TCPS275

3U CompactPCI Serial XMC Carrier

Version 1.0

User Manual

Issue 1.0.0

July 2020

TCPS275-10R

1 Slot Standard-XMC Carrier, PCIe x4, VPWR = 12 V

Style Conventions

Hexadecimal characters are specified with prefix 0x, i.e. 0x029E (that means hexadecimal value 029E).

For signals on hardware products, an ‚Active Low' is represented by the signal name with # following, i.e. IP_RESET#.

Access terms are described as:

W	Write Only
R	Read Only
R/W	Read/Write
R/C	Read/Clear
R/S	Read/Set

Issue	Description	Date
1.0.0	Initial Issue	July 2020

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1 Product Description

The TCPS275 is a PICMG CPCI-S.0 R2.0 compatible 3U module that provides one slot for a single-width XMC module used to build modular, flexible and cost effective I/O solutions for all kinds of applications like process control, medical systems, telecommunication and traffic control. The TCPS275 is a versatile solution to upgrade well known XMC I/O solutions to the ComapctPCI Serial standard.

The PCI Express x4 link from the host board to the XMC module is enhanced by a PCIe Gen3 Redriver, allowing safe operation of XMC modules in distributed PCIe systems.

The TCPS275 supports XMC front panel I/O.
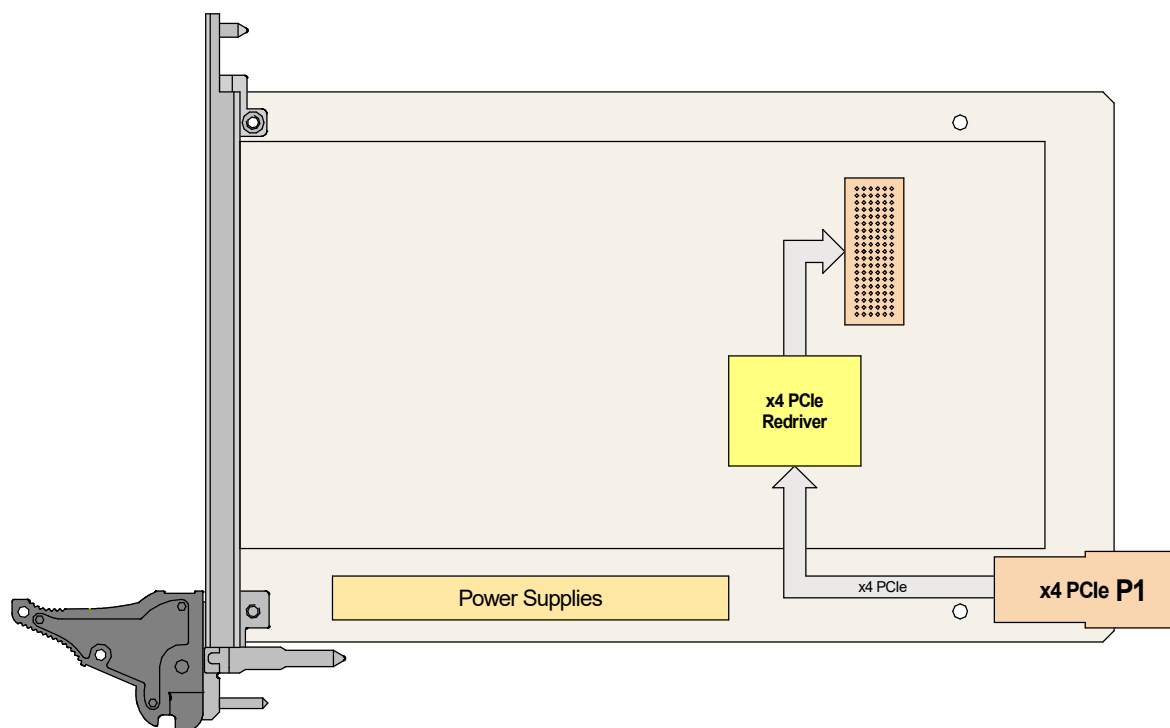
VPWR is 12 V for all variants.

Figure 1-1: Block Diagram

2 Technical Specification

CPCI-S.0 Interface	
Mechanical Interface	Compact Serial 3U Front Board conforming to PICMG CPCI-S.0 R2.0
Available Interfaces	PCIe: x4 link USB: not supported SATA: not supported I²C, WAKE, GA[0:2]: Connected to XMC slot
XMC Interface	
Mechanical Interface	Single-Width XMC Mezzanine Card conforming to ANSI/VITA 42.0-2008 (R2014) ANSI/VITA 42.3-2006 (R2014)
PCIe Interface	PCIe x4 link, connected through PCIe Gen 3 redriver
VPWR	12 V
On Board Devices	
PCIe Redriver	DS80PCI402 (Texas Instruments)
I/O Interface	
I/O Access	XMC Front Panel I/O
Physical Data	
Power Requirements	25 mA typical @ +12 V DC (without XMC)
Available Slot Power	3.3 V: 3 A VPWR: Connected to the backplane 12 V
Temperature Range	Operating: -40°C to +85°C Storage: -40°C to +85°C
MTBF	TCPS275-10R: 1 026 000 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	TCPS275-10R: 115 g

Table 2-1: Technical Specification

3 Handling and Operating Instructions

3.1 ESD Protection

<table>
<tr>
<td>The TCPS275 module is sensitive to static electricity. Packing, unpacking and all other module handling has to be done in an ESD/EOS protected Area.</td>
</tr>
</table>

4   XMC Interface

4.1 Installation of an XMC Module

The XMC module has to be mounted on the TCPS275 prior to installation into the system.

> **Before installing an XMC module, be sure that the power supply for the TCPS275 is turned off. TCPS275 and XMC are Electrostatic Sensitive Devices (ESD). Use an anti-static mat connected to a wristband when handling or installing the components.**

If the XMC has a front panel, first remove the cover from the XMC front panel cut-out of the TCPS275. Install the XMC at an angle so that the XMC front panel pushes through the XMC front panel cut-out. Then rotate down to mate with the XMC connectors on the TCPS275. If the XMC has no front panel, simply plug in the XMC, and leave the cover in the XMC front panel cut-out of the TCPS275.

After the XMC module has been installed, it can be secured on the TCPS275 using the mounting screws that come with the XMC module. There are four screw mounting locations, two at the XMC front panel and two at the standoffs near the XMC bus connectors.

4.2   VPWR

VPWR is 12 V. VPWR is connected to the 12 V backplane power supply.

According to the XMC specification, VPWR can be 5 V or 12 V, and it is up to the XMC to deal with both power supply voltage levels. Nevertheless, there are some XMCs on the market that work only with VPWR = 5 V, sometimes with remarkable and non-reversible effects when they are powered with VPRW = 12 V.

> **Make sure that your VPWR setting matches the requirements of your XMC.**

4.3   Power Limits for XMC Modules

The following current limits have to be taken into account:

TCPS275	Voltage	Current Limits
TCPS275-10R	3.3 V	4 A
	VPWR (+12 V)	6 A

Table 4-1: Current Limits for the XMC Modules

The power supply for the XMC slot is stable approximately 5ms after the system power supply is stable.

5 Indicators

5.1 Front Panel LED Indicators

For a quick visual inspection, the TCPS275 module provides a front panel LED.

LED
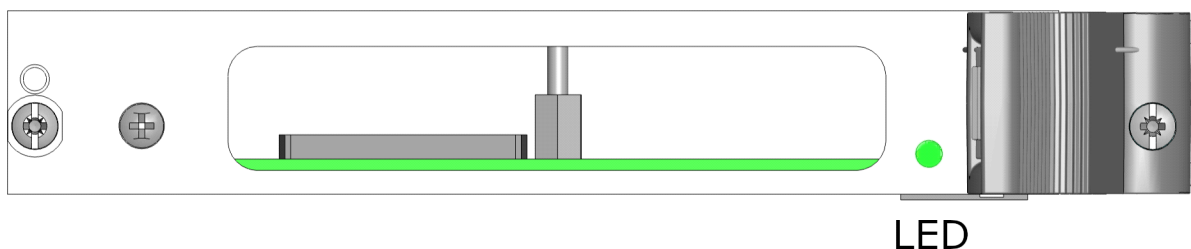
Figure 5-1: Front Panel LED View

LED	Color	State	Description
Front Panel	Red	On	Power Fail
		Off	Power Good, or Power is off
	Green	On	XMC Detected
		Off	No XMC Present, or Power is off

Table 5-1: Front Panel LED

6 I/O Connectors

6.1 Overview
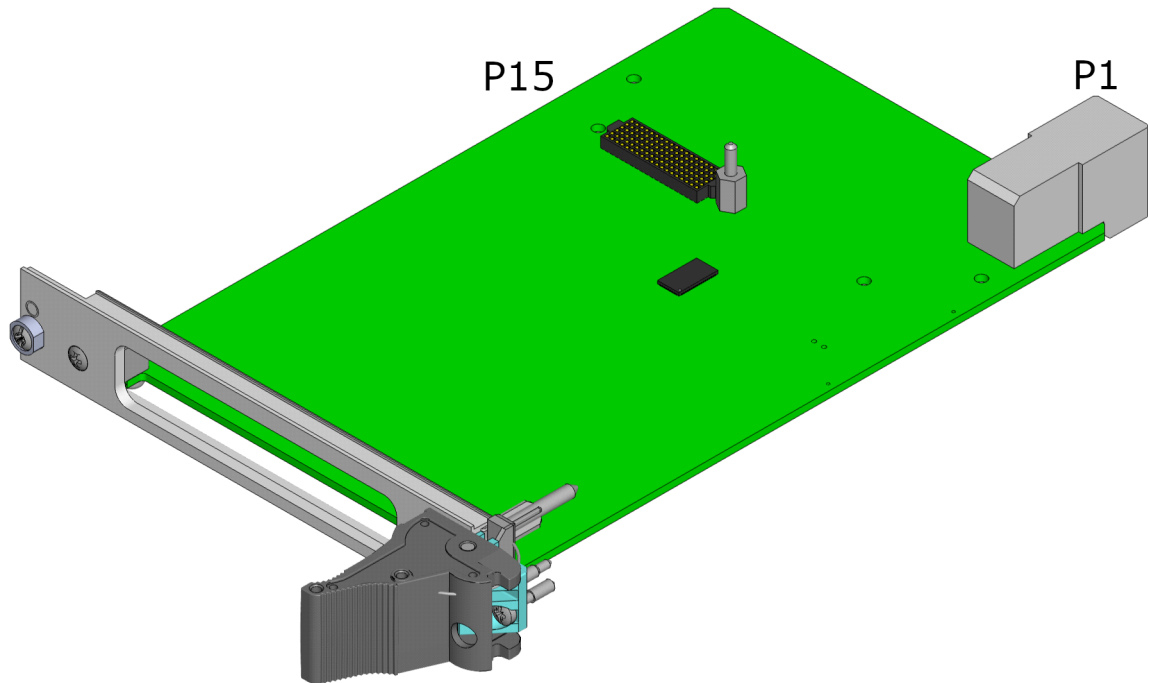
Figure 6-1: Connector Overview

6.2 CPCI-S.0 P1 Connector

Pin	1 - 01	1 - 02	1 - 03	1 - 04	1 - 05	1 - 06
A	+12V	GND	1_USB3_Tx+	GND	1_PE_Tx00+	GND
B	STANDBY	I²C_SCL	1_USB3_Tx-	1_USB2+	1_PE_Tx00-	1_PE_Tx02+
C	GND	I²C_SDA	GA0	1_USB2-	GND	1_PE_Tx02-
D	+12V	GND	1_USB3_Rx+	GND	1_PE_Rx00+	GND
E	+12V	reserved	1_USB3_Rx-	PE_CLKIN+	1_PE_Rx00-	1_PE_Rx02+
F	GND	reserved	GA1	PE_CLKIN-	GND	1_PE_Rx02-
G	+12V	GND	SATA_SDI	GND	1_PE_Tx01+	GND
H	+12V	RST#	SATA_SDO	1_SATA_Tx+	1_PE_Tx01-	1_PE_Tx03+
I	GND	WAKE_OUT#	GA2	1_SATA_Tx-	GND	1_PE_Tx03-
J	+12V	GND	SATA_SCL	GND	1_PE_Rx01+	GND
K	+12V	PCIE_EN#	SATA_SL	1_SATA_Rx+	1_PE_Rx01-	1_PE_Rx03+
L	GND	SYSEN#	GA3	1_SATA_Rx-	GND	1_PE_Rx03-

Table 6-1: Peripheral Slot P1 Pin Assignment

To support the XMC IPMI EEPROM, the XMC IPMI I²C bus is connected to the CPCI-S.0 I²C System Management Bus. In addition, the XMC GA[2-0] signals are connected to the CPCI-S.0 GA[0-2] geographical address lines, taking into account the XMC I2C Address Decoding. The GA3 signal is not connected. If a different configuration is needed, please contact TEWS.

WAKE_OUT# is connected to the XMC WAKE# signal. If a different configuration is needed, please contact TEWS.

6.3 XMC P15 Connector

Pin	A	B	C	D	E	F
01	PET0p0	PET0n0	3.3V	PET0p1	PET0n1	VPWR
02	GND	GND	TRST#	GND	GND	MRSTI#
03	PET0p2	PET0n2	3.3V	PET0p3	PET0n3	VPWR
04	GND	GND	TCK	GND	GND	MRSTO#
05	PET0p4	PET0n4	3.3V	PET0p5	PET0n5-	VPWR
06	GND	GND	TMS	GND	GND	+12V
07	PET0p6	PET0n6	3.3V	PET0p7	PET0n7	VPWR
08	GND	GND	TDI	GND	GND	-12V
09	-	-	-	-	-	VPWR
10	GND	GND	TDO	GND	GND	GA0
11	PER0p0	PER0n0	MBIST#	PER0p1	PER0n1	VPWR
12	GND	GND	GA1	GND	GND	MPRESENT#
13	PER0p2	PER0n2	3.3V AUX [1]	PER0p3	PER0n3	VPWR
14	GND	GND	GA2	GND	GND	MSDA
15	PER0p4	PER0n4	-	PER0p5	PER0n5	VPWR
16	GND	GND	MVMRO [2]	GND	GND	MSCL
17	PER0p6	PER0n6	-	PER0p7	PER0n7	-
18	GND	GND	-	GND	GND	-
19	REFCLK+0	REFCLK-0	-	WAKE# [3]	ROOT0#	-

Table 6-2: XMC Slot P15 Pin Assignment

To support the XMC IPMI EEPROM, the XMC IPMI I²C bus is connected to the CPCI-S.0 I²C System Management Bus. In addition, the XMC GA[2-0] signals are connected to the CPCI-S.0 GA[0-2] geographical address lines, taking into account the XMC I2C Address Decoding. If a different configuration is needed, please contact TEWS.

ROOT#, MRSTO and MBIST# are not supported.

[1] 3.3V_AUX is not connected. If a different configuration is needed, please contact TEWS.

[2] MVMRO is set to logic high by default, prohibiting write access. If a different configuration is needed, please contact TEWS.

[3] WAKE# is connected to the CPCI-S WAKE_OUT# signal. If a different configuration is needed, please contact TEWS.