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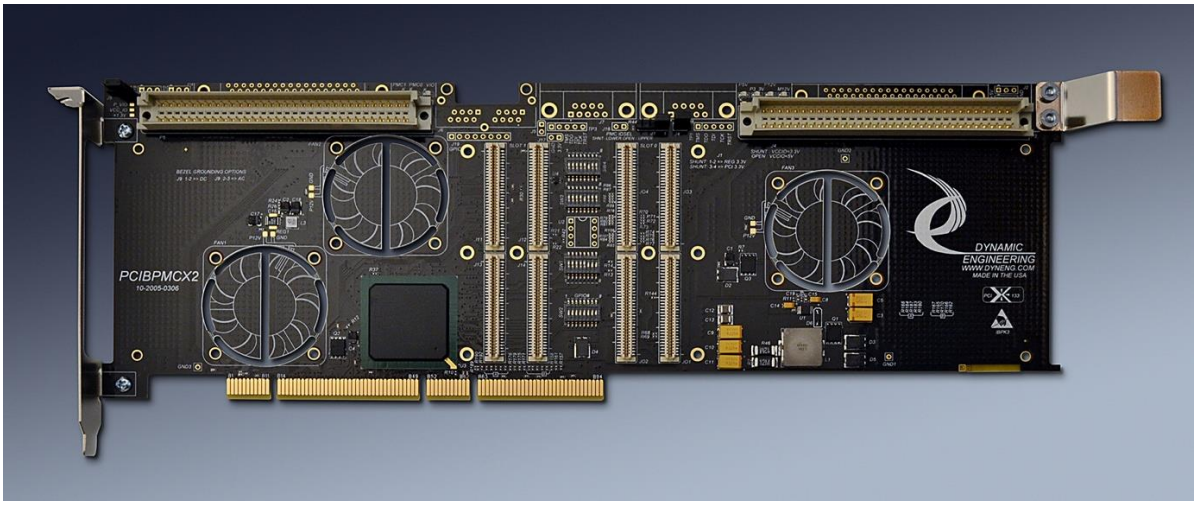
Est. 1988

User Manual

PCIBPMCx2

PCI 2 Position PMC Compatible Carrier



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PCIBPMCX2
PCI and PMC Compatible Carrier

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Connection of incompatible hardware is likely to cause serious damage.

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Product Description

PCIBPMCX2 is part of the Dynamic Engineering PCI and PMC Compatible family of modular I/O components. PCIBPMCX2 adapts 2 PMCs to one PCI slot.

Embedded applications frequently require real time processing coupled with special purpose IO. With PCIBPMCX2's two positions; a PrPMC can be matched with another PMC to make a high bandwidth processing node. The PrPMC can communicate with the host for set-up, and use the local bus to control and transfer data with the special purpose IO card. For example, the PMC-BiSerial-VI-HW1 provides 32 channels of Manchester encoded IO, and when matched with a PrPMC can control or monitor a large system in real time.

The PCIBPMCX2 has programmable [switch] options for interrupts, and other features to customize for your application.

Special features:
- Universal PCI voltage
- PCI compatible
- Device Hiding and Opaque Memory options
- LED on PMC Busmode "Present" for each slot.
- Voltage monitors for 12V, minus 12V, 5V, and 3.3V. LED illuminates when in tolerance.
- Selectable secondary VIO.
- 32 bit operation\
- 66 or 33 MHz operation.
- Front panel connector access through PCI bracket
- User IO [Pn4] available through one of two cable connectors (DIN IDC or SCSI compatible) Spare pins on SCSI connector can be shunt selected to power or ground.
- Cooling cutout for increased airflow to PMCs
- Optional Fan(s) to increased airflow
- JTAG programming support

The PCIBPMCx2 is ready to use with the default settings. Just install the PMC onto the PCIBPMCX2
and then into the system. There are a few settings that can optimize performance.

IDSEL

The IDSEL is AD20 for slot 0 and AD21 is used for slot 1 [secondary PCI].

DipSwitch Settings

Please note that the switch numbering and '1' and '0' definitions are per the silk screen.

The dipswitches are numbered SW4, SW3, SW1 from top to bottom and are located between the PMC connectors. SW3, 4 are used to control the PMC interrupt routing. SW1 controls the Bridge operation. SW 3, 4 are oriented with pin 1 to the right and SW1, 2 are positioned with pin 1 on the left [see “dot” in silkscreen]. The “on” position is the closed position for the switch.

Switch 1: Special selections

Position 1 corresponds to Secondary Side VIO selection. When closed 5V is selected. When open 3.3V is selected. VIO3.3 option hardwires this option by removing part of the circuit to force 3.3V secondary side VIO. Select the appropriate VIO for your PMC(s). A PMC can be 3.3V or 5V or “universal”.

The VIO plane is a reference for the IO level. The specification does not prohibit larger current consumption from these pins. The PCIBPMCX2 design utilizes a MOSFET to control the 5V or 3.3V rails onto the VIO plane. Max consumption on the VIO rail is 3A. The maximum power draw of a PMC is 7.5W leaving a large safety factor. The factory setting is 3.3V on the secondary VIO rail.

The factory setting is open.

Position 2 corresponds to Secondary side M66EN over ride. When closed M66EN is pulled low to force 33 MHz operation. When open the signal is pulled up with the secondary side M66EN signal ‘1’ or ;0; based on the installed PMCs. SM66EN acts as an open drain signal with any of the nodes capable of reducing the clock rate and all nodes required to operate at the higher rate. ‘1’ = 66 MHz capable secondary side. ‘0’ = 33 MHz. The factory setting is open.

Position 3 corresponds to CONFIG66. When closed the signal is ‘0’ and set to 33 MHz operation. When open the signal is ‘1’ and set to 66 MHz capable operation. The factory setting is open.

Position 4-6, and 8 are spare The factory setting is open.

Position 7 is connected to the Monarch pin for slot 0. When open a 4.7K pull-up to VIO is used to control the Monarch signal [Pn2-64]. When closed the Monarch signal is set to gnd. The factory setting is '1'.

Switch 2: GPIO

The 4 positions on TP2 can be read in from the bridge via the configuration space registers. The bits can be used for any purpose – Card numbering etc. TP2.1-4 ⇔ GPIO 0-3.

Interrupts from the PMC are connected from the PMC to the primary PCI bus. INTA through INTD are mapped indirectly to the primary bus segment.

Switch 3: PMC 0 Interrupt routing control
The PMC INTA-D signals are tied to switch positions 4-1 and 8-5. The upper bits are tied to Switch 4[8-5] and form the slot 0 connection to the Interrupt Intermediate bus. The lower bits are tied to the PCI connector interrupts. The right-hand side connections in the schematic are tied to the PMC Slot 0 interrupts.

Most PMC cards will have only one interrupt and present that on INTA. With switch 4 closed the interrupt from PMC 0 is connected to INTA on the PCI [primary bus].

If Slot 0 is not occupied or does not use interrupts; the interrupt from Slot 1 will need to be routed to INTA on the PCI bus.

The factory setting is switch 4 closed and the rest open to put INTA from PMC0 on INTA to the system.

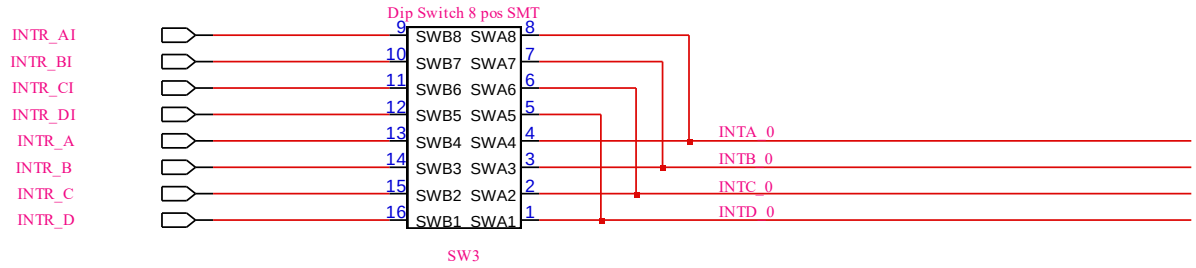


FIGURE 1 PCIBPMCX2 SLOT0 INTERRUPTS SCHEMATIC

Switch 4: PMC 1 Interrupt routing control
The PMC INTA-D signals are rotated and tied to switch positions 4-1 and 8-5. INTA is on pins 8 and 3, INTB is on 7 and 2 and so forth. The upper bits are tied to Switch 3 and form the second connection on the Interrupt Interconnect bus. The lower bits are tied to the PCI connector for direct connection to the PCI Interrupts. The right hand side connections in the schematic are tied to the PMC Slot 1 interrupts.

Most PMC cards will have only one interrupt and present that on INTA. With switch 3 closed the interrupt from PMC 1 is connected to INTB on the PCI [primary bus]. With two PMCs installed and PMC 0 using interrupts this is the correct configuration. Slot 0 utilizing INTA and Slot 1 assigned to INTB. This corresponds to the IDSEL settings built into the X2.

With switch 8 closed on SW3 and SW4 the intermediate bus ties INTA to INTA between the PMC sites.

The factory setting is has Position 0 tied to INTA and Position 1 tied to INTB

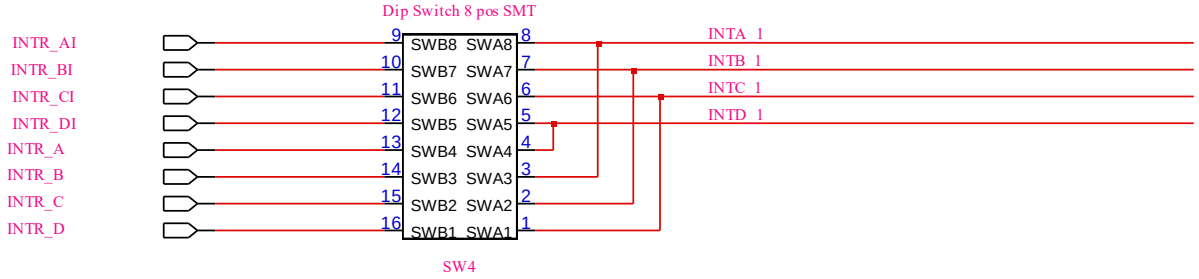


FIGURE 2 PCIBPMCX2 SLOT1 INTERRUPTS SCHEMATIC

Please note that SW3 and SW4 are installed with pin one on the RHS when viewing the card with the PCI fingers down. SW3 DIP switch number 1 is on the RHS and DIP switch number 8 is on the LHS. For a “mental picture” you can rotate the schematic counter-clockwise 90 degrees. With the switch in the up position the switch is open. With the individual switches in the down position the switches are closed [making the connection].

To implement the INTA from slot 1 to INTA on the PCI bus example: Starting with the right hand side of SW3 the first three switches would be up, and the 4th down, then the next three up and the 8th down to correspond to SW3 switch 4 and 8 closed. On SW4 the first 7 switches would be up and the last [8th] down.

The PCI reserved signals are routed to the PMC reserved pins in accordance with the PMC specification to allow for future signal definitions or special user signaling.

Jn2 pins 58 and 64 are pull-ed up to VCC_IO with 4.7KΩ. Pin 60 is open. This configuration works with most Monarch capable PMCs. Please contact Dynamic Engineering if you need alternate settings.

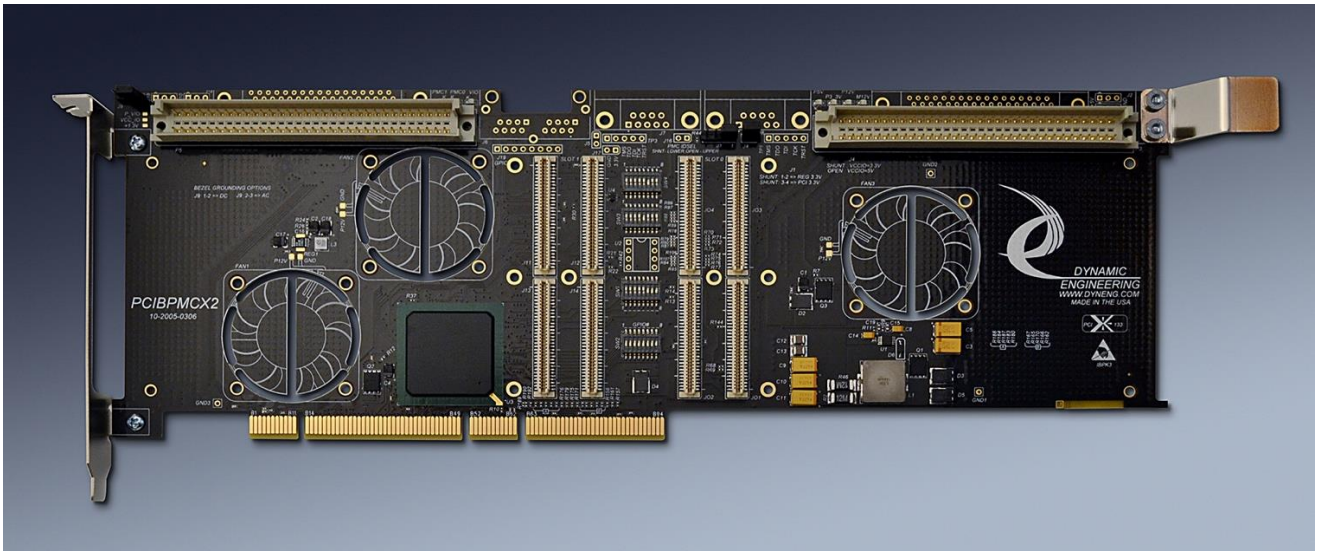
Options

Dynamic Engineering offers multiple versions of the PCIBPMCX2 design.

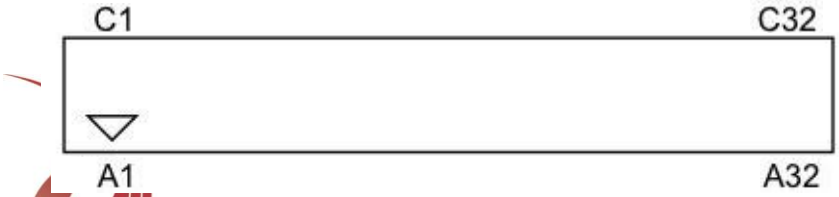
The PCIBPMCx2 features cooling cutouts designed to support the addition of a fan in one of two positions for each PMC. On PrPMCs and other PMCs with high thermal loads the fan option is a good idea. On cards with a lower thermal profile the fan is not needed. The fan produces 5 CFM in a small area to create a high LFM rating suitable for most cooling requirements. The fan used has a relatively low noise rating for quiet operation. Positions are numbered left to right in the photo below.

In addition, the PCIBPMCX2 has two options for Pn4 signal routing. VME style 2x32 pin header [shown] or a SCSI style connector.

Please mix and match options, as you need them.



Revision 6 shown



The “VME” connectors are oriented as shown 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 the PCIBPMCX2.

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

PMC Module Backplane IO Interface Pin Assignment

The figure below gives the pin assignments for the PMC Module IO Interface – from Pn4 to the PCIBPMCx2 connectors. Also see the User Manual for your PMC board for more information. Please note that P2 or P3, P4 or P5 are installed not both.

DIN IDC [P3,P5]		SCSI [P2,P4]			Pn4	
C1	A1	1	35		1	2
C2	A2	2	36		3	4
C3	A3	3	37		5	6
C4	A4	4	38		7	8
C5	A5	5	39		9	10
C6	A6	6	40		11	12
C7	A7	7	41		13	14
C8	A8	8	42		15	16
C9	A9	9	43		17	18
C10	A10	10	44		19	20
C11	A11	11	45		21	22
C12	A12	12	46		23	24
C13	A13	13	47		25	26
C14	A14	14	48		27	28
C15	A15	15	49		29	30
C16	A16	16	50		31	32
C17	A17	17	51		33	34
C18	A18	18	52		35	36
C19	A19	19	53		37	38
C20	A20	20	54		39	40
C21	A21	21	55		41	42
C22	A22	22	56		43	44
C23	A23	23	57		45	46
C24	A24	24	58		47	48
C25	A25	25	59		49	50
C26	A26	26	60		51	52
C27	A27	27	61		53	54
C28	A28	28	62		55	56
C29	A29	29	63		57	58
C30	A30	30	64		59	60
C31	A31	31	65		61	62
C32	A32	32	66		63	64
		33	67	Open, +5 or GND via J2 silk screen defined		
		34	68	Open, +5 or GND via J3		

FIGURE 3 PCIBPMCX2 PN4 INTERFACE STANDARD

Read table:
P3-C1 = P2-1 = Pn4-1
P3-A1 = P2-35 = Pn4-2
etc.

Applications Guide

Interfacing

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

Installation
The PMC is mounted to the PCIBPMCX2 prior to installation within the chassis. For best results: with the PCI bracket installed, install the PMC at an angle so that the PMC front panel bezel penetrates the PCI bracket then rotate down to mate with the PMC [PnX] connectors. The rear slot does not have the bezel interaction and can be mounted directly.

There are four mounting locations per PMC. Two into the PMC mounting bezel, and two for the standoffs near the PMC bus connectors.

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 PMC 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 PCIBPMCX2 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 PMCs installed onto the PCIBPMCX2 than the PCIBPMCX2 itself, and it is smart system design when it can be achieved.

Construction and Reliability

The PCIBPMCX2 is constructed out of 0.062 inch thick, high temp, RoHS compliant, FR4 material. Cooling cutouts have been designed into the product for improved air flow to the PMC sites. The components on the PCIBPMCX2 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 PMCs or for a chassis with a lack of air circulation.

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

The PMC Module connectors are keyed and shrouded with Gold plated pins on both plugs and receptacles. They are rated at 1 Amp per pin, 100 insertion cycles minimum. These connectors make consistent, correct insertion easy and reliable.

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

Thermal Considerations

If the PMC installed has a large heat dissipation; forced air cooling is recommended. [Fan options]

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:

Customer Service Department
Dynamic Engineering
150 DuBois St. Suite B&C
Santa Cruz, CA 95060
831-457-8891 Internet Address support@dyneng.com

Specifications

Logic Interfaces:	PCI Interface 33/32 <–> 66/32
Access types:	PCI bus accesses
CLK rates supported:	66, 33 MHz PCI clock rates
Software Interface:	transparent Bridge. Registers in configuration space. Unmodified PMC drivers and User software used to control installed devices.
Initialization:	Switch selections for VIO, secondary clock rates, special bridge based features and cable options
Interface:	PMC front bezel via PCI bracket and User IO connector via DIN ribbon and or SCSI connector
Dimensions:	full length PCI 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

PCIBPMCX2	full length PCI card with 2 PMC positions https://www.dyneng.com/PCIBPMCX2..html
-FAN(1,2,3,4)	fan installed in position
-ROHS	[ROHS compliant parts and process]
-CC	Add conformal coating
HDEterm68	https://www.dyneng.com/HDEterm68.html 68 pin SCSI II to 68 screw terminal converter with DIN rail mounting.
HDEcabl68	https://www.dyneng.com/HDEcabl68.html SCSI cables with latch blocks or thumbscrews and various lengths are available. Custom lengths can be ordered.
DINterm64	https://www.dyneng.com/DINterm64.html 64 pin ribbon cable to to 64 screw terminal converter with DIN rail mounting.
DINribn64	https://www.dyneng.com/DINribn64.html 64 pin ribbon cable with strain relief. Add –XX for number of inches. 36” is default.