PART 1 INTRODUCTION
AudioPCI* Technology
AudioPCI* technology is a combination of hardware and software that provides the highest quality i
n PC sound and the greatest compatibility with current standards. AudioPCI* will continue to supp
ort new standards as they emerge.

AudioPCI* technology was developed by ENSONIQ, a recognized leader in the electronic musical instr
ument industry. The same advanced chip designs that function as the engines for ENSONIQ's line of
professional-level synthesizers, samplers, and effect processors have been used in AudioPCI*. In a
ddition to this impressive array of hardware technology, your AudioPCI* card contains the result o
f many years' experience in sound development. Every instrument sound has been created with waveta
ble synthesis and held to a professional performance standard. Each sound in the wavetable is deri
ved from real instrument sounds that have been carefully produced for inclusion in ENSONIQ's exten
sive sound library.

For more information about the ENSONIQ Product Line, write to this address:

<center>

ENSONIQ, Corp.
Accessory Desk, Dept. SS
155 Great Valley Parkway
PO Box 3035
Malvern, PA 19355-0735

</center>

What is AudioPCI*?
ENSONIQ's new AudioPCI* sound card utilizes breakthrough technology to take full advantage of the
PCI bus' architecture, while maintaining compatibility with older legacy software. Legacy game com
patibility was originally a problem when considering a PCI based sound card solution. The problem
was that existing software and games for the PC had been designed to run on ISA based sound cards.
To function properly, those cards must write directly to the inherently slow ISA Direct Memory Acc
ess (DMA) controller. These signals are not present on the PCI bus. AudioPCI* allows legacy softwa
re to function as if the ISA signals are present, while utilizing the faster speed of the PCI bus.

Why PCI?
The PCI bus is far superior to the ISA bus. It is capable of transferring data on a wider 32-bit b
andwidth bus. This allows much more data to pass from the PCI bus to the host processor. The ISA b
us is only capable of 16-bit bandwidth transfers. Using the PCI bus will allow a 4 to 20 times inc
rease in speed over much slower DMA transfers on the ISA bus. This drastically reduces the overhea
d on the host CPU. This tremendous processing power opens up new possibilities for sound cards. Re
al-time software based sound fields are now possible without bogging down the host CPU.

Here's a brief overview of AudioPCI*'s main features:

Synthesizer
* Provides up to 32 voices of wavetable synthesis.
* Includes two and four megabyte General MIDI/ Roland MT-32 sound sets as well as AdLib/ S
oundBlaster Pro I (with OPL2) FM synthesizer emulation.
* Because of the high data transfer rates that the PCI bus will allow, AudioPCI* is able t
o utilize a flexible method of storing and accessing wavetable sounds. All 128 General M
IDI instrument sounds are stored on the PC's hard drive and accessed using the compute
r's on-board RAM. This technology allows for expandable sound sets.

Digital Audio
* Allows the recording of CD-quality stereo sound (up to 16 bits, 48.0 kHz sampling rate)
from Aux, CD and TV Tuner Inputs as well as from the internal synthesizer.
* Allows the recording of mono sound from the Mic Input with or without 5-volt BIAS power
or 30-dB boost.
* Allows the recording of mono sound from the Modem/TAD Input/Output.
* Playback of stereo wave samples of 8- or 16-bit sound.
* Enables playback of standard PC Wave files (.VOC, .WAV, etc.).

MIDI
* Provides an MPU-401 compatible MIDI interface, including MIDI In and MIDI Out/Thru (requ
ires external cable, not supplied).
* Allows the recording of MIDI events from an external MIDI keyboard controller.
* Enables playback of standard PC MIDI files (i.e., .MID, .ROL, etc.) to either the on-b
oard synthesizer or to an external synthesizer.

Mixer
Provided software mixer allows synthesizer and digital audio output to be mixed with signal arrivi
ng at the card's CD, Aux, Mic, Modem and TV Tuner Inputs.

Included Software

AudioPCI∗ is supplied with installation software, configuration utilities, device drivers and initialization utilities.

About This Manual

Many people do not read manuals; however, an ounce of caution is worth a pound of prevention, so we do strongly recommend that you take a few moments to go through these pages before installing your AudioPCI∗ hardware and software. In particular, we recommend that you carefully read the information preceded by the following two symbols, which have these special meanings:

∗ This is a CAUTION. It lets you know that if you fail to heed the accompanying message, you could damage your system or software. Be sure to read these!

∗ This is a hint, tip, or other piece of valuable information that can save you time and energy, especially during initial installation.

PART 2 INSTALLING AUDIOPCI∗ HARDWARE

What You Need

To use AudioPCI∗, your computer system should meet the following requirements:

∗ 75 MHz Pentium processor or better

∗ VGA or SVGA graphics adapter and monitor

∗ Mouse

∗ Windows 95, Windows 95 OSR2, Windows NT 4.0 (I386 or Alpha), Windows NT 3.51, or Windows 3.x

∗ One open PCI expansion slot

∗ At least 12 MB of free hard disk space (to install all software and samples)

∗ Enough RAM to accommodate the system, plus the waveset chosen (2 MB and 4 MB wavesets included)

∗ You will also need a set of powered speakers or headphones.

What You Should Have

Check to see that your AudioPCI∗ package contains all of the following items:

∗ The ENSONIQ AudioPCI∗ sound card in anti-static bag

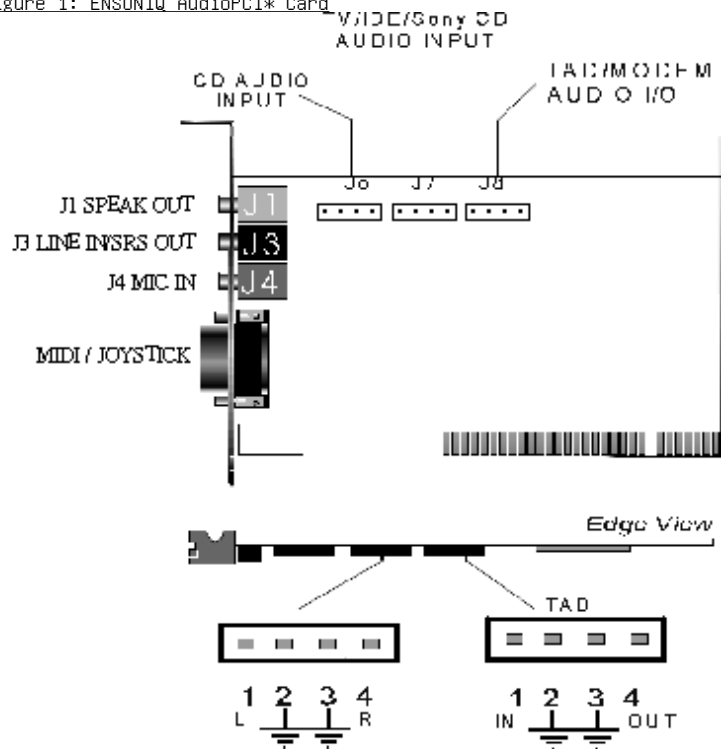∗ The ENSONIQ AudioPCI∗ Manual (this manual)

∗ Installation media

Preparing Your Computer

As you install the AudioPCI∗ card, follow these basic precautions:

∗ Some PC's maintain power to the motherboard even when the power switch is turned off.

∗ If it is necessary to disconnect peripheral equipment cables from the back of the computer, be sure to note cable positions for proper reconnection later.

∗ Remove the computer cover's mounting screws and save them for its replacement. Slide the cover off the computer and place it aside while you install the AudioPCI∗.

∗ Handle the card by the edges only, being careful not to touch edge connectors or exposed circuitry.

∗ Keep the board inside its protective anti-static packaging until you are ready to install it.

∗ Never place the board on a metal surface.

∗ Static electricity can damage your equipment, but can be easily avoided. Before installing any internal optional equipment such as the AudioPCI∗ card, consult your computer manufacturer's manual regarding grounding, power connection, and peripheral card installation.

∗ You can ground yourself by wearing an anti-static wrist strap (available at most electronics stores). To use this wrist strap:
1. Place the wrist strap on your wrist. Look for an alligator clip on the other end of the wrist strap's elastic cord. Some wrist straps require you to snap (attach) the clip to the elastic cord.
2. Attach the alligator clip securely to the edge of a D-shell shaped connector in one of the computer's serial ports (the D-shell shape surrounds the pins) or to an unpainted portion of the computer's chassis. To maintain proper grounding, the clip must remain securely attached (grounded) to the serial port connector or to an unpainted portion of the computer's chassis throughout the installation procedure.

∗ If you don't have an anti-static wrist strap, you can ground yourself by touching and maintaining continuous contact with an exposed metal surface of the computer (i.e., an unpainted portion of the computer's rear panel) while handling or touching any chips or internal components such as the AudioPCI∗ card.

Connectors

V/IDE/Sony CD
AUDIO INPUT

CD AUDIO
INPUT

TAD/MODEM
AUDIO I/O

J6   J7   J8

J1 SPEAK OUT   J1
J3 LINE IN/SRS OUT   J3
J4 MIC IN   J4

MIDI / JOYSTICK

Edge View

TAD

1 2 3 4
L   R

1 2 3 4
IN   OUT

Modem/TAD In/Out
Port J8 can be used to connect a modem audio line to AudioPCI*. You would use this connector when using telephone answering machine software for mono input and output.

TV Tuner/IDE/Sony CD Input
Port J7 is an MPC-3 stereo connector that can be used to connect a TV tuner, IDE CD-ROM audio connector, or a Sony CD-ROM audio connector.

CD Audio Input
Port J6 is an MPC-3 stereo connector that can be used to attach a CD-ROM audio connector.

Line Out/Headphone (Green)
J1 is a stereo line level output through which the combined signal of all internal and external audio sources on the board is output. It can be connected to 1/8-inch TRS stereo headphones or to amplified speakers.

Aux Input (Black)
J3 is a stereo line-level input that accepts a 1/8-inch TRS stereo plug. It can be used as a source for digital sound recording, a source to be mixed with the output, or both.

Mic In (Red)
J4 is a 1/8-inch jack that provides a mono input. It can be used as a source for digital sound recording, a source to be mixed with the overall output signal, or both.

If you use a dynamic microphone you should disable the BIAS power on the Settings tab of the Windows 95 Driver. If BIAS power is enabled with a dynamic microphone you may experience distortion. If you use an electret condenser microphone, enable the BIAS power on the Settings tab of the Windows 95 Driver.

Note: The Mic BIAS setting is located on the Microphone panel of the ENSONIQ Mixer in Windows NT 4.0 and Windows NT 3.51.

You may select to apply a 30-dB gain to the microphone input by checking the "Boost" box in the Microphone panel of the ENSONIQ Mixer.

Joystick/MIDI
 This is a 15-pin D-sub connector. It can be used with standard MIDI adapters and joystick connectors. The joystick interface will support both single and dual joysticks. See the "Connector Pin-Out" section on page 58 for "Figure 8: MIDI/Joystick Connector Pin-Out".

Placing the Card in Your Computer

* Always consult your system manual before opening your computer to avoid any damage. Consul t your computer manufacturer's manual regarding grounding, power connection, and peripheral card installation.
1. Remove the cover to your computer as described earlier. Your AudioPCI* card can be install ed in any available PCI expansion slot. Its approximately 3*-inch long double connector ca n identify a PCI expansion slot.
2. Remove the metal expansion slot cover for the selected slot. Save the screw for installing the board.
3. Hold the AudioPCI* card by the edges and press the connector gently but firmly into the exp ansion slot. Remember PCI cards generally are installed with the component side facing the opposite direction of ISA cards.
4. Align the notch in the mounting bracket of the AudioPCI* card with the screw hole in the re ar panel of the computer case. Use the screw that you removed from the metal expansion slo t cover to secure the AudioPCI* card in place. This step is important for proper grounding of the card.
5. Secure all internal cables before you replace the computer cover. If you are installing an internal CD-ROM drive, make sure you connect it properly.
6. Replace the computer cover.
7. Reconnect any peripheral equipment cables that you may have previously disconnected.
8. Make the audio connections you desire to AudioPCI*'s inputs and outputs.
9. If you wish to use a joystick, a MIDI device, or both, connect an adapter cable to the Audi oPCI* joystick/MIDI port.

PART 3 INSTALLING AUDIOPCI* SOFTWARE

This chapter includes installation and configuration instructions for all the supported operating systems. If you are using Windows 95 (version 4.00.950) follow the instructions under the section labeled "Windows 95" starting on page 11. If you have a new computer with Windows 95 (version 4.0 0.950B) follow the instructions in the section labeled "Windows 95 OSR2" starting on page 20. If you are using Windows NT 4.0 follow the instructions under the section labeled "Windows NT 4.0" st arting on page 22. If you are using Windows NT 3.51 follow the instructions under the section lab eled "Windows NT 3.51" starting on page 25. Finally, if you are using Windows 3.x follow the inst ructions under the section labeled "Windows 3.x" starting on page 27.

Windows 95

If you are using the Installation CD with the AutoRun feature enabled simply insert the CD. The A udioPCI* Install Launcher dialog will appear. The Install Launcher presents you with the option to view the release notes, read the manual, browse the CD, or start the Install Wizard.

Figure 2: ENSONIQ AudioPCI* Install Launcher

| 1.MANUAL |
| 2.WINDOWS 3.1 |
| 3.WINDOWS 95 |
| 4.WINDOWS APPLICATION |
| 5.WINDOWS 95 DEMO GAME |
| Exit |
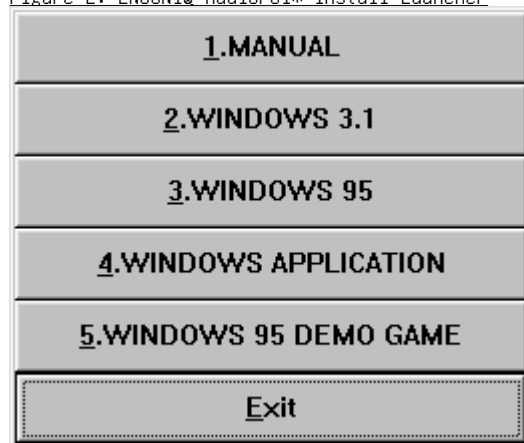
Installing/Updating the ENSONIQ AudioPCI* Installing the Driver for the First Time

The first time you run Windows 95 after inserting the AudioPCI* card, follow this procedure:
1. Log on to Windows 95 and establish any network connections.
2. Windows 95 will detect the AudioPCI* and prompt you for a driver diskette provided by the m anufacturer.
3. At this point, you should insert the AudioPCI* Install Wizard media and click *OK*. The inst all media could be a floppy diskette, a CDROM, a mapped network drive, or the contents of a folder in a local hard drive. "Clicking" refers to a single press of the left or primary m ouse button.

4. Type or *Browse*∗ to the path of the Install Wizard media followed by EAPCI.INF to start the program. (i.e., D:\S311\EAPCI.INF or A:\EAPCI.INF) Click *OK* to install the Windows 95 drivers.
5. Use "Windows 95 Default Driver" if possible to install the Gameport joystick when prompted and select *OK*. The Windows 95 installation media may be required.
6. Next, to ensure compatibility in MS-DOS Mode you should follow the procedure under "Updating the Current Driver" .

<u>Installing the Multimedia Extensions</u>
Windows 95 includes a number of multimedia utilities. If your system was configured with Windows 95 before the AudioPCI∗ card is installed it is likely that these utilities are not installed.
Note: To install these extensions, you will need to have your Windows 95 installation media handy.
If you wish to add these utilities:
1. Open the Control Panel by selecting ✉*Start* ✉ *Settings* ✉ *Control Panel.*
2. Double-click the Add Remove Programs icon.
3. Select the Windows Setup tab.
4. In the list of installed components, check Multimedia.
5. Select *Details*∗
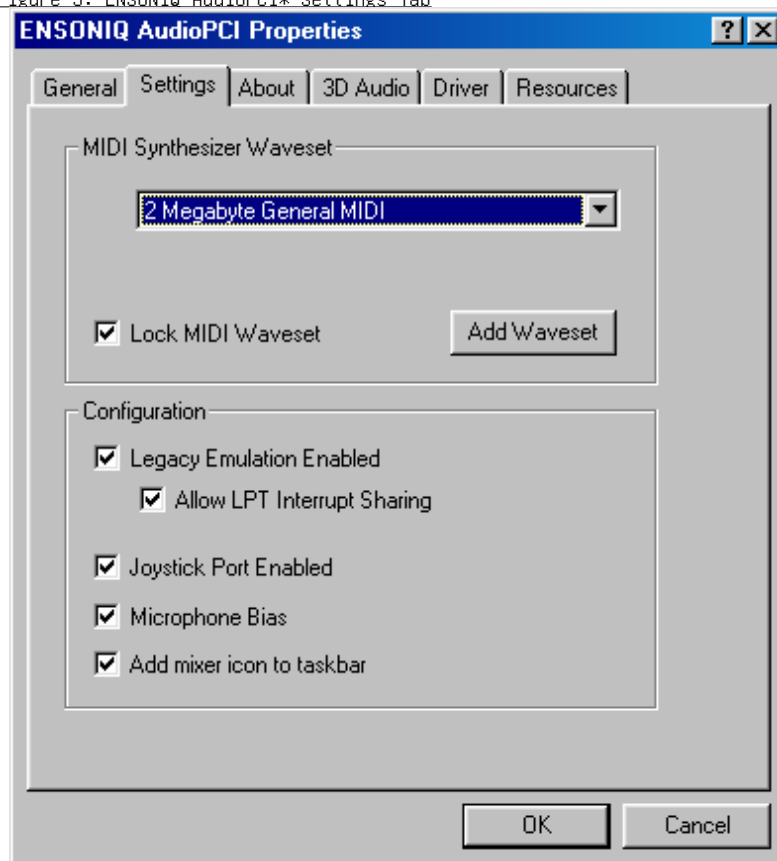6. Choose the components you wish to install and select *OK*.

Windows 95 will then install the Multimedia extensions. You may be prompted for the Windows 95 media at this time.
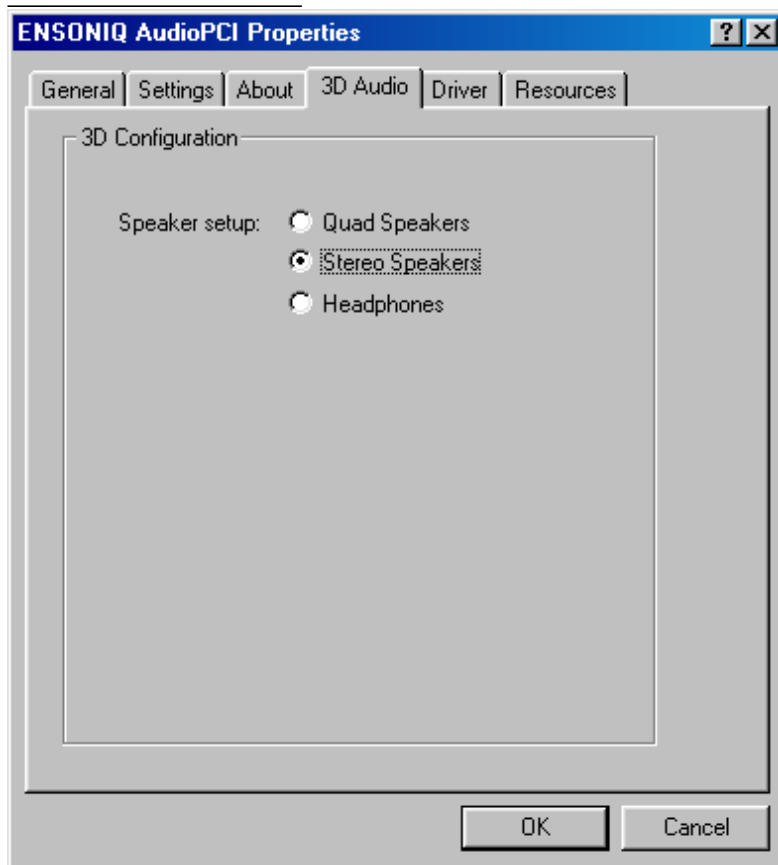
Configuring the ENSONIQ AudioPCI∗AudioPCI∗ requires one 64-byte I/O Range and one PCI Interrupt to function in Windows 95; however, additional resources must be allocated to enable legacy compatibility in an MS-DOS Prompt and MS-DOS Mode applications. See the section entitled "Configuring the ENSONIQ AudioPCI∗ Legacy Device" on page 17 for more information on configuring the AudioPCI∗ Legacy Device.
The AudioPCI∗ Properties window contains several tabs with the configuration options for the AudioPCI∗ card. To open the AudioPCI∗ Properties window follow the steps below:
1. Open the Device Manager by selecting ✉*Start* ✉ *Settings* ✉ *Control Panel* and double-clicking System.
2. Double-click "Sound, video and game controllers" from the hardware tree under the Device Manager tab.
3. Double-click ENSONIQ AudioPCI∗.

<u>Figure 3: ENSONIQ AudioPCI∗ Settings Tab</u>

ENSONIQ AudioPCI Properties

General | Settings | About | 3D Audio | Driver | Resources

3D Configuration

Speaker setup:　○ Quad Speakers
　　　　　　　　　● Stereo Speakers
　　　　　　　　　○ Headphones

OK　　Cancel

MIDI Synthesizer Wavesets

The first section under the Settings tab contains a drop down menu that will allow you to choose from either the 2-megabyte wavetable instrument set or the 4-megabyte instrument set included with AudioPCI∗. It is likely that new wavesets will be available in the future, so an *Add Waveset* button is included. Generally, the larger the waveset the better it will sound.

To select from existing wavesets:

　1. Click the down arrow in the "MIDI Synthesizer Waveset" section to display the drop down box with all the available wavesets.
　2. Highlight and click the waveset you wish to use.
　3. Click *OK* to close the ENSONIQ AudioPCI∗ Properties window.

To load a new waveset:

　1. Click the *Add Waveset* button in the "MIDI Synthesizer Waveset" section.
　2. *Browse∗* to the new waveset file (∗.ECW) and click *OK*.

　　Note: The ∗.ECW file will be copied to the folder indicated by the SNDSCAPE environment variable in the AUTOEXEC.BAT. (i.e., C:\EAPCI)

　3. The new waveset will appear in the MIDI Synthesizer Waveset drop down menu. Select it if it is not selected.
　4. Click *OK* to close the ENSONIQ AudioPCI∗ Properties window.

Locking the MIDI Waveset

The "Lock MIDI Waveset" checkbox in the Settings tab determines how the AudioPCI∗ manages the waveset memory.

If checked the entire waveset is locked into physical memory each time the driver is initialized on boot up or the MIDI Device is in use. When the MIDI Device is closed the waveset is unlocked, so the memory is available to other applications when the MIDI device is not in use.

If unchecked only the wavetable sounds in use are locked into memory. If a sound is not being played it will not be locked into memory. This means that as a complicated MIDI sequence is played there may be a delay as each instrument is locked to and paged out of memory. The only time this should be necessary is when another memory-heavy application has a greater need for RAM than the MIDI device.

For MS-DOS Prompt and MS-DOS Mode applications the entire waveset is always locked in memory regardless of this setting.

AudioPCI∗ legacy emulation provides applications with the resources necessary to function in MS-DO
S Mode or an MS-DOS Prompt. AudioPCI∗ does not require most of the resources used by non-PCI (als
o called ISA or Legacy) devices. To ensure compatibility with applications designed to function w
ith those non-PCI cards, the AudioPCI∗ Legacy Device is used.
When legacy emulation is enabled in the Settings tab the AudioPCI∗ Legacy Device will appear in th
e Device Manager. See the section entitled "Configuring the ENSONIQ AudioPCI∗ Legacy Device" on p
age 17 for more information.

To conserve system resources LPT interrupt sharing should be enabled. When this box is checked the
AudioPCI∗ Legacy Device attempts to use the same interrupt that the LPT port is using, which is ty
pically 5 or 7.

To enable the AudioPCI∗ joystick port in Windows 95 the Gameport Joystick drivers must be installe
d. The Gameport Joystick driver is provided with Windows 95. The Gameport Joystick device will ap
pear in the Device Manager after an initial install of the AudioPCI∗ or when the "Joystick Port En
abled" box is checked in the AudioPCI∗ Settings tab.
*Note: If another game card is installed in the system, the "Joystick Port Enabled" box should not
be checked.*
The 3D Audio can select used 2-speakers or 4-speakers.

If the "Microphone BIAS" box is checked 5-volt BIAS power will be applied to the red Mic Input. T
his is necessary for electret condenser microphones to function. Uncheck this box when using a dy
namic microphone.
MS-DOS Mode and MS-DOS Prompt do not have microphone support.

When this box is checked the ENSONIQ Mixer will be added to the system tray of the taskbar. This c
heckbox doesn't affect the Microsoft volume control, which is controlled by the Multimedia applet
of the Control Panel.

There should never be a need to use the *Change Driver*∗ button under the Driver tab of the ENSONIQ
AudioPCI∗ Properties window. Always use the Install Wizard to remove or update the driver files.

The PCI resources for AudioPCI∗ are assigned by the BIOS and should never be changed in Windows 95.
  Using the BIOS setup utility, you can ensure the AudioPCI∗ acquires the resources it needs.
Legacy devices, including the AudioPCI∗ Legacy Device, use only the resources available to the ISA
bus. The majority of the resources in a system can be reserved for the ISA bus. Almost every PCI
device in a system can share a single interrupt. Only rare PCI devices, using distributed DMA, ne
ed a DMA channel to be available.
A special note for those who use MS-DOS applications:
Unless you plan on using LPT interrupt sharing reserve IRQ 5 for the ISA bus to allow the AudioPCI
∗ Legacy device to acquire it. IRQ 7 is typically used by the LPT port and IRQ 10 by legacy devic
es (i.e., scanners and network adapters). They should also be reserved for the ISA bus. Remember
that at least one interrupt must be available to the PCI bus. IRQs 11 and 9 are good interrupts t
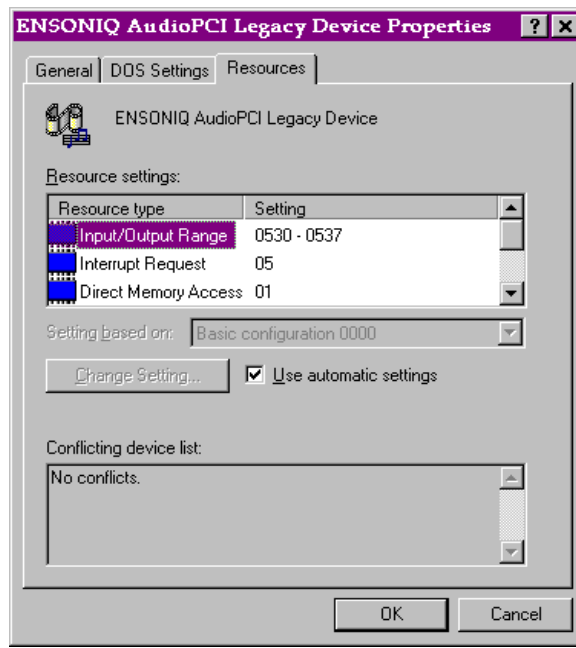o leave for the PCI bus.
Some BIOS setups allow the reservation of DMAs for the ISA bus as well. AudioPCI∗ doesn't require
a PCI DMA, but reserving DMAs 1 and 0 for the ISA bus will ensure that one of them is available to
the AudioPCI∗ Legacy Device.

Configuring the ENSONIQ AudioPCI∗ Legacy Device
Windows 95 assigns Plug and Play legacy device resources after the BIOS assigns PCI resources. The
ENSONIQ AudioPCI∗ Legacy Device requests the most popular resource settings when installed. The W
indows 95 Device Manager allows you to reconfigure the AudioPCI∗ Legacy Device resources, however,
so you can easily manage other legacy devices. Changes made to these settings are also reflected
in MS-DOS Mode. If the ENSONIQ AudioPCI∗ Legacy Device is disabled in Windows 95 the AudioPCI∗ wi
ll be disabled in MS-DOS Mode.
To reconfigure the AudioPCI∗ Legacy Device resources:

ENSONIQ AudioPCI Legacy Device Properties `? X`

General | DOS Settings | Resources

ENSONIQ AudioPCI Legacy Device

Resource settings:

Resource type	Setting
Input/Output Range	0530 - 0537
Interrupt Request	05
Direct Memory Access	01

Setting based on: Basic configuration 0000

Change Setting...   ☑ Use automatic settings

Conflicting device list:

No conflicts.

OK   Cancel

1. Open the Device Manager by selecting ✉Start ✉ Settings ✉ Control Panel and double-clicking System.
2. Double-click "Sound, video and game controllers" from the hardware tree under the Device Manager tab.
3. Double-click ENSONIQ AudioPCI* Legacy Device.
4. Select the Resources tab.

This will display the current AudioPCI* Legacy Device resources. These resource settings are obtained from one of ten Basic Configurations. These Basic Configurations contain the most popular hardware resource options. In most cases you can change just the Basic Configuration to resolve a conflict.

To change the Basic Configuration:
1. Clear the checkbox labeled "Use Automatic Settings" by clicking it, unless it is already clear.
2. Select the Basic Configuration pull-down menu.
3. Choose the Basic Configuration, noting the changes in the Resource window.

In some cases however you may wish to have more control over which resources are used. In this case, you can modify individual resources.

To modify individual resources:
1. Clear the checkbox labeled "Use Automatic Settings".
2. Select the Resource you wish to modify in the Resource Settings Window and click Change Setting* or double-click the resource.
3. If the Device Manager indicates that the resource is not modifiable you may still be able to change it by selecting an alternate Basic Configuration.
4. The Device Manager will then present you with the available options for this device. Use the up and down arrows to change the resource values or enter a specific value when the Edit Resource dialog prompts you.

When you are finished configuring the AudioPCI* Legacy Device select OK to close all open windows.

Disabling/Uninstalling the ENSONIQ AudioPCI*Disabling the driver

If you wish to disable all the AudioPCI* drivers, follow the steps below:
1. Open the Device Manager by selecting ✉Start ✉ Settings ✉ Control Panel and double-clicking System.
2. Double-click "Sound, video, game controllers" from the Device Manager tab's hardware tree.
3. Double-click ENSONIQ AudioPCI*.
4. Select the General tab.
5. Uncheck the option "Original Configuration (Current)".
6. Select OK.

If you wish to disable either or both the Gameport Joystick and AudioPCI* Legacy Device only, follow the steps below:

1. Open the Device Manager by selecting ✉Start ✉ Settings ✉ Control Panel and double-clicki
   ng System.
2. Double-click "Sound, video, game controllers" from the Device Manager tab's hardware tree.
3. Double-click ENSONIQ AudioPCI*.
4. Select the Settings tab.
5. Uncheck "Legacy Emulation Enabled" to disable the AudioPCI* Legacy Device. Uncheck "Joysti
   ck Port Enabled" to disable the Gameport Joystick.
6. Click OK to apply the changes

*Note: If the Legacy Emulation is disabled in the Device Manager, MS-DOS Mode and MS-DOS Prompt ap
plications will not be able to use the AudioPCI* card for sound or music.*

Uninstalling the AudioPCI*The Install Wizard includes a remove only option. To uninstall the AudioPCI*
and its software follow the steps below.

1. Open the Run dialog box by clicking on ✉Start ✉ Run*. Insert the Install Wizard media.
3. In the Run dialog box type or Browse*to the path of the Install Wizard media followed by WI
   ZARD.EXE to start the program. (i.e., A:\WIZARD.EXE or D:\s311\WIN95\ENGLISH\SETUP.
   EXE)
   Note: If you are using the AudioPCI Installation CD with the AutoRun feature enabled simpl
   y insert the CD. The AudioPCI* Install Launcher dialog will appear. Click Install to cont
   inue.*
4. The Welcome dialog will appear. Click Next.
5. The Install Wizard options will appear. To remove the drivers on your system select "Remov
   e Software", then click Next.
6. Click Finish to close the Install Wizard.

*Note: The Install Wizard's "Remove Software" procedure will remove all Windows 95 and MS-DOS driv
ers you may have installed, but it puts system integrity over the removal of AudioPCI* components.
Some AudioPCI* components may remain after the removal is complete.*

Windows 95 OSR2

Windows 95 OEM Service Release 2 (OSR2 or Windows 95 version 4.00.950B) comes installed on most ne
w systems. The Windows 95 OSR2 drivers are provided on the AudioPCI* Installation CD. The same In
stall Wizard used in Windows 95 is used in Windows 95 OSR2.

Note: If you are using the AudioPCI Installation CD with the AutoRun feature enabled simply inser
t the CD. The AudioPCI* Install Launcher dialog will appear. The Install Launcher presents you wi
th the option to view the release notes, read the manual, browse the CD, or start the Install Wiza
rd.*

Installing/Updating the ENSONIQ AudioPCI*Installing the Driver for the First Time

After inserting the AudioPCI* card follow this procedure the first time you run Windows 95 OSR2:

1. Log on to Windows 95 OSR2 and establish any network connections.
2. The Windows 95 OSR2 Update Device Driver Wizard will detect the AudioPCI* and attempt to lo
   cate a driver diskette provided by the manufacturer.
3. At this point, you should insert the AudioPCI* Install Wizard media and click Other Locatio
   ns*. Type or Browse* to the path of the Install Wizard media.
      (i.e., D:\s311\WIN95\ENGLISH\ or A:\) Click OK.
5. When the correct location is displayed in the Update Device Driver Wizard dialog click Fini
   sh.
6. The Windows 95 OSR2 installation media may be required to complete the installation of the
   Gameport Joystick.
7. Next, to ensure compatibility in MS-DOS Mode you should follow the procedure under "Updatin
   g the Current Driver" .

Updating the Current Driver

To complete a first time installation or if you currently have drivers installed and wish to updat
e them use the Install Wizard, following same instructions described under "Updating the Current D
river" on page 12.

Installing the Multimedia Extensions

Windows 95 OSR2 includes a number of multimedia utilities that can be installed following the same
procedure described under "Installing the Multimedia Extensions" on page 13.

*Note: To install these extensions, you will need to have your Windows 95 OSR2 installation media h
andy.*

Configuring the ENSONIQ AudioPCI* and Legacy Device

The AudioPCI* is configured exactly the same as detailed Configuring the ENSONIQ AudioPCI*" on pag
e 13 and "Configuring the ENSONIQ AudioPCI* Legacy Device" on page 17.

There should never be a need to use the Update Driver button under the Driver tab of the ENSONIQ A
udioPCI* Properties window. Always use the Install Wizard to remove or update the driver files.

Disabling/Uninstalling the ENSONIQ AudioPCI*Disabling the driver

If you wish to disable all the AudioPCI∗ drivers, follow the steps below:
1. Open the Device Manager by selecting ✉Start ✉ Settings ✉ Control Panel and double-clicki ng System.
2. Double-click "Sound, video, game controllers" from the Device Manager tab's hardware tree.
3. Double-click ENSONIQ AudioPCI∗.
4. Select the General tab.
5. Check "Disable in this hardware profile" and click OK.

If you wish to disable either or both the Gameport Joystick and AudioPCI∗ Legacy Device only, foll ow the steps below:
1. Open the Device Manager by selecting ✉Start ✉ Settings ✉ Control Panel and double-clicki ng System.
2. Double-click "Sound, video, game controllers" from the Device Manager tab's hardware tree.
3. Double-click on ENSONIQ AudioPCI∗.
4. Select the Settings tab.
5. Uncheck "Legacy Emulation Enabled" to disable the AudioPCI∗ Legacy Device. Uncheck "Joysti ck Port Enabled" to disable the Gameport Joystick.
6. Click OK to apply the changes

Note: If the Legacy Emulation is disabled in the Device Manager, MS-DOS Mode and MS-DOS Prompt ap plications will not be able to use the AudioPCI∗ card for sound or music.

Uninstalling the AudioPCI∗The Install Wizard includes a remove only option. To uninstall the AudioPCI∗ and its software follow the steps described under "Uninstalling the AudioPCI∗" on page 19.

Note: The Install Wizard's "Remove Software" procedure will remove all Windows 95 OSR2 and MS-DOS drivers you may have installed, but it puts system integrity over the removal of AudioPCI∗ compone nts. Some AudioPCI∗ components may remain after the removal is complete.
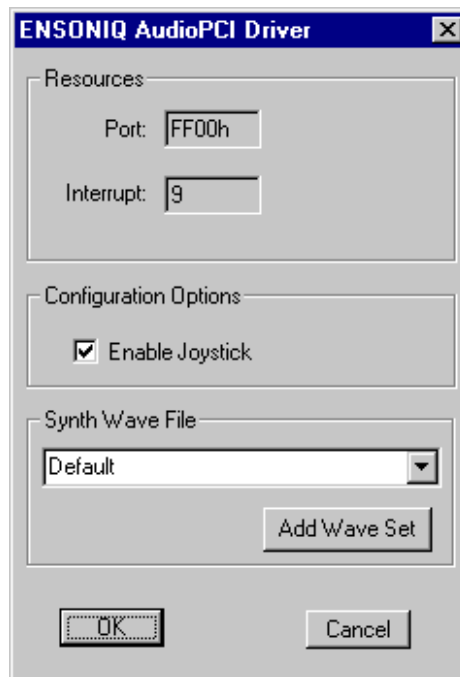
Windows NT 4.0

The Windows NT 4.0 drivers are provided on the AudioPCI∗ Installation CD. The DEFAULT.ECW file copied during the installation is a two-megabyte waveset. There is no support for true MS-DOS Mode or MS-DOS Prompt in Windows NT 4.0.

Note: If you are using the AudioPCI∗ Installation CD with the AutoRun feature enabled simply inser t the CD. The AudioPCI∗ Install Launcher dialog will appear. The Install button will be grayed ou t, but you may view the release notes, read the manual, or browse the CD.

Installing/Updating the ENSONIQ AudioPCI∗To install or update the software for the AudioPCI∗ in Windows NT 4.0 follow this procedure:
1. Logon to Windows NT 4.0 and establish any network connections.
2. Open the Control Panel by selecting ✉Start ✉ Settings ✉ Control Panel.
3. Double-click the Multimedia icon.
4. Expand Audio Devices in the Devices tab. Select any existing audio devices and click Remove. If no audio devices are present continue with step 6 .
5. Close the Multimedia applet, reboot and return to the Devices tab.
6. Click Add∗ Choose "Unlisted or Updated Driver", and click OK.
7. At this point you should insert the AudioPCI∗ Windows NT 4.0 driver media.
8. Type or Browse∗ to the path of the AudioPCI∗ Windows NT 4.0 driver media. (i.e., D:\NT40\E NGLISH\I386\CD or A:\)
9. Click OK to display the Add Unlisted or Updated Driver window. Select "ENSONIQ AudioPCI" a nd click OK to continue.
10. If you are updating your existing AudioPCI Windows NT 4.0 drivers a Driver Exists dialog bo x will appear. Select New to install the updated drivers.
11. The ENSONIQ AudioPCI∗ Driver window will be displayed. Click OK to complete the installatio n.

Configuring the ENSONIQ AudioPCI∗Figure 5: ENSONIQ AudioPCI∗ Driver Settings

<u>Joystick</u>

To enable the AudioPCI∗ joystick port in Windows NT 4.0 perform the following steps:

    1. Open the Control Panel by selecting ⊠*Start* ⊠ *Settings* ⊠ *Control Panel.*

    2. Double-click the Multimedia icon.

    3. Expand the Audio Devices branch under the Devices tab.

    4. Select "Audio for ENSONIQ AudioPCI∗" and click *Properties.*

    5. The ENSONIQ AudioPCI∗ Properties window will appear. Click *Settings*∗

    6. Under Configuration Options check "Enable Joystick".

       Note: If another game card is installed in the system, the "Joystick Port Enabled" box should not be checked.

    7. Click *OK* to close all open windows.

    ∗ To use the AudioPCI∗ joystick port in Windows NT 4.0 the joystick device driver must be installed. The Microsoft joystick driver is provided with Windows NT 4.0.

<u>Synth Wave File</u>

The ENSONIQ AudioPCI∗ Driver window provides a "Synth Wave File" section where you are able to select a wavetable instrument set to be used by the AudioPCI∗. It is likely that new wavesets will be available in the future, so an *Add Waveset* button is included. Generally, the larger the waveset the better it will sound.

To select from existing wavesets:

    1. Open the Control Panel by selecting ⊠*Start* ⊠ *Settings* ⊠ *Control Panel.*

    2. Double-click the Multimedia icon.

    3. Expand the Audio Devices branch under the Devices tab.

    4. Select "Audio for ENSONIQ AudioPCI∗" and click *Properties.*

    5. The ENSONIQ AudioPCI∗ Properties window will appear. Click *Settings*∗

    6. Click the down arrow in the "Synth Wave File" section to display the drop down box with all the available wavesets.

    7. Highlight and click the waveset you wish to use.

    8. Click *OK* to close all open windows.

To load a new waveset:

    1. Open the Control Panel by selecting ⊠*Start* ⊠ *Settings* ⊠ *Control Panel.*

    2. Double-click the Multimedia icon.

    3. Expand the Audio Devices branch under the Devices tab.

    4. Select "Audio for ENSONIQ AudioPCI∗" and click *Properties.*

    5. The ENSONIQ AudioPCI∗ Properties window will appear. Click *Settings*∗

    6. Click the *Add Waveset* button in the "Synth Wave File" section.

    7. Use the Load MIDI Waveset window to select the new waveset file (∗.ECW) and click *Open.*

Note: The *.ECW file will be copied to the %SYSTEMROOT%\SYSTEM32 folder. (i.e., C:\WINNT4\SYSTEM32)

8. The new waveset will now appear in "Synth Wave File" drop down menu. Select it if it is not selected.
9. Click *OK* to close all open windows.

ENSONIQ Mixer

The ENSONIQ Mixer shortcut is added to the Start Menu during the AudioPCI∗ installation. It provides volume, effects, and recording controls for the AudioPCI∗. See the "ENSONIQ Mixer" section on page 36 for details about the ENSONIQ Mixer.

Uninstalling the ENSONIQ AudioPCI∗To remove the software for the AudioPCI∗ in Windows NT 4.0 follow this procedure:

1. Open the Control Panel by selecting ⌧*Start* ⌧ *Settings* ⌧ *Control Panel.*
2. Double-click the Multimedia icon.
3. Expand Audio Devices in the Devices tab. Select the ENSONIQ AudioPCI∗ device and click *Remove.*
4. Close the Multimedia Properties window and reboot.

Windows NT 3.51

The Windows NT 3.51 drivers are provided on the AudioPCI∗ Installation CD. The DEFAULT.ECW file copied during the installation is a two-megabyte waveset.

Installing/Updating the ENSONIQ AudioPCI∗ Drivers

To install or update the software for the AudioPCI∗ in Windows NT 3.51 follow this procedure:

1. Logon to Windows NT 3.51 and establish any network connections.
2. Open the Program Manager. Double-click the Control Panel icon in the Main group.
3. Double-click the Drivers icon in the Control Panel window. Select any existing audio drivers and click *Remove.* If no audio drivers are present skip to step 5.
4. Click *OK* to close the Driver window and reboot. Open the Main group in the Program Manager and double-click the Drivers icon in the Control Panel to continue.
5. Click *Add∗* Select "Unlisted or Updated Driver" from the Add window and click *OK.*
6. At this point you should insert the AudioPCI∗ Windows NT 3.51 driver media.
7. Type or *Browse∗* to the path of the AudioPCI∗ Windows NT 3.51 driver media. (i.e., D:\NT351\ENGLISH\I386\CD or A:\)
8. Click *OK* to display the Add Unlisted or Updated Driver window. Select "ENSONIQ AudioPCI∗" and click *OK* to continue.
9. If you are updating your existing AudioPCI∗ Windows NT 3.51 drivers a Driver Exists dialog box will appear. Select *New* to install the updated drivers.
10. The ENSONIQ AudioPCI∗ Driver window will be displayed. Click *OK* to complete the installation.

Configuring the ENSONIQ AudioPCI∗Joystick

To enable the AudioPCI∗ joystick port in Windows NT 3.51 perform the following steps:

1. Open the Program Manager, then double-click the Control Panel icon in the Main group.
2. Double-click the Drivers icon in the Control Panel window.
3. Select "Audio for ENSONIQ AudioPCI∗" and click *Settings∗*
4. Under Configuration Options check "Enable Joystick".
    Note: If another game card is installed in the system, the "Joystick Port Enabled" box should not be checked.
5. Click *OK* to close all open windows.
∗   To use the AudioPCI∗ joystick port in Windows NT 3.51 the joystick device driver must be installed. The Microsoft joystick driver is provided with Windows NT 3.51.

Synth Wave File

The ENSONIQ AudioPCI∗ Driver window provides a "Synth Wave File" section where you are able to select a wavetable instrument set to be used by the AudioPCI∗. It is likely that new wavesets will be available in the future, so an *Add Waveset* button is included. Generally, the larger the waveset the better it will sound.

To select from existing wavesets:

1. Open the Program Manager, then double-click the Control Panel icon in the Main group.
2. Double-click the Drivers icon in the Control Panel window.
3. Select "Audio for ENSONIQ AudioPCI∗" and click *Settings∗*
4. Click the down arrow in the "Synth Wave File" section to display the drop down box with all the available wavesets.
5. Highlight and click the waveset you wish to use.
6. Click *OK* to close all open windows.

To load a new waveset:

1. Open the Program Manager, then double-click the Control Panel icon in the Main group.
2. Double-click the Drivers icon in the Control Panel window.
3. Select "Audio for ENSONIQ AudioPCI*" and click *Settings**
4. Click the *Add Waveset* button in the "Synth Wave File" section.
5. Use the Load MIDI Waveset window to select the new waveset file (*.ECW) and click *Open*. *Note: The *.ECW file will be copied to the %SYSTEMROOT%\SYSTEM32 folder. (i.e., C:\WINNT351\SYSTEM32)*
6. The new waveset will now appear in "Synth Wave File" drop down menu. Select it if it is not selected.
7. Click *OK* to close all open windows.

ENSONIQ Mixer

The ENSMIX32.EXE file is copied to the %SYSTEMROOT%\SYSTEM32 folder during the AudioPCI* installation. When executed it provides volume, effects, and recording controls for the AudioPCI*. See the "ENSONIQ Mixer" section on page 36 for details about the ENSONIQ Mixer.

To run the ENSONIQ Mixer in Windows NT 3.51 follow the instructions below:
1. Click on *File⊠Run* in the Program Manager to open the Run window.
2. In the Command Line section of the Run window type or *Browse** to the %SYSTEMROOT%\SYSTEM32\ folder followed by ENSMIX32.EXE.
   (i.e., C:\WINNT351\SYSTEM32\ENSMIX32.EXE)
3. Click *OK* to run the ENSONIQ Mixer.

Uninstalling the ENSONIQ AudioPCI* To remove the software for the AudioPCI* in Windows NT 3.51 follow this procedure:
1. Open the Program Manager, then double-click the Control Panel icon in the Main group.
2. Double-click the Drivers icon in the Control Panel window.
3. Select the ENSONIQ AudioPCI* from the "Installed Drivers" list and click *Remove*.
4. Close the Drivers window and Control Panel. Reboot to complete uninstallation.

Windows 3.x

The Windows 3.x drivers are provided on the AudioPCI* Installation CD. The DEFAULT.ECW file copied during the installation is a two-megabyte waveset. There is no support for MS-DOS Prompt inside Windows 3.x.

Installing/Updating the ENSONIQ AudioPCI* Drivers

To install or update the software for the AudioPCI* in Windows 3.x follow this procedure:
1. Logon to Windows 3x and establish any network connections.
2. Open the Program Manager. In the *File* menu, choose *Run**
3. At this point insert the AudioPCI* Windows 3.x Install Wizard media.
4. In the *Command Line* of the Run window type or *Browse** to the path of the Windows 3.x Install Wizard followed by SETUP.EXE.
   (i.e., D:\S311\WIN31\ENGLISH\SETUP.EXE or A:\SETUP.EXE)
5. The Welcome dialog will appear. Click *Next*.
6. Select "Remove and Install Components" and click *Next*.
7. Use *Browse** to enter or select the MS-DOS Mode utilities' destination folder if you don't wish to use the default C:\EAPCI folder.
8. Click *Next* to install the AudioPCI* Windows 3.x drivers.
9. Choose "Yes, I want to restart my computer now." and click *Finish* to complete the installation.

Note: When the installation has completed INITAP.BAT will be added to the AUTOEXEC.BAT file. INITAP.BAT must be loaded in order for MS-DOS Mode applications to function.

Configuring the ENSONIQ AudioPCI* All the settings for the AudioPCI* can be adjusted from the ENSONIQ AudioPCI* driver settings window. To open the settings window follow this procedure:
1. Open the Program Manager, then double-click the Control Panel icon in the Main group.
2. Double-click the Drivers icon in the Control Panel window.
3. Select "Audio for ENSONIQ AudioPCI*" and click *Settings**
4. Click *OK* to close all open windows if changes are made.

ENSONIQ Soundscape Emulation

The resources listed in the Soundscape Emulation section are used by applications that have native ENSONIQ Soundscape driver support.

Sound Blaster Emulation

The resources listed in this section determine the BLASTER environment variable settings for those applications that have support for Sound Blaster or Sound Blaster Pro.

Legacy Emulation

If this box is unchecked the AudioPCI∗ will be disabled in MS-DOS Mode. Only native Windows 3.x a
pplications will be able to use the AudioPCI∗ for sound.

Joystick

Check the "Joystick Enabled" box if you intend to use the AudioPCI∗ joystick port. Uncheck this bo
x if you are using a separate game card for your joystick.

Microphone BIAS

If the "Microphone BIAS" box is checked 5-volt BIAS power will be applied to the red Mic Input por
t. This is necessary for electret condenser microphones to function. Uncheck this box when using
a dynamic microphone.

MS-DOS Mode and MS-DOS Prompt do not have microphone support.

ENSONIQ Mixer

A group is created in the Program Manager called ENSONIQ AudioPCI∗. Within that group is the ENSON
IQ Mixer icon. It provides volume, effects, and recording controls for the AudioPCI∗. See the "ENS
ONIQ Mixer" section on page 36 for details about the ENSONIQ Mixer.

Uninstalling the ENSONIQ AudioPCI∗To uninstall the AudioPCI∗ Windows 3.x drivers follow this procedure:
1. Open the Program Manager. In the *File* menu, choose *Run*∗
2. At this point insert the AudioPCI∗ Windows 3.x Install Wizard media.
3. In the *Command Line* of the Run window type or *Browse*∗ to the path of the Windows 3.x Instal
   l Wizard followed by SETUP.EXE.

   (i.e., D:\S311\WIN31\ENGLISH\SETUP.EXE or A:\SETUP.EXE)
4. The Welcome dialog will appear. Click *Next*.
5. Select "Remove Components" and click *Next*.
6. Choose "Yes, I want to restart my computer now." and click *Finish* to complete the uninstall
   ation.

PART 4 USING AUDIOPCI∗ IN WINDOWS 95

The AudioPCI∗ card is compatible with the popular sound standards on the market. Games that suppo
rt the following sound modes will operate on the AudioPCI∗ card: AudioPCI∗, DirectX, ENSONIQ Sound
scape, SoundBlaster Pro I, AdLib and MPU401/Roland (Sound Canvas/General MIDI or MT32/LAPC-1). Fo
r additional information see the section titled "Selecting the Best Sound Options in a game" on pa
ge 34.

Three Operating Modes

You will use one of three modes when using the AudioPCI∗ card in Windows 95:
1. Windows 95 Mode
2. Windows 95 MS-DOS Prompt
3. Windows 95 MS-DOS Mode

Windows 95 Mode

Windows 95 Mode is the native mode of the AudioPCI∗ card. Games that indicate that they are for W
indows 95 use this mode. In general, the only thing required to play a game under Windows 95 is t
o install the game.

Some Windows 95 games will use DirectX. AudioPCI∗ is fully compatible with DirectX.

Windows 95 MS-DOS Prompt

The majority of games currently on the market are designed for MS-DOS only. The AudioPCI∗ card fu
lly supports MS-DOS games. The recommended method for playing MS-DOS games is to open an MS-DOS v
irtual machine (also known as MS-DOS Prompt or MS-DOS Box), install and run the MS-DOS game. The
icon, "MS-DOS Prompt", should appear in the Start Menu under Programs. This will give you an MS-D
OS Prompt.

The AudioPCI∗ Legacy Device must be enabled in order for MS-DOS Prompt games to function.

Windows 95 MS-DOS Mode

There could be times when you may not be able to or do not want to run a game in an MS-DOS Prompt.
The game may be incompatible with Windows 95, or you may not have enough system resources to play
the game with Windows 95 loaded. When these situations arise, you can use a mechanism called MS-D
OS Mode, which loads only the real-mode portions of the operating system.

Using MS-DOS Mode

To start the system in MS-DOS Mode:
1. Select *Shutdown* from your ✉*Start Menu.*
2. When the Shutdown dialog box appears select "Restart the computer in MS-DOS Mode."
3. Select *OK*.

This unloads the Windows 95 GUI and puts the system in MS-DOS Mode.

How MS-DOS Mode works

The AudioPCI∗ MS-DOS Mode driver initializes in the AUTOEXEC.BAT file before Windows 95 even loa
ds. During a Windows 95 session the MS-DOS Mode driver is inactive. When MS-DOS Mode is entered
the driver becomes active again.

Windows 95 will add the necessary lines for AudioPCI∗ to initialize to the AUTOEXEC.BAT and CONFIG.SYS each time it loads, even creating these files if they are missing. This ensures that AudioPCI∗ is initialized even if an alternate method is used to reach MS-DOS Mode. (i.e., a shortcut to an MS-DOS Mode application or the system boot menu by holding F8 as Windows 95 is loading)

Changes Made to the System

Files Deleted
The Install Wizard deletes the following files from the Windows 95 System folder (i.e., C:\WIN95\SYSTEM):

      SNDSCAPE.DRV
      VSNDSCP.386
      SSCAP.CPL
      SNDSCAPE.HLP
      CONCERT.VXD

Files Added
The Install Wizard copies the following files to the path indicated:

∗   The Windows 95 System folder (i.e., C:\WIN95\SYSTEM)
      EAPCI.VXD
      EAPCI95.DRV
      EAPCI2M.ECW
      DEFAULT.ECW
      EAPCI4M.ECW
∗   The Windows 95 folder (i.e., C:\WIN95)
      ENSMIX32.EXE
      STARTER.EXE
      MIXRES32.DLL
      SNDSCAPE.INI
∗   The Windows 95 Help folder (i.e., C:\WIN95\HELP)
      EAPCI95.HLP

AUTOEXEC.BAT
The Install Wizard adds a few lines to the AUTOEXEC.BAT file to initialize AudioPCI∗. If the AUTOEXEC.BAT file is missing it will be created. The lines added are described below.

Note: In Windows 3.x the only line added to the AUTOEXEC.BAT is "CALL C:\<path>\INITAP.BAT", where <path> refers to the AudioPCI∗ destination folder (i.e., C:\EAPCI) indicated during installation. This batch file contains the lines described below, which are necessary for the AudioPCI∗ to function.

1. SET SNDSCAPE=<SNDSCAPE.INI location>
   The SNDSCAPE environment variable points to the location of the SNDSCAPE.INI file. This file is installed when you install the Windows 95 driver. It typically resides in the Windows 95 directory.
    (i.e., SET SNDSCAPE=C:\WINDOWS).
   The SNDSCAPE.INI file is used for backward compatibility with other ENSONIQ Soundscape cards and should not be removed.

2. SET BLASTER=Axxx Ixx Dx T2
   This is included for SoundBlaster Pro compatibility. The "A" (SoundBlaster Port Address), "I" (Digital Audio Interrupt), and "D" (DMA Channel) values can be changed in the Device Manager of Windows 95. See the section entitled "Configuring the ENSONIQ AudioPCI∗ Legacy Device" on page 17 for more details. "T2" indicates stereo SoundBlaster Pro I digital audio.

3. <AudioPCI∗ Path>\APINIT.COM
   APINIT.COM is the AudioPCI∗ MS-DOS driver. It is required for the AudioPCI∗ card to function properly under MS-DOS Mode.
   APINIT.COM requires that EMM386.EXE or another memory manager, such as QEMM.SYS, is loaded. If needed the Install Wizard adds the necessary EMM386.EXE and HIMEM.SYS lines to your CONFIG.SYS file, creating CONFIG.SYS if it isn't present.
   On the rare occasion a program does not work with expanded memory, simply add the NOEMS parameter to your memory manager.
   (i.e., DEVICE=C:\WINDOWS\EMM386.EXE NOEMS)
   You may load this driver into high memory in the AUTOEXEC.BAT, even though by default it is not.

(i.e., LOADHIGH C:\EAPCI\APINIT.COM)

Do not remove the memory manager all together. Do not attempt to load APINIT.COM into high memory when using the NOEMS option if APINIT.COM fails to run APLOAD.EXE or APCONFIG.EXE.

In the rare case that a program will not work with a memory manager you will not be able to use the AudioPCI∗ card.

CONFIG.SYS

The Install Wizard adds a few lines to the CONFIG.SYS file to initialize AudioPCI∗. If the CONFIG.SYS file is missing it will be created. The lines added are listed below.

1. DEVICE=C:\WINDOWS\HIMEM.SYS
2. DEVICE=C:\WINDOWS\EMM386.EXE

Installing Games for AudioPCI∗

Determining Resources

In both an MS-DOS Prompt and MS-DOS Mode, you will generally have to tell the game what type of hardware is installed and what resources (Port, IRQ, DMA, etc.) the hardware is using.

To find the current AudioPCI∗ resources in Windows 95:

1. Open the Device Manager by selecting ⊠Start ⊠ Settings ⊠ Control Panel and double-clicking System.
2. Select "Sound, video, game controllers" from the Device Manager hardware tree.
3. Double click ENSONIQ AudioPCI∗ Legacy Device.
4. Select the DOS Application Settings tab.

You can use the information in this dialog box to help you configure MS-DOS games for use with the AudioPCI∗ card.

To find the current AudioPCI∗ resources in MS-DOS Mode:

1. Switch to your AudioPCI∗ directory. (i.e., C:\EAPCI\)
2. Type APCONFIG <ENTER>.

Note: The MS-DOS driver APINIT.COM must be running in order for APCONFIG.EXE to work properly.

∗ Some older games may have difficulty detecting the AudioPCI∗ card at certain resource settings. Typically, these games would expect the card to be at a fixed set of resources and would fail to load if those resources were not detected. If you have any older MS-DOS games that do not work properly, try changing the AudioPCI∗ Legacy Device's configuration. Use the table below as a guide.

Table 1 : Trouble-shooting Tips

ProblemResource

The SoundBlaster Pro emulation is not recognized. Try switching the AudioPCI∗ Wave IRQ between 7 and 5, use DMA channel 1, use Wave Port 220.

The ENSONIQ Soundscape emulation is not recognized.   Try using Base/MIDI Port 330, use Wave Port 534, use Wave/MIDI IRQ 5 or 7, use DMA 1

The MPU-401 emulation is not recognized. Try using Port Address 330.

Selecting the Best Sound Options in a game

Most MS-DOS based games that provide sound have some procedure for sound setup. These procedures generally present you with a list of popular sound cards or sound devices to choose from. The AudioPCI∗ card will work with one or more of the available options.

The methods used by games to present sound options can vary greatly. Some may present a single choice that corresponds to a particular sound device. (i.e., ENSONIQ Soundscape, SoundBlaster Pro I, Roland Sound Canvas, etc.) Others will provide an option for music and digital audio separately. (i.e., General MIDI music with SoundBlaster Pro I digital audio, etc.) Often there are two separate menus to configure in this case.

Some games allow you to set the MIDI port address and IRQ for music and sound. Make sure that these settings correspond to the values displayed by APCONFIG.EXE or the DOS Application Settings tab of the ENSONIQ AudioPCI∗ Legacy Device Properties window, described in the "Determining Resources" section on page 33.

There are games that offer MPU-401/Roland (General MIDI or MT-32/LAPC-1) as an option. Often these games allow you to set the MIDI port address and/or IRQ. Make sure they match the MIDI Address and IRQ settings in the MIDI Settings section of the DOS Application Settings tab in Windows 95. The same values can be found under "MPU-401 (General MIDI, Roland MT-32/LAPC-1) Emulation", displayed by APCONFIG.EXE in MS-DOS Mode. Remember to load the MT-32 MIDI patch with the MT32.EXE or APMIXER /M: 1 command if you select Roland MT-32 or LAPC-1 for music.

Sometimes a game offers ENSONIQ Soundscape support for digital audio, but auto-detects SoundBlaster Pro. Use the Wave Address and IRQ values in the "Wave/SB Emulation Settings" section of the DOS

Application Settings tab in Windows 95. These values are displayed under "Soundscape Emulation" and "SoundBlaster Pro Emulation" when using APCONFIG.EXE in MS-DOS Mode.

Frequently, a game only offers SoundBlaster Pro for digital audio. There are also times when you may choose to use SoundBlaster Pro over other options for your digital audio. The values you enter should correspond to the "Wave/SB" settings in the DOS Application Settings tab. AudioPCI∗ software emulates a SoundBlaster Pro board with OPL2 FM synthesis. Generally, when you set up a game that does not have direct ENSONIQ Soundscape support, you should choose SoundBlaster Pro (SoundBlaster Pro I, SoundBlaster Pro Original or SoundBlaster Pro Old) as your digital audio option.

> ∗ When configuring the SoundBlaster game settings, make sure that the IRQ and DMA settings match the Wave settings of the AudioPCI∗ Legacy Device. Remember that an easy way to find out the current hardware settings in MS-DOS Mode is to use APCONFIG.EXE from the AudioPCI∗ directory.
> (i.e., C:\EAPCI\APCONFIG)

Music Options

Most MS-DOS games offer a menu choice for sound when they start up. AudioPCI∗ supports all of the popular music options. The only time you will need to provide an instruction to AudioPCI∗ is when MT32/LAPC-1 is offered and Sound Canvas/General MIDI is not.

Because General MIDI provides the highest quality sound, the majority of today's popular games offer it as an option. Those that do not almost always offer MT-32 in its place. If you have a choice between General MIDI and MT-32, always choose General MIDI, since it will provide you with the best sound quality. If you need to use MT-32, you must first switch from the General MIDI patch set (the default) to the MT-32 patch set. Be sure to switch back to the General MIDI set when you are finished using the MT-32 waveset. See "MT32.EXE" on page 40.

Digital Audio Options

AudioPCI∗ supports ENSONIQ Soundscape, SoundBlaster, SoundBlaster Pro and AdLib digital audio emulation. If an application provides all of these as options specify ENSONIQ Soundscape as your first, SoundBlaster Pro I as your second and AdLib as your last choice for digital audio.

Applications that provide ENSONIQ Soundscape as an option are commonly denoted by an ENSONIQ Soundscape logo someplace on the package.

PART 5 USING AUDIOPCI∗ APPLICATIONS IN WIN95

ENSONIQ Mixer

ENSONIQ has included a mixer for AudioPCI∗. This mixer accommodates some features found on the AudioPCI∗ card. These features are unavailable through the Windows 95 mixer.

To start the mixer simply double-click the ENSONIQ Mixer icon in the taskbar. The Install Wizard adds this icon during the initial install.

Figure 6 :Windows 95 ENSONIQ Mixer
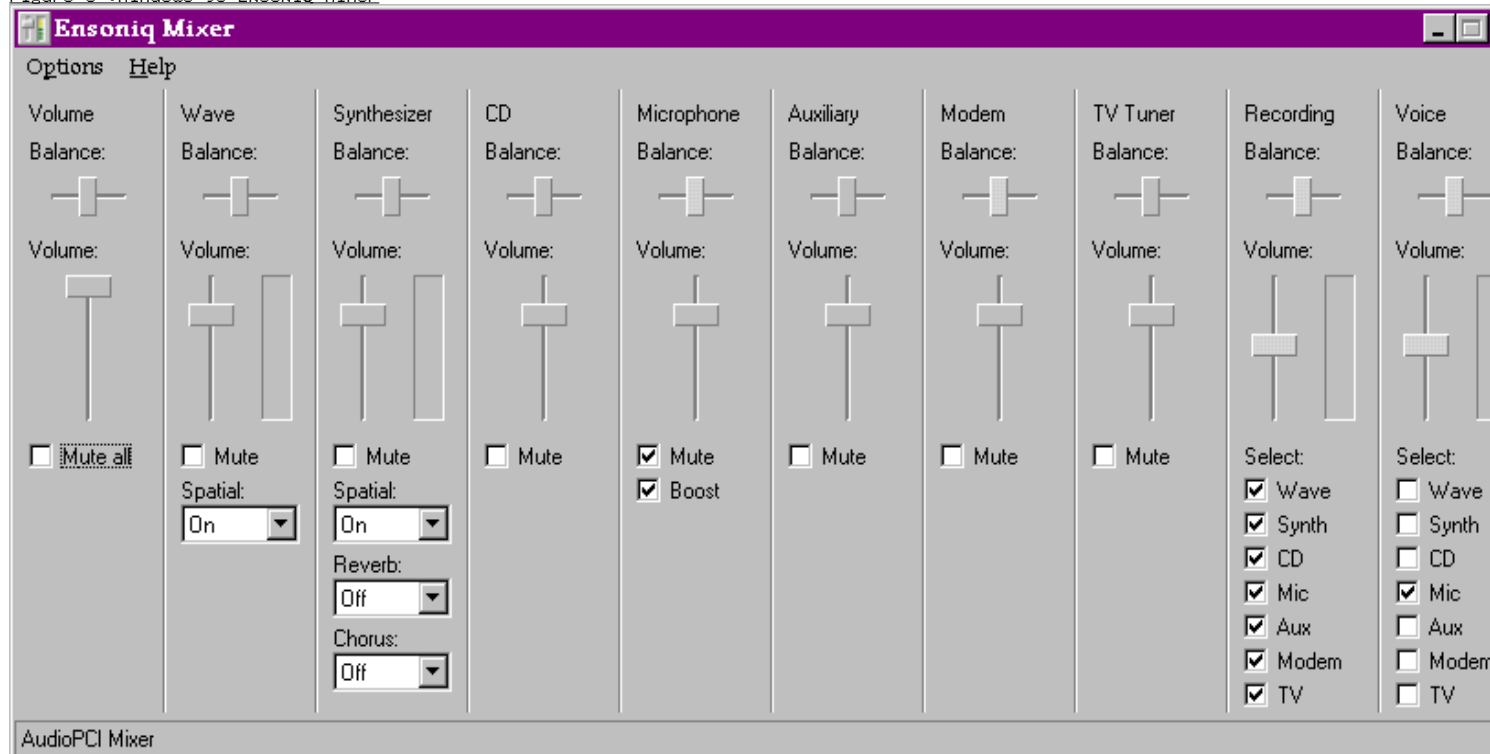
Real-Time Effects

AudioPCI∗ supports real-time effects. In addition to the effects described below, more effects may be available in the future.

∗ Spatial

This effect provides a surround sound effect. There is a drop down box on the desired device's panel that will allow you to switch between the three different spatial presets: Off, On, and Wide. By default this switch is set to Off.

This effect can be applied to the Wave or Synthesizer device.

∗ Reverb

The reverb effect will make the MIDI instruments on the card sound as if they were playing in a large concert hall or stadium. The three degrees of reverb provided are Off, On, and Full.

This effect can be applied to the Synthesizer device.

∗ Chorus

The chorus effect will add depth to the card's synthesizer sounds. The three settings for chorus are Off, On, and Full.

Note: Chorus is a special effect, which should be used with discretion; it is generally not recommended to leave the chorus effect enabled at all times.

This effect can be applied to the Synthesizer device.

Recording

Under the recording volume slider you will see checkboxes listing all the audio sources on the system. If the box next to the corresponding source is checked, you will be able to record from that source.

You will notice that the record volume slider is grayed out and fixed in one position. The record volume is directly proportional to the playback volume. For example, if you wanted to adjust the input level for the wave source, you would move the wave playback slider to the desired level. It will control both playback and record volumes.

Microphone

"Boost" and "Mute" checkboxes appear under the microphone heading of the ENSONIQ Mixer.

The "Boost" box adds a 30-dB audio gain to the microphone when checked. Keep in mind, this is an audio gain only. If the microphone is an electret condenser microphone that needs actual power, there is a "Mic BIAS" checkbox located on the Settings tab of the ENSONIQ AudioPCI∗ Properties window in the device manager. See the section entitled "Microphone BIAS" on page 16 for more details.

Note: In Windows NT 4.0 and Windows NT 3.51 the "Mic BIAS" checkbox is located on the Microphone panel in the ENSONIQ Mixer.

When the microphone "Mute" box is not checked, you will be able to hear anything spoken into the microphone through your computer's speakers. With some full duplex Internet phone applications this box should be checked to eliminate loop-back/feed-back. With "Mute" checked the person to whom you are speaking over the Internet will hear your voice, but you won't hear your yourself speaking through your own speakers. If you want to prevent input from the microphone uncheck the "Mic" box in the Recording panel.

Note: In Windows NT 4.0 and Windows NT 3.51 a "Mic Mon" box is located on the Microphone panel in the ENSONIQ Mixer. When the "Mic Mon" box is checked you will be able to hear anything spoken into the microphone through your computer's speakers. When the "Mute" box is checked no input will be received by the microphone.

Options Menu

The first choice, *Always on Top* does exactly as the name implies. It will keep the ENSONIQ Mixer window on top of whatever program windows are active at the moment. This will allow you to access the record/volume controls easily when using applications that require frequent volume adjustment.

The second choice, *Volume Control Only* will display only the main volume control panel when selected.

A list of source panels available appears in the second section of the Options menu. If a check mark is placed in front of a source, then the panel for that source will appear in the ENSONIQ Mixer window. Unlike Windows 95 volume control, all ENSONIQ Mixer options will appear in the same window.

The *Save Options Now/Save Options on Exit* selections you see in the third segment of the *Options* menu will save your customized mixer settings.

MS-DOS Mode Utilities

The AudioPCI∗ card includes a few MS-DOS utilities. These utilities require the AudioPCI∗ driver, APINIT.COM, to be loaded.

APCONFIG.EXE

The APCONFIG.EXE utility is used to obtain hardware settings and show the status of the AudioPCI * card. This is useful for finding out how the AudioPCI* card is configured so that you may properly setup a particular game.

Usage: APCONFIG.EXE

APCONFIG.EXE will display the following hardware settings:

*   PCI Hardware Settings: Port, IRQ
*   Soundscape Emulation: Base/MIDI Port, Wave Port, MIDI IRQ, Wave IRQ, DMA
*   SoundBlaster Pro Emulation: Port, IRQ, DMA
*   MPU-401 Emulation (GM, Roland MT32/LAPC-1) Emulation: Port, IRQ
*   AdLib Emulation: Port

Note: If the AudioPCI Legacy Device is disabled in Windows 95 or Windows 3.x APCONFIG.EXE will indicate this and only present the PCI Hardware Port and IRQ settings.*

APMIXER.EXE

Use APMIXER.EXE to change the volume levels or the MPU-401 waveset used on the AudioPCI* card. APMIXER.EXE has two modes of operation, command-line mode and interactive mode.

Command-line mode is useful for advanced users who want to setup batch files with particular volume levels.

Usage: APMIXER [options]

Where

/s: <0-127> will adjust the synth volume.

/w: <0-127> will adjust the wave volume.

/c: <0-127> will adjust the CD audio volume.

/m: <0 or 1>sets the synth MT-32/LAPC-1 mode (0 is OFF, 1 is ON).

/?   displays a help screen.

APMIXER.EXE without any options will invoke the interactive editor. The interactive editor mode allows you to change the mixer settings with the mouse, TAB, PGUP, PGDN, or arrow keys.

Figure 7: APMIXER.EXE Interactive Mode

The settings for APMIXER.EXE are independent of the ENSONIQ Mixer settings in Windows 95. If the *Save As Default* button is not used the settings will remain in effect until the system is rebooted. Running Windows 95 and shutting down into MS-DOS Mode will not reset APMIXER.EXE.

APMIXER.EXE cannot be run in Windows 95 Mode.

MT32.EXE

MT-32 or LAPC-1 was a popular waveset in the late 1980s (prior to the General MIDI standard) which provided superior sound over the PC sound systems that were available at that time. During that period, many game manufacturers supported the MT-32 as their high-end sound device.

AudioPCI* provides two sets of patches: a General MIDI compatible patch set and a patch set which emulates a Roland MT-32/LAPC-1 patch set. These patches cannot be used simultaneously, so a utility called MT32.EXE is provided to allow you to easily switch from one patch set to another and show the currently loaded patch. Use this utility whenever a game supports MT-32 as a music/sound option.

Usage: MT32 [/ON | /OFF]

Where

```
/ON          selects the MT-32 patch set.
/OFF         selects the General MIDI patch set.
```
Typing `MT32.EXE` without any arguments (i.e., /ON or /OFF) will display the currently loaded wave set.

Windows 95 always uses the General MIDI patch. Use `MT32.EXE` in a batch file to temporarily enable the MT-32 patch set for MS-DOS Prompt applications. If the Windows 95 MIDI Device is opened, the patch set will automatically be switched to General MIDI. The `MT32.EXE` command will have to be executed again before the MT-32 patch set is restored.

APPENDIX A MORE ABOUT MIDI

What is MIDI?

MIDI (an acronym for the Musical Instrument Digital Interface) is a hardware and software specification that allows electronic musical instruments and a wide variety of related equipment (such as personal computers) to communicate with each other. MIDI carries information that describes a performance rather than sound. Think of it as being the modern equivalent of the player piano roll: the roll itself is just paper with holes punched in it, but, played back on the proper instrument, the holes (which represent a performance) are turned into music.

In MIDI, the holes are messages that indicate when a note has been played (indicated by a Note On message), which note it was (indicated by a MIDI note number), and how hard it was played (indicated by a velocity value). There are 128 possible notes in MIDI, which translates to nearly an 11-octave range. Other messages carry gestural information from continuous controllers (such as pitch bend or sustain switch), timing information for synchronizing systems, or program change information that tells an instrument which of its sounds to use.

Just as your television set has different channels to carry separate programs, MIDI uses a system of 16 channels to allow a number of instruments to be independently controlled. Unlike television channels, however, the only difference between MIDI channels is a number carried in the first byte of most MIDI messages. This means that information for all 16 channels can be simultaneously carried on a single cable.

Personal computers came into being around the same time as MIDI, which was no accident, since it was the development of microprocessors that enabled both to happen. Personal computers can record, play back, and perform sophisticated manipulations of MIDI data. A personal computer is used to record information about a performance and can even be used to simplify the programming of sounds on a synthesizer. Recorded MIDI data can be stored in a Standard MIDI File (SMF) format which, in Windows 95, is called a MID file.

General MIDI

General MIDI (GM) is an enhancement to the original MIDI specification designed to make it easy to play back a Standard MIDI File on a variety of instruments, with some assurance that the proper sounds will be heard. General MIDI assigns specific sounds to individual program change numbers, (for example, sending MIDI program change 1 message to a GM instrument will always call up a Grand Piano sound). The exact quality of the Grand Piano sound always depends on the capabilities of the particular synthesizer.

The General MIDI specification divides sounds into instrument groupings, each of which represents a family of instruments or class of sounds. MIDI channel 10 is defined in General MIDI as being used for percussion, with each percussion sound being assigned to a specific note number.

General MIDI instruments respond to a number of controllers, specifically: Modulation Wheel (MIDI Continuous Controller #1), Main Volume (CC#7), Expression (CC#11), and Sustain Pedal (CC#64).

Table 2: General MIDI Level-1 Sound Set

1. Acou Grand Piano	33. Acoustic Bass	65. Soprano Sax	97. FX 1 (rain)
2. Bright Acou Piano	34. Elec Bass (finger)	66. Alto Sax	98. FX 2 (Soundtrack)
3. Elctric Grnd Piano	35. Elec Bass (pick)	67. Tenor Sax	99. FX 3 (crystal)
4. Honky-tonk Piano	36. Fretless Bass	68. Baritone Sax	100. FX 4 (atmosph)
5. Elec Piano 2	37. Slap Bass 1	69. Oboe	101. FX 5 (brightness)
6. Elec Piano 1	38. Slap Bass 2	70. English Horn	102. FX 6 (goblins)
7. Harpsichord	39. Synth Bass 1	71. Bassoon	103. FX 7 (echoes)
8. Clavi	40. Synth Bass 2	72. Clarinet	104. FX 8 (sci-fi)
9. Celesta	41. Violin	73. Piccolo	105. Sitar
10. Glockenspiel	42. Viola	74. Flute	106. Banjo
11. Music Box	43. Cello	75. Recorder	107. Shamisen
12. Vibraphone	44. Contrabass	76. Pan Flute	108. Koto
13. Marimba	45. Tremelo Strings	77. Blown Bottle	109. Kalimba
14. Xylophone	46. Pizzicato Strings	78. Shakuhachi	110. Bag Pipe
15. Tubular Bells	47. Orchestral Harp	79. Whistle	111. Fiddle
16. Dulcimer	48. Timpani	80. Ocarina	112. Shanai
17. Drawbar Organ	49. String Ensemble 1	81. Lead 1 (Square)	113. Tinkle Bell
18. Percussive Organ	50. String Ensemble 2	82. Lead 2 (sawtooth)	114. Agogo
19. Rock Organ	51. SynthStrings 1	83. Lead 3 (calliope)	115. Steel Drums
20. Church Organ	52. Synth Strings 2	84. Lead 4 (chiff)	116. Woodblock
21. Reed Organ	53. Choir Aahs	85. Lead 5 (charang)	117. Taiko Drum
22. Accordion	54. Voice Oohs	86. Lead 6 (voice)	118. Melodic Tom
23. Harmonica	55. Synth Voice	87. Lead 7 (fifths)	119. Synth Drum
24. Tango Accordion	56. Orchestral Hit	88. Lead 8 (bass+lead)	120. Reverse Cymbal
25. Acou Guit (nylon)	57. Trumpet	89. Pad 1 (new age)	121. Guit Fret Noise
26. Acou Guit (steel)	58. Trombone	90. Pad 2 (warm)	122. Breath Noise
27. Elec Guit (jazz)	59. Tuba	91. Pad 3 (polysynth)	123. 123 Seashore
28. Elec Guit (clean)	60. Muted Trumpet	92. Pad 4 (choir)	124. Bird Tweet
29. Elec Guit (muted)	61. French Horn	93. Pad 5 (bowed)	125. Telephone Ring
30. Overdriven Guitar	62. Brass Section	94. Pad 6 (metallic)	126. 126 Helicopter
31. Distortion Guitar	63. SynthBrass 1	95. Pad 7 (halo)	127. Applause
32. Guit Harmonics	64. SynthBrass 2	96. Pad 8 (sweep)	128. Gunshot

Table 3: General MIDI Level-1 Percussion Map

35. Ac Bass Dm	51. Ride Cym 1	67. Hi Agogo
36. Bass Dm 1	52. Chinese Cym	68. Lo Agogo
37. Side Stick	53. Ride Bell	69. Cabasa
38. Ac Snare	54. Tambourine	70. Maracas
39. Hand Clap	55. Splash Cym	71. Short Whistle
40. Elec Snare	56. Cowbell	72. Long Whistle
41. Lo Floor Tom	57. Crash Cym 2	73. Short Guiro
42. Closed Hi-Hat	58. Vibraslap	74. Long Guiro
43. Hi Floor Tom	59. Ride Cym 2	75. Claves
44. Pedal Hi-Hat	60. Hi bongo	76. Hi Woodblock
45. Lo Tom	61. Lo bongo	77. Lo Woodblock
46. Open Hi-Hat	62. Mute Hi Conga	78. Mute Cuica
47. Low-Mid Tom	63. Open Hi Conga	79. Open Cuica
48. Hi-Mid Tom	64. Lo Conga	80. Mute Triangle
49. Crash Cym 1	65. Hi Timbale	81. Open Triangle
50. Hi Tom	66. Lo Timbale	

ENSONIQ AudioPCI* also supports the following extensions to the General MIDI Percussion Map.
Table 4: Extensions to the General MIDI Percussion Map

35.	Shaker
36.	Jingle Bell
37.	Bell Tree
38.	Castanets
39.	Mute Surdo
40.	Open Surdo

APPENDIX B TROUBLESHOOTING IN WINDOWS 95

If your AudioPCI* card is not functioning correctly don't panic. The problem is probably very simple to find and fix as long as you remain calm and approach the situation methodically.

The secret to troubleshooting is to examine the evidence you have, gain as much information as you can, and eliminate possibilities one by one. In most cases, the source of the problem will soon become clear.

For example, if AudioPCI* works fine when you remove all other cards from your computer, but it stops working when you replace your fax-modem, there may a conflict between the sound card and the fax-modem (such as port address or IRQ).

Problems are often extremely simple. There may simply be a bad cable, components may not be plugged in or turned on, etc. Check the obvious first, not last.

Configuration

Adding new hardware and software to your computer requires ensuring that there are no conflicts with your existing system. If you have difficulty with the installation procedure or are unable to make the card work, a conflict may be present. There are three major configuration settings to consider: I/O Port Address, Interrupt Request lines (IRQ), and Direct Memory Access channels (DMA).

Even though the AudioPCI* card is a plug and play card, the presence of other legacy cards can still cause resource conflicts. To resolve such conflicts, it is important to know the settings of other cards (it is best to remove other sound cards) and peripherals currently in your system, including the mouse, fax-modem, video accelerators, etc. Many peripherals come with setup software similar to AudioPCI*. This software lets you see and change the current configuration. There are also utility programs that investigate and report on the configuration of your system and its peripherals. In either event, make a record of the settings used by all the peripherals in your system for reference when installing new hardware and software or trouble shooting problems.

Generally, you will only have a DMA conflict if the AudioPCI* Legacy Device is enabled and your system contains another sound card, a scanner, or an external CD-ROM drive.

Using Two Sound Cards

Having another sound card in your system in addition to the AudioPCI* card will greatly increase the chances of having system conflicts. We highly recommend that any other sound devices and their associated Windows 95 drivers be removed before installing the AudioPCI* card.

Multimedia Components (i.e., Media Player)

If you install the AudioPCI* card after Windows 95 is installed Windows 95 will not install the sound utilities that you would expect to find. Features such as the Audio CODEC, the Media Player, and the Microsoft Mixer may not be present. This may cause your sound card to not function properly, even when the drivers are installed. If this is the case, these applications must be installed onto the system from the Windows 95 installation media. Follow the instructions in the section titled "Installing the Multimedia Extensions" on page 13.

Audio Problems

If you are satisfied that the AudioPCI* hardware and software are properly installed, but you do not hear sound, the problem may be with your audio connections. Here are some suggestions:

* Try playing both a .WAV file and a .MID file to ascertain that there is no sound at all coming from the speakers. If you hear one and not the other, the problem is internal and has nothing to do with your audio system.
* Be sure that your speaker system is properly set up. Try connecting a sound source other than AudioPCI*, such as an audio CD player, and establishing whether or not you can hear it.
* Be sure that the sound card is properly connected to the speaker system (a 1/8-inch mini-phone cable should be running from AudioPCI*'s green Line Out connector to a line input on the speaker system). To eliminate the possibility of a bad cable, try plugging a pair of high-impedance headphones to the AudioPCI* Line Out jack and see if you hear any sound.

Volume and Balance Levels

To make adjustments to AudioPCI*'s volume settings and balance levels, use the ENSONIQ Mixer. The Install Wizard adds the ENSONIQ Mixer to your taskbar. See the section entitled "ENSONIQ Mixer" on page 36 for more details

The Windows 95 mixer can also be used to adjust the volume settings. To add or remove the Windows 95 mixer from the taskbar:

1. Open the Control Panel by selecting ⊠Start ⊠ Settings ⊠ Control Panel.
2. Double click on the Multimedia icon. The Multimedia Properties page appears.
3. In the Playback section of the Audio tab, the box marked "Show volume control on the task bar" determines whether or not the Windows 95 mixer appears on the taskbar. Windows 95 volume control mixer can be invoked by double clicking on its icon located on the right side of the taskbar when this box is checked.

Recording with a Microphone

For ease of installation we recommend that you use a dynamic microphone. These require the least amount of setup. Perform the following steps to be sure that your software is set up correctly for microphone input:

1. In your toolbar next to the clock double-click on the ENSONIQ Mixer icon.
2. Under the Recording panel make sure the "Mic" box is checked.
3. Make sure the Mic slider is all the way up, the "Mute" box is checked and the "Boost" box is checked.
4. In the Options menu select Save Options Now.
5. If you experience distortion with a dynamic microphone uncheck the "Boost" and check the "Mute" boxes of the Microphone panel or adjust the volume levels of the Microphone and Master audio devices.

If you wish to use an electret condenser microphone make sure the 5-volt BIAS power is being applied by checking the "Microphone BIAS" box under the Settings tab of the ENSONIQ AudioPCI* Properties window.

Note: The "Mic BIAS" box is on the Microphone panel of the ENSONIQ Mixer in Windows NT 4.0 and Windows NT 3.51.

CD Audio

* First, be sure that your CD volume is turned up to the maximum in the ENSONIQ Mixer.
* If you still aren't getting music, you will need to verify that the internal patch cable is connected between your CD ROM drive and the AudioPCI* card's CD Input. This is typically a small connector with four wires coming out of it. If it is connected but not working, try unplugging it and reconnecting it to the TV Tuner connector (See Figure 1: ENSONIQ AudioPCI* Card on page 8). Remember to use the TV Tuner slider control on the ENSONIQ Mixer to adjust the volume. If this does not work, there is a chance that the patch cable is broken or defective.
* Another tip is to obtain a 1/8-inch stereo patch cord and connect one end to the headphone out on the front of the CD-ROM drive, and the other end to the black Aux Input on the back of the AudioPCI* card. Make sure the headphone volume dial on the CD-ROM drive is turned all the way up. Adjust the Aux and Master sliders on the ENSONIQ Mixer to maximum.

Uncheck the "Mute" boxes on the Master and Aux panels of the ENSONIQ Mixer. Try playing a CD. You should hear the music playing. If your internal patch cable is missing or defective, contact your CD-ROM manufacturer for information on how to obtain another cable.

Problems with Games

* If the ENSONIQ AudioPCI* Legacy Device is disabled in Windows 95 the AudioPCI* will be disabled in MS-DOS Mode. Be sure that the ENSONIQ AudioPCI* Legacy Device is set up and working properly before configuring a game in MS-DOS Mode or an MS-DOS Prompt.

* Make sure that you have the game set up in a music option that AudioPCI* supports. See the section entitled "Installing Games for AudioPCI*" on page 33. Be sure to follow the guidelines for "Selecting the Best Sound Options in a game" on page 34. Remember that you can obtain the AudioPCI* hardware settings by looking at the values displayed by APCONFIG.EXE in MS-DOS Mode or the DOS Application Settings tab of the ENSONIQ AudioPCI* Legacy Device window in Windows 95.

* If the game's install or setup program does not give you a particular sound option that you know the game supports (i.e., the game's box and manual specify MT-32, but the game's install or setup does not support it) try rerunning the game's install or setup program.

* If the game takes advantage of DirectX or DirectSound be sure that you have the latest DirectX drivers from Microsoft.

* If you are having a problem with external joystick or gamepad, make sure that the AudioPCI* joystick port is enabled and the Windows 95 Gameport Joystick drivers are loaded and working properly in the Device Manager.

* In order to use two joysticks, you will need to use a SoundBlaster-compatible Y-connector (such as Radio Shack part # 26-380), or use an industry-standard MIDI Joystick Kit. This will make allowances for the proper direct connections for dual joysticks.

APPENDIX C ERROR MESSAGES

This appendix provides descriptions of the error messages generated by AudioPCI*'s MS-DOS utilities.

APINIT.COM

Error: *This program cannot be run from Windows.*

Error: *Memory Manager is currently inactive.*
Try turning off the AUTO switch in your memory manager CONFIG.SYS entry. (i.e., DEVICE=C:\WIN95\EMM386.EXE RAM)

Error: *Could not allocate Wave RAM.*

Error: *Could not lock Wave RAM.*
These occur if the extended memory needed for the waveset could not be allocated or locked. Try using a smaller waveset or increasing the amount of system RAM.

Error: *Could not open Wave data file.*
The *.ECW file, pointed to by the SNDSCAPE.INI file, could not be opened. Select or add a different waveset file.

Error: *Memory Manager not detected.*
AudioPCI* needs a memory manager such as EMM386.EXE. Make sure EMM386.EXE is loaded in your CONFIG.SYS file.

Error: *Could not execute APCONFIG.EXE.*
If this happens, the APCONFIG.EXE file is probably missing or corrupted. Download and install the latest AudioPCI* drivers.

Error: *XMS services were not detected.*
Extended memory is needed for the MS-DOS virtual code and Wave Data for the synthesizer. Make sure that EMM386.EXE is loaded in the CONFIG.SYS.

Error: *Could not allocate code/patch RAM.*

Error: *Could not lock code/patch RAM.*
These occur of the extended memory needed for the legacy code could not be allocated or locked. Try using a smaller SMARTDRV.EXE cache size (i.e., LH C:\WIN95\SMARTDRV.EXE 1024) or increasing the amount of system RAM.

Error: *Could not allocate code/patch RAM below 4-MB boundary.*
This occurs of the extended memory needed for the legacy code could not be allocated and locked below the 4-megabyte boundary. Try loading APINIT.COM before SMARTDRV.EXE, minimi

zing VDISK, or specifying a smaller cache size for SMARTDRV.EXE (i.e., LH C:\WIN95\SM
ARTDRV.EXE 1024).

Error: *Could not execute APLOAD.EXE.*

    If this happens, the APLOAD.EXE or DOS4GW.EXE file is probably missing. (APLOAD.EXE i
s a protected mode application that needs DOS4GW.EXE to run.) Download and install the la
test AudioPCI* drivers.

Error: *PCI BIOS detect failed; <PCI BIOS-specific error message>.*

Error: *PCI device detect failed; <PCI BIOS-specific error message>.*

    These will occur if a PCI BIOS was not detected or if the PCI BIOS cannot locate our card i
n the system. They are both followed by PCI BIOS-specific error messages, which are describ
ed starting on page 54.

Error: *Could not allocate DOS memory.*

    Could not allocate temporary MS-DOS memory to make VCPI calls.

Error: *Could not install service vectors.*

    This should not happen. If it does, the user is probably using a very old or very odd memor
y manager.

Error: *<Path>\<*.ECW> is not a valid ENSONIQ AudioPCI* waveset file.*

    Select or add a different *.ECW file.

Error: *SynthFile name is too long.*

    The full waveset file path and name (combined) in SNDSCAPE.INI must be no more than 63 ch
aracters long. You can try downloading and installing the latest AudioPCI* drivers, specify
ing a shorter Destination Path for the MS-DOS Utilities. Then, select or add a different w
aveset file with a shorter filename.

Error: *Cannot open <path>\AUDIOPCI.BIN.*

    This will occur if the AUDIOPCI.BIN file could not be found. It should reside in the same
directory as APINIT.COM, APCONFIG.EXE, and APLOAD.EXE. Download and install the late
st AudioPCI* drivers.

Error: *AudioPCI* hardware has not been configured by PCI BIOS.*

    This may occur if you specify "Use plug and play OS" in your BIOS setup and enter MS-DOS Mo
de before Windows 95 loads. Try using the BIOS setup utility to configure PCI devices or s
hutdown to MS-DOS Mode from Windows 95.

Error: *AudioPCI* hardware was not detected.*

    This will occur if the AudioPCI* hardware is not installed correctly. Try reinstalling the
hardware.

Error: *Cannot open <path>\<*.ecw>.*

    This will occur if the waveset *.ECW file, pointed to by the SNDSCAPE.INI file, cannot b
e found. Select or add a different *.ECW file.

Error: *Waveset sample rate is not 22050 Hz.*

    Select or add a different *.ECW file.

Error: *Current chip revision is out of date.*

    This message will appear if production software is used with a pre-production chip.

Error: *BLASTER environment variable missing or incorrect.*

    This message will occur if the BLASTER environment variable was not properly set. Make su
re the "Enable Legacy Emulation" box is checked on the Settings tab of the AudioPCI* Device
Properties window.

Error: *Invalid parameters.*

Error: *Config pointer out of range.*

Error: *ENSONIQ AudioPCI* tag not found.*

    Any of these three errors can occur if a user invokes APCONFIG.EXE directly with argument
s that are invalid. If the user is going to invoke this program (in order to view the Audio
PCI* hardware and legacy settings), no arguments (parameters) should be entered on the comm
and line.

Error: *SNDSCAPE environment variable not found.*

    This will occur if the SNDSCAPE environment variable is not set in the AUTOEXEC.BAT fil
e. Make sure the "Enable Legacy Emulation" box is checked on the Settings tab of the Audio
PCI* Device Properties window.

Error: *Cannot read config file, SNDSCAPE.INI.*

This will occur if the SNDSCAPE.INI file, pointed to by the SNDSCAPE environment variab
le, cannot be found. Download and install the latest AudioPCI* drivers.

Error: *Config file is incomplete.*
SNDSCAPE.INI entries are missing. This message is followed by the name of the missing ent
ry, i.e. SBPort. Download and install the latest AudioPCI* drivers.

Error: *Config contains an invalid value.*
SNDSCAPE.INI entry has a bad value. This message is followed by the name of the missing e
ntry and its value, i.e. SBPort 592 (250 HEX). Download and install the latest AudioPCI*
drivers.

APCONFIG.EXE

Error: *PCI BIOS detect failed; <PCI BIOS-specific error message>.*
Error: *PCI device detect failed; <PCI BIOS-specific error message>.*
These will occur if a PCI BIOS was not detected or if the PCI BIOS cannot locate our card i
n the system. They are both followed by PCI BIOS-specific error messages, which are describ
ed starting on page 54.

Error: *BLASTER environment variable missing or incorrect.*
This message will occur if the BLASTER environment variable was not properly set. Make su
re the "Enable Legacy Emulation" box is checked on the Settings tab of the AudioPCI* Device
Properties window.

Error: *Invalid parameters.*
Error: *Config pointer out of range.*
Error: *ENSONIQ AudioPCI* tag not found.*
Any of these three errors can occur if a user invokes APCONFIG.EXE directly with argument
s that are invalid. If the user is going to invoke this program (in order to view the Audio
PCI* hardware and legacy settings), no arguments (parameters) should be entered on the comm
and line.

Error: *SNDSCAPE environment variable not found.*
This will occur if the SNDSCAPE environment variable is not set in the AUTOEXEC.BAT fil
e. Make sure the "Enable Legacy Emulation" box is checked on the Settings tab of the Audio
PCI* Device Properties window.

Error: *Cannot read config file, SNDSCAPE.INI.*
This will occur if the SNDSCAPE.INI file, pointed to by the SNDSCAPE environment variab
le, cannot be found. Download and install the latest AudioPCI* drivers.

Error: *Config file is incomplete.*
SNDSCAPE.INI entries are missing. This message is followed by the name of the missing ent
ry, i.e. SBPort. Download and install the latest AudioPCI* drivers.

Error: *Config contains an invalid value.*
SNDSCAPE.INI entry has a bad value. This message is followed by the name of the missing e
ntry and its value, i.e. SBPort 592 (250 HEX). Download and install the latest AudioPCI*
drivers.

MT32.EXE

Error: *<Option> is an invalid option.*
Bad parameter on command line. This will be followed by a usage message. See "MT32.EXE" on
page 40.

Error: *AudioPCI* DOS driver is not loaded.*
In MS-DOS Mode the MS-DOS driver, APINIT.COM, must be successfully loaded for the utility
to work.

Error: *AudioPCI* Windows driver is not loaded.*
The Windows 95 driver, EAPCI.VXD, must be successfully loaded for the utility to work.

APMIXER.EXE

Error: *PCI BIOS detect failed; <PCI BIOS-specific error message>.*
Error: *PCI device detect failed; <PCI BIOS-specific error message>.*
These will occur if a PCI BIOS was not detected or if the PCI BIOS cannot locate our card i
n the system. They are both followed by PCI BIOS-specific error messages, which are describ
ed starting on page 54.

Error: *BLASTER environment variable missing or incorrect.*
This message will occur if the BLASTER environment variable was not properly set. Make su
re the "Enable Legacy Emulation" box is checked on the Settings tab of the AudioPCI* Device
Properties window.

Error: *SNDSCAPE environment variable not found.*
>   This message will occur if the SNDSCAPE environment variable was not set. Make sure the "Enable Legacy Emulation" box is checked on the Settings tab of the AudioPCI∗ Device Properties window.

Error: *Cannot read config file, SNDSCAPE.INI.*
>   This will occur if the SNDSCAPE.INI file, pointed to by the SNDSCAPE environment variable, cannot be found. Download and install the latest AudioPCI∗ drivers.

Error: *Config file is incomplete.*
>   SNDSCAPE.INI entries are missing. This message is followed by the name of the missing entry, i.e. SBPort. Download and install the latest AudioPCI∗ drivers.

Error: *Config contains an invalid value.*
>   SNDSCAPE.INI entry has a bad value. This message is followed by the name of the missing entry and its value, i.e. SBPort 592 (250 HEX). Download and install the latest AudioPCI∗ drivers.

Error: *AudioPCI∗ driver is not loaded.*
>   The MS-DOS driver, APINIT.COM, must be successfully loaded for the mixer to work. Make sure the "Enable Legacy Emulation" box is checked on the Settings tab of the AudioPCI∗ Device Properties window. Try shutting down to MS-DOS Mode from Windows 95, using the ⌧*Start Menu.*

Error: *<Option>; Invalid option.*

Error: *<Parameter>; Value out of range.*
>   The mixer has a command-line mode and an interactive mode. In command-line mode, these messages indicate a bad parameter. This will be followed by a usage message. See "MT32.EXE" on page 40.

Error: *Cannot run this program in Windows.*
>   The mixer is only for MS-DOS Mode. Volumes under Windows 95 should be adjusted via the Windows 95 volume control or Windows 95 ENSONIQ Mixer.

PCI Specific Errors

Error: *BIOS extensions not supported.*

Error: *Function not supported.*

Error: *Bad vendor ID.*

Error: *Device not found.*
>   These messages usually indicate the presence of some sort of hardware problem in either the motherboard's chipset or the AudioPCI∗.

APPENDIX D TECHNICAL SPECIFICATIONS

Host Interface
Port Address: One 64-byte I/O Port
Interrupt Usage: One PCI Interrupt
Number of Audio Ports: There is one stereo input port, one mono microphone input port with BIAS power and Boost available, one stereo output port, one stereo internal CD audio input connector, one internal stereo TV tuner input connector and one internal mono modem/TAD input/output connector.
Joystick Interface: Standard PC-Compatible Joystick Port
Max Number of Joysticks: 2 (2 Axis, 2 Buttons) or 1(4 Axis, 4 Buttons)

Synthesizer
Architecture: Digital Wavetable Synthesis
Number of Voices: Up to 32
D/A Converter: 18-bit Linear Serial Sigma-Delta Converter
Level and Panning Controls: Separate 5-bit L&R controls for each voice
Envelopes: Per-voice Envelopes for Filters and Amplitude

FM Synthesis
OPL2 FM software emulation

Digital Audio
PCM Playback Section
Devices: One Wave device capable of simultaneous input (record) and output (playback)
D/A Converter: 16-bit Linear Serial Sigma-Delta Converter
Max Playback Sample Rate: 48.0 kHz
Level and Panning Controls: Separate 5-bit L&R controls for each voice
Data Formats: 8-bit unsigned linear, 16-bit signed linear; all formats Mono or Interleaved Stereo.
Digital Recording Section
A/D Converter: 16-bit Linear Serial Sigma-Delta Converter
Available Sampling Rates: 4.0 - 48.0 kHz

Source Selection: Any external source, Mic, CD, Synthesizer, Wave, Modem or TV tuner

Level Control: Individual

Level Control Range: +12 to -50 dB on all record sources

Formats: 8-bit unsigned linear, 16-bit signed linear. All formats Mono or Interleaved Stereo.

Audio Mixing

Input Sources: Synthesizer Output, CD Input, Aux Input, MIC Input, TV Tuner Input, Modem Input/Output

Level Control: 5-bit for all mixer control

Level Control Range: +12 to -50 dB for all

Frequency Response: 20-20,000 Hz * 1 dB

Distortion: <0.01%

Signal/Noise Ratio: 90 dB typical

Internal Audio Connectors

CD In:

Connector: MPC III Std. (Molex 70553)

4 Pin Shrouded .1-inch Centers

PIN 1: Left Channel

PIN 2: Ground

PIN 3: Ground

PIN 4: Right Channel

TV Tuner In:

Connector: MPC III STD. (Molex 70553)

PIN 1: Left Channel

PIN 2: Ground

PIN 3: Ground

PIN 4: Right Channel

Telephone Answering Device (TAD) In/Out:

Connector: Molex 70553 4 Pin w/ Shrouded .1-inch Centers

PIN 1: Modem Audio Input

PIN 2: Ground

PIN 3: Ground

PIN 4: Boosted (30 dB) Microphone Output

External Audio Connectors

Mic In:

Connector: 3.5-mm (1/8-inch) mini phone jack

Tip and Ring are connected together internally

Sleeve = Ground

Nominal Input Level = 30 mV r.m.s. Max

Nominal Input Impedance = 50K Ohms

Aux In:

Connector: 3.5-mm (1/8-inch) TRS mini phone jack

Tip = L channel

Ring = R channel

Sleeve = Ground

Max Input Level = 1 V r.m.s. (2.8 V p-p)

Nominal Input Impedance = 50k Ohms Output

Line Out:

Connector: 3.5-mm (1/8-inch) TRS mini phone jack

Tip = L channel

Ring = R channel

Sleeve = Ground

Max Output Level into a Line Input = 2 V r.m.s. (5.6 V p-p)

Max Output Level into Headphones = 100 mW into Hi-Z head-phones

Connector Pin-Out

Figure 8: MIDI/Joystick Connector Pin-Out