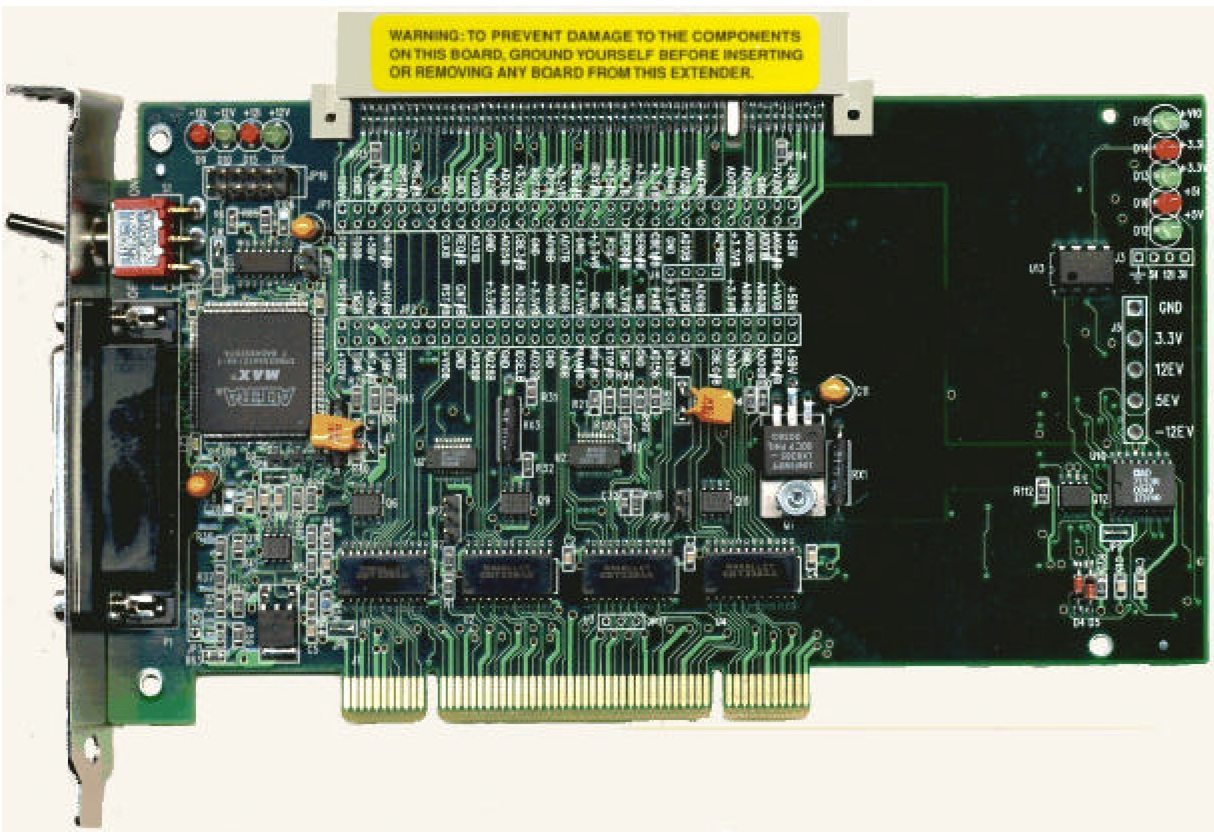
PCIBX32-X PCIBX64-X

User's Manual
&
Programming Guide

Revision 2.3 – February 2003



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FEATURES

PCIBX is a Hot Swap PCI, PCI-X extender card, compliant with PCI 2.2 specification. This extender card is able to isolate voltages and signals to the UUT for Hot Swapping purposes via software control or the on-board mechanical switch. The software interface is done with the system parallel port in order to not add any additional loading on the PCI signals and to be able to control the extender from a different system than the one testing the UUT.

All PCI signals are switched during On/Off operation, except the JTAG signals which are routed straight through without any isolation.

The On-Off may be controlled via mechanical switch or the software. The power control domination between the switch and software is explained here:

> On power up of the extender card, the extender can be controlled by the mechanical switch in the case where software control is not available. Once the first software instruction is issued, the mechanical switch is disabled, and the control of the extender is passed to the software.
>
> In typical auto test applications it is suggested to leave the mechanical switch in the On position, so when the system is powered up the BIOS can configure the PCI registers on the UUT. After the system has completed booting user may issue SW commands (or continue to use the switch) to turn the power to the extender Off and back On.

In addition to Hot Swapping the main voltages and signals, the PCIBX cards have the following features:

1) Short circuit protection
2) Software controllable +3.3Vaux.
3) Register to allow to reading of the status of the PME# signal.
4) On-board 3.3V source, 3 Amps
5) 5V ⇔ 3V signal translators for DUT ⇔ System, jumper selectable
6) I-to-V converters for +5V, +12V and +3.3V
7) ADC converter to read DUT voltages and current measurement
8) Board select jumper for multiple boards operation, 2 boards per system.
9) Selectable RST#, fixed 150 ms or programmable reset width from 2.5 us to 5 seconds
10) Registers to read the status of the RST#, 66 MHz enable, 32 bit or 64 bit operation and status of the UUT power
11) Frequency counter for measuring the slot clock speed
12) Selectable power up +5V ramp, 50 us or 10 ms
13) Detection of the DUT not being fully asserted in the extender. This detection works by detecting if both pins B3 and B57 are connected to GND. If both signals are connected to GND it is assumed that the UUT is seated correctly in the top connector.
14) PCI-X power up initialization. This feature allows the user to define how the PCI-X signal is handled by the extender. Options are UUT determines, forced to 66 MHz PCI-X or disabled. These option are selected by the position of JP17.

INTRODUCTION

PCIBX Active Extender board isolates all signals and voltages to the Unit-Under-Test, when the On-Off switch is in the Off position. All voltages are ramped down and ramped up during the power down and power up in order to eliminate any spikes.

This board also allows voltage margin testing of the UUT, by allowing external power supplies to replace the system power supplies as inputs to the Unit-Under-Test.

On-board current-to-voltage converters allow measurement of the current drawn by the UUT at any time, using just a voltmeter, at the appropriate test points. On-board A/D also allows various current and voltage measurement via software commands, see programming guide.

INSTALLATION

To install the Active Extender board, make sure to turn the PC power off. Insert the Active Extender in any available slot and secure it's bracket to the main chassis. You are now ready to use your new extender board.

OPERATION

In order to use the hot swap capability of these board you must use Catalyst software utility (PCIUD or PCIUW) available our web site, http://www.getcatalyst.com, to read and write configuration registers. This software is available free of charge. For an overview of these software packages see the Hot Swapping Utilities section of this manual.

ON-OFF

To insert or remove any Unit-Under-Test into and out of the Active Extender, make sure that the Active Extender is turned Off, if the system power is to stay On. There are two ways to turn the Active Extender power On and Off. 1) The mechanical toggle switch. 2) Software control.

Note: Once the software control is used the mechanical switch becomes disabled until next power cycle to the extender card.

The software control to the PCIBX boards is done via parallel port interface. Plug a parallel cable between the system port running the software and the extender board(s) to turn the board(s) On and Off. Up to 2 PCIBX boards in a system may be controlled independently, if so desired.

POWER-ON RESET

Each time the Active Extender board is turned Off and then On, a reset signal will be generated from the extender to the Unit-Under-Test automatically. The duration of this reset is about 150 milliseconds. This reset time may be changed by software up to 5 seconds. The reset to the Unit-Under-Test is also generated every time there is a reset from the bus.

CURRENT MEASUREMENT

Measurement may be taken using software commands or external voltmeter.

Voltmeter: To measure the current being drawn by the Unit-Under-Test, just connect a voltmeter to J3. Every Volt read by the meter represents one Amp. So if the voltmeter reads 0.35, it represents that the Unit-Under-Test is drawing 350 milliampere of current. J3 terminals are marked for Ground, +5I, +3.3I and +12I.

NOTE: If the VIO and +5V are on the same plane on your board, you need to remove JP10 jumper, located on the extender board, in order to get an accurate current measurement for the +5V.

Software: The voltage and current to the UUT may also be measured by software, please see instructions in the "Programming Guide".

CURRENT LIMIT CIRCUITRY

Red LEDs, when illuminated, indicate a short or a very low voltage. Green LEDs when illuminated, indicate voltages at their corresponding outputs. +5V, +12V, +3.3Vare electronically protected. +VIO and -12V are protected by resetable fuses.

INCREASE CURRENT LIMIT

1- To increase the +5V current limit remove the resistor at location R23 and follow the steps below.

A: To change the current limit to 8 Amps install a 10K resistor at location R22 and 6.2K resistor at location R23.

B: To change the current limit to 10 Amps install a 10K resistor at location R22 and 10K resistor at location R23.

2- To increase the +3.3V current limit the system must be supplying the +3.3V and not the on board regulator.

A: To change the current limit to 8 Amps install a 4.7K resistor on top of existing R57.

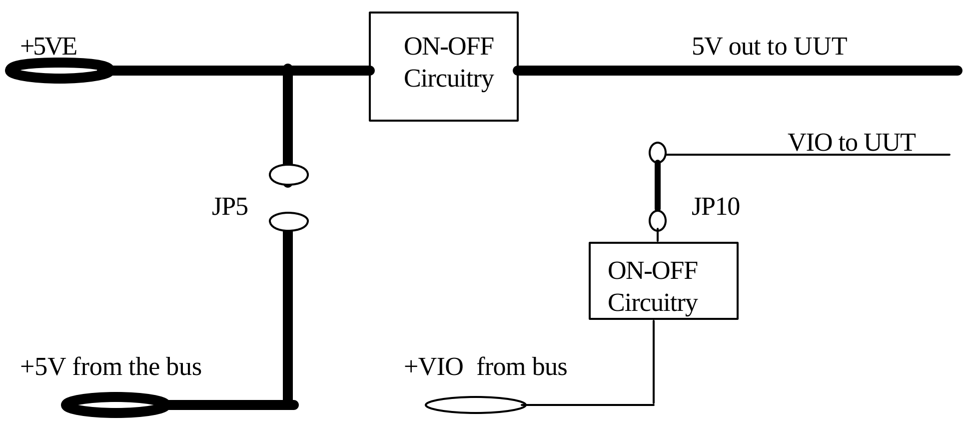
EXTERNAL POWER SUPPLY

An external power input terminal, J5, is used for the external power supply input. <u>However, remember never to connect any supply to these inputs so long as you have JP4, JP5, JP6 and JP7 installed.</u> In case you want to use the external supply as an input you must remove these 4 jumpers in order not to cause any conflict with the bus voltages. These jumpers are, however, independent from each other. For instance if you would want to bring in only a +5V from the external supply and continue to use the bus voltages for +12V, -12V, and +3.3V, you would only need to remove JP5. The list below identifies which jumper is for which supply:

JP4 = -12V
JP5 = +5V
JP6 = +12V
JP7 = +3.3V

JP7 1-2 installed ➔ 3.3V from on-board regulator
JP7 2-3 installed ➔ 3.3V from the bus
JP7 not installed ➔ 3.3V from the external supply

The following diagram indicates the interconnection of the Unit-Under-Test voltages to the bus voltages and the external voltages:



As indicated, there will be conflict in case the external supply is connected while the jumper is still in place. This circuit is repeated for each of the 4 voltages.
If you are using external power supplies do not forget to connect the Ground (GND) signals between the system and the supply. If your external power supply outputs are not isolated, make sure the ground of the PC (containing the extender board) and the ground of the power supply are at the same voltage phase/level with respect to a common point, before connecting the GND signal.

If making current measurements in +5V, be sure to remove JP10 if the VIO and +5V on your board are on the same voltage plane.

LEDs

There are two sets of LED on the board, green and red. Each LED has a label which Voltage it represents. The green LED, when lit, indicates presence of the corresponding voltage. The red LED, when lit, represent a short on the corresponding voltage at the output. Please note that the green LEDs indicate presence of some voltage and do not necessarily indicate if the exact voltage is at the expected level.

LED	Purpose of LED
D10	-12V is present
D11	+12V is present
D12	+5V is present
D13	+3.3V is present
D18	+VIO is present
D9	-12V has a short or low voltage condition
D15	+12V has a short or low voltage condition
D14	+3.3V has a short or low voltage condition
D16	+5V has a short or low voltage condition

5V ⇔ 3.3 V Translation

PCIBX is capable of allowing 5V UUT to work with 3.3V system and vice versa, without any timing degridation. Therefore cards or components needing 3.3 V signaling can be tested or operated on a 5-volt system using these extender cards.

+5V cards can operate in +3.3V systems provided that +5V is provided to the UUT cards.

If JP3 is installed the UUT signals will be the same as the bus signals, most likely +5V.
If JP3 is not installed the signals between the bus and the UUT will be translated.

JUMPERS, PCIBX

SW	Installed => Mechanical switch may be used to control the extender, so long as software control has not been used. (Default) Not Installed => Mechanical switch is disabled
JP15	Installed => PCIBX board ID is PCI_1 (Default) Not Installed => PCIBX board ID is PCI_2
JP3	Installed => UUT I/O signals = System VIO Not installed => Allows UUT and systems of different VIO voltages (5V and 3.3V) to operate together (Default)
JP4	Installed => -12V source is from the system. Not Installed => -12V source is from the external input.
JP5	Installed => +5V source is from the system. Not Installed => +5V source is from the external input.
JP6	Installed => +12V source is from the system. Not Installed => +12V source is from the external input.
JP7	Installed 1-2 => +3.3V to UUT is from On-board source. Installed 2-3 => +3.3V to UUT is from system. Not installed => +3.3V to UUT should be from the external source.
JP10	Installed => UUT VIO is connected to the system VIO. Not Installed (Default) => UUT VIO not connected to the system VIO, but connected to the UUT power plane.
JP16	For factory use only.
JP17	Installed between 1 and 2 => PCI-X enable signal driven by the UUT. Installed between 2 and 3 => PCI-X enable signal set to 66 MHz. Not installed => PCI-X enable signal is not supported (Default)
J4	Factory use.

SPECIFICATION: PCIBX32-5, PCIBX32-3, PCIBX64-5, PCIBX64-3

Bus:	PCIBX32-5, PCIBX64-5 == 32/64-bit PCI, Top connector = 5V key PCIBX32-3, PCIBX64-3 == 32/64-bit PCI, Top connector = 3.3V key
Voltages:	
Input requirement	+5V at 200 mA, +/- 12V at 50 mA, +3V at 50 mA.

Inputs From PC bus or the external input, configurable by jumpers per voltage.

Output Ratings	+5V @ 5 Amp, higher than 5 Amp current limit can be accommodated per user request. +3.3V @ 2.5 Amps if on-board regulator is used. +3.3V @ 5 Amps if system provides 3.3 Volts. +VIO @ 1 Amp. +/- 12V @ 1 Amp.
Drop Across the Switches	40 millivolts drop for every 1 Amp drawn for +5V, +3.3V and +VIO. 30 millivolts drop for every 1 Amp drawn for -12V. 30 millivolts drop for every 100 milliampere drawn for +12V.
Propagation Delay:	Less than 500 Pico-seconds from the PC bus to the UUT. The switch propagation delay is rated at only 250 Pico-seconds.
On-Off Controls:	SPST switch on-board, or the system parallel port.
Outputs:	
J3	+5V, +12V and +3.3V current draw by the UUT can be measured at a four-point terminal, J3, by a voltmeter. Each volt represents 1 Amp.
JP1	JP1-1 to JP1-59, all odd pins on the B side, 100 mil centers.
JP1	JP1-2 to JP1-60, all even pins on the B side, 100 mil centers.
JP2	JP2-1 to JP2-59, all odd pins on the A side, 100 mil centers.
JP2	JP2-2 to JP2-60, all even pins on the A side, 100 mil centers.
JP13, JP14	Extended Signal for 64 bit as marked (PCIBX64 only).

The signals at JP1, JP2, JP13 and JP14 are active when the extender power is on and tri-stated when the power is off.

Mechanical Dimensions:

Height	4.5 inches
Length	7.2 inches

REGISTERS

Up to 2 cards are allowed in a system, PCI_1 refers to addresses on one of the extenders and PCI_2 refers to the second one. The definition of the first and second card are defined by the position of JP15.

DESCRIPTIONS

The PCI_1 responds to address range starting from 0x6X and the PCI_2 card responds to starting from 0xEX address range. The Jumper JP15 installed on the PCI board makes the board to respond as PCI_1 and jumper removed makes the board to be PCI_2.

Name	Address		Type	Data
	PCI_1	PCI_2		
Read Board ID	53	d3	R	PCI_1 = 0x5a (90); PCI_2 = 0x5b (91)
PCI_x Global Power	63	e3	W/R	0= All main power to UUT Off (On power-On = 0) 1= Enables power switches to be programmed.
PCI UUT Voltages	64	e4	W/R	D0 - 0= On (+5V, +12V, -12V and +3.3V) D0 - 1= Off

After turning the extender on and before start using the UUT or starting any test program a wait time of about 200 ms must be observed for the reset signal to be de-asserted.

This delay time may have to be adjusted to as long as 5.7 seconds if the reset signal duration has been reprogrammed by the user.

Name	PCI_1	PCI_2	Type	Data
PCI Aux 3.3V	66	e6	W/R	0 = On; 1 = Off
PCI Analog select	67	e7	W	

D[7..0]	Signal to Convert & Read
0X08	+2.5V Reference
0X09	+12V UUT
0X0A	+5V UUT
0X0B	+3.3V UUT
0X0C	Reserved
0X0D	Current +5V
0X0E	Current +12V
0X0F	Current +3.3V

Name	PCI_1	PCI_2	Type	Data
A/D Convert	68	e8	W	D=0x0
A/D Strobe	69	e9	W	D=0x0
A/D Data	6a	ea	R	D[11..8]
A/D Data	6b	eb	R	D[7..0]
PCI PME#	6f	ef	R	

RST# Reg [7..0]	71	f1	W	
RST# Reg [15..8]	72	f2	W	
RST# Reg [23, 20..16]	73	f3	W	

Value 20..0 provides a delay time up to 5.368709 seconds in 2.56 microseconds increment.
D23 = 0, set the reset time to default of about 150 ms
D23 = 1, set the reset time to the value defined by D0 to D20

Reserved	74	f4		
Reserved	75	f5		
Read back	76	f6	R	(D0=0, RST# asserted; D0=1, RST# de-asserted) (D1=0, no 64 bit handshake detected; D1 = 1 64 operation established) (PCIBX64 Only) (D2=0, no 32 bit handshake detected; D2 = 1 32 operation established) (PCIBX64 Only) (D3=0, 33 MHz enabled slot; D3=1, 66 MHz enabled slot) (D4=0, DUT not fully asserted; D4=1, DUT asserted)
32/64 status bit clear	77	f7	W	0x0 To clear status registers for 32 bit and 64 bit handshake.
Frequency Register 1	78	f8	R	D[7..0]
Frequency Register 2	79	f9	R	D[15..8]
Frequency Register 3	7a	fa	R	D[23..16]
Measure Frequency	7b	fb	W	Issue a write 0x0 to this address to start a conversion. Then wait 15 ms and then read Frequency Registers

System Frequency, MHz = (D[23..0] * 100) / (1048575)

Ramp control, +5V	7c	fc	W	D0 = 0, 50 us; D0 = 1, 10 ms

Programming Guide

1- To read Board ID:

Use the "Set Address" routine to set address	DUT 1 = 0x53	DUT2 = 0xd3
use read routine to read the data.		

2- To read firmware revision:

Use the "Set Address" routine to set address	DUT 1 = 0x50	DUT2 = 0xd0
use read routine to read the data.		

3- Read Board various status bits:

Use the "Set Address" routine to set address	DUT 1 = 0x76	DUT2 = 0xf6
use read routine to read the data.	(D0=0, RST# asserted; D0=1, RST# de-asserted) (D1=0, no 64 bit handshake detected; D1 = 1 64 operation established) (PCIBX64 Only) (D2=0, no 32 bit handshake detected; D2 = 1 32 operation established) (PCIBX64 Only) (D3=0, 33 MHz enabled slot; D3=1, 66 MHz enabled slot) (D4=0, DUT not fully asserted; D4=1, DUT asserted)	

4- Clear 32/64 bit status:

Use the “set Address” routine to set address	DUT 1 = 0x77	DUT 2 = 0xf7
Use write routine to write	0x0	

5- **To Turn on or off any Voltages Global register must be turned on**

Set Global Register on

Use the "Set Address" routine to set address	DUT 1 = 0x63	DUT2 = 0xe3
use write routine to write	0x1	

Global register is a global enable for all power sources, it may be used to turn OFF all the power sources with one command.

6- Main Power Up:

Set Main Voltages to On, this routine disables the mechanical switch. To enable the mechanical switch the power to the extender board has to be turned off and then on.

Use the "Set Address" routine to set address	DUT 1 = 0x64	DUT2 = 0xe4
use write routine to write	0x0	

7- Main Power Down:

Set Main Voltages to Off, this routine disables the mechanical switch. To enable the mechanical switch the power to the extender board has to be turned off and then on.

Use the "Set Address" routine to set address	DUT 1 = 0x64	DUT2 = 0xe4
use write routine to write	0x1	

8- +5V Aux Up

Be sure to have the Global register to on before turning any voltages on or off

Use the "Set Address" routine to set address	DUT 1 = 0x65	DUT2 = 0xe5
use write routine to write	0x0	

9- +5V Aux Down:

Use the "Set Address" routine to set address	DUT 1 = 0x65	DUT2 = 0xe5
use write routine to write	0x1	

10- +3.3V Aux Up:

Be sure to have the Global register to on before turning any voltages on or off

Use the "Set Address" routine to set address	DUT 1 = 0x66	DUT2 = 0xe6
use write routine to write	0x0	

11- +3.3V Aux Down:

Use the "Set Address" routine to set address	DUT 1 = 0x66	DUT2 = 0xe6
use write routine to write	0x1	

12- RST# setup:

Data[20..0] provides a delay time up to 5.368709 seconds in 2.56 microseconds increment.

D23 = 0, sets the reset time to default of about 150 ms
D23 = 1, sets the reset time to the value defined by D0 to D20

Use the "Set Address" routine to set address	DUT 1 = 0x71	DUT2 = 0xf1
use write routine to write D[7..0]		
Use the "Set Address" routine to set address	DUT 1 = 0x72	DUT2 = 0xf2
use write routine to write D[15..8]		
Use the "Set Address" routine to set address	DUT 1 = 0x73	DUT2 = 0xf3
use write routine to write D[23, 20..16]		

13- Measure system frequency:

Use the "Set Address" routine to set address	DUT 1 = 0x7b	DUT2 = 0x7f
use write routine to write	0x1	

Wait 15 ms

Use the "Set Address" routine to set address	DUT 1 = 0x78	DUT2 = 0xf8
use read routine to read D[7..0]		
Use the "Set Address" routine to set address	DUT 1 = 0x79	DUT2 = 0xf9
use read routine to read D[15..8]		
Use the "Set Address" routine to set address	DUT 1 = 0x7a	DUT2 = 0xfa
use read routine to read D[23..16]		

system frequency = (D[23..16] D[15..8] D[7..0])*100/1048575 MHz

For example if the read numbers were 0x5, 0x 55 & 0x46 then 0x55546 = decimal 349510 *100/1048575 = 33.33 MHz.

14- Measure DUT Voltages and current:

Select the voltage or current to convert

Use the "Set Address" routine to set address	DUT 1 = 0x67	DUT2 = 0xe7
use write routine to write		

D[7..0]	**Signal to Convert & Read**
0X08	+2.5V Reference
0X09	+12V UUT
0X0A	+5V UUT
0X0B	+3.3V UUT
0X0C	+5V Aux
0X0D	Current +5V
0X0E	Current +12V
0X0F	Current +3.3V

Wait 10 ms after selecting the signal

Start Conversion

Use the "Set Address" routine to set address		DUT 1 = 0x68	DUT2 = 0xe8
use extended write routine to write.	0x0		

Wait 2 ms

To read data, shift data to a parallel register

Use the "Set Address" routine to set address		DUT 1 = 0x69	DUT2 = 0xe9
use write routine.	0x0		

Repeat this write 13 times.

To read converted Data out

Use the "Set Address" routine to set address	DUT 1 = 0x6a	DUT2 = 0xea
use read routine to read the data.		
Use the "Set Address" routine to set address	DUT 1 = 0x6b	DUT2 = 0xeb
use read routine to read the data.		

To convert the read data to voltage and current use the following equations:

Read Data (decimal) * 2.26 * 2.5/4096 = all voltages and currents in Volts and Amps, except 12V voltage.
Read Data (decimal) * 5.75 * 2.5/4096 = for 12V voltage only

15- Select +5V ramp:

Use the "Set Address" routine to set address	DUT 1 = 0x7c	DUT2 = 0xfc
use write routine.	0x0 = slow; 0x1 fast	

Read-Write Routines

1) To write:

Set Address

Reset the AS and DS signals	outp(0x37a, 0xde);
Set an Address in parallel port register	outp(0x378, 0xaddress_value from the menu);
Latch the value in PCI card Address register	outp(0x37a, 0xd6);
Wait, 100 us minimum	
Reset the AS and DS signals	outp(0x37a, 0xde);

Write Data

Set a Data in parallel port register	outp(0x378, 0xdata_value from menu);
Latch the value in PCI card Data register	outp(0x37a, 0xdc);
Wait, 100 us minimum	
Reset the AS and DS signals	outp(0x37a, 0xde);

2) To read :

Set Address

Reset the AS and DS signals	outp(0x37a, 0xde);
Set an Address in parallel port register	outp(0x378, 0xaddress_value from the menu);
Latch the value in PCI card Address register	outp(0x37a, 0xd6);
Wait, 100 us minimum	
Reset the AS and DS signals	outp(0x37a, 0xde);
Set the port to read mode	outp(0x37a, 0xff);
Read Register and display	I = inp(0x378);
Reset the AS and DS signals	outp(0x37a, 0xde);

3) Extended Write for voltage and current conversion routine:

Set Address

Reset the AS and DS signals	outp(0x37a, 0xde);
Set an Address in parallel port register	outp(0x378, 0xaddress_value from the menu);
Latch the value in PCI card Address register	outp(0x37a, 0xd6);
Wait, 100 us minimum	
Reset the AS and DS signals	outp(0x37a, 0xde);

Write Data

Reset the AS and DS signals	outp(0x37a, 0xde);
Set a Data in parallel port register	outp(0x378, 0xdata_value);
Latch the value in PCI card Data register	outp(0x37a, 0xdc);
Wait 2 ms	
Reset the AS and DS signals	outp(0x37a, 0xde);

Example, On-Off Software Control

Using DOS "Debug" the following instruction will turn the board on and off. This example assumes that JP15 is installed enabling the PCIBX as board 1 in the system and also assuming using LPT1 set at 0x378.

Commands to turn the PCIBX ON

o 37a de	set LPT port to write mode
o 378 63	set address for global register
o 37a d6	strobe address
o 37a de	return strobe
o 378 01	set data to global register
o 37a dc	strobe data
o 37a de	return strobe
o 378 64	set address for on-off register
o 37a d6	strobe address
o 37a de	return strobe
o 378 00	set data to turn the board on
o 37a dc	strobe data
o 37a de	return strobe

Commands to turn the PCIBX OFF

o 37a de	return strobe
o 378 64	set address for on-off register
o 37a d6	strobe address
o 37a de	return strobe
o 378 01	set data to turn the board off
o 37a dc	strobe data
o 37a de	return strobe

Sample Code

For example code, please see the PCIBX example code document located at
http://www.getcatalyst.com/pcibx_examplecode.pdf

AC Characteristics

For the AC characteristics diagrams see the PCIBX AC Characteristics document located at
http://www.getcatalyst.com/pcibx_acchar.pdf

Hot Swapping Utilities

Features

- Hot Swap PCI Boards Under Test
- Reload configuration space data without rebooting the computer.
- Automate board testing for production applications
- Software control of Extenders, for hands off power cycling of Unit Under Test
- View & change configuration registers.

Overview

The purpose of this document is to provide the user with the knowledge and application of Hot Swap utility software and extender cards for purposes of swapping PCI cards while the system power stays on. These utilities will allow the user to perform various functions with the Catalyst Enterprises, PCI Active extenders. The software allows the user to read, save and reload the configuration space data and allow the user to control the power of to the UUT during testing via the test program.

Utility Programs

1. **PCIUD:** This DOS program allows the users of MS-DOS to read, save and reload (after the BIOS has already configured the UUT at boot up) the configuration space data for PCI Devices. This program is useful if the user needs to swap out the UUT, and continue to test the UUT, in MS-Dos. Please note that the configuration space data for each device is slot specific. For more details please refer to the PCIUD document located on our website http://www.getcatalyst.com on the Documents page.

2. **PCIUW:** This Windows program allows the users of Windows 95/98/ME and Windows NT/2000/XP, to read, save and reload (after the BIOS has already configured the UUT at boot up) the configuration space data for PCI Devices. This program is useful if the user needs to swap out the UUT, and continue to test the UUT, in Windows. Please note that the configuration space data for each device is slot specific. For more details please refer to the PCIUW document located on our website http://www.getcatalyst.com on the Documents page.

3. **PARALLEL:** This program allows the user to control the ON/OFF of the PCIBX extenders via the Parallel Port, under Windows only. This program is useful when the user wishes to automate the power cycling of the PCIBX. (The parallel port is used to control the On-Off power of the extenders to minimize the loading effect on the PCI Signals to UUT). For more details please refer to the Parallel document located on our website http://www.getcatalyst.com on the Documents page.

4. **Driver file for Windows NT/2000/XP:** This driver is required for user of Windows NT/2000/XP. This driver provides a software interface between the Windows NT/2000/XP Operating System and the computer's Parallel Port.

To Get Started Using the Hot Swapping Software

> **NOTE:**
>
> Please note that the utility programs provided here only read and write the configuration space data to UUT and do not actually assign these parameters.
>
> On system power up the BIOS has to do the assignment and initialization of the configuration registers before the utility programs may be used.

At Power Up

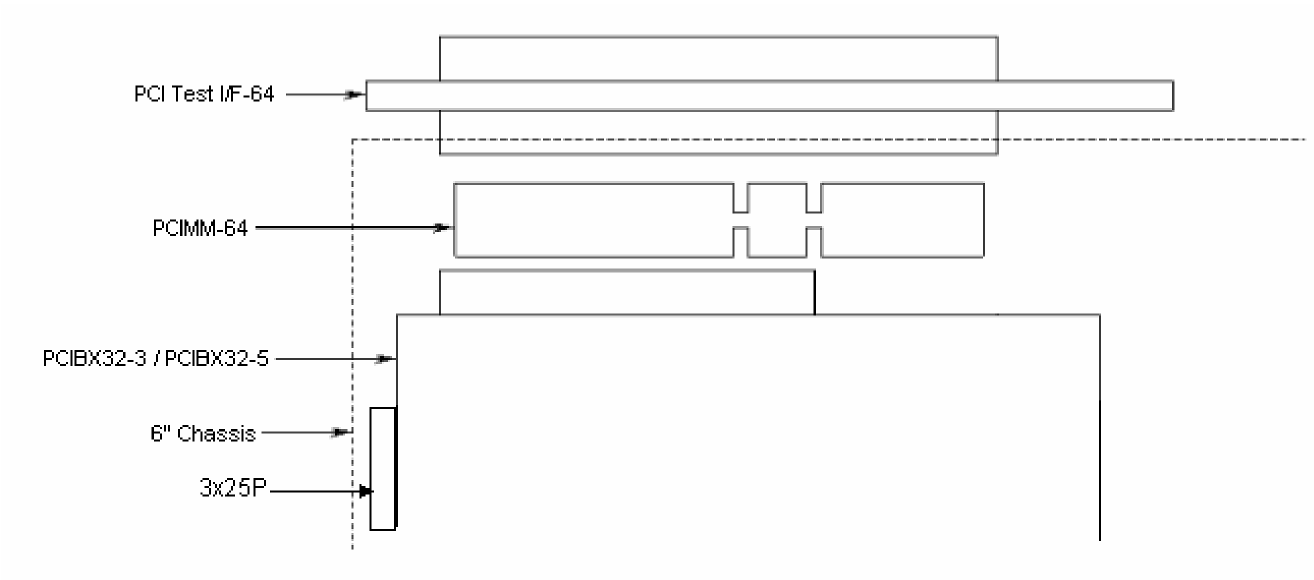
Before the software in this package can be used, the following steps must be performed:

1. Power Down the Computer, remove the cover, and install the PCI Extender in a PCI Slot.
2. Install the UUT on top of the extender and be sure that the On-Off switch on the extender is in the On position.
3. Power on the computer and allow the system to go through boot.
4. When the computer has finished booting, verify that the UUT is working properly by executing your application.
5. If the UUT is working properly, you can proceed using the software provided in this package, please see the section on Operating Instructions for PCIUW or PCIUD.
6. If the UUT is not working properly, refer to the troubleshooting guide section of this document.

Production Automation

PCI Test I/F Package

- Hot Swap up to 2 UUT boards on an enclosed system
- Low cost, easy to replace Connectors
- Designed to be used with the PCIBX.
- May be used in test environments where it is not desirable to leave the PC Chassis open.
- LEDs provide visual indication of UUT power.
- Easy automation of the power up and power down cycles, through software control.
- Minimizes the extender board connector wear-out.
- This fixture is designed for a 6" high PC Chassis, the user must cut a hole in the top cover of the chassis. This fixture will connect to the installed PCIBX extenders, via a provided adapter PCIMM. After the fixture is installed the PC cover may be installed again.



Troubleshooting Guide

UUT works when plugged directly on the motherboard, but does not work when plugged on top of a PCI Extender.

Assuming the PCI extender is in good condition and has not been damaged, this condition occurs on motherboards where the IDSEL line is connected to an address line through a resistor larger than ~ 51 ohms. To verify this move the extender and UUT to another machine with a different type of motherboard, if the UUT works on the second system, the problem is the IDSEL line on the first system. You can also find the resistor for the IDSEL and measure it by an Ohmmeter. This resistor is usually right next to the IDSEL pin next to each connector.

UUT stops working after cycling the power switch of the extender, but when the PC is booted with the UUT on top of the extender, the UUT works fine.

The reason the UUT stopped working, is that the UUT has lost the configuration data when the PCI Extender was powered down. To solve this problem you must use the PCIUD or PCIUW software to read, save and reload the configuration data.

Computer crashes when the extender power switch is cycled OFF and then ON, with UUT installed in top connector of extender.
This condition can occur if any of the following conditions exist:

A. Devices on the UUT require a special timing sequence at the time of power up,

   Check the devices on the UUT to determine if it contains a PCI Controller or other Bridge Chips. If it does, install a 22 uF Capacitor between Pin 3 of U13 and GND. This capacitor will slow down the time between when the +5V goes high and the time the Chip enable is driven low.

B. Some of the control signals of the PCI device on the UUT may be noisy or have glitches during power up. This may be corrected in most cases by providing pull up on these signals. PCIBX has these pull ups but other extenders do not.

   With the UUT installed on top of the extender use a scope to check the signals SERR#, DEVSEL#, LOCK#, FRAME#, TRDY# and STOP#, as the extender power switch is cycled, see if any of these signals spike below 2V and then return to 3.3V.

C. The extender is damaged.

   Several different UUT cards may be tested on an extender to see if all cards cause a system crash (which points to the extender) or the problem is depended on any specific type of UUT.

Computer crashes when the extender power switch is turned OFF.

A. This can occur if the ICs on the extender card have been damaged and have internal leakage, This leakage can cause some of the signals to be shorted to ground, VCC, or to each other.

B. The UUT is being used, by the system software, at the time the extender power switch is turned off the software is looking for the board and system hangs when it can not find the UUT board.

Computer crashes when the extender power switch is in the OFF position and a new UUT is inserted.

This can occur if the extender card is damaged, and some of the signals are not fully turned off.