PCIe XMC x8 Lane Adapter

Adapts PCI Express XMC to Desktop with P16 High Speed Communications Ports and JN4 Digital IO

FEATURES

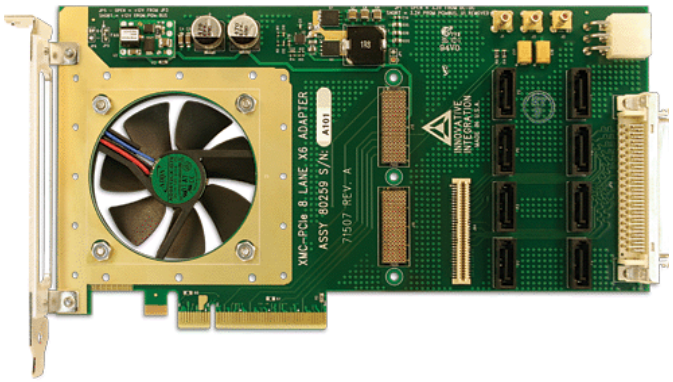
- Adapt one XMC PCI Express VITA 42.3 module to a desktop PCI Express slot
- Supports up to 8 lanes
- Transparent Operation
- 8 high speed expansion ports from XMC J16 using SATA connectors
- 32 differential pairs routed from Pn4 to rear MDR68
- IEEE 1384 XMC mechanicals
- >50W power provided to the module
- Auxiliary power connector for 12V
- Configurable XMC VPWR connections
- Robust end bracket
- Optional fan provides 12 CFM air flow
- Thermal plane and conductive rails improve module cooling
- ~½ size PCI Express card

APPLICATIONS

- Add XMC modules to standard PCIe host systems
- System expansion using high speed serial links

SOFTWARE

- No software required



DESCRIPTION

The PCI Express to XMC module adapter allows a single width XMC module to be used in a PCI Express slot. The XMC module is VITA 42.3 compatible and supports up to eight PCI Express lanes. The adapter is completely transparent to PCI Express. All signals from the PCI Express host bus are connected directly to the XMC module.

The XMC P16 connector is routed to SATA connectors for high speed signals at speeds up to 3GHz. The connectors provide a simple way to “patch-panel” communications links between cards.

The XMC Jn4 connector routes differential matched-length pairs to the MDR68 connector at the rear of the card. Special support for trigger and timing inputs to Innovative XMC modules is provided through SMA connectors.

More power to the XMC module may be provided by using the optional power connector to the adapter card. The power connector provides +12V to the adapter and powers the on-card 3.3V, 15A DC-DC power supply. Power to the XMC VPWR inputs is configurable using jumpers on the card.

Conduction cooling using VITA20 standard, as well as an optional fan, provide cooling to the XMC module.

The XMC module mounts securely to the adapter using standoffs and with the end bracket. The bracket mates to standard PMC end brackets and supports an EMI gasket.

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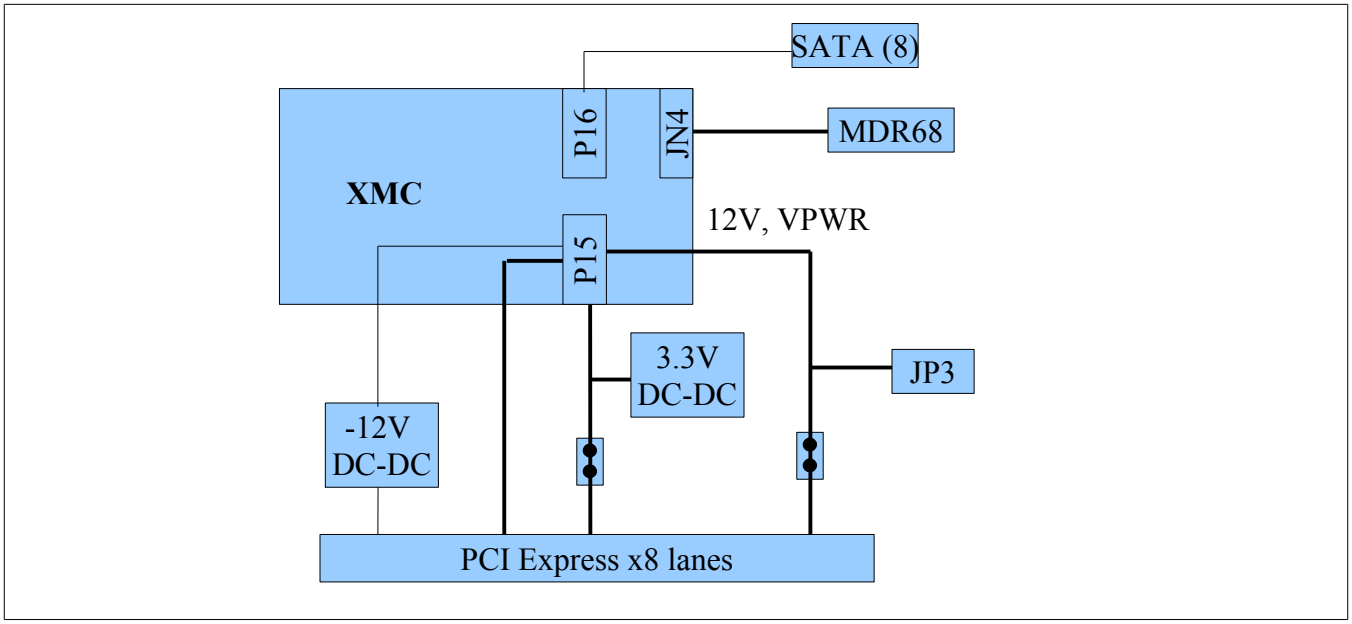
PCIe XMC x8 Lane Adapter

This electronics assembly can be damaged by ESD. Innovative Integration recommends that all electronic assemblies and components circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

ORDERING INFORMATION

Product	Part Number	Description
PCIe-XMC Adapter	80259-0	PCIe-XMC 8 lane Adapter Assembly with on-board 3.3V, 8A supply (12V to 3.3V DC-DC)
Breakout and Cable	80116-1	Screw terminal assembly and 36 inch (0.91 m) pleated foil flat ribbon MDR68 cable
MDR68 cable	65057	MDR68 male to male cable assembly, pleated foil shielded flat ribbon, 36 inches (0.91 m)



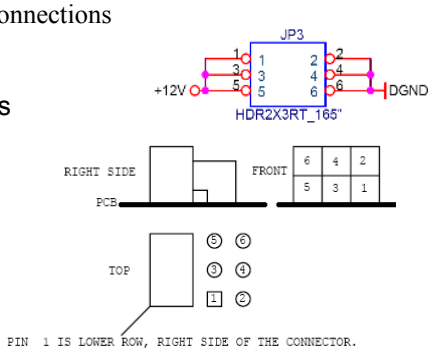
PCIe XMC x8 Lane Adapter

JP3 Auxiliary Power Connector
JP3 provides +12V to the XMC.

Pin	Power
1, 3, 5	+12V
2, 4, 6	Ground

Caution: incorrect connections may cause damage!

Mating connector is AMP 1586019-6 or equivalent.



Physicals	
Form Factor	PCI Express half card
Size	3.72 in x 8.05 in
Weight	100g
Power Capability Delivered to the PMC	
Volts	Amps
3.3V	15A Maximum
+12V	Supplied by the host computer or input to JP3
-12V	1A max (supplied by on-card DC-DC)

** XMC cooling may be required

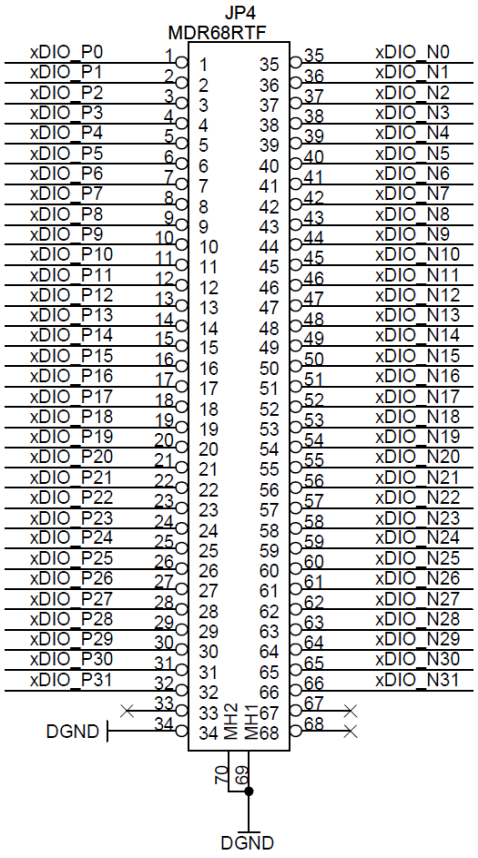
Mean Time Between Failures (MTBF)	93460 Hours

JP4 - Breakout Connector for XMC JN4

Signals are routed as 32 differential pairs. Pairs are 50 ohm, 100 ohm differential characteristic impedance, suitable for LVDS or PECL.

Connector is 3M 10268-55H3VC or equivalent.

Mating connector is 3M 10168-6010EC or equivalent.



PCIe XMC x8 Lane Adapter

JP4 Pin Assignments

Signal	XMC Pn4 Pins	JP4 Pins
xDIO_P0/N0	1/3	1/35
xDIO_P1/N1	2/4	2/36
xDIO_P2/N2	5/7	3/37
xDIO_P3/N3	6/8	4/38
xDIO_P4/N4	9/11	5/39
xDIO_P5/N5	10/12	6/40
xDIO_P6/N6	13/15	7/41
xDIO_P7/N7	14/16	8/42
xDIO_P8/N8	17/19	9/43
xDIO_P9/N9	18/20	10/44
xDIO_P10/N10	21/23	11/45
xDIO_P11/N11	22/24	12/46
xDIO_P12/N12	25/27	13/47
xDIO_P13/N13	26/28	14/48
xDIO_P14/N14	29/31	15/49
xDIO_P15/N15	30/32	16/50
xDIO_P16/N16	33/35	17/51
xDIO_P17/N17	34/36	18/52
xDIO_P18/N18	37/39	19/53
xDIO_P19/N19	38/40	20/54
xDIO_P20/N20	41/43	21/55
xDIO_P21/N21	42/44	22/56
xDIO_P22/N22	45/47	23/57
xDIO_P23/N23	46/48	24/58
xDIO_P24/N24	49/51	25/59
xDIO_P25/N25	50/52	26/60
xDIO_P26/N26	53/55	27/61
xDIO_P27/N27	54/56	28/62
xDIO_P28/N28	57/59	29/63
xDIO_P29/N29	58/60	30/64
xDIO_P30/N30	61/63	31/65
xDIO_P31/N31	62/64	32/66

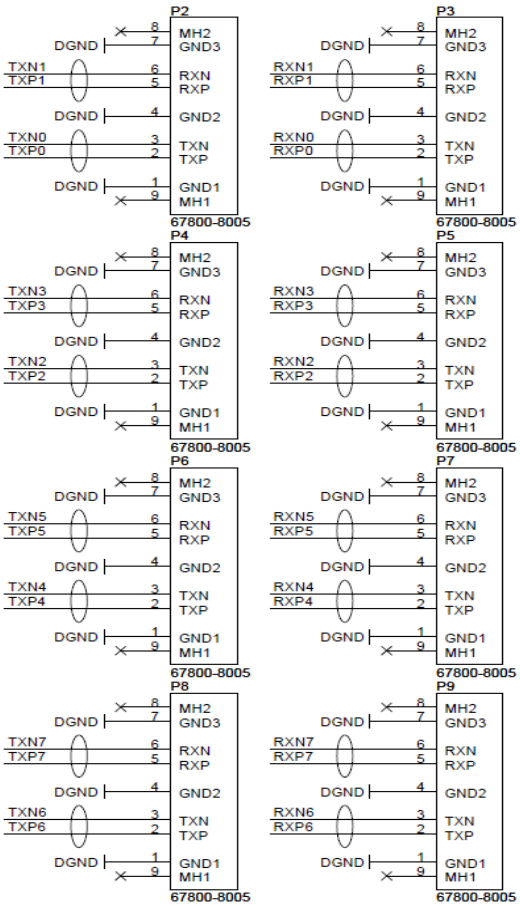
SMA Inputs

The adapter has three SMA inputs that connect to XMC connector P16 as shown in the following table. On Innovative X6 modules, these are connections for the triggger and PPS inputs to the modules.

PCIe XMC x8 Lane Adapter

SMA	P16 Connection	X6 Module Function
J1	D19	PPS
J2	A19	H_TRIG0
J3	B19	H_TRIG1

High Speed Connectors



High Speed Serial Pair	J16 Pins (P/N)	SATA Connector
TXP0/N0	A1/B1	P2
TXP1/N1	D1/E1	P2
TXP2/N2	A3/B3	P4
TXP3/N3	D3/E3	P4
TXP4/N4	A5/B5	P6
TXP5/N5	D5/E5	P6
TXP6/N6	A7/B7	P8
TXP7/N7	D7/E7	P8
RXP0/N0	A11/B11	P3
RXP1/N1	D11/E11	P3
RXP2/N2	A13/B13	P5
RXP3/N3	D13/E13	P5
RXP4/N4	A15/B15	P7
RXP5/N5	D15/E15	P7
RXP6/N6	A17/B17	P9
RXP7/N7	D17/E17	P9

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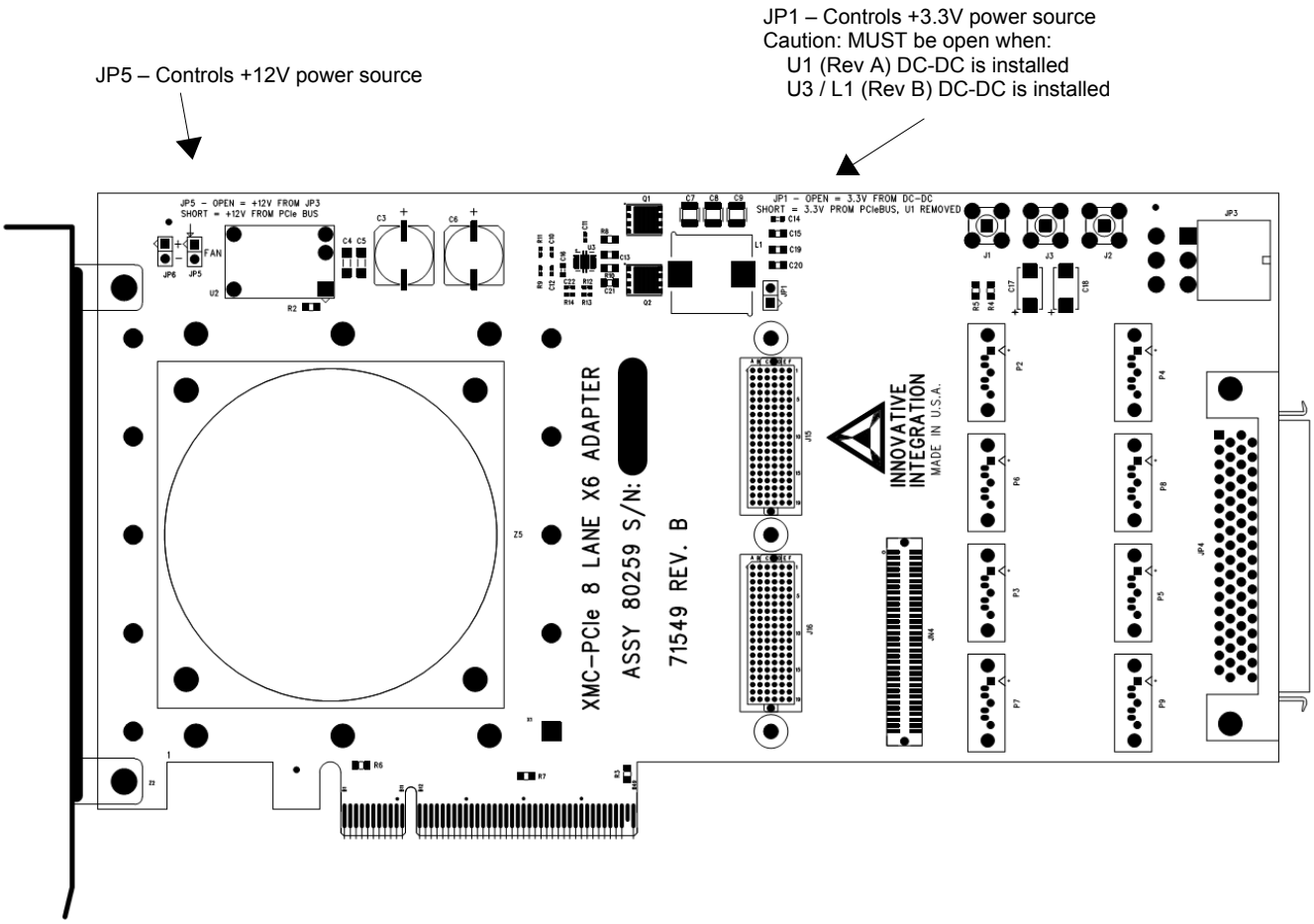


Applications Information

High Speed Serial Communications

The adapter card has 8 high speed serial lanes from the XMC card via J16 supporting Gigabit serial ports for intercard communications or expansion. The serial lanes connect directly to SATA connectors. Standard SATA cables can be used to connect multiple cards together to create high speed, dedicated communications channels between XMC modules. On Innovative's X5 and X6 modules, these are Rocket IO ports directly from the XMC Virtex5.

The cables will not interfere with a card in the adjacent slot when right angle SATA cables such as Tripp-Lite P/N P943-19I are used when cards are used.

Digital IO

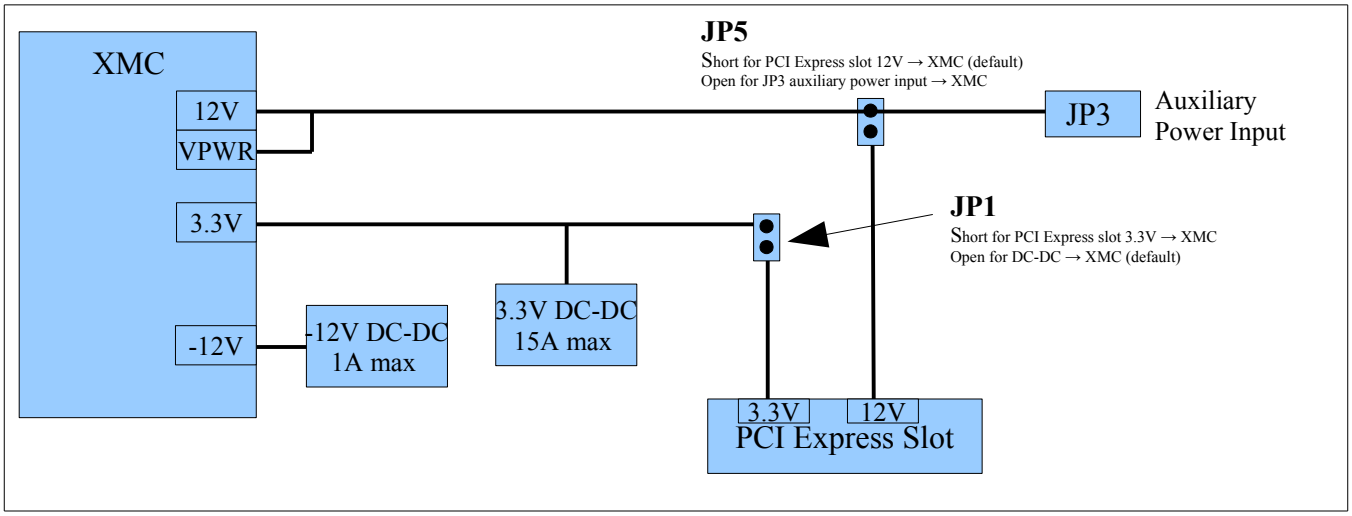
Digital IO from Jn4 is directly mapped to the MDR68 connector on the adapter. There are 32 differential pairs from the module connector to the rear connector JP4. These are match-length and are 100 ohm differential pairs. Mating cable (see ordering information) is also suitable for high-speed differential pairs.

PCIe XMC x8 Lane Adapter

Power to the XMC Module
The XMC site provides +3.3V, +12V and -12V to the module. The adapter includes an on-board DC-DC power module providing 3.3V @ 15A to the XMC site.

The XMC VAUX power is +12V on the standard configuration. This can be changed to other voltages by removing jumper JP5 and supplying the voltage through JP3. NOTE that the +12V to module is also changed in this case. CAREFULLY review the XMC requirements before making this change.

Jumper Setup



Default configuration of the 80173-0 Rev A or B card is JP5 shorted, JP1 open, 3.3V DC-DC populated.

Default configuration of the 80173-1 Rev A or B card is JP5 open, JP1 open, 3.3V DC-DC populated.

DO NOT HOT PLUG THE CONNECTOR!
Damage may occur.

Cooling the XMC Module
Many XMC modules require special considerations to provide adequate cooling. Monitor XMC module device temperatures and add convective air flow if required to maintain within rated thermal limits.

The module provides conduction cooling using on-card heat sink and a dedicated thermal plane. The conduction cooling conforms to VITA20 specification for PMC/XMC module cooling. When a compatible module is used with the card, the thermal plane effectively conducts heat from the module to the carrier card and front bracket. System cooling is therefore more effective because o f the heat spreading from the module to the carrier card.

An optional fan may also be installed for cooling. The fan provides approximately 12 CFM air flow. When the fan is installed, it blows air directly on the module and is very effective. The fan protrudes 10mm from the back of the card and does interfere with the adjacent slot in the PC.

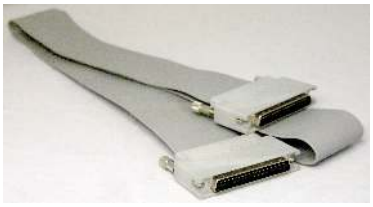
PCIe XMC x8 Lane Adapter

Module Mounting Hardware
The module can be securely mounted to the adapter for both conduction cooling and ruggedness. Two 10mm female threaded standoffs are used to secure the module to the adapter. If conduction cooling is used, cooling bars are secured to the card and the module using 2.5 mm screws. This hardware can be purchased from Innovative Integration.

Software Driver

No software is required.

Cables
Innovative offers a cable assembly (P/N 65057) and screw terminal/cable assembly (P/N 80116-1) for use in connecting to the MDR68 connector.



The cable assembly generally offers performance up to >50 MHz when differential signaling such as LVDS is used. Single ended signals are limited to about 10 MHz.

SATA cables are widely available as commodity items. Cables rate for SATA300 are required for higher data rates.

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