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Chapter 1

in

1.1 VCLI.Guide Table of Contents

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1.2 1 - VCLI Principles of Operation

VCLI uses the Perfect Sound 3, Sound Magic (Sound Master), DSS 8, or a Generic audio digitizer and voice.library, an Amiga public domain library of voice recognition functions, to learn and recognize spoken voice commands. Each voice command is associated with a corresponding CLI command which is executed when the incoming voice command is recognized. This CLI command may be used to execute an ARexx script, give a single line ARexx command, or execute any ordinary CLI command. VCLI allows the use of voice commands to control programs which have an active ARexx port, or to execute any CLI command by spoken voice command.

VCLI uses voice.library to compute and save frequency/time maps (or voice prints) of a vocabulary of voice commands. Voice commands are

recognized by comparing frequency maps of incoming words with stored frequency maps in the voice command vocabulary. The voice.library should be copied to the sys:libs directory in order to run VCLI.

VCLI should be copied into its own drawer, either on the workbench or on a separate disk. VCLI will create configuration files and voice command files that are best kept in a directory with VCLI.

1.3 2 - VCLI Options

The first step in using VCLI is to choose the audio digitizer and other options to be used. Make your selections from the "Option" menu of the VCLI Window by assigning check marks to the desired options. VCLI will remember your selections for future sessions until you choose differently.

You may choose either the Perfect Sound 3, Sound Magic (Sound Master), DSS 8, or a Generic audio digitizer. Select this option before attempting any learning or recognition of voice commands. Note that your microphone must be connected to the right (not left) channel of the audio digitizer.

You also have a choice in the Option menu of which CIAB Timer for VCLI to use in timing the intervals between audio samples. Timer B is the normal selection, and you usually will not have to change it. However, you may find some programs that are using Timer B themselves and will object if VCLI attempts to use Timer B. For these cases, choose Timer A. VCLI will remember your selection for future sessions.

Ordinarily, VCLI will speak back the command that it recognizes and give you a short delay period in which to cancel an erroneous command. Some users find this annoying, so an option is available to operate VCLI either with or without this confirmation. Choose "Confirm On" or "Confirm Off" from the Option menu.

VCLI gives you a choice of text output to CON: or NIL:. Make your selection from the Option menu. If the programs you will run by voice command are expected to have text output (such as if you use the ARexx "say" command), then you will need the CON: output window for text display. If your programs have no text output, or open their own windows for text and graphics, then select output to NIL:. The majority of programs will not need the CON: window, so NIL: is the normal selection.

The VCLI Scope display has two modes of operation. The normal display mode is 8 bit audio signal amplitude versus time. Amplitude data over a time span of 3/4 second is displayed. The frequency mode is a display of signal frequency (0 to 3200 Hz) versus time over 3/4 of a second. You can choose either amplitude or frequency display from the Option menu.

VCLI will also calculate high or low resolution voice prints of incoming commands (72 or 36 time points). You can choose either high or low resolution operation from the Option menu. High resolution is somewhat better at voice recognition, but takes nearly twice as much time to recognize a word.

1.4 3 - Learning VCLI Commands

LEARNING COMMANDS

Before VCLI is used to recognize spoken commands, the program must first learn each voice command and associated CLI command. First, select

an option for the correct audio digitizer. Connect your microphone to the right channel of the audio digitizer. Then choose "New Commands" from the "Function menu" to bring up the "Learn Commands" window containing string gadgets for each of 12 voice commands and 12 matching CLI commands. This window is used for adding, deleting, modifying and learning voice commands and matching CLI commands.

To learn a voice command, type the command word or short phrase you have chosen in one of the string gadgets in the left hand column and strike the "Return" key. You will then be presented with the "Learning" window for audio sampling of the voice command. When you see "Ready to take first sample," click the "Sample" button and speak your chosen voice command or phrase into the microphone connected to the audio digitizer. In order to ensure a good audio sample the program examines the audio data for volume too low, volume too high (clipping), or for noisy input, and you will be warned if these conditions exist. If volume needs adjustment, you may change your volume of speech, move your microphone, or change the gain of your audio digitizer and repeat the sample. Volume must be MAXIMUM possible without clipping. Try taking several samples, clicking the "Sample" button each time before speaking. Adjust volume until the sample amplitude is the maximum possible without getting a "Volume too high" warning.

The gain of the Perfect Sound 3 digitizer can be adjusted using the "Volume Up" and "Volume Down" buttons. Perfect Sound 3 has 16 discrete gain steps. Clicking the "Volume Up" or "Volume Down" buttons changes the gain by one step. Increase or decrease the gain until the maximum level without severe clipping is achieved. Adjusting gain of the Perfect Sound 3 digitizer can be confusing. If you reach gain step 16, the next step up will take gain down to minimum step 1. Likewise, if you reach minimum step 1, the next step down will take you to maximum step 16. This can cause some confusion if you attempt to increase gain past maximum and find that gain has actually dropped to minimum.

The gain of the DSS 8 digitizer can also be adjusted using the Volume Up and Volume Down buttons. DSS 8 has 8 discrete gain steps and is easy to use since gain will not jump between high and low levels. VCLI will remember the gain setting you choose for DSS 8 and use it for future sessions.

The gain of the Sound Magic digitizer can be adjusted using the sliding control knob on the digitizer unit. Setting gain (or volume) to maximum without clipping is very important to operation of VCLI. The MOST COMMON CAUSE of failure of VCLI to recognize voice commands is digitizer gain (volume) set too low.

When you see "Sample OK. Recommend accept," click the "Accept" button to store the audio sample of this voice command. This process is repeated for a second and third audio sample of the voice command. When you see "Ready to take second sample," and "Ready to take final sample," just repeat the voice command again into your microphone and "Accept" each sample when appropriate. Internally, VCLI combines these three audio samples into a frequency/time map or voice print of the command. This voice print will be stored along with those of the other spoken commands in the VCLI vocabulary for use in recognizing spoken commands. VCLI also stores the digitized audio signal of the third sample you take to be used later for playback when voice commands are recognized.

When three audio samples have been accepted and a voice print of the command stored internally, you will be returned to the "Learn Commands" window where you must then type the matching CLI command into its appropriate string gadget in the right hand column.

HOW MANY COMMANDS:

The "Learn Commands" window displays one of four pages of voice commands. Each page can hold 12 commands for a total of 48 possible commands. Choose Page One through Page Four from the "Page Select" menu. Add your commands beginning with Page One, filling the later pages as more commands are needed. Try not to leave gaps in the vocabulary of voice commands, but group your commands together on as few pages as possible.

As more commands are added, the time required for VCLI to recognize a voice command increases in proportion. The use of more than one page (or 12 commands) is not recommended unless you are fortunate enough to have an accelerated Amiga.

1.5 4 - Loading, Modifying and Saving VCLI Commands

You can save commands by selecting "Save Commands" from the Function menu. Each command file will contain voice print data for learned voice commands, matching CLI commands, and configuration data from the Option menu. It is important that you save your command file as the last thing that you do before quitting VCLI. This will ensure that all changes to your commands are stored for future use. VCLI will also remember the file name under which you save your commands and will load this file automatically the next time you run VCLI

You can recall previously saved commands by selecting the "Load Commands" menu item from the Function menu. These commands can then be used to run VCLI without any relearning. If you need to make modifications, choose "Mod Commands" from the Function menu and proceed as described under Learning VCLI Commands above to modify or add commands to the vocabulary. VCLI 7.0 will load command files created by earlier versions of VCLI. However, since earlier versions did not store digital audio of your voice commands, you will not hear VCLI speak back your recognized commands until each one is learned again.

1.6 5 - Use of VCLI Commands

CLI commands are matched to your voice commands by typing them into the CLI string gadgets in the right hand column of the "Learn Commands" window. There are four possible uses for the CLI commands that you will match to each of your voice commands and store in a command file. Your CLI commands may be used to execute ARExx scripts, single line ARExx commands, or ordinary CLI commands as described below. Note that you must always use FULL PATH NAMES in your CLI commands.

AREXX SCRIPTS:

You can use your CLI command to execute an ARExx script. For example, suppose you have stored an ARExx script named "DoSomething.rexx" in ram:. The proper text to enter in the CLI Command sting gadget would be:

```
sys:rexxc/rx ram:DoSomething.rexx
```

When the voice command that you stored for this CLI command is recognized, your ARExx script will then be executed just as if you had typed the text at the CLI.

AREXX COMMANDS:

You can use your CLI command to execute a single line ARExx command. For example, suppose you want to send the ARExx message "MYCOMMAND" to an ARExx port named "AREXXPORT." The proper CLI command would be:

```
sys:rexxc/rx "ADDRESS AREXXPORT MYCOMMAND"
```

Again, this ARExx command will be executed as if it were typed in the CLI.

CLI COMMANDS:

You can also execute any CLI command, completely independent of ARExx. For example, if you are using a voice command to start a game named "MindlessGame" in df0:, the proper CLI command to store will be:

```
run df0:MindlessGame
```

In this case, running MindlessGame does not rely on ARExx in any way.

LOAD COMMANDS:

You can also use a voice command to load another file of voice commands which has been saved previously. To do this, precede you CLI command with the word "LOAD" (all capitals). The CLI string following "LOAD" will be interpreted as a file name of voice commands to be loaded into VCLI. For example, if you have a command file by the name of dh0:Voice.commands, the proper CLI command to store will be:

```
LOAD dh0:Voice.Commands
```

When VCLI recognizes this command, the voice prints and CLI commands in Voice.Commands will be loaded into VCLI and will take control. In this way you can minimize the number of commands (and thus the time required for recognition) by grouping small numbers of similar commands together and saving each group as a separate command file. Then use the LOAD command to move from one command file to another.

1.7 6 - Running VCLI

Now that you have selected a sampler, and other configuration options, and learned spoken commands and matched them to CLI commands, you can proceed to use the VCLI Scope display to execute the commands you have specified. When VCLI indicates "Ready," it is ready to receive your spoken commands. When a command is recognized, VCLI will speak the name of the recognized command before executing. If VCLI misunderstands, you have approximately two seconds to speak again and correct VCLI before the command is executed. A command can be interrupted by any noise during the two second period. So, for example, blowing on the microphone to produce clipping can be used to cancel any command.

VCLI will stay continuously active even after launching other programs. It will wait in the background, listening for your spoken command. When a spoken word is detected, VCLI will become a high priority task while it does the intensive calculations needed to compute and compare a voice print of the incoming word with those in memory. You may see some lag in performance of other programs for the second or two that VCLI takes to recognize a word. Otherwise, VCLI uses very little CPU time.

The VCLI Scope display has two modes of operation which will display either amplitude or frequency characteristics of the audio signal. Toggle between these two display modes by clicking the "Disp" button. You can also choose either amplitude or frequency display from the Option menu.

VCLI will also calculate high or low resolution voice prints of incoming commands. Toggle between the two by clicking the "Res" button. You can also choose either high or low resolution from the Option menu.

You can also change the gain of either the Perfect Sound 3 or DSS 8 audio digitizer by clicking the "Vol Up" or "Vol Dn" gadgets. Each click changes the gain by one step in the appropriate direction. Gain control operates identically to that used when learning commands.

1.8 7 - External ARexx Control

In addition to executing ARexx commands and scripts, VCLI has its own ARexx port and can be externally controlled using ARexx commands. The port name for external ARexx commands to VCLI is VCLI_CONTROL. The following commands are recognized:

(COMMAND)	(RESULT)
FRONT	Bring VCLI window to front.
BACK	Move VCLI window to back.
LOAD 'filename'	Load an alternate command file.
SUSPEND	Suspend operation, free parallel port.
ACTIVATE	Return from suspend.
QUIT	Quit VCLI.
ATIMER	Select CIAB Timer A.
BTIMER	Select CIAB Timer B.
ONCONFIRM	Select confirmation on.
OFFCONFIRM	Select confirmation off.
NILOUTPUT	Select NIL: output.
CONOUTPUT	Select CON: output.
HIRES	Select high resolution processing.
LORES	Select low resolution processing.
FREQDISPLAY	Select frequency display mode.
AMPDISPLAY	Select amplitude display mode.
VOLUP	Increase digitizer gain one step.
VOLDOWN	Decrease digitizer gain one step.

Using these commands will allow VCLI to be integrated with other applications under the control of ARexx in many unique combinations.

1.9 8 - VCLI Practical Considerations

The choice of command words or phrases is important to successful use of VCLI. Words that sound distinctly different from each other will be more reliably recognized. Words that rhyme are poor choices. "Seven" and "eleven," or "make" and "break" will frequently be confused by VCLI. Even with distinctly different words, you must diligently pronounce each syllable of each word slowly, distinctly, and forcefully. This is very important.

The frequency maps of spoken command words will vary due to any change in the pitch or rate of your speech. If you have a cold, or become impatient and speak at a faster rate, VCLI may not recognize your commands. Often, the only cure is to relearn a difficult word when this occurs.

An expensive high bandwidth microphone is not necessary or desirable. It can be helpful, though, to have a microphone with a push button on-off switch. A microphone that is active continuously will often confuse VCLI due to pick up of extraneous noise.

And finally, you will find some words that just don't work well with VCLI. The simplified voice recognition process used by VCLI is very fast in operation, but cannot handle all circumstances. If this happens, keep cool and pick another word or phrase.

1.10 9 - Solving Problems

INCORRECT AUDIO DIGITIZER

If you have not selected the correct audio digitizer, VCLI may give a continuous string of error messages (Clipping/Noisy/No Match) and error beeps. Select the option for the correct audio digitizer from the Option menu.

VOICE COMMANDS NOT RECOGNIZED

The most common cause for failure of VCLI to recognize voice commands is audio digitizer gain set too low. Of course, you must have learned or loaded commands before they can be recognized. Also be sure that your microphone is connected to the right (not left) channel of the audio digitizer.

CLI COMMANDS NOT EXECUTED

If your voice commands are recognized, but the corresponding CLI command is not executed, it is likely that your command is defective or does not contain a full path name for all required files. Try out your CLI commands independently in an Amiga Shell, with your current directory set to the same directory that contains VCLI. Or select the CON: Output option in order to see any error messages resulting from your CLI commands. your CLI commands.

INFORMATION MENU ITEM DOES NOTHING

If you select the Information menu item and nothing happens, check to see that either the Multiview of AmigaGuide program is present in your sys:utilities directory and that the VCLI70.Guide database file is available in the same directory as VCLI.

1.11 10 - Version

This is version 7.04 of VCLI which supports Perfect Sound 3, Sound Magic (Sound Master), DSS 8, and Generic audio digitizers. Voice.library version 8.4 is recommended with this program.

1.12 11 - Credits

VCLI and voice.library were written by Richard Horne for the enjoyment of the Amiga community and are freely distributable in the public domain. Questions, comments, and constructive criticism are welcome.

Due to the insight of Zap, the voice.library functions now run much faster. Recognition time has been cut in half compared to earlier library versions.

Mark Moore succeeded where many others failed in discovering the programming secrets of DSS 8. Since GVP has not been interested at all in assisting users with this information, Mark's work has been vital to providing DSS 8 support with this version of VCLI.

And finally, thanks to Commodore for this wonderful machine.
