The Embedded I/O Company

TXMC397

Conduction Cooled, 2 Channel 10GBASE-T Ethernet

Version 1.0

User Manual

Issue 1.0.0

May 2024

TXMC397-10R

2 Channel 10GBASE-T Ethernet; P16 Back I/O (X12d); Conduction Cooled

(RoHS compliant)

TXMC397-20R

2 Channel 10GBASE-T Ethernet; P16 Back I/O (X8d); Conduction Cooled

(RoHS compliant)

Issue	Description	Date
1.0.0	Initial issue	May 2024

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1   Product Description

The TXMC397 is a Conduction Cooled Switched Mezzanine Card (CCXMC) compatible module providing a two channel 100Base-TX / 1000Base-T / 2.5GBase-T / 5GBase-T / 10GBase-T Ethernet interface.

The XMC-Connector P15 provides access to the Intel X710-AT2 dual port 10GbE controller via an x4 PCIe link. Both Ethernet interfaces support 100, 1000 Mbit/s and 2.5, 5, 10 Gbit/s transmission rates.

The controller is equipped with a 64 Mbit Serial Flash to support PXE and iSCSI boot and LEDs indicate the different network activities.

The two Ethernet interfaces of the TXMC397 are capable of performing an auto negotiation algorithm which allows both link-partners to determine the best link-parameters. The TXMC397 supports IEEE 1588/802.1AS Precision Time Protocol (PTP).

The TXMC397-10R provides two 10GBase-T Ethernet interfaces via Back I/O P16 connector and they are both mapped in the X12d range specified in VITA46.9 standard.

The TXMC397-20R provides two 10GBase-T Ethernet interfaces via Back I/O P16 connector and they are both mapped in the X8d range specified in VITA46.9 standard.

The module meets the requirements to operate in extended temperature range from -40°C to +85°C (Card Edge Temperature).

Software Support:

- o   Software support for Intel X710-AT2 at www.intel.com

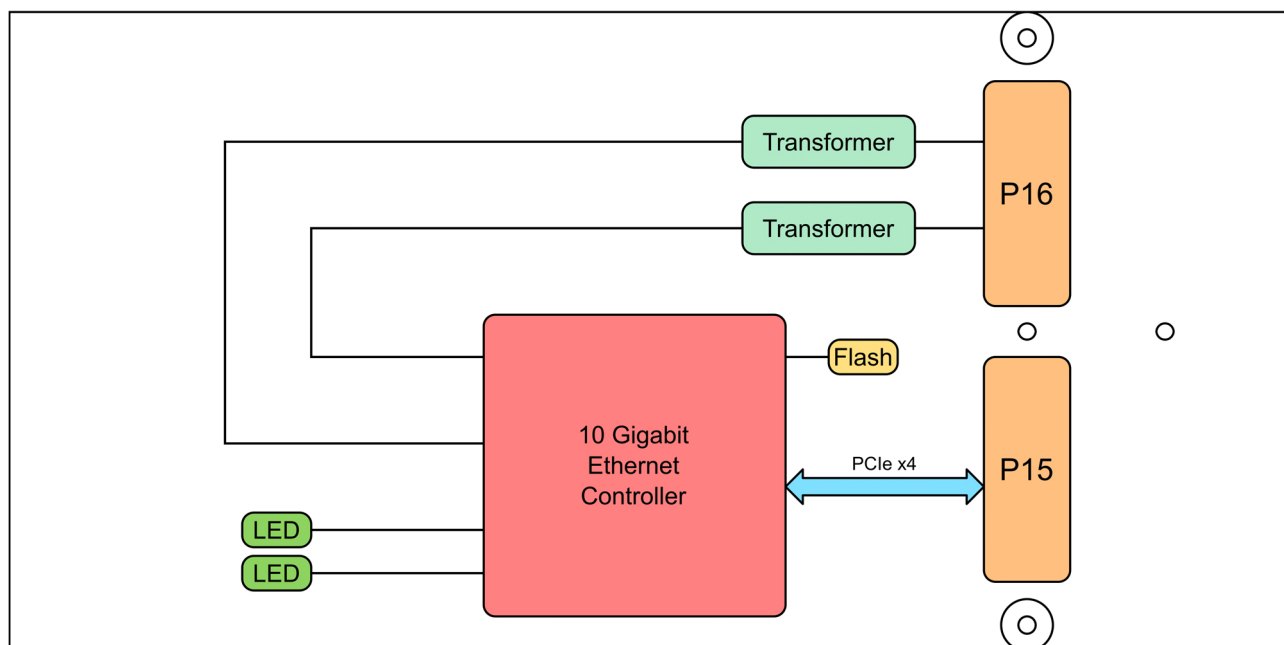- o   For operating systems not supported by Intel, please contact TEWS.

Figure 1-1 : Block Diagram

2 Technical Specification

XMC Interface	
Mechanical Interface	Conduction Cooled Switched Mezzanine Card (CCXMC) Interface conforming to ANSI/VITA 42.0 and ANSI/VITA 20 Standard single-width (143.75 mm x 74 mm)
Electrical Interface	x4 PCI Express (Specification 3.0) compliant interface conforming to ANSI/VITA 42.3

On Board Devices	
10 Gigabit Ethernet Controller	X710-AT2 (Intel)
64 Mbit Serial Flash for Boot ROM	W25Q64JV (Winbond)

I/O Interface		
Number of Channels	2	
I/O Standards	10GBase-T NBase-T 1000Base-T 100Base-TX	
I/O Connector	Back I/O P16 (Samtec ASP-103614-04 or compatible) Both ports mapped in X12d range or both ports mapped in X8d range (VITA46.9)	

Physical Data		
Power Requirements	580mA typical @ VPWR = +5V (two channel, no link) app. additional 45mA to 195mA per link 280mA typical @ VPWR = +12V (two channel, no link) app. additional 15mA to 80mA per link	
Temperature Range	Operating	-40°C to +85°C (Card Edge Temperature)
	Storage	-40°C to +85°C
MTBF	441000 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	99 g	

Table 2-1 : Technical Specification

3 Handling and Operation Instructions

3.1 ESD Protection

⚠	This CCXMC 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 CCXMC module requires adequate conduction cooling!

4 PCI Express Interface

4.1 X710 PCI Express Identifiers

Vendor-ID	0x8086 (Intel)
Device-ID	0x15FF (X710 for 10GBASE-T)
Class Code	0x020000 (Ethernet Controller)
Subsystem Vendor-ID	0x8086 (Intel)
Subsystem Device-ID	0x0000

Table 4-1 : X710 PCI Express Identifiers

5 Ethernet Interface Status LEDs

The TXMC397 provides an individual LINK/ACT-LED and two individual SPEED-LEDs for each of the both Ethernet Interfaces. Due to the fact that CCXMCs are mounted upside-down on the carrier card the Status LEDs are visible on the back side of the TXMC397. A marking is placed close to the three Status LEDs to indicate the Ethernet Port they correspond to.

See table below for more details:

LINK/ACT LED (green)	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)

SPEED LEDs	Description
GREEN	Indicates 10Gbit/s link
ORANGE	Indicates 5Gbit/s, 2.5Gbit/s or 1000Mbit/s link
OFF	Indicates 100Mbit/s link

Table 5-1 : Status LEDs

Figure 5-1 : Status LEDs

6 Pin Assignment – I/O Connectors

6.1 Back I/O P16 Connector (TXMC397-10R)

	A	B	C	D	E	F
19	NC	NC	NC	NC	NC	NC
18	NC	NC	NC	NC	NC	NC
17	PORT2_TX2/RX2+	PORT2_TX2/RX2-	NC	PORT2_TX3/RX3+	PORT2_TX3/RX3-	NC
16	NC	NC	NC	NC	NC	NC
15	PORT2_TX0/RX0+	PORT2_TX0/RX0-	NC	PORT2_TX1/RX1+	PORT2_TX1/RX1-	NC
14	NC	NC	NC	NC	NC	NC
13	NC	NC	NC	NC	NC	NC
12	NC	NC	NC	NC	NC	NC
11	NC	NC	NC	NC	NC	NC
10	NC	NC	NC	NC	NC	NC
9	NC	NC	NC	NC	NC	NC
8	NC	NC	NC	NC	NC	NC
7	PORT1_TX2/RX2+	PORT1_TX2/RX2-	NC	PORT1_TX3/RX3+	PORT1_TX3/RX3-	NC
6	NC	NC	NC	NC	NC	NC
5	PORT1_TX0/RX0+	PORT1_TX0/RX0-	NC	PORT1_TX1/RX1+	PORT1_TX1/RX1-	NC
4	NC	NC	NC	NC	NC	NC
3	NC	NC	NC	NC	NC	NC
2	NC	NC	NC	NC	NC	NC
1	NC	NC	NC	NC	NC	NC

Table 6-1 : Back I/O P16 Connector (TXMC397-10R)

Both ports lie within the X12d mapping (VITA46.9)

6.2 Back I/O P16 Connector (TXMC397-20R)

	A	B	C	D	E	F
19	NC	NC	NC	NC	NC	NC
18	NC	NC	NC	NC	NC	NC
17	NC	NC	NC	NC	NC	NC
16	NC	NC	NC	NC	NC	NC
15	NC	NC	NC	NC	NC	NC
14	NC	NC	NC	NC	NC	NC
13	PORT2_TX2/RX2+	PORT2_TX2/RX2-	NC	PORT2_TX3/RX3+	PORT2_TX3/RX3-	NC
12	NC	NC	NC	NC	NC	NC
11	PORT2_TX0/RX0+	PORT2_TX0/RX0-	NC	PORT2_TX1/RX1+	PORT2_TX1/RX1-	NC
10	NC	NC	NC	NC	NC	NC
9	NC	NC	NC	NC	NC	NC
8	NC	NC	NC	NC	NC	NC
7	NC	NC	NC	NC	NC	NC
6	NC	NC	NC	NC	NC	NC
5	NC	NC	NC	NC	NC	NC
4	NC	NC	NC	NC	NC	NC
3	PORT1_TX2/RX2+	PORT1_TX2/RX2-	NC	PORT1_TX3/RX3+	PORT1_TX3/RX3-	NC
2	NC	NC	NC	NC	NC	NC
1	PORT1_TX0/RX0+	PORT1_TX0/RX0-	NC	PORT1_TX1/RX1+	PORT1_TX1/RX1-	NC

Table 6-2 : Back I/O P16 Connector (TXMC397-20R)

Both ports lie within the X8d mapping (VITA46.9)