

TQMC800

1 Channel 1000BASE-T Ethernet

Version 1.0

User Manual

Issue 1.0.0

June 2026

TQMC800-10R-A

1 Channel 1000BASE-T Ethernet

(RoHS compliant)

TQMC800-10R-H

1 Channel 1000BASE-T Ethernet; Conduction Cooled

(RoHS compliant)

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Document History

Issue	Description	Date
1.0.0	Initial Issue	June 2026

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1 Product Description

The TQMC800 is a VITA 93.0 Small Form Factor Mezzanine Card (QMC) compatible module providing a one channel 10Base-T / 100Base-TX / 1000Base-T Ethernet interface.

The Intel I210IT Gigabit Ethernet Controller is accessible via PCIe. The Ethernet interface supports 10, 100 and 1000 Mbit/s transmission rates and is equipped with a 16 Mbit Serial Flash to support PXE and iSCSI boot.

The Ethernet interface of the TQMC800 is capable of performing an auto negotiation algorithm which allows both link-partners to determine the best link-parameters. The TQMC800 supports IEEE 1588/802.1AS Precision Time Protocol (PTP) and IEEE 802.1Qav Audio/Video Bridging (AVB) traffic shaping (with software extensions).

The TQMC800-10R routes the Ethernet port to the QMC I/O P12 connector.

The port is galvanically isolated from the Ethernet Controller and LEDs on the board indicate link/activity and link speed.

The TQMC800 has an I²C board temperature sensor to facilitate measurement of the board heat near the Ethernet Controller. The module is equipped with an I²C EEPROM storing IPMI Platform Management FRU Information and the EEPROM is write-protected by the QMC Connector's NVMRO signal.

The module meets the requirements to operate in extended temperature range from -40°C to +85°C.

Software Support:

- Software support for Intel I210IT at www.intel.com
- For operating systems not supported by Intel, please contact TEWS Technologies.

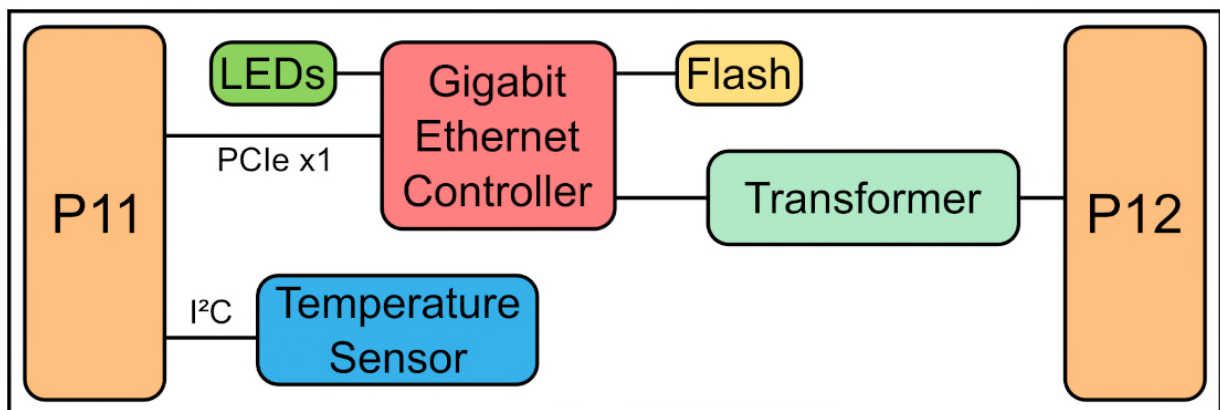


Figure 1-1 : Block Diagram

2 Technical Specification

General	
Mechanical Interface	Small Form Factor Mezzanine Card (QMC) Interface conforming to ANSI/VITA 93.0 Standard Single-Width (78 mm x 25.8 mm)
Electrical Interface	x1 PCI Express (Specification 2.1) compliant interface
Main On Board Devices	
Gigabit Ethernet Controller	I210-IT (Intel)
16 Mbit Serial Flash for Boot ROM	W25Q16JV (Winbond)
Temperature Sensor	PCT2075 (NXP Semiconductors)
FRU Records EEPROM	M24128-BF (STMicroelectronics)
I/O Interface	
Number of Channels	1
I/O Standard	1000Base-T 100Base-TX 10Base-T
I/O Connector	QMC I/O P12 (Samtec ADF6-20-07.5-L-4-0-A-TR or compatible)
Physical Data	
Power Requirements	140mA typical @ +3.3V (no link) 160mA typical @ +3.3V (10Base-T link) 170mA typical @ +3.3V (100Base-TX link) 240mA typical @ +3.3V (100Base-T link)
Temperature Range	Operating -40 °C to +85 °C Storage -40 °C to +85 °C
MTBF	TQMC800-10R-A: 1759000 h TQMC800-10R-H: 1759000 h MTBF values shown are based on calculation according to MIL-HDBK-217F and MIL-HDBK-217F Notice 2; Environment: G _B 20°C. The MTBF calculation is based on component FIT rates provided by the component suppliers. If FIT rates are not available, MIL-HDBK-217F and MIL-HDBK-217F Notice 2 formulas are used for FIT rate calculation.
Humidity	5 – 95 % non-condensing
Weight	TQMC800-10R-A: 12 g TQMC800-10R-H: 25 g

Table 2-1 : Technical Specification

3 Handling and Operation Instructions

3.1 ESD Protection

	This QMC module is sensitive to static electricity. Packing, unpacking and all other module handling has to be done with appropriate care!
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3.2 Installing QMCs

QMCs are protected against wrong insertion by a polarization feature incorporated in the connector.

QMCs are easily installed by placing them aligned with the Carrier's connectors and gently pressing them onto the Carrier.

The QMC can now be screwed to the Carrier as needed.

3.3 Removing QMCs

When removing the QMC from the Carrier, care must be taken to ensure that both plugs are disconnected simultaneously and in parallel. To do this, grab both short sides of the PCB with both hands at the tabs and carefully lift the QMC.

- Remove the screws that secure the QMC on the Carrier, if needed.
- Gently and simultaneously unplug both connectors of the QMC.

Be aware that there is a risk of damaging the QMC Module or Carrier during QMC Module extraction. Applying an unequal force to the two connectors while unplugging can cause a misalignment, which then can potentially result in damaging the connectors or boards.

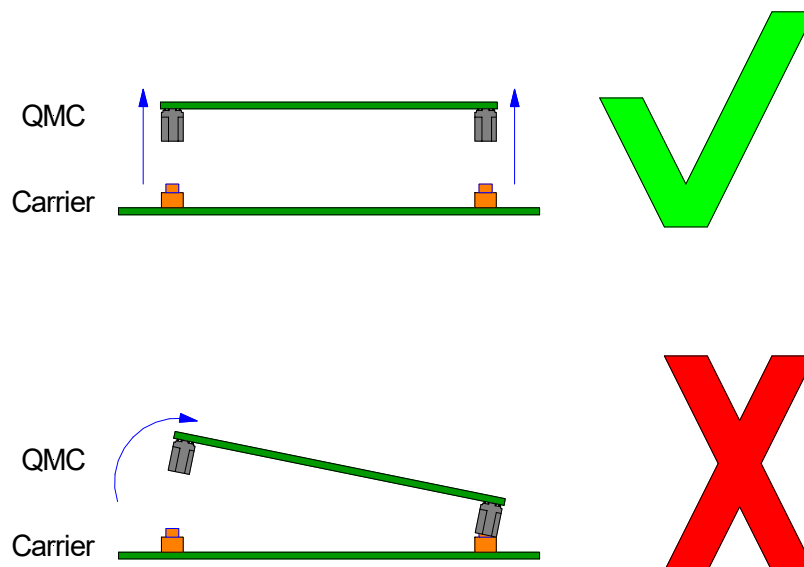


Figure 3-1 : QMC Removal

4 PCI Express Interface

4.1 PCI Express Device Topology

The TQMC800 uses a Gigabit Ethernet Controller (Intel I210-IT) communicating via a PCIe Rev. 2.1 compliant x1 Interface at 2.5 GT/s.

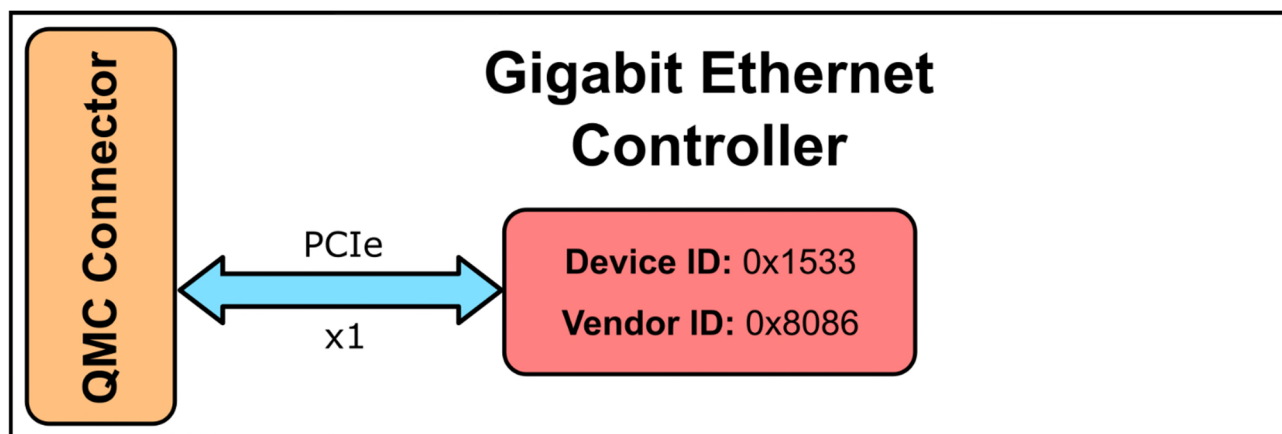


Figure 4-1 : PCI Express Device Topology

4.2 I210 PCI Express Identifiers

Vendor-ID	0x8086 (Intel)
Device-ID	0x1533 (I210-IT copper only)
Class Code	0x020000 (Ethernet Controller)
Subsystem Vendor-ID	0xFFFF
Subsystem Device-ID	0x0000

Table 4-1 : I210 PCI Express Identifiers

4.3 I210 PCI Express Base Address Register Configuration

PCIe Base Address Register (Offset in PCIe Configuration Space)	PCIe Space Mapping	Size (Byte)	Description
0 (0x10)	MEM	128K	Internal Registers
1 (0x14)	-	-	-
2 (0x18)	I/O	32	Internal Registers via I/O Space
3 (0x1C)	MEM	16K	MSI-X

Table 4-2 : I210 PCI Express Base Address Register Configuration

5 Ethernet Interface LEDs

The TQMC800 provides a “LINK/ACT” LED and a “SPEED” LED. Due to the fact that QMCs are mounted upside-down on the carrier card the LEDs are visible on the back side of the TQMC800.

See table below for more details:

“LINK/ACT” LED	Description
OFF	No cable is connected or no link is established
GREEN	A link is established
BLINKING GREEN	Activity (the TQMC800 transmits or receives data)

Table 5-1 : “LINK/ACT” LED

“SPEED” LED	Description
OFF	The TQMC800 operates at 10Base-T
ORANGE	The TQMC800 operates at 100Base-TX
GREEN	The TQMC800 operates at 1000Base-T

Table 5-2 : “SPEED” LED

6 Pin Assignment – I/O Connectors

6.1 QMC I/O P12 Connector

6.1.1 Connector Type

Pin-Count	80
Connector Type	QMC Connector 80-pol Female
Source & Order Info	Samtec ADF6-20-07.5-L-4-0-A-TR or compatible

Table 6-1 : QMC I/O P12 Connector Type

6.1.2 Pin Assignment

	D	C	B	A
1	TERM_PLANE	ETHERNET_TX0/RX0+	TERM_PLANE	ETHERNET_TX1/RX1+
2	TERM_PLANE	ETHERNET_TX0/RX0-	TERM_PLANE	ETHERNET_TX1/RX1-
3	ETHERNET_TX2/RX2+	TERM_PLANE	ETHERNET_TX3/RX3+	TERM_PLANE
4	ETHERNET_TX2/RX2-	TERM_PLANE	ETHERNET_TX3/RX3-	TERM_PLANE
5	NC	NC	NC	NC
6	NC	NC	NC	NC
7	NC	NC	NC	NC
8	NC	NC	NC	NC
9	NC	NC	NC	NC
10	NC	NC	NC	NC
11	NC	NC	NC	NC
12	NC	NC	NC	NC
13	NC	NC	NC	NC
14	NC	NC	NC	NC
15	NC	NC	NC	NC
16	NC	NC	NC	NC
17	NC	NC	NC	NC
18	NC	NC	NC	NC
19	NC	NC	NC	NC
20	NC	NC	NC	NC

Table 6-2 : QMC I/O P12 Pin Assignment