SYSTEM

Product Information

SD4-SWEEP • *CompactPCI® Serial* • M.2 SATA RAID

Document No. 7626 • 10 June 2016

General

The SD4-SWEEP is a peripheral slot card for CompactPCI® Serial systems, equipped with a quad-channel PCI Express® to SATA 6Gbps controller, and four on-board sockets for M.2 type 2280 SATA solid state drives (SSD). With a capacity available of 512MB as of current, M.2 is a fast emerging embedded storage module form factor. The Marvell® SATA 3.0 controller allows RAID or non RAID operation.

The SD4-SWEEP fits into any CompactPCI® Serial peripheral slot that is PCIe enabled. For optimum performance a fat pipe slot may be chosen. Hardware RAID operation is supported, running with an enhanced ARM-based processor to offload the host CPU. Thanks to the four M.2 sockets provided on the SD4-SWEEP, a JBOD or hardware RAID level 0/1/10 system can be easily configured.
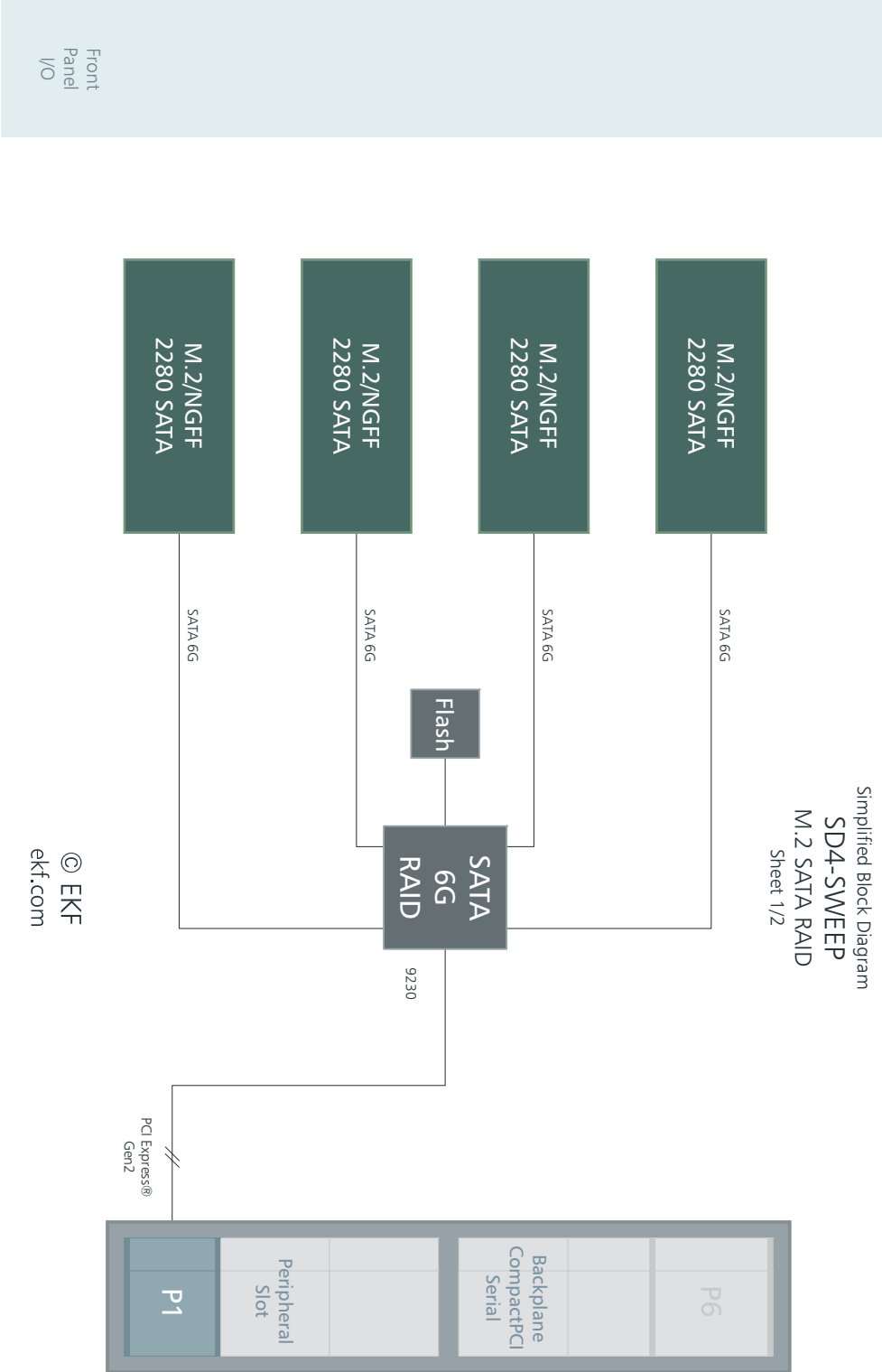
Feature Summary

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

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

▸ Suitable for CompactPCI® Serial peripheral slot (PCI Express® enabled)

▸ CompactPCI® Serial fat pipe slot (PCIe x 8) or peripheral slot (PCIe x 4) recommended

▸ cPCI-S backplane connector P1for PCI Express®, single or dual lane link

▸ Marvell® PCI Express® 2.0 to SATA III host controller

▸ Four SATA 6Gbps interface ports

▸ Native Command Queuing

▸ Hardware RAID 0/1/10

▸ On-the-fly AES encryption 128/256-bit

▸ AHCI driver support
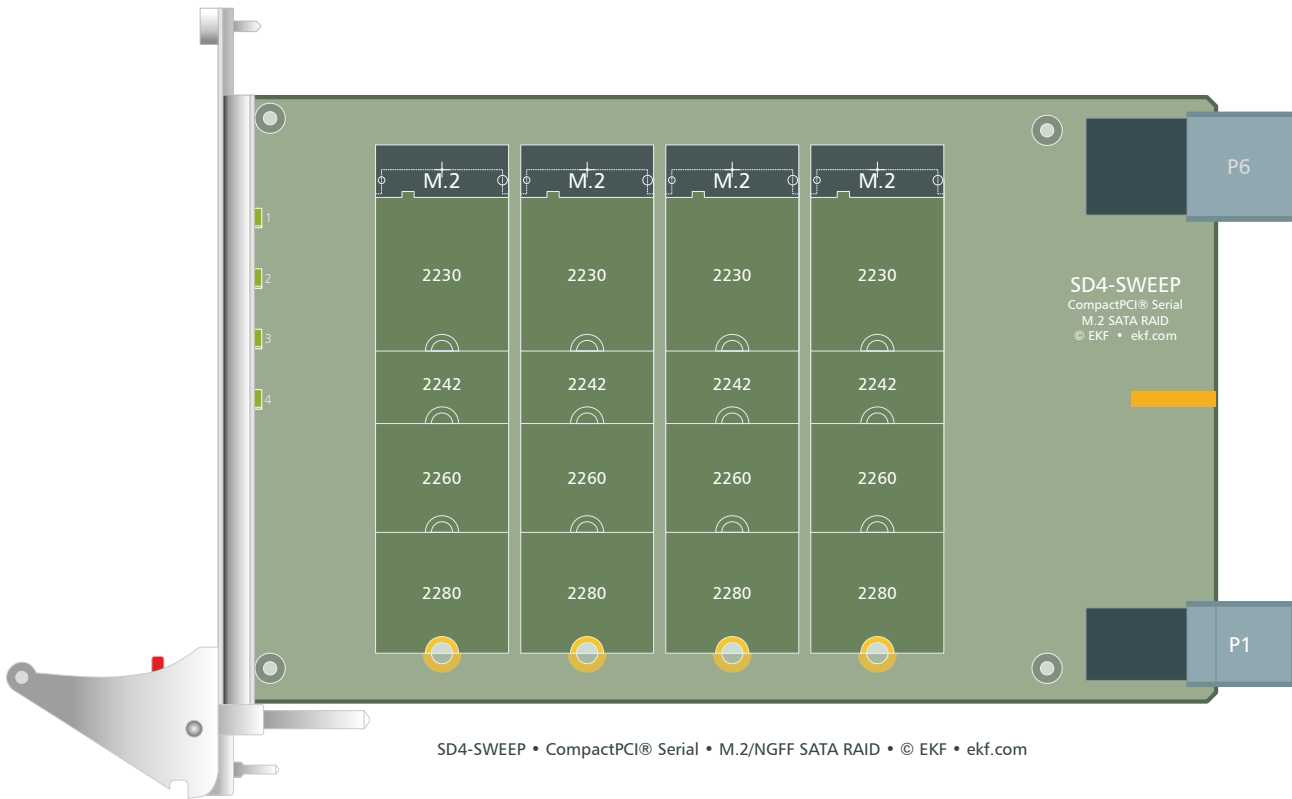

▸ Designed according to PCI Express® M.2 Specification (aka NGFF)

▸ Up to four on-board M.2 SATA SSD modules (must be ordered separately)

▸ M.2 module size 2280, 2260, 2242, typically B-M coded

▸ M.2 host connectors B-coded, 4.2H (accepts double-sided modules)

▸ Socket 2 pin-out for SATA based SSDs (configuration pins 0000)

▸ Various brands of M.2 SATA SSDs available (e.g. Intel, Micron, Samsung)

▸ Hardware RAID option for dual or triple/quad device configuration

▸ Designed & manufactured in Germany

▸ Certified quality management according to ISO 9001

▸ Long term availability

▸ Rugged solution (coating, sealing, underfilling on request)

▸ RoHS compliant

▸ Operation temperature 0°C to +70°C (commercial temperature range)

▸ Operation temperature -40°C to +85°C (industrial temperature range) 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 82.8 years

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

Block Diagram

Front
Panel
I/O

M.2/NGFF
2280 SATA

M.2/NGFF
2280 SATA

M.2/NGFF
2280 SATA

M.2/NGFF
2280 SATA

SATA 6G

SATA 6G

SATA 6G

SATA 6G

Flash

SATA
6G
RAID

9230

Simplified Block Diagram
SD4-SWEEP
M.2 SATA RAID
Sheet 1/2

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PCI Express®
Gen2

P1

Peripheral
Slot

Backplane
CompactPCI
Serial

P6

Component Orientation

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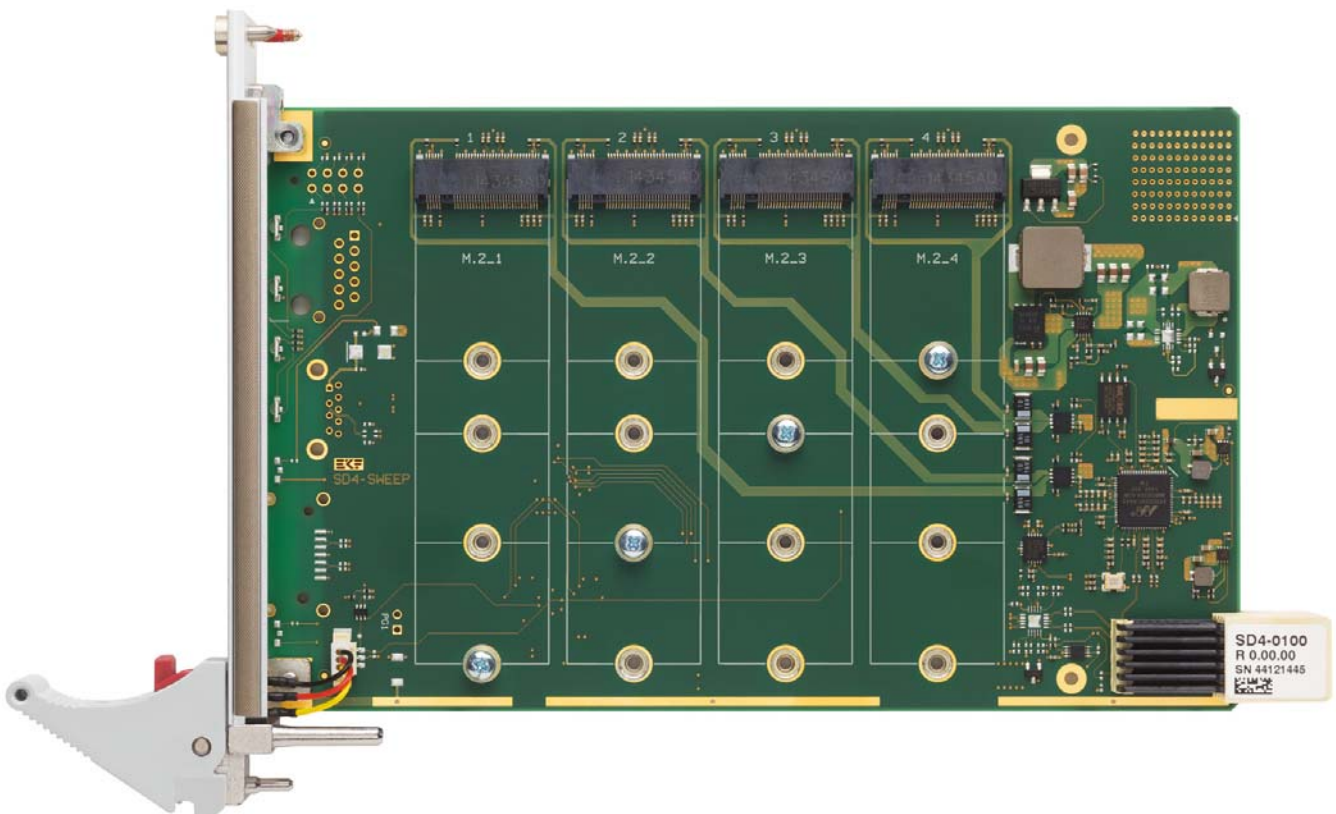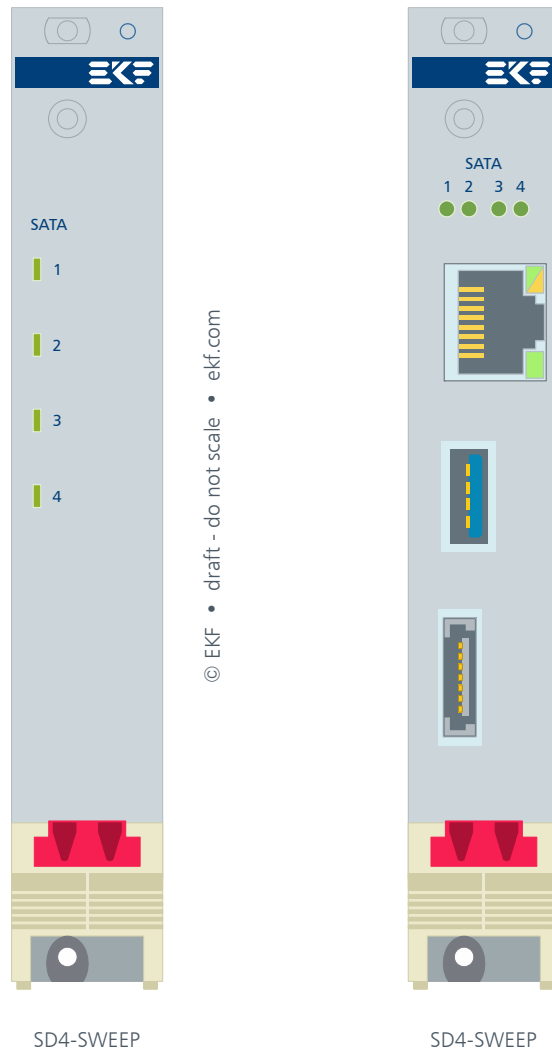
P6 is not populated by default. This connector can be provided on request for even more mechanical stability, e.g. railway applications.

Front Panel

SD4-SWEEP

SD4-SWEEP

SATA activity LEDs assigned to M.2 modules 1 - 4
LED on= M.2 module ready
LED blinking = M.2 module active

The front panel layout illustrated right is available on special request only. Please contact sales@ekf.de before ordering.

Please note: The front handle is provided with a built-in microswitch, which is used to disable the on-board power circuit when released. Vice versa, the *on-board devices are enabled not before the handle gets locked*. Please refer to the illustration below and make sure that the eject lever has reached its final position for proper board operation, as shown in picture 8. A gentle click should be audible, when the red actuator pin moves into its raised position, indicating that the board is locked and ready for use.
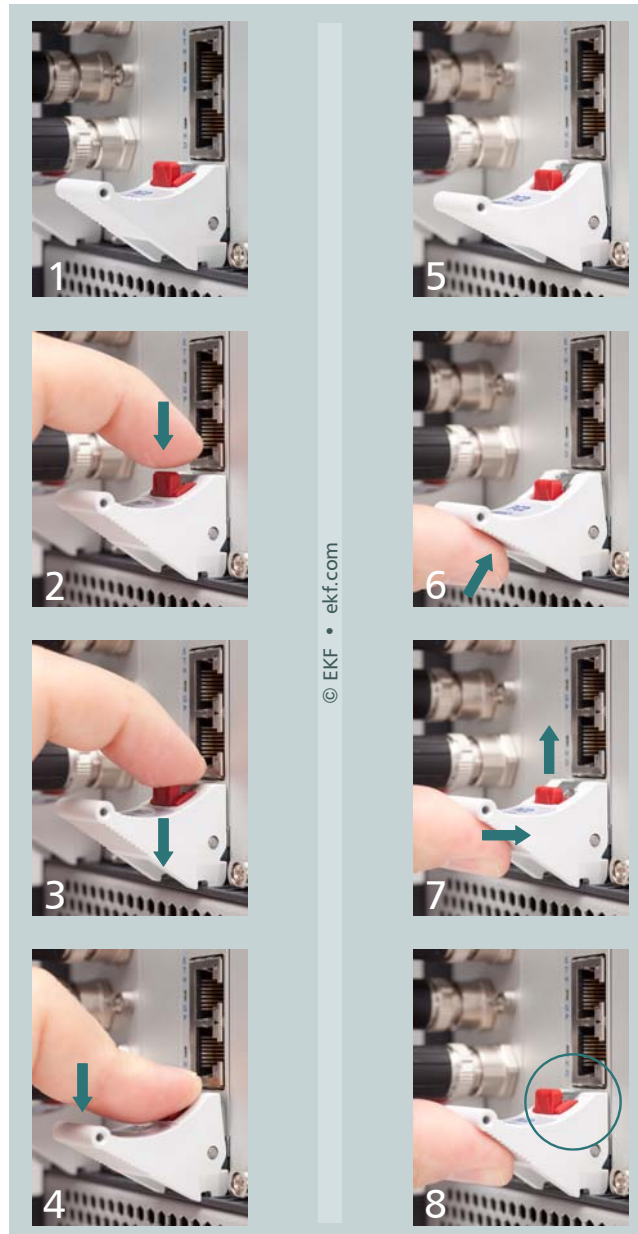
1 - 4: remove board
5 - 8: install board

1 & 8: on-board power enabled
2-7: on-board power disabled

M.2 Connectors

The SD4-SWEEP is provided with four M.2 module host connectors Type B. After inserted, the M.2 module must be locked manually by a screw, in order to withstand shock and vibration. With two or more M.2 solid-state drives engaged, the SD4-SWEEP allows for hardware RAID level 0/1/10 operation.

M.2 1-4 • Pin 1 - 38 EKF Part #255.50.1.2242.10			
CFG-3 *	1	2	+3.3V
GND	3	4	+3.3V
GND	5	6	NC
NC	7	8	NC
NC	9	10	DA/DSS
GND	11	12	B Key
B Key	13	14	B Key
B Key	15	16	B Key
B Key	17	18	B Key
B Key	19	20	NC
CFG-0 *	21	22	NC
NC	23	24	NC
NC	25	26	NC
GND	27	28	NC
NC	29	30	NC
NC	31	32	NC
GND	33	34	NC
NC	35	36	NC
NC	37	38	DEVSLP

M.2 1-4 • Pin 39 - 75			
GND	39	40	NC
SATA B+ (SSD OUT)	41	42	NC
SATA B- (SSD OUT)	43	44	NC
GND	45	46	NC
SATA A- (SSD IN)	47	48	NC
SATA A+ (SSD IN)	49	50	NC
GND	51	52	NC
NC	53	54	NC
NC	55	56	NC
GND	57	58	NC
NC M-Key	59	60	NC M-Key
NC M-Key	61	62	NC M-Key
NC M-Key	63	64	NC M-Key
NC M-Key	65	66	NC M-Key
NC	67	68	NC
CFG-1 *	69	70	+3.3V
GND	71	72	+3.3V
GND	73	74	+3.3V
CFG-2 *	75		

*   10k pull-up +3.3V
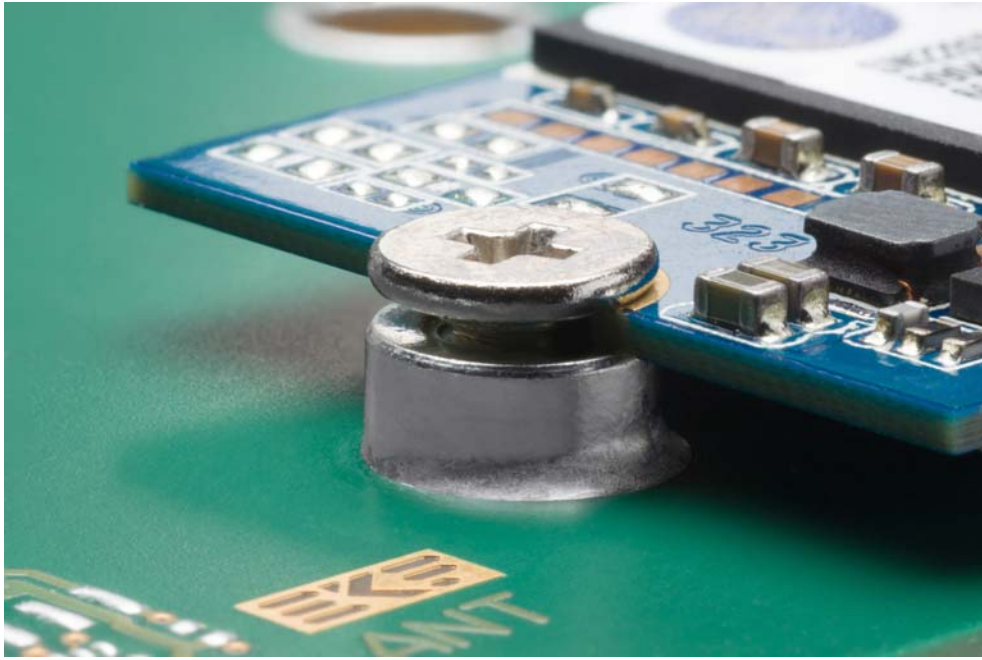
M.2 Module Fixation (Picture Similar)

Mounting Parts for M.2 SSD Modules	
440.08.025.006	Screw M2.5 x 6mm (supplied together with board)
442.0.02502.5	Spacer sleeve M2.5 x 2.5mm (supplied together with board)
440.45.025.015	M2.5 PCB nut, bottom mount threaded inserts (populated on-board by default)

Front Panel Connectors (Option)

Available on request, the SD4-SWEEP front panel can be provided with I/O connectors for Gigabit Ethernet (RJ45), USB 3.0, and eSATA. These data ports are passed through from the associated backplane connectors, P6 for Gigabit Ethernet, and P1 with respect to USB and eSATA. For operability, the CompactPCI® Serial backplane resources of the chosen backplane slot must be available (please refer to diagrams 'Backplane Resources' e.g. www.ekf.com/s/sc3/img/sc3_backplane.pdf).

Usage of any F/P I/O connector is independent from the M.2 SSD mass storage devices. However, the USB connector may be useful for copying data from an SSD to an USB stick and vice versa. The Ethernet connector would allow to attach e.g. a remote NAS. A local storage system could be connected via the eSATA cable connector. Since no differential signal redrivers are provided on-board, the maximum external cable length or data transfer speed for any front panel I/O port may be affected (reduced).
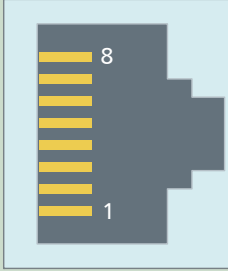

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Please contact sales@ekf.de before ordering

Gigabit Ethernet
270.01.08.6 • RJ45 Jack

270.01.08.06

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Draft - Do Not Scale

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

USB 3.0
Standard Mount Receptacle • 270.23.09.1

270.23.09.1
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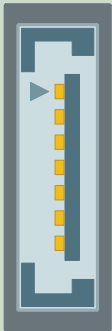
1	VBUS +5V 1.5Amax
2	USB D-
3	USB D+
4	GND
5	SS RX-
6	SS RX+
7	GND
8	SS TX-
9	SS TX+

Front Bezel eSATA
#256.007.10.10

eSATA Receptacle
256.007.10.10 • © EKF • ekf.com

1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

Please contact sales@ekf.de before ordering

CompactPCI® Serial Backplane Connector

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 white: not connected

The on-board PCI Express® to SATA controller is suitable for PCIe generation 1 and 2 (up to 5Gbps). Two PCI Express® lanes are provided over the backplane connector P1 as upstream link. It is recommended to position the SD4-SWEEP on a 'Fat Pipe' CompactPCI® Serial peripheral slot (if available on a backplane, the fat pipe slot(s) would be adjacent to the system slot). When inserted into a standard peripheral slot, there is frequently only a single PCI Express® lane available (depends on the CPU card capabilities), which may reduce the maximum data throughput of the SD4-SWEEP.

Ordering Information
For popular SD4-SWEEP SKUs please refer to www.ekf.com/liste/liste_21.html#SD4

Related Links to CompactPCI® Serial Mass Storage Solutions	
SD4-SWEEP Home	www.ekf.com/s/sd4/sd4.html
CompactPCI® Serial SATA Storage	www.ekf.com/s/serial.html#SD
CompactPCI® Serial PCIe Storage	www.ekf.com/s/serial.html#SE

Related Documents CompactPCI® Serial	
Basics / Overview CompactPCI® Serial	www.ekf.com/s/smart_solution.pdf
CompactPCI® Serial Home	www.ekf.com/s/serial.html

Recommended CPU Cards	
SC2-PRESTO	www.ekf.com/s/sc2/sc2.html
SC3-ALLEGRO	www.ekf.com/s/sc3/sc3.html

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