The Embedded I/O Company

TEWS TECHNOLOGIES

TXMC895

Four Channel 10/100/1000 Mbit/s Ethernet

Version 1.0

User Manual

Issue 1.0.0

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TXMC895-10R

Four Channel 10/100/1000 Mbit/s Ethernet, Intel I210IT, RJ45

(RoHS compliant)

Issue	Description	Date
1.0.0	Initial issue	December 2021

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1 Product Description

The TXMC895 is a Switched Mezzanine Card (XMC) compatible module providing a four channel Ethernet 10Base-T / 100Base-TX / 1000Base-T interface.

A PCIe Switch provides access to the Intel I210IT Gigabit Ethernet controllers. Each 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 four Ethernet interfaces of the TXMC895 are capable of performing an auto negotiation algorithm which allows both link-partners to determine the best link-parameters. The TXMC895 supports IEEE 1588/802.1AS Precision Time Protocol (PTP) and IEEE 802.1Qav Audio/Video Bridging (AVB) traffic shaping (with software extensions).

The TXMC895-10R provides four 10/100/1000 Mbit/s Ethernet connections via front panel RJ45 connectors.

All ports are galvanically isolated from the Ethernet controllers and LEDs on the board indicate the different network activities.

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.

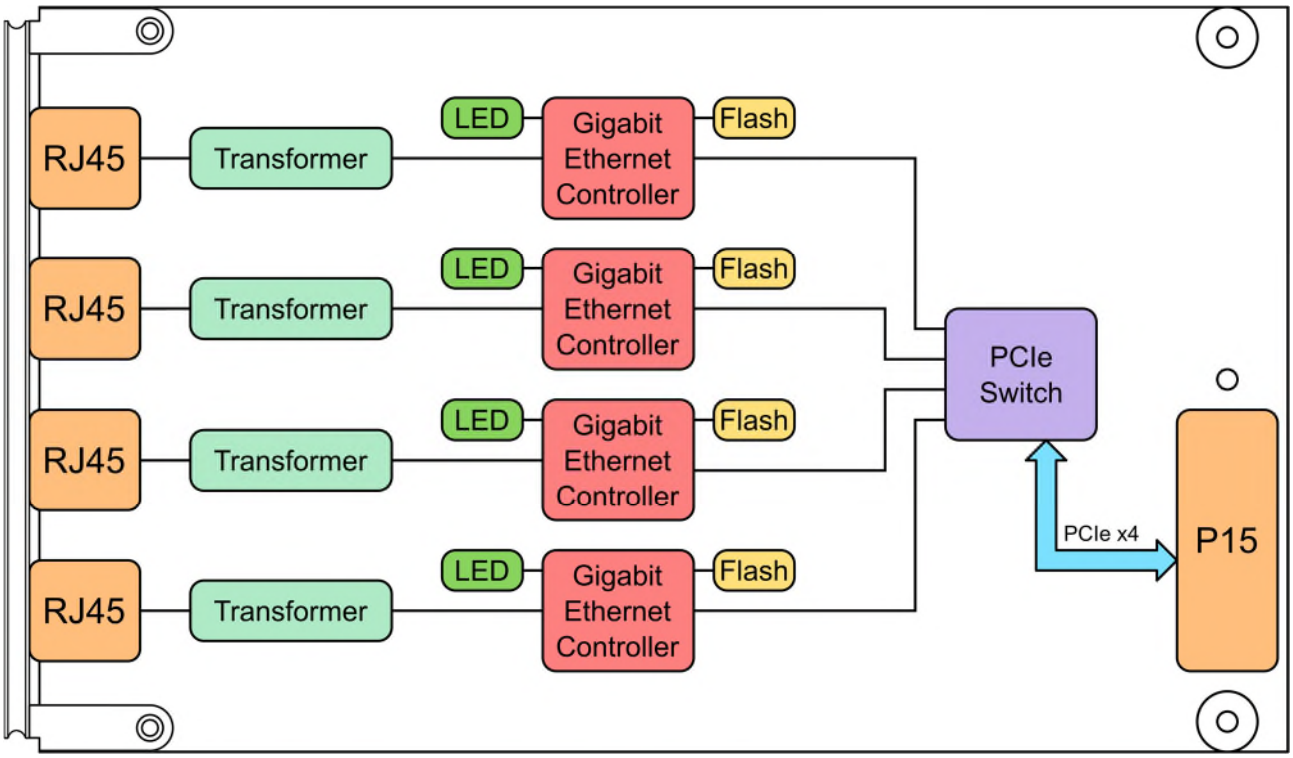


Figure 1-1 : Block Diagram

2 Technical Specification

XMC Interface	
Mechanical Interface	Switched Mezzanine Card (XMC) Interface conforming to ANSI/VITA 42.0 Short single-width (124 mm x 74 mm)
Electrical Interface	x4 PCI Express (Specification 2.1) compliant interface conforming to ANSI/VITA 42.3

On Board Devices	
PCIe Switch	PI7C9X2G608GP (Diodes Incorporated)
Gigabit Ethernet Controllers	For each interface: I210-IT (Intel)
16 Mbit Serial Flashes for Boot ROM	For each interface: W25Q16JV (Winbond)

I/O Interface	
Number of Channels	4
I/O Standards	1000Base-T 100Base-TX 10Base-T
I/O Connector	RJ45 (TE Connectivity 406732 or compatible)

Physical Data		
Power Requirements	600mA typical @ VPWR = +5V (four channel, no link) app. additional 10mA to 100mA per link 270mA typical @ VPWR = +12V (four channel, no link) app. additional 4.5mA to 45mA per link	
Temperature Range	Operating Storage	-40°C to +85°C (constant airflow of 2m/s is required) -40°C to +85°C
MTBF	581000 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	72 g	

Table 2-1 : Technical Specification

3 Handling and Operation Instructions

3.1 ESD Protection

This XMC module is sensitive to static electricity.
Packing, unpacking and all other module handling has to be done with appropriate care.

3.2 Power Dissipation

This XMC module requires adequate forced air cooling!

4 PCI Express Interface

4.1 TXMC895 PCI Express Device Topology

The TXMC895 uses four Gigabit Ethernet Controllers (Intel I210-IT) each communicating via a PCIe Rev. 2.1 compliant x1 Interface.

To be able to access the Ethernet controllers they are connected to the x1 Downstream Ports of a PCIe Switch (Diodes Incorporated PI7C9X2G608GP).

The x4 Upstream Port of the PCIe Switch is connected to the host system.

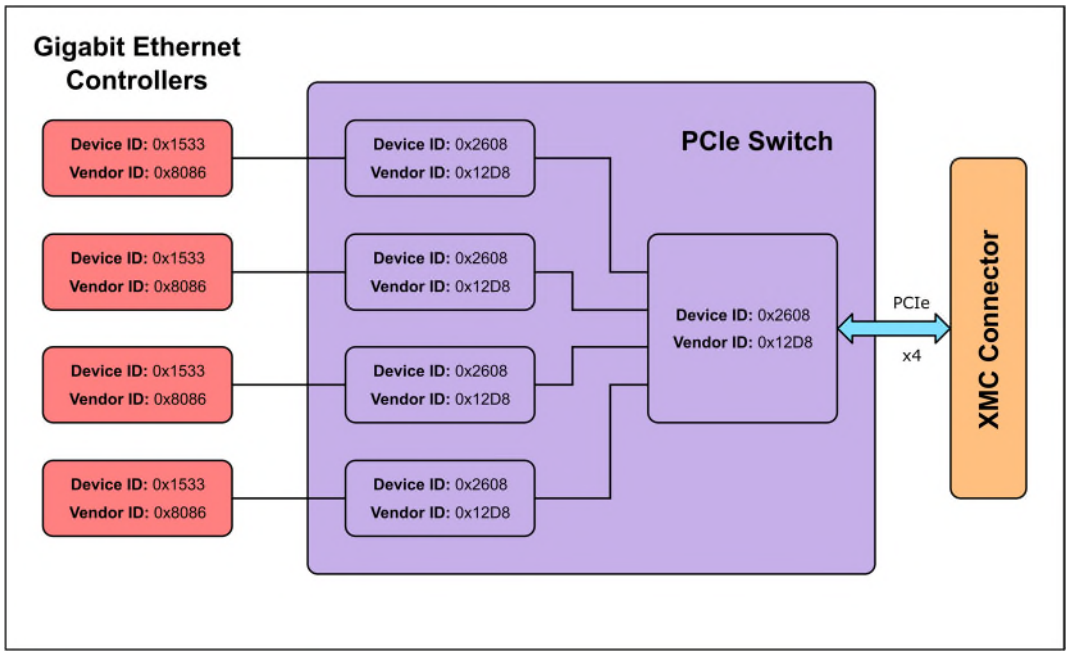


Figure 4-1 : TXMC895 PCI Express Device Topology

4.2 TXMC895 PCI Express Memory and I/O Size Requirements

PCIe Space Mapping	Four Channel (Byte)	Two Channel (Byte)
MEM	4M	2M
I/O	16K	8K

Table 4-1 : TXMC895 PCI Express Memory and I/O Size Requirements

4.3 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 4-2 : I210 PCI Express Identifiers

4.4 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 4-3 : I210 PCI Express Base Address Register Configuration

5 Ethernet Interface Status LEDs

The TXMC895 provides an individual Status LED for every Ethernet Interface. Due to the fact that XMCs are mounted upside-down on the carrier card the Status LEDs are visible on the back side of the TXMC895. A marking is placed close to each Status LED to indicate the Ethernet Port it corresponds to.

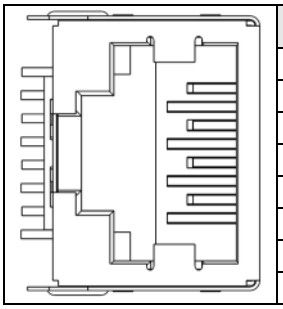
See table below for more details:

Status LED	Description
OFF	No cable is connected or no link is established
ON	A link is established
BLINKING	Activity (the Ethernet Port transmits or receives data)

Table 5-1 : Status LED

6 Pin Assignment – I/O Connectors

6.1 RJ45 Connector



Pin	Signal (1000Base-T)	Signal (100Base-TX/10Base-T)
1	TX0/RX0+	TX+
2	TX0/RX0-	TX-
3	TX1/RX1+	RX+
4	TX2/RX2+	not used
5	TX2/RX2-	not used
6	TX1/RX1-	RX-
7	TX3/RX3+	not used
8	TX3/RX3-	not used

Table 6-1 : RJ45 Connector