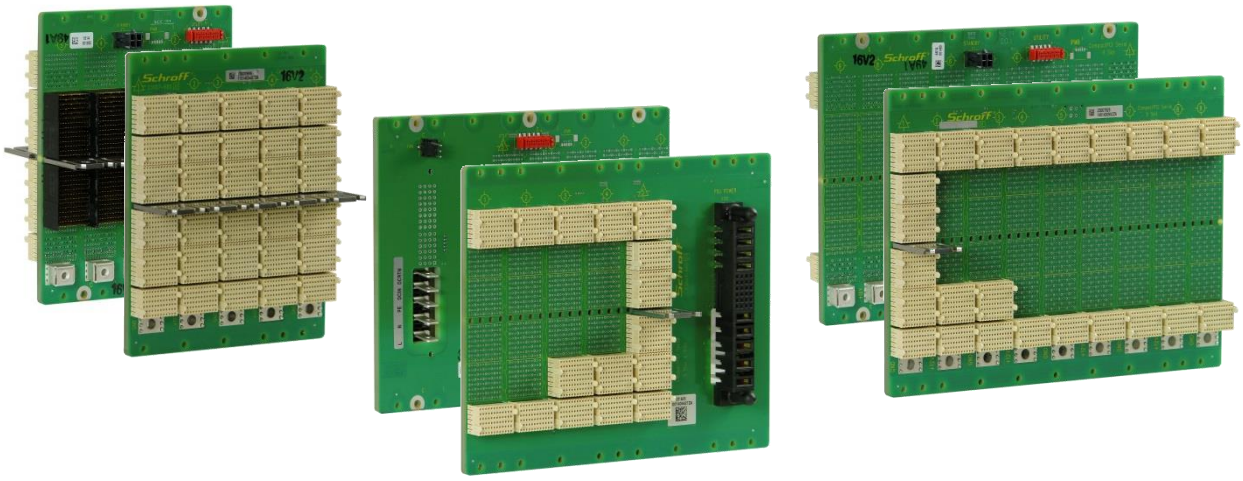
Users guide

Revision 1.8 (21/02/2020)

CompactPCI Serial backplanes 23007-6xx



Doc-No: 63972-333 (User Guide CPCI Serial BP Rev1.7)

R1.0	March 2015	Initial Release
R1.1	April 2015	Corrected backplane drawings
R1.2	September 2015	Updated order number table
R1.3	January 2015	Corrected pinout utility connector
R1.4	January 2015	Added information about producer, corrected pinout Mains power connector for 1 slot bps, added 2 power adapter boards, added Power adapter board configuration Examples
R1.5	June 2016	Deleted footer with legal information about entity
R1.6	August 2016	Updated order number table
R1.7	April 2018	nVent Logo added
R1.8	Februar 2020	Backplane rear side drawing corrected

Information about producer

Schroff GmbH
D-75334 Straubenhardt

The details in this manual have been carefully compiled and checked.

About CompactPCI Serial

CompactPCI Serial is a new standard that supports the fast serial protocols PCI Express, Serial-ATA, USB and Ethernet.

Each Schroff CompactPCI Serial backplane supports the current generation of protocols (PCIe up to Gen3, S-ATA up to rev. 3.0, USB 2.0, USB 3.0 and Ethernet up to 10G Base-T). A maximum of 9 slots is possible (one system slot and up to 8 peripheral slots).

All 5 protocols are available simultaneously on each slot. The successor to CompactPCI is based on the same mechanical form factor. A robust stainless steel centering and coding pin allows use even in harsh environments.

The Schroff CompactPCI Serial backplane portfolio comprises of system slot left and system slot right backplanes. The Schroff CompactPCI Serial backplane family consists of backplanes with Ethernet routed as single star from the system slot to all peripheral slots and backplanes with full-mesh Ethernet topology. In addition to the backplanes with Ethernet, backplanes are available where the upper connector pair, J6/RP6, is assembled for “rear I/O on RP6”. Backplanes with Ethernet routing and up to five slots have full-mesh Ethernet topology implemented which includes the signal lines for the star topology as well. Higher slot count backplanes with star topology and backplanes with full-mesh Ethernet implementation are available. Schroff CompactPCI Serial backplanes are available with or without rear I/O connectors on J2..J5 / RP2..RP5 on each peripheral slot.

For partial rear I/O connector assembly, slot counts which are not in the current Schroff CompactPCI Serial backplane portfolio, conformal coated backplanes or custom developments based on the Schroff standard backplane portfolio please contact your Schroff sales representative or send an inquiry to backplanes@nVent.com

Applicable Specifications PICMG CPCI-S.0 Rev. 2.0

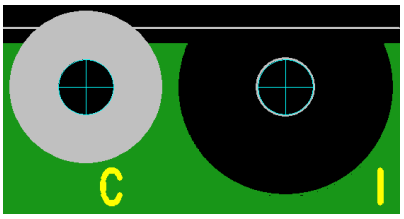
Assembly instructions & general information

Mounting

Attach the backplane using every non-plated mounting hole at the top and the bottom to fix the backplane to the system / subrack with M2.5 screws.

Chassis GND

If only the non-plated mounting holes are used the backplane GND will be isolated from the chassis GND. On the top and bottom mounting hole rows there are 2 mounting holes near each other, one plated, marked with a “C” and one non-plated, marked with an “I”.

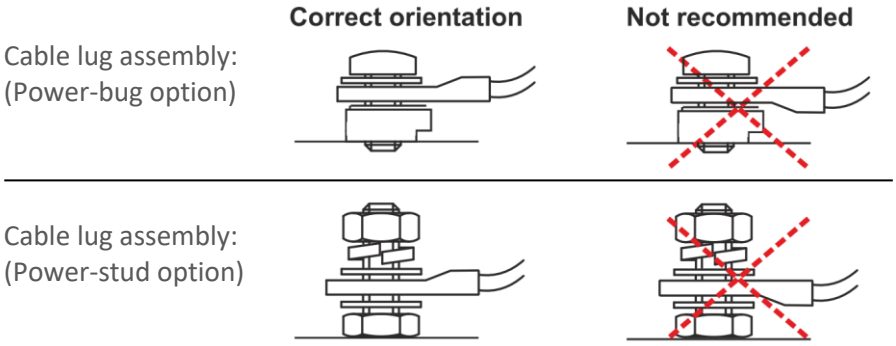


Mounting holes for „I“ isolated or „C“ connected mounting of backplane GND to Chassis GND

If connected mounting of the backplane is required, please assemble screws in each plated mounting hole of the backplane. Spring washers are recommended instead of flat washers.
If both grounds are isolated, creepage and clearance between screw and digital GND are in accordance with EN60950.

Power input

The backplane provides power terminals with M4 thread power bugs to connect power cables for +12V and GND. The power bug below the system slot is always GND. The potential of the power bugs (+12V, GND) alternates with each slot.
M4 cable lugs should be used to connect the power cables to the power bugs. A maximum of 2 cable lugs are recommended per power bug. Please assemble the cable lugs with the flat side to the power bug to ensure the correct isolation distance between the not insulated part of the power cable and not insulated parts of the backplane.

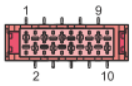


For harsh environments with very high shock and vibration values a power stud with nuts is recommended. Schroff CompactPCI Serial backplanes are already prepared to accept a power stud instead of the power bugs assembled as standard option. Please ask your Schroff sales contact for a configured version with M4 power studs assembled or send an inquiry to backplanes@nVent.com. The power stud accepts a maximum of 2 cable lugs.

Backplane cable connectors

Utility connector

Tyco 8-338069-0



Pin	Signal
1	Sense_RTN
2	STNDBY / IPMB_PWR (+5 V)
3	+12 V Sense
4	PS_ON#
5	PWRBTN#
6	PWR_FAIL#
7	WAKE_IN#
8	PRST#
9	I²C_SDA
10	I²C_SCL

5 V standby

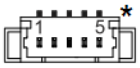
Molex: 44914-0401

Pin	Signal
1	GND
2	STNDBY / IPMB_PWR (+5 V)
3	GND
4	STNDBY / IPMB_PWR (+5 V)

Max 8.55 Amp per contact

IPMB connector (optional)

Molex: 53398-0571

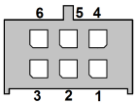


* = not assembled by default

Pin	Signal
1	I²C_SCL
2	GND
3	I²C_SDA
4	STNDBY / IPMB_PWR (+5 V)
5	n.c.

Mains power for 1 slot backplanes

Molex: 43045-0618



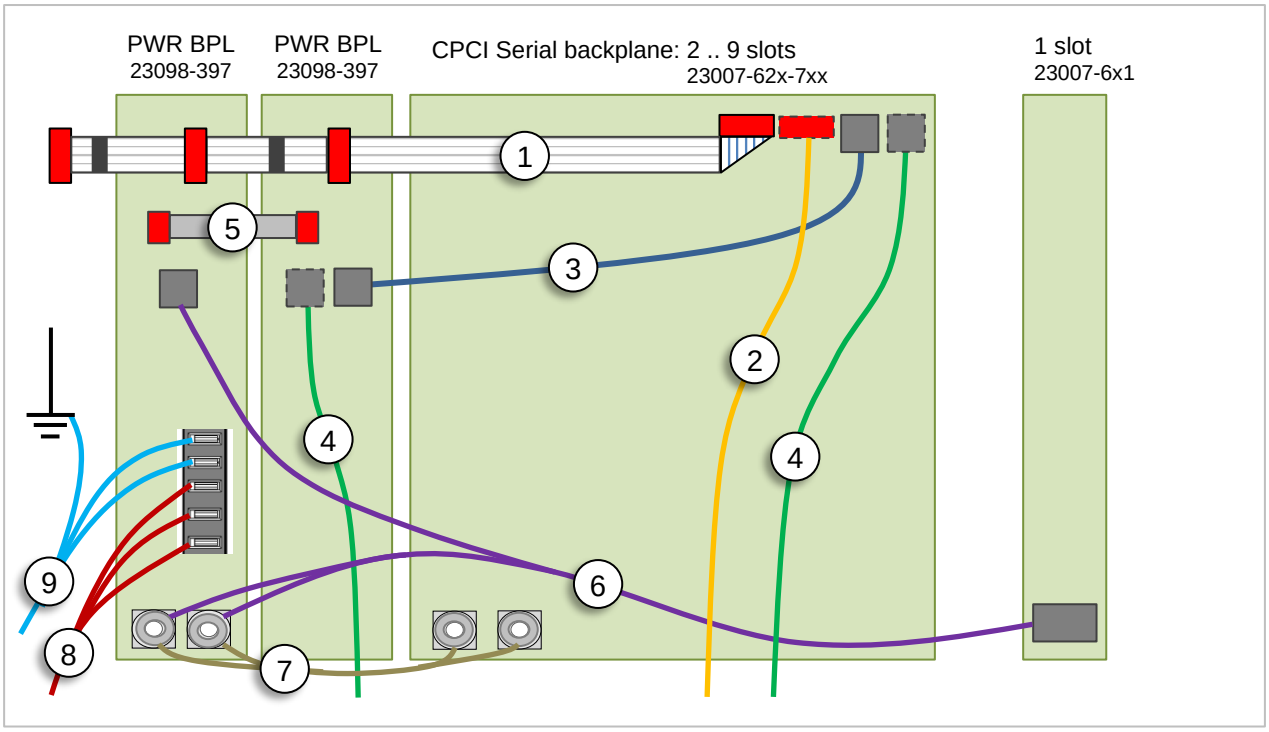
Pin	Signal
1	+12 V
2	GND
3	STNDBY / IPMB_PWR (+5 V)
4	+12 V
5	GND
6	GND

Max 8.55 Amp per contact

Accessories

Pos	Item number	Description	Connector 1	Connector 2	Connector 3	Connector 4	Cable type	Length mm
1	23204-875	Utility cable	10 pin Micromatch	10 pin Micromatch	10 pin Micromatch	10 pin Micromatch	Ribbon cable	650
2	23204-852	Utility cable	10 pin Micromatch	Open end	-	-	Discrete wire	600
3	23204-866	Standby cable	4 pin Microfit	4 pin Microfit	4 pin Microfit	-	Discrete wire	400
4	23204-853	Standby cable	4 pin Microfit	2x loop terminal	-	-	Discrete wire	600
5	23204-867	Current share cable	4 pin Micromatch	4 pin Micromatch	-	-	Ribbon cable	150
6	23204-869	1 slot power cable	6 pin Microfit	2x loop terminal	4 pin Microfit	-	Discrete wire	600
7	23204-879	Power cable	2x loop terminal	2x loop terminal	-	-	Discrete wire	300
8	23204-880	AC input power cable	3x faston	-	-	-	Discrete wire	500
9	23204-881	DC input power cable	3x faston	-	-	-	Discrete wire	500

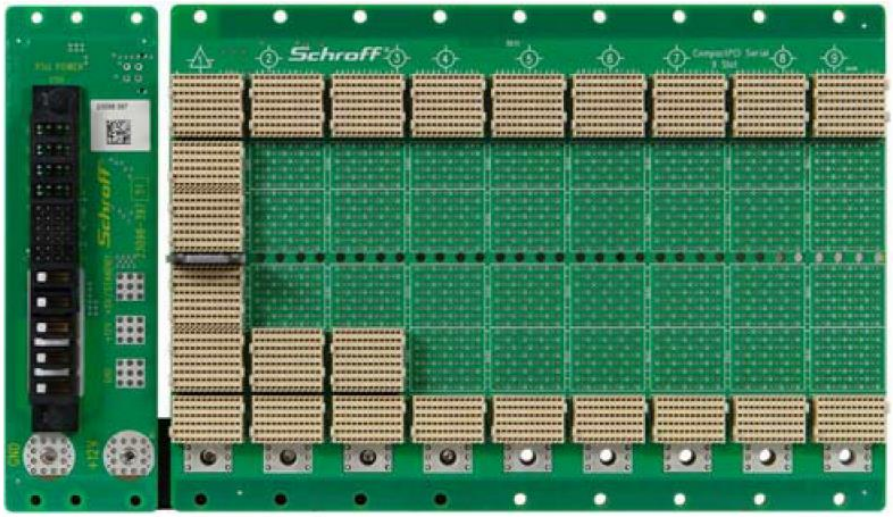
Connection Diagram



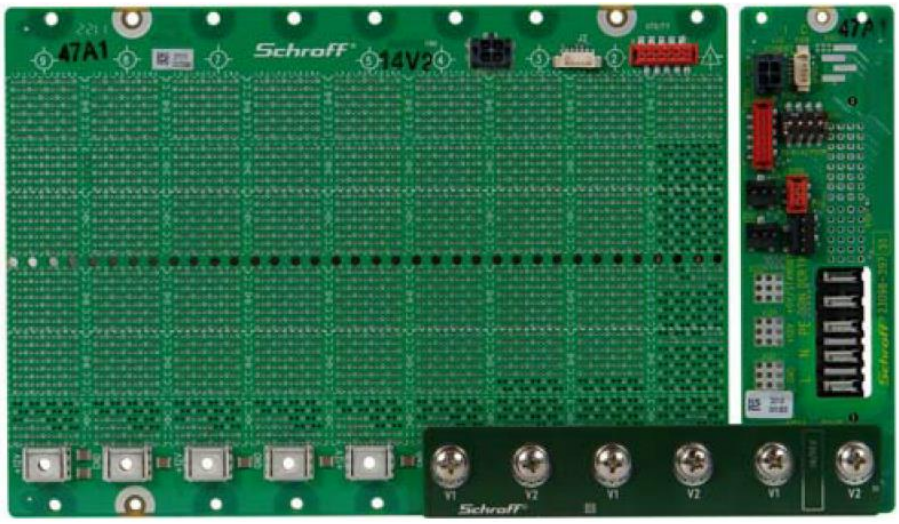
Cable connectors on the backplane rear side

Power supply

A pluggable Schroff CompactPCI Serial PSU with corresponding power backplane and power connection adapter is also available. For further details please visit our webpage at www.schroff.nVent.com



3U CompactPCI Serial backplane with power backplane on the left hand side, front view



3U CompactPCI Serial backplane with power backplane, rear view

Power adapter boards

The easiest way to connect the 12 V payload power between the CompactPCI Serial backplanes and the corresponding power backplane(s) is the use of the Schroff power adapter boards. Those PCBs have voltage rails for 2 voltages inside (12 V and GND). They are mounted on the power bugs of the backplane and power backplane. For selecting the correct power adapter and for assembly instruction please refer to the CompactPCI Serial power backplane manual at www.schroff.nVent.com.

Description	Item number
Power adapter board, 3x V1, 3x V2, 121212	23098-399
Power adapter board, 2x V1, 2x V2, 1212	23098-400
Power adapter board, 3x V1, 3x V2, 122121	23098-401
Power adapter board, 2x V1, 2x V2, 1221	23098-402
Power adapter board, 4x V1, 4x V2, 12121212	23098-405
Power adapter board, 4x V1, 4x V2, 12122121	23098-406

Current carrying capacity

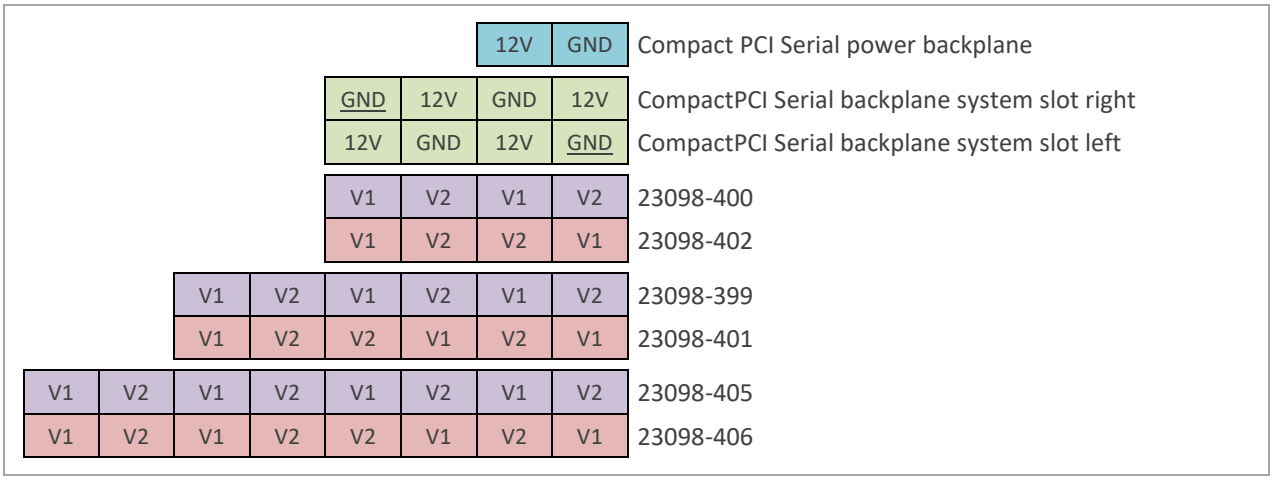
Power adapter boards: 60 Amp with < 25 K temperature rise, 70 Amp with < 32 K temperature rise

Power backplane power bug (X111, X112): 120 Amp

CompactPCI Serial backplane power bug: 30 Amp

Power adapter board configuration Examples

Attention: *All information in this chapter refer to the view on the rear side of the backplane*



6 slot backplane system slot right, power backplane on left-hand side	PAB orientation	Item number
GND 12V GND 12V GND 12V 12V GND		
V1 V2 V1 V2 V2 V1	Label to backplane	23098-401

Backplane front view

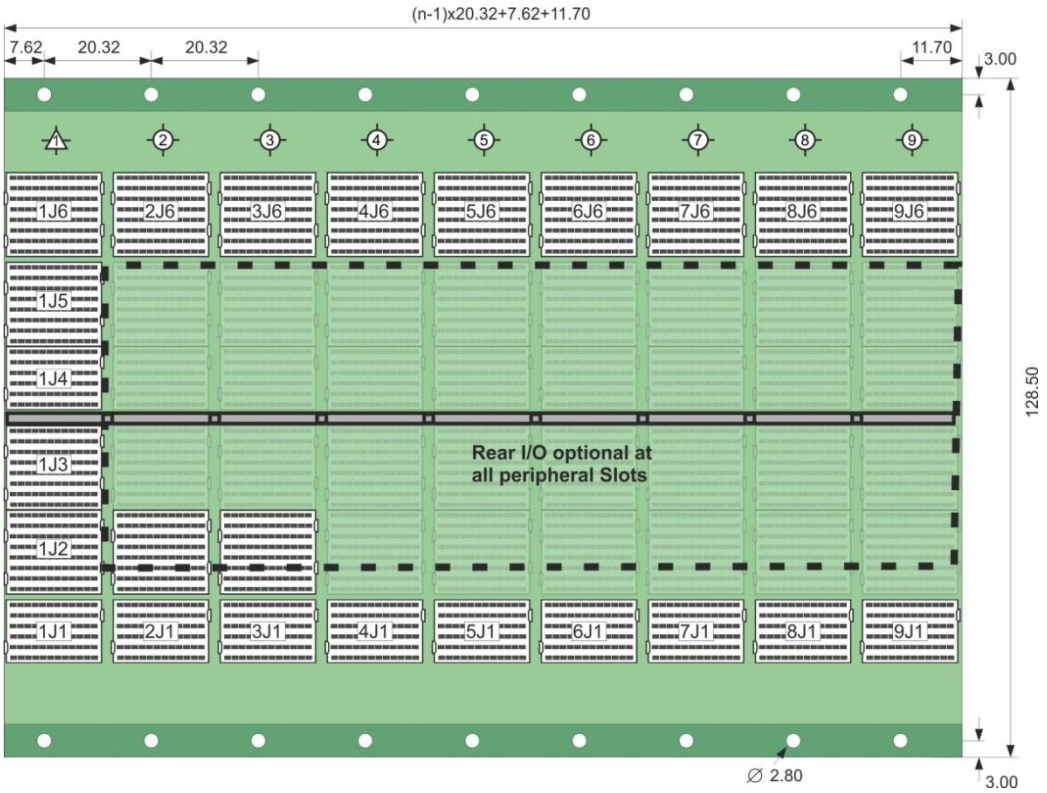
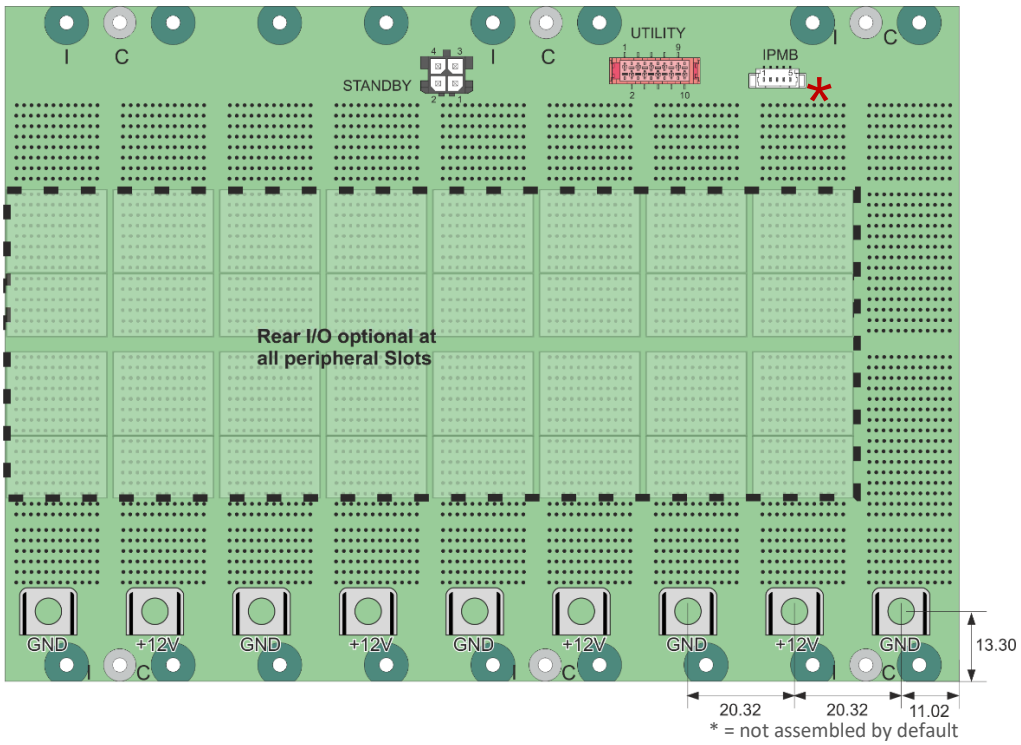


Figure shows a 9 slot backplane. The overall width at the different slot counts is: 7.02 + 11.70 + (n-1) x 20.32 mm

Backplane rear view



Backplane topology

CPCI Serial backplanes with a maximum of 9 slots support the full set of serial links at all slots. The serial links (SATA/SAS, USB2/3, PCIe) are arranged as a single star architecture. Rear I/O at the CPCI Serial peripheral slots at connectors J2..J5 / RP2..RP5 is possible as an option. Ethernet is implemented at connector J6 by 4 differential pairs to support 10/100/1000Base-T and 10GBase-T. Ethernet is routed in a single star or full-mesh topology depending on the backplane part number. Since the revision 2.0 of the CompactPCI Serial specification rear I/O is also possible on the connector J6 / RP6. In that case Ethernet routing won´t be implemented on the backplane.

Topology example CPCI Serial (other topologies are available on www.schroff.nVent.com)

9 Slot Backplane (System Slot Left, FM)

Physical Slot Number:	1	2	3	4	5	6	7	8	9
GA[3:0]	n.u.	0111	0110	0101	0100	0011	0010	0001	0000
Slot / Interface	SYS	Peri_1	Peri_2	Peri_3	Peri_4	Peri_5	Peri_6	Peri_7	Peri_8
Eth_8	Link_1-9	Link_2-9	Link_3-9	Link_4-9	Link_5-9	Link_6-9	Link_7-9	Link_8-9	Link_8-9
Eth_7	Link_1-8	Link_2-8	Link_3-8	Link_4-8	Link_5-8	Link_6-8	Link_7-8	Link_7-8	Link_7-9
Eth_6	Link_1-7	Link_2-7	Link_3-7	Link_4-7	Link_5-7	Link_6-7	Link_6-7	Link_6-8	Link_6-9
Eth_5	Link_1-6	Link_2-6	Link_3-6	Link_4-6	Link_5-6	Link_5-6	Link_5-7	Link_5-8	Link_5-9
Eth_4	Link_1-5	Link_2-5	Link_3-5	Link_4-5	Link_4-5	Link_4-6	Link_4-7	Link_4-8	Link_4-9
Eth_3	Link_1-4	Link_2-4	Link_3-4	Link_3-4	Link_3-5	Link_3-6	Link_3-7	Link_3-8	Link_3-9
Eth_2	Link_1-3	Link_2-3	Link_2-3	Link_2-4	Link_2-5	Link_2-6	Link_2-7	Link_2-8	Link_2-9
Eth_1	Link_1-2	Link_1-2	Link_1-3	Link_1-4	Link_1-5	Link_1-6	Link_1-7	Link_1-8	Link_1-9
PCIe_8	PE_8								
PCIe_7	PE_7								
PCIe_6	PE_6								
PCIe_5	PE_5								
PCIe_4	PE_4								
PCIe_3	PE_3								
PCIe_2	PE_2*								
PCIe_1	PE_1*	PE_1*	PE_2*	PE_3	PE_4	PE_5	PE_6	PE_7	PE_8
USB3.0_8	USB3_8								
USB3.0_7	USB3_7								
USB3.0_6	USB3_6								
USB3.0_5	USB3_5								
USB3.0_4	USB3_4								
USB3.0_3	USB3_3								
USB3.0_2	USB3_2								
USB3.0_1	USB3_1	USB3_1	USB3_2	USB3_3	USB3_4	USB3_5	USB3_6	USB3_7	USB3_8
USB2.0_8	USB2_8								
USB2.0_7	USB2_7								
USB2.0_6	USB2_6								
USB2.0_5	USB2_5								
USB2.0_4	USB2_4								
USB2.0_3	USB2_3								
USB2.0_2	USB2_2								
USB2.0_1	USB2_1	USB2_1	USB2_2	USB2_3	USB2_4	USB2_5	USB2_6	USB2_7	USB2_8
SATA_8	SATA_8								
SATA_7	SATA_7								
SATA_6	SATA_6								
SATA_5	SATA_5								
SATA_4	SATA_4								
SATA_3	SATA_3								
SATA_2	SATA_2								
SATA_1	SATA_1	SATA_1	SATA_2	SATA_3	SATA_4	SATA_5	SATA_6	SATA_7	SATA_8
SGPIO	SGPIO								
I²C/SMB	I²C / SMB								

* PCIexpress Fat Pipe (8x).

Ordering information

The following tables list the part numbers of the Schroff CompactPCI Serial backplanes with some indication about availability and lead time. As this is a subject which might change over time and new versions will be added, please ask your Schroff sales representative for the current list or contact us at backplanes@nVent.com.

Some Schroff CompactPCI Serial backplanes already have a slot for a pluggable 19" power supply integrated on the backplane. In the ordering information table those are marked with the slot count information x + y pwr where the x stands for the number of CompactPCI Serial slots and the y for the number of slots for pluggable power supplies. For the backplane power connector type and pinout please refer to the table in the CompactPCI Serial power backplane user guide and for the dimensions of the backplane to the master drawing of those backplanes. Please visit the CompactPCI Serial backplane section of our webpage www.schroff.nVent.com for these documents.

System slot left backplanes						
	Ethernet star topology		**Ethernet full-mesh topology**		**Rear I/O on RP 6**	
	with rear I/O	without rear I/O	with rear I/O	without rear I/O	with rear I/O	without rear I/O
Slot count	**Item number**	**Item number**	**Item number**	**Item number**	**Item number**	**Item number**
1	**23007-661**	**23007-621**	**23007-661**	**23007-621**	**23007-681**	**23007-641**
2	**23007-682**	**23007-642**	**23007-682**	**23007-642**	*	*
3	**23007-683**	**23007-643**	**23007-683**	**23007-643**	*	*
4	**23007-684**	**23007-644**	**23007-684**	**23007-644**	*	*
5	**23007-685**	**23007-645**	**23007-685**	**23007-645**	*	*
6	*23007-666**	*23007-626**	*23007-686**	*23007-646**	*	*
7	**23007-667**	**23007-627**	*23007-687**	*23007-647**	*	*
8	**23007-668**	**23007-628**	*23007-688**	*23007-648**	*	*
9	**23007-669**	**23007-629**	**23007-689**	**23007-649**	*	*
System slot right backplanes						
	Ethernet star topology		**Ethernet full-mesh topology**		**Rear I/O on RP 6**	
	with rear I/O	without rear I/O	with rear I/O	without rear I/O	with rear I/O	without rear I/O
Slot count	**Item number**	**Item number**	**Item number**	**Item number**	**Item number**	**Item number**
1	**23007-661**	**23007-621**	**23007-661**	**23007-621**	**23007-681**	**23007-641**
2	23007-692*	23007-652*	23007-692*	23007-652*	*	*
3	**23007-693**	**23007-653**	**23007-693**	**23007-653**	*	*
4	**23007-694**	**23007-654**	**23007-694**	**23007-654**	*	*
5	**23007-695**	**23007-655**	**23007-695**	**23007-655**	*	*
5 + 1 Pwr	**23007-615**	**23007-605**	**23007-615**	**23007-615**	*	*
6	**23007-676**	**23007-636**	*23007-696**	*23007-656**	*	*
7	**23007-677**	**23007-637**	*23007-697**	*23007-657**	*	*
8	*23007-678**	*23007-638**	*23007-698**	*23007-658**	*	*
9	**23007-679**	**23007-639**	*23007-699**	*23007-659**	*	*

Bold printed item numbers have a maximum lead time of 2 weeks (small quantities)
** please ask your Pentair / Schroff sales contact for availability and lead time*

Technical data

Further requirements or request at backplanes@nVent.com

Mechanical and climatic parameters	
Operating temperature	-55° C to +85° C
Storage temperature	-55 °C to +125 °C
Humidity with conformal coating	max. 95 %, not condensing
Flammability: PCB, connectors and components Ceramic caps	 UL 94 V-0 Fire-proof
Mechanical durability Mating cycles Mating force: Un-mating force: Compliant pin insertion force: Durability: All contacts powered at	 level 2 0.40N maximum / contact 0.10N minimum / contact 25N maximum 200 cycles 1A / pin
Dimensions (mm) Width (please see drawing) Height 3U / 6U Thickness	 7.62 + 11.70 + (n-1) x 20.32 mm 128,5 mm / - 3,8 mm +/- 10% mm 5,1 mm +/- 10% mm for full-mesh versions
Electrical Parameters:	
Supported bus types Ethernet: PCIe: SATA/SAS: USB 2.0: USB 3.0: System Management Bus (I^2C / SMB)	 10/100/1000Base-T and 10GBase-T [>10 Gbit/s] PCIe 1/2/3: [>8 Gbit/s] Serial-ATA 1.5/3.0/6.0 Gbit/s (Rev 2.x, 3.x) and SATA Express 8 Gbit/s (Rev 3.2) Low-Speed / Full-Speed / High-Speed mode Super Speed mode [>5Gbit/s] 100 kbps / 400 kbps / 1 Mbps
Hot swap	supported
Power input	Power bugs , power studs (on request) special power connection adapter boards to connect the CPCI Serial backplane with CPCI Serial power backplane without any cabling
Max. current carrying capacity +12V / GND +5V / GND (STANDBY)	 6,65 A per slot on a 3U System 0,95 A per slot on a 3 U System

Max. voltage drop between any two points on the backplane on +12 V on +5 V (Standby)	 < 100 mVpp < 20 mVpp
Clock frequency	100 MHz on PCIe