

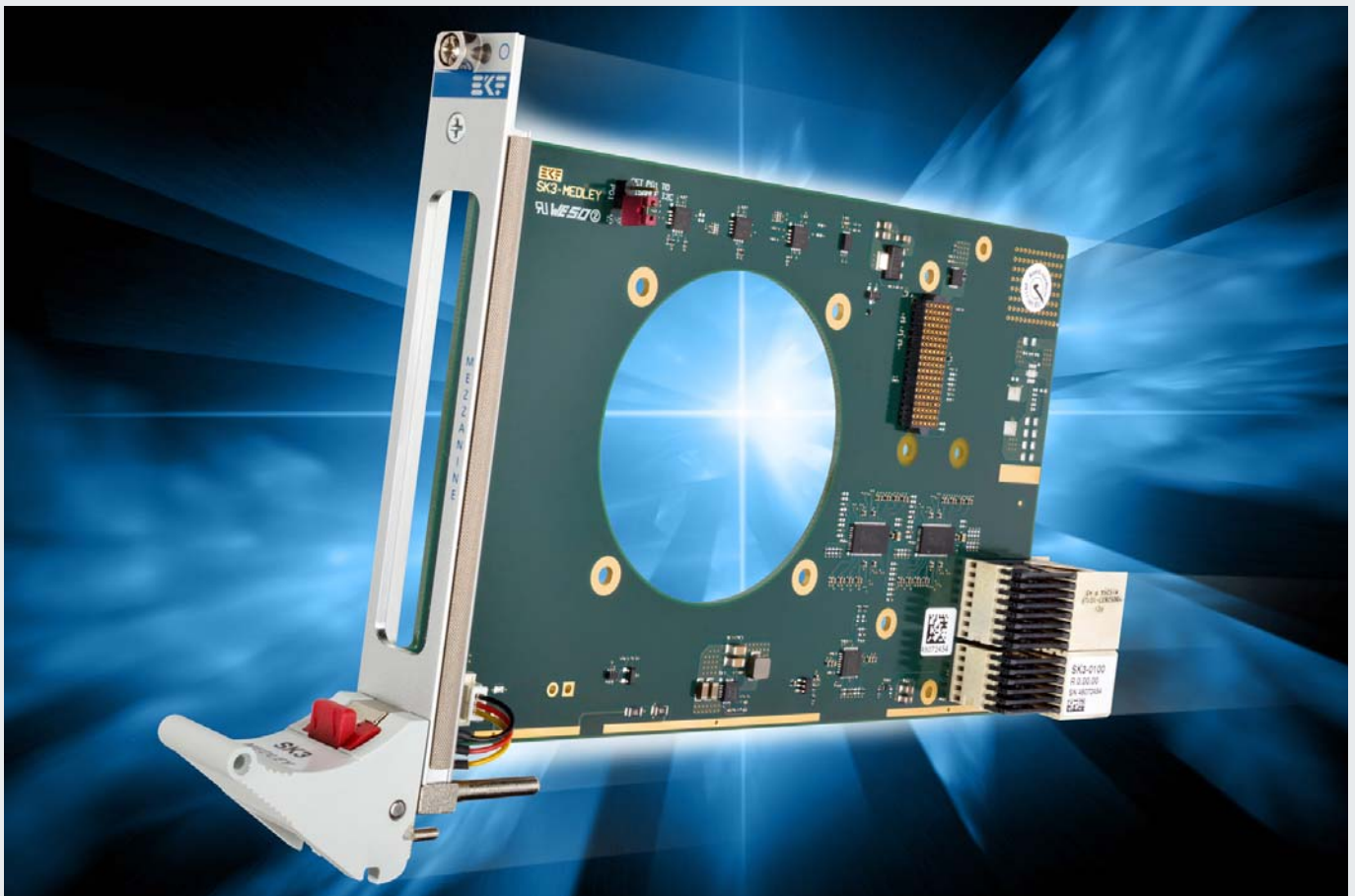


## Product Information

### SK3-MEDLEY

**CompactPCI® Serial** • XMC Module Carrier PCIe® x 8

Document No. 7965 • 4 January 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 74 x 139mm<sup>2</sup> shortened length XMC mezzanine cards (149mm PMC style modules do not fit).

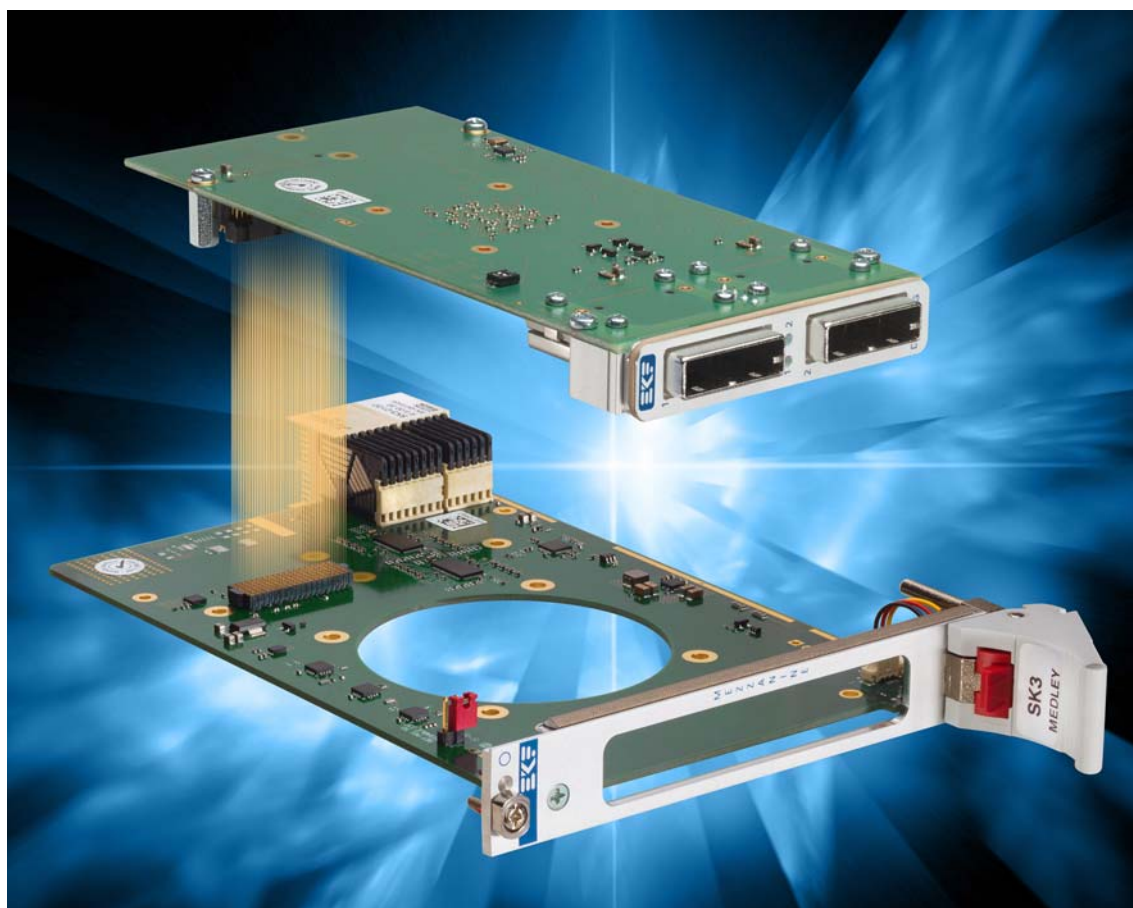


SK3-MEDLEY w. XMC Module Mounted

## 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<sup>2</sup>
- ▶ CPCI-S backplane connectors P1 & P2 (fat pipe slot up to PCIe x 8)

### XMC Mezzanine I/F

- ▶ Suitable for 74x139mm<sup>2</sup> 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)

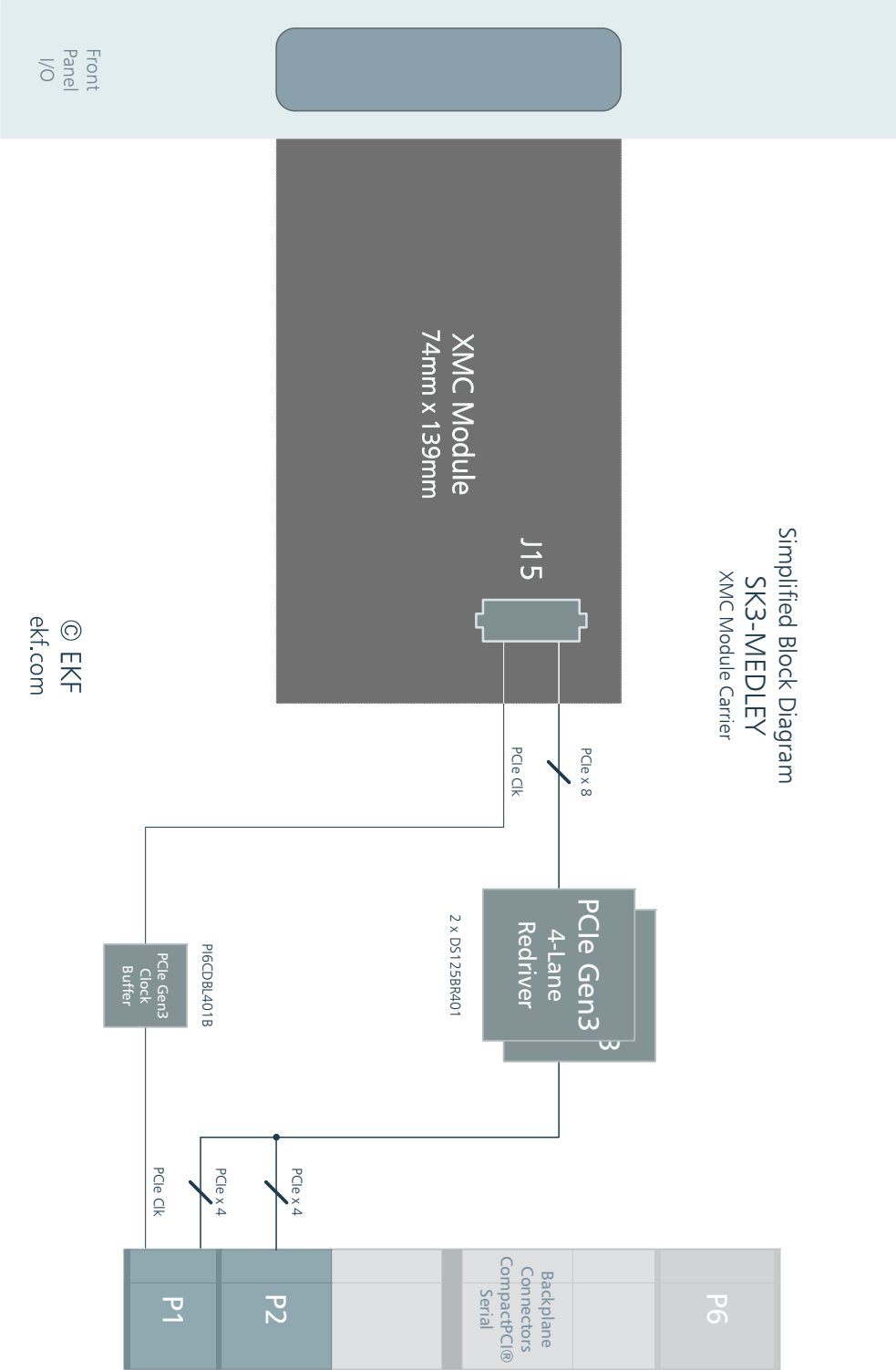
### Regulatory, Environment

- ▶ 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)

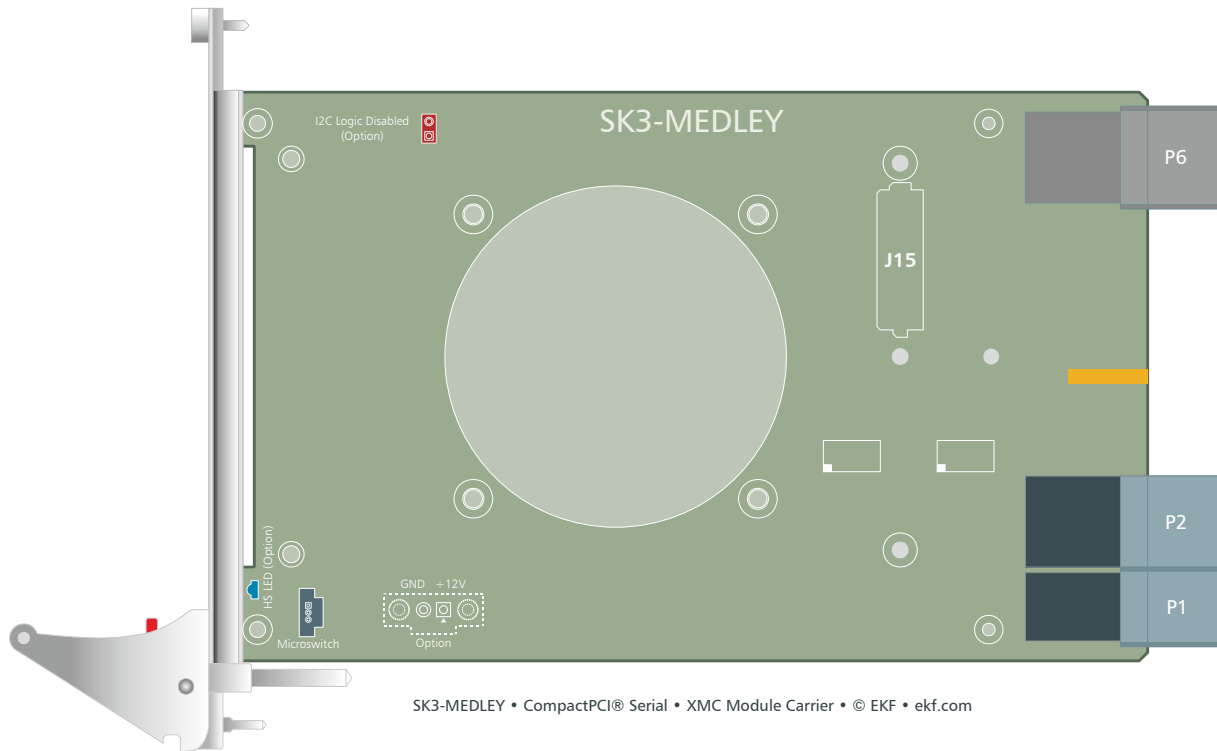




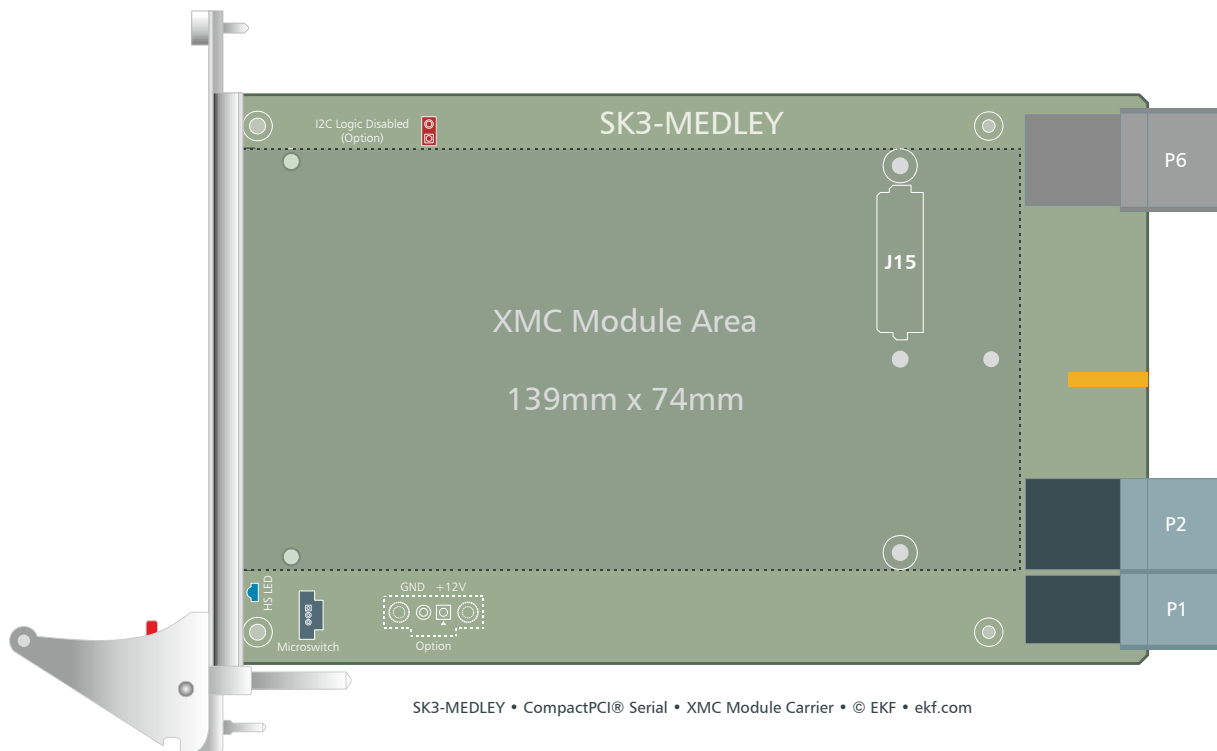
Block Diagram



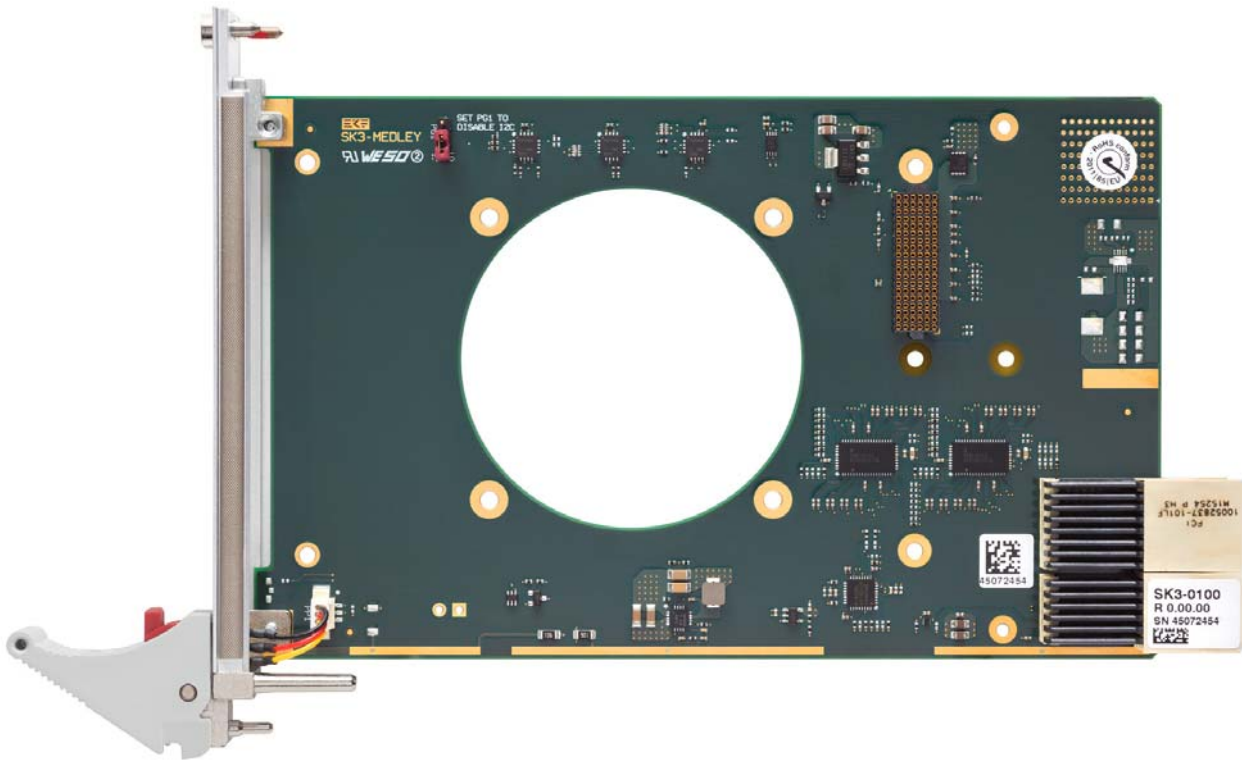
### Board Assembly



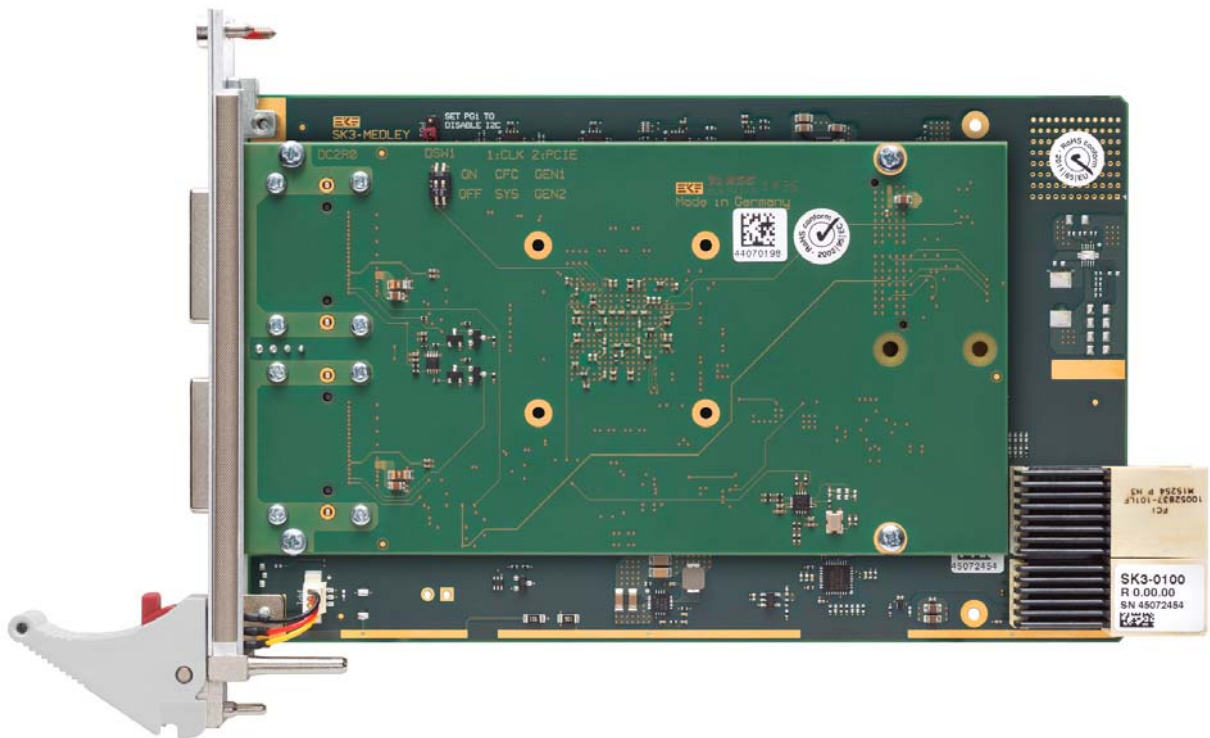
PCB Opening for Optimized XMC Heat Removal



Shortened Length XMC 139mm

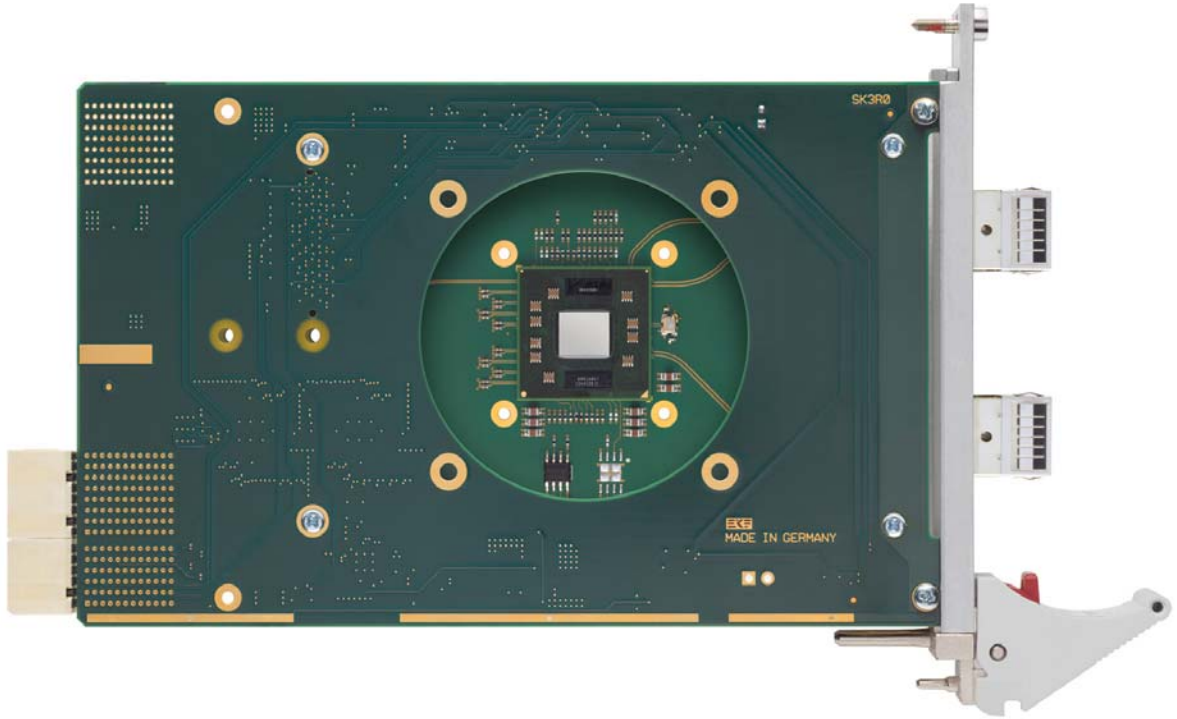


SK3-MEDLEY Top View



SK3-MEDLEY w. XMC Module Mounted





SK3-MEDLEY Bottom View w. XMC Module Mounted



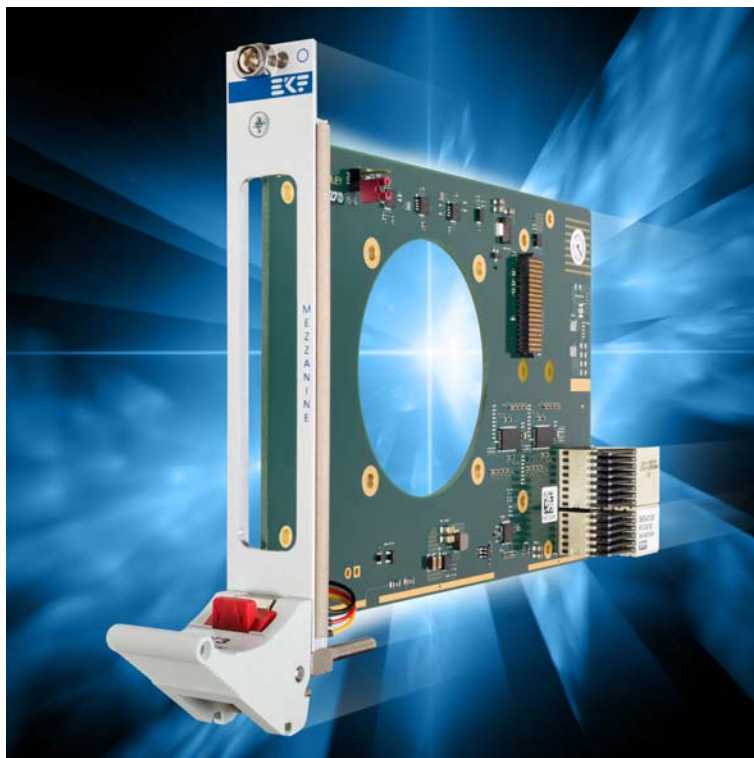
SK3-MEDLEY Bottom View (Alternate XMC Module)

### Front Panel



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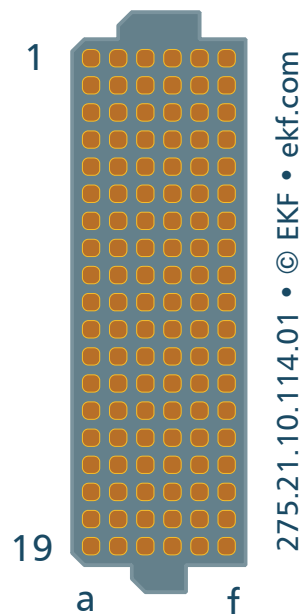
SK3-MEDLEY



## 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).

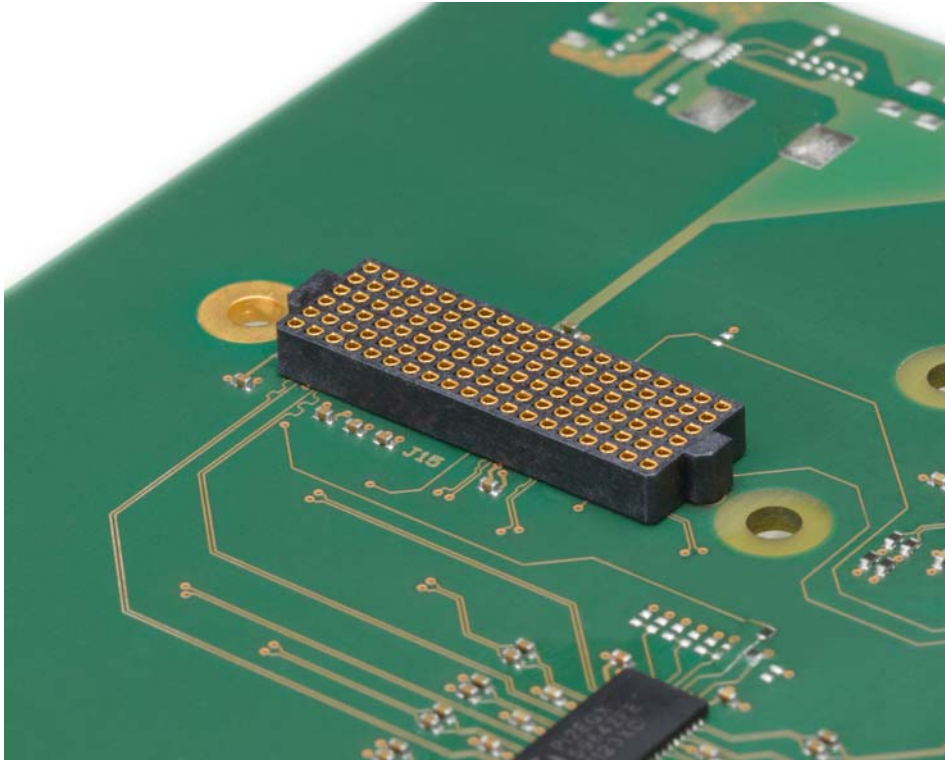
The SK3-MEDLEY is an XMC carrier board with a 8-Lane PCI Express® host interface, which is wired through the primary connector XMC J15. A secondary connector is not provided.



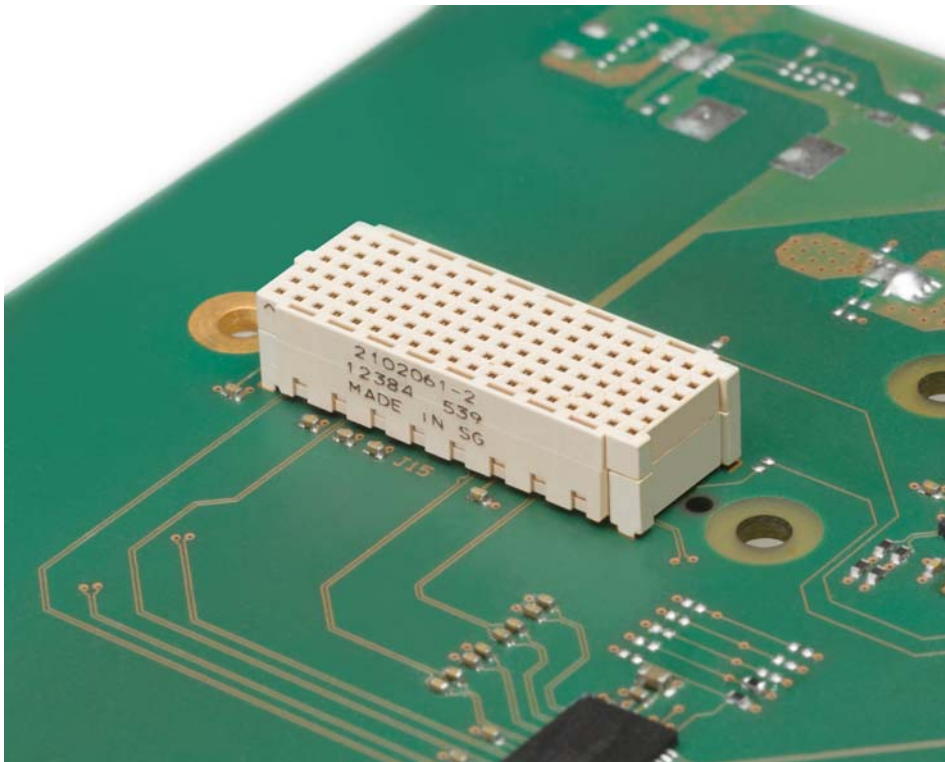
XMC Receptacle

CompactPCI® Serial cards are supplied by +12V only. This voltage is therefore used to feed 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	PETOP0	PETON0	+3.3V	PETOP1	PETON1	+12V VPWR
2	GND	GND	TRST# <sup>11)</sup>	GND	GND	MRSTI# <sup>6)</sup>
3	PETOP2	PETON2	+3.3V	PETOP3	PETON3	+12V VPWR
4	GND	GND	TCK	GND	GND	MRSTO# <sup>7)</sup>
5	PETOP4	PETON4	+3.3V	PETOP5	PETON5	+12V VPWR
6	GND	GND	TMS	GND	GND	+12V VPWR
7	PETOP6	PETON6	+3.3V	PETOP7	PETON7	+12V VPWR
8	GND	GND	TDI	GND	GND	-12V <sup>8)</sup>
9	<i>RFU</i>	<i>RFU</i>	<i>RFU</i>	<i>RFU</i>	<i>RFU</i>	+12V VPWR
10	GND	GND	TDO	GND	GND	GA0 <sup>3)</sup>
11	PEROP0	PERON0	MBIST#	PEROP1	PERON1	+12V VPWR
12	GND	GND	GA1 <sup>3)</sup>	GND	GND	MPRESENT# <sup>9)</sup>
13	PEROP2	PERON2	+3.3V <sup>4)</sup>	PEROP3	PERON3	+12V VPWR
14	GND	GND	GA2 <sup>3)</sup>	GND	GND	MSDA <sup>10)</sup>
15	PEROP4	PERON4	<i>RFU</i>	PEROP5	PERON5	+12V VPWR
16	GND	GND	MVMRO <sup>5)</sup>	GND	GND	MSCL <sup>10)</sup>
17	PEROP6	PERON6	<i>RFU</i>	PEROP7	PERON7	<i>RFU</i>
18	GND	GND	<i>RFU</i>	GND	GND	<i>RFU</i>
19	CLKP_XMC	CLKN_XMC	<i>RFU</i>	WAKE#	ROOT0#	<i>RFU</i>

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

- <sup>3)</sup> GA2 GA1 GA0 (I2C address assigned to module) strapped to 1 0 1 by default
- <sup>4)</sup> Module +3.3V AUX
- <sup>5)</sup> MVMRO (Module Volatile Memory Read Only) is an optional input to the XMC module, connected to an optional on-board GPIO
- <sup>6)</sup> MRSTI# (Module Reset Input) tied to platform reset
- <sup>7)</sup> MRSTO# (Module Reset Output) is an optional output by the XMC module, connected to an optional on-board GPIO
- <sup>8)</sup> -12V is provided by the SK3-MEDLEY as an option only (inverting regulator, -12V 0.2A)
- <sup>9)</sup> MPRESENT# (Module Present), connected to backplane connector P1 signal PCIE\_EN#
- <sup>10)</sup> MSCL/MSDA derived from backplane connector P1 signals I2C SDA/SCL via optional I2C switch
- <sup>11)</sup> 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, without any performance loss.

## P2 CompactPCI® Serial Peripheral Slot Backplane Connector

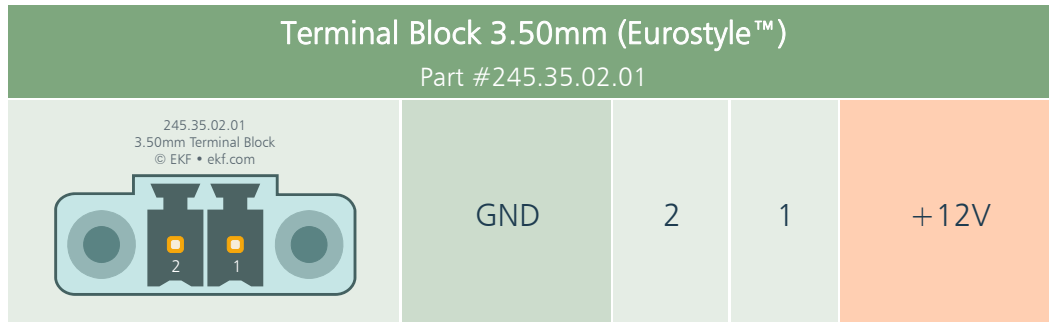
EKF Part #250.3.1208.20.00 • 96 pos. 12x8, 16mm Width

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).



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](http://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](http://www.ekf.com/s/sk2/sk2.html)

CompactPCI® Serial Overview

[www.ekf.com/s/smart\\_solution.pdf](http://www.ekf.com/s/smart_solution.pdf)

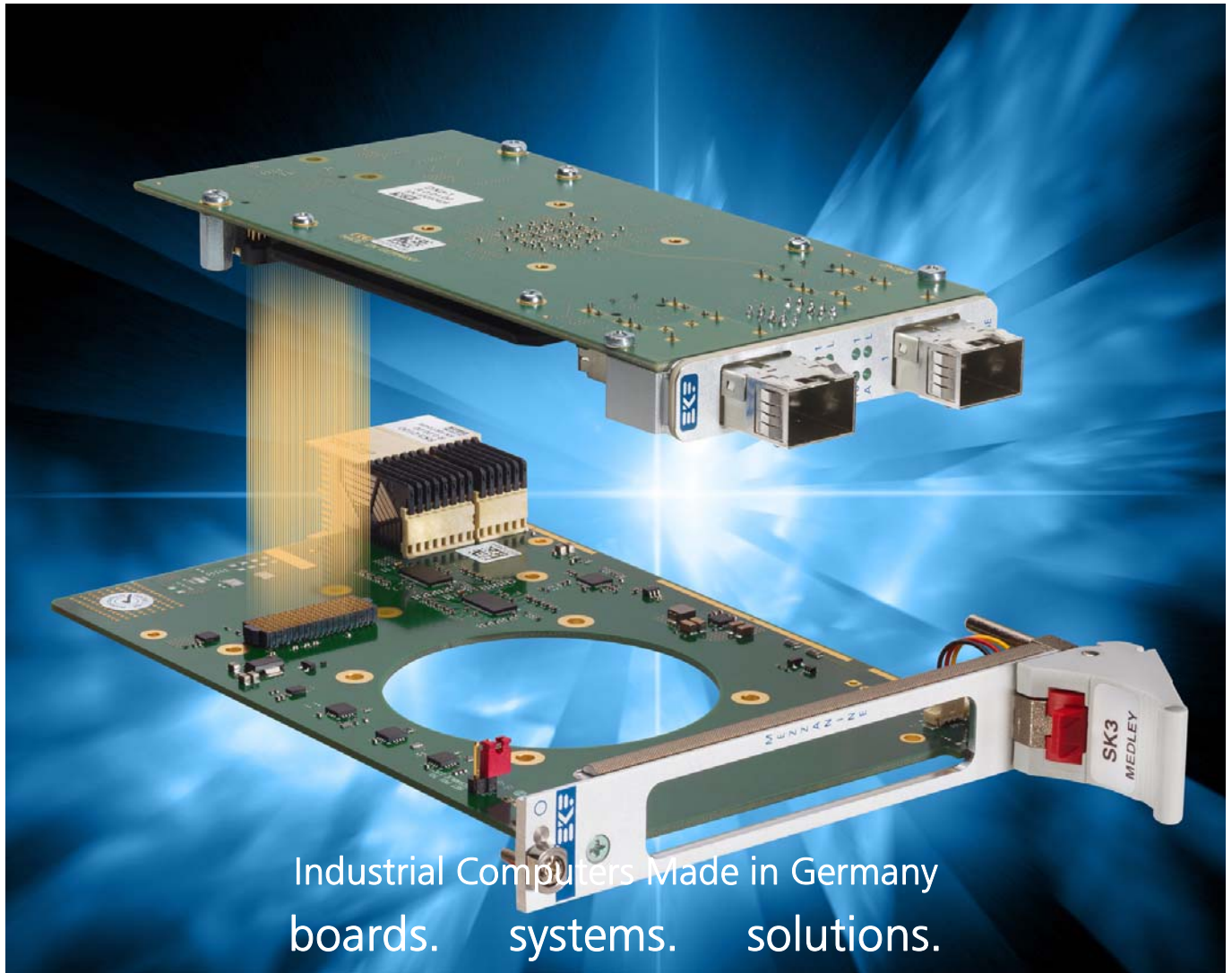
## Ordering Information

## Ordering Information

For popular SK3-MEDLEY SKUs please refer to  
[www.ekf.com/liste/liste\\_21.html#SK3](http://www.ekf.com/liste/liste_21.html#SK3)

## XMC Mezzanine Modules from EKF

XMC Overview		<a href="http://www.ekf.com/d/xmc_concise.pdf">www.ekf.com/d/xmc_concise.pdf</a>
DB4-EAGLE	USB 3.0	<a href="http://www.ekf.com/d/dusb/db4/db4.html">www.ekf.com/d/dusb/db4/db4.html</a>
DN1-PIKE	GbE	<a href="http://www.ekf.com/d/dnic/dn1/dn1.html">www.ekf.com/d/dnic/dn1/dn1.html</a>
DN3-SHARK	10GbE	<a href="http://www.ekf.com/d/dnic/dn3/dn3.html">www.ekf.com/d/dnic/dn3/dn3.html</a>
DS1-LEOPARD	SAS	<a href="http://www.ekf.com/d/dsas/ds1/ds1.html">www.ekf.com/d/dsas/ds1/ds1.html</a>
DU1-MUSTANG	RS-485 iso	<a href="http://www.ekf.com/d/dcom/du1/du1.html">www.ekf.com/d/dcom/du1/du1.html</a>
DU2-PONY	RS-232 iso	<a href="http://www.ekf.com/d/dcom/du2/du2.html">www.ekf.com/d/dcom/du2/du2.html</a>
DV1-DRAGON	VGA/DVI	<a href="http://www.ekf.com/d/dgxa/dv1/dv1.html">www.ekf.com/d/dgxa/dv1/dv1.html</a>
DX2-COUGAR	SATA	<a href="http://www.ekf.com/d/dide/dx2/dx2.html">www.ekf.com/d/dide/dx2/dx2.html</a>
DX4-BADGER	mSATA	<a href="http://www.ekf.com/d/dide/dx4/dx4.html">www.ekf.com/d/dide/dx4/dx4.html</a>
DX5-ANT	M.2 SATA	<a href="http://www.ekf.com/d/dide/dx5/dx5.html">www.ekf.com/d/dide/dx5/dx5.html</a>



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