



# Installation Guide

MEDIA  VISION

The logo symbol consists of a stylized, bold letter 'M' with a jagged, sawtooth-like top edge, set against a dark rectangular background.

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The software must not be used on two or more machines at the same time.

## FCC Compliance Statement

This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. Operations is subject to the following two conditions: (1) this device may not cause harmful interference; (2) this device must accept any interference received, including interference that may cause undesired operation. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television equipment reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna
- Move the equipment away from the receiver
- Plug the equipment into an outlet and circuit different from that which powers the receiver
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.

**CAUTION:** Only equipment certified to comply with Class B (computer input/output devices, terminals, printers, etc.) should be attached to this equipment, and must have shielded interface cables.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Finally, any changes or modifications to the equipment by the user not expressly approved by the grantee or manufacturer could void the user's authority to operate such equipment.

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(2) Media Vision warrants to you that the Sound Card will be free from significant defects in materials and workmanship for a period of three years from the date of purchase; the stereo speakers will be warranted for a period of one year from the date of purchase; the CD-ROM Drive will be warranted for a period of ninety days from the date of purchase. Media Vision's sole and exclusive remedy with respect to defective hardware will be, at Media Vision's option, to repair or replace the hardware, if it is determined to be defective by Media Vision in its sole discretion, or refund the purchase price of the hardware.

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## Credits

*Pro AudioSpectrum 16 Mac Installation Guide* designed, written, and illustrated by Jim Rogers. Book design and layout done using FrameMaker<sup>®</sup>. Artwork created with Adobe Illustrator<sup>™</sup>.

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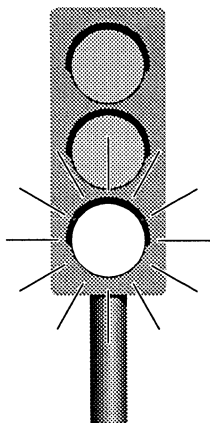
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## GETTING STARTED

Congratulations on your purchase of Pro AudioSpectrum 16 MAC™ (hereafter called *PAS 16 Mac*) from Media Vision, Incorporated.

This combination of hardware and software greatly expands the capabilities of your Macintosh computer. For example, you'll be able to:

- Increase the quality of sound input and output for your Macintosh.
- Connect a variety of other devices to your Macintosh for greater flexibility with both input and output operations.

You don't need to know much about sound, or the way your Macintosh uses it, to get the most out of your PAS 16 Mac. However, if you'd like to learn a little more about sound theories (such as digitizing methods and sampling rates), take a few minutes and read *SOUND THEORY* beginning on page 29.

This guide explains how to install your PAS 16 Mac hardware and software. You'll also find instructions for using your new equipment – such as how to connect other input and output devices. Please follow all instructions in this guide closely to ensure that your PAS 16 Mac equipment works properly.

## Computer System Requirements

The following table shows the Macintosh models you can use with your PAS 16 Mac system and the type of expansion slot required for each:

Table 1 • Supported Models

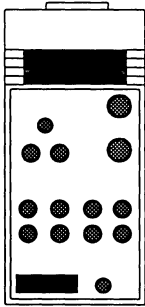
Model	Expansion Slot Requirement
LC	Processor Direct Slot (PDS)
LC II	PDS
IIsi	NuBus
IIci	NuBus
Performa 400	PDS
Performa 600	NuBus
IIvx	NuBus
Quadra	NuBus

In addition, your system must meet all of the following requirements:

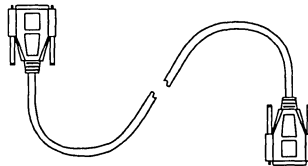
- You must be running either System 7.0 or later, or System 6.0.7.
- Your Macintosh must have a minimum of 4 megabytes (MB) of RAM memory.
- Your hard disk must have at least 2 megabytes (MB) of free space.
- You must have one expansion slot available inside your computer. See the preceding table for specific requirements.

# Check Package Contents

Make sure your package contains the items shown here:



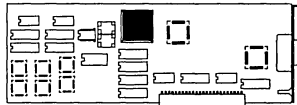
1 ea. Patch Panel



1 ea. Interface Cable

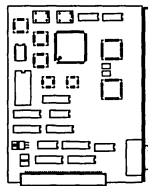
**EITHER...**

1 ea. NuBus Card



**...OR**

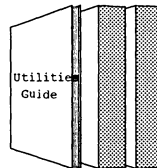
1 ea. LC Card



**NOTE:** Your package contains one or the other of the cards shown here, *but not both*. If you have a Macintosh LC, you need the LC Card – otherwise, you need the NuBus card for your Macintosh II-class computer.



1 ea. Product Disk



2 ea. Software Packages  
and  
*Sound Tools 16 User's Guide*

### *If Anything is Missing*

If your package is missing any of the items shown in the illustration on the preceding page, contact our Customer Service Department. See Table 2, *Media Vision Telephone Numbers*, on page 5.

**Remember**, your package contains only **one** of the Cards shown in the diagram. Please make sure you have the correct Card for your particular model of Macintosh.

### *Handle Contents Carefully!*

Please **do not unwrap** your NuBus or LC Card yet. It's wrapped in a special anti-static bag and you should not open the bag until you're ready to install the card in your computer.

### *Bundled Software*

The following software is included with your PAS 16 Mac:

Media Vision's *Sound Tools 16* is a program for recording, editing, and playing your audio files.

*LucasArts Indiana Jones and the Fate of Atlantis* is a challenging adventure game that has been especially modified to take advantage of the sound synthesis available on your PAS 16 Mac equipment.

*Passport Design's TRAX Quicktunes* is a collection of standard MIDI song files designed for use in multimedia presentations; *Audio Producer* is a powerful multimedia player that incorporates the recording, editing, and playback of digital audio, MIDI, and CD Audio files.

If You Need Help With the Bundled Software...

If you need help with the games or other software included with PAS 16 Mac, call the help line for the specific piece of software you want to know about. You'll find the help line telephone numbers in the individual software manuals.



## Registration & Support

### *Send in Your Registration Cards*

Before proceeding, please fill out and mail the registration card enclosed in your package. As a registered PAS 16 Mac owner you automatically receive the latest news about this and other Media Vision products.

Also fill out and mail the registration cards included with each of the software packages you received with PAS 16 Mac. This entitles you to receive additional benefits from the manufacturers of the software.

### *Contacting Media Vision, Inc.*

Please use the telephone numbers in this table for contacting Media Vision, Inc.

**Table 2 • Media Vision Telephone Numbers**

<b>Service</b>	<b>Phone Number</b>	<b>Notes</b>
Main Phone Number	(800) 348-7116 (510) 770-8600	General inquiries and information.
Fax Number	(510) 770-8648	
Sales Office	(800) 845-5870	
Technical Support and Customer Service	(800) 638-2807 (510) 770-9905	Hours: 8:00 am to 5:00 pm, Pacific Standard Time (PST), Monday through Friday.
Media Vision Bulletin Boards	(510) 770-0968 - or - (510) 770-0527 Both numbers support 300 to 14,400 Baud	8 bits, No parity, 1 stop bit. Assign your own Account Name and Password.
CompuServe™	Use your local access number	Enter GO MEDIAVISION once you have logged on to the network

## *Using the Bulletin Board*

If you are calling the Bulletin Board (BBS) for the first time, just answer the on-screen questions and create your own password. You can then download information about your PAS 16 Mac system.

Here's an example showing how to use the BBS to download a hypothetical file named SAMPLE.SIT:

At the Main Menu, choose **F** for Files.

At the Files Menu, choose **D** for Download.

Enter the file name **SAMPLE.SIT** and press **Return**.

At this point you must tell your communications software to download the file. Refer to your communications software's manuals for the proper steps.



## **HARDWARE SETUP**

**This section shows how to set up the hardware components you received with your PAS 16 Mac package. Take a few moments to study this section before beginning the actual installation. The installation process is easiest if you have a general understanding of the steps you need to complete before you begin.**

**If you're installing your PAS 16 Mac equipment on a Macintosh II-model computer, follow the instructions on page 8 through page 11. The instructions specifically describe installation on a Macintosh IIci; however, the procedures vary only slightly from one model to another. Have your Owner's Manual handy for reference.**

**If you're installing your equipment on a Macintosh LC, the steps differ slightly from those for the Macintosh II-model machines. You should follow the instructions beginning on page 12. And, have your Owner's Manual handy for reference.**

# MACINTOSH II MODELS

## Remove Computer Cover

Shut down your computer system and turn the power OFF to all of your equipment. Leave the power cord connected between your computer and the power outlet to help ground your equipment.

- 1 Working from the rear of your Macintosh, remove the screw that attaches the cover to the chassis.

Put the screw where you can find it later.

- 2 On the rear side of the cover are two plastic *handles*. Working from the front of your computer, lift up on the two handles to unsnap the cover from the chassis.

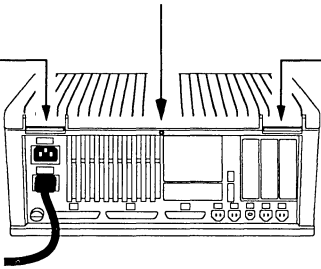
- 3 Pull the rear part of the cover straight up and slightly toward you to an angle of about 75°.

- 4 Gently work the tabs holding the cover to the front panel out of their slots. Then set the cover aside safely out of your way.

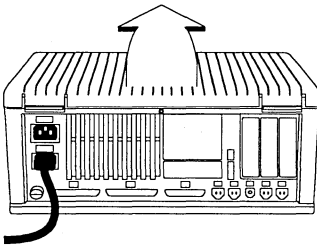
Screw attaching cover to chassis

Handle

Handle



Pull rear of cover up and toward you

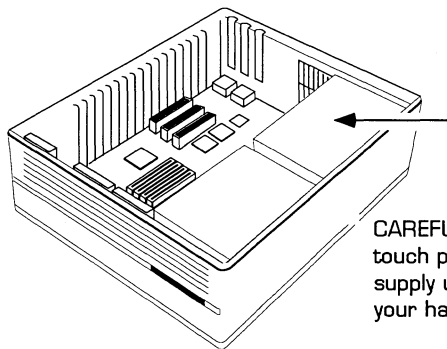


## Discharge Yourself



**CAUTION!** Power Supply might be hot.

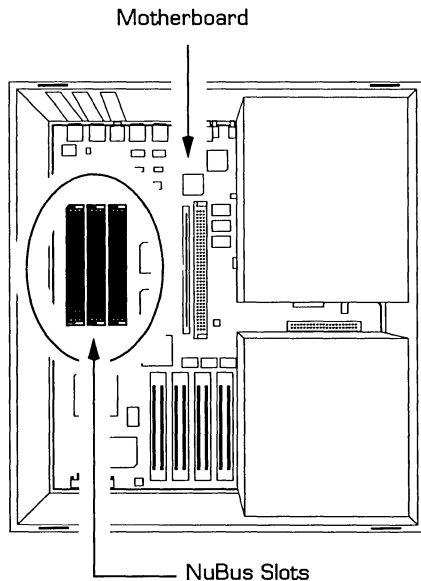
With your hand, lightly touch the power supply unit inside your computer. This disperses any static electricity that might be present in your body and prevents damage to your equipment.



CAREFULLY...  
touch power  
supply unit with  
your hand

## Select a NuBus Slot

Look straight down inside your computer chassis and you're looking at the *motherboard*. Find the NuBus slots on the left side of the motherboard. Some slots might already be in use. You need a NuBus slot to install your PAS 16 Sound Card.



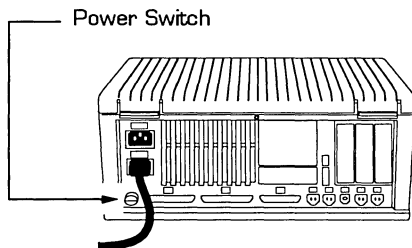
If you don't have a NuBus slot available, or if you want to switch an existing card to a different slot, complete the steps below. **Otherwise**, determine which slot you want to use and proceed to the next step, *Remove Slot Covers* on page 10.

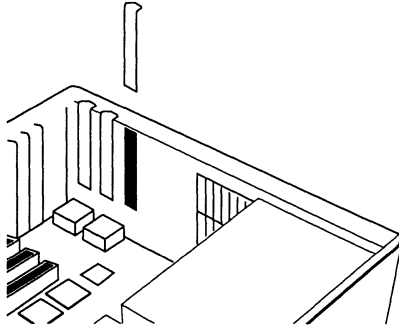
- 1 Determine which NuBus slot you want to use.
- 2 Check for any cables connected to the card on the rear panel, or connected to the motherboard, or connected to other components. If there are any, disconnect them.
- 3 If there is a screw holding the card in place, remove it.
- 4 Grasp the card by its top edges and pull firmly but gently straight up to disconnect the card from the NuBus slot.
- 5 Make sure you haven't left any screws or other metals objects inside the chassis, and then locate the Power Switch on the rear panel. Press the Power Switch to restart your Macintosh.

You don't need to replace the cover or monitor for this step. However, you **must** restart in order to reset the NuBus from the settings on the card you just removed.

- 6 Wait about 10 seconds and then press the Power switch to turn your Macintosh off again.

If you plan to reinstall the card you just removed in a different slot, install your PAS 16 Sound Card first, and then re-install the card you just removed.





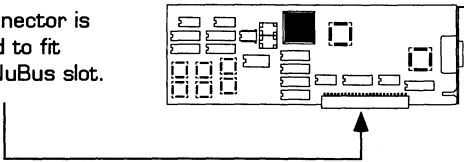
## Remove Slot Covers

Corresponding to the NuBus slot you've selected, there might be a metal plate covering the opening at the rear of the chassis.

If necessary, remove the metal plate.

There might also be a plastic cover over the opening on the other side. If it's present, remove it by pushing it out from the inside of the chassis.

This connector is designed to fit over a NuBus slot.

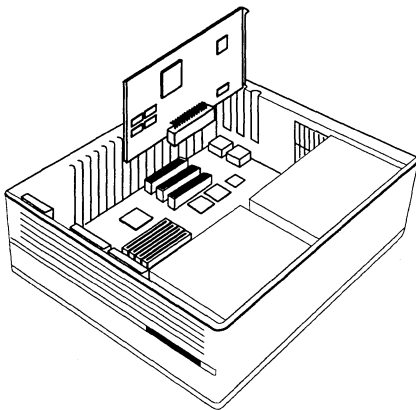


## Install PAS 16 Sound Card

**WARNING!** Handle your card carefully. Avoid touching any of the connections or the chips on the card.

Note the connector at the bottom of the card. It is designed to fit snugly over one of your NuBus slots.

- 1 Hold your PAS 16 Sound Card by its top edges and carefully position it over the NuBus slot so that the connector on the card aligns with the slot.
- 2 Install the card by pushing it down gently so that the connector seats fully over the NuBus slot.



**Do not force** the connectors into the slot. Carefully align the connectors with the slot and firmly, but gently, push the card down. If you encounter undue resistance, remove the card, realign it, and try again.

## Re-Assemble Your Macintosh

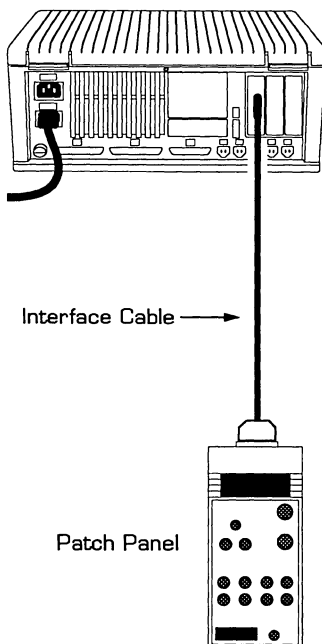
The inside front part of your cover has two plastic tabs on either side that fit into two matching slots on the front edge of the chassis.

- 1 Check to make sure you haven't left any loose screws or other metal objects inside your chassis.
- 2 Hold the cover in place, align the two tabs with their matching slots, and insert the tabs into the slots.
- 3 Lower the rear part of the cover and snap it into place against the rear panel of the chassis.
- 4 Replace the screw you removed earlier to attach the cover to the chassis.

## Connect Interface Cable

Locate the Patch Panel and Interface Cable in your PAS 16 Mac package.

- 1 Attach one end of the Interface Cable to the connector on the rear of your PAS 16 Sound Card, which is now visible at the rear panel of your Macintosh.
- 2 Attach the other end of the Interface Cable to the matching connector found on one end of your Patch Panel.



## Position Patch Panel

You can position your Patch Panel anywhere that suits you. Until you've used it for a while and decided which devices you want to keep connected most of the time, you'll probably want to keep it in a readily accessible spot.

Installation of your PAS 16 Mac equipment is complete. Be sure to re-connect all power cords and cables, and then turn to page 15 to install your software.

# MACINTOSH LC

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## Remove Computer Cover

Shut down your computer system and turn the power OFF to all of your equipment. Leave the power cord connected between your computer and the power outlet to help ground your equipment.

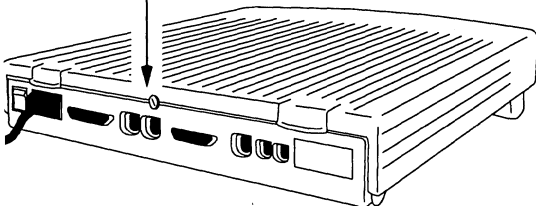
- 1 Working from the rear of your Macintosh, remove the screw that attaches the cover to the chassis.

Put the screw where you can find it later.

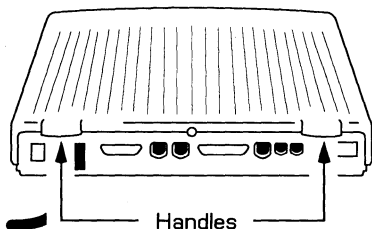
- 2 On the rear side of the cover are two plastic *handles*. Working from the front of your computer, lift up on the two handles to unsnap the cover from the chassis.

- 3 Lift the cover straight up and away from the chassis. Then set the cover aside safely out of your way.

Screw attaching  
cover to chassis



Lift the cover straight up and  
away from the chassis



## Discharge Yourself

Locate any unpainted, metal surface inside your Macintosh and, with your hand, lightly touch the metal surface. This disperses any static electricity that might be present in your body and prevents damage to your equipment.



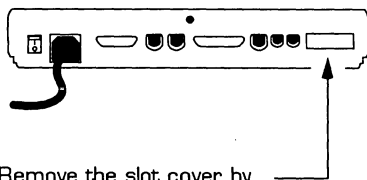
CAUTION! Surfaces might be hot.



## Remove Slot Cover

On the rear panel of your Macintosh LC you'll find a plastic cover over the access port to your PDS expansion slot. You must remove the cover to have access to the connector on your PAS 16 Sound Card after it is installed.

To remove the cover, reach inside the chassis and push it out from the inside.



Remove the slot cover by pushing it **out** from the inside of your Macintosh

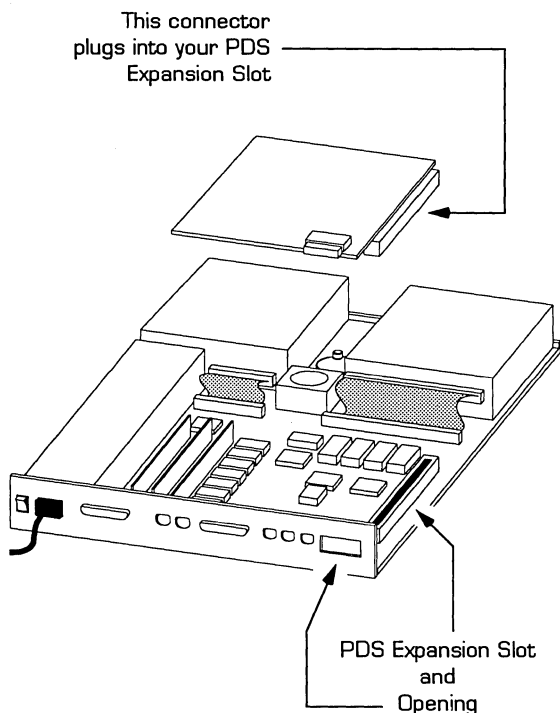
## Install PAS 16 Sound Card

**WARNING!** Handle your card carefully. Avoid touching any of the connections or the chips on the card.

Note the connector at the bottom of the card. It is designed to plug into the PDS expansion slot inside your Macintosh LC.

- 1 Hold your PAS 16 Sound Card by its edges and carefully position it over the PDS slot so that the connector on the card aligns with the slot.
- 2 Install the card by pushing it down gently. The connector must seat fully over the PDS slot, and the connector on the rear of the card must fit into the expansion slot opening you made available in the previous step. This connector must be accessible at the rear of your computer so you can connect your Patch Panel in a later step.

**Do not force** the connectors into the slot. Carefully align the connectors with the slot and firmly, but gently, push the card down. If you encounter undue resistance, remove the card, realign it, and try again.



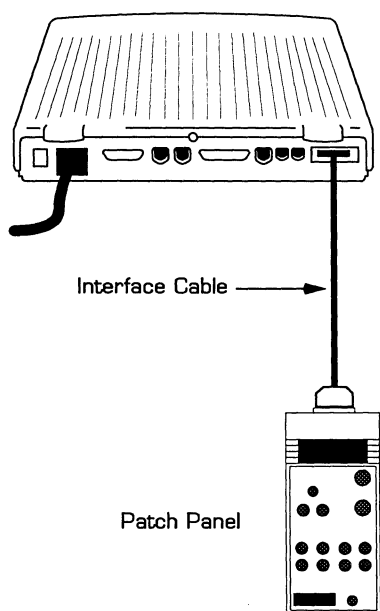
## Replace Cover

The inside front part of your cover has two plastic tabs on either side that fit into two matching slots on the front edge of the chassis.

- 1 Hold the cover in place, align the two tabs with their matching slots, and insert the tabs into the slots.
- 2 Lower the rear part of the cover and snap it into place against the rear panel of the chassis.
- 3 Replace the screw you removed earlier to attach the cover to the chassis.

## Connect Interface Cable

Locate the Patch Panel and Interface Cable in your PAS 16 Mac package.

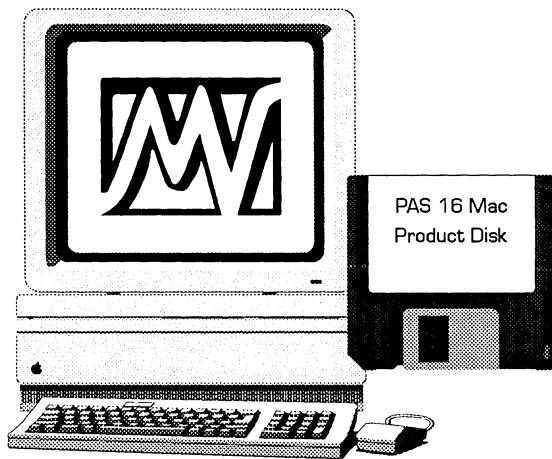


- 1 Attach one end of the Interface Cable to the connector on the rear of your PAS 16 Sound Card, which is now visible on the rear panel of your Macintosh LC.
- 2 Attach the other end of the Interface Cable to the connector found on one end of your Patch Panel.

## Position Patch Panel

You can position your Patch Panel anywhere that suits you. Until you've used it for a while and decided which devices you want to keep connected most of the time, you'll probably want to keep it in a readily accessible spot.

Installation of your PAS 16 Mac equipment is complete. Be sure to re-connect all power cords and cables, and then go to page 15 to install your software.



## SOFTWARE INSTALLATION

Your PAS 16 Mac Product Disk contains the software you need to operate your equipment.

**NOTE:** Please make a copy of your PAS 16 Mac Product Disk. Store your original disk in a safe place and use your copy from here on.

Insert the copy of your Product Disk into your disk drive and, if necessary, open the disk's window by double-clicking the disk icon on your desktop. Your disk should contain the items shown here:



PAS16 Mixer



JoyStick



PAS16



Sound Tools 16

## Installing Your Software

This section briefly describes the software components found on your Product Disk and also explains how to install each one.

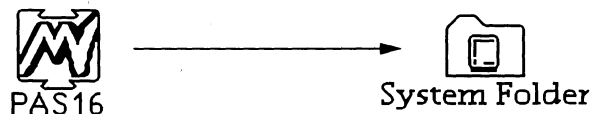
### *PAS 16 System Extension*

This software component is *required*. It is a System Extension (or, INIT) and it must be installed in your System Folder. PAS 16 contains the software necessary to control the functions on your PAS 16 Mac Patch Panel.

Once installed, PAS 16 loads automatically during startup, and you see the PAS 16 icon appear momentarily at the bottom of your screen.

To install the PAS 16 System Extension:

- 1 Select the PAS 16 icon and drag it on top of your System Folder icon. Then, release the mouse button.



If you're using System 7.0 or later, a dialog box appears asking if you want to install this component in your Extensions folder. Click *OK* to copy PAS 16 to that folder.

If you're using System 6.0.7, the PAS 16 INIT copies directly into your System Folder.

- 2 Restart your Macintosh so that the PAS 16 system extension is able to load into memory. If you prefer, you can wait until after you've installed the other PAS 16 Mac software (as explained in the remainder of this section) before restarting.

### Resolving Conflicts between System Extensions

If you load other system extensions during startup, one or more of them might *conflict* with PAS 16 and cause your Macintosh to malfunction in various ways. If you experience such problems after installing PAS 16, you need to *isolate* your system extensions to determine which one is causing the problem. The following steps explain how to do this.

**To identify a conflicting system extension (or, INIT):**

- 1** If you're using System 7.0 or later, restart your Macintosh and hold down the Shift key during startup. This prevents all system extensions from loading into memory.

If you're using System 6.0.7, restart your Macintosh using a different startup disk – such as a floppy disk with a minimum System configuration on it.

- 2** Move all system extensions (or, INIT's) out of your System Folder, with the exception of PAS 16.
- 3** Restart your Macintosh.

After restarting, everything should work fine because only the PAS 16 extension is loaded. In this case, continue with step 4 in this procedure.

If at this point you are still experiencing a problem, contact Media Vision Technical Support for assistance (see the table of phone number on page 5).

- 4** Replace one of the System Extensions you removed earlier back into your System Folder.

Replace only **one** extension at a time. Otherwise, you won't have any way of knowing which one is creating the conflict.

- 5** Restart your Macintosh.

- 6** If the problem you were experiencing reoccurs, you have isolated the extension that is causing the problem. Go to step 7.

If the problem does **not** reoccur, repeat steps 4 and 5 until such time as it does. Then, continue with step 7.

- 7** If the extension that is causing the problem is **not essential** to the operation of your Macintosh, leave it out of your System Folder permanently – or, contact the manufacturer of the extension to see if an updated version is available.

If the problem extension is **essential**, **first** contact the manufacturer of the extension to see if an updated version is available. If no update is available, contact Media Vision Technical Support for further assistance.

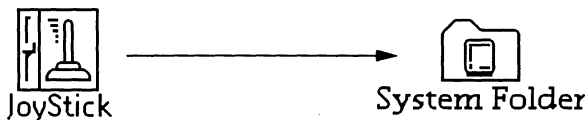
## *Joystick Control Panel*

If you plan to install and use a joystick, you must install this Control Panel (or, CDEV) in your System Folder. You'll learn how to attach a joystick to your PAS 16 Mac Patch Panel in the next chapter.

If you do *not* plan to install a joystick, you do not need to install this component.

To install the Joystick Control Panel:

- 1 Select the **Joystick** icon and drag it on top of your System Folder icon. Then, release the mouse button.



If you're using System 7.0 or later, a dialog box appears asking if you want to install this component in your Control Panels folder. Click *OK* to copy the Joystick Control Panel to that folder.

If you're using System 6.0.7, the Joystick Control Panel copies directly into your System Folder.

You do not need to restart your Macintosh after installing the Joystick Control Panel.

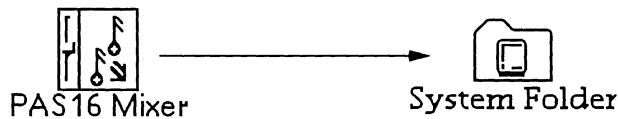
The Joystick Control Panel provides options for controlling the operation of your joystick. See your *Sound Tools User's Guide* to learn about these options.

## ***PAS 16 Mixer Control Panel***

The PAS 16 Mixer Control Panel provides options for controlling the operation of your PAS 16 Mixer. See your *Sound Tools User's Guide* to learn about these options.

To install the PAS 16 Mixer Control Panel:

- 1 Select the PAS 16 Mixer icon and drag it on top of your System Folder icon. Then, release the mouse button.



If you're using System 7.0 or later, a dialog box appears asking if you want to install this component in your Control Panels folder. Click *OK* to copy the PAS 16 Mixer Control Panel to that folder.

If you're using System 6.0.7, the PAS 16 Mixer Control Panel copies directly into your System Folder.

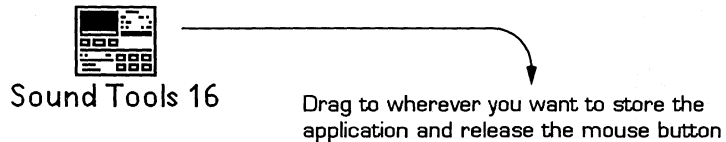
You do not need to restart your Macintosh after installing the PAS 16 Mixer Control Panel.

## ***Sound Tools 16 Application***

This application program helps you record, edit, and play back sound documents with your PAS 16 Mac. See your *Sound Tools User's Guide* for a complete description and instructions for this program.

To install Sound Tools 16:

- 1 Determine where you want to place Sound Tools 16 on your hard disk.
- 2 Drag the Sound Tools 16 icon to your hard disk (or the folder where you want to store the program) and release the mouse button.

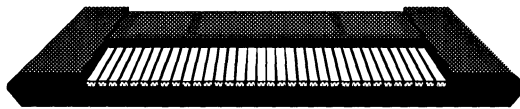
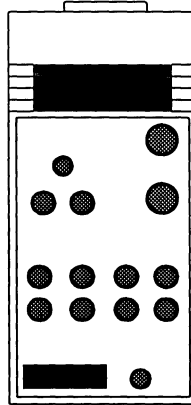


After releasing the mouse button, Sound Tools 16 is copied to your specified location.

Your PAS 16 Mac hardware and software is now ready to use.

Turn to page 21 to learn how to use your PAS 16 Mac hardware components, and how to connect other devices to your Patch Panel.



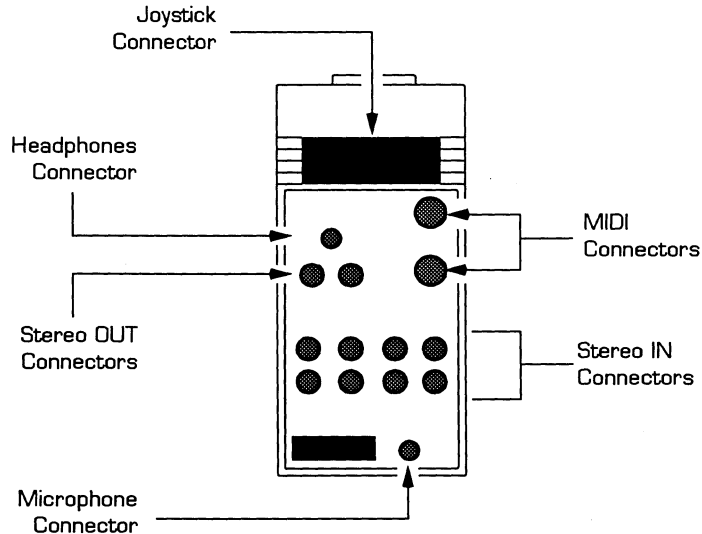


## **USING YOUR PAS 16 Mac EQUIPMENT**

This section explains how to use your PAS 16 Mac hardware. Specifically, it describes the connections found on your Patch Panel and how to use them to attach other devices to your system through this component.

## The Patch Panel

Your Patch Panel contains several different connectors. A diagram of these connectors follows, along with information about each one and how to use it.



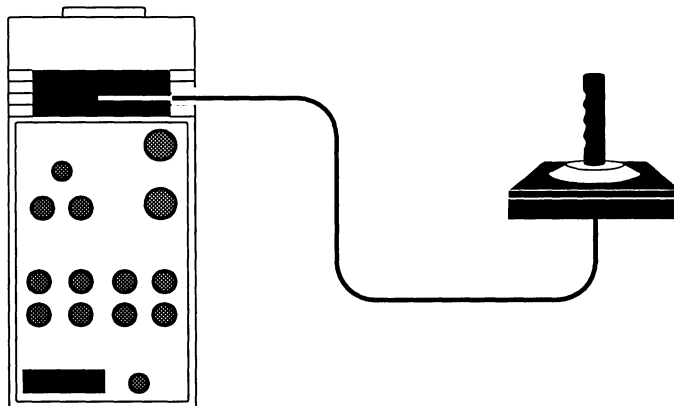
**WARNING!** Always shut down your Macintosh and turn off power to all equipment before connecting any device to your Patch Panel. Connecting a device while the power is on can damage your equipment.

### *Joystick Connector*

Some entertainment and game software (such as a flight simulator) are easier to control and more enjoyable using a joystick rather than your mouse or keyboard. You can connect a joystick to your Patch Panel to use with these products.

Your PAS 16 Mac package does **not** contain a joystick. You can, however, purchase one from most computer retail stores and mail order outlets. Before making such a purchase, read this section carefully to make sure you buy a joystick with the proper connectors.

The joystick connector on your Patch Panel is located near the top of the unit – below the Media Vision logo. This connector accepts a standard 15-pin, D-Shell connection. Examine both connections closely to make sure they are compatible before attempting to connect your joystick.

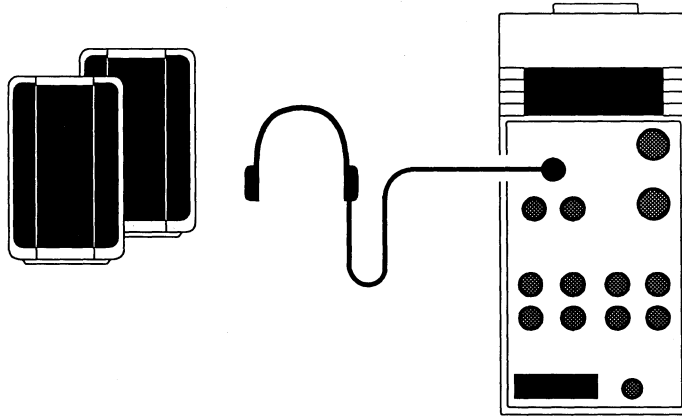


**NOTE:** For your joystick to operate correctly, the Joystick Control Panel (CDEV) must be installed in your System Folder. If the Control Panel is not currently installed, follow the instructions on page 18 to install it. You do not have to restart your Macintosh after installing the Control Panel.

The Joystick Control Panel lets you set various options for the way your joystick operates. See your *Sound Tools 16 User's Guide* for information about the options in the Joystick Control Panel.

## *Headphones Connector*

For private listening, or to more closely monitor audio while recording, you can connect your favorite pair of headphones to the Headphones connector on your Patch Panel. Or, if you have a pair of self-powered speakers you want to connect to your Patch Panel, you can connect them to the Headphones connector.

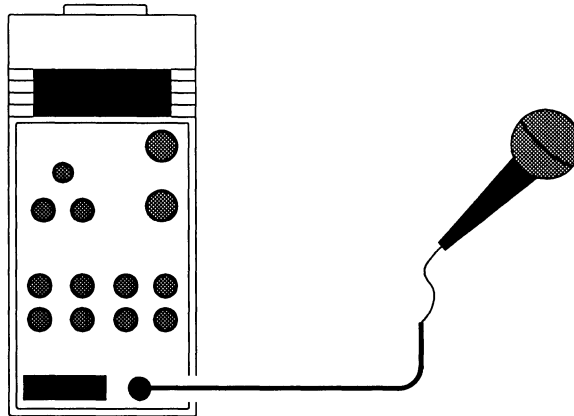


This connector accepts a standard RCA-type mini-stereo jack. If your headphones (or speakers) have a different type of jack, you can use a special adapter to connect them. Your PAS 16 Mac package does **not** contain one of these adapters. You can purchase one from an electronics or audio supply store.

**WARNING!** Your headphones can be damaged if the volume level to your Patch Panel is set too high. Before connecting your headphones, use the Sound Tools 16 program to adjust the volume to less than 50% output. See your *Sound Tools 16 User's Guide* for instructions on using the utility program to adjust the volume level.

### *Mic IN Connector*

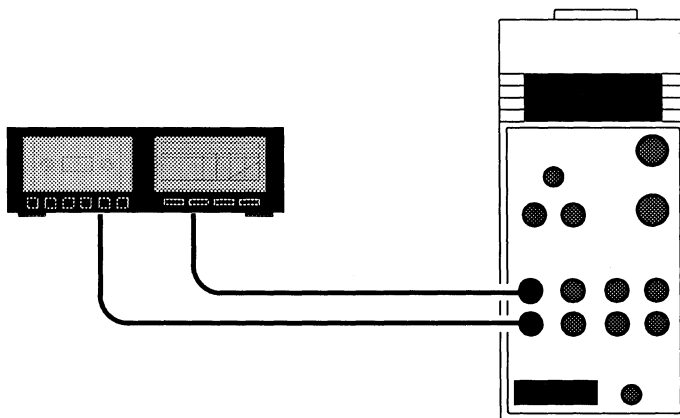
You can plug any suitable microphone into this jack when you want to record from a live source – such as your own voice or those of others.



You can connect any type of microphone to this jack as long as it is rated at either 4 or 8 ohms impedance. If your microphone has a different type of jack, you can use a special adapter to connect it. Your PAS 16 Mac package does **not** contain one of these adapters. You can purchase one from an electronics supply store, audio supply outlet, or most department stores.

### ***Stereo IN Connectors***

These connectors accept *line-level* input from a variety of external devices, such as a tape cassette deck or audio CD player. Most devices of this type provide a jack for sending line-level output to some other device, such as your Patch Panel. With this type of connection, you can record directly from the external device. This type of connection yields optimum audio quality.



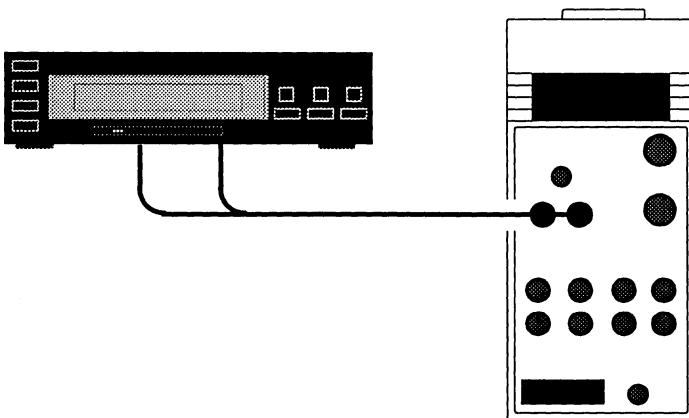
These are standard RCA-type phono connectors. You have four separate pairs of connectors available, so you can connect as many as four different external devices to your Patch Panel.

If the external device you want to attach does not have the right type of jack to connect to the Stereo IN connectors, you can purchase adapters from electronic supply stores, audio supply outlets, and most department stores. Your PAS 16 Mac package does not provide these adapters.

Please refer to the owner manual for any device you want to attach before connecting it to the Stereo IN Connectors.

### *Stereo OUT Connectors*

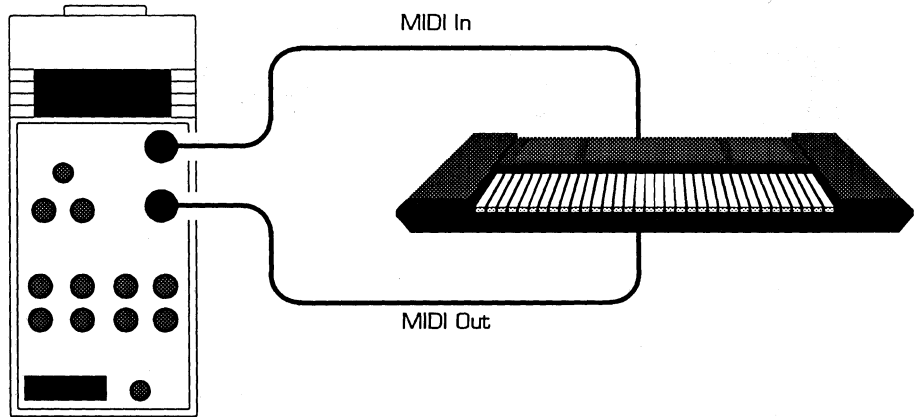
These connectors can be used to direct audio output through your Patch Panel to a suitable output device. One way you might want to use these connectors is to attach an external amplifier to your Macintosh.



Some Macintosh models (such as the Quadra, LC, and IIfx) provide jack(s) on the rear panel for connecting audio output devices (such as speakers). These jacks, however, are restricted to 8-bit audio output, maximum. Your PAS 16 Sound Card, on the other hand, accommodates 16-bit audio output. You'll receive superior audio quality by using the Stereo OUT Connectors on your Patch Panel rather than the output connectors on the rear panel of your Macintosh. The Stereo OUT Connectors on your Patch Panel take priority over the connections on your Macintosh. That is, connecting an output device to your Patch Panel automatically disables output through the Macintosh connectors.

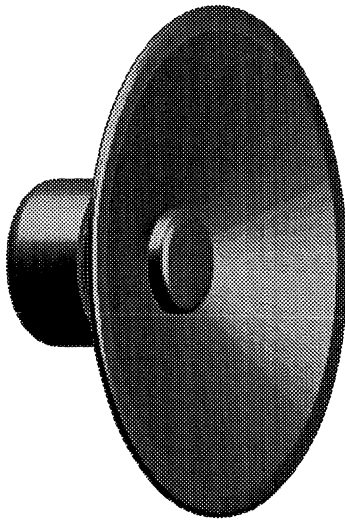
## ***MIDI Connectors***

Your Patch Panel provides two separate MIDI Connectors – MIDI In and MIDI Out. You can connect a variety of different MIDI devices to these connectors for receiving input *from* a MIDI device, and for directing output *to* a MIDI device.



**Both connectors accept standard MIDI-type jacks. Please consult the manuals that came with your MIDI device before attaching it to the MIDI connectors.**





## **SOUND THEORY**

*If a tree falls in the forest but no one is there to hear it, does it make a sound?*  
Probably – because any object moving through space moves (or, vibrates) the air molecules around it, and the human auditory system is highly sensitive to such vibrations. That is, our ears sense vibrating air molecules and translate the vibrations into information our brains interpret as sound.

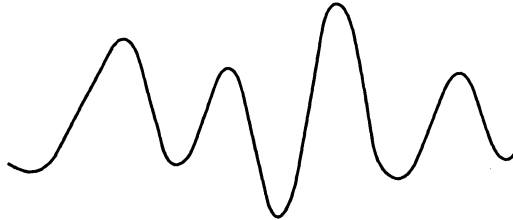
Whether it's a tree falling in the forest, a telephone ringing, or vibrations emitted by plucking a guitar string, the principal is always the same – our ears detect the vibrating air molecules and translate them into noises our brains can discern and, normally, distinguish from other sounds.

This is a very simple explanation of the theory of sound. Many other factors come into play as we explore the theory further. For example, why are some sounds louder than others? and, why do some sounds please our senses more than others?

You don't need to be an expert on sound to get the most out of your PAS 16 Sound Card and software. However, if you have a basic understanding of the theories, especially as they relate to computer equipment, you'll more readily appreciate the power and sophistication of the Media Vision hardware and software you've purchased and installed on your Macintosh.

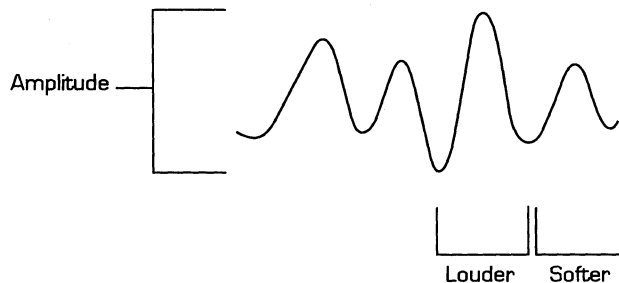
## Principles of Sound

Sound is often shown graphically as a line called a *waveform*. The waveform represents many different aspects of the sound's characteristics and might look something like this:

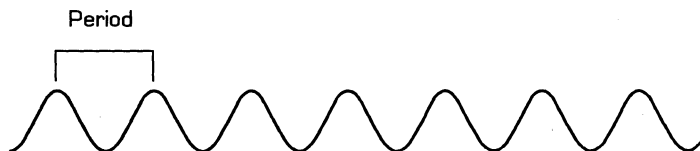


So that we can more easily understand and discuss a sound's characteristics, we use a variety of terms to name them – such as *amplitude*, *period*, and *frequency*.

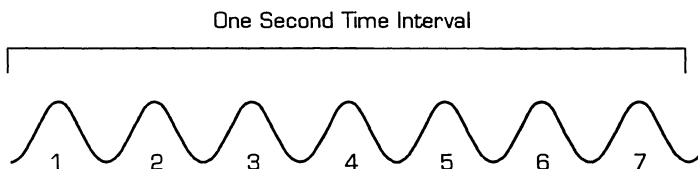
**Amplitude** describes a sound's strength, which really determines just how loud it is. Amplitude is measured by the vertical range (or, height) of the waveform. The higher and lower the peaks of the waveform, the louder or softer the sound. As shown below, the louder portion of the sound has higher and lower peaks than does the softer portion.



**Period** measures the distance between any two successive peaks in a waveform.



**Frequency** measures the number of peaks that occur in a waveform within one second.



We typically measure frequency in *hertz* (Hz) or *kilohertz* (kHz). The waveform above measures 7 Hz because it contains seven peaks (or, cycles) within the one second time interval.

## Macintosh Sounds

Sound we perceive with our ears is best described as *analog* sound. This is because our ears directly measure and interpret vibrating air molecules using our auditory senses. Your Macintosh has no auditory senses, so it cannot perceive sounds in an analog format.

### *Digitized Sound*

Your PAS 16 Sound Card converts waveforms (as they pass through the hardware) into *digitized* sound. That is, it processes the waveform and turns it into numeric (or, digital) values. Your Macintosh can then process the digital values in much the same way it processes other information – such as text, graphics, and so forth.

When digitizing a waveform, your PAS 16 Sound Card does the following:

- It analyzes the waveform every 1/44,000 of a second (maximum potential) and converts the information from analog to digital format (this analysis is called *sampling*, and you'll learn more about it in a moment).
- As part of the analysis, your PAS 16 Sound Card also stores a value to indicate the amplitude of the waveform.

Your PAS 16 Sound Card stores the information it gathers from the preceding steps in memory (RAM) or on your hard disk. You can then manipulate the information using various software programs.

## Sound Sampling

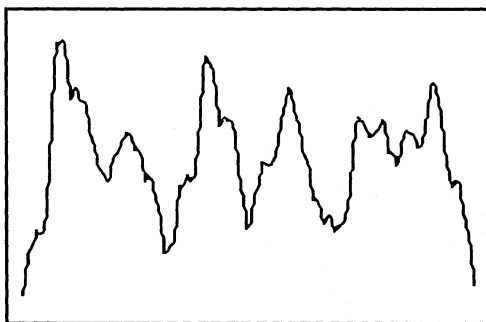
While digitizing sound, your Macintosh analyzes a “slice” of the waveform – and this can occur thousands of times per second. This process is known as sound *sampling* and one of the reasons it is used is to keep sounds (whether stored on disk or occupying memory) to a practical and manageable size.

The process of sampling means that some information from the original analog sound is lost. In many cases, however, the difference between the original and the sampled sound is imperceptible to the human ear.

The following illustration graphically shows the difference between an original waveform and its digitized and sampled counterpart:

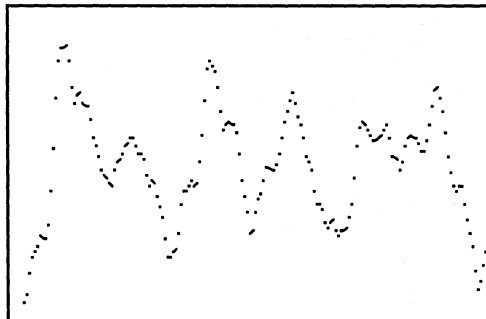
### ORIGINAL WAVEFORM

Before digitizing and sampling, the original, analog waveform is a stream of continuous information, as shown here by the solid lines.



### DIGITIZED/SAMPLED WAVEFORM

During sampling, the original waveform is analyzed thousands of times each second. Each sample is then converted into digital information your Macintosh can use.



Note that the Digitized/Sampled Waveform appears as a series of dots rather than a solid line. This illustrates that the resulting waveform contains only part of the information from the original one, and the information is distributed as digitized data.

The standard Macintosh computer samples sounds at a rate up to 22 kHz. That is, the maximum number of sound samples it can collect per second is 22,254. Your PAS 16 Sound Card increases this limit to 44 kHz (or, 44,010 samples per second).

### Downsampling

Downsampling occurs when you record a sound at any rate less than 22 kHz. It also occurs if you later convert a 22 kHz (or higher) sound to anything less than 22 kHz.

Downsampling reduces the disk and memory requirements for the sound, but it also reduces the frequency range and, thus, sacrifices sound quality.

### *Sound Resolution*

The final aspect of sound processing you should understand is *resolution*. This determines, potentially, the amount of information stored from each sound sample. In the case of a sound sample with very high amplitude, the amount of information that *could* be stored is very high. So, here again, to conserve disk and memory space, your Macintosh does not attempt to store all of the information from that particular sample. Instead, it uses an algorithm to extract only as much data as it can store within a predetermined space in memory and, eventually, on disk.

Some information about the sound is lost as a result of this resolution factor. Thus, some degradation in sound quality does occur – though minimal.

Maximum sound resolution on the standard Macintosh computer is 8-bits. That is, each time a sound sample is taken, your Mac saves only as much data as it can store within 8-bits. (Think of a *bit* as an individual location in memory where a minute amount of information can be stored.)

Your PAS 16 Mac increases your Macintosh's sound resolution capacity to 16-bits. This more than doubles the amount of information your Macintosh can store with each sound sample it takes. Thus, a great deal more information is retained – with the results being significantly better sound quality than you can achieve using 8-bit sound resolution, and more disk space required to store the sound.

## Notes

**Table 3 • Pro Audio Spectrum 16 Mac Specifications**

<b>SIGNAL QUALITY (1V p-p reference)</b>	
Sample Rate (16 bit PCM)	<ul style="list-style-type: none"> <li>• 2-44.1kHz programmable frequency step size &lt; 1kHz</li> </ul>
Dynamic Range and Signal to Noise	<ul style="list-style-type: none"> <li>• Synthesized mixed audio: -75dB</li> <li>• Sampled audio (PCM): -85dB</li> </ul>
Frequency Response	20Hz-20kHz (3/- 3dB)
Filtering	4Hz-20kHz programmable
Volume Control (programmable in steps with left and right channel adjustment)	<ul style="list-style-type: none"> <li>• Master volume: 0 to -80dB (2dB/step)</li> <li>• Mixer: +3 to 12dB</li> </ul>
<b>SYNTHESIS: YAMAHA YMF262 MODE OPTIONS</b>	
2 Operator	<ul style="list-style-type: none"> <li>• 18 Voices</li> <li>• 16 Melody and 6 Rhythms</li> </ul>
4 Operator	<ul style="list-style-type: none"> <li>• 6 four-operator melody voices with 6 two-operator voices</li> <li>• 6 four-operator melody voices with 3 two-operator voices and 5 rhythm voices (four operator)</li> </ul>
<b>AUDIO MIXING</b>	
8 Input stereo audio mixing with independent left/right channel control	
Internal synthesizers (stereo)	
Microphone 4 channel external line-in audio (stereo)	
<b>SYSTEM INPUTS/OUTPUTS</b>	
4 Line-level inputs	
Dual RCA Line-level output	
Dual RCA Headphone output (mini-stereo)	
MIDI – 1 Input and 1 Output	
Standard Joystick 15-pin	
<b>VOLUME CONTROL</b>	
Master volume	0 to -62dB (1dB/step)
Input mixer	+1 to -60dB (2dB/step)

# Notes





# QUICK START SHEET FOR PRO-AUDIO SPECTRUM 16 (Mac)

First please verify that all of the necessary components were included in your package. These are described on page 3 of the *Pro AudioSpectrum 16 Installation Guide*.

Next, verify that your system meets the basic requirements described on page 2 of the *Pro AudioSpectrum 16 (PAS 16) Installation Guide*.

## HARDWARE INSTALLATION

- 1 Remove the cover of your Macintosh system. If you are not familiar with this procedure, please reference your system manuals or the *PAS 16 Installation Guide*.
- 2 Discharge any static electricity present in your body by lightly touching the Mac power supply (the metal "box" located at the rear right side of your system chassis) inside your computer.
- 3 Next insert the card into the computer. First select the desired NuBus slot that you wish to use.

To insert the card, hold it by its top edges and carefully position it over the NuBus slot so the connector on the PAS 16 aligns with the slot. Gently push down on the PAS 16 so that the connector seats fully over the slot. **DO NOT** force the card into the slot! If you encounter undue resistance; remove the card, re-seat it, and try again.

**NOTE:** Mac IIsi systems require a Nubus slot adapter. These are available from your local Mac dealer.

- 4 Replace the cover of your Macintosh system.
- 5 Connect the interface cable to the connector on the rear of your PAS 16 (now visible at the the rear panel of your Macintosh). Attach the other end of the cable to the matching connector found on the Patch Panel.
- 6 Position the Patch Panel so that it is easily accessible within your workspace.

**NOTE FOR MAC LC USERS:** The installation procedure for an LC Bus is basically identical, with the exception of the way you plug the card in the Mac. Refer to page 12 of the *Pro AudioSpectrum 16 Installation Guide* for a more detailed description of this procedure.

# SOFTWARE INSTALLATION

- 1 Insert the Sound Tools diskette into any drive. Double click on the icon that appears shortly thereafter. This will expand into a "window" that contains the following 4 icons:
  - Joystick
  - PAS 16
  - Sound Tools 16
  - PAS 16 Mixer
- 2 Double-click your hard drive icon, so that it expands into a "window". Find your System Folder.
- 3 Individually drag the Joystick, PAS 16, and PAS 16 Mixer icons on to the System Folder and release the mouse button (the System Folder icon will turn black when each icon is properly positioned for this transfer).
- 4 Drag the Sound Tools 16 icon to your hard disk (or the folder where you wish to store the program), and release the mouse button.
- 5 Make sure that have selected the PAS 16 microphone icon (located in the Sound control panel under the "Control Panels" option of the Apple menu).

Now your PAS 16 hardware and software should be properly installed and ready for use. Refer to your *Sound Tools 16 User's Guide* for instructions for using these accessories.

**NOTE:** Your Sound Tools 16 icon's appearance is slightly different than as it appears in your publications. We apologize for any inconveniences this may have caused you.

## TROUBLESHOOTING

---

**Problem:** I am unable to RECORD files:

**SOLUTION:** Make certain that the desired input level is raised to an adequate level in the PAS 16 mixer.

These slider switches correspond by number to the input ports on the patch panel (1,2,3,4, and Mic In)

---

**Problem:** I am not getting any output when attempting to PLAY files:

**SOLUTION:** First, connect a set of personal stereo headphones to the headphone jack on the patch panel to determine if your speakers are working.

Make sure that the volume level (in the PAS 16 Mixer) is adequate. Also make sure that the "Mute Inputs" button is not depressed.

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Now your PAS 16 hardware and software should be properly installed and ready for use. Refer to your *Sound Tools 16 User's Guide* for instructions for using these accessories.

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**Problem:** I am not getting any output when attempting to PLAY files:

**SOLUTION:** First, connect a set of personal stereo headphones to the headphone jack on the patch panel to determine if your speakers are working.

Make sure that the volume level (in the PAS 16 Mixer) is adequate. Also make sure that the "Mute Inputs" button is not depressed.

# Pro AudioSpectrum 16 (Macintosh) Addendum

Version 1.0

## ***Please Read***

***This addendum contains additional information that was omitted from your Pro AudioSpectrum 16 Installation Guide.***

This addendum describes the following information:

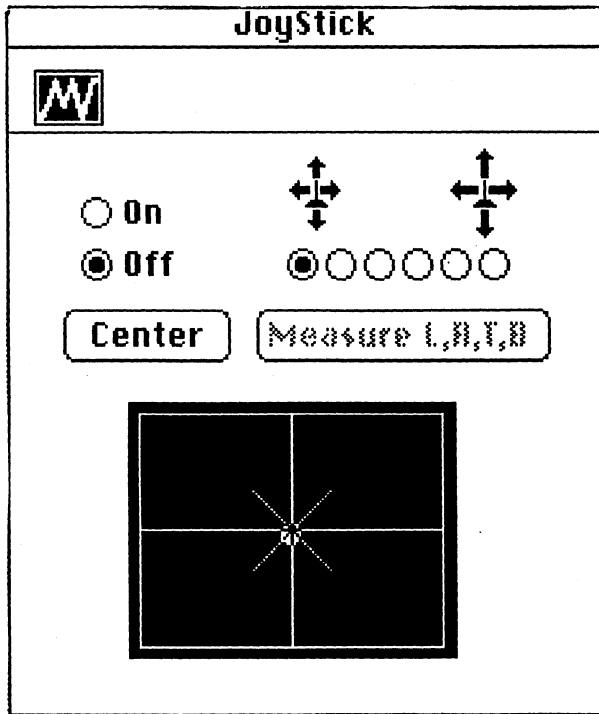
- Configuring and Aligning The Joystick

## Joystick Registration & Alignment

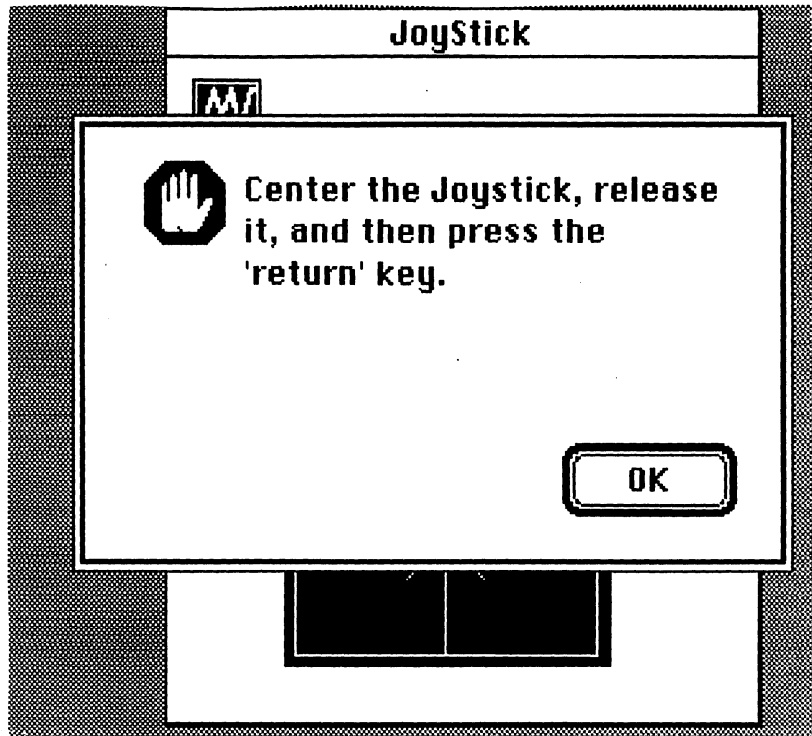
If you use a Joystick with your PAS 16, you'll want to use the Joystick Control Panel (CDEV) to align and register your joystick. Aligning and registering the Joystick ensures that your PAS 16 hardware and software are accepting information from the Joystick correctly. Before you open the Joystick Control Panel make sure you connect the Joystick to the Patch Panel (see page 14 of your *Installation Guide*).

To register and align the joystick:

1. Select Control Panels from the Apple System menu.
2. Double-click on the Joystick icon. The Joystick Control Panel appears.



3. Press the Center button. A dialog box appears asking you to center the Joystick. Press the "return key" when you are finished.

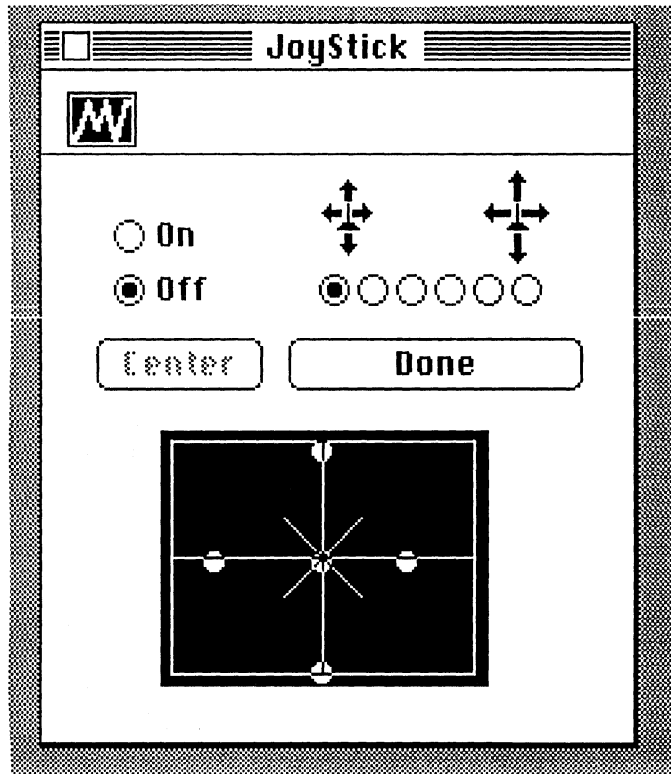




4. Click on the Measure L,R,T, B button. Click on the OK button when the Alert box appears. This button allows the Left, Right, Top and Bottom limits of your Joystick to be registered and aligned.



5. Move the Joystick full Left, Right, Up, and Down. Notice how the cross hairs move inside the alignment window.



If you want to disable the Joystick, click on the Off radio button. Press the Done button when you are finished.

6. Click on the Close box to exit the Joystick Control Panel.

These settings are now the default for your Joystick.