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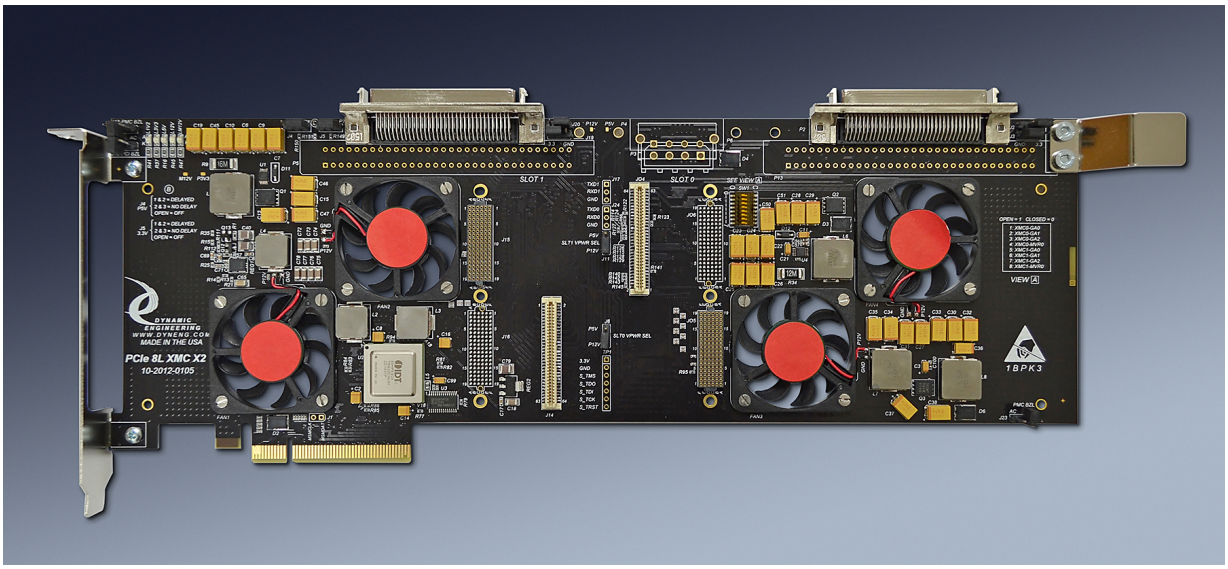
User Manual

PCIe8LXMCX2

PCIe 8 Lane 2 Position XMC Compatible Carrier



Shown With PMC/SCSI rear IO connector

Revision E3 12/28/18
Corresponding Hardware: Revision C-F
Fab number 10-2012-0106

PCIe8LXMCX2
PCIe and XMC Compatible Carrier

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Dynamic Engineering has made every effort to ensure that this manual is accurate and complete. Still, the company reserves the right to make improvements or changes in the product described in this document at any time and without notice. Furthermore, Dynamic Engineering assumes no liability arising out of the application or use of the device described herein.

The electronic equipment described herein generates, uses, and can radiate radio frequency energy. Operation of this equipment in a residential area is likely to cause radio interference, in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

Dynamic Engineering's products are not authorized for use as critical components in life support devices or systems without the express written approval of the president of Dynamic Engineering.

Connection of incompatible hardware is likely to cause serious damage.

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Product Description

PCIe8LXMCX2 is part of the Dynamic Engineering PCI and XMC Compatible family of modular I/O components. PCIe8LXMCX2 adapts 2 XMC's to one PCIe slot.

Embedded applications frequently require real time processing coupled with special purpose IO. With PCIe8LXMCX2's two XMC positions; a PrXMC can be matched with another XMC to make a high bandwidth processing node. The PrXMC can communicate with the host for set-up, and then use the local bus to control and transfer data with the special purpose IO card.

Special features:

- 24 lane Gen1/2 compliant Switch
- 8 lanes allocated to PCIe "gold finger" interface. 8 lanes each to the XMC's
- Switch can store and forward locally to communicate directly between the XMC's
- Voltage monitors, each with LED's on plus 12V, minus 12V, plus 5V, plus 3.3V, and switch power [1.0V]
- 10A regulator for XMC 3.3V and 5V supplies. Shunts for Delayed, not Delayed, Off
- Selection switch for VPWR [12V or 5V] per XMC. Option for hardwired 5V or 12V
- Front panel connector access through PCI bracket
- User IO [Jn4 and/or Jn6] available through one of two cable connectors (DIN IDC or SCSI II compatible) Spare pins on SCSI connector can be shunt selected to power or ground.
- Cooling cutout for increased airflow to XMC's
- Optional Fan(s) for increased airflow
- Optional Ethernet connectors to support XMC's with Ethernet
- Optional Serial Port connectors to support XMC's with Serial Ports
- JTAG programming support
- DIP switch to select global addressing on XMC's

PCIe8LXMCX2 is ready to use with the default settings. Just install the XMC onto PCIe8LXMCX2 and into the system.

Headers and TestPoints

J6 and J11 are used to select the VPWR source for position 0 and 1 respectively. When the Shunt closes 1-2 – 12V is selected. With 2-3 closed 5V is selected. FET's are used to provide a low impedance path from the power supplies to VPWR for each position. Options are in place on the PCB to allow hardwired selections for clients who prefer a fixed voltage. The headers are not installed when the fixed voltage option is in place. With pin 2 open VPWR will be open.

J12, 13, and 23 are used to select the bezel grounding option. 1-2 selects AC coupled, 2-3 selects DC coupled and open is open. J12 = PCIe Bezel. J13 = Slot 0. J23 = Slot 1.

J1 is an optional header for SMB connection. Pin 1 is data and pin 2 is clock. Both are pulled up. 3rd party tools can be used to see the "innards" of the switch. Usually not needed but handy if you are doing development or want to talk through the switch to the XMC positions.

TP1 is an optional JTAG header used to connect to XMC 0. The pin definitions are in the silk. 1: 3.3V, 2: GND, 3: TMS, 4: TDO, 5: TDI, 6: TCK, 7: TRST

J2 & J19 control the voltage on 33,67 of P2 and P7 respectively when the SCSI connector options are selected. 1-2 selects 3.3V and 2-3 selects ground on those pins. The shunt and traces are rated for 1A. Not fuse protected.

J3 & J20 control the voltage on 34,68 of P2 and P7 respectively when the SCSI connector options are selected. 1-2 selects 3.3V and 2-3 selects ground on those pins. The shunt and traces are rated for 1A. Not fuse protected.

J16 & J17 provide the serial port connections when installed. J16 is for Serial Port 0 and J17 is for serial port 1 on XMC0. Pin 1 is TX and pin 2 is Rx. Pin 3 is a ground reference. Standard serial connections IAW 2.15 from Pn4 when this option is installed

J10 & J18 provide the ethernet port connections when installed. J10 is for ethernet Port 0 and J18 is for ethernet port 1 on XMC0. Standard Ethernet connections IAW 2.15 from Pn4 when this option is installed

P3, 4, 6 are optional power connectors to allow for added 12V power to be used by the PCIe8LXMCX2. The PCIe gold fingers allow for about 60W of power to be consumed by the board across all XMC voltages including power supply losses. In many cases

the power budget is more than sufficient. If your XMC's require more power please request one of the optional power connectors [discrete wire, 4 wire standard PC vert or horizontal] to increase the 12V available. Both 12V entry points are diode coupled to prevent the current back-feeding when an external or other supply is added.

P3: 1-2 = gnd, 3-4 = 12V. P4,6: 1= 12V, 2-3 = gnd.

J4, J5 control the power sequencing for 3.3V and 5V respectively. 1-2 selects a delayed start-up of the power supply, 2-3 for immediate start-up [based on 12V available] and open is off [used for power savings when a supply is not required. Added with Rev 03 boards. Resistor options are available to hardwire the selection.

DipSwitch Settings

Switch 1: Global Address Settings

Position 1-3 corresponds to XMC0 GA0-2. When closed the signal is '0'. When open the signal is '1'.

Position 4 corresponds to XMC0-MVR0. When closed the signal is '0'. When open the signal is '1'.

Position 5-7 corresponds to XMC1 GA0-2. When closed the signal is '0'. When open the signal is '1'.

Position 8 corresponds to XMC1-MVR0. When closed the signal is '0'. When open the signal is '1'.

Options

Dynamic Engineering offers multiple versions of the PCIe8LXMCX2design.

In addition to the basic bridged version there are options for Ethernet, Fan, Serial ports, and minimization.

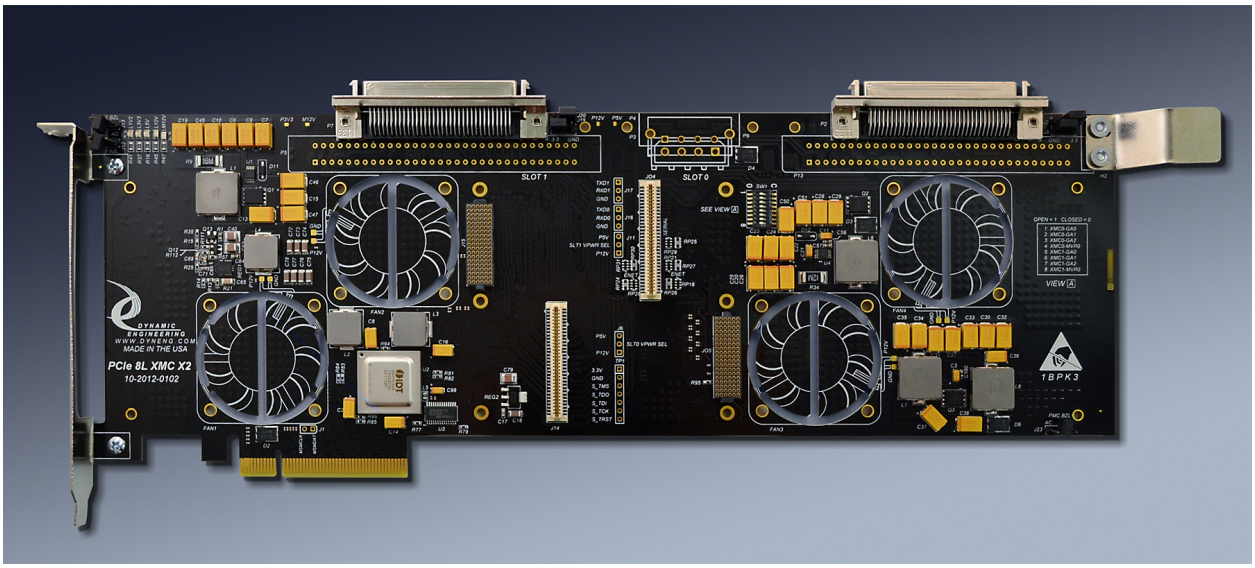
The PCIe8LXMCX2 features cooling cutouts designed to support the addition of a fan in one or two positions for each XMC. On PrXMC's and other XMC's with high thermal loads the fan option is a good idea. On cards with a lower thermal profile the fan is not needed. The fan produces 5 CFM in a small area to create a high LFM rating suitable for most cooling requirements. The fan used has a relatively low noise rating for quiet operation. Position 1 is closest to the PCI bezel and position 2 is closer to the XMC connectors. For position 3 and position 4 locations continue counting left to right.

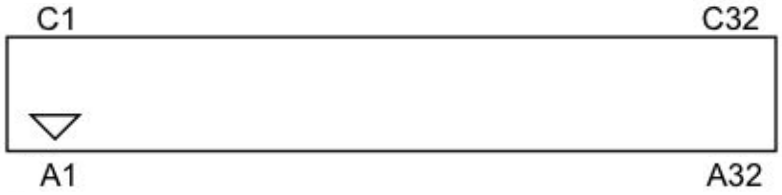
Some XMC's support Ethernet connections over the J04 connector with pins specified by the PICMG standard 2.15. PCIe8LXMCX2 supports Ethernet capable cards with an optional two-position RJ45 connector on the top edge of the card. Slot 0 has this option.

Some XMC's support serial channels on J04 with pins specified by by PICMG standard 2.15. PCIe8LXMCX2 supports serial capable cards with an optional pair of header connectors. Slot 0 has this option.

In addition PCIe8LXMCX2 has two options for Jn4/Jn6 signal routing. VME style 2x32 pin header [shown] or a SCSI style connector.

Please mix and match options, as you need them.





The “VME” connectors are oriented as shown by the pads under the SCSI connectors in the picture and the diagram. Pin C1 is the lower left corner pin. Pin C1 corresponds to the cable wire number 1 for a standard header inserted into the connector on PCIe8LXMCX2. The mating part number is 120-964-455 Panduit, DIN-IDCA-64CSB-TG30 Robinson Nugent, Berg also has a part which is slightly taller.

Cables and breakouts are available from Dynamic Engineering – Please see DINterm64 and DINribn64 or HDEcabl68 and HDEterm68 products from the Dynamic Engineering website.

XMC Module Backplane IO Interface Pin Assignment

The figure below gives the pin assignments for the XMC Module IO Interface – from Jn4 and/or Jn6 to the PCIe8LXMCX2 connectors. Also see the User Manual for your XMC board for more information. Please note that P2 or P13, P7 or P5 are installed not both.

DIN IDC [P13,P5]		SCSI II [P2,P7]		Jn4		Jn6	
A1	C1	1	35	3	1	B1	A1
A2	C2	2	36	4	2	E1	D1
A3	C3	3	37	7	5	C2	C1
A4	C4	4	38	8	6	F2	F1
A5	C5	5	39	11	9	B3	A3
A6	C6	6	40	12	10	E3	D3
A7	C7	7	41	15	13	C4	C3
A8	C8	8	42	16	14	F4	F3
A9	C9	9	43	19	17	B5	A5
A10	C10	10	44	20	18	E5	D5
A11	C11	11	45	23	21	C6	C5
A12	C12	12	46	24	22	F6	F5
A13	C13	13	47	27	25	B7	A7
A14	C14	14	48	28	26	E7	D7
A15	C15	15	49	31	29	C8	C7
A16	C16	16	50	32	30	F8	F7
A17	C17	17	51	35	33	B9	A9
A18	C18	18	52	36	34	E9	D9
A19	C19	19	53	39	37	C10	C9
A20	C20	20	54	40	38	F10	F9
A21	C21	21	55	43	41	B11	A11
A22	C22	22	56	44	42	E11	D11
A23	C23	23	57	47	45	C12	C11
A24	C24	24	58	48	46	F12	F11
A25	C25	25	59	51	49	B13	A13
A26	C26	26	60	52	50	E13	D13
A27	C27	27	61	55	53	B15	A15
A28	C28	28	62	56	54	E15	D15
A29	C29	29	63	59	57	B17	A17
A30	C30	30	64	60	58	E17	D17
A31	C31	31	65	63	61	B19	A19
A32	C32	32	66	64	62	E19	D19
		33	67	Open, +3 or GND via J2,19 silk screen defined			
		34	68	Open, +3 or GND via J3,20			

FIGURE 1 PCIE8LXMCX2 JN4/JN6 INTERFACE STANDARD

Read table:
P13-C1 = P2-35 = Pn4-1
P13-A1 = P2-1 = Pn4-3 etc.
With Jn6: Pins: A, B, D, E of rows 2, 4, 6, 8, 10, 12 ,14, 16, 18 are grounded

XMC Module Jn4 Ethernet and Serial Pin Assignment

Ethernet[J10,18]		Serial[J16,J17]		Pn4 Slot 0	
11	14			1	2
12	15			3	4
				5	6
13	17			7	8
16	18			9	10
				11	12
21	24			13	14
22	25			15	16
				17	18
23	27			19	20
26	28			21	22
				23	24
				25	26
			13	27	28
			23	29	30
				31	32
			12	33	34
			22	35	36
				37	38
				39	40
				41	42
				43	44
				45	46
				47	48
				49	50
				51	52
				53	54
				55	56
				57	58
				59	60
				61	62
				63	64

FIGURE 2 PCIE8LXMCX2 JN4 ETHERNET, SERIAL

The channel number is shown then the pin number. For example on the ethernet connectors J10 and J18, there are two ports. Port 1 [J10] pin 1 is tied to Pn4 pin 1, Port 2 pin 8 is tied to pin 22 of Pn4. When the Ethernet and Serial options are installed the corresponding pins on Jn4 are no longer connected to the SCSI or VME connectors. The unaffected pins are still connected.

Applications Guide

Interfacing

Some general interfacing guidelines are presented below. Do not hesitate to contact the factory if you need more assistance.

Installation
The XMC's are mounted to the PCIe8LXMCX2 prior to installation within the chassis. XMC connectors are rated for 50 insertion cycles and putting less rotational stress on the connectors is a good idea. It is recommended to remove the PCIe bezel to allow installation vertically onto the mating connectors. [you can leave the bezel in place and rotate the XMC onto the mating connectors but this will put some side force on the connectors and is not recommended]. The rear slot does not have the bezel interaction and can be mounted directly.

Be careful when removing to restrict the amount of rocking used. Slowly walk the board out of the connector. The connectors are SMT on both sides and undue stress can fatigue the joints causing premature failure.

There are four mounting locations per XMC. Two into the XMC mounting bezel, and two for the standoffs near the XMC bus connectors. For proper contact and operation during vibration it is recommended to use the fasteners.

Start-up
Make sure that the "system" can see your hardware before trying to access it. Many BIOS will display the PCI devices found at boot up on a "splash screen" with the VendorID and CardId for the XMC installed and an interrupt level. If the information is not available from the BIOS then a third party PCI device cataloging tool will be helpful

Watch the system grounds. All electrically connected equipment should have a fail-safe common ground that is large enough to handle all current loads without affecting noise immunity. Power supplies and power consuming loads should all have their own ground wires back to a common point.

Power all system power supplies from one switch. Connecting external voltage to the PCIe8LXMCX2 when it is not powered can damage it, as well as the rest of the host system. This problem may be avoided by turning all power supplies on and off at the same time. This applies more to the XMC's installed onto the PCIe8LXMCX2 than the

PCIe8LXMCX2 itself, and it is smart system design when it can be achieved.

Construction and Reliability

PCIe8LXMCX2 is constructed out of 0.062 inch thick high temp RoHS compliant FR4 material. Cooling cutouts are designed into the product for improved air flow to the XMC sites. The components on the PCIe8LXMCX2 are tied into the internal power planes to spread the dissipated heat out over a larger area. This is an effective cooling technique in the situation where a large portion of the board has little or no power dissipation.

A fan option is available for high thermal load XMC's or for a chassis with a lack of air circulation.

Surface mounted components are used. The connectors are SMT for the XMC bus and through hole for the IO.

The XMC Module connectors are keyed and shrouded with Gold plated pins on both plugs and receptacles. They are rated at 1 Amp per pin, 50 insertion cycles. These connectors make consistent, correct insertion easy and reliable. Please be aware the connectors are somewhat delicate compared to PMC and other mezzanine connector types.

The XMC Module is secured against the carrier with the XMC connectors. It is recommended, for enhanced security against vibration, that the XMC mounting screws are installed. The screws are supplied with the XMC from the OEM. Dynamic Engineering has screws, standoffs, blank bezels and other XMC hardware available at a reasonable cost if your XMC was not shipped with some of the required attachment hardware or if it has been misplaced.

Thermal Considerations

If the installed XMC has a large heat dissipation; forced air cooling is recommended. The zero slot Fan option can provide plenty of cooling power should your XMC require it.

Warranty and Repair

Please refer to the warranty page on our website for the current warranty offered and options.

http://www.dyneng.com/warranty.html

Service Policy

Before returning a product for repair, verify as well as possible that the suspected unit is at fault. Then call the Customer Service Department for a RETURN MATERIAL AUTHORIZATION (RMA) number. Carefully package the unit, in the original shipping carton if this is available, and ship prepaid and insured with the RMA number clearly written on the outside of the package. Include a return address and the telephone number of a technical contact. For out-of-warranty repairs, a purchase order for repair charges must accompany the return. Dynamic Engineering will not be responsible for damages due to improper packaging of returned items. For service on Dynamic Engineering Products not purchased directly from Dynamic Engineering contact your reseller. Products returned to Dynamic Engineering for repair by other than the original customer will be treated as out-of-warranty.

Out of Warranty Repairs

Out of warranty repairs will be billed on a material and labor basis. Customer approval will be obtained before repairing any item if the repair charges will exceed one half of the quantity one list price for that unit. Return transportation and insurance will be billed as part of the repair and is in addition to the minimum charge.

For Service Contact:

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Specifications

Logic Interfaces:	PCIe up to 8 lanes per XMC Gen1 and Gen2 compliant switch and clock buffer.
Access types:	PCIe TLP transactions. MSI interrupts.
CLK rates supported:	Gen1 and Gen2
Software Interface:	switch is auto configured and usually will not require any user intervention.
Initialization:	switch selections for VPWR, bezel grounding, and cable options
Interface:	XMC front bezel via PCIe bracket and User IO connector via DIN or SCSI connector
Dimensions:	full length PCIe board with offset PCI card guide support.
Construction:	High Temp FR4 Multi-Layer Printed Circuit, Through Hole and Surface Mount Components.

Order Information

standard temperature range -40⇔85ºC

PCIe8LXMCX2	full length PCIe card with 2 XMC positions DIN connectors installed. User VPWR selection http://www.dyneng.com/PCIe8LXMCX2.html
-FAN(1,2,3,4)R	[fan installed in position 1 or 2 or 3 or 4 or combinations] “R” for rear mounted higher velocity fans(~8 CFM). Non “R” boards use “Zero Slot” fans with ~ 5CFM.
-ENET/SER	[ethernet and serial port connectors installed and connected to Jn4]
-ROHS	[ROHS compliant parts and process]
-XIO	Install Jn6 connectors as well as Jn4
-XIOExc	Install Jn6 connectors without Jn4
-SCSI	Install SCSI connectors instead of DIN
-NC	Do not install DIN or SCSI connectors
-VPWR	Use to hardwire VPWR setting to be 5V or 12V per XMC site [-5V0 for 5V in position 0]
-5VXXX, -3VXXX	XXX = ND [no delay], DEL[delay], OFF [power supply disabled] for hardwired options instead of user selectable
-DD, -DDV, -OT	Options to add **D**isk **D**rive or **D**isk **D**rive **V**ertical or Screw Terminal [**OT**] style connectors
HDEterm68	http://www.dyneng.com/HDEterm68.html 68 pin SCSI II to 68 screw terminal converter with DIN rail mounting.

HDEcabl68	http://www.dyneng.com/HDEcabl68.html SCSI cables with latch blocks or thumbscrews and various lengths are available. Custom lengths can be ordered.
DINterm64	http://www.dyneng.com/DINterm64.html 64 pin ribbon cable to to 64 screw terminal converter with DIN rail mounting.
DINribn64	http://www.dyneng.com/DINribn64.html 64 pin ribbon cable with strain relief. 50-2012-0101-XX.YY.ZZ Substitute XX = major, YY = minor, ZZ = units . For example 1.0.FT = 1 Ft long. 1.6Ft is 1 Foot 6". Metric and English units are acceptable. 36" is the default length if XX.YY.ZZ is left off.