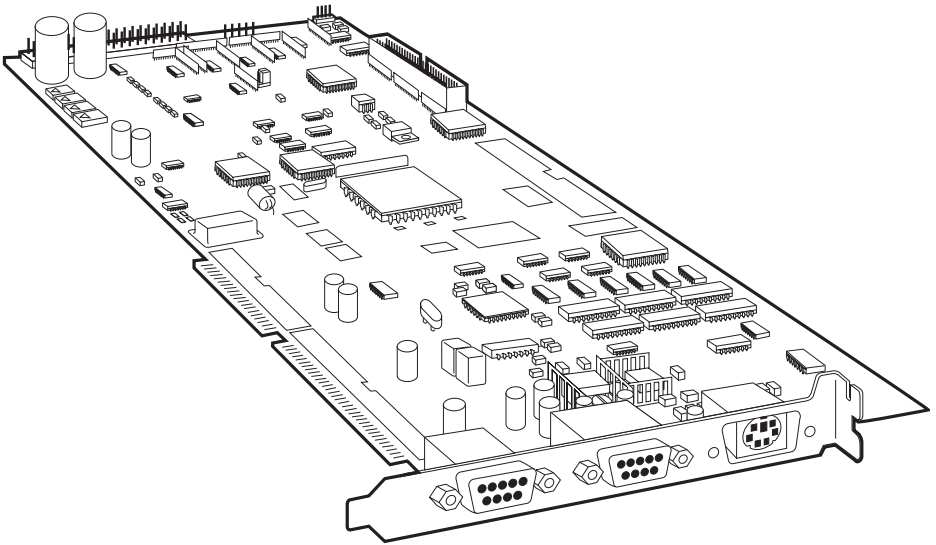




PC Image II



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1. Introduction

With PC IMAGE II, you can convert your PC's VGA output to be displayed on a television or recorded to a VCR. This capability, combined with PC IMAGE II's complete sound card functions, brings audio and video production to your PC.

Please take a few minutes to read this introduction carefully. It details the use of this manual and the functional blocks of the PC IMAGE II; and provides a glimpse of the uses for this innovative device.

1.1 Block Diagram of PC Image

There are several sections to the PC Image board. The combination of these parts is what gives the PC IMAGE it's unique capabilities.

With PC IMAGE II, you can record audio onto your hard disk from a microphone, CD, or external (AUX) device. MIDI data can play the on-board FM synthesizer, or can be sent to external synthesizers. All audio sources can be mixed and modified via the mixer.

The video block of PC Image II takes the external VGA signal and does two things. First, it splits the signal and passes part of it to the PC Image II's VGA port, for viewing on a VGA monitor. Second, it connects the signal to a television signal, and sends it out to the PC IMAGE II's video out ports for recording and display.

1.2 PC Image II Functions

- **Business Presentations** — Your PC IMAGE II gives you the power to record, edit, and play back all audio and video elements for a dynamic and effective presentation, product demo, or multimedia experience. Presentations can be recorded to videotape for distribution, or alternatively can be distributed on floppy disk.
- **MIDI** — Your PC IMAGE II puts a recording studio in your PC. You can use your PC Image II with the latest MIDI sequencer software (optional) as well as explore possibilities of hard disk recording.
- **MPC Compatible** — The PC IMAGE II meets or exceeds all the specifications for the Multimedia PC (MPC) platform. It is fully compatible with the Microsoft® Windows™ graphical environment with Multimedia Extensions, Version 1.0 and Windows 3.1, and all the applications requiring an MPC audio adapter.
- **Audio Mixer** — PC IMAGE II's high-fidelity audio mixer ties together CD-audio, sequenced MIDI synthesizers, digitally sampled audio samples, and external audio and plays them through whatever playback system you want. You can mix all your sound sources to a single stereo output; play sounds together; and solo, or pan them from one side of the stereo field to the other.

1.3 System Requirements

Your PC must meet the following minimum specifications for your PC IMAGE II to work properly. If it does not, you will need to upgrade the deficient areas.

- IBM® AT®, 80286, 80386, 80486, or other compatible
- 3.5" disk drive
- 640K RAM System Memory
- DOS 3.1 or higher
- Hard disk with 6 MB free space.
- Headphones (using a 1/8-inch stereo phono plug)

Optional:

- Microphone (600 to 10K ohm dynamic)
 - External audio source (tape player, stereo, etc.)
- MIDI interface cables and MIDI sequencing software.

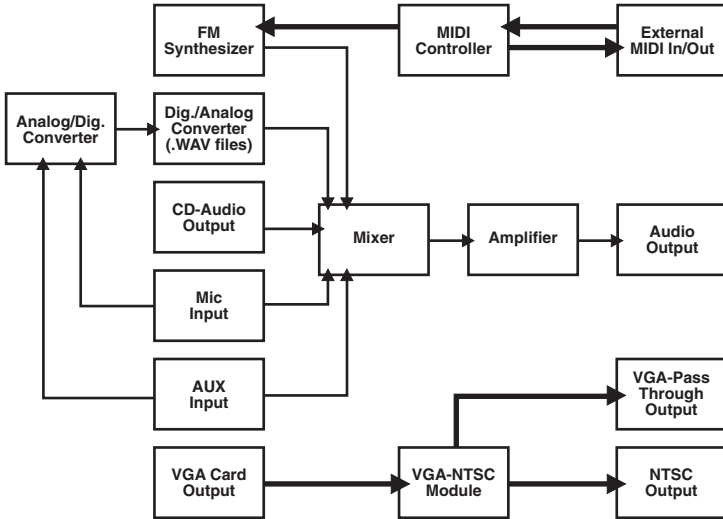


Figure 1-1. Block Diagram of PC IMAGE II.

2. Quick Install

This chapter is designed for people who have a thorough understanding of both their PC and their video and audio hardware. If you are not one of these people, refer to the detailed instructions beginning in **Chapter 3**.

2.1 Install the Hardware

Set the CD-ROM Jumpers

Your PC IMAGE II board includes a CD-ROM interface. If you wish to connect a CD-ROM drive, you will have to set two jumpers. If you are not using the CD-ROM interface, go to the next heading.

Jumpers 15 and 16 set the IRQ level and DMA channel for the PC IMAGE II's CD-ROM interface. Set these so that they do not conflict with other peripherals in your PC.

Connect the audio header cable.

Take this time to locate the audio header. This unit is a long, flat, ribbon cable with an expansion-slot connector at one end. Plug this cable into the back of the PC IMAGE II board (see Figure 2-1). Pin 1 on all of the board connectors is indicated by a small triangle.

Figure 2-1. PC IMAGE II Board.

Install the board.

Remove the cover from your PC and install the board in an unused 16-bit expansion slot. Secure the card with the screw from the PC's expansion slot cover.

Install the audio-header cover.

Remove one of the slot covers from the back of your PC. Route the audio-header cable to the back of the PC and install it in the expansion-slot opening.

2.2 Connect External Devices to PC IMAGE II**CD-ROM**

If you are using a CD-ROM drive with your PC IMAGE II, install it now. Follow the instructions that came with the drive, and use the manufacturer's supplied cables for interfacing the drive to the PC IMAGE II card. Connect both the SCSI controller cable and the CD-audio interface.

There are no jumpers to set when installing the SCSI CD-ROM drive. The settings are controlled through the PC IMAGE II installation software.

PC Speaker

You can hook up your PC's speaker to PC IMAGE II, although it is not necessary. Unplug the PC speaker from the motherboard, and plug it into the PC IMAGE II board (see Figure 2-2).

Do not plug in the internal speaker if you are going to connect external speakers. External speakers are usually far superior to the PC's internal speaker.

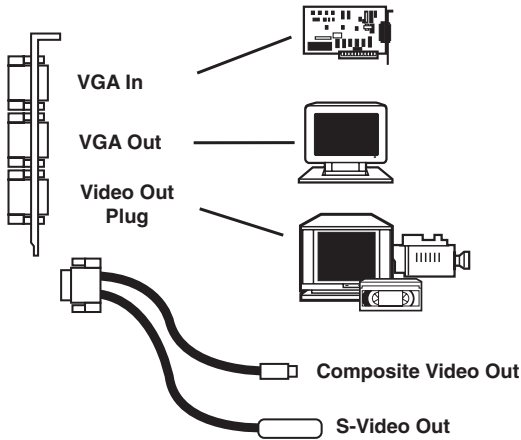


Figure 2-2. Connecting the PC Speaker.

External VGA Connection

Take the supplied VGA interface cable and plug it from your VGA card into the VGA In port of the PC IMAGE II. The 6-pin circular end plugs into the PC Image II, and the 15-pin male end plugs into your PC's VGA port.

Use the cables supplied with the PC IMAGE II when connecting external devices. This is especially important when hooking up the VGA Card.

Plug in the VGA Monitor

Plug your VGA monitor into the VGA Out port (the middle port) on the PC IMAGE II.

Video Output Device

Plug your external video device into the PC IMAGE II.

Plug the 9-pin video cable into the bottom port of the PC IMAGE II card. This cable has both the 4-pin S-Video connections and the RCA® plug for composite video.

Plug your video device into the appropriate Video Out port on the PC IMAGE II's video cable.

Use the S-Video connection whenever possible to ensure the highest-quality video signal.

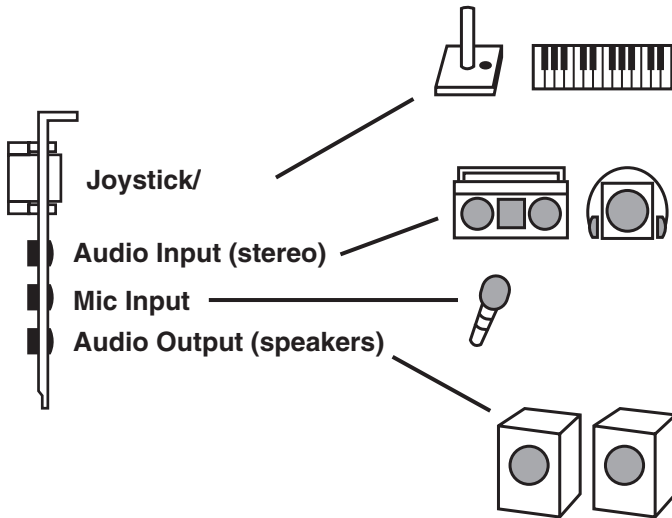


Figure 2-3. Connecting the Video Output Device.

Speakers

The speakers plug into the Audio Out port of the audio header cover. See Figure 2-2 for proper connections.

Plug in all cables (speaker, joystick, audio in, mic, etc.) before powering up your PC.

Joystick

Plug the joystick into the 15-pin joystick on the top of the header cover.

External Audio Input

You can connect an external audio source (tape player, radio, etc.) to the PC IMAGE II. Use the appropriate converter cable to interface to your external equipment.

Microphone

You can connect a 300-600 ohm microphone to the PC IMAGE II. Plug it into the middle 1/8-inch mini plug on the audio header cover.

Power up the PC

You can now power up the PC. If the installation is correct, you should see text appear on your VGA monitor. If you don't, either go through the full installation instructions in **Chapter 3**, or refer to **Chapter 8, Troubleshooting**.

The video display (television or VCR) of PC IMAGE II is set for 640 x 480 graphics resolution. This means that under Windows or graphic applications, no software driver is necessary. In order to see text screens on the TV set; you will have to load the PC2NTSC driver. See **Chapter 4**.

Run the INSTALL Program

Place your PC IMAGE II install diskette in your disk drive and type INSTALL.

The program will prompt you for input, and will test and setup your PC IMAGE II.

Run the Windows Install Program

To run the Windows Install program:

Start Windows 3.1 (type **WIN**).

Select the File menu from the **Program Manager**, select the "Run" option, and then type X:INSTALL.

The PC IMAGE II System should be ready to go. Skip the next two chapters and go on to **Chapter 5**.

3. Hardware Installation

You can install the PC IMAGE II card in any full-length slot of an IBM AT, 80286, 80386, 80486, or compatible with an ISA (Industry Standard Architecture) bus.

The steps described on the following pages illustrate the procedures for a typical system. Your system may differ slightly.

NOTE

Steps 6 through 8 protect your PC IMAGE II card from accidental damage from static electricity. These procedures apply to all cards that contain CMOS or other components that are sensitive to static electricity. Do not remove your PC IMAGE II card from its protective sleeve until advised to do so.

3.1 Hardware

1. Turn off your PC, but leave the power cable connected to the wall outlet to ensure that your PC is grounded.
2. Remove the screws from the back of the PC cover. Be sure to use the proper size screwdriver or you will strip the heads.
3. Use both hands to pull the cover forward and slowly remove it from the system unit (see Figure 3-1). Be careful. Sometimes there is a bracket that gets caught on the cables inside the PC case.

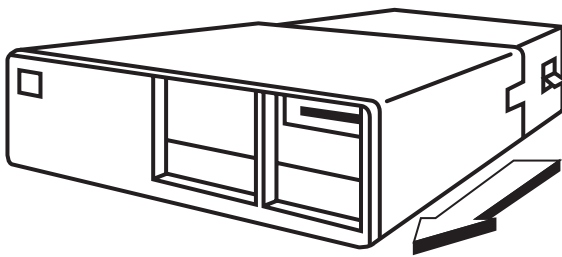


Figure 3-1. Removing the PC Cover.

4. Locate an unused slot. Any full-length slot can be used.
5. Remove the slot cover (see Figure 3-2). Save the screw to anchor the PC IMAGE II's mounting bracket later.
6. Pick up the card (still in the sleeve) by grasping the edge bracket with one hand. Avoid pressing on the card components. With the other hand, touch an unpainted metal surface, such as the rear panel of the PC, to discharge any built-up static electricity in your body.
7. Remove the plastic sleeve with your free hand.
8. Touch an unpainted metal surface a second time to ensure there is no static build-up.

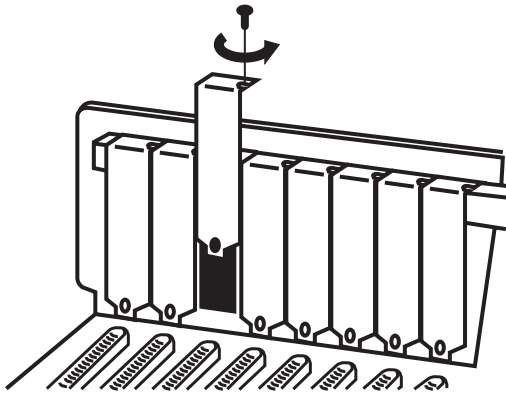


Figure 3-2. Removing the Slot Cover.

3.1.1 SET THE CD-ROM JUMPERS

Your PC IMAGE board includes a CD-ROM interface. If you wish to connect a CD-ROM drive, you will have to set two jumpers. If you are not using the CD-ROM interface, go to the next section.

Jumpers 15 and 16 set the IRQ level and DMA channel for the PC IMAGE II's CD-ROM interface. Set these so that they do not conflict with other peripherals in your PC.

3.1.2 CONNECT THE AUDIO HEADER

The audio header is a long, flat ribbon cable with an expansion slot connector at one end. Plug this cable into the back of the PC IMAGE II board (see Figure 3-3). Plug the connector into the board so that the cable can be routed towards the back of the PC without any loops or turns. This will ensure that Pin 1 on the cable lines up to Pin 1 on the board.

Pin 1 on the PC IMAGE II board is marked with a small triangle. Pin 1 on the cable is marked with a red stripe or small triangle, or both..

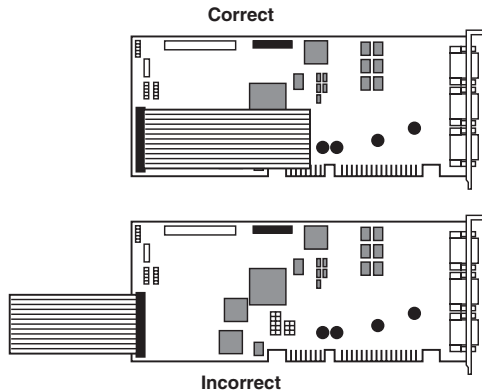


Figure 3-3. Connecting the Audio Header Cable.

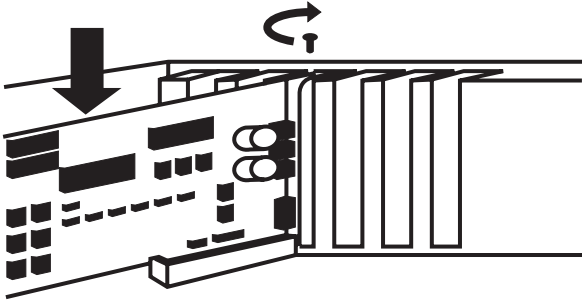


Figure 3-4. Inserting the PC Image II into the PC Slot.

Insert the card into the expansion slot. Press firmly to ensure that the card is fully seated. Anchor the card's mounting bracket using the screw from the earlier steps.

3.1.3 INSTALL THE AUDIO-HEADER COVER

Remove one of the slot covers from the back of your PC. Route the audio-header cable to the back of the computer and install it in the expansion-slot opening.

3.2 Attach PC Speaker Wires (Optional)

To reroute the PC speaker cable to the PC Image II, locate the 2-wire cable that runs from your PC motherboard to the speaker inside your PC. Grasp the plug at the end of the wires, where it connects to the motherboard, and pull gently.

Attach this plug to the 4-pin PC speaker connector near the rear corner of your PC Image II. The connector is close to the CD-ROM connector. You don't have to worry about the orientation of the plug, since the sound is identical either way.

After rerouting the cable, you will still hear the customary beeps, key clicks, and other familiar PC speaker sounds even when your PC Image II is not in use. An added bonus is that you can now control the volume of all sounds coming out of your speaker.

Some connectors are non-standard and may not plug onto your PC Image II card. Look in Appendix A for connector pin definitions and further information.

3.3 Connecting SCSI CD-ROM Drives

Each CD-ROM drive manufacturer uses a different type of audio-cable connector. If the cable included with our kit will not connect to your PC Image II, call Black Box.

3.3.1 CD-ROM DRIVE SETTINGS

Your CD-ROM drive's ID numbers are configured at the factory with default settings. Refer to your CD-ROM drive's documentation for altering the settings, or for troubleshooting information.

Before you start, the CD-ROM drive must be properly installed and connected to your power supply within your PC's case. Refer to your CD-ROM drive's manual for these steps. Follow the descriptions below for connecting your CD-ROM drive to your sound card. If necessary, refer to the illustration for connector locations.

In order to connect the Data Cable and Audio Connector to the PC Image II, you may have to temporarily remove any card to the immediate right of your bracket adapter.

3.3.2 CONNECTING THE DATA CABLE

Connect one end of the 50-pin SCSI (ribbon-type) cable to your PC Image II's CD-ROM connector. Pin 1 on this connector is on the upper right corner of the connector. Make sure that Pin 1 on your SCSI cable (red stripe) is connected to this pin. Connect the other end of the SCSI cable to your CD-ROM drive.

3.3.3 CONNECTING THE AUDIO CABLE

Attach one of the 5-pin connectors on the Internal Audio connector cable to the PC Image II's connector. The audio cable and this connector are keyed so that the cable will plug in only one way.

Connect the other end of the audio cable to the CD-ROM drive's audio connector. When all of these steps are complete, your CD-ROM drive should be connected to your PC's power supply and to your PC Image II through the data cable and audio cable.

Do not plug the CD-Audio connector into the PC-speaker jack.

You don't need to change the SCSI ID on your CD-ROM drive unless you connect additional SCSI devices to your PC Image II. If you want to connect other devices in addition to your CD-ROM drive, refer to your CD-ROM drive's documentation for SCSI ID settings.

3.3.4 REASSEMBLE THE PC

Put the cover back on your PC and secure it.

3.4 Connecting to a Television Monitor

There are three ways to connect your PC IMAGE II to video equipment. Please follow the directions under the appropriate heading.

3.4.1 RCA PLUG (VIDEOOUT)

Plug the RCA plug from the PC IMAGE II's Video Out cable into the television's Video Out plug.

3.4.2 4-PIN DIN PLUG (S-VIDEO)

The S-Video connection separates the luminance and chrominance video signals, providing the highest image quality. The S-Video connector is a circular plug on your television set with 4 pins. Use the cable provided in the PC IMAGE II package to connect to this port.

3.4.3 CABLE INPUT (ANTENNA INPUT)

The antenna hookup on your television set may be used with PC IMAGE II. This hookup, however, decodes the video signal from RF waves. This requires that you convert the video signal from the PC IMAGE II radio-frequency waves through the use of an RF modulator. This optional accessory is available at local electronics stores.

Do *not* use the "GAME" RF modulators. These units encode both audio and video.

3.5 Protecting Your Sound Equipment

If you have attached the PC's internal speaker to the PC IMAGE II, keep the speaker volume low, since the speaker cannot tolerate excessive power for a sustained period.

Never plug Line Out or the speaker connector of your PC IMAGE II, or any other audio equipment, to the output of another audio device. This may damage your equipment.

4. Software Installation

4.1 Installing DOS Drivers and Software

The DOS Installation disk of the PC IMAGE II set contains a file called `INSTALL.EXE`, which performs the following tasks:

- Creates the `PCIMAGE` subdirectory.
- Configures the various `IRQ`, `DMA`, and `I/O` settings, as well as enabling or disabling emulation modes and a joystick.
- Copies files onto your hard disk from the floppies.
- Adds the `MVSOUND.SYS` sound-device driver and the `CD-ROM` driver to the `CONFIG.SYS` file.
- Optionally adds `MSCDEX.EXE` to the `AUTOEXEC.BAT` file.
- Copies the `PC2NTSC` program to the hard disk. This program drives the TV output for DOS applications.

Before proceeding, be sure to make backup copies of the original disks.

Use the DOS `DISKCOPY` command to back up your diskettes. See your DOS manual for information.

4.2 Installation Procedures

Make sure speakers or headphones are plugged into the sound card's line out jack, so you can hear when the test file plays.

When typing commands, press the enter key when you see the `[Enter]` command. Use the appropriate drive (`A:` or `B:`) for the type of disk you are using (3.5" or 5.25").

Place your program disk #1 in floppy drive `A:` or `B:`, and type:

```
A: (or B:) [Enter]
INSTALL [Enter]
```

The first screen that appears lets you "Install Software and Setup Hardware" or just "Setup Hardware Only." Use the arrow keys to highlight "Install Software and Setup Hardware." Press `[Enter]`.

The second screen describes the installation program and asks if you want to use the default directory (`C:\PCIMAGE`). If not, press the backspace key to erase the name, and type in the name of the directory you want to use. Then press `[Enter]`.

The third screen is the configuration screen. It shows the default DMA, IRQ, and I/O settings for the PC Image, Sound Blaster™, and MPU-401 emulation modes.

If you're resetting the hardware, this screen shows the current settings.

This screen also lets you enable or disable the emulation modes, and the joystick. You can select "Yes" at the appropriate option to have the program automatically modify your PC's AUTOEXEC.BAT and CONFIG.SYS files. You must modify the CONFIG.SYS file for the sound card to work.

Use the arrow keys to highlight a category to change. Press [Enter] to choose other options for that selection.

When you have made all of your selections, highlight "Accept the configuration shown above," and press [Enter].

NOTE

The Sound Blaster compatibility mode and the PC Image mode must use different IRQ and DMA settings.

Now the program presents a test screen. If you current settings are correct, a sound file is played back. The sound momentarily plays and stops, signifying that your settings are correct. If the test is successful, press [Enter].

If the sound file "skips" and does not stop, your IRQ settings are conflicting. Press [Esc] to return to the configurations screen and select a new IRQ.

NOTE

If there is a DMA conflict, you may hear a loud hissing sound, or it may totally inhibit your PC Image's ability to play back digital sound files. Choose a different DMA channel.

If there is an IRQ conflict, the sound file keeps playing like a skipping record. Choose a different IRQ channel.

The next test screen checks the Sound Blaster emulation settings. A sound file plays that signifies correct or incorrect settings. If the settings are incorrect, press [Esc] and the program returns to the configuration screen. If the settings are correct, press [Enter].

Only when both tests have been successfully completed can the program copy all of the necessary files to your chosen directory and modify the AUTOEXEC.BAT and CONFIG.SYS files.

When the installation is complete, press [F3] to exit. Press [F3] to exit. Reboot your system to return to the DOS prompt, after which you can start using PC Image.

You can change your original DMA and IRQ settings, and disable or enable your joystick, at any time. Simply re-run the install program from your PCIMAGE directory and make the necessary changes.

You must reboot your PC for the change in the AUTOEXEC.BAT and CONFIG.SYS files to take effect.

4.3 CD-ROM Driver Setup

This section describes the CD-ROM drivers included with the PC Image II. These drivers are the TSLCDR.SYS drivers and the MSCDEX.EXE driver for Windows.

4.3.1 USING YOUR SCSI DRIVER

The TSLCDR.SYS provides a software interface for SCSI (50-pin) hardware to the MSCDEX.EXE driver. This driver is automatically added to the CONFIG.SYS file by the installation program.

The entry in the CONFIG.SYS file should look like the example below:

```
device=[path]\tslcdr.sys
/d:mvcd001/p:3
```

Where:

- **[path]** specifies the DOS path to tslcdr.sys.
- **/d:mvcd001** specifies the device name.
- **/p:3** enables CD-ROM seek commands.

4.3.2 OPTIONAL PARAMETER

/r resets the SCSI devices.

4.4 The MSCDEX Driver

MSCDEX.EXE provides a Windows software interface to all applications that address the CD-ROM drive. MSCDEX.EXE is automatically installed in your AUTOEXEC.BAT file by the installation program.

This file is required in order for your CD-ROM drive to be recognized by Microsoft Windows.

The entry in the AUTOEXEC.BAT file should look like this:

```
[path]\mscdex.exe/d:mvcd001
/m:10/v
```

Where:

- **[path]** specifies the DOS path to MSCDEX.EXE
- **/d:mvcd001** specifies the device name.
- **/m:10** specifies the buffer memory allocation.
- **/v** causes the MSCDEX.EXE to display a verbose listing of information about memory usage.

4.4.1 OPTIONAL PARAMETERS

- **/l:[drive letter]** lets you specify the DOS drive letter of the CD-ROM drive.
- **/e** instructs MSCDEX to use EMS memory.

4.5 MVSOUND.SYS Driver

The file MVSOUND.SYS is the device driver for the PC Image which is automatically loaded when your PC boots. It initializes the card and provides access to the on-board mixer and volume control and must be correctly installed in your PC's CONFIG.SYS file.

If you choose to edit this line in the CONFIG.SYS manually, it must conform to the following syntax.

**DEVICE=C:\PATH
 \MVSOUND.SYS
 D:#Q:#/J:#/S:#/M:#**

Example:

**\MVSOUND.SYS D:3
 Q:7/J:1/S:1,220,1,5/M:1,330,2**

Each switch (letter) in the statement above should be followed by a value(s). Values are separated by commas. Follows are examples of how to set each switch. Default settings are marked with an asterisk (*).

D:=DMA Channel 0, 1, 3*, 5, 6, 7

Q:=IRQ Channel 2, 3, 5, 7*, 10, 11, 12, 15

Joystick 1=On*, 0=Off

/S:

IRQ Channel 2, 3, 5*, 7
 DMA Channel 0, 1*, 3
 I/O Address 220*, 230, 240
 SB Emulation 1=On*, 0=Off

/M:

IRQ Channel 2, 3, 5*, 7
 I/O Address 300, 330*
 MP-401 Emulation 1=On*,
 0=Off

Some PCs have a defective "OSC" (oscillator) signal. The FM synthesizer and PC speaker emulation are sensitive to the signal. The symptom appears as static noise when the volume of the FM on the mixer is set to full. This defect may be compensated for by adding the /T:1 switch to the end of your MVSOUND.SYS device statement to reduce the noise levels in your recordings.

For example, the /T:1 switch selects the 28.224 MHz frequency oscillator (divided by 2) instead of the system oscillator clock of 14.31818 MHz frequency.

Remember that changes to CONFIG.SYS do not take effect until you reboot the PC.

4.6 Changing the Volume Level

Once MVSOUND.SYS is installed in your PC, you can change the PC IMAGE volume while running your DOS or Windows applications:

- **[Ctrl] + [Alt] + [U]** — Increases volume
- **[Ctrl] + [Alt] + [D]** — decreases volume
- **[Ctrl] + [Alt] + [M]** — toggles mute.

4.7 Changing Hardware Settings With A Text Editor

If you did not allow the installation procedure to change your CONFIG.SYS automatically, you should insert the line yourself. Do this only if you are familiar with editing DOS text files.

4.8 Installing the DOS Video Driver

When your PC Image first boots up, it is set to run in 640 x 480 graphics mode. Your memory intensive graphics applications will run without requiring a software driver. For DOS and text applications to appear on the television screen properly, the file PC2NTSC.COM must be loaded. Change to the PCIMAGE directory and type: **PC2NTSC.**

A screen appears providing various options for positioning the screen and for changing the flicker-reduction modes.

4.8.1 FLICKER REDUCTION

Press the **Ctrl**, **Alt**, and **F** keys simultaneously to toggle between the various PC Image display modes. Each mode will change the amount of flicker that appears on the screen. Select the mode that provides the most stable display for your television or VCR.

4.8.2 SCREEN POSITION

Use **Ctrl**, **Alt**, and the **arrow keys** to center and adjust the display position.

On some televisions and VCRs, the top or bottom of the image may not be visible. Because of the limitations of the television signal, there are no adjustments on the PC Image to adjust the size of the television image. Either resize your presentation/PC application or adjust the controls on your television set.

4.9 Installing Windows Drivers

To install Windows drivers, you must have successfully installed Windows 3.1 or Windows with Multimedia Extensions 1.0a on your PC. If you are updating your drivers, be sure to delete your old drivers first. Use the “Drivers Applet” in Windows’ control panel (the control panel is located in Windows Main program group). Earlier versions of Windows do not support audio.

Insert your Windows Utilities diskette into drive A: or B:. Start Windows by typing WIN.

From the Windows File menu, select the "Run" option and type: **X:\SETUP.EXE**, where **X** is the drive where the PC Image diskette is located.

The install program automatically locates your Windows directory and asks you to confirm the current Windows path. Click on the "OK" button or correct the path and then click "OK" to proceed.

At this point, the install program is ready to modify your SYSTEM.INI and WIN.INI files, and asks you if you want to be prompted for each driver setting. Click on the "yes" button. At every subsequent prompt, click on the "yes" button, unless one of the default settings conflicts with other hardware or software you have installed..

Once the installation is almost complete, the installation program asks if you want to reboot. Select the "yes" button. You must reboot Windows in order for your new drivers to become active.

Upon entering Windows, an introductory sound file is played. If this sound file plays continuously, you have an IRQ conflict.

4.9.1 INSTALLING MCI CD-AUDIO DRIVERS

You must have your CD-ROM drive and device driver installed before beginning these steps. Since Windows 3.1 does not automatically install the CD -Audio drivers, you will want to install the drivers before you run any MPC applications that use CD-Audio.

From the Program Manager, select the Window menu and choose "Main".

Double-click on the Control Panel Icon. Double Click on the Drivers icon.

Once the drivers selection box appears, click on the Add button.

When the Add selection box appears, click on the (MCI) CD Audio Selection. Click on the OK button to proceed to the next stage.

Next, Windows prompts you to place the disk with the updated MCICDA.DRV driver in your selected disk drive. Place the correct disk in your drive and click on the OK button.

Windows will install the driver and verify that a CD-ROM drive exists. Windows will return a message that says "One CD-ROM drive was detected. Installation is complete."

Click on the Close button to return to the Control Panel.

4.9.2 CHANGING THE HARDWARE SETTINGS FOR WINDOWS

When you enter the Windows 3.1 environment, the PC IMAGE settings in the Windows control panel take precedence over the DOS settings. When you exit Windows 3.1, the DOS settings become active again. The DOS and Windows settings can be set to the same values. Follow these steps to configure Windows 3.1 with different DMA and IRQ settings:

1. From the Program Manager, select the Windows menu and choose the Main selection.
2. Double-click on the Control Panel Icon.
3. When the Control Panel group appears, double-click on the Drivers icon.
4. Highlight the "PCIMAGE/Spectrum WAVE/MIDI/AUX" driver in the Installed Drivers selection window. Click on the "Setup..." button.
5. The PC Image Setup dialog box appears with the current DMA and IRQ settings. Any numbers grayed out are not available.
6. Point and click on the circle which corresponds to your new DMA and IRQ settings. Click on the OK button.

You must exit Windows for your new drivers to become active.

4.9.3 RESOLVING DMA AND IRQ CONFLICTS IN DOS

An IRQ problem will interfere with your PC IMAGE's ability to play both MIDI music and digital audio. If you discover an IRQ or DMA conflict between the PC Image and another card, use the following steps to reconfigure PC Image.

1. Determine which IRQ line and DMA channel you want to use.
2. Run the PC IMAGE install program to select your IRQ and DMA settings. If your settings are correct, a sound file is played back from your PC. If the sound file skips, you have an IRQ conflict. Use the Install program to choose each IRQ until you find a channel that doesn't conflict (the sound file plays correctly).

If a conflict still exists, try another IRQ or DMA setting by repeating this process.

Reboot the PC to activate the revised CONFIG.SYS file.

4.9.4 UNDERSTANDING IRQS

Your PC IMAGE uses an interrupt to communicate with your PC system. When the PC IMAGE needs your PC's attention, it issues an interrupt to gain the attention of your PC's CPU.

The Install program lets you select the interrupt request level for PC Image's audio circuitry.

You must choose an interrupt level that no other device in your PC is using.

Most DOS programs can only recognize DMA 1 and 3 and IRQ 2, 3, 5, and 7.

There are several possible conflicts. IRQ assignments vary, but the typical IRQ assignments listed below are the most common. Check network cards, Fax/Modem cards, SCSI adapters and tape backup units for already used IRQs and DMAs. The default IRQ for the Sound Blaster part and the PC Image portion of the card is 5.

Typical IRQ assignments:

- **IRQ 2** — Interrupt 8-15
- **IRQ 3** — COM2
- **IRQ 4** — COM1
- **IRQ 5** — LPT2: (2nd printer)
- **IRQ 6** — Floppy disk controller
- **IRQ 7** — LPT1: Printer
- **IRQ 10** — Not Available
- **IRQ 11** — Novell Disk
- **IRQ 12** — Not Available
- **IRQ 13** — Math co-processor
- **IRQ 14** — Hard disk

4.9.5 UNDERSTANDING DMA CHANNELS

Your PC has six usable DMA channels for rapid data transfer between peripherals (including your hard drive) and memory. The PC Image typically uses one DMA channel for high-speed transfer of waveform (PCM digitized audio) sound data. Wave form files are used to add special effects, such as sounds or a voiceover, to the background melody.

The Install program included with your PC Image lets you select the DMA channel through the software. There are no jumpers to set. You can set the PC Image to DMA channels 1 and 3. DMA channel 1 is used for the Sound Blaster Compatibility mode.

Ideally, your PC Image will not have to share a DMA channel with another device in your PC. However, if you run out of DMA channels, you can share, but you *must not* use the PC Image (in particular the PCM feature for digitized audio) and the other device simultaneously. For instance, you can share DMAs with the Sound Blaster compatible part of your board. You must *not* share a DMA channel with a hard drive or a network card since one or both of these would be active while you operate your PC IMAGE.

Typical DMA assignments are listed below. DMA 3 is the DMA channel most likely to be available.

- **DMA 1** — Available
- **DMA 2** — Floppy Disk
- **DMA 3** — Available
- **DMA 4** — Memory Refresh
- **DMA 5** — Unassigned
- **DMA 6** — Unassigned (not recommended)

Note that all of the devices listed below require a DMA channel and may already use DMA channels 3, 4, 5, 7, and 0:

- Network Card
- Tape-Backup Unit Controller
- Proprietary Printer Card (such as a PostScript® controller)
- SCSI or Other Storage Device Controller
- Scanner Card
- SDLC Controller

4.9.6 CONFLICTS WITH OTHER PROGRAMS

Simplify your CONFIG.SYS so it includes only the FILES, BUFFERS, and the DEVICE= command for the MVSOUND.SYS. You must also retain in your CONFIG.SYS any absolutely essential device drivers, such as DMDRVR.BIN, which is necessary for some types of disk drives. To maintain a standard, configure FILES to 20 and BUFFERS to 24.

Before revising your CONFIG.SYS and AUTOEXEC.BAT, you should make copies of them. Ideally, you should create a working floppy boot disk with your current CONFIG.SYS and AUTOEXEC.BAT before experimenting with these files on your hard disk. Check your DOS manual on how to create a boot disk.

You should simplify your AUTOEXEC.BAT. Remove everything but your PROMPT and PATH statement. Also remove any TSR programs, disk caches, RAM disks, menu, or shell programs.

5. PAS Utility

5.1 Introduction to PAS

The PCIMAGE subdirectory contains a utility program called PAS.EXE. This utility lets you control the mixer, equalizer, and volume controls of your sound card by using an on-screen mixer control panel. Figure 5-1 shows how the mixer ties together many different audio sources.

You can also use PAS by typing commands from the DOS command line or sending them from a batch file. Note that for convenience, we sometimes say “mixer” when we actually mean the mixer, equalizer, volume control, and related devices that you can control on your sound card.

Settings you enter with the PAS utility will be lost if you run an application program that requires VMP to be loaded.

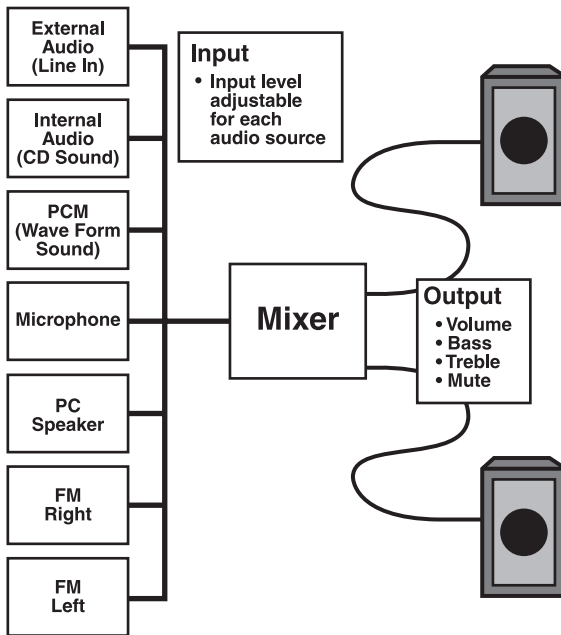


Figure 5-1. Using the Mixer to Connect Various Audio Sources.

5.2 Mixer Control Panel

To display the on-screen mixer control panel, you must first switch to the PCIMAGE directory if you haven't included this in your PATH:

```
C:\CD PCIMAGE [Enter]
PAS * [Enter]
```

You must type a space between "PAS" and the asterisk and press the [Enter] key to initiate the PAS mixer (from within the PCIMAGE directory).

The following keys have special meanings when using the interactive mixer:

- [F1] — Displays on-line help
- [F2] — Accesses control panel for recording special effects
- [F4] — Restores default settings
- [Tab] — Advances to the next control down (or to the right)
- [Shift Tab] — Advances to the next control up (or to the left)
- [Enter] — Toggle this option on or off
- [Esc] — Quit the control panel (your changes to the settings are saved automatically)

Press [F1] to see the help screen, which lists the keys available for navigating within the mixer panel and for moving the slide controls.

The Mixer and Volume Control slide controls initially appear as a solid bar that extends across both left and right channels. Actually, the left and right channels can be adjusted independently or together, depending on which key you use. When the name of a slide control is highlighted, you will adjust that control when you press the cursor keys (such as [PgUp] or [Right]) or press the [Enter] key.

The cursor keys move the slide control while the [Enter] key toggles this source as a potential input for waveform (PCM digital audio) recording. When a slide control is selected for recording, the words "Play & Record" appear to the right of it. When the control is selected for just playback, the screen shows "Play Only." You may still need to adjust the volume. Input volume is controlled by using the [Right] or [Left] arrow keys to move the slider to the left or right. Note how the slide is all the way to the left where the dots are the smallest. This is the minimum setting, which is equivalent to off. The dots indicate the direction for increasing a setting; slide the control toward the larger dots to increase the effect.

The on/off buttons, such as Loudness and Enhanced stereo, are toggled on/off by pressing the [Enter] key while that control is highlighted.

The master Volume Control, visible on the right side of the Main Control Panel, controls the volume you hear through your headphones or speaker. This includes all sound sources whether or not they are set for recording input.

There are several special effects available which appear when you press [F2]:

- **Recording Monitor Level** — The default setting, a middle setting, is appropriate for most recording sessions. This controls the volume, heard through the speakers or headphones, of all inputs selected for recording. It has no effect upon the recording volume or the volume of inputs not selected for recording.
- **Channel Connections** — For normal stereo recording, you will want to use the default left-to-left and right-to-right channel connections. You can force monaural output by mapping left-to-left and left-to-right, or right-to-left and right-to-right.
- **Real Sound Support** — Turn on real sound if your game software supports it. Enabling this option changes the sound of your PC beeps.

The sound card is capable of very sophisticated control over mixing. All sources can be controlled individually. All inputs selected for recording are combined into a single input that can be mixed with the non-recorded inputs. In addition, when you adjust the volume for listening comfort, you do not affect the volume at which recording takes place.

If you wish to hear only inputs selected for recording, turn down the individual volume level for all other inputs, set the Recording Monitor Level to an intermediate setting, and adjust the master Volume Control. If you wish to hear only inputs not selected for recording, turn down the setting of the Recording Monitor Level (or turn down the individual recording inputs) and then adjust the Master Volume Control. If you wish to hear both recording and non-recording inputs, adjust the Recording Monitor Level and the individual non-recording inputs so you have the correct balance. Adjust the master Volume Control to a comfortable level.

Both the Recording Monitor Level and the Master Volume Control affect only what you hear; they do not change the volume at which a source is recorded. The volume level for digital audio recording is set by the individual slide controls for the inputs selected for recording.

As an example of this sophisticated mixing control, suppose you are singing along with an internal CD player but wish to record only your voice. You would select for recording only the microphone input and adjust its slide control, adjust the Internal Connector slide to make for a good balance between the two, and then adjust the master Volume Control for comfortable listening.

5.3 Command Line Mixer Control

This section explains how to use PAS Utility command lines to access each of the functions. This is an alternative to the on-screen mixer control panel for customizing how your sound card operates. The PAS utility recognizes a select set of English keywords, entered either at the DOS command line or issued by a batch file. The PAS command language includes commands and effects which are not available through the on-screen mixer control panel.

This section is of interest primarily to people who have very sophisticated requirements. If you find the on-screen mixer control panel—accessed from either AudioLink or from the DOS command line—adequate for your purposes, you can skip this section.

5.3.1 PAS KEYWORDS

There are six sources of audio that can be combined in the mixer. Each source is identified with a keyword:

- **FM** — Stereo FM synthesizer
- **PCM** — Digitally sampled audio (PCM) playback
- **INT** — Internal CD-Audio connection
- **EXT** — External Stereo jack
- **SPEAKER** — PC speaker
- **MIC** — Microphone jack

Each audio source has a left channel and a right channel associated with it; therefore, to refer to the FM synthesizer on the right channel, the keywords **FM RIGHT** are used together. If **FM** appears without **LEFT** or **RIGHT**, it is assumed that the action is to take place on both channels.

Additional keywords used to build a command sentence are listed below:

- **SET** — Start of command line for setting a fixed value
- **FADE** — Start of command line for a gradual change
- **TURN** — Start of command line for toggling a setting on
- **VOLUME** — Overall output volume
- **INPUT MIXER** — Source to the mixer should be in record mode

- **OUTPUT MIXER** — Source to the mixer should be in the play mode
- **FROM** — Starting point for a fade-in or fade-out
- **TO** — Stopping point for a fade-in or fade-out
- **TREBLE** — Specifies treble adjustment
- **BASS** — Specifies bass adjustment
- **ENHANCED** — Turns treble and bass enhancements on or off
- **MUTE** — Turns output audio on or off
- **ON** — Turns specified feature on
- **OFF** — Turns specified feature off
- **SECONDS** — Specifies the period in seconds of a fade

The last set of keywords are special cases in that they can be used on a command line alone. The keywords that fall into this category are described below:

- **HOLD** — Instructs PAS to place the following commands (up to 16) in a queue to be executed when a RELEASE command is received.
- **RELEASE** — Executes the commands that were placed in the queue after a HOLD command was issued.
- **RESET** — Restores the default settings for the mixer and master volume.

5.3.2 HELP

You can see help screens summarizing the PAS keywords. To see the help information type: **PAS [Enter]**.

Use the following keys while viewing help screens:

- **Any key** — go to the next help screen.
- **Control C** — Exit help.

5.4 PAS Utility Examples

5.4.1 AUDIO SOURCE INPUT LEVEL CONTROL

The input level is expressed as a percentage of the maximum possible volume for that source.

To include an audio source, set the volume for that source to a value greater than 0%. A value of approximately 75% will ensure that you hear this source.

Here are some examples for setting audio-source input levels. These commands must be issued from your PCIMAGE directory. The relative levels control the relative strength of the audio sources.

PAS SET FM TO 60

Sets level for both FM synthesizers 60% of maximum possible for that synthesizer. Note that it selects both channels since the FM keyword is not followed by either a LEFT or RIGHT.

PAS SET LEFT FM TO 50

Sets the level for the left channel FM synthesizer to 50% of the maximum possible for that synthesizer. The right channel setting is not affected.

PAS SET INT TO 100

Sets the level for the internal CD-Audio source to maximum. Use input for recording and output for playback.

PAS SET INPUT MIXER FM TO 75 or PAS SET OUTPUT MIXER FM TO 75

The first example sets the input (record) mixer to 75% volume for the FM source. The second example sets the output (playback) mixer to 75% volume for the FM source.

PAS SET RIGHT PCM TO 5

Sets the level of the right channel of the PCM source to 5% of maximum.

You can also use the following key combinations to change the volume while running your presentation.

- [Ctrl] + [Alt] + [U] increases volume
- [Ctrl] + [Alt] + [D] decreases volume
- [Ctrl] + [Alt] + [M] toggles mute

5.4.2 FADING

For the effect of audio slowly fading in or fading out, have the volume level slowly increase or decrease over time. For example:

PAS FADE FM FROM 100 TO 0 IN 2 SECONDS

Both FM channels fade from maximum level to minimum level over a 2 second period.

PAS FADE RIGHT PCM TO 50 IN 3 SECONDS

The PCM signal level on the right channel fades from its present level to 50% strength in 3 seconds. Note that depending on what the present level is, this could cause a fade-in or a fade-out.

PAS SET PCM TO 0 PAS FADE PCM FROM 0 TO 83 IN 4 SECONDS

The first command turns off the PCM audio source. The second command turns it on and sets it to 83% of its maximum in 4 seconds, causing a fade in.

When fading audio, you should provide an original percentage as in the example directly above, unless you want the fade to start from the current volume setting.

5.4.3 EQUALIZER CONTROL (ENHANCEMENTS)

There are two equalizer bands available to adjust the bass and treble of the output (audio sources already mixed) signal. The keywords here are BASS and TREBLE. Each has its own level of control. Use the equalizer band settings to provide a boost (gain to +12 dB) or a cut (attenuation to -12 dB) to the treble and bass. A 100% setting gives the maximum boost while a 0% setting gives the maximum cut. A 50% setting provides for flat response; the signal is neither boosted nor cut.

PAS SET BASS TO 100

Sets the bass to 100%, resulting in the maximum possible boost in the bass range (this is equivalent to a 12-dB boost).

PAS SET TREBLE TO 17

Sets the treble to 17%, resulting in a moderate cut in the treble range (equivalent to an 8-dB cut).

There are a couple of additional controls for enhancing the sound source. When enhanced bass is turned on, it gives a boost to low-volume, low-frequency signals. When enhanced treble is turned on, it gives a boost to high-frequency signals and often gives an impression of greater stereo separation. The controls are simple on/off controls and appear as follows:

PAS TURN ENHANCED BASS ON

Turns on the enhanced bass.

PAS TURN ENHANCED TREBLE OFF

Turns off the enhanced treble.

5.5 Master Volume Control

You can control the master output volume of your sound card by using the keyword **VOLUME**. The master output is a stereo output that consists of all the individual audio source signals after they have been mixed together to form left and right channel output. You can adjust the volume of both the left and right channels individually or together. For example:

PAS SET VOLUME TO 100

Sets the master volume level of both the left and right channels to maximum.

PAS SET LEFT VOLUME TO 50

Sets the master volume of the left channel to 50% of maximum. This has no effect on the right channel.

You can also do fades:

PAS FADE RIGHT VOLUME FROM 30 TO 80 IN 6 SECONDS

Fades in the master volume level of the right channel from 30% to 80% over a period of 6 seconds.

PAS FADE VOLUME TO 0 IN 2 SECONDS

Fades out the master volume level of both channels over a period of 2 seconds.

5.6 Mute

It is also possible to mute all sound output. The mute command appears as follows:

PAS TURN MUTE ON

Turns off the output.

PAS TURN MUTE OFF

Turns the output back on.

5.7 Queue Control

The ability to queue up commands for your sound card is a powerful feature of the PAS utility. A queue stores up to 16 commands. This is especially useful when you are entering commands from the DOS command line and want to enter all commands before execution begins on the first one.

For example, if you want to fade out the FM audio on the left channel, then fade in the PCM audio on the right channel with a smooth transition, use the **HOLD** and **RELEASE** queue commands. The following commands provide this smooth fade without the delay that results when typing commands at the keyboard.

- **PAS HOLD** (all commands that follow are queued)
- **PAS FADE LEFT FM FROM 100 TO 0**
- **PAS FADE RIGHT PCM FROM 0 TO 100**
- **PAS RELEASE** (start executing the commands in the queue)

5.7.1 RESET COMMAND

You may lose track of the current mixer and master volume settings. The following command returns your sound card to the initial settings provided upon power up.

PAS RESET

The PAS RESET command cannot be queued. This command immediately voids all PAS utility commands entered so far.

5.8 Error Messages

If you type a command incorrectly, an error message appears. For example, if you type:

```
PAS FADE LEFT AM FROM 100 TO 0
```

the following message appears:

```
There is an error in your command.  
The question marks show where the  
problem exists:  
FADE LEFT????
```

5.9 Playback and Record Utilities

The following conventions apply to the Playfile and Recfile utilities, except when explicitly noted otherwise.

Command parameters can be typed in either upper or lower case and a dash (-) or slash (/) preceding the parameter is optional. The default is always an 8-bit file specification. See the command line parameters for other options and overrides.

```
PLAYFILE racecar.wav/s120 -d3
```

Command parameters need not be entered in a prescribed order. The two command lines below are equivalent:

```
PLAYFILE racecar.wav D3 S120  
PLAYFILE racecar.wav S120 D3
```

5.9.1 PLAYFILE.EXE

The PLAYFILE.EXE utility plays back digitized audio data stored in a file. It converts the digital sound data into audio that can be mixed and heard through the speakers or headphone.

With Playfile you can play a file from the DOS command line or from a batch file. There is an advantage to using Playfile and Recfile rather than larger playback and record utilities to play back and record digitized audio. Since these two programs are designed specifically for one task, they are faster than one utility that performs both operations. Playfile and Recfile can handle playback and record at up to 44,100 samples per second (twice this for stereo) on most machines. An example command line is below:

**PLAYFILE file name [Dx] [Ix] [S]
[Sxxx] [Rxxxxx]**

The command line parameters are:

- **filename** — Filename for file to play. You must specify the file extension (.WAV or .VOC)
- **Dx** — This is optional. This overrides the default DMA setting.
- **Ix** — (Optional). Overrides the default IRQ setting.
- **S** — (Optional). This forces a monaural file to be played back as stereo sound. Half of the samples (every other one) become left-source sound data; half become the right source.
- **Sxxx** — (Optional). This is a speed adjustment that adjusts the sampling rate by up to 100%. Values can range from 0 (silence) to 100 (no change in speed) to 200 (double the speed).
- **Rxxxxx** — Optional parameter for .WAV and .VOC files; required for other file types. This is the sampling rate to use. This overrides the sampling rate in the file header of a .WAV and .VOC file. This can vary between approximately 6000 and 44100.

Playfile will play back ANY file you give it. If it doesn't recognize the file type, it assumes that the file contains 8-bit unpacked PCM audio data.

Example:

PLAYFILE racecar.wav R120

This plays sound file RACECAR.WAV at 120% of the speed it was recorded (20% speed increase). Type in the following command to see more Playfile options:

**PLAYFILE [Enter]
5.9.2 RECFILE.EXE**

The RECFILE.EXE records audio input, converting it into digitized audio that is saved to disk in either VOC or WAVE file format. Before using Recfile, you should use the PAS utility to set up the mixer inputs and volume control. Recfile and Playfile can handle playback/record at up to 44,100 samples per second on most machines. For example:

**RECFILE filename [Rxxxxx] [Ix]
[Rx] [S]**

Terminate recording by pressing [Esc]. Since the PCM circuitry on your sound card can be used for either playing back or recording digitized audio, you must not select already-digitized audio as an input when recording with Recfile.

The command-line parameters are listed below:

- **filename** — Filename for the file to save as digitized audio. If the file extension is .VOC, the sound data is saved in SoundBlaster .VOC format. If the file extension is not .VOC, the sound data is saved in Microsoft WAVE (.WAV) format.
- **Rxxxxx** — Sampling rate to use. This can vary between approximately 6000 and 44100.
- **Dx** — This option overrides the default DMA setting.
- **Ix** — This option overrides the default IRQ setting.
- **S** — (Optional). Forces stereo recording; without this flag, the sound input is recorded as mono. If you do a monaural record of a stereo source, only the left-channel sound is captured.

Use the lowest possible sampling rate that's feasible to avoid filling up the hard disk. For example, to record a human voice, a sampling rate of 6000 is adequate. If you record stereo sound at 44,100 sampling rate, you record 88,200 samples per second. Since each sample is 1 byte, you save 88200 bytes per second. One minute of recording consumes almost 5.3 megabytes!

Example:

```
RECFILE LEFT.WAV r11025 S
```

This creates a stereo digitized audio file, in .WAV format, which has been sampled at 11 KHz (recording 22 KHz samples per second at 8 bits). Type in the command below for more Recfile options:

```
RECFILE [Enter]
```

6. Windows Utilities

Your PC IMAGE II comes with several useful utilities that let you easily control the audio mixer on the card. The mixer provides full volume control over six different audio sources as well as control over the master volume. After installation from within Windows 3.1, these mixer utilities can be found in the PC Image group of the Program Manager.

These utilities are Pro Mixer, Pocket Mixer, and Pocket Recorder. The Pro Mixer option gives you complete control over the advanced mixing capabilities of your sound card. The Pocket Recorder is an easy-to-use Windows 3.1 based application for recording waveform data. Pocket Mixer is a Windows 3.1 based application that lets you control the volume and equalization settings of your sound files and create custom mixer files. The following sections provide detailed information on each program.

6.1 Pro Mixer Utility

Use the Pro Mixer Option to control the unique stereo mixing and equalizing capabilities of your sound card. Features of the Pro Mixer are as follows:

- **Pro Mixer Menu Multimedia Mixer Dialog** — Provides complete stereo volume control over all audio sources on your sound card as well as the master volume.
- **Equalizer** — Provides control over the sound card's bass and treble equalizer. It is also used to select Stereo Enhance and Loudness modes.
- **Timed Fade Dialog** — Used to do special effects on audio signals (such as fading in and out, or panning from channel to channel).
- **Select a Mixer State File** — Used to save and restore various mixer settings by name to disk.

The Pro Mixer is activated by double-clicking on its icon in the PC Image group within the Program Manager.

Once the Pro Mixer is activated, the Multimedia Mixer dialog box appears. However, if this box is later closed, you can still activate the Mixer, Equalizer, or Fader by clicking once on the Pro Mixer icon (located in the lower left corner of the screen). A menu will appear above the icon (Figure 6-1).

6.1.1 USING THE MULTIMEDIA MIXER DIALOG BOX

The Multimedia Mixer dialog box is activated by either double-clicking on the Pro Mixer icon, or by single-clicking on the Pro Mixer icon and selecting "Pro Mixer" from the menu.

L oad State	
S ave State	
R eset State	
P ro Mixer	
E qualizer	
F ade Mixer	
A bout Box	
M ove	
C lose	Alt+F4
S witch To...	Ctrl+Esc

Figure 6-1. Multimedia Mixer Menu.

Each feature in the Multimedia Mixer dialog box is listed below.

- **Synthesized Music** — Music produced by the sound card's FM synthesizer.
- **Record** — Lets you hear what you are currently recording.
- **Auxiliary** — Stereo input from CD players, tape players, stereo tuners, and other devices capable of line-level input to the sound card's stereo line in.
- **CD-Audio** — Stereo input from internal or external CD-ROM drives to the sound card's internal audio connector.
- **Microphone** — Mono input from a microphone.
- **Waveform** — Stereo input from on-board Digital-to-Analog Converter (DAC).
- **Speaker** — Mono input that duplicates any sounds normally generated by your PC's speaker.
- **Blaster** — Controls the Sound Blaster compatibility volume control.
- **Master Volume** — Overall volume control after mixing.
- **Record** — Varies the signal going into the record circuitry (record gain).

6.1.2 CHANGING THE VOLUME

To change both the left and right channels simultaneously, click on either the left or right slider button above the audio source of your choice and, without releasing the mouse button, drag the button to the desired level.

To change the left or right channel independently, click on the up or down arrow above the audio source of your choice. The volume level will change by one notch with every click of the mouse (or hold down the mouse button for rapid volume changes).

Increasing an audio source's volume to 100% of its maximum level may cause some distortion because of overamplification.

6.1.3 SET AN AUDIO SOURCE FOR PLAYING OR RECORDING

The buttons above each of the audio source sliders are used to toggle the audio source between play mode and record mode. The Sound Recorder can be used to record any audio sources selected for recording via the Multimedia Mixer dialog box.

When recording, all audio sources not being recorded should have their volume levels reduced to zero, even though no audio may be present on a particular channel. This makes your recording as noise-free as possible.

When not recording or playing through the microphone, the microphone's volume level should be reduced to zero. This is especially important if no microphone is presently connected to the microphone input jack of your sound card. Again, this is to reduce any possible noise.

6.1.4 USING THE EQUALIZER

One of the unique features of your sound card is its ability to adjust the bass and treble frequency ranges of the output signals just like a stereo equalizer.

The Equalizer window (Figure 6-2) is accessed via the Pro Mixer icon. When you click once on this icon, a menu appears that includes an entry for the Equalizer.

The Equalizer window has four features:

- **Bass** — The Bass slider is used to control the volume of the lower frequencies of the combined audio sources.
- **Treble** — The Treble slider is used to control the volume of the higher frequencies of the combined audio sources.
- **Stereo Enhance** — This makes all sounds being played more rich and full. It phase shifts the left and right channels a small degree. The result is a “spatial separation” that makes mono sounds sound like stereo, and stereo sounds sound more dynamic. Click on the Stereo Enhance box to enable this feature.

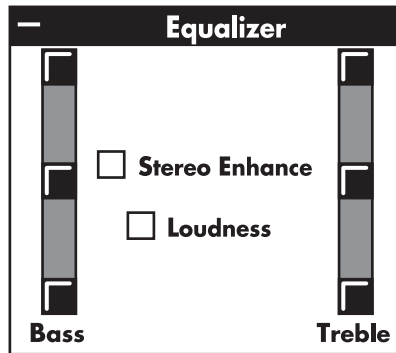


Figure 6-2. The Equalizer Window.

- **Loudness** — This control boosts the lower bass frequencies of the combined audio sources. Click on the Stereo Enhance box to enable this feature.

6.1.5 USING THE TIMED FADE DIALOG

The Timed Fade dialog (Fader) is a useful software tool that allows you to perform special audio effects with your sound card. The Fader works in conjunction with the Multimedia Mixer dialog to fade audio sources in and out, perform cross-channel fades (panning), and set mixer delays.

The Fader is accessed via the Pro Mixer icon. Click once on this icon and a menu appears with a selection called “Fader & Timed Fade.” The Timed Fade Dialog box appears (Figure 6-3). To set audio sources to fade in or out, follow these steps:

1. From the Multimedia Mixer window, set the volume for the audio source that will start.
2. From the Fader window, set the volume for the audio source that will end.

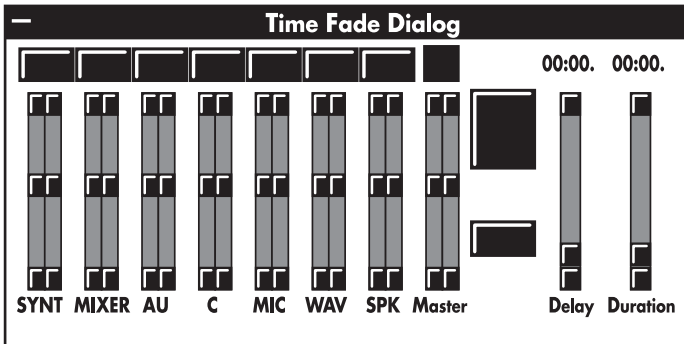


Figure 6-3. Timed Fade Dialog Window.

3. Set the delay time that must elapse before the fade is started by moving the delay slider in the Fader window.
4. Set the duration of the fade by moving the Duration slider in the Fader window.
5. Start the audio sources playing if they are not already playing.
6. Click the Fade button in the Fader window to put the settings into action.

When you are ready to put the Fade feature into motion by clicking the Fade button, you can use the Sound Recorder to begin a recording of any audio source that has its record feature enabled. The resulting recording will then fade in or fade out as you have chosen.

The Multimedia Mixer dialog window will reflect changes made by the Fader and Pocket Mixer as they happen.

6.1.6 CROSS-CHANNEL FADES

A cross-channel fade is a special audio effect usually referred to as stereo panning. It makes an audio source sound as though it is traveling from one speaker to the other. Follow the steps for doing a regular fade, and set the begin and end volume levels of the left and right channels of a particular audio source to different values.

6.1.7 MIXER SETTING DELAYS

The mixer settings of your sound card can be set to switch instantly from one pre-configured state to another after a specific period of time. The duration must be set to zero. After you click on the Fade button and the time you specified with the Delay slider has expired, the mixer state will jump from the state specified in the Multimedia Mixer dialog window to the state specified in the Fader window.

A powerful feature of the Pro Mixer is its ability to save and restore the current sound card mixer and equalizer state. The Load State feature lets you load the exact mixer settings for each audio source as previously saved with the Save State feature. To save or load a mixer state, click once on the Pro Mixer icon.

To load a mixer state:

1. Select the directory you used when saving a previous mixer state.
2. Select a “.mix” file that appears in the mixer box.
3. Click on the selected button.

To save a mixer state:

1. Select the directory in which you want to save the mixer settings.

2. Type in the file name you wish to save the mixer settings under in the Mixer State Name Field.

3. Click on the OK button.

To restore the mixer to the state it was in when you started, click on the Pro Mixer icon once. Select Reset State from the menu.

6.2 Pocket Recorder

Pocket Recorder is an easy-to-use, Windows 3.1 based application for recording waveform data in an 8- or 16-bit format.

You can use Pocket Recorder to record and play back waveform files (*.WAV) from any Windows application.

You can also splice and blend files together for interesting audio effects. By default, your view of the file being displayed is an outline of the entire file. The total length of your file is also conveniently displayed in seconds format in the status area. Figure 6-4 shows the opening screen of Pocket Recorder. Figure 6-5 shows the drop-down menu which appears when you select File from the opening screen. To run Pocket Recorder, double-click on the Pocket Recorder icon found in the PC Image group.

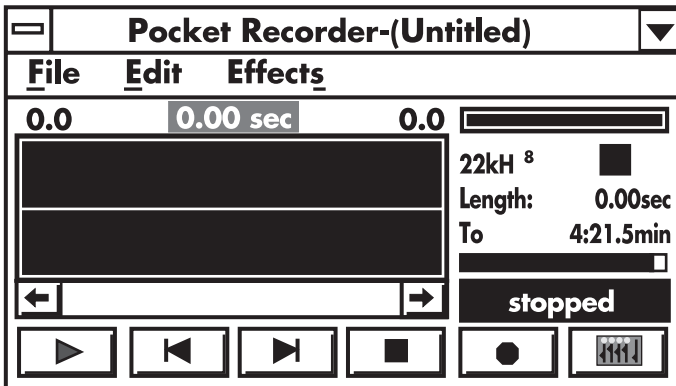


Figure 6-4. Opening Screen of Pocket Recorder.

File	Edit	Effects
New...		
O pen..		Ctrl+F12
S ave		Ctrl+F??
S ave A s...		F12
Revert		
S et Temp D irectory...		
E xit Alt+F4		
A bout...		

Figure 6-5. File Menu for Pocket Recorder.

6.2.1 FILE MENU FUNCTIONS

The functions in the File menu are listed below:

- **New** — Creates a new file, and presents you with a dialog box for specifying recording parameters.
- **Open** — Presents you with a standard file requester dialog box for opening an existing waveform file.
- **Saves** — Saves the current waveform file. If the current waveform is untitled you will be prompted to input a standard file format.
- **Save As...** — Lets you save your file under a different name and extension. “Save As...” saves the current contents of the file being edited into a new file, without affecting either the contents or state of the current file.

- **Revert** — Causes the current waveform file to revert to the last saved version. This feature is helpful when you accidentally edit a waveform. The revert selection actually recalls a temporary file in which all edits are stored.
- **Set Temp Directory...** — You can use this command to define where Pocket Recorder stores its temporary files. This temporary directory is only used by Pocket Recorder and is not related to the DOS TEMP environment variable. To use this option, do the following:

1. Select the Set Temp Directory option in the File menu. The window shown in Figure 6-6 appears.
2. If a file is loaded and has been modified, a message box appears asking whether the modification(s) should be saved. Select either Yes or No.

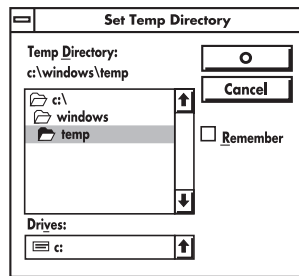


Figure 6-6. Set Temp Directory Window.

3. The Set Temp Directory dialog box appears. In this dialog box, you can choose the current drive and directory for the applications temporary files.

Selecting the OK button causes the application's temporary files to be recreated on the newly specified drive and directory. Selecting the Cancel button causes the application to ignore any changes made to the specified drive or directory.

Select the Remember check box to allow Pocket Recorder to remember these specific paths to the temporary drive and directory for the next time you open Pocket Recorder.

Calculating TEMP File Size

The TEMP (temporary) file size is not dependent upon how much free space is available on your hard disk. When the TEMP file reaches its maximum size, a message box appears. You must save the file at this time. Any edits which increase the file size will not be saved. To calculate the amount of disk space which can be used to record a file, take the total free space of your temporary drive, subtract the size of the file currently loaded and divide by two.

- **Exit** — The Exit command lets you properly exit from the Pocket Recorder application. If there is an open waveform file currently being edited, you will be prompted to save changes.
- **About...** — Displays information on which version of Pocket Recorder you are using.

6.2.2 EDIT FUNCTIONS

You can insert a file at any location within a waveform file. It simply appends the selected file to the current file. However, you cannot mix two files which were recorded at different sample rates. The following list describes the Edit functions:

- **Insert File** — Lets you place a file within your current file. The placement of the file depends on the position of the insertion point.
- **Blend File** — Effectively overlays the files on top of one another. The duration of the final file will be the same length of the longest file used. This feature merges two waveforms into one file.

Saturation levels must be monitored while blending files. Saturation is another form of distortion that occurs when the amplitude of a blended file is excessive. This is sometimes called clipping.

- **Compress File** — This feature is currently not supported.

6.2.3 EFFECTS FUNCTIONS

Sound effects modify the waveform data. If an unwanted or undesirable effect is produced, use the “Revert” command to reload the last saved version of the waveform. The Effects functions are listed below:

- **Louder** — Increases the amplitude of the waveform file by 50%.
- **Softer** — Decreases the amplitude of the waveform file by 50%.
- **Faster** — Increases the speed of the waveform file by 100%.
- **Slower** — Decreases the speed of the waveform file by 50%.
- **Higher** — The Higher command raises the pitch of the waveform file. The speed and duration are not affected.
- **Lower** — The Lower command lowers the pitch of the waveform file. The speed and duration are not affected.
- **Voice...** — TheVoice... command reduces the sound of a waveform file from a range of 1/50th of a second to 1/200th of a second. Use your mouse to slide the range of settings from the left (lower voices) or to the right (higher voices). See Figure 6-7.
- **Echo** — Adds an echo effect to the waveform file by repeating the waveform data at a delay of approximately 0.5 seconds. This effect is more noticeable on voice data.
- **Reverb** — Applies a reverb characteristic to all waveform data in the file.

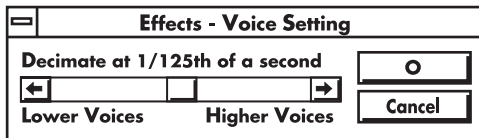


Figure 6-7. Voice Setting Box.

- **Reverse** — Plays your waveform file backwards.
- **Convert to 8-bit** — This command lets you convert (downsample) a 16-bit file into an 8-bit file. Some versions of 16-bit capable hardware let you record in an 8-bit format, but they also record a large amount of noise. Record your waveform file in a 16-bit format and use this command to convert the waveform file. You can also use this command to reduce the size (by one-half) of any 16-bit waveform file that doesn't justify the extra disk space needed to store the file.
- Hold down the shift key and click the mouse button at a point in the view area. This method selects a region between the current insertion point (if no position has been selected, then the beginning of the view area) and the position where you clicked the mouse.

The two methods described above will let you zoom in on a portion of the waveform file. Once you have this zoom view, it is possible to select a portion of the wavefile larger than can be normally displayed in the view area. Follow these steps:

1. Place the current position cursor (the red line in the waveform view area) at the beginning of the region you want to select. Then scroll the view area to the part of the waveform region where you want the region to stop.
2. Press the shift key and simultaneously click on the mouse button. The region between the two selection points is highlighted (Figure 6-8).

If a region is currently selected before you perform the above steps, that region will be un-selected. You cannot select a region in the zoomed-in mode, then zoom out while maintaining that selection. Therefore, in order to zoom out, you must double-click on the waveform view window, which removes any defined selection.

6.3 Using Pocket Recorder

6.3.1 SELECTING A REGION OF A WAVEFILE

In order to edit a portion of a wavefile, you must select a portion of the wavefile from within the view area. You can do this in two ways:

- Click down on a mouse button while the insertion point is in the waveform view area and drag the mouse until a portion of the waveform is highlighted.

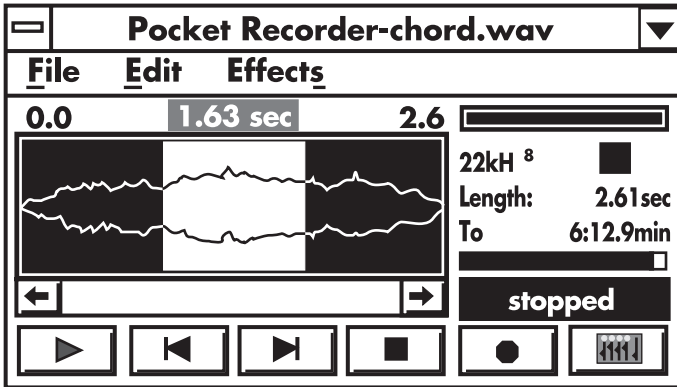


Figure 6-8. Selecting a Region of a Waveform File.

6.3.2 PLAYING A WAVEFORM FILE

1. Select "Open" from the File menu.
2. Once the Open Wave File dialog box appears, click on the disk drive or subdirectory where you have stored your waveform (*.WAV) files.
3. Highlight the waveform file you want to open. Click on the OK button. The waveform file is automatically loaded into the Pocket Recorder's view area.
4. Click on the Play button to play back the waveform file. As it is played back, notice the activity of the VU meter. Both bars moving confirms that you have selected a waveform that was recorded in stereo. The green bar represents channel 1 and the blue bar represents channel 2.

6.3.3 RECORDING A WAVEFORM FILE

Several options are available when recording waveform files. If a selection is grayed out, it is not available with your version of Pocket Recorder. Before proceeding with these steps, be sure that your microphone or audio device is plugged into either the microphone or line-in input plug on your sound card.

1. Select "New" from the File menu. The Record Parameters dialog box (Figure 6-9) appears and presents several options:

Sample Rate — Select either 44.1 KHz, 32.0 KHz, 22.05 kHz, or 11.025 KHz. Keep in mind that the larger the sampling rate, the more disk space is required to store the waveform file.

The 44.1 KHz sampling rate may not be possible on 386sx PCs running at 20 MHz, or slower, when recording in the 16-bit stereo mode. We recommend that you limit your sampling rate to 32.0 KHz for this type of PC.

Channels — If you are going to record in stereo, click on the Stereo button. Otherwise, select Mono.

Compression — Currently not supported.

Sample — Select the 8-bit or the 16-bit mode. Pocket Recorder does not convert waveform files from different formats.

2. Click on the Record button (red circle) to record from your selected audio source. Speak into your microphone or activate your audio source. Keep a close eye on your VU meter. The record mode changes the VU meter's bars from green and blue to red.

Pocket Recorder will not let you produce a recording larger than the temporary recording file. Pocket Recorder always creates a temporary recording for use with the revert command. It is this temporary file that is recalled when you select "Revert" from the File menu.

3. Click on the Stop button (square) to end the recording process. Notice how the File Status window constantly informs you of your operating status.

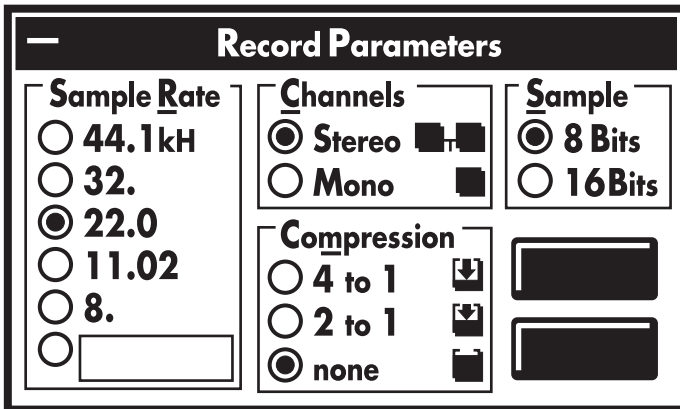


Figure 6-9. Record Parameters Dialog Box.

Pocket Recorder uses an Auto-Stop feature when your temporary recording file becomes too large to be saved. A message box appears indicating that the recording will be stopped. At this point, you should save the file if any editing is going to be done that may increase the file's size.

Make sure you have set the mixer to record from the desired source.

To reduce the time it takes to save a recorded file to disk, press the space bar on the keyboard to stop the recording.

4. Select "Save As..." from the File menu. Type in a name for your new file when Pocket Recorder displays the Save Wave File dialog box (Figure 6-10).

6.3.4 OLE AND POCKET RECORDER

Object linking and embedding (OLE) is a Windows 3.1 function that allows Windows 3.1 applications to transfer data and to share data by establishing a common link between two Windows 3.1 applications. In the OLE world, the requesting application is called a client, while the application the provides the data is called the server. Among the applications included with Windows 3.1, Paintbrush and Sound Recorder are OLE servers and Cardfile and Write are considered OLE clients. Pocket Recorder is considered an OLE server.

The most common use of OLE is inserting a graphic or voice annotation into your word processor. The following example shows how to place a voice annotation within a Microsoft Word document. Refer to your

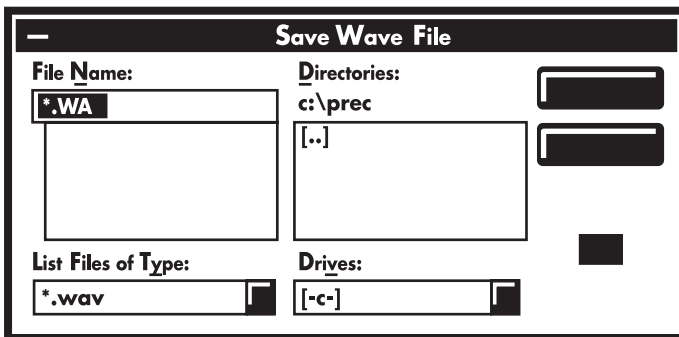


Figure 6-10. Save Wave File Dialog Box.

Windows 3.1 application documentation for specific requirements on using OLE. The instructions below assume you have a microphone plugged into the external microphone jack of your sound card.

1. From Microsoft Word, select the Insert menu and choose “Object...”
2. Select “Pocket Recorder Wave” from the Object dialog box and click on the OK button.
3. Once Pocket Recorder appears (Figure 6-11), click on the record button and record your voice annotation.

4. From the File menu, choose the “Return to Microsoft Word” selection.
5. A message box appears asking “Do You Want to Update the Changes in Microsoft Word?” Select “Yes” to continue. Once the Pocket Recorder icon appears in your document, all you have to do is double-click on it to activate Pocket Recorder. Press the play button to hear the voice annotation.

6.3.5 EXITING FROM POCKET RECORDER

Select “Exit” from the File menu. If you have modified your current waveform file, you will be prompted to save these changes.

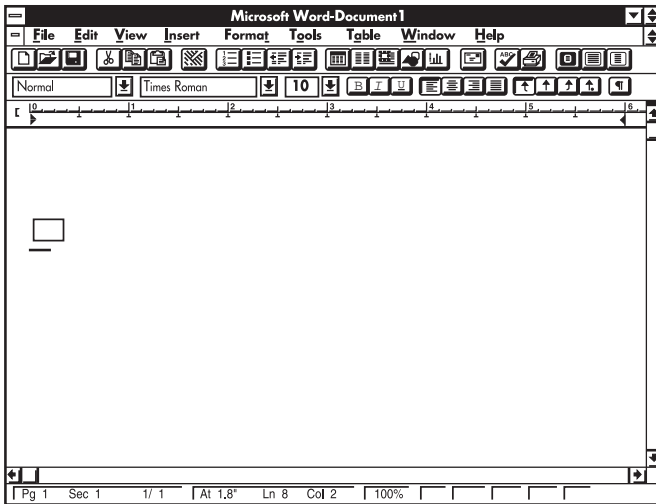


Figure 6-11. Selecting Pocket Recorder Wave from Within Microsoft Word.

6.4 Pocket Mixer Utility

Pocket Mixer is a simple, easy-to-use, Windows 3.1 based application that lets you control the volume and equalization settings of your sound card. It also lets you create custom mixer files.

The following options are available in the File menu of the Pocket Mixer.

- **Save As..** — Lets you save your file under a different name and extension. “Save As..” saves the current contents of the file being mixed to a new file, without affecting either the contents or state of the file.
- **Revert** — This selection causes the current MIX file to revert to the last saved version. This feature is useful if you accidentally edit a wavefile.
- **Exit** — This selection exits the Pocket Mixer application. If there is an open MIX file currently being edited, you will be prompted to save changes.
- **About** — Displays information on which version of Pocket Mixer you are using.

6.4.1 USING POCKET MIXER

You use the Pocket Mixer to control the unique stereo mixing and equalization capabilities of your sound files. The audio channels from left to right are described below. Refer to Figure 6-12.

- **Monitor** — Lets you hear the audio of all channels patched to record.
- **FM Channel** — Stereo channel for the sound card’s FM synthesizer.
- **Microphone** — Mono input from a microphone.
- **Digital Audio** — Mono or stereo channel for playback of digital waveforms.
- **CD** — Stereo input from internal or external CD-ROM drives connected to your sound card’s internal audio connector.
- **PC Speaker** — Mono input that duplicates any sounds generated by your PC’s internal speaker. Not all PCs support this feature.
- **Aux** — Stereo input from CD players, tape players, stereo turners and other devices capable of line-level input to your sound card’s stereo line in.
- **Balance** — Adjusts the output from the left and right channels.
- **Volume** — Controls volume of the currently selected audio channel.

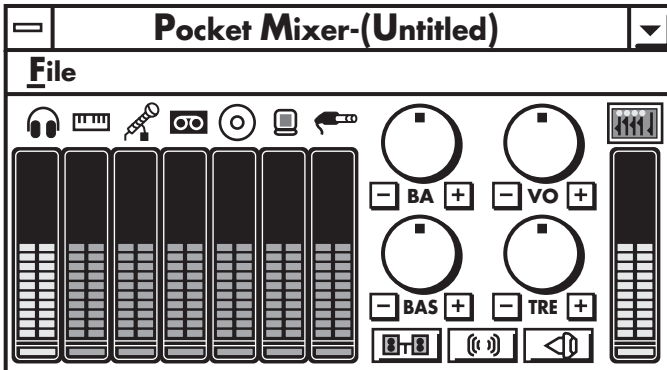


Figure 6-12. Pocket Mixer Opening Screen.

- **Bass (BASS)** — Use the bass knob or continuously click on the [+] or [-] icon just below the bass knob. These icons control the volume of the lower frequencies of the combined audio sources.
- **Treble (TREB)** — Use the treble knob or continuously click on the [+] or [-] icon just below the treble knob. These icons control the volume of the higher frequencies of the combined audio sources.
- **Stereo Enhance** — This feature makes sounds being played back richer and fuller. The left and right channels are phase-shifted to a small degree, resulting in spatial separation. Mono sounds become stereo, and stereo sounds become more dynamic.
- **Loudness** — This icon boosts the lower bass frequencies of the combined audio sources.
- **Mute** — Mutes all audio output.

6.4.2 CREATING A MIX FILE

In order to create a MIX file, you have to have audio file or several sources of audio to mix. In the procedures below, it is assumed that the file being mixed is a MIDI file. Let's assume that a business executive chooses a MIDI file for background music in a computer demo and wants to quickly tailor it for two different listening environments: an auditorium and a board room.

1. From the Program Manager's Accessories group, double-click on the Media Player icon.
2. From the Media Player File menu, select "Open..."
3. In the "Open..." dialog box, place the cursor in the File Name's text field and type *.MID. Use the Drives selection windows to select a different directory if the MIDI file you are looking for is not in the default directory.
4. Highlight the MIDI file to mix and click on the OK button. Media Player now loads your file.
5. Bring up the Pocket Mixer. From under Program Manager's Window menu, select the Multimedia Tools group. Double-click on the Pocket Mixer icon. Minimize Program Manager so you can place both Media Player and Pocket Mixer in view.
6. Click on Media Player's play button. Once your MIDI file begins to play and you have output either from your external speakers or headphones, click on Pocket Mixer's FM icon (represented by the keyboard symbol).
7. Use your mouse to click and drag up and down the FM channels Source Volume meter. Notice how the volume increases as the green bars rise. Now you can adjust the bass and treble to suite the particular environment in which the file will be played back. Reducing the bass will reduce the amount of non-directional, lower frequencies being played. Doing this will reduce the chance of the mix file sounding too "boomy" if played back in an auditorium. Raising the treble would help highly directional high frequencies reach the members of the audience who are seated on the sides of the auditorium. Or if you are mixing a musical selection, you might want to adjust the bass and treble to your own personal taste.
8. When you have established your MIX file settings, you can save your MIX file. From under the File menu, select "Save." The Save Mixer File dialog box appears. Type the name of your new mix file into the File Name field.
9. Click on the OK button. Your file name now appears on the Pocket Mixer's list.
10. Once you have created several MIX files, use the File Menu's "Open" selection to open several different MIX files in quick succession. As Pocket Mixer opens and closes the MIX files, the audible difference between each file's settings becomes apparent.

**6.4.3 RECORDING/PLAYBACK
CONSIDERATIONS**

When recording, it is recommended that all audio sources not being recorded from have their volume level reduced to zero, even though no audio may be present on a particular channel. This will help make your recording as noise-free as possible.

6.4.4 RECORDING WITH A MICROPHONE

When not recording or playing through the microphone, its volume level should be reduced to zero, especially if no microphone is presently connected to the microphone input jack of the PC Image II. Again, this is to reduce any possible noise.

**6.4.5 SETTING AN AUDIO SOURCE FOR
PLAYING OR RECORDING**

The buttons below each of the Source Volume meters are used to toggle the audio source between playback mode (represented by green blocks) and record mode (represented by red blocks). The Pocket Mixer can be used to mix any audio source selected for recording or playback via the Media Player or Pocket Recorder.

6.5 Media Player

Media Player is an application that ships with every copy of Microsoft Windows 3.1 or later. This program lets you play any media file, including .WAV files (recordings), .MID files (MIDI), and CD-ROM audio. The Media Player icon is located in the Windows Accessory program group.

To play a .WAV file:

1. Open Media Player.
2. Select the Device menu.
3. Select the Sound option. A dialog box appears showing all of the available .WAV files.
4. Select a file to play.

To play a MIDI file:

1. Open Media Player.
2. Select the Device menu.
3. Select the MIDI Sequencer option. A dialog box appears showing all of the available .MID files.
4. Select a file to play.

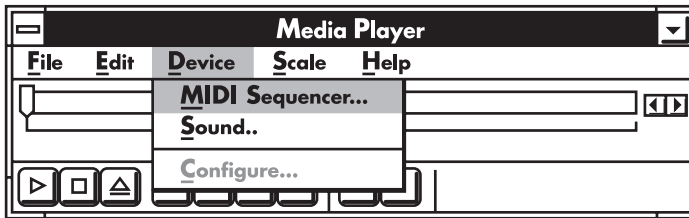


Figure 6-13. Media Player Dialog Box.

7. VGA, TV, and Video Primer

There are marked differences between what you see on your PC monitor and what you see on your television set. You need to understand these differences so that you can produce the best possible results.

7.1 The Basics

Resolution is the number of vertical and horizontal elements that make up the image. Typical VGA resolution is 640 pixels (picture elements) across by 480 pixels down.

Refresh rate is the number of times per second the screen is redrawn. This is usually 60 times per second (60 Hz).

7.2 VGA Basics

Your VGA card can produce a variety of resolutions. The basic VGA resolution is 640 pixels (picture elements) across by 480 pixels down. Standard VGA resolution is 16 colors, out of a palette of 262,144 colors. Super VGA resolutions enable VGA cards to display up to 16.7 million colors, and resolutions up to 1280 x 1024.

7.2.1 INTERLACED AND NON-INTERLACED RESOLUTIONS

VGA resolutions can be either interlaced or non-interlaced.

Interlaced displays require 2 passes to redraw the screen. The first pass draws the odd lines (1, 3, 5, 7...479), while the second pass draws the even lines (2, 4, 6...480). In the interlaced mode, the refresh rate is typically 60 Hz. This means that each “half” of the image is refreshed 30 times per second.

Non-Interlaced displays redraw each line on the screen in a single pass. This, combined with refresh rates (60 to 72 Hz or more), typically results in a more stable image.

7.3 TV/Video Basics

The television standards are NTSC (North America) and PAL (European). Both of these standards were around long before the PC, and have limitations when used in a PC environment. These limitations are listed below:

- Resolution of 525 lines (NTSC) or 625 lines (PAL).
- Both use interlaced video only.
- Refresh rates of 60 Hz (NTSC) or 50 Hz (PAL).

- There are two television output modes that the PC IMAGE II supports: composite video and S-Video.
- Composite video mixes the color (chroma) and brightness (luma) information on the same signal. While reducing connections and wires, it can result in a “muddier” signal (less definition, more bleed, etc.).
- S-Video separates the chroma and luma signals, providing the highest-quality picture.
- The television image will not be as “sharp” as your VGA monitor when viewed up close. When viewed at normal television distances (about 6 feet), the image will look fine.
- Images with many single-pixel horizontal lines (Windows, line drawings), may have a tendency to flicker. This is caused by the interlaced video signal. The board’s circuitry minimizes this effect, but it may be noticeable on older television sets.

Typically, the image on your television is always in motion, always changing. Because of this, color bleed and flicker are not very noticeable. Static computer display screens make this television limitation more apparent.

7.4 Converting VGA to Television

In light of the above capabilities and limitations of VGA and television, the following are recommendations for getting the best audio and video results with PC IMAGE II.

- Don’t use resolution above 640 x 480 x 16.7 million colors.
- Conversion will only work with 60-Hz refresh rates from the VGA signal. The new “ergonomic” refresh rates (72 Hz) cannot be changed to the 60-Hz rate required by the television or VCR.

7.5 Best Results on TV

Don’t use high contrast colors, as they will have a tendency to bleed.

Don’t use “opposite” colors (red, blue) next to or on top of each other, as they will bleed.

Create presentations that are centered both vertically and horizontally on your computer screen. The outer edges of the picture may be lost when converted to video.

Use S-Video connections whenever possible.

Run directly into the television set. Do not go through splitter boxes or other video equipment.

7.6 Best Results on Videotape

Record a test screen. Place an image on-screen and record it to videotape. If the image is too bright, adjust the palette, or colors, that the image uses. Watch for bleed between colors.

Record a test audio track onto videotape. Make sure that the volume levels are loud enough. Watch for audio distortion, caused by volume settings that are too high. Once you have recorded the proper volume levels, you may want to save the settings using the Pocket Mixer application (see **Chapter 5**).

Use S-Video whenever possible.

7.7 Audio and Video Output to TV or Videotape

Connect the VCR as described in **Chapters 2** and **3**.

Locate the 1/8-inch to RCA female adapter cable that was included in your PC IMAGE II package. This is a "Y"-shaped cable. Plug this cable into the SPEAKER OUT port on the PC Image II to the AUDIO IN on the VCR or TV.

Boot up your PC.

Run the PC2NTSC program from the AUDIOSHO directory.

7.7.1 RECORD TO VIDEOTAPE

Press RECORD on your VCR.

Test the audio levels. Record about 30 seconds of audio and VGA to your VCR. Use the Pocket Mixer application to adjust the relative and overall volumes.

Play back the test videotape. If the audio is distorted, turn down the volume and redo the test. If you are missing either audio or video, recheck the VCR connections and consult **Chapter 8**.

After you have set the audio levels, press RECORD on your VCR and run the application that you wish to record.

When you have finished running the application, press STP on the VCR. Rewind the tape and view your presentation.

8. Troubleshooting

Most of the problems that can occur with your PC IMAGE II are correctable with little effort. Should you have problems, follow the steps listed below before calling Black Box. The symptoms are in bold print, the solutions in normal print.

Before proceeding, make sure of the following:

- Simplify your CONFIG.SYS so it includes only the FILES, the BUFFERS, and the DEVICE= command for the MVSOUND.SYS. You must also retain in your CONFIG.SYS any absolutely essential device drivers, such as DMDRVR.BIN, which is necessary for some types of disk drives. To maintain a standard, we recommend you configure your FILES to 20 and BUFFERS to 24.
- You should simplify your AUTOEXEC.BAT. Remove everything but your PROMPT and PATH statements. Also, remove any TSR programs, disk caches, RAM disks, menu, or shell programs.

To comment out a line in either the CONFIG.SYS or AUTOEXEC.BAT files, add a colon (:) as the first character in the line you wish to disable. When your PC boots and reads through CONFIG.SYS, it will display an error message for each of these lines, but it will not affect the operation of DOS.

- The board is properly inserted in a 16-bit ISA slot.
- The power to the PC is on.
- Both the PC monitor and the television monitor are on.
- The software is properly installed.

8.1 Poor Sound or No Sound

No sound output or no sound other than the beep typically heard when the PC is turned on.

Check that the speakers (or headphones) are plugged in. Set the total volume and the individual mixer settings high enough to ensure hearing the input (use [Ctrl] + [Alt] + [U] to increase volume, and [Ctrl] + [Alt] + [M] to toggle sound on and off). If this fails to solve the problem, quit the application. Type **PAS RESET** from your PCIMAGE directory to restore your default mixer settings.

The sound from my PC speaker is too “tinny” and not as good as when using another PC.

Nearly all PCs have one of two different speakers. Neither is designed for music production. One type of speaker, which is noticeably “flat” because it contains a small magnet, produces sound inferior to the type of speaker containing a larger magnet. You can buy a superior speaker, or use external self-amplified stereo speakers. You can also connect the PC IMAGE to the auxiliary (AUX) connectors on your stereo system.

Sound output is distorted even though the master volume control is set low.

The mixer settings (volume for each input) are set too high.

Left channel sound input appears on right speaker and vice-versa when I use internal sound input (such as from a CD-ROM).

The cable plugged into the Audio (CD-ROM) connector is plugged in backwards. Remove the cable and reattach the connector with the reverse orientation.

Sound is fine, but I don’t hear the speaker beep or keyboard click.

First, check that the mixer control setting for the PC speaker is set high enough. Use the PAS utility to run PAS reset. Your “Real Sound” may be on.

The sound quality is poor when I record from my home stereo.

Check that output from your stereo goes to LINE IN rather than the MIC IN of the PC IMAGE II.

I get a lot of distortion when I am mixing.

This is because of “clipping” (distortion at high volume). When mixing two or three sources, set the volume level for each source to about 3/4 full volume. When mixing more than three sources, set the individual volume levels to 1/2 full volume. Use the PAS utility to set the volume levels.

Microphone recording level is too soft.

You MIC setting in the mixer may be too low, or your microphone has incorrect impedance. The card expects a microphone with an impedance of approximately 600-10K ohms.

I hear “clicks” when I mix.

Avoid turning up all the mixers at one time, since this causes clipping, which results in a clicking sound.

8.2 CD-ROM and Disk Drive Problems

The sound quality or loudness from the external CD-ROM is inferior to that expected.

If your external CD-ROM has both line and headphone outputs, check that you are using the line output. It is usually a more consistent source than the headphone output.

Unable to access the CD-ROM player.

Check whether the CD-ROM in-use light (similar to the one on your hard drive) comes on when you attempt to read the CD-ROM. If the light does not come on, review the installation instructions for the CD-ROM and make sure that all cables are attached properly. Make sure the CD-ROM software driver is installed correctly. If the light does come on, but you cannot hear sound, check that the audio cables are attached correctly and that the volume is set to a middle position.

Disk drive or other storage device, which used to work fine, doesn't work when I use PC IMAGE II.

The PC IMAGE II is using the same DMA channel as this other storage device. Reassign the DMA channel.

My PC IMAGE II works fine except when I save PCM input to disk. The PC hangs up or my disk drive doesn't work properly.

Devices in your PC cannot be assigned to the same DMA channel if there is even a remote possibility that both devices will be used at the same time. For example, it is okay (but not ideal) for the PC IMAGE II to use the same DMA channel as the controller for the tape backup unit, provided that you don't use your PC IMAGE II while doing backups. However, never share the same DMA channel with a disk drive. Typically, DMA channel 2 is used for the floppy drive.

I'm having problems with my serial mouse (or serial printer or modem) when I run software for my PC IMAGE II.

The PC IMAGE II may be using an interrupt needed by another card in your PC. The most likely conflict is with a second serial port (COM2:), which is frequently assigned to a modem or mouse. COM2: is usually assigned to interrupt IRQ3, which is one of the possible settings for PC IMAGE II.

I can't get the FM sound synthesis, MIDI control, or PCM to work. This is a first-time installation.

If your PC has a parallel printer port, and you are using hardware interrupt IRQ7, note that IRQ7 can be shared by PC IMAGE II. However, the parallel port of some PCs may block the PC IMAGE II from receiving the interrupt. If this is the situation, set the PC IMAGE II to another interrupt level or disable the printer port.

8.3 System Hang-Ups or Lock-Ups

My PC hangs after running software for the PC IMAGE II.

There could be an interrupt clash. Check the IRQ settings for the PC IMAGE II and make sure that these IRQ levels are not used by another card in your PC. If necessary, remove drivers for all cards except the PC IMAGE II and re-install the other drivers one-by-one (re-trying the application after each one in re-installed and your PC is rebooted). You will locate the one that is clashing with PC IMAGE II.

PCM digitized audio playback repeats short segments forever, broken-record style.

Incorrect audio interrupt (IRQ) level selected.

PCM digitized audio playback sounds choppy when I use a high sample rate, but OK at a lower sample rate.

Try reducing the bus speed of your PC if it is selectable. If you are using VMP, increase the size of the VMP driver buffer. If you are recording digital audio, use a lower sample rate. Add the `/amem=xx` switch to VMP where xx is a multiple of four and a value between 12 and 32.

8.4 Windows Questions

I record a sound in sound recorder or pocket recorder, but when I play it back, I don't hear anything.

If you see a straight line space in the waveform window of the recording application, then you probably forgot to switch the source you are recording to "Record" in the mixer.

I have turned up CD\FM\WAVE AUDIO in the mixer, but I still can't hear CD\FM\WAVE AUDIO when it is being played.

The source in question may be set to "Record" in the mixer and the "Rec Monitor" is turned down.

I hear hiss.

Make sure Input volume levels are set to the maximum level. Treble and stereo enhance causes hiss when set too high.

8.5 Video Questions

No display on the the television or video tape.

Make sure that the PC IMAGE II is properly connected to the video device.

Computer display is fine, TV display is jumpy.

Run the PC2NTSC software.

Windows Logo appears on the television, but Windows does not.

Try using the standard VGA driver in Windows. Go to the MAIN menu, double-click on Windows Setup. Pull down the Configure menu, click on Change System Settings, then select the VGA driver. Please remember 640 x 480 is the maximum resolution, and some drivers included with VGA cards (though they may be 640 x 480 resolution) may not work.

Wrong connector for television. I need coaxial (cable TV standard).

This unit does not contain an RF Modulator like many video game systems. You will need to purchase an RF modulator. *A game adapter will not work.* You must purchase an RF modulator with standard video inputs.

The VGA card has two VGA connectors (15-pin or 15- and 9-pin) and does not work.

Use a dedicated 15-pin card. Dual VGA cards do a frequency split to output to both connectors. After the frequency split, the PC IMAGE II can no longer accept the signal.

Sometimes the driver works, sometimes it doesn't.

You are most likely using a disk-doubler program such as Stacker. Remove this from your hard drive.

Cursor disappears, severe jumping occurs on television, or system locks after loading the driver.

Check for a conflicting TSR. These TSR's are usually found in the AUTOEXEC.BAT or CONFIG.SYS files in the root directory. Try booting off a self-booting diskette with no AUTOEXEC.BAT or CONFIG.SYS files on it, then load the PC2NTSC driver.

Windows does not fit on the television screen.

This is because of the digital conversion from 640 x 480 (VGA resolution) to 512 x 512 (theoretical television resolution). Resize the windows, or use the positioning hotkeys in your PC IMAGE II driver. **Text is hard to see.**

The limitations of the NTSC format make small text difficult to see. Try using a larger font in your presentations.

Will not sync after running through a professional switcher.

Use a TBC (time-base corrector).

Color bleeding.

You can minimize this effect by using the Y/C (S-Video) connector. Also, change the color combination on your system to colors that are not pure red, green, or blue.

Will not work with 16.7-million color drivers.

Use the Up and Down positioning hotkeys to better sync your VGA signal to the NTSC (television) signal.

No display on television.

Make sure you're using an actual video or S-Video input and the display on your television or VCR says "Line IN" or "AUX". Try testing the input by disconnecting the VIDEO OUT from the PC IMAGE II and connecting it to the VIDEO OUT on a camcorder or VCR.

Will not work with some video-capture boards.

There is no fix. These boards modify the frequency in such a manner that the PC IMAGE II cannot accept it.

Will not work with LOCAL BUS.

Several local bus standards exist. Make sure that your local-bus video card is set for 60 Hz refresh rates and 640 x 480 resolution. Some local-bus boards modulate the VGA signal in a manner that capture boards, overlay, and output boards cannot accept.

Changes display position using a VESA driver.

Try the positioning hotkeys. If this does not help, then change to another VGA card.

Some game programs look like the screen is split in half.

Find out the resolution at which this particular game is running, and cross-check it with the resolutions PC IMAGE II will work with.

Appendix A: Technical Information

PC Speaker Cable Connector

Pin	Definition
1	Speaker Sound - (NEG)
2	Speaker Sound + (POS)
3	Speaker Sound + (POS)
4	Speaker Sound + (POS)

Some plugs are keyed so that only half the plug can fit into the PC Speaker Cable Connector. In this situation, attach the plug to pins 1 and 2. This should result in proper operation.

Pin 1 on all connectors is indicated by a small triangle.

Internal Audio (CD) Connector

Pin	Definition
1	Right Return Ground
2	Right Signal
3	Shield Ground
4	Left Signal
5	Left Return Ground

Joystick Port Pin Description

Pin	Definition
1	+5 VDC
2	Joystick 1 Fire 1
3	Joystick 1 x
4	Ground
5	Ground
6	Joystick 1 Y
7	Joystick 1 Fire 2
8	+5 VDC
9	+5 VDC
10	Joystick 2 Fire 1
11	Joystick
12	Ground (MIDI Transmit - OUT)
13	Joystick 2 Y
14	Joystick 2 Fire 2
15	+5 VDC (MIDI Receive - IN)

A.1 I/O Addresses

Your PC Image uses 74 I/O Addresses. The I/O address map lists the register names and system addresses that your PC IMAGE chipset uses. The base address (Base) is 388H for all material in this manual.

Several abbreviations are used in Table A-1:

- **(W)** — Write only
- **(R)** — Read only
- **(R/W)** — Read and write
- **(Dcd)** — Decode only provided

The MVSOUND.SYS driver “wakes up” the PC IMAGE at the base address. The subsequent I/O addresses are obtained by adding the hexadecimal offsets (H).

Table A-1. I/O Addresses.

Register	System Address (Default)
Speaker Control (W)	61H/Base + 7003H
Speaker Timer Control (W)	43H/Base + 7403H
Warm Boot (W)	41H
Speaker Timer (W)	42H/Base + 1002H
Joystick (DcdR/DcdW)	201H/Base + 7001H
Read Data (R)	2XAH
Command (W)/Status (R)	2XCH
Restart (W)	2X6H
Data Available (R)	2XEH
Reserved	3X0H
Reserved 3X1H	
Master Decode (W)	9A01H
FM Stereo (Dcd)	Base + 0H-3H (388-BH)
FM Mono Left (Dcd)	Base + 0H-1H, 400H-401H (388-389/788-789H)
FM Mono Right (Dcd)	Base + 2H-3H, 402H-403H (38A-38BH/78A-78BH)
Mixer (R/W)	Base + 800H (B88H)
Interrupt Status (R/W)	Base + 801H (B89H)
Filter Frequency (R/W)	Base + 802H (B8AH)
Interrupt Mask (E)/PCB Config (R),	Base + 803H (B8BH)
PCM Data Low (DAck) (R/W)	Base + C00H (F88H)
PCM Data High (DAck) 16-bit only,	Base + C01H (F89H)

Table A-1 (continued). I/O Addresses.

Register	System Address (Default)
PCM Control (R/W)	Base + C02H (F8AH)
Sample Rate Counter (R/W)	Base + 1000H (1388H)
Sample Buffer Timer (R/W)	Base + 1001H (1389H)
Timer Ghost Port (R)	Base + 1002H (138AH)
Sample Counter Control (R/W)	Base + 1003H (138BH)
MIDI External (Dcd)	Base + 1400H-1403H, 1800H-1803H, (1788-BH1B88-BH)
MIDI Prescale (R/W)	Base + 1400H (1788H)
MIDI Timer (R/W)	Base + 1401H (1789H)
MIDI Data (R/W)	Base + 1402H (178AH)
MIDI Control (R/W)	Base + 1403H (178BH)
MIDI Status (R/W)	Base + 1800H (1B88H)
MIDI FIFO Status (R/W)	Base + 1801H (1889H)
MIDI Compare Time (R/W)	Base + 1802H (1B8AH)
External CD-ROM (Dcd)	Base + 1802H (1B8AH)
External CD-ROM (Dcd)	Base + 1C00H - 1C03H, 3C00H-3C0H (1F88H-1F8BH, 3F8BH)
Sony Read Stb (Dcd & IOR)	Base + 1C00H-1C01H (1F88-1F89H)



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