

» User Guide «

OM6040

**MicroTCA™ Four-Slot
Single-Width, Full-Size
Single-Tier
Cube Shelf**

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Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.



Explanation of Symbols



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.

Please refer also to the section “High Voltage Safety Instructions” on the following page.



Warning, 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” on the following page.



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.



Note ...

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



For Your Safety

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.

Temperature and High Voltage Safety Instructions



Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.

Be careful, this device will heat up during operation, and if touched may cause burns. The temperature of the product housing may reach up to approximately 50° C. Allow for sufficient cool down before handling after power is turned off.



Caution, Electric Shock!

Before installing your new Kontron product into a system always ensure that your mains power is switched off. This applies also to the installation of piggybacks.

Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing work.

Special Handling and Unpacking Instructions



ESD Sensitive Device!

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.

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 piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, 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.



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 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.

In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.

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.

Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction on the previous page of this manual.



Two Year 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.

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Chapter

1

Introduction



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1. Introduction

1.1 Overview

The OM6040 is a cost-optimized, compact and modular MicroTCA™ platform designed for the implementation of high-performance MicroTCA™ solutions for industrial automation, energy and medical applications.

The OM6040 single-tier MicroTCA™ Cube shelf consists of a MicroTCA™ backplane, an AC power supply unit, two cooling fans, a Kontron Single Full-size MicroTCA™ Carrier Hub (MCH), and four slots for accommodating up to four Single Full-size AMC modules with various configurations of AMC CPUs and peripheral devices. The components are enclosed in a chassis with a wall-mount panel and two fixed feet allowing the OM6040 to either stand alone on any flat surface in development environments or be fix mounted using the wall-mount panel. The OM6040 is closed with the exception of the front slots and cooling air inlets on the bottom and outlets on the top of the chassis.

The OM6040 is equipped with one large fan that provides forced-air cooling for the front slots of the system, and a second, smaller fan that provides forced-air cooling for the power supply and backplane in the rear area of the chassis.

The OM6040's outstanding features are:

- MicroTCA™ Cube design
- Support for up to four Single Full-size AMCs
- Full-size MCH with up to three tongues
- Integrated, high-power, low-cost AC power supply unit (instead of high-cost power modules)
- Two integrated cooling fans
- MicroTCA™ backplane:
 - Four Single, Full-size AMC module slots
 - One three-tongue, Full-size MCH slot
 - Fabric support: Gigabit Ethernet, PCI Express, Serial Rapid I/O, SATA/SAS
 - Integrated generation of 3.3 VDC management power
 - Payload power switching on mezzanine compatibility module
 - Storage for FRU data

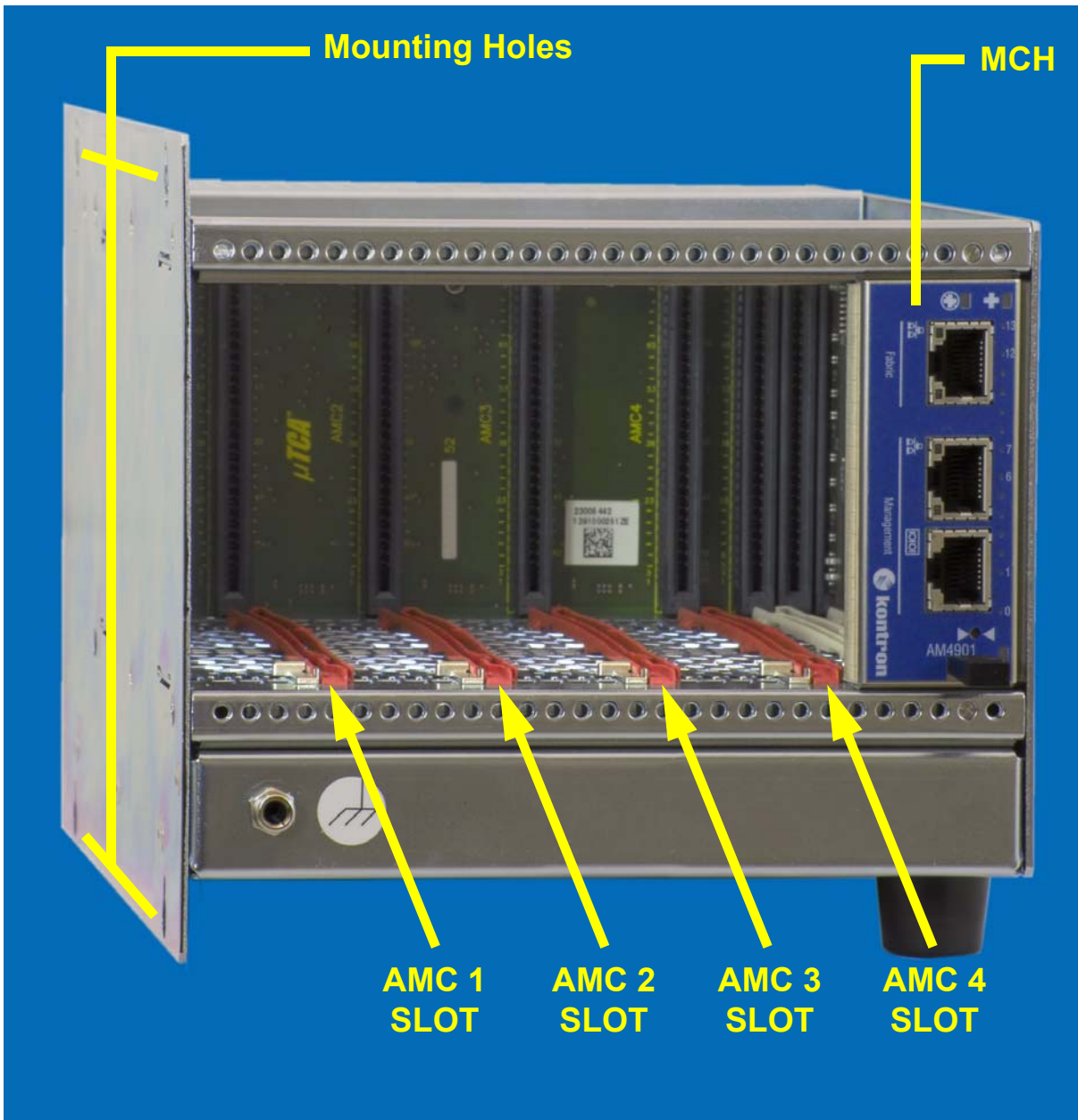
1.2 Components

The OM6040 shelf is comprised of the following elements:

- Chassis
- Backplane with CM integrated
- Subrack
- Power Supply Unit (PSU)
- Fans
- MCH (Kontron AM490n)

The following figure illustrates the OM6040 shelf configured with the AM4901 MCH. The chassis is provided with a wall-mount panel on the left side of the chassis. The cooling fans are located at the bottom of the chassis and the power supply at the rear. These units are not user-serviceable.

Figure 1-1: OM6040 Shelf - Perspective View



1.3 Technical Specification

Table 1-1: OM6040 Subrack Specifications

FEATURES	SPECIFICATIONS
Shelf	<p>MicroTCA™ cube form designed for Single Full-size AMC Modules</p> <ul style="list-style-type: none"> • Dimensions: 250mm x 157mm x 150mm (depth x width x height) (with mounting panel) • Slot geometry (from left side of the subrack): <ul style="list-style-type: none"> slot 1: allocated for Single Full- or Mid-size AMC module to slot 4: allocated for Single Full- or Mid-size AMC module slot 5: allocated for MicroTCA™ Single Full-size Carrier Hub - MCH • Two fans: one located at bottom-front area of the shelf, and one in bottom of the rear bay • Rear bay area occupied by the power supply unit, CM, and small fan <p>Temperature Ranges:</p> <ul style="list-style-type: none"> • Operating: 0°C to +55°C • Storage: -40°C to +70°C <p>Humidity: 93% RH at 40°C, non-condensing</p> <p>Weight: 2.8 kg shelf with fans and power supply unit 3.1 kg as above, plus MCH</p>
Backplane and Compatibility Module	<p>MicroTCA™ compliant, single-tier backplane with:</p> <ul style="list-style-type: none"> • Four AMC module connectors • One three tongue MCH connector • DC/DC converters for 3.3 VDC management power • PCIe clock routing to all AMC slots • Two connectors for interfacing to the MCH Compatibility Module (CM) <p>Input power distribution and control functionality</p> <p>Fan power distribution</p> <p>Backplane FRU data EEPROM</p> <p>Fabrics:</p> <ul style="list-style-type: none"> • Single-star Gigabit Ethernet Fabric (port 0 to each AMC slot; port 1 to AMC slots 1 and 3) • Fat pipes are routed in a star configuration between AMC ports 4-7 to the MCH. Depending on the MCH configuration (PCIe switch or SRIO switch) the fat pipes may be used for 4x lanes of PCIe or 4x lanes of SRIO. • Fat pipes routing: AMC ports 8-11: AMC slots 1-2 and 3-4 • SATA/SAS porting (AMC Ports 2 and 3): <ul style="list-style-type: none"> • AMC#1 port 2 to AMC#2 port 2 • AMC#1 port 3 to AMC#3 port 2 • AMC#3 port 3 to AMC#4 port 2 <p>IPMB-L and I²C interfacing supported for IPMI and local monitor and control</p>

**Table 1-1: OM6040 Subrack Specifications (Continued)**

FEATURES	SPECIFICATIONS
Fans	Two auto restart, brushless DC motors, axial fans: <ul style="list-style-type: none">• Input voltage range: 10 to 14 VDC, nominal 12 VDC• Maximum air flow: 170 m³/h and 13.5 m³/h• Power consumption: 5.3 and 1.6 watts
Power Supply Unit	Built-in single AC power supply unit: <ul style="list-style-type: none">• Input voltage range: 85 to 264 VAC; 47 to 63 Hz• Output voltage: +12 VDC• Output power: maximum continuous: 250 watts (forced air cooling required)• Maximum current rating: 20 A• Power derating: 2.5% per degree from 50°C to 70°C ambient temperature

1.4 Standards

This *Kontron MicroTCA™* Subrack complies with the requirements of the following standards.

Table 1-2: Standards

COMPLIANCE	TYPE	STANDARD	TEST LEVEL
CE	Emission	EN55022 EN61000-6-3	--
	Immission	EN55024 EN61000-6-2	--
	Electrical Safety	EN60950-1	--
Mechanical	Mechanical Dimensions	IEEE 1101.10	--
Environmental and Health Aspects	Climatic Humidity	IEC60068-2-78	93% RH at 40°C, non-condensing
	WEEE	Directive 2002/96/EC	Waste electrical and electronic equipment
	RoHS	Directive 2002/95/EC	Restriction of the use of certain hazardous substances in electrical and electronic equipment



Note ...

Kontron performs comprehensive environmental testing of its products in accordance with applicable standards.

Customers desiring to perform further environmental testing of Kontron products must contact Kontron for assistance prior to performing any such testing. This is necessary, as it is possible that environmental testing can be destructive when not performed in accordance with the applicable specifications.

In particular, for example, boards **without conformal coating** must not be exposed to a change of temperature exceeding 1K/minute, averaged over a period of not more than five minutes. Otherwise, condensation may cause irreversible damage, especially when the board is powered up again.

Kontron does not accept any responsibility for damage to products resulting from destructive environmental testing.



1.5 Related Publications

The following publications contain information relating to this product.

Table 1-3: Related Publications

PRODUCT	PUBLICATION
MicroTCA	PICMG® MTCA.0 Micro Telecommunications Computing Architecture R1.0, July 6, 2006
AMC	PICMG® AMC.0, Advanced Mezzanine Card Specification R2.0, Nov. 15, 2006 PICMG® AMC.1, PCI Express R2.0, Oct. 8, 2008 PICMG® AMC.2, Gigabit Ethernet R1.0 PICMG® AMC.3, Storage Interfaces R1.0, Aug. 25, 2005 PICMG® AMC.4, Serial Rapid IO R1.0, July 11, 2009
IPMI	IPMI - Intelligent Platform Management Interface Specification, v1.5 IPMI - Platform Management FRU Information Storage Definition, V1.0 Document Revision 1.1, September 27, 1999
PCI Express	PCI Express Base Specification Revision 1.0a
Rapid IO	Rapid IO Specification Revision 1.3
Serial ATA	Serial ATA 2.5 Specification
All Kontron products	Product Safety and Implementation Guide, ID 1021-9142



Chapter

2

Component Description



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2. Component Description

2.1 Shelf

The OM6040 is a single-tier, vertically oriented MicroTCA™ Cube shelf and can accommodate up to four Single Mid-size AMC. For unused slots, dummy filler assemblies must be installed to ensure proper air flow through the subrack. If required, these assemblies must be ordered separately as they are not standard elements of the OM6040 shelf.

The shelf's steel frame provides a robust housing for system components and airflow channelization over the system slots. It is wall-mountable for industrial environments, and it can be placed on any flat surface. Always ensure that adequate spacing for proper cooling is provided.

The following figures illustrate the mechanical design of the OM6040 shelf.

Figure 2-1: OM6040 Shelf - Front View

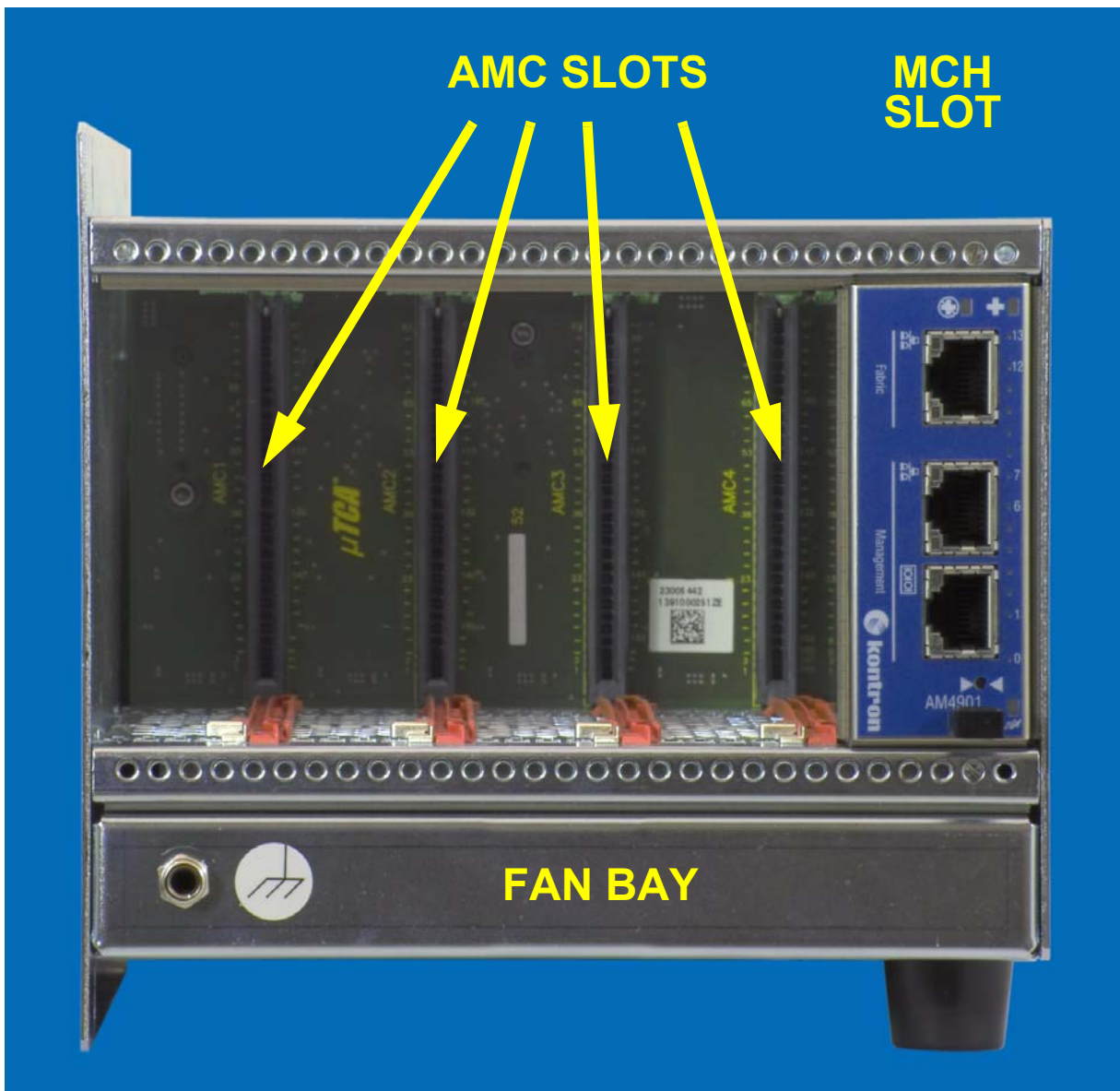




Figure 2-2: OM6040 Shelf - Rear View

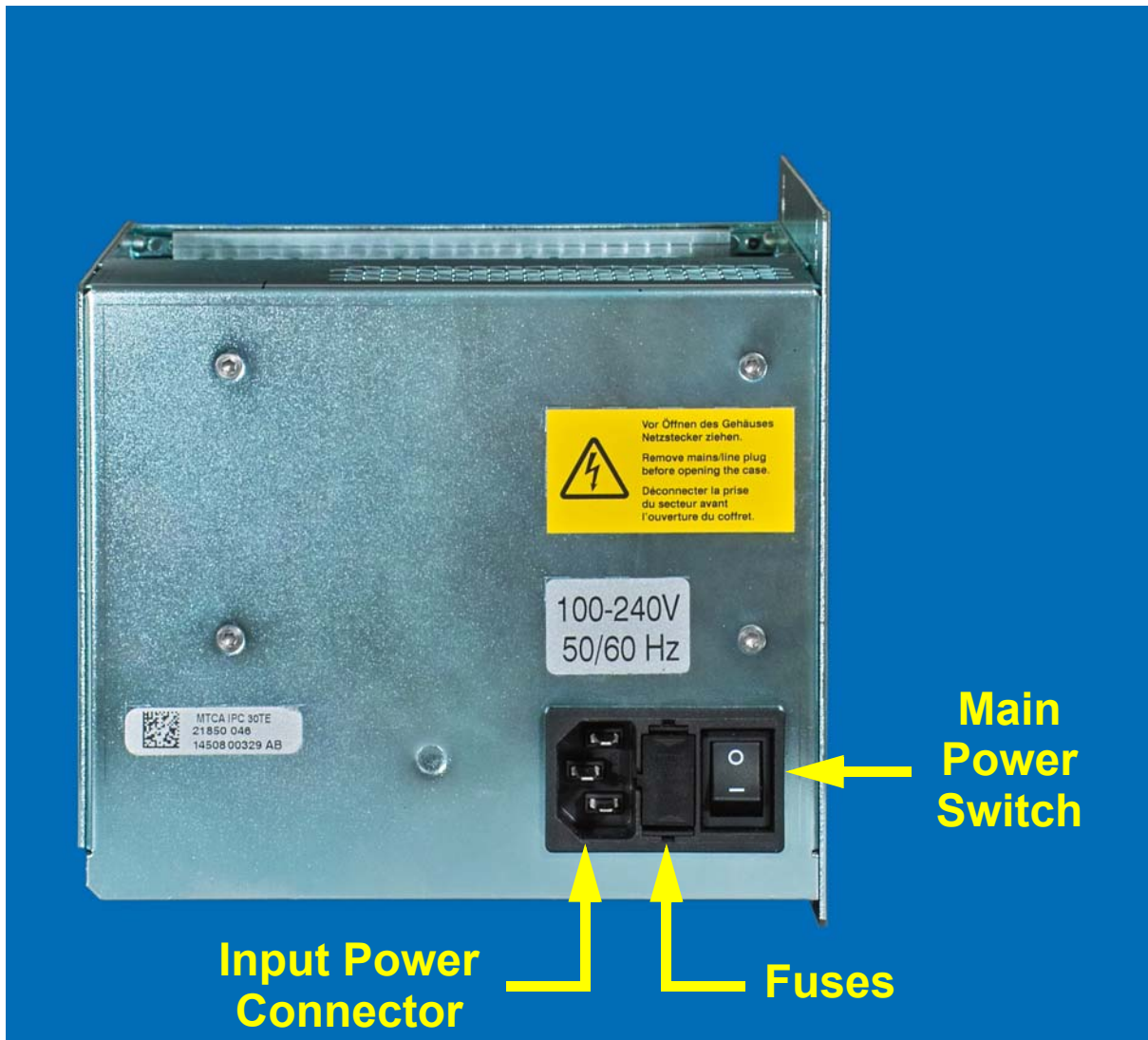




Figure 2-3: OM6040 Shelf - Bottom View



Figure 2-4: OM6040 Shelf - Top View

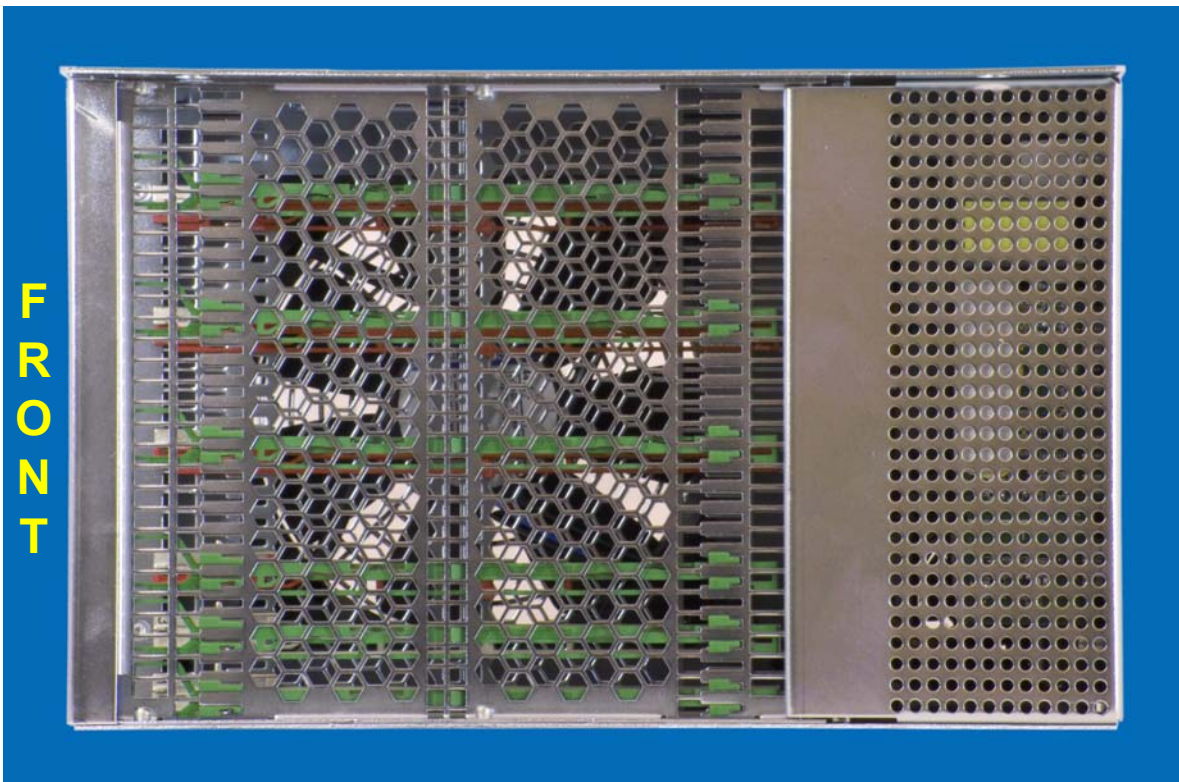




Figure 2-5: OM6040 Shelf - Left Side View

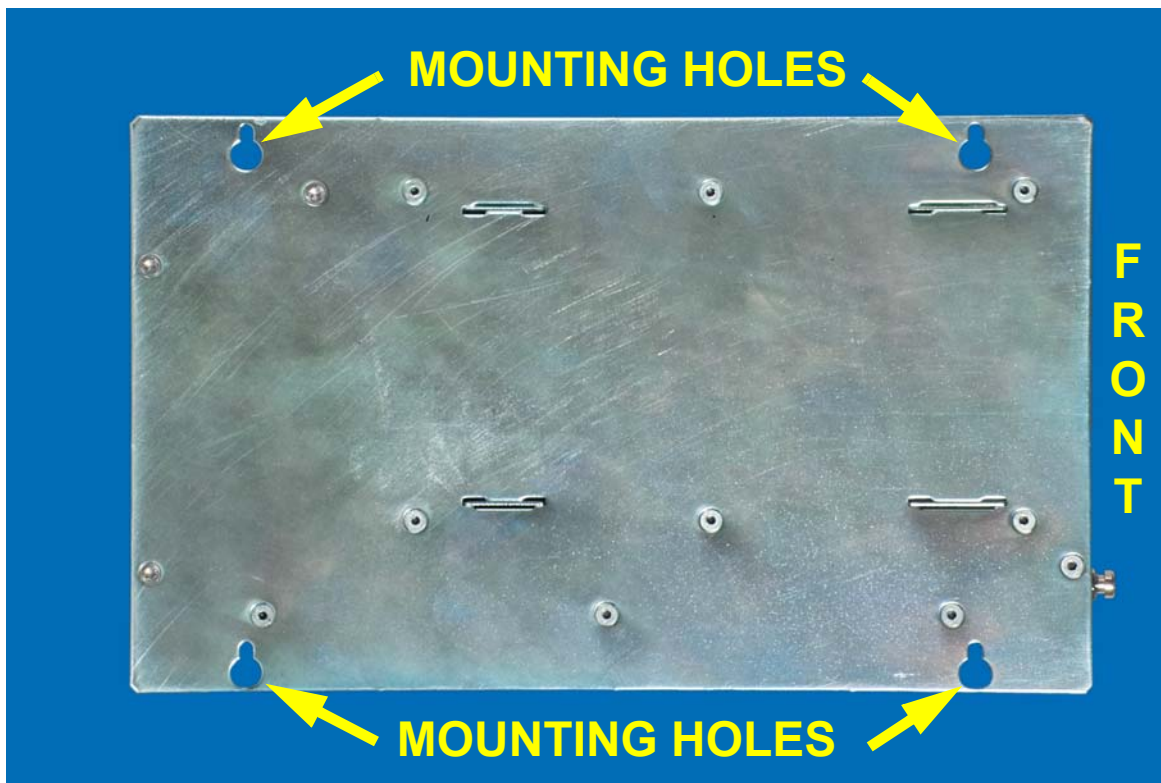


Figure 2-6: OM6040 Shelf - Right Side View

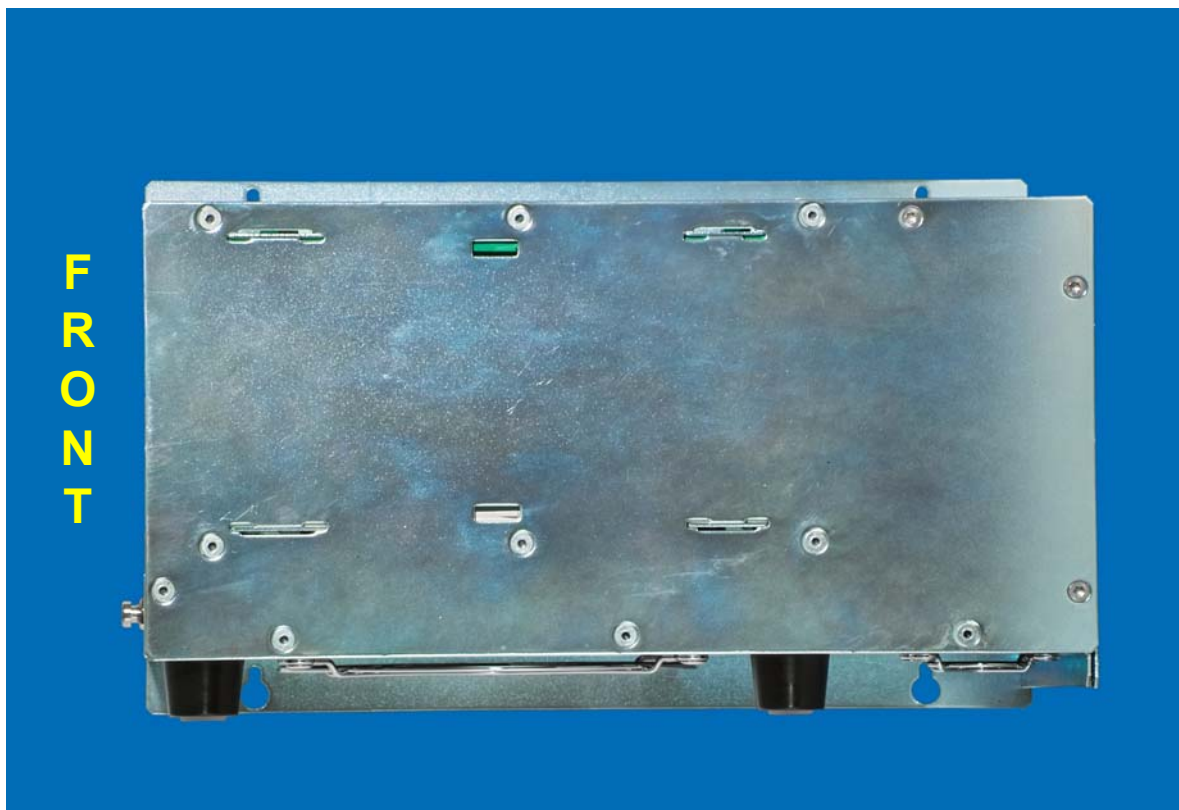
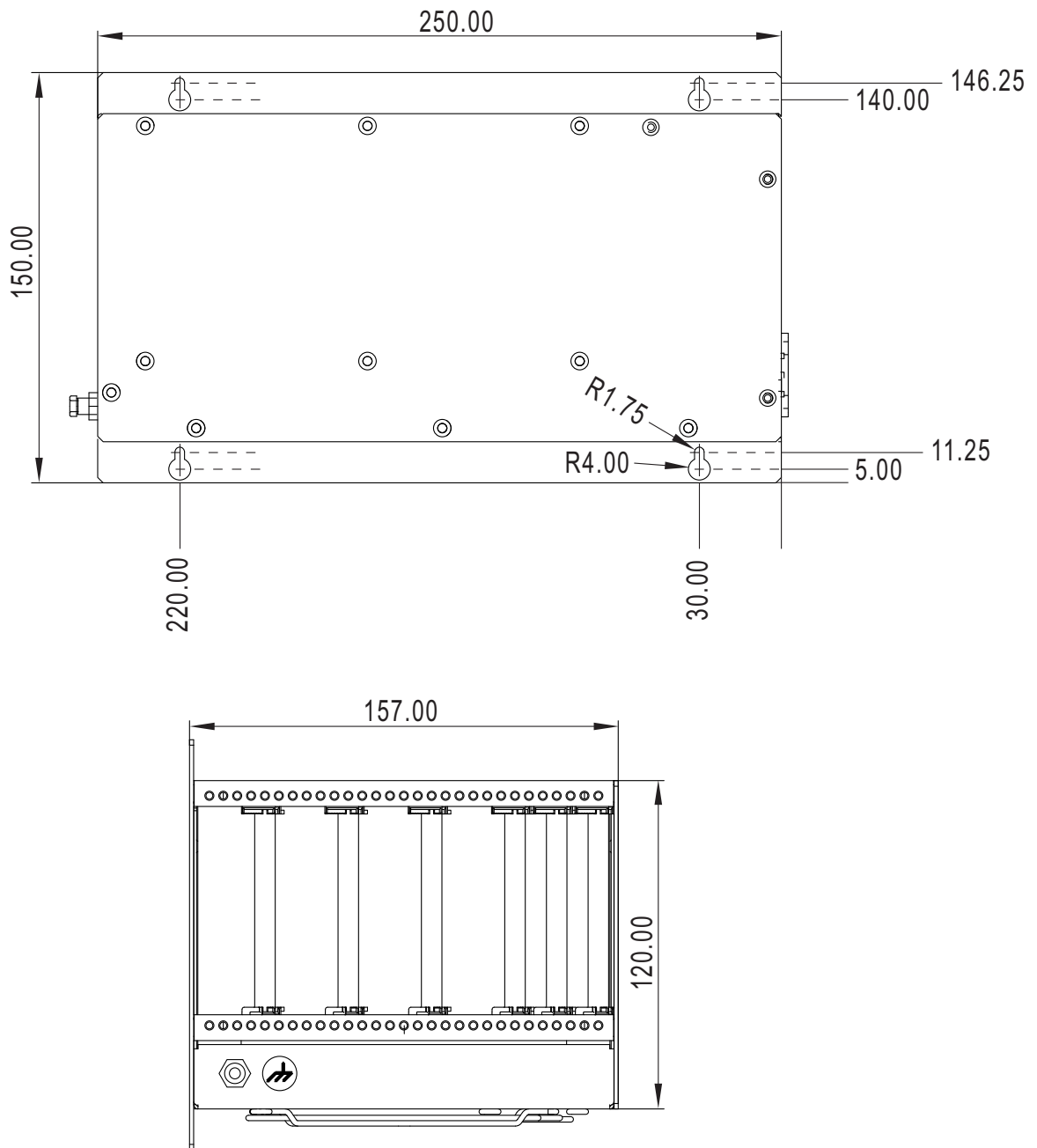




Figure 2-7: OM6040 Shelf - Dimensions



2.2 Backplane and CM

The OM6040 backplane and CM (MCH Compatibility Module) provide the following basic functions:

- Fabric interconnectivity for:
 - Gigabit Ethernet
 - SATA/SAS
 - PCIe or SRIO (depends on MCH used)
- Input power distribution and control for payload and management power
- Point-to-point connectivity: slot 1-2 and slot 3-4: ports 8-11
- PCIe clock distribution
- IPMI monitor and control interfacing (IPMB-L)
- Backplane FRU data storage (EEPROM)
- MCH IPMB-0 monitor and control interfacing
- Interfacing for MCH module

The following figures illustrate the basic layout of the backplane and power supply. In addition, a block diagram of the backplane and the backplane topology are provided.

Figure 2-8: OM6040 Shelf - Subrack View

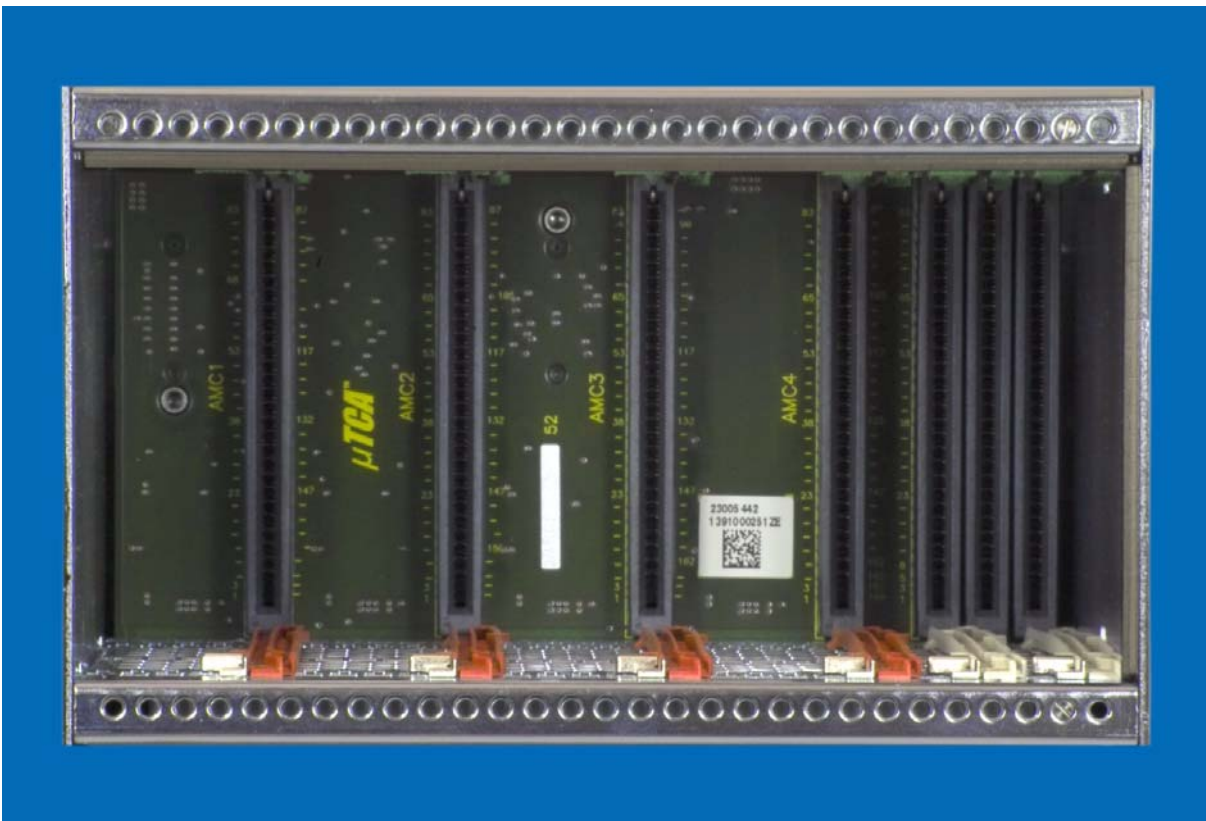
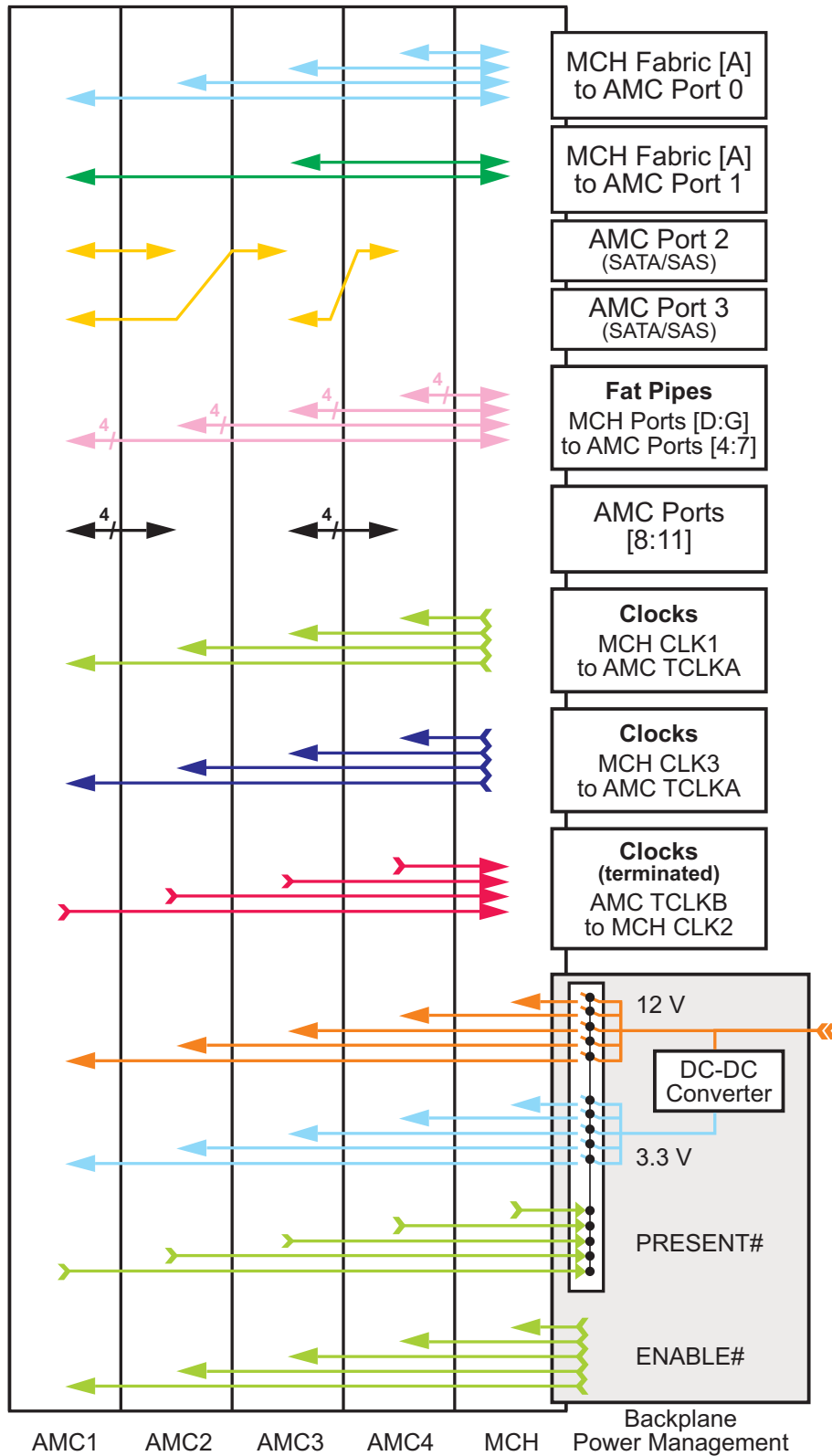




Figure 2-9: Backplane Topology





The topology of the OM6040 backplane permits a wide range of module configurations. There are, however, some restrictions as to the use of particular module combinations.

If, for example, CPU modules are installed in both slots 1 and 2 (or 3 and 4), there must be no SATA functionality active on AMC ports 2 and 3. If both CPUs have SATA active on these ports, neither of the CPUs will not properly boot.

If PCIe functionality is implemented, by default, slot 1 is configured as the root complex. This can be changed by setting appropriate PCIe configuration parameters in the MCH.

2.3 MicroTCA Carrier Hub - MCH

The OM6040 is supplied with an appropriate MCH installed at the factory. There are three possible configurations which must be specified at the time the OM6040 is ordered.

There is a base MCH which supports only GbE Fabric, the second version supports GbE and PCIe, and the third version provides GbE and SRIO.



Chapter

3

Installation



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3. Installation

3.1 General

The OM6040 shelf itself is an application support platform for MicroTCA™ solutions. In order to satisfy solution requirements it must be configured accordingly. To assist application developers and system implementers in achieving their goals, the OM6040 is provided with a minimum configuration. Specifically, it is delivered with an appropriate MCH module.

The following table and figures illustrate the base solution configuration of the OM6040. This configuration is the basis for the information and procedures provided in the following Installation sections.

Table 3-1: OM6040 Base Solution Configuration

COMPONENT	QTY	SYSTEM LOCATION - DESCRIPTION
Subrack	1	Mechanical chassis of OM6040
Backplane	1	-
Power Supply Unit (PSU)	1	Built-in to the rear bay area
Fan	2	One fan in the bottom-front bay area, and one fan in the rear bay area
Filler Panels	0	Must be ordered separately as required. Available are 2HP filler panels and Full-size dummies
MCH	1	FSA-5: Single Full-size with extraction handle Required configuration must be specified at time OM6040 is ordered

Legend for Table 3-1:

FSA = front slot area, as seen from front - numbered left to right

QTY = quantity



3.2 Safety

The following precautions must be observed.



Caution, Electric Shock Hazard!

The OM6040 requires AC mains power in the range from 90 to 240 volts for operation. Therefore, due caution must be exercised when handling or performing operations on the OM6040 when power is applied.

Failure to comply with the above could endanger your life or health and may cause damage to the OM6040 or other system components including process-side signal conditioning equipment.



ESD Equipment!

The OM6040 contains electrostatic sensitive devices. Ensure that the following precautions are observed to avoid damaging the OM6040:

Discharge clothing before touching the assembly. Tools must also be discharged before use.

Do not touch any board components, connector pins, or board conductive circuits.

If working at an anti-static workbench with professional discharging equipment, ensure compliance with its usage when handling this product.



3.3 Prerequisites

3.3.1 Cooling

The OM6040 requires forced-air cooling which is provided by the cooling fans located on the bottom side of the subrack in the front and rear bay areas. Adequate ambient airflow to the fan inlet areas must be ensured. In addition, the area above the subrack must also provide for adequate outlet airflow. Direct re-cycling of outlet air to the inlet area must be avoided to preclude overheating of the system.



Warning!

Failure to comply with the above can result in improper operation or damage to the OM6040 or other components installed in the OM6040.

Kontron rejects any and all liability for damage resulting from inadequate cooling of the OM6040 or components installed in the OM6040.



Warning!

If the OM6040 is operated at temperatures above 45°C, ensure that an inlet area and an outlet area of 1U (44.45 mm) are provided.

Failure to comply with the above may cause improper operation of or damage to the OM6040.

3.3.2 Filler Panels

Filler panels for the OM6040 are available as required. Depending on solution requirements these components may be removed or reconfigured as necessary.

3.4 Mounting

The OM6040 is supplied with a fixed mounting panel for installation in a system cabinet. This will require mounting hardware which is not supplied with the OM6040.

For operation of the OM6040 on a flat surface, desktop or rack shelf, there are no special mounting fixtures. In this case, for operation ensure adequate airflow to the OM6040. Care must also be taken to ensure that the OM6040 cannot fall off of the flat surface.



3.5 Adding or Replacing OM6040 Components

Solution requirements determine the operational configuration of the OM6040. Therefore, it may or will be necessary to add, remove, or reconfigure components.



Warning!

Remove power from the system before performing any reconfiguration of these components.

Failure to comply with the above could endanger your life or health and may cause damage to the OM6040 or other system components including process-side signal conditioning equipment.

Kontron rejects any and all liability for damage resulting from failure to remove power before performing the above.

AMC modules are normally supplied with documentation which provides instructions or guidelines on their installation or replacement. Please refer to their respective documentation for further assistance. For replacement of the MCH, refer to the MCH User Guide.

The power supply, fans and backplane are not user replaceable.

3.6 MCH/AMC Module Hot-Swapping

The OM6040 as such is designed to support hot-swapping under IPMI control. Hot-swapping, however, is a function of the individual application requirements and the ability of system components (hardware and software) to support these requirements. Therefore, it is the responsibility of the system integrator to ensure the system operability and compliance with hot-swap requirements prior to application implementation.

More specifically, for example, the MCH used supports hot-swapping of itself. This in return results effectively in a power off and on cycling of the system as a whole. If this is not desired, then precautions must be taken to ensure proper hot-swapping of system components.

3.7 AMC Connector Mating Cycles

The OM6040 backplane connectors and the AMC module card-edge connectors are designed to support at least 200 insertion/extraction cycles. As systems used in a laboratory or development environment may exceed this number of mating cycles over the product life time, the card-edge connector of each AMC module should be inspected for wear or damage before insertion or after extraction. If a card-edge connector exhibits excessive wear or damage, the AMC module must be replaced to preclude improper operation of the system.