Product Information

# SN2-VIBRATO

## *CompactPCI® Serial* • 5-Port Gigabit Ethernet NIC

Document No. 6946 • 1 September 2014

## General

*The SN2-VIBRATO is a peripheral slot card for CompactPCI® Serial systems, equipped with five independent Gigabit Ethernet controllers, wired to associated M12 circular front panel connectors, either X-Coded (1000Mbps) or classic D-Coded (100Mbps).*

*The Intel® I210-IT (I211-AT) Ethernet NICs provide latest networking technology, e.g. power management and Audio-Video Bridging (AVB) for tightly controlled media stream synchronisation, buffering, and reservation.*

The on-board PCI Express® packet switch allows for operation of the SN2-VIBRATO either in a CompactPCI® Serial fat pipe slot, or even a standard peripheral backplane slot. The optimum performance can be achieved with a PCIe x 4 link established via the backplane connector P1.

The SN2-VIBRATO is well suited for high performance industrial and transportation networking applications. Drivers are available for all major operation systems.

SN2-0100-VIBRATO

## Theory of Operation

The SN2-VIBRATO is equipped with five independent Intel® I210 industrial temperature range Gigabit Ethernet controllers. Each of them requires a PCI Express® x1 lane, which is provided by a PCI Express® Gen2 packet switch. The downstream ports operate at 2.5GT/s, fully sufficient for the 1Gbps Ethernet data transfer speed. The PCIe x 4 upstream port of the PCI Express® packet switch is capable to operate at 4 x 5.0GT/s (Gen2), if supported by the CompactPCI® Serial system slot controller (CPU board) for the chosen SN2-VIBRATO card slot.

The PCI Express® packet switch is a flexible interface between one to four PCI Express® lanes, derived from the CompactPCI® Serial backplane connector P1 (upstream link), and 5 GbE NICs (single lane downstream links). For maximum data throughput the SN2-VIBRATO should be inserted either into a CompactPCI® Serial fat pipe slot (which provides 8 PCIe lanes), or PCIe x 4 capable standard peripheral slot. For typical applications however, reasonable performance can be already achieved in a PCIe x 1 CompactPCI® Serial peripheral slot.

SN2-0100-VIBRATO (M12 X-Coded Connectors)

M12 X-Coded 8-Lead Gigabit Ethernet Connectors
Designed for Optimum Performance

## Feature Summary

- PICMG® CompactPCI® Serial standard (CPCI-S.0) peripheral slot card
- Single Size Eurocard 3U 100x160mm$^2$, front panel width 8HP
- cPCI-S backplane connector P1
- Suitable for PCIe x 1 or PCIe x 4 standard peripheral slots, and fat pipe peripheral slots

- PLX PCI Express® Gen2 packet switch for optimum bandwidth distribution
- 1 x Upstream port PCIe x 4 oder PCIe x 1, Gen2 or Gen1 PCI Express® over backplane
- 5 x Downstream ports PCIe x 1 to Gigabit Ethernet NICs

- Five independent Gigabit Ethernet controllers (5 x MAC address) Intel® I210-IT
- Intel® I211-AT Gigabit Ethernet controllers populated as an alternate (depends on SKU)
- Integrated PHYs 1000BASE-T, 100BASE-TX, 10BASE-T (IEEE 802.3, 802.3u, 802.3ab)
- IEEE 802.3ab Auto Negotiation for automatic link configuration
- Auto MDI, MDI-X Crossover at all speeds
- Full duplex operation at 10/100/1000Mbps
- 9.5KB Jumbo Frame support
- Hardware-based time stamping (IEEE 1588) and support for 802.1AS - Precise Timing Protocol
- Support for Energy Efficient Ethernet (EEE) standard of IEEE 802.3az
- Option IEEE 802.1Qav compliant Audio-Video Bridging (AVB)
- IPv4, IPv6, TCP/UDP checksum offloads
- Driver support for all major operating systems
- Five front panel M12 circular connectors
- Choice of high performance X-coded or classic D-coded (aka railway) type connectors
- SN2-0100-VIBRATO: M12 X-coded connectors (8-leads, 1000Mbps Ethernet)
- SN2-0200-VIBRATO: M12 D-coded connectors (4-leads, 100Mbps Ethernet)

- Long term availability
- Rugged solution (coating, sealing, underfilling available on request)
- RoHS compliant 2002/95/EC
- Commercial operating temperature range 0°C to +70°C
- Industrial operating temperature range -40°C to +85°C on request
- 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 tbd
- EC Regulations EN55022, EN55024, EN60950-1 (UL60950-1/IEC60950-1)

items are subject to changes

SN2-0200-VIBRATO (M12 D-Coded Connectors)

M12 D-Coded 4-Lead 100Mbps Ethernet Connectors
Designed for Legacy Applications (Railway)

## System Integration

The SN2-VIBRATO 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.

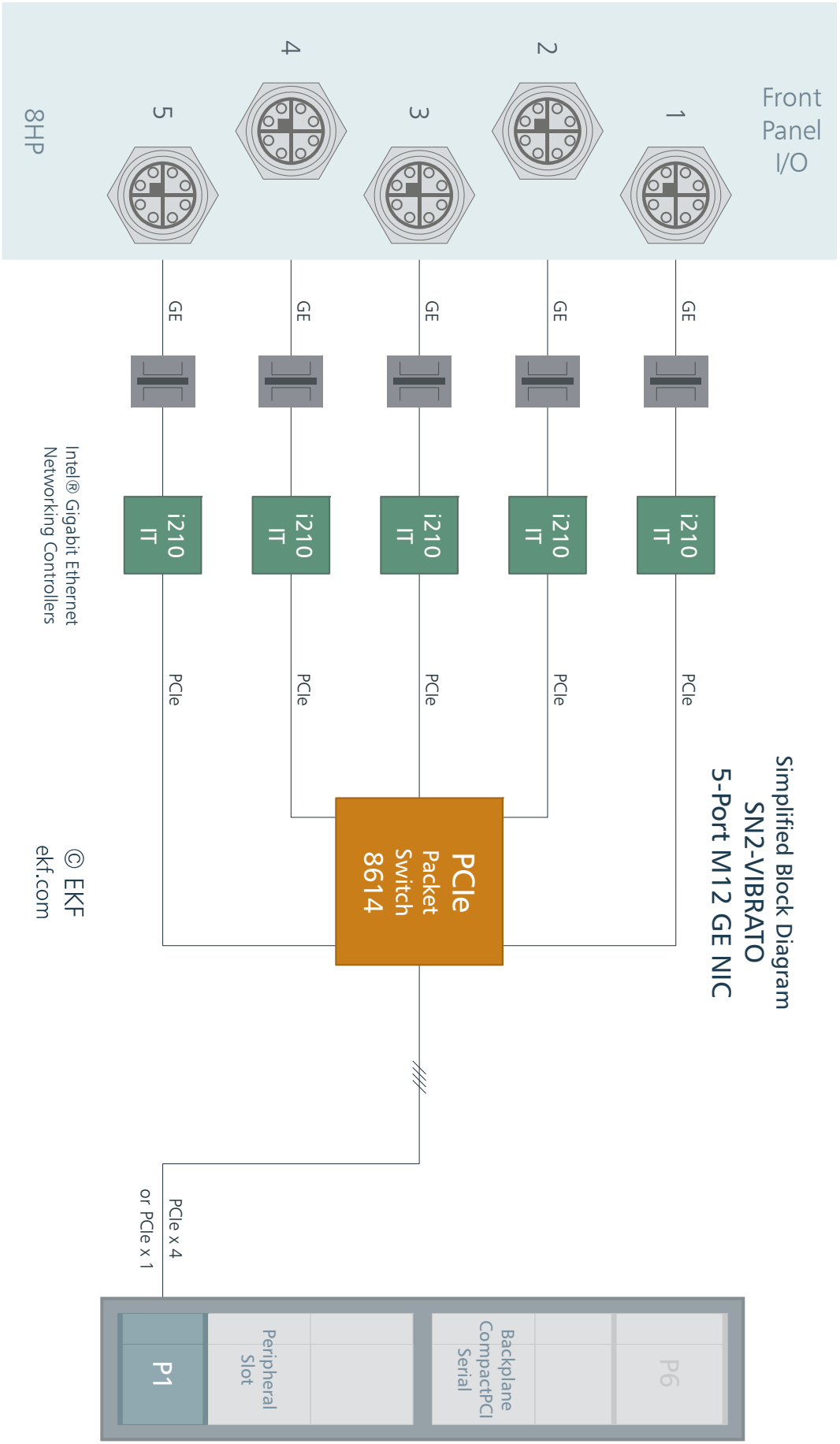
Hybrid systems (providing card slots for both cPCI Classic & cPCI Serial) can be configured by means of a CompactPCI® PlusIO CPU card such as the PC1-GROOVE or PC3-ALLEGRO in combination with a suitable hybrid backplane.

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.

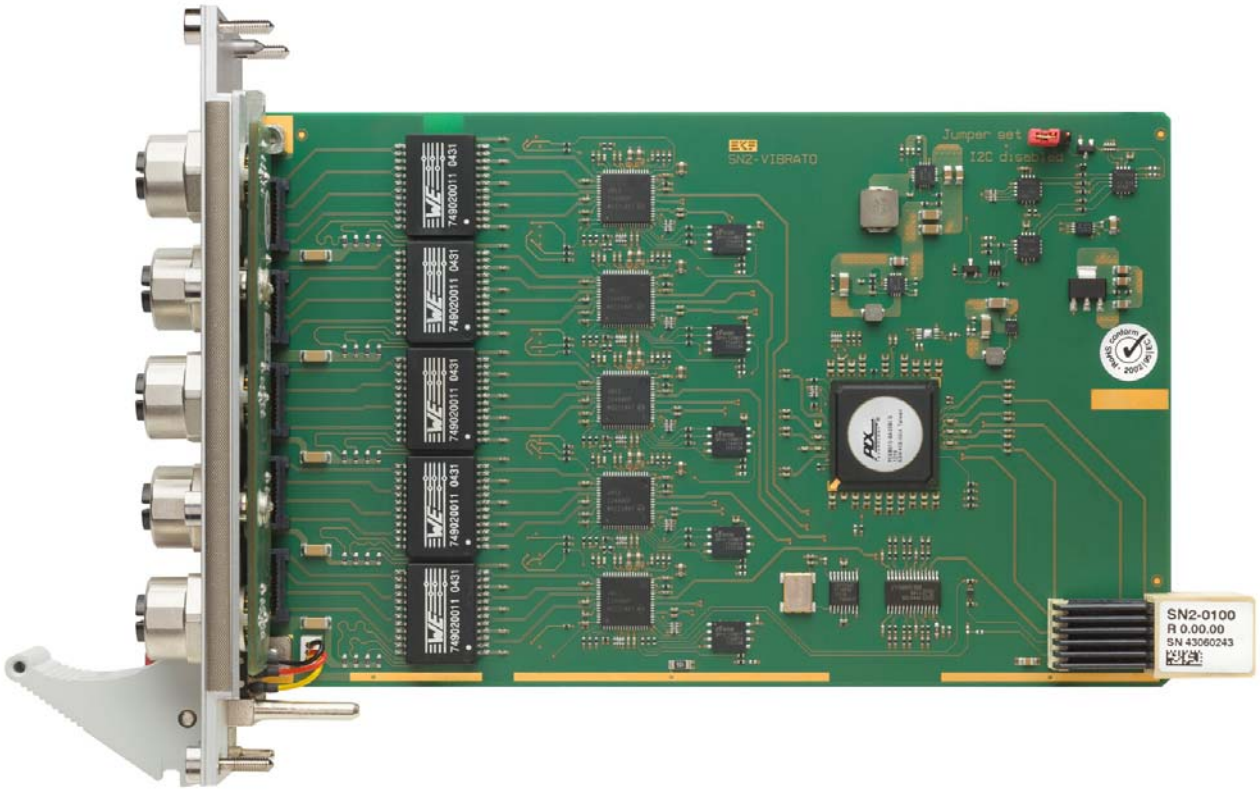
SRP-4401-PLUSIO • Hybrid System

SRS-4401-SERIAL • Native cPCI-S System

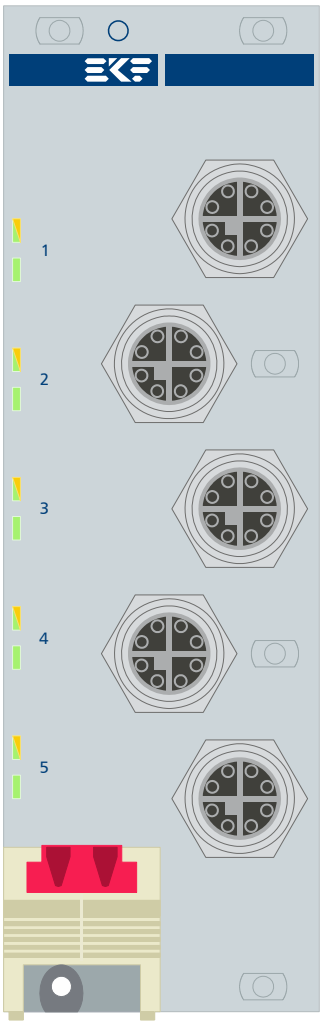
## Block Diagram



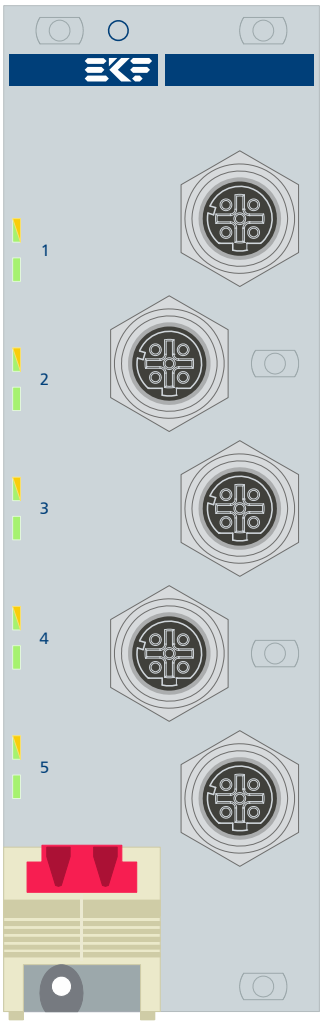
## Component Assembly



## Front Panel Options




SN2-0100-VIBRATO
C31-M12X




SN2-0200-VIBRATO
C34-M12D

X-Coded and D-Coded M12 Cable Assemblies Available

M12 to M12 Cable
Phoenix Contact

M12 Cable Connector
Phoenix Contact

M12 to RJ45 Cable
Phoenix Contact

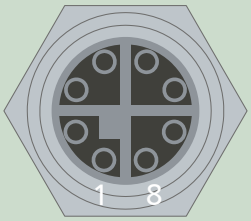
M12 Gigabit Ethernet Cable Assembly

| Ordering Information Cable Assemblies |
| --- |
| Gigabit Ethernet cable M12 to M12: #271.14.008.xx (xx=length/meter)<br>Gigabit Ethernet cable M12 to RJ-45: #271.15.008.xx (xx=length/meter) |
| 100Mbps Ethernet cable M12 to M12: #271.14.004.xx (xx=length/meter)<br>100Mbps Ethernet cable M12 to RJ-45: #271.15.004.xx (xx=length/meter) |

## M12 Front Panel Connectors

### C31-M12X
Gigabit Ethernet • 271.12.008.00 • M12-X Flush-type socket 1+10 Gigabit Ethernet

271.12.008.00

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Draft - Do Not Scale

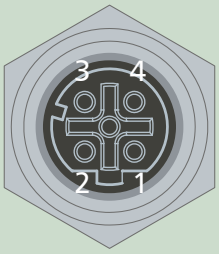
Upper F/P LEDs
yellow=1Gbit/s green=100Mbit/s off=10Mbit/s

Lower F/P green LEDs
on=link established blinking=activity (data)

| | | |
|---|---|---|
| Ports 1-5 | 1 | MDX0+ |
| | 2 | MDX0- |
| | 3 | MDX1+ |
| | 4 | MDX1- |
| | 5 | MDX3+ |
| | 6 | MDX3- |
| | 7 | MDX2- |
| | 8 | MDX2+ |

### C34-M12D
100Mbit Ethernet • 271.12.004.00 • M12-D Flush-type socket 100Mbps Ethernet

271.12.004.00

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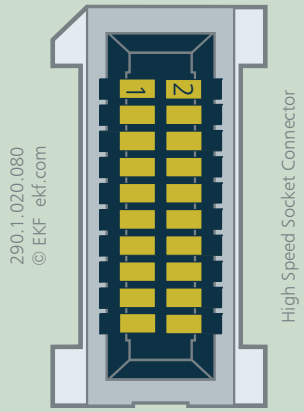
Upper F/P LEDs
yellow=1Gbit/s green=100Mbit/s off=10Mbit/s

Lower F/P green LEDs
on=link established blinking=activity (data)

| | | |
|---|---|---|
| Ports 1-5 | 1 | MDX0+<br>TX+ |
| | 2 | MDX1+<br>RX+ |
| | 3 | MDX0-<br>TX- |
| | 4 | MDX1-<br>RX- |

## Internal Connectors

### High Speed Dual Row Socket 0.8mm Pitch (290.1.020.080)




| | | | |
|---|---|---|---|
| MDX3- | 01 | 02 | |
| MDX3+ | 03 | 04 | |
| | 05 | 06 | MDX2- |
| | 07 | 08 | MDX2+ |
| | 09 | 10 | |
| | 11 | 12 | |
| | 13 | 14 | MDX1- |
| | 15 | 16 | MDX1+ |
| MDX0- | 17 | 18 | |
| MDX0+ | 19 | 20 | |

This high speed connector is in use on-board for each network port between the SN2-VIBRATO and the riser cards C31-M12X or C34-M12D. Custom specific riser cards with a mixture of M12 X-coded (e.g. uplink) and M12 D-coded (e.g. downstream) or even proprietary connectors can be designed - please contact sales@ekf.de

### 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 |

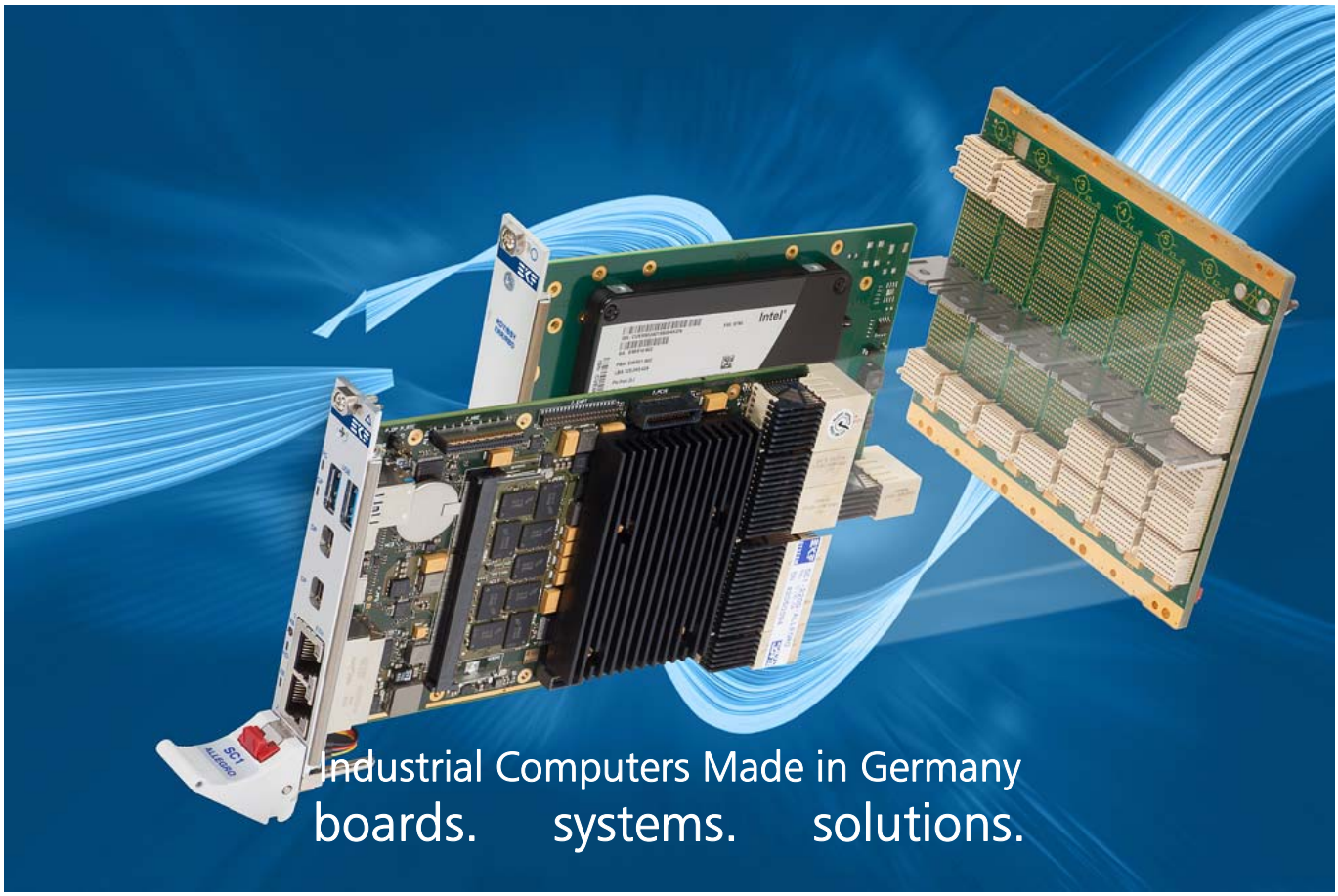
pin positions printed gray: not connected

| SN2-VIBRATO Links | |
|---|---|
| SN2-VIBRATO Home | www.ekf.com/s/sn2/sn2.html |
| Intel® I210/I211 Driver Download | www.ekf.com/s/sn2/sn2.html |
| CompactPCI® Serial Overview | www.ekf.com/s/serial_concise.pdf |
| CompactPCI® Serial - All You Need to Know | www.ekf.com/s/smart_solution.pdf |

## Ordering Information

For popular SN2-VIBRATO SKUs please refer to
www.ekf.com/liste/liste_21.html#SN2


SYSTEM
Rugged Products
For Railway Application

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