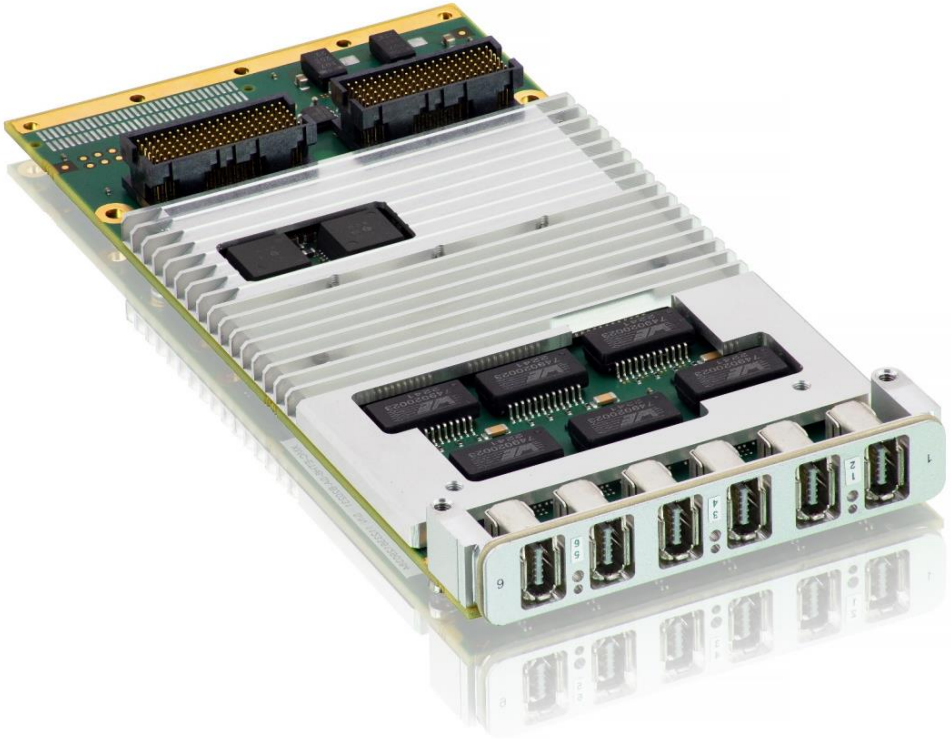
XMC-ETH6 Six-port Gigabit Ethernet Mezzanine Card
User Guide



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Kontron Europe GmbH
Gutenbergstraße 2
85737 Ismaning
Germany
www.kontron.com

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⚠CAUTION	Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled. Please follow the "General Safety Instructions" supplied with the system.
NOTICE	You find the most recent version of the "General Safety Instructions" online in the download area of this product.
NOTICE	This product is not suited for storage or operation in corrosive environments, in particular under exposure to sulfur and chlorine and their compounds. For information on how to harden electronics and mechanics against these stress conditions, contact Kontron Support.

Revision History

Revision	Brief Description of Changes	Date of Issue
0.1	Preliminary release	May 2022
0.2	Content improved	June 2022
1.0	First official release, including –RC and –SA board versions	June 2023
1.1	Moved to the newest Kontron visual identity. Then, content updated following bring-up results of the –SA board version : - Pictures of the –SA prototypes - Front panel LED identification, - Power consumption table, - Mass of –SA board version.	November 2023

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Kontron sells products worldwide and declares regional General Terms & Conditions of Sale, and Purchase Order Terms & Conditions. Visit https://www.kontron.com/terms-and-conditions.

For contact information, refer to the corporate offices contact information on the last page of this user guide or visit our website CONTACT US.

Customer Support

Please contact our support team at support.KFR@kontron.com .

Customer Service

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For more details on Kontron's service offerings such as: enhanced repair services, extended warranty, Kontron training academy, and more visit https://www.kontron.com/support-and-services.

Customer Comments

If you have any difficulties using this user guide, discover an error, or just want to provide some feedback, contact Kontron support. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user guide on our website.

Symbols

The following symbols may be used in this user guide.

⚠DANGER	DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	NOTICE indicates a property damage message.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.
	Electric Shock! This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. 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.
	ESD Sensitive Device! This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.
	HOT Surface! Do NOT touch! Allow to cool before servicing.
	Laser! This symbol inform of the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.
	This symbol indicates general information about the product and the user guide. This symbol also indicates detail information about the specific product configuration.
	This symbol indicates important information which must be read carefully.
	This symbol precedes helpful hints and tips for daily use.

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.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

⚠CAUTION

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

⚠CAUTION

Electric Shock!
Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.
Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

NOTICE

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 workstations. Where a safe workstation is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools.
It is particularly important to observe standard anti-static precautions when changing removable elements like ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product 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 product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.

⚠CAUTION

Danger of explosion if the battery is replaced incorrectly.
Replace only with same or equivalent battery type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

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 product, that are not explicitly approved by Kontron and described in this user guide or received from Kontron Support as a special handling instruction, will void your warranty.

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

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

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit https://www.kontron.com/about-kontron/corporate-responsibility/quality-management.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- Reduce waste arising from electrical and electronic equipment (EEE)
- Make producers of EEE responsible for the environmental impact of their products, especially when the product become waste
- Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- Improve the environmental performance of all those involved during the lifecycle of EEE

Environmental protection is a high priority with Kontron.
Kontron follows the WEEE directive
You are encouraged to return our products for proper disposal.

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1. Introduction

The XMC-ETH6 is a XMC mezzanine card focusing on application domains such as Military & Aerospace, Transportation and Energy/Industry.
The XMC-ETH6 is the ideal building block to expand the networking capability of any VME or VPX computer.
Depending on the available variant selected, the XMC-ETH6 board offers:

- up to six 10/100M or 1G (copper) Ethernet ports,
- or up to four 10/100M or 1G (copper) Ethernet ports, and up to two 1000BASE-SX (optical) Ethernet ports.

1.1. Document Overview

1.1.1. Objective

This guide provides general information, hardware instructions, operating instructions and functional description of the XMC-ETH6 board.

This hardware technical documentation reflects the most recent version of the product. The “Release Notes" (contact Kontron) might help to keep track of potential evolutions.

A vertical bar in the margin identifies functional changes that differ from previous version of the document.

1.1.2. Audience

The scope of this guide is to cover, as much as possible the range of people who will handle or use the XMC-ETH6, from unpackers/inspectors, through system managers and installation technicians to hardware and software engineers. Most chapters assume a certain amount of knowledge on the subjects of single board computer architecture, interfaces, peripherals, system, cabling, grounding and communications.

1.1.3. Scope

This guide is based on the definition of XMC-ETH6-RC-B19343 and XMC-ETH6-SA-B20231 product versions, as specific implementations (options) of the RC and SA board versions of the corresponding COTS products.

1.1.4. Structure

This guide is structured in a way that will reflect the sequence of operations from receipt of the board up to getting it working in your system. Each topic is covered in a separate chapter and each chapter begins with brief introduction that tells you what the chapter contains. In this way, you can skip any chapters that are not applicable or with which you are already familiar.

1.1.5. Terminology, Definitions and Abbreviations

Term or Acronym	Definition
BIST	Built-In Self-Test
DC	Direct Current
EEPROM	Electrically Erasable Programmable Read-Only Memory
EIA	Electronic Industries Alliance
ESD	Electrostatic Sensitive Device
IEEE	Institute of Electrical and Electronic Engineers
IO	Input-Output
MTBF	Mean Time Between Failures
Option	A feature which requires a specific order code.
PCB	Printed Circuit Board.
PCI	Peripheral Component Interface
PCIe	PCI Express
PIM	PCI Interface Module
PMC	PCI Mezzanine Card
PTP	Precise Time Protocol
RC	Rugged Conduction-cooled
SA	Standard Air-cooled
SPI	Serial Peripheral Interface
S/FTP	Shielded / Foiled Twisted Pair
TSN	Time Sensitive Networking
XMC	An evolution of the PMC mezzanine card that includes a new connector and the electrical signals necessary for switched communications (PCI Express) between the mezzanine card and its carrier
Abbreviations	**Definition**
10/100M	10-Mbit or 100-Mbit Ethernet interface (10BASE-T or 100BASE-TX)
1G	1-Gbit Ethernet interface (1000BASE-T)
TBC	To Be Confirmed. Information not available at the time this document was released
TBD	To Be Defined. Information not available at the time this document was released

1.2. Related Publications

The following publications contain information related to the XMC-ETH6 product.

Table 1: Related Publications

Standard	**Version**	**Description**
IEEE Std 1386.1	2001	Standard Physical and Environmental Layers for PCI Mezzanine Cards (PMC)
IEEE 1386	2001	Standard Mechanics for a Common Mezzanine Card Family (CMC)
ANSI/VITA 42.0	2021	XMC Switched Mezzanine Card Auxiliary Standard
ANSI/ VITA 42.3	R2020	XMC PCI Express Protocol Layer Standard
ANSI/ VITA 46.9	R2018	PMC/XMC Rear I/O Fabric Signal Mapping on 3U and 6U VPX Modules
ANSI/VITA 47	R2019-Errata 2022	Environments, Design and Construction, Safety, and Quality for Plug-In Units
Product	**Version**	**Description**
D275138 Kontron XMC-ETH6 Release Note	1.0	XMC-ETH6 Release Note
DS43471 Diodes PI7C9X3G808GP Datasheet	1-2 2021-08-03	PI7C9X3G808GP - PCI Express Gen 3 Packet Switch Datasheet https://www.diodes.com/assets/Datasheets/PI7C9X3G808GP.pdf
327935 Intel I210 product brief	2021-02-11	Intel I210 product brief https://www.intel.com/content/www/us/en/content-details/327935/intel-ethernet-controller-i210-enhances-network-connectivity-product-brief.html
621753 Intel I225 & I226 product brief	2022-11-30	Intel I225 & I226 product brief https://www.intel.com/content/www/us/en/content-details/621753/intel-ethernet-controller-i225-i226-product-brief.html

1.3. Board Overview

Depending on the available variant selected, the XMC-ETH6 board offers:

- up to six 10/100M or 1G (copper) Ethernet ports,
- or up to four 10/100M or 1G (copper) Ethernet ports, and up to two 1000BASE-SX (optical) Ethernet ports.

Refer to sections 1.3.3 and 1.3.4 for Detailed Block Diagram of the RC board and Detailed Block Diagram of the SA board.

1.3.1. Simplified Board Diagram, including both SA/RC (Front/Rear IOs) board versions

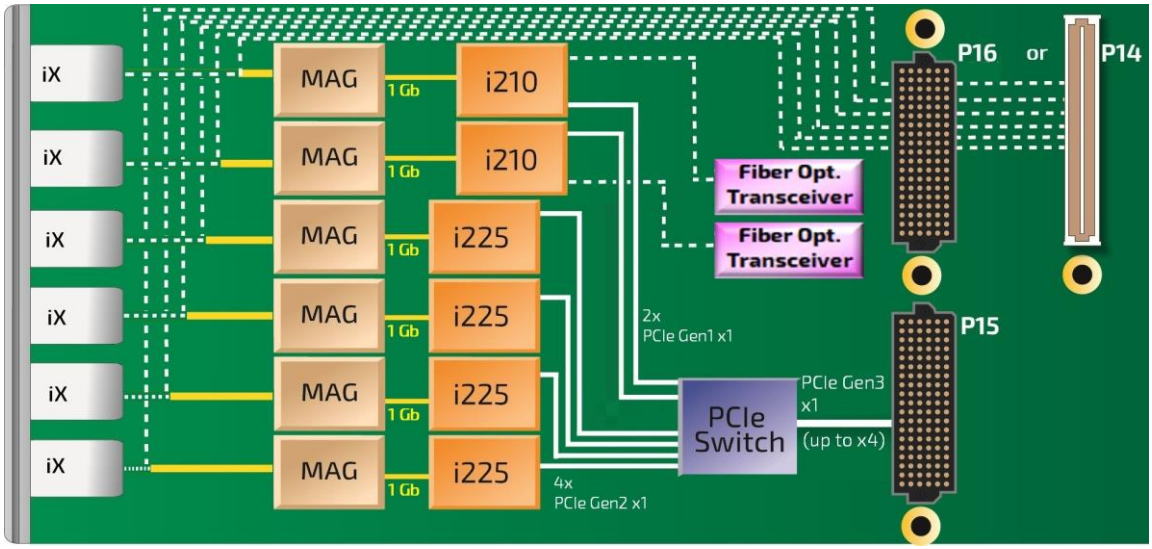


Figure 1: Simplified Board Diagram, including both SA/RC (Front/Rear IOs) board versions

1.3.2. Main features

Table 2: Main features

Features overview	
Onboard Interfaces	
10BASE-T or 100BASE-TX or 1000BASE-T (Copper)	Up to six independent controllers supporting TSN/IEEE1588 PTP : Intel P/N I225IT and Intel P/N i210IT (exclusive with optional i210IS controllers)
1000BASE-SX (Optical)	Up to two independent controllers : Intel P/N i210IS (exclusive with i210IT controllers)
Memory Devices	
Vital Product Data (VPD)	One 256-kbit EEPROM access provided on P15 connector (SMbus), can be used (optional) to store Vital Product Data (VPD) if selected
PCIe Switch configuration	One 1-Mbit SPI NOR Flash, used to store the PCIe switch configuration
Ethernet PHY configuration	One 16-Mbit Ethernet SPI NOR Flash per controller, used to store MAC address and Ethernet controller configuration
XMC Slot	One PCIe link up to Gen3 (8Gb/s) x1 for the 6 Ethernet ports board configuration, or up to x4 for the 4 Ethernet ports board configuration.
Power Supplies	VPWR either +5 V +/- 5% or +12 V +/- 5% ; 8 W max power requirement
OS Support	Developed and thoroughly tested to support Yocto, Basically tested to support Fedora
Form Factor / Mechanical size	2 different PCB for Copper Ethernet versions, form factor is according to IEEE P1386: - RC board : 74 x 143.75 mm - SA board : 74 x 152.50 mm with the front panel (74 x 149 mm for the PCB only) Optical Ethernet Versions: Please contact Kontron : PCB form factor are the same, but locations of optical transceivers are out of a standard XMC form factor (placed bottom side: the nearby slot shall be empty!). Transceivers P/N is FTE8511K1LTN from Finisar (1G/10G, -40 to +85 °C, Endurance family).

1.3.3. Detailed Block Diagram of the RC board

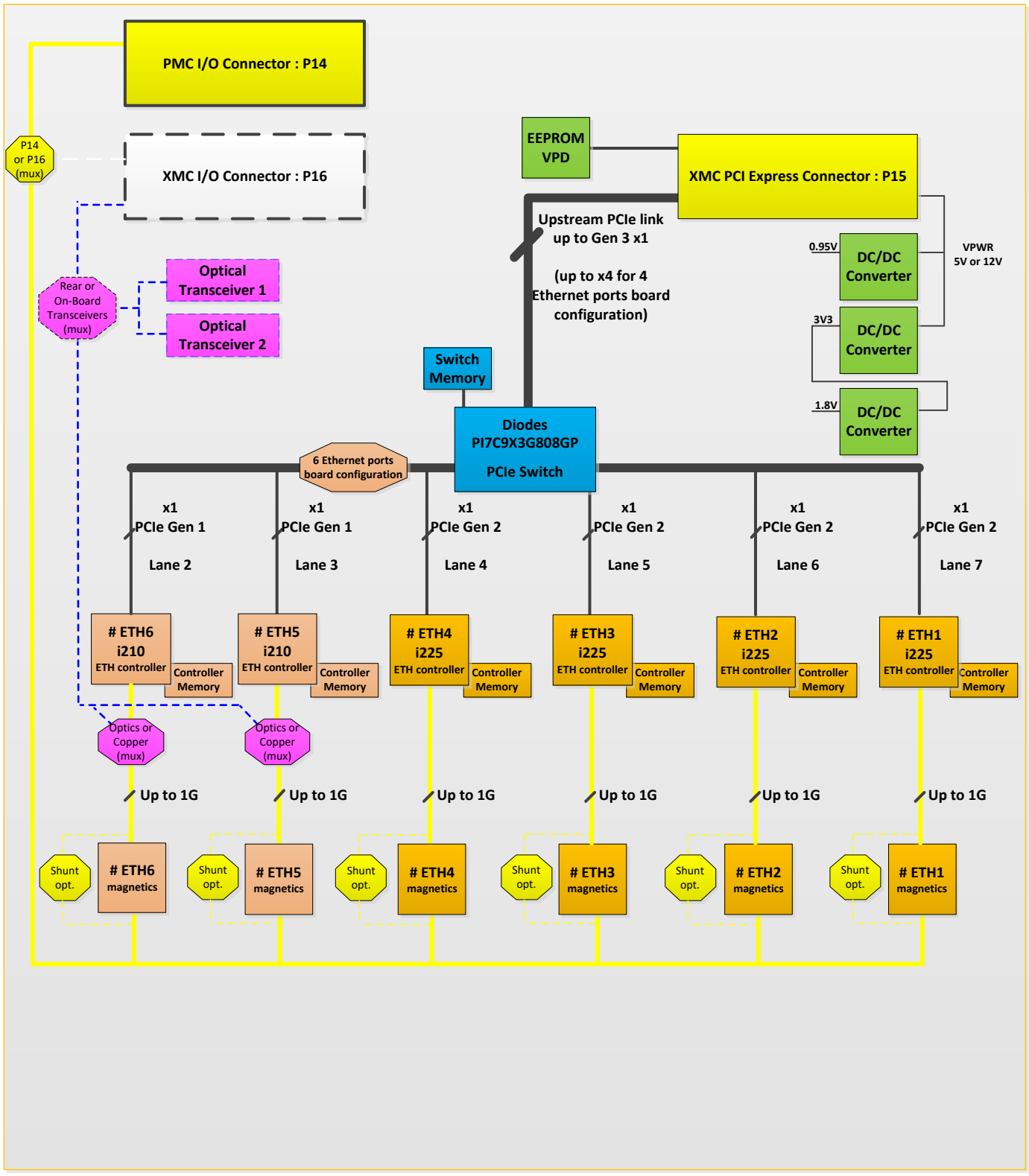


Figure 2: XMC-ETH6-RC Block Diagram

1.3.4. Detailed Block Diagram of the SA board

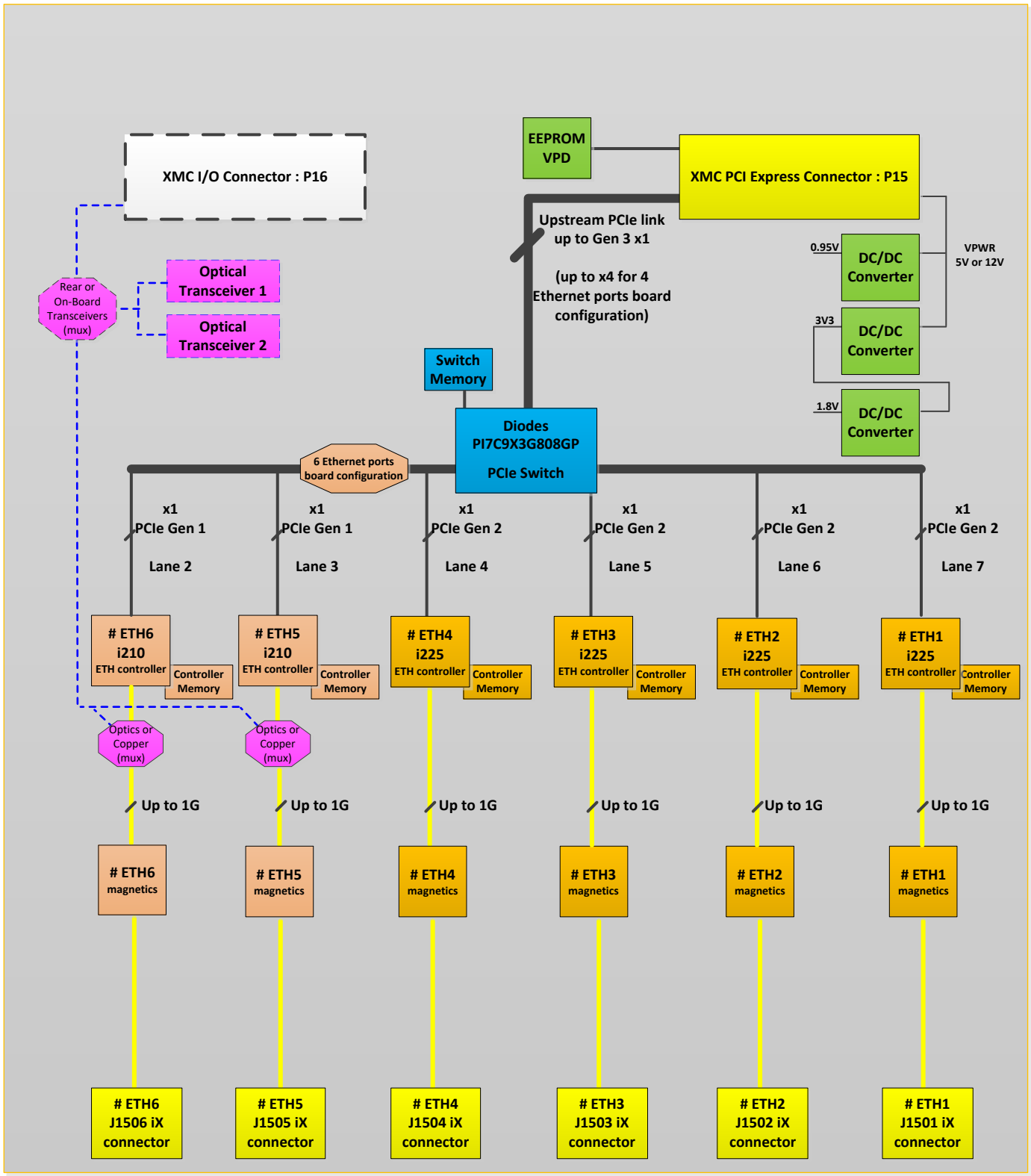


Figure 3: XMC-ETH6-SA Block Diagram

1.3.5. Ordering Information

The available order codes are described below. For a specific need, please contact Kontron.

Table 3: Available Order Codes

Product	Order Code	Description
XMC-ETH6	XMC-ETH6-RC	Configuration by default, like XMC-ETH6-RC-B19343 (1069-0975): _ XMC VITA 42 connectors (VITA 61 connectors available as an option) _ Upstream PCIe link up to Gen3 x1 for 6 Ethernet ports board configuration 6 Ethernet ports board configuration: • Four 1G (copper) Ethernet interfaces • Two 10/100M (copper) Ethernet interfaces ; can be configured to 1G (copper) as an option (six 1G Ethernet ports board configuration available as an option) (4 Ethernet ports board configuration available as an option) _ No Front panel _ P14 PMC rear I/O connector equipped (six Ethernet ports) _ No P16 XMC rear I/O connector _ Rugged Conduction-cooled (-40°C to +85°C operational temperature, measured at the heatsink edge level of the host board) _ Sn Pb+ process _ Conformal coating _ No dedicated stand-alone heatsink (available as an option, since the host board heatsink for RC class applications is usually designed to optimize thermal management of both the host board and its XMC boards) _ No mechanical kit
	XMC-ETH6-SA	Configuration by default, like XMC-ETH6-SA-B20231 (1070-4071): _ XMC VITA 42 connector (VITA 61 connectors available as an option) _ Upstream PCIe link up to Gen3 x1 for 6 Ethernet ports board configuration 6 Ethernet ports board configuration: • Six 1G (copper) Ethernet interfaces (4 Ethernet ports board configuration available as an option) _ Front panel (six Ethernet ports available on iX connectors) _ No P14 PMC rear I/O connector _ P16 XMC rear I/O connector, equipped but not used (only for mechanical purpose) _ Standard Air-cooled (0°C to +55°C operational temperature, measured at the slot input airflow of the host board) _ RoHS process _ No conformal coating (available as an option) _ Dedicated stand-alone heatsink _ Mechanical kit for both 10mm and 12 mm XMC stack-up

1.3.6. I/O Interfaces

➢ **Front Interfaces**

- On the XMC-ETH6-RC board version, there is no front interface option (on a RC class, I/Os are redirected to the host board).
- On the XMC-ETH6-SA board version, the Front Panel interface is equipped with six Ethernet connectors (“IX Industrial” type).

Refer to Section 2.3.3 for detailed pin assignments and interfaces.

➢ **Rear Interfaces**

- On the XMC-ETH6-RC board version, all Ethernet interfaces are available on the P14 (PMC I/O) connector by default (like XMC-ETH6-RC-B19343), but redirection to P16 (XMC I/O) connector is available as an option (contact Kontron).
- On the XMC-ETH6-SA board version, no Ethernet interfaces are available on any rear I/O connector by default (like XMC-ETH6-SA-B20231).

Refer to Sections 2.3.6, 2.3.7 and 2.3.8 for detailed pin assignments and interfaces.

Equipment options for Ethernet ports type, Output connector rear-P14/ rear-P16 / front-IX, or VITA 42/61 connectors may be available: please contact Kontron.

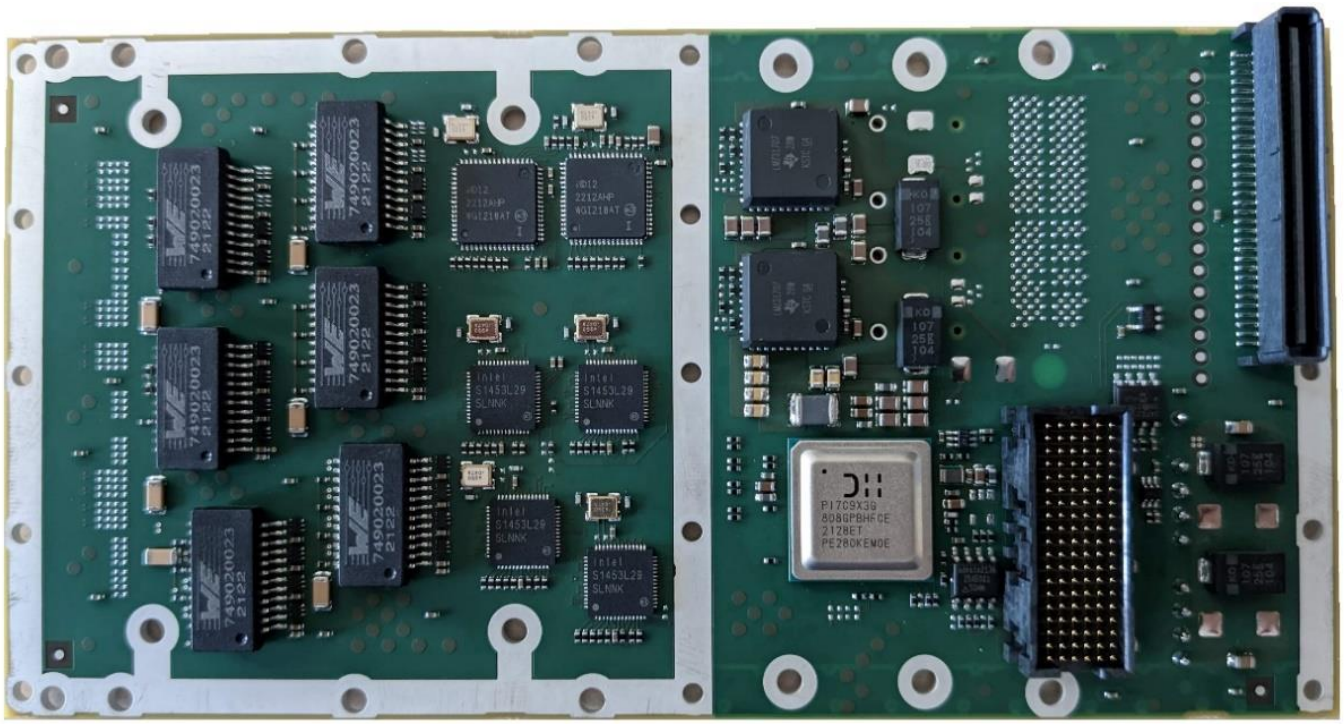


Figure 4: XMC-ETH6-RC top view (Six copper ports; Rear P14 I/O connector)

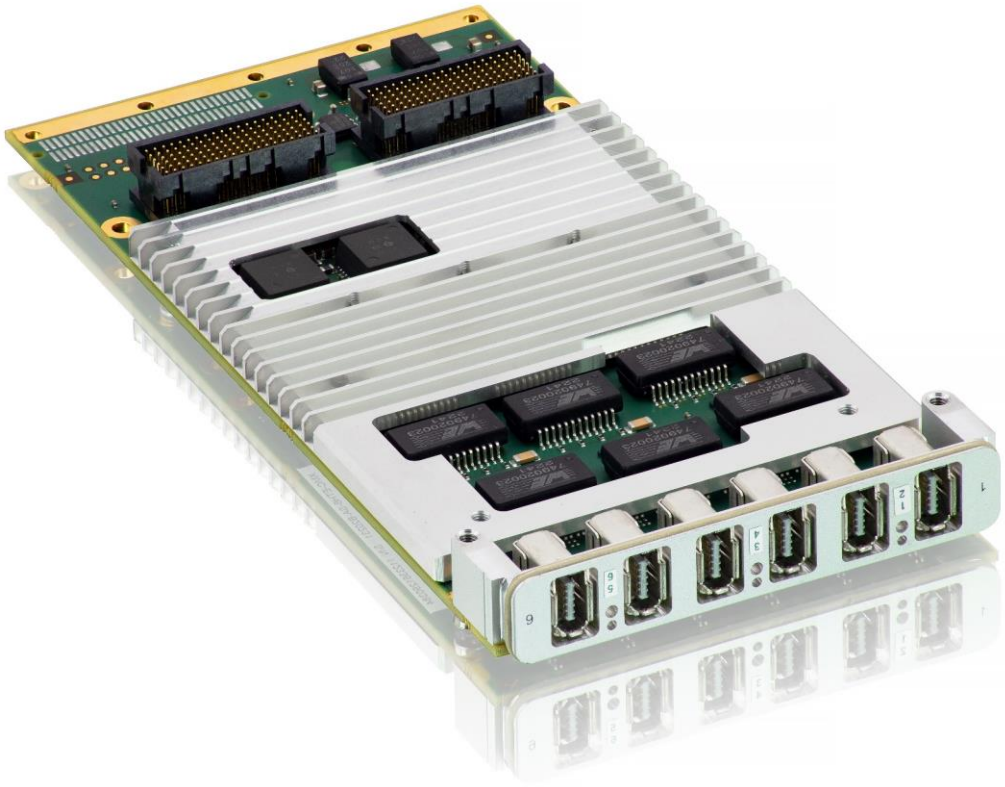


Figure 5: XMC-ETH6-SA top view (Six copper ports; P16 present but Not Connected; P14 not present)

2. Board Features

2.1. PCIe interface

One upstream PCIe link up to Gen3 x1 for the 6 Ethernet ports board configuration (up to x4 for the 4 Ethernet ports board configuration) as per VITA 42.3 (on P15 connector).

The PCI Express packet switch is set to operate in transparent mode: it is represented by a logical PCI-to-PCI Bridge that implements type 1 configuration space header.

PCI Express Gen3 packet switch device used is the PI7C9X3G808GP from DIODES.

See DIODES datasheet for detailed information: https://www.diodes.com/part/view/PI7C9X3G808GP/

➢ **PCIe switch features, extracted from the datasheet (please confirm with Kontron for support):**

The PI7C9X3G808GP is a PCIe GEN3 packet switch that supports 8 lanes of GEN3 SERDES in flexible 2-port, 3-port, 4-port, 5-port and 8-port configurations.

The architecture of the PCIe packet switch allows the flexible port configuration by allocating variable lane widths for each port.

The packet switch can be configured to have different port types such as upstream port, downstream ports and Cross-Domain End-Point (CDEP) ports to support various applications, which include port fan-out, dual-host connectivity.

Inside the packet switch, multiple DMA channels are embedded to facilitate data communication more efficiently among host(s) and end-points.

➢ **Details for the PCIe switch ports configuration & ports mapping on XMC-ETH6 board:**

- The 6 Ethernet ports board version is based on the default 8 ports PCIe switch configuration,
- The 4 Ethernet ports board version could be defined by setting an optional 5 ports PCIe switch configuration (contact Kontron).

Table 4: PCIe switch ports configuration & ports mapping on XMC-ETH6 board

Lane	5-port configuration	8-port configuration
Lane 0	Upstream link from the host board	Upstream link from the host board
Lane 1		Not used
Lane 2		ETH6 (i210)
Lane 3		ETH5 (i210)
Lane 4	ETH4 (i225)	ETH4 (i225)
Lane 5	ETH3 (i225)	ETH3 (i225)
Lane 6	ETH2 (i225)	ETH2 (i225)
Lane 7	ETH1 (i225)	ETH1 (i225)

2.2. Ethernet interfaces

➢ **Four Intel I225 controllers are connected to lanes 4 to 7 of the PCI Express packet switch :**

The XMC-ETH6 board allows a future path of upgrade from I225 controllers to newer I226 controllers, since the board design is compatible with I226 controllers and since the driver code base is expected quite similar (developments might be still required: in case of need, please contact Kontron to request for availability). The I226 claims for some enhancements, most notably:

- Improved Bit Error Rate (BER): Better packet performance; especially at the longest cable lengths.
- Reduced Active Power: Better packet performance; especially at the longest cable lengths.

I225 controller features, extracted from the product brief (please confirm with Kontron for advanced features support not detailed in other sections of this user guide):

- Intel Ethernet Controller I225-IT supports extended temperatures for embedded applications with extended temperature ranges of -40 °C to 70 °C up to 2500BASE-T and -40 °C to 85 °C up to 1000BASE-T.

Overview of the Intel Ethernet Controller I225

- This PCI Express controller with Base-T copper networking interface, provides compact, single-port integrated, 1000BASE-T, 100BASE-TX, 10BASE-TE connections (IEEE 802.3, 802.3u, 802.3ab).
- The Intel Ethernet Controller I225 is designed for use mobile, desktop, workstation, value-server, or industrial designs that have critical space constraints. The I225 can also support Intel vPro technology on specific Intel platforms and chipsets.
- The Intel Ethernet Controller I225 also supports the latest time sensitive networking (TSN) features, along with best in class power management and Operating System Support.

Key Features

- PCI Express 3.1 (8GT/s) x1 host interface
- MDI (Copper) standard IEEE 802.3 Ethernet interface up to 2.5Gb/s
- Time Sensitive Networking (TSN) capability support
- Innovative power management features
- Support for Intel Active Management Technology on systems enabled with Intel vPro technology
- Support for Intel Stable IT Platform Program

➢ **Two Intel I210 are connected to ports 2 to 3 of the PCI Express packet switch :**

I210 controller features, extracted from the product brief (please confirm with Kontron for advanced features support not detailed in other sections of this user guide):

- The I210-IT, 1210-IS, I210-CS, and I210-CL support -40 °C to 85 °C for industrial applications.

Overview of the Intel Ethernet Controller I210

- The Intel Ethernet Controller I210 provides a full-featured Gigabit Ethernet Media Access Control (MAC) and Physical-Layer (PHY) for Desktop, Server, and Embedded Applications. This controller is ideal for embedded applications such as industrial automation, in-vehicle infotainment, medical, print imaging, telecommunications infrastructure, and for military.
- The I210 supports advanced features such as Audio-Video Bridging (AVB), IEEE 802.1AS precision timestamping, Error Correcting Code (ECC) Packet Buffers, and Enhanced Management Interface options.
- The fully integrated GbE MAC/PHY capabilities can be configured for either 1000 Mb/s or 10/100 Mb/s modes of operation. The I210 enables a quick migration from custom interconnects to Ethernet.

Key Features

- IEEE 802.1Qav Audio-Video Bridging (AVB) for tightly controlled media stream synchronization, buffering and reservation
- Hardware-based timestamping of IEEE 1588 and 802.1AS packets
- Innovative power management features including Energy Efficient Ethernet (EEE) and DMA Coalescing
- Supports commercial and industrial temperature applications
- MDI (Copper) standard IEEE 802.3 Ethernet interface for 1000BASE-T, 100BASE-TX, 10BASE-T connections (IEEE 802.3, 802.3u, 802.3ab)
- Supports a SerDes interface for 1000BASE-SX/LX fiber connections as well as an SGMII interface for SFP and external PHY connections

2.3. Physical I/O

2.3.1. Front panel description (for SA board version only)

On the XMC-ETH6-SA board version, the front panel is equipped with up to 6 IX industrial connectors and their associated status LED (tri-color) arranged as below:

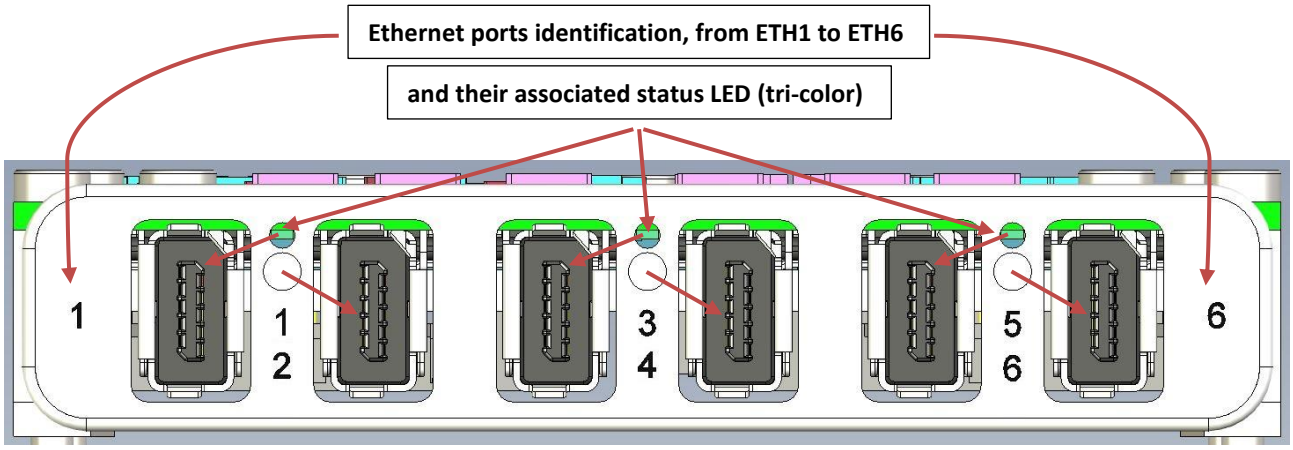


Figure 6: Front panel arrangement with IX connectors and associated status LEDs

2.3.2. Front panel status LEDs description (for SA board version only)

To each ETH*n* port = (*n* from 1 to 6) is associated a tri-color status LED (named "*n*"on the print screening of the front panel), which indicates SPEED and ACTIVITY information about the Ethernet Port using the decoding table below:

Table 5: Decoding status LED colors

Link Status		1 (i225)	2 (i225)	3 (i225)	4 (i225)	5 (i210)	6 (i210)
RED		ON = Link Up BLINK = Activity on Link OFF = No Link				ON = Highest Speed (1G) OFF = Not 1G Speed	
GREEN		ON = Highest Speed (2.5G) OFF = Not 2.5G Speed				ON = Link Up BLINK = Activity on Link OFF = No Link	
BLUE		ON = 1G Speed OFF = Lowest Speed (10/100M)				ON = 100M Speed OFF = Lowest Speed (10M)	
Resulting status colors for different use cases							
Use case		**ETH1 – ETH4 LED colors**				**ETH5 – ETH6 LED colors**	
No Link		**All LED are OFF**				**All LED are OFF**	
10M	**Activity**	**Blinking RED only**				**Blinking GREEN only**	
	No Activity	**RED**				**GREEN**	
100M	**Activity**	**Blinking RED only (same as for 10M speed)**				**Blinking GREEN + BLUE**	
	No Activity	**RED (same as for 10M speed)**				**GREEN + BLUE**	
1G	**Activity**	**Blinking VIOLET = Blinking RED + BLUE**				**RED + Blinking GREEN**	
	No Activity	**VIOLET = RED + BLUE**				**GREEN**	
2.5G	**Activity**	**Blinking RED + GREEN**				**2.5G is N/A on the i210**	
	No Activity	**RED + GREEN**				**2.5G is N/A on the i210**	

2.3.3. Front panel IX Industrial connectors description (for SA board version only)

Front panel connectors for the SA board version are jacks chosen in the IX industrial type A family, P/N 09452812560 from Harting (dual-source available: P/N IX61G-A-10P(01) from Hirose).
The small, robust design makes IX Industrial ideal for use in industrial environments. The high speed transmission design together with the IEC 61076-3-124 standard compliant interface contribute to equipment evolution and smart manufacturing applications.
The IX Industrial is the next-generation connector for Ethernet and other industrial equipment transmissions, whose following key features are extracted from the catalog page :

- 70% less size compared to the RJ45
- Robust socket with THR shield contacts
- Resistant to shock and vibration, designed for 5000 mating cycles.
- Cat. 6A performance for 1/10 Gbit/s, with PoE (Power over Ethernet)/PoE+ capability (not supported on XMC-ETH6)
- Two snap-in metal hooks ensure that the socket receptacle (jack, on board) and the plug connector (cable) are safely connected: it clicks in!
- Continuous 360° shielding and robust cable attachment
- IEC 61076-3-124 standard compliant interface

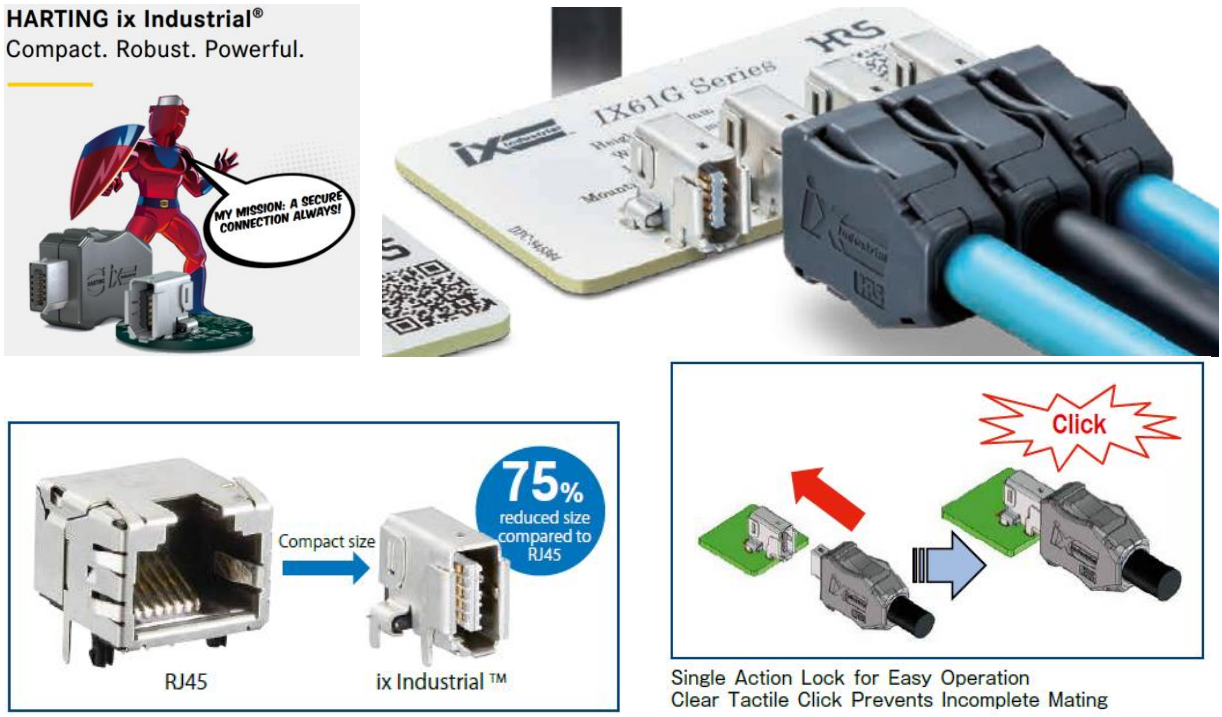
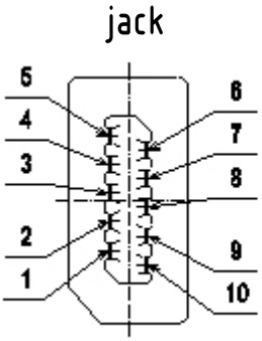


Figure 7: Rugged IX Industrial connectors benefits

2.3.4. Front panel J1501-J1506 Connectors pin assignments (for SA board version only)

Table 6: J1501-J1506 Connectors Pin Assignments



Pin No. IX connector	Signal definition for 1G applications	Signal definition for 10/100M applications	Color of the conductor insulation in a EIA/TIA 568A cable	Color of the conductor insulation in a EIA/TIA 568B cable
J150*n* pin 1	BI_DA+ (bidirectional)	TX+ (transmit)	white/green	white/orange
J150*n* pin 2	BI_DA- (bidirectional)	TX- (transmit)	green	orange
J150*n* pin 3	Chassis Ground *(GND as an option)*	*N.C.*	-	-
J150*n* pin 4	BI_DC+ (bidirectional)	*N.C.*	blue	blue
J150*n* pin 5	BI_DC- (bidirectional)	*N.C.*	white/blue	white/blue
J150*n* pin 6	BI_DB+ (bidirectional)	RX+ (receive)	white/orange	white/green
J150*n* pin 7	BI_DB- (bidirectional)	RX- (receive)	orange	green
J150*n* pin 8	Chassis Ground *(GND as an option)*	*N.C.*	-	-
J150*n* pin 9	BI_DD+ (bidirectional)	*N.C.*	white/brown	white/brown
J150*n* pin 10	BI_DD- (bidirectional)	*N.C.*	brown	brown
Shield	Chassis Ground			

Kontron recommends to use CAT6 compliant Ethernet cable:
- These Ethernet cable shall be S/FTP type at least (Shielded Foiled Twisted Pair), providing shielding continuity between each end.
- The Ethernet transmission should operate using a CAT6 cable with a maximum length of 100 m.

2.3.5. Onboard Connectors and Main Devices Location

Onboard connectors and main devices location are given in the figures below:

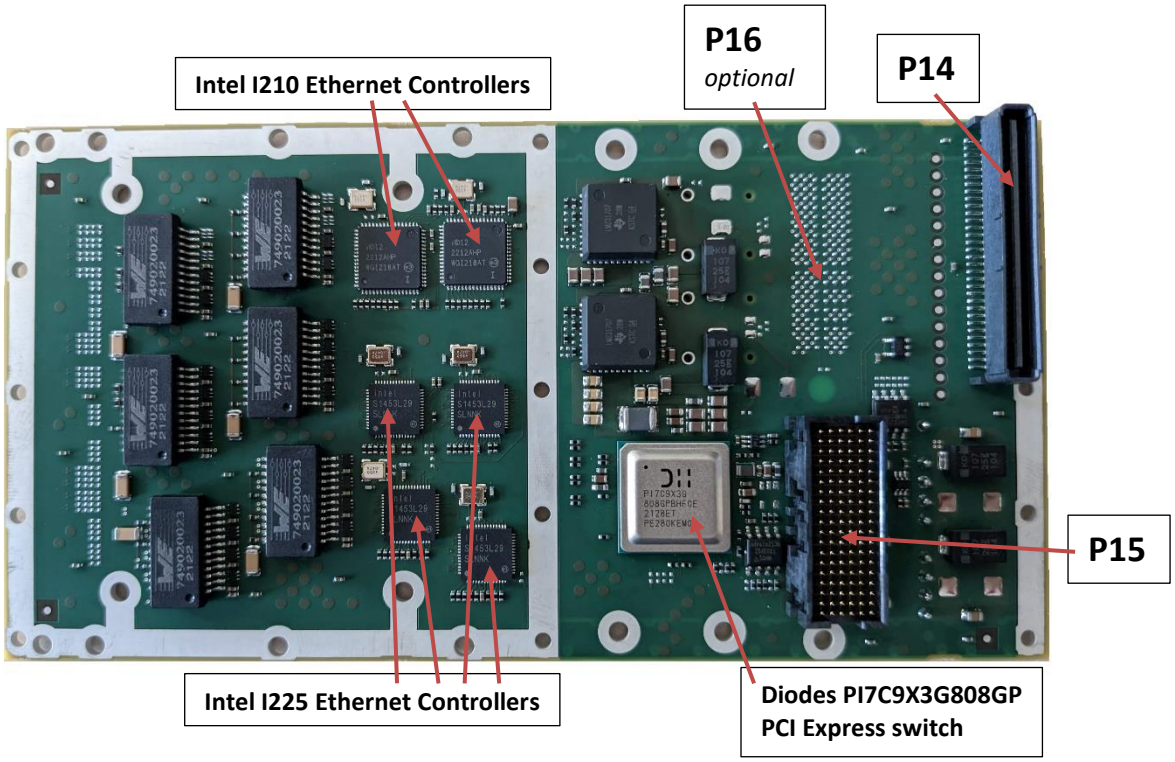


Figure 8: XMC-ETH6-RC : Onboard Connectors P14 and P15 and Main Devices Location

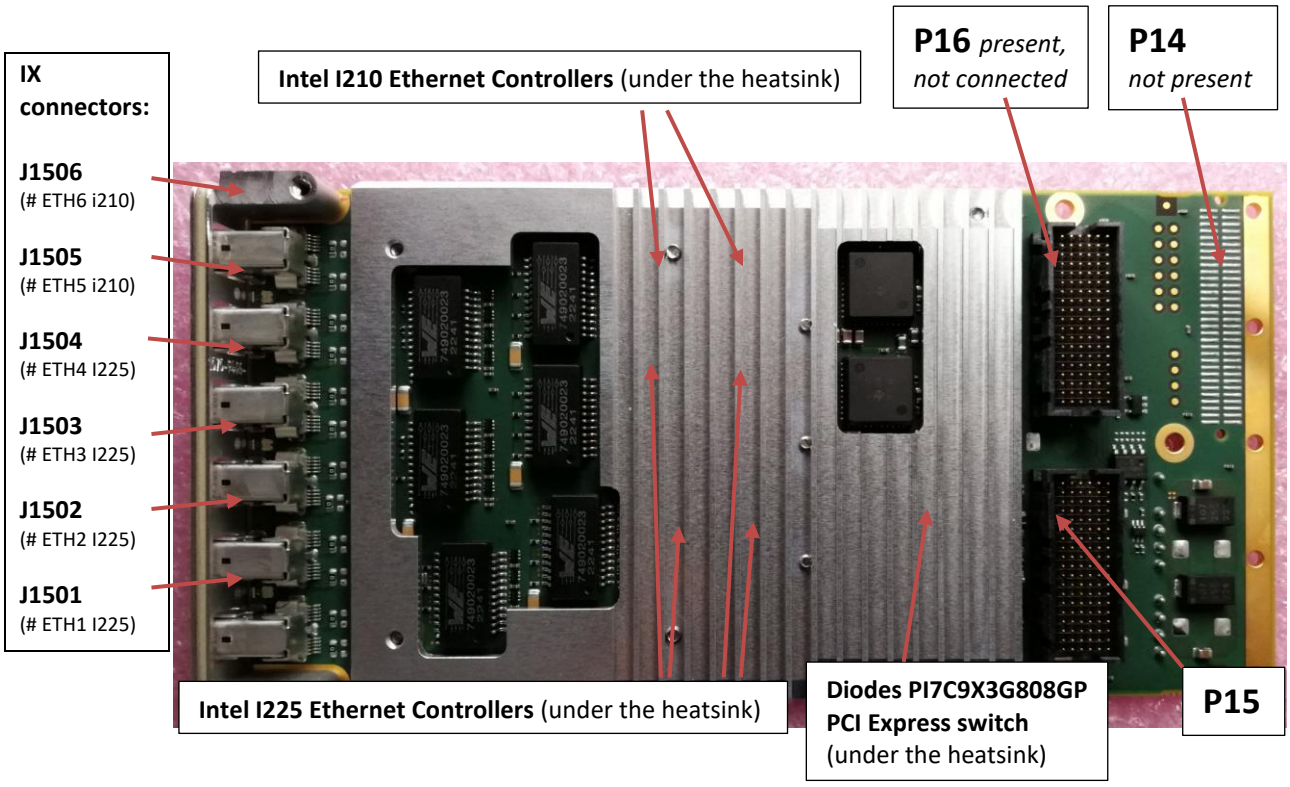


Figure 9: XMC-ETH6-SA: Onboard Connectors, P16 and P15 and Main Devices Location

2.3.6. XMC P15 Connector Pin Assignment

The pin assignment of the XMC P15 PCI Express connector is compatible with VITA 42.0 pin definition.
This interface is a PCI Express with up to four lanes routed on the PCB and coming from the PCI Express packet switch.

Table 7: XMC P15 Connector Pin Assignment

Pin	Row A	Row B	Row C	Row D	Row E	Row F
1	PET0p0	PET0n0	3.3V	PET0p1	PET0n1	VPWR (1)
2	GND	GND	TRST#	GND	GND	MRSTI#
3	PET0p2	PET0n2	3.3V	PET0p3	PET0n3	VPWR (1)
4	GND	GND	TCK	GND	GND	*MRSTO#*
5	*PET0p4*	*PET0n4*	3.3V	*PET0p5*	*PET0n5*	VPWR (1)
6	GND	GND	TMS	GND	GND	+12V
7	*PET0p6*	*PET0n6*	3.3V	*PET0p7*	*PET0n7*	VPWR (1)
8	GND	GND	TDI (2)	GND	GND	-12V
9	RFU	RFU	RFU	RFU	RFU	VPWR (1)
10	GND	GND	TDO (2)	GND	GND	GA0
11	PER0p0	PER0n0	*MBIST#*	PER0p1	PER0n1	VPWR (1)
12	GND	GND	GA1	GND	GND	MPRESENT#
13	PER0p2	PER0n2	3.3V AUX	PER0p3	PER0n3	VPWR (1)
14	GND	GND	GA2	GND	GND	MDSA
15	*PER0p4*	*PER0n4*	RFU	*PER0p5*	*PER0n5*	VPWR (1)
16	GND	GND	NVMRO	GND	GND	MSCL
17	*PER0p6*	*PER0n6*	RFU	*PER0p7*	*PER0n7*	RFU
18	GND	GND	RFU	GND	GND	RFU
19	REFCLK+	REFCLK-	RFU	*WAKE#*	*ROOT0#*	RFU

Pin positions printed italic/gray: reserved by specification, but not connected

(1) VPWR: either +5V or +12V
(2) TDI and TDO JTAG serial data can be wired together (option) if access to the JTAG chain of the XMC is not necessary.
Signals active when low.

Table 8: XMC P15 Connector Signals Definition

MNEMONIC	DIRECTION	SIGNAL DEFINITION
+12V	I	+12 Volts DC power pin.
-12V	I	-12 Volts DC power pin.
3.3V	I	+3.3 Volts DC power pin.
3.3V AUX	I	Auxiliary +3.3 Volts.
GA[0..2]	I	I2C channel select as per VITA 42.0.
GND	-	Ground
MRSTI#	I	XMC Reset In as per VITA 42.0 (10 ms pulse min.) and PCIe PERST# as per VITA 42.3. The mezzanine card shall initiate itself into a known state when this signal is asserted low by the carrier.
MSDA	I/O	I2C serial data as per VITA 42.0.
MSCL	I	I2C serial clock as per VITA 42.0.
MPRESENT#	O	Module present as per VITA 42.0. This signal allows the carrier to determine whether an XMC is present. Connected to GND on XMC module.
NVMRO	I	XMC Write Prohibit as per VITA 42.0.
TCK	I	JTAG Clock as per VITA 42.0.

MNEMONIC	DIRECTION	SIGNAL DEFINITION
TDI	I	JTAG Data In as per VITA 42.0. TDI and TDO JTAG serial data can be wired together (option) if access to the JTAG chain of the XMC is not necessary.
TDO	O	JTAG Data Out as per VITA 42.0. TDI and TDO JTAG serial data can be wired together (option) if access to the JTAG chain of the XMC is not necessary.
TMS	I	JTAG Mode Select as per VITA 42.0.
TRST#	I	JTAG Reset as per VITA 42.0.
PER0p/n[0..7]	I	Link 0 Differential Receive. These signals are used by the XMC to receive high-speed protocol-specific data FROM the carrier over the PCI Express interface.
PET0p/n[0..7]	O	Link 0 Differential Transmit. These signals are used by the XMC to transmit high-speed protocol-specific data TO the carrier over the PCI Express interface.
REFCLK+/-	I	100MHz PCIe differential reference clock as per VITA 42.3.
ROOT0#	I	Open drain ROOT# signal as per VITA 42.3.
RFU	-	Reserved for Future Uses as per VITA 42.0.
VPWR	I	+5V or +12V power pins, protected by a 6.5A non-resettable fuse
WAKE#	I	Open drain WAKE# signal as per VITA 42.3.

2.3.7. XMC P16 Connector (optional) Pin Assignment

On the SA board version, P16 pinout is irrelevant since the connector is equipped only for mechanical purpose (connector not used, signals are NC). Contact Kontron if you need a mixed configuration.

On the RC board version, I/O signals are routed to the P14 PMC I/O connector by default, but alternative routing option to the P16 XMC I/O connector is available:

- this option follows X8d and X12d patterns for differential pairs mapping from XMC-Jn6 to VITA 46.0 connectors through PCB routing on the XMC host board, please refer to Sections §3.5, 3.6 and 3.7 of VITA 46.9 standard.
- Following X12d pattern, ETH1, ETH2 and ETH3 are fully supported for 1G application.
- Following X8d pattern, ETH4 is fully supported for 1G application and ETH5 and ETH6 are supported for 10/100M application (restriction due to the required number of pins versus those available on P16).

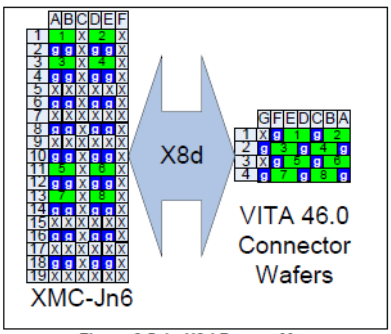


Figure 3.5-1: X8d Pattern Map

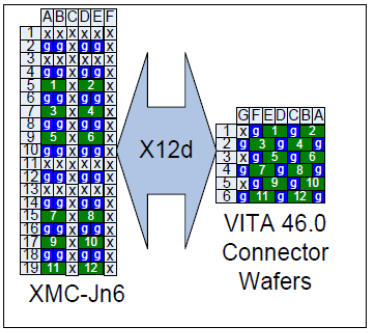


Figure 3.6-1: X12d Pattern Map

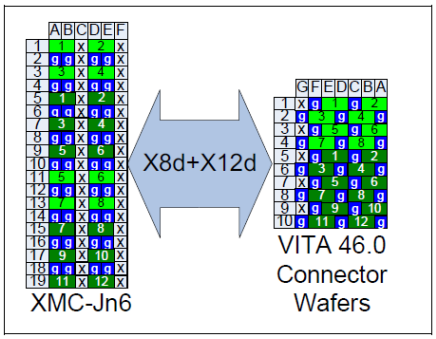


Figure 3.7-1: X8d+X12d Pattern Map

Figure 10: XMC-ETH6-RC with P16 option: X8d, X12d, X8d+X12d patterns

Table 9: XMC P16 Connector Pin Assignment (available as an option for RC board, present but NC for SA board)

Pin	Row A	Row B	Row C	Row D	Row E	Row F
1	ETH4_DA+ or ETH4_TX+	ETH4_DA- or ETH4_TX-	SWITCH_ FATAL_ERROR	ETH4_DB+ or ETH4_RX+	ETH4_DB- or ETH4_RX-	*NC*
2	GND	GND	*NC*	GND	GND	*NC*
3	ETH4_DC+	ETH4_DC-	*NC*	ETH4_DD+	ETH4_DD-	*NC*
4	GND	GND	*NC*	GND	GND	*NC*
5	ETH1_DA+ or ETH1_TX+	ETH1_DA- or ETH1_TX-	*NC*	ETH1_DB+ or ETH1_RX+	ETH1_DB- or ETH1_RX-	*NC*
6	GND	GND	*NC*	GND	GND	*NC*
7	ETH1_DC+	ETH1_DC-	*NC*	ETH1_DD+	ETH1_DD-	*NC*
8	GND	GND	*NC*	GND	GND	*NC*
9	ETH2_DA+ or ETH2_TX+	ETH2_DA- or ETH2_TX-	*NC*	ETH2_DB+ or ETH2_RX+	ETH2_DB- or ETH2_RX-	*NC*
10	GND	GND	*NC*	GND	GND	*NC*
11	ETH5_DA+ or ETH5_TX+	ETH5_DA- or ETH5_TX- or SERD2_SDA_I2C	*NC*	ETH5_DB+ or ETH5_RX+ or SERD2_SCL_I2C	ETH5_DB- or ETH5_RX- or SERD2_SIG_DET	*NC*
12	GND	GND	*NC*	GND	GND	ETH6_DC+ or SERD2_TX+
13	ETH6_DA+ or ETH6_TX+	ETH6_DA- or ETH6_TX- or SERD1_SDA_I2C	*NC*	ETH6_DB+ or ETH6_RX+ or SERD1_SCL_I2C	ETH6_DB- or ETH6_RX- or SERD1_SIG_DET	ETH6_DC- or SERD2_TX+
14	GND	GND	*NC*	GND	GND	ETH6_DD+ or SERD1_RX+
15	ETH2_DC+	ETH2_DC-	*NC*	ETH2_DD+	ETH2_DD-	ETH6_DD- or SERD2_RX-
16	GND	GND	*NC*	GND	GND	*NC*
17	ETH3_DA+ or ETH3_TX+	ETH3_DA- or ETH3_TX-	*NC*	ETH3_DB+ or ETH3_RX+	ETH3_DB- or ETH3_RX-	*NC*
18	GND	GND	ETH5_DC+ or SERD2_TX+	GND	GND	ETH5_DD+ or SERD2_RX+
19	ETH3_DC+	ETH3_DC-	ETH5_DC- or SERD2_TX+	ETH3_DD+	ETH3_DD-	ETH5_DD- or SERD2_RX-

Table 10: XMC P16 Connector Signals Definition

MNEMONIC	DIRECTION	SIGNAL DEFINITION
ETH*n*_DA+/-	I/O	1G (copper) Ethernet *n* : First pair of bidirectional data
ETH*n*_DB+/-	I/O	Second pair of bidirectional data
ETH*n*_DC+/-	I/O	Third pair of bidirectional data
ETH*n*_DD+/-	I/O	Fourth pair of bidirectional data
ETH*n*_TX+/-	O	10/100M (copper) Ethernet *n* : Transmit data
ETH*n*_RX+/-	I	Second pair of Bidir data (for 1G) or Transmit data
GND	-	Ground
NC	-	Not Connected
SERD*p*_SDA_I2C	I/O	1G (optical) Ethernet *p* : Serial data line of the optical transceiver
SERD*p*_SCL_I2C	O	Serial clock line of the optical transceiver
SERD*p*_TX+/-	O	Serial transmit data
SERD*p*_RX+/-	I	Serial receive data

2.3.8. PMC P14 Connector Pin Assignment

On the XMC-ETH6-SA board version, P14 is not present.

On the XMC-ETH6-RC board version, I/O signals are routed to the PMC P14 connector (alternative routing to P16 available as an option).

Table 11: PMC P14 Connector Pin Assignment

Pin	Signal Name	Pin	Signal Name
1	ETH3_DA+ or ETH3_TX+	2	GND
3	ETH3_DA- or ETH3_TX-	4	ETH3_DB- or ETH3_RX-
5	GND	6	ETH3_DB+ or ETH3_RX+
7	ETH3_DC+	8	GND
9	ETH3_DC-	10	ETH3_DD-
11	GND	12	ETH3_DD+
13	ETH4_DA+ or ETH4_TX+	14	GND
15	ETH4_DA- or ETH4_TX-	16	ETH4_DB- or ETH4_RX-
17	GND	18	ETH4_DB+ or ETH4_RX+
19	ETH4_DC+	20	GND
21	ETH4_DC-	22	ETH4_DD-
23	GND	24	ETH4_DD+
25	ETH5_DA+ or ETH5_TX+	26	GND
27	ETH5_DA- or ETH5_TX-	28	ETH5_DB+ or ETH5_RX+
29	GND	30	ETH5_DB- or ETH5_RX-
31	GND	32	GND
33	GND	34	GND
35	*NC*	36	*NC*
37	*NC*	38	*NC*
39	*NC*	40	ETH6_DB- or ETH6_RX-
41	ETH6_DB+ or ETH6_RX+	42	GND
43	ETH6_DA- or ETH6_TX-	44	ETH6_DA+ or ETH6_TX+
45	GND	46	GND
47	ETH2_DD+	48	ETH1_DC+
49	ETH2_DD-	50	ETH1_DC-
51	ETH2_DC+	52	ETH1_DD+
53	ETH2_DC-	54	ETH1_DD-
55	GND	56	GND
57	ETH2_DB+ or ETH2_RX+	58	ETH1_DA+ or ETH1_TX+
59	ETH2_DB- or ETH2_RX-	60	ETH1_DA- or ETH1_TX-
61	ETH2_DA+ or ETH2_TX+	62	ETH1_DB+ or ETH1_RX+
63	ETH2_DA- or ETH2_TX-	64	ETH1_DB- or ETH1_RX-

Table 12: PMC P14 Connector Signals Definition

MNEMONIC	DIRECTION	SIGNAL DEFINITION
ETHx_DA+/- or ETHx_TX+/-	I/O or O	Ethernet x: First pair of Bidir data (for 1G) or Transmit data (for 10/100M)
ETHx_DB+/- or ETHx_RX+/-	I/O or I	Ethernet x: Second pair of Bidir data (for 1G) or Receive data (for 10/100M)
ETHx_DC+/-	I/O	Ethernet x: Third pair of Bidir data (for 1G) or Not Used (for 10/100M)
ETHx_DD+/-	I/O	Ethernet x: Fourth pair of Bidir data (for 1G) or Not Used (for 10/100M)
GND	-	Ground
NC	-	Not Connected

2.4. Environmental Specifications

Table 13: XMC-ETH6 –Environmental Specifications for both RC and SA board classes

	XMC-ETH6-RC (RC class)	XMC-ETH6-SA (SA class)
Conformal Coating	Standard	Optional
Airflow	N/A	
Cooling Method	Conduction	Forced Air
Operating Temperature	-40 °C to +85 °C	0 °C to +55 °C
Storage Temperature	-50 °C to +100 °C	-40 °C to +85 °C
Vibration Sine (Operating)	5hz to 20Hz, 2.5mm displacement 20Hz-2,000Hz - 5g Acceleration / Frequency Range	5hz to 20Hz, 1.25mm displacement 20Hz-500Hz - 2g Acceleration / Frequency Range
Vibration Random (Operating)	Product withstand vibration as defined below, 1 hour per axis: 5 Hz to 100 Hz PSD increasing at +3 dB/octave 100 Hz to 1000 Hz PSD = 0.1 g^2/Hz 1000 Hz to 2000 Hz PSD decreasing at -6 dB/octave	Product withstand vibration as defined below, 1 hour per axis: 5 Hz to 100 Hz PSD = 0.04 g^2/Hz
Shock (Operating)	40 g / 11 ms, half sine pulse	20 g / 11 ms, half sine pulse
Altitude (Operating)	-1,500 to 60,000 ft	-1,500 to 60,000 ft
Relative Humidity	95 % without condensation	95 % without condensation

2.5. Power Consumption

Table 14: XMC-ETH6 power consumption

Input Rail	Power Source				Power Consumption	Ripple / Noise	Power sequencing
	Min	Nominal	Max	Source			
VPWR (designed for VPWR either at 5V or 12V)	4.75 V	5.0 V	5.25 V	VITA 42	Power consumption measured at ambient temperature is: • 2 W during idle (no operation), • 4 W typical during initialization, • 5 W typical for 4 links running at 10/100M speed (XMC-ETH6-RC-B19343 use case), • 8 W typical for 6 links running at 1G speed (XMC-ETH6-SA-B20231 use case), • < 10 W max (peak during simultaneous iperf tests on the 6 links configured as Emitters running at 1G speed, XMC-ETH6-SA-B20231 use case). (Note: If the board is to be used as a replacement of a legacy PMC board with an identical power budget, a 7.5W max requirement is induced thus limitations may have to be set regarding number of active links or speed limits.)	Neither VITA 42 nor design requirement, thus both VME and VPX requirements should be considered (Note: 50mVpp over a 0-20MHz range, included in the +/-5% tolerance)	No requirement (Note: all functions are supplied from VPWR, except the I2C VPD EEPROM supplied from 3.3V)
	11.4 V	12.0 V	12.6 V	VITA 42	Similar efficiency thus power consumption		
3.3V	3.0 V	3.3 V	3.6 V	VITA 42	Negligible by analysis (<10 mA) (Note: only for the XMC I2C chain: an EEPROM and a buffer)		

2.6. Board Mass

Table 15: XMC-ETH6 Mass

XMC-ETH6-RC	~ 64g (measurement of the board mass without a dedicated stand-alone heatsink, since the host board heatsink for RC class applications is usually designed to optimize thermal management of both the host board and its XMC boards)
XMC-ETH6-SA	~ 95 g (estimation for the board equipped with its front panel, but without its heatsink) ~ 114 g (measurement of the board mass equipped with its aluminium heatsink)

2.7. MTBF Data

Calculations are made according to the standard MIL-HDBK217F-2 for the following types of environment, if applicable:

- Air Rotary Wing (ARW) @ 50 °C
- Naval Sheltered (NS) @ 25 °C
- Ground Benign (GB) @ 25 °C

Table 16: XMC-ETH6 MTBF Data

MTBF	ARW (HOURS)	NS (HOURS)	GB (HOURS)
	50 °C	25 °C	25 °C
XMC-ETH6-RC	26172 hours	-	-
XMC-ETH6-SA	22856 hours	161609 hours	944395 hours

3. Installation

The XMC-ETH6 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 XMC-ETH6 on a host board.

Kontron assumes no responsibility for any damage resulting from failure to comply with these requirements.

Special care shall be taken while handling the boards since the heat sink or heat frame can get very hot during operation:

- Do not touch the heat sink when installing or removing the board.
- In addition, the board should not be placed on any surface or in any form of storage container before the board and heat sink have cooled down to room temperature.

This board contains electrostatically sensitive devices. 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.

We strongly recommend our customers to work in an environment equipped with anti-static workbenches with professional discharging equipment.

3.2. Board Identification

The XMC-ETH6 board is identified by labels fitted to the bottom side of the board.
Locations are different between RC and SA board versions.

3.2.1. Identification labels for the Air-Cooled (SA) board version

- **Top Side**

No label fitted.

- **Bottom Side**

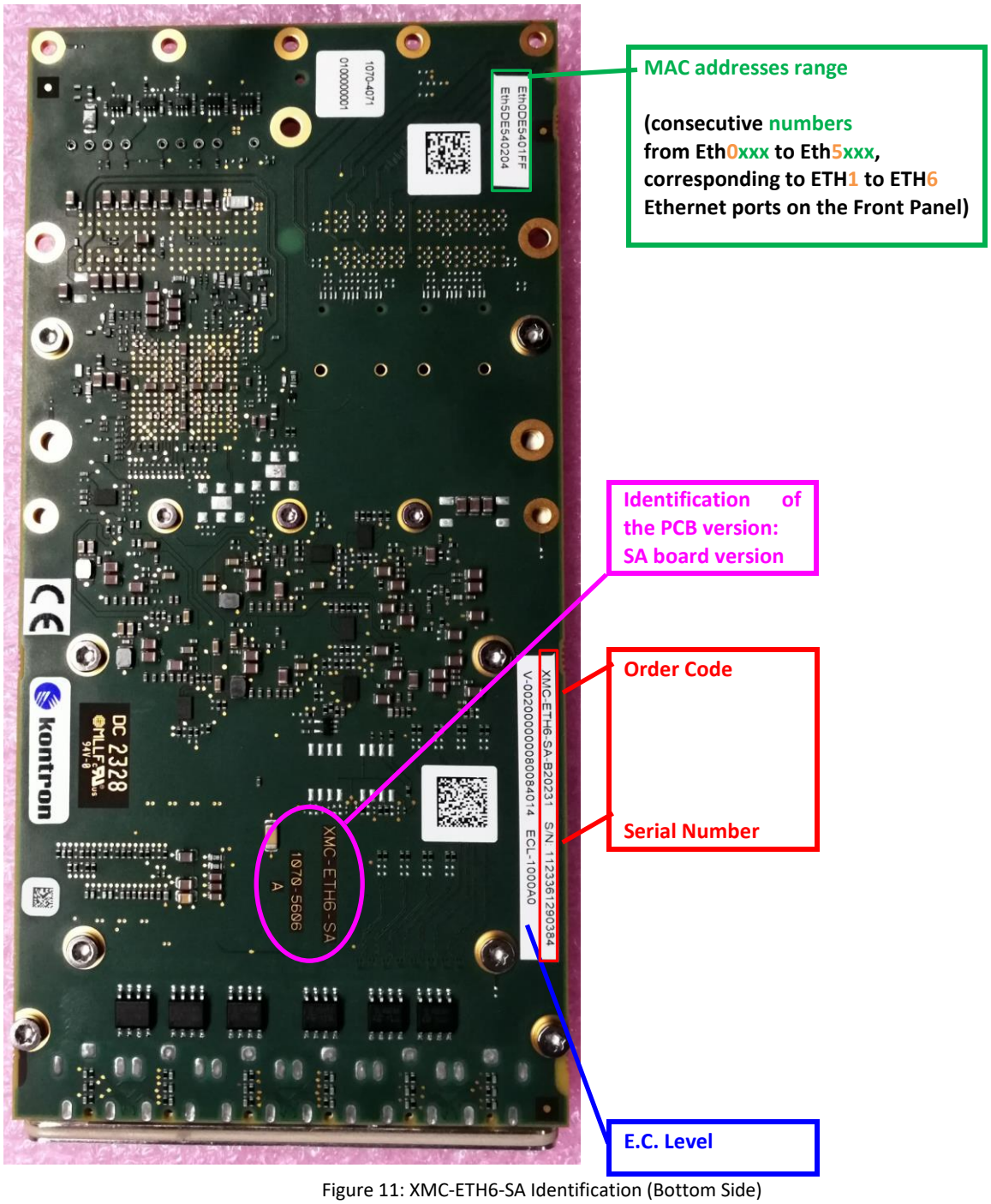


Figure 11: XMC-ETH6-SA Identification (Bottom Side)

3.2.2. Identification labels for the Conduction-Cooled (RC) board version

➢ **Top Side**

No label fitted.

➢ **Bottom Side**

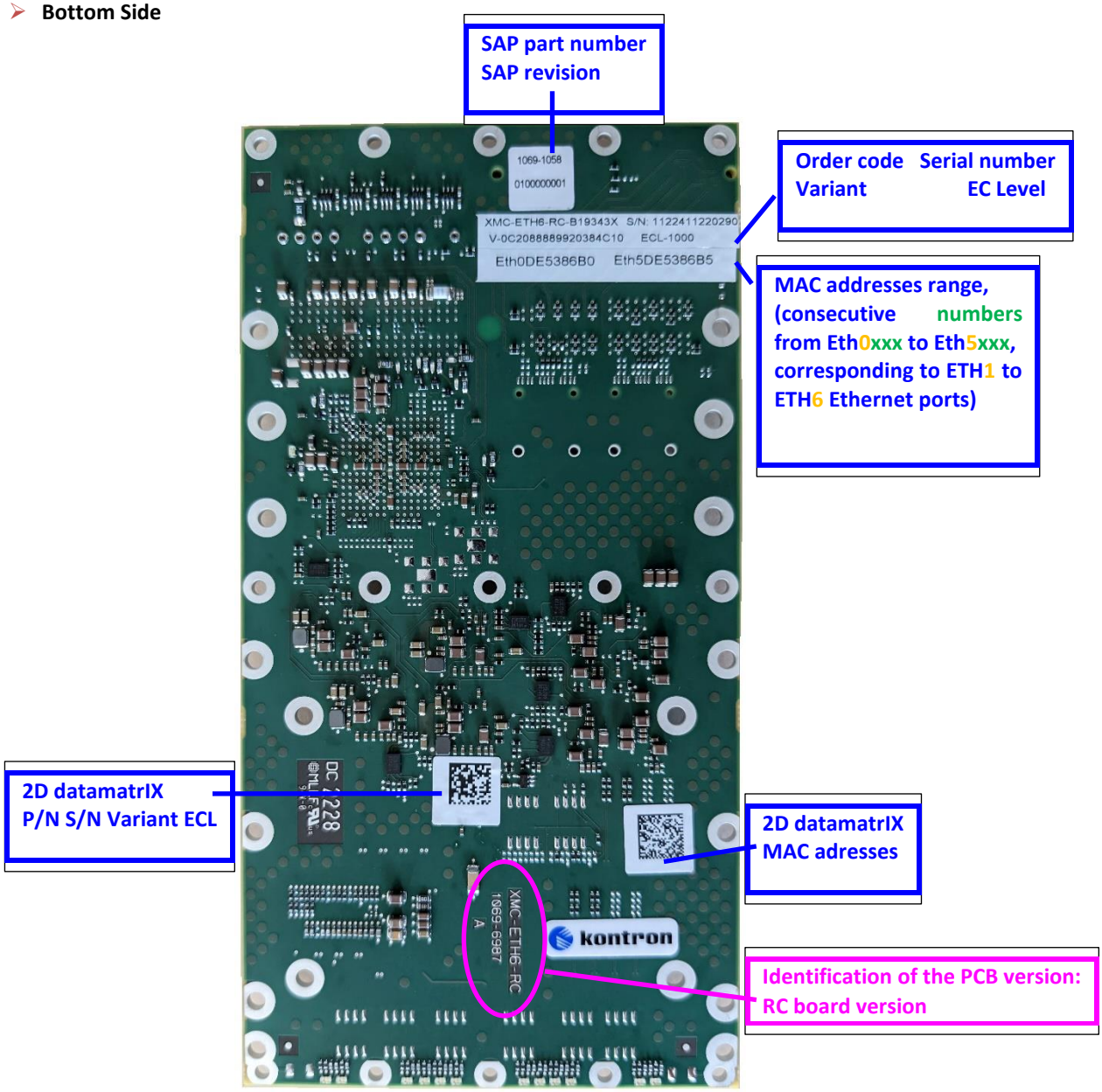


Figure 12: XMC-ETH6-RC Identification (Bottom Side)

3.3. Installation Procedures

The following procedures are applicable only for the installation of the XMC-ETH6 on a host board.

Procedures for removal operations are presented in chapter 3.4.

3.3.1. Installation of the Forced Air-Cooled (SA) board version

To install the XMC-ETH6-SA on a host board, proceed as follows:

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

ESD sensitive Device! Precautions are listed in chapter 3.1

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

2. The XMC-ETH6 is shipped in an individual, reusable shipping box closed by an ESD stick-on label.

Closely inspect the XMC-ETH6 board for any signs of shipment-related damages such as loose components or bent pins. If any evidence of damage is discovered, notify the carrier and Kontron immediately. The XMC-ETH6 board attaches to a host board. The attaching hardware for the XMC-ETH6 board is included with your order. Do not throw out the shipping box, it should be used to store or ship the board.

CAUTION: Care must be taken when applying the procedures below to ensure that neither the XMC-ETH6 nor the host board are physically damaged by the application of these procedures. In case of doubt, please contact Kontron for installation support.

3. Attach the XMC-ETH6 board to the host board according to the following steps:

a) Remove the XMC host board from the chassis.

b) Unscrew the 4 screws on the standoffs on the top side (components side) of the XMC-ETH6. CAUTION:

Be careful not to lose the 2mm spacers if present between the screws and the front panel on the top side (components side) of the XMC-ETH6 board.

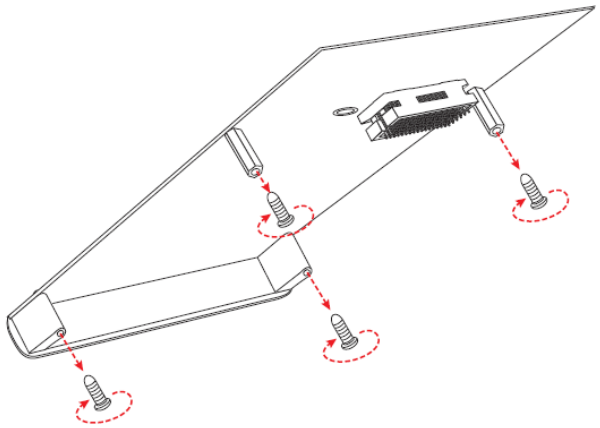
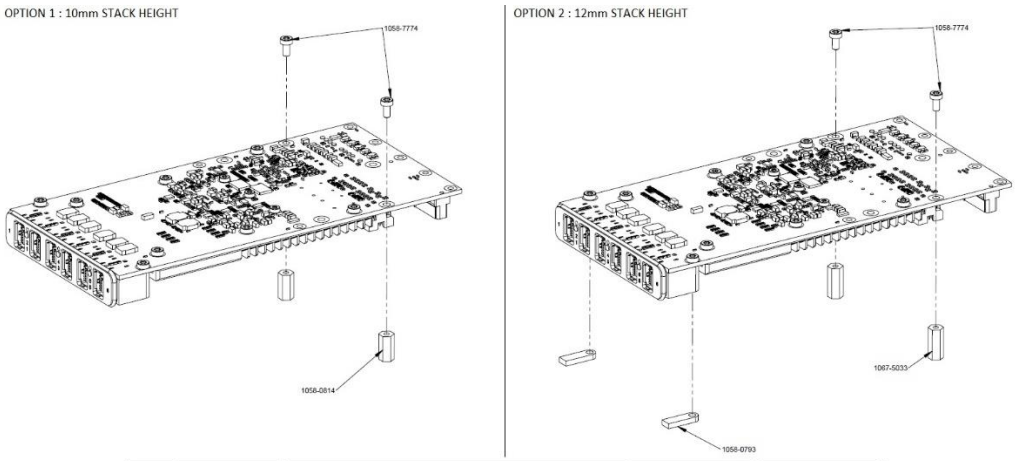


Figure 13: Unscrewing a freshly unpacked SA-class XMC board

c) CAUTION :

Apply "Loctite 222e" threadlock on each screw during following re-assembling steps. Recommended torque is 0.40 N.m .

d) The host board definition can use a stack height of 10mm or 12mm. The XMC-ETH6-SA board is packed with a mechanical kit, which allows for mounting of 12mm by default (using the 12mm standoffs + 2mm spacers) or for adaptation to 10mm (using only the 10 mm standoffs), as described in the following figure:



ITEM NO	PART NUMBER	DESCRIPTION	OPTION 1 QTY	OPTION 2 QTY
5	1058-7774	HEXALOBULAR SOCKET CHEESE HEAD SCREW ISO 14580-M2.5X5-A4-70	2	2
7	1058-0814	SCHROFF 61591-073 ENTRETOISE POUR CARTE MEZZANINE PMC	2	
8	1067-5033	ESSENTRA 30121204156 HEXAGONAL 6mm M2.5 THREADED 12mm LENGTH STAINLESS STEEL		2
9	1058-0793	2mm FRONT PANEL SPACER		2

Figure 14: Chosing mechanical elements to equip for 10/12mm stack height of a SA-class XMC board

e) Install the XMC-ETH6 board, top side down (components side), aligning the connectors with their mating connectors on the host board. Press them together so that the friction from the pins holds them together. Insert the standoff plug mounted on the host board into the keyhole. The module's bezel will fill the slot and provide a connection to the module.

f) Secure the XMC-ETH6 board to the host board by inserting the 4 screws supplied with the XMC-ETH6 board through the bottom of the host board and into the standoffs and front panel holes attached to the XMC-ETH6 board.

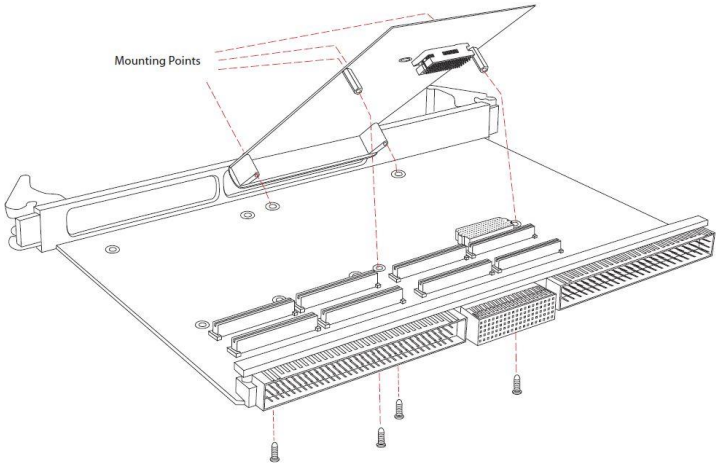


Figure 15: Screwing a SA-class XMC board on a host board

g) Insert the host board back into the chassis making sure it is plugged into the backplane.

4. The XMC-ETH6 board attachment is now complete, ready for operation: refer to the appropriate XMC-ETH6 specific software, application, and system documentation (especially for the host board).

3.3.2. Installation of the Conduction-Cooled (RC) board version

To install the XMC-ETH6-RC on a host board, proceed as follows:

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

ESD sensitive Device! Precautions are listed in chapter 3.1

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

2. The XMC-ETH6 is shipped in an individual, reusable shipping box closed by an ESD stick-on label.

Closely inspect the XMC-ETH6 board for any signs of shipment-related damages such as loose components or bent pins. If any evidence of damage is discovered, notify the carrier and Kontron immediately. The XMC-ETH6 board attaches to a host board. The attaching hardware for the XMC-ETH6 board is included with your order. Do not throw out the shipping box, it should be used to store or ship the board.

CAUTION: Care must be taken when applying the procedures below to ensure that neither the XMC-ETH6 nor the host board are physically damaged by the application of these procedures. In case of doubt, please contact Kontron for installation support.

3. Attach the XMC-ETH6-RC board to the host board according to the following steps:

a) Remove the XMC host board from the chassis.

b) Check that the standoffs or the heatsink are attached to the host board.

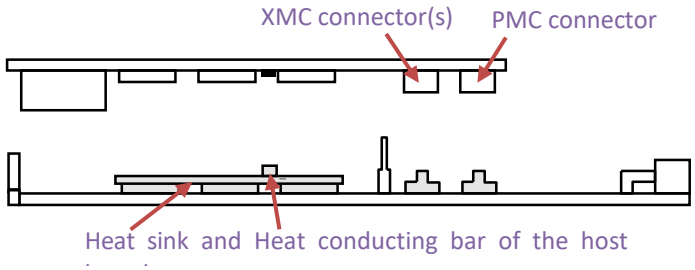


Figure 16: Major elements for mounting a RC-class XMC board on a host board

c) Align the holes of the host board's standoffs or heatsink with the matching holes on the XMC board.

d) Lower the XMC-ETH6-RC, top side down (both components side face to face), fitting the XMC-ETH6-RC connectors into their mating connectors on the host board. Press them together so that the friction from the pins holds the XMC-ETH6-RC in place.

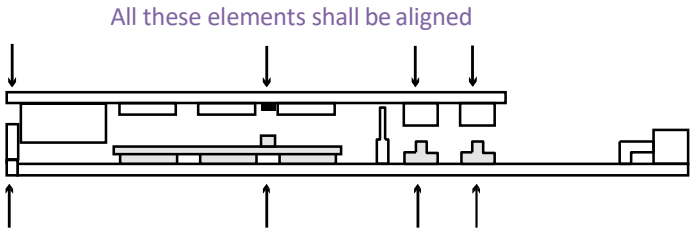


Figure 17: Aligning elements of a RC-class XMC board on a host board

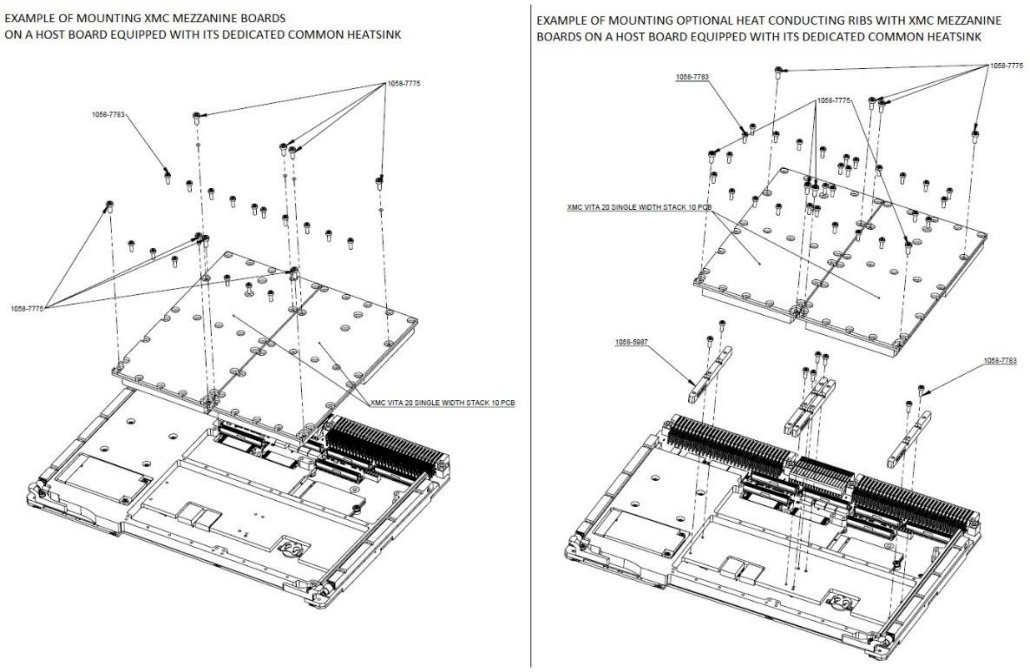
e) CAUTION :

Apply "Loctite 222e" threadlock on each screw during following re-assembling steps. Recommended torque is 0.40 N.m .

f) First, screw the XMC-ETH6-RC in place using 2 mounting screws at the corners of the front side and 2 mounting screws both sides of the line of XMC connectors.

g) Then, complete screwing of the XMC-ETH6-RC using 8 mounting screws at the heat conducting bars at the front side and middle of the XMC board.

h) Optionally, finish screwing of the XMC-ETH6-RC using 6 mounting screws at the heat conducting ribs (if any).



ITEM NO	PART NUMBER	REV	DESCRIPTION	QTY	Config 1 QTY	Config 2 QTY
6	1058-7783		HEXALOBULAR SOCKET CHEESE HEAD SCREW ISO 14580-M2X6-A4-70	31	28	48
8	1058-7775		HEXALOBULAR SOCKET CHEESE HEAD SCREW ISO 14580-M2.5X6-A4-70	14	14	14
14	1058-5987	A	VITA 20 RIBS FOR RC MEZZANINE BOARD	-	-	4

Figure 18: Example of screwing a RC-class XMC board on a host board

i) Insert the host board back into the chassis making sure it is plugged into the backplane.

4. The XMC-ETH6 board attachment is now complete, ready for operation: refer to the appropriate XMC-ETH6-RC specific software, application, and system documentation (especially for the host board).

3.4. Removal Procedure

ESD sensitive Device! Precautions are listed in chapter 3.1

To remove the XMC-ETH6 from a host board, proceed as follows:

1. Ensure that the safety requirements indicated in Section 3.1 are observed. Particular attention must be paid to the warning regarding the heat frame of the host board !

CAUTION: Care must be taken when applying the procedures below to ensure that neither the XMC-ETH6 nor the host board are physically damaged by the application of these procedures.

2. If applicable, remove the host board from system using host board removal procedures.

3. Remove the XMC-ETH6 retaining screws.

4. Carefully disengage the XMC Connectors P15, P16 and the PMC connector P14 on the host board.

5. Slide the XMC card away from the host board (SA-class board may need an angle to disengage their front panel).

CAUTION: Due care should be exercised when handling the board because the heat frame of the host board can get very hot. Do not touch the heat frame when manipulating the board.

6. Dispose of the XMC-ETH6 board as required.

4. Technical Support

For technical support, contact our Support Department:
E-Mail: support.KFR@kontron.com
Phone: +33-498-163-400

Make sure you have the following information available when you call:
Product ID Number (PN),
Serial Number (SN)

The serial number can be found on the Type Label, located on the product's rear side.

Be ready to explain the nature of your problem to the service technician.

5. Warranty

Due to their limited service life, parts that by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law. This applies to the CMOS battery, for example.

If there is a protection label on your product, then the warranty is lost if the product is opened.

6. Returning Defective Merchandise

All equipment returned to Kontron must have a Return of Material Authorization (RMA) number assigned exclusively by Kontron. Kontron cannot be held responsible for any loss or damage caused to the equipment received without an RMA number. The buyer accepts responsibility for all freight charges for the return of goods to Kontron's designated facility. Kontron will pay the return freight charges back to the buyer's location in the event that the equipment is repaired or replaced within the stipulated warranty period. Follow these steps before returning any product to Kontron. Visit the RMA Information website: https://www.kontron.com/en/support/rma-information

TO REQUEST A RETURN MATERIAL AUTHORIZATION (RMA) NUMBER

1. E-mail to repair.KFR@kontron.com with the following information:
2. Part number, serial number of the material to be returned,
3. Failure description or reason for return
4. Once everything is completed, an RMA form will be sent to you if your equipment is under warranty. If your equipment is not under warranty, a quote will be sent and the RMA will be sent when we receive your PO.
5. Print the RMA form and put it with the material to be returned
6. Ship the goods to the address indicated on the RMA form

The goods for repair must be packed properly for shipping, considering shock and ESD protection.

Goods returned to Kontron Modular Computers S.A.S in non-proper packaging will be considered as customer caused faults and cannot be accepted as warranty repairs.

About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT) and offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through a combined portfolio of hardware, software and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

For more information, please visit: **www.kontron.com**

Your Contact

Kontron Modular Computers S.A.S

150 rue Marcelin Berthelot
ZI de Toulon-Est – BP 244
83078 Toulon Cedex 9, France
Tel.: + 33 4 98 16 34-00
sales.KFR@kontron.com

Global Headquarters

Kontron Europe GmbH

Gutenbergstraße 2
85737 Ismaning, Germany
Tel.: + 49 821 4086-0
info@kontron.com

www.kontron.com