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User Manual

PCIBPMCX1

PCI, PCI-X 1 Slot PMC Compatible Carrier

Revision A2
Corresponding Hardware: Revision A/B
Fab number:10-2006-1501/2

PCIBPMCX1
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

PCIBPMCX1 is part of the Dynamic Engineering PCI and PMC Compatible family of modular I/O components. The PCIBPMC adapts a PMC to one PCI slot.   The PCIBPMCX1 uses a PCI-X compatible bridge and can operate with PCI-33, 66,100 or 133 speeds. The PMC can operate with a different bus speed, width, or VIO than the primary bus.

The PCIBPMCX1 has programmable [switch] options for most features.

Special features:
• Universal PCI voltage
• PCI, PCI-X compatible
• Device Hiding and Opaque Memory options
• LED on PMC Busmode "Present"
• LED's on plus 12V, minus 12V, plus 5V, plus 3.3V, and VIO
• 8A regulator for PMC 3.3V supply
• Selection switch for PCI3.3 or regulated 3.3
• Selectable secondary VIO.
• 32 or 64 bit operation on either bus
• 133, 100, 66 or 33 MHz operation.
• Front panel connector access through PCI bracket
• User IO [Pn4] available through SCSI II connector.   Spare pins on SCSI connector can be shunt selected to power or ground. Routing done as differential pairs with 100 Ω differential impedance.
• Cooling cutout for increased airflow to PMCs
• Optional Fan(s) to increased airflow
• Optional JTAG programming support

The PCIBPMCX1 is ready to use with the default settings. Just install the PMC onto the PCIBPMC and then into the system. There are a few settings to optimize performance.

Shunt Settings

Select the appropriate VIO for your PMC. A PMC can be 3.3V or 5V or "universal". Please select the 3.3 or 5V VIO choice with the shunt **J4**. The Voltage choices are marked. Install the shunt for 3.3V operation; open for 5V operation.

The VIO plane is a reference for the IO level. The specification does not prohibit larger current consumption from these pins. The PCIBPMCX1 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 factory setting is 3.3V on the secondary VIO rail.

Select the 3.3V source for your PMC. Some backplanes have 3.3 and some do not. Sometimes the isolation provided by an inline power supply is useful. Sometimes there is not enough 3.3V to supply all of the devices and it is handy to convert some of the 5V rail to 3.3V. The PCIBPMCX1 has a switching DC/DC power converter built in.

When shunt **J1** is installed the switching regulator is enabled and the backplane power path is disabled. The switching regulator controls a low impedance MOSFET to pass the 5V onto the 3.3V rail. When the switching regulator senses that the voltage is within tolerance the MOSFET is disabled. When the voltage falls below the threshold the MOSFET is enabled. An inductor and several large value tantalum capacitors are used to provide "clean" power to the PMCs. The switching regulator is much more efficient than a linear regulator resulting in lower heat dissipation and a higher MTBF. When shunt J1 is **not** installed, the 3.3V rail from the backplane is routed to the PMC. The factory setting is installed.

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, SW2 from top to bottom and are located between the PMC connectors. SW3,4 are used to control the PMC interrupt routing. SW2 is used for the GPIO port. 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 for the 31154 Bridge
For more information please refer to the Intel® documentation

Position 1 corresponds to S_MAX100. When closed the signal is '0'. When open the signal is '1'. When set to '1' the secondary [PMC] side is limited to 100 Mhz in PCI-X mode. The factory setting is '0'.

Position 2 corresponds to S_PCIXCAP. When closed the signal is '0'. When open the signal is '1'. When set to '1' PCI-X operation is enabled for the secondary side. The factory setting is '0'.

Position 3 corresponds to OPAQUE_EN. When closed the signal is '0'. When open the signal is '1'. When set to '1' Opaque Memory is enabled to establish the Base and limit registers used to create a private memory space. The factory setting is '0'.

Position 4 corresponds to IDSEL_MASK. When closed the signal is '0'. When open the signal is '1'. When set to '1' hide the devices attached to the PMC slot from the host after reset.   The factory setting is '0'.

Position 5 corresponds to DEV_64BIT#. When closed the signal is '0'. When open the signal is '1'. When set to '1' 64 bit operation is enabled for the PMC slot. The factory setting is '0'.

Position 6 is used to ground the Monarch pin J2-64. A pull-up holds the signal high when the switch is not closed. Revision 2 and later boards are marked in the silk-screen. Revision 1 boards have rework for this feature.

Position 7 corresponds to S_M66EN. When closed the signal is '0'. When open the signal is '1' assuming that the PMC does not pull the signal down. 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. Select the secondary side [PMC] PCI bus frequency. The options are to use the PCI bus speed [primary] or to force 33 MHz on the secondary side. The PMC to be installed must be 66 MHz compliant to use the 66 MHz secondary side option.   '1' = 66 MHz capable secondary side. '0' = 33 MHz. Please note that PCI-XCAP will override if set to enabled. The factory setting is '1'.

The SM66EN signal is also routed to the PMC connector pin M66EN. If the PMC uses the M66EN as an input then the dipswitch can be used to control the frequency. If the PMC uses the M66EN pin as a control, then the Switch may have no effect. For example if the switch is in the '1' position and the PMC is selecting M66EN = '0' then the PMC will "win" and the signal will be at the 33 MHz setting. Both the dipswitch and the PMC M66EN have to be enabled for 66 MHz operation.

Position 8 corresponds to P_M66EN. When closed the signal is '0'. When open the signal is '1'.   Select '1' to use the PCI bus speed and '0' to force 33 MHz operation. If the rest of the cards installed on the same PCI segment ,and the segment itself are 66 MHz capable then the PCI primary speed will be 66 MHz. If any device on the segment is set to 33 MHz only then the entire segment will operate at 33 MHz. We recommend enabling the 66 MHz operation, and using the bridge to switch to 33 MHz for the PMC. The factory setting is '1'.

Switch 2: GPIO

The 8 switch positions can be read in from the bridge via the configuration space registers. The switch bits 8-1 correspond to the GPIO bits 7-0. The bits can be used for any purpose – Card numbering etc. The GPIO bits are also connected to a test point strip. If the GPIO bits are to be used as outputs be sure that the corresponding switch is in the open position. The factory setting is open.

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.

The IDSEL is set to AD20 for the PMC slot [secondary PCI].

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.

Reserved Pins Routing

PCI	PMC
A9	Pn2-8
B10	Pn2-9
A11	Pn2-10
B14	Pn1-10
A40	Pn1-41
A41	Pn1-42
B63	Pn3-1
A92	Pn3-59
B92	Pn3-63
B93	Pn3-61
A94	Pn3-64

In Addition Jn2 pins 58 and 64 are pulled 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.

Revision 2 and later boards have resistor jumpers for the Reserved pins to allow for their isolation should your PMC need to be disconnected from the newer signals. "-RSVD" removes these signals when added to the part number. For revision 1 boards specific pins can be pulled at the PMC connector.

Options

The PCIBPMCX1 features cooling cutouts designed to support the addition of a fan in one or two positions for the PMC. On PrPMC's and other PMCs with high thermal loads the fan option is a good idea. On cards with a lower thermal profile the fan(s) is not needed. The fan produces 8 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 PMC connectors.

PMC Module Backplane IO Interface Pin Assignment

The figure below gives the pin assignments for the PMC Module IO Interface – from Pn4 to the PCIBPMCX1 connectors. Also see the User Manual for your PMC board for more information.

SCSI II [P2,P4]		Pn4	
35	36	1	2
1	2	3	4
37	38	5	6
3	4	7	8
39	40	9	10
5	6	11	12
41	42	13	14
7	8	15	16
43	44	17	18
9	10	19	20
45	46	21	22
11	12	23	24
47	48	25	26
13	14	27	28
49	50	29	30
15	16	31	32
51	52	33	34
17	18	35	36
53	54	37	38
19	20	39	40
55	56	41	42
21	22	43	44
57	58	45	46
23	24	47	48
59	60	49	50
25	26	51	52
61	62	53	54
27	28	55	56
63	64	57	58
29	30	59	60
65	66	61	62
31	32	63	64
33	67	Open, +5 or GND via J2 silk screen defined	
34	68	Open, +5 or GND via J3	

FIGURE 1   PCIBPMCX1 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 PCIBPMCX1 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.

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 PCIBPMCX1 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 PCIBPMCX1 than the PCIBPMCX1 itself, and it is smart system design when it can be achieved.

Construction and Reliability

The PCIBPMCX1 is constructed out of 0.062 inch thick FR4 material. Cooling cutouts have been designed into the product for improved air flow to the PMC sites. The components on the PCIBPMCX1 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.

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.

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Specifications

Logic Interfaces: PCI, PCI-X Interface 33/32 <–> 133/64

Access types: PCI bus accesses

CLK rates supported: 133, 100, 66, 33 MHz PCI clock rates

Software Interface: transparent Bridge. 31154 registers in configuration space

Initialization: switch selections for VIO, 3.3V source, primary and secondary clock rates, bridge based features and cable options

Interface: PMC front bezel via PCI bracket and User IO connector via DIN ribbon and or SCSI II connector

Dimensions: 1/2 length PCI board, single PCI slot width with PMC installed

Construction: High Temp FR4 Multi-Layer Printed Circuit, Through Hole and Surface Mount Components.

Order Information

standard temperature range 0-70$^{\varnothing}$C

PCIBPMCX1

1/2 length PCI,PCI-X card with PMC positions
-FAN(1,2,12 [fan installed in position 1 or 2 or both 1 and 2]
-NC [SCSI connector not installed]
http://www.dyneng.com/PCIBPMCX1.html
-RSVD for no connections to PCI reserved pins
-ROHS for ROHS compliant processing

HDEterm68

http://www.dyneng.com/HDEterm68.html
68 pin SCSI II to 68 screw terminal converter with DIN rail mounting.

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