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PCI Expansion Chassis
User's Guide



4 Slot PCI Expansion

Model: PCI4DRQ
Model: CB4DRQ

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Preface

What's in this Guide

This PCI Expansion Chassis User Guide is designed to accompany a Magma Host Card Installation Guide. This guide provides easy instructions to install your expansion system, verify the installation was completed correctly, and troubleshoot the installation, if necessary. The corresponding Host Card Installation Guide provides similar information for your Magma host card.

This manual is divided into the following parts:

Chapter 1: Provides General Specifications and Parts List.

Chapter 2: Briefly explains Expansion Chassis installation.

Chapter 3: Explains how to verify a successful installation.

Chapter 4: Provides information on installing 3rd Party PCI cards.

Chapter 5: Provides troubleshooting assistance.

Chapter 6: Explains where to get technical support.

Appendix A: Explains the Bus Hierarchy.

Appendix B: .Provides information on FCC Regulatory Compliance.

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Advisories

Five types of advisories are used throughout this manual to provide helpful information, or to alert you to the potential for hardware damage or personal injury. They are **Note**, **Important**, **Caution**, **Warning**, and **Danger**. The following is an example of each type of advisory.



NOTE

Used to amplify or explain a comment related to procedural steps or text.



IMPORTANT

Used to indicate an important piece of information or special “tip” to help you



CAUTION

Used to indicate and prevent the following procedure or step from causing damage to the equipment.



WARNING

Used to indicate and prevent the following step from causing injury.



DANGER or STOP

Used to indicate and prevent the following step from causing serious injury or significant data loss.

Disclaimer: We have attempted to identify most situations that may pose a danger, warning, or caution condition in this manual. However, Magma does not claim to have covered all situations that might require the use of a Caution, Warning, or Danger indicator.

Safety Instructions

Always use caution when servicing any electrical component. Before handling the Magma PCI Expansion chassis, read the following instructions and safety guidelines to prevent damage to the product and to ensure your own personal safety. Refer to the “Advisories” section for advisory conventions used in this manual, including the distinction between Dangers, Warnings, Cautions, and Notes.

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- Always use caution when handling/operating the computer. Only qualified, experienced, authorized electronics personnel should access the interior of the computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.

- Use extreme caution when installing or removing components. Refer to the installation instructions in this manual for precautions and procedures. If you have any questions, please contact Magma Technical Support.



WARNING

High voltages are present inside the expansion chassis when the unit's power cord is plugged into an electrical outlet. Disconnect the power cord from its source before removing the system cover.

Never modify or remove the radio frequency interference shielding from your workstation or expansion unit. To do so may cause your installation to produce emissions that could interfere with other electronic equipment in the area of your system.

When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

1. Turn off the computer and any peripherals

2. Disconnect the computer and peripherals from their power sources to prevent electric shock or system board damage.

3. Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to systems boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.

- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned

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to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.



CAUTION

Do not attempt to service the system yourself except as explained in this manual. Follow installation instructions closely.

Protecting Against Electrostatic Discharge

Electrostatic Discharge (ESD) Warning



Electrostatic Discharge (ESD) is the enemy of semiconductor devices. You should always take precautions to eliminate any electrostatic charge from your body and clothing before touching any semiconductor device or card by using an electrostatic wrist strap and/or rubber mat.

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Magma strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's anti-static packaging material until you are ready to install the component in a computer. Just before unwrapping the anti-static packaging, be sure you are at an ESD workstation or grounded.
- When transporting a sensitive component, first place it in an anti-static container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use anti-static floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.

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Chapter 1 Introduction

General Specifications

The Magma 4 Slot PCI to PCI Expansion System is a general-purpose bus expansion chassis for the Peripheral Component Interconnect (PCI) local bus. The expansion chassis is fully compliant with the PCI Local Bus Specification. The PCI expansion system consists of an expansion bus cable (a shielded, high-speed cable), an expansion interface card, an expansion motherboard and a rack-mount enclosure with a power supply.

Item	Description
Backplane:	4 PCI slots (supports full or short-length PCI cards)
Enclosure:	19" Rack-mount Standard with drive bays
Dimensions:	(2U) 10" W x 2.570" H x 15.144" D
Weight:	5.3lbs or 2.40 kg
Construction	Aluminum and Steel
Cooling:	Two 13.2 CFM fans
Power Supply:	550W Silencer (auto-switching)
Standard Cable:	1-meter
MTBF:	100,000 hours
PCI Bus:	32-bit /33Mhz
PCI Local Bus Specification:	Revision 2.2
PCI Bridge Architecture Spec:	Revision 1.1
Interconnect Bandwidth:	132 MB/sec (Theoretical Max. of PCI 33/32)
Operating Environment:	0º to 50º C Operating Temperature -20º to 60º C Storage Temperature 5% to 85% Relative Humidity, Non-condensing
Operating Systems:	Windows Vista/XP/2000/Server 2003 Mac OS X Version 10.4.x + Linux Kernel 2.6.x +
Warranty:	1 Year Return to Factory
Available Options:	1.5-meter cable (PN: SUBCBL1.5HF) PCI Host Card: for desktops (PN: PCIHIF68) PCI Express Host Card for desktops (PN: PEHIFX1) CardBus Host Card for laptops (PN CBH1F) ExpressCard/54 or 34 for laptops (EC54 or EC34)

Pre-Installation Information

Before using the Magma expansion chassis you should perform the following steps:

- Inventory the shipping carton contents for all of the required parts

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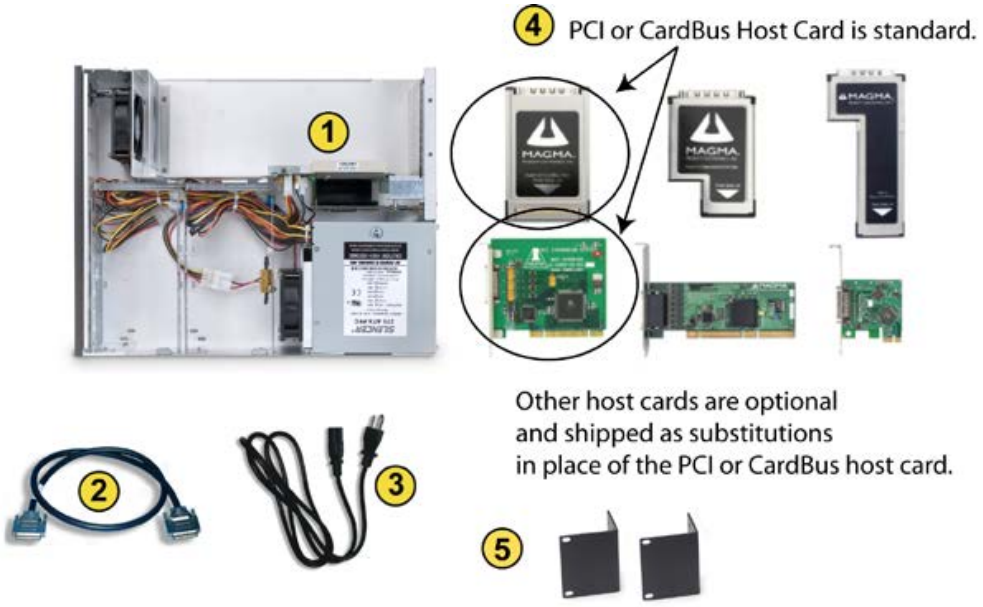
- Gather all of the necessary tools required for installation
- Read this manual

Parts List

The following parts are provided:

	Qty	Item
1	1	Black enclosure containing a 4 slot PCI expansion motherboard and auto-switching power supply (550W)
2	1	PCI expansion cable (1-meter or 1.5-meter)[1]
3	1	Power supply cord
4	1	Host Card (PCI or CardBus is standard)
5	2	Rack-mount brackets
	1	User's Manual

[1]The Magma PCI expansion cable uses a 68-pin connector; however, it is NOT an "off-the-shelf" SCSI cable. The Magma PCI expansion cable is a custom cable designed specifically for PCI Expansion.



Tools Required for Installation

In order to complete the installation of the Magma expansion system you will need a Phillips-head screwdriver.



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Chapter 2 Hardware Installation

The following steps will guide you in completing the hardware installation of your Magma PCI Expansion System.

Electrostatic Discharge (ESD) Warning



All PCI cards are susceptible to electrostatic discharge. When moving PCI cards, it is best to carry the cards in anti-static packaging. If you need to set a PCI card down, be sure to place it inside or on top of an anti-static surface. For more information, see "Protecting Against Electrostatic Discharge" in the Preface.

WARNING



High voltages are present inside the expansion chassis when the unit's power cord is plugged into an electrical outlet. Disconnect the power cord from its source before removing the enclosure cover. Turning the system power off at the power on/off switch does not remove power to components. High voltage is still present.

CAUTION



Before touching anything inside the enclosure, move to an ESD station and follow proper ESD procedure. Failure to do so may result in electrostatic discharge damaging the computer or its components. For more information, see "Protecting Against Electrostatic Discharge" in the Preface.

STOP



If your Magma expansion chassis was not purchased directly from Magma, you must check to ensure that it doesn't contain any pre-installed PCI cards.

Check the rear side of the chassis to see if any PCI cards are visible in the slots. If you see a PCI card, you should continue installation using instructions provided by your dealer. If no separate instructions are available, remove the cover by using instructions in Step 1. Then remove the card as normal. If no PCI card is visible, then continue with the cable installation.

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Before you Begin

The power supply is auto-switching. These means that it will automatically switch to match whatever source power you are using. Since all products ship with a US Standard 115V power cord, you will need to use a power cord adapter for non-US Standard 115V power sources.

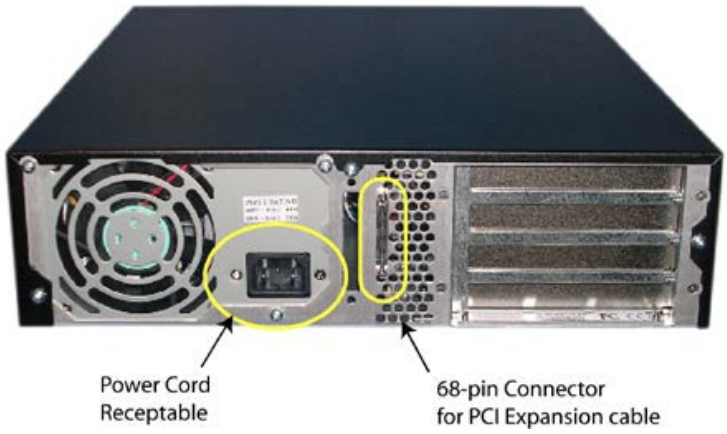
1 Attach PCI Expansion and Power Cable

Carefully position the Magma expansion chassis so that the supplied PCI expansion cable will conveniently reach from the connector of the Host Card to the connector on the back of the chassis. See your Host Card Installation Guide for information on installing your Host Card.

Attach one end of the PCI expansion cable to the Host Card and secure it using the captive thumbscrews on the cable. ***See the Host Card Installation Guide for more information on connecting the cable to the card.***



Carefully route the cable to the rear side of the expansion chassis and attach it to the 68-pin connector, as shown below:



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Secure the cable with the captive thumbscrews. It is important that the cable be attached securely to the connectors at both ends.

Before connecting the power cord, check that the expansion chassis On/Off switch is set to the OFF position. This switch is located on the left side of the chassis.



NOTE

If at all possible, plug all power cords from the Magma expansion chassis and your host computer into a shared power strip, preferably one that has surge and noise suppression circuitry built into it.



Recheck the Installation

Check your installation before powering up the Magma expansion chassis for the first time. Although the power supply has an over voltage protection device built into it, it may not "trip" in time to fully protect a device that has been improperly connected, or whose power cable has been damaged.



Applying Power Correctly

Starting Up:

You must apply power to the Magma expansion chassis BEFORE you power up your computer. This will allow the higher numbered PCI buses in the PCI bus hierarchy to be at a stable state when the host system issues its master power-on bus reset. In systems that perform automatic PCI bus configuration, this will allow the configuration code to recognize the PCI bus hierarchy and any attached devices.



There is an On/Off switch on the front panel, as well as an LED indicator to indicate power status. Verify that the green power indicator is ON.

Shutting Down:

When shutting your system down, it is recommended that you first shut down the computer correctly, and then power down the Magma expansion chassis to avoid ‘computer lock-up’ and potential data loss.

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STOP

DO NOT TURN OFF THE MAGMA EXPANSION CHASSIS UNTIL YOU HAVE SHUT DOWN YOUR LAPTOP COMPLETELY! It can cause a system lockup and loss of any unsaved data.

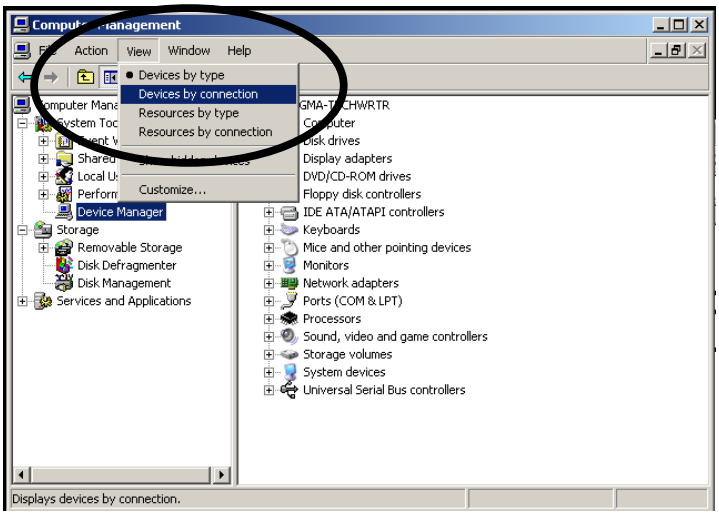
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CHAPTER 3 Verify Installation

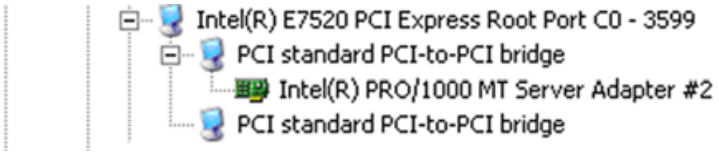
The Magma Host Card is not visible to the Windows' Device Manager or the Apple System Profiler *until the Expansion System has been successfully connected and properly powered on*. Therefore, you will need to connect your Expansion System to the host computer and turn them both on before you can verify the Magma Expansion Chassis installation. See your Host Card Installation Guide for information on how to connect your Host Card. Always power-up your Expansion System by turning on the power to the Expansion Chassis first, followed by your host computer.

Windows

To verify a successful installation on Windows, find the '**My Computer**' icon and "right-click" on it. Then select '*Manage*' from the pop-up menu. Next, click on '*Device Manager*' in the leftmost Computer Management window. Finally, click on the *View Menu* and select *View Devices by Connection.*



Open ACPI (BIOS) → Open PCI Bus→ Click the '+' sign several times until your reach a PCI or PCI Express Root Port with a PCI Standard PCI-to-PCI Bridge beneath it.

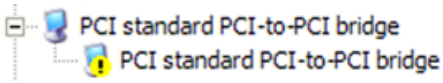


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When installed correctly, you will see three “PCI to PCI Bridges” below your system’s PCIe Controller. Any 3rd Party PCI cards installed in the chassis will appear below one of the PCI-to-PCI bridges.

If everything is OK, then the Magma Expansion System installation is complete. You can now proceed to Chapter 4 for help with the installation of 3rd Party PCI Cards.

If, however, the installation was unsuccessful, you may not see the PCI to PCI Bridge, or it will have a small yellow in front of it.

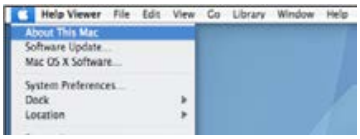


If any of these devices are not displayed as shown above, you should shut down your system (host computer first, then the expansion chassis) and reconnect the cables and reseat the PCI Host Card to ensure that you have a solid connection. Then restart the Magma expansion chassis, followed by the host computer. Next, try to verify the installation again, as shown above. If you are still having problems, review *Chapter 5, Troubleshooting* before contacting Magma Technical Support at (858) 530-2511. Additional troubleshooting help is available in your Host Card Installation Guide and on the web at www.Magma.com.

Mac OS X

When using Mac OS X no additional software or drivers are needed. As long as you are using Mac OS X Version 10.2.2 or newer, the operating system should automatically recognize the Magma expansion chassis.

Select “**About This Mac**” under the Apple Icon



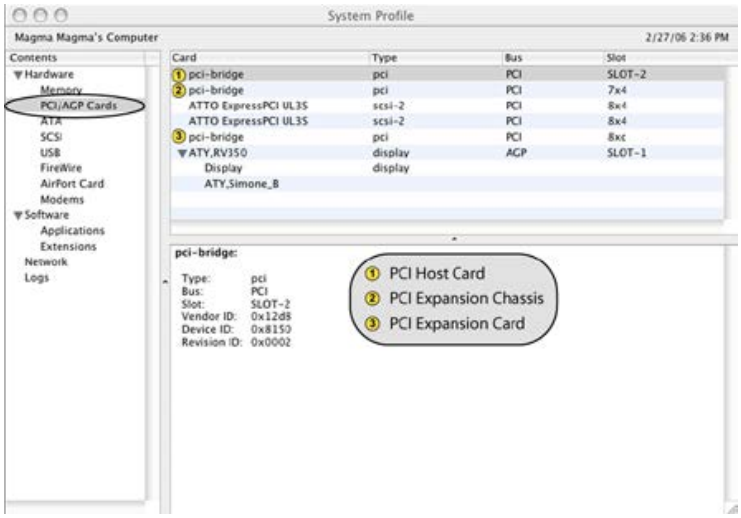
Then click the “**More Info**” button.



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MAC OS 10.3.x & 10.4.x

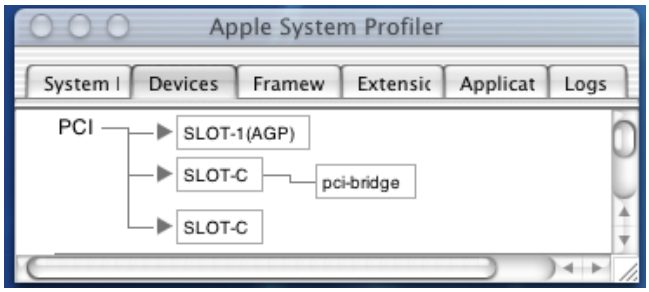
Next, click on the **PCI Card** item. You should see a **pci-bridge** device listed under PCI as shown below:



Any PCI Cards you install in the expansion chassis will appear behind the **pci-bridge** device.

MAC OS 10.2.x

Next, click on the **Devices** tab. You should see a **pci-bridge** device listed under PCI as shown below:



Any PCI Cards you install in the expansion chassis will appear behind the **pci-bridge** device.

If any of these devices are not displayed as shown above, you should shut down your system (computer first, then the expansion chassis) and reconnect the cables and the PCI expansion host card to ensure that you have a solid connection. Then restart the Magma expansion chassis followed by the computer. Next, try to verify the installation again, as shown above. If you are still having problems, contact Magma Technical Support at (858) 530-2511.

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Chapter 4 Install 3rd Party PCI Cards

This chapter provides information on how to install 3rd Party PCI cards into your Magma expansion chassis. More details on the installation of individual cards are provided by the card's manufacturer. This chapter is provided as a simple guide to help you install your PCI cards in the chassis.

For the purpose of installation, the Magma expansion chassis functions exactly as a standard desktop computer chassis. Always follow the manufacturer's instructions for installing their card on a desktop computer.

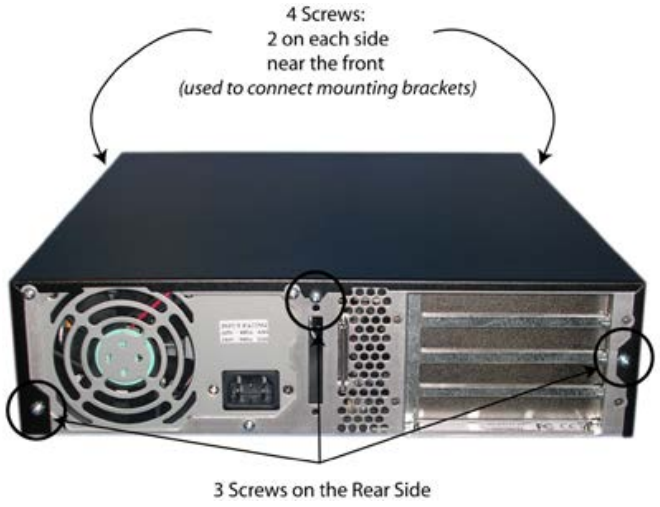
IMPORTANT

Important

We will provide reasonable technical support with 3rd Party PCI cards. However, if you have verified a successful installation of the Magma expansion system (as defined in *Chapter 4*), but experience difficulty installing your 3rd Party PCI cards, the PCI card manufacturer should be able to provide the best support.

1 Remove PCI Expansion Chassis Cover

Seven (7) screws retain the cover on the expansion chassis. Three (3) are located on the rear of the unit with four (4) more are located on the sides – 2 on each side. Remove all of these screws to open the enclosure.



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Slide the enclosure cover backwards, disengaging it from the guides at the front of the enclosure, by firmly grasping the rear cover lip over the card IO area and pulling the cover backward about ¼" and then lifting the cover off.



CAUTION

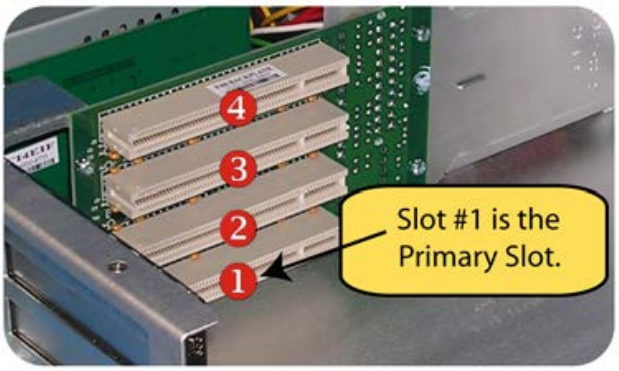
When replacing the enclosure cover, be sure that the front edge guides on the cover engage the inner lip of the enclosure.

2 Install PCI Cards in PCI Expansion Chassis

CAUTION

When installing PCI cards or hard drives, please ensure that the input current rating specified on the AC input label is not exceeded.

Slot ordering in the 4 Slot PCI Expansion chassis should begin with the bottom slot – identified in this graphics as 1.



Generally, when installing 3rd Party PCI cards in the Magma expansion chassis, it should make no difference which PCI slot you place your cards in, unless specified by the card manufacturer.

Install PCI cards following PCI card manufacturer's recommendations. Some PCI card manufacturers recommend that you install their software driver(s) prior to installing the hardware. If this is the case, you should install their driver before you connect and power up the expansion chassis.

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Make sure that all PCI cards are fully seated in their connectors. When correctly seated in its connector, you will notice a firm resistance when you pull up gently on the card. To keep the cards in place, secure them in the enclosure with their retaining screws (supplied with the Magma expansion chassis).

IMPORTANT



The sheer number of PCI cards and device drivers available makes it impossible for Magma to fully test and certify all available PCI cards for use in the Magma expansion chassis. Our best advice to you in this regard is to insist on full PCI Specification compliance from your card and system vendors. Cards and systems should be at least PCI Specification Revision 2.0 compliant or better. Compliance in your system motherboard, PCI cards, and console firmware (or BIOS) is your best assurance that everything will install and operate smoothly.

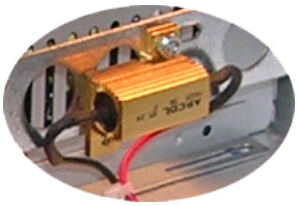
Not all PCI cards are as "well-behaved" as they should be. Sometimes simply moving a PCI card that is having a problem to a different slot, or reordering your cards in their slots, will alleviate "behavior" problems.



Install Hard Drive(s)

Your Magma 4 Slot PCI expansion chassis provides drive brackets for up to four hard drives. If you want to install a hard drive to your system, a PCI hard drive controller card can be installed into one of the available PCI slots.

To install a hard drive, you must remove the 5V Load Resistor that has been mounted in the hard drive bay. The Load Resistor is installed to allow you to use 3.3V PCI cards without causing power problems.



If you place a hard drive in your Magma expansion chassis, the hard drive will automatically provide the 5V resistance required and the Load Resistor is not required. It can be removed by removing the screw and disconnecting the power cable.

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DANGER



The Load Resistor is 

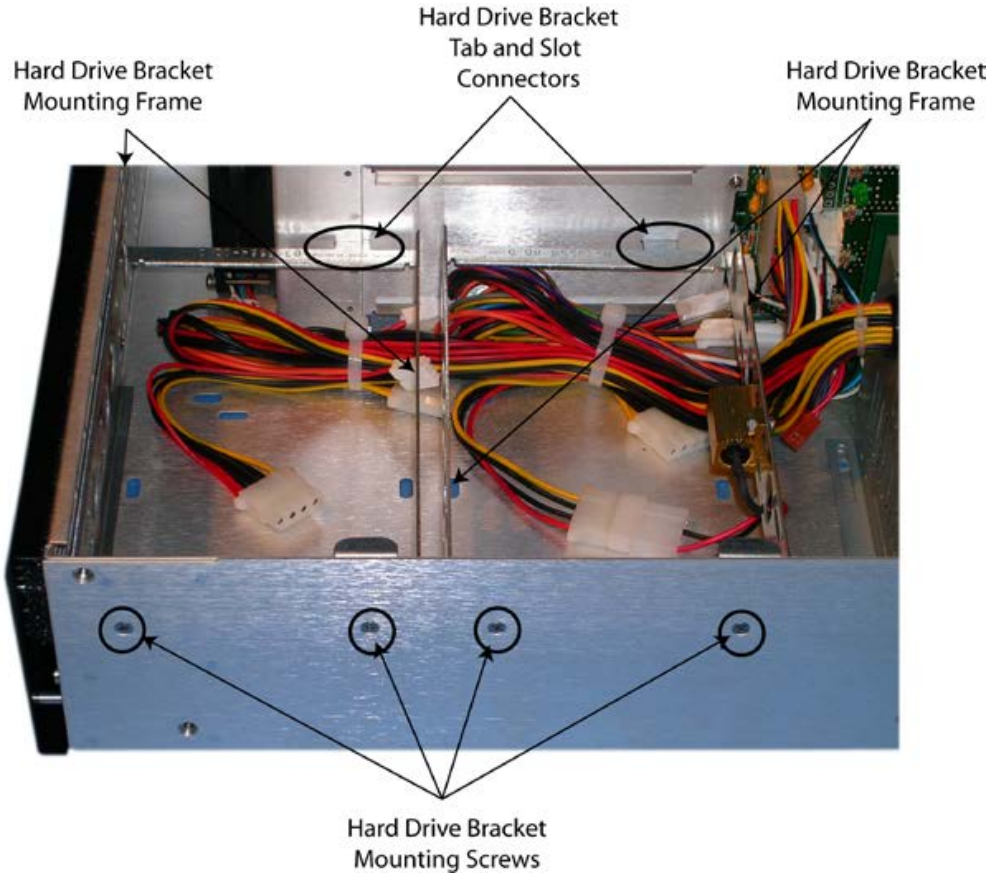
and must NOT BE TOUCHED unless the system has been shut off for a long period of time. Use caution when touching the Load Resistor.

NOTE



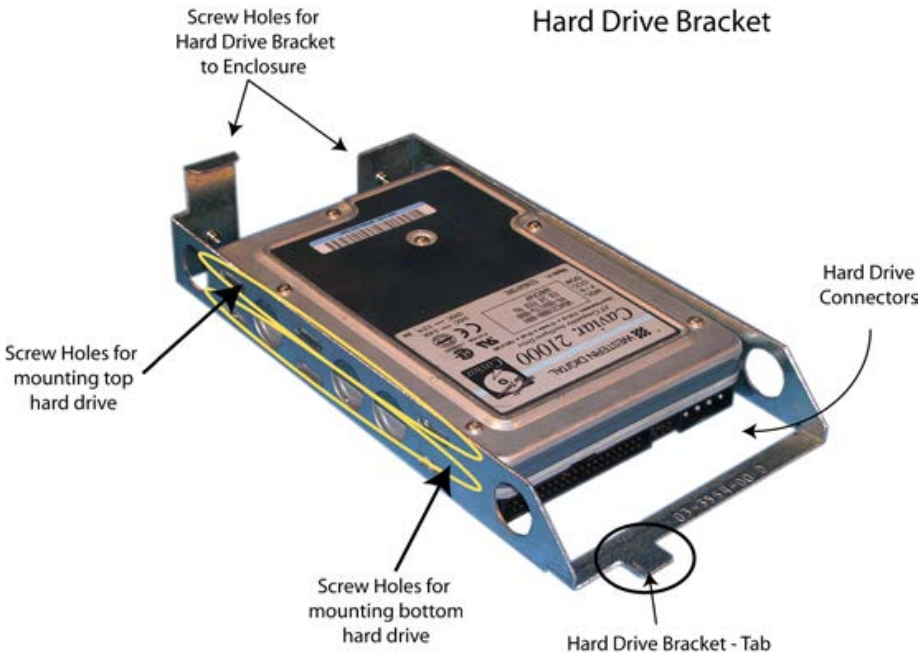
After you remove the 5V Load Resistor, it is a good idea to place it in an ESD envelope and save it. If you ever decide to remove the hard drive(s), you will need to reinstall the 5V Load Resistor to ensure your Expansion chassis continues to work properly.

After you have removed the 5V Load Resistor, you need to remove the hard drive bay brackets to allow for an easy hard drive installation. Simply remove the screws on the side of the enclosure that retain the drive bracket(s) that you wish to remove. Remember, each hard drive bracket is capable of supporting two hard drives.

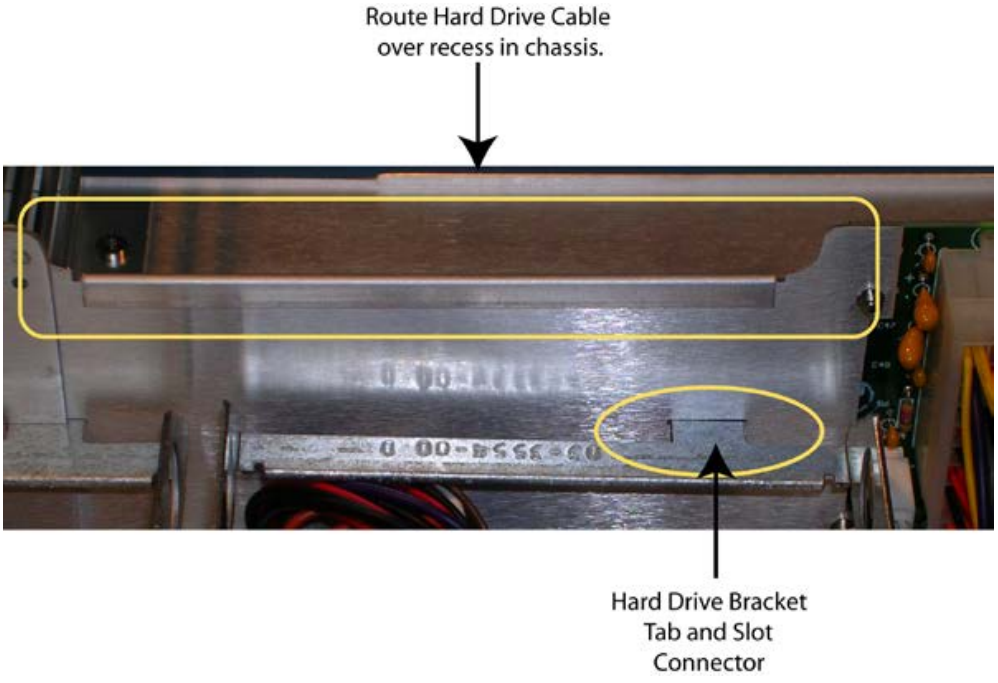


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Once the hard drive brackets have been removed, mount your hard drive(s) to the hard drive bracket as shown. You have two (2) rows of mounting holes in each mounting bracket. This allows you to mount two hard drives with each hard drive bracket.



Next, thread the hard drive ribbon cable over the metal bracket that the backplane is mounted on as shown below.



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Finally, reattach the hard drive brackets to the chassis by inserting the “Tab” on the hard drive bracket into the “Slot” in the metal bracket that the backplane is mounted on and replacing the screws. Hard drives require power. Make sure to connect one of the white power supply tabs to the hard drive. Be sure to also connect your hard drive cables.

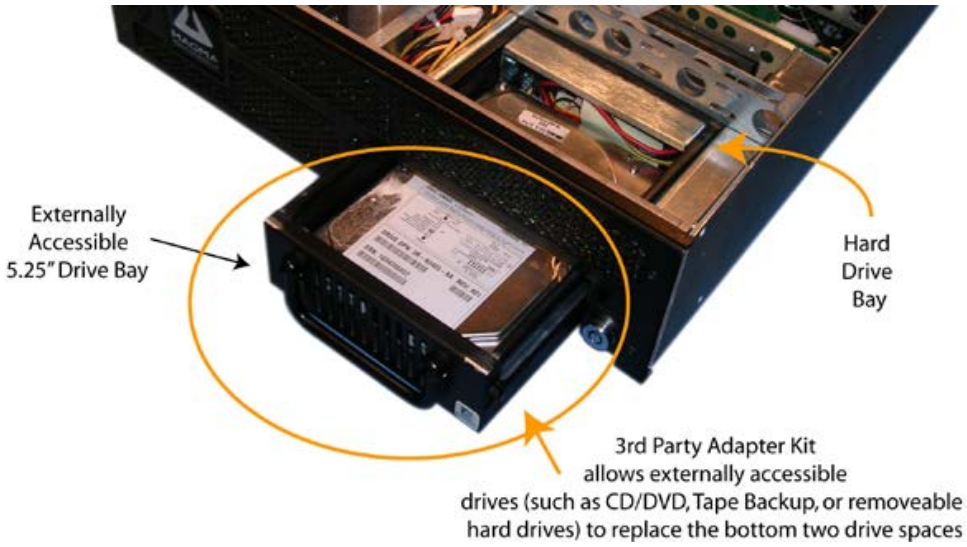
Externally Accessible 5.25” Drive Bay

The 4 Slot Expansion System is designed to allow you to add an externally accessible 5.25” drive. The chassis has a removable panel in the lower right front that opens up access to the two lower drive bays. With the addition of a 3rd Party adapter kit, you can easily add a DVD burner, a tape backup system, or removable hard drive to your Expansion System.



IMPORTANT

The 4 Slot PCI expansion chassis is designed to hold 4 hard drives or 2 hard drives AND 1 externally accessible drive, such as a CD/DVD burner, an internal tape backup system, or removable hard drive.



The 3rd Party adapter kit is easily installed by removing the front panel, sliding it below the hard drive brackets, and securing it to the bottom of the chassis using the screw holes already provided.

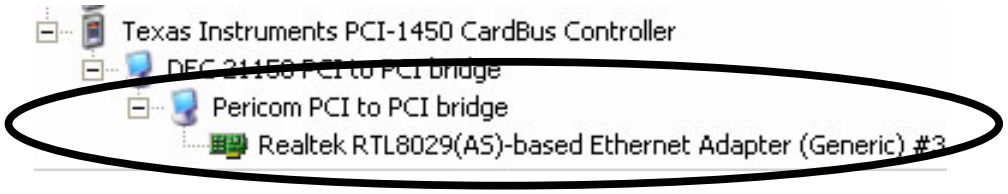
Sorry, this adapter kit is not available through Magma.

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4 System Should Be Up and Running

Apply power to the Magma expansion chassis first, then power up the computer.

Use the procedures detailed in *Chapter 4* to confirm the card installation(s) in the Windows Device Manager or Apple System Profiler.



5 Finishing Touches

After your system is working properly, replace any empty slots with slot covers, and replace the host computer cover and the expansion chassis cover.

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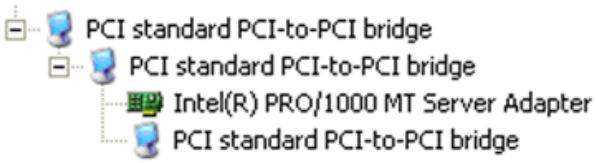
Chapter 5 Troubleshooting

Locate the Problem

If you are having trouble with the Magma expansion system, verify that all cards are seated properly and all cables are connected properly. Be sure you followed the instructions in earlier sections of this User Guide. Always remember to power **On** and **Off** correctly when rechecking and testing your installation. If you are still having problems, try these simple troubleshooting steps.

- My Computer Can't Find the PCI Expansion System
- When Nothing Works
- My PCI Card Doesn't Work

The PCI to PCI Expansion System is correctly displayed as a **"PCI standard PCI-to-PCI bridge"** (Windows Device Manager) and as a **"pci-bridge"** (MAC Apple System Profiler). When connected and functioning correctly, this Expansion System will be displayed as follows:



Windows

Card	Type	Bus	Slot
pci-bridge	pci	PCI	SLOT-2
pci-bridge	pci	PCI	7x4
ATTO ExpressPCI UL3S	scsi-2	PCI	8x4
ATTO ExpressPCI UL3S	scsi-2	PCI	8x4
pci-bridge	pci	PCI	8xc

MAC

If this is not what you see when you verify your installation, the following troubleshooting steps may help you to locate and resolve your installation issues, without having to call Technical Support.

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My Computer Can't Find the PCI Expansion System

If the expansion system is not visible in your Windows Device Manager or your Apple System Profiler at all, you will need to turn off your computer (first) and then the Magma expansion chassis (second) and test all cords and cables to ensure you have everything connected correctly. If everything seems to be connected correctly, and you are sure you have applied power correctly (power up expansion chassis first and then the computer), then try these additional troubleshooting steps:

- Double-check the PCI host card to ensure it is inserted correctly in a PCI slot.
- Try moving the PCI host card to a different PCI slot.
- Check for a bad cable or connection. Try another expansion cable, if you have one.
- If the expansion system is still not visible after trying all of the above steps, go to *Chapter 6* to see about getting additional help.

Windows

If the PCI to PCI Bridge is now visible, but contains a  in front of it, it has a problem that must be fixed.

To identify this problem, right-click on the line with the  and select "Properties" from the pop-up menu.



Resolve the identified problem or go to *Chapter 6* to see about getting additional help.

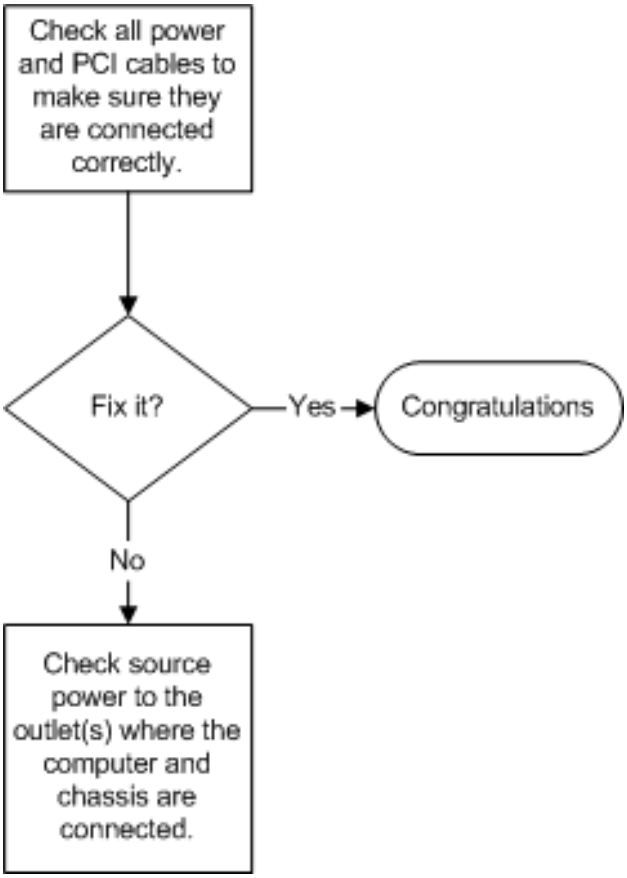
MAC

Go to *Chapter 6* to see about getting additional help.

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When Nothing Works

The following troubleshooting steps will help you when the computer or chassis won't turn on or "nothing seems to work" correctly:





Review Chapters *3 (Verify Installation)* and *4 (Install 3rd Party PCI Cards)* as necessary to verify that you have a valid installation of the Magma expansion system and that you have correctly installed your 3rd Party PCI card(s) and their associated drivers (as required).

If it powers up OK, but nothing works, check the computer's Device Manager or System Profiler to see if the expansion system has been found. If not found, try the troubleshooting steps for *My Computer Can't Find the PCI Expansion System*. If the expansion system is visible, but has a problem, try to resolve the problem (See Note above). If that fails, go to *Chapter 6* to see about getting additional help.

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My Computer Hangs During Power Up

If your computer “hangs” while being turned on and you can’t even start, follow these simple steps to try to fix this problem:

1. Shut off the computer (first) and then the Magma expansion system and verify that all cards and cables are installed correctly. Reapply power first to the expansion system and then to the computer.

2. If it still hangs, remove all 3rd Party PCI cards and try booting up without any cards installed.

    a. If it still hangs, remove the Magma PCI expansion host card from the computer and try booting up without the Magma expansion system attached.

        i. If it boots up OK without the Magma expansion system attached, call Magma Technical Support.

        ii. If it still hangs, the problem is in the computer and not with the Magma expansion system or the 3rd Party PCI cards.

    b. If it boots up OK without any 3rd Party PCI cards installed, try adding only one card and see if it boots up.

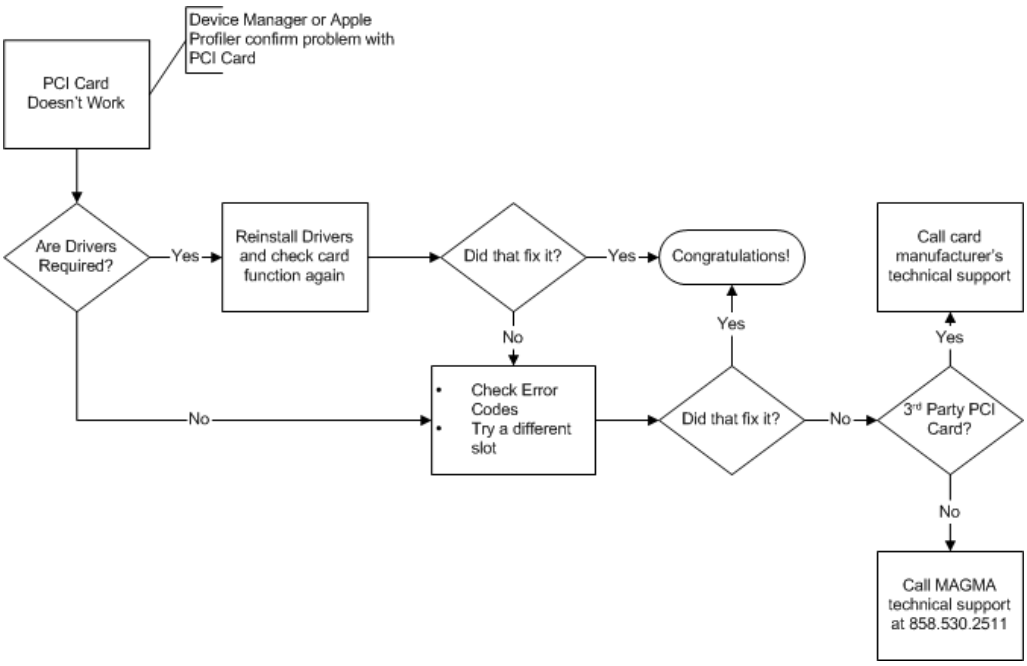
        i. If it boots up OK with one card in it, shut it down (in the proper order, of course) and swap cards. Repeat this until all cards have been tested. If they all test OK, then add them back one at a time until you find the combination that doesn’t work, or you are running fine. If you find a bad card, call Technical Support. If you don’t – congratulations, you fixed it!

        ii. If it still hangs up, try a different card – this one is probably bad (or has driver problems). If the second cards works, troubleshoot the first card. If the second card also fails, call Technical Support.

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My PCI Card Doesn't Work

Follow these simple troubleshooting steps to resolve typical 3rd Party PCI card problems:



The following additional steps might also help when the above troubleshooting steps for fail to resolve your problem:

1. Shut down the computer followed by the Magma expansion chassis

2. Remove the PCI card displaying a problem

3. Replace the "problem card" with a *simple* PCI card, such as an Ethernet card that has drivers built into the operating system. *(Using this "type of card" will avoid any future questions about drivers possibly being installed incorrectly.)*

4. Turn on the Magma expansion chassis, and then turn on the computer.

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Windows

5. Next, open the Device Manager (View by Connection selection).

   If the  is gone, the problem is with the 3rd Party PCI card or the card drivers. You should go to the *Windows Error Codes* section of this chapter to learn how to troubleshoot using error codes.

   If the  is still visible, the problem may be with the Magma expansion system. Please contact Magma Technical Support for further guidance and/or a replacement product.

   If an error shows on any of the PCIe to PCI Bridge Connections, call Magma Technical Support immediately.

MAC

5. Next, open the Apple System Profiler and if the PCIe to PCI Bridge Connections and the 3rd Party PCI card(s) are now correctly visible.

Support for 3rd Party PCI Cards

Magma will provide reasonable technical support to with 3rd Party PCI cards. However, if you have verified a successful installation of the Magma PCI Expansion System (as defined in *Chapter 4*), but experience difficulty installing your 3rd Party PCI cards, the PCI card manufacturer may be able to provide the best support.

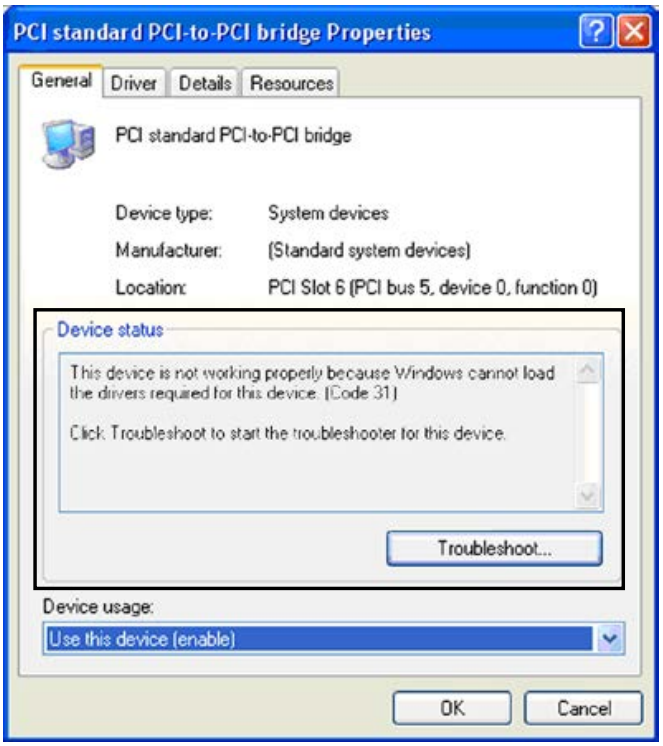


The Magma PCI Expansion System is designed to function exactly like your desktop computer. This means that you should follow the PCI card maker's instructions for installation on a Windows or Mac computer as if the expansion chassis WAS the desktop computer. When correctly installed, there is no difference to the operating system, removable cards, or most software.

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Windows Error Codes

If you are having a problem with one of your devices, and the Device status box shows a Windows Error Code, refer to the following list of error codes for guidance:



Error Code	Description/Action
10	**This code indicates that there is a problem with the 3rd Party PCI Card driver.** If necessary, contact the PCI Card's manufacturer for updated PNP compatible drivers. If all else fails, contact Magma Technical Support for further assistance.
12	**On the Bridge:** If you receive error code 12 on the first PCI to PCI Bridge, call Magma Technical Support. **On the PCI Card**: This usually means the memory, I/O, or prefetch is more than has been allocated. Call Magma Technical Support.

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Error Code	Description/Action
28 (PCI Card)	The driver for the PCI Card is not installed on your system. Reinstall the PCI Card driver following the manufacturer's instructions. If that fails to fix the problem, call the card manufacturer for new drivers.
1	The PCI host card or expansion chassis are not working correctly. Reinstall the PCI host card into the computer's PCI slot and recheck all cable connections. If the error code remains, try another PCI slot. If you still have the error, call Magma Technical Support.
Other Codes	For all other error codes, call: **On the PCI to PCI Bridge:** Magma Technical Support **On the PCI Card:** Card Manufacturer's Technical Support, after first verifying that the Magma expansion system is installed properly.

If you are still having problems, contact Magma Technical Support for more help.

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Chapter 6 How to Get More Help

Frequently Asked Questions (FAQ)

You can visit the Magma Technical Support FAQ pages on the Internet at:

www.magma.com/support/

Contacting Technical Support

Our support department can be reached by fax at (858) 530-2733 or by phone at (858) 530-2511. Support is available Monday through Friday, 8:00 AM to 5:00 PM PT. When contacting Magma Technical Support, please be sure to include the following information:

1) Name
2) Company Name
3) Phone Number
4) Fax Number
5) Email Address
6) Model Number
7) Serial Number
8) Computer Make
9) Computer Model
10) Operating System and Version
11) Make/Model of PCI cards in expansion chassis
12) Detailed description of the problem

You can also visit our web site at:

www.magma.com/support/

For a quick response, use the Technical Support and RMA Request Form available in the Support Section of the website. Simply complete the form with all required information. Please make sure that your problem description is sufficiently detailed to help us understand your problem.

> *For example: Don't say "Won't boot up." Do say "Tried all the steps in the Troubleshooting Section and it still won't boot up."*

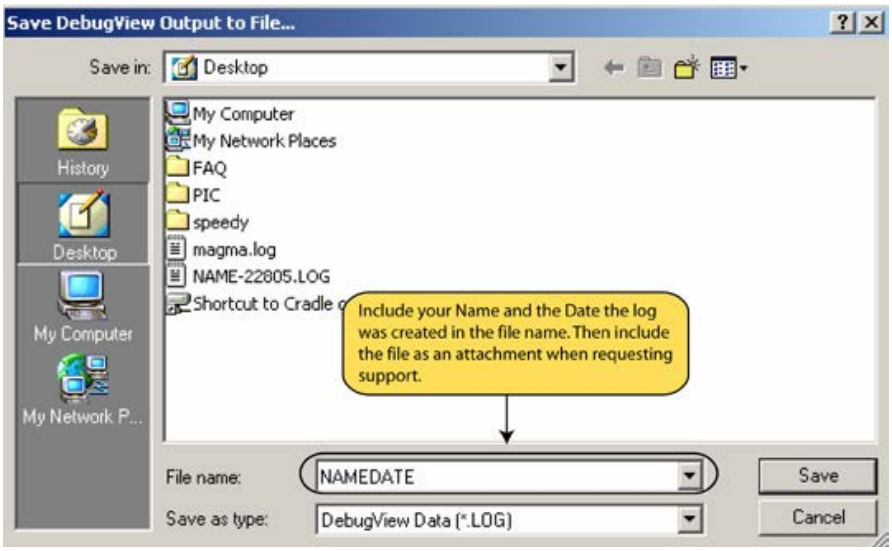
For faster diagnosis of your problem, please run the two utility programs described in the following sections and include the diagnostic files they generate with your email.

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Magma Debug Utility

Occasionally, Magma Technical Support may request Windows users to produce and email a Magma debug log file to help them resolve your problem. This file should be included as an attachment when submitting a request at www.magma.com/support.

1. Locate a file called **dbgview.exe** on the Magma CDROM.
2. Double-click on the file **dbgview.exe**
3. While the **dbgview** screen is open, locate and double-click on a file called **dump.exe** on the Magma CDROM.
4. Switch back to the **dbgview** screen, which is now filled with data.
5. Save this file and submit it as an attachment when submitting a Technical Support request.



Use the “Save As Type” drop-down arrow to select a file type of (*.LOG).

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PCIScope Software Utility

PCIScope is a powerful tool for Windows users. It was designed by a Germany company called APSoft. This software utility is a valuable resource to explore, examine and debug the PCI subsystem of your computer. It was made to fit the requirements of the most demanding users, especially engineers, programmers, and system administrators, and to integrate all advanced functions and tools into one product. Please visit www.tssc.de for more information about the capabilities of **PCIScope** and other utilities offered by APSoft.

An evaluation version of **PCIScope** is available for download at www.tssc.de. (You can purchase an inexpensive license from APSoft for use beyond the evaluation period.)

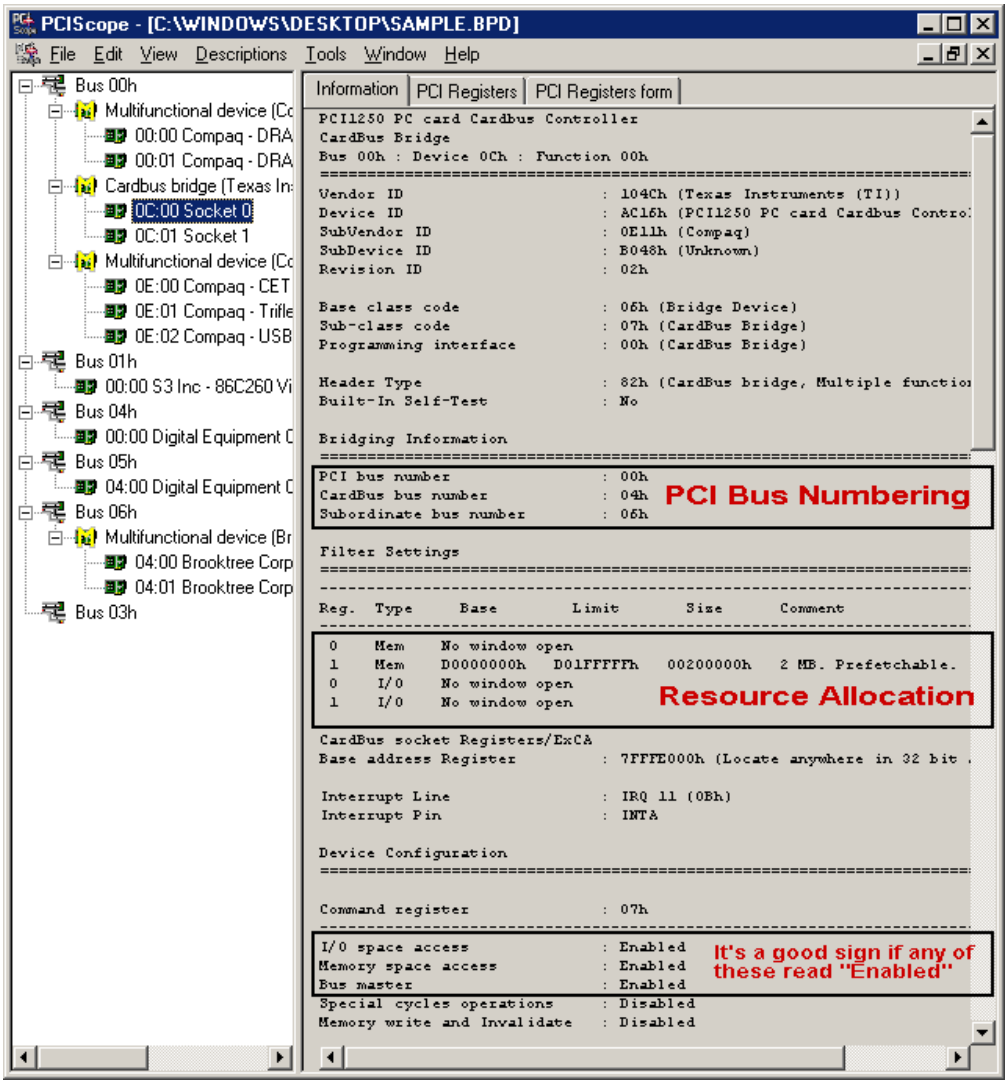
PCIScope has proven to be extremely useful when verifying and debugging configurations involving the Magma PCI Expansion Systems under any Windows platform.

PCIScope can provide information to you and our Technical Support Group such as PCI Bus Numbering, Resource Allocation, and other information that may prove useful when debugging expansion chassis or PCI card problems.

If you are experiencing problems setting up your system, you should run **PCIScope** before contacting the Magma Technical Support Group.

With the Magma expansion chassis powered up and connected to your computer, load and launch the **PCIScope** application. The **PCIScope** Program will be installed on your computer and a window similar to the one shown below will appear. (The example was taken from a Compaq Armada 7400)

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You should save this data as a file on your computer. Please include your name and date as part of the file name with an extension of ".bpd." Then submit a technical support request using our on-line support form.

Go to http://www.magma.com/support.asp and select Technical Support Request Form.

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Returning Merchandise to Magma

If factory service is required, a Service Representative will give you a Return Merchandise Authorization (RMA) number. Put this number and your return address on the shipping label when you return the item(s) for service. **Magma will return any product that is not accompanied by an RMA number**. Please note that Magma WILL NOT accept COD packages, so be sure to return the product freight and duties-paid.

Ship the well-packaged product to the address below:

MAGMA RETURNS DEPT.
RMA # _____
9918 Via Pasar
San Diego, CA 92126
USA

It is not required, though highly recommended, that you keep the packaging from the original shipment of your Magma product. However, if you return a product to Magma for warranty repair/ replacement or take advantage of the 30-day money back guarantee, you will need to package the product in a manner similar to the manner in which it was received from our plant. Magma cannot be responsible for any physical damage to the product or component pieces of the product (such as the host or expansion interfaces for PCI expansion chassis) that are damaged due to inadequate packing. Physical damage sustained in such a situation will be repaired at the owner's expense in accordance with Out of Warranty Procedures. Please, protect your investment, a bit more padding in a good box will go a long way to insuring the device is returned to use in the same condition you shipped it in. Please call for an RMA number first.

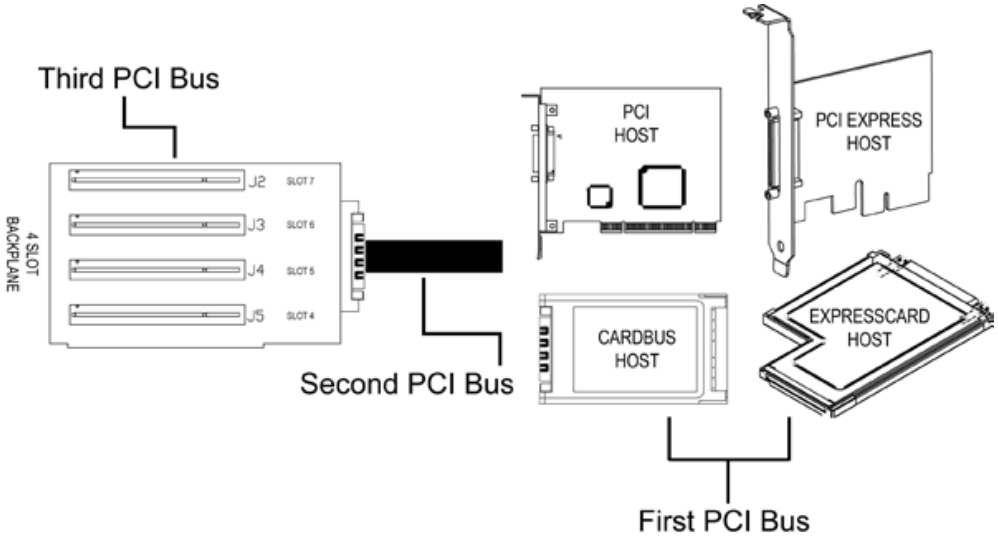
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Appendix A Bus Hierarchy

Bus Hierarchy

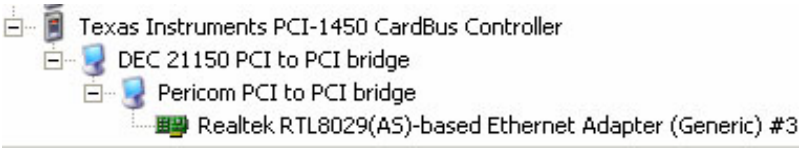
The following figure is representative of the PCI Bus hierarchies for the 4 Slot PCI Expansion System. This figure pictorially conveys the overall PCI bus topology of the system.

4 Slot Topology



In general, we do not know what the actual Bus numbers are. We only know how they increment starting from the host card.

The key point in the figure of the 4 Slot topology is that the connecting cable between the host card and the 4 Slot backplane is actually a PCI bus itself. This is represented in the Windows Device Manager as shown below:





NOTE

All PCI cards installed in the PCI Expansion chassis will appear on the Third PCI Bus behind the PCI Bus that the host card is installed on. *If you need to know the actual Bus number, right-click on the Bus and select Properties*.

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Appendix B Need More Slots?

Multiple PCI Expansion System Configurations

The PCI Local Bus Specification defines the PCI bus as a *hierarchical bus*, where PCI to PCI Bridges (PPBs) may be used to add "levels" to the PCI bus hierarchy. Because hierarchies are *organized systems arranged into different levels*, you can take advantage of this automatic organizing and layering to expand the number of available PCI slots beyond the number available in your computer's motherboard.

You can easily add two or more Magma expansion systems to your current system in either a "fan-out" or "daisy-chain" configuration. Each of these configurations has advantages and uses. To determine which type of configuration you wish to use, you should first understand a few basic facts:

1. In a desktop computer, the bios enumerates automatically behind PCI bridges. In the Magma configuration, the bios finds the Magma host card in a PCI slot. The bios configures it, and then looks beyond it to find any PCI cards installed in the expansion chassis. The bios then configures the cards and allocates resources. Empty PCI slots are ignored during configuration.



In theory, your computer "should" be able to travel across up to 255 PCI buses to identify and configure all installed PCI cards. Unfortunately, not all computers are created equal. The 255 PCI bus limit is actually a theoretical maximum. The practical limit is somewhat lower, but should still be a fairly large number.



In a desktop computer the bus numbers tend to be lower (0, 1, 2, etc.). Once the bios is finished configuring everything and assigning resources, the Operating System starts loading and activates the PCI cards found.



When adding more Expansion Systems to an existing system, be sure to connect and test them "one-at-a-time." This will allow you to quickly resolve any connectivity, or other, issues right at the start. *DO NOT INSTALL any 3rd Party PCI cards into any system until ALL attached systems are working correctly.*

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2. The 4 and 7 Slot Magma Expansion Systems each add two (2) PCI to PCI Bridges to the PCI Local Bus. The 13 Slot adds three (3) PCI to PCI Bridges to the PCI Local Bus. The 6 Slot adds one (1) bridge. These bridges are the communication paths between the PCI cards and the computer resources. Most computers allow multiple bridges (and thus PCI buses) to be correctly configured. Some computers, unfortunately, place an arbitrary limit on the number of bridge levels that can be traveled during power-on configuration. Your computer “power-on-software” should be PCI Specification 2.1 compliant in order to effectively use a Magma PCI Expansion System. For "fan-out" and "daisy chained" system configurations, where more than one PCI expansion system is being used, you should count all of the bridge levels to your most deeply nested PCI bus to determine the maximum number of bridge levels that must be traveled.

3. For easier understanding, the PCI Local Bus should be viewed as a “Resource Toll road” that runs from the computer CPU (resource home), through the “Toll Booths” (the PCI bridges), to the “Resource Users” (PCI Cards). As in the case of a real Toll Road, the more Toll Booths you have to slow down a “nanosecond” for, the longer it will take you (your data) to get from the PCI Card to the CPU and back again. Under most circumstances the effect cannot even be detected. However, under other conditions, it can be important to know about.

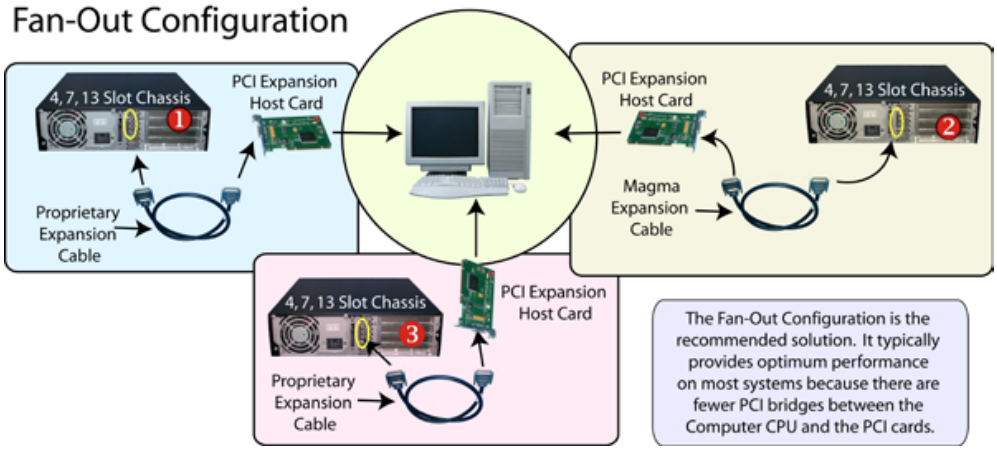
Fan-Out

For reasons described in bullet #3 above, we recommend using a fan-out configuration when you need to add successive PCI expansion systems to the host computer. This addition to the PCI bus hierarchy is at the "peer" level of other existing expansion buses, thus adding "breadth" to the PCI bus hierarchy, since these buses will be at the same hierarchical level within the system configuration.



You may use either PCIe or PCI host cards in your host computer, depending on available slots and your performance requirements. You must ensure that you have the corresponding PCIe to PCI Expansion System, or PCI Expansion System, chassis to connect with your host card and support your desired configuration.

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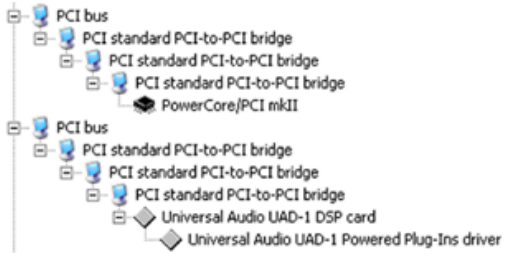
In this configuration, you have fewer "Toll Booths" (PCI Bridges) to pass through; therefore there are fewer opportunities for concern.

Important

For clarification, it is necessary to understand that the amount of latency caused by any PCI Bridge (even those built into a 3rd Party PCI card or the computer motherboard itself) is negligible ("nanoseconds") and will not produce any visible effect on most systems. It is only mentioned here because on a few rare configurations which use some unique PCI cards with special software drivers, the total number of PCI buses that the data must pass through COULD make a difference. See Chapter 5 Troubleshooting for more information if you suspect this could be an issue with one of your specialty PCI cards.

Verify your configuration

Before you start installing your PCI cards *(refer to Chapter 4 Install Cards and Drives for more information)*, you should confirm that everything is in proper working order. Refer to Chapter 3 Verify Installation for guidance in verifying the proper installation of your Expansion System. The following image shows the Windows Device Manager display when a Windows PC has 2 Expansion Systems connected in a "Fan-Out" configuration.



Windows Device Manager with 2 PCI to PCI Expansion Systems Installed in a "Fan-Out Configuration.

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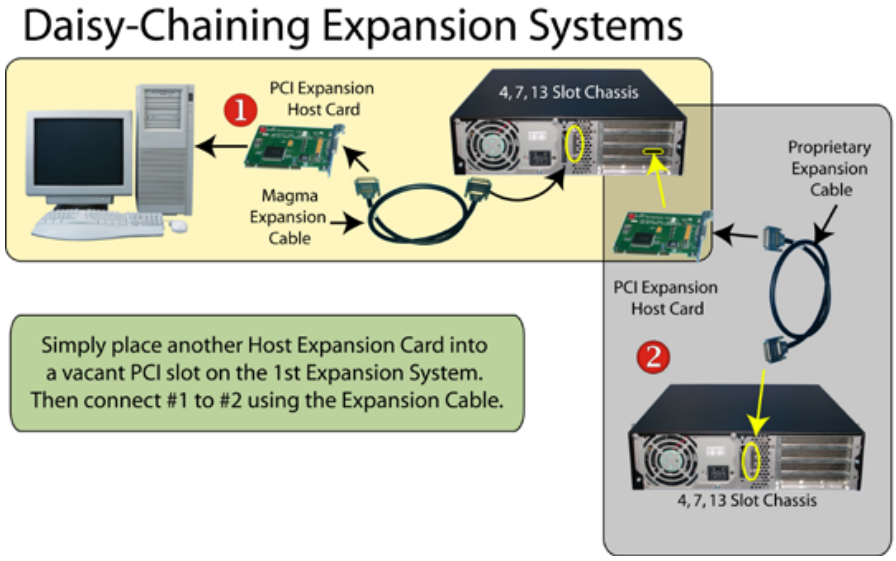
The following image shows the Apple Profiler display when a MAC has 2 Expansion Systems connected in a “Fan-Out” configuration

Card	Type	Bus	Slot
pci-bridge	pci	PCI	bxc
pci-bridge	pci	PCI	7x4
pci-bridge	pci	PCI	ax4
pci-bridge	pci	PCI	SLOT-2
pci-bridge	pci	PCI	8xc
pci-bridge	pci	PCI	SLOT-3
pci110b,4	Other Multimedia	PCI	bx4
pci1057,6		PCI	8x4

MAC System Profiler with 2 PCI to PCI Expansion Systems Installed in a “Fan-Out Configuration.

Daisy-Chaining

Recognizing the typical insignificance of the performance variance between the “Fan-Out” and “Daisy-Chaining” configurations, the primary reason for using this one would be limitations on physical space. This could be the number of available slots on the computer motherboard, or a lack of desk or rack space.



In the daisy-chain configuration, successive PCI expansion systems are added to the "end" of the PCI bus hierarchy, which adds "depth" to the PCI Local Bus by increasing the number of PCI Local Bus levels active in the system configuration.

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Verify your configuration

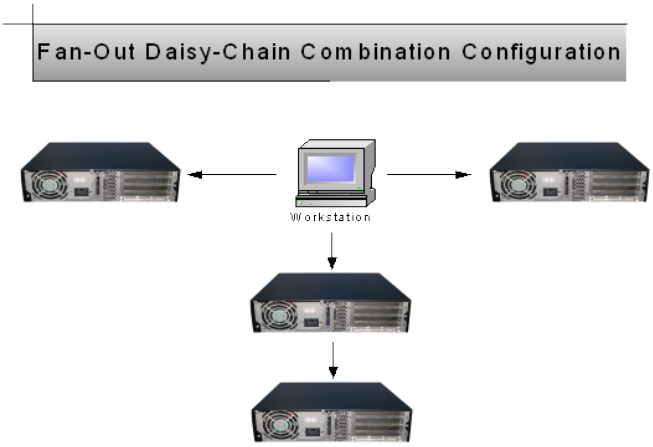
Before you start installing your PCI cards *(refer to Chapter 4 Install Cards and Drives for more information)*, you should confirm that everything is in proper working order. Refer to Chapter 3 Verify Installation for guidance in verifying the proper installation of your Expansion System.

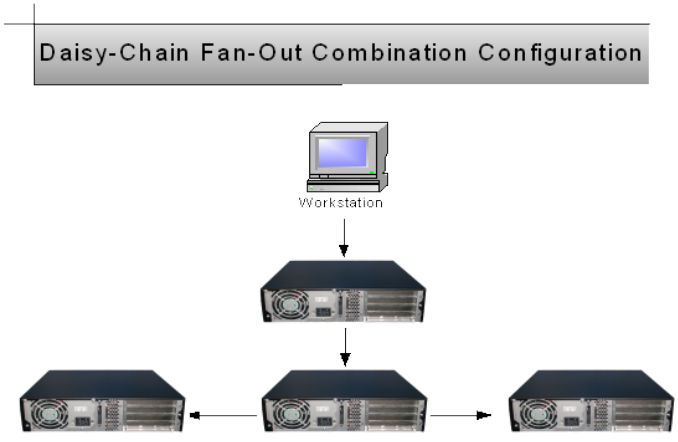


Notice that each Daisy-Chained unit appears in the Device Manager in the reverse order of its place in the configuration.

Combination Configurations

Depending on your business requirements, and your physical space limitations, you can add additional Expansion System in multiple configurations, such as these. These combinations are only limited by the available slots and/or slot types: PCIe or PCI.





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Obviously, you will need to keep an eye on your system performance and make any adjustments that may be required, either to PCI card location or to Expansion System configuration, to obtain maximum performance.

PCI Card Conflicts

If you determine that one PCI card is interfering with the operation of another card, first try reorganizing the cards on the motherboard. Moving the cards around can change the order in which the cards are configured by the system during power-on. This will go a long way toward resolving module conflicts.

Power-On Sequence for Advanced Configurations

As previously stated in Chapter 2 Hardware Installation, it remains necessary to power up ALL Expansions Systems BEFORE you turn on the computer. This will ensure that your power-on software can read all available PCI buses and properly configure all installed PCI cards.

Obviously, the reverse also remains true for shutting your system down. The computer must be shut off BEFORE you attempt to turn off your Expansion System(s).

Troubleshooting Advanced Configurations

When trying to troubleshoot problems with PCI cards in a multiple expansion system configuration, it is vital to correctly determine the nature of the problem. Therefore, the first task is to identify the card or chassis having a problem by using the Windows Device Manager, or Apple System Profiler. Refer to the first part of this Appendix for more information on identifying hierarchical levels in multiple expansion system configurations.

Remember, Fan-Out configurations can consist of both PCIe to PCI Expansion Systems and PCI to PCI Expansion Systems. Whereas, Daisy-Chain configurations will consist only of a PCI to PCI Expansion System, or a PCIe to PCI Expansion System, followed by one or more PCI to PCI Expansion Systems. Only after you have all expansion systems working without any 3rd Party PCI cards should you attempt to install any 3rd Party PCI cards.

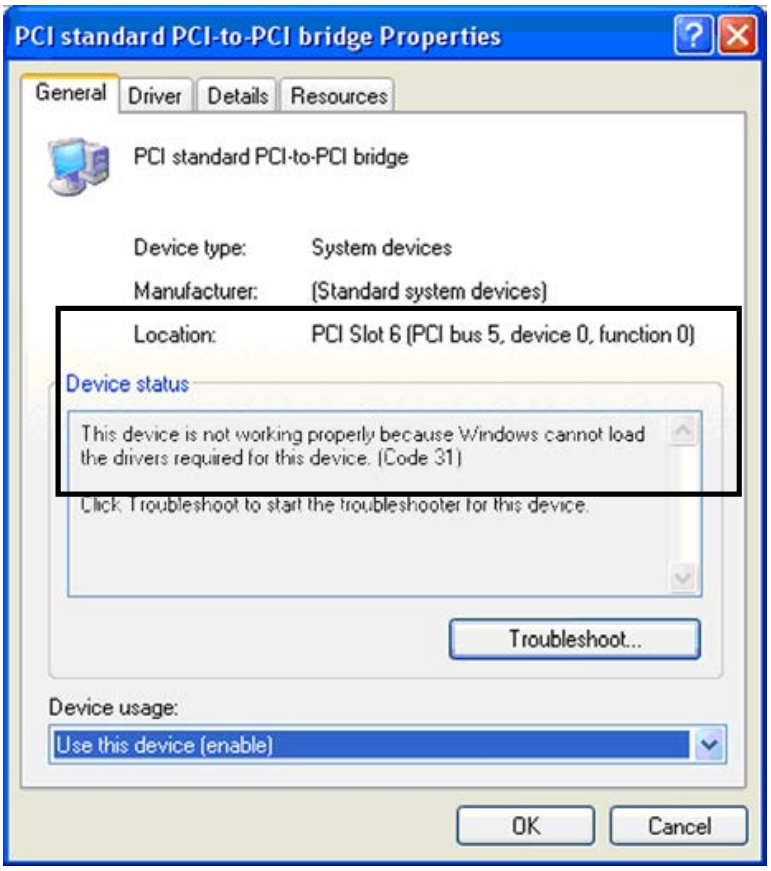
Problems with 3rd Party cards might only be traceable once you have identified the expansion system containing the problem card. Remember, it may be necessary to identify the PCI Slot that the Host Interface Card is in before you can properly identify the correct expansion chassis and ultimately the card. Obviously, this is only an issue if you have multiples of the same type of card installed.

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Finding the Problem Card

Windows

If you need help to determine which PCI card, or which expansion chassis, has the problem, you can “right-click” on the card with the  and check the information contained in the “Location:” field.



Look for the “Error Code” in the box in the center of the Properties Window and then go to the *Windows Error Code* section for information on how to resolve this issue.

MAC

If you have already reinstalled and reseated everything according to instructions in *Chapter 2*, and the PCI to PCI Bridge is still not visible in the Apple System Profiler, call Magma Technical Support.

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APPENDIX C Compliance

FCC

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.



NOTE

The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interferences or to be noncompliant with the appropriate standards for its intended use.

Industry Canada

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numériqué de la classe A est conformé à la norme NMB-003 du Canada

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives. Magma will not retest or recertify systems or components that have been reconfigured by customers.

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Magma

9918 Via Pasar, San Diego, CA 92126, USA

Phone (858) 530-2511 • Fax (858) 530-2733

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