Multimedia Sound Card

MultiSound Monterey

User's Guide

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Congratulations on your purchase of MultiSound Monterey!

This is the second generation of our MultiSound board. MultiSound Monterey is a combination of two Turtle Beach Systems products—Tahiti and Rio—our state-of-the-art sound card and MIDI synthesizer. MultiSound Monterey offers the MultiSound quality customers expect from Turtle Beach Systems. Enjoy the awesome digital audio capabilities of MultiSound Monterey!

MultiSound Monterey Features

PC
Multimedia PC.

Full compatibility with MPC standard for multimedia computing on the PC. This means MultiSound Monterey will work with all Windows multimedia applications.

An industry expansion header, which houses Turtle Beach Rio, a MIDI synthesizer.

Very high quality digital audio using 64x oversampled, 16/18 bit analog/digital converters. Digital/analog converters use 8x oversampled interpolating filters and sigma/delta conversion technology.

Fast digital signal processor (Motorola 56001), providing 20 million instructions per second (MIPS). This allows you to perform operations like real-time ADPCM decompression and provides the needed horsepower for future multimedia standards like data compression.

High throughput **Hurricane**™ architecture. MultiSound Monterey moves sound data through the PC roughly eight times faster than competitive sound cards.

Wavetable synthesis with an on-board effects processor.

Wave SE, a Turtle Beach Systems sound editing application.

SampleStore™ technology allows creation and use of additional wavetable samples.

Built-in multiport MIDI interface.

Before You Get Started...

Registration Card

Take the time to fill out and send back the registration card right now. Returning this card entitles you to...

- updates and notifications of any program revisions, bug fixes, and/or upgrades made to MultiSound Monterey.

- use of the Turtle Beach Systems customer support line, which helps with any questions or problems you may have with MultiSound Monterey. Non-registered users are ineligible to use the support line.

This registration information also lets us know your uses and needs for MultiSound Monterey and the future products in which you are interested.

SEND IN THE REGISTRATION CARD!!

Using This Guide

This user's guide is designed primarily as a reference document; we don't expect you to read it from cover to cover. Nevertheless, you will need to read the Before You Get Started section and the first four chapters before you dive into Monterey. (From this point forward MultiSound Monterey will be referred to as Monterey. Any references to Tahiti or Rio refer to the Monterey.)

Required Reading

Before You Get Started... covers all the basics for Monterey, including technical support and upgrade information, registration, and our update policy.

Chapter One, **Hardware,** includes the component list and minimum systems requirements for Monterey. It offers step-by-step instruction for hardware and upgrading installation, as well as instructions for using Monterey's back panel.

Chapter Two, **Software,** addresses installation of Monterey software and Wave SE. It also discusses using Monterey Setup.

Chapter Three, **Final Check,** gives a short check to verify proper installation of Monterey and a demonstration applet showcasing Monterey's awesome audio capabilities.

Chapter Four, **Connecting Your PC to an External MIDI Source,** discusses three ways to properly connect your PC to MIDI sources.

Reference Chapters

Chapter Five, **Quick Start,** offers quick step-by-step instruction for some of the basics of Monterey. These subjects are discussed in greater depth later in the user's guide.

Chapter Six, **Applets,** discusses the Synthesizer Control Panel, **MousePlayer,** Mixer, Record Prep, MIDI Patch bay, and Diagnostics applets. (Wave SE is addressed in the Wave SE User's Guide.)

Chapter Seven, **Applications**, looks at recording and playing .WAV files in DOS and substituting your own sound for presets in Monterey's synthesizer.

Chapter Eight, **Troubleshooting**, looks at common problems and solutions for Monterey, answers some of the most-asked questions, discusses EMM386/QEMM/386 Max Issues, and explains the Warning, Error, and Fatal Error message system in Monterey's Synthesizer Control Panel.

Appendix A, **Customer Support Checklist**, is a checklist you should fill out before calling Turtle Beach Customer Support.

Appendix B, **Technical Data**, lists the General MIDI presets, a MIDI drum map, a MIDI implementation chart, specifications for building your own MIDI connector, a diagram of the internal CD-ROM audio connection, and specifications for the ICS WaveFront Chip Set.

Appendix C, **Understanding MIDI Concepts**, Appendix D, **Digital Audio Concepts**, and Appendix E, **About Synthesis: The Difference Between Wavetable and FM Synthesis**, all offer an introduction into the world of digital recording.

Appendix F, **Limited Warranty**, explains the limited warranty for Monterey. This appendix also contains the License and FCC Compliance Statement for Monterey.

As a general rule, if you need help, turn to the table of contents or index first. This will tell you exactly where to find needed information. And don't forget to make use of Windows' on-line help facilities!

Customer Support

Before calling Turtle Beach Customer Support, check the Troubleshooting chapter for a listing of common problems. For other questions or problems, do not hesitate to call our customer support line at (717) 764-5265. This support line is answered Monday through Friday from 9:00 a.m. to 6:00 p.m. Eastern Time. At other times, leave a message and the call will be returned; or fax user-problems—Attention: Customer Support—to (717) 767-6033.

Via Beach-Comber

If you have a Hayes-compatible modem, contact the BeachComber bulletin board at: (717) 767-0238—9600 baud, eight (8) data bits, No parity bits, one (1) stop bit; OR (717) 767-5934—2400 baud, eight (8) data bits, No parity bits, one (1) stop bit.

Via Compuserve

For technical support via Compuserve contact:
CompuServe: 71333,2432
Forums: MIDIVEN Section 2 and MULTIVEN Section 16

Support Call Checklist

Please have the following information readily available when calling Turtle Beach Customer Support:

• Monterey version and serial number(s) from the FCC sticker located on the board(s).

• Type of CPU.

• DOS and Windows versions.

• Any other software or adapter cards presently installed in your system.

• Application software where you are encountering the problem.

When calling with a technical problem, make sure you have made note of any error messages or the steps that led up to your problem. It is helpful if you are at your computer when calling.

You are not eligible for this support, except for initial installation problems, unless you return your user registration form.

Update Policy

Once registered, you are entitled to software maintenance updates—bug fixes, minor enhancements, etc.— for one year from the date of purchase. There is a nominal update charge to cover disks and shipping. Or the updates can be obtained from the BeachComber bulletin board and Compuserve.

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Chapter One—Hardware

What's in the Box?

- One Monterey sound card

- One Monterey User's Guide (You're reading it!)

- One Wave SE User's Guide

- One audio output cable

- One 3.5 inch installation diskette

- One 3.5 inch Wave SE diskette

System Requirements

In order to properly operate Monterey your computer system should include:

• An MPC-compatible computer (VGA, 386 required: 386/25 recommended, 40M hard disk, 1.4M floppy, 2M RAM, Mouse) or better, with an empty 16-bit slot.

• Windows 3.1 installed and running on the computer.

• A high-quality stereo sound system to properly hear Monterey's amazing quality.

Installing the Hardware

Before installing Monterey in your machine, copy the serial number(s) from the FCC sticker(s) on the back of Monterey onto your registration form. You will need to have this number if you call for customer support.

Follow these steps for sound card installation:

1. If you are adding a Single Inline Package (SIPP) to Monterey, refer to "Installing a **SampleStore** RAM" following this installation section. Add the SIPP before installing Monterey.

2. Turn off the power to your PC.

3. Refer to your computer manufacturer's instructions for removing the PC cover.

4. Locate any available 16-bit ISA expansion slot.

5. Remove the expansion slot cover from the back of your PC.

6. Install Monterey into the 16-bit slot.

7. Adjust the port switch settings according to the table below. As shipped, Monterey uses I/O port $290 ($=hex), hardware IRQ 10, and it maps a 32K window of shared RAM into segment $D000-$D7FF.

I/O Port ($=Hex)	Switch Setting		
	Switch 4	Switch 3	Switch 2
$290 (Factory Default)	On	On	On
$260	Off	On	On
$250	On	Off	On
$240	Off	Off	On
$230	On	On	Off
$220	Off	On	Off
$210	On	Off	Off
$3E0	Off	Off	Off
Switch 1 should be On if a joystick is connected to the Monterey card. It should be Off if no joystick is being used or if the joystick is connected to another card.			

NOTE: If you do not understand these terms, simply install the card as configured by the factory. These settings were chosen to avoid conflicts in most systems. If conflicts occur, they can be resolved in the troubleshooting section of this manual. The only setting on Monterey that is not computer controlled is the I/O port setting. The IRQ number and RAM window can be changed within the driver setup program in Windows.

8. Secure the mounting bracket with the screw used for the expansion slot.

9. Replace the cover of your PC.

Installing a SampleStore RAM

You can add RAM to your Monterey to enable SampleStore. Since the on-board processor automatically detects RAM there is no need to change or switch jumper settings when changing the memory configuration.

Specifications for the SIPP (Single Inline Package) are:

256K x 9	70ns DRAM
1M x 9	70ns DRAM
4M x 9	70ns DRAM

The SIPP must have an access time of 70 nanoseconds or better.

To install a RAM on Monterey:

1. Hold the Monterey sound card vertically with the SIPP connector pointed upward.

2. Carefully align the SIPP pins with the connector making sure the SIPP chips face the same direction as the chips on Monterey. (See diagram below.)

3. Press the SIPP down to insure it solidly mates with the connector.

4. If the SIPP moves or feels loose in the connector, remove it and begin again.
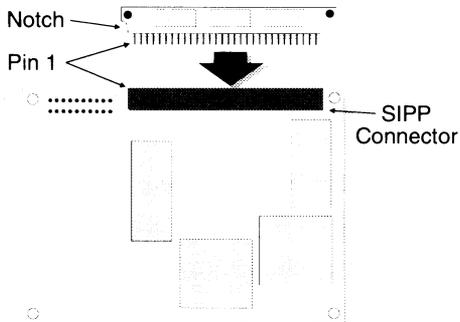
Follow this diagram to ensure proper connection of the SIPP.

IN From Main Source (Rec)

AUX From Auxiliary Source

OUT To Audio Amplifier or Headphones

MIDI

To MIDI In,Out,Thru
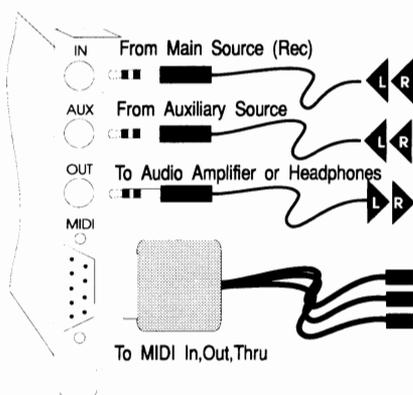
Follow this diagram for proper connections to Monterey's back panel.

Connections for Monterey's Back Panel

The back panel of Monterey has input (IN), auxiliary (AUX), output (OUT), and MIDI connectors that allow you to connect a variety of devices including audio systems, headphones, and an external CD-ROM drive to your PC. The above diagram shows the connectors on Monterey's back panel.

To connect your audio system or a set of headphones to Monterey's output, use the bottom or OUT jack.

If you have an external CD-ROM drive, connect a one-eighth inch stereo audio cable from the audio output of your CD-ROM drive to Monterey's AUX input.

To record from your CD-ROM, plug into the IN input.

NOTE: These inputs are at line level and cannot be used for an unamplified microphone. There is an internal connector for users with internal CD-ROM drives. (The internal CD-ROM Audio Connector is shown in Appendix B—Technical Data.) Adapter cables are available as an option for popular CD-ROMs from Turtle Beach Systems. See the accessories sheet in the Monterey box.

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Chapter Two—Software

This chapter assumes you understand Windows terms like launching applications and clicking the mouse button. If you do not understand these terms, consult a Windows manual for basic operating instructions. Briefly, to launch an application in Windows' Program Manager, point at its onscreen icon and click twice, quickly, on your pointing device.

If the application you need to start is not installed in the Program Manager as an icon, you can launch it by clicking on Run in the file menu and then typing the program's path and filename.

Installing the Software

Monterey requires Windows 3.1 or greater in order to operate. If you have not already done so, install Windows 3.1 or greater on your PC. See the instructions accompanying your copy of Windows for the proper installation procedure. For the remainder of this manual, any version of Windows 3.1 or greater will be referred to as Windows.

To install Monterey software:

1. Insert Monterey's installation diskette into either drive A or B.

2. Run Windows.

3. Select Run from the Program Manager's File menu, and type **A:SETUP** (or **B:SETUP**). Click OK.

4. Follow the directions on the screen.

Before you do anything else...

Check the program group for a README.DOC icon. If you find one, view or print the file; it includes any changes made to Monterey since this manual was printed.

Installing Wave SE

To install Wave SE on your computer:

1. Run Windows.

2. Insert the Wave SE diskette into drive A. (Substitute the drive you use throughout this installation.)

3. Click Run from the File Menu.

4. Type **A:SETUP** to run the setup program.

5. Follow the onscreen prompts of the Wave SE install program.

6. Exit Windows and restart to properly initialize Wave SE.

Using Monterey Setup

Monterey comes with a driver setup utility that can be run from the Windows control panel. To initiate:

1. Run Control Panel and double click on the Drivers applet.

2. Select Turtle Beach Tahiti Wave, MIDI, & Aux. (You should then see the Setup button enable.)

3. Click on Setup and you'll see the Tahiti Setup dialog.

NOTE: The dialog lists the possible port addresses (This must match your setting of the port switches.), interrupt level, and memory window. Changes in this dialog take effect the next time you run Windows. If you are trying different interrupts or memory windows, remember to restart Windows between attempts.

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Chapter Three—Final Check

Checking Your Monterey

After installing driver software, it's a good idea to make sure everything is correctly configured and running.

.WAV File
Playback

First, follow these steps to verify proper driver installation:

1. Run Windows.

2. Open the Accessories Windows from Program Manager.

3. Launch Media Player from Accessories.

4. Select Sound in the Device menu. This will bring up a file dialog containing .WAV files. Select one and click OK.

5. Click on the play button. You should hear the system sound you selected in the file menu.

NOTE: The .WAV files supplied with Windows are very small and poorly recorded, so don't worry about sound quality at this time.

MIDI File
Playback

Certainly the next thing you will want to do is hear Monterey's awesome audio quality. To play a MIDI (.MID) file:

1. Open the Accessories Window from the Program Manager.

2. Launch Media Player from the Program Manager.

3. Select MIDI Sequencer from the Devices Menu.

4. Open any .MID file from Media Player. (CANYON.MID is supplied with Windows.)

5. Click Play to hear the file. You can adjust the playback level by running Monterey's mixer applet.

CD-ROM
Playback

Finally, test the playback of the audio CD. If you connected the CD-ROM's audio to Monterey, test the playback by putting an audio CD in the CD-ROM drive and launch media player. Select CD Audio and click Play.

External
CD Play-
back

If you are using an external CD player, follow these steps:

1. Connect the external cord from your compact disc player to the AUX on the back panel of Monterey.

2. Select Media Player from the Control Panel.

3. Select Devices from the Media Player panel.

4. Click CD Audio.

5. Click Play.

Monterey Demonstration

To demonstrate the sound capabilities of Monterey, execute the demonstration application by double clicking on the demonstration icon labeled Rio Demo in the Monterey program group.

To listen to one of the four choices, select either Jazz, Rock, New Age, or Orchestral and click on the play button.

To listen to a different selection while a selection is playing, click on the new selection then click on the play button.

Click on the stop button to cease playing your selection.

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# Chapter Four—Connecting Your PC to an External MIDI Source

Insuring proper connection between your PC and external MIDI sources can alleviate many of the headaches associated with sequencers, external keyboards, and your PC. The three setups used are a basic setup for the Monterey synthesizer, a setup for use with an external keyboard, and a studio setup using a keyboard and a second module.

For sequencers with multi-port configuration capabilities, such as Cakewalk and Master Tracks Pro, necessary adjustments can be made under the MIDI Devices menu of your sequencers. Use the following steps for the setup of your choice.

Monterey
Setup

To setup the Monterey synthesizer:

1. Select the MIDI Devices menu in your sequencer.

2. Click on Tahiti External In from the In column.

3. Click on Tahiti Header Out from the Out column.

4. Follow the diagram below for connecting your keyboard and PC.
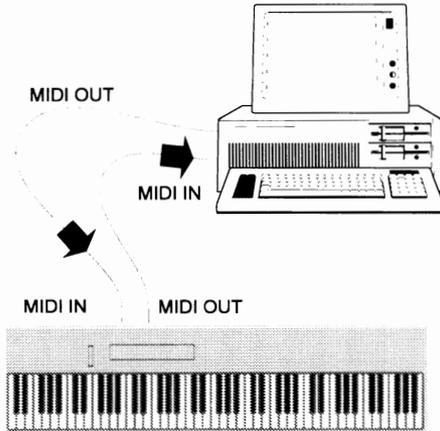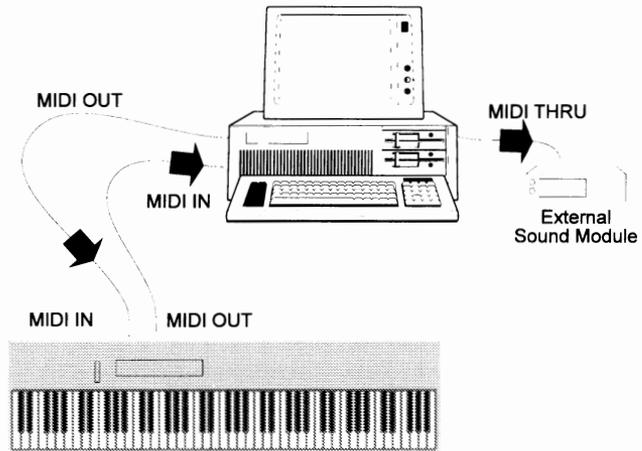

Follow this diagram to setup the Monterey synthesizer and to setup an external keyboard.

External
Keyboard
Setup

To setup an External Keyboard (In or Out):

1. Select the MIDI Devices menu in your sequencer.

2. Click on Tahiti External In from the In column.

3. Click on Tahiti External Out from the Out column.

4. Follow the above diagram for connecting your keyboard and PC.

Follow this diagram for a studio setup.

Studio Setup

To setup for Studio use:

1. Select the MIDI Devices menu in your sequencer.

2. Click on Tahiti External In from the In column.

3. Click on Tahiti External Out, Tahiti External Thru, and Tahiti Header Out from the Out column. Sequencers with less than three ports will not accept all three choices.

4. Follow the above diagram for connecting your PC and keyboard.

Multiple Settings Within Monterey

Some MIDI sequencers/players, such as Windows Media Player, do not allow for multi-port configuration. But you can still have multiple settings within the 16 channels of the MIDI Mapper in Monterey. (The default setting in the MIDI Mapper sets Tahiti as the port name for all 16 channels.)
To adjust this setup:

1. Select the Main Control Panel.

2. Select MIDI Mapper.

3. Select the port name you wish to change by clicking on the corresponding arrow.

4. Select the new port name.

NOTE: The Patch Map name should be set to none, except for Channel 10, the General MIDI channel for percussion, which can be set to the percussion device. No changes should be made to this channel.

Chapter Five—Quick Start

Chapter Five offers quick step-by-step instruction on how to
assign .WAV files to system sounds and set up your own
samples. The Synthesizer Control Panel is discussed in depth in
Chapter Six of the User's Guide.

Assigning .WAV Files to System Sounds

Windows gives your PC the ability to play sounds in response to user activity. To set up:

1. Launch Main from Program Manager.

2. Launch Control Panel from Main icon group.

3. Launch Sound from the Control Panel icon group.

4. Select sounds from the files window, using the Test button to audition the sounds.

5. To record your own system sounds use the included Wave SE application or the Windows' Sound Recorder applet.

NOTE: Turtle Beach also markets *The Turtle Tools for Multimedia*. This software program allows you to attach sounds and MIDI files to numerous Windows actions, not just the small list supported by Microsoft.

Setting up Your Own Samples

The Synthesizer Control Panel allows you to adjust settings on Monterey. If you have added a SIPP memory module, you can load samples into Monterey's memory from disk, replace any of the 128 General MIDI instruments with one of the uploaded samples, view Monterey's memory resources, and save/load your instrument setups (called WaveFront Sample Sets) through the Control Panel.

Follow this procedure to set up your own samples:

To Load
Sample

1. Record or obtain all .WAV files you intend to use as replacements for the MIDI programs in Monterey and place them in a specific directory on your hard disk (such as C:\WAVES).

2. Define two (2) loop points for each .WAV file using Wave SE. This step is not necessary but recommended, and is explained in the Wave SE manual.

3. Click on the **SampleStore** button in the Synthesizer Control Panel for each .WAV file to be loaded into Monterey's memory. Assign each to an initial General MIDI instrument.

To Edit Sample

4. Click on the **Edit** button.
 For each Sample Name:
   a. Adjust the volume.
   b. Adjust root key selection.
   c. Specify General MIDI instrument to replace.
   d. Click on the **Assign** button.

5. Use the **MousePlayer**, a sequencer, or a keyboard, to review the replacement sounds of the instruments.

To Save Sample

6. Click on the Save button in the Control Panel's main screen to save the current setup into a .WSS file for future use.

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Chapter Six—Applets

Monterey is equipped with several applets or small programs to make your use easier and more productive. This chapter explains the use of each of these applets in detail. The supplied Windows applications include:

• Synthesizer Control Panel.

• Turtle Beach **MousePlayer**.

• An audio mixer that controls the audio levels of Monterey's various sound sources.

• A professional-grade input level meter for use when recording from external audio sources.

• A MIDI patch bay that sets up the connections between Windows, the Monterey synthesizer, and the optional MIDI connector on Monterey's rear panel.

• A diagnostics check for Monterey's hardware for proper operation.

• Wave SE. (See the Wave SE User's Guide for general operating procedures.)

Synthesizer Control Panel

The Synthesizer Control Panel allows you to adjust settings on the Monterey synthesizer. The Control Panel contains buttons that can perform the same functions as the items in the pull-down menus of this applet.

If you have not installed a SIPP memory module on your PC, the SampleStore and edit features will not be available.

Control Panel Buttons

The **SampleStore** button is equivalent to selecting Store under the Sample menu.

The **Edit** button is equivalent to selecting Edit under the Sample menu.

The **Save** button is equivalent to selecting Save under the File menu.

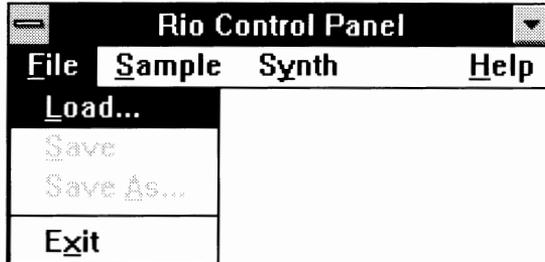The **Load** button is equivalent to selecting Load under the File menu.

The **Output Level** adjusts overall output. Output level indicators show the current volume of the synthesizer. Adjust the slider with the mouse or PgDn, PgUp, Down Arrow, and Up Arrow keys. The clip indicator illuminates when the output level passes maximum.

The **FX** button is the equivalent to selecting FX (Effects) under the Synth menu.

The **Resources** button is equivalent to selecting Resources under the Synth menu.

The **Clear** button is equivalent to selecting Clear from the Synth menu.

Pull-Down Menu Items

```
┌─────────────────────────────────────────────────┐
│ ▬         Rio Control Panel              ▼ │
├─────────────────────────────────────────────────┤
│ File   Sample   Synth              Help │
├──────────────────┐                              │
│ Load...          │                              │
│ Save             │                              │
│ Save As...       │                              │
├──────────────────┤                              │
│ Exit             │                              │
└──────────────────┘                              │
```

File:Load   **Load** retrieves a WaveFront Sample Set file with the .WSS extension from disk. A WaveFront Sample Set file contains the sample, patch, and program information necessary to load .WAV files into Monterey, and substitutes them for General MIDI instruments.

In the dialog box, select the WaveFront Sample Set file to load. The application loads the file and the associated .WAV files from disk. If the .WAV files are not in the expected locations, are corrupted, or Monterey becomes low on memory, the application alerts you to the problem and prompts to continue or abort the loading operation.
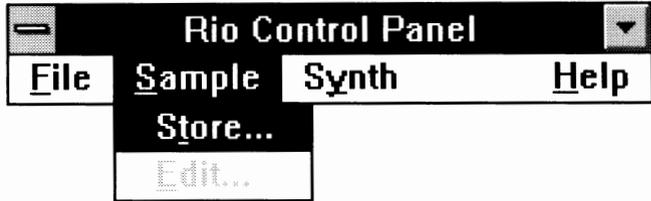
File:Save   **Save** stores the current Monterey configuration (.WAV, patch and program information) to the open WaveFront Sample Set file. If the current configuration isn't associated with an .WSS file, the application displays a Save As dialog box and you must enter a .WSS file to save the current configuration. If the .WSS file already exists, the application displays an overwrite confirmation dialog.

File:Save As   **Save As** saves the current Monterey configuration to a WaveFront Sample Set file you specify. If the .WSS file specified exists, the application displays an overwrite confirmation dialog box.

File: Exit   **Exit** allows you to leave the Synthesizer Control Panel.

```
┌──┬────────────────────────────────────┬──┐
│ ─ │        Rio Control Panel         │ ▼ │
├────┬────────┬──────────┬───────────────┤
│ File │ Sample │ Synth    │        Help   │
└────┴────────┴──────────┴───────────────┘
        │ Store... │
        ├──────────┤
        │  Edit... │
        └──────────┘
```

Sample: **Store** uploads a .WAV file (or sample) into Monterey and
Store   assigns it to a General MIDI instrument. Clicking on the
             SampleStore button in the Synthesizer Control Panel is
             equivalent to this menu selection.

             Up to 256 patches and 512 samples can be stored in Monterey's
             memory, but it is important to remember that stereo .WAV files
             occupy two (2) sample and two (2) patch spaces, while monau-
             ral files occupy one (1) sample and one (1) patch space. The
             General MIDI sample set occupies 205 patches and 268 samples.
             If a .WAV file is detected as a stereo file, you can load the
             sample as a stereo or mono sample. While the .WAV file is being
             uploaded to Monterey, a status meter displays upload progress
             and the cursor changes to an hourglass.

             To store:

             1. Press the **SampleStore** button.

             2. Select the .WAV file to be uploaded to Monterey.

             3. Select the General MIDI instrument to be replaced from the
             SampleStore dialog box.

4. If you are assigning a sample to a General MIDI instrument that has been replaced, an overwrite confirmation dialog will prompt you to overwrite the assignment. Clicking OK uploads the sample overwriting the assignment, while pressing Cancel returns you to the SampleStore dialog box.

NOTE: If you click OK, the overwritten sample is placed in <No Assignment>. This means the sample is still in Monterey's memory but no longer replaces a General MIDI instrument.

5. A status meter will appear notifying you of the progress made during sample loading. You may not perform other operations on your computer while a sample upload occurs.

Sample: Edit

Edit assigns a General MIDI instrument, volume, and root key selection to each .WAV file or deletes a General MIDI assignment. Clicking on the **Edit** button in the Control Panel is equivalent to choosing this menu selection.
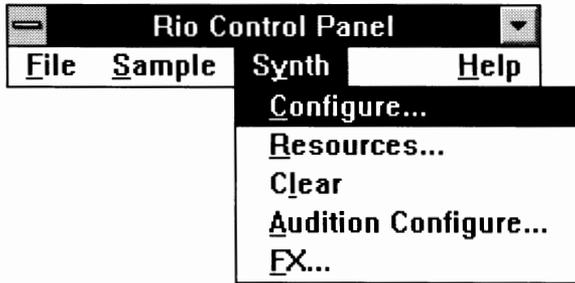
To reassign a .WAV file to a different General MIDI instrument or to <No Assignment>:

1. Select the sample to be reassigned and the new General MIDI instrument assignment in the Edit dialog box. (<No Assignment> simply retains the sample in Monterey's memory, but does not make use of it.)

2. Adjust the volume and the root key by using the slider controls.

3. Click the **Assign** button once the parameters are set to the right values. This stores all changes in the General MIDI instrument location, including default values for all other program and patch parameters, such as envelope and LFO data.

4. To delete samples and restore the old configuration, select the sample and click the delete button.

```
┌──────────────────────────────────────────┐
│ ▬          Rio Control Panel           ▼  │
├──────────────────────────────────────────┤
│  File    Sample   Synth           Help    │
│                  ┌──────────────────────┐ │
│                  │ Configure...         │ │
│                  │ Resources...         │ │
│                  │ Clear                │ │
│                  │ Audition Configure...│ │
│                  │ FX...                │ │
│                  └──────────────────────┘ │
```

**Synth:
Configure**

Configure adjusts the voice bandwidth and master tune global synthesizer parameters. It also allows you to connect an external keyboard to the External In port and hear the synthesizer respond to your keyboard.

Voice bandwidth adjusts the 16 to 32 simultaneous voices used by Monterey via the slider control. The number of voices determines the available sample playback bandwidth, which varies from 33,075 Hz for 32 voices to 44,100 Hz for 24 voices.

Monterey's master tuning adjusts to 63 semitones (half steps) relative to A-440 Hz using the slider.

**Synth:
Resources**

Resources displays the available sample memory, patch spaces, and sample spaces on Monterey. Clicking on the **Resources** button in the Synthesizer Control Panel is equivalent to choosing this menu selection.

NOTE: Memory or sample RAM may run out before all patch and sample locations are used. This problem can be solved by (1) deleting unused samples from the sample RAM; (2) uploading samples of shorter length; and/or (3) purchasing more RAM, up to four megabytes, for Monterey.

Synth:Clear

Clear turns off the clip indicator above the level meters. The clip indicator illuminates when the output level passes a maximum reference level.

Synth:
Audition
Configure

Audition Configure allows you to select which MIDI In port will be used when the audition is enabled.

Synth:FX

FX allows you to select one of sixteen preset reverb effects or customize your own.

Using the FX Feature

Reverb is used to add spatial dimension to audio. This is accomplished by adding several delayed signals into the original audio signal to produce echoes and reflections. The output can simulate a room, closet, concert hall, or anything else in between. The end result is more colorful and realistic sounding music.

The FX feature offers sixteen preset reverb effects and a customized setting. To activate this effect, click on the FX button on the Synthesizer Control Panel or select FX from the Synth menu.

In the dialog box, select the preset reverb effect you desire and click OK.

Customiz-
ing Your
Own
Effects

The Synthesizer Control Panel allows you to adjust the five parameters of the reverb algorithm to create your own effects. You can save up to 16 customized effects. To activate:

1. Click on the FX button and the reverb dialog box will appear.

2. Click on Advanced in the dialog box, and controls for the five parameters will appear.

3. Adjust the five settings.

4. Click OK to activate the effect.

5. Save the effect if you wish to keep it. (The last reverb effect you create will be activated when you return to this feature.)

Mix
This parameter controls the amount of the reverberated signal which is heard at the output in proportion to the direct signal. As more of the output signal is run through the effect it is termed to be wetter mix. As more of the direct signal added to the output it is termed to be a dryer mix.

Room Size
This parameter controls the perceived room size of the effect. Increasing this value will increase the delay times, and thus make the audio sound like it is being produced in a larger room.

Absorption
This parameter controls the type of walls in the room. A high absorption will reduce the reflections, producing an effect as if the sound was played in a room with padded walls. A low absorption will increase the reflectivity, producing an effect as if the sound was played in a racquetball court.

Decay   The decay time is the time it takes for the reflections of one
               sound to die out. When this value is high, one sound will
               produce many reflections which will die out slowly. When it is
               low, the reflections will fade away rapidly.

Pre-Delay   This parameter controls the amount of time from when a sound
   is produced on the output until the result of the effect is heard.

```
┌─────────────────────────────────────────────┐
│ ▬        Rio Control Panel          ▼       │
│ File   Sample   Synth         Help          │
│                              ┌──────────────────────────┐
│                              │ Index                    │
│                              │ Product Support          │
│                              │ Using Help               │
│                              ├──────────────────────────┤
│                              │ About Rio Control Panel...│
│                              └──────────────────────────┘
```
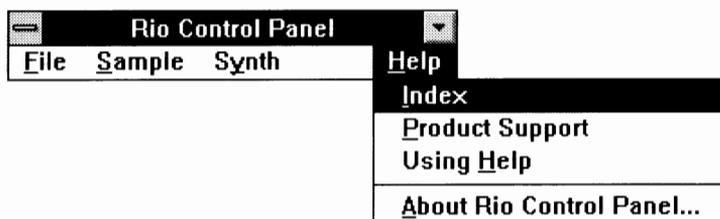
Help:Index   **Index** launches Help for the Synthesizer Control Panel. Press-
               ing F1 also launches Help.

Help: **Product Support** displays information about Turtle Beach
Product   Systems and Turtle Beach customer support. General informa-
Support   tion and customer support phone numbers and hours of
               operation are included in this display.

Help:Using   **Using Help** displays information on how to use the Windows
Help   Help System.

Help:About   **About Rio Control Panel** displays information about the
Rio Control   application and version.
Panel

MousePlayer

Keyboard

MousePlayer allows you to preview sounds generated by Monterey if you do not have an externally-connected MIDI keyboard. To play the screen's keyboard, position the hand cursor over the key and click the left mouse button. You can also play the keyboard using the "A" through "=" keys on the keypad. "A" is the lowest note and "=" is the highest. "U" is middle C (C4).

Drums

To play the drums, move the mouse to one of the eight drum pads and click the left mouse button. One alternate method to play the drum pads is using 'x' through '.' on your computer keyboard. The 'x' key is mapped to the first drum pad (upper left); the 'c' key is mapped to the second drum pad; etc. The drums can also be played on the number pad on your keypad.
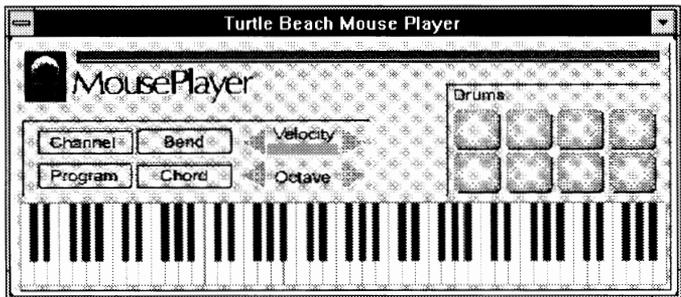
To change the sound for a given drum pad:

1. Click the right mouse button over the pad you want to change.

2. In the Drum Note dialog box, click on any drum sound to preview.

3. Click on OK to assign the selected sound to the drum pad.

Mouse-Player Features	**MousePlayer** offers these options to further enhance the quality of your sounds:

Channel selects the output MIDI channel (1-16).

Program opens a dialog box providing a list of possible programs or instruments to play.

Bend chooses keyboard behavior when the left mouse button is pressed and moved horizontally across the keyboard. Choose glissando to rapidly slide across the keyboard, or bend to change the pitch of the note you are playing.

Chord chooses a chord quality for any note on the keyboard. Choices include none, major, minor, seventh, minor seventh, fifth interval, and octave interval.

Velocity changes the loudness of the note. Auto allows the velocity to vary depending on where you click on a piano key. For example, clicking toward the front edge of the key produces more volume. In the Auto mode, the velocity screen is green. Any other setting for velocity (1-128) will set it to a fixed value and the velocity screen will be red.

Octave opens a dialog box that allows you to change middle C (C4) on the keyboard to the octave above or below its normal position.

Using the Mixer

The mixer applet allows you to easily control the level of the various audio sources that exist in Monterey. In normal use, you can have the mixer running minimized to control levels quickly in any Windows application. To do this, simply drag the Mixer icon into the AutoStart folder on your Windows desktop.
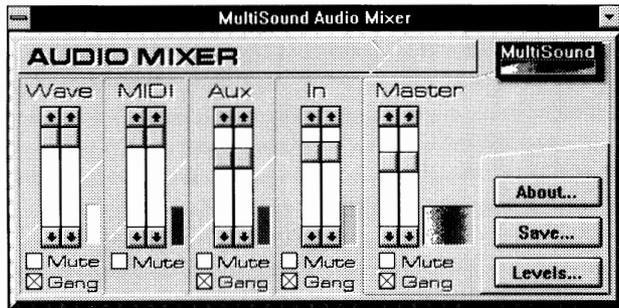
Mixer
Features

The mixer provides level control for Monterey's four audio sources—Wave, MIDI, Aux, and In.

Wave control levels for any .WAV digital audio files.

MIDI controls Monterey's MIDI synthesizer. Although this is a stereo device, the left and right channels cannot be controlled individually.

Aux controls any audio source plugged into the AUX input on the back of Monterey.

In controls any audio source plugged into the IN input on the back of Monterey.

The **Gang** buttons beneath the level sliders can be used to make both left and right sliders track together. To adjust the balance between left and right, disable the gang option, set the balance, then re-enable the gang option.

The **Mute** buttons provide a quick way to turn off sound sources while retaining the setting of the level faders.

The **Save** button allows current mix settings to remain the same the next time you start your Windows system.

The **Levels** button sets the input level of both the Aux and IN sources. (For an explanation of setting levels, see the Level Adjustments section below.)

To close the Mixer, select Close from the Windows system icon at the upper left of its window.

Level Adjustment

Since Monterey can handle both low and high level inputs, the Level Adjustment option optimizes Monterey's inputs for the type of equipment you are using.
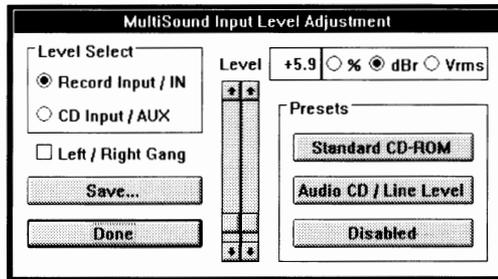
If you are using an internal or external CD-ROM, set the AUX input level to the normal CD-ROM level:

1. Click on CD Input/Aux under Level Select.

2. Click on the Standard CD-ROM button.

If you are using stereo equipment like a tuner, cassette deck, or audio CD player, click on Audio CD/Line Level button to set the input level for line level sources.

NOTE: These preset values are not absolutes. The real output levels may vary from manufacturer to manufacturer.

Record
Input
Level

The record input has a much wider gain range than the AUX input. The preset level buttons work the same with the record input as with the AUX input.

NOTE: These buttons are only presets. You can trim the input level by adjusting the input level faders. The calibration of the levels can be set to a percentage level of full gain, in decibels where zero (0) dbs equals one (1) VRMS or RMS Volts.

Click on **Save Levels** to save your input levels so they become the power-up defaults. The next time you start Windows, your input levels will be returned to their saved state.

Click on **Disabled** to use the sliders manually to optimize the input level to the source level.

Using Record Prep

The Record Prep applet is designed to allow the input level to be properly set when using Monterey's recording functions.

Unlike any other sound board we're aware of, Monterey can actually sense levels higher than digital clipping. The meters on the Record Prep applet show levels up to +3 db and also have separate peak hold meters that track the highest level in a recording. Click **Reset Peaks** to reset the peak hold values to their minimum (-90 db).

A unique feature of the Record Prep applet is that it constantly monitors incoming data for peaks. With this, you can run the applet and minimize it to reduce CPU overhead for redrawing the meters. When finished recording, you can maximize the Record Prep applet and it shows the maximum input level since the last time you clicked on **Reset Peaks**.
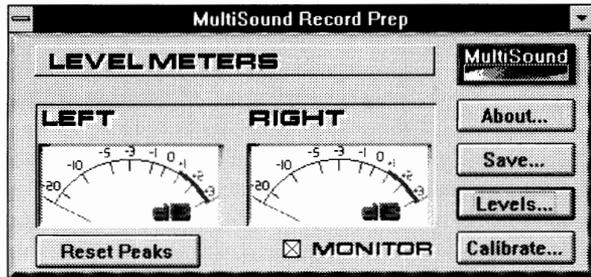
Record Prep   The **Monitor** option allows the audio being recorded to be
Features   monitored through Monterey's output. If this option is dis-
               abled, no sound will be echoed from the record input to the
               output.

               Levels operate exactly the same as previously mentioned, but in
               conjunction with Record Prep you can adjust the input level in
               real time and see the effect on the meters.

               Calibrate selects the sample rate that you plan to use for
               recording. Monterey can calibrate the analog to digital convert-
               ers to match the input.

               Line In should be activated if your source equipment has noise
               or DC offset problems.

               Analog Ground calibrates to absolute ground. Make sure your
               source is connected, but not making any sound before perform-
               ing the calibrations.

               Save captures the current settings for your next session.

Using the MIDI Patch Bay

This applet controls the routing of MIDI signals between
Windows, the Monterey synthesizer, and the optional external
MIDI connector. You can select between two incoming MIDI
signals—via the Monterey synthesizer or an external synthe-
sizer—and three outgoing signals—the Monterey synthesizer,
an external synthesizer, or a second module.

A second routing applet, which sends the MIDI signal from an
internal synthesizer to the Monterey synthesizer is also dis-
cussed in this section.
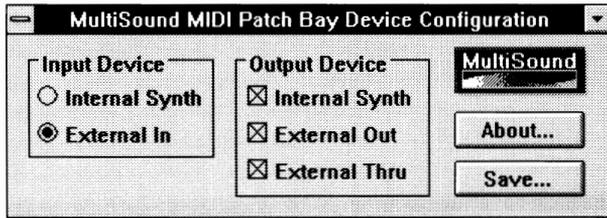
The first column in the MIDI Patch Bay applet selects the origin
of incoming MIDI data. Select Internal Synth if the data is
coming from the Monterey synthesizer or any other synthesizer
connected to Monterey. Select External In if this data is coming
from an external synthesizer.

The second column allows you to choose the destination of the
MIDI signal. External connections can be made in any combina-
tion. Select Internal Synth to send the signal from an external
keyboard to the Monterey synthesizer. Select External Out to
send the MIDI signal from the Monterey synthesizer to an
external keyboard. Select External Thru to send the signal
though the PC to a second module.

MIDI Thru
Utility

As shipped from the factory, Monterey sends incoming MIDI information from the rear MIDI connector to Windows and sends outgoing MIDI information to both the synthesizer and the rear MIDI connector. This is the correct setup for both multimedia playback purposes and musical authoring with sequencer programs. The only time you might want to change this, is if you want your synthesizer to communicate with an external MIDI device.
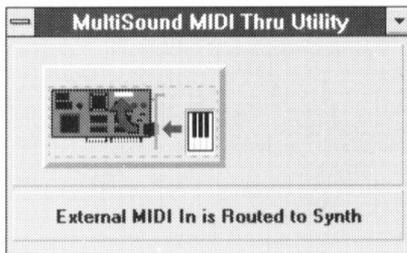
To access the synthesizer remotely, select the TBS ExtIn icon and click on the keyboard. This connects the synthesizer's input and output to the rear connector.

Using the Diagnostics

Hopefully, you will never need to run the Monterey diagnostics. But they provide you (and our customer support staff) with important information on possible conflicts and hardware problems. The diagnostics are provided in both DOS and Windows versions, since there are situations that Monterey's Windows driver will not be able to execute. The information provided by the two diagnostic versions is the same.

DOS Diag-
nostics

To run the DOS diagnostics:

1. Make sure you are in the MSNDAPPS directory and type: MSNDDIAG at the DOS prompt.

2. Locate MSNDWIND.EXE

3. Launch it from the Program or File manager.

Windows Diagnostics

To run the Windows diagnostics:

1. Click on the MSNDWIND icon in the Monterey Group.

Chapter Seven—Applications

Recording & Playing Sound

One of Monterey's primary functions is to record and play back digital audio, using the hard disk for storage. There are some tricks you should know before recording with Monterey.

Digital Audio's Data Requirement

At its highest quality level, Monterey produces data at a rate of 10 megabytes per minute! Remember to account for this when starting a recording project. The table on the next page lists the various sampling options supported by Monterey with the size (per minute) of the sound data.

Quality of Recording	Amount of Hard Drive Used
11 kHz, 8 bit, Mono	661K/Minute
11 kHz, 8 bit, Stereo	1.3 Meg/Minute
11 kHz, 16 bit, Mono	1.3 Meg/Minute
11 kHz, 16 bit, Stereo	2.6 Meg/Minute
22 kHz, 8 bit, Mono	1.3 Meg/Minute
22 kHz, 8 bit, Stereo	2.6 Meg/Minute
22 kHz, 16 bit, Mono	2.6 Meg/Minute
22 kHz, 16 bit, Stereo	5.3 Meg/Minute
44.1 kHz, 8 bit, Mono	2.6 Meg/Minute
44.1 kHz, 8 bit, Stereo	5.3 Meg/Minute
44.1 kHz, 16 bit, Mono	5.3 Meg/Minute
44.1 kHz, 16 bit, Stereo	10.5 Meg/Minute

Data Compression

In an attempt to get more usable recording time on your hard disk, you might be tempted to try one of the "on the fly" compression utilities on the market which advertise they double hard disk space by compressing data the instant it is sent from the PC, and decompressing it as it is read from the hard disk. This works great for spreadsheets, word processors, and some other PC applications. There are two reasons these compression products do not work well with Monterey.

The first is the time overhead required to compress the data in order to write it to disk. The software-based products in particular add about 15 percent overhead to disk reads and writes. This means there is less time for actually writing the data to the disk.

The second reason is the compression algorithms in these products work by identifying patterns in the data and compressing them into a smaller storage area. Compression is optimized for standard patterns found in text and executables. These patterns are not found in digital audio data, and therefore will get almost no compression. In fact, several compression utilities actually increase the size of the file by trying to compress it. If you have a compressor such as DOS 6.0 Doublespace, you should record to your uncompressed drive.

Microsoft recently announced a standard for audio data compression called Microsoft ADPCM. The drivers shipped with Monterey play this form of compressed file, decompressing the sound with the onboard DSP in real time. This is an example of the forward thinking that went into the Monterey's engineering.

Limitations of DOS

There are some limitations that exist in the MS-DOS operating system that can affect digital audio recordings.

When recording CD-quality sound to the hard disk, the PC must write 176,000 bytes of data to the hard disk per second! This puts a heavy demand on your PC's disk drive. In certain circumstances the hard disk may not be able to accept incoming data fast enough, causing audible "stuttering" on the recorded file.

Optimizing your Hard Disk

The most common cause of record errors is fragmentation of the hard disk. Fragmentation means files are strewn all over the disk's surface. When writing, the disk constantly seeks for places to write. Errors occur when the drive takes too much time seeking and not enough time writing. When this happens, Monterey has no choice but to dump the incoming digital audio data until the PC is ready to accept more.

If you experience this problem, use a disk defragmenting program like SpeedDisk, Compress, or Disk Optimizer. These programs gather data on a hard disk in a large contiguous area,

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leaving a large open area for any new recording. As an added by-product, Windows and other applications will run faster because of reduced access time.

Recording and Playing .WAV Files in DOS

Monterey includes utilities to record and play .WAV files while in DOS. This allows you to play .WAV files from DOS applications like GRASP or Autodesk Animator. These utilities can also be used if your computer is not fast enough to record sound from within Windows.

NOTE: These programs are strictly DOS applications. They cannot be run within a DOS window in enhanced mode Windows.

MREC records sound files and MPLAY allows you to play sound files.

To use any of the DOS utilities with the default settings, simply enter MREC or MPLAY followed by a full path name of the .WAV file you wish to record or play.

Using
MREC

The defaults for DOS recording are 16 bit, stereo, 44.1 kHz recording, but you can instruct the program to record any standard .WAV file by using these command line switches:

/Sn n is for sample rate. Possible values are 11,025, 22,050, and 44,100. (When entering these values, delete the comma.)

/Cn n is for channels. Possible values are 1 for Mono or 2 for Stereo.

/Bn n is for bits. Possible values are 8 and 16.

/N   record raw PCM data with no .WAV header.

You can opt to record only the raw PCM data, which allows easy use of the files with other digital audio packages.

To record a 44.1 kHz stereo (default setting) soundfile:

1. Set your recording level in Windows using the record prep applet.

2. Exit Windows.

3. Type: **MREC** *SoundfilePathName*

To record an 11 kHz, 8 bit mono .WAV file:

1. Set your recording level in Windows using the record prep applet.

2. Exit Windows.

3. Type: **MREC** *SoundFilePathName* /S11025 /C1 /B8

Using MPLAY

The MPLAY file player can play .WAV or .PCM files. To play a .PCM file, you must supply the proper parameters in the DOS command line. The MPLAY takes these commands:

/Sn	n is for sample rate. Possible values are 11,025, 22,050, and 44,100. (When entering these values, delete the comma.)
/Cn	n is for channels. Possible values are 1 for Mono or 2 for Stereo.
/Bn	n is for bits. Possible values are 8 and 16.
/P	Pause for keystroke before playback.

To play a 22 kHz, 8 bit Mono PCM file, type: **MPLAY** *SoundFilePathName* **/S22050 /C1 /B8**

If you are playing a .WAV file, you need not enter the parameters, MPLAY will get them from the .WAV file header.

To play the .WAV file, type: **MPLAY** *SoundfilePathName*

If your hard disk is badly fragmented, you may experience record errors reported by MRECORD. If this happens, defragment the disk using one of the defragmenting utilities previously described and try again.

Substituting Your Own Sample for One of the 128 MIDI Presets

If you installed a SIPP memory module onto your Monterey, you have the ability to play your own samples. For an example of this capability, follow these steps to replace Monterey synthesizer's patch 31—Distortion Guitar, with you own guitar sound.

1. Record yourself playing D above middle C onto your hard drive using Wave SE. Call it DGUITAR.WAV.

2. Set two loop points on the sample. Wave SE enables you to specify the section to be repeated and edit the sample. Refer to Wave SE documentation for explanation.

3. Send the sample data to the Monterey synthesizer using one of the following methods:

   a. In Wave SE, click on the Transfer to Sampler button.

   b. In the dialog box, choose D above middle C (62) as the root key and distortion guitar as the program number.

OR

a. Click on the **SampleStore** button on the Synthesizer Control Panel.

b. In the dialog box, choose DGUITAR.WAV and click OK.

c. In the next dialog box, choose the General MIDI instrument to replace (31) and click OK.

NOTE: If DGUITAR.WAV is a stereo file, the Control Panel will ask you if you wish to load the file as a stereo or mono sample.

4. Enable MIDI Thru for Monterey using one of the following methods:

a. Launch a sequencer. If you do not have a sequencer, see the **MousePlayer** Note following this step.

b. Under the MIDI devices option select Rio External In for input device and Sample Player for output device.

c. Choose patch 31 for the currently selected channel.

d. Plug the external keyboard's MIDI Out to Monterey's MIDI In, using the MIDI cable connected to the external MIDI port.

e. You should now be able to hear your sample respond to MIDI input.

OR

a. Choose Configure in the Synth menu and make sure the Audition Enabled box is checked.

MOUSEPLAYER NOTE: If you do not have access to a sequencer or keyboard, double click on MousePlayer. Click on program and choose Distortion Guitar. Due to the fact that you can only play this keyboard using the hunt-and-peck method, MousePlayer can supply the other notes of a chord. Click on chord and choose the type of chord to play. The key you click on the piano will be the root (lowest note) of the chord.

NOTE: If you uploaded the sample using the Control Panel, you might notice the note you are hearing is a whole step higher than the note you are playing. This is because when you loaded the sample, the Control Panel assigned the root key to a default of middle C. To remedy this, click on the Control Panel's edit button. In the Current File/Sample Name box, choose DGUITAR. Make sure the General MIDI Instrument lists 31-Distortion Guitar. Change the root key from C5 to D5 and make any additional adjustments. When all settings are correct, click on Assign and Done, and the synthesizer will respond correctly to each note.

5. Repeat steps one through four for each MIDI program you want to replace.

6. To save this configuration (or sample set) with the replaced program 31, choose either Save in the File menu or click on the Save button. For this example, type **RPLCGUIT.WSS**.

7. The next time you start your computer, launch the Control Panel, choose File:Load or click on the Load button, and choose RPLCGUIT.WSS to configure the synthesizer with the substitution you made for Distortion Guitar. To automatically set up the synthesizer using RPLCGUIT.WSS as the sample set, create an icon in the Startup group with the following command line **C:\RIO\RIOICP.EXE / MRPLCGUIT.WSS**.

8. To delete this configuration and restore the original configuration, pull down the Edit menu and select DGUITAR.WAV. Click the Delete button.

Chapter Eight—Troubleshooting

Listed in this section are some of the most commonly asked questions and problems addressed by our customer support team. Also addressed in this chapter are issues with CD-ROM drive .WAV playback, issues with memory managers like QEMM, 386MAX, or DOS/EMM386.EXE, and Warning, Error, and Fatal Error messages associated with the Synthesizer Control Panel.

If after reading this chapter you still have questions, contact our customer support line at (717)764-5265, or our fax line at (717) 767-6033. Our lines are manned between 9:00 a.m. and 5:00 p.m. Eastern Time.

To contact the BeachComber bulletin board or via Compuserve, see Appendix A—Technical Support Checklist.

Installation Questions

EMM-
Exclude

Question: When I install the Monterey drivers I get the message EMMEXCLUDE NOT AS EXPECTED. What does this mean?

Answer: When the Monterey driver installs, it puts an EMMExclude statement into your Windows SYSTEM.INI file. Because you don't want to interfere with any Windows setup, check SYSTEM.INI to make sure you are not installing the Monterey in a memory slot already excluded by something else in Windows. Before installing the Monterey driver, you may want to edit your SYSTEM.INI file. To do so:

1. Check the [386ENH] section for a statement like EMMEXCLUDE=D000-D7FF, the default memory address of the Monterey.

2. If you do find an EMMEXCLUDE= statement and have already partially installed the Monterey, scroll down to the section labeled [TAHITI.DRV].

3. Check the statement RAMADDR=.

4. If it has the same address as the EMMExclude, erase the EMMExclude and reinstall Monterey at a different address.

Lockup
When
Starting
Windows

Question: When I run my install and reboot the computer to start Monterey, my computer locks up. What should I do?

Answer: The most likely problem is a port address conflict. The default port address for Monterey is 290.

If your computer is locking up:

1. Shut down your PC and remove the cover.

2. Switch all four of the switches on the little red box on the Monterey card to the OFF position.

3. Turn on and reboot your computer.

If you CAN enter Windows:
4. Enter the Control Panel from your Main Window and double click on the Drivers icon.

5. Select Turtle Beach Tahiti Wave, MIDI, & Aux and click on Setup.

6. In the setup's Port section choose address 3E0.

7. At this time you will be prompted to restart Windows.

8. After re-entering Windows, enter the Monterey Window and double click on Diags. This will run the Monterey Diagnostics.

If you CAN'T enter windows after changing the switches:
4. Enter the DOS editor.

5. Edit the C:\WINDOWS\SYSTEM.INI file.

6. Delete the [TAHITI.DRV] section and any references to the tahiti.drv in the DRIVERS section.

7. Scroll to the [386ENH] section and delete the line EMMEXCLUDE=D000-D7FF. If you have changed the memory address of Monterey during your first installation, this statement will reflect the new memory address and not the default address of D000.

NOTE: Consult your computer's manual and the manuals for any other cards or devices you are using and make a list of their port, RAM, and IRQ addresses. With this list, you should be able to enter Windows, and upon installation of the Monterey's drivers and applications, change Monterey's addresses appropriately.

8. Make sure the switches on the Monterey's red port address box are set to the appropriate settings for the chosen port address.

Diagnostics Fail

Question: When I run diagnostics everything fails. Why?

Answer: You most likely have a port conflict. Refer to the answer to the previous question.

NOTE: If you wish to stay within the Windows environment to edit your files, use a program called SYSEDIT.EXE from Windows. It is not normally loaded upon installing Windows. Go to your File Manager, click on the Windows directory, then the System sub-directory. Look for SYSEDIT.INI and double-click on it. This will bring up four windows, AUTOEXEC.BAT, CONFIG.SYS, SYSTEM.INI, and WIN.INI. You may edit here as easily as in DOS.

Memory Errors

Question: When I run Monterey's diagnostics I get a memory conflict or a memory share error. What does this mean?

Answer: You either need to choose a new memory address or, in the case of a memory share error, properly exclude the memory address you have chosen. Monterey's default address is D000. If this address does not work for your computer and you have no idea what other memory space you have or what memory addresses are, try addresses E000, E800 or B000. NOTE: These are ZEROS not O's.

To change your memory address:

1. Enter your Main Program Group.

2. Open the Control Panel.

3. Open Drivers.

4. Select Turtle Beach and click SETUP.

5. Change the memory address (Mem Address).

6. Click Yes to Restart.

If you receive the message, EMMEXCLUDE NOT AS EXPECTED, edit the SYSTEM.INI files [386ENH] section:

1. Put a semicolon (;) in front of the EMMEXCLUDE= statement.

2. Save this change.

3. Repeat steps 1 through 6.

Share Error   The last part of the memory error is the Share error. In order to avoid this error, the CONFIG.SYS must be set up correctly. If you are using a high memory manager like QEMM or EMM386, you must put an exclude statement in your CONFIG.SYS file.

For example, If you are using EMM386, you may see:

DEVICE=C:\WINDOWS\EMM386.EXE

You should enter a line at the end of this statement beginning with X= and containing one of the following exclude lines:

B000-B7FF

C800-C7FF

D000-D7FF

D800-DFFF

E000-E7FF

E800-EFFF

Make sure that the first number in the exclude matches the Monterey's memory address. Consult the memory manager's manual for the proper exclude statement for your memory manager. After making this change, reboot your computer.

IRQ Errors   **Question:** When I run Monterey's diagnostics I get an IRQ error. How can I fix this?

Answer: To remedy this problem:

1. Enter the Windows Control Panel and double click on the drivers icon.

2. Select Turtle Beach Tahiti Wave, MIDI, & Aux.

3. Click on Setup.

4. In the Window labeled Interrupt, select another choice rather than the default of 10. In many machines IRQ 11 or IRQ 15 are good choices.

5. Restart Windows for this change to take effect.

Commonly Asked Questions About Monterey

Question: Does Monterey work in the DOS environment?

Answer: Yes. If you want to run DOS games, you can install a compatible card in your PC for the purpose. Do not install the SoundBlaster Windows driver if you want to retain Monterey's great Windows sound. With this configuration you will be able to play games in DOS and still have the best MPC card available for your more serious Windows applications.

Question: Is Monterey compatible with Adlib or SoundBlaster?

Answer: No. Monterey was designed specifically for use with the Windows 3.1 environment and is General MIDI compatible.

The design of Monterey's hardware is very different from a SoundBlaster or Adlib compatible card. These differences are precisely what provides you with superior hard disk recording capabilities. In the future, more and more software developers will be using MPC specifications for their games and other software, which will allow you to further utilize Monterey's superior sound.

Question: I can hear my record source (CD-ROM, tape deck, external CD player, etc.) but it does not record. What's wrong?

Answer: Check your input. If you have an internal CD ROM and you want to record with the Monterey, you should be connected to JP2 internally (this is the four pin jumper between the IN and the AUX jack) or externally to the IN input. Monterey is designed to record only from the IN and uses the AUX as an audio thru jack. This configuration has many uses when using Monterey in complex multimedia applications.

Question: Why can't I hear my record source through Monterey?

Answer: Check the mixer application and make sure the MASTER and IN are not muted and are turned up sufficiently.

Question: Why can't I get a good level with my microphone plugged into Monterey's IN input?

Answer: Monterey is designed to work with a line level input. Most microphones have a output significantly below this level. To use a microphone with Monterey, run it through a mixer with line level outputs, a microphone pre-amp, or a tape deck with microphone inputs and a line level output. Or purchase a cordless microphone—most are line level.

Problems and Solutions

Problem: No sound from Monterey.

Solution: Check that the amplifier is turned on and set to the correct source.

Check that the audio output cable is plugged into the jack labeled OUT.

Check that the output level slider is up in the Mixer applet.

Check that the mute button is disabled in the Mixer applet.

Problem: MCI (Media Control Interface) error message appears on the screen. For example: THE SPECIFIED DEVICE IS NOT OPEN OR IS NOT RECOGNIZED BY MCI. or CANNOT OPEN MCI DEVICE.

Solution: Check that the following drivers are installed using the control panel:

Turtle Beach Tahiti Wave, MIDI, & Aux...

Timer [MCI]

MIDI Sequencer [MCI]

Sound [MCI]

CD Audio (if you have a CD-ROM drive)

Problem: Installing Windows 3.1 over Windows 3.0 overwrites MIDIMAP.CFG. (This will cause MIDI sequences to play incorrectly.)

Solution: When updating Windows, make a backup of the MIDIMAP.CFG file or re-install Monterey applets after updating.

Problem: You are thrown out of Windows when trying to install the Monterey drivers, or Share errors appear in Monterey's diagnostics.

Solution: Check for memory and/or device conflicts in upper memory above 640K (addressed as $A000-$FFFF). If you used the factory defaults, Monterey's shared RAM window will be at segment $D000-$D7FF.

Problem: When installing from the Monterey drivers and applications disk the computer locks and has to be rebooted.

Solution: Don't Panic! You are experiencing an easily corrected conflict. The most likely problem is there is a memory share error. Monterey defaults to the RAM address of D000. To solve this problem edit the Windows initialization file using this procedure:

1. With DOS 5.0, type **EDIT C:\WINDOWS\SYSTEM.INI** at the C:> prompt.

2. Go to the end of the file and insert: **[MULTISND.DRV] RAMADDR=E800** (If the $E800 address is not available, the $B000 address is usually a good bet.)

3. Scroll up to the [386ENH] section.

4. At the bottom of the section insert: **EMMEXCLUDE=E800-EFFF** (or **EMMExclude=B000-B7FF**).

5. Put an exclude statement in your CONFIG.SYS file if you are using a high memory manager like EMM386, 386MAX, or QEMM.

Problem: When opening a Monterey application, an error message—MIDI DRIVER NOT INSTALLED—appears.

Solution: If a MIDI sequencer or any MIDI application has been installed after installing Monterey applications, the MIDIMAP.CFG file may have been overwritten. If you have not saved the previous MIDIMAP.CFG, reinstall Monterey drivers and applications. To do so, copy the MIDIMAP.CFG off the installation disk into the C:\WINDOWS\SYSTEM directory.

Problem: Not getting any input when recording.

Solution: Make sure that the sound source is plugged into the IN jack.

If you are using a microphone, run it through a pre-amp. The microphone level must be boosted to a line level to be recorded with Monterey. To do this, run the microphone into a cassette deck's MIC in, set the deck for record pause, and then run the deck's line out to Monterey.

If you still hear no sound, check the mixer applet and make sure the Master and IN are not muted. Also check the Record Prep application for adequate recording levels.

Problem: After booting or during operation the computer acts erratically or locks.

Solution: If possible, double click on the 'Diags' to see if there is a port address conflict. If so, change the address in setup and change the switch settings on the card. See the Installing the Hardware section of the user's guide for instructions on changing the port address switch.

CD-ROM Drive .WAV Playback

Playing high resolution .WAV files directly from a CD-ROM drive may lead to "stuttering." This is caused by insufficient data transfer from the drive and has nothing to do with your sound card. To eliminate this problem, copy the file to the hard disk. Turtle Beach sells a line of double-speed CD-ROM drives that play .WAV files with no stuttering.

EMM386/QEMM/386 Max Issues

If you are using an extended memory manager that operates outside the Windows environment, like QEMM, 386MAX, or DOS/EMM386.EXE, the memory manager must exclude the memory (RAM) that Monterey uses for its shared memory window.

If you are not using multiple configurations and not using 386MAX, this is done automatically by Monterey's SETUP.EXE program. If you are using multiple configurations in your CONFIG.SYS (you would see "menu" in the CONFIG.SYS file) be sure under one of the menu options to exclude from your memory manager the same address you chose for Monterey.

NOTE: If you are using 386MAX as your memory manager, consult your 386MAX user's manual to find out how to exclude Monterey's memory address.

It is possible that Video Capture, LAN, and other cards, as well as Shadow BIOS and other disk caches may be trying to refer-ence the same memory area as Monterey. Check the associated user manuals to determine the RAM address used. If another device is using the same address as Monterey, change Monterey's address using the following steps, assuming you are not using 386MAX or multiple configurations in CONFIG.SYS:

1. Insert Monterey's install disk.

2. From the File Manager, run SETUP.EXE from the install disk.

3. Choose Configure. A dialog box will display the present settings of Monterey's Port, IRQ, and RAM address.

4. Change the RAM address to an available one.

5. Follow instructions to exit Windows.

6. Reboot your computer.

To manually change follow these steps (For this example, Monterey is set to a RAM address of D000-D7FF, and you would like to change it to E800-EFFF.):

1. From the File Manager, run
   C:\WINDOWS\SYSTEM\SYSEDIT.EXE.

2. Bring the SYSTEM.INI window to the front.

3. Scroll down to the section that is labelled [MONTEREY.DRV].

4. Change RamAddr from D000 to E800.

5. Scroll up to the section that is labelled [386ENH].

6. Find EMMEXCLUDE=D000-D7FF and change it to
   EMMEXCLUDE=E800-EFFF.

7. Go into CONFIG.SYS and look for EMM386, QEMM, or 386MAX.

8. If you see EMM386 or QEMM change its X=D000-D7FF (or EXCLUDE=D000-D7FF) to X=E800-EFFF. If you are using 386MAX, consult its manual to make the exclusion change.

Warning, Error, and Fatal Error Messages

While using the Synthesizer Control Panel, you may encounter warning, error, or fatal error dialogs. These dialogs are intended to provide a message to the user as a result of some action performed.

A **warning** is the lowest level problem and is accompanied by a question requiring your decision. It indicates that you may cause a possibly irreversible configuration change or be a confirmation to continue a partially failed operation.

An **error** is a middle level problem and is accompanied by an exclamation point. It indicates that you attempted an operation that could not be completed. An error does not stop the Synthesizer Control Panel and no user decision is required.

A **fatal error** is the highest level problem and is accompanied by a stop sign. It indicates that an unrecoverable error occurred and the Synthesizer Control Panel cannot continue running A fatal error causes the Synthesizer Control Panel to shut down.

Warnings

W-1:
Replace sample for Program *programname* with Sample *samplename*?

Action: You attempted to store or assign a sample to program *programname* that has already been assigned with sample *samplename*. Pressing OK confirms overwriting the assignment and associating program *programname* with sample *samplename*. The sample that used to be assigned sample *samplename* after Pressing OK is not deleted but given an assignment of <No Assignment>. Pressing Cancel aborts the assignment or storing operation.

W-2:
Delete sample *samplename* from memory?

Action: You selected sample *samplename* and pressed the Delete button. Pressing OK confirms deletion of the sample from Monterey sample memory. Deleting the last sample in memory causes the Edit dialog to close and return the user to the Control Panel window. Once deleted, this cannot be brought back. Pressing Cancel aborts the delete operation.

W-3:
Problem encountered with WaveFront Sample Set upload. Continue attempting preset file upload?

Action: You attempted a WaveFront Sample Set upload and one of the .WAV files failed to load into the synthesizer. Pressing OK continues the WaveFront Sample Set upload while pressing Cancel aborts the upload operation. Pressing Cancel will not restore the synthesizer's state to the pre-WaveFront Sample Set upload condition.

W-4:
filename is a stereo file. Upload file as a mono sample?

Action: You selected a stereo file for storage. Pressing Yes uploads the file as a monaural sample, pressing No downloads the file as a stereo sample, and pressing Cancel aborts the upload operation. The Synthesizer Control Panel now considers the sample to be mono in .WSS files. It does not affect the original .WAV file.

W-5:
filename could take up to X minute(s) and Y second(s) to upload. Continue with sample upload?

Action: You selected a large file to upload as a sample and the Synthesizer Control Panel estimated the longest time it should take to upload the sample. The Synthesizer Control Panel displays this warning only when the expected upload time is

greater than one minute. Pressing OK uploads the file while pressing Cancel aborts the upload operation.

W-6:
Current configuration has not been saved. Save configuration in *filename*?

Action: You changed the current configuration of the control panel, did not save the settings and attempted to load a new .WSS configuration or exit. Pressing Yes saves the current configuration in *filename* and continues. Pressing No does not save the current configuration and continues. Pressing Cancel aborts the operation. If the *filename* is Untitled, the Control Panel will prompt you for a filename.

W-7:
Not enough samples to upload *filename* as a stereo sample. Upload as mono?

Action: There were not enough sample slots available to upload *filename* as a stereo sample, however, *filename* will fit as a mono sample. Pressing OK continues the upload, uploading *filename* as a stereo sample. Pressing Cancel aborts the upload operation.

Errors

E-1:
Not enough sample memory to store *filename* in RAM!

Problem: You attempted to upload a sample with more audio data than memory available in the synthesizer.

Remedy: Check the memory available for samples by pressing the Resources button in the Synthesizer Control Panel. The sample must contain less audio data than the amount of memory available in the synthesizer. Reducing the size of the sample can be achieved by:

• shortening the length of the sample to less than available memory by using Wave SE to trim the sample length;

- reducing the sample resolution (eight bit samples consume half the space of sixteen bit samples);
- reducing the sampling rate; or
- making the sample monaural if it is currently stereo.

E-2:
filename is too large! Cannot upload a sample over 1 megabyte in size.

Problem: You attempted to upload a sample with more than one megabyte of single channel audio data. Monterey accepts monaural samples with no more than one megabyte of audio data and stereo samples with no more than two megabytes of audio data.

Remedy: See remedy for E-1.

E-3:
filename cannot be found or is a corrupt .WAV file!

Problem: The file specified for uploading could not be found or you attempted to upload a .WAV file with corrupt data.

Remedy: Specify the accurate filename of the file to be uploaded and attempt to fix the .WAV file with corrupt data.

E-4:
filename is not a PCM .WAV file!

Problem: You attempted to upload a .WAV file that is not in a PCM (Pulse Code Modulation) format. The Synthesizer Control Panel does not support direct loading of non-PCM formatted files.

Remedy: Use Wave SE to import the .WAV file from the non-PCM format to a PCM format. Once the .WAV file is in the PCM format, attempt the upload again.

E-5:

Not enough patches or samples available to upload *filename* as a stereo sample!

Problem: You attempted to upload a sample that would take up more patches or samples than the patches or samples available.

Remedy: This happens when you attempt to upload a stereo sample and there is only one available patch or sample left. Free up some patches by deleting a user loaded sample from memory and try to upload the sample again. To verify that there are enough patches left, check the synthesizer's resources by pressing the **Resources** button in the Synthesizer Control Panel window prior to uploading a sample.

E-6:

Could not upload sample—communications error!

Problem: The Synthesizer Control Panel could not establish communications with the synthesizer and failed to upload a sample.

Remedy: Repeat the offending operation once more. If this error message comes up again, exit the Synthesizer Control Panel. Restart the Control Panel again. Otherwise, shut the computer down properly and reboot.

E-7:

Could not upload program—communications error!

Problem: The Synthesizer Control Panel could not establish communications with the synthesizer and failed to upload a program.

Remedy: See remedy for E-6.

E-8:

Could not upload patch—communications error!

Problem: The Synthesizer Control Panel could not establish communications with the synthesizer and failed to upload a patch.

Remedy: See remedy for E-6.

E-9:
Could not download program—communications error!

Problem: The Synthesizer Control Panel could not establish communications with the synthesizer and failed to download a program.

Remedy: See remedy for E-6.

E-10:
filename cannot be found!

Problem: The WaveFront Sample Set (.WSS) file specified by the user had part or all of the path invalid and the file could not be found.

Remedy: Check the path and filename and ensure they specify a valid and existent WaveFront Sample Set file.

E-11:
filename has an invalid path!

Problem: The WaveFront Sample Set (.WSS) file specified by the user had part or all of the path invalid and the file could not be found.

Remedy: See remedy for E-10.

E-12:
There are too many files open!

Problem: The system has too many open files in use.

Remedy: DOS has a limit on the number of files it can open simultaneously. This number is specified in the FILES=xx line of the computer's CONFIG.SYS file. If you continue to get this message, increase the number of open files by adjusting the FILES=xx number upwards. Remember to shut down your computer properly and reboot for any CONFIG.SYS modifications to take effect. Consult the Files command section of your DOS manual.

E-13:
filename cannot be accessed!

Problem: The system cannot access the specified file.

Remedy: There is a system problem that prohibits the file from being accessed. Check the computer's manual to make sure all switches and settings are properly set.

E-14:
Bad disk seek!

Problem: The system cannot properly open your file.

Remedy: There is a DOS or Operating System problem that prohibits the file from being accessed. Check the computer's manual to make sure all switches and settings are properly set.

E-15:
Hardware error!

Problem: The system cannot access the specified file.

Remedy: There is a system hardware I/O problem that prohibits the file from being accessed. Check the computer's manual to make sure all switches and settings are properly set.

E-16:
Sharing violation!

Problem: The system cannot access the specified file because SHARE.EXE was not loaded or the file is in use by another application.

Remedy: Ensure that the file is not being used by another application and/or not shared in the AUTOEXEC.BAT file.

E-17:
Generic file error!

Problem: The system cannot access the specified file.

Remedy: There is a generic and unspecifiable system problem that prohibits the file from being accessed. Check the computer's manual to make sure all switches and settings are properly set.

E-18:
filename is not a valid WaveFront Sample Set!

Problem: The specified file is not in a valid WaveFront Sample Set data format.

Remedy: Check the path and filename and ensure that they specify a valid and existent WaveFront Sample Set file.

E-22:
Invalid command line parameter!

Problem: The Control Panel didn't recognize one or more of the command line parameters used to start the Control Panel.

Remedy: Check the command line parameters and ensure that they are correctly used.

E-23:
filename is already in the synth!

Problem: The .WAV file being loaded has the same name as one of the .WAV files loaded in the synthesizer.

Remedy: Rename the .WAV file being loaded to a name not being used in the synthesizer or delete the same named sample already in the synthesizer.

E-24:
filename is not in the synth! Can't upload new loop parameters!!

Problem: A sample header was being loaded from Wave SE for a wave file that wasn't in the synthesizer.

Remedy: Upload the .WAV file into the synth using Wave SE's **SampleStore** function. Any subsequent loop point changes will be uploadable.

Fatal Errors

FE-1 FATAL ERROR:
Couldn't find synthesizer!

Problem: The Synthesizer Control Panel could not initiate communications with the synthesizer.

Remedy: Make sure the synthesizer is installed in the computer and that the I/O port and interrupt settings are correct both in the software and with the jumpers on the synthesizer board.

FE-2 FATAL ERROR:
Unknown application error!

Problem: An unanticipated error has occurred.

Remedy: Click OK and try to save your .WSS configuration file. Then shut down the Control Panel and start over.

FE-3 FATAL ERROR:
Couldn't load *filename*, improper VBX/DLL file, or VBX/DLL could not be initialized.

Problem: Control Panel could not find or initialize the specified file.

Remedy: Make sure the file exists and is valid. .VBX files should be in the Windows system directory. .DLL files should be in the same directory as the Monterey applets.

5 1 0 - 8 2 4 - 6 2 0 0

Appendix A—Customer Support Checklist

Before contacting Turtle Beach Customer Support, look through the Troubleshooting chapter to help remedy your problem. To assist the customer support staff, fill out the form on the next page before calling.

Turtle Beach Customer Support can be reached at (717) 764-5265, Monday through Friday, 9:00 a.m. to 6:00 p.m., Eastern Time. Their fax number is (717) 767-6033.

Via modem contact the BeachComber bulletin board at (717) 767-5934, 2400 baud, eight (8) data bits, no parity bit, one (1) stop bit; OR (717) 767-0238, 9600 baud, eight (8) data bits, no parity bit, one (1) stop bit.

For customer support via Compuserve contact:
Compuserve: 71333,2432
Forums: MIDIVEN Section 2 and MULTIVEN Section 16

Monterey version and serial number(s) (located on the FCC sticker(s) on the Monterey board): _____

_____

Type of CPU: _____

DOS and Windows version: _____

_____

Adapter cards installed in your system: _____

_____

Applications software where you are encountering problems:

_____

_____

Error messages:

Steps leading up to your problem:

Appendix B—Technical Data

General MIDI Presets

The presets in the General MIDI set are as follows:

Preset	Preset Name
001	Acoustic Piano
002	Bright Acoustic Piano
003	Electric Grand Piano
004	Honky-tonk Piano
005	Electric Piano 1
006	Electric Piano 2
007	Harpsichord
008	Clavinet
009	Celeste
010	Glockenspiel
011	Music Box
012	Vibraphone
013	Marimba
014	Xylophone
015	Tubular Bells
016	Dulcimer
017	Drawbar Organ

Preset	Preset Name
018	Percussive Organ
019	Rock Organ
020	Church Organ
021	Reed Organ
022	Accordion
023	Harmonica
024	Tango Accordion
025	Nylon Stringed Guitar
026	Acoustic Guitar (Steel Strings)
027	Electric Guitar (Jazz)
028	Electric Guitar (Clean)
029	Electric Guitar (Muted)
030	Overdriven Guitar
031	Distortion Guitar
032	Guitar Harmonics
033	Acoustic Bass
034	Electric Bass
035	Picked Bass
036	Fretless Bass
037	Slap Bass 1
038	Slap Bass 2
039	Synth Bass 1
040	Synth Bass 2
041	Violin
042	Viola
043	Cello
044	Contrabass
045	Tremelo Strings
046	Pizzicato Strings
047	Orchestral Harp
048	Timpani
049	String Ensemble 1
050	String Ensemble 2
051	Synth Strings 1
052	Synth Strings 2
053	Choir Aahs
054	Voice Oohs

Preset	Preset Name
055	Synth Voice
056	Orchestra Hit
057	Trumpet
058	Trombone
059	Tuba
060	Muted Trumpet
061	French Horn
062	Brass Section
063	Synth Brass 1
064	Synth Brass 2
065	Soprano Saxophone
066	Alto Saxophone
067	Tenor Saxophone
068	Baritone Saxophone
069	Oboe
070	English Horn
071	Bassoon
072	Clarinet
073	Piccolo
074	Flute
075	Recorder
076	Pan Flute
077	Blown Bottle
078	Shakuhachi
079	Whistle
080	Ocarina
081	Square Wave Synth
082	Sawtooth Wave Synth
083	Synth Calliope
084	Chiff Lead
085	Charang Lead
086	Voice Lead
087	Fifth Lead
088	Bass and Lead
089	New Age Pad
090	Warm Pad
091	Polysynth Pad

Preset	Preset Name
092	Choir Pad
093	Bowed Pad
094	Metallic Pad
095	Halo Pad
096	Sweep Pad
097	Rain FX
098	Soundtrack FX
099	Crystal FX
100	Atmosphere FX
101	Brightness FX
102	Goblins FX
103	Echo Sweep FX
104	SciFi FX
105	Sitar
106	Banjo
107	Shamisen
108	Koto
109	Kalimba
110	Bagpipe
111	Fiddle
112	Shanai
113	Tinkle Bell
114	Agogo
115	Steel Drums
116	Wood Block
117	Taiko Drum
118	Melodic Tom
119	Synth Drum
120	Reverse Cymbal
121	Guitar Fret Noise
122	Breath Noise
123	Seashore
124	Bird Tweet
125	Telephone Ring
126	Helicopter
127	Applause
128	Gunshot

MIDI Drum Map

The standard MIDI key assignments for percussions instruments are based on the General MIDI Mode specification. Drum sound number 60 (High Bongo) is Middle C. Here are the key assignments:

Preset	Preset Name
27	High Q
28	Slap
29	Scratch Push
30	Scratch Pull
31	Sticks
32	Square Click
33	Metronome Click
34	Metronome Bell
35	Acoustic Bass Drum
36	Bass Drum 1
37	Side Stick
38	Acoustic Snare
39	Hand Clap
40	Electric Snare
41	Low Floor Tom
42	Closed High Hat
43	High Floor Tom
44	Pedal High Hat
45	Low Tom
46	Open High Hat
47	Low-Mid Tom
48	High-Mid Tom
49	Crash Cymbal 1
50	High Tom
51	Ride Cymbal 1
52	Chinese Cymbal
53	Ride Cymbal Bell
54	Tambourine
55	Splash Cymbal
56	Cowbell

Preset	Preset Name
57	Crash Cymbal 2
58	Vibraslap
59	Ride Cymbal 2
60	High Bongo
61	Low Bongo
62	Mute High Bongo
63	Open High Bongo
64	Low Conga
65	High Timbale
66	Low Timbale
67	High Agogo
68	Low Agogo
69	Cabasa
70	Maracas
71	Short Whistle
72	Long Whistle
73	Short Guiro
74	Long Guiro
75	Claves
76	High Woodblock
77	Low Woodblock
78	Mute Cuica
79	Open Cuica
80	Mute Triangle
81	Open Triangle
82	Shaker
83	Jingle Bells
84	Belltree
85	Castanets
86	Mute Surdo
87	Open Surdo

MIDI Implementation Chart

MIDI Implementation Chart				
Function	Sub-Function	Transmitted	Recognized	Remarks
Basic	Default	X	1 through 16	
Channel	Change	X	1 through 16	
Mode	Default	X	Mode 3	Omni Off, Poly
	Messages	X	Mode 3, 4 (m=1)	* (See Notes)
	Altered	**********		
Note		X	0 through 127	
Number	Sound Range	**********	0 through 127	
Velocity	Note On	X	O	
	Note Off	X	X	
After	Key's	X	X	
Touch	Channel's	X	O	
Pitch Bend		X	O	Resolution: All 14 bits
Control Change	1	X	O	Modulation Wheel
	2	X	O	Breath Controller
	4	X	O	Foot Controller
	6	X	O	Data Entry MSB
	7	X	O	Volume
	10	X	O	Pan
	11	X	O	Expression Controller
	64	X	O	Hold Pedal
	98 and 99	X	O	NRPN
	100 and 101	X	O	RPN
	120	X	O	All Sounds Off
	121	X	O	Rest All Controllers
Program Change		X	O	
		*********	0 through 127	
System Exclusive		O	O	Dump & Receive Program Data
System Common	Song Position	X	X	
	Song Select	X	X	
	Tune	X	X	
System Real Time		X	X	
Aux Messages	Local ON/OFF	X	X	
	All Notes Off	X	O (123-127)	
	Active Sensing	X	O	
	Reset	X	X	
O: Yes X: No				
NOTE: *Mode 4 (Omni Off, Mono) is recognized as m=1 regardless of the value of m.				

MIDI Connector

If you wish, you can build your own MIDI connector using the schematic diagram below or order it through the Accessories Sheet in the Monterey box.
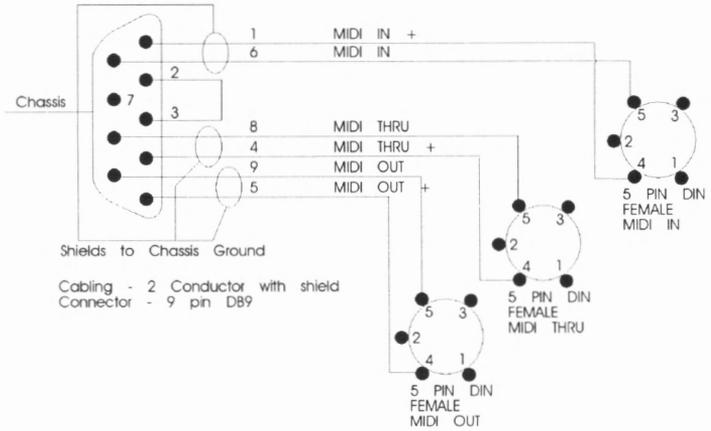
Internal CD-ROM Audio Connection

This connector uses a four (4) pin Berg connector, available at many electronics stores. Be sure to keep signal and chassis grounds separate.

Pin Layout (Same for both Inputs)
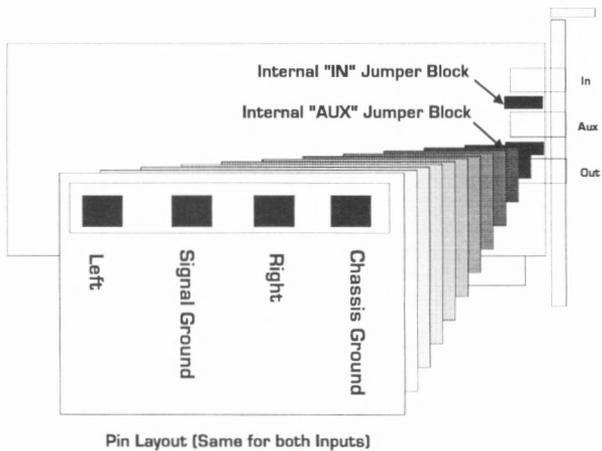
Specifications of ICS WaveFront Chipset

General MIDI compatible
Creative Labs WaveBlaster Connector Compatible
Wavetable synthesis
Wavetable size:
  4 MB of ROM samples (16 bit uncompressed samples)
  SIPP socket for up to 4 MB of sample RAM
Synthesizer:
  ICS WaveFront 2115
Memory Configurations:
  256K, 1M, 4M
CPU:
  Motorola 68000 10MHz
Effects:
  Sixteen-bit real time effects processor

Oscillators

Oscillators: 32
Envelopes per oscillator: 2
Low Frequency Oscillators (LFO) per oscillator: 2
FM Modulators per oscillator: 2
AM Modulators per oscillator: 1 + Envelope 2
Stereo pan assignments: 8 + modulator

Envelopes

Six point envelopes:
-Attack
-Decay 1
-Decay 2
-Sustain
-Release
-Ambience
Keyboard-Scaled Decay
Velocity Level Sensitivity
Velocity Attack Sensitivity

Low Frequency Oscillators

Variable Frequency (0-30 Hz)
Amplitude Ramp with Delay
Amplitude Modulator
Frequency Modulator

Modulators

Envelopes
LFOs
6 MIDI controllers (1,2,4,7,10,11)
MIDI Channel Pressure
Random with variable rates
Keyboard Scaling (linear and logarithmic)
Velocity Scaling (linear and logarithmic)

Performance
Sample Playback Rate using 33.8688 MHz system clock
24 oscillators 44,100 Hz (generally, this is the number of
simultaneous voices available)
32 oscillators 33,075 Hz

Sixteen-bit General MIDI Sound Set

Programs

- There are 128 programs available on Monterey.
- Each program can call up to 4 of 256 possible patches.
- One General MIDI instrument uses one program.

There are two types of programs: "normal" programs, ranging range from 0 to 127, and the drum program, whose number is 128. The drum program is assigned to MIDI's drum channel (10).

Patch splits are possible within a program, either by note or by velocity. This means that a patch will play only if it is above/ below a particular note/velocity. For example, a quick press of a key on a keyboard may produce a brighter trumpet patch than a slow key press.

Each of the 4 layers of a normal program contains the following parameters:
- *Patch Number* of this layer.
- *Mix Level* balance of this instrument compared to other instruments in the program.
- *Mute* flags to mute this layer.
- *Split point* of this layer.
- *Up/down* splits the layer up or down.
- *Key/Velocity* determines whether the split is key or velocity.
- *Pan Setting/Multiplier* determines the stereo position of the layer or multiplier for pan modulator.
- *Fixed/Modulated* determines whether pan comes from Pan Modulator or a fixed setting.
- *Pan Modulator Source* determines the source of the pan modulator.

Instead of 4 layers, a drum program contains one set of program parameters for every note number. The program associated with each note number contains the following parameters:
- *Patch Number* indicated the number of the patch.
- *Mix Level* indicates the balance of this instrument compared to other instruments in the program.

• *Mute* mutes the patch.
• *Group Number* represents the number of a particular drum group that this drum instrument belongs to.
• *Pan Setting/Multiplier* determines whether pan comes from Pan Modulator or a fixed setting.
• *Pan Modulator Source* determines the source of the pan modulator.

Patches

A patch describes the behavior of a single oscillator. The three types of patch parameters are Oscillator parameters, Envelope parameters, and LFO parameters.

Oscillator parameters
• *Frequency Bias* modifies the frequency of the oscillator.
• *Amplitude Bias* modifies the amplitude of the oscillator.
• *Portamento* identifies the length of the portamento.
• *Sample Number* identifies the number of the sample to be played on this oscillator.
• *Pitch Bend* indicates the maximum pitch bend in semitones.
• *Flags* indicate Mono, Retrigger, No Sustain, Env Reset, Filter Config, New Voice, LFO Reset.
• *FM Source 1 & 2* identifies the sources for the 2 oscillator frequency modulators.
• *FM Multiplier 1 & 2* identifies multipliers for the 2 oscillator frequency modulators.
• *AM Source* identifies the source for the oscillator amplitude modulator.
• *AM Multiplier* identifies the multiplier for the amplitude modulator.
• *FC1 Modulator Source & FC2 Modulator Source* identify the sources for the filter cutoff frequency modulators.
• *FC1 Kbd Scaling & FC2 Kbd Scaling* identify the multipliers for the fixed keyboard filter cutoff frequency modulators.
• *FC1 Bias & FC2 Bias* represent the bias values applied to the filter cutoff frequencies.

• *Randomizer Rate* identifies the amount to randomize while note is held.

Envelope Parameters
• *Attack, Decay 1, Decay 2, Sustain, Release1 and Release2* all determine the length of time spent in each segment of the envelope.
• *Attack, Decay1, Decay2, Sustain and Release levels* all determine the level of the endpoint of each segment of the envelope.
• *Attack Velocity* determines the amount of effect that the velocity will have on the attack.
• *Volume Velocity* determines the amount of effect that the velocity will have on the whole envelope.
• *Keyboard Scaling* determines the amount of effect that note number will have on the decay.

LFO Parameters
• *Sample Number* indicates the sample number of the waveform used for the LFO effect.
• *Frequency* determines the frequency of the LFO.
• *FM Source* determines the source number for the LFO frequency modulator.
• *FM Multiplier* identifies the multiplier for the LFO frequency modulator.
• *AM Source* is the source for the LFO amplitude modulator.
• *AM Multiplier* identifies the multiplier for the LFO amplitude modulator.
• *Start Level* identifies the amplitude of the LFO at the start of the note.
• *End Level* identifies the amplitude of the LFO at the end of the ramp.
• *Wave Restart* causes the wave sample that has finished playing to restart at beginning.
• *Ramp Delay* is the amount of time from the start of the note until the LFO starts.
• *Ramp Time* is the length of time for the LFO amplitude to ramp from start to end levels.

Possible sources for the above parameters:
0　LFO 1
1　LFO 2
2　Envelope 1
3　Envelope 2
4　Keyboard
5　Keyboard (log)
6　Velocity
7　Velocity (log)
8　Random
9　Channel Pressure
10　Modulation Wheel (Controller 1)
11　Breath Controller (Controller 2)
12　Foot Controller (Controller 4)
13　Volume (Controller 7)
14　Pan (Controller 10)
15　Expression (Controller 11)

Samples

• Each patch can contain one of 512 possible samples.
• A set of ROM samples comes with Multisound Monterey.
• With an installed SIPP memory module, the user can load his own samples into Multisound Monterey's RAM for use in any of the programs.

Appendix C—MIDI Concepts

What is MIDI?

MIDI is an acronym for Musical Instrument Digital Interface, a standard method for electronic musical equipment to pass messages to each other. These messages can be simple (Hey, play a middle C until I tell you to stop.") or complex ("Adjust the VCA bias on oscillator 6 to match oscillator 1.").

MIDI was developed in the early 1980s and proceeded to completely change the musical instrument market and the course of music. Its growth exceeded the wildest dreams of its inventors, and today, MIDI is entrenched to the point that you cannot buy a professional electronic instrument without MIDI capabilities.

Unless you are a musician, you might have ignored this startling growth. But today, with multimedia computer as it driving force, the MIDI revolution is on the verge of taking over the mainstream personal computing market.

Why MIDI is Cool

How does MIDI technology relate to multimedia? An understanding of the problems faced by multimedia producers is needed to answer the preceding question. Every element included in multimedia presentation requires extensive resources such data storage and CPU time.

In the case of recorded digital audio, the data requirements can be staggering—up to ten megabytes per minute for CD-quality stereo sound. Coupled with the requirement to be simultaneously playing other media, such as video animation or slideshows, it's easy to see how any computer can get bogged down.

The main advantage of MIDI playback on the multimedia machine is its rather spartan data requirements. One minute of music represented as MIDI data only requires about 20 kb of data, 1/500th the size of a CD-quality recording!

Another advantage is MIDI is based on a programmable clock and not on a constant data stream, which allows the ability to speed up or slow down music without affecting pitch. This really helps when you need to align a piece of music to a time-specific event.

A third advantage is MIDI's control over the music and lighting markets. MIDI can operate fog machines, light shows, audio and tape machines, CD players, audio effects, and anything else that hooks up to AC power! MIDI has the power to add all these devices to a multimedia presentation.

No Free Lunch

As always, there are some "gotchas." The majority of today's multimedia sound boards use an inferior sound synthesis technique called FM synthesis. The sounds produced by this method are not usable for serious presentations. Recently, Turtle Beach Systems has begun to integrate highly-developed synthe-

sis techniques from the electronic music market into multimedia with great success. This new class of sound boards uses digital audio recordings of real instruments to re-create the exact instrument sound, offering audio quality equivalent to a compact disc.

MIDI=Your Future

We at Turtle Beach Systems believe today's multimedia market is where the desktop publishing market was in 1984 when Pagemaker first shipped. Within a few years, we expect to see a thriving cottage market of "clip media"—spoken word, MIDI music tracks, digital audio, still and motion video clips, computer generated artwork—much like today's typeface and clip art products.

MIDI Basics

Think of MIDI as an easily connected network between multiple devices. (They don't even need to be computers or instruments!) In the MIDI landscape there are thousands of electronic messages, but three—Note On, Systems Exclusive, Program Change—are used by 99 percent of all MIDI applications.

The most basic MIDI function, Note On, tells the instruments what notes to play. In this regard, MIDI is similar to an electronic form of an old-style player piano, where a hole punched in a sheet of paper forced a key down on the piano's keyboard. MIDI performs this task electronically.

The designers of MIDI had a good bit of forethought and made the standard extensible through the use of System Exclusive commands. These commands are sent with an introductory special code that is ignored by all but the desired receiver.

Since synthesizers have the ability to alter the sound of their musical output, a command called Program Change instructs them to change their program.

What is General MIDI?

As the MIDI revolution enveloped the professional music market, people took notice that it was difficult to exchange MIDI files and have them sound right on any other system. The problem was that most musicians had varying equipment, setups, and preset voices—even with identical synthesizers. There was no standard to ensure that when one individual composed for "Grand Piano" on preset #12, that the next person's preset #12 had a grand piano sound on it. In fact, most of the time, the resulting music was more like musical instruments being thrown down a flight of steps than anything else.

The International MIDI Association recognized the need for a standard set of voices so people could interchange MIDI files. The General MIDI standard enumerates 128 standard sounds and their associated presets. This means when a composer uses a honky-tonk piano sound in the General MIDI file, Maui will play it back as a honky-tonk piano sound. See the listing of the General MIDI presets at the end of this manual.

MIDI Buzzwords

Like the computer industry, the music industry has developed many acronyms and buzzwords. To the beginner in electronic music making, these can be intimidating. But an understanding of the most common terminology can help you get started.

A sequencer is a software program that records and plays back MIDI music data. A MIDI sequencer is like a tape recorder, except that it only records MIDI data. Many sequencers exist for PC, including CakeWalk for Windows, Cadenza for Windows, Cubase for Windows, MIDISoft Studio, and Master Tracks Pro. All Windows 3.1 compatible sequencers work with Monterey. If you do not have a sequencer, consider Turtle Beach's Turtle Tools for Multimedia, which contains a sequencer and four other great programs for sound cards.

Preset

For marketing reasons, every synthesizer manufacturer defines their voice architecture using different terms, but generally every synthesizer has a number of easily available sounds, called presets or patches, that it can produce.

Velocity
Sensitivity

MIDI designers understood that turning a note on and off would not be expressive enough to make real sounding music, so they invented a method of including the strength of a note along with the note's play command, called velocity. Entry level keyboards that lack this capability send a moderate level velocity with every note.

Rio can be programmed to use velocity information supplied by either a sequencer or MIDI keyboard to perform varied tasks like blending between two different wavetables, bending pitch, or filtering sound. Velocity variations add life to MIDI music that can be otherwise dull and flat.

Modulation

Original analog synthesizers were basically sine wave generators controlled by a computer or musical keyboard. Electronic music pioneers quickly determined that by varying the pitch of an oscillator, a more convincing synthesizer tone could be created. When applied to pitch, this effect gives the subtle tremolo of a concert cellist or contralto opera singer.

Modern synthesizers like Turtle Beach Rio allow incredible versatility in modulating different sound sources with sine, ramp, and even random waveforms.

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Appendix D—Digital Audio Concepts

Before putting Monterey to good use it is necessary to understand sound and the process of digitally recorded (sampled) sound. A good understanding of the physics of sound helps in producing great soundfiles.

About Sound

Sound is made when an object causes a disturbance in a medium. Like the waves produced when you throw a pebble into a pond, sound waves move away from the source of the disturbance in all directions. We hear sound by sensing these air pressure changes in our eardrums. Our ears constantly monitor these changes and our brain interprets them as sound.

When sound goes into a microphone, it is transformed from a pressure change to an electron voltage change. In a sense the microphone is a converter. When air pressure moves the diaphragm in the microphone, it converts the motion into voltage. This is just the first of many converters used in processing sound.

Since we like sound—especially loud, clean sound—we want to store it for later playback. For many years, the most common storage method for sound has been analog recording or tape recording. In this method, a microphone is plugged into a tape recorder. Since the tape is magnetic, the sound wave, which is currently stored as voltage, needs to be adapted into a magnetic field. As the tape moves over the record head, the sound is converted to a magnetic field. This second converter fluctuates the magnetic field, which leaves the tape magnetized to match the recorded voltage fluctuations. During playback, the tape head, a third converter, 'listens' for magnetic changes and regenerates them as voltage. This is called analog recording because the voltages are stored directly as they come from the microphone. The magnetic fields are an exact (or close) analogy of the sound waves that go into the microphone.

When digitally recording audio, Monterey hears the sound as electronic voltage changes, but it cannot store the sound the way a tape recorder can. The digital audio card stores the sound, but since the card is a computer, it only understand numbers. Therefore sound must be converted to numbers. When recording, the voltage changes still get produced by the microphone, but are converted voltage into a number, using an analog to digital converter (also known as A/D).

It would be great to place an entire song into just one sample, but you cannot. In order to recreate the voltage changes accurately when called on to play back, Monterey has to convert the analog input to numbers many times per second. This is called sampling rate. When Monterey plays back the sound, it uses a digital to analog (D/A) converter to recreate the voltage changes at the exact rate at which it was originally recorded.

Resolution

Resolution measures the accuracy of a device, whether it is a microscope (visual resolution) or a digital audio recorder (audio resolution). In digital audio, resolution is measured by the number of different voltage levels that the device can define.

Resolution is expressed in bits, a computer term meaning 'power of two (2)'. If a sound board has a eight (8) bits of resolutions, it can remember 2'8 or 256 different voltage levels. Any voltage levels that fall between those 256 voltage levels get rounded up to the nearest step. Eight (8) bits of resolution is the minimum number needed to store acceptable sound.

Bits	Voltage Levels
8	256
9	512
10	1,024
11	2,048
12	4,096
13	8,192
14	16,384
15	32,768
16	65,536

Since electronic voltage changes occur in real time, time resolution is also important when recording audio. If the digital recorder memorizes the voltage only ten times per second, all changes between tenths of a second are lost.

In a digital system, the maximum frequency that can be played back is one-half of the sample rate—the Nyquist frequency. To capture the best representation of the voltage changes, sampling should be done at greater than twice the maximum frequency being sampled. Ignoring this rules leads to a problem that plagues all analog/digital systems—aliasing. This occurs when the input sound contains frequency above the Nyquist frequency. Aliasing frequencies sound horrible because they are not harmonically related and low in pitch compared to the

playback spectrum. Most PC sound cards have ineffective filtering, which leads to excessive aliasing in recorded sound. Luckily, most samplers have anti-aliasing filters that sharply cut off frequencies above the Nyquist point.

This means if you digitally record a cymbal—which emits frequencies up to and beyond 20,000 cycles, the high limit of human resolution—the rate should be greater 40,000 samples per second. Unfortunately, higher sample rates use more memory for a given sound, but this trade-off is decreasing in importance with the ever-lowering price of hard disks and optical storage technologies. As a general rule, record audio at the highest available sampling rate unless memory limitations force a reduction in sample rates.

Appendix E—About Synthesis: What is the Difference Between FM and Wavetable Synthesis?

For years, FM (Frequency Modulation) synthesis was consid-
ered a superior form of synthesis in the music world. Many of
the first audio adapter cards implemented FM synthesizers on
their sound cards because it was a relatively inexpensive form of
synthesis and could create complex sounds with very few
components. Then companies, such as Turtle Beach Systems,
began introducing sound cards that implemented synthesizers
based on actual samples of real instruments (i.e. the Proteus
synthesizer), which required more on-board memory but
produced more realistic sounds. In magazine reviews, the Turtle
Beach MultiSound has received high marks especially in the
MIDI category because of the superior sound of sample-based
synthesis.

Although many musicians know intimately the difference between an FM synthesizer and a synthesizer based on sampled sounds (including samplers), many PC users who now own synthesizers on their sound cards may not understand why the new standard is considered superior.

Timbre, the characteristic that distinguishes the sound of an instrument such as a trumpet from the sound of a clarinet, can be easily and graphically distinguished from another timbre by considering Jean Baptiste Fourier's analysis. Fourier proved that a sound can be represented not only by its waveform, but also by combining a number of different sine waves.

Most people know that a tone has a fundamental frequency, but it may not be as obvious that there are other higher frequencies present that characterize the sound, each representable by a sine wave. The frequencies that compose a sound are the tone's fundamental frequency and all of its harmonics (e.g. if the fundamental tone is at 100 Hz, the harmonics are 200 Hz, 300 Hz, 400 Hz, 500 Hz, etc.). Therefore, a sound can be described not only by its waveform (amplitude versus time), but also by its frequency spectrum (frequency vs. amplitude; see below). The timbre of a sound can be distinguished by observing the amount of energy at certain frequencies in the frequency spectrum. For example, sounds that have a "bright" quality have a great deal of energy in the higher frequencies. A spectrum with little or no energy in the even-numbered harmonics tend to have a sound like that of a clarinet playing a low note.

Figure 1—Two sine waves can be joined to obtain a more complex waveform.
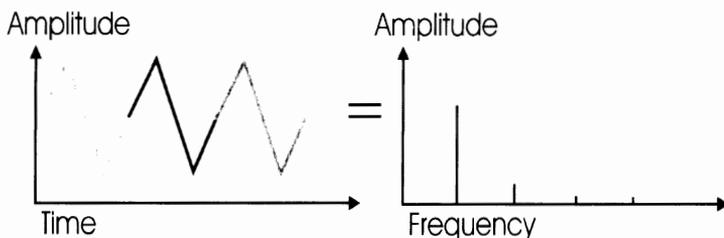
Figure 2—The qualitative description of "brilliant" or "bright" characterizes spectra that have a great deal of energy at high frequencies.

But it is not that simple. The frequency spectrum of a sound varies over time, especially at attack time. A sound can be broken down into attack time, sustain, and decay. Generally at attack time the frequency spectrum is rich with many harmonics, and then during the sustain the fundamental frequency is predominant, with the frequency spectrum maintaining relatively steady levels. "Relatively" is used because even during the sustain there are many things going on, like periodic and random vibrato at each of the harmonics. Timbre varies based on the pitch of the sound, the duration, and the loudness. Also, timbres are many times distinguished by their "fixed formats, " or energy concentrations at specific absolute frequencies (described below).

For years people have been trying to examine sound in the natural world and imitate it using computers. Because of the work that Fourier accomplished in the area of spectral analysis of sound, musicians and computer wizards were able to construct sound from simple sine waves. These sine waves can be produced by using an oscillator. An oscillator can be either an analog or digital generator of a periodic waveform (in this case a simple sine wave). If it digitally produces the periodic waveform (which most present-day synthesizers do), it actually stores all the samples of the sine wave in a table; this will become important when sample-based synthesis is discussed. It can be called a

Amp

Freq

Output
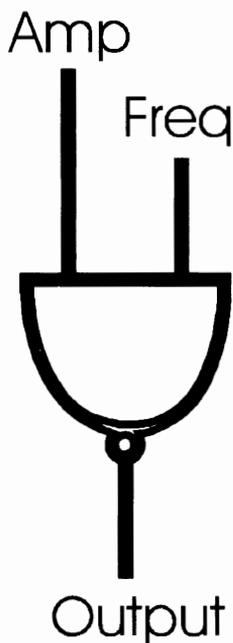
Figure 3—Flowchart
symbol for an
oscillator.

"unit generator" because by itself it produces a sine wave with a constant amplitude and frequency. These parameters can be adjusted through its amplitude and frequency inputs in real time.

One of the ways in which complex sounds can be produced is through "additive synthesis." In this form of synthesis, a sound is first analyzed for its frequency content, and then is produced by telling the computer what the amplitude of each harmonic of the sound should be. The computer can in turn set the amplitude and frequency of all oscillators involved in producing the sound. However, the amount of energy in each harmonic changes during the sustaining of the note. Because of this, two functions of time have to be used to vary the amplitude and frequency of each of the oscillators. This set-up produces a high-quality sound, but requires a lot of data and many oscillators to produce the sound. Ten or more oscillators are often needed with two functions for each to describe its behavior. This can be a painstaking process.

Because of the complexity and resources needed for additive synthesis, today's common form of synthesis is based on another technique: one which requires a lot fewer oscillators and data yet can still produce a complex sound which varies over time. The technique is based on modulation, which is the altering of the amplitude, frequency, or phase of an oscillator with another signal, both based on the sine wave. This other signal is usually another oscillator, and the parameter modulated is the frequency in the case of frequency modulation (see diagram below). The "index of modulation" is a number used in

FM synthesis which is related to both the amplitude and the frequency of the modulating oscillator. Even with a very simple setup with two oscillators which only require the main amplitude and index of modulation, the harmonic spectrum is rich and can be easily made to vary over time (which means it comes close to a real-world sound without too much sweat).
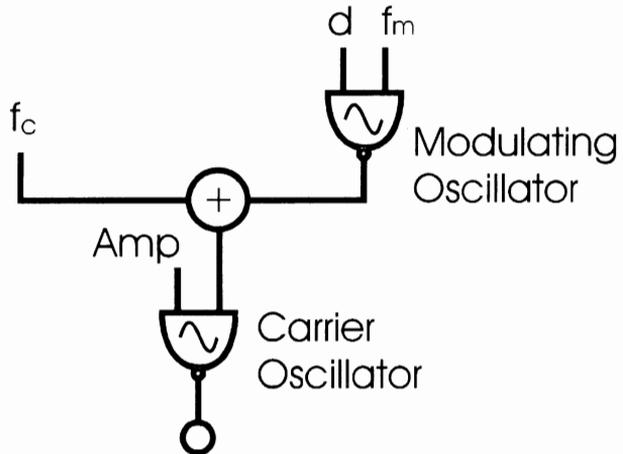
Figure 4—A basic FM instrument.

Normally, if the frequency of the carrier oscillator is modulated at a relatively slow rate, a vibrato is produced (the regular, slight variation in pitch used by musicians). However, if the frequency is increased to a certain point, the periodic change in the frequency can no longer be heard as such, but instead one hears a distortion of the carrier sine wave. With FM synthesis, the spectrum can be changed over time by varying a couple of parameters, but it may not change in the same way that the spectrum of a real-world instrument may change.

Fixed formats are important properties of many natural sounds (timbres) and are difficult to simulate with FM synthesis. Fixed formats are energy peaks at certain absolute points in the frequency spectrum for a particular timbre; these energy peaks

are not dependent on the fundamental frequency of a given tone of that timbre (e.g. there is an energy peak at 1100 kHz no matter whether the sound's fundamental frequency is at middle C or the E above it). With plain two-oscillator FM synthesis, peaks in the frequency spectrum move around depending on the index of modulation and the fundamental frequency (which is not true of real-world timbres). To approximate fixed formats, two carrier oscillators can be used instead of one. However, since this is only an approximation, it can still only come somewhat close to a real world sound.

Percussive sounds are especially difficult to simulate with FM synthesis The frequency spectrum of these sounds are so complex that constructing them from sine waves can be problematic. John Chowning, the pioneer of FM synthesis, managed to produce a bell sound with a complex frequency modulation setup. The bell sound begins with a clang, which has a full spectrum (even frequencies not related to the fundamental frequency). The highest components die out rapidly. Vibrato begins occurring at each remaining component and each becomes separated from the others. Eventually there is a reduction in vibrato and decay of all components. Chowning's instrument used as many as six carrier oscillators, all out of tune with each other. Not only were the indices of modulation increased, but random and periodic vibrato had to be applied for a realistic sound. Needless to say, most FM synthesizers (especially ones on PC cards) are not equipped to play such complex sounds realistically.

Because of the inadequacies of FM's sine-wave-based synthesis, a breed of synthesizers has been developed to create more natural-sounding instruments. Synthesizers, like the Proteus or the ICS WaveFront in Monterey, start with digitally recorded samples of actual instruments stored in either ROM or RAM. Thus, instead of reading a sine-wave from a table (as discussed above), numbers representing the actual waveform of a real instrument are read from on-board memory. These sample-based synthesizers still manipulate the samples with which they start as do the FM synthesizers. This manipulation includes low

frequency oscillation, envelopes, pitch bend, portamento, response to velocity, etc. These parameters allow further changing of the sound based on external controls and internal envelopes.

With digital recordings of real instruments as a starting point, there is no need to try to construct the desired sound from scratch—from basic sine, square, or sawtooth waves. The Maui card not only contains built-in recordings of real instruments for building sounds, but also has the ability of storing your own samples. This means that if you prefer a slightly different electric guitar sound, you can record your own sound and store it on Rio. Because the tables of sound stored in memory are static recordings each for a single note, they must be changed slightly by transposing to the note desired, adding vibrato, and responding to velocity from the keyboard. After all this is accomplished, you end up with exactly what you wanted: great sound!

References:
Dodge, Charles, and Jerse, Thomas A. Computer Music: Synthesis, Composition, and Performance. Schirmer Books, 1985.

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Appendix F—Warranty

Turtle Beach Systems (COMPANY) warrants MultiSound Monterey (Product) for a period of one year.

During the specified warranty period, if a defect should occur, the Product must be returned to the place from which it was purchased for repair. In the event the problem cannot be resolved, the Product, along with proof of purchase, is to be shipped, post-paid, to the COMPANY in its original container or equivalent. Static protection must be provided when shipping if the Product was originally provided with static protection. Customer's sole and exclusive remedy and the Company's liability in the event of defect is expressly limited to correction of the defect by adjustment, repair, or replacement at the COMPANY's option and expense. The COMPANY will pay the shipping charges when returning the Product to you. This warranty does not cover, and the COMPANY is not responsible for, damage caused by misuse, neglect, fire, or unauthorized modification of the Product or damage resulting from the use of the Product with hardware or software programs not provided or specifically recommended by the COMPANY.

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Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

After the warranty period, the COMPANY will repair your Product for a flat charge, plus parts.

The COMPANY reserves the right to refuse repair on any Product which has been misused, abused, altered, or damaged beyond our reasonable ability to repair.

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This is a legal agreement between you, the end user, and Turtle Beach Systems, Inc. BY FILLING OUT AND RETURNING THE ENCLOSED WARRANTY CARD, YOU ARE AGREEING TO BE BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THE TERMS OF THIS AGREEMENT, PROMPTLY RETURN THE PROGRAM MATERIALS AND REFERENCE MANUALS TO THE PLACE OF PURCHASE FOR A FULL REFUND.

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FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a CLASS B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Despite this, there is no implied or expressed guarantee that interference will not occur in a particular installation.

If this equipment does cause interference to radio or television equipment reception—determined by turning the unit on and off—you are encouraged to try to correct the interference by one or more of the following measures: reorient or relocate the receiving antenna; move the equipment away from the receiver; or plug the equipment into an outlet and circuit different from the circuit powering the receiver. Consult the dealer of the receiver or a radio/televisions technicians for additional suggestions.

CAUTION: Only equipment certified to comply with FCC CLASS B (Computer Input/Output devices, Terminals, Printers, etc.) should be attached to this equipment, and must have shielded interface cables.

ANY CHANGES MADE TO THE EQUIPMENT BY YOU COULD VOID YOUR AUTHORITY TO OPERATE THE EQUIPMENT.

FCC ID: JMN-TBS-MSND-PC01

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