SYSTEM

Technical Information

DU2-PONY

XMC Module

Dual-Port Isolated RS-232 Interface

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Contents

About this Manual

This manual is a short form description of the technical aspects of the DU2-PONY, required for installation and system integration. It is intended for the advanced user only.

Edition History

Ed.	Contents/*Changes*	Author	Date
1	Technical Information DU2-PONY, english, preliminary edition Text #6762, File: du2_ti.wpd	jj	26 June 2012
2	Added photos, added XMC 2.0 information	jj	17 December 2012
3	Added photo XMC 2.0 VITA 61 connector P15	jj	13 August 2014
4	MTBF added	jj	24 June 2016

Related Documents

Related Information	
DU1-MUSTANG Home	www.ekf.com/d/dcom/du1/du1.html
DU2-PONY Home	www.ekf.com/d/dcom/du2/du2.html
CU6-RATTLE (CompactPCI® Assembly)	www.ekf.com/c/ccom/cu6/cu6.html
SU9-RATTLE (CompactPCI® Serial Assembly)	www.ekf.com/s/su9/su9.html
CK2-SESSION XMC Carrier (CompactPCI® Card)	www.ekf.com/c/cpcc/ck2/ck2.html
SK2-SESSION XMC Carrier (CompactPCI® Serial Card)	www.ekf.com/s/sk2/sk2.html

Nomenclature

Signal names used herein with an attached '#' designate active low lines.

Trade Marks

Some terms used herein are property of their respective owners, e.g.

- CompactPCI, CompactPCI PlusIO, CompactPCI Serial: ® PICMG
- Windows: ® Microsoft
- EKF, ekf system: ® EKF

EKF does not claim this list to be complete.

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This document has been edited as carefully as possible. We apologize for any potential mistake. Information provided herein is designated exclusively to the proficient user (system integrator, engineer). EKF can accept no responsibility for any damage caused by the use of this manual.

Standards

Reference Documents		
Term	Document	Origin
CompactPCI®	CompactPCI Specification, PICMG® 2.0 R3.0, Oct. 1, 1999	www.picmg.org
CompactPCI® PlusIO	CompactPCI PlusIO Specification, PICMG® 2.30 R1.0, November 11, 2009	www.picmg.org
CompactPCI® Serial	CompactPCI Serial Specification, PICMG® CPCI-S.0 R1.0, March 2, 2011	www.picmg.org
PCI Express®	PCI Express® Base Specification	www.pcisig.com
RS-232	TIA/EIA-232-F Standard	www.tiaonline.org
XMC	ANSI/VITA 42.0 & 42.3, IEEE P1386.1 / Draft 2.4 & Draft 2.4a	www.vita.com
XMC 2.0	ANSI/VITA 61.0	www.vita.com

Datasheets

Useful External Documents	
OXPCIe952	Product Brief • PCI Express® bridge to dual serial and parallel port • www.plxtech.com/products/uart/oxpcie952
ADM3252E	Datasheet • Isolated, Dual Channel, RS-232 Line Driver/Receiver • www.analog.com/static/imported-files/data_sheets/ADM3252E.pdf

Technical Features

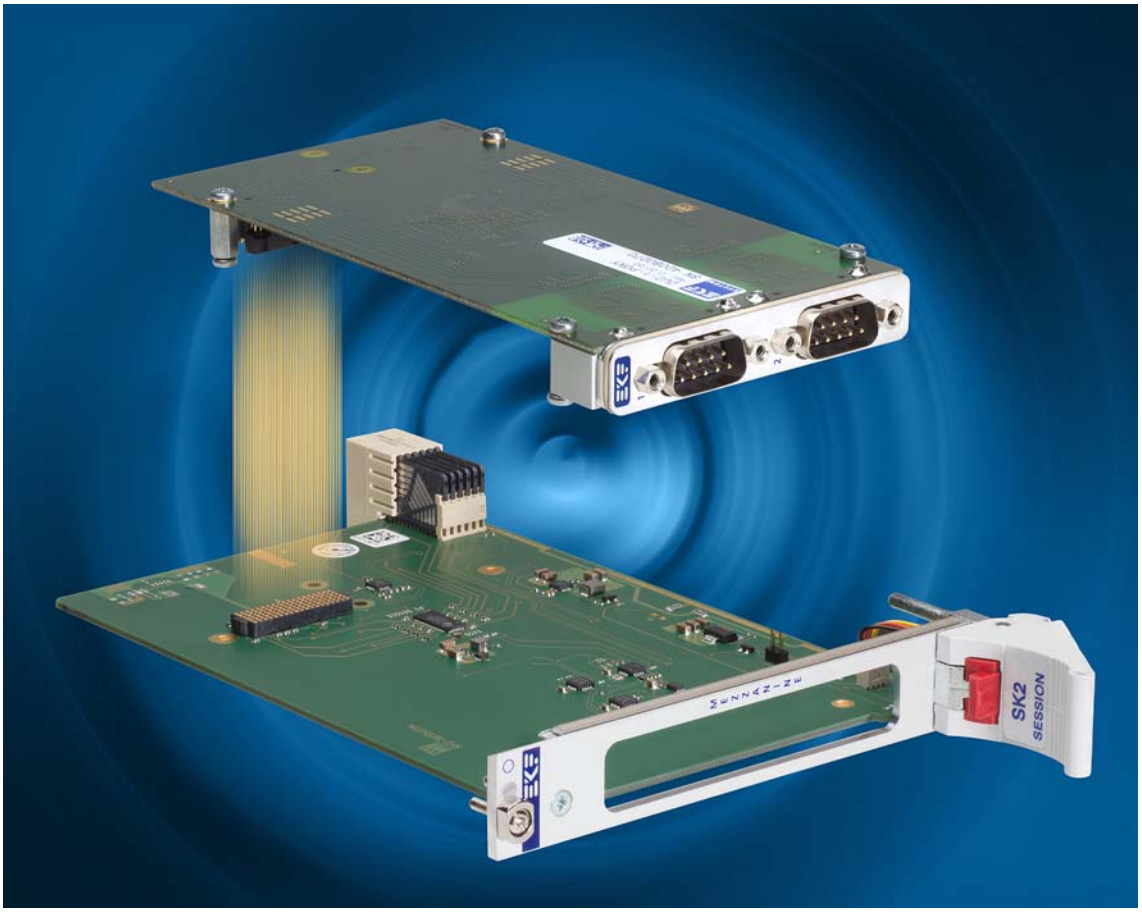
Feature Summary

Feature Summary
▸ Form factor XMC single-width mezzanine card 139mm x 74mm
▸ Stack height 10mm XMC to host
▸ Host I/F Connector P15 XMC - PCI Express, single lane, single link
▸ Option P15 connector according to XMC 2.0
▸ +3.3V operated (VPWR not in use)
▸ PCI Express® bridge to dual-port UART
▸ PLX Oxford 950 type UART w. 128-byte transmit/receive FIFO
▸ Asynchronous baud rates up to 15Mbps (UART)
▸ Windows® & Linux device driver support
▸ 2.5kV isolation barrier RS-232 transceivers (Analog Devices *iso*Power)
▸ Transceivers meet EIA/TIA-232-E specifications
▸ High data rate up to 460kbps
▸ ±8 kV/±15 kV ESD protection on transceiver input/output pins
▸ High common-mode transient immunity >25 kV/µs
▸ Suitable for high noise data communications and diagnostic ports
▸ Two front bezel male 9-pin D-Sub connectors (RXD/TXD, CTS/RTS)
▸ RS-232 ports isolated against each other and board circuitry (limited to 250VAC by D-Sub connector characteristics)
▸ Suitable e.g. for industrial, transportation & instrumentation applications
▸ Designed & manufactured in Germany
▸ ISO 9001 certified quality management
▸ Long term availability
▸ Rugged solution
▸ Coating, sealing, underfilling on request
▸ RoHS compliant
▸ Operating temperature: -40°C to +85°C
▸ Storage temperature: -40°C to +85°C, max. gradient 5°C/min
▸ Humidity 5% ... 95% RH non condensing
▸ Altitude -300m ... +3000m
▸ Shock 15g 0.33ms, 6g 6ms
▸ Vibration 1g 5-2000Hz
▸ MTBF 115.2 years
▸ EC Regulatory EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

Short Description

The DU2-PONY is a XMC standard single-width mezzanine card, equipped with a PCI Express® to dual-UART bridge. Two RS-232 transceivers with internal 2.5kV isolation barrier provide for optimum noise and EMC immunity. The front bezel D-Sub connectors withstand up to 250VAC measured against shield.

The 950-style UARTs (COM ports) are compatible with any asynchronous serial application. Certified device drivers are available for Windows®. The 460kbps EIA/TIA-232-E transceivers allow for hardwired CTS/RTS handshake, and are well suited for operation in electrically harsh environments



DU2-PONY

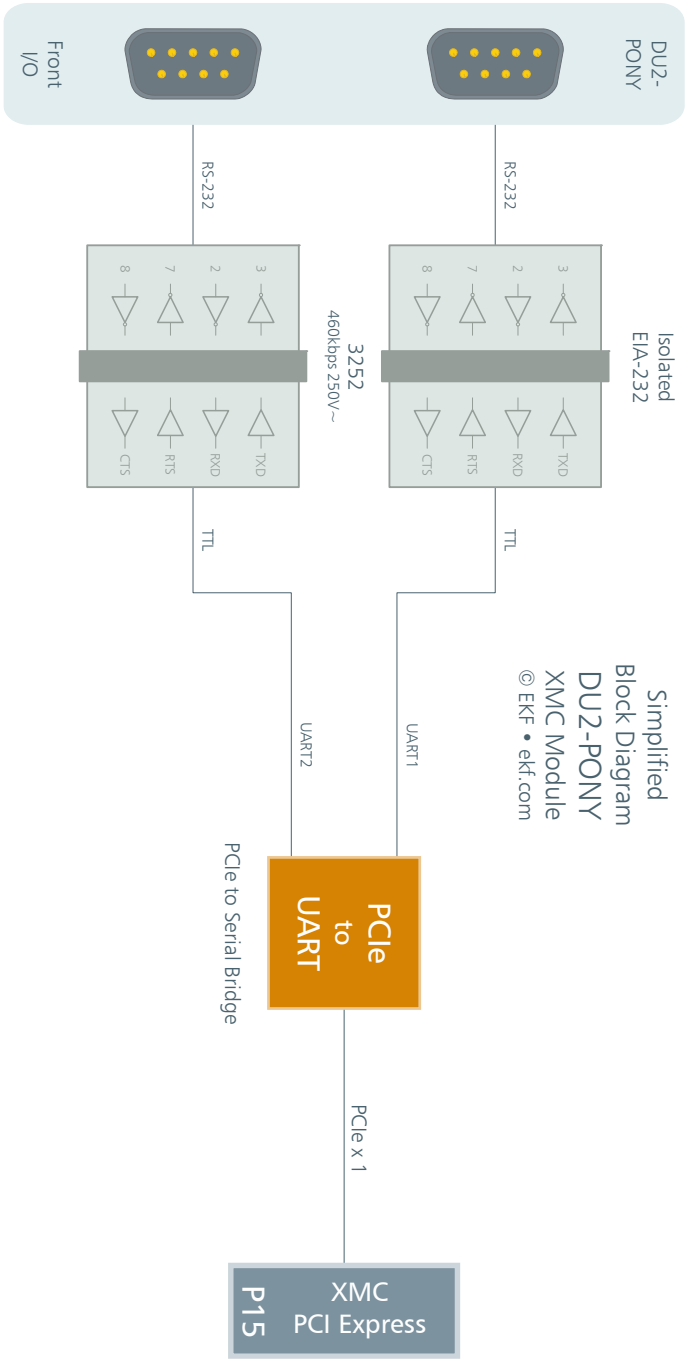
Theory of Operation

The DU2-PONY is equipped with the PLX OXPCIe952 single chip PCI Express® to UART bridge, which is suitable for asynchronous baud rates up to 15Mbps. Compared to the PC style RS-232 D-Sub pin assignment, the UART RX/TX signals are supported, and in addition CTS/RTS for (optional) hardwired handshake. The DCS, DSR, DTR and RI signals are not in use.

Two ADM3252E transceivers are provided to meet the TIA/EIA-232-E physical layer specifications. The RS-232 signals of both serial ports are isolated from the board circuitry, and also isolated from each other. Due to the D-Sub connector specification, a maximum of 250VAC between the RS-232 signals measured against shield (front bezel) must not be exceeded.

DU2-PONY

Block Diagram



Front Bezel

Installing and Replacing Components

Before You Begin

Warnings

The procedures in this chapter assume familiarity with the general terminology associated with industrial electronics and with safety practices and regulatory compliance required for using and modifying electronic equipment. Disconnect the system from its power source and from any telecommunication links, networks or modems before performing any of the procedures described in this chapter. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage. Some parts of the system can continue to operate even though the power switch is in its off state.

Caution

Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis or board front panel. Store the board only in its original ESD protected packaging. Retain the original packaging (antistatic bag and antistatic box) in case of returning the board to EKF for repair.

Installing the Board Assembly

Warning

This procedure should be done only by qualified technical personnel. Disconnect the system from its power source before doing the procedures described here. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage.

Typically you will perform the following steps:

- Switch off the system, remove the AC power cord
- Attach your antistatic wrist strap to a metallic part of the system

- Remove the board packaging, be sure to touch the board only at the front panel
- Identify the related CompactPCI® slot (peripheral slot for I/O boards, system slot for CPU boards, with the system slot typically most right or most left to the backplane)
- Insert card carefully (be sure not to damage components mounted on the bottom side of the board by scratching neighboured front panels)
- A card with onboard connectors requires attachment of associated cabling now
- Lock the ejector lever, fix screws at the front panel (top/bottom)
- Retain original packaging in case of return

Removing the Board Assembly

Warning

This procedure should be done only by qualified technical personnel. Disconnect the system from its power source before doing the procedures described here. Failure to disconnect power, or telecommunication links before you open the system or perform any procedures can result in personal injury or equipment damage.

Typically you will perform the following steps:

- Switch off the system, remove the AC power cord
- Attach your antistatic wrist strap to a metallic part of the system
- Identify the board, be sure to touch the board only at the front panel
- unfasten both front panel screws (top/bottom), unlock the ejector lever
- Remove any onboard cabling assembly
- Activate the ejector lever
- Remove the card carefully (be sure not to damage components mounted on the bottom side of the board by scratching neighboured front panels)
- Store board in the original packaging, do not touch any components, hold the board at the front panel only

Warning

Do not expose the card to fire. Battery cells and other components could explode and cause personal injury.

EMC Recommendations

In order to comply with the CE regulations for EMC, it is mandatory to observe the following rules:

- The chassis or rack including other boards in use must comply entirely with CE
- Close all board slots not in use with a blind front panel
- Front panels must be fastened by built-in screws
- Cover any unused front panel mounted connector with a shielding cap
- External communications cable assemblies must be shielded (shield connected only at one end of the cable)
- Use ferrite beads for cabling wherever appropriate
- Some connectors may require additional isolating parts

Technical Reference

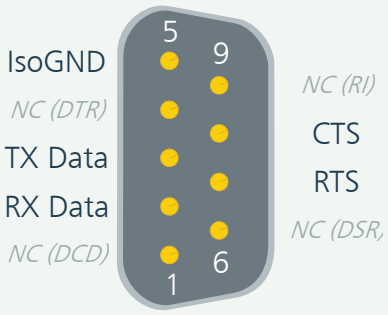
D-Sub Connectors

The DU2-PONY is equipped with two front bezel D-Sub 9-pin male connectors, which are wired to associated ADM3252E isolating RS-232 transceivers.

Ferrite beads and TVS diodes are provided for optimum ESD/EMC compliance. Both COM ports are electrically isolated from each other, and in particular from common system ground.

Serial Ports 1 / 2 • Male D-SUB 9

EKF Part No. 261.02.009.23



1	*NC (DCD)*
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	*NC (DTR)*
5	Isolated Ground
6	*NC (DSR)*
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	*NC (RI)*

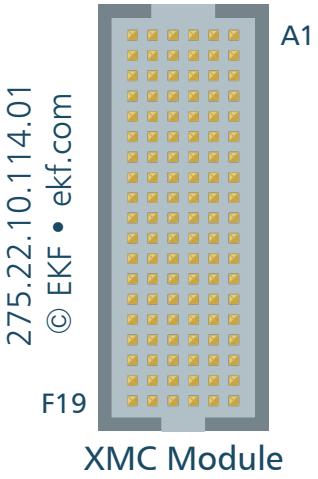
For normal bidirectional data transmission, only the RXD and TXD signals are required. Software protocol handshake (X-ON/X-OFF characters inserted into the stream) may be activated (by OXPCIe952 UART driver settings) to prevent from FIFO buffer overflow. For hardwired handshake, the signals RTS and CTS are provided in addition. Compared to the classic PC COM-port connector, some legacy control signals (DCD, DTR, DSR, RI) are not available, since they are not necessary for most industrial applications.

The maximum ADM3252E data transfer rate is specified at 460kbps, or even higher when running at reduced RS-232 capacitive load levels.

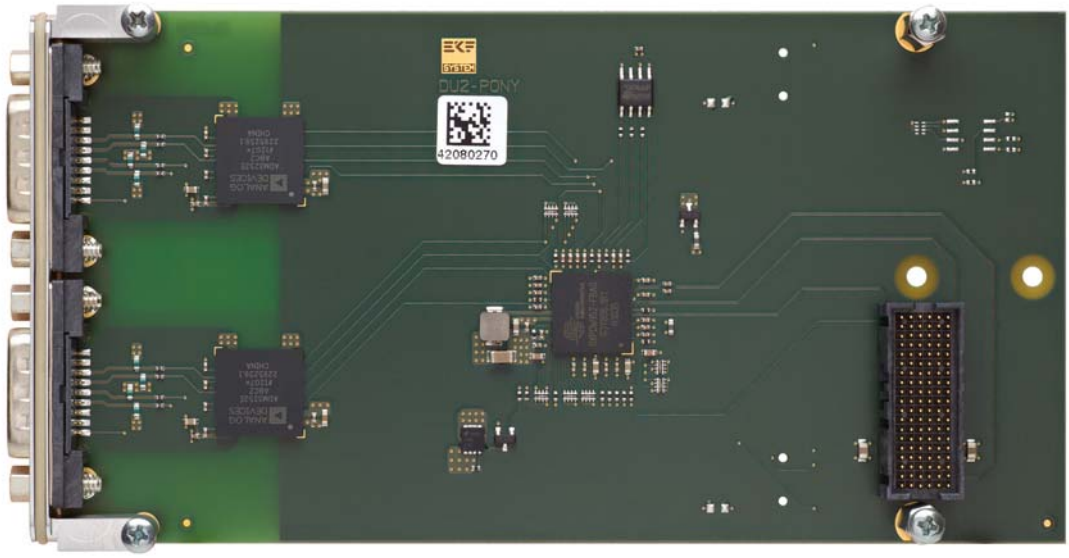
The maximum applicable isolation voltage depends mainly on the voltage rating specified for the D-Sub connectors (voltage between signal pins and isolated ground measured to frame shield and system ground). The rated connector voltage can be found as 250VAC (Suyin) or 300VDC (some other manufacturers).

P15 Mezzanine Connector

The DU2-PONY is equipped with a high speed XMC mezzanine connector P15, mating with the host board J15 and establishing the data path (PCI Express®) and power link to the carrier. The pin assignment of P15/J15 is specified by VITA 42.3. The DU2-PONY is organized as single-lane single-link PCI Express® device.

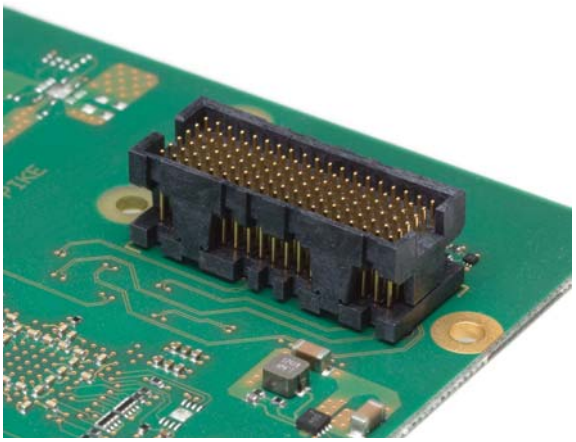


As an option, the DU2-PONY can be equipped with a P15 connector according to the XMC 2.0 style, as defined by VITA 61.0. Carrier card and module connectors J15/P15 must match - VITA 61 and VITA 42 XMC connectors are not intermateable. Both connector styles can be easily distinguished from each other by the connector body colour as visual key.

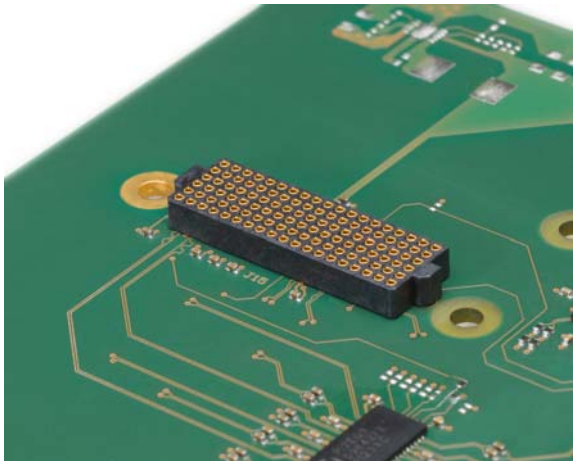


DU2-PONY Top View

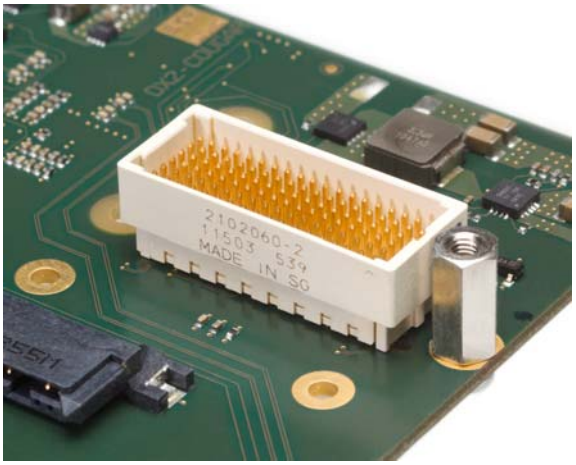
Black = VITA 42 XMC
Off-white = VITA 61 XMC 2.0



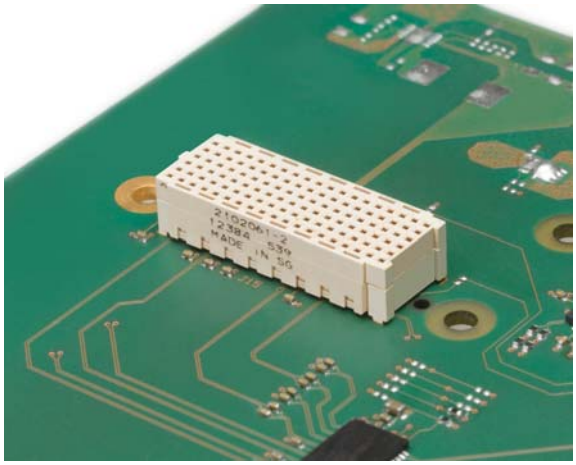
XMC Connector P15



XMC Connector J15

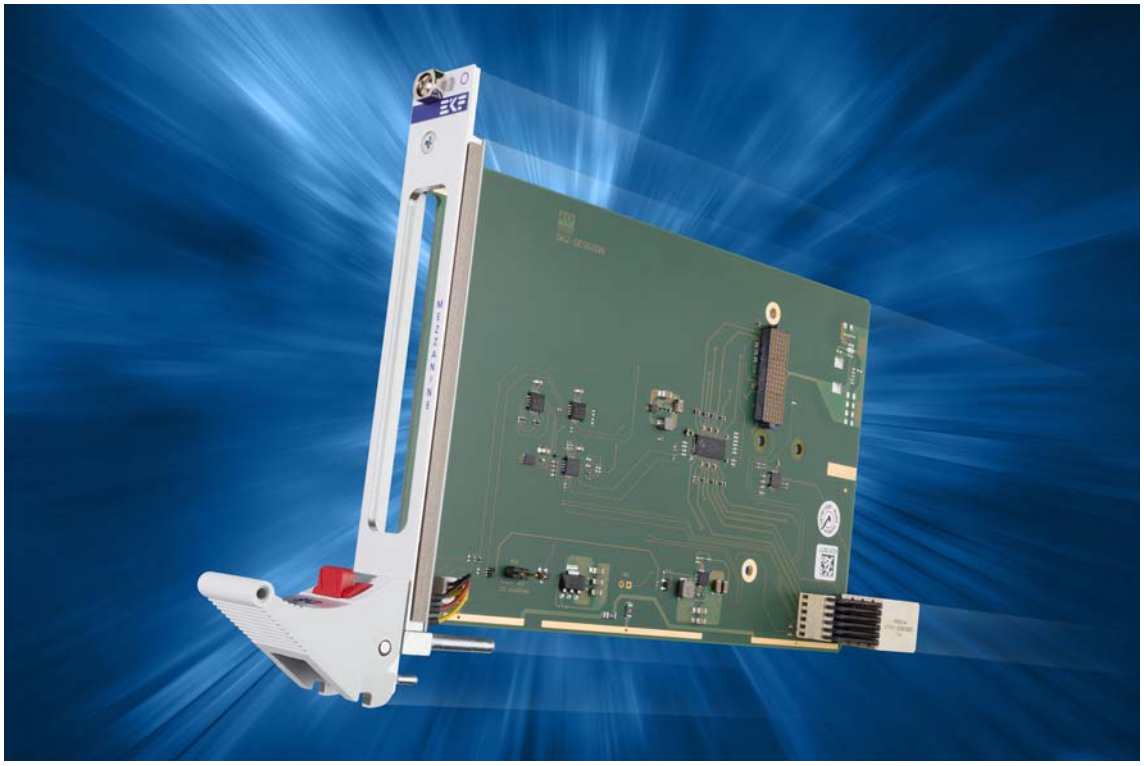


XMC 2.0 Connector P15

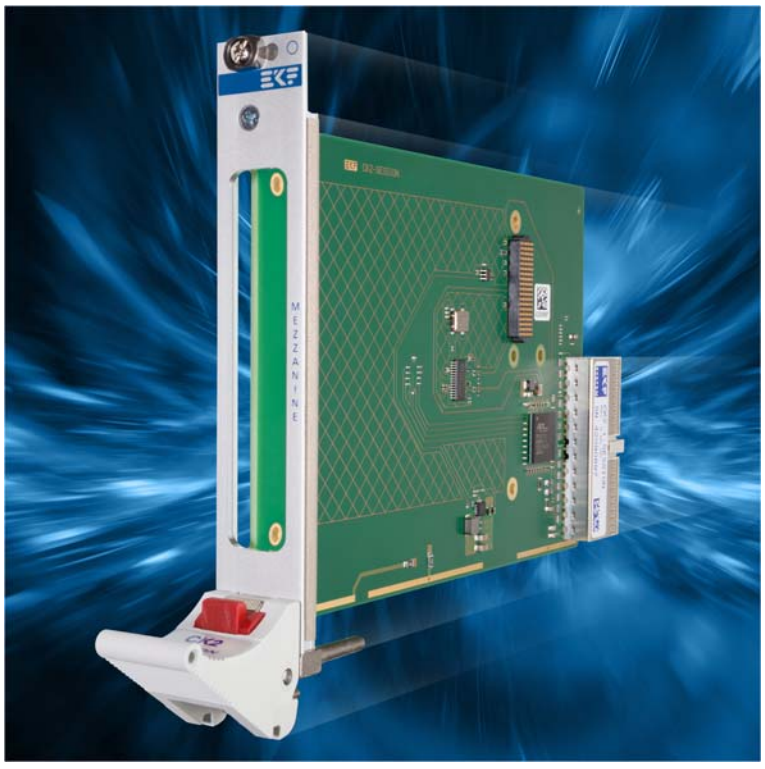


XMC 2.0 Connector J15

ANSI/VITA 42.3 defines a primary XMC connector P15, which is mandatory (for PCIe fabric), and a secondary XMC connector P16, which is optional (either fabric or user I/O). The DU2-PONY does not make use of P16. Suitable carrier cards are available from EKF, e.g. the SK2-SESSION CompactPCI® Serial XMC module carrier board, or the CK2-SESSION, a carrier for CompactPCI® Classic systems.



SK2-SESSION • CompactPCI® Serial • XMC Module Carrier



CK2-SESSION • CompactPCI® • XMC Module Carrier

XMC Connector P15 - PCIe Fabric • EKF Part No. 275.22.10.114.01						
	A	B	C	D	E	F
1	PET0P0	PET0N0	+3.3V	*PET0P1*	*PET0N1*	VPWR [2]
2	GND	GND	TRST# [1]	GND	GND	MRSTI#
3	*PET0P2*	*PET0N2*	+3.3V	*PET0P3*	*PET0N3*	VPWR [2]
4	GND	GND	*TCK*	GND	GND	*MRSTO#*
5	*PET0P4*	*PET0N4*	+3.3V	*PET0P5*	*PET0N5*	VPWR [2]
6	GND	GND	*TMS*	GND	GND	*+12V*
7	*PET0P6*	*PET0N6*	+3.3V	*PET0P7*	*PET0N7*	VPWR [2]
8	GND	GND	*TDI*	GND	GND	*-12V*
9	*RFU*	*RFU*	*RFU*	*RFU*	*RFU*	VPWR [2]
10	GND	GND	*TDO*	GND	GND	GA0 [1]
11	PER0P0	PER0N0	*MBIST#*	*PER0P1*	*PER0N1*	VPWR [2]
12	GND	GND	GA1 [1]	GND	GND	MPRESENT#
13	*PER0P2*	*PER0N2*	*+3.3V_AUX*	*PER0P3*	*PER0N3*	VPWR [2]
14	GND	GND	GA2 [1]	GND	GND	MSDA [1]
15	*PER0P4*	*PER0N4*	*RFU*	*PER0P5*	*PER0N5*	VPWR [2]
16	GND	GND	MVMRO	GND	GND	MSCL [1]
17	*PER0P6*	*PER0N6*	*RFU*	*PER0P7*	*PER0N7*	*RFU*
18	GND	GND	*RFU*	GND	GND	*RFU*
19	CLKP_XMC	CLKN_XMC	*RFU*	*WAKE#*	*ROOT0#*	*RFU*

pin positions printed italic/gray: reserved by specification / not connected

1) Serial EEPROM not populated by default (no IPMI)

2) VPWR is not in use on the DU2-PONY (+3.3V only design)

Drivers

The Windows® drivers for the PLX/Oxford UART can be downloaded here:

DU2-PONY Driver Software
www.ekf.com/d/dcom/du2/drv/

Schematics

For better understanding, the schematics of the DU2-PONY RS-232 line transceivers are available:

DU2-PONY Schematics
www.ekf.com/d/dcom/du2/img/du2_scm_6.pdf

Complete circuit diagrams for this product are available for customers on request. Signing of a non-disclosure agreement would be needed. Please contact sales@ekf.de for details.

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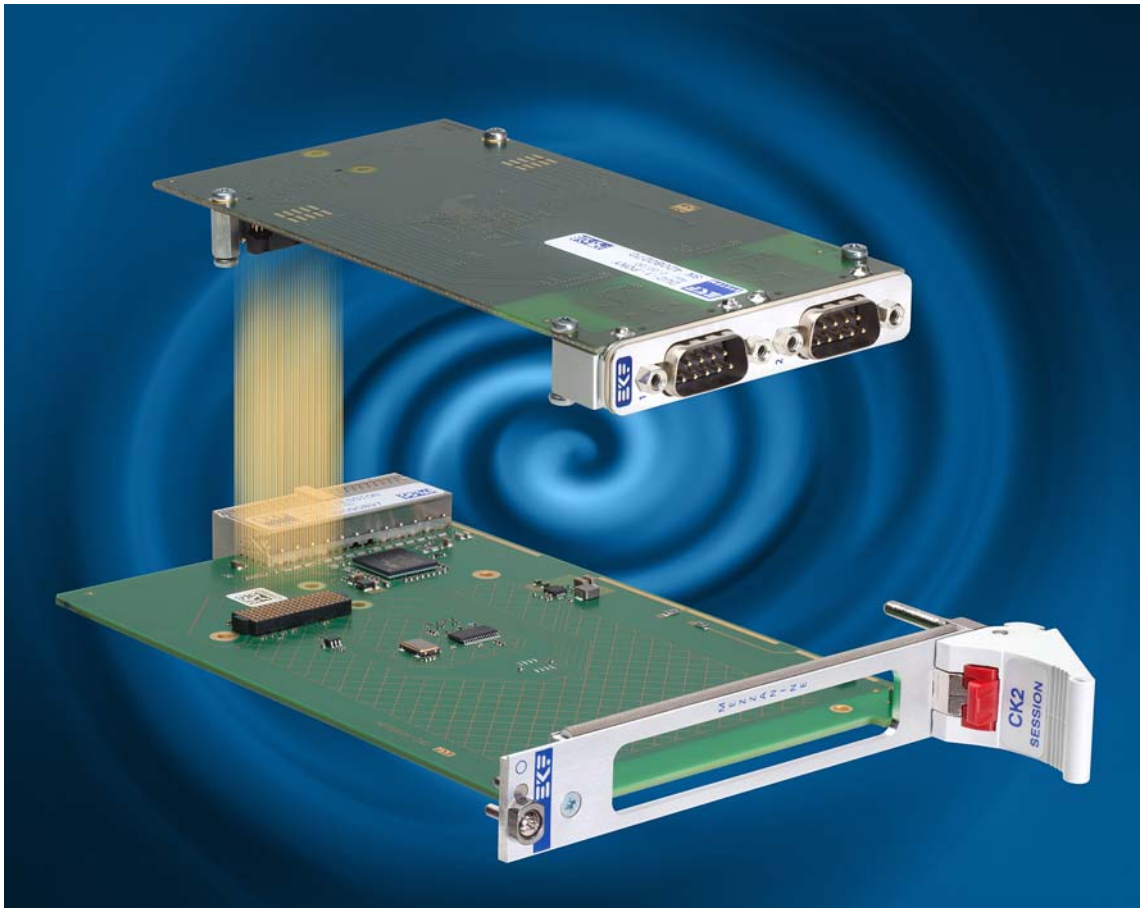

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