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# SoundWave 32+SCSI

## User's Manual

for models:

SoundWave 32+SCSI  
SoundWave 32Pro SCSI  
SoundWave 32+Studio



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## Introduction

Welcome to the exciting world of sound with the Orchid SoundWave 32+SCSI™! The SoundWave 32+SCSI is an advanced wavetable 16-bit sound card with DSP (Digital Signal Processor). With the DSP chip on board, SoundWave 32+SCSI transforms your computer into a powerful digital audio workstation, complete with special effects processing, expandable wavetable synthesis and audio compression.

Three versions of SoundWave 32+SCSI are available: *SoundWave 32+SCSI*, *SoundWave 32Pro SCSI* and *SoundWave 32 +Studio*. All three versions provide support for software written for the major sound standards. The DSP architecture makes upgrades and expansion simple and accessible. SoundWave 32+SCSI also comes with both SCSI-2 and Mitsumi CD-ROM interfaces.

For realistic sounds, SoundWave 32+SCSI has two megabytes of high-quality sound samples on-board. These samples can be used by games or multimedia applications under the General MIDI specification. In addition, several application programs for Windows 3.1 are provided.

Thank you for purchasing the SoundWave 32+SCSI. Care has been taken to ensure that it will provide you with years of trouble-free operation. We believe you will be pleased with your purchase.

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## About This Manual

This manual presumes that you are already familiar with your IBM PC-compatible computer. While the SoundWave 32+SCSI has been designed to be easy to install, we recommend that you refer to your computer's reference manual when terminology or installation steps are unfamiliar to you. Each chapter is divided into short, easy to follow steps, to help you understand the installation and function of the SoundWave 32+SCSI.

### Chapter 1: Hardware and Software

Whether you are a beginner or an experienced user, this chapter will give you important information on proper installation, and instructions on how to connect external devices to SoundWave 32+SCSI.

### Chapter 2: Orchid Utilities

This chapter provides you with several Orchid utilities. These utilities will enhance the capabilities of your SoundWave 32+SCSI and your CD-ROM drive.

### Appendix A: Technical Information

If you are experiencing installation difficulties or require troubleshooting information, this appendix gives you checkpoints to ensure that your SoundWave 32+SCSI is operating properly. Appendix A also includes the technical specifications.

### Appendix B: MIDI

Here you are given an overview of the MIDI specification and a list of the General MIDI, MT-32 and percussion sounds used on SoundWave 32+SCSI.

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## ***Important! - Before You Begin***

This manual contains information for the products listed below. All references to "SoundWave 32+SCSI" will refer to all these products, unless otherwise noted.

### **SoundWave 32+SCSI**

SoundWave 32+SCSI provides FM and wavetable synthesis, SCSI-2 and Mitsumi CD-ROM interfaces, and comes with a WaveBooster interface connector. Hardware support is provided for software written for the major sound standards, including Sound Blaster, Windows Sound System, General MIDI and Roland MT-32.

### **SoundWave 32Pro SCSI**

SoundWave 32Pro SCSI has the same features as the SoundWave 32+SCSI, but replaces the Roland MT-32 compatibility mode with the Algorithmic/Wavetable Synthesis (A/WS) method for creating sounds.

### **SoundWave 32+Studio**

SoundWave 32+Studio has the same features as the SoundWave 32+SCSI for a total of 56 wavetable synthesis voices. In addition, it comes with Orchid's WaveBooster 4FX high-quality wavetable synthesizer card. Its features include 4MB of ROM samples, built-in digital effects, reverb and chorus, and compatibility with the General Synthesizer specification.

---

## *Before You Begin*

This manual will familiarize you with the features, installation and use of the SoundWave 32+SCSI. There are several symbols and conventions used throughout this manual which will help to draw your attention to a feature or to focus on important information:



When you see the Magnifying Glass it means the text is referring to something you should take a closer look at before proceeding further.



When you see the Exclamation Mark, it gives important information on avoiding damage to property.

### Common Names

BBS	Bulletin Board System
DAC	Digital/Analog Converter
DSP	Digital Signal Processor
MIDI	Musical Instrument Digital Interface
MPC	Multimedia PC
PC	Refers to the family of IBM PC, PC/XT or PC/AT compatible computers



## INSTALLING SOUNDWAVE 32+SCSI

Designed to be easy to use and easy to install, SoundWave 32+SCSI can be used with the preset jumper settings. If you need to change the default address settings, see the section "Jumper Settings."

### Quick Installation

#### Hardware Installation

*If you are connecting a CD-ROM drive, go to "Installing a CD-ROM Drive," otherwise continue. Please refer to Figures 1.1 and 1.6 for connection locations.*



#### STATIC!

*Before handling the SoundWave 32+SCSI, be sure to guard against electrostatic discharge. Be properly grounded by touching the power supply housing, or you may want to buy a Ground strap from your local computer store.*

1. If you previously installed another sound card, remove it and all associated files from your SYSTEM.INI and CONFIG.SYS files.
2. Turn off the power to your computer, unplug all power cords and remove the computer cover.
3. Install the SoundWave 32+SCSI into a 16-bit expansion slot.
4. If you are connecting external speakers to the SoundWave 32+SCSI, connect the speaker cable to the SPEAKER jack on the metal bracket.
5. If you are connecting amplified external speakers to the SoundWave 32+SCSI, connect the speaker cable to the LINE OUT jack on the metal bracket.
6. If you are connecting a microphone to the SoundWave 32+SCSI, connect the microphone cable to the MIC jack on the metal bracket.
7. If you are connecting a MIDI device or a joystick to the SoundWave 32+SCSI, connect the cable to the joystick port on the metal bracket (refer to Figure 1.6).

8. Reconnect previously removed cables and power cords and replace the cover of the computer.

### Software Installation

1. Start Microsoft Windows.
2. Insert the SoundWave 32+SCSI software disk into your floppy drive.
3. From the Program Manager File menu, choose Run.
4. Type the drive letter, then SETUP.EXE, e.g., A:\SETUP.EXE.
5. The SETUP.EXE program automatically copies the SoundWave 32+SCSI drivers and application programs to your hard drive.
6. Once the software is installed, the SETUP.EXE program automatically updates your CONFIG.SYS and AUTOEXEC.BAT files.
7. At this point, you must exit Windows and reboot your system. The CD-ROM drive is initialized on bootup. If it does not initialize on bootup, check for an I/O, DMA or IRQ address conflict. Verify the address settings of other peripherals in your system to correct the address conflict(s).
8. If you are installing a SCSI device with your SoundWave 32+SCSI, you must run the setup utilities from the DOS command line. These utilities are found on the SoundWave 32+SCSI software disk.

Once the software installation is complete, the application programs will be located in the Orchid Audio Software group.

### Audio Hardware Setup

Besides installing the SoundWave 32+SCSI's drivers and applications, the SETUP.EXE program lets you configure its audio hardware resources. Your SoundWave 32+SCSI needs to claim some hardware resources for exclusive use to signal its status and needs to the system. Therefore, two hardware devices cannot share the same address (one exception is that interrupts 5 and 7 can often be shared without causing problems). Refer to the documentation that accompanies any other hardware products installed in your system for their addresses.

#### Configuring the audio hardware resources:

1. From the Orchid Audio Software group, double-click on the Audio Hardware Setup icon.



Figure 1.1: Audio Hardware Setup Screen



To restore the default recommended hardware settings at any time, click on the Defaults button and then on the OK button.

2. Select your SoundWave 32+SCSI's configuration from the Product pull-down menu. Click on the Defaults button to see the most commonly used hardware configurations.
3. Enable the sound standard(s) and other features of your choice. To enable a selection, click in the box next to the selection. For each selection enabled, select addresses that will not duplicate those of other hardware devices in your system.
4. Once all your selections are made, click on OK to save your settings.

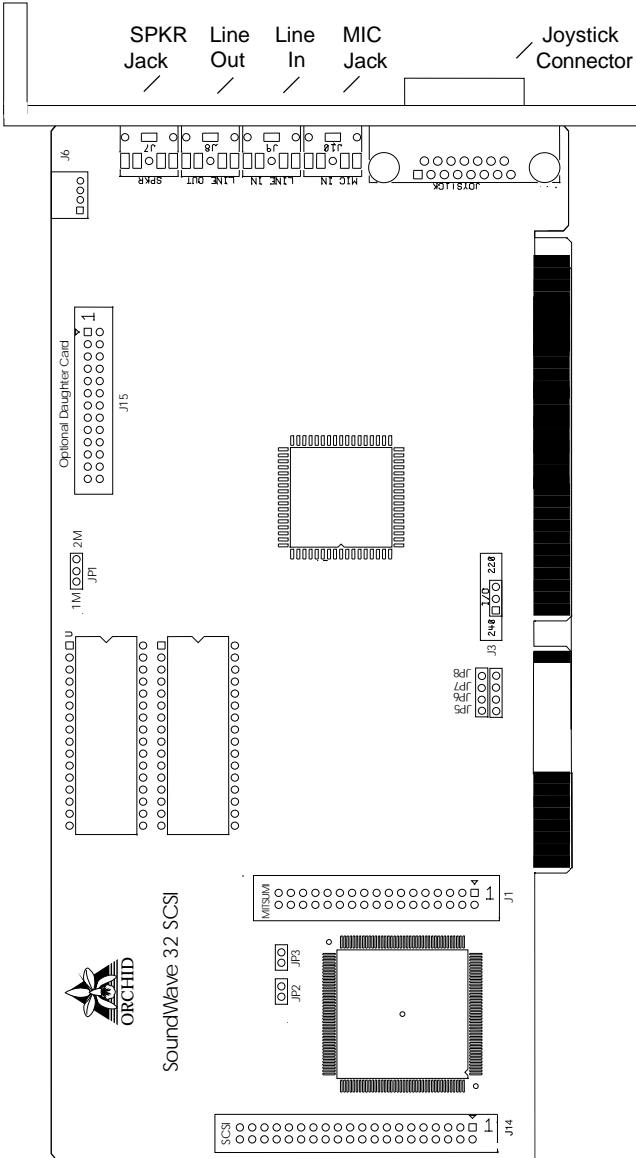


Figure 1.2: SoundWave 32+SCSI Diagram

NOTE: Pin 1 on the connectors is indicated by a square.

## Jumper Settings

The following table lists the jumpers used in the configuration of SoundWave 32+SCSI. The information following the table explains the jumpers in more detail.

Jumper	Setting	Default	Function
J3	Connect 1 & 2 Connect 2 & 3	✓	Enable I/O Address 240 Enable I/O Address 220
JP1	Connect 1 & 2 Connect 2 & 3	✓	Enable 1MB Wavetable (for 512K ROMS) Enable 2MB Wavetable (for 1MB ROMS)
JP2 & JP3 JP2 & JP3 JP2 & JP3 JP2 & JP3	Open   Open Closed   Open Open   Closed Closed   Closed	✓	Set SCSI Address - CA000 Set SCSI Address - C8000 Set SCSI Address - CE000 Set SCSI Address - DE000
JP5 JP6 JP7 JP8	Connect JP5 Connect JP6 Connect JP7 Connect JP8		Set SCSI Interrupt 4 Set SCSI Interrupt 11 Set SCSI Interrupt 12 Set SCSI Interrupt 15
J15	No Connection		Optional WaveBooster Daughtercard

Table 1.1: Summary of Jumper Settings

### Jumper J3: I/O Address

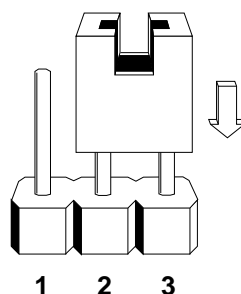
Jumper J3 sets the base port address for Sound Blaster mode. The default setting is 220 Hex.



For help on avoiding address conflicts, see Appendix A.

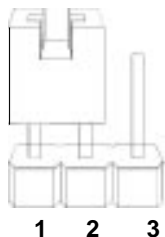
Figure 1.3: Jumper J3 (pins 2 and 3 connected). Default setting

If you need to change the default address, connect pins 1 and 2 to select the optional address—240 Hex.

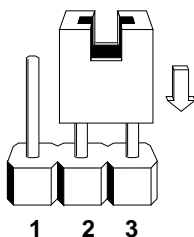


### Jumper JP1: Wavetable

The SoundWave 32+SCSI and SoundWave 32+Studio uses two 512K Wavetable ROM chips for 2MB of compressed sample sounds. The SoundWave 32Pro SCSI uses a single 1MB ROM chip for 2MB of compressed sample sounds. Refer to Table 1.2 for details on the Wavetable configuration.



**Figure 1.4:** Jumper JP1  
(Default setting for  
SoundWave 32+SCSI and  
SoundWave 32+Studio)



**Figure 1.5:** Jumper JP1  
(Default setting for  
SoundWave 32Pro SCSI)

### Wavetable Configuration

The DSP on the card decompresses the sample sounds as it plays them. The following table details the wavetable configuration of the various SoundWave models.

Sample Sound Size	Compressed Size	ROM Size
2MB (1MB x 16)	1MB	2 x 512KB
2MB (1MB x 16)	1MB	1 x 1MB
4MB (2MB x 16)	2MB	2 x 1MB

**Table 1.2:** Wavetable Configuration

where:

Sample Sound Size = actual uncompressed sample size

Compressed Size = size of samples after compression

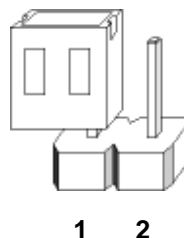
ROM Size = chip(s) used to store the sample set

### Jumpers JP2 and JP3: SCSI Memory Segment

These jumpers set the memory address segment for the SCSI interface. The default address setting is both jumpers OFF (or open), which configures for address CA000. The complete address ranges used are CA000-CBFFF, C8000-C9FFF, CE000-CFFFF, or DE000-DFFFF.

**Figure 1.6:** Jumpers JP2 & JP3 (no connection). *Default setting*

*If you are using a memory manager program, you may need to exclude the address range being used.*



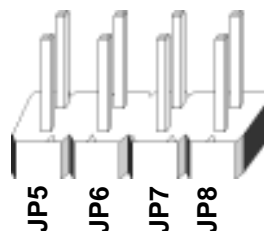
### Jumpers JP5-JP8: SCSI IRQ Address

These jumpers set the interrupt address for the SCSI interface. The default address setting is all jumpers OFF (or open), which configures for no SCSI interrupt used.

Configuring these jumpers is only necessary for a SCSI device that requires an IRQ setting. An IRQ is not required for a SCSI CD-ROM drive or a SCSI hard drive.

**Figure 1.7:** Jumpers JP5- JP8 (no connection). *Default setting*

*To configure for another interrupt address, connect the jumper across two pins. Refer to Table 1.1 for other addresses available.*



### External Devices

#### **External Speakers**

You can connect 4 or 8 ohm external speakers or headphones to SoundWave 32+SCSI. The speakers and headphones plug into the SPEAKER jack on the SoundWave 32+SCSI metal bracket.

#### **Joystick**

Plug the joystick into the 15-pin connector on the metal bracket.

#### **MIDI**

If you purchased a MIDI interface kit, you will have an additional cable. This cable plugs into the 15-pin connector and provides MIDI IN and MIDI OUT connections, in addition to a joystick connection. Connect this cable to the joystick port and connect any MIDI devices to the appropriate cables.

#### **Line In**

You can connect an external mono or stereo audio source to the SoundWave 32+SCSI, such as a tape player or radio. Use the appropriate converter cable to interface to your external equipment.

#### **Line Out**

Allows you to connect the audio output of your SoundWave 32+SCSI to your home stereo or VCR or amplified speakers.

#### **Microphone**

You can connect a 300-600 ohm microphone to SoundWave 32+SCSI. Plug it into the MIC jack on the metal bracket.

#### **CD-ROM**

The SoundWave 32+SCSI supports both internal and external CD-ROM drives. It has interface connectors for the SCSI-2 and Mitsumi CD-ROM drives.

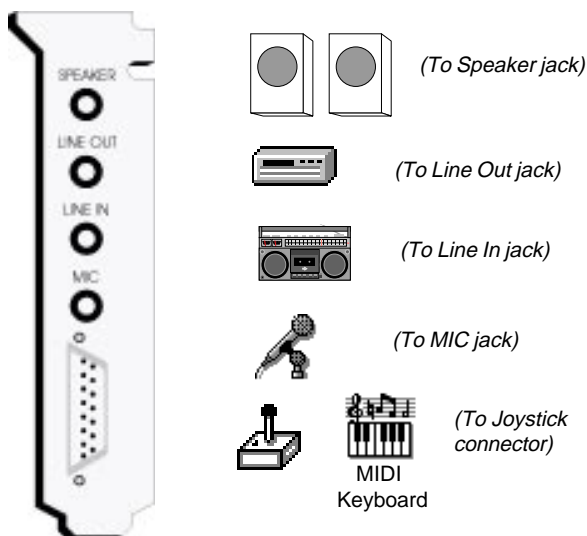


See Figure 1.6 for the connection locations of the external devices.



#### **WARNING!**

The SoundWave 32+SCSI can produce high sound levels when played through headphones. To avoid permanent or temporary hearing loss or impairment, always hold the headphones away from your ears when adjusting the volume.



**Figure 1.8:** SoundWave 32+SCSI Bracket

### The MIDI Interface

An optional MIDI Kit is available for the SoundWave 32+SCSI. The kit includes a Sound Blaster-type MIDI cable and MIDI software. To purchase the kit, call your local dealer or the Orchid Sales department.

### The WaveBooster Daughtercard Interface

An optional WaveBooster daughtercard is available for the SoundWave 32+SCSI. Installation is easy! It plugs right into the SoundWave 32+SCSI's Optional Daughter Card connector (see Figure 1.2).

Refer to Appendix B for a listing of the General MIDI and MT-32 sounds available. To purchase the WaveBooster, call the Orchid Sales department.

### Installing a CD-ROM Drive

If you are installing a CD-ROM drive these instructions will help you, but you should also refer to the documentation that came with your CD-ROM drive. Before starting the setup and installation, make sure that your computer is turned OFF and the power cord has been disconnected from the wall outlet. Your CD-ROM drive kit should contain the following items for a successful installation:

- CD ROM Drive with optional slide rails
- Interface Cable
- Audio Cable

Install the CD-ROM hardware as recommended by the CD-ROM manufacturer. Follow the steps below for help on installing the CD-ROM audio cable.

#### Installing the cable:

1. Connect one end of the interface cable (ribbon-type) to the CD-ROM drive interface connector. Be sure to match the colored stripe to Pin 1 of the CD-ROM drive connector.
2. Connect the other end of the cable to the SCSI or Mitsumi connector on the SoundWave 32+SCSI card. Pin 1 is located on the bottom right corner of the connectors. Make sure that Pin 1 on your cable (colored stripe) is connected to this pin.
3. Connect the audio cable to the CD-ROM drive's audio connector.
4. Connect the other end of the audio cable to the MPC-2 compatible CD-ROM audio connector on the SoundWave 32+SCSI.
5. You are now ready to install the SoundWave 32+SCSI. Go to "Quick Installation" at the beginning of this chapter. See "Software Installation" to install the SoundWave 32+SCSI software and application programs.



*Try to avoid excessive twists or bends in the cable that might damage it or interfere with other boards in your computer.*



*SoundWave 32+SCSI uses an MPC-2 compatible audio cable for the CD-ROM drive. Please contact your drive manufacturer or local dealer if you need this cable.*

### CD-ROM Device Drivers

CD-ROM drives require device drivers to access the drive. These device drivers are generally provided by the manufacturer of the CD-ROM drive. Usually one device driver is added to the CONFIG.SYS file and one to the AUTOEXEC.BAT file.

The device driver added to the CONFIG.SYS file is the CD-ROM device driver. This file configures the CD-ROM drive and initializes the drive on boot up. It is dependent on the type of CD-ROM drive installed.

The device driver added to the AUTOEXEC.BAT file is an executable file that tells the operating system that a CD-ROM drive is installed in the system and what configuration the CD-ROM drive is using. MSCDEX.EXE is a commonly used device driver. There are other versions of this device driver that perform the same function, such as the CORELCDX.COM driver.

### SoundWave 32+SCSI CD-ROM Device Drivers

The SoundWave 32+SCSI setup program automatically installs two device drivers for a SCSI CD-ROM drive. FDCD.SYS is added to the CONFIG.SYS file. This device driver initializes the SCSI CD-ROM drive on boot up and configures the settings for the drive.

CORELCDX.COM is added to the AUTOEXEC.BAT file. This device driver tells the operating system that a CD-ROM drive is installed. CORELCDX.COM is similar to the MSCDEX.EXE device driver.

If you need to configure the FDCD.SYS device driver, the following syntax is used:

```
device=FDCD.SYS /D:name [/F /I /N:# /R /T  
/V /Z]
```

The parameters are defined as follows:

- /D 1 to 8 character device name.
- /F scans CD-ROM drives in ascending SCSI ID numbers.
- /I inhibits invalid disk change status.
- /N:#sets a maximum number of units to support with # as the number.
- /R forces a SCSI Bus Reset to occur before driver initialization.
- /T forces drive to use the OEM Tool Kit even if Future/CAM{SYMBOL 212 \f "Symbol" is available.
- /Z displays the driver size.

If you need to configure the CORELCDX.COM device driver, the following syntax is used:

```
CORELCDX /D:driver_name /M:mem_bufs  
/L:drive_letter/E /FILES: num  
/CACHE:pt;dir;data/DATABLK:blk_val  
/E:emm_val /STACK [:stack_size]
```

The parameters are defined as follows:

- /D:driver\_name identifies the name of the CD-ROM device driver to be used. You can enter more than one /D:driver\_name option to identify multiple CD-ROM device drivers. The names you enter must match names used in the /D:device\_name parameters for each device driver entry in the CONFIG.SYS file.

- `/M:mem_bufs` specifies the approximate number of sector buffers allocated. Using a predetermined formula, the total number of sector buffers is divided among the path table directory and data cache. Minimum, maximum and alignment requirements may require that the actual number of buffers differ slightly from those you specify.
- `/L:drive_letter` forces the CD-ROM drive letter assignment to begin at a particular drive letter if you have software that requires your CD-ROM drive to be assigned a specific drive letter. If that drive letter is not available, CD-ROM drives are assigned from the next available drive letter.
- `/E` uses expanded memory for the cache buffers if it is available. Expanded memory is allocated in blocks. To make the most efficient use of allocated memory, this option may slightly increase the number of specified cache buffers.
- `/FILES: num` specifies the number of CD-ROM files that you can open at the same time. Each file requires approximately 16 bytes. By default, the limit is the number specified by the `FILES=` line in the `CONFIG.SYS` file.
- `/CACHE:pt;dir;data` specifies the number of cache blocks to allocate for the path table cache, directory cache, and

data cache. Each block requires 2K.

The path table cache stores information about the name and location of each sub-directory on the CD. Each (2K) path table cache buffer accommodates approximately 100 sub-directories.

The directory cache stores information such as the name and location of the files in each sub-directory on the CD.

The data cache stores the most recently accessed contents of files on the CD. When you specify the number of sector buffers using the `/M:mem_bufs` option, the `mem_buf` value is divided among the path table, directory, and data cache using a predetermined formula. You can use the `/CACHE:pt;dir;data` option to fine-tune the allocation of cache blocks.

When adjusting the allocation of cache blocks, you cannot exceed the following minimum and maximum sizes for each area:

path table cache:

block size	1 sector
minimum	2 sectors
maximum	64 sectors

directory cache:

block size	1 sector
minimum	2 sectors
maximum	64 sectors

data cache:  
block size 2 sectors  
minimum 1 block (If you use /DATABLK to alter the block size, the minimum sectors change.)  
maximum 64 sectors

When using the expanded memory for cache buffers, certain internal alignment requirements are enforced. You cannot change these requirements.

*NOTE:* The /CACHE: and /M: options are mutually exclusive. If you use both switches, the /M: option is ignored.

/DATABLK:blk\_val adjusts the number of 2K sectors assigned to each data cache block.

Valid values are 1, 2, 4, or 8. The default is 2. This option is useful for applications that read data from a CD in contiguous segments. CORELCDX uses a read ahead plus least recently used (LRU) algorithm for its data cache. Data read into the cache is read in blocks.

Setting the data block size to 1 disables read-ahead caching, but an additional 4K of conventional memory is required. Also, note that the read-ahead caching logic internal of some CD-ROM drives is adversely affected by changing the default data cache block size.

`/E:emm_val` extends the basic MSCDEX compatible/`E` option by allowing you to force CORELCDX to use expanded memory, if it is available, for code, data, or cache buffer storage.

The valid `emm_val` options are: *code/data only* in expanded memory.

*cache blocks only* in expanded memory, the same as the `/E` option.

*code/data and cache blocks* in expanded memory.

When expanded memory is used for code and data, only a small "footprint" (less than 2K) remains resident in conventional memory. This option may be incompatible with some CD-ROM applications, for example, those that perform absolute disk reads into expanded memory buffers.

If cache buffers are located in expanded memory, a small amount of conventional memory may also be allocated for storage of required tables. Also, to make efficient use of expanded memory, and due to internal cache alignment requirements, the number of cache blocks in use may be adjusted slightly when this option is used.

`/STACK[:stack_size]` causes CORELCDX to switch to its own internal stack while processing software interrupts,

rather than using the programs stack.

Use the `stack_size` variable to change the stack from its default size of 512. For example, `/STACK:1024` causes a 1K stack to be used, while `/STACK:256` causes a 256 byte stack to be used.

### Mitsumi Compatible Drivers Installation

To access a Mitsumi CD-ROM drive, you will need to install three device drivers. The following is a description of the device drivers:

#### CONFIG.SYS FILE

```
Device=C:\SWAVE32\SWCD.SYS /i:12 /a:360
```

This device driver initializes the SoundWave 32+SCSI and sets the IRQ and Port Address used by the Mitsumi compatible CD-ROM drive. *NOTE:* It must be loaded in the CONFIG.SYS before any other CD-ROM device drivers.

```
Device=C:\[Path]\[CD-ROM device driver]/d:mcsd0001  
/p:360 /a:0
```

This syntax is an example of a device driver supplied by the CD-ROM manufacturer, which initializes the CD-ROM drive and sets the IRQ and Port Address used by the drive. The path is the directory where the CD-ROM device driver is copied. The CD-ROM device driver is the file provided by the CD-ROM manufacturer. Remember if you are using a Mitsumi CD-ROM drive, you must configure the device driver for Programmed I/O. In addition, the parameter of this driver must match the parameters set for the SWCD.SYS device driver. Refer to your CD-ROM manual for the specific syntax.

### AUTOEXEC.BAT FILE

*C:\[Path]\MSCDEX.EXE /d:mscd0001 /m:10*

This device driver is supplied with MS-DOS 6.0 or later and initializes the operating system, or DOS, for the CD-ROM drive and assigns a drive letter to the drive. Again, the parameters of this driver must match the parameters set for the CD-ROM device driver. *NOTE:* The "m" parameter indicates the sector buffers, not an IRQ or DMA address.

### Configuring SoundWave 32+SCSI for a Mitsumi Compatible CD-ROM Drive

The SW32.EXE program and Audio Hardware Setup program need to be configured for a Mitsumi CD-ROM drive as well. For example, the SoundWave 32+SCSI can be configured as follows:

*Mitsumi CD-ROM Interface    Port=360    IRQ=12*

This can be done one of the following ways:

1. *From DOS:* Change to the SWAVE32 directory and type: SW32 /C  

or
2. *From Windows:* Open the Orchid Audio Software group and click on the Audio Hardware Setup icon.

When the configuration screen appears, make sure the settings for the Mitsumi CD-ROM Interface are configured for the same Port Address and IRQ as the device drivers in the CONFIG.SYS and AUTOEXEC.BAT files. Configuring either of these devices modifies the other automatically. If you are using a SCSI CD-ROM drive, you will need to configure it from within Windows using the Orchid Audio Hardware Setup program.

### Mitsumi Compatible CD-ROM Device Drivers

If you are installing a Mitsumi compatible CD-ROM drive, you will need to install the device drivers provided by the CD-ROM manufacturer. Follow the installation procedure provided by the CD-ROM manufacturer. Remember, you will need a CD-ROM device driver added to the CONFIG.SYS file and an operating system device driver like MSCDEX.EXE, added to your AUTOEXEC.BAT file.

In addition, you will need to configure the parameters of the drive to use programmed I/O. Refer to your CD-ROM manufacturer's documentation.

### Configuring the MSCDEX.EXE Device Driver

If you are using the MSCDEX.EXE device driver and need to configure the driver, the following syntax is used:

```
[drive:\][path\]mscdex.exe /d:device_name  
[/l:m]
```

The parameters are defined as follows:

**/d:** Specifies the device name of the CD-ROM drive. The driver1 parameter must match the parameter specified by the /D switch on the CONFIG.SYS command that starts the corresponding CD-ROM device driver.

The MSCDEX command must include at least one /D switch. To install additional CD-ROM device drivers, specify an additional /D switch for each device driver.

**/l:** Specifies the drive letter of the first CD-ROM drive. If you have more than one CD-ROM drive, MS-DOS assigns additional CD-ROM drives subsequent available drive letters.

- /m: Specifies the number of sector buffers.
- /e: Specifies that the CD-ROM driver use expanded memory, if available, to store sector buffers.
- /k: Specifies that MS-DOS should recognize CD-ROM volumes encoded in Kanji. By default, MS-DOS does not recognize Kanji CD-ROM volumes.
- /s: Enables sharing of CD-ROM drives on MS-NET or Windows for Workgroups servers.
- /v: Directs MSCDEX to display memory statistics when it starts.

Chapter

# 2

## ORCHID UTILITIES

SoundWave 32+SCSI comes with DOS and Windows utilities for use with your CD-ROM drive. Included are utilities that allow you to send commands to your SCSI CD-ROM drive and a software volume control utility. In addition, you have the ability to play instrumental music through your computer keyboard.



*This manual presumes that you are already familiar with the basics of Microsoft Windows. Please refer to the Microsoft manual when terminology or installation steps are unfamiliar to you.*

The SoundWave 32+SCSI utilities are automatically installed using the SETUP.EXE program. Refer to "Chapter 1: Hardware and Software" if you have not installed the SoundWave 32+SCSI software.

### SCSI CD-ROM Utilities

The following CD-ROM utilities are DOS programs and must be run from the DOS (C:\) prompt:

#### FDCDTEST

This test utility will test the integrity of the CD-ROM device driver and drive.

#### FDEJECT

Ejects the CD-ROM disc from the CD-ROM drive. If the drive door is locked, this utility first unlocks the door and then ejects the disc. This function is valid only for CD-ROM drives that support a software controlled eject command.

#### FDLOCK

Locks the door on the CD-ROM drive. On most drives, this disables the eject button on the front of the drive.

#### FDUNLOCK

Unlocks the CD-ROM door that has previously been locked by FDLOCK or another utility.



*You cannot run the CD-ROM utilities from the Windows MS-DOS prompt. You must first exit Windows.*

### FDAUDIO


A Terminate-and-Stay Resident (TSR) utility that can be used as an audio CD player. Once it is loaded into memory, FDAUDIO can be accessed from within a program by pressing the SHIFT-ALT-CTRL keys simultaneously. Press the ALT-F4 key to terminate the TSR.

The following menu options are available for FDAUDIO:

- << **Skip Back**: skips back one track.
- >> **Skip Forward**: skips forward one track.
- < **Fast Reverse**: skips back 10 seconds into current track.
- > **Play**: plays the current track if the CD is not currently playing.
- >> **Fast Forward**: skips forward 10 seconds into the current track if the CD is currently playing.
- " **Pause/Resume**: Pauses the current track if the CD is playing, or resumes if the CD is paused.
- **Stop**: stops the CD.
- ▲ **Next CD**: goes to the next CD player if there is more than one CD in the system (for example, if the current CD is at drive letter D:, then the next CD will be at E:).
- ▼ **Previous CD**: goes to the previous CD player if there is more than one CD in the system (for example, if the current CD is at drive letter E:, then the previous CD would be D:).

## SW32.EXE

The SW32.EXE utility program configures the address settings and emulation modes of your SoundWave 32+SCSI from the DOS command line. For example, to change the hardware setup values from the SWAVE32 subdirectory, type the following:

C:\SW32 /C 

The following screen appears:

SoundWave32 Configuration, Version 3.10-WP (c) 1993-1994, Orchid Technology	
Emulation Mode	: Sound Blaster + General MIDI
Volume Level	: 12
Startup Music	: On
Joystick Port	: Disable
Sound Blaster Interface	: Disable
Windows Sound System	: Port=530
MIDI (MPU-401) Interface:	Port=330 IRQ=5
Mitsumi CD-ROM Interface:	Port=360 IRQ=12
DSP Interface	: Port=220 IRQ=11
Accept the above configuration	
F2 = Set all Ports, IRQ's and DMA's to default values ↑↓ Move Cursor ↵ = Select Esc = Abort Configuration	

**Figure 2.1:** SW32 Configuration Screen

The command line options are as follows:

- C:\SW32/? - A listing of options and syntax
- C:\SW32/C - Change the hardware setup values
- C:\SW32/S - Status of the current configuration
- C:\SW32/V:x - Sets the volume, where x is 0 to 31
- C:\SW32 - Reinitializes the hardware with the last saved settings

### Changing the Address Settings

If you need to change the SoundWave 32+SCSI's configuration or change the hardware setup values, run the SW32.EXE utility program from the SWAVE32 subdirectory. For help on eliminating address conflicts, see Appendix A.

### Synthesis Algorithms


The SoundWave 32+SCSI comes with several synthesis algorithms for different emulation modes and superior sound quality. The algorithms include the following:

GENMID.LD    General MIDI Synthesizer

MT32.LD        MT32 Emulation Synthesizer

3DFM.LD        Q-Sound Algorithm

The synthesis algorithms can be executed from the DOS prompt. For example, to set up Q-Sound to run in a DOS game, type the following:

```
C:\SW32 /C 
```

Highlight the Emulation Mode option and select Q-Sound. The Q-Sound synthesis algorithm adds three dimensional virtual audio sound to FM music synthesis for games.



*Some software applications have a built-in volume control. Check your application before using the volume control utility.*

## Volume Control

The SWVOLUME.COM program allows you to change the volume of the SoundWave 32+SCSI within a program, by using Hot Keys. This utility can be executed from the SWAVE32 subdirectory or added to your AUTOEXEC.BAT file.

The default Hot Keys values are:

ALT + :

ALT + "

You can define Hot Keys and make other changes from the DOS command line. The DOS command line options are:

- /I - Installs the TSR
- /S or /? - Display Status
- /D - Disables the Hot Keys
- /E - Enables the Hot Keys
- /K<Key><Down><Up> - Defines the Hot Keys

<Key> is either C (CTRL) or A (ALT) key. Down and Up can be any printable character.

For example:

```
C:\SWVOLUME /I /KAXC
```

This installs the TSR and redefines the Hot Keys as:

ALT + X - to turn Down the volume

ALT + C - to turn Up the volume



*Some games will disable TSR programs before they begin. These games will disable the SWVOLUME program.*

## Key-Z Player

Key-Z player allows you to play instrumental music from your computer, using a standard computer keyboard. The unique note mapping feature prevents you from playing an incorrect note in your chosen Key or Scale. Your computer is transformed into an intelligent polyphony (multiple notes at a time) musical instrument that is exhilarating to play.

Key-Z Player incorporates the following features: a standard MIDI file song player, graphic piano keyboard display, graphic mixer with volume, channel, patch, pan and mute control, and over 40 song styles.

### To run Key-Z Player:

1. From the Orchid Audio Applications program group, double-click on the Key-Z Player icon. The following screen appears:



Figure 2.2: Key-Z Player Screen

The buttons at the top of the screen are from left to right: File, Key, Scale, Layout, Settings, Player, Piano, Mixer, and Help. To access a feature, click once on the feature.

**Key** - allows you to choose from 12 different keys. Click on the key of your choice. You can change the key any time by clicking on the Key button and selecting another key. *NOTE:* After you have made your selection, a check mark appears next to your selection.

**Scale** - Key-Z Player offers four types of scales: Major, Minor, Blues and Harmonic Minor. Choose a Scale the same way you choose a Key Signature. Click once on the preferred scale to start playing music from your computer keyboard.

**Layout** - maps the notes on your keyboard to your choice of Jagged or Horizontal.

*Jagged* - maps the keys so that they progress up the scale alternating rows. This mapping also works well for organ solos and arpeggios.

*Horizontal* - maps the keys so that they progress up the scale from left to right, from the bottom to the top, while increasing the pitch for each row. This mapping works great for quick string-scale runs and playing blues' piano.

**Setting** - offers the following four features:

*MIDI Mapper* - allows you to view your current MIDI Mapper settings from inside Key-Z Player. *NOTE:* All notes from Key-Z Player are routed through the Mapper. Refer to the Windows User's Guide for instructions on setting up the MIDI Mapper.

*Multimedia Drivers* - allows you to view your currently installed multimedia drivers. *NOTE:* Your multimedia drivers must be installed for Key-Z Player to function.

**Patch Names** - this feature gives you a list of eight types of sound hardware:

0-127	1-128
General MIDI	Proteus
MT-32	Roland GS
U-110	U-110 Tones

**Keyboard** - brings up a dialog box that allows you to type in Channel, Patch and Volume changes.

**Player** - opens or hides the Song Player window that includes the controls for playing standard MIDI Song Files. You can also measure the length of a song by using the Bar Control option.

**Bar Control** - the bar control detects the length of the song, (how many measures the song consists of). For example, if you have a 128 bar song, the bar control will start at Bar Zero, which is the beginning of the song. It will play through the entire song, ending at Bar 128. *NOTE:* The song must be stopped before using the bar control slider.

**Piano** - graphically displays all notes that are playing. The graphic keyboard has seven full octaves.

**Mixer** - features 16 channels, and allows you to control the Patch, Volume, Pan and Mute of each track in the Song File. Make sure the patch for each track is set to an appropriate patch for your output device.



You may add to the Patch List by editing the *PATCHES-INI* file located in your Key-Z Player directory.

### Key-Z Player - Solo

Key-Z Player can be used to perform solo compositions, test melodies, play rhythm and bass tracks, and learn scales and arpeggios in various keys.

#### To play Key-Z Player - Solo:

1. Select the Key and Scale you desire.
2. Select the Patch for the sound you desire.
3. Select the keyboard mapping from the Layout menu.
4. Set your Volume and begin playing by tapping out notes on your computer keyboard.

### Keyboard Notes

The playable key is shown in white. You can play multiple notes and chords by pressing several keys at once (this is called polyphony).



Figure 2.3: Playable Keyboard Note

### Note Progression

Notes begin with the lowest left row (the Z row) in Horizontal Mapping, and the "A" key in Jagged Mapping. This ends with the highest note on the upper right.

### Sustain

There are several ways to get sustained notes: (1) For continuous sustain, press the Caps Lock key. The notes played are sustained until the Caps Lock key is pressed again. (2) Hold down the Shift key while playing various notes.

### Key-Z Player - Accompanied

Key-Z Player can perform melodies while being accompanied by any standard MIDI Song File played in real-time.

#### To play Key-Z Player - Accompanied:

1. Open the Song Player window by clicking on the Player menu button.
2. Click on the Open Song button and select a song to play.
3. When the file is opened, it will use the default settings for Key, Scale and Tempo. In addition, the track structure of the Song File (including the instrument name and MIDI channel) is set into the Mixer.

**NOTE:** Key-Z Player can read and play Format 0 and Format 1 MIDI files. The standard MIDI files included with Key-Z Player are Format 1 files and contain the optional Key and Scale data.



*Please refer to Appendix B for the MIDI Drum Patch Settings.*

Appendix

# A

## TECHNICAL INFORMATION

Orchid Technology is known for its responsiveness to its customers. This section gives you helpful hints for troubleshooting the SoundWave 32+SCSI and the technical specifications.

### CompuServe

In addition to calling Orchid technology, technical support is now available through the CompuServe Information Service (CIS). You can also download drivers and get new product information. To find us on CompuServe, follow the instructions below:

1. Log onto CompuServe.
2. Type GO MULTIBVEN to get into the Multimedia Vendor Forum B. Once you are in this forum, select Message Section #10. The message and library sections are labeled Orchid. . .

or

You may type GO ORCHID to get immediate access to the Orchid section.

3. If you would like to leave private mail for Orchid, type GO MAIL. Address your letters to our technical support account number 72662,2672.



*All commands can be typed in lower or upper case letters.*

### Before You Begin

Because of the unique hardware design of the SoundWave 32+SCSI, each sound standard is independent of the other. This is how SoundWave 32+SCSI can emulate multiple sound standards simultaneously.

When troubleshooting the SoundWave 32+SCSI for potential conflicts, it is important to remember that

if a sound standard works correctly, the problem generally becomes a software issue. For example, the start-up music with the SW32.EXE program uses the Sound Blaster interface. If the start-up music plays, the Sound Blaster interface is operating correctly. If an application that is emulating the Sound Blaster standard is not operating properly, contact the software manufacturer for possible configuration requirements or software updates.

### Troubleshooting the SoundWave 32+SCSI

The following information will help you diagnose problems you may have with the SoundWave 32+SCSI. Following these simple steps serves a two-fold purpose:

You may be able to fix your problem and avoid having to contact the Orchid Technology Technical Support Department...

or

if these steps do not help you solve your problem, they will most certainly give you a better handle on what to tell Technical Support once you do contact them.

The information provided here is in symptom/response form. That is, a symptom is given, and a check point response is provided for you.

#### Symptom 1

**System locks up on bootup with the SoundWave 32+SCSI installed.**

#### Check

1. If the lock up occurs when loading the SW32.EXE file, disable all sound settings by using SW32 /C. Enable each sound setting one at a time to identify which setting is causing the lock up. Port

addresses and DMA conflicts will normally cause a lock up. IRQ conflicts will cause continuous noise from the speakers. When you have identified the conflict, change the address setting.

2. Check whether another peripheral in your system is using the same I/O address configured by Jumper J3 on the SoundWave 32+SCSI.
3. If a SCSI CD-ROM is installed, verify that no other peripherals are configured for the same memory address set by JP2 and JP3 on the SoundWave 32+SCSI.

### Symptom 2

**No startup sounds when running the SW32.EXE program.**

#### Check

1. Verify that the external speaker is properly connected to the SoundWave 32+SCSI stereo speaker jack.
2. Verify that the Startup Music is on and the volume is turned up in the SW32.EXE program.
3. Since the SoundWave 32+SCSI uses the Sound Blaster interface to play the Startup Music, check for possible conflicts with the Sound Blaster interface settings.
4. Verify that the ORCHID.WAV file is in the SWAVE32 directory. This file is limited to 8-bit resolution and 22KHz sample frequency (mono). If you have replaced the ORCHID.WAV file with another wave file, verify that it does not exceed these limits.

### Symptom 3

**Certain applications do not play sound.**

#### Check

1. Verify that the SoundWave 32+SCSI and the software application are configured for the same sound emulation modes (for example, Sound Blaster for digitized sound).
2. Many software applications require a large amount of base memory, such as 640KB and are unable to operate if any drivers or TSR programs are installed. Try removing all unnecessary drivers and TSRs or load them in high memory (refer to your DOS user's manual for more information).
3. Verify that the SET BLASTER statement is in the AUTOEXEC.BAT file.
4. Make sure the application is configured for the same IRQ, I/O, or DMA as the SoundWave 32+SCSI.

### Symptom 4

**Certain applications do not play digitized sound, such as speech or sound effects.**

#### Check

1. Check for a conflict with the Sound Blaster interface configuration settings. Digitized sounds are played back through this interface.
2. Verify that the SET BLASTER statement is in the AUTOEXEC.BAT file. Some applications look specifically for this statement to set the Sound Blaster environment. Verify that the settings of the statement match the configuration for the SoundWave 32+SCSI and the software application.

3. Verify that there is sufficient base memory to run the software application. If you are configuring the software application for Sound Blaster, the software application may omit digitized sound if there is not enough base memory available.

### **Symptom 5**

**I cannot access the CD-ROM drive.**

#### **Check**

1. Verify that the FDCD.SYS device driver (or other CD-ROM device driver) is loaded in the CONFIG.SYS file. Verify that the MSCDEX or similar device driver is loaded in the AUTOEXEC.BAT file.
2. Verify that the path and syntax for each of the device driver lines are correct (refer to Chapter 1).
3. If there is a LASTDRIVE statement in the CONFIG.SYS file, verify that the drive letter used is set to a letter after the CD-ROM drive (refer to your DOS manual for more information).
4. Verify that the colored stripe on ribbon cable is correctly installed on Pin 1 on both the SoundWave 32+SCSI and the CD-ROM drive.

### **Symptom 6**

**My CD-ROM drive does not play CD Audio.**

#### **Check**

1. Verify that the audio cable used matches the pin-outs for the CD Audio connector. See Appendix A for the CD-ROM Audio Cable Connector pin assignments. Contact the CD-ROM manufacturer for an MPC-2 CD audio connector.

### Symptom 7

**My joystick does not work when connected to the SoundWave 32+SCSI.**

#### Check

1. Verify that the Joystick Port in the SW32.EXE program is enabled.
2. Many I/O adapter cards have a built-in joystick/game port (even if they do not contain a 15-pin DB connector). The SoundWave 32+SCSI has its own joystick port. Disable the joystick/game port on the I/O adapter card.

### Symptom 8

**My microphone recording level is too soft or unable to record properly.**

#### Check

1. Verify that your microphone has the proper impedance or is too sensitive. The SoundWave 32+SCSI expects a microphone with an impedance of approximately 600-10K ohms.
2. Verify that the software used to record, and the Windows temporary directory, are not on a drive that is using a disk doubling utility.
3. Turn up the microphone input level.
4. Make sure that the microphone is selected as the recording source.

### Symptom 9

**Wave files do not play correctly in Windows.**

#### Check

1. Verify that the settings for the SoundWave

32+SCSI driver in Windows, match the settings configured with SW32.EXE. This can be done by opening the Audio Hardware Setup program in the Orchid Audio Software group.

### Symptom 10

#### **MIDI files do not play correctly in Windows.**

#### Check

1. Verify that the settings for the SoundWave 32+SCSI driver in Windows, match the settings configured with SW32.EXE. This can be done by opening the Audio Hardware Setup program in the Orchid Audio Software group.
2. Make sure the MIDI Mapper is properly configured. The MIDI Mapper should be set to a "SoundWave 32" setting. Select PSA/Wavetable to hear wavetable synthesis sounds, or PSA Basic Synthesis to hear FM sounds.

### Avoiding Address Conflicts

A conflict may occur if you have another card in your system using the same I/O, DMA or IRQ addresses as SoundWave 32+SCSI. Resolve the conflict by selecting another available address. When selecting a different address, please *note* the following information:

☞ A BUS mouse commonly uses I/O address 240H

☞ Network cards commonly use the following addresses:

IRQ 10 or 11

I/O 300H, 320H, 340H or 360H

☞ Other devices such as SCSI cards, hard disks and CD-ROM drives commonly use the following addresses:

IRQ 10, 11, 14 or 15

I/O 330H or 340H

☞ When you encounter an IRQ conflict, you will normally hear a continuous noise from the speakers. I/O and DMA conflicts normally lock up your system.

☞ SoundWave 32+SCSI must use DMA Channel 1 for Sound Blaster mode. If any other device is using DMA Channel 1, move it to another location.

### MIDI Usage

#### **Compatibility with Roland MT-32**

*For SoundWave 32+SCSI and SoundWave 32+Studio only.* The Roland MT-32 synthesizer mode of SoundWave 32+SCSI supports the system-exclusive messages (sysex) for reverb and voice assignment. It does not support sysex messages for partial synthesis. Therefore, games that attempt to create their own sound bank may experience sonic anomalies (weird sounds). Selecting General MIDI will correct this. MIDI channel 1 is not active as a default in the MT-32 mode. Your application (games/software) will activate it if required.

#### **Roland Synthesizers**

Some Roland synthesizers, most notably the D-50, send "all notes off" commands when all keys are released. This causes SoundWave 32+SCSI sounds to play in a "staccato" fashion. Holding down one key while playing other notes will correct this.

#### **Windows Sound System**

The Windows Sound System applications that come with the Windows Sound System hardware will cause a "Windows Sound System board not installed" error. This error occurs because the applications require the actual Microsoft hardware to run. You can correct this by loading the Microsoft Sound Systems driver instead of the SoundWave 32+SCSI driver, or you can use the retail version of Windows Sound System (the software only version).

#### **External keyboard control of SoundWave 32+SCSI**

If you wish to plug a MIDI keyboard into SoundWave 32+SCSI, you will need to purchase the joystick/MIDI cable adapter from Orchid. The Orchid SoundWave 32+SCSI also supports "standard" joy-

stick/MIDI cable sets, so if you have access to a Sound Blaster or Pro Audio Spectrum MIDI cable or compatible cable, it should work properly. Due to the number mechanism used by various keyboard manufacturers, access to some of the SoundWave 32+SCSI sounds may be restricted. The following are keyboards that may have sound access limitations:

- Korg M1 - The Korg M1 can access sounds 0 - 100. Switching to the ROM card addressing restarts the patch numbering from 0, not 101.
- Yamaha DX-7 - This synthesizer can access sounds 0 - 64 (internal and cartridge). If your DX-7 has the E! retrofit, then cycling through the upper banks will provide access to sounds 64 - 128.

## Technical Specifications

This section covers the specifications and features of SoundWave 32+SCSI. Also included are the specifications for the Joystick/MIDI Port.

### Configurations

SoundWave 32+SCSI

SoundWave 32Pro SCSI

SoundWave 32+Studio (*ships w/WaveBooster 4FX*)

### Features

Full compatibility with the following sound and multimedia standards:

- Sound Blaster
- AdLib
- Microsoft Windows Sound System
- General MIDI
- Roland MPU-401
- Roland MT-32 (*SoundWave 32+SCSI and SoundWave 32+Studio only*)
- MPC Level I and II

### Chipsets

Analog Devices 20MHz ADSP-2115 DSP

Analog Devices 1848 CODEC and Gate Array

### Video Standards Supported

MDA, CGA, EGA and VGA

### Computers Supported:

ISA machines: 386, 486 and compatibles

### Interfaces:

Future Domain SCSI-2 CD-ROM interface

Mitsumi CD-ROM interface

DB-15 port for Joystick/MIDI Port

Optional WaveBooster daughtercard

3.5 mm stereo jack for line input

3.5 mm stereo jack for line out

**Temperature:**

Operating: from 0 to 40 degrees C

Storage: from -25 to 90 degrees C

**Humidity:**

Operating: from 15% to 90%

Storage: from 0% to 90%

**Additional Features:**

20 MIPS of Digital Signal Processing Power (DSP)

**FM Synthesizer**

- 11-voice Stereo Synthesizer

**Stereo Digital/Analog Mixer (built-in)**

- Selectable input and mixing of all audio sources for recording:

Line-in

Stereo CD-Audio

Mono Microphone

**Stereo Digitized Audio Playback**

- 8-bit and 16-bit sample modes
- Sampling Rate of :  
2KHz to 48KHz (mono or stereo)
- Hardware audio decompression ADPCM (ratios of up to 10:1)

**Synthesizer Emulations**

- General MIDI Mode  
Up to 32 simultaneous voices
- Roland MT-32 voice with reverb  
Up to 24 simultaneous voices
- Yamaha OPL2 emulation  
FM Stereo

### Sample Sounds

- 2 megabytes (1MBx16) wavetable ROM samples, compressed and stored in two 512K (1MB) ROMS or a single 1MB ROM

### Audio Amplifier

- Frequency Response: 20Hz to 22KHz

### Stereo Digitized Audio Recording

- 8-bit and 16-bit sample modes
- Sampling Rate of 2KHz to 48KHz

### CD-ROM

- One built-in Mitsumi CD-ROM interface and one built-in SCSI-2 CD-ROM interface

### MIDI

- Sound Blaster type Joystick/MIDI cable

### Wavetable

- Interface for optional Wave Booster daughtercard

### Joystick Port/MIDI Interface

- Standard built-in (15-pin D-sub) connector
- Game I/O port for PC analog joystick
- Interface for Sound Blaster MIDI cable
- MIDI time-stamp for Multimedia extension
- Sound Blaster MIDI compatible
- 64-byte FIFO buffer

### Mono Microphone Input

- Automatic Gain Control for direct sound input

### Address Settings and Pin Assignments

The SoundWave 32+SCSI address settings are software configured using the Audio Hardware Setup program in the Orchid Audio Software group. The following information lists the address settings and pin assignments in detail.

**Mitsumi CD-ROM  
Addresses**

I/O	IRQ
300	3
310	5
320	7
330	9
340	10
* 360	11
	12 *

**Table A.1:** CD-ROM Addresses

**SCSI CD-ROM  
Addresses**

Memory Segment
CA000-CBFFF
C8000-C9FFF
CE000-CFFFF
DE000-DFFF

**Table A.2:** CD-ROM Addresses

### Sound Blaster Mode Addresses

I/O	IRQ	DMA
* 220	3	* 1
240	5	
	* 7	

**Table A.3:** Sound Blaster Mode Addresses

\* *Default Setting*

### Windows Sound System Mode Addresses

I/O	IRQ	DMA
* 530	7	0
640	9	1
E80	10	3
F40	11	

**Table A.4:** Sound System Addresses

### MPU-401 Mode Addresses

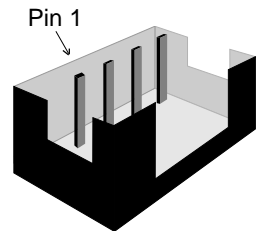
I/O	IRQ
300	3
320	* 5
* 330	7
	9

**Table A.5:** MPU-401 Addresses

\* *Default Setting*

### MPC-2 Audio Cable Connector

Pin	Assignment
1	Left Channel
2	Ground
3	Ground
4	Right Channel



**Table A.6:** CD-ROM Audio Cable Pin-Outs

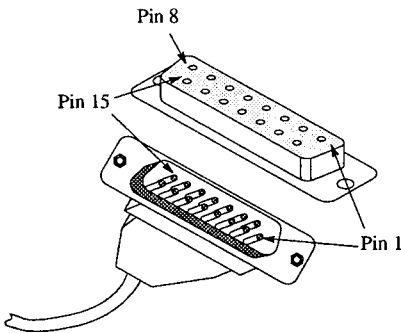
\* *Default Setting*

## Joystick/MIDI Port Pin Assignments

The joystick port on SoundWave 32+SCSI is identical to the standard PC Game Control adapter. The 15-pin D-sub connector is also used as the built-in MIDI interface. The pin-out assignments are as follows:

Pin	Function	Pin	Function
1	+5V	9	+5V
2	A-1	10	B-1
3	A-X	11	B-X
4	GND	12	MIDI-OUT
5	GND	13	B-Y
6	A-Y	14	B-2
7	A-2	15	MIDI-IN
8	+5V		

**Table A.7:** Joystick/MIDI Pin Assignments



**Figure A.1:** Joystick/MIDI Pin-Outs

SoundWave 32+SCSI MIDI Port Specifications

The chart below shows the MIDI implementation for SoundWave 32+SCSI.

Function	Setting	Parameters
Basic Channel	Default Channels	1-16 1-16
Mode	Default Messages Altered	No No No
Note Number	True Voice	21-108
Velocity	Note ON Note OFF	Yes Yes
After Touch	Key Channel	Yes Yes
Pitch Blender		Yes
Control Change		1 Mod Wheel 4 Foot Pedal 7 Volume 10 Pan 64 Sustain
Program Change	True Number	0-127
System Exclusive		Yes
System Common	Song Position Song Select Tune	No No No
System Read Time	Clocks Commands	No No
Auxiliary Messages	Local ON/OFF All Notes OFF Active Sense Reset	No Yes No Yes



# B

## MIDI Specification

This section gives you an overview of the MIDI specification, and provides a list of Patches and Percussion sounds available on the SoundWave 32+SCSI.

### MIDI Overview

MIDI (Musical Instrument Digital Interface) is a serial communications protocol designed specifically for electronic music devices. MIDI (pronounced "mid-ee") has revolutionized the composition, recording, and performance processes by allowing many instruments to be centrally-controlled like one electronic orchestra. The MIDI Manufacturers Association (MMA) is responsible for the development and evolution of MIDI.

MIDI contains instructions controlling how and when devices like digital synthesizers produce sound. You can think of MIDI as a sort of Postscript for music. Postscript describes objects, rather than casting them into bitmapped form. MIDI describes the elements of the musical performance, rather than casting them into the bitstreams of digital audio.

### General MIDI

General MIDI defines specific and predictable sounds for each of 128 program locations. This allows composers and producers to include program change commands in compositions that will configure the timbres appropriately for the tracks.

### SoundWave 32+SCSI Sounds

*For SoundWave 32+SCSI and SoundWave 32+Studio only.* These are the General MIDI and MT-32 Patches (sounds) that are stored on the SoundWave 32+SCSI. The SoundWave 32+SCSI also contains over 40 percussion instruments on MIDI channel 10.

Patch	MT-32 Sound	General MIDI Sound
1	Acoustic Piano 1	Acoustic Grand Piano
2	Acoustic Piano 2	Acoustic Bright Piano
3	Acoustic Piano 3	Electric Grand Piano
4	Electric Piano 1	Honky Tonk Piano
5	Electric Piano 2	Fender Rhodes
6	Electric Piano 3	Chorused Piano
7	Electric Piano 4	Harpsichord
8	Honky Tonk	Clavinet
9	Electric Organ 1	Celesta
10	Electric Organ 2	Glockenspiel
11	Electric Organ 3	Music Box
12	Electric Organ 4	Vibraphone
13	Pipe Organ 1	Marimba
14	Pipe Organ 2	Xylophone
15	Pipe Organ 3	Tubular Bells
16	Accordion	Dulcimer
17	Harpsichord 1	Hammond Organ
18	Harpsichord 2	Percussive Organ
19	Harpsichord 3	Rock Organ
20	Clavinet 1	Church Organ
21	Clavinet 2	Reed Organ
22	Clavinet 3	Accordion
23	Celesta 1	Harmonica
24	Celesta 2	Tango Accordion
25	Synth Brass 1	Nylon Acoustic Guitar
26	Synth Brass 2	Steel Acoustic Guitar
27	Synth Brass 3	Jazz Electric Guitar
28	Synth Brass 4	Clean Electric Guitar
29	Synth Bass 1	Muted Electric Guitar
30	Synth Bass 2	Overdriven Guitar
31	Synth Bass 3	Distorted Guitar
32	Synth Bass 4	Guitar Harmonics
33	Fantasy	Acoustic Bass

34	Harmony Piano	Fingered Electric Bass
35	Chorale	Picked Electric Bass
36	Glasses	Fretless Bass
37	Soundtrack	Slap Bass 1
38	Atmosphere	Slap Bass 2
39	Warm Bell	Synth Bass 1
40	Funny Vox	Synth Bass 2
41	Echo Bell	Violin
42	Ice Rain	Viola
43	Oboe 2001	Cello
44	Echo Pan	Contrabass
45	Doctor Solo	Tremelo Strings
46	School Daze	Pizzicato Strings
47	Bellsinger	Orchestral Harp
48	Square Wave	Timpani
49	String Section 1	String Section 1
50	String Section 2	String Section 2
51	String Section 3	Synth Strings 1
52	Pizzicato	Synth String 2
53	Violin 1	Choir "Aahs"
54	Violin 2	Voice "Oohs"
55	Cello 1	Synth Voice
56	Cello 2	Orchestra Hit
57	Contrabass	Trumpet
58	Harp 1	Trombone
59	Harp 2	Tuba
60	Guitar 1	Muted Trumpet
61	Guitar 2	French Horn
62	Electric Guitar 1	Brass Section
63	Electric Guitar 2	Synth Brass 1
64	Sitar	Synth Brass 2
65	Acoustic Bass 1	Soprano Sax
66	Acoustic Bass 2	Alto Sax
67	Electric Bass 1	Tenor Sax
68	Electric Bass 2	Baritone Sax
69	Slap Bass 1	Oboe
70	Slap Bass 2	Basoon
71	Fretless 1	English Horn
72	Fretless 2	Clarinet
73	Flute 1	Piccolo
74	Flute 2	Flute 81
75	Piccolo 1	Recorder

## Appendix B: MIDI

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Patch	MT-32 Sound	General MIDI Sound
76	Piccolo 2	Pan Flute
77	Recorder	Bottle Blow
78	Pan Pipes	Shakuhachi
79	Sax 1	Whistle
80	Sax 2	Ocarina
81	Sax 3	Lead 1
82	Sax 4	Lead 2
83	Clarinet 1	Lead 3
84	Clarinet 2	Lead 4
85	Oboe	Lead 5
86	English Horn	Lead 6
87	Bassoon	Lead Fifths
88	Harmonica	Lead + Bass
89	Trumpet 1	New Age Pad
90	Trumpet 2	Warm Pad
91	Trombone 1	Polysynth Pad
92	Trombone 2	Choir Pad
93	French Horn 1	Bowed Pad
94	French Horn 2	Metallic Pad
95	Tuba	Halo Pad
96	Brass Section 1	Sweep Pad
97	Brass Section 2	Rain
98	Vibe 1	Soundtrack
99	Vibe 2	Crystal
100	Synth Mallet	Atmosphere
101	Windbell	Brightness
102	Glockenspiel	Goblins
103	Tube Bell	Echoes
104	Xylophone	Sci-Fi
105	Marimba	Sitar
106	Koto	Banjo
107	Sho	Samisen
108	Shakuhachi	Koto
109	Whistle 1	Kalimba
110	Whistle 2	Bagpipe
111	Bottleblow	Fiddle
112	Breathpipe	Shanai
113	Timpani	Tinkle Bell
114	Melodic Tom	Agogo
115	Deep Snare	Steel Drums

116	Electric Percussion 1	Woodblock
117	Electric Percussion 2	Taiko Drum
118	Taiko	Melodic Tom
119	Taiko Rim	Synth Drum
120	Cymbal	Reverse Cymbal
121	Castanets	Guitar Fret Noise
122	Triangle	Breath Noise
123	Orchestra Hit	Seashore
124	Telephone	Bird Tweet
125	Bird Tweet	Telephone Ring
126	One Note Jam	Helicopter
127	Water Bells	Applause
128	Jungle Tune	Gunshot

### SoundWave 32+SCSI Percussion Sounds

These are the Percussion sounds on the SoundWave 32+SCSI. These percussion instruments are accessed by sending data to MIDI channel 10.

Key #	Keyboard Note	Sound
35	B0	Acoustic Bass Drum
36	C1	Bass Drum 1
37	C1+	Side Stick
38	D1	Acoustic Snare
39	D1+	Hand Clap
40	E1	Electric Snare
41	F1	Low Floor Tom
42	F1+	Closed Hi-Hat
43	G1	High Floor Tom
44	G1+	Pedal Hi-Hat
45	A1	Low Tom
46	A1+	Open Hi-Hat
47	B1	Low-Mid Tom
48	C2	Hi-Mid Tom
49	C2+	Crash Cymbal 1
50	D2	High Tom
51	D2+	Ride Cymbal 1
52	E2	Chinese Cymbal
53	F2	Ride Bell
54	F2+	Tambourine
55	G2	Splash Cymbal
56	G2+	Cow Bell
57	A2	Crash Cymbal 2
58	A2+	Vibraslap
59	B2	Ride Cymbal 2
60	C3	Hi Bongo
61	C3+	Low Bongo
62	D3	Mute Hi Conga
63	D3+	Open Hi Conga
64	E3	Low Conga
65	F3	High Timbale
66	F3+	Low Timbale
67	G3	High Agogo
68	G3+	Low Agogo

69	A3	Cabasa
70	A3+	Maracas
71	B3	Short Whistle
72	C4	Long Whistle
73	C4+	Short Guiro
74	D4	Long Guiro
75	D4+	Claves
76	E4	High Wood Block
77	F4	Low Wood Block
78	F4+	Mute Cuica
79	G4	Open Cuica
80	G4+	Mute Triangle
81	A4	Open Triangle

*NOTE: C1 refers to the lowest C-key on a standard 5-octave keyboard. The + sign refers to a half-step (sharp).*

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## FCC NOTICE

FCC# DDS7EF0694-94-SWA

SoundWave 32+SCSI  
Certified compliant with FCC Class B limits, part 15

To meet FCC requirements, shielded cables are required to connect the unit to a Class B certified device

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

This equipment generates and uses radio frequency energy and, if not installed and used properly in strict accordance with the manufacturer's instructions, may cause interference to radio or television reception.

This device has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. Only equipment (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this product.

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

1. Reorient the receiving antenna.
2. Relocate the computer with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into an outlet which resides on a different circuit breaker than the receiver.
5. If necessary, consult your dealer, or an experienced radio or television technician for additional suggestions.

You may find the booklet **How To Identify and Resolve Radio-TV Interference Problems** helpful. It was prepared by the Federal Communications Commission and is available from the U.S. Government Printing Office, Washington, DC 20402. Refer to stock number: 004-000-00345-4.

Orchid Technology is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. It is the responsibility of the user to correct such interference.

Operation with non-certified equipment is likely to result in interference to radio and TV reception. The user must use shielded interface cables in order to maintain the product within FCC compliance.

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