



PCI Expansion System User's Manual



13 Slot PCI to PCI Expansion

*With Surveillance Pro 2 Remote Monitoring
and SNMP Capability*

Model: P13RR-TEL

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Preface

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.

- ◆ 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.



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



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.

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- ◆ 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.

Chapter 1 Introduction

General Specifications

The MAGMA P13RR-TEL is a rugged COTS (Commercial-Off-The-Shelf) 13 Slot PCI to PCI Expansion System designed specifically for industrial telephony and military-grade configurations requiring remote monitoring capability. In addition, this expansion was designed to meet MIL-STD 461E. The expansion chassis is fully compliant with the PCI Local Bus Specification. This MAGMA expansion system consists of a PCI Host Interface Card, a PCI expansion cable (a shielded, high-speed cable), a 16 gauge steel expansion chassis containing a 13 slot PCI backplane, the Surveillance Pro 2 remote monitoring system and status panel, a redundant power supply, and high volume cooling fans.

Item	Description
▪ Backplane:	13 standard PCI slots 32-bit / 33MHz
▪ Enclosure:	Black, 4U Rack-Mount
▪ Dimensions:	19"W x 7"H x 18"D
▪ Weight:	35lbs or 15.9kg
▪ Standard Cable Length:	1 meter
▪ 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)
▪ Cooling:	(3) 120mm 92CFM fans
▪ Power Supply:	Dual Redundant N+1 400W Power Supply
▪ MTBF:	53,000 hours
▪ Operating Environment:	0° to 50° C Operating Temperature -20° to 60° C Storage Temperature 5% to 85% Relative Humidity, Non-condensing
▪ Operating Systems:	Windows XP/2000 Mac OS X version 10.2.2+ RedHat Linux 9
▪ Warranty:	1 Year Return to Factory
▪ Available Options:	1.5-meter cable (PN: SUBCBL1.5HF) CardBus Card: required to use the expansion chassis with a laptop computer (PN: SUBCBHIF) Rack mount slide kit (PN: RSLIDES-XX)

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

Parts List

The following parts are provided:

	Qty	Item
①	1	13 Slot PCI to PCI Expansion Chassis
②	1	PCI Expansion Cable (1-meter or 1.5-meter) ¹
③	1	PCI Host Interface Card
④	13	Long card retainers
	13	Short card retainers
⑤	2	U.S. Standard 115V power cord
	1	User's Manual
	1	Software CD-ROM

¹The 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.

Chapter 2 Hardware Installation

The following steps will guide you in completing the hardware installation of your MAGMA P13RR-TEL.

Electrostatic Discharge (ESD) Warning



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.



Danger

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 [Chapter 4 Install 3rd Party PCI Cards](#). Then remove the card as normal. If no PCI card is visible, then continue with the cable installation.

Before you Begin

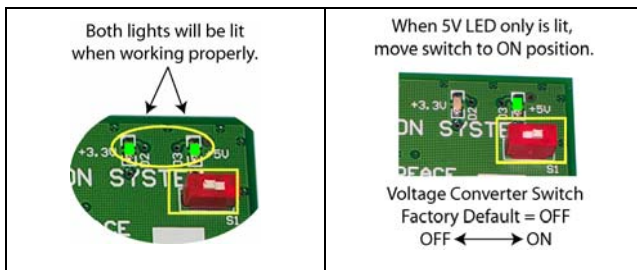
The 400W redundant power supply is auto-switching. These means that it will automatically switch to match whatever source power you are using. Since all products ship with a US Standard 115V power cord, you will need to use a power cord adapter for non-US Standard 115V power sources.

1 Install PCI Host Interface Card

Begin the installation of your PCI expansion host card by first powering down the host computer. Use the procedures for shutting down your operating system and shutting off power to your system provided in your owner's manual or system documentation.

The PCI Host Interface Card includes a voltage switch in the top right corner of the board that may need to be adjusted for proper installation. It is an easy process to determine if the voltage switch needs to be adjusted for your configuration.

1. Insert the PCI Host Interface Card into a vacant PCI slot by gently pushing the card until it is firmly seated.
2. Secure the card in the PCI slot opening with a mounting screw.
3. Turn on power to the host computer.
4. If both LEDs shown below are lit, **DO NOT** adjust the dip switch, simply power down and continue to step two.
5. If only the +5V LED is lit, shut down your computer, then flip the switch to the ON position before continuing to the next step. When you power up the computer again, both LEDs should now be lit.

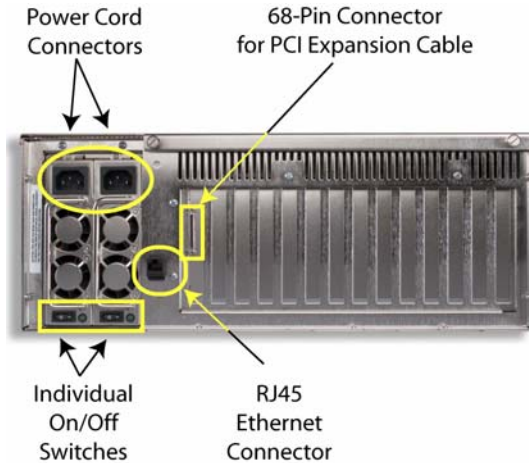


2 Attach PCI Expansion and Power Cable

Carefully position the MAGMA expansion chassis so that the supplied PCI expansion cable will conveniently reach from the connector of the PCI host card to the connector on the back of the PCI expansion. The standard size cable that ships with the P13RR-TEL is 1 meter long. An optional 1.5 meter cable is available from Magma in case you didn't order it with your system during your initial purchase.

Attach one end of the PCI expansion cable to the PCI expansion host card and secure it using the captive thumbscrews on the cable.

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



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

Before connecting the power cords, check that the expansion chassis On/Off switch is set to the OFF position. This switch is located on the right side of the monitor control on the front of the chassis.



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.

3 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.

4 Applying Power Correctly

Starting Up:

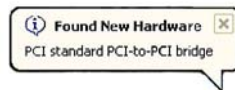
You must apply power to the MAGMA expansion chassis BEFORE you power up your computer. This will allow the higher numbered PCI buses in the PCI bus hierarchy to be at a stable state when the host system issues its master power-on bus reset. In systems that perform automatic PCI bus configuration, this 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 LED indicators to indicate power status. Verify that the green power indicators are ON.



Windows XP and Windows 2000 Start Up

As your Windows XP/2000 computer starts up, you will see a small message box pop-up in the lower-right corner of the screen to alert you that Windows has found new hardware.



You are now ready to go. No drivers are needed. Now go to [Chapter 3 Verify Installation](#).

MAC Start Up

MAC computers will boot up without any visible indicators that the Expansion System is connected. Go to [Chapter 3 Verify Installation](#).

Shutting Down:



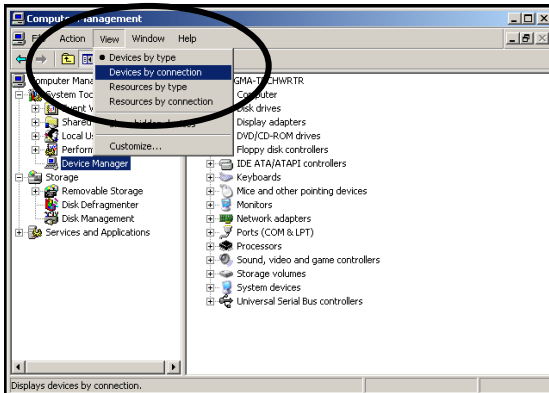
DO NOT TURN OFF THE MAGMA EXPANSION CHASSIS UNTIL YOU HAVE SHUT DOWN YOUR COMPUTER COMPLETELY! It can cause a system lockup and loss of any unsaved data.

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.

CHAPTER 3 Verify Installation

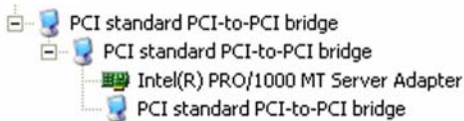
Windows 2000 and XP

To verify a successful installation on Windows XP or 2000, find the 'My Computer' icon → Right-click and select 'Manage' → Highlight 'Device Manager' → Click on the View Menu and select View Devices by Connection




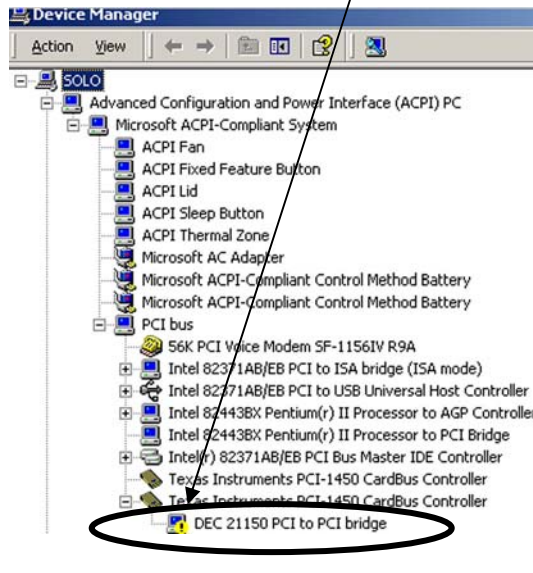
Open ACPI (BIOS) → Open PCI Bus → Click the '+' sign several times until you reach the PCI Standard PCI to PCI Bridge.

When installed correctly, you will see three "PCI to PCI Bridges" below your system's PCI Controller.



If everything is OK, then the MAGMA PCI expansion host card installation is complete. You can now proceed to [Chapter 4 Install 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.

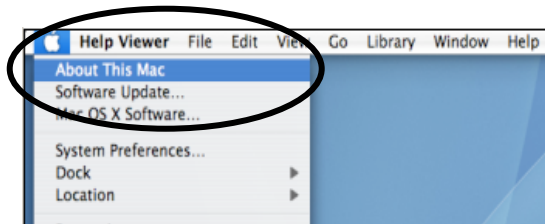


Proceed to [Chapter 7 Troubleshooting](#) for help with Windows installation problems.

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.

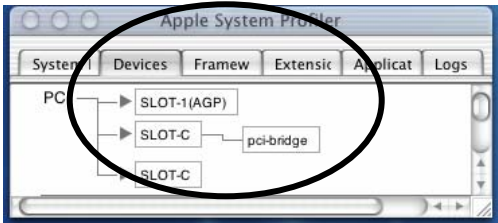
Select “About This Mac” under the Apple Icon



Then click the “More Info” button → click on the Devices tab → you should see a **pci-bridge** device listed under PCI as shown below:

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



Mac OS 10.2.x

Card	Type	Bus	Slot
pci-bridge	pci	PCI	SLOT-2
pci-bridge	pci	PCI	7x4
ATTO ExpressPCI UL35	scsi-2	PCI	8x4
ATTO ExpressPCI UL35	scsi-2	PCI	8x4
pci-bridge	pci	PCI	8xc

Mac OS 10.3.x & 10.4.x

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.

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.



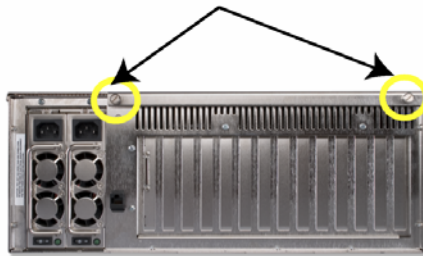
We will provide reasonable technical support with 3rd Party PCI cards. However, if you have verified a successful installation of the MAGMA expansion system (as defined in *Chapter 3*), but experience difficulty installing your 3rd Party PCI cards, the PCI card manufacturer should be able to provide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



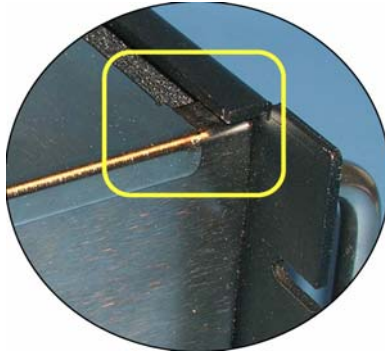
Remove PCI Expansion Chassis Cover

Two captive thumb screws retain the cover on the expansion chassis. Loosen them to release the cover.

Release cover with 2 captive thumb screws



Slide the enclosure cover backwards, disengaging it from the guides at the front of the enclosure, by firmly grasping the cover lip and pulling the cover backward about $\frac{1}{4}$ " and then lifting the cover off.



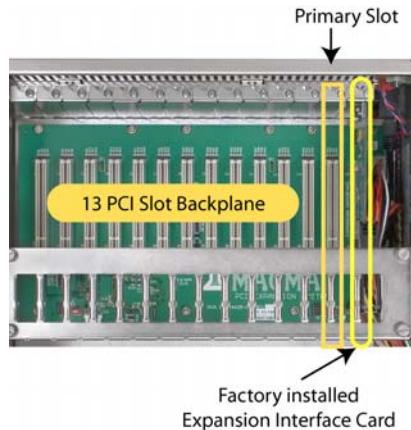
When replacing the enclosure cover, be sure that the front edge guides on the cover engage the inner lip of the enclosure.

2

PCI Expansion Interface Card

Next, check the PCI Expansion Interface Card. This card is factory installed in the 1st PCI slot next to the power supply connections on the backplane. It is required to allow your host computer to communicate with the PCI cards in the expansion chassis.

Ensure that the card is installed in the slot labeled "Expansion Interface" and that it is fully inserted into the slot and fastened to the chassis correctly.



After you have verified the card installation, check the card hold-down assembly that is holding the card securely to the card hold-down bar.



If necessary, use the adjustment screw to tighten the card hold-down brace.

3

Install PCI Cards in PCI Expansion Chassis

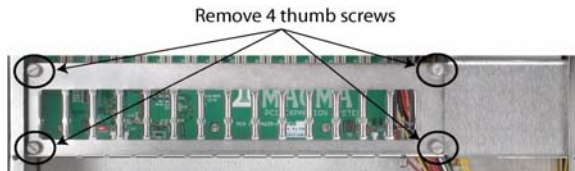


When installing PCI cards or hard drives, please ensure that the input current rating specified on the AC input label is not exceeded.

Slot ordering in the 13 Slot PCI to PCI Expansion chassis should begin with Slot 4 – previously identified as the slot next the slot identified as the “Expansion Interface” slot.

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*.

Remove the PCI card hold down bar first.



Install each PCI card following the 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.



To reduce potential problems with the installation of 3rd Party PCI cards, it is recommended that the cards and their drivers, if any, are installed and tested individually. This practice will reduce troubleshooting tasks in the event of a problem.

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).



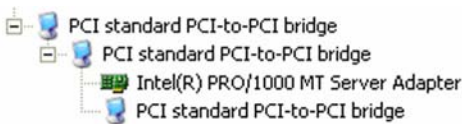
The sheer number of PCI cards and device drivers available makes it impossible for Magma to fully test and certify all available PCI cards for use in the MAGMA expansion chassis. Our best advice to you in this regard is to insist on full PCI Specification compliance from your card and system vendors. 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.

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 3](#) to confirm the card installation(s) in the Windows Device Manager or Apple System Profiler.



Windows Device Manager

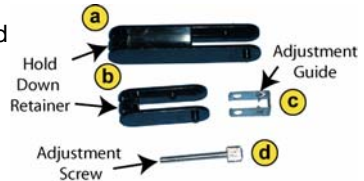
Card	Type	Bus	Slot
pci-bridge	pci	PCI	SLOT-2
pci-bridge	pci	PCI	7x4
ATTO ExpressPCI UL3S	scsi-2	PCI	8x4
ATTO ExpressPCI UL3S	scsi-2	PCI	8x4
pci-bridge	pci	PCI	8xc

MAC Apple System Profiler

5 Finishing Touches

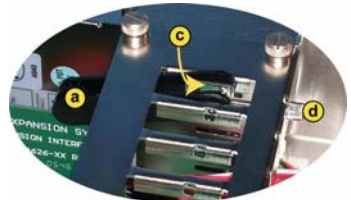
After your system is working properly, replace any empty slots with slot covers, and install the card hold down retainers that shipped with your expansion system.

The P13RR-TEL includes a PCI card hold down bar and set of plastic retainers to provide an extra method of securing the PCI cards in the chassis. This is especially useful when transporting a fully-loaded expansion chassis.



The PCI cards in your chassis can easily be held firmly in place in a couple of simple steps.

1. Select either the (a) long or (b) short Retainer, depending on the height of your PCI card.
2. Squeeze the open end of the Retainer and insert it, from the bottom of the bar, into an open slot directly above your PCI card. When the round tips on the end of the Retainer are inline with the round holes on the bar, release the Retainer.
3. Next, squeeze the open end of the Bracket (c) and insert it (from the top) into the bar so that the round holes on the Bracket align with the round tips inside the bar. When aligned, release the Bracket. The Bracket should move freely.
4. Take the Screw (d) and insert it through the slot in the edge of the bar so that it will align with the threaded opening in the closed end of the Bracket (c) and start to thread it by turning it clockwise.
5. You will notice that the threading action will start to adjust the closed end of the Retainer toward the PCI card directly below. Continue to tighten the Screw until it fits snugly onto the top of the PCI card.



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Finally, replace the host computer cover and the expansion chassis cover.

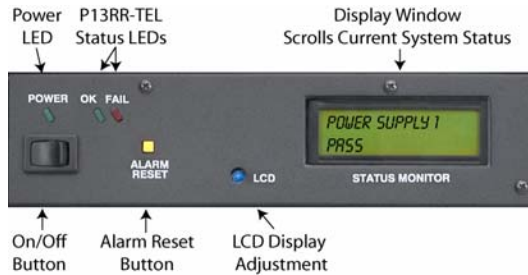
Rack Installations

Installing your new P13RR-TEL into an equipment rack has never been easier. Simply attach one of MAGMA's optional Rack-mount slide kits (PN: RSLIDES-XX) to allow you to mount the chassis in a computer rack and then simply slide the chassis in and out whenever you need to do work on, or in, it. These sets come in various lengths to accommodate various racks. Contact MAGMA for more information, or to order a set. When ordering, replace the "XX" in the part number with your required kit size (18, 24, 26, or 28 inches).



Chapter 5 Remote Monitoring

The Remote Monitoring System Surveillance Pro 2 adds the ability to remotely monitor the status of the P13RR-TEL. You can now get all the information that is displayed on the LCD of the chassis in near real time without leaving your desk. It is useful for tracking chassis functionality off site applications.



With the prevalence of the Internet almost all computers are now networked together, and the P13RR-TEL has leveraged the existing TCP/IP Ethernet connection as a pathway to the chassis status.

There are two methods to access the status of the P13RR-TEL critical parameters:

The first method is to use an Internet browser. Simply enter the IP address of the Surveillance Pro 2 and the information will be displayed.

The second method is to configure Surveillance Pro 2 to send an email address of your choice. Once configured, Surveillance Pro 2 will alert any problems without user intervention.

In addition, Surveillance Pro 2 is programmed with SNMPv1 (Simple Network Management Protocol). This enables the P13RR-TEL to output the status of its critical parameters to a SNMPv1 manager.

Getting Started

There is a RJ45 Ethernet jack on the rear of the chassis. Simply plug one end of a standard Ethernet cable in the jack and the other end into your network hub, switch, or router.



Surveillance Pro 2 Web Page

To view the status web page created by Surveillance Pro 2, open any web browser and simply type the default Surveillance Pro 2 IP address of 192.168.1.100 into the address bar. In a few moments you will see a web page showing the status of the P13RR-TEL critical parameters. The screen will automatically refresh every 30 seconds.



Your computer must be on the same IP address network as the Surveillance Pro 2 if you are not connected through a router.

The black text on the page represents all the parameters that can be monitored for a particular P13RR-TEL chassis. To the right of the black text is the status on each monitored parameter. If the status text is green, the parameter is in an acceptable, or “pass,” state. If the status text is red, the parameter is in a “fail” state. If there is no status text below the parameter heading, it is a parameter that is not monitored in this chassis.

Surveillance Pro 2

Monitored Item	Status
Power Supply 1	PASS
Motherboard Mount Fan 1	PASS 2220 RPM
Motherboard Mount Fan 2	PASS 2220 RPM
Motherboard Mount Fan 3	PASS 2220 RPM
Motherboard Mount Temp	PASS

[Click to go to the Surveillance Pro II administration pages!](#)

To view the status of another P13RR-TEL, simply enter the IP address of the next chassis' Surveillance Pro 2.

Configuring Surveillance Pro 2

To configure a Surveillance Pro 2, open the status web page as previously described. At the bottom of the page, there is a link to go to the Administration page. When you click on it, a password dialog box will appear. Enter a user name and password. The factory default for

the **username** is **admin** and factory default for the **password** is **password**, both in lower case.

Surveillance Pro II

Name	Value
Chassis name	MAGMA
IP Address	192.168.1.100
Subnet Mask	255.255.255.0
Gateway Address	0
SMTP Address	
Email Address #1	
Email Address #2	
Email Address #3	
Email Address #4	
Admin Name	admin
Admin Password	password
From Email Address	

Submit Reset

Chassis Name

The chassis name is blank by default. In order to help identify which system has an error, you should give the chassis a meaningful name, such as MAGMA, or MAGMA01 if you have more than one system. There is a 100 character limit on this field.

Chassis name	MAGMA
--------------	-------

The chassis name will be included in the email notification of chassis status.

IP Address

Your network administrator can assist you in setting up a reservation and using appropriate values for the IP address, subnet mask, and gateway address fields. Remember, every device on your network needs to have a unique IP address.

There are two ways to set up the IP address of the Surveillance Pro 2. The first option is to specify an IP address as shown.

IP Address	192.168.1.100
------------	---------------

M A G M A

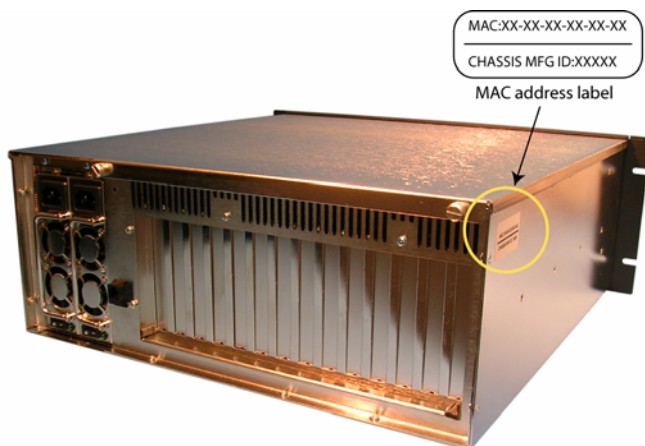
The second option is to have a **DHCP** (Dynamic Host Configuration Protocol) server assign an IP address that has a reservation set up for the MAC of the Ethernet interface.



If there is not a reservation set up on the DHCP server, the DHCP server will automatically assign the next available address from its IP pool each time the chassis is restarted. This will make it almost impossible to monitor manually.

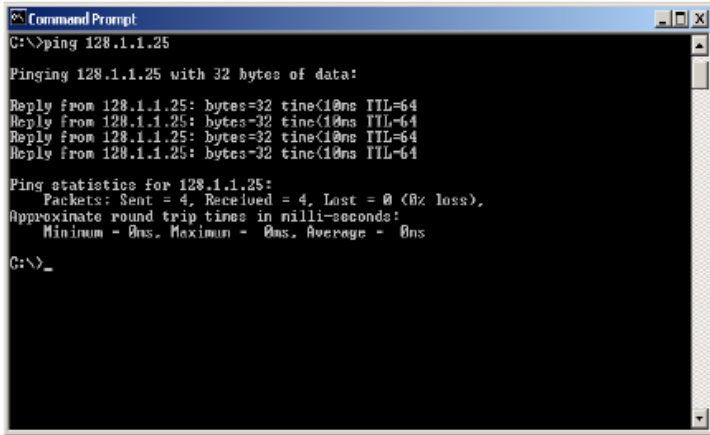
To use DHCP, simply enter a 0 (zero) in the IP address and subnet mask fields.

Near the rear of the chassis there is a decal with the **MAC** (Media Access Control) number and chassis manufacturer ID. The MAC is used in conjunction with a DHCP server to give the Surveillance Pro 2 its IP address.



The Surveillance Pro 2 is set to a factory default IP address of 192.168.1.100. Use the MAC of the Surveillance Pro 2 as the unique identifier for your DHCP server to set the Surveillance Pro 2 to an IP address that will work with your network.

The IP address of the Surveillance Pro 2 can be verified by pinging the address that you set it to. For example, open a Command Prompt Window and type “**ping 192.168.1.100**”. You should see a set of replies back from the Surveillance Pro 2 with the time it took for the response.



```

C:\>ping 128.1.1.25

Pinging 128.1.1.25 with 32 bytes of data:

Reply from 128.1.1.25: bytes=32 time<10ms TTL=64
Reply from 128.1.1.25: bytes=32 time<10ms TTL=64
Reply from 128.1.1.25: bytes=32 time<10ms TTL=64
Reply from 128.1.1.25: bytes=32 time<10ms TTL=64

Ping statistics for 128.1.1.25:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>_

```

Subnet Mask and Gateway Address

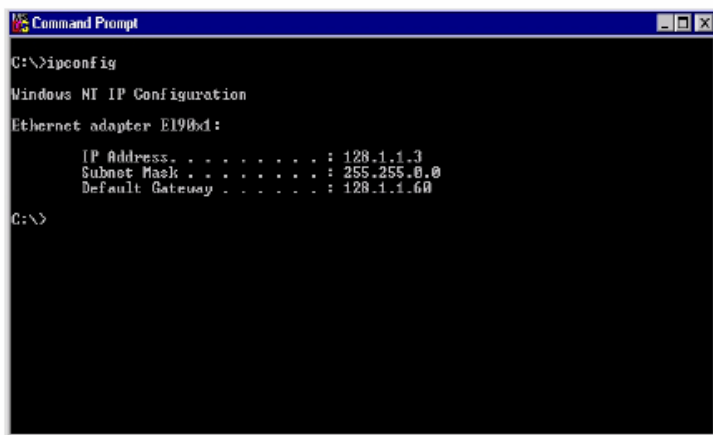
The subnet mask can be used to determine which network a particular IP belongs to. It is helpful for dividing a host to many different subnets. The gateway address is used to point Surveillance Pro 2 to the router used to gain access to the Internet. If your DHCP server is configured to assign DHCP clients with a gateway address simply enter a 0 in the gateway address field. Otherwise, enter the appropriate value in the field in dotted decimal format (an example of dotted decimal notation would be 64.225.254.129).



If you entered a specific IP address in the IP Address field above, you must also enter an IP address in the Subnet Mask and Gateway Address fields. If you are using DHCP and used a 0 in the IP Address field, enter a 0 into these fields.

Subnet Mask	255.255.255.0
Gateway Address	192.168.1.2

The actual subnet mask and gateway address can be found by typing **ipconfig** at the command prompt.



```

C:\>ipconfig

Windows NT IP Configuration

Ethernet adapter E198d1:

    IP Address. . . . . : 128.1.1.3
    Subnet Mask . . . . . : 255.255.0.0
    Default Gateway . . . . . : 128.1.1.60

C:\>

```

Surveillance Pro 2 Email Notification Setup

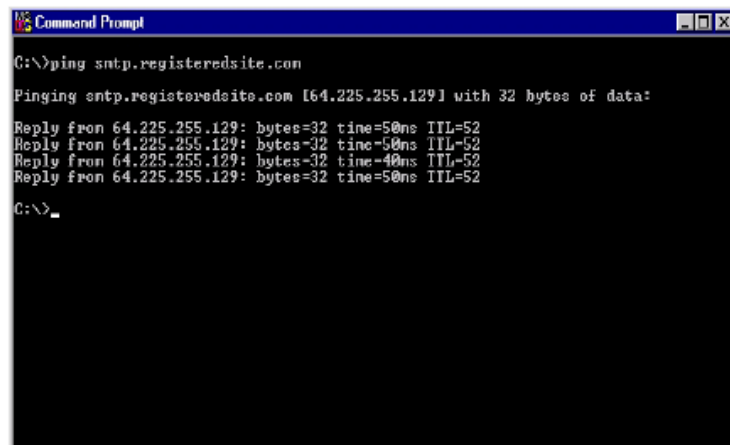
In order for Surveillance Pro 2 to send email notifications, you must setup the following: an SMTP address, and a recipient's email address.

SMTP Address

Enter an SMTP server address in dotted decimal format. This can be obtained from your internet service provider.

SMTP Address

Alternately, if you know your SMTP server name, you can ping it from a command prompt to obtain the SMTP IP address.



```

C:\>ping smtp.registeredsite.com

Pinging smtp.registeredsite.com [64.225.255.129] with 32 bytes of data:

Reply from 64.225.255.129: bytes=32 time=50ms TTL=52
Reply from 64.225.255.129: bytes=32 time=50ms TTL=52
Reply from 64.225.255.129: bytes=32 time=40ms TTL=52
Reply from 64.225.255.129: bytes=32 time=50ms TTL=52

C:\>_

```

Recipient's Email Address (Email Address #1 - #4)

At least one email address must be set up to send the remote email notification messages to. The email address needs to be less than 45 characters. Up to four recipient's email addresses can be entered. If you need more than four email addresses, try combining some of them into a "group address."

Email Address #1	<input type="text"/>
Email Address #2	<input type="text"/>
Email Address #3	<input type="text"/>
Email Address #4	<input type="text"/>

Administration Name and Password Setup

The administration name can be any combination of alphanumeric characters up to 10 characters in length. It is case-sensitive, but **DO NOT USE** special characters, i.e. symbol characters.



Using special characters will result in your not being able to access Surveillance Pro 2's administrative functions.

Admin Name	<input type="text" value="admin"/>
Admin Password	<input type="text" value="password"/>

The same rules listed for the administration name setup apply to the password setup. It is wise to write down the administration name and password and store it in a safe location. You cannot reenter the administration page without them.



If you ever lose your ID/password, or are otherwise "locked-out", you can reset the Surveillance Pro 2 system to its factory default ID/password (shown above). Contact Magma Technical Support for more information.

From Email Address

Lastly you need a from email address. The "From" email address needs to be a valid email address for your SMTP domain.

From Email Address	<input type="text"/>
--------------------	----------------------

M A G M A

Most SMTP servers will reject the email that Surveillance Pro 2 is trying to send if it does not belong to its domain.

Finalizing Surveillance Pro 2 Configuration

Once you have filled in all of the needed information, hit the submit button for the data to be saved to the Surveillance Pro 2. In order for the new settings to take effect, either the power to the chassis needs to be cycled, or the yellow reset button on the chassis monitoring system needs to be pressed.

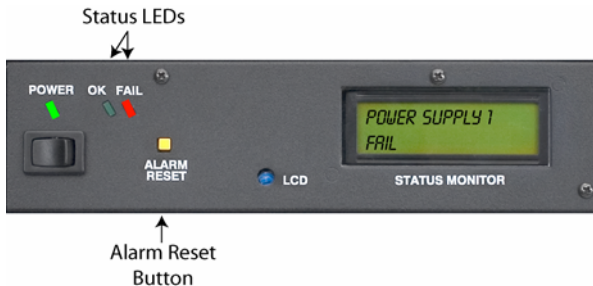
To test the email configuration, create a fault condition on your chassis. This can be accomplished by switching off a power supply. Wait for 15 seconds after the audible alarm on the chassis sounds. At this point you can correct the error and press the yellow reset button. Check the recipient's inbox; you should see an email with the fault you have created.

*From: EmailMonitor@yourdomain.com
Sent: Wednesday, November 19 2005 16:36 PM
To: YourName@yourdomain.com
Subject: Failure on chassis MAGMA01*

*Motherboard Mount Fan 2
FAIL*

Removing Faults From Surveillance Pro 2

The Surveillance Pro 2 system is closely linked with the monitoring system built into the P13RR-TEL. As errors are removed from the monitoring system, they will also be removed from the Surveillance Pro 2.



When the faults with the chassis are corrected, press the yellow monitoring reset button on the front of the chassis and the faults will be removed.

Chapter 6 Chassis Maintenance

Like all computer systems, you will need to perform some routine maintenance tasks. Some of these include making sure that the air vents in the chassis are clear of obstructions and that the cooling air from the fans flows freely. You will also need to check the foam filter behind the front panel to ensure it is clean, thus allowing for unrestricted air flow to the fans. You should always keep an eye on all cables to make sure they are not damaged and are securely connected. Occasionally, you should remove the chassis cover and check for loose cards, and remove any dust build-up.



Always to remember to power down your computer and then the expansion system BEFORE you attempt to perform any maintenance tasks.

In spite of regular performance of routine maintenance tasks, some computer systems can experience hardware failures. Fortunately, your investment in a P13RR-TEL provides you with the ability to easily repair the system in the event of component failure.

Two of these components are field-replaceable: the cooling fans and the hot-swappable redundant power supply modules.

“Hot-Swappable” Power Supply

The redundant power supply includes two hot-swappable modules that share the power load requirements during normal operations. Should one module fail for any reason, the power load will be shifted to the other module and sound an audible alarm.

If a power supply fails, the monitor will display a message in the display window, sound an alarm, update the web-access-page, and, if you have configured the SNMP monitoring for email alerts, it will also send you an email advising you of the power failure.

To replace a failed power supply, simply remove the Phillips-head screw above the failed power supply module, grab the handle, and pull. Replace the failed module with a new one and turn on the power to the module using the power switch at the bottom of the

Remove Hold-Down Screw(s)



Open Handle and “Pull”

module. Then press the yellow alarm monitoring reset button on the front panel to reset the monitoring operation. The power load will again be shared between these two modules.



In order to ensure the safety and efficiency of your expansion system, it is recommended that you keep a spare power supply module on hand – just in case. Protect yourself, keep a spare. Order your spare power supply module from Magma – PN 40-00022-01.

Replacing a Fan

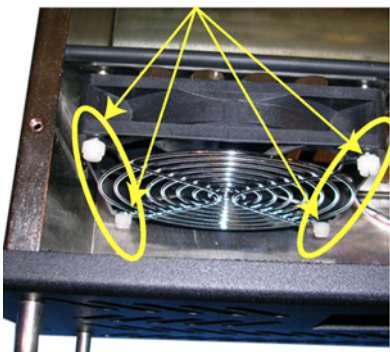
The expansion system chassis provides three (3) high-volume fans to keep your PCI cards running smoothly. If a fan fails, the monitor will display a message in the display window, sound an alarm, update the web-access-page, and, if you have configured the SNMP monitoring for email alerts, it will also send you an email advising you of the power failure.

Unlike the “hot-swappable” redundant power supply repair, you will have to shut off power to the expansion system chassis to replace a failed fan. Remember to shut down the host computer first.

First, remove the chassis cover, and the Surveillance Pro 2 control panel using the four (4) screws on the front panel. Next, identify the fan that needs replacement. Now, remove the four (4) white plastic thumb-screws that are located in each corner of the fan.

Gently remove the fan front grill and the fan itself. Finally, unplug the fan's power connector to remove the fan completely from the chassis.

Remove white thumb-screws located in each corner.



Replace the fan with a new one, PN 26-00028-01, which is available from Magma.

Before you attempt to reinstall the new fan, be sure to position the new fan correctly using the direction arrows on the side of the fan. Make sure that the air flows “into” the chassis as indicated by the arrows.



Reconnect the power cable, add the front grill to the fan, and secure with the four (4) white thumb-screws. Reinstall the Surveillance Pro 2 control panel and the cover.

Finally, restore power to the expansion chassis and then the host computer. It may also be necessary to press the yellow alarm reset button to completely clear the fault and restore normal monitoring conditions.

Adjusting the Digital Display Window

The Digital Display Window on the Surveillance Pro 2 control panel is adjusted at the factory for optimum viewing. However, if lighting, or other, conditions dictate, you can easily adjust the contrast of the window for better viewing under present conditions.

To adjust the contrast of this window, simply use a small flathead screwdriver to turn the Blue Adjustor Control either “clockwise” or “counter-clockwise” for better viewing.



Turn Blue Control to Adjust Contrast

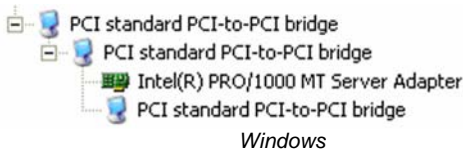
Chapter 7 Troubleshooting

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:



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.


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 8](#) 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 8](#) to see about getting additional help.

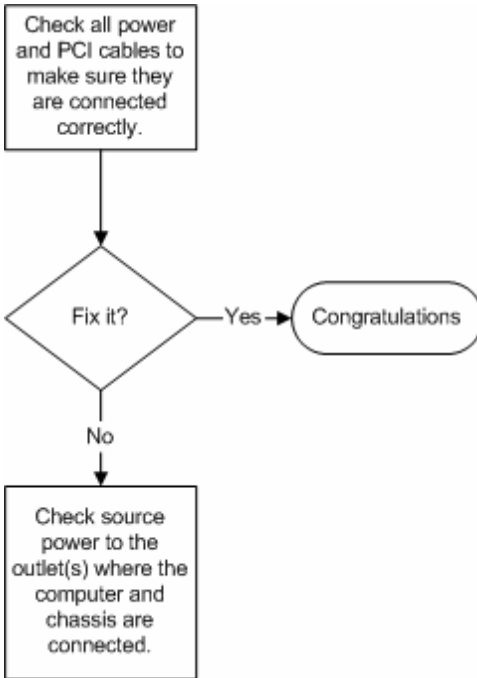


MAC

Go to [Chapter 8](#) to see about getting additional help.

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 8](#) to see about getting additional help.

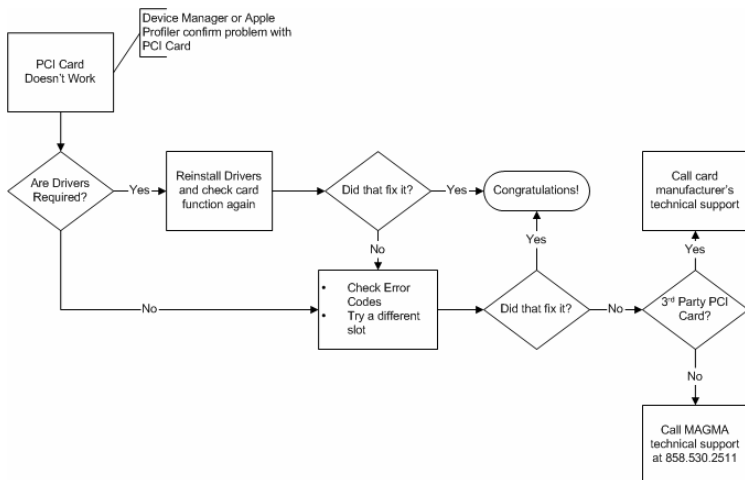
My Computer Hangs During Power Up

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 card works, troubleshoot the first card. If the second card also fails, call Technical Support.

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 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.

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

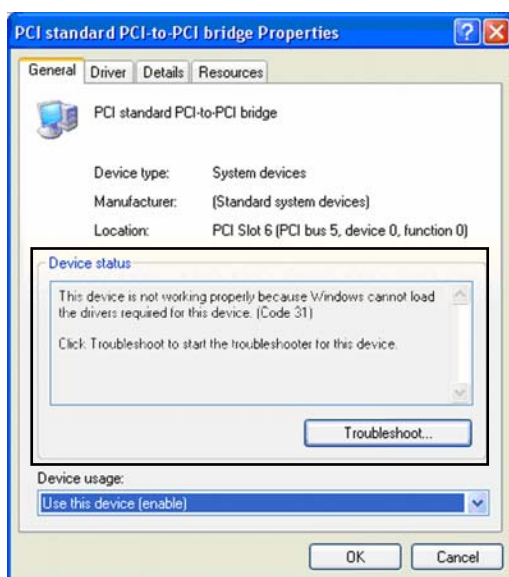
Magma will provide reasonable technical support to with 3rd Party PCI cards. However, if you have verified a successful installation of the MAGMA PCI Expansion System (as defined in [Chapter 4](#)), but experience difficulty installing your 3rd Party PCI cards, the PCI card manufacturer may be able to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

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

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	<p>For all other error codes, call:</p> <p><u>On the PCI to PCI Bridge:</u> Magma Technical Support</p> <p><u>On the PCI Card:</u> Card Manufacturer's Technical Support, after first verifying that the MAGMA expansion system is installed properly.</p>

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

Chapter 8 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 | 7) Serial Number |
| 2) Company Name | 8) Computer Make |
| 3) Phone Number | 9) Computer Model |
| 4) Fax Number | 10) Operating System and Version |
| 5) Email Address | 11) Make/Model of PCI cards in expansion chassis |
| 6) Model Number | 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.

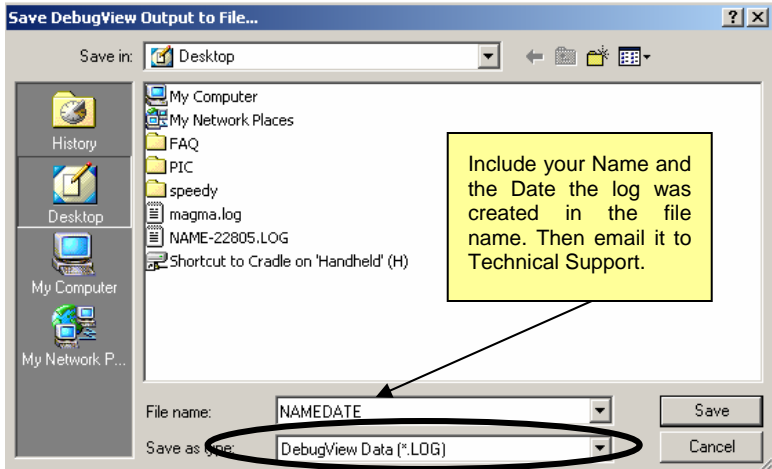
For example: Don't say "Won't boot up." Do say "Tried all the steps in the Troubleshooting Section and it still won't boot up."

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.

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 emailed to support@magma.com. This file should have a “.log” file extension. To create the *.log file, follow these instructions:

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 email to support@magma.com upon request.



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

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)

The screenshot shows the PCIScope application window with the title bar "PCIScope - [C:\WINDOWS\DESKTOP\SAMPLE.BPD]". The interface includes a menu bar (File, Edit, View, Descriptions, Tools, Window, Help) and a tree view on the left showing a hierarchy of PCI buses and devices. The main pane is divided into several sections:

- Information:** Displays details for the PCI1250 PC card Cardbus Controller, including Vendor ID (104Ch), Device ID (AC16h), and Base class code (06h).
- Bridging Information:** Shows PCI bus number (00h), Cardbus bus number (04h), and Subordinate bus number (06h). This section is highlighted with a red box and the text "PCI Bus Numbering".
- Filter Settings:** A table showing filter rules for memory and I/O access.
- Resource Allocation:** A table showing resource allocation for memory and I/O. This section is highlighted with a red box and the text "Resource Allocation".
- CardBus socket Registers/ExCA:** Displays the Base address Register (7FFFE000h) and Interrupt Line (IRQ 11).
- Device Configuration:** Shows the Command register (07h).
- Configuration Options:** A table showing various configuration options like I/O space access, Memory space access, and Bus master, all of which are enabled. This section is highlighted with a red box and the text "It's a good sign if any of these read 'Enabled'".

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 email this file to support@magma.com if you are experiencing configuration problems.

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

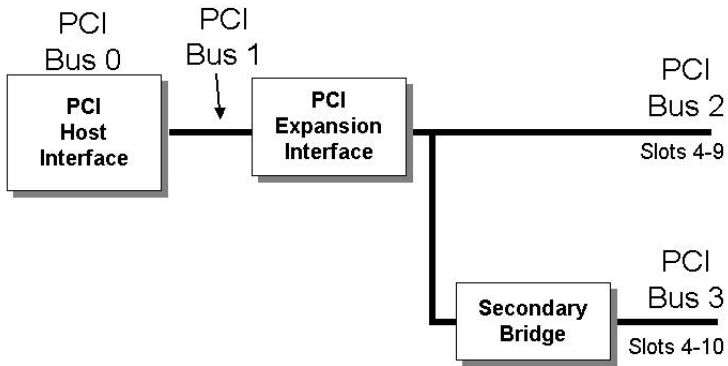
It is not required, though highly recommended, that you keep the packaging from the original shipment of your MAGMA product. However, if you return a product to MAGMA for warranty repair/replacement or take advantage of the 30-day money back guarantee, you will need to package the product in a manner 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.

Appendix A Bus Hierarchy

Bus Hierarchy

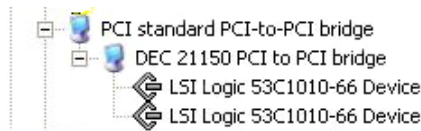
The following figure is representative of the PCI Bus hierarchies for the 13 Slot PCI to PCI Expansion System. This figure pictorially conveys the overall PCI bus topology of the system.

13 Slot Topology



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

The key point in the figure of the 13 Slot Topology is that the connecting cable between the PCI expansion host card and the 13 Slot backplane is actually a PCI bus itself. This is represented in the Windows Device Manager as shown below:



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

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.**

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.

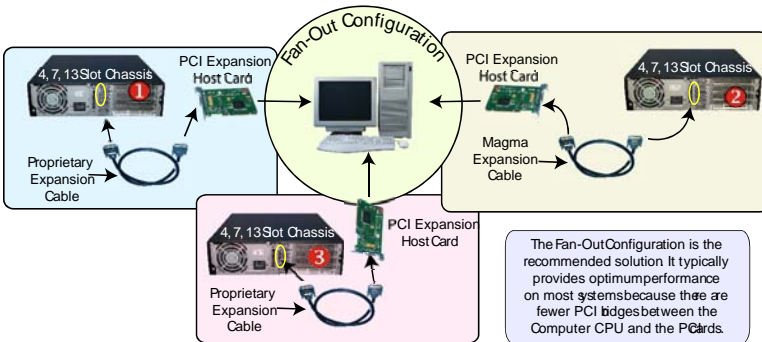
3. For easier understanding, the PCI Local Bus should be viewed as a "Resource Toll road" that runs from the computer CPU (resource home), through the "Toll Booths" (the PCI bridges), to the "Resource Users" (PCI Cards). As in the case of a real Toll Road, the more Toll Booths you have to slow down a "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.



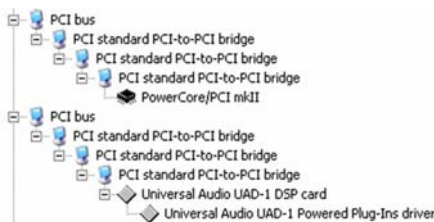
In this configuration, you have fewer “Toll Booths” (PCI Bridges) to pass through; therefore there are fewer opportunities for concern.



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.”

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

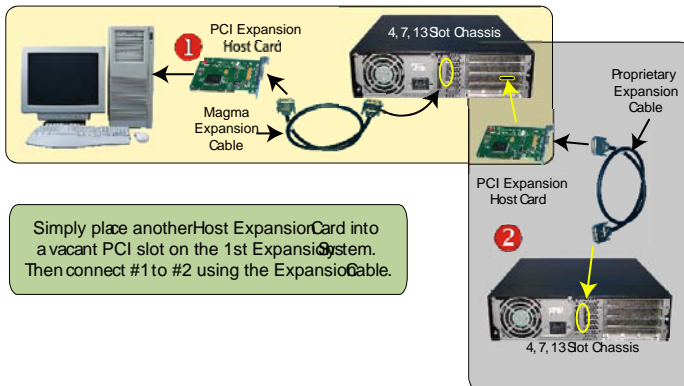
Card	Type	Bus	Slot
pci-bridge	pci	PCI	bx4
pci-bridge	pci	PCI	7x4
pci-bridge	pci	PCI	ax4
pci-bridge	pci	PCI	SLOT-2
pci-bridge	pci	PCI	8xc
pci-bridge	pci	PCI	SLOT-3
pci110b,4	Other Multimedia	PCI	bx4
pci1057,6		PCI	8x4

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.

Daisy-Chaining Expansion Systems



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.

Verify your configuration

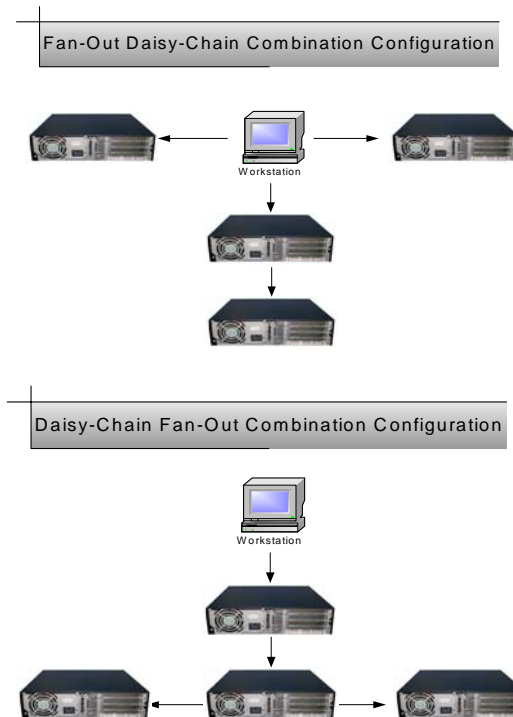
Before you start installing your PCI cards (refer to [Chapter 4 Install Cards and Drives](#) for more information), you should confirm that everything is in proper working order. Refer to [Chapter 3 Verify Installation](#) for guidance in verifying the proper installation of your Expansion System.



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.



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

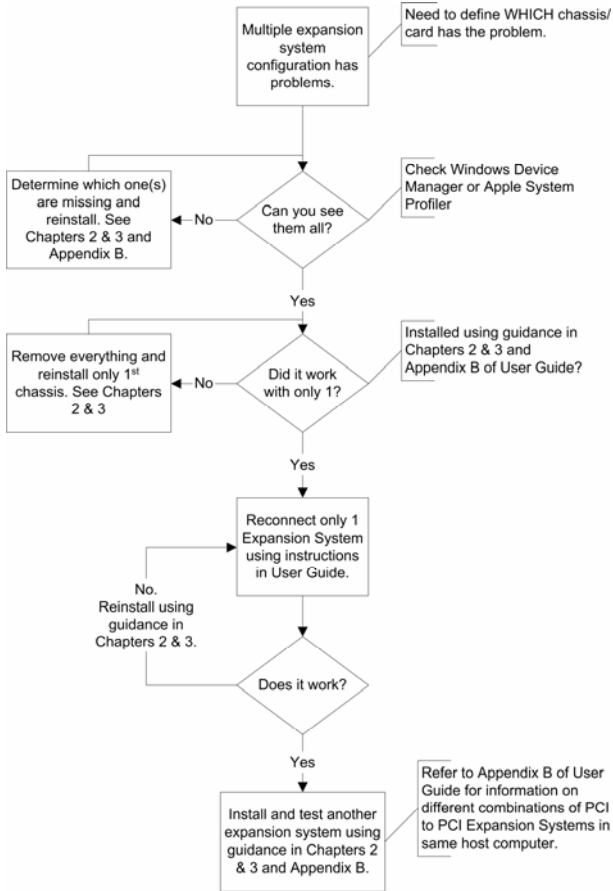
As previously stated in [Chapter 2 Hardware Installation](#), it remains necessary to power up ALL Expansions Systems BEFORE you turn on the computer. This will ensure that your power-on software can read all available PCI buses and properly configure all installed PCI cards.

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.

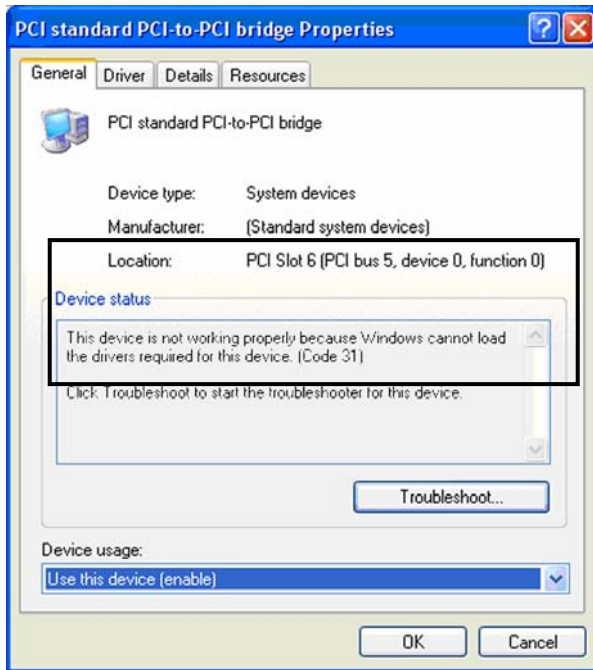


Problems with 3rd Party cards might only be traceable once you have identified the expansion system containing the problem card. Remember, it may be necessary to identify the PCI Slot that the Host Interface Card is in before you can properly identify the correct expansion chassis and ultimately the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

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.

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.



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 numérique de la classe A est conforme 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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