ECHO MANUAL

FOR APPLE II COMPUTERS

The Echo® IIb

The Echo® IIc

and the

The Echo®+

by

Street Electronics Corporation

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INTRODUCTION

Thank you for choosing the Echo from Street Electronics. With it, your Apple will be able to speak to you from your own programs as well as the many talking programs now on the market that support the Echo. Whether you will be using it for education, games, as a special aid, or programming tool, we hope that you will find it to be a fun, versatile, and easy-to-use product.

How To Use This Manual

This manual is intended for use with three similar products, the Echo IIb, Echo+, and Echo IIc. Most of the chapters in this manual deal with the operation of all three speech processor products. Some, such as the passages on installation, are divided into sections which deal with each product on an individual basis. Still others, such as the sections which describe the music capabilities of the Echo+, deal only with one product. Each time a portion of the manual is not intended for use with all three products, it will be clearly labeled.

We have attempted to make this manual informative and easy to use. If you will only be using programs which are written specifically to work with the Echo, you may only need to read the installation and compatibility sections of the manual. However, it is highly recommended that you go through the tutorial sections of the manual as well. These will introduce you to the ease with which the Echo may be used and some of the features which are available with the Echo. You may even learn a little about how your Apple works and how to write your own programs.

THE ECHO IIb

Basic Equipment

To use the Echo IIb you will need either an Apple II+ (with 64K of memory), Apple IIe, or an Apple IIGS. In addition, the female speech supplied with the Echo IIb requires an Apple IIe with an extended 80-column card (128k) or an Apple IIGS.

What You Get

When you opened the Echo IIb box you should have found:

*An Echo IIb circuit board
*A speaker with volume control
*This manual
*Mounting hardware (strain relief, nut, bolt)
*Two diskettes (one double sided ProDOS disk and one single sided DOS 3.3 disk)
*A speaker "jumper" wire
*A quick reference card
*A warranty registration card

THE ECHO+

Basic Equipment

To use the Echo+ you will need either an Apple II+ (with 64K of memory), Apple IIe, or an Apple IIGS. In addition, the female speech, music, and sound effects supplied with the Echo+ require an Apple IIe with an extended 80-column card (128k) or an Apple IIGS.

What You Get

When you opened the Echo+ box you should have found:

*An Echo+ circuit board
*A speaker with volume control
*This manual
*Mounting hardware (strain relief, nut, bolt)
*Two diskettes (one double sided ProDOS disk and one single sided DOS 3.3 disk)
*A speaker "jumper" wire
*A quick reference card
*A warranty registration card

THE ECHO IIc

Basic Equipment

To use the Echo IIc you will need either an Apple IIc , or an Apple IIc+.

What You Get

When you opened the Echo IIc box you should have found:

*An Echo IIc speech synthesizer
*This manual
*A wall-mount power supply/transformer
*Three diskettes (one double sided ProDOS 5 1/4"disk, one single sided DOS 3.3 5 1/4" disk, and one ProDOS 3 1/2" disk)
*A cable adapter
*A quick reference card
*A warranty registration card

Types of Computerized Speech

The Echo is capable of speaking in two distict ways: with an unlimited vocabulary, robotic, male voice (text-to-speech); and with a limited vocabulary, high quality, female voice. Both types of speech have their advantages and disadvantages.

Text-to-speech (the Textalker program) enables your Apple to speak anything that you can spell. In essence, the Textalker program instructs your computer how to read aloud. The main benefit of this type of speech is that an unlimited vocabulary is available while using only 12K of your computer's memory. This makes it easy to add speech to many text-based programs and is very useful for those programs that need to be able to speak what the user types in (such as his or her name). In fact, this type of speech is essential in order for a blind individual to do word processing and effectively operate a computer. The drawback is that not all of the words are pronounced correctly and the speech is of lower quality than The Echo's female speech.

The female speech produced by the Echo is nearly natural sounding while using only 175 bytes of your Apple's memory for each second of speech. However, you can choose only from a limited vocabulary of words and a certain degree of "choppiness" is introduced when individual words are strung together to form sentences. While there are only 720 female words included with the Echo, an additional vocabulary of over 4000 words is available from Street Electronics and custom words and phrases may be ordered by software developers. This type of speech is used in many educational programs.

Another type of speech available on some computers that is not produced by the Echo is "digitized" speech. With the proper input equipment, a speech signal can be converted into a sequence of numbers and then stored in your computer's memory. When you want to hear the speech, those numbers are sent out through another circuit which turns them back into a speech signal. In effect, your computer is acting as a "digital tape recorder", only the speech is being stored in memory rather than on a magnetic tape.

Along with its superb music capabilities, the Apple IIGS can "play back" speech that has been previously recorded in this manner with its sound chip. The drawback is that this type of speech uses **lots of memory.** Typically, digitized speech uses 8,000 bytes per second or more. In a typical program that uses 30 seconds of speech, you would have to dedicate 240,000 bytes of memory for your speech! The Echo is capable of storing a similar quantity of speech in less than 6,000 bytes.

Music and Sound Effects (Echo+ only)

In addition to its speech capabilities, the Echo+ has two sound chips for generating both music and sound effects with up to six channels (voices) of sound. Simple one note melodies accompanied with three note chords can be easily added to BASIC programs or used from assembly language. More complex music can be programmed with the Music Construction Set from Electronic Arts.

Included on the Music/Sound disk is a sound effects editor program for producing customized sound effects. Once created, these may also be easily added to BASIC or assembly language programs.

Software Compatibility

The Echo is compatible with hundreds of programs. Among these are: programs you write yourself, many public domain programs, commercial programs written specifically to work with the Echo (see appendix G), and many text-based programs which are not copy protected. Getting the Echo to work with programs which you already own can be as simple as typing a single command before running your program. It should be clear, however, that not all software will be compatible with the Echo. Copy protected programs and programs which use the same areas of memory as the Echo are usually not compatible. See chapter five for a more in-depth discussion of this topic.

Keyboard Notation

Throughout this manual, especially in the tutorial sections, you will be asked to type various things into your computer. What you are expected to type will be printed in a different font and indented. For example:

```
<CTRL-E>T HELLO <RETURN>
```

would instruct you to type a Control-E , the letter "T", a space, the word "HELLO", and finally a RETURN. Special characters such as RETURN, ESCAPE, and control characters are enclosed in brackets. You should remember that control characters are typed by holding down the key marked CONTROL and at the same time pressing the associated letter key. For instance, to type a Control-E as in the above example, hold down the CONTROL key and then type the letter "E".

Syntax Errors

Occasionally, when typing in the program lines in the examples shown in this manual, you may find that the computer beeps and prints SYNTAX ERROR on the screen. When this happens, it means that the computer does not understand what you want it to do. Generally this is caused by a typing error. When this happens, simply re-type the line which generated the syntax error. **REMEMBER:** Do not ignore syntax errors, you must re-type the line.

GETTING STARTED

Installing the Echo+ or Echo IIb

Before you can install the Echo+ or Echo IIb in your computer, you must first choose a slot for it. The Echo can reside in any slot inside your Apple except for slot #3 in an Apple IIe or IIGS. Generally you will want to use a slot that is not currently used for some other function. By convention, certain slots inside your computer are used for specific purposes. Slot #1, for example, is usually used for a printer interface. Slots, and their usual uses are listed below.

Slot #	General use
1	Printer port
2	Modem port
3	80-column text display
4	Mouse interface
5	Disk controller
6	Disk controller
7	No specified purpose

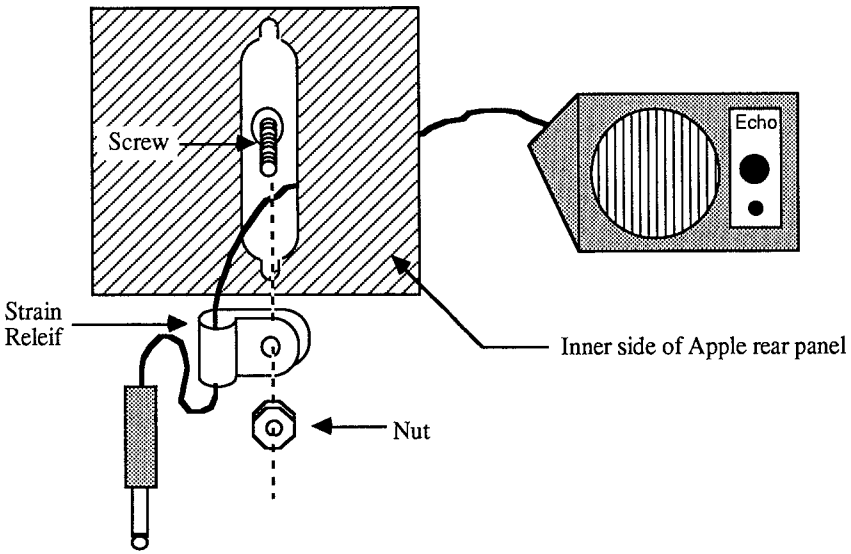
These slot conventions have been strengthened even further by the introduction of the Apple IIGS. In the Apple IIGS, these functions have been built into the computer. In general, it is best to plug the Echo into either slot 4, 5 or 7 if you are not currently using one of these locations for some other device.

Once you have chosen a slot for your Echo, you are ready to install it in your computer by following the steps listed below.

Caution: Make sure that the power to your computer is turned off. Attempting to install the Echo with the power on can damage your Echo, your computer, or both.

1. Lift the cover of your Apple and remove the cut-out on the back panel of the computer which is nearest to that slot.

2. Locate the Echo speaker, the plastic strain relief, and the nut and screw which were supplied with your Echo (if you are installing the board into an Apple IIGS, refer to the section on IIGS installation at the end of this section). You will use these components to firmly mount the speaker wire to the case of the Apple to prevent dislodging the card by pulling on the speaker wire. Place the strain relief around the cable about three to four inches from the plug on the end of the cable. You will notice that the bottom of the cut-out on the back panel of the computer has a round section that a screw can pass through. Slide the supplied screw from the outside of the computer in through this round area, inserting the screw through the hole on the strain relief. Now fasten these components to the back panel by adding the nut. Be careful on an Apple IIGS not to excessively tighten the nut or you may crack the computer case.



3. Once the speaker cable has been mounted, install the Echo circuit board. This is done by centering the gold "fingers" on the card over the slot in which it is to be installed. Push down with an even rocking motion until the card is firmly seated.

4. Now plug the speaker into the jack on the Echo labeled "speaker".

5. The final step is to use the short "jumper" wire which is provided to take the audio signals generated by the Apple (on the IIGS this includes any audio generated by the sound chip) and pass them through the higher quality Echo speaker. This is handy since you can use the volume control on the speaker to adjust all audio output from your Apple.

Locate the double wire which is connected to the motherboard of your computer in the front right corner and which is labeled "speaker"(the motherboard is the large circuit board in the bottom of your computer). This wire is removed by sliding the connector off of the two prongs which are soldered to the motherboard. Replace this wire with the "jumper" wire which was included with your Echo by sliding the connector at either end of the wire over the now exposed two prongs. The other end of the wire is connected to the prongs on the top edge of the Echo.

6. Now you should make a quick test of the installation before replacing the lid on your computer. Turn the volume control on the Echo speaker to a midway point and turn your computer on. If the computer doesn't beep through the Echo's speaker, you must reverse the polarity of the wire at the Echo. Slide the connector off of the Echo, rotate the connector 180°, and then slide it back on. You may find that the two pins on the Echo will need to be pulled slightly away from the Echo to provide proper clearance for the connector to fit. The computer should now beep when turned on.

This completes the installation of the Echo+ or Echo IIb. You may now replace the cover on your Apple and go on to one of the tutorial sections of the manual.

Using the Echo+ or Echo IIb With an Apple IIGS

Installation of the Echo in an Apple IIGS can be slightly different than for other Apples. The information below will give you some additional tips on IIGS installation.

The cut-outs on the back panel of an Apple IIGS are substantially smaller than on the Apple IIe and Apple II+. For this reason you may find that the plug on the end if the Echo's speaker cable may not pass easily through the cut-out. If this is the case, the cable may be routed through an alternate path. Locate the button on the right hand side of the computer which is used to release the computer's lid. Immediately to the left of this release button is a "slot" into which the speaker cable can be placed. Be sure to allow enough slack on the cable to allow it to reach the Echo after it is installed. In this installation the strain relief, nut, and bolt are not necesary and may be retained for future installation into another computer.

If you are installing the Echo into a slot other than #7 in an Apple IIGS, you will have to use the built-in Control Panel (accessed by pressing the Control, Open-apple, and Escape keys simultaneously) to disable the normal function of whichever slot you choose.

It may also be necessary to use the control panel to set the Apple IIGS to the normal system speed when using some Echo compatible software. Although all of the software which was included with your Echo can run at either the normal or the fast system speeds, older software may not have this capability. If you purchase third party software which is supposed to work with the Echo, and you are unable to get it to produce speech, try setting the system speed to normal and see if that remedies the problem.

Installing The Echo IIc

The Echo IIc is very easy to install. Place the Echo on a level surface near your computer. If you are using an Apple IIc Plus, plug the cable coming from the Echo into the modem port of your computer. If you are using an Apple IIc, plug the cable from the Echo into the adapter

cable which is supplied, then plug the adapter cable into the Apple's modem port. Now plug the Echo's power supply into the connector on the rear of the Echo. The power supply is then plugged into a wall outlet. The red light on the front of the Echo should illuminate when the Echo is plugged in. This completes the Echo's installation.

Backing Up Your Disks

The disks that are supplied with your Echo are not copy protected and may be copied using the ProDOS Utilities Disk and the DOS 3.3 System Master disk. You should make copies right away and place the originals in a safe place for future use.

TEXTALKER TEXT-TO-SPEECH SYSTEM

Introduction

The Textalker program does just what its name implies. It takes text and speaks it through the Echo. It does this in two separate steps. First, the Textalker program uses over 400 pronunciation rules to translate the letters and characters of each phrase into a list of the sounds (phonemes) that they represent. Second, it takes the list of phonemes and actually speaks each one by sending the proper speech data to the Echo. The Textalker program allows you to bypass the first step and send it phoneme codes directly if you prefer. This is described in detail in the next section of the manual.

How it Works

Before Textalker can say anything it must first be loaded into memory and have some way of getting the text that you want it to say. When you run the Textalker program, DOS or ProDOS is modified so that characters are sent to the Textalker program before they are printed on the screen. Therefore, to send characters to Textalker, you simply print them as you normally would to send them to the screen. When Textalker gets the characters it either says them, sends them on to the screen, or both.

A TEXT-TO-SPEECH TUTORIAL

Installing Textalker

You can install Textalker in a couple of different ways. The easiest is to just boot up the Textalker side of the appropriate (ProDOS or DOS 3.3) disk that came with your Echo. The Startup (Hello) program will automatically install Textalker and exit to BASIC. If you are already in BASIC simply insert the proper Textalker disk (DOS or ProDOS) into your disk drive and type:

```
BRUN TEXTALKER <RETURN>
```

Note that you should type "BRUN" and not "RUN." If you typed "RUN" your Apple responded with a"FILE TYPE MISMATCH ERROR" because this is a binary file and not an APPLESOFT file. If you made this error you should simply re-type the line. After the disk drive stops whirring you will see a copyright notice on the screen and the computer will let you know that the Textalker program is properly installed by saying "Ready".

You are probably ready to hear Textalker speak. Type:

```
PRINT "HELLO" <RETURN>
```

You probably noticed that Textalker said each letter as you typed it and, when you pressed <RETURN>, that it said the word "HELLO." If this was not the case, then make sure that you typed exactly what is shown above, especially the quotes. (Notice that Textalker did not say anything when you typed the quotation marks. Later we will show you how to have punctuation spoken.) If you want to hear the Echo say "Hello" again, then just re-type the line above again.

What did we just do anyway? Well, the word "PRINT" is a BASIC command. Anything in quotation marks that follows this command will be printed on the screen. The Textalker program is also at work. It looks at everything printed to the screen and pronounces it to the best of its ability. Pressing the <RETURN> key signals the Apple that this is the end of the command, and that it should now carry out that command. In this case it should print and speak the word "HELLO." Using this information you can now make Textalker say anything that you want. For example, you could type:

```
PRINT "I AM ECHO"  <RETURN>
```

Go ahead and play around a little, it will help you to get a feel for Textalker and also allow your ear to become better accustomed to it's speech. Try CATALOGing the diskette and hear it read to you. Type:

```
CATALOG <RETURN>
```

Mispronunciation

Welcome back. While typing in phrases for Textalker to speak, you may have come across a word or two which Textalker has mispronounced. Although the Textalker program uses many rules to guide it in correctly pronouncing your text, English is full of exceptions to these rules, such as compound words and foreign words. For Textalker to pronounce every word correctly it would require vast amounts of memory and would be too slow to be practical. However, with a few simple adjustments, you can help to bridge the gap between Textalker and perfection. Our first example involves a compound word, but the solution to the problem applies to more than just this type of exceptional word. Type:

```
PRINT "TYPEWRITER"  <RETURN>
```

Textalker said what sounded like "Tipwriter." Now type it again and leave a space between "type" and "writer."

```
PRINT "TYPE WRITER"  <RETURN>
```

Often breaking up the word is all that is needed to correct the pronunciation of an exceptional word. For more examples of this, type:"baseball" (BASE BALL) and "create" (CRE ATE).

Other words may need to be misspelled for them to be pronounced correctly. For instance, type:

```
PRINT "PILOT"  <RETURN>
```

Notice that the "I" is mispronounced. We need to change the vowel sound from a short sound to a long sound. (Remember "sounding out" words phonetically when you learned to read? If you don't remember--the "short i" sound is the "i" in "sit" and the "long" sound is found in "ice." The long sound of each vowel is its name.) Try typing "PIE LOT" instead of "PILOT". By following the "i" with an "e" we

have made the pronunciation of the "i" as a long "i" more consistent with the patterns of English speech.

Along the same lines we can change the short "a" sound to a long one by spelling it "ay," and the short "e" will be pronounced "long" if it is doubled ("ee"). To make a vowel go from long to short, try doubling the following consonant. Using these hints, your own common-sense knowledge of English, and experimentation (which is really the key), correct pronunciation will be made simple. Now, what if you want Textalker to pronounce one of these exceptional words correctly and also print it on the screen spelled correctly? This is not difficult, and we will show you how soon.

PRINT or ?

This is a good time to look at an easier way to type PRINT. APPLESOFT BASIC allows an abbreviation for the word "PRINT" and that is the question mark (?). Try it.

```
? "HELLO"   <RETURN>
```

We will continue to use PRINT in our examples, but feel free to type the question mark instead. Also, notice that you have been hitting the <RETURN> key at the end of each line. We are going to stop telling you to do this each time. You must take care to remember to press <RETURN> after each command so that the Apple knows that you are done with that line.

Another point of general interest concerns the RESET key. When you press RESET, or (CTRL-RESET) on newer Apples, the Textalker program no longer works. The program is still there, but it cannot react to what is being printed to the screen. To reconnect Textalker type:

`PR#0` (if a 40 column screen is desired), or
`PR#3` (if an 80 column screen is desired)

Note that the last character in the first example is a zero, not the letter "O". Give it a try: press RESET (or CTRL-RESET) and then type PR#0 or PR#3 as shown above.

Output Commands

The Textalker program has several different modes in which it can operate. The rest of this tutorial will explain these to you. Type:

```
PRINT "<CTRL-E>O"
```

or...

```
?"<CTRL-E>O"
```

Are you still remembering to press <RETURN>? Did you remember that <CTRL-E> means to hold down the CTRL key while typing E? If you are carefully following instructions, you did not type a space after Control-E. You should never type a space after control-E. Now type:

```
PRINT "HELLO"
```

Textalker did not make a sound! A Control-E, or <CTRL-E> precedes all ECHO commands. So, whenever you print a Control-E the Textalker program interprets the following characters as a command. In this case the character following was an "O." This command puts Textalker into "**O**utput only" mode (get it? "O" for "Output"). In this mode the computer will print to the screen but Textalker will remain silent. Now type:

```
PRINT "<CTRL-E>T"
```

This command puts Textalker into a "**T**alk only" mode. In this mode Textalker will speak, but nothing will be shown on the screen. Type:

```
PRINT "HELLO"
```

To return to the first mode, in which Textalker does **B**oth printing and talking, type:

```
PRINT "<CTRL-E>B"
```

In all of the preceeding examples, we have told you to preceed all Textalker commands, such as <CTRL-E>B, with the print command. In the case of Textalker commands, it is not strictly necessary to use the print statement. We have shown you this way of accessing the Textalker program to get you used to how Textalker commands are used from within a BASIC program. Textalker commands may also be entered directly from the keyboard. In the most recent example, when we had Textalker revert to the **B**oth mode, instead of typing:

```
PRINT "<CTRL-E>B"
```

We could just as easily have typed:

```
<CTRL-E>B
```

The result would have been the same. In fact, by typing:

```
PRINT "<CTRL-E>B"
```

we are actually putting the Textalker program into the **B**oth mode twice: once when we type in the command (Textalker sees the command as soon as it is typed), and once again when the computer PRINTs the command. In the remainder of this section we will have you type only the control sequences.

Notice that all of the commands have been preceded by a Control-E. Now suppose that for some very practical reason (or even a totally impractical reason) you do not wish to use Control-E to indicate a Textalker command. You have the ability to change this if you so desire. To change the Control-E to Control-Q type:

```
<CTRL-E><CTRL-Q>
```

Now Control-Q is the new command character.To double-check the change, type the following commands:

```
<CTRL-E>T

PRINT "HELLO"
```

Notice that "HELLO" was printed on the screen, which it should not have been if we had activated the "Talk only" mode in this usual way. Now type:

```
<CTRL-Q>T

PRINT "HELLO"
```

Now the "Talk only" mode is in effect. Return to the "Both" mode by typing:

```
<CTRL-Q>B
```

And let us also change the command character back to a Control-E. Type:

```
<CTRL-Q><CTRL-E>
```

You may change the command character to any control character except Control-M (which will act just like the <RETURN> key), Control-U (the ->), Control-H (the <-) or Control-J (a linefeed).

Using Textalker From Within A Program

To demonstrate how to use Textalker from within your own program, we will now write a short APPLESOFT BASIC program. To speed things up, first issue the "Output only" command (<CTRL-E>O), and then type:

```
NEW
```

to let your Apple know you are about to type a "new" program. Now type the following lines exactly as shown (including the line numbers). End each line by pressing the <RETURN> key, of course.

```
10 INPUT A$
20 PRINT A$
30 GOTO 10
```

Now type:

```
LIST
```

and double check your listed program with the program above. If there is a mistake you just have to retype the line containing the mistake (including the line number).

A BASIC Primer

Those of you who know BASIC should skip the next couple of paragraphs. If you do not know much BASIC--stick around. The three line program that you just typed in is a BASIC program. In BASIC, each command or instruction must be preceded by a number, which is called a line number. The Apple will perform these commands in numerical order. The numbers do not need to be in increments of one, however. (For example, in your program the computer will do line 10 and then line 20--it will not sit there waiting for line 11.)

Our program will, therefore, perform as follows: The first line (line 10) uses the BASIC command "INPUT." When the Apple encounters this command it will print a question mark and wait for the user (that's you) to type a response as an input. The program will store what you have typed in its memory and label it "A$." We will assume that you type in the word "HELLO" as an input. Line 20 contains the "PRINT" command. We have used the PRINT command before, but only when

followed by a phrase within quotation marks. Since A$ is not in quotes, the computer will not print the characters "A" and "$," but will instead print the "value" of A$, which is the input/response to line 10--the word "HELLO." Therefore, when the Apple encounters line 20, it will print "HELLO." Line 30 simply tells the computer to "GO TO" line 10 and start all over again by first asking for an input and then printing the input and then starting all over again...

Let's try running the program. Type:

```
RUN
```

Enter any word you like when you see the question mark, and press <RETURN>. The Apple will obediently print the word that you entered and then ask you for another word. To end this limited game, type:

```
<CTRL-C>
```

in response to the input request (the question mark). The program will stop and your Apple will tell you that you stopped it at line 10 of your program, or, in its words, "BREAK IN LINE 10." Now you can turn the speech function back on and have screen output by issuing the familiar ECHO command:

```
<CTRL-E>B
```

Now RUN the program again. Note that you do not have to put quotation marks around your response to the input request to hear it spoken unless the phrase contains a comma. Also, keep your response down to less than 255 characters (your Apple manual can explain the reason for this if you are curious). Type in a few of your favorite phrases, and also try typing the commands that you have learned. If you do type a phrase which contains a comma, Textalker will pause at the comma. Also note that if you type:

```
<CTRL-E>T HELLO
```

the Textalker program will stop printing to the screen as soon as you enter the Talk command--even before you press <RETURN>.

To make our program even easier to use, we will modify it slightly. First, exit the program by typing:

```
<CTRL-C> <RETURN>
```

To add the following lines to the program, simply type them in:

```
 5 PRINT CHR$(5)"O"
15 PRINT CHR$(5)"B"
```

These lines will automatically assume their place in proper numerical order within your program. Now change line 30 by typing:

```
30 GOTO 5
```

The Apple will automatically replace the old line 30 with the new one. Now type:

```
LIST
```

Compare your program to the following listing. If there are any mistakes, just retype the line containing the mistake.

```
 5 PRINT CHR$(5)"O"
10 INPUT A$
15 PRINT CHR$(5)"B"
20 PRINT A$
30 GOTO 5
```

You see that the new line 5 uses the now familiar PRINT command, but that following it we have "CHR$(5)." This is a BASIC command

equivalent to typing Control-E. (E is the fifth letter of the alphabet, hence the "5" in parenthesis.) After this comes the letter "O" in quotes. These two parts of line 5 combine to be the equivalent of typing "Control-E O." The reason we use the CHR$ command is that when you type Control-E, nothing shows on the screen, but while using the new command we can now easily check to see if we remembered to enter Control-E in the program. Line 15 prints out Textalker's "Both" command and line 30 now jumps to line 5, the new beginning of the program.

Our new program works as follows: Line 5 puts Textalker in "Output only" mode. This way, when you type your response to line 10, Textalker will not speak, which allows you to type faster. Line 15 puts Textalker in "Both" mode, so that line 20 both prints and speaks your input. Line 30 starts the program over again. You may stop the program as you did before by typing a Control-C instead of an input.

You can probably now see how we would have a word spelled correctly on the screen, and yet spelled incorrectly for Textalker to pronounce. First we would put Textalker in "Output only" mode and print the correctly spelled word (e.g. PILOT). Then we would put Textalker in "Talk only" mode and print the word spelled as we would spell it for pronunciation (i.e. PIE LOT).

Rate Commands

We are now ready to cover some additional commands. First, if it is not already running, RUN the program that you typed in. Now enter a sentence at least a few words long (e.g. "RUBBER BABY BUGGY BUMPERS"), then type:

```
<CTRL-E>C
```

Now type the same sentence again. You are now in "Compressed" mode in which the speech is compressed--that is, faster. Some people find the fast mode difficult to understand at first, but only until they have become accustomed to it. Once you have more experience with

Textalker, you may find that you are always using the compressed mode. To return to the slower mode type:

<CTRL-E>E

You are now in "**Expanded**" mode in which the sounds are expanded and, therefore, slower. Type in another phrase to make sure you entered the "**Expanded**" mode command correctly.

Pronunciation Commands

Currently you are in "**Word**" mode, in which Textalker pronounces whatever you type as a word. You may also have it spell out everything letter by letter by typing:

<CTRL-E>L

Type a few phrases in "**Letter**" mode and then return to "**Word**" mode by typing:

<CTRL-E>W

Punctuation Commands

You may remember that, earlier in this tutorial, we promised to show you how to get Textalker to say the quotation marks as you typed them in; we will do that now. The punctuation mode that you are in now pronounces only some punctuation (e.g. "#", "$", "%", "&", "=", "@", "+", "<", ">", "!", "/", etc.) and also a "." if followed immediately by another character. (For an example of this last point ,have Textalker say "2.9%.") This mode is known as the "Some punctuation" mode. To get Textalker to pronounce **M**ost of the punctuation characters type:

<CTRL-E>M

Textalker will now pronounce all punctuation characters except spaces, line feeds (Control-J) and carriage returns (Control-M or <RETURN>). Textalker will say even these if you type:

```
<CTRL-E>A
```

This command puts you in "All punctuation" mode. To return to the standard "Some punctuation" mode, enter:

```
<CTRL-E>S
```

Pitch Commands

It is also possible to adjust the "Pitch" of Textalker. Type:

```
<CTRL-E>40P
```

Type in a short phrase. Notice that the voice of Textalker has a higher pitch now. You may vary the pitch by varying the number in the command from 1 to 63. Try some different pitches now. When you are done, return the pitch level to a middle value, or back to the original pitch level of 22.

Now type:

```
"ARE YOU HAPPY?"
```

Listen carefully as Textalker's pitch changes at the end of the sentence. Since the sentence ends in a question mark, the pitch rises, just as it does in normal human speech. Compare this with :

`"ARE YOU HAPPY"` (no punctuation)

and

`"ARE YOU HAPPY."` (with a period).

When the sentence ends in a period, exclamation point or a colon, Textalker's pitch will drop. If the sentence ends with a question mark or a semi-colon the pitch will rise. Notice, too, that some variations in pitch exist within each word.

If you would like Textalker to speak in a robotic tone, you can put it in "**F**lat pitch" mode by typing:

```
<CTRL-E>22F
```

You may vary the pitch by changing the number here from 1 through 63 also. Type in a few phrases and notice that when Textalker speaks now, its pitch does not vary within the sentence.

Volume Command

Even though the Echo speaker has a built-in volume control, you can also use Textalker to change the text-to-speech volume from within a program or directly from the keyboard. To set the volume, use Textalker command :

```
<CTRL-E>5V
```

The number may vary from 0 through 15. You may use this command to create special effects such as an "echo" for Textalker. Try setting the volume at progressively lower levels. At the lower levels, Textalker sounds like a whisper.

Delay Command

Textalker has the ability to insert a delay of varying length between words. This will aid the first time Textalker user in better understanding the speech it produces. This delay can vary between a value of 0 and 15. These are only relative values and don't relate to anything "real-world" like seconds. 0 is the shortest delay and 15 is the longest. To activate this command, type:

```
<CTRL-E>15D
```

This will insert a long pause between each word. To disable this feature, type:

```
<CTRL-E>0D
```

Repeat Character Filtering

This feature will filter out special characters after a specified number of those characters have been received by Textalker in succession. For example, assume that you regularly use a program whose title page includes a row of underline characters. Without this feature, Textalker might say "underline" seventy or eighty times in a row. Using this feature it is possible to hear only the first few "underlines" and have the rest remain unvoiced. This setting starts out at a value of two. So, in the above example, only the first two "underlines" would be pronounced. If it is necesary to hear more than two of any repetitive character, you can change the value of n in the command below:

```
<CTRL-E>nR
```

For example, to change the filtering to begin after the first 5 repetitions, type:

```
<CTRL-E>5R
```

Inputting <CTRL-E>0R will disable this feature entirely.

List Control Commands

The last two commands can best be explained without running the program that you have typed in. Remember that to stop the program you type:

```
<CTRL-C> <RETURN>
```

Now set Textalker into the "Both" mode and type:

```
CATALOG
```

To halt Textalker in mid sentence type the following (no RETURN):

```
<CTRL-S>
```

To continue the catalog press any key. Now type:

```
CATALOG
```

again and, while it is listing, type the following (again, no RETURN):

```
<CTRL-X>
```

Note that the catalog continues to list, but that Textalker remains silent. Control-X puts Textalker in "Output only" mode until the Apple requests an input. After the catalog stops listing, the Apple waits for a command (input) which puts Textalker back into "Both" mode. It is also possible to start the speech again by pressing the spacebar.

Another way to temporarily silence Textalker is by pressing any key other than the spacebar. The difference between this method and the one above is that the key pressed to silence Textalker can be an input. Let's say that you regularly use a menu driven program. You know, even before Textalker reads the menu options to you, that you want to select option number 3. By merely pressing 3 when Textalker begins to read the menu, you will not only silence Textalker for the remainder of the menu, but also make your menu selection.

This concludes our discussion of Textalker's text-to-speech system and its various commands. You should know that with few exceptions, the commands all work independently of each other. Therefore, you may combine the commands in many different combinations. For instance, you could have Textalker spelling out words letter by letter in a very low, flat pitch at a low volume.

THE TEXTALKER PHONEME SYSTEM

Introduction

Phonemes are the smallest distinguishable sound units of a language. The word "speech," for example, is composed of six letters, but only four phonemes: they represent the "s" sound, the "p" sound, the "long e" sound and the "ch" sound. When you used Textalker in the previous section, it automatically translated the text into phonemes for you. This section will detail how to bypass the text-to-phoneme translation and send phonemes directly to Textalker to be spoken. This gives you more precise control over how your words will be pronounced and their inflection.

It should be noted that while Textalker's phoneme capability gives added flexiblility, programming speech at this level can be a tedious process. In fact most users simply use the built-in text-to-speech capability of Textalker and never bother with phonemes at all. However, you still may find it rewarding to read this section to learn more about how the Echo works and the components that make up the English language.

A PHONEME TUTORIAL

Phoneme Codes

To send phonemes to Textalker you will need the reference card (or the chart in Appendix E) handy. You will find a table which shows all of the phonemes and associated phoneme codes that you will be using to create speech. The first column contains an example of a common word containing a clear instance of a sound. The second column shows the common dictionary symbol for the sound, and the third shows the symbol that you will actually be typing into the computer to represent that sound. Using this table we can see that the word "speech" (to continue with our previous example) would be written in phoneme codes as SP&C. The word "echo" would be EKO.

The Phoneme Command

Textalker uses a Control-V character to signal it that the characters which follow should be interpreted as phoneme codes rather than letters of a word. Once it receives a Control-V, it will pronounce everything as phonemes until it gets a <RETURN> character. This tells it to revert back to text-to-speech. Phoneme codes can only be sent to Textalker from within a program, you can't enter the Control-V directly from the keyboard.

It is a simple matter to write a short program to input phoneme codes from the keyboard and then send them along with a Control-V to Textalker. For the rest of this section you will need to enter the short program listed below. First, if you don't have your computer running with Textalker installed, insert the Textalker disk (either DOS or ProDOS) into your drive and turn on your computer. Now type "NEW" to erase any program that is currently in memory and enter the following program:

```
10 E$=CHR$(5)
20 V$=CHR$(22)
30 PRINT E$"O"
40 INPUT A$
50 PRINT E$"T"
60 PRINT V$;A$
70 GOTO 30
```

Now type:

```
LIST
```

Double check your listing of the program you just typed in against the listing in this manual. As always, if there are any mistakes retype the line and list again.

The program works as follows. Lines 10 and 20 of the program will make "E$" equal to a Control-E and "V$" equal to a Control-V ("E" being the 5th letter and "V" being the 22nd letter of the alphabet). This

is done because Textalker commands must begin with a Control-E and every group of phonemes must be preceded by a Control-V. Line 30 will turn off the speech by sending Textalker the "output only" command. Line 40 allows you to input the group of phonemes that you would like to hear, and stores them into A$. Line 50 then turns on the speech (and turns off the screen) by sending Textalker the "talk only" command. Line 60 sends Textalker a Control-V (phoneme command) followed by your list of phonemes (A$) which are then spoken. A "PRINT" statement that doesn't end with a semicolon automatically sends a <RETURN>, so Textalker returns to normal operation. Lastly, line 70 starts the whole process over again.

Try the program now by typing:

```
RUN
```

For the remainder of the examples in this section, simply type in the phonemes you would like to hear, and the program you just entered will do the rest.

Inflection and Stress

Type:

```
EKO
```

Listen carefully. Now type:

```
E3KO
```

Note that the second time the "E" had more stress. The number 0,1,2 or 3 following a vowel, diphthong or "r-colored vowel" (you will see these categories on your reference card and in Appendix E) determines the stress of that phoneme. If no stress number is given then a value of 2 is used. Using a 3 gives greater stress by making the phoneme higher in pitch, longer in duration, or both. Try re-typing the line above and substituting 2,1 and 0 for the 3. The 1 reduces the stress placed on the phoneme by making it lower in pitch and shorter.

A stress of 0 reduces the sound to what is termed a "schwa." The schwa also has its own code (') which can be used.

Pitch and Rate

The base pitch of the ECHO is set using the same commands that we used in Textalker (i.e. Control-E40P, Control-E40F...). These are outlined in more detail in the text-to-speech tutorial. You may also set the rate of speech (speed) using the rate commands (i.e. Control-EC and Control-EE). In the phoneme mode, you can adjust the pitch within a word too. Simply insert a number from 1 through 9 anywhere within a word except following a vowel or a diphthong (where it would be considered a stress number). The base pitch is 5 and 9 is the highest pitch. The pitch will remain at the new level until it is reset, or until the first "stop consonant" (such as "B", "T" or "P") or "fricative" (such as "F", "S", or "SH" is encountered. See Appendix E for a listing of stop consonants and fricatives. Try typing:

9!3 **7**AM **5**AN **3**E3K**1**O3

The numbers in bold print set the pitch level, while the numbers following the vowels set the stress level as explained earlier. This may seem a little confusing at first, so try experimenting with different combinations and familiarize yourself with the system.

Another way to modify the pitch is by using the symbols ">," "<" and "=." The ">" symbol will set up a pattern of rising pitch, the "<" symbol sets up a pattern of falling pitch, and flat pitch is set up using the "=" symbol. All sounds will continue to vary in the pitch pattern that you have set until either a fricative, stop consonant, or a pitch level change is encountered. Try typing the word "help" using these symbols. You might type:

```
H>EEEELLLLP
```

or...

```
H<EEEEEEEEEE>LLLLLLLLLLP
```

Volume Control

You can adjust the volume from within the phoneme mode by using "+" and "-." Typing a "+" increases the volume and the "-" decreases it. You may also type a series of "+"s or "-"s, just as you did with the pitch symbols. For example type:

```
EKO--EKO--EKO--EKO++++++EKO
```

The volume will remain modified until it is explicitly changed again using the "+" or "-" commands. When Textalker is first RUN, the volume is already set at about the maximum level. Increasing the volume more than one level above this will increase the volume of fricatives without a corresponding increase in the voiced sounds. This will result in horrible sounding speech.

Pauses

The phoneme mode ignores spaces between words although we recommend that you type them for better legibility. To make a pause, use a comma. The comma should be followed by a number to vary the length of the pause. A 1 is a short pause while a 9 gives a long pause. Type in this demonstration (including the quotation marks):

```
"EKO ,1 EKO ,3 EKO ,5 EKO ,7 EKO ,9 EKO"
```

If no number is used, a value of 2 is assumed. We had to enclose our entry within quotes because BASIC doesn't allow commas within a single entry of an "Input" statement (used in line 40 of our program). Now try:

```
"EKO , EKO ,2 EKO"
```

The pauses between the words are identical.

Using the phoneme mode of Textalker is not as difficult as it may at

first seem. Due to its high degree of flexibility, you probably feel that there is an awful lot to remember. Practice will help you to become more familiar with the phoneme mode commands. Try using the phoneme codes which are found in the sample vocabulary on the next page as a starting point, then try modifying these codes to get different effects. You will also find it helpful to use a dictionary's pronunciations as a starting point, then, using the reference card, convert these dictionary pronunciations to phoneme codes.

A Sample Phoneme Vocabulary

A - @
AND - AND
ANSWER - A3NS'R
APPLE - A3P'L

B - B&
BYTE - B!3T

C - S&
CATALOG - KA3DIL*G
CORRECT - KORE3KT

D - D&
DECIMAL - DE3SIM'L
DIVIDE - DI1V!3D

E - &
EQUALS - &3KW'LS
EXCLAMATION - EKSKL'M@3SHUN

F - EF
FIRST - F'RST

G - J&
GOOD - GQ3D

H - 'C
HELLO - HELO1

I - !3
INCORRECT - INKORE3KT

J - J@

K - K@
KEYBOARD - K&3BORD
L - EL

M - EM YES - YES
MEMORY - MEM'R&1
MULTIPLIED - MULTIPL!1D

N - EN
NO - NO
NUMBER - NUMB'R

O - O3
OFF - *F
ON - *N
OPEN - OP'N

P - P&
PROGRAM - PRO3GRAM

Q - K%3
QUESTION - KWESC'N

R - ;R3
RETURN - R&T'R3N

S - ES
SORRY - S;R3&
SPELL - SPEL

T - T&
THAT - (AT
THE (&3
THOUSAND -)#3ZS'ND

U - %3
UNDERSTAND - UND'RSTA3ND

V - V&

W - DUBI%1
WHERE - W@R3
WRONG - R*/

X - EKS

Y - W!3

Z - SZ&

ADDING SPEECH TO EXISTING SOFTWARE

Quite often you may find existing software which you would like to have speak with text-to-speech. Programs in the public domain, those written by friends or associates, or perhaps programs which are located in your Apple User Group library are possible candidates. Although it is not possible to add speech to every piece of software, a large number can be made to speak quite easily.

What Programs Will Work

There are several conditions that a program must meet before we can add speech to it. The most important of these is that it is possible to run the program with DOS 3.3 or ProDOS. Copy protected programs are one large group that do not meet this requirement. Generally, if you are able to catalog the disk a program is on, or if you are able to start the program by RUNning it or BRUNning it from the keyboard, it will work with speech.

The Textalker program intercepts characters on their way to the screen by patching into the normal character printing routines of DOS and ProDOS (see chapter 3). Because of this, a program that stores characters directly to screen memory will bypass Textalker and won't talk. Programs that print text characters by drawing them on the hi-res graphics screen (this includes most mouse based programs) also will not talk.

The final consideration involves memory conflicts. If your program overwrites any of the Textalker program, unpredictable things will happen. More than likely it will cause your computer to "crash", forcing you to re-boot. See Appendix A on what memory locations are used by Textalker.

There are two ways to get both Textalker and your program into memory and running at the same time. The easiest is to "boot" the Textalker disk and then run your program from the keyboard. This works okay for testing programs to see if they are compatible, but is tedious if you will be using a program often.

The other approach is to place the Textalker program on the same disk as your application program. Then you can modify the start of your program to automatically install Textalker (if its written in BASIC). Or you can write a very short BASIC STARTUP (HELLO) program to install Textalker and then run your program for you when you boot the disk. Both methods are described below. However, first you must determine what disk operating system your program uses and whether it is written in BASIC or machine language.

DOS or ProDOS?

There are two versions of Textalker, one for DOS 3.3 and one for ProDOS. Therefore, you need to determine which disk operating system is used by your program. Generally, if the program is on a ProDOS formatted disk, a message indicating which version of ProDOS is in use appears on the computer's screen during the "booting" process. If no message of this type appears, then you can probably assume that the program is on a DOS 3.3 disk. Once you have determined which disk operating system is in use, you will know which version of Textalker to use.

BASIC or Machine Language?

Once you know what operating system your program uses, you need to know whether it is written in BASIC or machine language. You can determine which operating system your disk uses by doing a "catalog" of the disk your program is on. If it is a ProDOS disk, you should see something similar to the following:

```
    NAME          TYPE   BLOCKS    MODIFIED

*   PROGRAM1      BAS    4         11/12/86
    PROGRAM2      BIN    23        10/4/86
```

If the diskette is formatted in DOS 3.3, the catalog will look similar to this:

DISK VOLUME 254

```
* A    002          PROGRAM1
  B    023          PROGRAM2
```

Each of the catalogs tells us about the programs which reside on the disk. Find the name of your application in the catalog listing. If the program is on a ProDOS disk, you will be able to tell if the program is written in BASIC or machine language by looking in the TYPE column. If your program is labeled as type BAS, then it is a BASIC program. Those programs labeled BIN are in binary, or machine language.

The same information can be obtained from a DOS 3.3 catalog. The letter appearing in the leftmost column determines in what language the program is written. If the letter in the leftmost column is an "A", then the program is in BASIC. If the letter is a "B", the file is binary, or machine language.

Adding Speech From the Keyboard

It is possible to make your programs talk by simply typing in commands from the BASIC prompt (]). These steps will have to be followed each time you run your programs, but they have the advantage that no program or disk modifications are necessary. You should use this method when testing programs for compatibility.

First, you will need to install Textalker into your computer. The easiest way to do this is to "boot" the appropriate Echo disk (ProDOS or DOS 3.3) which will automatically install Textalker and exit to BASIC. As an alternative, you may enter the following command with the Textalker disk in the drive:

```
]BRUN TEXTALKER <RETURN>
```

The computer should access the disk drive, place a copyright notice on the screen, and say "ready". Now execute your program by typing:

RUN (PROGRAM NAME) <RETURN> - For a BASIC program

or

BRUN (PROGRAM NAME) <RETURN> - For a machine language program

substituting the name of your program for (PROGRAM NAME). Your program should now execute as always, with the addition of speech.

Putting Textalker on Your Disk

Caution: Before making any changes to your program disk, first make a backup copy. Then make all changes to the copy. That way, if you make a mistake, you can make another copy and try again.

Once you have shown that speech can be added to your program by using the above steps, you may add Textalker to your program disk. Now you can either modify your program or write a short program that will automatically install Textalker and then run your program. The first step is to put the proper version of Textalker on the disk with your application program. This is accomplished by using either your ProDOS Utilities disk, or your DOS 3.3 System Master disk. You will need to copy two files onto your disk from the Echo disk.

For a DOS 3.3 disk, copy the files:

TEXTALKER and TEXTALKER.OBJ

For a ProDOS disk, copy the files:

TEXTALKER and PT.OBJ

Modifying Your Program

If the program you want to talk is written in BASIC, then you can modify it to install the Textalker program and start talking. This process generally only involves adding one line, or instruction, to the BASIC program. The first step is to load the program into memory by typing:

```
LOAD (PROGRAM NAME) <RETURN>
```

Remember to substitute the name of your program for (PROGRAM NAME). Once the program is in memory, you can look at the first few instructions that are contained in it by typing:

```
LIST 0,10 <RETURN>
```

After pressing RETURN, any instructions with line numbers zero through ten will be displayed on the screen. If no lines are displayed, then your program doesn't have any instructions with line numbers this low. BASIC will begin executing your program at the lowest numbered line and will continue in numerical order until it gets an instruction to jump elsewhere in the program.

One of the first things your program should do is load Textalker. Therefore, you need to find an unused line number at the beginning of your program where you can add the command to load Textalker. Programmers generally increment their line numbers in steps larger than one so that they can easily insert lines at a later date. Let's assume that there are lines in your program numbered 0 and 5, but there is no line number 1. You can insert the command to load Textalker as line number 1 by typing:

```
1 PRINT CHR$(4)"BRUN TEXTALKER" <RETURN>
```

The line that you insert does not have to be number 1, as long as it is located near the beginning of the program and before any instructions that jump elsewhere in the program.

Now save the modified version of the program back to the disk by typing:

```
SAVE (PROGRAM NAME) <RETURN>
```

If the computer beeps and gives you the error message FILE LOCKED, you will need to type:

```
UNLOCK (PROGRAM NAME) <RETURN>
```

before re-typing the SAVE command. Now your program should talk automatically any time it is run.

Writing an Auto-Install Program

If your program is running with ProDOS, you need to be certain that the program BASIC.SYSTEM is also on your disk. If not, you can use the ProDOS Utilities disk to put it there (the ProDOS utilities disk should have been supplied to you by Apple). This is because the short program you are about to write will be written in BASIC. Now erase any program that is currently in memory by typing :

```
NEW <RETURN>
```

and enter the following short program:

```
10 PRINT CHR$(4);"BRUN TEXTALKER"
20 PRINT CHR$(4);"RUN (PROGRAM NAME)"
```

Substitute the name of your program for (PROGRAM NAME) in line 20. Also, if your program is written in machine language, you will need to replace "RUN" with "BRUN" in line 20.

Now SAVE this program under any name you think you will be able to remember by typing:

```
SAVE (NEW PROGRAM NAME)
```

Be sure to use a different name than any which are already present on the disk or the program with the same name will be over-written. From now on, when you want to RUN the talking version of your program, simply type:

```
RUN (NEW PROGRAM NAME)
```

Your program will do the rest. Or, if you make the new program the STARTUP (HELLO) program for the disk, your application program will "come up" talking every time you boot the disk.

FIXED VOCABULARY FEMALE SPEECH

Introduction

In addition to the unlimited vocabulary text-to-speech, your Echo can produce higher quality female speech. This speech is coded in a compact format specifically for use with the speech chip found on your Echo. Since it only uses 175 bytes per second of speech, it allows you to store a sizable vocabulary both in memory and on your disks. This is much less than other approaches which typically use up to fifty times as much memory for their speech.

To use the female speech requires two steps. First, you must build a "word list" of the words you wish to use with the Speech Editor found on the ProDOS Echo disk (128K is needed). The words you have chosen will be saved in a special file. This is detailed in the "Using the Word Editor" section that follows. Second, a program speaks those words by using the SAY program. This short program gives you easy access to your vocabulary from BASIC (or assembly language) by using easy to remember ampersand commands (&). It is described in the section entitled "The SAY Program" later in this chapter.

The Word Editor that came with your Echo has a vocabulary of 720 words to use with your programs. An extended vocabulary disk, Echo Words 3.5, is available which extends the available vocabulary to about 4000 words and phrases. This 3 1/2" disk is available directly from Street Electronics. Echo Words 3.5 is only compatible with a 3 1/2" disk drive and will not work with a 5 1/4" drive.

The Script

To create a word list of fixed speech you will need to know what you want your speech synthesizer to say (your "script"). Take a moment to check your text against appendix D, which lists all of the words and phrases available. You can also check that all the words you need are available by using the word editor. In any event, you should familiarize yourself with the vocabulary list.

Though there are about 720 words contained in the vocabulary, not every word that you will want to use will be available. However, if you are flexible and creative, you have a surprising number of options. Consider the advantages of homonyms, prefixes, and suffixes.

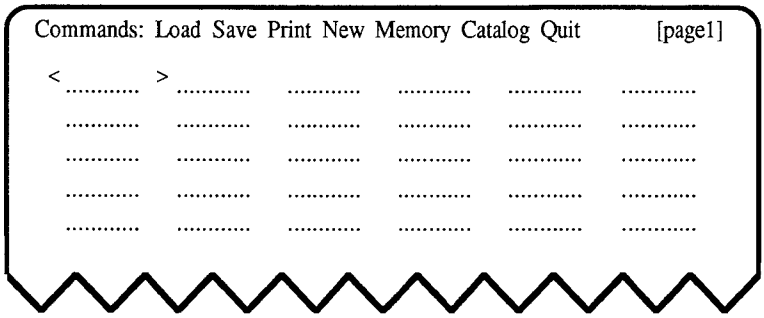
Homonyms are words that sound the same but are spelled differently. The vocabulary list usually contains the first occurance of a word with homonyms. For example, the list contains the word for the number "2", but not "to" or "too". The list also contains "U", but not "you". Taking advantage of homonyms can effectively add many words to the original 720.

Prefixes and suffixes are placed before or after a word to modify its meaning, or to make an entirely new word. Later, when you actually generate speech using the SAY program, you can add any one of four prefixes (UN', DIS', RE', or EX') or three suffixes ('S, 'D, 'T) to a word to create still more words to add to those already available. So, by putting "change" on your word list, you can say "change", "changed", "exchange", and "unchanged", just by adding the appropriate prefixes and suffixes in your program. A little creativity can un-earth such additions as dis-closed, dis-may, re-cent, re-member, ex-act, un-clear,... These additions will, of course, sound better on some words that on others, so experiment.

THE WORD EDITOR PROGRAM

Running the Editor

The Word Editor is located on the reverse side of the ProDOS Echo disk and requires 128K. To run the program you may either "boot" the editor disk or run the Applesoft program called "EDITOR". When you run the word editor program you should see the following Word Editor screen:



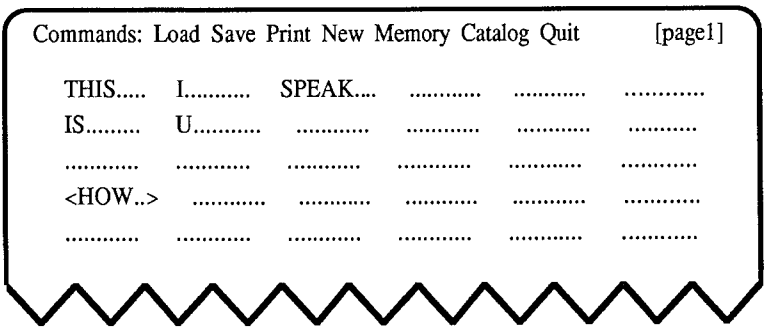
The two angled brackets (<>) form the cursor. The available commands are listed along the top of the screen. Use the arrow keys on the keyboard to move the cursor up, down, left and right. Enter the appropriate command by pressing either Apple key (🍎) simultaneously with the first letter of the command (e.g. 🍎-L for Load, 🍎-S for Save, etc.)

Entering Words

To enter a word, simply type it in. The word will appear between the two angled brackets of the cursor. To check if a word is available you may check the list in appendix D or just enter the word. The editor allows for only the first twelve letters of a word to be entered. If the word which you desire is longer than twelve letters, only the first twelve letters of the word will appear on the screen but the editor will still retrieve the word properly. If the word is not in the vocabulary, the Word Editor will "beep" and erase your entry. To change a word, simply type over it. If the new word is not in the vocabulary, the editor will "beep" and the old word will be restored. While entering a word you may use the back arrow or the delete keys to correct mistakes. You may also press the ESC key at any point to restore the original entry. In fact, the ESC key may be pressed at almost any time to cancel a command. To delete a word, use the arrow keys to place the cursor around the word and hit the Delete key.

There are two screens or "pages" onto which you may enter words. To flip between these two pages, use the TAB key. The words may be

entered anywhere on either screen. This is useful for organizing your words on the screen in a way that makes sense to you. The screens may be saved for future editing also. The following screen is an example of a word list in progress:



The phrases "This is how I speak" and "This is how you speak" can be spoken from this list. "I" and "U" have been grouped together since they are possible substitutions in the phrase. Other verbs might also be entered under "SPEAK", such as "READ", etc.

Note that the word "you" is entered as "U" (this has been previously explained in the "homonyms" section). Also note that the cursor is now on the word "HOW". To replace "HOW", it would only be necessary to type over it.

Later on in the manual you will see how it is possible to speak the words in your word list, referring to them by their relative position in the list. The editor will place the words into the list starting with the upper left corner of page number 1, move down the first column, then move down the succeeding columns, then onto page two. In the example above, the words would be put into your word list in the following order: 1) THIS 2) IS 3)HOW 4)I 5) U 6) SPEAK.

Deleting a Word

Position the cursor over the word that you would like to remove from the list and press the DELETE key.

Selecting Page One or Two

Press the TAB key to flip between pages.

Talking From the Editor

To hear a word spoken, position the cursor around the word to be spoken and type -T. The disk will whir for a few seconds and then the word will be spoken. On the above screen the word "HOW" would be spoken if you type -T.

Saving a File

Use this command to save your list to an initialized ProDOS disk. After typing -S, a menu with three options will appear.

The first option, Save the Text Screens, will save the words which you have typed in case you want to do some more editing in the future. This option saves only the text on the screen and does not save any of the information necessary to speak the words from the Say program. Although it is possible to load the screen information from a normal Echo Words file, it is a good idea to use this option as it will preserve any formatting which you may have done on the screen.

The second option, Save a Normal Echo Words File, will save a file which is ready to be spoken using the SAY program. Generally you will want to save both an Echo Words style file and a Text Screen file whenever you build up a word file. This is so that you will not only have the file from which you can speak your words, but also the text representation which can be loaded back into the editor in case you need to make changes in your word file later on.

The third option saves a special file called a "compressed" file. This option saves only the data which comprise the words in your word file. This option will generally not be used. It is included for compatibility with very early versions of Echo software.

Word files (option #1) will be saved with the letters ".WRD" appended to their name, and screen text files (option #2) will have ".SCRN" appended. The program does this so that when you look at a catalog of a disk you will be able to easily recognize those files associated with the Word Editor. Do not add .WRD or .SCRN to the name of the file that you type in, the editor will do this automatically.

Loading a Screen

Type ♦-L to get the LOAD menu. You will be presented with two options. The first loads a previously saved screen. The second creates a screen from a word file. Note that since a compressed file does not contain the text of the words, this cannot be used. Also, the words will be put on the screen in a single list. Any formatting that may have been present when the word list was created will be lost. If you want to retain the formatting of a screen, be sure to save the screen as a type ".SCRN" file (option #2).

Printing the Words

Entering ♦-P will send the words on the screen to a printer. The words will be printed along with the numbers that may be used from the SAY program to speak them.

Memory Usage

The ♦-M command computes the size of the word list (the Memory that the file will require). You must use this option to make sure that the file size does not exceed the memory present in your computer.

Catalog Command

To catalog a disk, type ♦-C. When you are asked for the name of the

disk you wish to catalog, you may enter either a ProDOS volume name, or a slot or drive (e.g. ",D2" will catalog drive two).

Quitting the Editor

Entering ⌘-Q lets you quit the program. You will be asked if you wish to run the SAY program. If you answer no, the program will end via the standard ProDOS exit routine.

THE SAY PROGRAM

The SAY program, which is found on the Word Editor disk, is used to actually "say" the words which you have selected in the Word Editor program. These words may be strung together into sentences and phrases, or used individually. The following examples assume that you will be using an example word list which is also found on the Word Editor disk and is called SAMPLE. The following list describes the contents and order of the words in the file SAMPLE:

I
Am
Like
Call
Change
Able
2
The
Echo II

Installing the Say Program

In order to use the SAY program, you must first install it into memory by typing:

```
BRUN SAY <RETURN>
```

The SAY program will disconnect the auxiliary /RAM disk and load SAY2 into auxiliary memory. Once the SAY program has been loaded, there are 12 commands which are available to you, as well as the ability to add suffixes and prefixes to the words in your word files. All of the commands which are a part of the SAY program use what is called the "Ampersand Vector". This is a special feature in the Apple which allows you to easily interact with a machine language program (which SAY is). As you will see below, all of the SAY commands begin with an ampersand character (&). These commands can be typed directly into the Apple, or may be used from within a BASIC program. See Appendix A for information on using the Say program from machine

language.

NOTE: If you are using Textalker as well as the SAY program, you must install Textalker first. Otherwise the Textalker program will overwrite portions of the SAY program and your program will not work.

Loading a Wordfile

The first command which we will examine is the &LODWRDS command. This command will take a specified wordlist and place it in auxiliary memory, ready to be spoken. Load the SAMPLE wordlist by typing:

```
&LODWRDS,"/WORDS/SAMPLE"    <RETURN>
```

Notice that we have included both the volume name and the file name in the &LODWRDS command.

Showing the Words

Now that a wordlist has been loaded into memory, we can check to see what the contents of the wordfile are. The &SHOWWRDS command will list the contents of the wordlist which is currently active. Type:

```
&SHOWWRDS    <RETURN>
```

The words in the file SAMPLE should now be shown on your screen.

Speaking the Words

To actually have the words spoken, you will use the &SAY command. You can speak only one word, or string words together to form sentences. As an example, let's have the Echo say "I like the Echo II". Type:

```
&SAY,"I","LIKE","THE","ECHO II"    <RETURN>
```

Rather than using the actual words you want spoken in the &SAY command, you can use the number of a word within the wordfile. Numbers are assigned to words in the order which they were chosen. (See the section on the Word Editor for more information on the numbering of words). The first word in a file is always zero. So, we could accomplish the same thing as above by typing:

```
&SAY,0,2,7,8
```

You can even mix the two methods:

```
&SAY,"I",2,"THE",8
```

You may also add suffixes and prefixes to any of the words in the vocabulary. The following are the available affixes:

Suffixes	Prefixes
'S	DIS'
'T	RE'
'D	EX'
	UN'

To add a prefix or suffix to a word, include it within the commas separating words, but outside of any quotation marks. As an example, the word "change" which is in our list, can be changed to "exchange" in the following way:

```
&SAY,EX'"CHANGE"    <RETURN>
```

Be sure to include the apostrophe after prefixes and before suffixes.

It is possible to combine all of the options available with the &SAY command into one sentence:

```
&SAY,"I",RE'"CALL","I","AM",UN'5,6,DIS'
  "LIKE",8'S <RETURN>
```

Obviously you would probably never use a statement as cryptic as this, but the flexibility is there if you need it.

Changing the Speed

There are two commands which affect the speed at which the Echo speaks. They serve to toggle between the fast and slow speeds. Type:

```
&SAYFAST    <RETURN>
```

Now type:

```
&SAY,0,1,6,7,5    <RETURN>
```

Hear the difference? The Echo is now in fast mode. You can return to the slower, default speed by typing:

```
&SAYSLOW    <RETURN>
```

Changing the Pitch

It is possible to make relative adjustments to the base pitch level at which a word was originally factory encoded. Type:

```
&SAYPITCH,10    <RETURN>
&SAY,"ECHO II"    <RETURN>
```

The pitch of the speech has been raised by ten! A pitch level adjustment may vary between -63 and +63. Let's assume that you raised the pitch by 30. A word that varies in pitch from 35 to 50, as encoded at the factory, would now vary between 65 and 80. These values would exceed the maximum level that the speech chip can use (63), and would be spoken in a high pitched monotone. A similar effect would occur if the bottom range of 1 was exceeded. Some additional examples would be:

`&SAYPITCH,10` (will raise the pitch 10 steps)

`&SAYPITCH,-3` (lowers the pitch 3 steps)

`&SAYPITCH,0` (returns the pitch to normal levels)

Changing the Volume

You can also make relative adjustments in the volume of the speech. The &SAYVOLUME command works almost identically to the &SAYPITCH command, except that the range of volume is -15 to +15. Try making the Echo whisper by typing:

```
&SAYVOLUME,-13    <RETURN>
&SAY,8    <RETURN>
```

Using a zero in the &SAYVOLUME command will return the volume to the normal level. Large volume levels may tend to distort the speech.

Pausing

You may insert a pause between words or series of words by using the &PAUSE command. You can vary the length of the pause in increments of 1/10th second. An example would be:

```
&SAY,0,2,7,8:&PAUSE,5:&SAY,0,2,7,8 <RETURN>
```

The Echo will wait 1/2 second between (5/10 sec.) between phrases

Resetting the Speech Chip

If you interrupt the Echo while it is speaking (by pressing control-reset, for example) it may be necessary to reset the speech chip.

This is accomplished by typing:

```
&RESET    <RETURN>
```

Getting Help

Built into the Say Program is a feature that you can use to remind yourself what the valid Say Program commands are. The command

```
&HELP
```

will print a list of the Say program commands to the Apple's screen.

Using the Animation Vector

The commands described in this section are for machine language programmers only. If you do not program in machine language, you may go on to the next section.

The SAY program has the ability to enable and disable an animation vector so that you can do animation while the Echo is speaking. The animation vector in enabled by typing:

```
&ANIM, address where animation routine resides
```

Your animation routine will be called by the SAY program periodically. The accumulator will contain a zero on the first call and will increment by one on each successive call, returning to zero at the beginning of each new word. Your animation routine should restore all zero page addresses and registers before returning. Also, your routine should not take more than a few thousand cycles. If your routine takes too much time, the Echo will hang. If this happens, use the &RESET command.

The animation vector can be disabled by typing:

```
&ANIMOFF
```

MUSIC AND SOUND EFFECTS
(Echo+ Only)

Introduction

Included on the Echo+ Music/Sound disk is the SOUND program. This program allows you to easily create music and sound effects from either BASIC or assembly language. The SOUND program may be installed along with Textalker and the Say program so that one application can incorporate both types of speech as well as music and sound effects.

The Echo+ has the capability of playing music using up to 6 different simultaneous voices or melodies. To use the full music capabilities of the Echo+, a music editor such as the Music Construction Set from Electronic Arts is necessary. Still, the Sound program itself does allow for quality music to be generated very simply from a BASIC program by anyone with a knowledge of written music. From BASIC you can play a one note melody with a range of up to 8 octaves, accompanied by three note chords. The melody can even be in either of two voices.

With the Sound program you can also play a wide variety of sound effects. But, before you can play any sound effects, you must first use the Sound Editor program to create and save a sound effects file to disk (see the section on the Sound Editor). You can have 31 different sound effects available in the Sound program at one time. Since the Echo+ has two separate sound generators, two different sound effects can be played simultaneously.

THE SOUND PROGRAM

Installing the Sound Program

In order to use the SOUND program, you must first install it into memory by inserting the Music/Sound disk and typing:

```
PREFIX /SOUND <RETURN>
BRUN SOUND <RETURN>
```

The SOUND program will disconnect the auxiliary /RAM disk and load SOUND2 into auxiliary memory. Once the SOUND program has been loaded, there are 11 commands which are available to you. All of the commands which are a part of the SOUND program use what is called the "Ampersand Vector". This is a special feature in the Apple which allows you to easily interact with a machine language program (like SOUND). As you will see below, all of the SOUND commands begin with an ampersand character (&). These commands can be typed directly into the Apple, or may be used from within a BASIC program. See Appendix A for information on using the SOUND program from machine language.

NOTE: If you are using Textalker or the SAY program as well as the SOUND program, you must install them first. Otherwise those programs will overwrite portions of the SOUND program and your application program will not work.

MUSIC

Playing Notes and Chords

The primary command for generating music is the PLAY command. This command generates a one note melody accompanied by three note chords. The notes are specified in a text string with commas separating the notes within the string. The notes may be sharp or flat, and may be played in any of 8 octaves and for varied lengths of time (utilizing the "dot" and "tie" options, in addition to the five basic note values). You may also specify rests. The chords are also specified by letter and may be played in any octave. In addition, chords may be major or minor. For more clarification of these options, see the explanations that follow and the example at the end of this section.

Notes: The letters `C`, `D`, `E`, `F`, `G`, `A`, and `B` specify which note is to be played, `C` being the lowest note of an octave.

Flats: Flats are indicated by a lower case letter B (b). For example Eb is an E flat.

Sharps: A sharp is specified by a pound sign (#). F# is F sharp.

Octave: Each note may be followed by a number from 1 to 8 specifying in which octave the note is to be played, 1 being the lowest octave. For example, G#3 would play a G sharp in the third octave.

Length: The length of a note is shown by following the note with a slash (/) and a number representing the length. /1is a whole note; /2 and /4 are half and quarter notes; /8, /6, and /3 are eighth, sixteenth, and thirty-second notes respectively. For example, C3/4 will play a quarter note C in the third octave; B/6 will play a sixteenth note B.

Dots: A dotted note is created by following the length notation with a dot (.). For example, /2. is a dotted half note.

Tie: A tied note is specified by an underline. For example, a half note tied to an eighth note would be: /2_/8.

Rest: A rest is an 'R' followed by the length as shown above. For example, R/4 is a quarter rest.

Chords: A chord is distinguished by being enclosed in brackets. For example, [C] will start playing a C major chord. Once a chord is started, it will play continuously until another chord is requested or until a stop chord command [S] is given. Chords are major unless a minor chord is specified by following the chord with the letter 'm'. The chord may be played in any of 8 octaves. For example, [C3m] will play a C minor chord in the third octave.

Please note that you do not have to retype those specifications which you do not wish to change. If a quarter note C has already been specified, then, to play a quarter note D you only need to type the D.

For example the following will play C, D, E, F as quarter notes in the third octave, followd by G, A, B as half notes also in the third octave, and then C as a whole note in the fourth octave:

```
&PLAY,"C3/4,D,E,F,G/2,A,B,C4/1"
```

Changing the Speed, Voices, and Decay

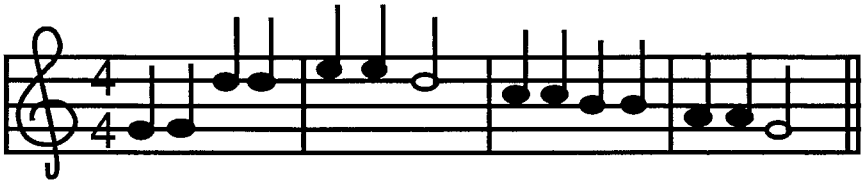
The TEMPO command is used to adjust how fast your songs are played. The speed is specified by a number between 1 (fast) and 255 (slow). For example, `&TEMPO,50` will set the speed at 50. The TEMPO command may also be directly followed by notes to be played without a separate PLAY command. The command `&TEMPO,100,"A,B,C"` will play the notes A, B, and C at a speed of 100.

If your Echo+ is installed in an Apple IIGS you will notice that the speed of your music is affected by the system speed. If you are running your computer at the "fast" speed your music will play almost three times faster and you will have to adjust the tempo accordingly.

The Echo+ may play its music in two different sounding voices or instrument sounds (`&VOICE,1` or `&VOICE,2`). Voice number 1 is the standard voice. Like the TEMPO command, the VOICE command may be directly followed with notes to be played without having to enter a separate PLAY command. For example, the command `&VOICE,2,"D,E,F"` would play the notes D, E, and F in voice 2.

The DECAY command adjusts the "decay", or length of time it takes for a note to fade away. The number for decay may be anything from a 0 (slow) to 255 (fast), but any decay value larger than 5 will probably be too fast. For example, the command `&DECAY,4,"A,B,C"`will play the notes A, B, and C with a stoccato effect.

A Sample Song



Try entering the following short BASIC program to play the short melody shown above. You can experiment with the various VOICE, DECAY, and TEMPO settings for different effects. (Don't forget to BRUN SOUND first if it's not already installed).

```
10 &TEMPO,50,DECAY,3,VOICE,1

20 &PLAY,"G4/4,G,D5,D,E,E,D/2"

30 &PLAY,"C/4,C,B4,B,A,A,G/2"
```

SOUND EFFECTS

Loading and Playing Sound Effects

Before a sound can be played it must first be created using the Sound Editor (described in the next section) and then saved as a short binary file. Sample sound effects such as "GUNSHOT.SND" and "OCEAN.SND" can be found on your Echo+ Music/Sound disk. Notice that sounds have the suffix ".SND" added to their name. You do not need to specify this suffix when issuing commands.

The &LODSOUND command is used to load sounds created with the Sound Editor into the SOUND program. When you load a sound, you will need to assign it a reference number between 1 and 31 and specify its file name. The command `&LODSOUND,1,"GUNSHOT"`, for example, would load the sound effect "GUNSHOT.SND" into the computer as sound effect #1.

Once a sound effect is loaded into the computer it is played back with the &SOUND command and is referenced with the number you assigned it. If you had used the command above to load the "gunshot" sound you could then play it back with a `&SOUND,1` command. Some sounds are continuous and will keep playing until you spefically turn them off. You can do this by either issuing a `&SOUND,0` command or by using the &PAUSE command (see below).

To experiment with these commands install the SOUND program and try entering the commands listed below:

```
&LODSOUND,1,"GUNSHOT" <RETURN>
&LODSOUND,2,"TRAIN" <RETURN>
&SOUND,1 <RETURN>
&SOUND,2 <RETURN>
&SOUND,0 <RETURN>
```

The Echo+ has two separate sound generators (chips) and you can specify which one will play a given sound effect. Some earlier Echos had limited stereo capability with one sound chip connected to the left speaker and one connected to the right speaker. For this reason, the two sound chips are referred to as "left" and "right" and the commands to specify them are &LEFT and &RIGHT.

If the command &LEFT is given, all subsequent sound effects are played with the "left" sound chip. Likewise, the &RIGHT command plays all following sounds through the "right" sound chip. If either command is followed by a number it will play that sound effect without having to have a separate &SOUND command. Try entering the following commands:

```
&LODSOUND,1,"TRAIN"   <RETURN>
&LODSOUND,2,"OCEAN"   <RETURN>
&LEFT,1   <RETURN>
&SOUND,2   <RETURN>
&LEFT,1,RIGHT,2   <RETURN>
&LEFT,0,RIGHT,0   <RETURN>
```

Notice that you can combine commands on a single line and that the ampersand (&) is only needed at the start of the line.

The Pause and Reset Commands

The &PAUSE command waits a specified length of time. The number that follows it controls how long the pause will be in tenths of seconds. For instance, the `&PAUSE,10` command will pause for 1 second. This command is useful for timing sound effects. Like the &TEMPO command, it is also affected by system speed and pauses will be shorter with an Apple IIGS running at the "fast" speed.

If the <RESET> key is pressed it will not only reset your computer but will reset the sound chips on the Echo+ as well. Because of this, the sound chips need to be re-initiallized before you can again generate music or sounds. If you re-install the SOUND program this will be done automatically. To avoid having to re-run SOUND every time this occurs you can issue a &RESET command which will restore the Echo+ to normal for you.

THE SOUND EDITOR

Introduction

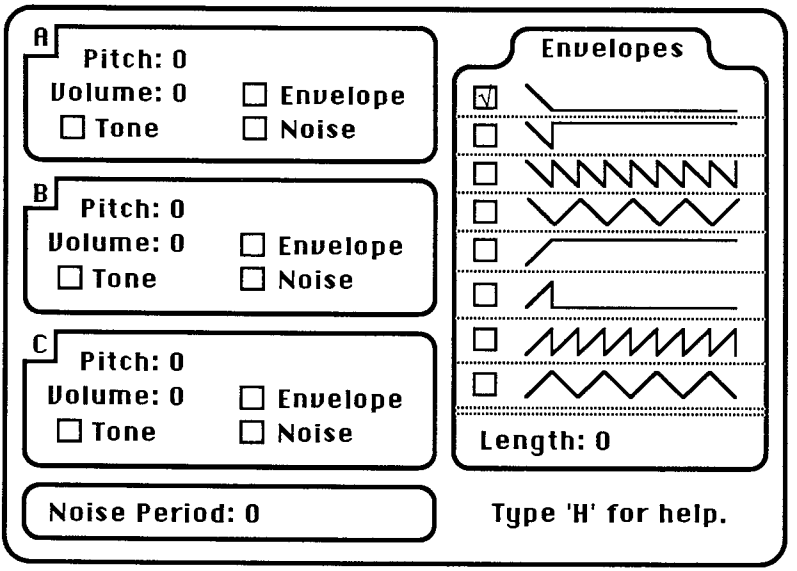
In order to generate sound effects using the SOUND commands, it is first necessary to create them. You can design a sound effect using the Sound Editor and save it to disk for use in programs and applications. Each sound is made up of from 1 to 3 sound "channels", each of which is programmed separately. Each of these can contain a tone, a noise, or both, all of which combine to make a sound effect. Using the SOUND commands the sound effect can then be programmed to play out of either of the Echo+'s two sound generator chips, or both for simultaneous sound effects.

How to Begin

To run the Sound Editor program you need to insert the Music/Sound disk into your drive and then enter the following commands:

```
PREFIX /SOUND <RETURN>
RUN SOUND.EDITOR <RETURN>
```

You will soon see the Sound Editor screen which is drawn below. The three boxes on the left (labeled A, B, and C) represent the three "channels" of sound available for each sound effect.



How to Move and Select

To learn how to move around the screen, type "H" for "Help". As you see from the Help screen, the arrow keys move the cursor within the boxes, and the Apple keys used with the arrow keys move from box to box. You can also press "A", "B", or "C" to enter the corresponding box, "N" for the "Noise Period" box, "E" for the "Envelopes" box, and "L" to move to "Length" at the bottom of the Envelopes box.

To select one of the options preceded by a small box, press <RETURN> or the space bar. To de-select, press it again. A checkmark appearing in the box indicates that it has been selected. To enter or change a number, move to the appropriate option and type in the new number. Unless you've already entered the maximum number of digits, or pressed an arrow key (other than backspace) while entering the new number, pressing the escape key will restore the original number. Also, if you type a number that is larger than the maximum value for any option, the entry will be ignored and the original number will be restored.

To return to the Sound Editor screen from the Help screen, you may press any key.

Sound Effect Options

Sound effects consist of either tones at a certain pitch, or electronic "noise" (static), or both, at a specified volume or pattern of volume ("envelope"). To create a sound effect, it is necessary to "fill in the blanks" on the Sound Editor screen, selecting "Tone" and/or "Noise", a volume or an envelope, and a pitch (if tone is selected). These options are further explained below:

TONE: To choose a tone, select "Tone" and enter a pitch.

PITCH: The pitch can vary from 1, which is the highest pitch, to 4095, which is the lowest except for 0 (think of 0 as 4096). To make the tone a specific note, use the pitch value in the sound effects column of "Appendix F: Note Value Table".

NOISE: To choose a noise, select "Noise" and enter a "Noise Period" (or leave it at 0). Noise has no pitch; it is merely "white noise" or static.

NOISE PERIOD: The noise period can vary from 0 to 31 an is used to vary the quality of noise. As you can set only one Noise Period, this setting affects noise in all three channels.

VOLUME: To select "Volume" instead of "Envelope", enter a number from 1 (quiet) to 15 (loud) or 0 (off).

ENVELOPE: To choose "Envelope" instead of "Volume", select it and then choose one of the eight envelopes and a length.

THE ENVELOPES: These graphs represent possible patterns of volume. The first, for instance, graphs a sound which starts out loud and then fades to nothing. The second envelope does almost the same thing, but then rises sharply to play loudly until stopped. This setting affects envelopes in all three channels.

ENVELOPE LENGTH: The envelope length can vary form 1 (the shortest) to 65535 (very long) to 0 (which is like 65536). This number controls the length of time that as sound plays. For example, using the first envelope, setting the length to 1000 would result in the sound quickly fading away; a length of 10000 would result in the sound fading away more slowly.

While using the Sound Editor, use the Help command ("H") to review the maximum values for each option.

Additional Editor Commands

There are additional commands available from the Sound Editor program besides the "Help" command. Like the "Help" command, all of the commands are entered by typing just their first letters rather than entering the entire commsnd. These are desribed below.

Play: The "Play" command will play the sound that is currently on the Sound Editor screen.

Stop: The "Stop" command will stop any sound that is playing.

Reset: The "Reset" command resets all sound options to zero.

Quit: Use the "Quit" command to exit the Sound Editor program.

Disk: The "Disk" command allows you to access the disk drive with any of the three following options:

Load: Loads a sound effect into the Sound Editor.

Save: Save a sound effect from the Sound Editor to disk.

Catalog: Catalogs a disk.

Where to Begin (Experimentation and Examples)

At this point you may want to try experimenting with different sounds or look at how the sample sound effects were created. If you would like to work with some sample sound effects, type "D" to access the disk, then "C" to catalog the Music/Sound disk. Press <RETURN> when asked for a file or path name (you don't need to type a name to catalog the Music/Sound disk if you've already set the prefix to /SOUND).

The files ending in ".SND" are sound effects files. Note any that sound interesting and press return to get back to the Sound Editor. Now type "D" again and "L" to load a sound effects file. When typing the name of the file, do not add ".SND". This suffix only appears within the catalog to help you identify sound effects files.

After loading in a file, the values for this effect should appear on the Sound Editor screen. Press "P" to play and "S" to stop playing the sound. Try all the sample files and note what settings get what sort of results. (The "TRAIN, "GUNSHOT", and "OCEAN" files are especially interesting examples of the possibilities of noise when used with different envelopes, while "GALLOP" uses both tone and noise for a very different effect.) You can also use the editor to modify these sounds. While the Echo+ is playing one sound effect, try changing some of the options and listen to the results. If you come up with something you like, save it onto an initialized ProDOS disk by using the "Disk" and "Save" commands.

APPENDIX A - Technical Information

Memory Locations Used by Textalker

ProDOS Version:

$221	to	$37C	(main memory, during installation only)
$37D	to	$3CF	(main memory)
$6000	to	$8FC7	(auxiliary memory)

DOS 3.3 Version

$9300	to	$94FF	(main memory, during installation only)
$D000	to	$FEB3	(main memory)

Memory Locations Used by The Say Program

Locations used by the program:

$264	to	$34E	(main memory, during installation only)
$34F	to	$37C	(main memory)
$900	to	$1DFE	(auxiliary memory)

Locations used by ".WRD" files:

$2000	to	end of file	(auxiliary memory)

Memory Locations Used by The Sound Program (Echo+ only)

Locations used by the program:

$22C	to	$318	(main memory, during installation only)
$319	to	$34E	(main memory)
$5000	to	$5C13	(auxiliary memory)

Using Textalker From Assembly Language

To use Textalker when programming in assembly language, simply do a JSR to "COUT" ($FDED) with the character to be sent in the accumulator. For example, the following program will result in the Echo saying "HI":

```
300: A9 C8      LDA #$C8    ;"H"
302: 20 ED FD   JSR $FDED   ;COUT
305: A9 C9      LDA #$C9    ;"I"
307: 20 ED FD   JSR $FDED   ;COUT
30A: A9 8D      LDA #$8D    ;[RETURN]
30C: 20 ED FD   JSR $FDED   ;COUT
30F: 60         RTS         ;DONE
```

The phoneme mode is accessed similarly, except that all phoneme strings must begin with a Control-V ($96) and end with a [RETURN] ($8D). For example, to say HI using the phoneme mode, you could write the following program:

```
300: A9 96      LDA #$96    ;CTRL-V
302: 20 ED FE   JSR $FDED   ;COUT
305: A9 C8      LDA $#C8    ;"H"
307: 20 ED FD   JSR $FDED   ;COUT
30A: A9 A1      LDA #$A1    ;"!"
30C: 20 ED FD   JSR $FDED   ;COUT
30F: A9 B3      LDA #$B3    ;"3"
311: 20 ED FD   JSR $FDED   ;COUT
314: A9 8D      LDA #$8D    ;[RETURN]
316: 20 ED FD   JSR $FDED   ;COUT
319: 60         RTS         ;DONE
```

Using The Say Program From Assembly Language

It is possible to access the SAY program directly from assembly language. To use the SAY program from assembly language, store a command code in zero page location $EB, load any registers as noted, and do a JSR to $3F5 (the ampersand vector). The SAY program preserves the A, X, and Y registers. However, it modifies zero page locations $9, $EB, $EC, and $ED. $EB always returns set to zero. The following table lists the command bytes. For information on what each command does, see Chapter 6 (Fixed Vocabulary Female Speech).

Command	Code	Command	Code
SAY[1]	$80	DIS'[5]	$8D
SAYFAST	$81	EX'[5]	$8E
SAYSLOW	$82	RE'[5]	$8F
SAYPITCH[2]	$83	UN'[5]	$90
SAYVOLUME[2]	$84		
SHOWWRDS	$85	'D[5]	$91
LODWRDS[3]	$86	'T[5]	$92
RESET	$87	'S[5]	$93
PAUSE[2]	$88		
ANIM[4]	$89		
ANIMOFF	$8A		
HELP	$8C		

Notes:

1. Load the accumulator with the number of the word to be spoken. (The first word in the list is number zero.)
2. Load the accumulator with the appropriate value.
3. Load the accumulator with the length of the string to be passed to the SAY program. Set $5E and $5F to point to the start of the string. The string should have all the high bits off (positive).
4. Load the accumulator with the LSB of the address of the animation routine, and the Y register with the MSB.
5. The prefix and suffix commands will affect the <u>following</u> word.

Example:

This program uses the LODWRDS command to load the file "/WORDS/SAMPLE" (the program automatically appends the .WRD) and then says "Echo II". The SAY program must already be installed by issuing a "BRUN SAY" command from BASIC or its equivalent from assembly language and the ProDOS MLI.

```
300: A9 1B      LDA  #<PATH   ;LSB of pathname
302: 85 5E      STA  $5E      ;LSB goes here
304: A9 03      LDA  #>PATH   ;MSB of pathname
306: 85 5F      STA  $5F      ;MSB goes here
308: A9 86      LDA  #$86     ;command for LODWRDS
30A: 85 EB      STA  $EB      ;store command here
30C: A9 0D      LDA  #$0D     ;length of pathname
30E: 20 F5 03   JSR  $3F5     ;call SAY program
311: A9 80      LDA  #$80     ;command for SAY
313: 85 EB      STA  $EB      ;store command
315: A9 08      LDA  #$08     ;number of "Echo II"
317: 20 F5 03   JSR  $3F5     ;call SAY program
31A: 60         RTS           ;return

31B: 2F 57 4F   ASC  '/WORDS/SAMPLE'
31E: 52 44 53
321: 2F 53 41
324: 4D 50 4C
327: 45
```

Using The Sound Program From Assembly Language
(Echo+ only)

Like the SAY program, it is possible to access the SOUND program directly from assembly language. To use the SOUND program from assembly language, store a command code in zero page location $EB, load any registers as noted, and do a JSR to $3F5 (the ampersand vector). The SOUND program preserves the A, X, and Y registers. However, it modifies zero page locations $9, $EB, $EC, and $ED. $EB always returns set to zero. The following table lists the command bytes. For information on what each command does, see Chapter 7 (Music/Sound Effects).

Command	Code
SOUND[1]	$A0
LEFT	$A1
RIGHT	$A2
PLAY[2]	$A3
TEMPO[1]	$A4
DECAY[1]	$A5
VOICE[1]	$A6
RESET	$A7
PAUSE[1]	$A8
HELP	$A9
LODSOUND[3]	$AA

Notes:

1. Load the accumulator with the appropriate value.
2. Load the accumulator with the length of the string to be passed to the SOUND program. Set $5E and $5F to point to the start of the string. The string should have all the high bits off (positive).
3. Set up the string as in note 2, and also load the Y register with the sound number.

Example:

This program uses the LODSOUND command to load the file "/SOUND/GUNSHOT.SND" (the program automatically appends the .SND) and then plays it. The SOUND program must already be installed by issuing a "BRUN SOUND" command from BASIC or its equivalent from assembly language and the ProDOS MLI.

```
300: A9 1B      LDA #<PATH   ;LSB of pathname
302: 85 5E      STA $5E      ;LSB goes here
304: A9 03      LDA #>PATH   ;MSB of pathname
306: 85 5F      STA $5F      ;MSB goes here
308: A9 86      LDA #$AA     ;LODSOUND command
30A: 85 EB      STA $EB      ;store command here
30C: A9 0D      LDA #$0E     ;length of pathname
30E: A0 01      LDY #$01     ;load as effect #1
310: 20 F5 03   JSR $3F5     ;call SOUND program
313: A9 80      LDA #$A0     ;command for SOUND
315: 85 EB      STA $EB      ;store command
317: A9 08      LDA #$01     ;number of "GUNSHOT"
319: 20 F5 03   JSR $3F5     ;call SAY program
31C: 60         RTS          ;return

31D: 2F 53 4F   ASC '/SOUND/GUNSHOT'
320: 55 4E 44
323: 2F 47 55
326: 4E 53 48
329: 4F 54
```

APPENDIX B - Features to Aid Blind Users

Extra commands designed to help the blind user are contained in both the ProDOS and DOS 3.3 versions of Textalker. This section is written as a tutorial and should be reviewed while at the computer. Before proceeding any further you should "boot" either Textalker disk or type:

```
BRUN TEXTALKER <RETURN>
```

with either Textalker disk installed in the drive. After the disk stops spinning, a copyright notice will appear on the screen and the computer will say the word "ready".

Type in the word "PRINT", but do not press RETURN. Now press the left arrow key (⇐) a few times. Notice that as you back up the cursor, the ECHO will pronounce the letters that the arrow is passing over. Now press the right arrow key (⇒) a few times. It also speaks. Only the characters normally pronounced in the punctuation mode currently set will be spoken.

Entering Line Review

The line review command provides you with a controllable audio cursor. You may move this invisible cursor around the screen to review whatever text is currently displayed on the screen. To explore this, we will enter the line review command and review the copyright notice that was just displayed on the screen. Now type the command to enter line review which is:

```
<CTRL-L>
```

The ECHO responded to this command by saying "review." It is now expecting line review commands. When you first enter line review you may enter any of the following commands (but do not type anything yet).

Any letter from A through X: Typing one of these letters will cause the audio cursor to be positioned at the beginning of the line which numerically corresponds to the letter selected. Pressing the letter "A" will position the cursor at the beginning of the first line. Pressing "B" will place it at the beginning of the second line, and so on to the twenty-fourth line (X). Textalker will read the line which you select and then place the audio cursor at the beginning of that line.

Z : Pressing Z will place the audio cursor at the same vertical and horizontal position as the normal video cursor.

SPACE BAR: Pressing the Space Bar will cause the ECHO to tell you the current vertical and horizontal position of the cursor. It will then exit line review.

A Control Character: Typing a Control character will change the command used to enter line review. This procedure is identical to that used to change the Control-E command in Textalker.

Now press the Space Bar. The ECHO responded by saying a letter, corresponding to the vertical position of the cursor, and then two numbers, which correspond to the horizontal position of the cursor. The leftmost position is zero. To re-enter the line review type:

```
<CTRL-L>
```

and then...

```
C
```

The ECHO should have confirmed your choice by reading the contents of the third line to you (COPYRIGHT 1985 STREET ELECTRONICS CORP.). There are now several new commands available to you.

Using the Audio Cursor

Press the right arrow twice:

⇒ ⇒

Please remember that commands in line review should not be followed by pressing RETURN.

The ECHO just said "COPYRIGHT 1985." Now press the left arrow once:

⇐

The ECHO said "1985". (The last word it had spoken.) Now type:

T

and

⇐ ⇐ ⇐

The ECHO said the letters "T" "H" and "G". What did we just do? When you first entered line review you were also in word mode; that is, pressing the arrow keys moved the cursor right or left by one word at a time. Pressing the letter "T" allows you to Toggle between (switch between) word mode and letter mode. In letter mode the cursor moves letter by letter. Press "T" again. You are now back in word mode. Press the arrow keys and check if you are not convinced. You may alternately use the commands "L" and "W" to chose between Letter and Word mode. Now return to word mode and return the cursor to the beginning of the line and press:

<RETURN>

The ECHO repeated the complete line. This is because pressing the RETURN key causes the ECHO to speak the entire line, starting from its current position. When it finishes speaking the line, the cursor will

be back at the leftmost position of the same line.

Moving From Line To Line

To move the cursor from line to line type:

;

and you will move up one line. To move down one line type:

/

This version of Textalker also supports the use of the up and down arrow keys. When moving up and down the cursor will always move to the beginning of the new line and will speak the contents of that line. Try moving to line A (the first line) with these new commands. Now type a comma:

,

The ECHO will say "to" and wait for you to indicate what line you would like it to read down to. You should respond with a letter corresponding to a line number greater than (further along in the text than) the current line. For example press:

C

The ECHO will now read lines A through C to you.

Entering Textalker Commands

It is also possible to modify the punctuation and speed characteristics of the speech from within line review. You can use the Control-E commands available in Textalker by simply typing the command. In line review you do not have to precede the command with a Control-E, simply type in the command. For example, if you want to switch to the All punctuation mode, simply type the letter "A", for Some punctuation type "S", and for Most punctuation, type "M". You can also switch between Compressed and Expanded modes in the same way.

Reviewing Text In Columns

This version of Textalker also allows you to review information on the screen in columnar format. You may select from among nine different columns in which to review. The column is selected by pressing a number key from 1 to 9. Pressing the 0 key will cause Textalker to revert back to its full line review. While any of the columns are selected, you may hear the entire contents of that column by pressing the RETURN key. If you want to hear an entire line while in the column mode press the "R" key.

You may alter a column's boundaries in one of two ways: To extend the edge of a column, simply use the arrow key to move to the existing edge of that column. Then, "stretch" the boundary by holding down the "Open Apple" key while using the arrow key to move the boundary over. To reduce the width of a column, just move the cursor to the desired boundary and press either the "-" or "=" key. Pressing the "-" key moves the left edge, pressing the "=" key moves the right edge. Columns may overlap each other and may even be contained within each other. Textalker "remembers" the last column used upon exit from line review so that the same column is selected when you re-enter line review. If you use the "Z" key to select the current position of the cursor, Textalker automatically reselects the normal full line review.

Exiting Line Review

Finally, there are three methods which can be used to exit line review. By pressing the spacebar immediately after entering line review, Textalker announces the current position of the cursor and then exits.

By pressing the ESCAPE key at any time while in line review, you will exit line review. This leaves the typing cursor exactly where it was before you entered.

The third method of exiting line review will come in handy if you want to use any of the editing features which are built into the Apple. By pressing the letter "X", you may exit line review with the typing cursor moved to the location of the audio cursor. This is different from using

the ESCAPE key which returns you to the previous location of the typing cursor.

Since line review exits with all APPLESOFT variables and pointers intact, you may enter line review and review the screen any time a program prompts you for an answer.

APPENDIX C - Other Programs on the Textalker Disk

The Textalker disk contains some example utility programs to show you the kind of things that can be done with the Textalker program. Your Textalker disk contains the following programs:

HELLO - This program loads the Textalker program into memory each time the Textalker disk is booted.

READ.TEXTFILE - Will read any standard text file outloud. The text files may be created with a word processor, received via a modem, or come from just about any other source. This program can only read files of the type T (DOS 3.3) or TXT (ProDOS).

ECHO.COM - This program is intended to serve as a communication device for a non-verbal individual.

COMFILE - This file holds the data for the ECHO.COM program.

SPELLING.TEST - Allows users to test themselves on the spelling of words in lists that have been previously created using the LIST.BUILDER utility.

LIST.BUILDER - Builds spelling lists for the SPELLING.TEST program.

ROBOT.DEMO - Allows users to type in phrases to be spoken by their synthesizer while displaying a robot graphic on the screen.

SAMPLE.LIST - A sample spelling list to be used with the SPELLING.TEST program.

Most of these programs are relatively easy to use. Most of them are menu driven, requiring only one keypress to select different options. A brief description of the operation of the programs is included below to get you started.

READ.TEXTFILE - This program is very simple to use. To get the program started, type:

```
RUN READ.TEXTFILE <RETURN>
```

in response to the BASIC prompt (]). When the program has loaded into memory it will ask you the name of the text file which you would like to have read. Type in the file's name, making sure to have the disk containing that file in drive number one of your computer, and press the return key. The computer will respond by reading your text file. All of the screen review commands described in the Textalker section of the manual will still be in effect, so if you want to review a section of the file, you have this capability.

ECHO.COM - The ECHO.COM program is designed to allow a non-vocal person to communicate using their Apple computer and a Street Electronics speech synthesizer. It has ten pages of words and ten pages of sentences from which the user can *build* a message. Once the message is built, returning to the main menu gives the user the opportunity to have the message spoken. The program is designed to require minimal keypresses by the user so that those with limited dexterity may operate the program. A small amount of *setting up* is required, but this can, in most cases, be done by a family member or clinician.

After typing:

```
RUN ECHO.COM <RETURN>
```

the program will present you with Echo Com's main menu.

It should look something like this:

```
<0-9> Select one of ten pages
<W> Word pages
<S> Sentence pages
<T> Say current message
<P> Print current message
<D> Delete current message
<R> Restore deleted message
<Y> Say yes
<N> Say no
<E> Edit page
<X> Exit ECHO.COM

Which?
```

The current message will be displayed at the bottom of the screen. For the time being it should be blank.

The program, in brief, operates in the following manner. The user chooses word or sentence pages from which he/she would like to select. The words or sentences are then added to the current message and then spoken from the main menu. For example, let's assume you want the synthesizer to say HELLO, I AM JOHN. WHO ARE YOU? First make sure that you are in word mode. The current mode is displayed in the upper right corner of the screen. You can toggle between word and sentence mode by typing W or S, respectively. If you are in sentence mode, switch to word mode by typing W. Now select the word page that you want to choose from. There are 10 to choose from (0-9). Let's go to page #1. Type 1. Now you should see all of the words currently saved to word page #1. To build your phrase type ABDJK. Notice how the selected words are added to the current phrase as the letters are typed in. Now that you have built your phrase, press (return) to go back to the main menu. To speak the current phrase type T, for talk. The computer should have spoken the phrase.

Look at the other choices in the menu. Instead of saying the phrase, we could have printed it by typing P, deleted it to prepare for a new phrase by typing D, or, if you accidentally delete a phrase, it can be restored

by typing R. For quick access, the menu also has single keypress access to saying the words (Y)es or (N)o.

Look through the various word and sentence pages. Notice how the sentence pages have fewer items, but much longer messages can be stored there. You will also notice that many of the pages are blank. These spaces, and those that already contain messages for that matter, are for you to fill in. You can do this by typing an E (for edit) from the main menu. The program will ask which page you want to edit, and then which element of that page you want to change. Simply type in the additions and press return.

You should also note that a provision for *speaking* uncommon words or phrases has been made. Word page #1 allows you to type directly into the current phrase.

LIST.BUILDER - As stated above, the LIST.BUILDER program allows you to create spelling lists to be used with the SPELLING.TEST program. The program allows you to enter not only the correct spelling of a word, but also a phonetic spelling for proper pronunciation. This pair of lists can then be saved to disk for use with the SPELLING.TEST. The program is self-prompting, but perhaps a brief explanation of the main menu commands would be helpful.

> **1 - Add a word** -- This command allows you to add a word to any existing SPELLING.TEST list. When the LIST.BUILDER program first comes up, there is a list already in memory. This list does not contain any words yet, but it's there. If you want to start a new list when you first run the LIST.BUILDER program, or if you want to add words to a list that you have just loaded into memory from a disk, make this selection.
>
> **2 - Delete a word** -- This command allows you to remove a word from the list that is currently in memory.
>
> **3 - Load a new list from disk --** This command allows you to load a list which has been previously saved to disk.

4 - Save the present list to disk -- Allows you to save the list currently in memory.

5 - Print the list -- Sends the list currently in memory to your printer.

6 - Start a new list -- Clears the current list from memory.

7 - Alphabetize list -- Arranges the list currently in memory in alphabetical order.

8 - End -- Exits the LIST.BUILDER program.

SPELLING.TEST - This program presents a test of spelling words created in the LIST.BUILDER program. It will ask you the name of the list to be tested on, your name, and how many of the words in the list you want to be tested on.

ROBOT.DEMO - After typing

```
RUN ROBOT.DEMO <RETURN>
```

a graphic of a robot is placed on the screen and you may type phrases for the robot to say.

APPENDIX D - Words Available in the Word Editor

1	2	3	4
5	6	7	8
9			

A	Able	About	Above
Across	Act	Action	Add
Addition	After	Again	Against
Ago	Air	Aliens	All
Almost	Along	Already	Also
Although	Always	Am	American
Among	Ampersand	An	And
Animal	Another	Answer	Any
Anything	Apple	Aqua	Are
Area	Around	Arrow	As
Asked	Assume	At	Available
Away			

B	Back	Base	Became
Because	Become	Been	Before
Began	Behind	Being	Bell
Best	Better	Between	Big
Billion	Black	Blue	Board
Body	Book	Both	Bottom
Boy	Brought	Brown	Business
But	By		

C	Call	Called	Calling
Came	Can	Cannot	Car
Card	Case	Cassette	Cent
Center	Certain	Change	Check
Children	Choice	Church	Circle
City	Clear	Clock	Close
Closed	Code	Cold	College

Color	Column	Come	Comma
Command	Company	Complete	Completed
Computer	Connected	Console	Controller
Correct	Could	Country	Course
Cut	Cyan		
D	Data	Day	Death
Development	Device	Did	Different
Disk Drive	Diskette	Divide	Division
Do	Does	Dog	Doing
Dollar	Done	Door	DOS
Double	Down	Draw	Drawing
During			
E	Each	Early	Earth
Eat	Echo II	Economic	Eighteen
Eighty	Either	Electronics	Eleven
Else	End	English	Enough
Enter	Error	Escape	Even
Ever	Every	Exactly	Example
Experience			
F	Face	Fact	Family
Far	Fast	Father	Federal
Feel	Feet	Felt	Few
Fifteen	Fifth	Fifty	Figure
Find	Fine	Finish	Finished
Fire	First	Fish	Fit
Following	Food	Form	Forty
Found	Fourteen	Fourth	Fraction
Free	From	Front	Future
G	Game	Gave	General
Get	Getting	Give	Given
Go	God	Going	Good

Good Work	Good-bye	Got	Government
Gray	Great	Green	Ground
Group	Grow	Guess	
H	Had	Half	Hand
Hard	Has	Have	Having
He	He Is	Head	Heard
Held	Hello	Help	Her
Here	High	Higher	Him
Himself	His	History	Hit
Home	Hour	House	How
However	Human	Hundred	Hurry
I	I Am	I Win	Idea
Identification	If	Important	In
Inch	Inches	Individual	Information
Inside	Instruction	Interest	Into
Is	It	It Is	Itself
J	Job	Joystick	Just
K	Keep	Key	Keyboard
Kind	Known		
L	Land	Large	Larger
Largest	Laser	Last	Later
Law	Learn	Learned	Least
Leave	Left	Less	Let
Letter	Life	Light	Like
Line	Little	Live	Lived
Living	Load	Loading	Local
Long	Look	Looked	Looking
Low	Lower		

M	Made	Magenta	Major
Make	Making	Man	Many
Matter	May	Me	Mean
Medium	Member	Memory	Men
Message	Middle	Might	Mile
Million	Mind	Minute	Miss
Module	Moment	Money	Monitor
More	Morning	Most	Mother
Move	Mr.	Mrs.	Ms.
Much	Multiplication	Multiply	Must
My			

N	Name	National	Near
Neat	Need	Negative	Never
New	Next	Nice Try	Night
Nineteen	Ninety	Not	Nothing
Now	Number		

O	O'clock	Of	Off
Office	Often	Old	On
Once	Only	Open	Or
Orange	Order	Other	Out
Over	Own		

P	Paddle	Paper	Part
Partner	Past	People	Per
Perhaps	Period	Personal	Photon
Picture	Pink	Place	Plant
Play	Please	Point	Political
Position	Positive	Possible	Power
Preesent	Present	President	Press
Print	Printer	Probably	Problem
Program	Proud	Public	Purple
Put	Putting		

Q	Question	Quite	
Ram	Random	Rather	Ray
Ready	Ready To Start	Real	Really
Reason	Recorder	Red	Reed
Refer	Remember	Reset	Rest
Result	Return	Rewind	Right
Ringing	ROM	Room	Round
Row	Run		
S	Said	Same	Save
Saving	Saw	Say	Says
School	Screen	Second	Seconds
Seem	Seemed	Seems	Seen
Select	Select 1 Of Fol	Sense	Sentence
Service	Set	Seventeen	Seventy
Several	Shall	Shape	She
She Is	Shift	Short	Shorter
Should	Show	Shown	Side
Since	Sixteen	Sixty	Slot
Slow	Small	Smaller	Smallest
So	Social	Society	Some
Something	Sometime	Soon	Sorry
Sound	South	Space	Speak
Speaker	Special	Speech	Spell
Sport	Square	Start	Started
State	Step	Still	Stop
Story	Street	Study	Substact
Subtraction	Such	Sum	Sun
Supposed	Sure	Switch	Synthesizer
T	Table	Take	Taken
Tape	Telephone	Television	Tell
Ten	Textalker	Than	Thank You
That	That Is Correct	That Is Right	The

Their	Them	Themselves	Then
There	These	They	They Are
Thing	Third	Thirteen	Thirty
This	Those	Though	Thought
Thousand	Threw	Thus	Time
Today	Together	Told	Tone
Took	Top	Torpedo	Toward
Tree	Triangle	True	Try
Try Again	Turn	Turned	Twelve
Twenty	Type		

U	Under	Understand	United States
Until	Up	Upon	Upper
Us	Use	Used	Using
Usually			

V	Very

W	Wait	Want	Wanted
War	Was	Water	Way
We	We Are	Week	Welcome
Well	Went	Were	West
What	What Was That	When	Where
Whether	Which	While	White
Who	Whole	Whose	Why
Will	Win	Wind	With
Within	Without	Word	Work
Working	World	Would	

X

Y	Year	Yellow	Yes
Yet	You Are	You Win	Young
Your			

Z Zero

APPENDIX E - Echo Command Reference Charts

TEXTALKER COMMANDS

OUTPUT MODES	
PRINT ONLY	CTRL-EO
TALK ONLY	CTRL-ET
*BOTH	CTRL-EB
PITCH (n=1 to 63) *22	
FLAT	CTRL-EnF
*INTONATION	CTRL-EnP
VOLUME (n=0 to 15) *12	CTRL-EnV
RATE	
COMPRESSED (FAST)	CTRL-EC
*EXPANDED (SLOW)	CTRL-EE
PUNCTUATION	
*SOME (#$%&+/<=>@)	CTRL-ES
MOST	CTRL-EM
ALL (LF,CR,SPACE)	CTRL-EA
PRONUNCIATION	
*WORDS	CTRL-EW
LETTERS	CTRL-EL
DELAY (n=0 to 15) *0	CTRL-EnD
REPEATS (n=0 to 15) *2	CTRL-EnR
CHANGING CTRL-E	CTRL-E CTRL-x

where x is any letter except H,J,M, or U.

*values set automatically when TEXTALKER is first run.

PHONEME CODES AND COMMANDS

All phonemes must be preceeded by a CTRL-V.
PITCH, RATE and VOLUME commands are the same as in TEXTALKER.

PHONEME CODES

Vowels

Sample Word	Dictionary Symbol	Phoneme Code
cat	a	A
lot	o	;
caught	o	*
let	e	E
see	e	&
hid	i	I
book	oo	Q
but	u	U
due	oo	:
about	'	

Voiced Consonants

Sample Word	Dictionary Symbol	Phoneme Code
let	l	L
many	m	M
no	n	N
sing		/
red	r	R
this	*th*	(
very	v	V
wet	w	W
yes	y	Y
zero	z	Z
azure	zh	X

Dipthongs

Sample Word	Dictionary Symbol	Phoneme Code
cake	a	@
tie	i	!
toe	o	O
pound	ou	#
toil	oi	?
you	u	%

Stop Consonants

Sample Word	Dictionary Symbol	Phoneme Code
bat	b	B
dog	d	D
get	g	G
kick	k	K
pet	p	P
tie	t	T
check	ch	C
job	j	J

PHONEME CODES (cont.)

"R" Colored Vowels

Sample Word	Dictionary Symbol	Phoneme Code
car	ar	;R
chair	ar,er	@R
her	ur,er	'R
hear	er	&R
fire	ir	!R
for	or	OR
tour	oor	QR
hour	our	#R

Unvoiced Fricatives

Sample Word	Dictionary Symbol	Phoneme Code
fit	f	F
hat	h	H
see	s	S
she	sh	$
think	th	)

INFLECTION

STRESSED - 3 NORMAL - 2 REDUCED - 1 SCHWA - 0

PITCH

RISING - > FLAT - = FALLING - < PAUSE - ,

BLIND USER COMMANDS

COMMNANDS TO ENTER LINE REVIEW

CTRL-L	Enters Line Review mode. One of the following commands must immediately follow:
A thru X	Selects line to review. A is the top line.
Z	Selects current line and horizontal position.
SPACE	Speaks the current position on screen and then exits.
CTRL-n	n may be any letter except H,J,M or U. Changes command to enter Review mode.

COMMANDS FROM WITHIN LINE REVIEW

SPACE	Speaks the current location of the audio cursor on the screen.
T	Toggles between Word and Letter mode.
W	Toggles to the Word mode
L	Toggles to the Letter mode
⇐	Left arrow moves the audio cursor to the left.
⇒	Right arrow moves the audio cursor to the right.
⇓	The down arrow moves the cursor to the beginning of the line below.
⇑	The up arrow moves the cursor to the beginning of the line above.
1 through 9	Selects column 1 through 9 (0 to disable this feature).
⌘ and arrow	Stretches a column boundary.

COMMANDS FROM WITHIN LINE REVIEW (cont.)

-	Moves the left edge of a column to the right.
=	Moves the right edge of a column to the left.
;	Moves audio cursor to the beginning of line above current line.
/	Moves audio cursor to the beginning of line below current line.
,	Echo will say "to" and wait for a letter. The Echo will then read all lines from the current line to the line corresponding to the letter entered.
RETURN	Echo will read entire line starting at current position.
ESC	Exits Line Review mode and leaves the typing cursor in the same location.
X	Exits Line Review mode and moves the typing cursor to the audio cursor.

THE SAY PROGRAM COMMANDS

Commands	Suffixes	Prefixes
&LODWRDS	'S	DIS'
&SHOWWRDS	'T	RE'
&SAY	'D	EX'
&SAYFAST		UN'
&SAYSLOW		
&SAYPITCH		
&SAYVOLUME		
&PAUSE		
&RESET		
&HELP		
&ANIM		
&ANIMOFF		

THE SOUND PROGRAM COMMANDS

(Echo+ only)

Commands

&PLAY	b	=	sharp
&TEMPO	#	=	flat
&VOICE	1 to 8	=	octave
&DECAY	/1, /2, etc.	=	whole note, half note, etc
&LODSOUND	.	=	dotted note
&SOUND	_	=	tie
&LEFT	R/4, R/8, etc.	=	quarter rest, eighth rest, etc.
&RIGHT	[ ]	=	chord
&HELP	m	=	minor chord
&PAUSE			
&RESET			

APPENDIX F - Note Value Table

	Note	Pitch Value		Note	Pitch Value
Octave 1	C	1955	**Octave 2**	C	978
	C#	1845		C#	923
	D	1742		D	871
	D#	1644		D#	822
	E	1552		E	776
	F	1465		F	732
	F#	1382		F#	691
	G	1305		G	652
	G#	1232		G#	616
	A	1163		A	581
	A#	1097		A#	549
	B	1036		B	518

	Note	Pitch Value		Note	Pitch Value
Octave 3	C	489	**Octave 4**	C	244
	C#	461		C#	231
	D	435		D	218
	D#	411		D#	206
	E	388		E	194
	F	366		F	183
	F#	346		F#	173
	G	326		G	163
	G#	308		G#	154
	A	291		A	145
	A#	274		A#	137
	B	259		B	129

	Note	Pitch Value		Note	Pitch Value
Octave 5	C	122	**Octave 6**	C	61
	C#	115		C#	58
	D	109		D	54
	D#	103		D#	51
	E	97		E	48
	F	92		F	46
	F#	86		F#	43
	G	82		G	41
	G#	77		G#	38
	A	73		A	36
	A#	69		A#	34
	B	65		B	32

	Note	Pitch Value		Note	Pitch Value
Octave 7	C	31	**Octave 8**	C	15
	C#	29		C#	14
	D	27		D	14
	D#	26		D#	13
	E	24		E	12
	F	23		F	11
	F#	22		F#	11
	G	20		G	10
	G#	19		G#	10
	A	18		A	9
	A#	17		A#	9
	B	16		B	8

APPENDIX G - Echo Compatible Software

As of October 1988, the following companies had license agreements on file with Street Electronics for the Echo compatible programs listed below:

EDUCATIONAL SOFTWARE

AIMS Media 6901 Woodley Avenue Van Nuys CA 91406 (818) 785-4111	Sam's Store (Math) Getting Started in... Series
Ballard & Tighe, Inc. 480 Atlas Street Brea CA 92621 (714) 990-4332	IDEA Cat, Elephant Ears
Berta-Max 3420 Stone Way North Seattle WA 98103-1849 (206) 547-4056	18 different titles
C.C. Publications P.O. Box 23699 Tigard OR 97062 (503) 692-6880	The Ollie Hears Series, Basic Language Series
Chatterbox 2265 Westwood Blvd. Suite 9 Los Angeles CA 90064 (800) 531-5314	Voice Reading,Voice English
Communication Skill Builders 3830 East Bellevue Tucson AZ 85716 (602) 323-7500	Idioms in America ESL

EDUCATIONAL SOFTWARE (cont.)

Computer Tutor 1543 Avenue K Plano TX 75074 (800) 442-4719	ESL
Developmental Equipment 900 Winnetka Terrace Lake Zurich IL 60047	Special Ed software
DLM Teaching Resources One DLM Park Allen TX 75002 (214) 248-6300	Syllasearch, Construct-A-Word Hint and Hunt
Early Learning, Inc. P.O. Box 712 Devon PA 19333 (215) 687-1331	Kindermath
Edmark Corporation P.O. Box 3903 Bellevue WA 98009 (206) 746-3900	Edmark Reading Program
Educational Activities 1937 Grand Avenue Baldwin NY 11510 (516) 223-4666	Adult Literacy
Electronic Arts 2755 Campus Drive San Mateo CA 94403 (415) 571-7171	Music Construction Set

EDUCATIONAL SOFTWARE (cont.)

Exceptional Teaching Aids Phil Mangold 20102 Woodbine Avenue Castro Valley, CA 94546 (415) 582-4859	Listen and Spell
Hartley Courseware P.O. Box 419 Diamondale MI 48821 (800) 247-1380	Easy Pilot (authoring language) Dr. Peet's Talk Writer, My Words
HCCCP/Sherwood Center 7938 Chestnut Kansas City MO 64132 (816) 363-4606	Color Find, Sight Word Spelling Letter Find Jimmy Jumper
Houghton Mifflin P.O. Box 683 Hanover NH 03755 (603) 448-3838	Sound Ideas Series
Laureate Learning One Mill Street Burlington VT 05401 (802) 862-7355	Speak Up, FAST, ACE, First Words, MicroLADS, First Categories
Learning Lab Software 21000 Nordhoff Chatsworth, CA 91311 (818) 341-9611 (800) 247-4641	Distributes several Echo compatible software titles. Will release *Talking Monsters* in February '89
Life Science Associates 1 Fenimore Road Bayport NY 11705 (516) 472-2111	Arithmetic 1,2, and 3

EDUCATIONAL SOFTWARE (cont.)

Marblesoft 21805 Zumbrota Street NE Cedar MN 55011 (612) 434-3704	Early Learning I, II, Mix 'n Match
James J. McLaughlin 1050 Gardena Avenue Fridley, MN 55432 (612) 571-3165	See it. Hear It. Spell It. Teacher's Assistant Speller
Microcomputer Applications RD#2, Box 229 Selinsgrove PA 17870	Goldilocks and the Three Bears
PEAL Software 2210 Wilshire Blvd., #806 Santa Monica CA 90403 (213) 451-0997	Keytalk, Exploratory Play Representational Play, Early Education
Polytel 2727 E. 21st Street, Suite 600 Tulsa OK 74144	The Farm, Safari Requires Polytel Keyport 717
Research Triangle Software P.O. Box 13044 Research Triangle Park NC 27709 (919) 851-0866	Wordmaster
Scholastic Software 730 Broadway New York NY 10003 (212) 505-3000	Talking Screen Text Writer - Early Education Talking Word Processor
Queue 562 Boston Avenue Bridgeport, CN 06610 (800) 232-2224	Master Talker SAT drill and other High School level programs.

EDUCATIONAL SOFTWARE (cont.)

Sensible Software, Inc. 210 S. Woodward, Suite 229 Birmingham MI 48011 (313) 258-5566	Talking Sensible Speller
Southwest Ed-Psych Services P.O. Box 1870 Phoenix AZ 85001 (602) 253-6528	Tic-Tac-Spell
Weekley Reader/Optimum Resource 10 Station Place Norfolk, CT 06058 (203) 542-5553	Various titles from the Stickybear series

SPECIAL NEEDS SOFTWARE

Adaptive Peripherals, Inc. 4529 Bagley Avenue North Seattle WA 98103 (206) 633-2610	The Talking Word Board. The Talking Unicorn The Talking Scanner
CITE 215 E. New Hampshire Avenue Orlando FL 32804 (305) 299-5000 X3291	Augmentative communication program
Castle Special Computer Services 9801 San Gabiel, NE Albuquerque NM 87111 (505)293-8379	Spellist, Coins 'n Keys
Closing the Gap P.O. Box 68 Henderson MN 56044 (612) 248-3294	Special Needs Resource
Computability 101 Route 46 East Pine Brook NJ 07058 (201) 882-0171	Power Pad Programmer
The Conover Company P.O. Box 155 Omro WI 54963 (414) 685-5707	Nuts & Bolts SAID Survival Words
David R. Beukelman, Ph.D. University of Nebraska-Lincoln 318 Barkley Memorial Ctr. Lincoln NE 68583-0738 (402) 472-5463	Publishes a communication program.

SPECIAL NEEDS SOFTWARE (cont.)

Dunamis 2856 Buford Highway Duluth GA 30136 (404) 476-4934	SimpleCom I, SimpleCom II
Educational Software Review 1400 Shattuck Avenue, Suite 774 Berkeley CA 94709 (415) 528-2788	Magic Music Teacher
Hornet Foundation 6000 J Street Sacramento, CA 95819 (916) 278-7001	Communication Training Program
Laureate Learning One Mill Street Burlington VT 05401 (802) 862-7355	Speak Up, FAST, ACE, First Words,MicroLADS, First Categories
Project ACTT 27 Horrabin Hall Western Illinois University Macomb IL 61455 (309) 298-1634	Peek and Speak
R.J. Cooper & Associates 24843 Del Prado, Suite 283 Dana Point CA 92629 (714) 240-1912	Point to Pictures Series
Schneier Communication Unit Dr. Carl Geiger 1603 Court Street Syracuse NY13208 (315) 455-7591	Quick Talk, Sound Match, Magic Cymbals, Say It

SPECIAL NEEDS SOFTWARE (cont.)

Speech Enterprises/Access Unltd.
9039 Katy Freeway, Suite 414
Houston TX 77024
(713) 461-0006
(800) 531-5314
TX - (800) 292-5619
AK and HI - (800) 821-0728

Resource for Special Needs

SOFTWARE FOR THE BLIND/VISUALLY IMPAIRED

American Printing House f/t Blind P.O. Box 6085 Louisville KY 40206-0085 (502) 895-2405 x315	Speaking Speller Elementary Math Talking Games
Apple Talk 3015 South Tyler Little Rock AR 72204 (501) 666-6552	Utility Talk, Trivia Talk, TextWriter, Fortune Talk, Fitness Talk Publishes "Apple Talk" newsletter on disk.
Area Education Agency 6 210 South 12th Avenue Marshalltown IA 50158 (515) 752-1578	Southern Prairiesoft Word Tutor
Bainum Dunbar Inc. P.O. Box 742028 Houston TX 77274 (713) 988-0887	Brainz Gamz
Bible Research Systems 2013 Wells Branch Parkway, #304 Austin TX 78728 (512) 251-7541	Publishes the Bible on ECHO-readable disks.
Bucks County Schools Routes 611 & 313 Doylestown PA 18901 (215) 757-0227	Talking...(Typing, Spelling, Math, Place Value, Flash Cards), TextTutor , Language Board (requires Muppet Keyboard)

SOFTWARE FOR THE BLIND/VISUALLY IMPAIRED (cont.)

Carriere Systems 519 Valley Forge Drive Placentia CA 92670 (714) 524-1488	Check Book Budgeting, Glossary, Addresses
Ciderware 1019 Martinique Dallas TX 75223-1445 (214) 827-7734	Call Talker - Spreadsheet Listertalker - File manager Ledger Talker - Bookkeeper
CITE 215 E. New Hampshire Avenue Orlando FL 32804 (305) 299-5000 X3291	Augmentative communication program
Computer Aids Corporation 124 West Washington, Lower Arcade Fort Wayne IN 46802 (219) 422-2424	Word-Talk, Calc-Talk, Braille-Talk, Screen Talk, Talking Transend
Criterion Micro Soft P.O. Box 847 Iowa City IA 52244 (391) 338-8669	Word Mentor
Cross Educational Software 1802 N. Trenton Ruston LA 71720 (318) 255-8921	Talking Writer, Talking Riddles
Howard K. Traxler 6504 W. Girard Avenue Milwaukee WI 53210 (414) 445-5925	Trax Pax, Checkbook, Filebox

SOFTWARE FOR THE BLIND/VISUALLY IMPAIRED (cont.)

Keith Creasey 1956 Mellwood Avenue Louisville KY 40206 (502) 896-0132	Personal finance programs.
Lorin Software 365 Brassie Orlando FL 32804 (305) 423-7547	Type-Talk, Talking typing tutor
Raised Dot Computing, Inc. 408 S. Baldwin Street Madison WI 53703 (608) 257-9595	Braille-Edit
Read-Well, Inc. P.O. Box 441047 Aurora CO 80044 (303) 690-6004	Video Reader
Schneier Communication Unit 1603 Court Street Syracuse NY 13208 (315) 455-7591	Quick Talk, Sound Match, Magic Cymbals, Say It
Sensory Aids Foundation 399 Sherman Avenue, Suite 12 Palo Alto CA 94306 (415) 329-0430	Publishes software for visually impaired children
Larry Skutchan 337 S Peterson Louisville KY 40206 (502) 896-1288	ProWords, ProTerm Teacher's Pet Talking Word Processor

SOFTWARE FOR THE BLIND/VISUALLY IMPAIRED (cont.)

Smith-Kettlewell Institute
2232 Webster
San Francisco CA 94115
(415) 561-1630

Talking Checkbook Program
Talking Games

Speech Enterprises/Access Unltd.
9039 Katy Freeway, Suite 414
Houston TX 77024
(713) 461-0006

Tall Talk Screens, Tall Talk Prints, Tex-Talk, Talking TFD

The following programs, developed by other companies, are available through Speech Enterprises/Access Unltd. (see above)

Ultimate Banker
Ultimate File Cabinet
Audio Tutorial Braille Game
Talking Term Exec
Tell'n Spell

Talking Computer Products
100 Main
Wallace KS 67761
(913) 891-3532

Publishes talking check book program and 4 talking game disks

Talking Computer Systems
P.O. Box 524
Revere MA 02151
(617) 289-3828

Phone List and Filing Program

Telesensory Systems, Inc.
P.O. Box 7455
Mountain View, CA 94039
(415) 960-0920

Apple Optacon II training system

SOFTWARE FOR THE BLIND/VISUALLY IMPAIRED (cont.)

The Communicator Rt. 4, Box 263 Hillsville VA 24343 (703) 766-3869	10 Public domain talking disks


ORPORA
LECTRONICS