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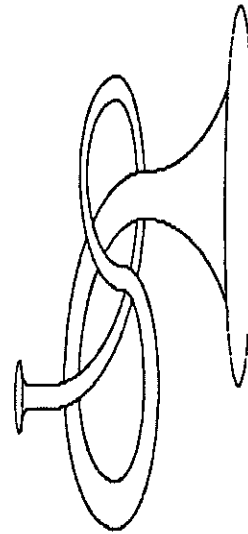
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# Pyware Instrument Designer

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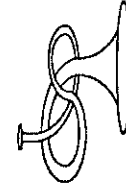
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# Chapter 1

## Getting Started

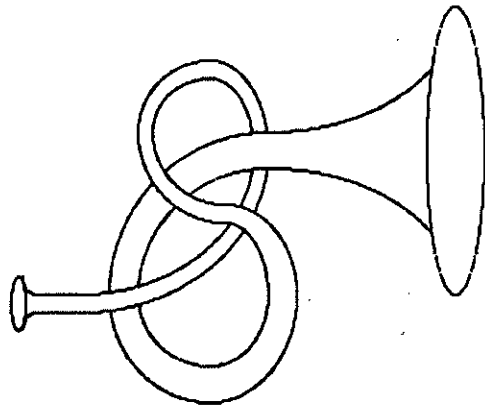
## Introduction



The *Pyware™ Instrument Designer* is designed to make use of the AppleII GS ensoniq chip and the Pyware Music Writer. With the Pyware Instrument Designer and the AppleII GS, you can create any instrument sound you wish, Alter sound waves, control sound attacks, sustains, decays, vibratos, pitch bends and much more. Create anything from acoustic instruments to your own original sounds.

The *Pyware™ Instrument Designer* is also an excellent teaching and learning program for teachers and students in Music or Science. It allows you to both SEE and HEAR how modifications to sound waves affect the sound.

Owners of the *Pyware™ Music Writer* can also benefit from the *Instrument Designer*. The *Instrument Designer* enables you to create unlimited libraries of sounds that can be used with the *Music Writer* to aid in music composition and notation.



## How to use this book



After reading this chapter. Begin learning about the *Instrument Designer* by reading through Chapter 2. This chapter explains different techniques for modifying sound waves. It is important to understand these techniques to help you produce the best sounds. The remainder of the manual covers each feature. You can read the features now or refer to the manual as necessary during a session.

## What you need to start



- Apple IIGS with at least 512K
- *Instrument Designer* Program disk
- Manual
- At least 2.0 ROM update for AppleIIGS

*Note:* If the first three digits of your computer serial number are less than 704 then you probably need the 2.0 update. If you do not have the update, the *Instrument Designer* will give unpredictable results. Your local Apple dealer can install this update for you at little or no charge.

### Optional

- MIDI Interface or MIDI box with a synthesizer

## **First back up your disks**



Before you begin, back up your disks. Use any copy program to copy the program and data disks to blank disks (see note below). Use the copies and store the originals in a safe place.

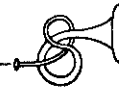
*Note:* Back up your data disk frequently after you begin designing. Although not a common occurrence floppy disks can be damaged.

## **Customer Support**



Pygraphics welcomes the opportunity to talk with you about any matters concerning computers and education. Should you have any need concerning your software, we are ready. If you have any suggestions on software updates, we want to hear them. Please call us! Our number is (817) 481-7536.

## **Hard Disk Users**



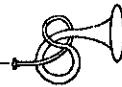
If you want to use a hard disk with the *Instrument Designer*, see the Appendix in the back of this manual.



# **Chapter 2**

## **Sound Wave Science**

## How Instrument Designer Works



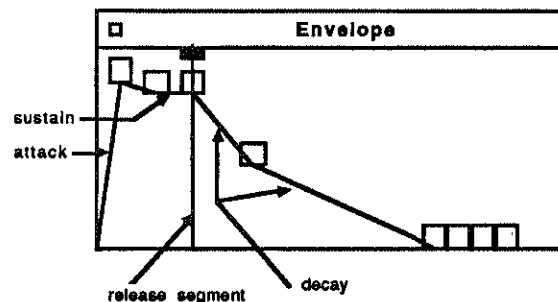
The *Instrument Designer* uses graphic windows to modify sound waves. The windows include Vibrato, De-Tuning, Envelope, and the graph of the actual sound wave. By using these windows you can dramatically alter the way a sound wave is heard.

**Vibrato.** With the Vibrato window you can cause the pitch of the sound to pulsate. A characteristic heard in many musical sounds. The vibrato (pulsation) intensity as well as the vibrato speed can be changed.

**De-Tuning.** An instrument sound on the instrument designer actually consists of two sound waves, usually looking exactly the same and played exactly at the same time. However, since there are two distinct waves you can do several unusual things. You can tune one wave slightly off from the other wave. This causes an intonation wavering that is commonly heard in instruments.

**Envelope.** A sound can be dramatically altered by changing the ASRD. ASRD refers to the instrument Attack, Sustain, Release and Decay. The Envelope consists of 8 segments. The slope between the first and second segment usually indicates the attack.

The slope between the second and third segment usually



indicates the Sustain, and likewise with the Release and Decay. The envelope is the most significant window for altering the way a sound is heard. For example, a substantial increase in the slope of the attack of a flute will make the flute sound like a bell.

**Sound Wave.** The sound wave window is used to draw and edit a sound wave pattern. You can edit or draw on either wave A or wave B or both simultaneously. (Remember, two waves are used as explained in De-Tuning above)

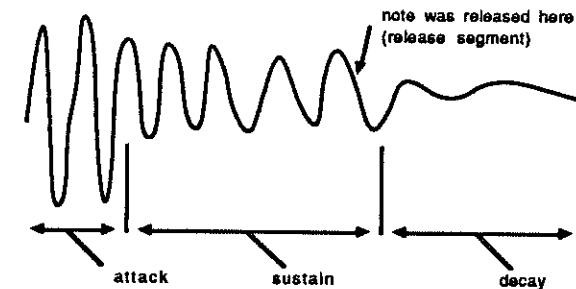
## Sound Design Methods



There are usually two ways digitized sounds are used. First, a pure sound wave played completely through one time, and second, only a section of a sound wave consisting of the sustained portion of the wave played repetitively throughout the length of a note.

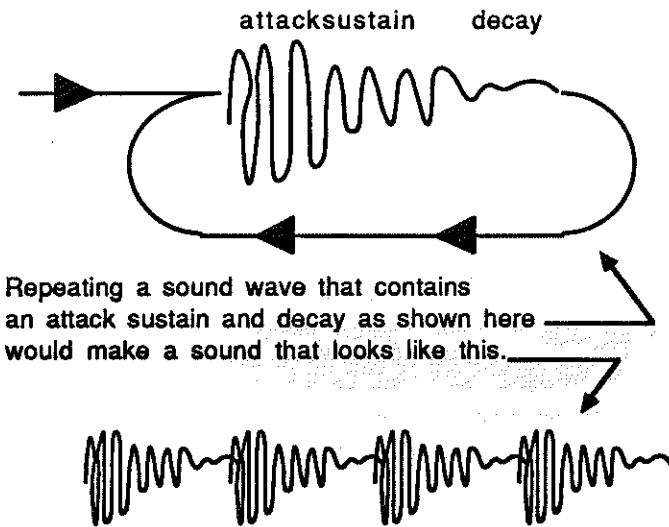
### One Shot Mode

The first type (pure sound wave) takes a lot of memory to store the sound wave. When the wave is played you will hear a very close approximation to the true sound. Below is a picture of a sound wave. Notice the different phases of the wave (attack, sustain, and decay).



In ONE SHOT MODE an entire wave is played from beginning to end one time. The wave should contain the three phases shown above to sound good. The sound waves are usually large in size (32768 bytes). Sound waves played in one shot mode have the best quality.

The only drawback to this type of sound wave is that you can only play the wave through one time for every note, otherwise you would replay the attack, sustain and decay many times as shown on the next page.

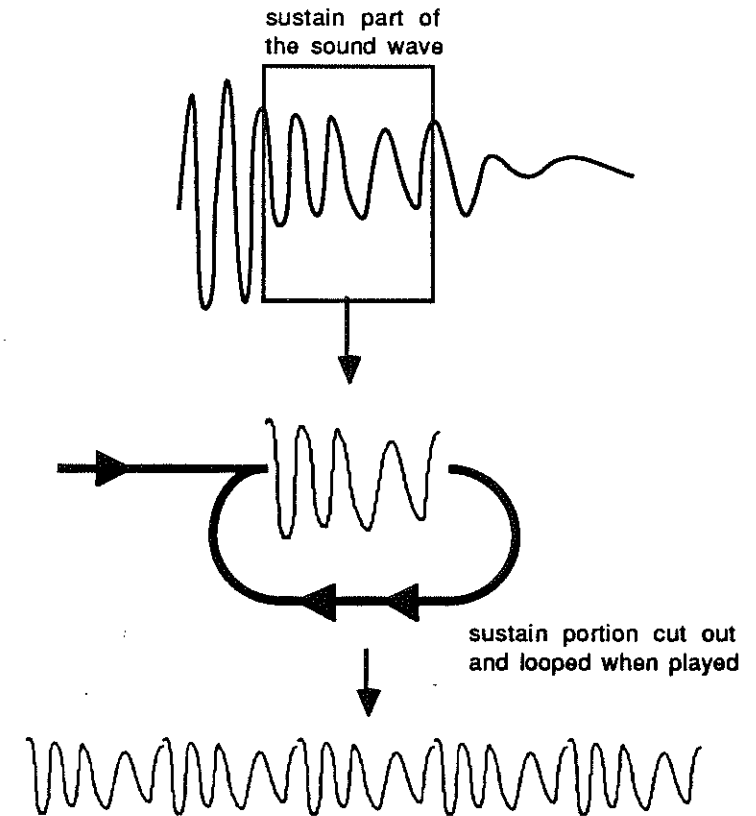


Such sound waves are better played in ONE SHOT mode. The ONE SHOT mode appears in the **OPTIONS** menu of the program under **Play Mode**. The ONE SHOT mode plays the sound wave only one time through. This is a good technique to use for instruments that do not sustain. For example, a piano has the same note length regardless of how long you hold down a piano key, whereas a trumpet note can be held many times longer. When you want to hold a note for an instrument such as a trumpet the ONE SHOT mode would be a poor choice. To sustain a note for an instrument like a trumpet, you would need to choose the LOOPED mode.

### Looped Mode

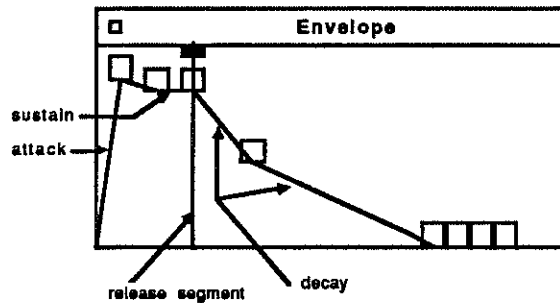
Before we show you the LOOPED technique, let's first dissect the sound wave used in the previous example. The complete sound wave was divided into three main parts. The attack, the sustain, and the decay. And you saw how looping a wave with all three parts would produce a sound with many repeating attacks, sustains and decays. However, what if we just picked a single part of the sound wave, which part would you pick? If the sound wave were a trumpet and we picked the attack, the sound would be the trumpet players tongue starting the note with a 'ta' sound. If that part of the wave was repeated over and over to create a long sound it probably would not sound like a trumpet player holding the note for a long time. It would sound more like a trumpet player attacking many notes over and over very fast.

What if we picked the sustain part of the sound to repeat (loop) instead of the attack part. Playing this part of the sound wave over and over again would sound more like a trumpet player holding a note for a long time. This is because the sustain is the part of the sound wave that you hear when a trumpet player holds a note.



*Note:* A looping sound wave should be short waves because even the sustain part of a sound will change through a long sound sample and when looped will have a quivering sound as it loops from the end of the wave back to the beginning of the wave. Keep wave samples under 1024 bytes for best results.

If we repeat the sustain part of the sound wave over and over there will not be a real sounding attack to the sound. Therefore the sound still does not sound like a true trumpet player. This is where the *envelope* window is best used. Since we have determined that the sustain portion of a sound wave is the best part to repeat, we must now try to make the sustain part of the wave sound like an attack when first started. With the envelope we can control the volume of a sound wave throughout the duration of the sound. Therefore we can make the attack much louder than the sustain part of the sound and make the looping wave simulate an attack.



The **Envelope** feature is found in the program on the **Windows** menu.

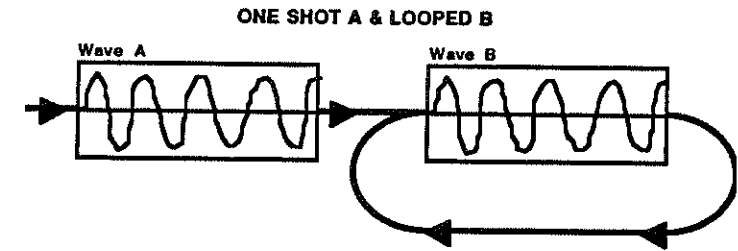
Notice the above example, there are eight small squares on the envelope graph. These squares are called handles. The handles are used to move the graph and change the slope between the graph segments. As you see, the attack slope is very steep. This steep envelope will cause a very sharp attack like the sound of a bell.

Now look at the decay. There are two segments used in this example for the decay. The first segment has a steeper slope than the second. This example will first decay to a medium volume fairly fast and then decay down to nothing more slowly during the last segment.

The last 4 handles are not used in this example, so they are moved to the bottom of the envelope window.

## Combination of both wave types

There is another technique of sound design that uses both types of sound waves. This mode is called **ONE SHOT A & LOOPED B**. In this technique two different waves are used. The first wave is played through one time and then the second wave is repeated until the note is released.



Wave A is only the Attack part of a sound and Wave B is the sustain part of the sound. As you see, this eliminates the need for the envelope to simulate an attack as used in the previous section. With this setup only Wave B is used during the sustain. Whereas the other two techniques use both Wave A and Wave B to contain the same wave played parallel giving you double the intensity of the sound.





# **Chapter 3**

## **The File Menu**

## The File Menu



The **File Menu** contains all of the filing and saving functions of the program. These features are:

**New** ..... Creates a new sound file in memory.

**Open** ..... Reads an existing sound file from a disk and loads it into memory.

**Close** ..... Removes an existing sound from the computers memory.

**Save** ..... Writes a sound file that is in the computers memory back to a disk.

**Save As** ..... Writes a sound that is in the computers memory to a disk and allows you to enter a new name for the sound.

**Get Wave File**.. Reads a Wave File into the Sound Wave window, keeping the other window settings unchanged.

**Librarian** .... Moves a Sound File into a Sound Library. The Sound Library is a collection of sound files that will load into the Pyware Music Writer.

**Quit** ..... Leaves the program.

## New command



The **New** command creates a new sound file in memory and displays it on the screen. If there is already a sound file displayed on the screen the **New** command will not operate until the file has been **Closed**. To operate the **New** command:

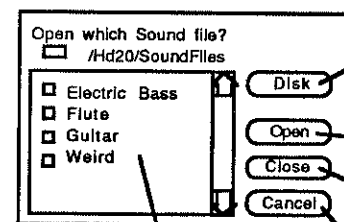
- 1 Move the mouse pointer to the menu item **File**.
- 2 While holding the mouse down, drag the mouse to the **New** command on the **File** menu and release.
- 3 A new sound file will be displayed on the screen.

## Open command



The **Open** command loads an existing sound file into memory from a disk. If there is already a sound file displayed on the screen the **Open** command will not operate until the sound file displayed is **Closed**. To operate the **Open** command:

- 1 Move the mouse pointer to the menu item **File**.
- 2 While holding down the mouse button, drag the mouse to the **Open** command.
- 3 An **Open** dialog box will display:



Sound File list

- Disk** - changes the disk that is looked at when the list of sound files is displayed
- Open** - opens the file that is highlighted on the list of sound files.
- Close** - closes the file or folder that is highlighted on the list of sound files.
- Cancel** - returns to the main screen without doing anything.

- 4 Click on the sound file that you want displayed and click the **Open** button.

## Close command



The **Close** command removes an existing sound file from computer memory. If there is no sound file displayed, the **Close** command will not operate. If there has been a change made on the sound file displayed, you will be asked if you want to **Save** the sound file to a disk before closing it. To operate the **Close** command:

- 1 Move the mouse pointer to the menu item **Close**.
- 2 While holding down the mouse button, drag the mouse to the **Close** command.
- 3 If there have been any changes made to the sound file while it has been displayed, you will be asked if you want to save the file before closing.

If you choose YES and the file has not yet been named a save dialog box will display as shown in the next section.

## Save command

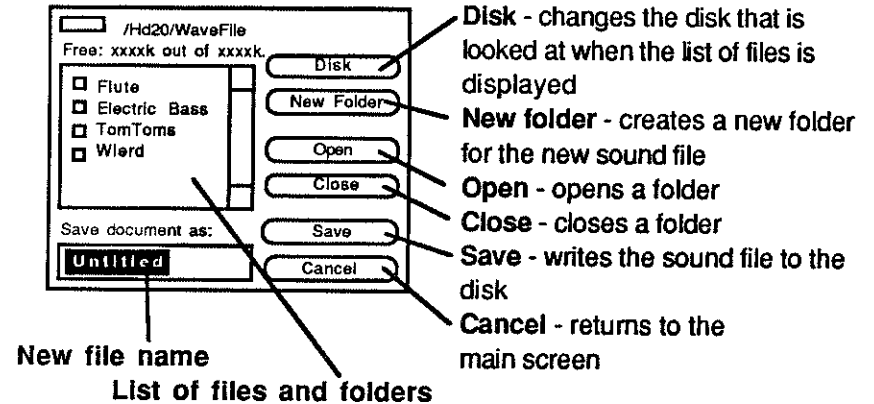


The **Save** command writes a sound file that is in the computers memory back to the disk. If there is no sound file displayed on the computer the **Save** command will not operate. If the file is untitled you will be prompted to enter a file name before saving to a disk. To operate the **Save** command:

- 1 Move the mouse pointer to the menu item **File**.
- 2 While holding the mouse button down, drag the mouse to the **Save** command on the **File** menu and release.

(continued next page)

- 3 If the file is untitled a **Save** dialog box will display.



- 4 Type the new file name and click the **Save** button.

## Save As command



The **Save As** command writes a sound file that is in the computers memory to a disk while allowing you to change the name of the sound file. To operate the **Save As** command:

- 1 Move the mouse pointer to the menu item **File**.
- 2 While holding the mouse button down, drag the mouse to the **Save As** command on the **File** menu and release.
- 3 A save dialog box will display as shown on previous page.
- 4 Type in the new name for the file and click the **Save** button.

## Get Wave File



The **Get Wave File** command is used to load a wave file into the Sound Wave window. Don't confuse a 'wave file' with a 'sound file'. A *wave file* is a binary file that only contains a wave table. A *sound file* is a file that contains a wave table and all other information such as the envelope, vibrato, relative pitch, etc. Sound files are loaded, saved and created with the Open, New, Save, and Save As commands on the File menu. Wave files are created by other programs such as samplers and can be loaded into the *Instrument Designer* via the **Get Wave File** command. To use the **Get Wave File** command:

- 1 Open a sound file whose Envelope, De-Tuning, Vibrato, and Relative Pitch is something that you want. If you want the default settings for these, select **New** from the **File** menu.
- 2 Select **Get Wave File** from the **File** menu.
- 3 A dialog window will display asking whether you want this wave file written to Wave A, Wave B or both Wave A & B.
- 4 A dialog window will display giving you choices of files that you may want. After choosing a file, the wave table will be loaded into wave A and/or wave B.

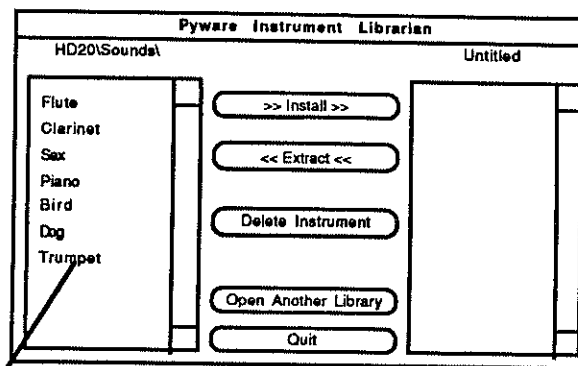
## Librarian



The Librarian is used to move sound files into a collection of sounds called a *sound library*. Sound Libraries are used with the Pyware™ Music Writer. If you do not own the Pyware Music Writer this feature is not of any use. To operate the librarian:

- 1 Select **Librarian** from the **File** menu.
- 2 A Librarian dialog window will display. As shown on the next page.

Click on an instrument that you want in the library.



For example the trumpet sound.

- 3 Click the **Install** button and a copy of the sound will be written into the sound library.
- 4 Repeat steps 2 and 3 until all sounds that you want are in the library.
- 5 Select **Quit** and you will be asked whether you want to save the library file. Choose **YES** and enter a new sound library file name.

### Other options:

**Extract** - Moves a sound file out of the sound library (right side) to the sound files list (left side). To use, click on the sound in the library (right side) you want extracted, then click **Extract**.

**Delete Instrument** - Removes an instrument from the sound library (right side). To use, click on the sound in the library (right side) you want deleted, then click **Delete Instrument**.

**Open Another Library** - Saves the current library on the right side (if any) and displays an **Open** dialog window for you to choose another library to display.

## **Quit command**



The **Quit** command leaves the program. If you have a sound file that you have made a change on and you have not saved it, you will be prompted to save the file before quitting.

- 1 Move the mouse pointer to the menu item **File**.
- 2 While holding the mouse button down, drag the mouse to the **Quit** command on the **File** menu and release.
- 3 If there is a sound file displayed on the screen with changes that have not been saved, you will be prompted to save the file before quitting.



# **Chapter 4**

## **The Edit Menu**

## The Edit Menu



The **Edit** menu is used to edit sound waves. With the **Edit** menu you can delete portions of a wave as well as cut, copy and paste portions of a sound wave using the clipboard. The *clipboard* is a temporary memory location that will hold copies of a sound wave for duplicating and moving.

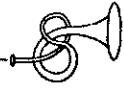
**Cut** ..... This function cuts a selected range from the sound wave in the sound wave window and saves the cut selection in the clipboard for future use.

**Copy** ..... This function makes a copy of a selected range of a sound wave in the sound wave window and saves the copy in the clipboard for future use.

**Paste** ..... This function takes a sound wave that is stored in the clipboard and inserts it into the sound wave in the sound wave window at the marked position.

**Delete** ..... This function deletes a selected range from the sound wave in the sound wave window.

## The Clipboard



The *clipboard* is a memory location that is used to store temporary copies of a sound wave so that you can relocate the wave at a new position. For example to copy the attack of Wave A to the beginning of Wave B you would:

- 1 Set the mode on the sound wave window from **Draw** to **Select**.
- 2 Select wave on the sound wave window to be **Wave A**.
- 3 Use the mouse to drag through (or select) the beginning range of the sound wave. It will become inverted indicating that it is selected.
- 4 Choose **Copy** from the **Edit** menu. This will make a copy of the selected range into the clipboard.
- 5 Switch to **Wave B** on the Sound Wave window.
- 6 Click on the beginning of the sound wave to indicate the insertion point.
- 7 Choose **Paste** from the **Edit** menu. This will make a copy of the clipboard into Wave B at the insertion point.

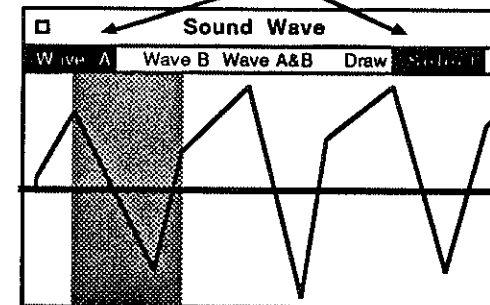
## Selecting ranges



Before you can edit with the clipboard, you must first select the range on the wave file you want to copy, cut and paste. Selecting ranges is possible with the Sound Wave window. The picture below shows steps for selecting a range.

Choose the wave you want to copy, cut, or delete

Choose the Select mode button



With the mouse, drag from the beginning to the ending of the range you want to select.

The steps for selecting ranges are:

- 1 Choose the sound wave you want by clicking **Wave A** or **Wave B** from the Sound Wave window. You cannot edit from Wave A and Wave B at the same time, so the **Wave A&B** option is not a valid option from the Sound Wave window for selecting ranges.
- 2 Click on the **Select** button on the Sound Wave window to indicate that you are going to be selecting a range.
- 3 With the mouse move to the beginning of the sound wave range you want to select.
- 4 While holding down the mouse, drag the mouse to the end of the sound wave range you want to select. The selected portion will be highlighted. (Note: There are several keys that are useful for selecting ranges when your range will not all fit on the window. These keys are covered next.)

### Selecting Range Shortcut Keys

*To select from a chosen point to the END of the wave, hold down the **Command** key while clicking on the beginning of the range with the mouse.*

*To select ranges larger than the Sound Wave window.*

- 1 Select the beginning of the range with the mouse.
- 2 Scroll to the wave portion that contains the end of the selection you want.
- 3 Hold down the **Shift** key while clicking on the ending position with the mouse.

*To select a range from the BEGINNING to a chosen point, hold down the **Shift** key while clicking on the ending of the range with the mouse.*

*To EDIT a selected range, hold down the **Shift** key while clicking on the new beginning or ending range with the mouse.*

## Cut command



The **Cut** command removes a selected portion of a sound wave and places the cut portion in a temporary storage location called the *clipboard*. To use the **Cut** command:

- 1 Choose which wave you want to cut from, and click on the wave choice in the Sound Wave window. Valid wave choices are **Wave A** and **Wave B**. (If the **Wave** button is already highlighted, you don't have to click it again.)
- 2 Click on the **Select** button in the Sound Wave window. This will indicate to the program that you want to select a range from the sound wave. (If the **Select** button is already highlighted, you don't have to click on it again.)
- 3 Move the mouse to the BEGINNING of the portion of the sound wave that you want to cut.
- 4 While holding down the mouse, drag the mouse to the END of the portion of the sound wave that you want to cut. (See *Selecting Range Shortcut Keys*, earlier in this chapter for more flexibility in selecting ranges)
- 5 Choose **Cut** from the **Edit** menu. The selected range of the sound wave will be deleted and copied to the temporary storage location called the *clipboard*.

## Copy command



The **Copy** command makes a copy of a selected portion of a sound wave and places the copy in a temporary storage location called the *clipboard*. To use the **Copy** command:

- 1 Choose which wave you want to copy from, and click on the wave choice in the Sound Wave window. Valid wave choices are **Wave A** and **Wave B**. (If the **Wave** button is already highlighted, you don't have to click it again.)
- 2 Click on the **Select** button in the Sound Wave window. This will indicate to the program that you want to select a range from the sound wave. (If the **Select** button is already highlighted, you don't have to click on it again.)
- 3 Move the mouse to the BEGINNING of the portion of the sound wave that you want to copy.

- 4 While holding down the mouse, drag the mouse to the **END** of the portion of the sound wave that you want to copy. (See *Selecting Range Shortcut Keys*, earlier in this chapter for more flexibility in selecting ranges)
- 5 Choose **Copy** from the **Edit** menu. The selected range of the sound wave will be copied to the temporary storage location called the *clipboard*.

## Paste command



The **Paste** command moves a copy of the wave selection in the *clipboard* into the sound wave at your chosen position. To place a wave selection into the clipboard you must first have used **Cut** or **Copy**. To use **Paste**:

- 1 Choose which wave you want to cut from, and click on the wave choice in the Sound Wave window. Valid wave choices are **Wave A** and **Wave B**. (If the Wave button is already highlighted, you don't have to click it again.)
- 2 Click on the **Select** button in the Sound Wave window. This will indicate to the program that you want to select a range from the sound wave. (If the **Select** button is already highlighted, you don't have to click on it again.)
- 3 Move the mouse to the **BEGINNING** of the portion of the sound wave that you want the *clipboard* inserted.
- 4 Choose **Paste** from the **Edit** menu. A copy of the *clipboard* will be inserted into the position indicated.

## Delete command



The **Delete** command removes a selected portion of a sound wave. To use the **Delete** command:

- 1 Choose which wave you want to delete from, and click on the wave choice in the Sound Wave window. Valid wave choices are **Wave A** and **Wave B**. (If the Wave button is already highlighted, you don't have to click it again.)

- 2 Click on the **Select** button in the Sound Wave window. This will indicate to the program that you want to select a range from the sound wave. (If the **Select** button is already highlighted, you don't have to click on it again.)
- 3 Move the mouse to the **BEGINNING** of the portion of the sound wave that you want to delete.
- 4 While holding down the mouse, drag the mouse to the **END** of the portion of the sound wave that you want to delete. (See *Selecting Range Shortcut Keys*, earlier in this chapter for more flexibility in selecting ranges)
- 5 Choose **Delete** from the **Edit** menu. The selected range of the sound wave will be deleted from the sound wave.



4-8

5-1



# Chapter 5

## The Window Menu

## The Windows Menu



The Windows menu is used to display each of the graphic windows that are used to modify a sound. The windows include:

**Sound Wave . . .** Displays the actual sound wave. The sound wave can be edited through this window.

**Keyboard . . .** Displays a piano keyboard so that the user can test his sound by selecting different notes from the keyboard.

**Envelope . . .** Displays the envelope where the attack, sustain, release and decay of a sound can be altered. This will greatly change the way a sound will be heard.

**Vibrato . . . . .** Displays the vibrato window. This window can change the speed and depth of a vibrato or pulsation of a sound as it is played.

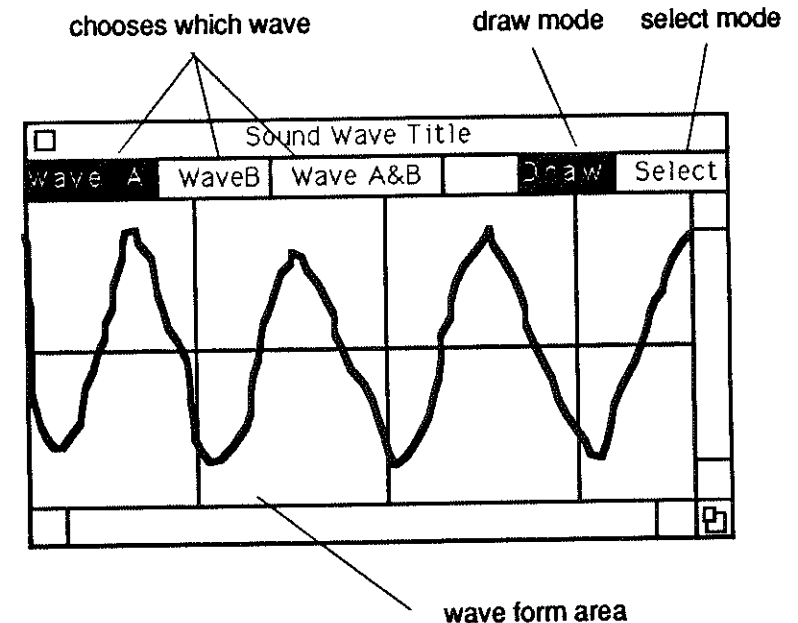
**De-Tuning . .** Displays the De-Tuning window. Two copies of a sound wave are usually played simultaneously (Wave A & Wave B). This window can change the pitch of one of the waves in very small increments.

**Volume . . . . .** Displays the Volume window. This window changes the playing volume of the sound while you are testing it. There is also a STOP button used to stop the sound if you cause an infinite loop in the envelope.

## Sound Wave window



The Sound Wave window displays the actual sound wave. The sound wave can be edited through this window.



### Choosing Wave A or B

Sounds on the Apple IIGS normally use two sound waves that are identical. When both are played simultaneously the Apple IIGS has a richer sound. Using two waves also gives you more flexibility in what you can do with the sound. For example two different waves played simultaneously give interesting results. You can also make the pitches of the two waves slightly different to give the sound more depth. As shown above, you can display wave A, by clicking the **Wave A** box found just under the Title line. Clicking **Wave B** will show only wave B and clicking **Wave A&B** will show both wave A and B.

## Drawing on the wave

If you want to edit the shape of a sound wave, you can do it with the mouse. To Draw:

- 1 Click on the **Draw** box.
- 2 Click on the wave that you want to draw on a portion of. (**Wave A, Wave B, or Wave A&B**)
- 3 Move the mouse to the start of the sound wave portion you want to change.
- 4 Drag the mouse to draw the new shape of the wave form.

## Selecting ranges to edit

If you want to copy portions, delete portions, or move portions of a wave you will use the **Select** button to select ranges of the wave for the edit operation. To **Select**:

- 1 Click on the **Select** box.
- 2 Use the mouse to drag through the range you want to edit.
- 3 Choose an edit function from the **Edit** menu.

*More details on editing waves are found in Chapter 4 - The Edit menu.*

## Keyboard Window

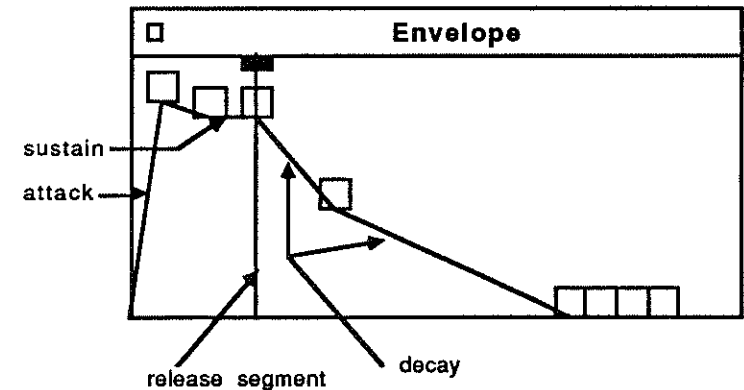
The **Keyboard** window displays a piano keyboard so that the user can test his sound by selecting different notes from the keyboard. To use the **Keyboard** window:

- 1 Move the mouse to the note on the keyboard that you want to play.
- 2 Hold down the mouse to play the note.

## Envelope Window



The **Envelope** window displays the envelope where the attack, sustain, release and decay of a sound can be altered. This will greatly change the way a sound will be heard.



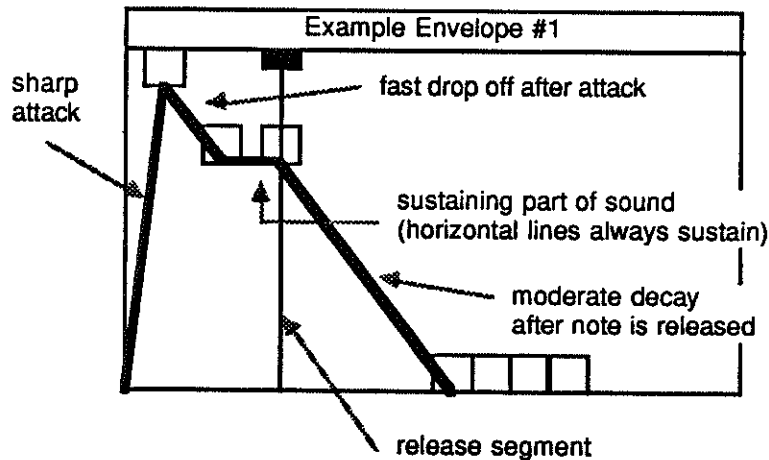
The small *boxes* found in the window are called *handles*. These *handles* are used to move the envelope slope lines. The example above has a strong attack, the sustain is the part of the envelope that is horizontal (no slope). The **release segment** is the point in the envelope that is jumped to when you release the note on the keyboard. After the note is released, it decays quickly and then slows down until the sound is gone. As shown, the decay is in two segments. The first with a fast slope and the second a slightly slower slope.

**Infinite loops or Sustain loops:** When you release your note on the keyboard the the sound will jump to the part of the envelope that is called the release segment. If there is a segment after that point that has no slope (horizontal) the sound will stick at that point. This is called an infinite loop. You rarely want this but since someone might want a sound to do this we have made it possible. If your sounds stick in an infinite loop and you want them to stop, there is a **STOP** button provided in the volume window. Just click on the **STOP** button and the sound will quit.

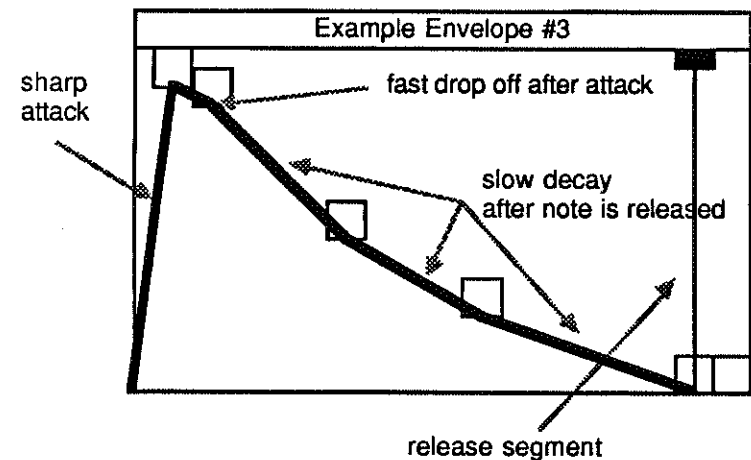
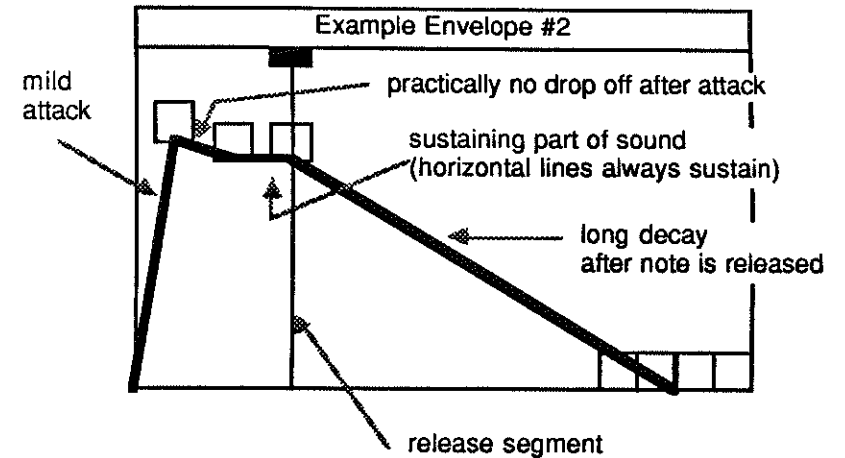
**Lowest position you can move a handle:** If you place a segment handle at the bottom of the window the sound will stop at the end of that segment regardless of any other segments positions past that point. This is why you cannot move a handle to the bottom of the envelope until all segment handles past that point are at the bottom also. To get around this, simply move handles to the bottom of the window starting with the LAST handle in the

## Envelope Examples

The next few pages contain several Envelope Window examples. It is recommended that you review these examples to fully understand the envelope and how to make setting adjustments.

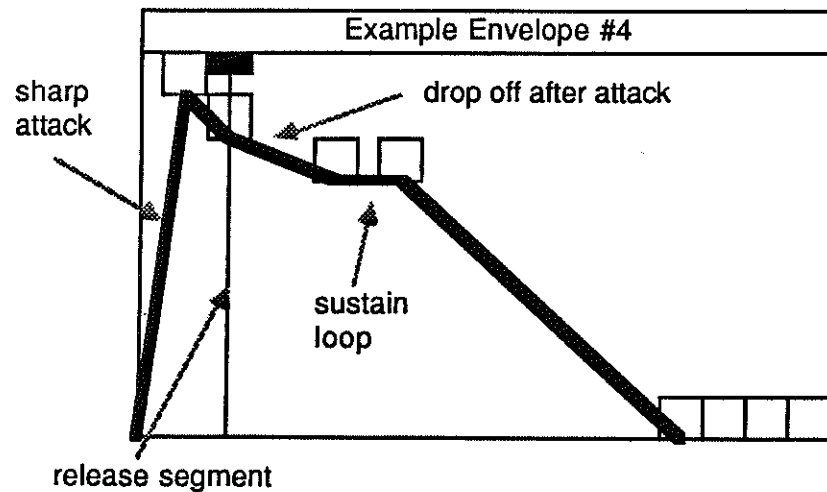


Notice the sustaining part of the sound. This is called the 'sustain loop'. It is created by placing two handles that are next to each other at the same horizontal level (volume). This is the part of the wave where the sound volume STICKS. When you release the note the sound volume will continue to the part of the envelope that is called the 'release segment'. As you see the release segment is AFTER the sustain loop. The sound volume will now travel through the remainder of the envelope through the part that is labeled 'moderate decay'.

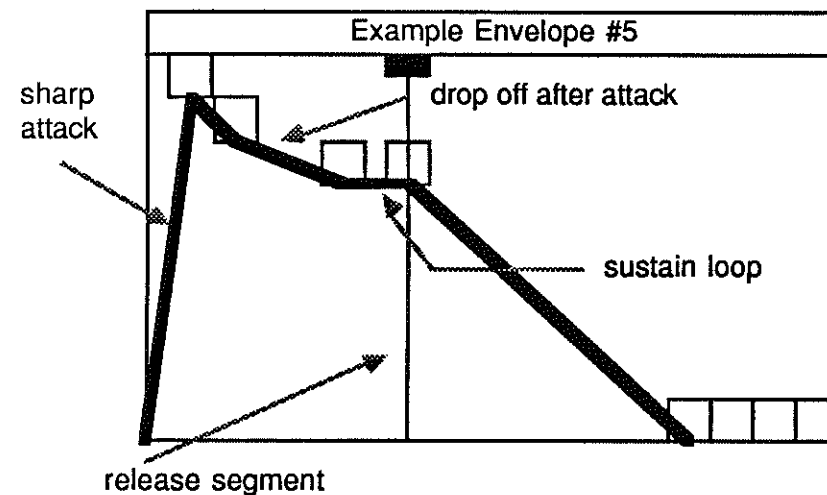


NOTE: Unlike examples 1 & 2, there are no sustaining segments (sustain loops) to the wave. Sustain loops are made by putting two adjacent handles together at same vertical level (volume). This example will not sustain. Non-sustaining envelopes are good for instruments such as guitars, pianos and bells because these instruments are unable to sustain for long times.

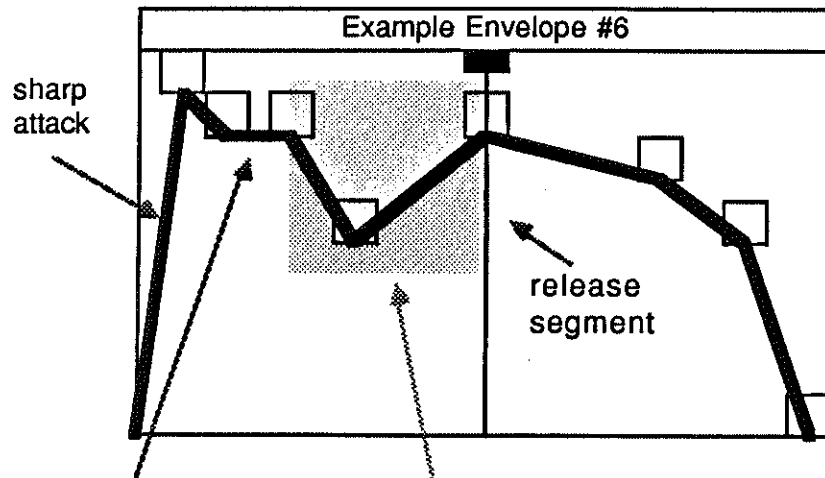
The release segment is at the end of the envelope. This is when a note is released the sound volume will jump directly to that part of the envelope.



After the note is attacked and the volume begins dropping off it will **STICK** at the sustain loop. The sustain loop will hold the note. When the note is released, the sound volume will jump back to the release segment point of the envelope and play back to the **STICK** point again. This note, therefore, will never stop unless you press the **STOP** button on the Volume window.



This example is exactly the same as example #4, except the release segment has been moved. The release segment is now **AFTER** the sustain loop. The sustain loop is the horizontal part of the envelope. Now as the sound volume follows the envelope graph, the sound volume **STICK** at the sustain loop, causing the sustained part of the note. When the note is released the sound volume will set to the release segment point of the envelope and continue down the decay until the sound volume is 0.



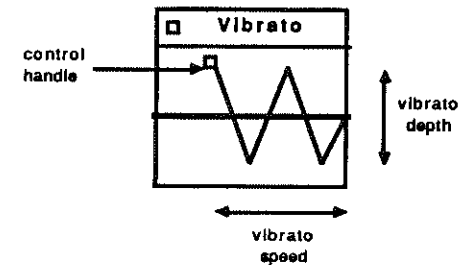
sustain loop                      this shaded portion will not play

The shaded portion of this envelope will NEVER play because of the location of the sustain loop and release segment. The sound volume will follow the envelope to the sustain loop where it will stick creating the sustain portion of the note. When the note is released the sound volume will jump to the release segment and follow the remainder of the envelope to the end. Therefore, the shaded portion of the envelope will never be played.

## Vibrato window



The vibrato window can change the speed and depth of a vibrato or pulsation of a sound as it is played.

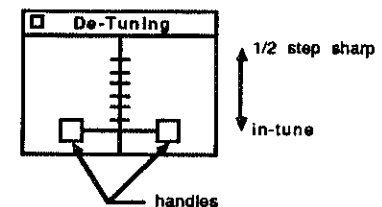


The control handle is used to change the vibrato. Moving the handle UP will increase the depth of the vibrato. Moving the handle left will decrease the speed of the vibrato (pulsation).

## De-Tuning Window



Two copies of a sound wave are usually played simultaneously. This window can change the pitch of waves in very small increments. This causes a slight intonation waver that is commonly heard in some instruments.

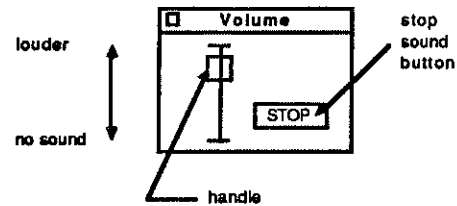


The handles are used to change the pitch of one of the two waves. Wave A is on the left and Wave B is on the right. As you drag the handle up the pitch raises up to 1/2 step from the original pitch. When the handle is at the bottom, the pitch is set to correct pitch.

## Volume Window

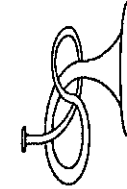


The volume window is used to change the volume of the keyboard when you test sounds. There is also a STOP button to stop a sound that is infinitely playing due to an envelope segment set with no slope. (sustaining pitch)



**Volume:** Use the volume handle to adjust the volume. Moving it up will increase the volume and moving it down will decrease the volume.

**Stop button:** If you should create an envelope that has an infinite loop (see Envelope Window). Clicking on this button will stop any infinite sounds.



# Chapter 6

## The Envelope Menu

## The Envelope Menu



The **Envelope** menu contains features used to modify the Envelope Window.

**Snapshot Envelope** . . . . Takes a picture or snapshot of the current Envelope window.

**Revert to Snapshot** . . . . Replaces the current Envelope window with the window that is in the snapshot.

**Exchange Envelope** . . . . Switches the envelope that is currently displayed in the Envelope window with the envelope that is in the snapshot.

*For more information about the envelope, see **Envelope Window** in Chapter 5.*

## SnapShot Envelope



This options takes a picture or snapshot of the current Envelope window. This is useful if you like the way an envelope is set but you want to experiment with a few changes. If your changes are not as good as the envelope snapshot, you can *revert* back to the snapshot. This way you don't have to try to re-make a envelope setting you liked if you experiment with new settings. To use this command simply select it anytime you want a snapshot made of the envelope.

## Revert To Snapshot



This option is used in conjunction with **Snapshot Envelope**. See **Snapshot Envelope** above. To use this command simply select it when you want the envelope reverted back to the snapshot envelope.

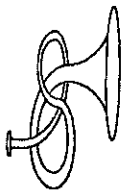
## Exchange Snapshot



This option operates like **Revert to Snapshot** except the current Envelope window settings are exchanged with the Envelope Snapshot. The Snapshot values will then be displayed on the Envelope window and the Settings in the Envelope window will be placed in the snapshot.

This is handy if you take a snapshot of an envelope setting you like, then you experiment with the envelope. After experimenting you want to hear which envelope you like best. You can exchange the two envelopes back and forth and hear each of them to choose which one is best.





# **Chapter 7**

## **The Options Menu**

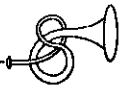
## The Options Menu



The **Options** menu contains the following:

- 100% Wave** . . . Displays a sound wave in 100% mode. This means that each pixel across the screen is one data byte.
- Size To Fit** . . . Displays a sound wave in Size To Fix mode. This means that the entire wave, regardless of its size is compressed to fit within the width of the sound wave window.
- WaveSize** . . . Changes the storage size of the sound wave. You can change the size of Wave A and Wave B independently.
- Relative Pitch** . . . Changes the pitch played when a key is pressed on the keyboard. Shifts all notes up or down the amount chosen. Increments are in 1/2 steps.
- Play Mode** . . . Changes the method (or mode) in which the sound waves are played.

## 100% Wave & Size To Fit options



These options change the way in which a wave is displayed on the Sound Wave window. If you choose **100% Wave**, the wave will draw on the window where each pixel (screen column) represents 1 byte in the wave. If you choose **Size To Fit**, the wave will be drawn compressed so that the entire wave will fit within the border of the Sound Wave window.

## Wave Size option



The **Wave Size** option is used to change the length of the wave sample in the Sound Wave window. You can change the length of the two waves Wave A and Wave B independently.

*Note:* Independent wave size control is useful when you are using a Play Mode called ONE SHOT A & LOOPED B. In this mode the first mode is played one time through first (the attack of the wave) and the second wave is looped to play the sustaining part of the sound. Your choices are from 256 bytes to 32k. The larger the wave the better the quality of sound. The smaller the wave the more that will fit into a sound library. See the chapter on Sound Wave Science to help you determine the correct sound wave size to choose.

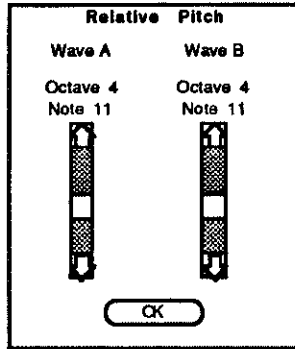
Wave A	Wave B
<input checked="" type="radio"/> 256 bytes	<input checked="" type="radio"/> 256 bytes
<input type="radio"/> 512 bytes	<input type="radio"/> 512 bytes
<input type="radio"/> 1024 bytes	<input type="radio"/> 1024 bytes
<input type="radio"/> 2048 bytes	<input type="radio"/> 2048 bytes
<input type="radio"/> 4096 bytes	<input type="radio"/> 4096 bytes
<input type="radio"/> 8192 bytes	<input type="radio"/> 8192 bytes
<input type="radio"/> 16384 bytes	<input type="radio"/> 16384 bytes
<input type="radio"/> 32768 bytes	<input type="radio"/> 32768 bytes

To select a sound wave size click on the desired button and click **OK**.

## Relative Pitch option



The Relative Pitch options is used to change the note played when a note is pressed on the keyboard. A Sound wave is recorded at a certain pitch. This pitch is called the *true pitch* of the sound wave. This feature will adjust the true pitch so that all notes are offset by the value indicated.



There are two slide scales on the Relative Pitch window, one for wave A and one for wave B. You can adjust the relative pitch of the waves independently with these slide scales.

If you move the slide up, the note offset will go up therefore playing higher notes. If you move the slide down, the note offset will go down therefore playing lower notes.

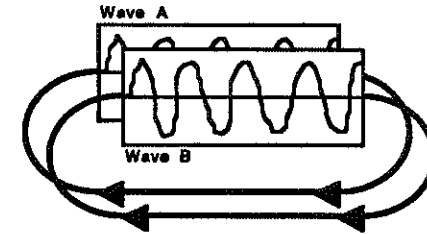
If the offset indicators located above the slide are positive numbers the offset is above the true pitch of the sound. If the offset indicators are negative numbers the offset is below the true pitch of the sound.

## Play Mode option

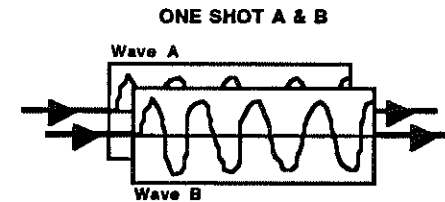


The **Play Mode** options change the way the sound waves are played. There are three methods: **Looped A&B**, **One Shot A&B**, **One Shot A & Looped B**. As discussed before there are actually two waves per sound. Usually the two waves are identical and played simultaneously. However, with these three modes you have several other options.

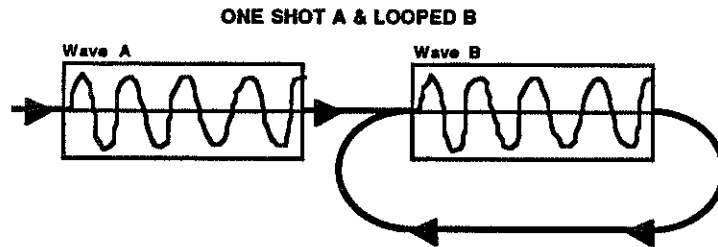
**Looped A&B** mode plays both waves A and B at the same time and when the wave is played through one time (usually taking only fractions of a second) the computer loops back and plays it over again. This will allow you to use a short sound wave and yet it can sustain a long time for long notes.



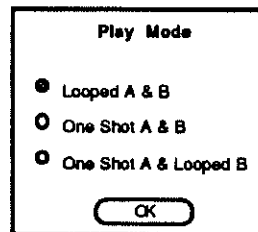
**One Shot A&B** mode plays both waves A and B at the same time but plays it only one time. This method is good for very long sound waves (i.e. wave size of 32768 bytes). The quality of the sound is usually greatly improved with long waves, however, they usually are too long to loop using LOOPED A&B method. Therefore, choosing ONE SHOT will provide a good quality sound but it can not be sustained for long notes.



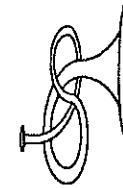
**One Shot A and Looped B** provides a unique technique for playing two sound waves. The attack of a sound wave is usually very different than the sustaining and decaying portion of the sound. If you want to loop a sound wave with such an attack you will end up replaying the attack part of the sound many times while the sound is being held for long notes. The **One Shot A & Looped B** mode gets around this problem. If you put only the attack part of the wave in Wave A and put only the sustain part of the wave in Wave B this mode will work well. Wave A will only play one time, therefore playing the attack part of the sound, then Wave B will loop until you release the note thus playing the sustain part of the note.



In the figure above the attack is Wave A and the sustain part of the sound is stored in Wave B.



To change the **Play Mode** click on the desired mode and click **OK**.



# Chapter 8

## The Sampler Menu

## The Sampler Menu



The **Sampler** menu contains commands that use a digitizer card such as MD Ideas Stereo Card with Digitizer. There is only one Sampler command.

**Record** Reads the digitizer card and stores the result (sample) in memory as Wave A, Wave B or both Wave A & Wave B.

## Record



The **Record** command is used to read sound samples from a digitizer card such as MD Ideas Stereo Card with Digitizer. Sounds are played into a microphone and turned into digital values and stored on the Instrument Designer as a wave on the Wave Sound window.

The **Sampler** menu has only one menu item. It is called **Record**. The **Record** command is used to record or read a sound as it is played into the microphone. To use **Record**:

- 1 Select **Record** from the **Sampler** menu.
- 2 A dialog will display that indicates which wave the sample will be written to. Your choices are Wave A, Wave B or Wave A&B.
- 3 A Recording dialog box will display:

Digitizer Slot = 1  
Samples per second = 27.5

Start Cancel

From the box you should setup the following things:

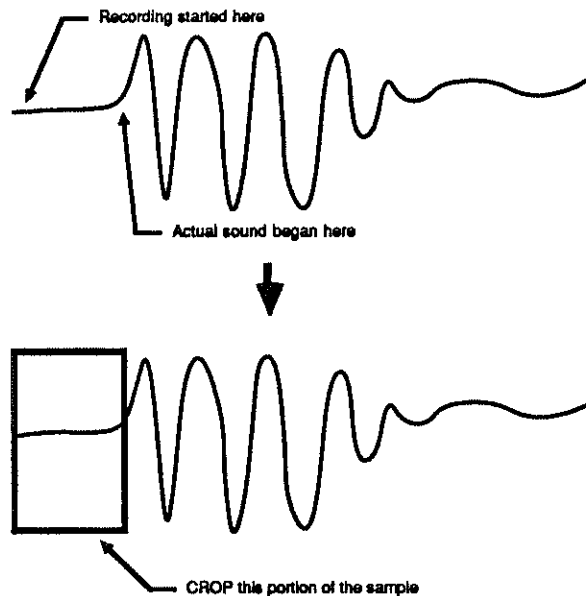
- **Digitizer Slot** - Indicates the slot in which the digitizer card is located.
- **Sample Rate** - Indicates the number of data points read per second. The higher the number of data points the more accurate the reading. The lower the data points the longer the sample.

To change any of the above settings, simply click on the number to the right of the equal sign (=). Every time you click on a number it will change to the next valid value.

- 3 To begin recording click on the **Start** button. Once clicked you will have only a few seconds to record the sound.

The digitized sound will be recorded and written to the **Sound Wave** window.

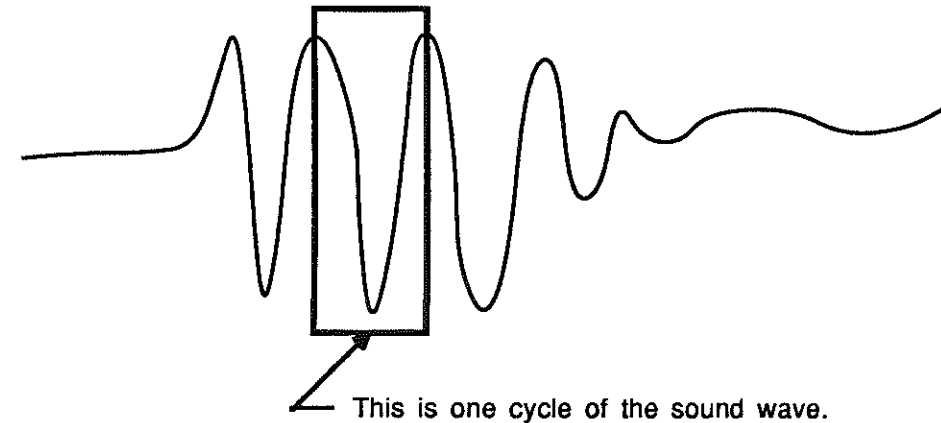
- 4 Unless you began your sound exactly when you clicked the **Start** button (which is very unlikely), you will need to **Cut** the silent portion of the recording found at the beginning of the sound wave.



The **Cut** feature is found on the **Edit** menu. (Refer to Chapter 4 - Edit Menu for details)

## Recording Hints

Prior to recording a sound you should decide what play mode you will be using. If you use a **LOOPED A&B** mode, you should plan on using a short wave. Usually you will want a sample that has only one cycle in it.

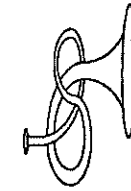


Sound waves are only stored in memory in sizes that are multiples of 256 bytes. If you want to create a short wave that is 256 bytes. Try the following:

- 1 Set the **Wave Size** to 1024 bytes.
- 2 **Record** the sound.
- 3 Display wave in **100% mode**.
- 4 Find one good wave cycle and crop all but that cycle.
- 5 If the wave cycle is longer than 256 bytes, re-sample with a higher frequency. If the wave cycle is shorter than 256 bytes, re-sample using a lower frequency.
- 6 Set the **Wave Size** to 256 bytes.

If you want to create a sound that has no sustain such as guitar, piano, bells, etc. you will probably use **ONE SHOT A&B** mode. With this mode you should take as long a sample as possible.

- 1 Set the **Wave Size** to 32768 bytes.
- 2 **Record** the sound.
- 3 Display wave in **100% mode**.
- 4 **Cut** the dead space from the beginning of the sound. (This is the recorded part before the sound began.)



# Appendix

## MIDI Troubleshooting



If your MIDI record or play is not operating check the following:

- Your computer must have at least 512K Free RAM. The RAM must be free and not used as RAM Disk. This information is found on your *AppleIIIGS Control Panel*. (See *AppleIIIGS Owner's Guide*)
- Slot 7 of the computer must be set to **Your Card**. This information is also found on the *AppleIIIGS Control Panel*.
- If you are using a MIDI interface card that plugs into a slot inside the computer, use slot 2, and set Slot 2 on the *AppleIIIGS Control Panel* to **Your Card**.
- If you are using a Casio HT700 synthesizer, you must always select one of the program buttons (piano, harpsichord, etc.) before each transmission when using the Apple MIDI Box.
- Your AppleIIIGS must have the 2.0 ROM. If the first 3 digits of your serial number are less than 704 the you probably need the 2.0 update. Your local Apple dealer can install this update for you at little or no charge.

## Installing Instrument Designer on hard disk



The version of PRODOS and Apple system tools installed on your hard disk may be different version from those that the Instrument Designer can work with. You may need to copy ProDos and Apple system tools found on the *Instrument Designer* program disk to your hard disk. If this prevents other programs from working you will have to recopy the current versions back to the disk when you want to run those programs.

- 1 After starting the AppleIIIGS finder, insert the *Instrument Designer* into the disk drive.
- 2 Drag the following *Instrument Designer* document **INSDSIGNER.SYS16** to the hard disk icon:
- 3 On the hard disk, rename **InsDeslgnr.SYS16** to **INSDSIGNER**.



## Making Data Disks



To make a data disk for the sound files created by the *Instrument Designer*:

- 1 Insert the *Apple IIGS System Disk* and turn on the computer.
- 2 Double-click on **SYS.UTILS** folder.
- 3 Double-click on **SYSUTIL.SYSTEM** application.
- 4 Select **Format a Disk**.
- 5 Remove the *Apple IIGS System Disk* from the disk drive.
- 6 Insert a blank or scratch disk into the disk drive.
- 7 Select the slot and drive of the disk you want to format.

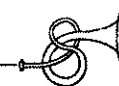
The first 3.5" drive is usually slot 5 drive 1.

The second 3.5" drive is usually slot 5 drive 2.

The first 5.25" drive is usually slot 6 drive 1.

- 8 Select **ProDos** operating system.
- 9 Enter **DATA** for the volume name (the delete key will back up) and press return.

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