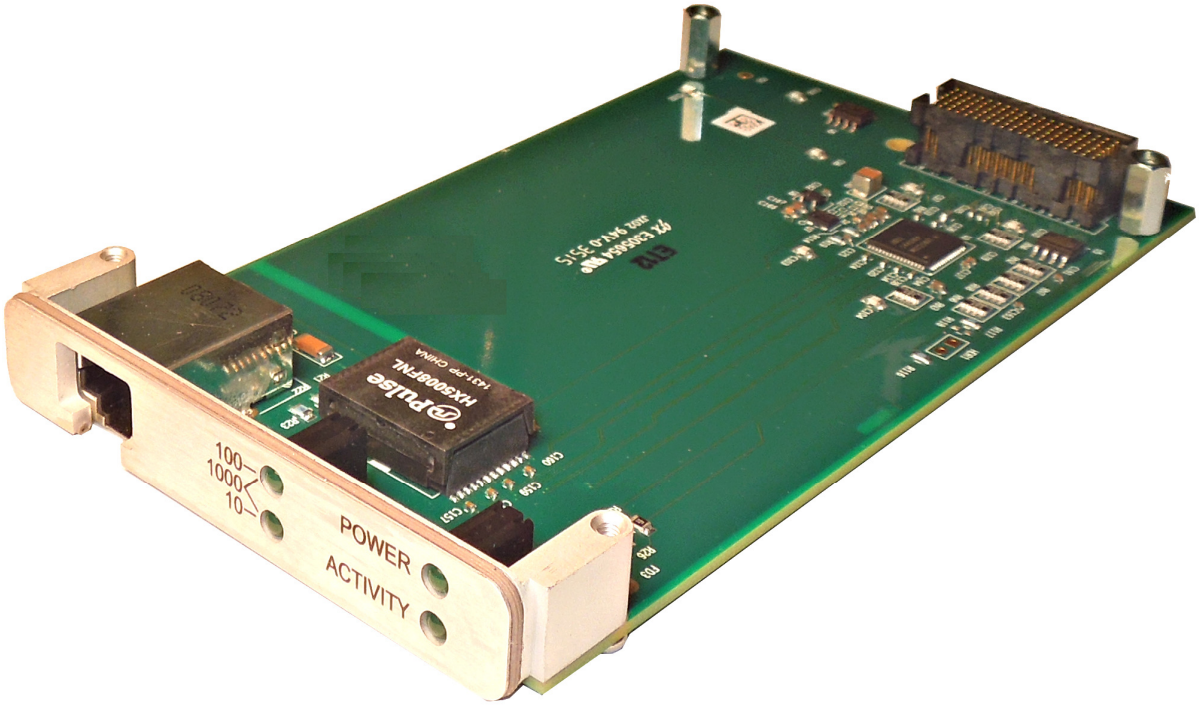


1 Channel 10/100/1000

Ethernet XMC Manual

P/N 7259



Technobox, inc.

www.technobox.com

Purpose/Scope

This hardware manual aids in installation, configuration and use of Technobox Products.

Life support statement

This Technobox product is not designed, intended, specified or tested for life support use, any life support usage of this product is the responsibility of the purchaser of this product.

Static and handling precautions

Static precautions are **mandatory** in handling this equipment. Use a conductive wrist strap and handle the board in a static-free environment. Avoid touching components or connectors on the PCB, it is best to hold the PCB by the edges.

Warranty

Warranty information is found on the Technobox website www.technobox.com for product **warranty** or **repairs** please call or email Technobox for an RMA number

Technical Support.

Please refer to the distribution CD received with the board for sample software and drivers or call Technobox for support with drivers and operating systems.

(856)-809-2306 ext. 2, support@technobox.com , www.technobox.com/support.htm

Part Numbers

P/N 7259 : 1 Channel 10/100/1000 Ethernet XMC

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Manual Revision

01/27/2017 – Rev 1 – Initial release

Electronic Emissions

This product is sold as a component and needs to be evaluated for electronic emissions by testing in the intended complete system.

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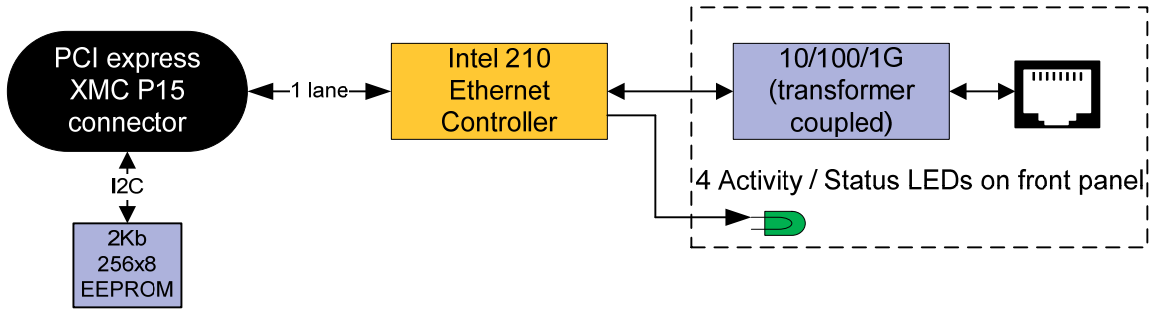


Introduction

The Technobox 7259 Gigabit Ethernet XMC provides a single 10/100/1000 RJ45 Ethernet Port at the XMC front panel.

The design is based on an Intel i210 (specifically WGI210IT) controller integrated circuit. This is one of the few Ethernet controllers that is qualified for industrial temperature range operation (-40 to +85 C).

LEDs visible on the front panel convey power, activity, and speed (10/100/1000) status.

Standard operating systems, such as Linux and Windows, are supported.

This product is built with industrial temperature range parts (-40 to +85 C) and is RoHS compliant.

Features

- One Intel WGI210IT 10/100/1000 Controller
- 1x Gen 1 (2.5 Gb/s) PCIe connection
- RJ45 Front Panel connection
- Front panel status and activity LEDs
- Air-cooled XMC
- Powered only by XMC 3.3V rail
- Industrial Temperature design
- RoHS compliant

Specifications

Temperature (Operating):	-40 to +85 degrees C
Temperature (Storage):	-55 to +105 degrees C
Altitude:	Not Specified or Characterized. Typ. similar equipment is at 15,000 ft.
Humidity(Operating/Storage):	5% to 95% non-condensing.
Vibration:	Not specified or Characterized.
Shock:	Not specified or Characterized.
MTBF:	Can be calculated upon request
PCI Express:	GEN-1 (2.5 Gb/s)
Voltages Required:	+3.3V only
Power:	0.293 amp measured @ 3.3V
Size	74 mm x 128.7 mm
PCB Thickness	1.57mm / 0.062” +/-10% as per standard PCBs
Weight:	53 grams

References

These references should help the user to understand this product. This manual generally excludes information that is better presented in these references:

1. **IEEE 1386** Common Mezzanine Card Family: CMC. Provides mechanical for Mezzanine Card applications. IEEE P1386.1 (PMC) is a daughter of this specification. Also, provides P2 to CMC JN4 signal mapping for VMEbus rear-I/O connectivity. Maintained by the IEEE. www.ieee.org.

2. **Vita 42** XMC high speed serial interface on PMC form factor, maintained by Vita www.vita.com.

3. **Vita 61** Improved XMC connector standard, maintained by Vita www.vita.com.

4. **Vita 42.3** XMC PCI express on the P15 and P16 connectors, maintained by Vita www.vita.com

5. **PCI Express Card Electromechanical Specification, Revision 1.1** standard for PCI Express bus – maintained by PCI Special Interest Group. www.pcisig.com

6. **IEEE 802.3 10BASE-T** Ethernet 10Mb standard www.ieee.com

7. **IEEE 802.3 100BASE-T** Ethernet 100Mb standard www.ieee.com

8. **IEEE 802.3ab 1000BASE-T** Ethernet 100Mb standard www.ieee.com

Power Overview

Technobox P/N 7259 requires +3.3V from the XMC carrier for local logic and interface power, and misc. on board circuitry. This is supplied by XMC connector P15.

On-board regulators supply core voltages for the Controller ICs.

Voltages VPWR, +12V -12V and +3.3Vaux are supplied by the XMC carrier, but not connected on this XMC.

Ground is carried on the P15 connector and is common throughout the board.

Note that for the Ethernet connector all signal pins are isolated by transformer coupling, and the metal case is connected to a frame ground.

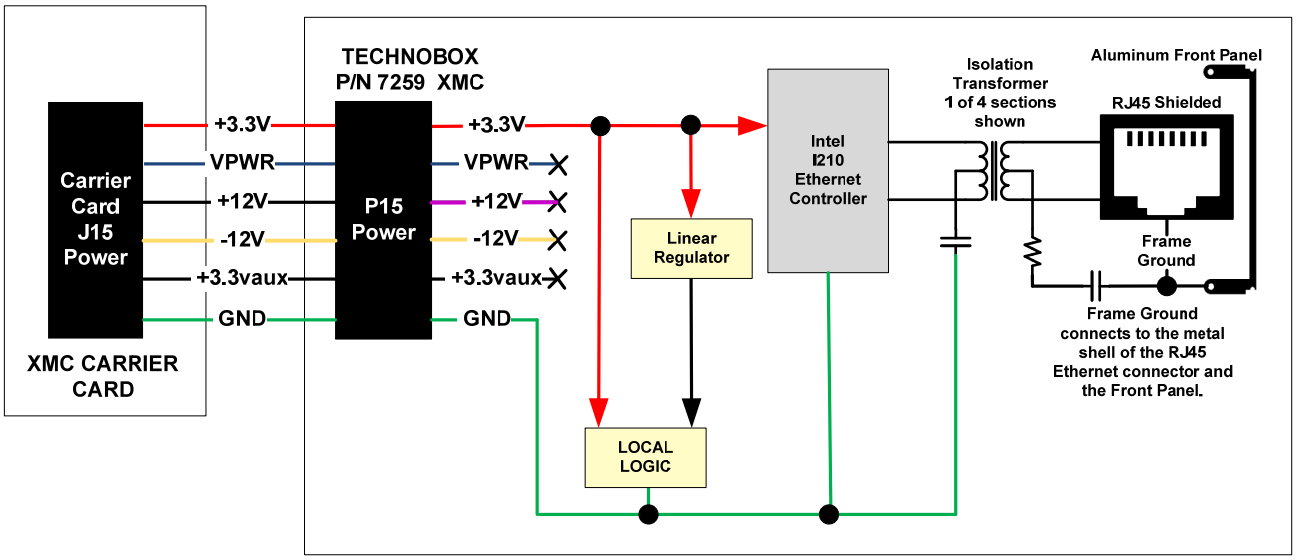


Figure 1 PN7259 Power supply architecture

Drivers

Most operating systems will recognize the Intel I210 ethernet controller's vendor ID and device ID in PCI configuration space and automatically install drivers.

Please consult your O/S supplier for additional information.

PCI device and vendor ID

When performing a PCI bus scan look for the Vendor and Device ID to determine if the XMC is visible to the host processor.

Register	Value	Name	Description
0x01-0x02	0x8086	Vendor ID	Identifies Intel.
0x02-0x03	0x1531	Device ID	Identifies I210

Table 1 - Device/Vendor ID

XMC connector P15

This XMC uses P15 only.

P15 allows up to 8 lanes of PCI express however P/N 7259 uses lane 0 only and does not connect to lanes 1 thru 7.

P16 is not populated, there is no rear IO on this XMC.

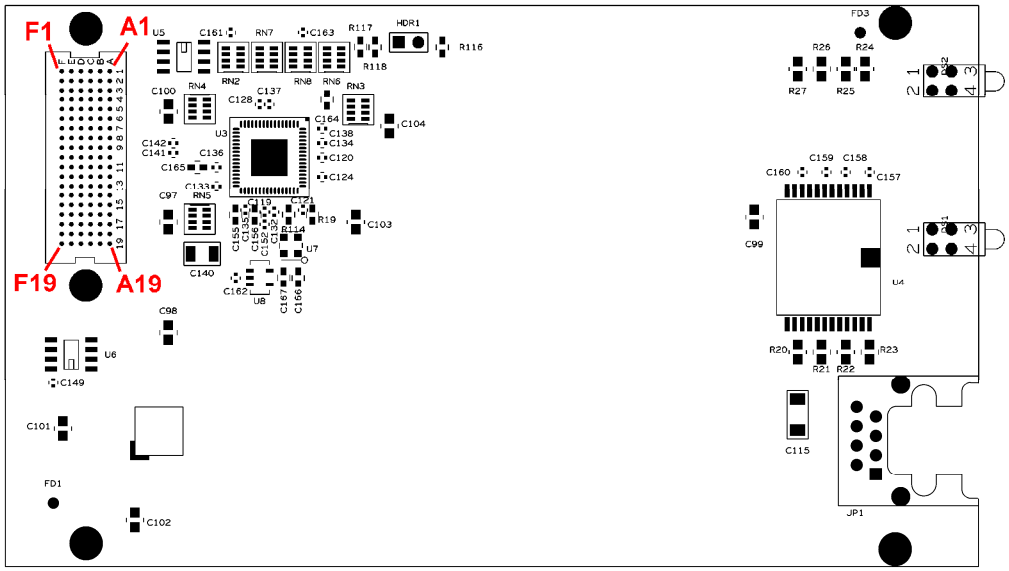


Figure 2 P15 pin orientation

P15 Connector pinout.

PCI express and XMC signals shown, top view looking into male pins of the connector.
The TX signals carry data from the XMC to the carrier.
The RX signals carry data from the carrier to the XMC
The REFCLOCK pair is generated on the carrier and received by the XMC

	F	E	D	C	B	A
1	*VPWR*	TX1-	TX1+	*3.3V*	TX0-	TX0+
2	*MRSTI*	*GND*	*GND*	*TRST*	*GND*	*GND*
3	*VPWR*	TX3-	TX3+	*3.3V*	TX2-	TX2+
4	*MRSTO*	*GND*	*GND*	*TCK*	*GND*	*GND*
5	*VPWR*	TX5-	TX5+	*3.3V*	TX4-	TX4+
6	*+12V*	*GND*	*GND*	*TMS*	*GND*	*GND*
7	*VPWR*	TX7-	TX7+	*3.3V*	TX6-	TX6+
8	*-12V*	*GND*	*GND*	*TDI*	*GND*	*GND*
9	*VPWR*	RFS	RFS	RFS	RFS	RFS
10	*GA0*	*GND*	*GND*	*TDO*	*GND*	*GND*
11	*VPWR*	RX1-	RX1+	*MBIST*	RX0-	RX0+
12	*MPRESENT*	*GND*	*GND*	*GA1*	*GND*	*GND*
13	*VPWR*	RX3-	RX3+	*3.3V AUX*	RX2-	RX2+
14	*MSDA*	*GND*	*GND*	*GA2*	*GND*	*GND*
15	*VPWR*	RX5-	RX5+	RPS	RX4-	RX4+
16	*MSCL*	*GND*	*GND*	*MVMRO*	*GND*	*GND*
17	*RFU*	RX7-	RX7+	*RFU*	RX6-	RX6+
18	RFS	*GND*	*GND*	RFS	*GND*	*GND*
19	RFS	*ROOT0*	WAKE	RFS	REFCLK0-	REFCLK0+

3.3V italic signals belong to VITA 42.0

RFU Reserved for use, reserved by VITA 42.0

All non-underlined signals belong to VITA 42.3

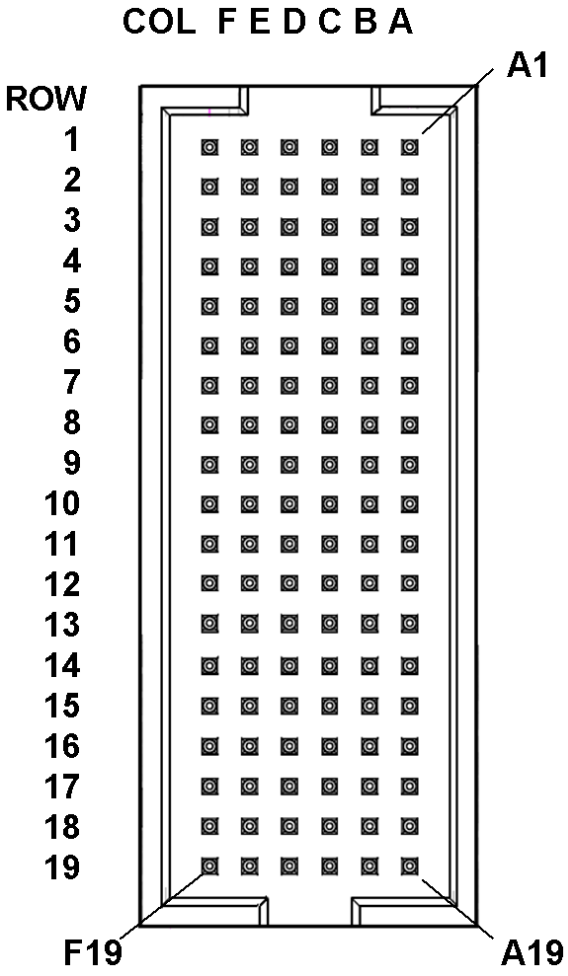
RFS Reserved for standard, reserved by VITA 42.3

RX7- etc. signals in red are not connected on 4 lane XMC cards.

TX3- etc. signals in blue are not connected on 1 lane XMC cards.

Pin numbering XMC Male connector.

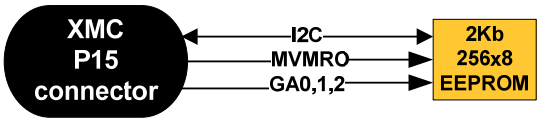
Top view looking into male pins. Notice that the large notch is near ROW 1 for orientation.



Miscellaneous XMC signals

XMC I2C / IPMI support

This XMC provides an I2C bus EEPROM for hardware definition storage. This EEPROM is readable by the host processor via IPMI commands. The IPMI commands are defined in PICMG2.9



The XMC signals used for this EEPROM include the following.

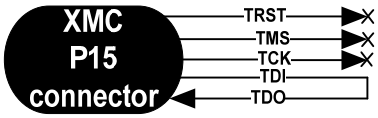
MVMRO is an active high memory protection signal set by the host processor which prevents writing to the eeprom.

Ga0, GA1and GA2 are signals driven by the host processor which set the base address of the eeprom on the I2C bus.

The MVMRO and Ga0-2 signals are XMC specific.

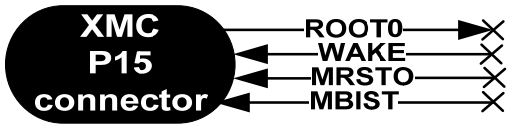
Note that there are no I2C devices, other than the EEPORM, accessible from the host on this XMC.

XMC JTAG support



There are no on board JTAG devices on this XMC accessible with the P15 JTAG signals, the JTAG data in and data out are connected together however.

XMC Misc unused signals



ROOT0 is an input to the XMC which when held low by the host allows the XMC to function as a root complex and assign base addresses to other devices on the PCI express buses.

MRSTO is an output from XMCs which resets other PCI express devices when the XMC is operating as a root complex.

WAKE is an output from XMCs which signals to the host to turn power back on and reinitiate PCI express communications.

BIST is an output from an XMC signaling to the host that the built in self-test has been performed

ETHERNET JP1 connector

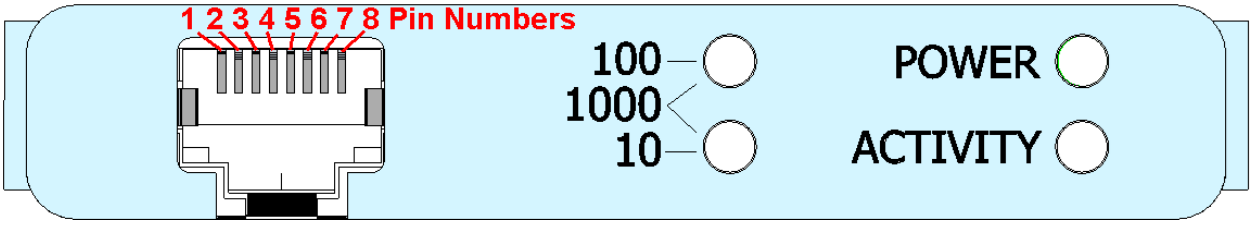


Figure 3 Front view of ethernet connector on front panel.

Pin Number	Description	Use
1	TXD+ transmit pair 1	10/100
2	TXD- transmit pair 1	10/100
3	RXD+ receive pair 2	10/100
4	Bi-directional Data+ pair 3	1000
5	Bi-directional Data- pair 3	1000
6	RXD- receive pair 2	10/100
7	Bi-directional Data+ pair 4	1000
8	Bi-directional Data- pair 4	1000

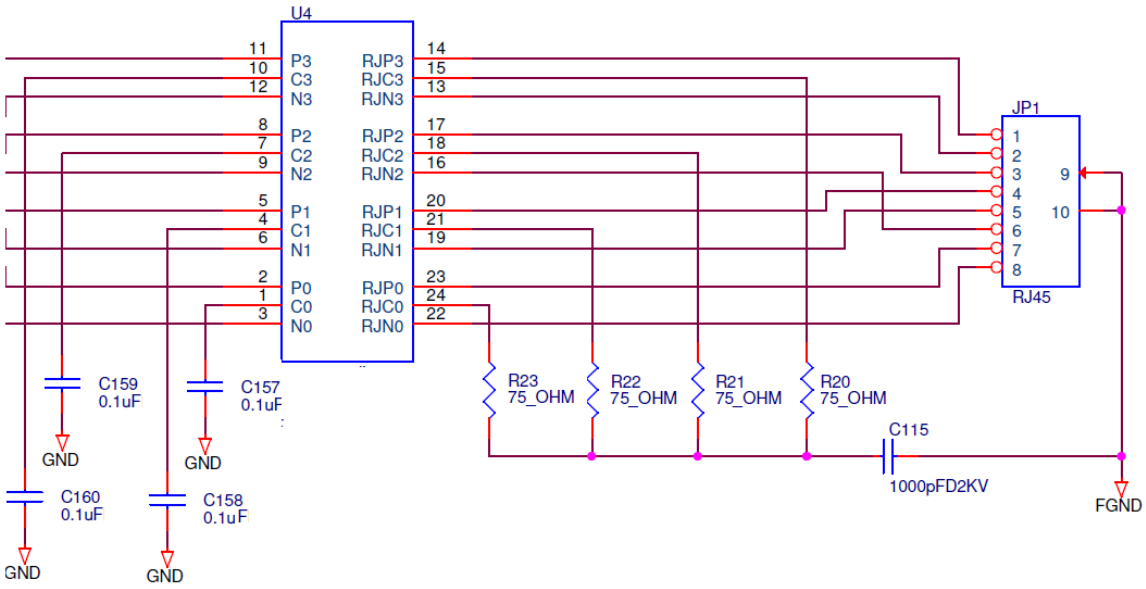


Figure 4 ethernet physical interface schematic

Indicator LEDs

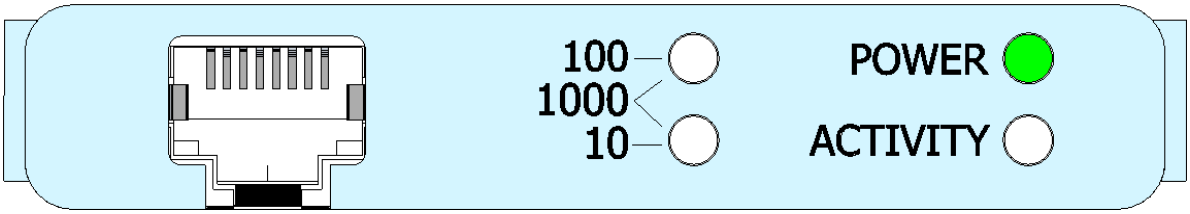


Figure 5 board receiving power , but cable unplugged or similar

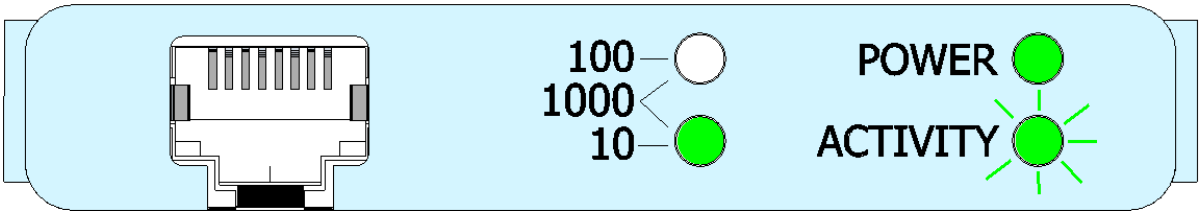


Figure 6 10 Mbps mode

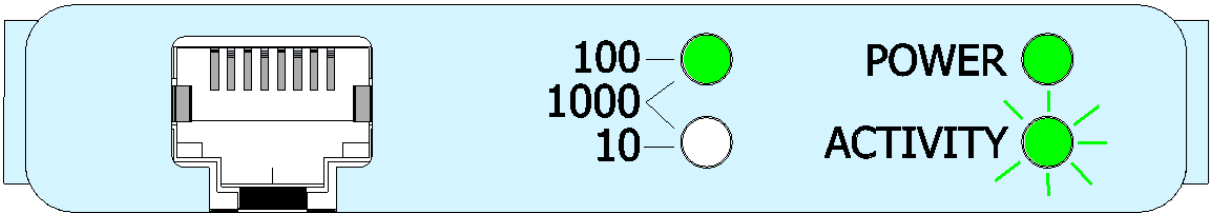


Figure 7 100 Mbps mode

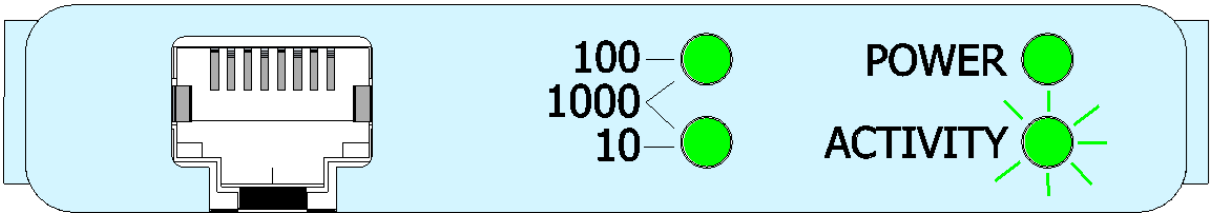


Figure 8 1000 Mbps mode

LED Function	Ref Designator	Function when ON
Power ON	DS2 TOP	Status LED indicating board is powered up.
Link Activity	DS2 BOTTOM	Activity flashing LED indicating valid link in either 10, 100 or 1000 Mbps mode.
Transmit/Receive Data	DS1 TOP	Status LED indicating 100 Mbps data transfer rate.
100 Mbps	DS1 BOTTOM	Status LED indicating 10 Mbps data transfer rate.

Table 2 Indicator LEDs

XMC Installation

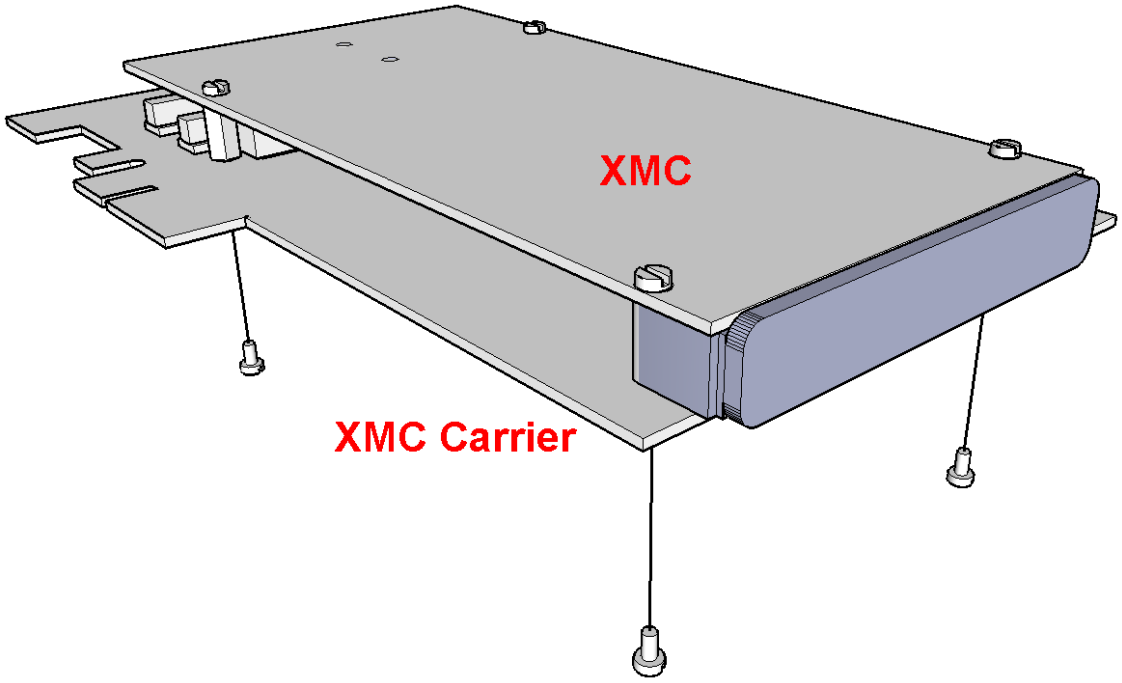
Place the XMC carrier on a static-safe flat surface.

Seat the front panel bezel with EMI gasket in the carrier card front panel opening.

Position the XMC rear connectors so they engage the corresponding carrier connectors. Since the XMC connectors are easy to damage, please make certain that the alignment features on the connectors are engaged properly.

Press down evenly on the XMC close to the P15/P16 connectors to fully engage the rear connectors.

Finally, use the four M2.5 machine screws, supplied in a plastic bag shipped with the XMC, to secure the XMC from the back side of the carrier board. Two fasteners for the front panel and two for the standoffs.



Cautions

Avoid ‘pinching’ the EMI gasket in the space between the XMC front panel and the carrier card front panel opening, as this may damage the EMI gasket.

Warnings

Static precautions are **mandatory** in handling this assembly. Use a conductive wrist strap and handle the card in a static-free environment. Avoid touching components on the XMC card or the carrier card. When transporting the board use the ESD protective bag it was shipped in or other protective wrapping.

Custom part numbers derived from the base 7259 design.

Custom part numbers derived from the baseline 7259 are possible, however order minimums, longer lead times and higher prices may apply. Call Technobox for help in choosing and ordering your specific options and to get an orderable part number. Options include.

- Acrylic Conformal coating.
- A VITA61 connector in place of the VITA 42 connector.
- For other customer requirements please contact Technobox.

Appendix A Typical applications.

Use with an XMC carrier

In the figure P/N 7259 is shown mounted on a Technobox P/N 4821 allowing delivery of Ethernet based I/O in a PCI express edge card slot.

Figure 9 P/N 7259 mounted on a P/N 4821 XMC carrier

APPENDIX B – Printed circuit placement

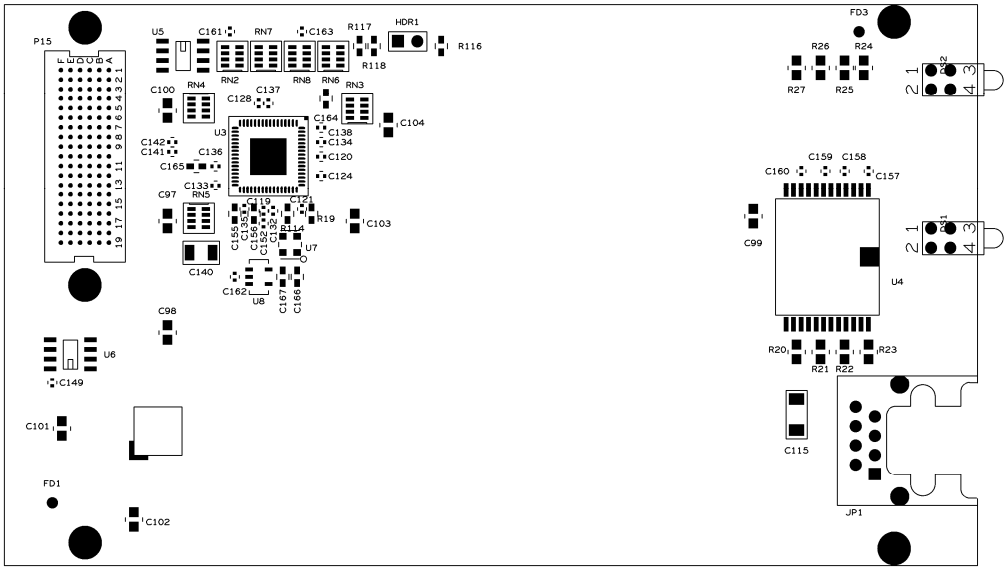


Figure 10 Printed Circuit Placement – side 1

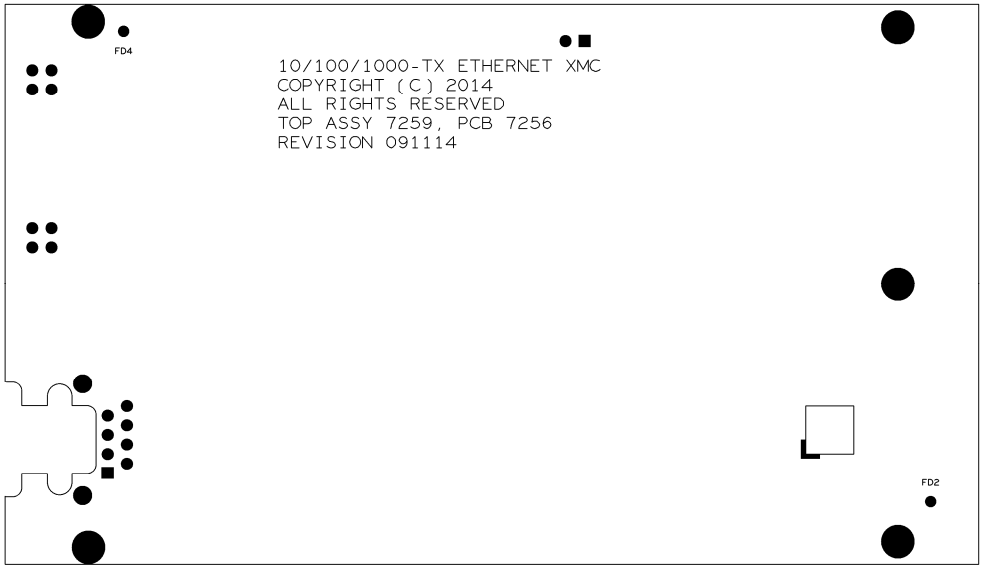


Figure 11 Printed Circuit Placement – side 2

APPENDIX C – Mechanical dimensions

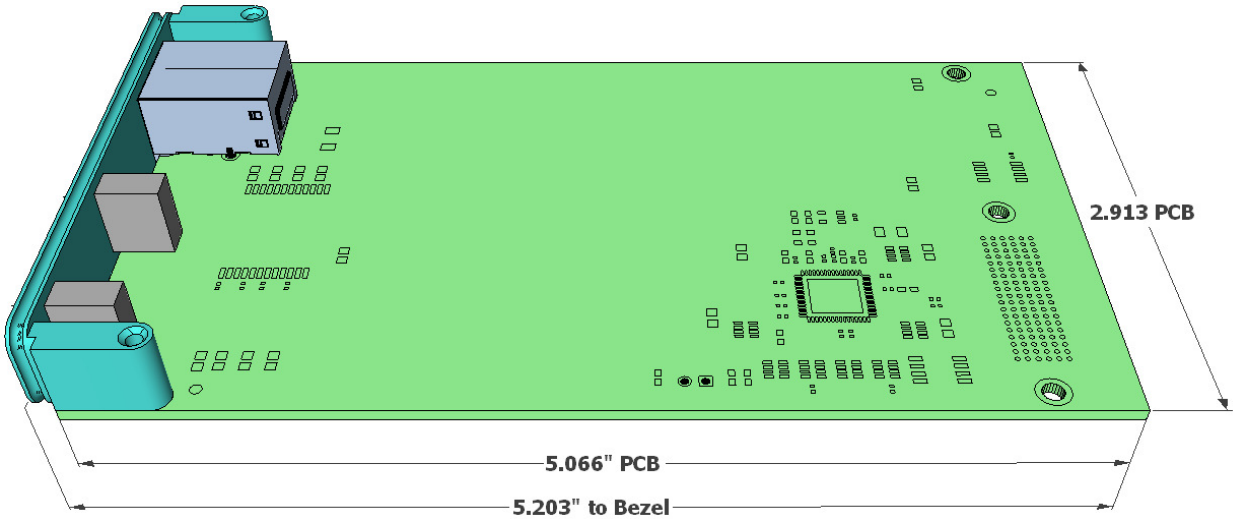


Figure 12 Major Dimensions