'
	2	Pass Code 1: ~'1'
	3	Pass Code 2: ~'5'
	4	Pass Code 3: ~'0'
	5	Pass Code 4: ~'0'
Response Data	1	Completion Code
	2...6	Release TAG
	7...12	Subrelease TAG
	13...20	Release Date

#### Example

```
ipmitool -t 0x80 -b 7 -l 3 raw 0x30 0x1 0xac 0xce 0xca 0xcf 0xcf
```

e.g. returned data:

```
48 45 41 44 00 4e 2f 41 00 00 00 59 59 59 59 4d 4d 44 44
```

## 2.5.2.2 OEM Set Control State

Command Name	NetFn	LUN	Command Number
CmdSetControlState	3Eh	0 - BMC	20h

	Byte Num	Data Field
Request Data	1	Control ID 0 – SFP#1 1 – SFP#2 2 – SFP#3 3 – SFP#4
	2	Control State Control Number 0: SFP#1 0 – AMC port 0 1 – AMC port 11 Control Number 1: SFP#2 0 – AMC port 1 1 – AMC port 10 Control Number 2: SFP#3 0 – AMC port 20 1 – AMC port 9 Control Number 3: SFP#4 0 – AMC port 4 1 – AMC port 8 Control Number 4: Loopback 0..7 – Loopback Mode Bit [2] – AD8159 LB_C Pin 65 state Bit [1] – AD8159 LB_B Pin 66 state Bit [0] – AD8159 LB_A Pin 67 state Default value is 00h (loopback mode disabled).
Response Data	1	Completion Code

Each SFP can separately be switched to one of the mentioned AMC ports.

Example 1: Configure SFP1 (Control ID 0) to port 11 (Control State 1)

```
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x0 0x1
```

Example 2: Configure SFP2 (Control ID 1) to port 1 (Control State 0)

```
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x1 0x0
```

### 2.5.2.3 OEM Get Control State

Command Name	NetFn	LUN	Command Number
CmdGetControlState	3Eh	0 - BMC	21h

	Byte Num	Data Field
Request Data	1	Control ID 0 – SFP#1 1 – SFP#2 2 – SFP#3 3 – SFP#4 4 - Loopback Mode
Response Data	1	Completion Code 00h – valid CCh – parameter out of range D5h – when payload is not applied
	2	Control State Control ID 0: SFP#1 0 – AMC port 0 1 – AMC port 11 FFh – override jumper JP6 (7-8) asserted Control ID 1: SFP#2 0 – AMC port 1 1 – AMC port 10 FFh – override jumper JP6 (5-6) asserted Control ID 2: SFP#3 0 – AMC port 20 1 – AMC port 9 FFh – override jumper JP6 (3-4) asserted Control ID 3: SFP#4 0 – AMC port 4 1 – AMC port 8 FFh – override jumper JP6 (1-2) asserted Control ID 4: Loopback 0..7 – Loopback Mode Bit [2] – AD8159 LB_C Pin 65 state Bit [1] – AD8159 LB_B Pin 66 state Bit [0] – AD8159 LB_A Pin 67 state

Example:

Module in AMC bay B1 (IPMB-L address 0x7a), ipmitool invokes on carrier (AT8404)

```
ipmitool -t 0x7a -b 7 raw 0x3e 0x21 <0|1|2|3>
ipmitool -t 0x7a -b 7 kontron boot get <0|1|2|3>
```



### 2.5.2.4 OEM Get SFP Data

Command Name	NetFn	LUN	Command Number
CmdGetSfpData	30h		

	Byte Num	Data Field
Request Data	1	Pass Code 0: ~'S'
	2	Pass Code 1: ~'1'
	3	Pass Code 2: ~'5'
	4	Pass Code 3: ~'0'
	5	Pass Code 4: ~'0'
	6	0 – SFP#1 1 – SFP#2 2 – SFP#3 3 – SFP#4
	7	Offset
	8	Count
Response Data	1	Completion Code D5h – when payload is not applied CEh – when SFP is not present C9h – when maximum count is exceeded, or when invalid SFP ID
	2	Count n returned DATA bytes
	3 ....	n DATA bytes

Example:

Module in AMC bay B1 (IPMB-L address 0x7a), ipmitool invokes on carrier (AT8404)

```
ipmitool -t 0x7a -b 7 -l 3 raw 0x30 0xa0 0xac 0xce 0xca 0xcf 0xcf <ID><OFFSET><COUNT>
```

### 2.5.3 Configuring Port Settings

The port settings can be configured using the ipmitool on Kontron ATCA AMC carrier board

```
ipmitool <IPMB-ADDRESS> <IPMB-CHANNEL> raw <NETFN> <CMD-ID> [CMD-DATA]
```

IPMB-ADDRESSES:

```
AMC slot A1: 0x72
AMC slot A2: 0x74
AMC slot A3: 0x76
AMC slot A4: 0x78
```

```
AMC slot B1: 0x7a
AMC slot B2: 0x7c
AMC slot B3: 0x7e
AMC slot B4: 0x80
```

```
# Configure SFP1 (Control ID 0) to port 0 (Control State 0)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x0 0x0
```

```
# Configure SFP1 (Control ID 0) to port 11 (Control State 1)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x0 0x1
```

```
# Configure SFP2 (Control ID 1) to port 1 (Control State 0)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x1 0x0
```

```
# Configure SFP2 (Control ID 1) to port 10 (Control State 1)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x1 0x1
```

```
# Configure SFP3 (Control ID 2) to port 20 (Control State 0)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x2 0x0
```

```
# Configure SFP3 (Control ID 2) to port 9 (Control State 1)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x2 0x1
```

```
# Configure SFP4 (Control ID 3) to port 4 (Control State 0)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x3 0x0
```

```
# Configure SFP4 (Control ID 3) to port 8 (Control State 1)
ipmitool -t 0x7a -b 7 raw 0x3e 0x20 0x3 0x1
```

# *Chapter 3*

# **Installation**

## 3. Installation

The AM4311 has been designed for easy installation. However, the following standard precautions, installation procedures and general information must be observed to ensure proper installation and to preclude damage to the board, other system components, or injury to personnel.

### 3.1 Safety Requirements

The following safety precautions must be observed when installing or operating the AM4311. Kontron assumes no responsibility for any damage resulting from failure to comply with these requirements.

---

#### WARNING



MCH modules require, by design, a considerable amount of force in order to (dis)engage the module from/in the MicroTCA™ backplane connector. For this reason, when inserting or extracting the module, apply only as much force as required to preclude damage to either the module's handle or the front panel.



**DO NOT** push on the module handle to seat the module in the backplane connector. Do not use the module handle as a grip to handle the board outside of the chassis slot.

Use of excessive force, bending or rotation of the module handle will result in damage to the handle or the module's locking mechanism. Kontron disclaims all liability for damage to the module or the system as a result of failure to comply with this warning.

---

#### ESD Equipment



This AMC board contains electrostatically sensitive devices. Please observe the necessary precautions to avoid damage to your board:

- Discharge your clothing before touching the assembly. Tools must be discharged before use.
- Do not touch components, connector-pins or traces.
- If working at an anti-static workbench with professional discharging equipment, please do not omit to use it.

---

#### WARNING



This product has gold conductive fingers which are susceptible to contamination. Take care not to touch the gold conductive fingers of the AMC Card-edge connector when handling the board.



Failure to comply with the instruction above may cause damage to the board or result in improper system operation.

---

#### WARNING



Be careful when inserting or removing the AM4311. The SFP cages have sharp edges which might lead to injuries.





### Caution, Laser Light!

Laser light from fiber-optic transmission cables and components can damage your eyes. The laser components plugged into the switch are Class 1 laser components. Class 1 laser is considered incapable of producing damaging radiation levels during normal operation or maintenance.

To avoid damaging your eyes and to continue safe operation in case of abnormal circumstances:

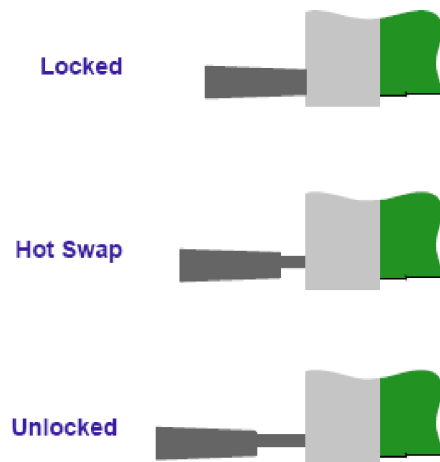
- Never look directly into the outlets of fiber-optic transmission components or fiber-optic cables with unprotected eyes.
- Never allow fiber-optic transmission path to operate until all the connections have been made.
- Always fit protective plugs to any unused ports of the switch.

## 3.2 Module Handle Positions

At the front panel, the AM4311 provides a module handle for module extraction for securing the module in the chassis and actuating the hot swap switch.

The module handle supports a three-position operation.

Figure 3-1: Module Handle Positions



**Table 3-1: Module Handle Positions**

Module Handle Position	Function
Locked	When the AM4311 is installed, the module handle is pushed in the "Locked" position and the following actions result: <ul style="list-style-type: none"> <li>• The module is locked in the chassis</li> <li>• The hot swap switch is actuated</li> </ul>
Hot Swap	When an extraction process of the AM4311 is initiated, the module handle is pulled in the "Hot Swap" position and the following actions result: <ul style="list-style-type: none"> <li>• The module is locked in the chassis</li> <li>• The hot swap switch is deactivated</li> </ul>
Unlocked	When the module handle is pulled to the "Unlocked" position, the AM4311 can be fully extracted and the following actions result: <ul style="list-style-type: none"> <li>• The module is unlocked in the chassis</li> <li>• The hot swap switch is deactivated</li> </ul>

**Note...**

For normal operation, the module handle must be in the "Locked" position

### 3.3 Hot Swap Procedures

The AM4311 is designed for hot swap operation. Hot swapping allows the coordinated insertion and extraction of modules without disrupting other operational elements within the system.

The procedures contained in this section are also applicable for "non-operating systems" with the exception of indications and functions which require power to be applied.

#### 3.3.1 Hot Swap Insertion

To insert the MCH module proceed as follows:

1. Ensure that the safety requirements indicated in Section 3.1 are observed.

**WARNING**

Failure to comply with the instruction above may cause damage to the board or result in improper system operation.

2. Ensure that the module is properly configured for operation in accordance with the application requirements before installation.

**WARNING**

Care must be taken when applying the procedures below to ensure that neither the AM4311 nor other system boards are physically damaged by the application of these procedures.

3. Ensure that the module handle is in the “Unlocked” position.
4. Using the front panel as a grip, carefully insert the module into the slot designated by the application requirements until it makes contact with the backplane connector.
5. Apply pressure to the front panel until the module is properly seated in the backplane connector. This may require a considerable amount of force. Apply pressure only to the front panel, not the module handle. During seating in the connector, there is a noticeable “snapping” of the board into the connector. When the board is seated it should be flush with the system front panel.

In the case of a running system, the following occurs:

- The BLUE HS LED turns on.  
When the module is seated, the module management power is applied and the BLUE HS LED turns on. (No payload power is applied at this time).
6. Connect all external interfacing cables to the module as required and ensure that they are properly secured.
  7. Push the module handle in the “Locked” position. When the module handle is in the “Locked” position, the module is locked and the hot swap switch is actuated.

In the case of a running system, the following occurs:

- The BLUE HS LED turns off.  
The power module now enables the payload power for the MCH.
8. The MCH module is now operating.

### 3.3.2 Hot Swap Extraction

To extract the MCH module proceed as follows:

1. Ensure that the safety requirements indicated in Section 3.1 are observed.
2. Pull the module handle in the “Hot Swap” position.

When the module handle is in the “Hot Swap” position, the extraction process of the module is initiated and the following occurs:

- The BLUE HS LED displays short blinks. When the power module IPMI controller receives the handle opened event, it sends a command to the MCMC with a request to perform short blinks of the BLUE HS LED.

This indicates that the MCH is waiting to be deactivated.

Once the MCH receives the permission to continue the deactivation, all used ports are disabled.

- The BLUE HS LED turns on.

The Intelligent Platform Management Controller on the power module disables the module's payload power and the BLUE HS LED is turned on.

Now the module is ready to be safely extracted.

3. Pull the module handle in the “Unlocked” position.
4. Disconnect any interfacing cables that may be connected to the module.
5. Disengage the module from the backplane connector by pulling on the module handle. This may require a considerable amount of force.
6. Using the front panel as a grip, remove the module from the chassis.
7. Dispose of the module as required.