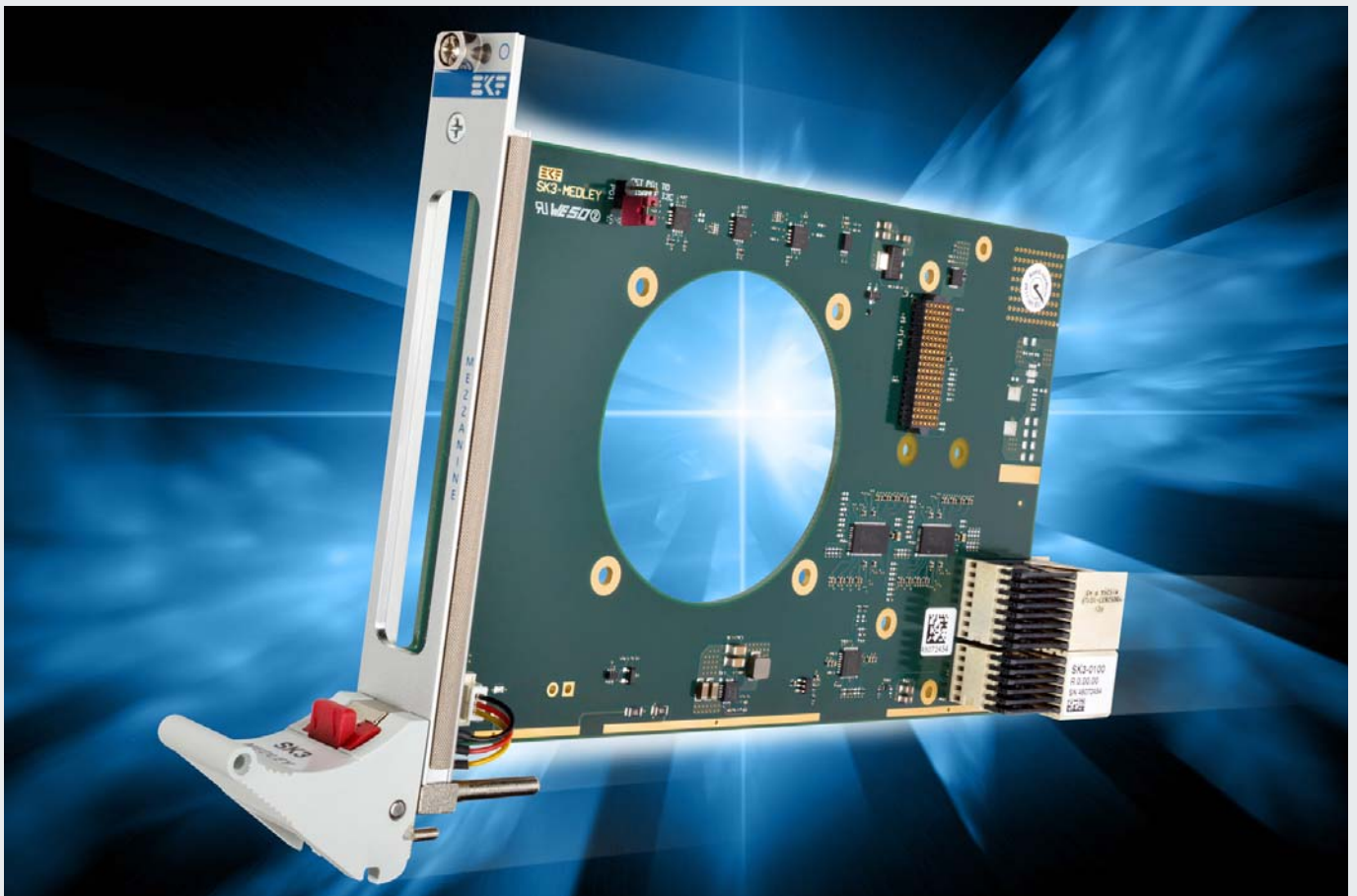# SYSTEM

Product Information

SK3-MEDLEY

CompactPCI® Serial • XMC Module Carrier PCIe® x 8

Document No. 7965 • 10 August 2016

General

The SK3-MEDLEY is a peripheral slot board for PICMG® CompactPCI® Serial systems and acts as carrier card for an XMC-style mezzanine module. XMC modules are specified by ANSI/VITA 42, as an advanced replacement for PMC modules. While using a similar form factor as PMC cards, XMC modules are provided with a PCI Express® interface.

The SK3-MEDLEY is equipped with a bidirectional 8-lane PCI Express® Gen3 redriver, for optimum 8GT/s high speed signal integrity, and should be installed into a fat pipe peripheral slot of a CompactPCI® Serial backplane. The SK3-MEDLEY can be used with 74x139mm² shortened length XMC mezzanine cards (149mm PMC style modules do not fit).
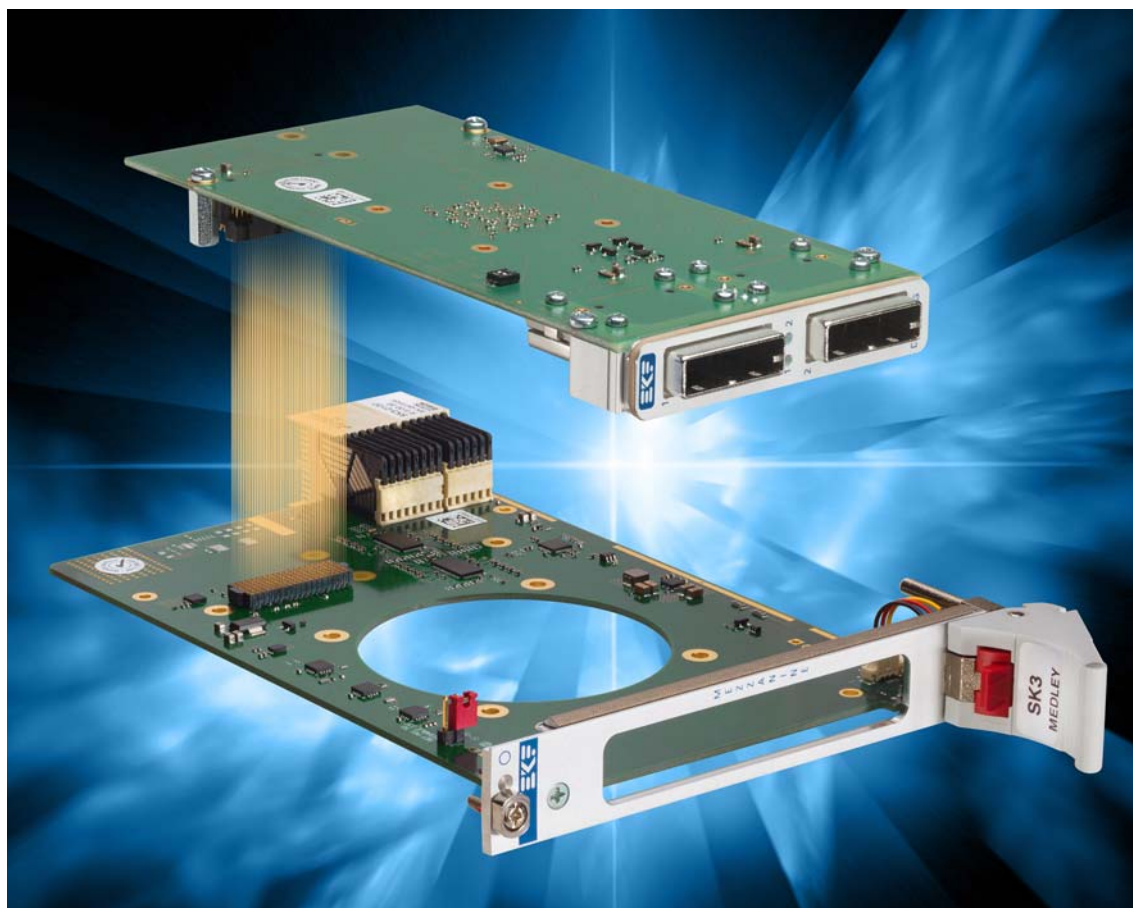

SK3-MEDLEY w. XMC Module Mounted

Theory of Operation

The SK3-MEDLEY requires at least a single PCI Express® lane from the backplane, passed over across the backplane connector P1 to the on-board PCIe redriver circuit. Up to eight PCI Express® lanes are supported, when the SK3-MEDLEY is installed into a CompactPCI® Serial *fat pipe* peripheral slot (P1/P2 backplane connectors in use). With a total link bandwidth of 64Gbps, even very demanding applications can be realized, such as a 10/40GBps Ethernet or USB 3.1 XMC mezzanine module e.g.

The on-board 8-lane bidirectional redriver is suitable up to 8.0Gbps (PCIe 3.0) data transfer rate per lane, and ensures optimum signal integrity (wider opening with respect to the eye diagrams). The XMC module connector J15 is directly tied to the redriver circuit. In addition, a zero delay PCIe Gen3 clock buffer is provided on-board. Due to space restrictions on the SK3-MEDLEY imposed by the backplane connector P2, only 139mm length XMC mezzanine modules can be populated.

SK3-MEDLEY w. XMC Module (Exploded View)

Feature Summary

Dimensions

▸ PICMG® CompactPCI® Serial standard (CPCI-S.0) peripheral slot card

▸ Single size Eurocard 3U 4HP 100x160mm^2

▸ CPCI-S backplane connectors P1 & P2 (fat pipe slot up to PCIe x 8)
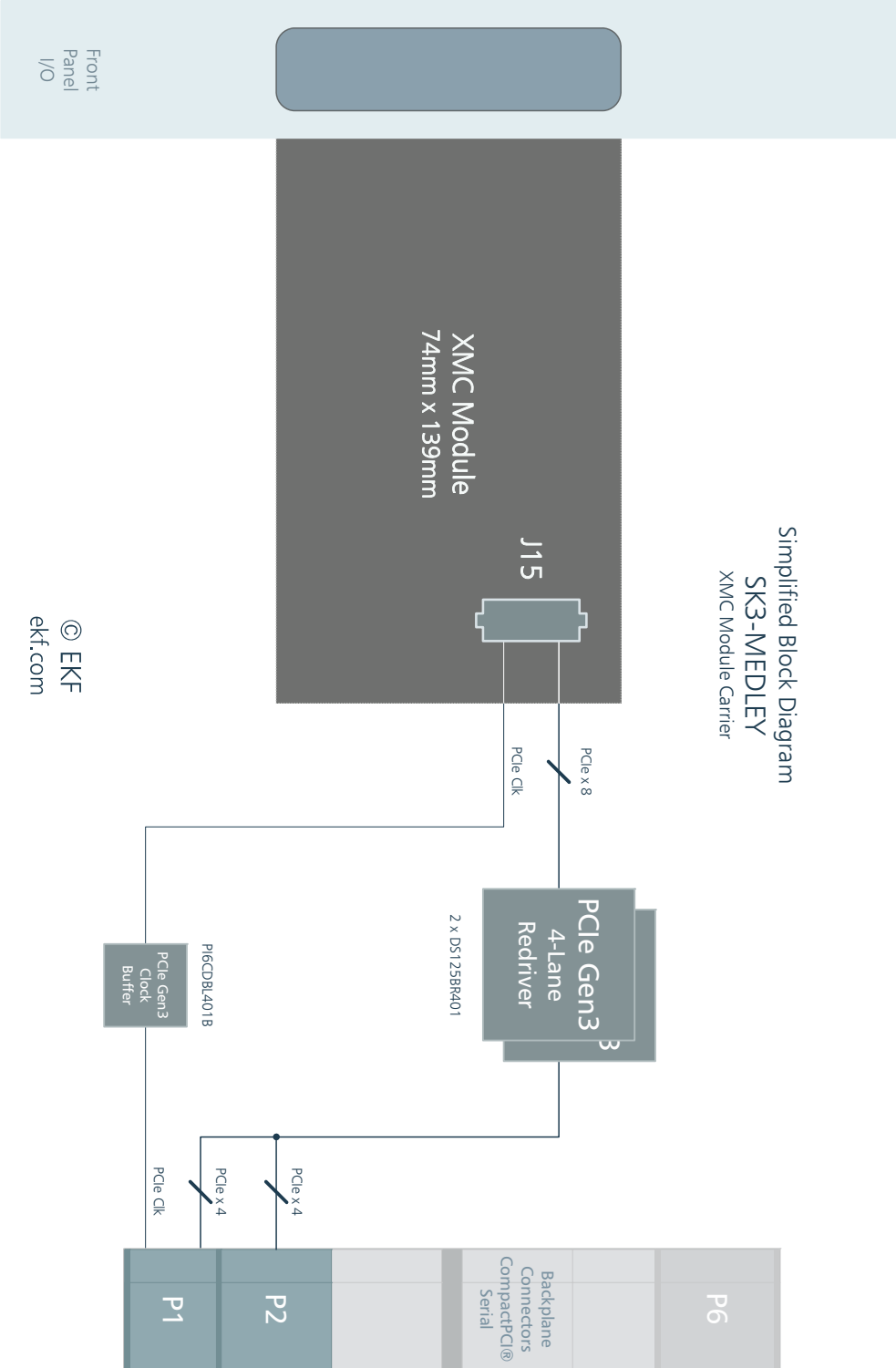
XMC Mezzanine I/F

▸ Suitable for 74x139mm^2 XMC modules (shortened length according to VITA 42 figure 3-4)

▸ XMC module connector J15 (originally defined by VITA 42 as PCIe Gen1 interface)

▸ Option XMC 2.0 module connector J15 (VITA 61) recommended for PCIe Gen2/Gen3

▸ 8 x PCI Express® lanes Gen1 (2.5GT/s), Gen2 (5.0GT/s) or Gen3 (8GT/s)

▸ 8-lane bidirectional PCIe Gen3 redriver/repeater for optimum signal integrity

▸ PCI Express® Gen3 clock buffer for optimum signal integrity

▸ +12V XMC VPWR

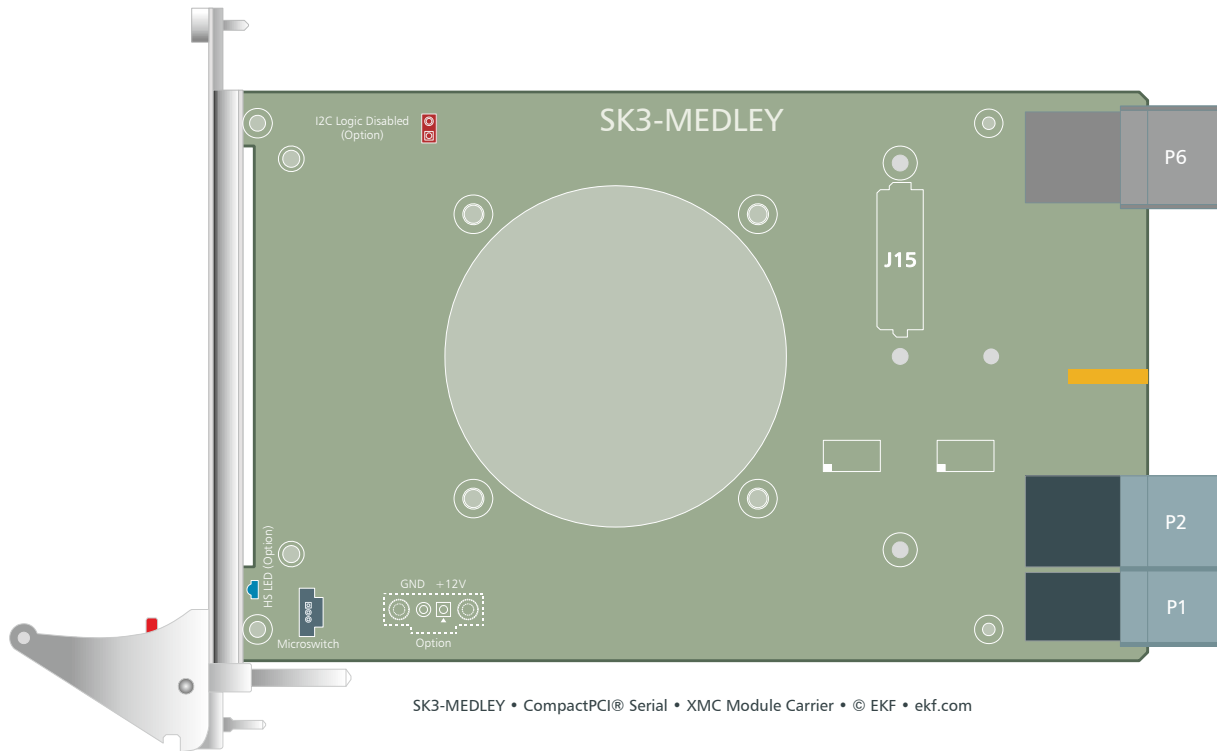▸ -12V regulator option (J15 Pin F8)

Regulatory, Environment

▸ Designed & manufactured in Germany

▸ ISO 9001 certified quality management system

▸ Long term availability

▸ Coating, sealing, underfilling on request

▸ RoHS compliant 2011/65/EC

▸ Operating temperature -40°C to +85°C (industrial temperature range)

▸ 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 111.1 years

▸ EC Regulatory EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

Block Diagram

Front
Panel
I/O

XMC Module
74mm x 139mm

J15

© EKF
ekf.com

PCIe Clk

PCIe x 8

Simplified Block Diagram
SK3-MEDLEY
XMC Module Carrier

PCIe Gen3
4-Lane
Redriver

2 x DS125BR401

PI6CDBL401B

PCIe Gen3
Clock
Buffer

PCIe Clk

PCIe x 4

PCIe x 4

P1

P2

Backplane
Connectors
CompactPCI®
Serial

P6

Board Assembly

SK3-MEDLEY

I2C Logic Disabled
(Option)

J15

P6

HS LED (Option)

Microswitch

GND +12V

Option

P2

P1

SK3-MEDLEY • CompactPCI® Serial • XMC Module Carrier • © EKF • ekf.com

PCB Opening for Optimized XMC Heat Removal

SK3-MEDLEY

I2C Logic Disabled
(Option)

J15

P6

XMC Module Area

139mm x 74mm

HS LED

Microswitch

GND +12V

Option

P2

P1

SK3-MEDLEY • CompactPCI® Serial • XMC Module Carrier • © EKF • ekf.com
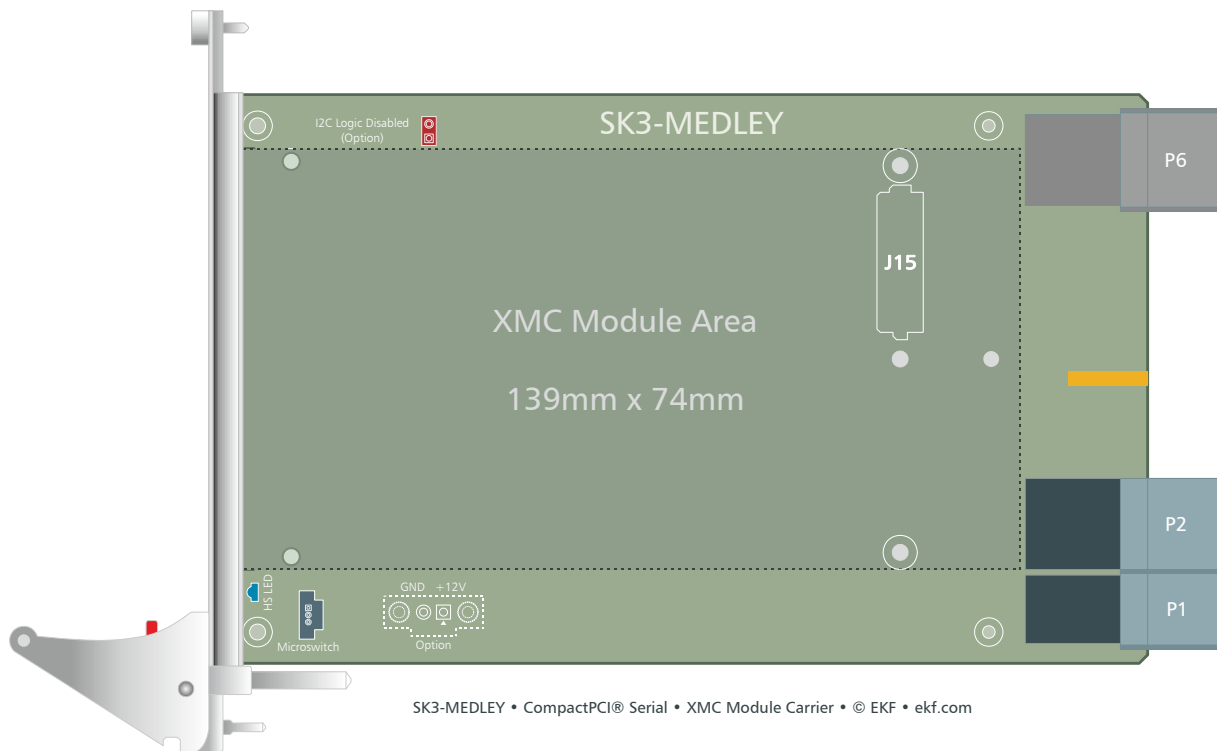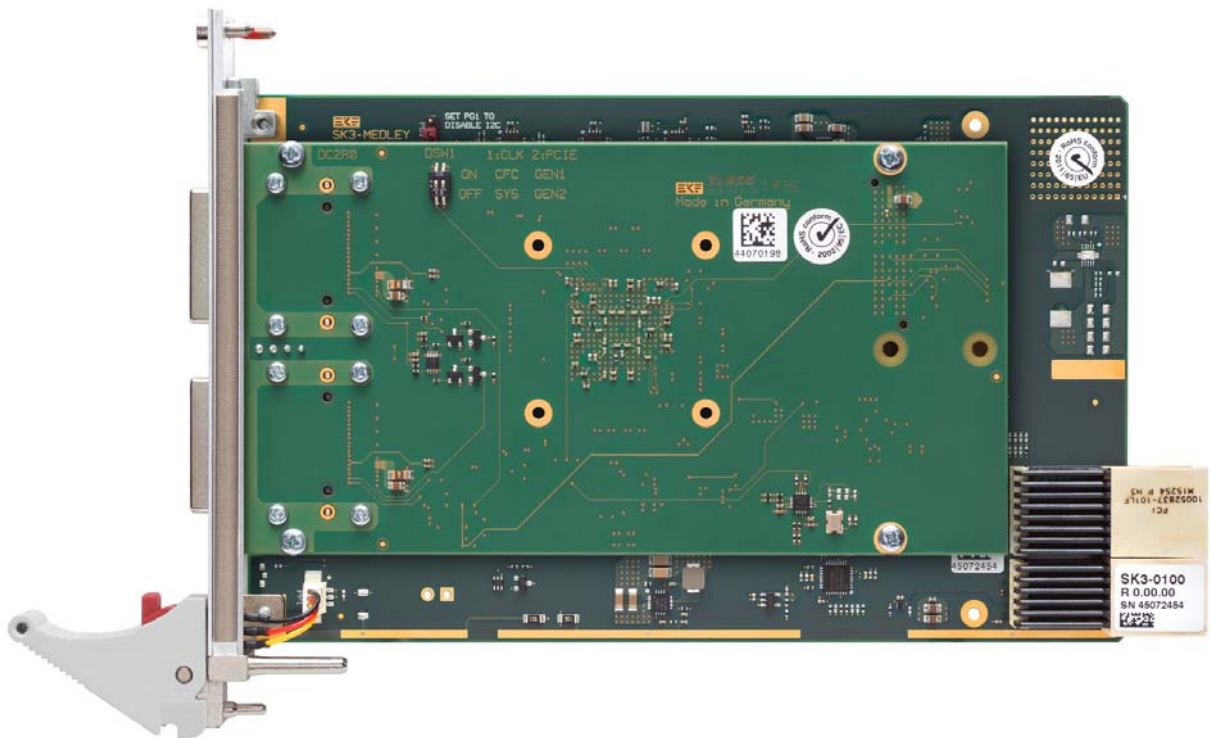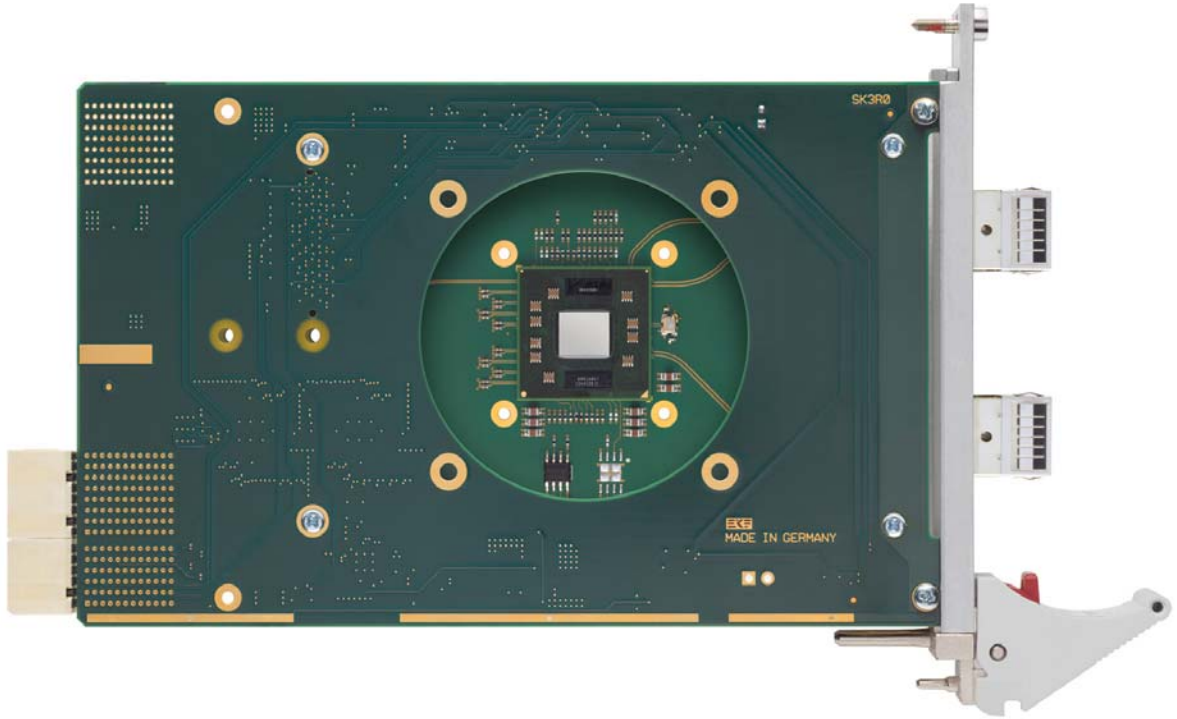
Shortened Length XMC 139mm
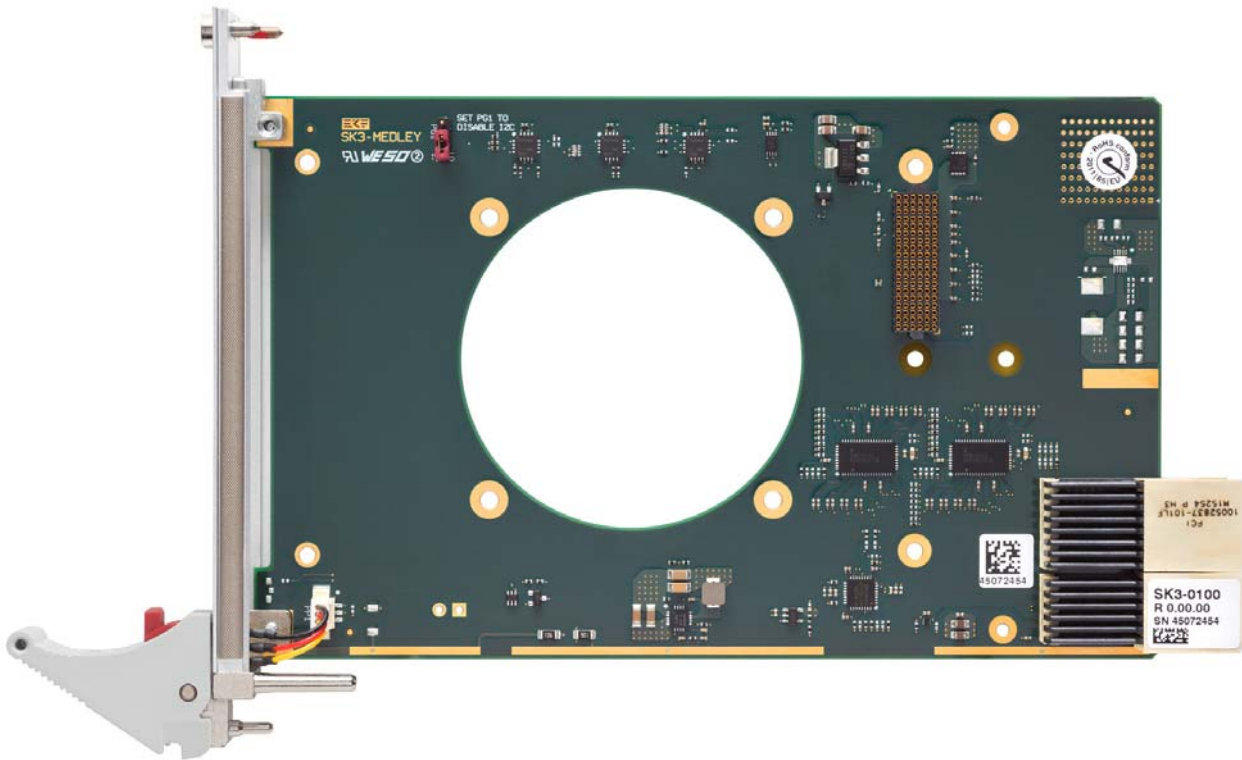
SK3-MEDLEY Top View

SK3-MEDLEY w. XMC Module Mounted

SK3-MEDLEY Bottom View w. XMC Module Mounted

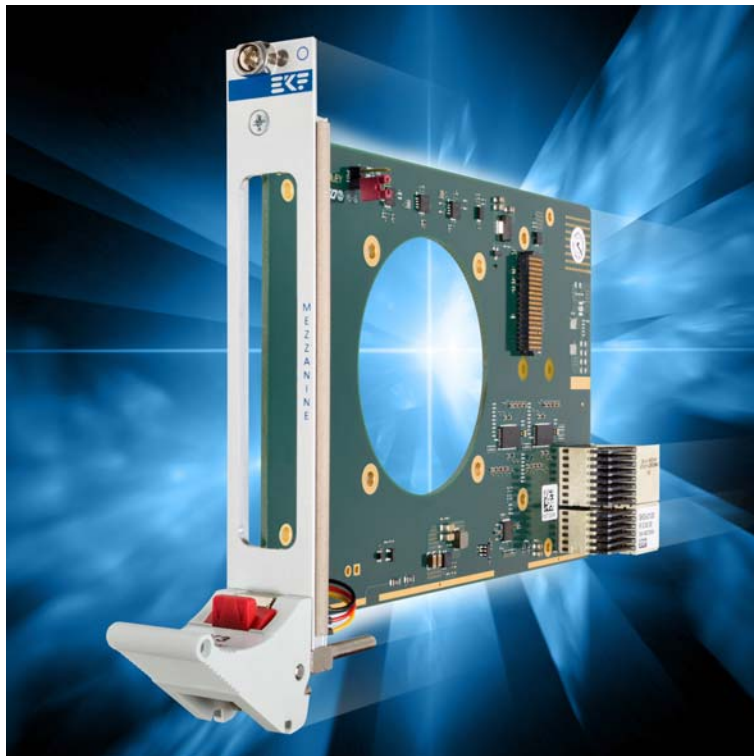SK3-MEDLEY Bottom View (Alternate XMC Module)

Front Panel

SK3-MEDLEY

XMC Socket J15

ANSI/VITA 42.3 defines a primary **XMC** connector, which is mandatory for PCIe fabric. The secondary XMC connector is optional (either fabric or user I/O).

The SK3-MEDLEY is an XMC carrier board with a 8-Lane PCI Express® host interface, which is wired through the primary connector XMC J15. A secondary connector is not provided.
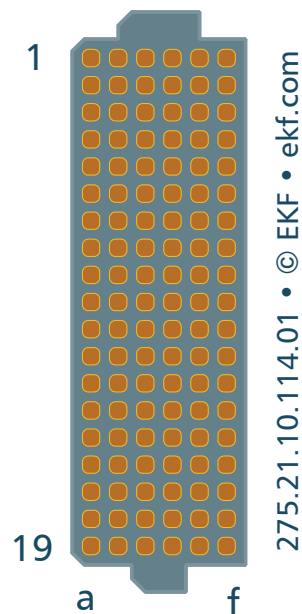

XMC Receptacle

CompactPCI® Serial cards are supplied by +12V only. This voltage is therefore used to fed the XMC connector J15 VPWR pins, across a power FET which is turned on when the front panel microswitch is activated (ejector lever position up = card locked). A switching regulator on the SK3-MEDLEY provides +3.3V up to 3A to the XMC connector J15 3.3V pins. In addition, -12V can be generated by an optional inverting regulator.

As an option, the SK3-MEDLEY can be equipped with a **XMC 2.0** type connector J15, as specified by VITA 61.0. With MIL/Aero environment in mind, the new connector incorporates a number of features for improved mechanical performance, and has been electrically characterized to support 5GHz+ allowing PCI Express® 2.0 (the VITA 42 connector in contrast has only been characterized to 3.125 Ghz). Since XMC (VITA 42) and XMC 2.0 (VITA 61) connectors are not intermateable, both the XMC carrier card and the XMC module must be populated with the same type of connector. The VITA 61 XMC 2.0 connector housing is off-white in colour as a visual key to differentiate it from the black VITA 42 legacy connector. Please specify your needs to sales@ekf.com when ordering the SK3-MEDLEY.
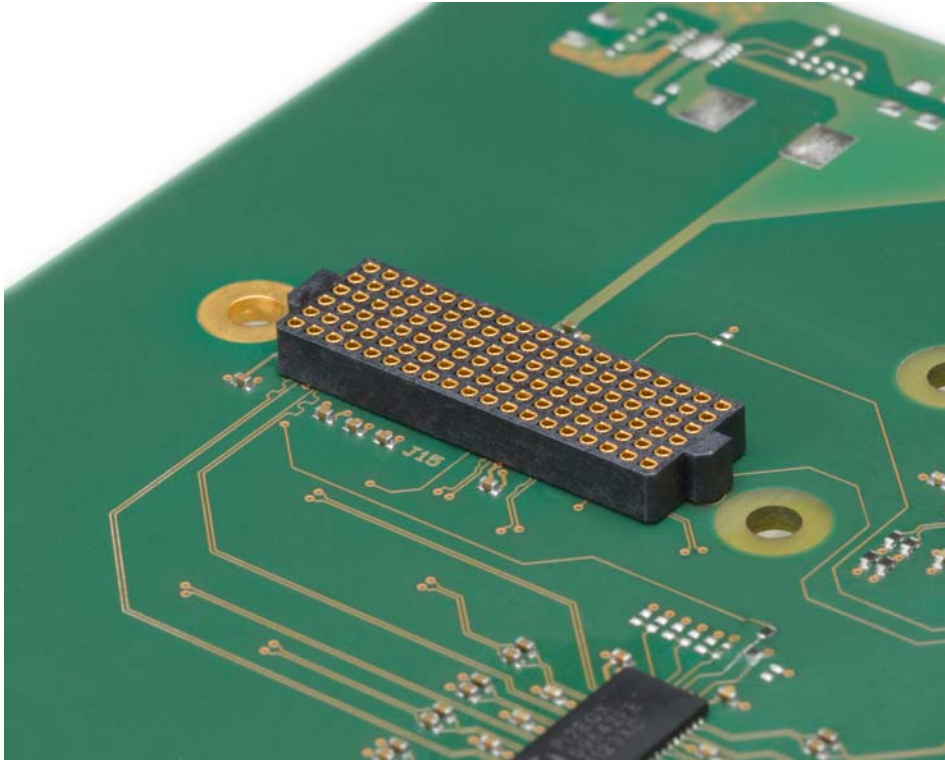
Classic J15 XMC Connector
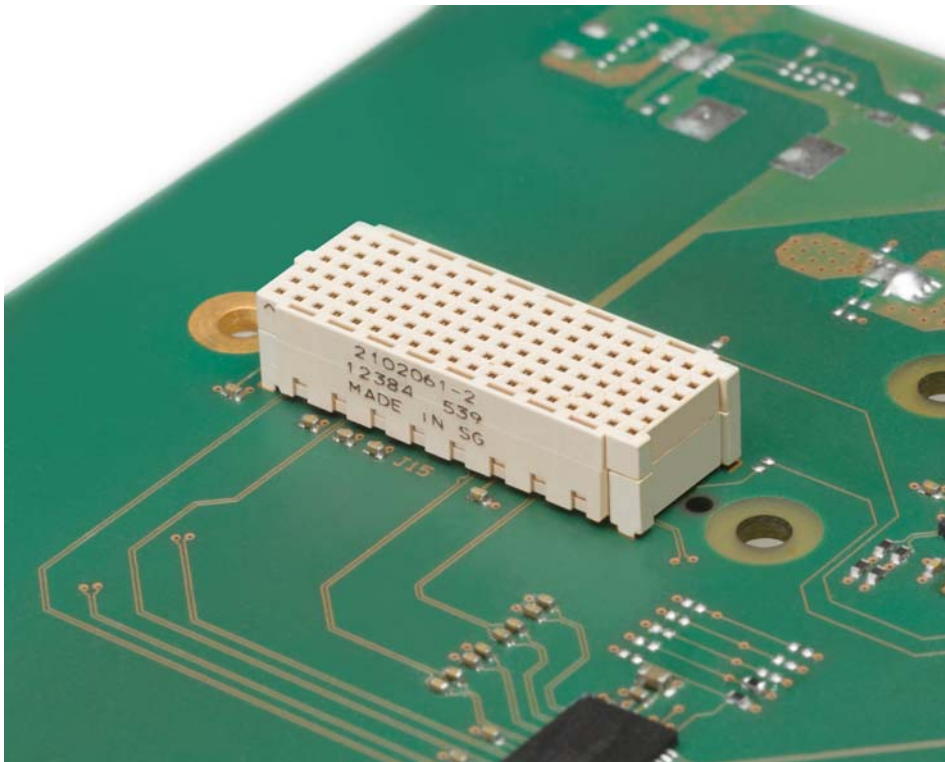
Advanced J15 XMC 2.0 Connector (Option)

XMC Connector J15 - PCIe Fabric • EKF Part No. 275.21.10.114.01					
	a	b	c	d	e	f
1	PET0P0	PET0N0	+3.3V	PET0P1	PET0N1	+12V VPWR
2	GND	GND	TRST# [11]	GND	GND	MRSTI# [6]
3	PET0P2	PET0N2	+3.3V	PET0P3	PET0N3	+12V VPWR
4	GND	GND	*TCK*	GND	GND	MRSTO# [7]
5	PET0P4	PET0N4	+3.3V	PET0P5	PET0N5	+12V VPWR
6	GND	GND	*TMS*	GND	GND	+12V VPWR
7	PET0P6	PET0N6	+3.3V	PET0P7	PET0N7	+12V VPWR
8	GND	GND	*TDI*	GND	GND	-12V [8]
9	*RFU*	*RFU*	*RFU*	*RFU*	*RFU*	+12V VPWR
10	GND	GND	*TDO*	GND	GND	GA0 [3]
11	PER0P0	PER0N0	*MBIST#*	PER0P1	PER0N1	+12V VPWR
12	GND	GND	GA1 [3]	GND	GND	MPRESENT# [9]
13	PER0P2	PER0N2	+3.3V [4]	PER0P3	PER0N3	+12V VPWR
14	GND	GND	GA2 [3]	GND	GND	MSDA [10]
15	PER0P4	PER0N4	*RFU*	PER0P5	PER0N5	+12V VPWR
16	GND	GND	MVMRO [5]	GND	GND	MSCL [10]
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

[3]   GA2 GA1 GA0 (I2C address assigned to module) strapped to 1 0 1 by default

[4]   Module +3.3V AUX

[5]   MVMRO (Module Volatile Memory Read Only) is an optional input to the XMC module, connected to an optional on-board GPIO

[6]   MRSTI# (Module Reset Input) tied to platform reset

[7]   MRSTO# (Module Reset Output) is an optional output by the XMC module, connected to an optional on-board GPIO

[8]   -12V is provided by the SK3-MEDLEY as an option only (inverting regulator, -12V 0.2A)

[9]   MPRESENT# (Module Present), connected to backplane connector P1 signal PCIE_EN#

[10]   MSCL/MSDA derived from backplane connector P1 signals I2C SDA/SCL via optional I2C switch

[11]   10k to GND

P1/P2 CompactPCI® Serial Backplane Connectors

P1 CompactPCI® Serial Peripheral Slot Backplane Connector											
EKF Part #250.3.1206.20.02 • 72 pos. 12x6, 14mm Width											
P1	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
6	GND	PE TX02+	PE TX02-	GND	PE RX02+	PE RX02-	GND	PE TX03+	PE TX03-	GND	PE RX03+	PE RX03-
5	PE TX00+	PE TX00-	GND	PE RX00+	PE RX00-	GND	PE TX01+	PE TX01-	GND	PE RX01+	PE RX01-	GND
4	GND	USB2+	USB2-	GND	PE CLK+	PE CLK-	GND	SATA TX+	SATA TX-	GND	SATA RX+	SATA RX-
3	USB3 TX+	USB3 TX-	GA0	USB3 RX+	USB3 RX-	GA1	SATA SDI	SATA SDO	GA2	SATA SCL	SATA SL	GA3
2	GND	I2C SCL	I2C SDA	GND	RSV	RSV	GND	RST#	WAKE#	GND	PE EN#	SYS EN#
1	+12V	STBY	GND	+12V	+12V	GND	+12V	+12V	GND	+12V	+12V	GND

pin positions printed gray: not connected

The on-board PCI Express® signal redrivers/repeaters are suitable for generation 1, 2 and 3 (up to 8Gbps). Both the PE receive/transmit signals and the PE reference clock are buffered. Operation with Gen2 or Gen3 speed may be functional but cannot be guaranteed however, since not specified by VITA42, mainly with respect to the XMC mezzanine connector. If possible, choose XMC 2.0 connectors (white housings) on both the carrier card and the XMC mezzanine card for reliable PCI Express® Gen2/3 operation.

A maximum of eight PCI Express® lanes is provided over the backplane connectors P1/P2, when the SK3-MEDLEY is positioned on a 'Fat Pipe' CompactPCI® Serial peripheral slot (typically adjacent to the system slot).

For XMC modules which employ only a single PCIe lane, the SK3-MEDLEY can also be installed in any ordinary CompactPCI® Serial peripheral slot, whithout any performance loss.

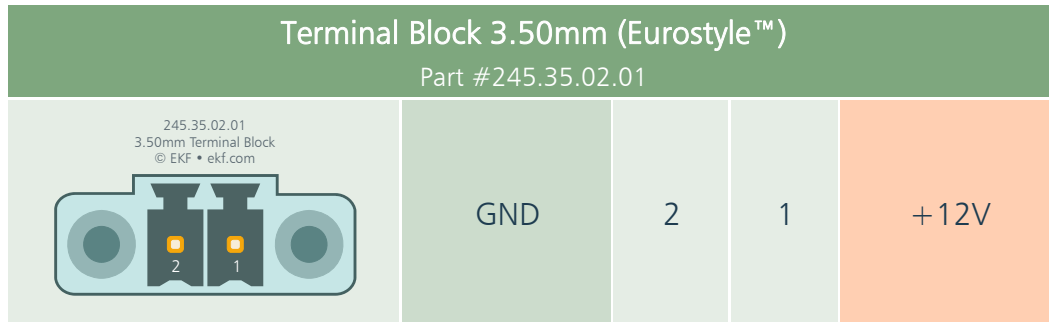## P2 CompactPCI® Serial Peripheral Slot Backplane Connector
EKF Part #250.3.1208.20.00 • 96 pos. 12x8, 16mm Width

P2	A	B	C	D	E	F	G	H	I	J	K	L
8	GND			GND			GND			GND		
7			GND			GND			GND			GND
6	GND			GND			GND			GND		
5			GND			GND			GND			GND
4	GND			GND			GND			GND		
3			GND			GND			GND			GND
2	GND	PE TX06+	PE TX06-	GND	PE RX06+	PE RX06-	GND	PE TX07+	PE TX07-	GND	PE RX07+	PE RX07-
1	PE TX04+	PE TX04-	GND	PE RX04+	PE RX04-	GND	PE TX05+	PE TX05-	GND	PE RX05+	PE RX05-	GND

pin positions left empty: not connected

Option 3.50mm Power Connector +12V

As an option, the SK3-MEDLEY can be equipped with a bottom mount 12V DC compact fan, for cooling of high power consuming XMC mezzanine modules. This would result in an 8HP front panel width assembly (backplane with system slot and fat pipe slots on the right side recommended).

Terminal Block 3.50mm (Eurostyle™) Part #245.35.02.01				
245.35.02.01 3.50mm Terminal Block © EKF • ekf.com	GND	2	1	+12V

The 3.50mm pitch vertical header mates with a suitable plug e.g. Molex part #0395073002. Other Eurostyle compatible terminal block suppliers are e.g. Phoenix Contact, Weidmüller, Würth, TE, or FCI. As an alternate, the pig tail wires of the cooling fan can be soldered directly to the SK3-MEDLEY PCB, using the 3.50mm connector terminal pads.

SK3-MEDLEY Links	
SK3-MEDLEY Home	www.ekf.com/s/sk3/sk3.html

| Related Links	
SK2-SESSION Home Suitable for 149mm Length XMC PCIe x 4	www.ekf.com/s/sk2/sk2.html
CompactPCI® Serial Overview	www.ekf.com/s/smart_solution.pdf

Ordering Information
For popular SK3-MEDLEY SKUs please refer to www.ekf.com/liste/liste_21.html#SK3

XMC Mezzanine Modules from EKF		
XMC Overview		www.ekf.com/d/xmc_concise.pdf
DB4-EAGLE	USB 3.0	www.ekf.com/d/dusb/db4/db4.html
DC2-STAG	PCIe Cabling	www.ekf.com/d/dpxc/dc2/dc2.html
DN1-PIKE	GbE	www.ekf.com/d/dnic/dn1/dn1.html
DN3-SHARK	10GbE	www.ekf.com/d/dnic/dn3/dn3.html
DS1-LEOPARD	SAS	www.ekf.com/d/dsas/ds1/ds1.html
DU1-MUSTANG	RS-485 iso	www.ekf.com/d/dcom/du1/du1.html
DU2-PONY	RS-232 iso	www.ekf.com/d/dcom/du2/du2.html
DV1-DRAGON	VGA/DVI	www.ekf.com/d/dgxa/dv1/dv1.html
DX2-COUGAR	SATA	www.ekf.com/d/dide/dx2/dx2.html
DX4-BADGER	mSATA	www.ekf.com/d/dide/dx4/dx4.html
DX5-ANT	M.2 SATA	www.ekf.com/d/dide/dx5/dx5.html

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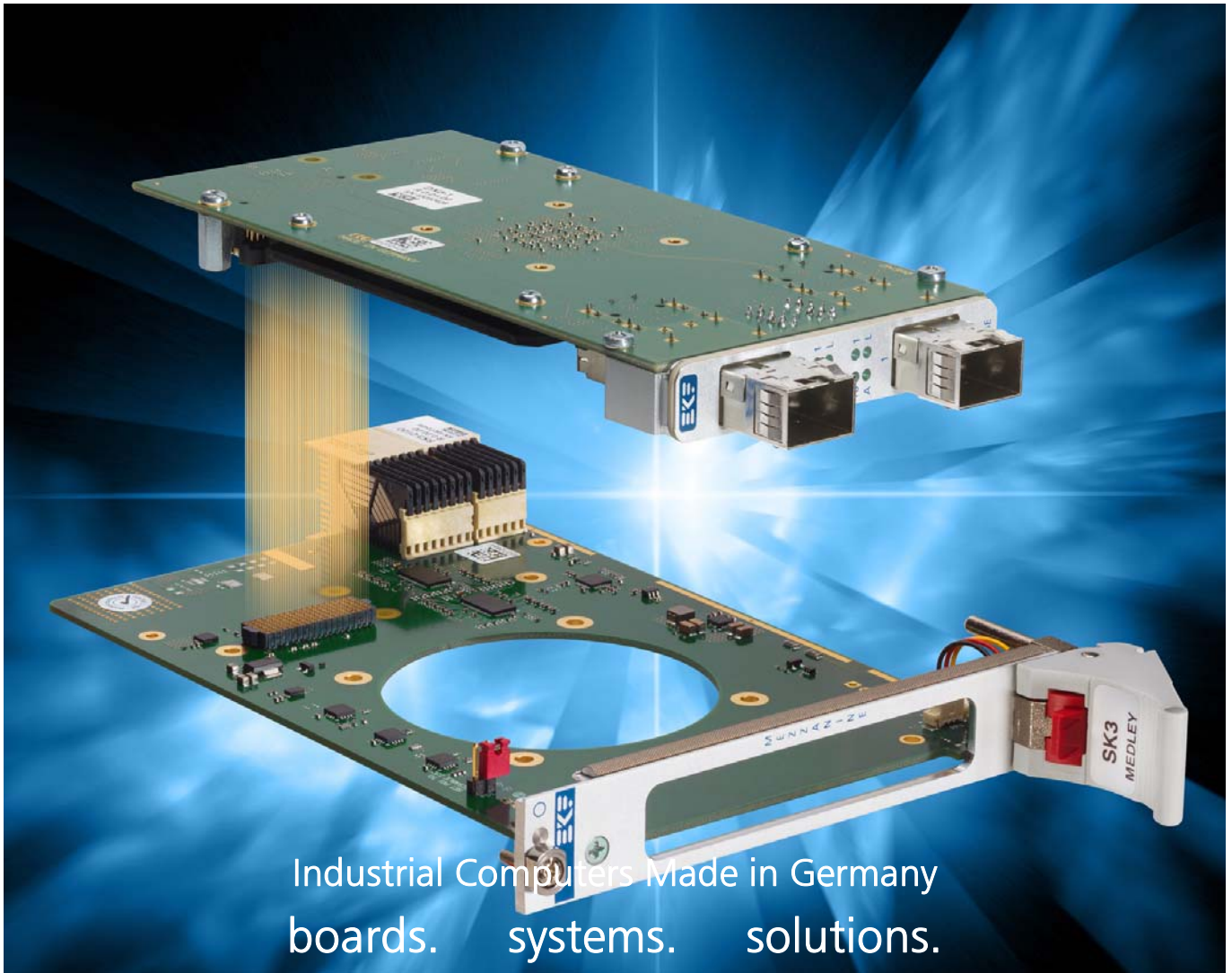
Beyond All Limits:

EKF High Performance Embedded

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