



Product Information

SA1-FUSION

CompactPCI® Serial • PCI Express® Card Adapter

Carrier Board Enables Standard PCIe Cards in a CPCI Serial System

Document No. 6945 • 29 October 2013



General

The SA1-FUSION is a peripheral slot board for PICMG® CompactPCI® Serial systems and acts as carrier for low profile PCI Express® Cards. The SA1-FUSION is provided with a PCIe x 8 connector (option x 4, x 1) and accommodates a PCIe card with dimensions up to 148mm (length) x 83.75mm (height).

With respect to the PCIe x 8 connector, the SA1-FUSION is equipped with the backplane connectors P1/P2 for support of up to 8 PCI Express® lanes when inserted into a CompactPCI® Serial Fat Pipe Slot. For the x 1 or x 4 options, only P1 is required.



Theory of Operation

The SA1-0100-FUSION requires only a single PCI Express® lane from the backplane, passed over across the connector P1 to the on-board PCIe x 1 connector. With respect to the SA1-0400-FUSION (PCIe x 4 connector), four PE lanes would be required, which are provided by a CompactPCI® Serial fat pipe slot, but may be available in some cases also from an ordinary peripheral slot. Both carrier board options, the SA1-0100 and SA1-0400, allow for up to 148mm x 83.75mm PCIe card dimensions.

The maximum performance can be achieved with the SA1-0800-FUSION, due to the PCIe x 8 on-board connector. Since both backplane connectors P1/P2 are required in order to pass over eight PE lanes from a CompactPCI® Serial fat pipe slot, the maximum length of a PCIe card would be limited by the position of P2 to 139mm.

The SA1-FUSION is provided with a PCIe clock buffer for optimum signal integrity.

Feature Summary

- ▶ PICMG® CompactPCI® Serial Standard (CPCI-S.0) Peripheral Slot or Fat Pipe Slot Card
- ▶ Single Size Eurocard 3U 8HP 100x160mm²
- ▶ cPCI-S Backplane Connector P1 (Mandatory with all SA1-FUSION Options)
- ▶ cPCI-S Backplane Connector P2 (SA1-0800-FUSION only, for PCIe x 8 Fat Pipe Slot)

- ▶ Carrier Board for Limited Size PCI Express® Card
- ▶ Maximum Dimensions 148mm x 83.75mm (SA1-0100-FUSION, SA1-0400-FUSION)
- ▶ Maximum Dimensions 139mm x 83.75mm (SA1-0800-FUSION)
- ▶ PCIe Connector x 1 (SA1-0100-FUSION)
- ▶ PCIe Connector x 4 (SA1-0400-FUSION)
- ▶ PCIe Connector x 8 (SA1-0800-FUSION)
- ▶ PCI Express® Clock Buffer on-Board

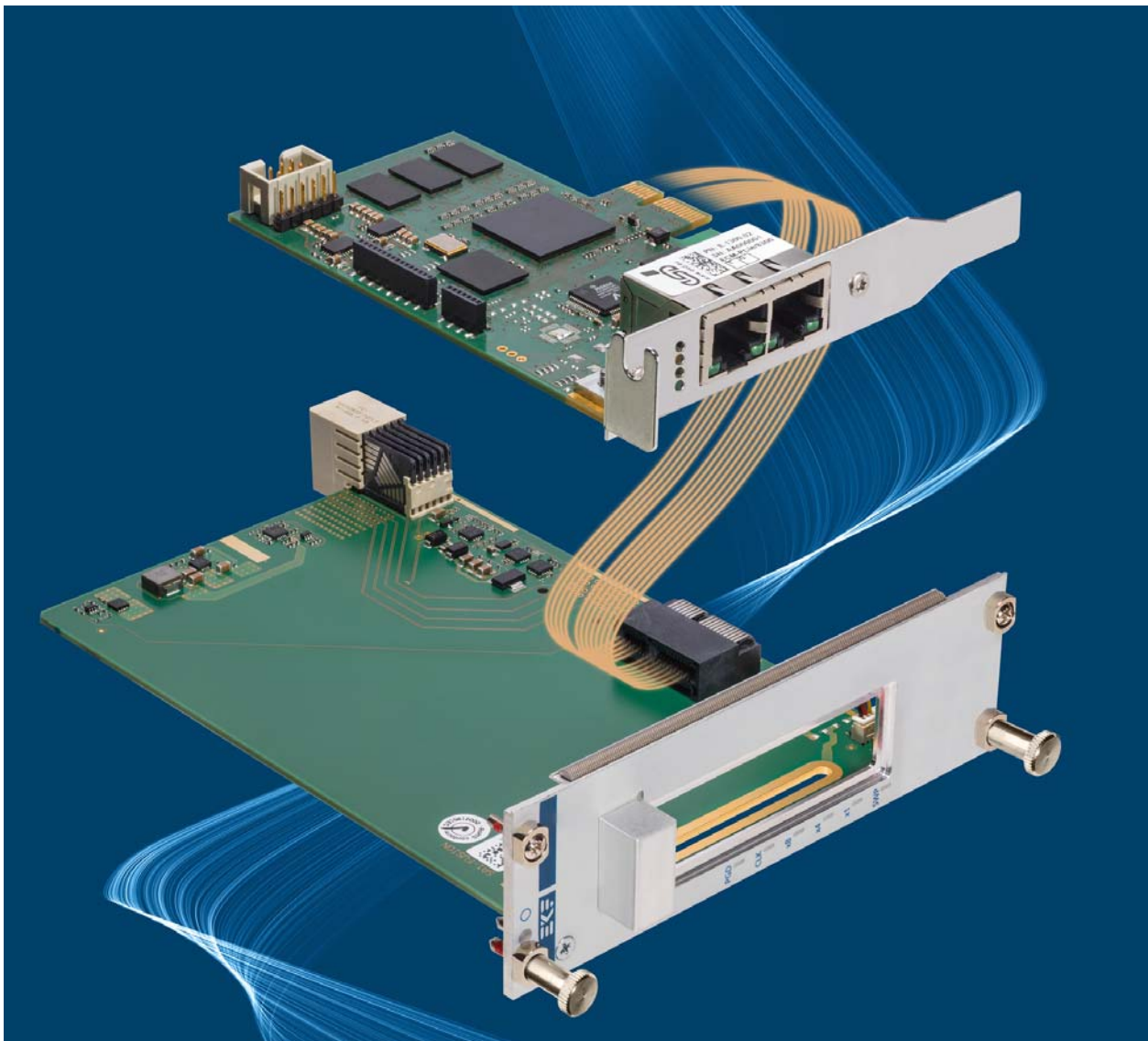
- ▶ Commercial and Industrial Temperature Range
- ▶ Long Term Availability
- ▶ Rugged Solution (Coating/Sealing Available on Request)
- ▶ RoHS Compliant

System Integration Options

The SA1-FUSION is a CompactPCI® Serial peripheral card. CompactPCI® Serial (CPCI-S.0) is a PICMG® standard for modular industrial computers, which provides high speed serial I/O (PCI Express®, SATA, USB, Gigabit Ethernet) over the backplane. The cPCI-S mechanical design is fully backward compatible to CompactPCI® Classic and will interoperate with existing systems, by means of a hybrid backplane.

Hybrid systems (providing card slots for both cPCI Classic & cPCI Serial) can be configured by means of a CompactPCI® PlusIO CPU card such as the PC1-GROOVE or PC3-ALLEGRO in combination with a suitable hybrid backplane.

Native CompactPCI® Serial systems (up to 8 cPCI Serial peripheral card slots) can be built around a suitable system slot CPU board such as the SC1-ALLEGRO.



SA1-0100-FUSION

Sample Applications



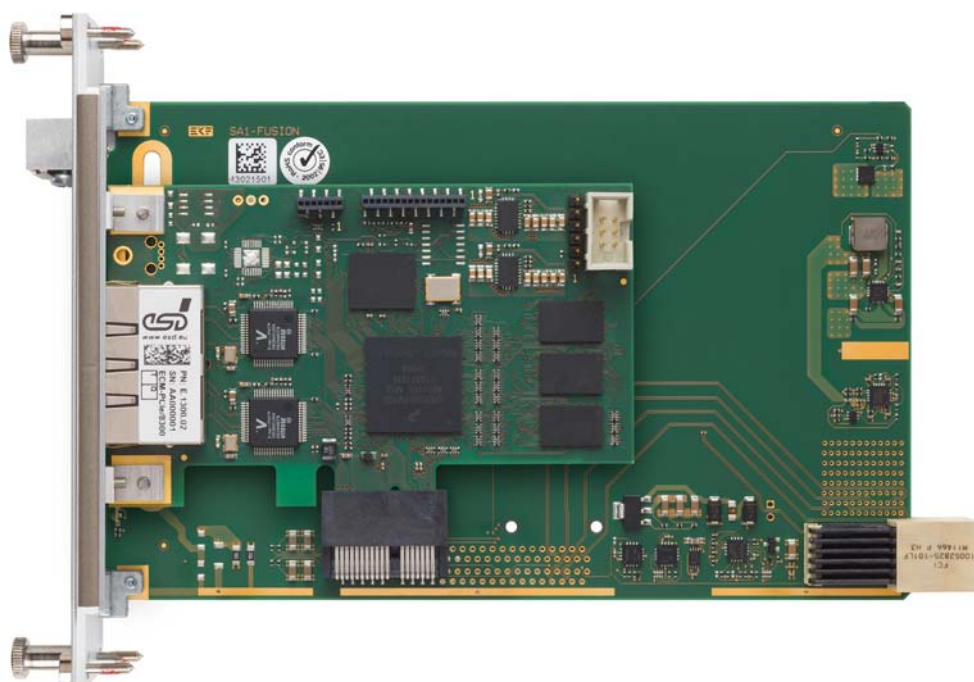
SA1-0100-FUSION w. Network Adapter



SA1-0100-FUSION w. Network Adapter



SA1-0100-FUSION w. Network Adapter



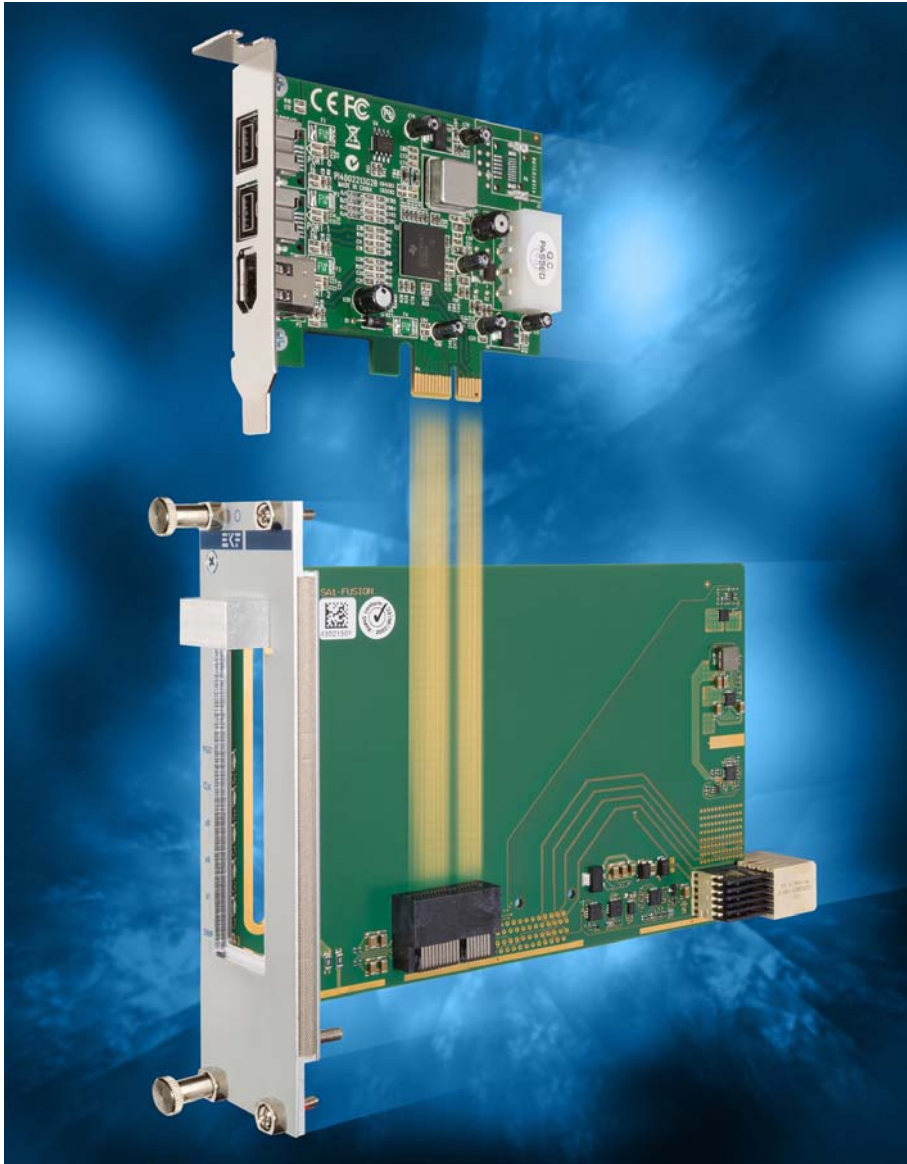
SA1-0100-FUSION w. Network Adapter



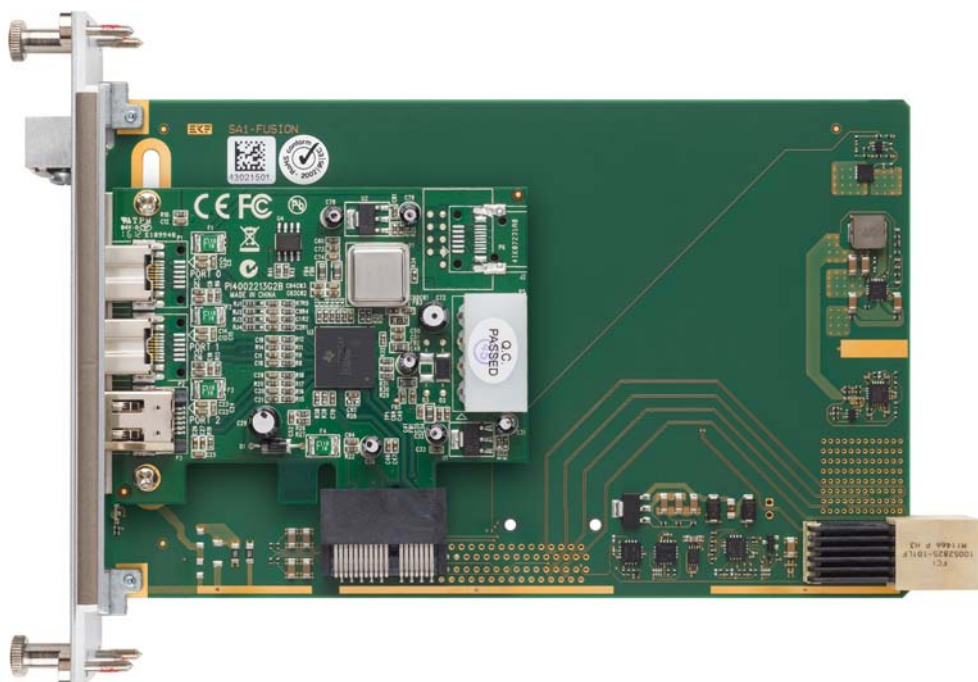
SA1-0100-FUSION w. FireWire 1394b Controller



SA1-0100-FUSION w. FireWire 1394b Controller



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SA1-0100-FUSION w. FireWire 1394b Controller



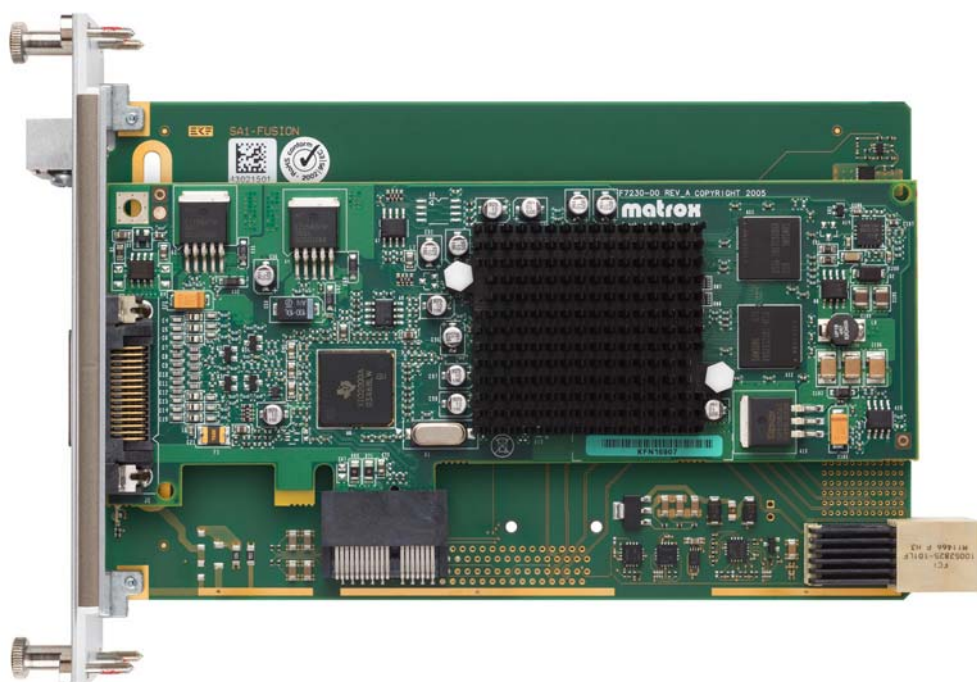
SA1-0100-FUSION w. Graphics Adapter



SA1-0100-FUSION w. Graphics Adapter



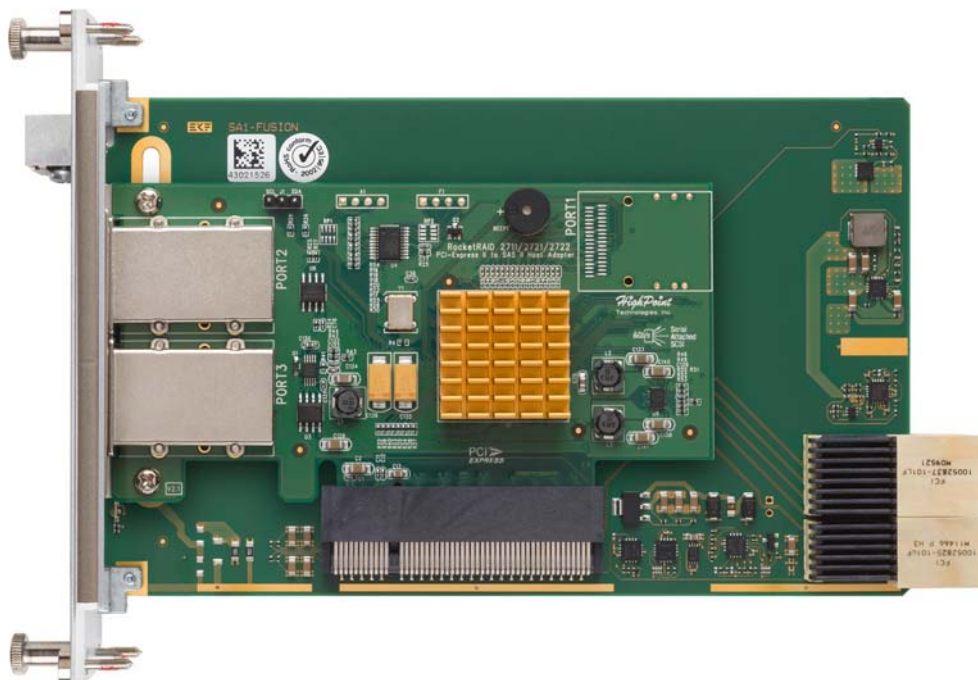
SA1-0100-FUSION w. Graphics Adapter



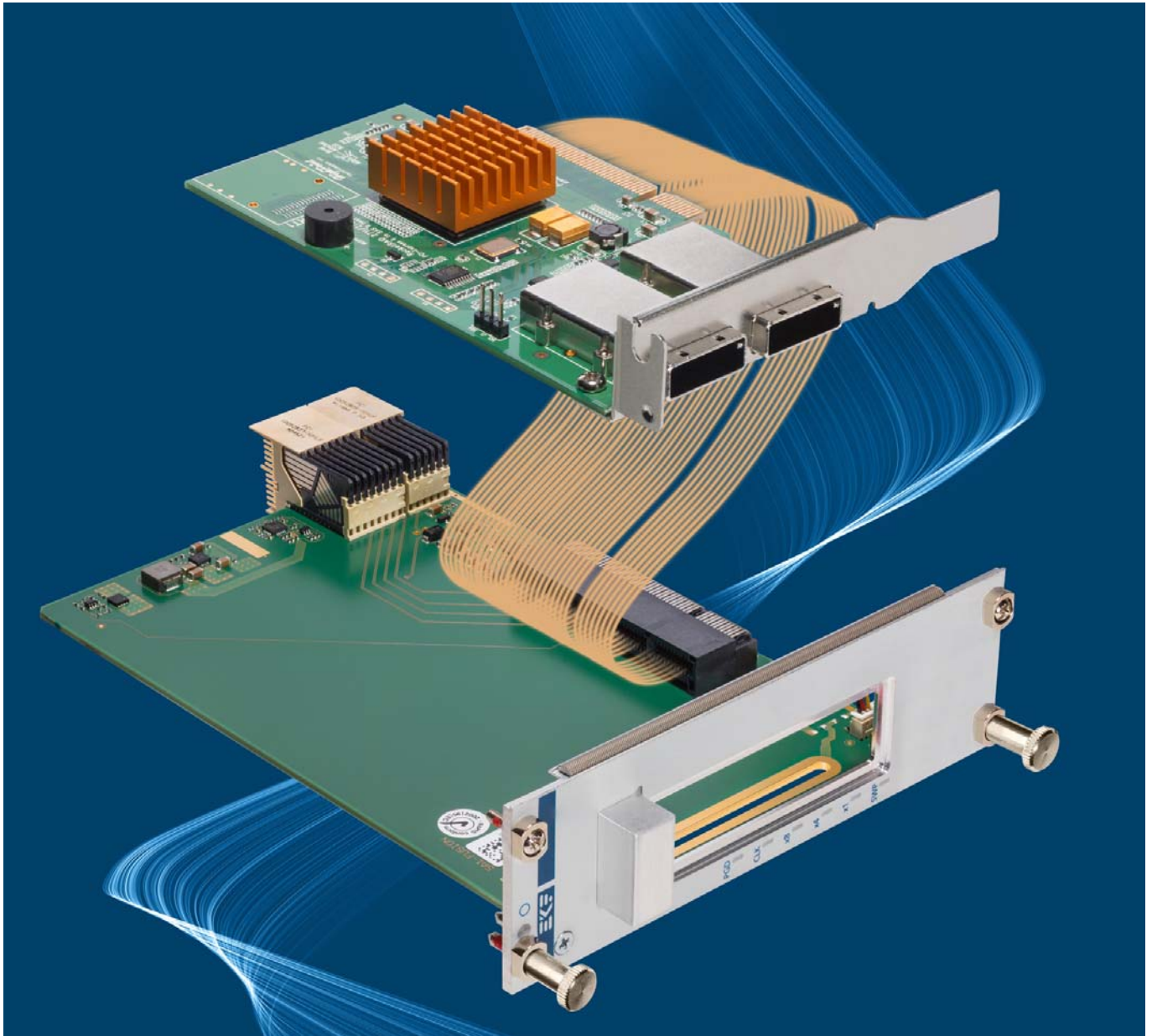
SA1-0100-FUSION w. Graphics Adapter



SA1-0800-FUSION w. SAS / SATA 6G RAID Controller

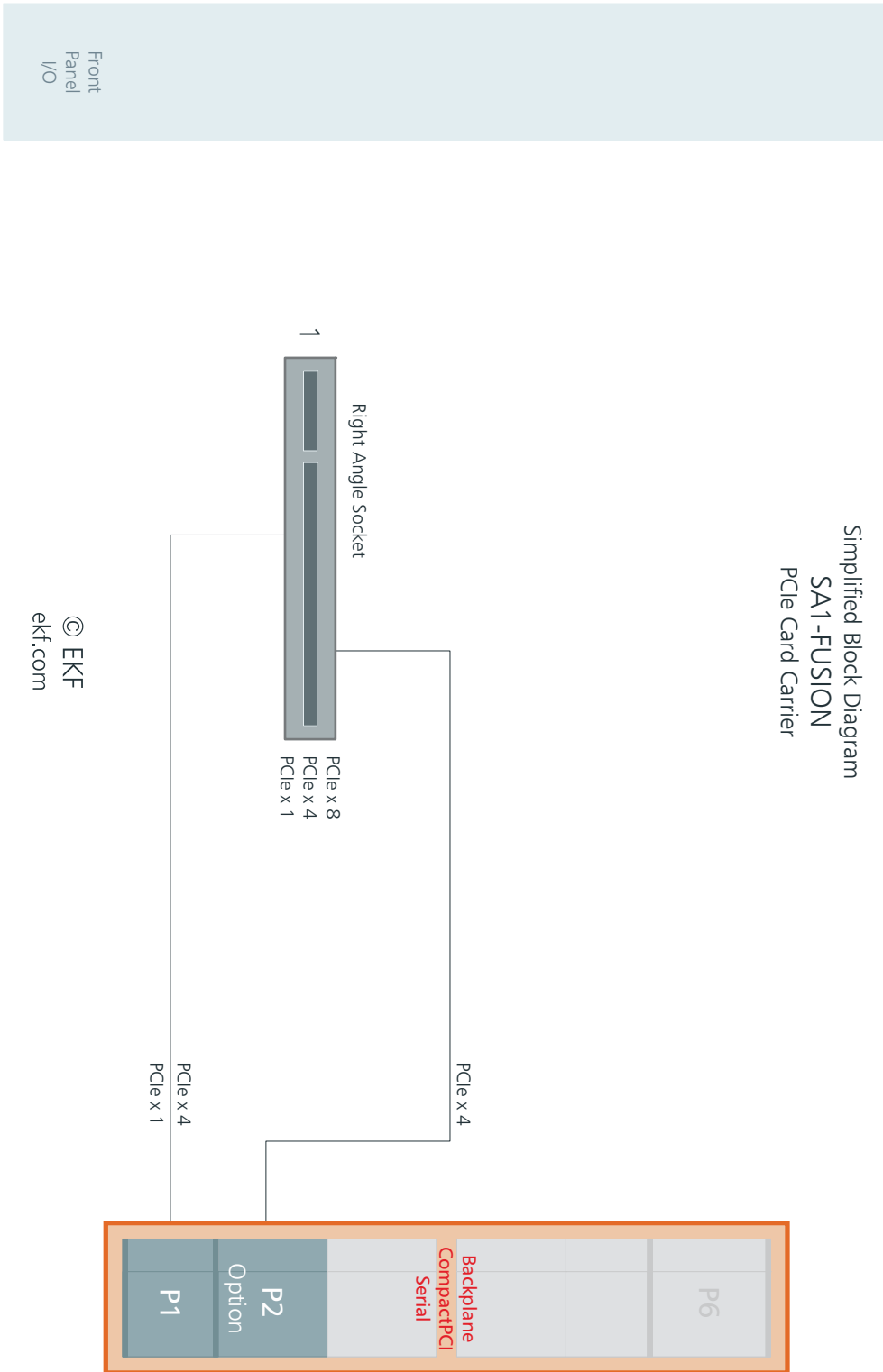


SA1-0800-FUSION w. SAS / SATA 6G RAID Controller

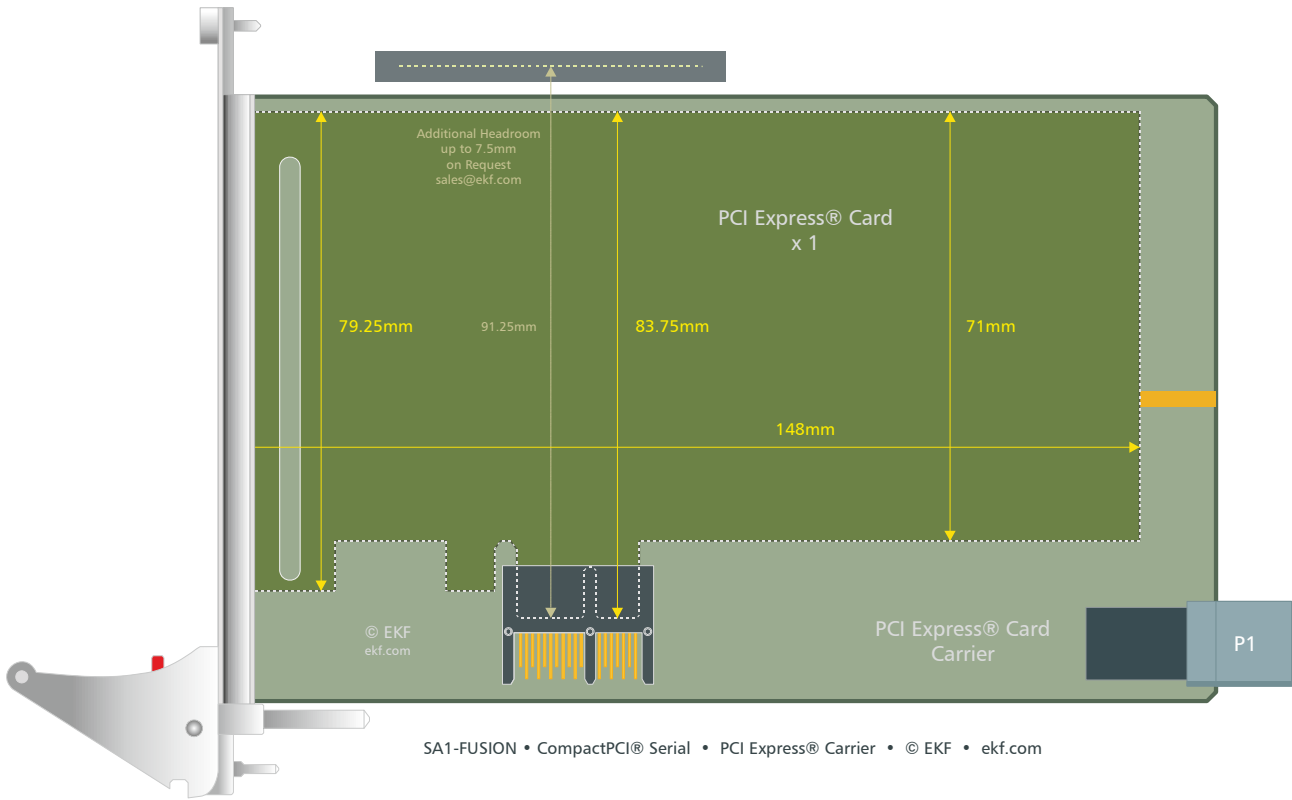


SA1-0800-FUSION w. PCIe x 8 Card

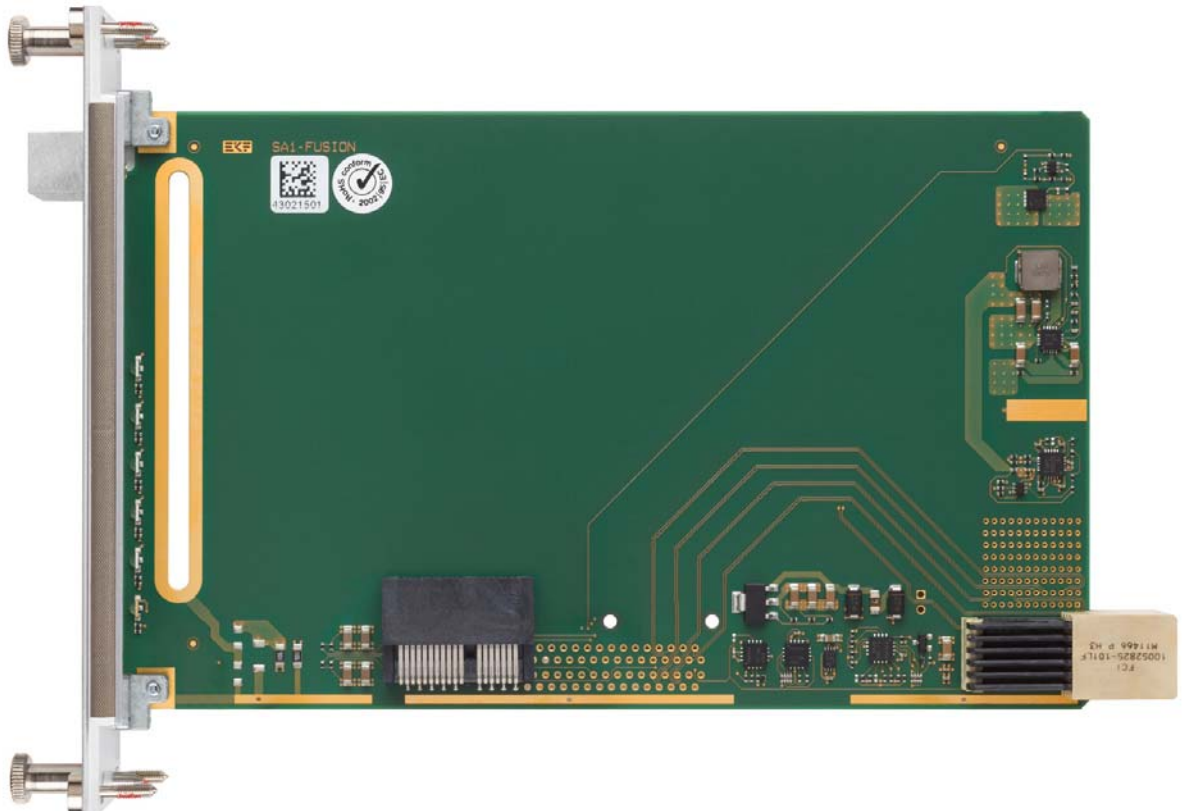
Block Diagram



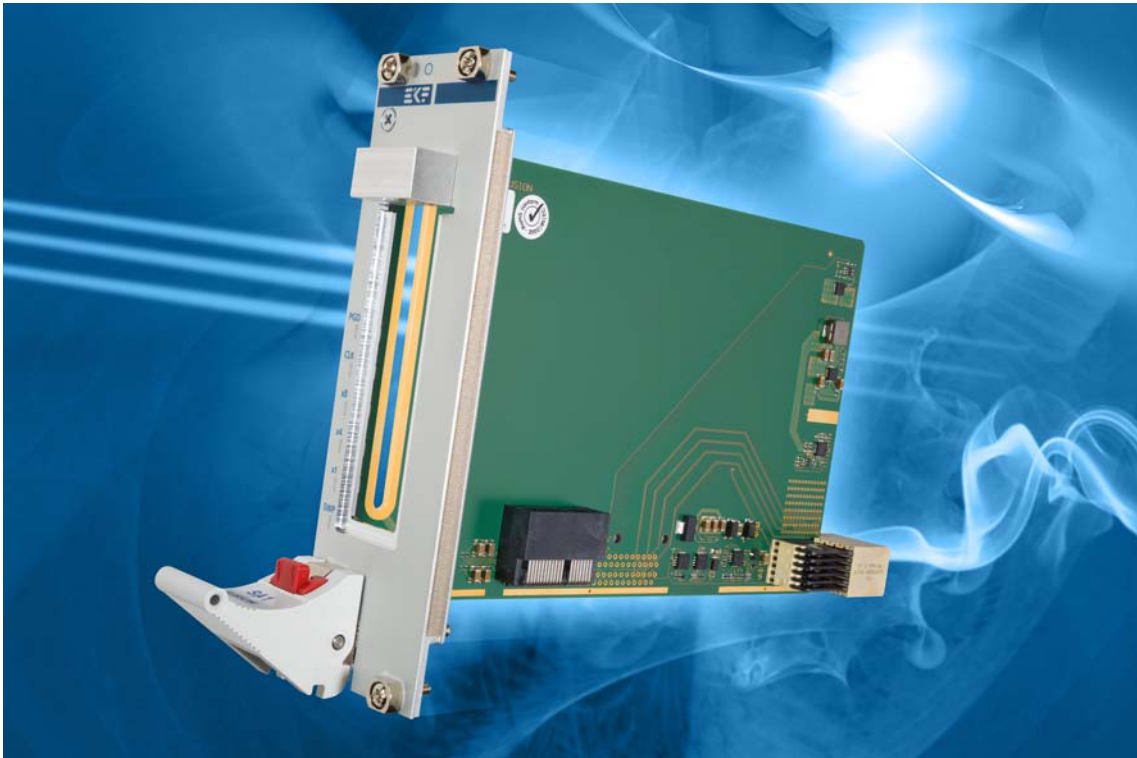
Component Assembly SA1-0100-FUSION



SA1-0100-FUSION



SA1-0100-FUSION

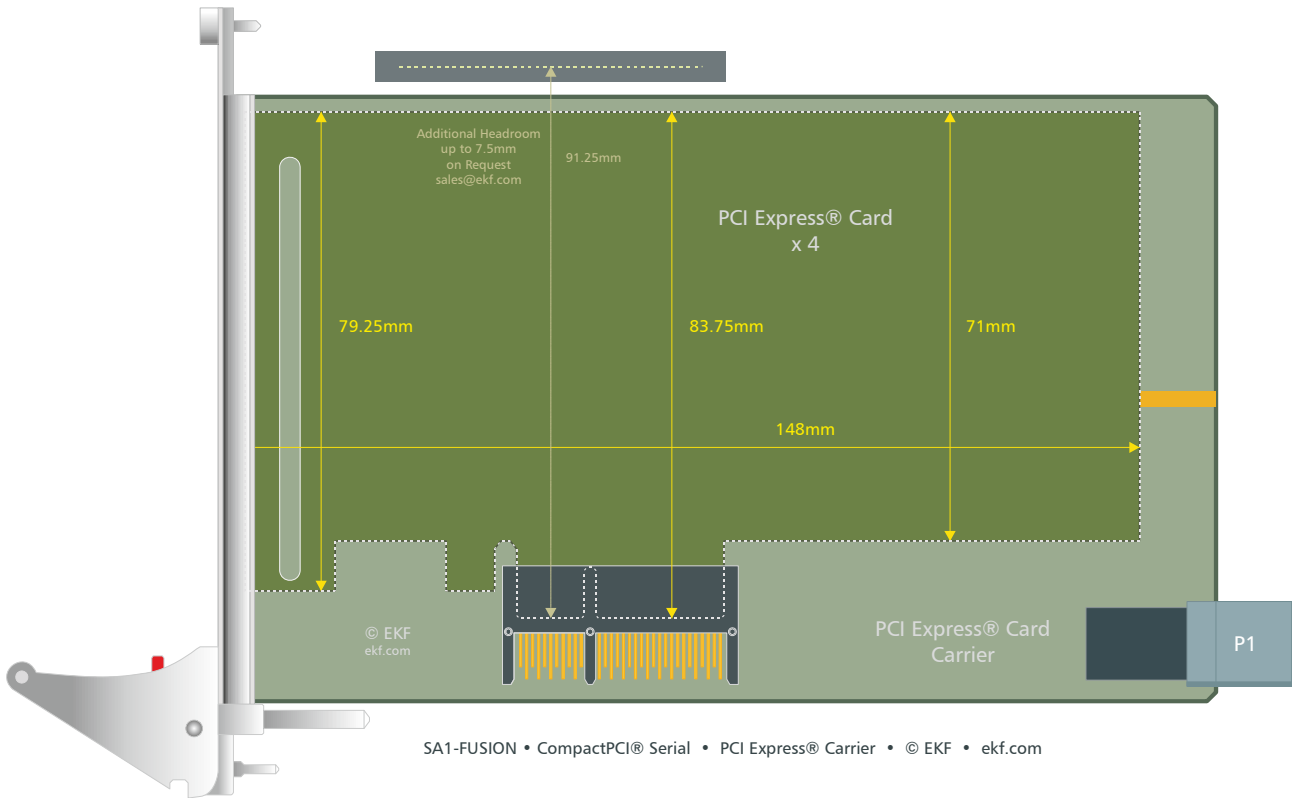


SA1-0100-FUSION

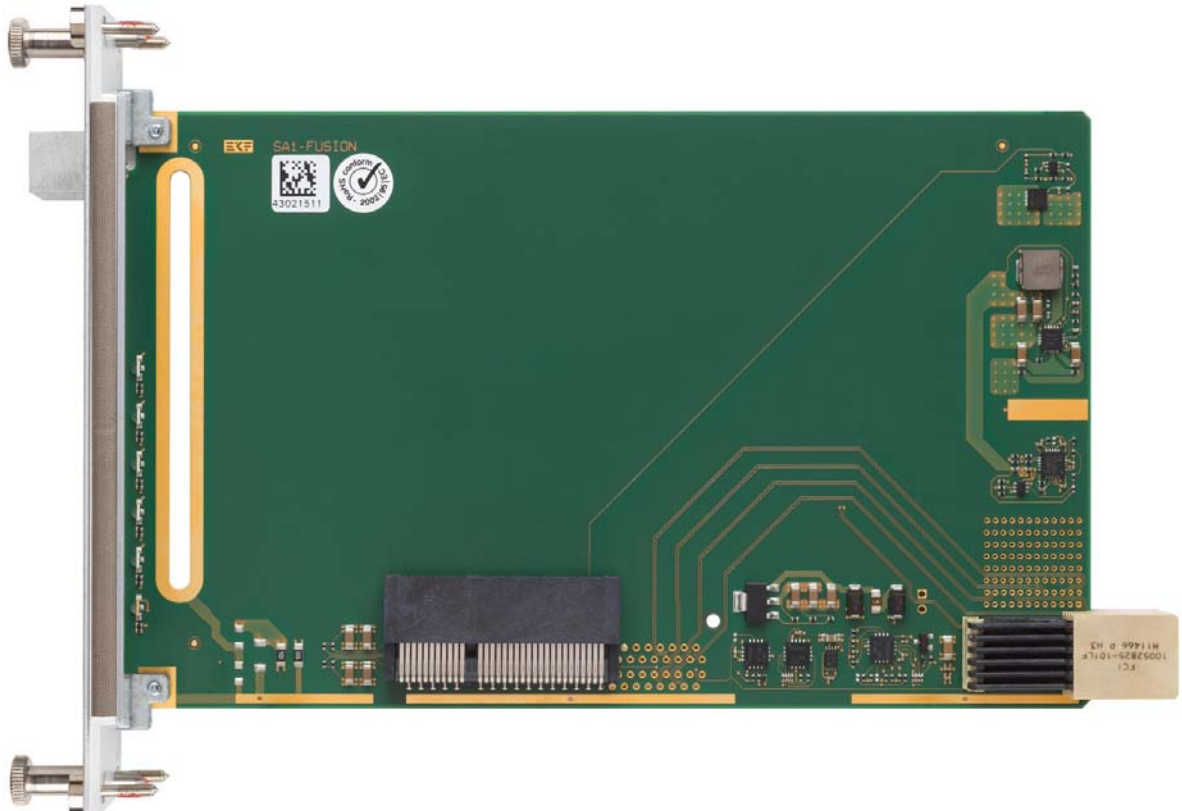


SA1-0100-FUSION

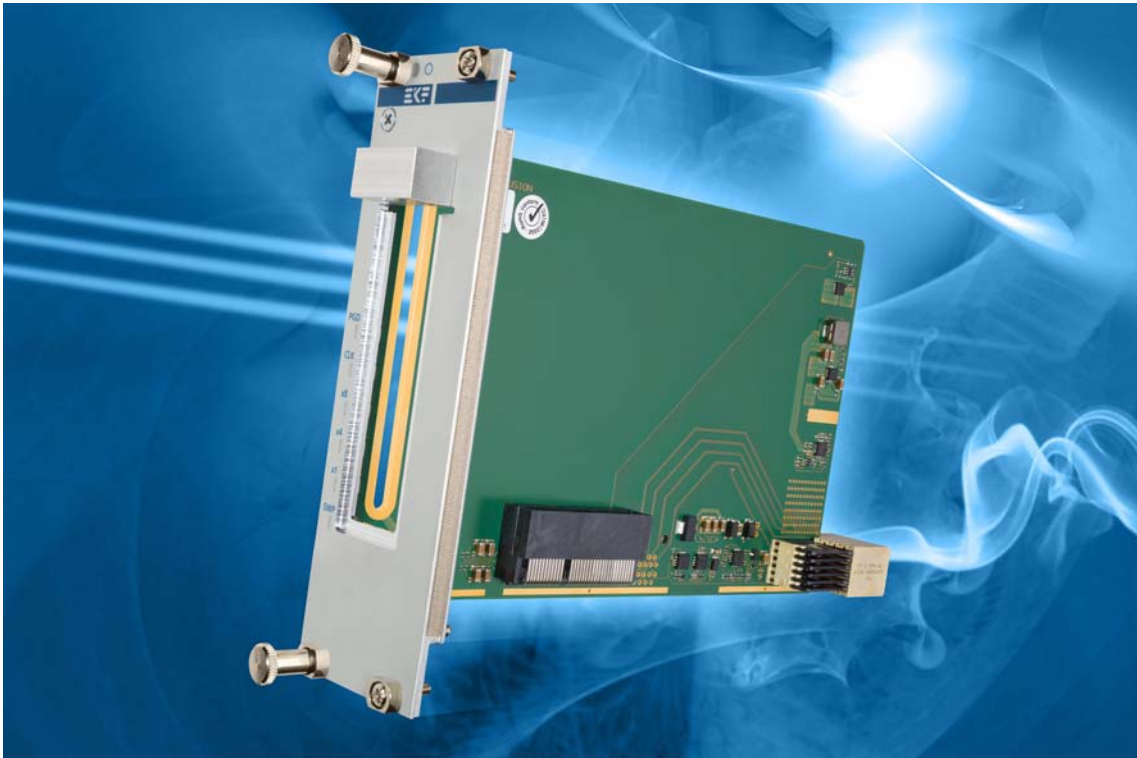
Component Assembly SA1-0400-FUSION



SA1-0400-FUSION



SA1-0400-FUSION

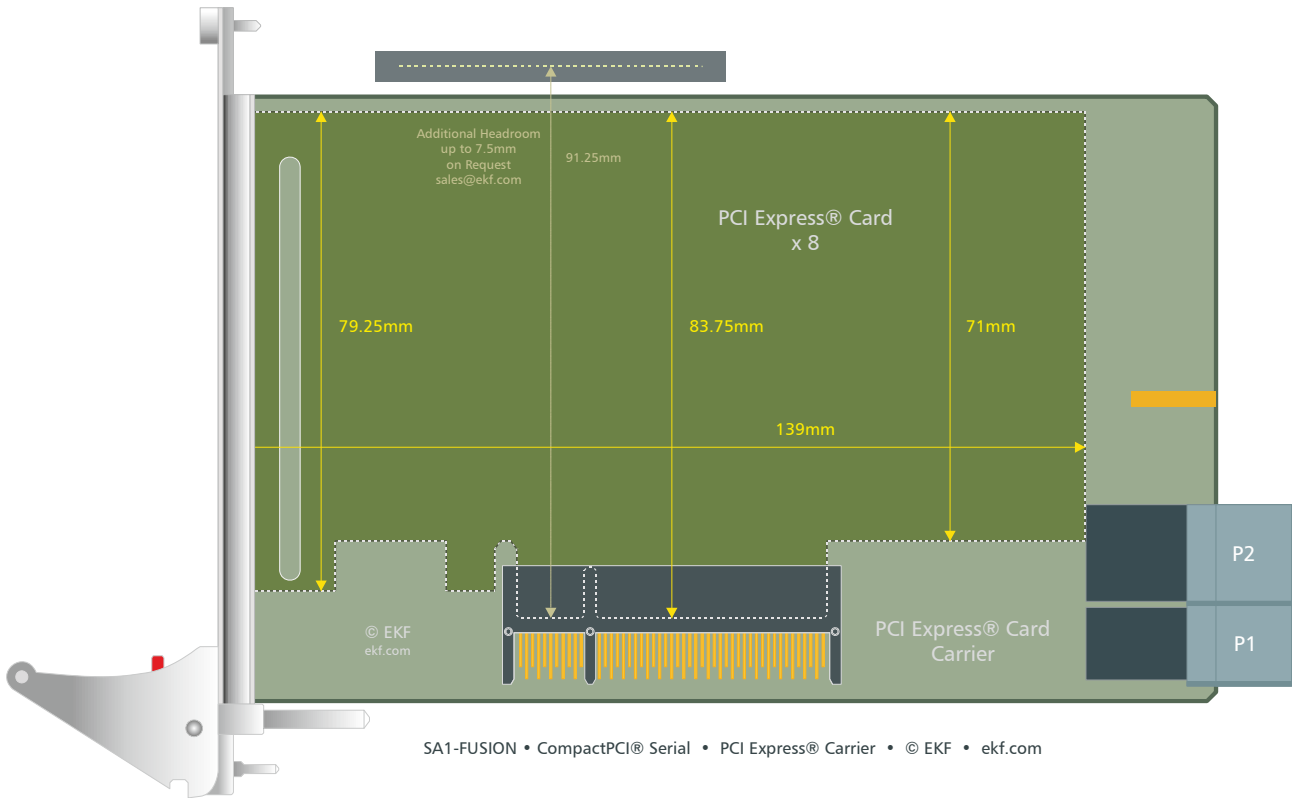


SA1-0400-FUSION

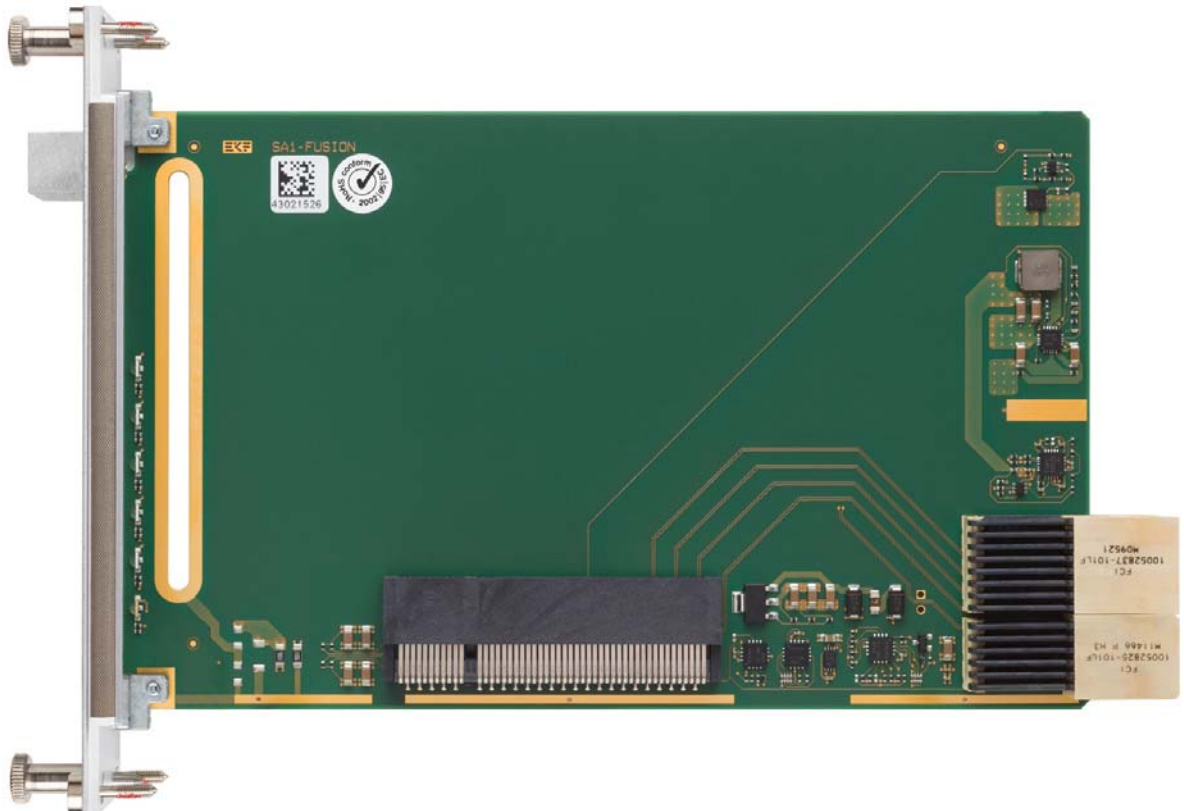


SA1-0400-FUSION

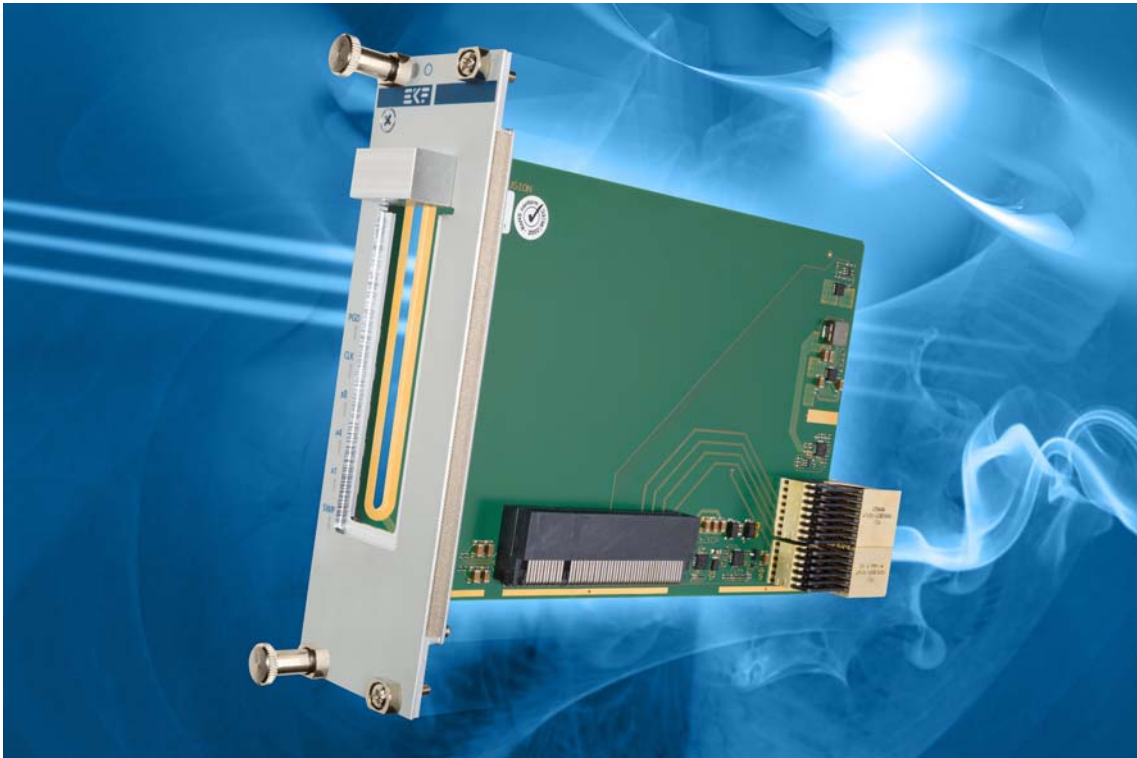
Component Assembly SA1-0800-FUSION



SA1-0800-FUSION



SA1-0800-FUSION



SA1-0800-FUSION



SA1-0800-FUSION

Front Panel



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SA1-FUSION

PCI Express Connector

The SA1-FUSION is provided with a right angled edge card connector for PCI Express® cards. Dependent of the PCIe card to be hosted, this connector can be sized either x 1, x 4 or x 8 lanes (link width).

Up-plugging:

A PCIe card with a link width of 1 or 4 would also fit into the x 8 connector (SA1-0800), and a PCIe card with a link width of x 1 will fit also into the x 4 connector (SA1-0400). For optimum ruggedness however it is recommended to chose that SA1-FUSION carrier card connector version which mates 1:1 the PCIe card capability.

| PCIe Connector x 1 Part #255.1.1.036.2 | | | |
|---|------------|----------|-----|
| B | | A | |
| B1 | +12V | PRST1# | A1 |
| 2 | +12V | +12V | 2 |
| 3 | +12V | +12V | 3 |
| 4 | GND | GND | 4 |
| 5 | SCL | TCK (PD) | 5 |
| 6 | SDA | TDI (PU) | 6 |
| 7 | GND | TDO (NC) | 7 |
| 8 | +3.3V | TMS (PU) | 8 |
| 9 | TRST# (PD) | +3.3V | 9 |
| 10 | +3.3V | +3.3V | 10 |
| 11 | WAKE# | RST# | 11 |
| B12 | RSVD | GND | A12 |
| 13 | GND | REFCLK+ | 13 |
| 14 | PE_TX00+ | REFCLK- | 14 |
| 15 | PE_TX00- | GND | 15 |
| 16 | GND | PE_RX00+ | 16 |
| 17 | PRST2# | PE_RX00- | 17 |
| 18 | GND | GND | 18 |

PCI Express® connector x 1
pin assignment common with x 4 & x 8 connectors

+3.3V is sourced from an on-board regulator. According to the PE Card specification, the current should not exceed 3A.

+12V is a switched power rail. According to the specification, a maximum of 2.1A is defined for the 25W slot.

Both power rails will be disabled if the front panel handle built-in microswitch has been activated.

| PCIe Connector x 4 Part #255.1.1.064.2 | | | |
|---|----------|----------|-----|
| B | | A | |
| B19 | PE_TX01+ | RSVD | A19 |
| 20 | PE_TX01- | GND | 20 |
| 21 | GND | PE_RX01+ | 21 |
| 22 | GND | PE_RX01- | 22 |
| 23 | PE_TX02+ | GND | 23 |
| 24 | PE_TX02- | GND | 24 |
| 25 | GND | PE_RX02+ | 25 |
| 26 | GND | PE_RX02- | 26 |
| 27 | PE_TX03+ | GND | 27 |
| 28 | PE_TX03- | GND | 28 |
| 29 | GND | PE_RX03+ | 29 |
| 30 | RSVD | PE_RX03- | 30 |
| 31 | PRSNT2# | GND | 31 |
| 32 | GND | RSVD | 32 |

PCI Express® connector x 4 • pin assignment common with x 8 connector

| PCIe Connector x 8 Part #255.1.1.098.2 | | | |
|---|----------|----------|-----|
| B | | A | |
| B33 | PE_TX04+ | RSVD | A33 |
| 34 | PE_TX04- | GND | 34 |
| 35 | GND | PE_RX04+ | 35 |
| 36 | GND | PE_RX04- | 36 |
| 37 | PE_TX05+ | GND | 37 |
| 38 | PE_TX05- | GND | 38 |
| 39 | GND | PE_RX05+ | 39 |
| 40 | GND | PE_RX05- | 40 |
| 41 | PE_TX06+ | GND | 41 |
| 42 | PE_TX06- | GND | 42 |
| 43 | GND | PE_RX06+ | 43 |
| 44 | GND | PE_RX06- | 44 |
| 45 | PE_TX07+ | GND | 45 |
| 46 | PE_TX07- | GND | 46 |
| 47 | GND | PE_RX07+ | 47 |
| 48 | PRSNT2# | PE_RX07- | 48 |
| 49 | GND | GND | 49 |

P1/P2 CompactPCI® Serial Backplane Connectors

P2 CompactPCI® Serial Peripheral Slot Backplane Connector

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

| P1 | 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 |

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

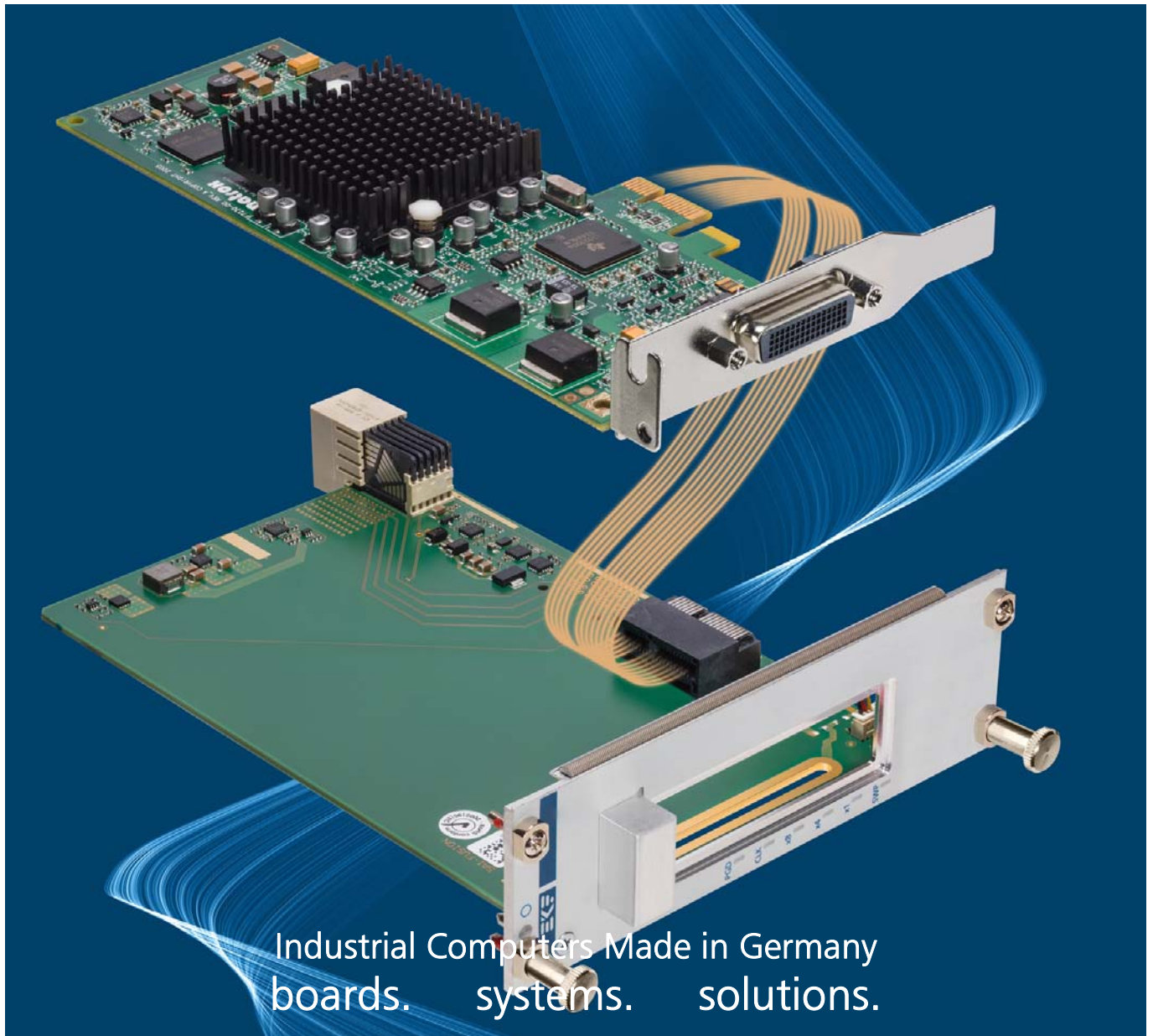
SA1-FUSION Links

| | |
|--------------------------------|--|
| SA1-FUSION Home | www.ekf.com/s/sa1/sa1.html |
| PCIe Card Mounting Information | www.ekf.com/s/sa1/sa1_mim.pdf |
| CompactPCI® Serial Overview | www.ekf.com/s/cpci_serial_overview.pdf |

Ordering Information

Ordering Information

For popular SA1-FUSION SKUs please refer to
www.ekf.com/liste/liste_21.html#SA1



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EKF Elektronik GmbH
Philipp-Reis-Str. 4
59065 HAMM
Germany



Phone +49 (0)2381/6890-0
Fax +49 (0)2381/6890-90
Internet www.ekf.com
E-Mail sales@ekf.com