DYNAMIC ENGINEERING

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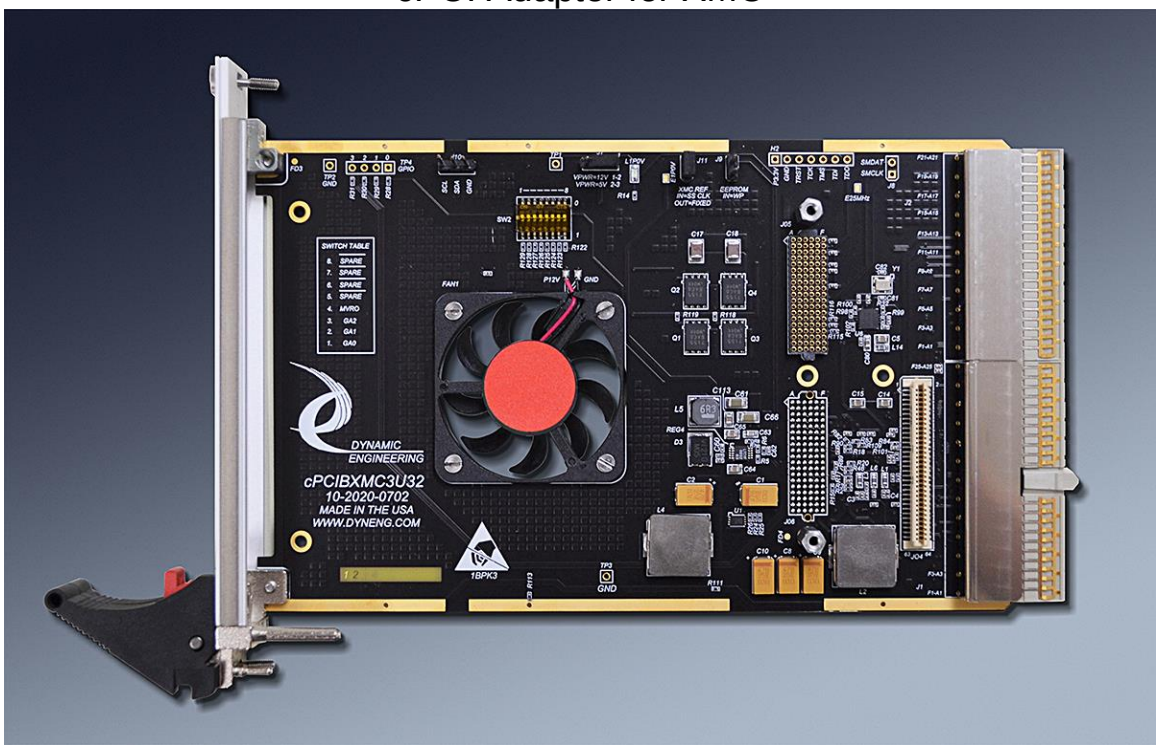
User Manual

cPCIBXMC3U32

cPCI Adapter for XMC



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cPCIBXMC3U32
cPCI 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.

Table of Contents

List of Figures

Product Description

cPCIBXMC3U32 is part of the Dynamic Engineering cPCI and XMC Compatible family of modular I/O components. cPCIBXMC3U32 adapts an XMC to one cPCI slot.

The conversion PCI ⇔ PCIe happens in the transparent bridge. The PCI side of the bridge is 5V tolerant allowing use in all cPCI positions. The PCI interface is 32 bits wide and can operate up to 66 MHz. The PCIe side is single lane. The bridge is PCI rev 3.0 compliant. PCIe is gen 1 compliant.

Special features:

- High accuracy crystal based 100 MHz reference to Bridge and XMC with shunt option for Spread Spectrum or fixed operation.
- Voltage monitors with LED for bridge power supply [1.0 V]
- LC filters on the 3.3V and 5V power rails.
- Selection shunt for VPWR [12V or 5V]. Option for hardwired 5V or 12V
- Front panel connector access through cPCI bracket
- Rear IO options [Jn4, Jn6, both] available through J2
- Cooling cutout for increased airflow to XMC's
- Optional Fan for increased airflow
- JTAG programming support – optional header
- DIP switch to select global addressing on XMC
- EEPROM with write protection and programming header
- Header with 4 GPIO bits accessed from bridge

The cPCIBXMC3U32 is ready to use with the default settings. Just install the XMC onto the cPCIBXMC3U32 and then into the system.

Headers and TestPoints

J7 is used to select the VPWR source. 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. 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. Be sure to make a selection as most XMCs will need the VPWR rail energized for proper operation.

J8 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 XMC if the bus is in use. Usually not needed but handy if you are doing development.

J9 is an optional header for EEPROM write protection. When installed the EEPROM is protected.

J10 is an optional header for SMB connection to the EEPROM/Bridge. Pin 2 is data and pin 1 is clock. Pin 3 is ground. Both signals are pulled up. Rarely required but handy if needed.

J11 controls the PCIe clock reference for fixed or spread operation. With the shunt not installed fixed frequency (NSSC) operation is selected. With the Shunt installed Spread Spectrum Clocking (SSC) is selected.

H2 is the optional JTAG header/pwr used to connect to the XMC. .025" sq post header. The pin definitions are in the silk. 1: 3.3V, 2: GND, 6: TMS, 4: TDO, 5: TDI, 3: TCK, 7: TRST

TP4 is an optional header for GPIO connection. Each of the GPIO has a 4.7K pull-up to 3.3V. GPIO 3..0 TP4.4..1 is the correspondence.

DipSwitch Settings

Switch 1: Global Address Settings

Position 1-3 corresponds to XMC GA0-2. When closed the signal is ‘0’. When open the signal is ‘1’.

Position 4 corresponds to XMC-MVR0. When closed the signal is ‘0’. When open the signal is ‘1’.

Position 5-8 are spare

Rear IO

The base model supports bezel IO. The IO at the XMC bezel will be available at the cPCI bezel. With the -RIO models connector J2 is installed to connect the XMC “read IO” to the backplane. Make sure your backplane is designed for IO. J2 on the backplane can also have the upper half of the PCI bus.

Jn6 is routed to Jn4 to J2. 100 ohm matched length differential routes are utilized. Matched across all pairs. Suitable for high speed differentials and single ended signals too.

-RIO corresponds to J2 and Jn4 installed. PMC style rear IO.

-RIO-XIO corresponds to J2, Jn4 , amnd Jn6 installed. Both “PMC” and XMC rear IO connectors.

-RIO-XIOexc corresponds to J2 and Jn6. XIO rear IO only.

XMC Module Backplane IO Interface Pin Assignment

The figure below gives the pin assignments for the XMC Module IO Interface – from XMC Jn4 / Jn6 to cPCI J2. Also see the User Manual for your XMC board for more information.

J2		Jn4		Jn6	
D13	E13	3	1	B1	A1
B13	C13	4	2	E1	D1
A12	A13	7	5	C2	C1
D12	E12	8	6	F2	F1
B12	C12	11	9	B3	A3
D11	E11	12	10	E3	D3
B11	C11	15	13	C4	C3
A10	A11	16	14	F4	F3
D10	E10	19	17	B5	A5
B10	C10	20	18	E5	D5
D9	E9	23	21	C6	C5
B9	C9	24	22	F6	F5
A8	A9	27	25	B7	A7
D8	E8	28	26	E7	D7
B8	C8	31	29	C8	C7
D7	E7	32	30	F8	F7
B7	C7	35	33	B9	A9
A6	A7	36	34	E9	D9
D6	E6	39	37	C10	C9
B6	C6	40	38	F10	F9
D5	E5	43	41	B11	A11
B5	C5	44	42	E11	D11
A4	A5	47	45	C12	C11
D4	E4	48	46	F12	F11
B4	C4	51	49	B13	A13
D3	E3	52	50	E13	D13
B3	C3	55	53	B15	A15
A2	A3	56	54	E15	D15
D2	E2	59	57	B17	A17
B2	C2	60	58	E17	D17
D1	E1	63	61	B19	A19
B1	C1	64	62	E19	D19

FIGURE 1 CPCIBXMC3U32 J2-PN4/JN6 INTERFACE STANDARD

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 is mounted to cPCIBXMC3U32 prior to installation within the chassis. For best results: with the cPCI bracket installed, install the XMC at an angle so that the XMC front panel bezel penetrates the cPCI bracket then rotate down to mate with the XMC [PnX] connectors.

There are four mounting locations per XMC. Two into the XMC mounting bezel, and two for the standoffs near the XMC bus connectors. It is highly recommended to installed the retaining screws to avoid having the connectors separate from vibration.

Start-up
Make sure that the "system" can see your hardware before trying to access it. Many BIOS will display the PCIe 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 cPCIBXMC3U32 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 installed onto the cPCIBXMC3U32 than the cPCIBXMC3U32 itself, and it is smart system design when it can be achieved.

Construction and Reliability

cPCIBXMC3U32 is constructed out of 0.062 inch thick high temp RoHS compliant FR4 material. A cooling cutout has been designed into the product for improved air flow to the XMC site. The components on the PCIeNLXMCX1 are tied into the internal power planes to spead 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 [press fit] 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 minimum. These connectors make consistent, correct insertion easy and reliable.

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 XMC installed 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.

https://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:	PCI 32 bit universal voltage. PCIe single lane
Access types:	PCI standard transactions including DMA. PCIe TLP transactions. MSI interrupts.
CLK rates supported:	PCI – 33/66 PCIe Gen 1
Software Interface:	Passive, no SW required for adapter
Initialization:	switch selection for VPWR
Interface:	XMC front bezel via cPCI bracket and User IO connector via J2
Dimensions:	3U 4HP with standard XMC installed including zero slot fan.
Construction:	High Temp FR4 Multi-Layer Printed Circuit, Through Hole and Surface Mount Components.

Order Information

standard temperature range -40⇔85ºC

cPCIBXMC3U32	https://www.dyneng.com/cPCIBXMC3U32.html 3U cPCI card with XMC position
-FAN	Add a fan to cool the mounted PMC. ~5 CFM, “Zero Slot” type
-FANRz	Add a fan to cool the mounted PMC. ~5 CFM, “Zero Slot” type. Mounted in reverse to pull air from the PMC side and blow to the rear
-FANR	Add a fan to cool the mounted PMC. ~8 CFM, full height fan will interfere with next cPCI position.
-ROHS	[ROHS compliant parts and process]
-JTAG	add JTAG headers
-XIO	Install J2 plus Jn6 as well as Jn4
-XIOExc	Install J2 plus Jn6 without Jn4
-RIO	Install J2 plus Jn4
-VPWR(5/12)	use to force VPWR to a voltage
PCI2cPCI-32-IO	https://www.dyneng.com/PCI2cPCI.html adapter to mount cPCI 32 bit device into PCI slot. J2 IO brought out to header.