A VALIANT LITTLE TERMINAL
A VLT User's Manual

Amanda Weinstein

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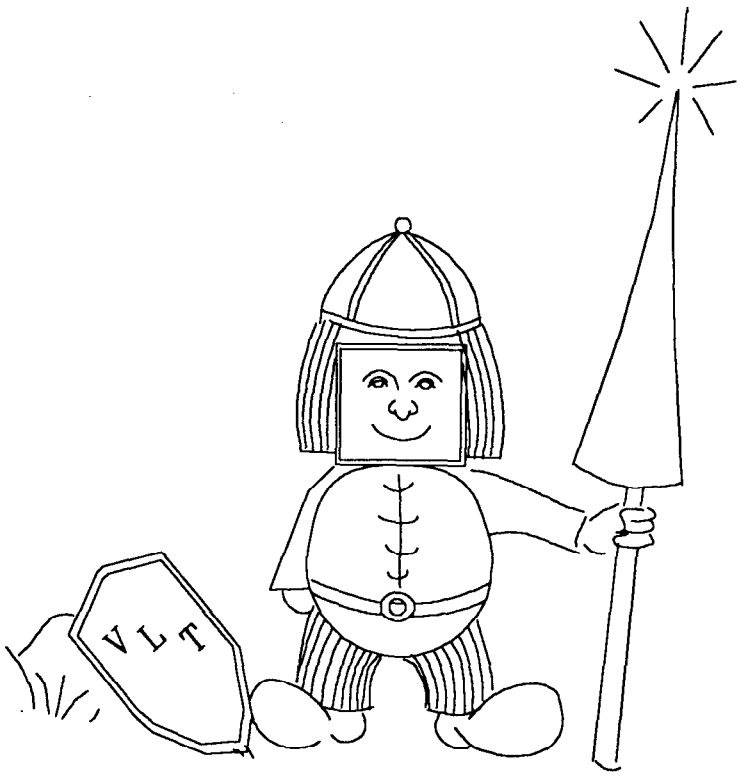

A Valiant Little Terminal

A VLT User's Manual

by

Amanda Weinstein

Fourth Edition—August 1992

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Acknowledgements

Many thanks to Willy Langeveld, the creator of VLT, for assistance, discussion, and explanation, as well as the writing of Appendices C and D of this manual. Thanks as well to Marvin Weinstein, author of the original VLT manual, *VLT, the Story*, for the use of his efforts, his TEX assistance, and the new VLT logo. We are also grateful to the BIX users whose questions formed the basis for the Troubleshooting section and to Suzanne Weinstein for the creation of the limited edition VLT T-shirt.

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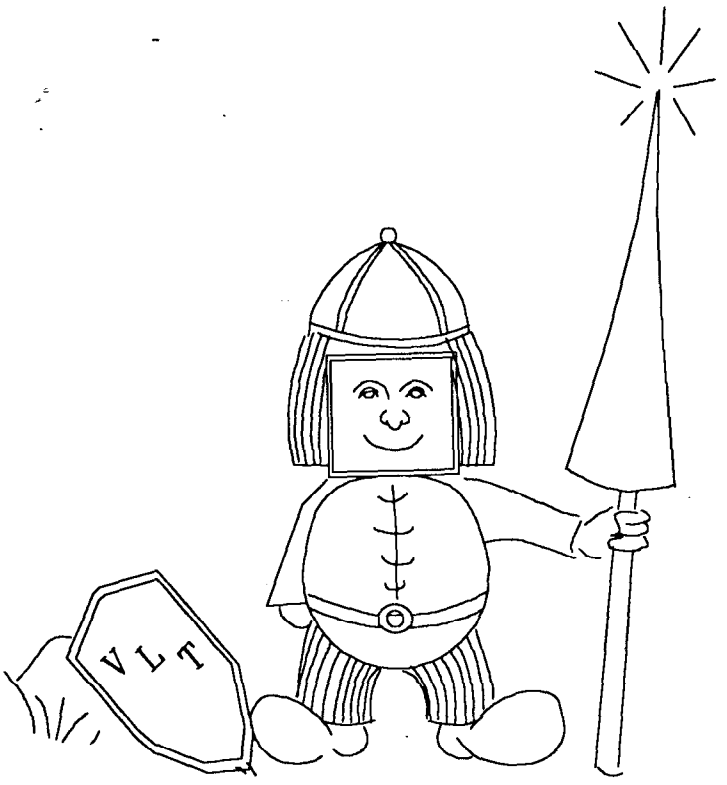
Introduction



An Introduction to VLT

VLT came to be used at SLAC (Stanford Linear Accelerator Center), because SLAC wanted to assess the Amiga's usefulness as a color graphics terminal and TEX workstation. Before the project could really begin, the people at SLAC needed a terminal emulator which could successfully talk to the IBM 3081 (now the IBM ES9000-580) and all the VAXes on the site. Moreover, it had to compete in quality with the Ann Arbor Ambassador GXL terminals which were already in use at the laboratory. Unfortunately, at the time there was no commercial program which fit the bill. Luckily, Willy Langeveld had been independently hacking up a public domain VT100 emulator written by Dave Wecker et al. and the result, VLT, suited SLAC's purposes.

Over the years, as the program was debugged and rewritten, the original code disappeared, so that now, in the present version of VLT, none of the original VT100 code remains. Despite this, we nevertheless owe a debt of gratitude to the authors of the original program because it kept VLT on the air and functioning while the changes were taking place. Kudos also go to Joanne Dow, who allowed us to use her code for handling the serial port, Charlie Heath, for the use of his file requester, which turned into the ARP library, Carolyn Scheppner for the palette tool, and Dave Betz for his Bmodem code. Having this stuff to fall back upon made the job of creating VLT much easier and helped things run faster and more smoothly. Thanks, too, to Marvin Weinstein, Jim Kent, Jim Mackraz, Tom Rokicki, and others for various little snippets of code, to Rick Huebner, Steve Walton, Marco Papa, the Software Distillery, and Marc Boucher for writing the `XPR` file transfer protocols used by VLT, and to the many people, too numerous to name, who have served as beta testers.

What It Does At SLAC: Terminal Emulation

A good terminal program was one of the crucial links in establishing the Amiga as a feasible, cost effective terminal + TEX Workstation at SLAC. Therefore, VLT had to satisfy certain requirements.

1. First, it had to allow one to log onto IBM and VAX mainframes over various communications links, telephone lines, the Micom Switch and the Bridge. This meant that various parity modes and protocols had to be supported and that it should be easy to switch between these modes. VLT supports baud rates from 110 to 57600, 15 parity modes, and four different handshaking protocols.
2. The terminals most in use at SLAC were Ann Arbor Ambassadors. These had 24 function keys and allowed the system to reprogram various attributes of the terminal in order to automatically switch between 24, 32 and 43 line modes on the IBM. Since the Amiga keyboard only has 10 function keys along the top of the keyboard, SLAC needed an alternative way of getting the same functionality. The solution to this problem was to provide the user with several choices:
   (a) First, an ever-growing number of keyboard sequences and menu options are programmable, including the numeric keypad on the right hand side of the Amiga keyboard, the alt-ed and shift-alt-ed keypad and cursor keys, the ten function keys at the top of the keyboard, both alone and in combination with the shift, alt, and ctrl keys, and the **User Menu** options.
   (b) At the bottom of the screen, a total of 30 function gadgets can be displayed. These gadgets are on-screen software objects which may be activated by moving the mouse

pointer over them and clicking the left mouse button. They are programmed by default to emulate the way in which the function keys on an Ambassador work, but they can be user-programmed in a variety of ways which will be explained later. For those users who do not wish to have these function gadgets displayed at the bottom of the screen, there is a means for removing and restoring them at will.

(c) VLT also allows you to program any key on the keyboard and command sequences using a special keymap (for use of the **Program Mode** and **Special Keymap** options, see **The User Interface: Text Screen Menus**).

3. It was important that the terminal allow the mainframe to send escape sequences in order to tell the Amiga to use different colors. VLT supports these features; the escape sequences which should be sent by the host in order to activate them are documented in **Appendix C**.

4. VLT is designed to provide the same sort of Tektronix emulation that is used by the Ambassador GXL terminal: it opens a second screen for graphics, independent of the alphanumeric screen. This second screen provides color support. It is also possible to display graphics and text on the same screen. The details of the Tektronix emulation are given in **Appendix D**.

5. The Amiga is naturally a mouse + keyboard oriented machine. Once a person gets used to this he or she often wishes to have a way to use the mouse to handle cursor positioning and interactive graphics support. VLT allows you to program the mouse's behavior in a variety of ways using the **Mouse Support** menu option (see **The User Interface: Text Screen Menus**).

File Transfer

File transfer protocols are used to transfer files between two different computers. A version of the file transfer protocol must be run on both machines, which means that, to use the Amiga for file transfer, the terminal program has to support these file transfer protocols. Usually, the file transfer protocols are built into the terminal program. Since only so many protocols can be included in this manner, this limits the user's choices. VLT, however, offers a better solution.

VLT supports what are known as *external* file transfer protocols. This means that the file transfer protocols are not part of VLT itself, but are accessed by VLT from special `XPR` (external *p*rotocol) libraries. VLT will let you use any file transfer protocol, as long as an Amiga version of the protocol, written according to the `XPR` specification, has been stored in the appropriate place in the form of an `XPR` library. When you obtain VLT, you should also obtain at least two `XPR` libraries: `xprkermit.library` and and `xprxmodem.library`.* These libraries contain, respectively, the file transfer protocols **Kermit** and **XMODEM**. Among the other `XPR`'s currently available are `xprascii.library` (included with VLT), `xprzmodem.library`, and `xprquickb.library`.

KERMIT IBM mainframes do not, in general, like to talk to non-IBM hardware. Therefore, special file transfer protocols had to be developed in order to make it possible to transfer files from an IBM mainframe to a desktop computer such as the Amiga. The most popular protocol for carrying on such transfers with an IBM mainframe is named **Kermit** (yes, for the frog). **Kermit** is also supported on many other SLAC systems.

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* If you are a SLAC user, you will receive these libraries with VLT. Otherwise, you will need to obtain the protocol libraries from their creators, since they don't normally come with VLT.

In any file transfer process of this type there are two separate programs which must be run together, one on the mainframe and one on the local (desktop) computer. In the beginning, you will probably have to do everything by hand; that is, first run the mainframe transfer protocol and then use the Amiga keyboard or menu options to handle the Amiga end of the process. This of course necessitates that you know how **Kermit** works on both the Amiga and the mainframe. At SLAC, you can learn how the mainframe version works by logging onto VM and typing

```
HELP KERMIT
```

Obviously, a general file transfer mechanism of this type had to be included, since it allows you to handle file transfers using **Kermit** with any **Kermit**-supporting machine. The disadvantage of this mechanism is that you have to carry out many repetitive steps.

Since VLT interfaces to AmigaREXX (ARexx), it is possible to write macros (also called scripts or execs) which handle the entire file transfer. These ARexx macros take care of running both the mainframe **Kermit** and the Amiga **Kermit** for you. Since each host supports **Kermit** in a slightly different manner, these macros *are* host-specific; it is not, however, all that difficult to alter these macros to suit another host. Macros of this type have already been written at SLAC; to obtain them, contact Marvin Weinstein (NIV@SLACVM).

XMODEM Another protocol which has come into wide use is the **XMODEM** protocol (and its derivatives such as **YMODEM** and **ZMODEM**). As with **Kermit**, it requires that a pair of programs be run together, one on the mainframe and one on the desktop computer. Although this protocol cannot be used with IBM mainframes, it can be used with VAXes. Again, as with **Kermit**, two modes of operation are possible. First, file transfer can be carried out entirely by hand by starting the mainframe program and then handling the Amiga's end of the deal from the menu options. On the other hand, it is a simple chore to rewrite the ARexx scripts which handle **Kermit** file transfers to handle **XMODEM** transfers to and from the VAX.

ARexx and VLT

ARexx is a programming language based on the IBM mainframe language Rexx. ARexx is a full implementation of Rexx on the Amiga, with extra features which allow access to many of the Amiga's special capabilities. A discussion of the way in which VLT interfaces to the general Amiga multi-tasking environment and ARexx in particular will be given later. Throughout this manual, we will often assume that you have a setup which includes ARexx. This will indeed be true for all 2.0 users, since ARexx comes with the 2.0 operating system, but it may not be true for those still using AmigaDOS 1.3. If you don't have this program, you should obtain it, since VLT is really designed to function in conjunction with ARexx. This product can be ordered from

William S. Hawes
P.O.Box 308
Maynard, MA 01754
(508) 568-8695

Although VLT will run perfectly well without ARexx, the full scripting capabilities will not be available to you unless you are operating within the environment created by this program.

FastFonts and VLT

If you are still running under AmigaDOS 1.3, you should also run FF (FastFonts), which comes with the Amiga 1.3 operating system. FastFonts allows you to replace the system font with a more attractive font that speeds up the writing of text to the screen by a significant amount, thus making for much smoother terminal operation (in fact, FastFonts are even nicer than some 2.0 fonts). Unfortunately, the 1.3 operating system only includes the FastFonts (FF) program, not the fonts themselves. At one time, the fonts could be purchased as part of the program TxEd-Plus, but this program is no longer available. At SLAC, the fonts are part of the TxEd Site License, so you can still get them.

VLT Jr.

There is a version of VLT known as VLT Jr.. VLT Jr. is basically the same as VLT, except that it doesn't do Tektronix emulation—that is, it doesn't handle graphics. In return, it is about 50 kilobytes smaller, which is an advantage for those with limited memory.

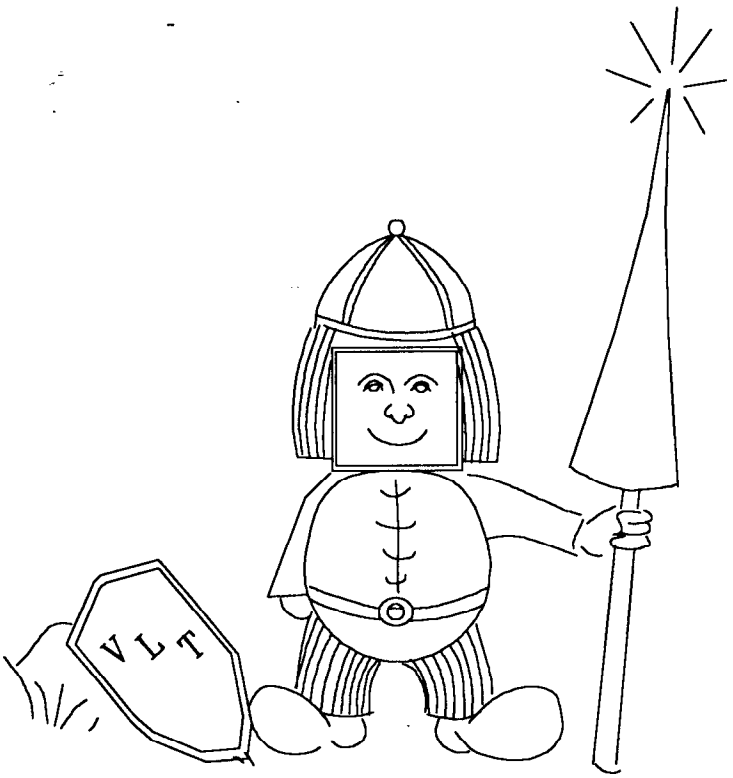
The VLT Manual

VLT has changed a great deal since it was first developed, and even experienced users may find unfamiliar features in the most recent version. Those familiar with versions of VLT older than version 4.846 will discover that, among other things, the VLT scripting language has been redesigned and menu options have been added, removed, or moved to different menus. Hopefully, this manual will clarify confusing issues and explain the new version of VLT to your satisfaction.

For those familiar with VLT version 5.045, the most important changes have been made to the menus, which, in addition to being rearranged, have acquired some new options, and to the scripting language, which has acquired some new syntax features and quite a few new commands.

2

Getting Started



Installation

At present, if you are not a SLAC user, you will have obtained VLT in the form of an archive file. SLAC users should get VLT directly from Willy Langeveld. Both SLAC and non-SLAC users have a wide variety of setups. If you have a hard disk, you will be able to run VLT with all of the frills you are accustomed to having on Workbench. If you have two floppy drives but no hard disk, you should still be able to do this, since you can run Workbench from one drive and VLT from another. If you have only one drive and must run Workbench and VLT from a single floppy, however, you will have to delete some of the Workbench's "frills," simply because VLT takes up so much space on the floppy.

Installing VLT From An Archive

If you have obtained VLT as an archive file, then you will have obtained one of two archives, **vlt5p576.lha**, which is the VLT archive, or **vltj576.lha**, which is the VLT Jr. archive. We will only explain how to decode the VLT archive and install it, as the procedure for installing VLT Jr. is exactly the same. Note, however, that some files only needed for VLT are not included in the archive for VLT Jr.

Decoding the Archive File

1. Change to a directory where you have at least 610K of disk space (this could be **rad:** or **ram:** if you have a great deal of memory). Use the **info** command to find out how much space you have on a given device (see your Amiga manual for details).
2. Next, let us suppose, for the sake of convenience, that the archive file **vlt5p576.lha** is on a floppy disk in **df0:**.
3. Go to your CLI and type
   lha -x -a x df0:vlt5p576.lha
   Please do not omit either the **-x**, **-a**, *or* **x** *qualifiers in this command.*

Installing VLT on a Hard Disk

After de-archiving all these files, you should see, from the Workbench, a drawer called VLT. For the sake of simplicity, let's say that you want to install VLT on the **work:** partition of your hard disk.* Double-click on the little disk icon labeled **work:** to open a **work:** window, then grab the VLT drawer icon with your mouse and drag it into the **work:** window. Your Amiga will automatically copy the VLT directory, along with its subdirectories and their contents, into **work:**. If you don't like using the mouse, issue the following commands in the CLI:

```
makedir work:VLT
copy VLT work:VLT all.
```

If you wish to make VLT a resident program, or if you are still running under AmigaDOS 1.3, then you must assign the logical device name **VLT:** to the directory which contains VLT. For instance, if you copied the VLT drawer to your **work:** partition, then you must assign **VLT:** to **work:VLT**. To do this, add the line:

```
assign VLT: work:VLT
```

to your **user-startup** file (or your startup sequence under 1.3).

---

* We're assuming that you have unarchived VLT on someplace other than **work:**—otherwise VLT would be already installed on **work:** and you wouldn't need to do anything further.

If you tend to run from a shell most of the time, you will also want to add a path to VLT (this is true for people running with AmigaDOS 1.3 as well as AmigaDOS 2.04). To do this, add the line:

```
path add work:VLT
```

to your startup sequence.

Note that using the procedures outlined above, you can install VLT on any hard disk partition, even inside any directory or subdirectory that you choose.

Installing VLT on a Floppy Disk

If you have two floppy drives, you can run Workbench from one drive and VLT from the other. In that case, you won't have any problems, since VLT just fits on a floppy disk. If you only have one floppy drive, however, you'll need to install VLT and Workbench on the same floppy. You may find this rather difficult, because VLT is a rather large program. So, in order to get rid of excess baggage, we recommend that you make copies of the VLT docfiles, as well as those **.rexx** and **.scp** files which, as examples, you won't need, and then delete all of these files from the **VLT** directory that you plan to install. If you don't intend to use some of the frills included with VLT, such as the phonebook facility, you can also get rid of the **VLTPhonebook**, **NeatStuff**, **SetMiscFlags** files that exist in your **rexx** and **scp** directories. Even so, in order to free up enough space (a little over 610K), you'll need to get rid of any unnecessary system files on the Workbench; especially since you'll probably need extra room for the files discussed in the following section.

Other Files You May Need

VLT uses certain other files that are not distributed with VLT, some of which are essential to VLT's operation, others of which support and provide various frills. First—and this is extremely important—VLT uses **arp.library** whether or not it is running under AmigaDOS 1.3; in other words, *2.04 users need it too.* Under 2.04, VLT uses ARP considerably less, but can't do without it. Therefore, you must have this file in your **libs:** directory (you don't, however, need the other files that usually come with ARP). You will need **arp.library** version 39.1 (commonly known as ARP 1.3).

Those running under AmigaDOS 1.3, unless they have WShell 2.0, must install ConMan 1.3e in order to use the console window. Under AmigaDOS 2.04 you can use the console handler that comes with the system, but you will need WShell 2.0 if you want to use the VLT-ConsoleMenus file in **s/** (the console menus only work under AmigaDOS 2.04). None of these files are absolutely required, but if you don't have them, you may not be able to open the console window or get it to behave properly.

Next, if you intend to play with FifoBBS.rexx and similar Fifo: based utilities, you must install the Fifo: handler by Matt Dillon. For more details, see **The User Interface: Text Screen Menus** for the discussion of **Fifo Pipes**.

VLT will complain if it cannot find the external file transfer protocol library (**XPR**) you have currently selected. Please note: although it may appear that the **XMODEM** and **Kermit** file transfer protocols are part of VLT, they actually depend on external protocols. While VLT's other features work perfectly without external file transfer protocols, you will need them if you intend to do file transfers (and you probably do). We suggest that you acquire the freely distributable **XPR** libraries of your choice. Currently, **XPR**'s for the **XMODEM**, **Kermit**, **ZMODEM**, **YMODEM**, **CISQuickB**, and **Jmodem** protocols are available. An **ASCII** XPR is included with VLT (**xprascii.library**).

Some of the ARexx programs that come with VLT *require* that you have **rexxarplib.library** version 3.0 (earlier versions of **rexxarplib.library** will not work correctly). **Rexxarplib.library**, like most other files discussed in this section, is available on BIX and on the anonymous FTP site **unixhub.slac.stanford.edu**, as well as various other online services and BBS's. In addition, floppy-based systems will not automatically run ARexx upon startup; if you have a floppy-based system and want to use ARexx macros, you'll need to either drag the RexxMast icon over to your WBStartup drawer or add RexxMast to your user-startup file.

Finally, several files included with VLT implement useful "extras," including a phonebook facility; these facilities are documented in **Appendix F**. There are also quite a few interesting and useful VLT scripts that have been written by other users. Some implement phone books, while others automate up/download facilities for on-line services.

Installation for SLAC Users

SLAC users should call Willy Langeveld and get their VLT setup, with all the files that they need, from him.

Installation Notes for 1.3 Users

Since VLT now uses, by default, 2.0-style icons, users will notice a new directory, **Icons_For_1.3**. This directory contains special 1.3-style icons for those users with a 1.3 operating system. Copy the relevant **.info** files from this directory over the ones that you copied during the installation.

Installation for 2.0 Users

Under 2.0, you can use the system's standard console handler to support the console window. Even if you want to use a ConMan console, you do not want to run ConMan in your startup sequence; when mounted as **CON:**, ConMan replaces the regular system console handler in all cases, which will irritate 2.0. Instead, you should issue the command **mount CNC:** and program VLT's console window to use **CNC:** instead of **CON:** (see **The User Interface: Text Screen Menus**). In this case, ConMan will only be used by VLT and won't interfere with ordinary 2.0 functions. On the other hand, you may choose instead to purchase WShell 2.0 (see the **Introduction, ARexx and VLT**).

Upgrading from older versions of VLT

Those of you upgrading from older versions of VLT will notice that the method of installing VLT has changed significantly, since VLT can now keep all the files it needs in its own directory. This is not entirely necessary; you can, if you wish, install VLT as you have previously done, by copying **devs** files to **devs:**, **libs** files to **libs:**, etc.. If you want to install VLT this way, you'll probably want to put all the **scp** files and **rexx** files that come with VLT into **rexx:**.

On the other hand, you might want to clean up your system and change over to the new method of installing VLT. In principle, you should be using the same method of installation as new users, but there will probably be one important difference: you'll have files of your own, such as script and configuration files, that you'll want to keep. You can copy these into subdirectories in the new VLT directory, but be careful not to overwrite the new files with old material, or to overwrite your own configuration files with the new standard configurations that come with VLT.

Here's a sample upgrading sequence.

1. Unpack the VLT archive as described earlier.
2. Make a directory called **work:vltnew**, as well as the directories **work:vltnew/rexx** and **work:vltnew/scp**.
3. Issue the following commands:
   ```
   copy rexx:#?.vlt work:vltnew/rexx
   copy rexx:#?.scp work:vltnew/scp
   ```
4. From the Workbench, drag the VLT drawer created when you unpacked the archive to your **work:** partition. You should now have a VLT and a VLTnew drawer on work: (you can also do this from a CLI as shown earlier).
5. Issue the following command:
   ```
   copy work:VLT work:VLTnew all
   ```
6. Now delete **work:VLT** by typing the following command:
   ```
   delete work:VLT all
   ```
7. Now rename **VLTnew** to **VLT** by issuing the following command:
   ```
   rename work:VLTnew work:VLT
   ```
8. Now copy the configuration files by typing:
   ```
   copy s:VTPrefs.dat work:VLT/s
   copy s:TekPrefs.dat work:VLT/s
   ```

   If you made changes to **s:TekProlog.ps**, make the same changes again to **work:VLT/s/TekProlog.ps**. Then delete the files just mentioned from your **s:** directory.
9. If you have other programs that need access to the **XPR** libraries, you should probably leave them in your **libs:** directory. Otherwise, copy all the **XPR** libraries you have to **work:VLT/libs**, then delete these files from **libs:**. You should also delete **libs:review.library**, **libs:strokefont.library**, **libs:simplexfont.library**, and **libs:duplexfont.library**.
10. If you wish, you can now delete all VLT specific fonts from your **fonts:** directory by issuing the command:
    ```
    delete fonts:vlt#?  all
    ```
11. If you intend to make VLT a resident* program, or if you are still running under AmigaDOS 1.3, assign **VLT:** to VLT's directory of residence, just as a new user would. For all users, if you tend to run VLT from a shell, add VLT's directory of residence to your path (see **Installing VLT on a Hard Disk**).
12. If you find that VLT is often unable to find needed files in specific situations, you may be able to fix the problem by making more assignments, or by consolidating files in certain directories, or by eliminating directories you don't need which VLT looks for anyway (see **Getting Started: VLT's Method of Searching Paths**).

---

* A resident program is a program which has been permanently installed in true memory. This means that a resident program is always loaded into memory, even when you're not using it; on the other hand, if you run the program several times, the computer will use the same copy instead of loading the program into memory several times, as it would with a non-resident program. To make VLT resident, issue the command **resident VLT:VLT** from a shell.

Flushing `review.library`

13. In order to use the new **`review.library`**, you must flush the old version from memory. To do this, make sure the old version is not in **`libs:`** (delete it if it is) and then reboot. If you go to the CLI and give the command **`version review.library`**, you should see the response **`review.library 1.31`** (or a higher number). Otherwise, you have the wrong version.

Testing VLT

Insert the VLT boot floppy you just created into one of your disk drives. Reboot. In half a minute or so, you should see a screen with a number of icons. Click twice on the icon called **`Work:`**. A window with a bunch of icons in it should appear; one of these icons is the VLT drawer icon. Double-click on this icon; a new window will appear, containing, among other icons, the VLT icon (you can't miss it). Increase the size of the window, drag the icons around so that they aren't overlapping anymore, and make a snapshot of the window (See your Amiga manual). In the process you should have discovered another icon called TestScript.scp. If you click twice on either icon, VLT should start up. For those who clicked on the TestScript icon, a little story will be told and VLT will exit automatically after thirty seconds. If you followed the installation procedure correctly, then you won't have any trouble with this. If you do find problems, go back over the installation procedure and check for mistakes.

If you installed VLT on your hard disk, follow the procedure outlined above, minus the floppy disk insertion.

VLT's Method of Searching Paths

As of version 5.517, VLT has acquired a new ability: the ability to search for the files it needs in several places, instead of looking only in a single place as it used to do. This is why, instead of having to install the files VLT needs in various directories, a user can now gather them all together in a single directory or put them in scattered directories according to his choice. VLT finds these files by checking what are known as "paths," and while this method of finding files is both useful and effective, it can occasionally be confusing as well. In this section, we'll explain how VLT looks for files and what aspects of this new feature are necessary for you, the user, to know.

When VLT is looking for a file, it will search through a set of likely directories, in sequence, until the file is found. This set of likely directories, plus the order in which they are searched, constitute a path. These paths will vary depending on whether VLT is looking for a file or putting up a file requester; they will also vary depending on the type of file that VLT is looking for. VLT will search through these paths until it finds the file it needs, then stop. This means that if you have slightly different copies of a file in different directories, you need to make sure that the version you want VLT to use is in the directory highest on VLT's priority list; otherwise, VLT will find a different version of the file early in its search and use that instead.

Understanding these paths can be useful, especially if you are a long-time VLT user with lots of baggage, such as handy scripts you absolutely can't live without. In that case, when you install your VLT upgrade, you'll probably be making some judgment calls on where to store such files; understanding the paths VLT uses can help you make those decisions. In addition, if you have (as you very well may), multiple versions of files floating around, you may have some frustrating moments where VLT just refuses to load *your* configuration file instead of some weird configuration file you haven't used in ages. The solution is probably that you have an old version of the file floating around in a high-priority directory; knowing the paths makes this type of problem much easier to solve. The paths VLT uses when searching for specific types of files are listed below, with the various directories listed in order of priority from left to right.

NOTE: In the tables which follow, **progdir:** *stands for the directory containing the VLT executable.*

Files(s)	**Path that is searched**						
TekProlog.ps	current dir	vlt_s:	vlt:s	progdir:s	s:		
TekPrefs.dat	current dir	vlt_s:	vlt:s	progdir:s	s:		
VTPrefs.dat	current dir	vlt_s:	vlt:s	progdir:s	s:		
.scp scripts	current dir	vlt_scp:	vlt:scp	progdir:scp			
ARexx macros	current dir	vlt_rexx:	vlt:rexx	progdir:rexx	rexx:vlt	rexx:	s:
fonts	current dir	vlt_fonts:	vlt:fonts	progdir:fonts	fonts:		
libraries	current dir	vlt_xpr:	vlt_libs:	vlt:xpr	vlt:libs		
		progdir:xpr	progdir:libs	libs:			
devices	current dir	vlt_devs:	vlt:devs	progdir:devs	devs:		

When VLT puts up a requester, it may not yet know where to look, so it will point to the first directory it can find in the path. The paths VLT follows when bringing up requesters for various filetypes are shown below. Notice that the directory with the highest priority is shown first, regardless of its contents; for example, if all your script files are in **s:** while a **rexx:** directory exists, the **rexx:** directory will appear in the requester (without your files) because **rexx:** is higher on the priority list. VLT can't know ahead of time that your scripts aren't there (of course, if you don't have a **rexx:** directory, you won't have a problem). So, for convenience, store your scripts in the first place on the path that exists (this holds true for other types of files as well). Note that you can always fool VLT by assigning **vlt_scp:** to the directory containing your VLT scripts, no matter how many other directories exist, because **vlt_scp** has the highest priority in the VLT script search path. You can pull a similar trick for the other paths, too.

Item	Path that is searched		
devices	vlt_devs:	vlt:devs	progdir:devs
	devs:	current dir	
XPR libraries	vlt_xpr:	vlt_libs:	vlt:xpr
	vlt:libs	progdir:xpr	progdir:libs
	libs:	current dir	
VLT scripts	vlt_scp:	vlt:scp	progdir:scp
	vlt_rexx:	vlt:rexx	progdir:rexx
	rexx:vlt	rexx:	s:
	progdir:rexx		
ARexx macros	vlt_rexx:	vlt:rexx	progdir:rexx
	rexx:vlt	rexx:	s:
	current dir		
keymaps	vlt_devs:keymaps	vlt:devs/keymaps	progdir:devs/keymaps
	devs:keymaps	current dir	
Tek "archive"	vlt_archive:	vlt:archive	progdir:archive
	current dir		
VT100 prefs file	vlt_s:	vlt:s	progdir:s
	s:		
Tek prefs file	vlt_s:	vlt:s	progdir:s
	s:		

Now, it is perfectly possible that you have previously saved certain things in your configuration files which will appear to alter VLT's path priorities without actually doing so. For example, you might have saved **libs:xprzmodem.library** as your default file transfer protocol. In that

case, when you select a new protocol to use, the XPR protocol requester will point to **libs:**, with **xprzmodem.library** in the file gadget. In that case, just type the real location of the XPR libraries into the drawer gadget, hit return, and select the desired XPR.

Starting Up

There are two ways to start VLT—from the Workbench or from a CLI. Before we discuss starting up VLT, we need to briefly explain a few terms.

Initialization Files — When VLT starts up, it first reads the file `VTPrefs.dat`, which contains default values of all its internal parameters. `VTPrefs.dat` can be in any directory in the appropriate search path (see **Getting Started: VLT's Method of Searching Paths**). Afterwards, it looks first for a file called `vlt_startup.vlt`, and then, if this file doesn't exist, for a file called `vlt.init`. These files, which are known as intialization files, are no different from other script files except that they are run at startup time before the VLT screen has been opened. Since it basically overwrites the settings in your VTPrefs.dat file, an initialization file is a good place for changing your color settings and so on. Initialization files are really for people who log on regularly to two or more different hosts, each of which requires different default settings.

Serial Devices and Unit Numbers — Normally, your Amiga comes with one serial port (the piece of hardware which handles the transmission of signals/information to and from your Amiga from and to your host). You may, however, choose to install extra serial ports. Serial ports are run by pieces of software known as serial devices. Depending what hardware you are using, you may have to run each serial port with a different serial device, or you may have to run all your serial ports with the same device and differentiate the ports using 'unit numbers' (Typically, unit numbers are assigned beginning with 0).

Starting Up VLT From the CLI

To start up VLT from the CLI environment, type

```
RUN VLT
```

(assuming that you have stored VLT in a directory belonging to the current "path"—that is, the group of directories that the Amiga will search for the specified program). You can provide the command with several parameters that affect the way in which VLT is invoked. The parameters are specified using special subcommands. A discussion of these subcommands and their syntax follows; if you forget them, typing **VLT ?** into your CLI will bring up a special message window with a brief description of these commands and their syntaxes.

```
RUN VLT +I startup.file
```

If you type the command with the +I option, then you are telling VLT that it should use an initialization file with a name other than `VLT_startup.vlt` or `vlt.init`. In the above example that would be `startup.file`. Moreover, the file specified with this option is automatically checked to see if it is written in either ARexx or VLT's scripting language and run upon startup when it is. On the other hand, if you type:

```
RUN VLT -I
```

then you indicate that the program should be run without looking for **vlt.init** or **vlt_startup.vlt**.

```
RUN VLT +S (serial device)
```

If you type the command with +S and a *serial device* name, you indicate that you want VLT to use the specified serial device. You must specify the serial device's full name, e.g. tsstrm.device.

```
RUN VLT +U (unit number)
```

If you type the command with +U and a *unit number*, you indicate that you want VLT to use the specified *unit*.

```
RUN VLT +N (VLT name)
```

If you type the command with +N and a name, VLT will be given a new name on startup. VLT's ARexx port will also be given this new name. This option is useful when you have several serial ports and want to run multiple copies of VLT with each one talking to a different serial port (You will, of course, also have to use either the +S or +U option to specify the different ports). Since you want each copy of VLT to have a different name and a distinguishable ARexx port, you will need to use the +N option to rename the different copies.

```
RUN VLT -N
```

If you type the command with -N, each invocation of VLT will be started with a different name. For instance, the first time you invoke the command with -N, VLT will be given the name VLT.1; the second time you invoke VLT with this option, VLT will be given the name VLT.2, and so on. So you can have different sessions of VLT running at the same time, each marked as different by the number appended to its name. If you have VLT come up on the Workbench, each successively invoked session will have its titlebar ten pixels lower than the previous invocation.

```
RUN VLT +P (VTPrefs filename)
```

If you type the command with +P, VLT will start up using the specified VT100 configuration file. By default, VLT loads a file called **VTPrefs.dat**. This file deals with parameters for the VT100 emulation, or text, part of VLT.

```
RUN VLT +T (TekPrefs filename)
```

If you type the command with +T, VLT will start up using the specified Tektronix configuration file. By default, VLT loads a file called **TekPrefs.dat**. This file deals with parameters for the Tektronix emulation, or graphics, part of VLT.

```
RUN VLT +C (Quickie Script)
```

If you type the command with +C, you can type a short VLT script, bounded by double quotes (see **Writing Scripts: Introduction To VLT's Scripting Facility**) immediately afterwards (separate the +C and the script by one or more spaces). This script will then be executed upon startup.

```
RUN VLT -B
```

If you type the command with -B, VLT starts up without opening the VLT screen. This is useful if, for some reason, you want VLT to be running in the background.

Any other file names specified on the command line are the names of script files that the program should run after startup is completed. *Note: see* **Getting Started: VLT's Method of Searching Paths** *for a description of where VLT looks for these files.* Names of script files should be specified last, after the parameter specifications that you have made. In fact, the complete syntax of the **RUN VLT** command is

```
RUN VLT [+]...[-]...[script1] [script2].....
```

where the [+] and [-] represent one or more of the parameters previously discussed. (Note that the [ ] indicate that the parameter is optional; they should not be typed).

As an example of how to run VLT from a CLI environment, let us say that you have two initialization files called IBM.INIT and VAX.INIT and two scripts called IBMLOGON.SCP and VAXLOGON.SCP. If you type

```
RUN VLT +I IBM.INIT IBMLOGON.SCP
```

VLT will setup according to the defaults specified in the file IBM.INIT and then execute the logon sequence specified in the script file IBMLOGON.SCP. If, on the other hand, you type

```
RUN VLT +I VAX.INIT VAXLOGON.SCP
```

it will set up the defaults specified in VAX.INIT and run the logon procedure specified in VAXLOGON.SCP. AmigaDOS 2.0 users and 1.3 users who own WShell or ARPShell can add the commands

```
ALIAS IBMVLT "VLT +I IBM.INIT IBMLOGON.SCP"
```

and

```
ALIAS VAXVLT "VLT +I VAX.INIT VAXLOGON.SCP"
```

to their startup sequences and save themselves a lot of typing.

Starting Up VLT From the Workbench

To start up VLT from the Workbench, double-click on the appropriate* disk icon (to double-click: move your mouse cursor over the icon and quickly click the left mouse button twice). This will cause a window to open; in this window you will find a VLT drawer icon. Double-click on this icon too. Another window will appear, this one containing the VLT program icon. Double-click on the program icon. At this point a clock will appear (unless you have the 1.3 operating system) to tell you that the program is loading. In a few moments, the appearance of your screen will change dramatically (everything will disappear) because you are now under the control of the terminal program.

It is possible, from the Workbench, to have VLT execute script files at startup time. For those of you who are unfamiliar with script files, they will be fully discussed in the chapter titled **Writing Scripts**. At this juncture, the only thing you need to know is that such scripts exist and that you can tell VLT to execute any number of them, in a specified order, at startup time. Since the procedure for running one script at startup time is slightly different from the procedure used for running multiple scripts at startup time, we will discuss them separately.

Running One Script

Before you can tell VLT to run a script at startup time, the script needs its own icon. There is a special script icon provided with VLT; this is a project icon titled `TestScript.scp.info`. A sample script file called `TestScript.scp` is included with the .info file. To make an icon for a different script, duplicate the `TestScript.scp` file from the Workbench (the icon file will duplicated automatically) by selecting the **Copy** option from one of the Workbench menus. Using the Workbench **Rename** option, rename the script file; then edit the script file and change it to what you want.

If you would like to make your own script icons, then make sure that the icon is a project icon and not a tool icon. Its `default tool` should be **VLT**.

To have VLT run the script at startup, you double-click on the script icon. VLT will start up automatically and run the script. *Note: If for some reason you have created an icon whose associated script file is not in the icon's directory, VLT will look for the script file elsewhere. See* **VLT's Method of Searching Paths.**

Running Multiple Scripts

Getting VLT to run multiple scripts in a specified order at startup time requires a slightly different procedure. First, create icons for all of your scripts using the procedure outlined above. Then click once on the icon belonging to the first script you want VLT to run and hold down the shift key. While holding down the shift key, click once, in sequence, on the icons of all the other scripts you want VLT to run. Then, still holding down the shift key, click twice on VLT's own icon. Phew! Now you can release everything and let your fingers have a rest. VLT will start running and execute all your scripts in the order that you clicked on them.

Tool Types

When starting up VLT from the CLI, there are various parameters which can be included with the `RUN VLT` command. What if you want to specify the values of these parameters, but also want to start VLT up from the Workbench? Tool Types are the solution. Using Tool Types,

---

* There will be several disk icons to one side of the Workbench screen, representing different partitions of your hard disk (if you have one) and the floppy(s) currrently in the floppy drive(s). Click on the icon named for the disk where VLT is stored.

you can specify the parameters you want VLT to start up with; then, whenever you start up VLT from the Workbench, VLT will start up using those parameters. *Note: If you direct VLT to run multiple script files at startup time using extended select (see* **Running Multiple Scripts**, *above), then VLT will start up using the Tool Types of the first script icon.*

If you click once on the VLT icon or any script icon, then go up to the menu bar of the Workbench screen, three menu names will appear. Move your cursor over the menu named **Icons**; then, when the menu drops down, select the **Information** option.† A window with all sorts of gadgets will appear. One of these gadgets will be labeled TOOL TYPES, and it will have up and down arrow gadgets, a button gadget labeled NEW, and a button gadget labeled DEL. When you want to specify an execution parameter for VLT from the Workbench, you click on the NEW gadget, type in a parameter, such as `-B`, and click on the SAVE gadget at the bottom of the window. You can specify as many parameters as you want in this fashion, but be sure to specify each parameter separately. For example, if you want to specify the parameters `-B` and `-I`, you would click on NEW, type in `-B`, then click on NEW again and type in `-I`. Then you would click on SAVE. *Don't click on SAVE until you have finished entering all your parameters, since selecting SAVE closes the Information window.* If you want to specify a parameter which requires an argument, such as `+S` or `+C`, you have to enter the parameter in the following fashion:

```
+S=tsstrm.device
```

Make sure that you don't begin the above command with a space or surround the equals sign with spaces; such spaces will cause problems. Moreover, when using the `+C` option, don't surround the command string with quotes.

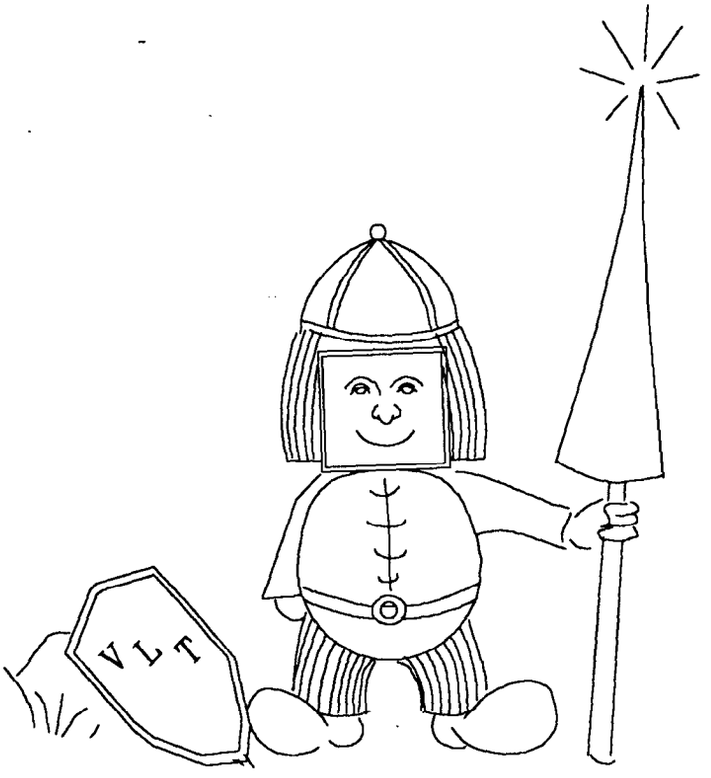
If you want to get rid of an already specified parameter, click on the parameter that you wish to delete, click on DEL, and then click on the SAVE gadget. Again, since selecting SAVE closes the Information window, don't select SAVE until you have finished making changes. Finally, if you want to take a look at all of the parameters you've specified, you use the arrow gadgets. The down arrow moves you forward in the list of parameters; the up arrow moves you backward. Under 1.3, the procedure for handling tool types is similar; see your Amiga manual.

No matter what procedure you use to get VLT up and running, once your screen goes blank you have entered the domain of VLT and the time has come to become acquainted with what we refer to as its user interface.

† Under AmigaDOS 1.3, the Workbench has fewer menus. So under 1.3, this particular item is found in the **Workbench** menu and is called **Info**.

3

The User Interface



Parameters and Menus

Assuming that you have followed our instructions in the previous chapter, you will now find yourself staring at a blank screen (this emulates what an ordinary terminal looks like when you turn it on) and wondering what you should do. If you have hooked up your modem or cable to the Amiga's serial port according to the instructions in your Amiga manual, all you really have to do is hit return once or twice. Everything might go very smoothly after that, in which case you will be ready to log on to your favorite host. Of course, Murphy's Law being what it is, you will probably not be so fortunate: you will have to reset some of VLT 's defaults so that it will work with your modem and host combination. The question we will address in this section is how you go about doing this and how, when you are finished doing this, you save the results of your efforts.

If you are an Amiga novice, the first step is to get acquainted with Amiga menus in general and VLT 's in particular. To display a menu put your hand on your mouse and hold down the *right* mouse button. At the top of the screen the following words will appear:

VLT Comm Paste Transfer Script Screen Operation User Graphics

These are the names of the nine menus which belong to VLT 's alphanumeric screen (i.e. the screen on which text is displayed). Moving the cursor over any one of these names (while you are holding the right mouse button down) causes the menu associated with that name to drop down from the *menu bar*. Each of these menus has several items, or options, displayed on it. Some of these options even have sub-options (or sub-items) associated with them. Sub-items are revealed only when you slide the mouse cursor down along the menu and point at the correct item. To select a menu option you slide the mouse cursor over the option until the choice you wish is highlighted and then holding the mouse steady you release the right mouse button. For keyboard oriented individuals, we have also provided keyboard shortcuts for selecting most of these options. To select an option from the keyboard, hold down the Right-Amiga key (i.e., the key to the right of the space bar with the letter A on it) and type the letter you found shown to the right of the item text in the menu. Thus, to start a capture you can select the Capture Session option in the VLT menu using the mouse, or alternatively hold down the Right-Amiga key and hit the letter O. You can change these shortcuts if you like (see **The User Interface: Text Screen Menus, Program Mode**). In this chapter, the keyboard abbreviations indicated are the default abbreviations.

There are also some shorthand symbols in the menus which need to be explained. You may be familiar with the practice of writing the keyboard equivalent of the menu option to the left of the option in the menu. In addition, the)) symbol to the left of a menu option indicates that the option has a submenu, while three periods following a menu option's name indicates that selecting the option opens up some sort of window.

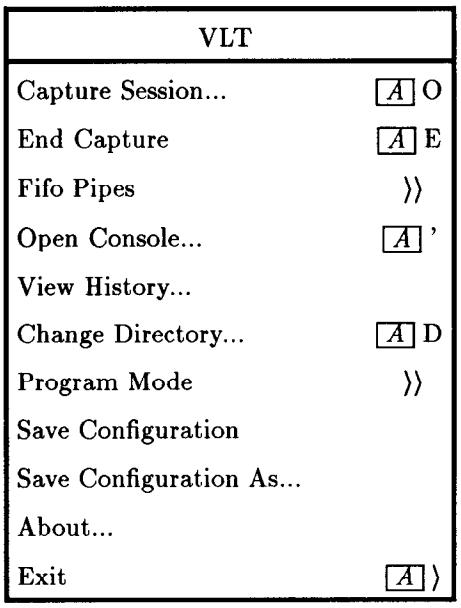
There are a great many menu options; some of these options allow you to change the default parameters with which VLT opened. If you discover that you need to change some of these parameters before logging on to your host, check with a local expert or documentation about the special parameter settings your host requires. Then flip through the following section, which discusses the various menus and menu options in detail, until you find the option(s) that will let you reset those parameters. Once you have done this, turn to the dicussion of the **Save**

Configuration option of the **VLT Menu**. Read this section carefully, as it explains how to make your new parameters the default parameters that VLT will use whenever it starts up.

We will devote the remainder of this chapter to listing each of the menu options and explaining what they do. Since there are separate menus associated with the text and graphics screens, the chapter is divided into two main sections: **Text Screen Menus** and **Graphics Screen Menus**. Within those sections, the menu options are organized according to the the menu which contains them.

Text Screen Menus

The VLT Menu



Capture Session The **Capture Session** option can be selected from the menu as shown, or by using the alternate keyboard command A O (hold down the right amiga key and type O). All commands that have keyboard alternatives are indicated in the menu in this way. This option allows you to capture to a file all information received from the host. If you select this option a file requester will appear. You will need to give it the necessary drawer and directory specifications as well as a filename for VLT to capture to. If the file already exists, a requester will appear, asking you whether you want *append* the new material to the end of the current file, *overwrite* the current file, or *cancel* the operation altogether.

Note that we recommend capturing to RAM: (or RAD:) since it is faster than capturing to a floppy disk. Also, should a system crash occur for some reason while VLT is writing to a disk, there is a chance that you will wind up with an unreadable floppy.

Selecting the **Capture Session** option from the VLT menu a second time will suspend file capture. A message box will appear on your screen saying that this has happened. This message box will go away as soon as you hit any key or click on one of your mouse buttons. When capture is suspended nothing that comes to the screen goes to the capture file. Reselecting **Capture Session** toggles capture on again and everything coming to the screen is again being saved into the previously defined file. You can toggle capture on and off as many times as you wish.

Note: The use of the file requester is discussed in **Appendix A**. *The file requester appears again and again when you save things to files from VLT, so if you are unsure of how to use the file requester, you should read this appendix.*

End Capture To shut down file capture completely and close the capture file select the **End Capture** option.

Fifo Pipes We will discuss the **Fifo Pipes** option in considerable detail later in this chapter.

Open Console Selecting the **Open Console** item opens a console window at the bottom of the screen. The console window, which allows you to send both ordinary text to the host and script commands to VLT, will be discussed in detail later in this chapter.

View History We will discuss the **View History** option in considerable detail later in this chapter.

Change Directory **Change Directory** provides you with a way of setting and/or changing the default directory from which VLT is operating. When you choose this option, a directory requester (or a string requester under 1.3) will appear which contains a single string gadget. The current default directory will be displayed in this gadget. Replace the displayed directory with

another of your choice. *Note on string requesters: after you have entered the desired string, you press the return key to proceed. Unlike the file requester, string requesters have no 'Okay' button, only a 'Cancel' button.*

Program Mode The **Program Mode** option allows you to program a number of function keys, menu options, and keyboard abbreviations. Details are discussed later in the chapter.

Save Configuration The **Save Configuration** command is very important in that it allows you to save the settings you have changed, such as baud rate, number of lines, macro key settings, colors, etc.. You configure VLT the way you want and then select this option. The settings will be saved in a configuration file, such as `VTPrefs.dat`. If you already have a `VTPrefs.dat` file, the current settings will replace the ones in that file. If you don't have a VTPrefs.dat file yet, VLT will create one and store it in the current directory.

Note that VLT looks for the specified initialization file using VLT's path search procedures; see **Getting Started: VLT's Method of Searching Paths** for more details.

Save Configuration As Selecting **Save Configuration As** allows you to save your current configuration without overwriting your current configuration file. This would be useful for a user who deals with many different hosts, each having specific configuration requirements, and who therefore needs several different configuration files. When you select this option, a file requester will appear; using this requester, you can give the configuration file you create any name you choose. In order to have VLT use a configuration file created this way instead of `VTPrefs.dat`, you invoke VLT using the `+P` command line option (see **Getting Started: Starting Up**).

About **About** brings up a message telling you what version of the program you are using. You should include this in any correspondence about problems you may encounter as the bug may already be fixed in a more recent version.

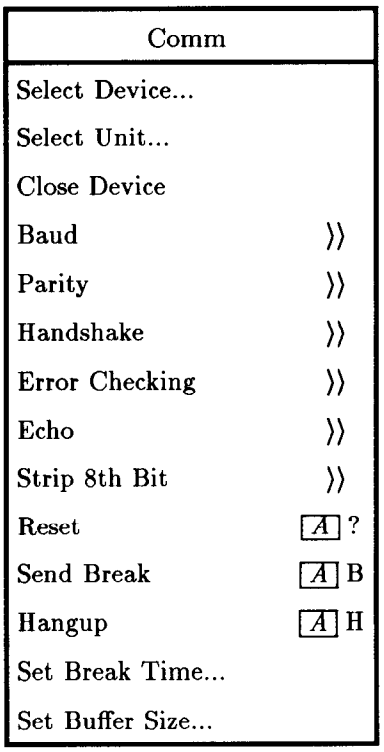
Exit **Exit** does exactly what it says: it shuts down the terminal program. *It is best to log off from your mainframe before selecting this option.*

This ends the list of commands available from the first menu on the text screen.

The Communications Menu

Select Device, Select Unit Normally, your Amiga comes with one serial port (the piece of hardware which handles the transmission of signals/information to and from your Amiga from and to your host). You may, however, choose to install extra serial ports. Serial ports are run by pieces of software known as serial devices. If you run each serial port with a different serial device, then you will want to tell VLT which serial device to use. This is done using the **Select Device** option. You may also, however, run several serial ports using the *same* serial device. When you are running several serial ports with one device, the ports are assigned what are known as 'unit numbers' in order to differentiate them (typically, unit numbers are assigned beginning with 0). VLT, in this case, will not know which serial port the serial device should talk to unless you specify a port unit number; this is done using the **Select Unit** option. *Note: After you select a device using the* **Select Device** *option, a string requester will appear, asking that you enter a unit number. The default number is 0 and unless advised otherwise, you should leave it that way.*

Close Device The **Close Device** option closes the device currently being used as a serial port.



Baud If you select the **Baud*** option a submenu will appear that shows the choices 110, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and Midi. These are the baud rates which VLT supports. If you are using a modem and a telephone line to connect with your host, you will probably have a 1200 or 2400 baud modem, and so should probably select one of these two choices. If you are working with a mainframe that you are hooked up to directly, you will probably be able to use either the 4800 or 9600 baud settings, depending on your setup (check with a local expert). *Important Note: Even if your setup supports it, you may have trouble using the 19200, 38400, 57600 and Midi baud options when using the Amiga's built-in serial port, due to hardware limitations on a standard A500 or A2000.*

Parity Parity is an outmoded technique for error detection which most non-IBM computers pretty much ignore unless the user insists upon it. Unfortunately IBM mainframes still insist on getting a specific parity and if this is not set correctly you will not be able to log on to the mainframe. If you select the **Parity** item in the **Comm Menu** you will be presented with a submenu which will allow you to choose the parity settings that the Amiga supports. In addition to the more common even and odd parity settings, you will find the less common mark and space parities. To log onto an IBM mainframe *always* select **7E1**. To log onto Tymnet and bulletin boards with modems you will often have to use **8N1**. For a more comprehensive discussion of parity, see **Appendix B**.

Handshake This item refers to the type of handshaking that the Amiga does with a host in order to guarantee that one computer does not transmit data too fast for the other to keep up. Both the host and the terminal have buffers which, in order to handle temporary overloads, store the characters coming from their correspondent; however, if, as in the case of graphics, a huge amount of information is coming down the wire, there has to be a way for one device to tell the other to shut up until it has finished handling what it already has gotten. The Amiga provides several choices of commonly used 'handshaking protocols,' which appear in a submenu when the **Handshake** option is selected. The most commonly used protocol is the one known as Xon/Xoff, which is the one you will use when dealing with most IBM and VAX mainframes as well as networks. The CTS/RTS protocol (also known as 7Wire) is for use when the Amiga and its host are connected together with a set of wires, one of which is used for handshaking; 7Wire/X allows the user to use both the 7Wire protocol and the Xon/Xoff protocol simultaneously. The None option on the submenu means exactly what is says; it tells VLT not to handshake at all with the host.

Error Checking Prior to version 5.034, VLT ignored all serial device errors. **Error Checking** allows you to specify which serial device errors VLT should check for by selecting

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$\star$ While the terms baud and bps (bits per second), technically speaking, refer to entirely different things, in current and common usage they both refer to the number of data bits transferred per second.

various options in its submenu. When a particular type of error checking has been selected, a check will appear beside the corresponding suboption.

When VLT detects an error for which you've told it to check, it will post a message to that effect. Moreover, if the error is a read error—that is, an error in the information being sent to VLT—VLT will flush the serial device.

Serial Device Busy, the first suboption, tells VLT to check for cases in which data flow to your Amiga has been turned off by an Xoff character from the host. **Baud Rate Mismatch** checks to see if VLT and the host are set to send/receive at different baud rates. **Line Error** checks for a generic error, while **Parity Error** checks for a parity mismatch between VLT and the host. **Buffer Overflow** checks for an overfull buffer—that is, too much information being sent to your Amiga for your serial device's buffer to handle. **No DSR** (DSR = Data Set Ready), when set, notifies you if the other side (e.g., the host) is not ready to send or receive data. **Break Received** tells you if VLT has received a break signal.

Echo Terminals tend to operate in one of two possible modes depending upon what the mainframe is doing. Either you type a character at the keyboard and the terminal puts it up on the screen ('echos' it) and sends it to the mainframe simultaneously, or the terminal sends the character to the mainframe and the mainframe sends back a signal telling the terminal what to put up on the screen. The first alternative is called *local echo*, the second *remote echo*. When you have selected the **Off** option in the submenu, you will immediately recognize that you have made the wrong choice if none of your commands appear on screen. If you have selected the **On** option, on the other hand, you will know that you have made the wrong choice if everything you type appears doubled on the screen. As you will see by examining the submenu there are alternative keyboard commands for turning local echo on and off.

Strip 8th Bit **Strip 8th Bit** is used when you are dealing with bulletin boards or networks that use something known as mark parity. These networks tend not to care whether the stuff that you send them has mark parity or not; your Amiga, on the other, does care that everything the network sends you has mark parity, because unless VLT is set for mark parity, anything sent to it with mark parity will seem like garbage. The reason this command is called **Strip 8th Bit** is that information is sent back and forth between the terminal and host computers in sets of eight bits, one of which is used for parity (when you are using parity, that is). Strip 8th Bit strips the parity bits from anything sent to VLT from the host computer, making information sent to VLT with mark parity intelligible to VLT. While you could also set VLT for mark parity, this can be a nuisance, so the **Strip 8th Bit** option can be very useful. *Note: See* **Appendix B** *for a more comprehensive discussion of parity.*

Reset **Reset** resets the serial device to the current settings. Normally this should not cause a disconnect from the host; some modems, however, are picky enough to notice and disconnect you.

Send Break The **Break** signal is a special signal which is useful when dealing with some hosts. Since the Break signal means different things to different hosts, you will need to find out what a Break signal means to whatever host you are dealing with. Since there is no break key on the Amiga keyboard we have it included as a menu option. This command has the alternative keyboard sequence [A] B (i.e. hold down the Amiga key to the right of the space bar and type B). This key is sometimes necessary on Tymnet and in IBM line mode but has no use in IBM full screen mode.

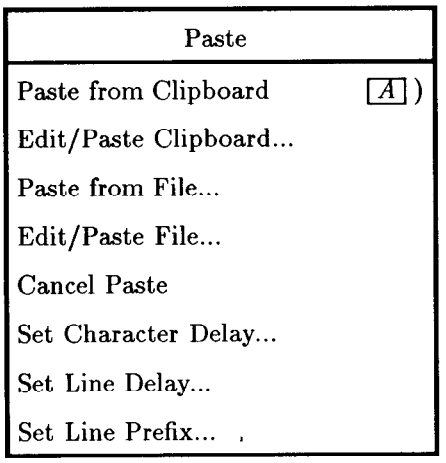
Hang Up Sometimes you want to drop your connection with the host (or Modem, Micom Switch, Bridge Box, etc.) without leaving the terminal program. This menu choice does that by shutting down the serial port for about a second. Its keyboard alternative is [A] H.

Set Break Time The break signal is sent as a pulse along the data line. Most hosts recognize the break signal as a break signal only if it endures for a specified length of time, known as the break time. For most hosts, a break time of 75 thousand microseconds will be sufficient for the host to recognize it as a break signal, but some hosts may demand a longer break time. Furthermore, some hosts consider the break signal a disconnect command if the break signal endures too long, so you will want to shorten the break time when dealing with these hosts. The **Set Break Time** option allows you to do this.

When you select the **Set Break Time** option, a string requester will appear. Specify the break time in terms of microseconds and hit return.

Set Buffer Size It is important not to confuse the buffer mentioned here with the history buffer. The buffer discussed here is the flow-control buffer, a buffer the Amiga uses to handle temporary overloads of incoming data. **Set Buffer Size** allows you to make this flow control buffer larger or smaller. Selecting this item will bring up a string requester. The default buffer size will appear in the requester; replace it with your own value. Specify the size of the buffer in terms of bytes.

The Paste Menu



Paste from Clipboard The **Paste from Clipboard** option will send the current clipboard contents to VLT and thence to the host.

Edit/Paste Clipboard The **Edit/Paste Clipboard** option resembles **Paste from Clipboard**, except that it gives you the opportunity to edit each line before it is sent. When you select this option, a string requester will appear, containing the first line of text in the clipboard. Edit the line to your satisfaction, then hit return. Another string requester will appear, containing the next line of text. You can abort this process at any time by clicking on the Cancel button of one of the string requesters, or by selecting the **Cancel Paste** option.

Paste from File The **Paste from File** option sends the contents of a specified file to VLT and thence to the host. When you select this option, VLT will bring up a file requester. Select the file that you want "pasted" and click on the Okay button, or click on Cancel to abort the process. You can abort the process at any time by selecting the **Cancel Paste** option.

Edit/Paste File The **Edit/Paste File** option resembles **Paste from File**, except that it gives you the opportunity to edit each line before it is sent (see the **Edit/Paste Clipboard** option).

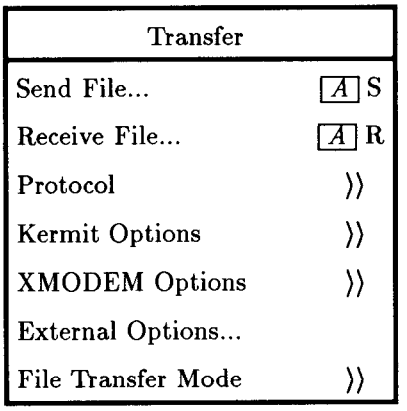
Cancel Paste Selecting the **Cancel Paste** option aborts the current paste operation.

Set Character Delay, Set Line Delay After sending a character to the host, the paste facility will wait a specified amount of time before sending the next character. The **Set Character Delay** option allows you to set the size of the delay, in milliseconds. When you select this option, a string requester will appear, containing the current character delay setting. Type in the desired setting and hit return (optimum settings may vary from host to host and may also depend on the baud rate that you are using).

After sending a line to the host, the paste facility also waits a specified amount of time before sending the next line. The **Set Line Delay** option allows you to specify the size of this delay in milliseconds. When you select this option, a string requester will appear, containing the current character delay setting. Type in the desired setting and hit return (again, optimum settings may vary from host to host and may also depend on the baud rate that you are using).

Set Line Prefix If you want the paste facility to send a string to the host before every line of text, you can specify that string using the **Set Line Prefix** option. When you select this option, a string requester will appear; the requester is blank by default. Enter the desired line prefix and hit return.

The Transfer Menu



Send File VLT supports three different kinds of file transfer. The send and receive commands discussed here are general commands which behave differently depending on the file transfer protocol you have chosen (e.g. **Kermit**, **XMODEM**, etc.). The **Send File** menu item is the one you choose to initiate a file transfer from the Amiga to your host. What will happen after you select this menu option depends upon the choices which are checked in items three through six of this menu. In any event, after you have selected this item a requester will appear and you can use it to find the file which you wish to send. Once the path and filename are in their appropriate string gadgets click on OK and the file transfer will start. While file transfer is going on a message box will appear and it will keep you apprised of how the transfer is proceeding.

In general, in order to send a file to or from your host, a program has to be run at *both* ends. These menu options *only control what is happening at the Amiga end of the process. Never* select the **Send File** option before directing your host to prepare to receive a file. If you select the **Send File** option first, you will not be able to get to your host to direct it to receive the file. In that case, the file transfer will either spontaneously abort or hang up.

NOTE: in order to abort a file transfer which has hung up (i.e. you see nothing happening in the message window) hit the ESC key or click on CANCEL ALL *in the transfer status window (see later). In the case of Kermit an abort signal is sent each time you hit the escape key and it takes several such signals to abort a transaction. After you have aborted a transaction you should hit return a few times to make sure you have either left the transfer program, or at least gotten its attention. In the latter case, you will have to type in some sort of quit command.*

As you have to direct your host to send or receive a file before you tell the Amiga to receive or send the file, you will need to learn how to run the file transfer protocol that you are using by reading its documentation.

Receive File **Receive File** performs the file transfer in the opposite direction, i.e. from the mainframe to the Amiga. Once again this option controls what the Amiga does, not what is going on on the mainframe. *Always tell the mainframe to send the file before you direct the Amiga to receive the file.* Again, to abort a transfer hit the ESC key (several times in a row for **Kermit**, and not too fast) or click on CANCEL ALL.

Protocol **Protocol** is the menu item which allows you to choose the basic file transfer protocol to be used by the **Send File** and **Receive File** commands. When you select this option you will be presented with a submenu displaying seven options: **XMODEM**, **Kermit**, **ASCII**, **CISQuickB**, **ZMODEM**, **YMODEM**, and Other. Each option can be selected by entering the indicated alternate keyboard commands shown next to the subitem names.

VLT uses external file transfer protocols, which are specially written programs in the form of libraries on the Amiga. These protocols may be written by anyone, but they must be written according to a special format outlined by the `XPR` specification. VLT will recognize and use any protocol which fits this specification; in fact, *all* file transfer protocols in VLT are external, including those which pretend to be built-in, such as **Kermit** and **XMODEM**.

Kermit transfer is the protocol of choice for sending files to and from the IBM mainframe. If you use this protocol, then you may set your various options using the **Kermit Options** item.

XMODEM transfer is not available for transfer to and from the IBM; it can, however, be used for transferring files to and from VAXes. If you select this protocol then you have to set your **XMODEM** default parameters using the **XMODEM Options** item.

All the other options come under the subheading of **External**. **ASCII**, **CISQuickB**, **ZMODEM**, and **YMODEM** are the four currently known external file transfer protocols other than **Kermit** and **XMODEM**. While not explicitly supported (there is no ASCII Options menu option, for example), they have been given their own submenu options. The **Other** option allows you to access *any* external file protocol, including the ones mentioned above. When you select **Other**, a file requester appears, showing the names of available `XPR` libraries. Give it the name of the library containing the protocol of your choice. An important warning: as we said before, *all* file transfer protocols supported by VLT are in fact external. You may notice `xprkermit`, `xprxmodem`, `xprquickb`, `xprascii`, and `xprzmodem` libraries listed in the file requester. *Do not erase them.* Without them, VLT will not let you use these file transfer protocols, not even if you select them from the menu instead of from the external protocol requester.

Kermit Options When you select **Kermit Options** a submenu will appear. The first two submenu options allow you to select which of **Kermit**'s two *modes* you want it to run in. Selecting the **Send/Receive** option allows you to run in **Send/Receive** mode. In **Send/Receive** mode, whenever you want to transfer a file, you first tell the mainframe to run **Kermit**. Then you select either the **Send File** or the **Receive File** option from VLT's **Transfer Menu**. Selecting the **Host is Server** option allows you to run Kermit in something known as *server* mode. In this mode, the mainframe Kermit is continuously running, which means that the Amiga can control the entire file transfer from its end. As a matter of fact, the entire file transfer *must* be controlled from the Amiga, because Kermit, when in *server* mode, blocks all keyboard input to the mainframe. When you are running in *server* mode, selecting **Receive File** will bring up a requester requesting the name of a file on the mainframe.

The third submenu option, **Downcase File Names**, tells VLT whether or not to automatically convert filenames on the mainframe to lower case on the Amiga. A check next to this option means the filenames are being converted to lower case; no check means that they are not.

The fourth option in the submenu is **Kermit Bye**. If you are running the mainframe **Kermit** in server mode, you need **Kermit Bye** in order to tell **Kermit** that you want it to terminate itself and return control of the terminal to you. Remember, while **Kermit** is in server mode all keyboard input to the mainframe is blocked. You should know, however, that with many hosts, **Kermit Bye** will also log you off the host.

The fifth option in the submenu is **Kermit Finish**. **Kermit Finish** behaves a great deal like **Kermit Bye**, except that it does not, under any known circumstances, log you off the host

when it terminates **Kermit**.

The sixth option in the submenu allows you to specify *packet size*. What are packets? Well, Kermit transfers your file to or from the mainframe a piece at a time. These pieces are known as packets. Each packet is checked for errors; if an error is found in a packet, the receiving computer tells the sending computer to send the packet over again (the sending computer does this automatically, so you don't need to worry about it).

If you are using a modem and sending information over a noisy telephone line, use short packets. Noisy telephone lines tend to increase the number of errors and short packets minimize the amount of information that needs to be resent when an error is discovered. If you are using a different setup and don't tend to get many file transfer errors, go ahead and use long packets—the file transfer will take somewhat less time. Some hosts don't support long packets; in that case choose a packet size of 94.

When you select **Set Packet Size**, a string requester will appear, containing the default packet size in bytes. Enter the new packet size and hit return.

XMODEM Options Choosing **XMODEM Options** brings up a submenu that allows you to choose file transfer packet size and the type of XMODEM error checking to be used in file transfers. Selecting the first option tells **XMODEM** to use a simple check sum for error checking and to use short packets for file transfer. When the second choice is selected, **XMODEM** uses the same simple error checking but transfers packets which have a length of one kilobyte. The third and fourth choices call for a more complicated form of error checking (CRC), with the third choice specifying short packets and the last choice specifying long packets. Again, use short packets in situations where you may have many file transfer errors and long packets in situations where you usually encounter very few file transfer errors.

External Options **External Options**, when selected, will bring up a requester that asks you to enter options for the external protocol that you have selected. This option should only be used when an external protocol other than **Kermit** or **XMODEM** has been selected. Each external protocol has its own options requester; since these requesters are always documented along with the protocol, we will not discuss them here.

File Transfer Mode Selecting **File Transfer Mode** brings up a submenu that controls the way in which binary files are transferred.

The first option, **Binary**, is only selected when a binary file is being transferred (examples of binary files are executable programs and graphics files on either the mainframe or the Amiga). In order to carry out a binary file transfer you have to set up both the mainframe and Amiga properly. Let us take as an example a binary file transfer from the Amiga to an IBM mainframe.

First go to the **Transfer Menu** and select **Binary** from the **File Transfer Mode** submenu. Then set up the IBM mainframe **Kermit** by typing

```
KERMIT
```

and then wait for the prompt to appear, at which point type

```
SET FILE BINARY
```

and

```
RECEIVE filename filetype filemode
```

Note: Don't make the mistake of taking this command literally. You're supposed to type in `RECEIVE`*, a filename—such as* **foo***—a filetype—such as* `x0f2imp`*—and a filemode—that's the mini-disk where the file is stored, such as* **a**.

When the screen clears you are ready to go to the menu and select **Send File**. When the file transfer completes you have to leave **Kermit** by hitting RETURN once or twice to get its attention and then type

```
QUIT
```

To get a binary file from the IBM to the Amiga you proceed in the same way except that you give the IBM the command

```
SEND filename filetype filemode
```

after setting the file to be binary, and you select the **Receive File** option on the Amiga.

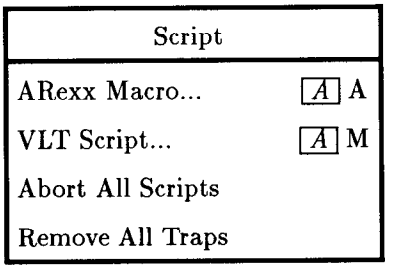
When transferring a text file, choose the **Text** option. On different computers, text files can be stored in slightly different ways. If you transferred a text file with the **Binary** option selected, you might end up with some peculiar-looking characters in the transferred file. The **Text** option translates between text file formats so that the transferred text file doesn't contain these funny characters. To verify that this option is switched on, look for a check mark to the left of this item on the submenu.

The Transfer Status Window

Whenever you send or receive a file, the transfer status window comes up. This window has several gadgets. When you click on the CANCEL ALL gadget, VLT attempts to shut down any and all file transfers as soon as possible. When you click on the CANCEL FILE gadget, VLT attempts to abort only the current file transfer; in a multi-file transfer, the file transfer currently in progress would be aborted and VLT would start sending or receiving the next file to be transferred. You can also abort a file transfer by typing [Esc], but only if the transfer status window is active. Clicking on the third gadget, SHOW WORKBENCH, puts VLT behind all other screens or windows and brings the Workbench to the front. Typing a character in the status window after a transfer is completed causes the window to close and the character to be sent on to the host.

The Script Menu

You can program VLT to perform highly specialized operations on two levels. At a lower level, you can write scripts in VLT's own simple command language. On a higher level, you can combine this simple command language with the more powerful AmigaREXX. These scripts can be executed by using the **ARexx Macro** and **VLT Script** menu options or by assigning one of 128 programmable keyboard sequences to call and execute the script file.



ARexx Macro When you select this menu option the file requester appears and displays all files found in the appropriate search path with the file extension `.vlt`. To execute one of these files double-click on its name, or single-click on its name and then click on the OK gadget. A brief explanation of ARexx scripts will be given in the next chapter, which is an introduction to writing scripts.

VLT Script There is a set of commands which VLT understands and which can be used to write VLT scripts. When these scripts are saved as files, they should have the file extension `.scp`. Examples of script files will appear in the next chapter. The file requester which appears when you select this menu option automatically assumes that these files will be found in a certain set of directories

(see **Getting Started: VLT's Method of Searching Paths**); you can, however, direct the requester to look in other directories for your file. Again, to execute one of these files, double-click on its name, or single-click on its name and then click on the OK gadget.

The difference between ARexx scripts—macros—and VLT script files is that ARexx is a more powerful language. Furthermore, while ARexx macros can be called from VLT and can send directions to VLT, the macro itself runs independently of VLT. ARexx macros have great flexibility and power; you can write ARexx macros to go through a specific logon sequence or to handle, at both ends, a file transfer between the Amiga and a mainframe, preparing the mainframe to receive/send the file at the same time as it directs VLT to send/receive it. VLT scripts, on the other hand, have only limited capabilities and run under the control of the VLT program itself.

Abort All Scripts Since ARexx macros run independently of VLT, they do not interfere with its operation; when they abort, the error messages are usually sent to an Amiga CLI. Since VLT scripts run under VLT's control, you need a way to abort a script once it has started, and selecting **Abort All Scripts** accomplishes this. As of VLT version 5.045, a new convention allows you to a create an "uninterruptable" script, which would be invulnerable to the **Abort All Scripts** option (see **Writing Scripts** for more details). *Note: If you select* **Abort All Scripts** *when a VLT script command has been sent to VLT by an ARexx macro and that script command is still pending, VLT will abort the script command and try to abort the ARexx macro as well.*

Remove All Traps There is a set of VLT script commands known as 'traps': the `wait` command, the `on` command, and the `trap` command. These 'trap' commands tell the script to wait for a certain set of characters to be sent from the mainframe before executing the next script clause. Sometimes, however, one of these 'traps' will be hanging around waiting for the mainframe to send it the right set of characters when you don't want it hanging around and waiting at all. **Remove All Traps** basically aborts all `wait`, `on`, or `trap` commands.

The Screen Menu

The menu options provided in the **Screen Menu** are concerned with setting various properties of the text screen. You should know that, in addition to being able to open multiple windows on the Workbench screen, the Amiga supports the concept of multiple custom screens. Following the desktop metaphor you can think of the screen as the desktop and the windows, which belong to a given screen, as pieces of paper, or file folders, which can be placed anywhere on a given desktop but which cannot be moved from one desk to another. Multiple windows can be opened on a given screen; when a window is opened, we are looking inside a given folder.

Although windows have different contents, all of the windows which open on a given screen share certain display characteristics. For example, all windows on a given screen have the same number of colors available to them. All windows which open on the Workbench screen, for instance, use the same four, eight, or sixteen colors, depending the version number of your operating system.* In addition, changing the characteristics of a screen changes the characteristics of its associated windows. For example, if you change a screen from non-interlace to interlace mode, then all the windows which open on it will also be in interlace mode.

---

* Under 1.3, the Workbench Screen (this is the screen which you see when you first boot) can display only four colors. You can use the Preferences tool to set these four colors to be any four chosen out of a palette of 4096 possible colors.

Screens and windows differ in a very important way. In general, most windows can be resized and moved around on their screen by using the mouse to grab their drag and resizing gadgets. Screens don't have close gadgets (they open and close only under the control of a program) and they cannot be resized. Also, screens must occupy the full width of the display, although they can slide up and down to reveal anything which lies behind them. Thus, like windows, screens can overlap one another and also, like windows, they can have front-to-back gadgets. In other words, if a screen has a drag bar at the top you can grab it with a mouse and slide it down to reveal a screen in back of it, or you can click on its front-to-back gadget to place it in back of any other screen which is open; however you cannot move it to the right or left. If there are back-to-front gadgets on the screen they will be located in the top right-hand corner of the drag bar.

VLT allows you to open both the text and graphics windows either on the Workbench screen, or on separate custom screens. If you open on the Workbench screen then your Workbench windows can be moved in front of the terminal window. This can be very useful if, for example, you wish to shrink a CLI or application window to a small size and keep an eye on what is going on in that window while you are doing something on the mainframe. It does, however, clutter up the Workbench with one more window. If you open VLT on a custom screen then you can have up to eight colors on the text screen (to provide for full color highlighting by the mainframe) and up to sixteen colors on the graphics screen. You can also set all the colors for that screen while you are running the program and save these values to your configuration files.

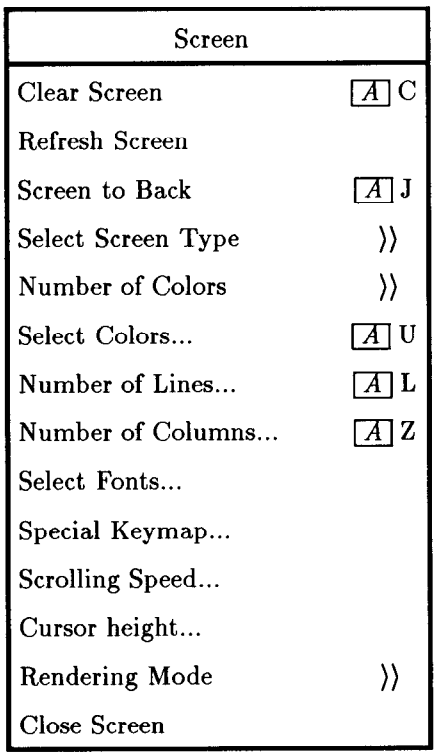
VLT provides menu options which allow you to change your current screen characteristics. Also, since the VLT-custom screen opens without a drag bar, front-to-back gadgets, close gadgets, etc., in order to be able to display the maximum number of lines, VLT provides keyboard and menu options to control the positioning of the VLT screen relative to the Workbench screen.

Clear Screen The **Clear Screen** command does just what it says, it clears the screen (without informing the mainframe).

Refresh Screen The **Refresh Screen** command redraws the VLT screen. Since it uses the history buffer to do so, however, the text on the restored screen is 'monochrome' (see **View History In Detail**).

Screen to Back The **Screen to Back** command does different things depending upon whether the VLT text window is on the Workbench screen or a custom screen. If you are on the Workbench screen then it simply puts the VLT text window behind all other windows on the Workbench screen. If you have VLT opened on a custom screen, this command will move VLT's screen in back of the Workbench screen.

Select Screen Type You select the **Select Screen Type** item in order to change the current status of the VLT text window and move it to and from the Workbench screen. When you select this item a submenu appears with the following choices: **Custom**, **Workbench**, **Interlaced** and **Non–Interlaced**. If you select **Workbench** then the text window will be opened on the Workbench screen. In that case it inherits the number of col-



ors and display characteristics of the Workbench screen and the **Interlaced** and **Non–Interlaced** options will do nothing (if Workbench is currently in **Interlace** mode, then VLT will be in **Interlaced** mode, if Workbench is currently in **Non–Interlaced** mode, then VLT will be in **Non–Interlaced** mode). If you select **Custom** then VLT opens a custom screen, independent of the Workbench screen, for the text window, and you may then choose this screen to be either interlaced or non-interlaced.

Number of Colors The **Number of Colors** option allows you to select the number of colors that can be displayed on the terminal text screen. Since the number of colors which can be displayed on a Workbench screen is fixed, this option only works if you have already selected your **Screen Type** to be **Custom**. If you are on a custom screen then you have the option of using 2, 4 or 8 colors on your text screen.

Select Colors When you choose the **Select Colors** option, a palette requester appears on your screen. This gadget works just like the one in Workbench preferences and allows you to interactively change the colors on your screen by moving the sliders with the mouse. To change a color click on the square showing that color and then move the R (red), G (green) and B (blue) sliders until you get the color you want. If, for example, the red slider is moved all the way to the left than there will be no red in the color that you are making; if, on the other hand, the red slider is all the way to the right, then you will have added the maximum amount of red to the color.

Number of Lines There will probably be commands specific to your host that allow you to alter the number of lines of text that are displayed on your terminal screen. If the number of lines to be displayed is too large, VLT will do its best to display as many as it can. You may, however, wish to change the number of lines to be displayed without relying upon your host to do it for you. In this case select this menu option. When you do this, a string requester will appear and the number of lines which are currently being displayed will be shown in the string gadget. Simply modify this number and hit RETURN; the new default number of lines will be established. If you choose too large a number of lines, VLT will display as many lines as possible.

Number of Columns VLT in principle allows you to set the screen to display any number of columns (each column has a width of one character). The limitations upon what can actually be displayed are the size of the screen and the size of the font being used. VLT can display a maximum of 140 columns on an "overscanned" screen; otherwise, VLT can display a maximum of 128 columns. You can also use the **Number of Columns** setting to affect where the text appears in the VLT window. If you use 80 columns, then it will be roughly centered; if you use a setting higher than 80—85, for example—it will be moved to the left on the screen. Note that for some applications on your host, 80 columns may be required, so check with a local expert. The procedure for setting the number of columns is the same procedure used for setting the number of lines with the **Number of Lines** option. If you specify too large a number of columns, VLT will display as many columns as it can using the smallest font available. *Note: On the Workbench, extra room is taken up by the window borders, so the number of columns that fit using a certain font on the Workbench may not be the same as the number that fits on a custom screen. If this is the case, you will notice that VLT uses the small font.*

Select Fonts The **Select Fonts** option allows you to select your favorite font for use with VLT. To use a font with VLT, the font must exist in both eight and eleven point tall forms, must have an eight point width, and must be monospaced. VLT checks the font you specify for these attributes and won't load your font if it doesn't conform.

When you select this option, a special font requester will appear (or a string requester if you are under 1.3); select the font you want to use and either hit return or select Okay.

Special Keymap The **Special Keymap** option, by using a special keymap, allows you to completely customize your keymap setup without rewriting your entire keymap. The special keymap should consist mainly of NULL entries; where the entry is not a NULL, VLT will use that entry instead of the corresponding entry in the default keymap (Note: default keymaps are country specific). These entries can be strings, and if these strings begin with a ~ or a ~@, they will be treated as if they were function keys; that is, they will execute commands or scripts. You do need a keymap editor to create the special keymap, however; the one we would recommend is KeymapEd, which is widely available on fish disks and bulletin board systems.

Scrolling Speed The **Scrolling Speed** option is of interest primarily to users who want to use VLT in scrolling mode and want it to scroll as fast as possible. Since scrolling the screen is a fairly time consuming process, listing files with many short lines may be slow and tedious if VLT scrolls only one line at a time. VLT's solution is to look ahead in the text that came from the mainframe; if there are many carriage returns, VLT simply scrolls a number of lines in one step. **Scrolling Speed** determines the maximum number of lines which will be scrolled at once. We have found 8 to be a number which provides fairly smooth scrolling without sacrificing much in the way of speed. Setting the prescroll variable proceeds in exactly the same way as setting the number of lines, or the number of columns. If you set the scrolling speed to be a negative number, like −2, then VLT will scroll that number of pixels at a time (this is called smooth scrolling). *Note: Even numbers work better when your screen is in* **Interlace** *mode.*

Cursor Height The **Cursor Height** option allows you to set the 'height' of your cursor, that is, make it thinner or thicker in the vertical direction. When you select the **Cursor Height** option, a string requester will appear and the present height in pixels of the cursor will be shown in the string gadget. Modify this number and hit RETURN to establish the new cursor height. If you set the cursor height to zero pixels, your cursor will disappear altogether. Furthermore, if you set the cursor height greater than or equal to eight, the cursor size will always be equal to the height of the font.

Rendering Mode The **Rendering Mode** option allows you to affect the way in which VLT handles special text modes (italics, boldface, reverse video, etc.) as it is sent from the mainframe. If you select a custom, eight color screen and select the **Color** option from the **Rendering Mode** submenu, then bold, underlined, reverse video and italic text will be displayed in different colors. If you select the **Normal** option, then normal text will be displayed in one color, boldfaced text will be displayed in another color, and reverse video and italic text will be displayed as is. If you select the **Quick** option, then instead of displaying boldfaced material in a different color it will be displayed in bold face type, and reverse video, italic, and underlined text will also be displayed as is. This mode is provided in order to speed up scrolling still further, since in this mode text is being rendered only onto what is effectively a two color screen. This option, together with a prescroll setting of 8, is sufficient to provide scrolling which keeps up at 9600 baud on a standard Amiga. A further speed increase can be gained by using no more than four colors on your text screen. Finally, if you prefer to live in non-interlaced mode, the text update speed (scrolling speed) is increased by another factor of two. If you select the last option, **Ansi Color** mode, special color escape sequences for foreground and background colors are recognized; **Ansi Color** mode, unlike the other three options, is not a mode in and of itself, rather, it is an optional addition to **Color** mode.

Close Screen The **Close Screen** option closes down VLT's screen, checking before it does so that the screen is not locked. While the screen is closed, VLT will continue to interpret incoming data: the review buffer is updated and escape sequences from the host, including those containing Amiga commands, will continue to work normally. As a result, if you reopen the screen at a later time, you will see the most recent data received by VLT.

To reopen the screen, simply run VLT again—the screen will open with the message that VLT is already there—or send an ARexx message with the command **`window open`**, which opens VLT's screen again.

The Operation Menu

The **Operation Menu** controls some of the terminal's display characteristics as well as the way in which keys on the keypad behave. It also controls whether you get an audible or visual beep.

Wrap **Wrap** controls whether or not the terminal automatically handles wrapping at the end of a line. Wrapping text is needed when a word runs over the end of a line; instead of ignoring all further characters, VLT will start on a new line. The default setting is off, as your host usually takes care of this for you. *Note: With* **Wrap** *set to be on, you can wrap back to the end of the previous line when using arrow keys and/or the backspace key.*

Key Repeat **Key Repeat** allows you to set your keys to automatically repeat when you hold them down. A check by this option means that key repeat is on, no check means that it is off.

Numeric Keypad Ordinarily the numeric keypad is set up to operate in function key mode—that is, instead of behaving like ordinary keys do, they direct VLT or the host to do special things, like quit, or send a file, or clear the screen, etc.. On the VAX the keypad is used in the same manner as it is used on a VT100. When logged onto the IBM, the keypad is used to access the 24 PFkeys available on various terminals used with the IBM mainframes, such as the Ambassador, IBM 3270, etc.. To use the numeric keypad so that unshifted characters provide numbers and symbols, select the **Numeric Keypad** option.

Operation	
Wrap	A W
Key Repeat	
Numeric Keypad	
Application Cursor	
Swap BS< – >Delete	A I
Destructive BS	
Help Key = LF	
Shift-Tab = ESC TAB	
Function Key Gadgets	A P
CR Key: Echo CR/LF	
CR Key: Send CR/LF	
Display CR as CR/LF	
Display LF as CR/LF	
Auto-Screen to Back	
Mouse Support...	A \
Beep Volume...	

Application Cursor The **Application Cursor** feature is there in order to give the user control over the way in which the cursor keys (the ones with arrows on them arranged in a T between the alphabetic and numeric keypad) operate. When the **Application Cursor** option is deselected, these keys behave as expected on an IBM mainframe: up-arrow is up, down-arrow is down, right-arrow moves right, and left-arrow moves left. When you are dealing with a VAX, you would normally leave this option deselected, since VAX editors will set these keys as necessary. When dealing with other hosts, you will have to consult with host help files or a local expert to find out whether or not you need to reprogram these keys. These cursor keys are often referred to as arrow keys.

Swap BS< – >Delete **Swap BS< – >Delete** is provided as a courtesy to VAX users who wish to interchange the function of the backspace and delete key (the backspace key is the key with the arrow just to the left of the delete key).

Destructive BS **Destructive BS** makes the backspace key destructive; in other words, after selecting this option, when you backspace using this key, it erases the text it backspaces over character by character. Selecting this option also affects the behavior of backspace characters received from the host.

Help Key = LF Since the Amiga keyboard does not provide a labelled linefeed (LF) key, VLT allows the user, if he so desires, to program the Help key to perform this function. Selecting the **Help Key = LF** option allows you to use the Help key to perform the same function as the LF key on a VT100. *Note: the Amiga 1000 has a different numeric keypad layout from the 500's, 2000's, and 3000's. As a result, for A1000 users, the help key has the same function as the numeric keypad + key on Amiga 500/2000/3000's, unless the* **Help Key = LF** *option is selected. If you own an Amiga 1000, you can program the function keys 1 through 4 to play the role of the top four keys on the A500/2000/3000 numeric keypad (VT100 PF1 through PF4).*

Shift-Tab = ESC TAB When **Shift-Tab = ESC TAB** is selected, the shifted TAB key (the one with the two arrows at the left hand side of the keyboard, just above the Ctrl and Caps Lock keys) will send the sequence ESC TAB to the mainframe. For SLAC VM, this effectively means back tab. When not selected, the shifted TAB key behaves like an unshifted TAB key.

Function Key Gadgets Since some users would prefer not to have the mouse operated function key gadgets on the screen, and would rather spread a large number of lines of text over a greater area, VLT provides an option which turns the function key gadgets on or off. If you are working with the function key gadgets turned off, selecting **Function Key Gadgets** brings them back on screen, and vice versa.

CR Key: Echo CR/LF When you have set the Echo option to be on, the **CR Key: Echo CR/LF** tells VLT to display an extra linefeed after every line you type. The extra linefeed will not be sent to the host.

CR Key: Send CR/LF **CR Key: Send CR/LF**, when ON, sends a carriage return and linefeed (as opposed to just a carriage return) to the host every time you hit return.

Display CR as CR/LF **Display CR as CR/LF** causes VLT to display a carriage return received from the host as a carriage return and linefeed. Some hosts—Macintosh computers, for instance—will only send back a carriage return without a linefeed. This can be a problem, because without the linefeed, the host will overwrite part of the text that it has just sent you. By selecting **Display CR as CR/LF**, you eliminate this difficulty.

Display LF as CR/LF **Display LF as CR/LF** is needed because of the **Fifo Pipes** option described earlier. When you connect to another Amiga, you usually get linefeed characters to signal the end of a line. Setting **Display LF as CR/LF** ensures that VLT will display a carriage return as well as a linefeed.

Auto Screen to Back During file transfers, **Auto-Screen to Back** brings the Workbench screen to the front and displays the status window.

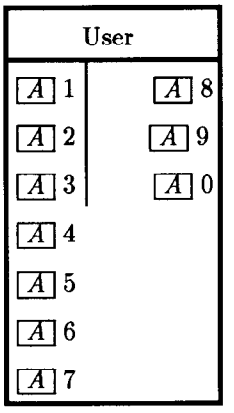
Mouse Support The **Mouse Support** option is discussed in detail later in the chapter.

Beep Volume Unless you are using the commodore 1080 or 1084 monitor, it is unlikely that the monitor you are using has a built-in speaker, so you will either have to go out and purchase a small speaker with a built-in amplifier or hook up the Amiga to your stereo in order to get an audible beep. If you have a speaker available you can set the volume of the beep by selecting this item and typing a number from 1 to 64 in the string gadget which appears (1 is low volume, 64 is high volume). Using negative numbers (-1 to -64) will provide you with a somewhat higher-pitched beep. If you do not have a speaker available, then setting this number to zero will

provide you with a visual beep; i.e., the screen will flash instead.

In addition, this option is programmable using **Program Mode**. Entering a standard VLT command string in the programming requester will cause that command to be executed in lieu of sounding the VLT bell. A common command is `~rx "address 'PingServer' BEEP"`, which causes the `BEEP` command to sent to the "PingServer" (See the documentation for the "PingServer" program). You can also reprogram the **Beep Volume** option using the `BEEPFunction` script command.

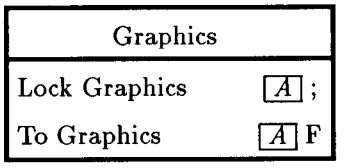
User Menu



There are ten options in the **User Menu**, each indicated by their keyboard abbreviations (A *n* where *n* stands for a number from 0 to 9). Selecting one of these options is equivalent to entering the listed keyboard sequence, which can be programmed using **Program Mode** to perform a special operation of your choice. The program can consist of a VLT script command, a command that calls a VLT or ARexx script, or an ARexx command (prefaced by a ~ and the `rx` command).

An especially nice feature of the **User Menu** is the ability to add explicatory taglines to its various options. To do this, go into **Program Mode** and select the option to which you want to add a tagline. When the program string requester appears, add the desired tagline as a comment string (preface it by a few spaces and the character #) just following the program string.

The Graphics Menu



Both of the commands in this **Graphics Menu** deal with the graphics screen, a special window or screen that is used to display graphics. The **To Graphics** command is basically self-explanatory, as it puts you on the graphics screen. If this screen is not already open, this command will open the screen, then switch you to it.

To understand the **Lock Graphics** command, you have to know that VLT supports a set of special characters and escape sequences which the mainframe can send in order to switch you to the graphics screen for subsequent output. It also supports a second set of sequences which switch you back to the text screen. Unfortunately, if you are on a noisy line, or if, while you are logged on the host, you leave your terminal for a long time, VLT may receive some kind of garbage which will throw you onto the graphics screen. Selecting the **Lock Graphics** option prevents you from being thrown onto the graphics screen by accident, because VLT disables the escape sequences which throw you onto the graphics screen.

This completes a discussion of the text menus themselves. The following sections discuss certain important menu options in detail.

Fifo Pipes in Detail

Before we begin, please note that **Fifo Pipes** won't work unless you have Matt Dillon's **fifo.library** and fifo-handler. So before you use this option, you need to obtain these programs and install them.

So what are Fifo Pipes? They're basically input/output control alternatives to the serial port; as such, they are very useful. There are two types of Fifo Pipes in VLT: local and remote. The local pipes are called (VLT-name)L and the remote pipes are called (VLT-name)R. Since VLT by default is called VLT, the default pipe names are VLTL and VLTR. Both VLTL and VLTR consist of two pipes each: one to handle input and one to handle output.

What do the Fifo Pipes do? You can use them to hook up to a CLI on your Amiga while VLT is running (especially useful when you want to preview a Tektronix file), or to set up a primitive bulletin-board service and hook up to another Amiga.

Hooking up to a CLI

To use Fifo Pipes to hook up with a CLI from VLT, go to your CLI and issue the following commands.

newcli fifo:VLTL/rwkecs (you can use **newwsh**, etc. instead of **newcli**)
run VLT (if VLT isn't already running)

Then set VLT to no echo, close the serial device (see the **Communications Menu**), and set the **Display LF as CR/LF** option to be on (you will find that last option in the **Operation Menu**; it causes incoming linefeeds to be displayed as returns plus linefeeds). Switch the Fifo Pipes on using the menu option **Fifo Pipes**. You should see the cli/shell prompt appear on VLT's screen. Type any command, such as **dir**, **cd**, **info**, etc. and the response should appear on VLT's screen.

While hooked up to the CLI, you can preview any Tektronix files you happen to have lying around on the Amiga. This only works, of course, if you're using VLT, not VLTjr, and you have switched **Graphics Lock** off (see the **Graphics Menu** later on). To preview a file, hook up to the CLI and issue the command

type ⟨**filename**⟩

VLT will automatically switch you to the graphics screen and begin drawing the picture encoded by the Tektronix file. *Note: Any files that you have saved from VLT in graphics mode are* not *Tektronix files, but an internal binary form. You can, however, still view such files using the* **Load From Archive** *option of the* **Image Menu**.

You can also use Fifo Pipes to gain access to a remote Amiga. Here's how to go about it:

1. Take the two Amigas and hook the serial ports together using a null modem. Use the CLI hookup procedure outlined earlier on the remote Amiga, substituting VLTR (remote) for VLTL.
2. Now, run a "normal" VLT on the local Amiga, but use no echo, and set **Display LF as CR/LF** to be on. Do not close the serial device.

You should now see the CLI prompt on your local Amiga, but the CLI will be running on the remote Amiga. This procedure will also work if you hook up to the remote Amiga with a modem.

VLT as a BBS

Of course, it is a little dangerous to let someone hook up to the CLI of your Amiga from their Amiga, because such a person could do whatever he or she liked to your system, including

erasing all your files. So included with VLT is a little BBS program, **FifoBBS.rexx**, which, along with VLT and Fifo Pipes, can be used to set up a bulletin board service. Using this BBS, you can give remote Amigas access to your Amiga, but you can also control who has that access and what kind of commands they can give.

To install this bulletin board service, first create a directory somewhere and assign **FifoBBS:** to it. FifoBBS will do the rest. To run the program, go to your CLI and type **FifoBBS** with either the **remote** or **local** argument. When invoked without arguments, a fake BBS will be run from the current CLI. When invoked with the **local** argument, the BBS will run with a local VLT, bypassing the serial port. Use this argument when you want to log into the BBS from the Amiga on which it is running. In neither of these cases will the FifoBBS commands UPLOAD or DOWNLOAD work. When invoked with the **remote** argument, the BBS will run as a real BBS, through the serial port, and people can dial in from the outside.

When FifoBBS is run for the first time, there will be only one account: that of SYSOP. Hit return to get to the FifoBBS **Username:** prompt. Log in as SYSOP and change your password. When you are logged on, hit return to see the list of supported commands. The commands prefaced by an asterisk can only be used by SYSOP. Now log on as someone else by logging on as NEW, and register. Then try logging on again; you will find that you are not yet validated. Log on as SYSOP, and use the VALIDATE command to change the access code of the new user from 2 to 3. The new user can now log on but does not have access to the commands prefaced by an asterisk. However, as SYSOP (or if you have access code 5 or larger) you can use the "SYSTEM" command. This will bring you to a $ prompt, from which you can type any system command (dir, cd, list, info, avail, anything that produces text output). You can even run Ed! (That's the editor that comes with the Amiga, and you can do this only under AmigaDOS 2.0 with the WINDOW * and WIDTH and HEIGHT settings). There are some programs (like More) that should work but don't. You can type **return** to get back into the BBS system.

FifoBBS currently has a single listings section, a single message section, and private mail between everybody. It detects the "NO CARRIER" string sent by the modem, and if that string is present will log the current user off, so that the next user can't intrude on someone else's account.

Capture To Fifo:

You can capture files to the Fifo Pipes by using the **Capture Session** option of the **VLT Menu** and capturing to the device **fifo:**. When doing so, it is wise to use unbuffered file transfer. Since file transfer is normally buffered, you will need to switch the buffering off. See the discussion of the **MISCFlags** option (found in **Writing Scripts:Quick Reference Section**) for an explanation of how to switch off buffering of file transfers; you can also use the ARexx macro **SetMiscFlags.vlt**, discussed in **Appendix F**.

The Console Window In Detail

Selecting the **Open Console** item opens a console window at the bottom of the screen. This console functions in two ways. First, ordinary text, typed in the console window, will be sent through VLT to the host as a command after you hit return. This is useful because VLT itself, when you are logged on to a mainframe or network, provides only those command line features present on the host. The console window, however, acts as an intermediary, giving the user the advantages of an AMIGA CLI window even when issuing commands to the host. More specifically, the console window provides command history and editing, which means that the user, using the up-arrow and down-arrow keys, can range through the commands recently entered in the CLI until he finds the command he wants to use. The user can then, using the right- and

left-arrow keys, the delete key, and the backspace key, edit the command.* Command history and editing are particularly advantageous when the user wants to issue a series of commands which are basically alike except for one or two small differences. Using the up-arrow key, the user can bring the most recent command to the screen, modify it, and hit return, without having to type the entire command again.

The console window has a second usage; by prefixing the command with the VLT key script character, which defaults to ~, the user can write, in the console, short VLT scripts that will be executed when he or she hits return (see **Writing Scripts**). While it pays to use this option for short, "quickie" scripts, if you are writing longer scripts, it is easier to use the methods outlined in Chapter 4. The console can also serve as the output window for tracing information when debugging scripts (see **Writing Scripts**).

The console window does have some drawbacks; for instance, it is line-oriented. In addition, it only functions under certain setups. Those running under AmigaDOS 1.3, unless they have WShell 2.0, must install ConMan 1.3e in order to use the console window. Under AmigaDOS 2.04 you can use the console handler that comes with the system, ConMan, or WShell 2.0, but you will need WShell 2.0 if you want to use the VLT-ConsoleMenus file in **s/** (please note that the console menus only work under AmigaDOS 2.04).

Programming the Open Console Option

Selecting the **Open Console** item under **Program Mode** lets you specify the console string you would like VLT to use when it opens the console. Editing this string is especially useful if you want to use **CNC:** instead of **CON:** to power the console window (which is likely the case if you are using AmigaDOS 2.0 and don't want to run ConMan in your startup sequence. Note that you will also have to add a mountlist entry for **CNC:** if it isn't already in the devs:mountlist file, and that you will have to add a **mount CNC:** statement in your s:user-startup file. For the full scoop on this, see the ConMan documentation).

Your default command string probably looks like

```
CON:%d/%d/%d/%d/VLTConsole/c
```

unless you are a long-time VLT user who worked and/or works under AmigaDOS 1.3, in which case your command string probably looks like

```
CON:S*/%d/%d/%d/%d/VLTConsole/c
```

The second form is only needed for those dependent on ConMan 1.3e; the first form is preferred under AmigaDOS 2.04 for use with both the normal Amiga console-handler and WShell 2.0.

If you only want to use **CNC:** instead of **CON:**, just change **CON:** to **CNC:** in the console string, hit return and save the configuration. If you also don't like the position and size of the console window as it comes up by default, you can replace the **%d**'s in the above by x-position, y-position, width and height, respectively. Otherwise they will be filled in by VLT with the default values, which are saved in the configuration file.

View History in Detail

The **View History** option uses the History Buffer, also called the review buffer. The History Buffer is an area in memory that stores the text that the host sends to VLT; the size of the area can be specified by the user. Whenever the buffer becomes full, the oldest parts of the text "scroll

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* The console recognizes all editing keys recognized by your console-handler. See your console-handler's documentation for further details.

off the top," i.e. are lost. The buffer operates in a slightly different manner depending on which kind of host VLT is dealing with. Line oriented hosts such as VAXes and BBSes ususally send lines of text followed by a return character. With these hosts, the review buffer simply appends the new lines of text to the bottom of the buffer as they come in, discarding lines if necessary from the top of the buffer. On the other hand, with page oriented hosts, such as IBM mainframes running VM/CMS, the buffer keeps a record of what is on each page, scrolling a page at a time. Page oriented hosts present the buffer with a problem; this problem will be explained in detail later in this section, when the **New Page** option of the Buffer menu is discussed.

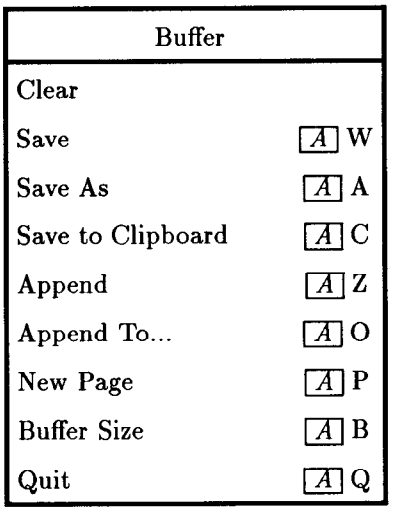
An important thing to remember is that the review buffer tries to keep track of all text *as it appears on the screen.* Text must appear on the screen to appear in the review buffer.

The history buffer does not remember the color of any text or if the text used graphics fonts. Since the history buffer is also used to restore VLT's screen contents when you change the number of lines or columns, refresh the screen, or change the properties of the screen (e.g, changing from two to four colors, or from interlace to non-interlace mode), the restored screen will be "monochrome" and may look peculiar in places if the original contents used any of the graphics fonts. This can be fixed, however, by directing the host to redraw the screen. On the IBM, this may be accomplished by hitting the 'Enter' key on the numeric keypad.

When you save your configuration (**Save Configuration** option, **VLT Menu**) the current size of the history buffer is also saved, as well as the dimension and location of the history buffer display window (known as the review window) when it was last opened.

If you want to take material from the review buffer and send it back to the host, you should select it, copy it to the clipboard, and then use the **Paste** facility (see the **Paste Menu**) to paste the clipboard contents into VLT.

Review Window Menus



Clear The **Clear** command clears the buffer, wiping out all the contents. Don't use this command unless you want to get rid of everything in the buffer.

Save, Save As The **Save As** command saves all selected (see the **Select Menu** explanation) lines to a file you specify. This command brings up a file requester in which you specify the file you want to save to. If the file already exists, clicking on the Okay button will bring up a second requester. This requester informs you that the file already exists and asks if you wish to *append* the new material (tack it on to the end of the file), *overwrite* the old file, or *cancel* the whole operation. The **Save** command saves all selected lines to the file specified in the most recent **Save As** command. *This overwrites what was previously in that file.*

Save to Clipboard When you select the **Save to Clipboard** option, all selected lines within the review buffer are saved to the Amiga clipboard. If you then return to the Workbench and enter your favorite editor, you can insert the contents of the clipboard into the editor's text.

Append, Append To **Append To** allows you to append all selected material in the history window to the end of an already existing file. Selecting this option brings up a file re-

quester. Choose the file to which you wish to append and hit return.

The **Append** command appends all selected lines to the file specified in the most recent **Append To** or **Save As** command.

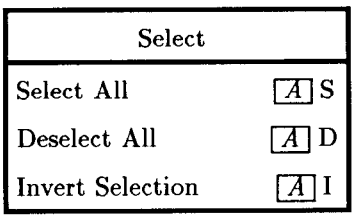
New Page The **New Page** command, which is for use with page-oriented hosts, tells the history buffer to start a new page. This command is important because of the way the History Buffer operates on page-oriented hosts. While the most recent screen, or 'page,' will appear in the review window, the contents of this most recent page can, unlike all the other pages in the buffer, be overwritten. That is, the last page in the buffer reflects all alterations that occur on the terminal screen, including the erasure of text. VLT recognizes *full* screen erasures as the start of a new page, but not *partial* erasures of the screen. Since the host partially erases the screen all the time to make room for new text, this means that some of the screen contents, if the user is not careful, will disappear from the buffer and be lost. The only way to avoid this is to inform either the host or VLT that a new page has been started. There are two ways to do this; first, by directing the host to redraw or erase the screen, signifying the start of a new page, or by using the **New Page** option in the **VLT Menu**.

Buffer Size **Buffer Size** allows you to resize the review buffer. When you select this option, a string requester will appear, asking for the new buffer size in bytes. The default value will already be displayed in the requester. Replace it with your new value.

Quit Closes the review window.

Select All The **Select All** command selects all lines in the buffer. Since only selected lines can be saved to a file, this command is useful when you wish to save the contents of the entire buffer. Selected lines are highlighted.

Deselect All The **Deselect All** command causes *all* the selected lines in the buffer to become unselected.



Invert Selection The **Invert Selection** command causes all selected lines in the buffer to become unselected and all unselected lines to become selected. You should be able to see the effects of the **Invert Selection** command; all highlighted lines should lose their highlighting and all unhighlighted lines should become highlighted.

Aside from using the menu options in the Review Window's **Select Menu**, you can also use the mouse to select and drag-select lines. To select a line, just click on it with the left mouse button. To deselect it, click on it again. To drag select, first click on a line you want to select or deselect, then hold down the left mouse button, and drag the mouse up or down. When the first line you clicked on was a selected line, it becomes deselected, and all other lines you move the mouse across also become deselected: the line you click on first determines whether you will select or deselect in the drag-select operation.

When you move the mouse over the top or bottom line, the display will start to scroll (a line at a time). If you drag the mouse a little higher or lower, the scrolling speed will become higher (a quarter page at a time). To select most of the buffer except for a few lines, use drag-select in combination with the menu options for selecting lines.

Moving Around The options in the menu to the right allow you to move around in the buffer window. **Line Up** and **Line Down** move the window text one line up or down, respectively; **Page Up** and **Page Down** move the window text one 'page' up or down, with a page being defined as the number of lines of text displayed in the window. **Column Left** and **Column Right** scroll to the left and right one character at a time. **Page Left** and **Page Right** scroll to the left and right one page at a time, with a page defined to be the the length of a line in the review window. **Left Margin** and **Right Margin** scroll to the left and right margins, respectively, and **Top of Buffer** and **End of Buffer** move you to the top of the buffer or the end of the buffer, respectively. In all these cases, you can accomplish the same thing by using the scroll bars at the right-hand and bottom sides of the review window or by using the keyboard alternatives.

Move	
Line Up	Left Margin
Page Up	Column Right
Top of Buffer	Page Right
Line Down	Right Margin
Page Down	
End of Buffer	
Column Left	
Page Left	

When you look at this menu in VLT, you will notice entries in brackets to the right of each command option. These entries correspond to the keyboard alternatives for each menu option; as a result, the menu can be used as a quick reference table for people who want to know the keyboard commands. If you are using the menu this way, however, it is necessary to note that when the bracketed entry is of the form $< +ctrl >$ or $< +shift >$, this does not mean to press the ctrl or shift key and then the + key. It means instead to press the ctrl or shift key and then the *arrow key* mentioned in one of the previous bracketed entries.

Search Forward The **Search Forward** command tells VLT to search from the top of the buffer down to a certain string after requesting this search string from the user (a search string can be any combination of letters and numbers). For instance, say you want to go to the set of telephone numbers you know were listed on your terminal screen earlier, and you know that this set of numbers was prefaced by the word 'Telephones.' Instead of scrolling endlessly up and down your buffer review window, you can select the **Search Forward** option. A string requester will appear, asking you for the string you wish to search for. When you type in the word 'Telephones' and hit return, the window will automatically scroll down to the location of the string. Of course, if the word 'Telephones' occurs more than once in the buffer file, you may not find yourself in the right place, in which case you will need to use the **Repeat Forward** command until you do.

Search	
Search Forward	[A] F
Search Reverse	[A] R
Repeat Forward	[A] G
Repeat Reverse	[A] T

Search Reverse **Search Reverse** tells the computer to search from the bottom of the buffer backwards to a certain string. As with **Search Forward**, this option will request a search string from the user.

Repeat Forward Search forward for another occurrence of the search string specified in the most recent **Search** command (it makes no difference whether the most recent **Search** command is **Search Forward** or **Search Reverse**).

Repeat Reverse Search backward for another occurrence of the search string specified in the most recent **Search** command.

Program Mode In Detail

Selecting this menu option reveals a submenu which gives you three choices: **Off**, **Function Keys/Menus**, and **Menu Shortcuts**. By default, **Program Mode** is turned **Off**.

Reprogramming Function Keys and Menu Options

If you wish to reprogram the behavior of the function keys, on-screen PFkey gadgets or any **User Menu** item, set the **Program Mode** to be **Function Keys/Menus** and then select the item that you wish to reprogram. A requester will appear and display the command which is currently assigned to this key. Change this command to the one you want and then hit RETURN; the requester will disappear. You can use the **Function Keys/Menus** option to reprogram the thirty on-screen, mouse-operated PFKey gadgets, the **User Menu** items, the function keys by themselves, the function key-SHIFT, function key-CTRL, and function key-ALT combinations, the shifted keypad and cursor keys, the shift-alt-ed keypad and cursor keys, the Delete key, and the Help key. Also programmable are the menu options **Mouse Support**, **Beep Volume**, and **Open Console**. When you are finished reprogramming the keys that you wish to change, return the **Program Mode** to **Off** so that the keyboard sequences, et al., stop bringing up reprogramming requesters.

As an example, let's say that you wanted to program function key 6 to send the command 'gone' to your host. You would select **Program Mode** to be **Function Keys/Menus**, then enter F6 from your keyboard. When the string requester appeared, you would type in:

```
gone *R
```

and hit return. Then you would turn **Program Mode** off.

When you want a key to send a command to your host, it is enough to enter the command as is. If you want the key to execute a VLT script command, you will have to preface the command by the VLT key script character. When you want the key to call and run a VLT or ARexx script, preface the name of the script with the VLT key script character and the @ command. *Note: VLT uses the ARP conventions for embedding escape, control, linefeed, etc. characters in strings; this is explained in* **Appendix E**.

Menu Shortcuts: Changing Keyboard Equivalents

The third suboption, **Program Menu Shortcuts**, allows you to change the keyboard sequence which VLT considers equivalent to a given menu option (or to add such an equivalent if none exists). When you select this option, a message window will appear, asking you to select the menu option whose keyboard equivalent you would like to change. After you select a menu option, a requester will appear, with the option's keyboard equivalent (minus the ubiquitous [A] symbol) shown in its string gadget. Replace this character with the desired symbol and hit return. To cancel this process, click on cancel; to turn **Program Menu Shortcuts** off, click in the main window with the right mouse button.

As an example, say you wanted to change the keyboard equivalent of the **Screen to Back** menu option to [A] B. First, you would turn **Program Menu Shortcuts** on, then select the **Screen to Back** option. A requester would appear; you would enter the letter B in the string gadget, then hit return. If another menu option already had [A] B as its keyboard equivalent (**Send Break**, for instance), a message would appear, informing you that this keyboard equivalent was already in use and that, if you continued the process, the keyboard equivalents of the two options would be swapped. If you clicked on the Continue button, you would then see that [A] B

was now the keyboard equivalent of the **Screen to Back** option, while **Send Break** would now have **Screen to Back**'s original keyboard equivalent.

Mouse Support In Detail

Selecting the menu option **Mouse Support** causes a panel of string gadgets to appear. These string gadgets allow you to program the left mousebutton's behavior in sixteen different ways, since you can program, not only the mouse by itself, but the mouse in combination with the shift, ctrl, alt, shift-ctrl, shift-alt, and shift-ctrl-alt keys; you can also program the mouse to respond differently depending on whether the left mouse button has been pressed or released.

If you enter the word **auto** into the first string gadget in the lefthand column, then clicking on the left mouse button will tell the host to move your cursor to that position on the screen. Therefore, in **auto** mode, **Mouse Support** provides a substitute for using the arrow keys on the cursor keypad. This is very useful on an IBM mainframe when in Xedit, etc. but does not necessarily work on all hosts. You can also use the **auto** string to program the mouse in combination with the qualifier keys.

If you want to program your mouse in more complicated ways, you can use command strings containing up to 7 C-style % escapes. The C-style escapes allow your mouse program to receive certain arguments, such as the location of the mouse, and each % style escape allows you to request a different type of information, as shown below.

%X= current mouse X position (in character coordinates)
%Y= current mouse Y position (")
%x= current cursor X position (")
%y= current cursor Y position (")
%l = number of lines currently on the screen
%c = number of columns currently on the screen
%q = the qualifiers (shift, ctrl, alt, etc.) pressed at the same time as the mouse (bit pattern)

All of the coordinates received this way will be character coordinates, with (1,1) being the upper lefthand corner of the screen.

The simplest example of using this feature is the case where the host can accept unsolicited cursor position reports. In that case, a possible command string might be:

***E[%X;%YR**

This string starts with *E, which will be interpreted, using ARP escape conventions, as an escape character (decimal 27), and then a square opening bracket (these two together are also known as the ⟨csi⟩ sequence). Next is a %X: this means that at this point the current mouse X position will be substituted. Then follows a semi-colon, and then a %Y. Here the current mouse Y position is substituted. The sequence ends with a capital R.

If you entered this string in the **no qualifiers** gadget of the **mouse selectdown:** column and clicked on Use, this sequence would be sent to the host, with current values substituted (e.g. **⟨esc⟩[26;68R**), whenever the left mouse button was depressed.

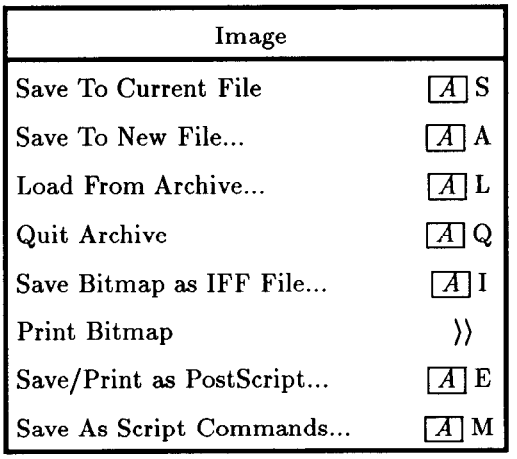
Note that VLT guarantees that left-mousebutton release (up) events will be treated the same way as the preceding left-mousebutton down press. That is, if you press the mouse button down while ctrl is also pressed, and then let go of the ctrl button *before* releasing the mouse button, VLT will still execute the program that went along with the left-mousebutton/ctrl program.

This completes our discussion of the menu options associated with the text screen. Now we turn to a discussion of the menu options which are associated with the graphics screen.

Graphics Screen Menus

When you are on the graphics screen and hold down the right mouse button, a menu bar appears, showing the names of six menus. In this section of the manual we will provide a fairly non-technical discussion of the items appearing in each of the menus. A technical discussion of the Tektronix emulation provided by VLT appears in **Appendix D**.

The Image Menu



Save To Current File, Save To New File The **Save To Current File** and **Save To New File** options are concerned with saving the currently displayed picture as vector graphics to either an archive file you have already chosen or a new archive file of your choice. **Save to New File** brings up a file requester in order to get the name of the graphics file that you wish to save.

Load From Archive **Load From Archive** allows you to load a graphics file that had been saved to an archive and view it on the graphics screen. This option, when selected, brings up a file requester. Enter the name of the file that you want to load, then click on the Okay button or hit return.

It is possible to display, on the graphics screen, an old file that had been saved to an archive without losing the current screen display—to return to the current display, **Quit** the archive file.

Quit Archive **Quit Archive** gets rid of the archive graphics file that you have displayed on your screen and, if another picture was displayed there earlier, displays that picture again.

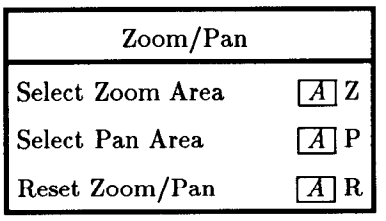
Save Bitmap as IFF File **Save Bitmap as IFF File** does just that; it saves the image on your screen as an IFF bitmapped graphics file.

Print Bitmap **Print Bitmap** lets you print the image currently displayed on your graphics screen using a printer attached to your Amiga. You can print this image in one of four sizes—**Maximum Size**, **1/3 Page**, **2/3 Page**, and **Full Page**. Specify the size of the printed image using the submenu that appears when you select the **Print Bitmap** option.

Save/Print as PostScript **Save/Print as PostScript** allows you to save the picture currently on-screen as a PostScript file; if a PostScript printer is attached to your Amiga, you can then, using this option, print the picture by saving the file directly to the `par:` device.

Save As Script Commands **Save As Script Commands** allows you to save the picture currently on-screen as a file of VLT script commands. An ARexx program called `VLT2Provec.pvrx` is provided with VLT that can translate these script commands into Provector ARexx instructions (Provector is a drawing program for the Amiga). Not all of the VLT script commands are supported by `VLT2Provec.pvrx`, but the most usual things (lines, colors, fills) are. Start it from Provector using Rexxecute. A requester will come up asking you for the VLT file name to import into Provector.

The Zoom/Pan Menu

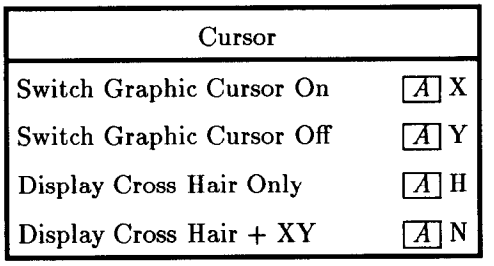


Select Zoom Area VLT supports true zoom. This means that when you have downloaded a picture to the graphics screen, you can magnify any section of that picture to an arbitrary degree without losing the resolution that was present in the original picture. To select the area to be magnified, first select this option, then position the cursor at the upper left hand corner of the region of interest and hold down the left mouse button. When you move the mouse down and to the right, a rectangle will appear; adjust the rectangle until it outlines the desired zoom area, then release the left mouse button.

Select Pan Area Once you have zoomed in on a region of a picture, you might want to slide the viewport over so that another region of the picture is magnified. **Select Pan Area** allows you to move your magnifying glass, so to speak, without having to first redraw the original picture and then zoom in on a new region. Once you've selected this option, hold down the left mouse button and move the mouse in the direction that you wish to have the display region move. A frame will appear as you do this in order to show you how your new display region will be positioned relative to the picture currently being displayed on the screen.

Reset Zoom/Pan The **Reset Zoom/Pan** item causes the original, unzoomed picture to be displayed upon the screen.

The Cursor Menu



Switch Graphic Cursor On makes a cursor appear on the graphics screen; **Switch Graphic Cursor Off** will make the cursor disappear. **Display Cross Hair Only** attaches cross hairs to your cursor (the cross hairs are two perpendicular lines intersecting in the middle of the cursor). Under ordinary circumstances, the graphics cursor will be turned on and off under the control of the host. Sometimes, however, it is convenient to be able to display the cross hairs in order to make it simpler to read the coordinates of a point off a graph, and you will need the ability to toggle the graphics cross hairs on and off under local control. If you select the **Display Cross Hair + XY** option, the coordinates of the cross hairs relative to the bottom left hand corner of the screen are also displayed (in Tektronix coordinates). This feature is useful if you are using the cross hairs to interact with a mainframe graphics program and want to position the cursor very accurately.

You can position the graphic cursor using the mouse or the cursor keys and shifted cursor keys; clicking on the left mouse button is equivalent to hitting a key on the keyboard.

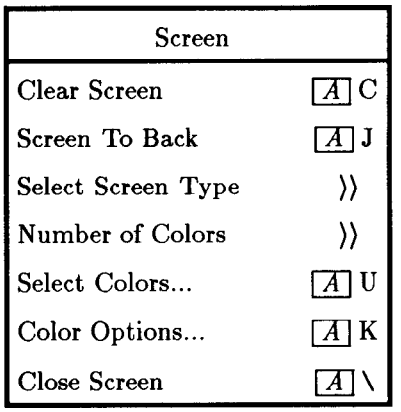
The Screen Menu

Most of these commands behave exactly like their counterparts on the text screen.

Clear Screen **Clear Screen** allows you to erase the screen under local control.

Screen To Back **Screen To Back** moves the VLT screens and/or windows to the back of all other screens which are open.

Select Screen Type **Select Screen Type** lets you select the screen type: Custom or Workbench, Interlace or Non-Interlaced (Remember that if you select the Workbench screen, you cannot specify Interlace or Non-Interlaced mode from any VLT menu, or change any of the screen settings from VLT). There are, however, two screen types available on the graphics **Screen Menu** that are not available on the text **Screen Menu**: Main VLT Screen and Double-Sized Custom. Selecting the first option kills the special graphics screen and redraws the current graphics display in the text screen, which then becomes a combination graphics-text screen. All subsequent graphics files will be drawn on this combination screen, and graphics and text can be mixed. Selecting the second option, 'Double-Sized Custom,' changes the screen to a Custom screen that has twice the width and height of the usual custom screen. You can scroll around this screen either by dragging the mouse to the screen edges currently not shown or by holding down the left Amiga key and dragging the screen using the left mouse button.



The 'Double-Sized Custom' option is a toggle; if you select the option a second time, the screen reverts to the regular screen size. The option also has the keyboard abbreviation A D. *Note: This last option only works under AmigaDOS 2.0, and then only if you have sufficient graphics memory. An 8-color, 1400 by 960 screen takes about half a Megabyte of graphics memory. If you get a message saying the screen couldn't be opened, first try changing to fewer colors.*

Select No. of Colors **Select No. of Colors** lets you choose the number of colors which can be used to display graphics on a Custom Screen. While the custom text screen is limited to eight colors, the custom graphics screen can display up to 16 colors out of a palette of 4096. These colors are selected using the same palette requester that is used for changing the colors of the text screen.

Color Options Selecting **Color Options** brings up a requester which will be discussed in detail later in this chapter.

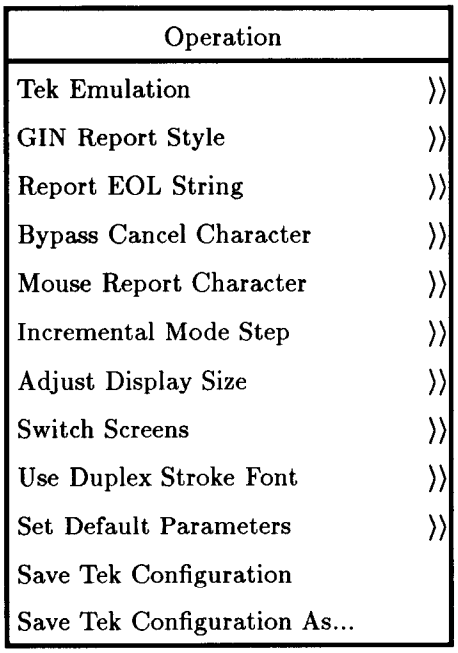
Close Screen If you are finished displaying graphics and wish to recover the memory being used to keep the graphics screen open, select the **Close Screen** option. If, at any later time, you wish to display more graphics, selecting the **To Graphics** Option from the text screen **Graphics Menu** will automatically reopen the graphics screen as long as there is enough memory available.

The Operation Menu

Tek Emulation The **Tek Emulation** option deals with the type of Tektronix emulation that you want VLT to use. You see, once upon a time, when Tektronix 4010 was first developed, it didn't really do all that much...it didn't support color, it only recognized a very limited set of escape sequences, and it only supported a 1024 by 1024 coordinate system. Then along came Tektronix 4014, which was a little bit better—it recognized more escape sequences and supported a 4096 by 4096 coordinate system as well as a 1024 by 1024 coordinate system. Yet Tektronix 4014 wasn't perfect—it still didn't provide color. So along came Tektronix 4105, which provided color. After Tektronix 4105 came Tektronix 4107, which had even more features.

Tek Emulation, when selected, provides you with two choices: a 4010/4014 emulation and a 4105/4107 emulation. The 4010/4014 emulation recognizes all the escape sequences and

provides all the features of the early 4010 and 4014 emulations. The 4105/4107 emulation, on the other hand, has all of the features of the Tektronix 4105 emulations with a few of the 4107 features thrown in. Unless your host can't deal with the 4105/4107 option, select it—it's much easier to work with.



GIN Report Style To explain what the **GIN Report Style** option does, we first need to explain what cursor reports are. Suppose that a mainframe application has brought up the cross hairs (i.e., the graphics cursor) and you are expected to position the cursor over some point on the screen and then hit a key. The mode that you are currently in is called the graphics input (GIN) mode and the cursor report is the information that is sent back to the mainframe after you hit a key. In general, this information consists of the key which you hit, the location of the cursor on the screen (i.e., its XY coordinates), and then some end-of-report sequence to tell the mainframe that you have completed the operation.

The cursor report uses the units of the Tektronix XY coordinate system. When the **GIN Report Style** option is selected, a submenu with two options will appear: 4010 and Extended. Select the 4010 report option when you are using a 1024 by 1024 coordinate system, the Extended report option when you are using a 4096 by 4096 coordinate system. *Note: Tektronix 4105's use 4010 reports.*

Report EOL String Sometimes, the host will ask questions of VLT, such as 'Who are you' and 'how much memory do you have?' You will not be aware of these questions; they are asked and answered 'behind the scenes' so to speak. In these cases, the EOL (end-of-line) string is used to end VLT's replies to the host. The **Report EOL String** option gives you the following choices for an EOL String.

CR—a carriage return.

CR/EOT—a carriage return and an end-of-tape character.

LF—a linefeed.

CR/LF—a carriage return and a linefeed.

None—no EOL String specified.

Set By Host—the host will specify the EOL String.

You will usually want to use CR (a carriage return) as your EOL String. If you experience difficulty, try allowing your host to set the EOL String.

Bypass Cancel Character **Bypass Cancel Character** also deals with those behind-the-scenes question-and-answer sessions VLT and the host engage in. In order for VLT's replies *not* to come to your screen, VLT, when it receives one of these questions, enters something known as Bypass mode. The bypass cancel character is a character that is sent from the host when it has received the answer to its question; this character tells VLT to quit bypass mode. This option

is important, because if VLT doesn't receive the bypass cancel character, it will stay in bypass mode forever and nothing the host sends you will ever be shown on your screen.

Selecting **Bypass Cancel Character** gives you a submenu with the following choices for a bypass cancel character.

CR—a carriage return.

LF—a linefeed.

None—None: VLT does not enter Bypass mode.

Set By Host—let the host set the Bypass Cancel Character.

The default setting of the **Bypass Cancel Character** option is CR. If your host didn't like a carriage return for your EOL String, set **Bypass Cancel Character** to be the *last* character of your EOL String instead. In case of trouble, try letting the host set the bypass cancel character.

Mouse Report Character Generally, host graphics programs don't support the use of a mouse. On an ordinary Tektronix terminal, when a graphic cursor is used, it is positioned using the cursor keys, although VLT lets you move the cursor around using the mouse. Furthermore, when a host graphics program wants you to specify a specific point, it usually asks you to position your cursor over that point and then hit a key on your keyboard. Mouse-oriented users, however, would rather be able to click on their mouse button. VLT allows the user to do this by a simple strategy; when you click on your left mouse button, VLT receives a mouse signal. VLT then sends a *keyboard character* to the host, who thinks that you have hit a key on the keyboard and is perfectly happy. In order to carry out this strategy, however, VLT needs you to tell it which keyboard character to send to the host; that is what **Mouse Report Character** is for. Selecting this option will bring up a string requester—enter the keyboard character that you want VLT to send to the host and hit return. *Note: When you bring up this string requester, the string gadget will probably appear empty. That's all right, because the string gadget isn't really empty—it contains a space, which means that VLT will send a space character to the host.*

Incremental Mode Step

The **Incremental Mode Step** option has to do with how far the cursor moves each time it receives a "move up/down/left/right one pixel" command from the mainframe. This option allows you to choose between two settings: 1/1024 and 1/4096. Although it is likely that you will want to choosse the 1/1024 setting, you may have to experiment to make certain which setting you should use.

Adjust Display **Adjust Display** allows you, using its suboptions Width and Height, to select the horizontal and vertical extent of the display region on the screen, and, using its suboptions Left Edge and Bottom Edge, to select the location of of the left and bottom edges of the display. Adjusting these values allows you to correct for faulty aspect ratios in some plots and also allows you to set up a sort of global magnification. In general the default settings provided with VLT provide reasonable values for your display size. You may, however, play around with your Width, Height, Left Edge, and Bottom Edge settings to see if you prefer values which are slightly different. If you have a very different screen size, you may wish to delete the default settings entirely, i.e. delete TekPrefs.dat, and have VLT recalculate the best values for you.

When you select any of **Adjust Display**'s four suboptions, a string requester will appear; enter the desired value in pixels and hit return. Width and Height are specified by positive numbers. Left Edge is counted inwards from the left edge of the screen, with the extreme left edge of the screen set to zero pixels; Bottom Edge is counted upwards from the bottom of the screen, with the very bottom of the screen set to zero pixels.

Switch Screens There are various special escape sequences used to switch VLT between VT100 and Tektronix mode; **Switch Screens** and its suboptions allow you to adjust, to some extent, VLT's response to these sequences (see **Appendix D** for more explanation of these escape sequences). Ordinarily, these sequences will cause VLT to switch between text and graphics screens as well as between text and graphics modes. This can cause a kind of flickering, however, because the host sends at least one of these sequences whenever it sends text to VLT (even if you're in the graphics screen, VLT can be receiving text behind the scenes). As a result, VLT is constantly and rapidly switching between the text and graphics modes so that it can get the text and go back to the graphics screen; when it is switching between screens as well, you get the flicker effect. By selecting one of these sequences from the submenu, you cause VLT to respond to that sequence by switching modes and screens; by deselecting one of these sequences (removing the checkmark next to the option), you cause VLT to respond to that sequence by switching modes only, thereby eliminating the flicker effect.

By default, VLT is set to switch screens as well as modes in response to these sequences.

NOTE: In previous versions of VLT, only one of these sequences, **On Select Code**, *was adjustable in this fashion. When you install the new VLT, you may find that the setting of this switch has been lost and that, like the other sequence switches, VLT has given it the default setting.*

Use Duplex Stroke Font Using the duplex stroke font as a matter of course is usually a trifle slow. Therefore, you may wish to choose **Never**, the first option on the **Use Duplex Stroke Font** item's submenu. If you do so, the duplex stroke font will never be used. When, however, the graphics that you have brought to your screen have text on them (e.g. graph titling, captions) and you zoom this text, the duplex stroke font looks nicer than the simplex stroke font. In that case, you may wish to choose this option's second subitem, **In Zoom**, which allows use of the duplex stroke font in zoom mode and in cases where text needs to be displayed in extra-large type.

Set Default Parameters The **Set Default Parameters** option allows you to reset your default parameters. This option gives you two choices: you can restore all default parameters to the last default parameters saved using the **Save Tek Configuration** option, or you can restore all default parameters to the original settings that came with VLT.

Save Tek Configuration All graphics screen settings will be saved to the file **TekPrefs.dat** (or your current configuration file if your configuration file is not **TekPrefs.dat**) when you select the **Save Tek Configuration** option. These settings then become the default settings used whenever the graphics screen is opened.

Save Tek Configuration As The **Save Tek Configuration As** option behaves like **Save Tek Configuration**, except that it allows you to save your current configuration into a file with a different name, instead of overwriting your current configuration file. This would be useful for a user who deals with many different hosts, each having specific configuration requirements, and who therefore needs several different configuration files. When you select this option, a file requester will appear; using this requester, you can give the configuration file you create any name you choose. In order to have VLT use a configuration file created this way instead of **TekPrefs.dat**, you invoke VLT using the **+T** command line option (see **Getting Started: Starting Up**).

The Control Menu

Lock Graphics **Lock Graphics** does just what its counterpart on the text screen does, except that it not only disables the escape sequence that throws you onto the graphics screen, it also kicks you out of the graphics screen and puts you back in the text screen.

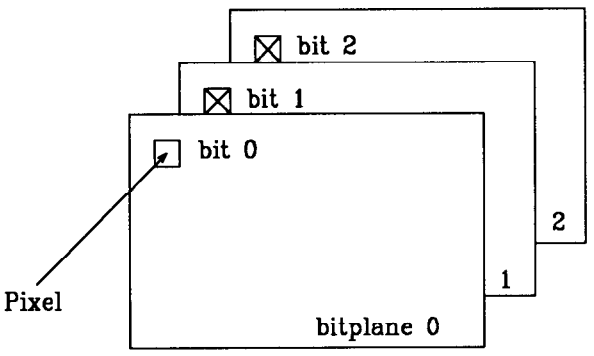
Control	
Lock Graphics	[A] ;
Return To Alpha–Numeric	[A] F

Return To Alpha–Numeric **Return To Alpha–Numeric** sends you back to the text screen. If you have selected your screen type to be **Main VLT Screen**, however, this option will change the set of menus at the top of the screen to be the text menus instead of the graphics menus.

The Color Options Requester In Detail

The **Color Options** requester allows you to do some unusual things; to understand how to use this requester you must first understand how the Amiga deals with color as well as how the Amiga display works.

When computers talk to each other about colors, they don't talk in terms of 'vermilion print, a gold background, pink menus, and purple highlighting.' They deal with color in terms of *color registers*, which are numbered from 0 on upwards; the color assigned to each color register can be redefined by the user. As a result, computers are effectively color-blind. For example, one computer sending a graphics file to another would inform the second computer that the text was to be drawn in 'color 1,' the background in 'color 0,' and the rest of the drawing in 'color 3.' Computer B has no way of knowing what color Computer A considers 'color 1' to be; Computer B only knows what color *it* considers 'color 1' to be. Thus, Computer A's 'color 1' might be defined as deep blue, while Computer B's 'color 1' is defined as bright yellow. Even though the text on the original graphics file sent by Computer A was blue, Computer B will show the text in bright yellow. Computer B doesn't know that it has drawn the text what we would consider to be the 'wrong' color; as far as it is concerned, it's drawn everything in the *right* colors.



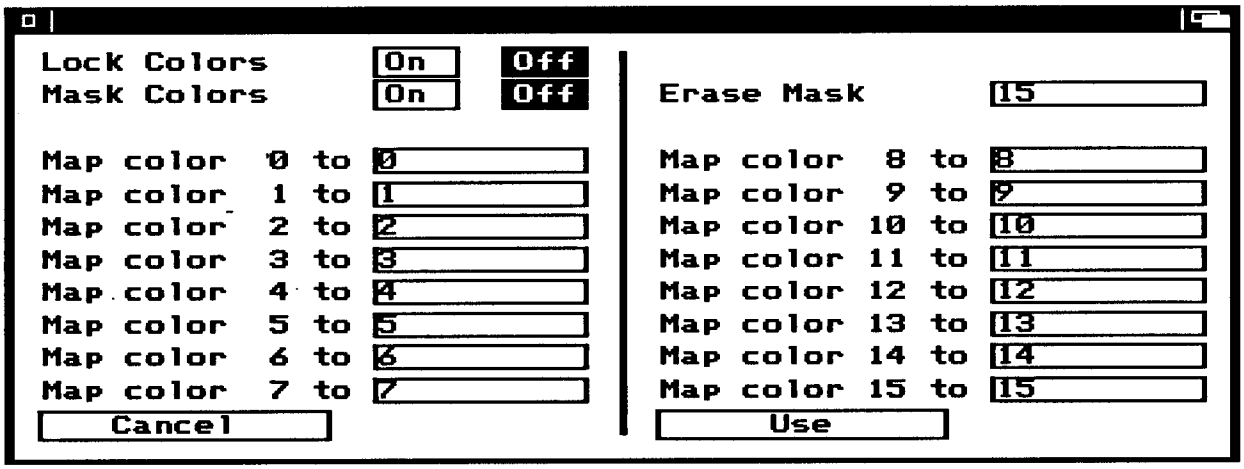
Pixels (smallest **pic**ture **el**ement) make up the Amiga screen display. The number of pixels on a screen varies depending on the resolution of the display. In order to display color, the Amiga uses what is referred to as bitmapped graphics. Every screen display consists of a number of bitplanes, one behind the other. Each pixel on the display that *we* see has a pixel component, or bit, in each bitplane. Bitplanes are numbered beginning with 0—0, 1, 2...—and the number of bitplanes used to make up a display varies. The color of a particular pixel in a display is determined by the state of the corresponding bits in each bitplane. For instance, take the pixel in the display to the right. Its component bit in bitplane 0 is off, while its component bits in bitplanes 1 and 2 are on. The Amiga then takes the component bits and their status (Off or On) and combines them into a single binary number. Since the bit in bitplane 0 is off, the number in the 2^0's place is zero; since the bits in bitplanes 1 and 2 are on, the number in the 2^1's

place and the 2^2's place are both one. The resultant binary number is the number 110, which, converted into base ten, is the number 6. The Amiga then gives this particular pixel the color stored in color register 6.

Remapping color registers

Normally, VLT displays every color on your graphics screen according to the mainframe program's instructions. On occasion, however, you may object to the mainframe's choice of colors. Let us say, for instance, that you are in the graphics screen, looking at a picture of flowers that the host has sent you. For some peculiar reason, the flowers are green and the leaves are red. To you, this seems completely ridiculous—you want the *leaves* to be green and the *flowers* to be red. Since you only want to swap the two colors without actually changing them, using the **Select Colors** option isn't quite what you want. The remapping option on the color options requester is.

When you select **Color Options**, the requester that appears looks like this:



You'll notice that the bottom half of the requester contains sixteen string gadgets preceded by the words **Map color** *n* **to:** where *n* is a number from zero to fifteen. These string gadgets constitute the remapping option. How do you use it? Well, normally, each color register will map to itself, so that the number in each string gadget corresponds to the number mentioned in the previous text. If you change the number in the string gadget to the number of some other color register, then the color register will be *mapping* to a different color register. Let's return to our example of the green flowers and red leaves. The color green used by the flowers is stored in, say, color register 3, the color red used for the leaves is stored in color register 4. To swap the two colors, we bring up our color options requester, then tell it to map color register 3 to color register 4 and color register 4 to color register 3. Now, if we have the screen redrawn, the colors will have been swapped. This is because, when the Amiga went to draw pixels in 'color register 3,' it was told by VLT that it should go find the color stored in color register 4 and use that color instead. The reverse happened whenever there were pixels to be displayed in 'color register 4.'

Most of you are probably wondering how you can be expected to know which color is stored in which color register. There's a trick that lets you find out quickly, easily, and intuitively.

Return to the **Screen Menu** and choose the **Select Colors** option. When the palette requester comes up, look at the top. You'll see one or more rows of little boxes, each in a different color; you know already that clicking on one of these boxes lets you select the color in the box as the one you want to change. Counting from left to right and from top to bottom, you can also use this row of boxes to find out the color register in which each color is stored. The color in the first box on the left is stored in color register 0 (note that the color stored in color register 0 is the background color), while the color shown in the box to its immediate right is stored in color register 1. Proceeding from left to right in this fashion will tell you the number of the color register associated with each color being used in the display. If there are multiple rows, when you reach the end of a row, continue counting from the far lefthand box of the next row. *Note: the number of colored boxes at the top of the palette requester will vary depending on the number of colors you have chosen to use—two, four, eight, or sixteen.*

If you want the picture to be in one color (barring a different background color, of course), you map all the color registers, except for color register 0, to one color register. It is important to understand that remapping color registers does not affect how and where the various colors are stored; remapping only affects how the colors stored in the registers are *used.*

Lock Colors

Computers are *usually* color-blind; they do, however, have a way to talk about color that is more exact than discussing color registers. Every color is defined in terms of how much red, blue, and green is in it. The proportions of red, blue, and green can be reduced to numbers, and the computers can send these numbers back and forth. Sometimes, the host will tell the graphics screen 'set color register 0 to so much red, so much blue, so much green' and so on down the line. You may not mind this, but then again, you may have just set your colors to something you like and not want the host to interfere. Setting **Lock Colors** to be on will tell VLT to ignore the host's directions to reset your colors.

Mask Colors

There is, as we mentioned, a special screen type which can be selected using the **Screen Type** option on the graphics **Screen Menu**. When you choose **Main VLT Screen** as your screen type, you are returned to the text screen, where the present graphics display is redrawn and all subsequent graphics displays are drawn as well. Choosing this option creates a screen where you can work with both graphics and text at the same time. There are, however, drawbacks. If you input or receive text that goes over your graphics display—an overlay, so to speak—the text and graphics will interfere. As a result of this interference, whenever you erase either text or graphics, you will discover that the display now has 'holes' in it.

The **Mask Colors** option provides a partial solution to this problem. Selecting this option to be **ON** causes VLT to draw pixels of a particular color only in those bitplanes in which the pixel's bits should be ON—it leaves those bitplanes where the pixel's bits are OFF alone. This means that if the pixels associated with the graphics display occupied one set of bitplanes, and text display pixels another, text and graphics would not interfere. While the graphics and text are both present, however, the overlapping portions will be rendered in another color entirely, since the computer will use the combined ON bits of both graphics and text to decide the color of the pixel.

If the color of the graphics and the color of the text share bitplanes—bitplane 2, for example—using the **Mask Colors** option will not solve your problem. When you erase the overlaid text, you will either get 'holes' in your graphics or portions of the graphics will be rendered in a different color. This is because you are erasing bitplane 2, which was being used to determine the color of both text *and* graphics. When the text is being rendered in Color mode, it uses all

bitplanes for text. As a result, **Mask Colors** won't work with your screen in Color mode. Quick mode, on the other hand, uses only bitplane 0 for text, while Normal mode uses only bitplanes 0 and 1. Thus, if you use Quick or Normal mode, you can ensure that text and graphics will *not* share bitplanes and **Mask Colors** will be a great help. *Note: Using Quick or Normal mode only affects the text; if your graphics is using bitplanes 0 and/or 1, you will still get interference. You also have to map all colors to color registers which use bitplane 2.*

Erase Mask

Using **Mask Colors** is sufficient to prevent interference when text and graphics overlap and the text is then erased. When the *graphics* is erased, however, **Mask Colors** is not sufficient. Although text and graphics, while **Mask Colors** is on, will not interfere when one is drawn over the other, portions of the text will be erased when the graphics is erased. As a result, you also have to set the **Erase Mask** before erasing overlaid or underlaid graphics.

Setting the **Erase Mask** tells VLT to only erase a pixel in specified bitplanes. You specify these bitplanes by giving **Erase Mask** a color register number, such as 4. VLT converts this number into the binary number 100; it then observes that this number has a one in the 2^2's place. This tells VLT that you want it only to erase in bitplane 2. All other bitplanes will remain untouched. If graphics is rendered in color register 4, while text is rendered in color register 2, then to keep VLT from erasing the text underneath the graphics you set your erase mask to be 4. VLT will erase bitplane 2 only, and leave bitplane 1 alone.

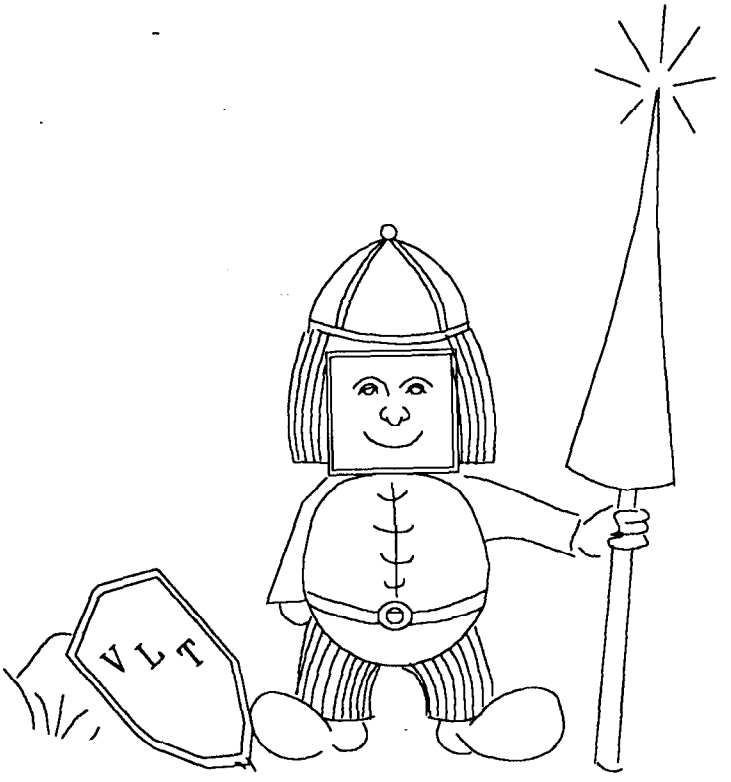
Note: the reason that you don't need to reset the **Erase Mask** *when the text is erased is that VLT automatically masks the erasure of text for you.*

The Use and Cancel Gadgets

The **Use** and **Cancel** gadgets at the bottom of the color options requester behave as you might expect; clicking on the **Use** gadget tells VLT to use the modifications that you have made, while clicking on the **Cancel** gadget aborts the entire process, just as clicking on the requester's close gadget would do.

4

Writing Scripts



Introduction To VLT's Scripting Facility

Syntax

VLT's scripting language is a very specific sort of computer programming language with its own grammar, or *language syntax.* Familiarity with this syntax is extremely important, as incorrect syntax can lead to all sorts of errors in your scripts.

String delimiters String delimiters surround a string and tell VLT that it is dealing with a string instead of a command. Delimiters can be double quotes ", single quotes ', curly braces { }, pointed brackets ⟨ ⟩, square brackets [ ], or parentheses ( ). Delimiters are also used in conjunction with certain commands, such as the **schedule** command. On the whole, anywhere that double or single quotes are used, the other delimiters can be used also.

Comments Whenever text in a script is prefaced by a # character, VLT ignores it. This is because the # character tells VLT that what follows is a *comment,* meant for the benefit of the user. If a comment runs over several lines, each line must be preceded by a # character. Comments are used to explain the purpose of a script, or the purpose of a particular command. They help make scripts more readable.

The Keyscript Character When a set of script commands are issued from the VLT Console window, from the program for any function key, or from the program for any programmable item, they must be prefaced by the VLT keyscript character. By default, this character is the tilde, ~. Although you can choose a different keyscript character, we advise against this, as it may lead to confusion.

The Universal Quote The combinations ⟩⟩, }},]], or)) act as a "universal quote." If one of these combinations, (without corresponding open brackets) is placed in a line, all text from there to the end of the line will be treated as a string and the reserved symbols ignored by VLT's script parser, including quotes and so forth which would otherwise have been processed. This is particularly valuable when you want VLT to send text without processing it first. For example, if you're reading text in and then having VLT send it, you may run into problems, because you won't know if the text contains reserved symbols. So you would issue the **send** command as follows

```
"send ⟩⟩" sometext
```

This syntax is only valid as of VLT version 5.045.

Use of Semicolons Whenever a set of commands are written on the same line, they must be separated by semicolons. The semicolons tell VLT that a new command is beginning and an old command is ending. Writing each command on a new line serves the same purpose, but it may sometimes be necessary to write commands on the same line—when you are running a script from the VLT console window, for instance.

Use of Colons A name, followed by a colon, tells VLT to consider the name a *label.* The uses of labels will be discussed later.

Schedules

Schedules: What Are They and How Do You Run Them?

VLT's scripting facility is based on the notion of a "schedule." A schedule is a set of commands written in VLT's scripting language and sent to VLT. VLT script files are schedules, as are scripts run from the console window and script commands executed when a programmable function key is pressed. Finally, if an ARexx script sends one or more commands to VLT, the set of commands sent *by* the ARexx script *to* VLT is considered a schedule too.

Schedules may have names. As a rule, VLT will assume that a schedule is named after the first label in the schedule. Therefore, it may be a good idea to start all schedules with a label that conveys some information about its purpose, even if you never need the label for use with a **goto** command.

A simple example of a schedule would be this brief script file, which programs the cursor to blink constantly.

```
#
# This is the file blinker.scp
#
blinker:
    cursorheight 0
    delay 0.3
    cursorheight 1
    delay 0.3
    goto blinker
```

To run the above schedule, you would select **VLT Script** from the **Script Menu** and enter **blinker.scp** in the file requester. You could, however, just as easily run the same schedule from the console window inside VLT. Inside the console window, we could start this schedule by typing:

```
blinker:  cursorh 0; delay 0.3; cursorh 1; delay 0.3; goto blinker
```

If you wanted to run this schedule from outside of VLT, you could start the schedule from WShell by typing

```
1) "Address VLT schedule '[blinker:  cursorh 0....goto blinker]'
```

If you do run a script from WShell, don't forget to type **schedule** after **"Address VLT**. The **schedule** command is there to tell VLT to turn control of WShell back over to you even though the blinker schedule runs in an infinite loop. If you only type **"Address VLT '[blinker....**, 'blinker' will run just fine, but WShell will be tied up forever and you'll have to cancel the schedule to regain control of it. The extra [ ] are needed because ARexx eats the first level of quotes.

Cancelling Schedules

Knowing how to run schedules isn't enough. You also need to know how to get rid of schedules when you don't want them around any more. Getting rid of unwanted schedules is called *cancelling* the schedule. There are several ways to cancel schedules. First, if you select "Abort VLT Scripts" from the **Script Menu**, then all currently pending schedules are cancelled. You can also cancel a schedule from ARexx by typing in a WShell

1) **"Address VLT cancel (schedulename)**

Since **cancel** is a VLT script command, it can be called from *inside* a schedule. The ability to cancel other schedules from inside a schedule can be very useful at times. For instance, if you wanted a particular schedule to stop your cursor from blinking whenever it ran, you could cancel the 'blinker' from inside this new schedule by including the command **cancel blinker**.

There is an even more important use for the ability to cancel a schedule from inside another schedule. If we ran the blinker schedule, for instance, from a script file, then from the VLT console window, and then from WShell, we would really be running *three* separate, independent copies of the blinker schedule. All of these blinker schedules have the same name, but are nevertheless considered separate schedules by VLT. When you use the **cancel** command from inside a schedule, it will only abort *other* schedules, *never* the schedule that the cancel command is issued from. We can therefore ensure that only one copy of the blinker schedule is running at any given time by modifying the schedule as shown below:

```
#
# This is the file blinker.scp
#
cancel blinker

    blinker:
    cursorheight 0
    delay 0.3
    cursorheight 1
    delay 0.3
    goto blinker
```

Note that this particular copy of blinker was the **blinker.scp** schedule, that is, the copy of blinker run from the script file. If we wanted to run blinker from the console window or WShell and still ensure that only one copy of blinker was running, we would have to add the **cancel blinker** command to the schedule that we ran from there.

A new convention, valid as of VLT version 5.045, allows you to create an uninterruptable script. Such a script cannot be cancelled by selecting **Abort VLT Scripts** or by issuing the **cancel all** script command. An uninterruptable script can, however, be canceled if specified by name; it is only protected from nonspecific script cancellations. Thus, if you want a particular script, such as the cursor blinker, to continue running after a general script cancellation, you can now make it an uninterruptable script—but you can still cancel it by name if necessary. To make a script uninterruptable, precede the first label in the script with a $. For example, in the case of the **blinker** script, you would type **$blinker:** instead of just **blinker:** to make **blinker.scp** uninterruptable. Note, however, that the label you must refer to then becomes **$blinker** instead of just **blinker**.

Expiration of Schedules

Schedules can cancel themselves, or 'expire.' This may happen for a number of reasons. First, schedules can expire when there are no more commands to be executed, or if an **exit** command is encountered in the schedule. Schedules also expire whenever a 'fatal' error is encountered; that is, if a command you gave VLT from the schedule is illegal, nonexistent, or improperly issued. At this time, all errors are considered fatal.

Important script commands

There is a group of VLT script commands which form the backbone of the VLT script language. Among these commands are the **emit** command, the **send** command, the **exit** command, the **delay** command, the **schedule** command, the **goto** command, the trap commands, the **paste** command, and the @ command. When writing schedules, you will find yourself using these commands a great deal, so they deserve special attention and explanation.

The Emit Command

The **emit** command tells VLT to *display* a character string on the screen at the current cursor position. The character string is *not* sent to the host. Enclose the character string with quotes or some other string delimiter (brackets, parentheses, etc.).

This command is useful when you want your program to give a piece of information to the user without telling the host. For instance, the command **emit "Please tell me what to do"** will result in your screen showing

Please tell me what to do.

If you issue the command **emit raw "some string"**, the string will not be parsed for ARP style escape sequences and will be displayed as is. Otherwise, VLT will parse the string before displaying it.

The Send Command

The **send** command sends a character string to the host. For instance, the command **send "gone"** is equivalent to your typing **gone** in the command line. If you issue the command **send raw** ⟨**character string**⟩, the string will not be parsed for ARP style escape sequences before it is sent to the host.

The Exit Command

The **exit** command tells VLT to exit the current schedule; in other words, the **exit** command tells VLT to cancel the script that the **exit** command was issued from. The command **exit VLT** will cause VLT to shut down completely, while the command **exit** ⟨**next script**⟩ will tell VLT to execute the specified schedule after exiting the current one. Consider the command **exit blinker.scp**, issued from the schedule **hello**. **Hello** will be cancelled and **blinker.scp** will be run.

The Delay Command

The **delay** command causes a schedule to pause for a specified amount of time before executing the next command. The length of the pause, or timeout, is specified in hours, minutes, seconds, tenths of seconds, and hundreths of seconds (See **Some Conventions**, earlier, for the syntax of timeouts). Delays allow you to keep your script from going too fast and getting ahead of itself; they can also be used to insert pauses for the user's benefit at any point in the program. For instance, a **delay** command allows you to specify the amount of time a message window stays open.

The Schedule Command

The **schedule** command tells VLT that the lines associated with the **schedule** command are part of a different schedule. In the script file below, the schedule command is used to create a second schedule within the *same* script file.

```
#
# This is to show you that there
# can be more than one schedule
# in the same script file if you use
# the schedule command.
#

schedule 'hello:  emit "Hi, I'm a schedule"; beep'

greeting:
    emit 'Hi, I'm a different schedule'
```

Notice that all commands associated with the **schedule** command are enclosed by delimiters, and that within these delimiters, commands are separated by semicolons.

The Goto Command and Infinite Loops

The **goto** command allows you to execute a certain set of commands in an infinite loop. Let's look again at **blinker.scp**.

```
#
# This is the file blinker.scp
#
cancel blinker

blinker:
    cursorheight 0
    delay 0.3
    cursorheight 1
    delay 0.3
    goto blinker
```

The last command in this schedule is **goto blinker**. **Goto blinker** tells VLT to go back to the line with **blinker:** on it and execute all subsequent commands. The line saying **blinker:** is known as a label; as we mentioned earlier, any name with a colon after it is considered a label by VLT. To use a **goto** command, you must have a label for the **goto** to return to.

When VLT reaches the **goto blinker** command again, it goes back to **blinker:** once more and executes all subsequent commands. As long as the schedule isn't cancelled, this cycle of commands will continue eternally. Such a cycle is known as an 'infinite loop.'

Infinite loops are not the only kind of loops used in programming. There are a variety of loops which let you loop through a set of commands a specified number of times, or until a certain answer is reached, etc. VLT's script language only has the **goto** command, which means that it doesn't recognize these other kinds of loops. There are, however, sneaky ways of making the **goto** command a *timed loop*, that is, a loop that expires after an elapsed period of time.

The Goto Command as a Timed Loop

Currently, if we run the schedule **blinker.scp**, our cursor will blink until we cancel the schedule. You may, however, want your cursor to blink for twenty seconds and then stop of its own accord, without your intervention. To turn the infinite **goto** loop into a timed loop, you need to use the **delay**, **schedule**, and **cancel** commands as shown below.

```
#
# A blinker with a timed loop called blinky.scp
```

```
#

schedule 'delay 20; cancel blinker;'

blinker:
    cursorheight 0
    delay 0.3
    cursorheight 1
    delay 0.3
    goto blinker
```

By using **schedule**, we have made the **delay 20** and **cancel blinker** commands part of a *different* schedule than the **blinker goto** loop; since one schedule can be cancelled from inside another schedule, this means that you can cancel the **blinker** loop from within the script file using the **cancel** command. The **delay 20** tells VLT to wait 20 seconds before cancelling the blinker loop.

Other Uses of the Goto Command

When you instruct VLT, using the **goto** command, to return to a label earlier in the schedule, you create an infinite loop. If the **goto** command is going to a label *later* in the program, however, you won't have a loop—you'll just execute the commands following the label once.

Trap Commands: Waits, Ons, and Traps

The **wait** command, the **on** command, and the **trap** command belong to a class of commands known as traps. These commands wait for a particular string to be sent from the host to VLT before executing the next line in the program.

Wait—The **wait** command waits for a particular string to be sent from the host; the rest of the schedule is put on hold until the **wait** command receives this string. A time limit, specified in seconds, can be attached to the wait. For example, the command

```
wait "Ready" 3.5
```

will wait for 3.5 seconds and then permit the rest of the schedule to continue (If it receives the string "Ready" within that time, the schedule will continue immediately). If no time limit is attached to the **wait**, then the schedule will wait until "Ready" is received; if "Ready" is never received from the host, then the schedule will just sit there until it is cancelled.

On—The **on** command watches for a particular string; whenever this string is sent from the host, the command associated with the **on** command is executed. For example, the following **on** command

```
on "Ready" emit "Host is ready"
```

tells VLT to wait until it receives the string "Ready" from the host and then tell the user "Host is ready." Unlike **wait** traps, **on** traps do not put the schedule on hold; after the **on** trap is set, the rest of the schedule is executed even if the trap string isn't received. As a consequence, **on** traps exist from the moment they are called until the schedule is finished running; each time the trap string is received, the associated command is executed. In order to rid yourself of an **on** trap *before* a schedule is finished running, you will have to cancel the **on** trap, which you do by issuing an **on** command with the same character string and an empty command string. For instance, to cancel the trap **on "Ready" emit "Host is ready"**, issue the command **on "Ready" ""**.

Only one command, such as **emit "Host is ready,"** can be associated with the **on** command. If you use a **goto** command as the associated command, however, you can tell VLT to

execute more than one command each time the trap receives the trap string. An example is shown below.

```
#
# Simple.scp script
#

simple:

on {Ready} goto gotit

delay 3.5
emit (I guess we timed out:  Host croaked.)
exit

gotit:
emit 'Host is ready'
exit
```

Trap—the **trap** command is the most flexible of the three trap commands. It has a several possible subcommands, discussed below.

trap add : Add a trap to the system. Depending on which option you specify, the trap will behave differently. The syntax of the **trap add** command is as follows:

trap add [⟨trap-ID⟩] [⟨options⟩] ⟨match-string⟩ ⟨actions⟩

A trap-ID only has to be given if the trap is to be referenced specifically by a later command (such as **trap activate**). Trap-ID's are integer numbers between zero and 32767. You may also want to use one of the ⟨options⟩ strings explained below.

—⟨options⟩

case: Make matching of trap string with received string case sensitive.
defer: Intialize trap as inactive.
autodeactivate: Deactivate trap after first occurrence.
install: Install this trap permanently, which will keep it alive beyond the duration of the schedule.

All traps must have a ⟨match-string⟩ string (a trap string), although the ⟨match-string⟩ may be the keyword **nothing**. Traps must also have an ⟨actions⟩ string, a set of VLT commands separated by semicolons and bounded by string delimiters.

trap cause: Causes trap(s) with specified ID(s) to be sprung, even if the ⟨match-string⟩ has not been received. The syntax of this command is as follows:

trap cause ⟨trap-ID⟩ [⟨trap-ID⟩]....

trap activate: Causes trap(s) with specified ID(s) to be activated; this command is used when a trap has been deferred and you want to activate it. The syntax of this command is as follows:

trap activate { ⟨trap-ID⟩ [⟨trap-ID⟩].... | all}

trap deactivate: Causes trap(s) with specified ID(s) to be deactivated. The syntax of this command is as follows:

trap deactivate { ⟨trap-ID⟩ [⟨trap-ID⟩].... | all}

trap remove: Removes trap(s) with specified ID(s) from the trap list. The syntax of this command is as follows:

trap remove { ⟨trap-ID⟩ [⟨trap-ID⟩].... | all}

The PASte Command

The **PASte** command is a major new command, which is actually used internally by the **Paste Menu** options. It has a slew of subcommands, among them **clip**, **file**, and **string**, which indicate what type of material is to be pasted. Using the **PASte** command requires a few peculiar constructions, since actually pasting something requires using the command in a loop, and the actual operation requires several steps.

First, the contents of the clipboard, file, or string, must be loaded into VLT's internal paste buffer. You can accomplish this using the **clip**, **file**, or **string** options. For example, the command

```
paste clip
```

retrieves the Amiga clipboard contents and stuffs it into VLT's internal buffer. In a similar fashion, the command

```
paste file work:foo/bar.txt
```

tells VLT to retrieve the contents of **work:foo/bar.txt** and to put it in VLT's internal buffer, while the command

```
paste string "This is a test"
```

causes VLT to put the words **"This is a test"** into the internal buffer.

Once we have something in the internal buffer, we need to paste it into VLT's input stream. The **paste** command, by itself, can only send a single line at most; if used with character delays, it will send only one character at a time. This is why a loop is needed to accomplish the full **paste** operation, so that your script can loop over the buffer contents until everything has been sent to the host.

Such a loop can be created automatically by using the command

```
paste AUTO
```

which causes your program to loop until everything has been pasted. You can achieve the same effect by using the following code:

```
$clipprog:
    paste clip;
        $1:
            paste
            if not clip exit
        goto $1
```

As you can see, this **clipprog** script uses the **if** command; if anything is left in the internal buffer, the loop continues; otherwise the program exits.

In this context, you can also use the **edit** subcommand. The **paste edit** command acts similarly to **paste**, except that it brings up a string requester which allows you to edit a line of text before it is actually pasted into VLT's input stream. You can also use the command **paste edit auto**, which allows you to send an entire file, etc. to the host while editing it a line at a time.

Only one **paste** operation can be active at a time, and you can abort a **paste** operation by issuing the command **paste cancel**. This command empties and deallocates the current internal buffer and indirectly causes any **paste** operation currently in progress to abort.

The **paste** command has two more subcommands, **prefix** and **delays**. Issuing the command **paste prefix**, followed by a string, will cause VLT to preface whatever you are pasting with

that string. For example, if you were sending a list of female nobility, and you wanted every line of the file you were pasting prefaced by the word **"Lady"**, you would type

```
Paste prefix "Lady"
Paste file kingdom:nobles.txt
Paste auto
```

Issuing the command **paste delays**, followed by a specified line delay and then (optionally) a specified character delay (in milliseconds), allows you to choose the amount of time VLT takes between pasting lines and between pasting characters. For example, the command

```
paste delays 300 40
```

would cause VLT to delay 300 milliseconds after pasting each line and 40 milliseconds after pasting each character.

The @ Command

An @ sign, followed by a scriptname, such as **blinker.scp**, tells VLT to run the specified script. If the @ sign prefaces a script with a different file extension, such as **blinker.vlt** or **blinker.rexx**, VLT runs the script as a REXX program. Normally, when VLT starts up a REXX program, VLT can't exit until the script exits. If you issue the command with two @ signs, like this:

```
@@SomeScript.vlt
```

then VLT runs the macro under ARexx instead of simply REXX, which means that VLT doesn't have to wait for the script to exit before exiting itself. The disadvantage is that the default host for the macro will now be REXX rather than VLT, with no way for the script to find out VLT's port name. This is occasionally inconvenient. Since, however, you can pass arguments to programs launched with either of the @ commands, you can get around this last problem. First, launch program A with a single @ sign, so that it knows who the default host is. Have program A do the following:

```
/* A.vlt */
vltport = address()
"@@B.vlt "vltport
exit
```

This launches program B with the correct VLT port name as an argument, so that it can still send messages to the correct host without requiring VLT to stick around until program B is finished running. You might ask: why have VLT launch the program rather than ARexx? The reasons is that VLT, unlike ARexx, has a particular search order for **.vlt** scripts. The way program A works, **B.vlt** will be found if it is in VLT's search path for ARexx scripts.

Mixing VLT and ARexx

Up to now, the programming language known as ARexx has only been peripherally discussed. It is important to establish that ARexx, unlike the VLT script language, is not a built-in feature of a single program, but a completely self-sufficient programming language with a great deal of flexibility and power. There are several sources which give a detailed explanation of how to use ARexx: if you're a 1.3 user, refer to the *ARexx Manual* by W. Hawes, the *IBM System Product Interpreter User's Guide (releases 1 and 2, No. SC23-0375-0)*, and the *IBM System Product Interpreter Reference, (releases 1 and 2, No. SC23-0374-0)*; if you're a 2.0 user, refer to the ARexx section of *Using The System Software*, a manual which came with your copy of

the operating system. In this manual, we will assume that you know the basics of ARexx use and focus on the ARexx features that make it possible to mix VLT script commands and ARexx commands within ARexx programs. We will then discuss certain VLT script commands which are specifically intended for use within ARexx programs and can only be called from within an ARexx environment. *Note: Before reading this section, we recommend that you become familiar with ARexx.*

The ARexx Address Command

ARexx has a special command, the **Address** command, which allows it to send commands to other programs. This command is invoked by typing **Address** and then the name of the program to which you want commands sent. To send commands to VLT, you type **Address VLT**. Once it sees **Address VLT** in the program, ARexx enters a mode wherein ARexx interprets as much of a line of the program as it can, without aborting the program when it sees an unfamiliar command. Instead, whenever a line contains commands that ARexx doesn't recognize, it will send the interpreted line to VLT as a separate schedule. VLT will then execute these commands. Of course, if VLT doesn't recognize a command either, the schedule containing the command will be aborted and VLT will put up an error message.

Sometimes ARexx will think that a VLT command or symbol is an ARexx command or symbol and try to interpret it accordingly. This can result in your macro making mistakes or returning error messages. If you want to be certain that nothing in a particular command or group of commands is interpreted by ARexx before being sent to VLT, surround each line of commands with ARexx string delimiters (double quotes or single quotes). Once an **Address VLT** command is issued, anything between quotes is sent directly to VLT.

Note: In an ARexx macro, just typing **Address VLT** *and continuing your program on a new line is sufficient. When typing commands from WShell, however, you must preface* **Address VLT** *with a double quote. Furthermore, whenever you type a series of commands on the same line as the* **Address VLT** *command, be sure to follow the* **Address VLT** *command with a semicolon. Otherwise, only the command immediately following the* **Address VLT** *command will be sent to VLT. Finally, when you run an ARexx macro from VLT, it is not necessary to put in the* **Address VLT** *at all, since ARexx will automatically know where to send the commands. In fact, this last feature is frequently useful, since VLT's port name may not be VLT if you've started the program up under a different name.*

The Fault Command and the RC variable

When, during the running of an ARexx macro, a timeout or error occurs, an error code is returned.* Error codes are numbers; each number corresponds to a particular type of error. In ARexx, the variable known as the RC variable stores the error code.

When VLT script commands are sent from ARexx to VLT and something goes wrong, VLT will return an error code to ARexx's RC variable. VLT has 29 error codes (0 to 28); *these error codes in no way correspond to the error codes returned by errors in ARexx macros.* The VLT script command **fault**, when given a number from 0 to 28, assigns to the variable **VLT.Error** a textual error message corresponding to that particular error code. **Fault** can be called with a

---

* Although an error code is returned when a timeout occurs, a timeout is *not* considered an error and therefore does not cause a VLT script to abort. Remember, all other errors will cause VLT scripts to spontaneously abort. ARexx macros are aborted by VLT errors unless the ARexx command ON FAILURE is used.

number as its argument—for instance, **fault 1** would result in VLT.Error containing the word **Timeout**—or it can be called with the ARexx RC variable as its argument.

You must issue the fault command from either WShell or an ARexx macro, using the **Address VLT** command. Let's take a look at an example to see how it works. When the program below is run, VLT returns the message **Timeout**.

```
/* An ARexx macro that shows how the fault command and the */
/* RC variable can be used together.  */

Address VLT

delay 1
fault RC
say VLT.Error
```

Upon seeing **Address VLT**, ARexx knew that it should send all unfamiliar commands to VLT. First, the unfamiliar command **delay 1** was sent to VLT. VLT ran a schedule with only that command in it. The schedule timed out, and the ARexx standard error code RC was set to 1. Then ARexx read the command **fault RC** and changed RC to 1 before sending the line to VLT. VLT, upon receiving the command **fault 1**, put the error message belonging to error 1, **Timeout**, in the special VLT variable VLT.Error. VLT then informed ARexx of VLT.Error's existence, location, and contents. ARexx then executed the last command, **say VLT.Error**, and printed the word **Timeout** on the screen.

Using the RC Variable with Timeouts

Using the RC variable with the **fault** command is very advantageous when you are debugging a macro/script and want to understand the error codes that VLT is returning to you. As it so happens, the RC variable by itself is extremely useful when you are dealing with timed commands and want to know if the command has timed out.

Suppose we want to wait for the host to send the string **Ready**. Well, we can just type in WShell

```
1) "Address VLT wait 'Ready'
```

What if, however, the host was broken and the word **Ready** never appeared? In that case, you would be up the creek, because WShell would just sit there and nothing short of cancelling everything from the menu or from another script would cure it. Now suppose we decide that the string **Ready** should come within the next three and a half seconds, and that if it does not the host is surely kaputt. We can then use the timeout feature of **wait** to create the following ARexx macro.

```
/* simple.rexx program */
Address VLT

"wait 'Ready' 3.5"
if RC=1 then do
    say "Host must have croaked"
    exit 20
end

say "Okay, I guess we're ready"
exit 0
```

The **exit 20** and **exit 0** commands are ARexx commands, not VLT script commands, which is why they have numerical arguments. As a matter of fact, the only VLT script command in the entire macro is the **wait "Ready" 3.5** command, so the macro may require a bit of explanation. The macro waits for three-and-a-half seconds; if the string "Ready" is received within that time, the **if...then do** section is skipped entirely and the macro goes directly to the **say "Okay, I guess we're ready"** command. If the **wait** command times out, however, VLT returns an error code of one to ARexx, who stores it in the RC variable. Since RC=1, the **if...then do** clause is obeyed; "**Host must have croaked**" is displayed on your screen and the macro immediately exits, returning an *ARexx error code* of 20 to the caller.

The Extract Command

Color settings, programs associated with function keys, program options, outstanding schedules, etc., are stored in *fields*. If you want to know the contents of one of these fields while you are working in ARexx, then you use the **extract** command. With **extract** you can either extract the contents of a single field from VLT or the contents of all fields at once. In particular, you can extract the line that is currently on the screen at the vertical location of the cursor, and also the current "search" line in the review buffer. Combine this with the **movecursor** command, and you can read every line on the screen from ARexx. Also extractable are the current x and y coordinates of the cursor—you can thus put the cursor back to where it was. The stem variable that receives all the extract values is always called VLT.; VLT.ansicolor, for example, stores the extracted value for the ANSICOLOR field.

The number of fields that can be extracted is stored in the variable VLT.fields, while the names of all the fields that can be extracted are stored in an array with the stem VLT.fields.; **VLT.fields.1**, for instance, stores the *name* ANSICOLOR. Some fields have subfields. For intance, VLT.color.0 stores the RGB setting for color 0, VLT.color.1 the RGB setting for color 1, etc., while VLT.color itself stores the number of different colors that VLT can use.

The sample program which follows, an ARexx program which extracts all the color fields and prints their contents to the screen, demonstrates the use of **extract** command. If you want a more comprehensive demonstration of the **extract** command's powers, refer to the **extracttest.rexx** program that comes with VLT, an ARexx program that extracts all the VLT fields it possibly can. By studying the program and running through the output it generates, you should get a pretty good picture of the **extract** command's range, which includes the programs associated with all function keys, the settings for all program options, all outstanding schedules, etc..

```
/**
*
*   Extract the color fields from VLT
*
**/
address VLT 'extract'  /* This is the *only* command in this program
                        *  that is sent to VLT*/

do j = 0 to VLT.color - 1   /* VLT.color is # of subfields */
   b = color"."j            /* b will be color.j */
   say overlay(b, copies(" ", 30)) " = " VLT.b
                            /* prints contents of VLT.b to screen */
```

```
end
```

The RX Command

The **rx** command is a VLT script command that tells VLT to submit a specific command to ARexx.* If the **rx** command is issued with the **synchronous** option specified, the program will wait until the ARexx command is completed before continuing. You will find that the **rx** command is useful with traps, such as the **on** trap, when you want the **on** command string to be an ARexx command. For example, the command **on "Ready" address MYPORT ready** won't work, even if issued from ARexx using the **Address VLT** command. This is because the entire command is sent to VLT to be executed. VLT will set up the **on** trap, but will not be able to recognize the command string, since it is an ARexx command. Since the entire **on** command has already been established as a *VLT* script command, VLT doesn't know to return the second half of the command—the command string—to ARexx to execute. Instead, VLT will return an error message and abort the script. On the other hand, if you issue the commands

```
Address VLT; 'on "Ready" rx {address MYPORT ready}; delay 10'
```

everything will work, because VLT will see the **rx** command and send the command string back to ARexx to be executed.

Unlike the **extract** and **fault** commands, the **rx** command can be invoked from within VLT as well as from within ARexx. Within VLT, the **rx** command is primarily useful when programming the user menu or keyboard functions because it lets you program these functions in ARexx.

Delimiters and Delays: Keeping an ARexx-sent On Command Alive

An **on** trap lasts only as long as the schedule that set it up. Normally, this isn't a problem, since the schedule will end after the **on** command has outlived its usefulness. When an **on** trap is created from ARexx, however, you run into a problem. An **on** command, sent from ARexx via the **Address VLT** command, is received by VLT *as a one-line schedule.* The only command the schedule contains is the **on** command itself, so the schedule sets up the **on** trap and promptly expires. Since the **on** trap always dies with the schedule, the **on** trap dies too—much too fast to receive the trap string that it was supposed to be waiting for. There is, however, a nice, sneaky way around this difficulty. Let's take another look at the set of sample commands we used when discussing the **rx** command.

```
Address VLT; 'on "Ready" rx {address MYPORT ready}; delay 10'
```

You've probably noticed the **delay 10** command issued just after the **on** command. You may have also noticed that the pair of commands **on "Ready" rx {address MYPORT ready}; delay 10** are surrounded by single quotes: ARexx string delimiters. The **delay** command and these delimiters comprise the solution to the problem. As both the **on** command *and* the **delay** command are surrounded by the delimiters, ARexx sends them to VLT without interpreting them *and* sends them to VLT *as a single schedule.* The schedule now has *two* commands in it: the **on** command and the **delay 10** command. Until the ten-second delay occasioned by the **delay** command times out, the schedule will still be alive—and so will the **on** trap.

---

* Not to be confused with the **RX cli** command that comes with ARexx.

The Wedge Command

Currently, you can only **WEDGE** keystrokes. By issuing the command **wedge keystrokes** ⟨**portname**⟩, you tell VLT to wedge all keystrokes and send them as packets to the port that you have named. **WEDGING** keystrokes means that all keystrokes—everything typed by the user—are intercepted by VLT and sent to your program before being acted on. This means that you can write a program to intercept certain keystrokes and change them into different keystrokes before sending them back to VLT and your host. When is this useful? Well, suppose there's a character on your keyboard that your host misinterprets as a logoff command. You might want to make sure that you could never type that character by mistake. To do this, you would **WEDGE** all keystrokes, have a program check the incoming keystrokes for the logoff character, and then, if the logoff character was found, send something else to VLT in the logoff character's place.

When a keystroke is intercepted and sent as a packet to a specified port, it is sent in the form KEYSTROKE ⟨code⟩ ⟨qualifier⟩ ⟨iaddress⟩ ⟨character⟩, where code and qualifier numbers indicate which key was pressed and whether a ctrl, shift, or alt key was pressed in conjunction with it. The character specification is simply the character associated with the key, while the iaddress specification keeps a history of previous keystrokes. The iaddress specification was added as of VLT version 5.034; the change is, unfortunately, non-compatible with previous versions, so when you switch to version 5.034, any programs you have which use the **WEDGE** command must be modified to deal with the iaddress specification.

On the next page is a sample program which shows how keystrokes can be intercepted and altered using the **WEDGE** command. Note that, since you are using ports, you will want to use an ARexx macro to **WEDGE** keystrokes.

```
/**
*
*   Example program to intercept keystrokes.
*
**/

mp = openport(WEDGEPORT) /* opens a port */

/**
* tells VLT to intercept all keystrokes and send them to WEDGEPORT
**/
address VLT "wedge keystrokes WEDGEPORT"

/*
*   Loop until quitflag is 1, waiting for packets (each keystroke is a
*   packet)
*/
do forever
   if quitflag = 1 then leave
   t = waitpkt(WEDGEPORT)
/*
*   We got a number of packets. Loop over all of them, sifting out "null"s
```

```
*/
   do ff = 1
      p = getpkt(WEDGEPORT)
      if c2d(p) = 0 then leave ff
      line = getarg(p)
/*
*   Got a line. It is of the form: KEYSTROKE code qualifier iaddress character,
*   parse it out.
*/
      parse var line command code qual iaddr char .
/*
*   If we got an "a", quit. If a "b", say that we'll handle this one
*   ourselves by replying a 0 error return and replace it with a capital C!
*   Otherwise return a 1.
*/
      if char = 'a' then quitflag = 1
      if char = 'b' then do
         t = reply(p, 0)
         if (char = 'b') then address VLT "send (C); emit (C);"
      end
      else t = reply(p, 1)
   end
end
```

Quick Reference Section

Some Conventions

We now turn to a description of all the script commands. In this description, we will use the following conventions.

Abbreviations:

The capitalized letters (unless indicated otherwise) indicate the minimum number of characters that need to be specified. Usually, commands less than 6 characters in length need to be specified fully, whereas with longer commands a suitable abbreviation is used.

Timeouts {hh:mm:ss.xx}:

Timeouts are specified in hours, minutes, seconds and hundredths of seconds. Units not required need not be specified, i.e., the single digit "1" means one second, whereas "1:00" means one minute, etc.

VLT Action Strings {⟨string⟩ | ~⟨command⟩}:

A VLT action string is either a string that is sent to the host after ARP style escapes are parsed, or a keyscript character followed by one or more VLT script commands.

ARP:

Some commands, such as **send** and **emit**, have a text string as their argument. Most of the time, you can use ARP escape sequences to insert special characters in such strings. See **Appendix E** for a description of ARP escape sequences.

{{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

You'll see this argument description many times next to a main command in the list of VLT script commands below. What this means is that typing the main command plus 'On,' 'Yes,' or '1' will tell VLT to turn the option specified by the main command on, while typing the main command plus 'Off,' 'No,' or '0,' will tell VLT to turn that option off. Typing the main command plus Toggle will allow you to toggle the option specified by the main command to its opposite state.

The Script Commands

The following list is for quick reference; all entries will tell you what the command does as briefly as possible. Those commands which correspond to menu options discussed earlier will not be discussed in detail, but the names are nearly identical, so you should be able to go back and review the detailed explanation of the option/command.

@ ⟨Name of VLT/ARexx script file⟩:

Can be used to execute `.scp` files as VLT native scripts, or to launch `.vlt` and `.rexx` scripts as ARexx programs. This command was described in more detail earlier in this chapter.

ACTivate {Vt100 | Tektronix | Next}:

Brings either the VT100 screen, the Tektronix screen, or the next screen in the screen list to the front. If the VT100 screen is not open, and `Activate Vt100` or `Activate Tektronix` is received, the screen will be opened.

ANSicolormode {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches ANSI color mode on or off. In ANSI color mode, color escape sequences for foreground and background colors are recognized.

APPlicationcursor {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches Application Cursor mode on or off. Using the **APPlicationcursor** script command is the same as selecting the Application Cursor option on the text window's **Operations Menu.**

AUToscreentoback {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches Automatic Screen-to-back mode on or off. When set to be on, this option causes the screen to be put behind all other screens when a file transfer starts, with the file transfer status window appearing on the Workbench. Otherwise, the status window remains on VLT's screen, and VLT's screen remains where it is.

BAUD ⟨baudrate⟩ — MIDI ⟨new-value⟩:

Lets you select a new data transmission speed. Valid values are 110, 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and Midi. The Midi setting is programmable; by issuing the command **baud midi ⟨new-value⟩**, where new-value is the serial speed you would like to use, you can equate the Midi setting with any baud rate, no matter how unusual. For instance, you could set Midi to the 600 bps rate used by X10 controllers, or, if you wanted to work at a faster rate than 57600, to 115400 bps. Midi is set by default to be 31250 bps. Note that the new Midi value is *not* saved in the configuration file and is not extractable using the **extract** command. Midi's programmability is provided strictly for peculiar situations.

BEEP:

Causes a beep. When a "Beep function" has been set, this function is executed. Otherwise, when the volume is set to 0, the screen will flash. If the volume is not zero, the built-in beep is sounded.

BEEPFunction ⟨beep function⟩:

Lets you specify the command to be executed in place of sounding the VLT bell. The command is a standard VLT action string. A common action string is **"rx ''address 'PingServer' beep''**, which causes the **beep** command to be sent to the PingServer. See the documentation for the PingServer program.

BREAK:

Sends a break signal to the host.

BREAKTime ⟨break time⟩:

Sets the time (in microseconds) that the break signal lasts. The default is 75000.

BUFfersize ⟨size⟩:

Sets the size of the serial buffer; the default is 2048 bytes, the lower limit is 128 bytes, and the upper limit is 8192 bytes.

CANcel {ALL | ⟨script name⟩ ⟨cancelflag⟩}:

Cancels a specified script, or all scripts except the current one if **all** is specified. If a script needs to be run without interference from other scripts, a **cancel** may be placed as the first command in a script. Script names are determined by their first label. Therefore, it is recommended to specify the name of the script in the form of a label at the beginning of the script. When two scripts of the same name are present, the first script found will be cancelled.

If **cancel** is called with a scriptname and cancelflag specified, and if the script to be cancelled was run from an ARexx context, then, when the script is cancelled, the ARexx context will now have a value assigned to **VLT.CANCELFLAG** equal to the cancelflag that you specified. This allows you to use scripts which sit around indefinitely and can be cancelled by various other scripts. By using the cancelflag, you can then tell which program cancelled the indefinitely running script. For an example of how the cancelflag is used, see the script **VLTPhoneDial.rexx**.

CAPture (file name):

Captures the session to a file with the specified file name. This script command is the same as the **Capture Session** option of the text screen's **VLT Menu**.

CAPture RAW {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Select the capture mode. With "raw" mode on, all characters are captured as received, including carriage returns, line feeds and nulls. Otherwise, nulls are stripped out, and files are stored with linefeeds as line delimiters, according to Amiga standards.

CAPture {SUSPEND | RESUME | FLUSH | OFF}:

Capture Suspend and **Capture Resume** suspend or resume capturing to the current capture file. **Capture Flush** causes the current buffer to be flushed to the capture file. **Capture Off** causes the current capture file to be closed.

CD (directory specification):

Changes the directory out of which VLT is operating according to your specification.

CHeckserialerror { SERialdevicebusy | BAUdratemismatch | LINEerror | PARity-error | BUFferoverflow | NODsr | BREakreceived | ON | OFF | DECimal (error mask)}:

Tells VLT to check for various errors. Any number of the options may be used in the same call. Each option specified will be switched by default to the ON state; to turn an option off, preface it by the OFF option. You can use the ON and OFF switches several times in the same command, for example:

```
Ch Ser Off Bau On Line Par Off Buf
```

Once you've used the OFF switch, all options specified will be switched OFF until you use the ON switch again, at which point all options specified will be switched ON. The **DECimal** option can be used in conjunction with the **extract** command for **checkserialerror**. The **extract** command returns a bit mask of the current state of each option. A bit mask in the identical format can be used to set the options in the **checkserialerror** command using the **DECimal** option.

CLEAR [CLOSE]:

Clear the VT100 screen. If the CLOSE option is specified, the screen or window will also be closed (see **ACTivate**).

COLOR (color register) (color value) [(pen assignment)...]:

Sets a certain color register to a particular RGB value. For example, color 2 FFF sets color 2 to white. The three *hexadecimal digits* specify Red, Green and Blue respectively; F means 'as much R/G/B as possible' while 0 means 'no R/G/B at all.'

When running with a custom screen in AmigaDOS 2.0, the specified color may also be assigned to any of the following 8 pens: DETail, BLOck, TEXt, SHIne, SHAdow, HIFILL, HIFILLText, BACkground. These assignments only affect VLT when the screen has four or more colors. You must close VLT's screen and reopen it in order to see the full effect of these assignments. The Shine and Shadow assignments are also used to determine shadowing of all gadgets VLT uses. Since these assignments are not protected in any way, it is up to the user to be very careful: system gadgets and window borders may seem to disappear if certain pen assignments are made. In order to get the same colors and settings that are in effect on the Workbench, run the following script:

```
#
# Set VLT's custom screen up for WB colors.
#
COLOR 0 AAA DETAIL BACKGROUND
```

```
COLOR 1 000 BLOCK TEXT SHADOW HIFILLTEXT
COLOR 2 FFF SHINE
COLOR 3 57A HIFILL
CLEAR CLOSE
ACTIVATE VT
```

To get pretty good looking shadowing on VLT's screen using VLT's default colors, use

```
#
# Set VLT's custom screen up for default 8 colors.
#
COLOR 0 000 DETAIL BACKGROUND HIFILLTEXT
COLOR 1 078 BLOCK TEXT
COLOR 2 A00 HIFILL
COLOR 3 090
COLOR 4 C6A
COLOR 5 E90
COLOR 6 056 SHADOW
COLOR 7 999 SHINE
CLEAR CLOSE
ACTIVATE VT
```

As it turns out, these settings also work pretty well in 4 colors, although the shine pen now effectively will be color 3, and the shadow pen color 2. As said before, for a two-color screen these settings have no effect.

COLOR REQuest:

Causes the VLT color requester to open on VLT's screen. The command will only return when the user has completed his color selection.

COLUmns (number of columns):

Sets the number of columns to be displayed on the screen. If the number is larger than the number that fits on the current screen size, the font may be changed to a smaller size.

CONFiguration SAVE [(filename)]:

Allows you to save VLT's configuration, as do the **Save Configuration/Save Configuration As** options in the **VLT Menu**. The configuration file will be saved according to VLT's path search methods (see **Getting Started: VLT's Method of Searching Paths**). If the filename is not specified, the file will be saved over the last read preferences file. If the filename is specified, the configuration file will be saved with that name; if no directory is specified for this file, the path will be searched for the file. If VLT still can't find the specified file, it will create that file in the current directory.

CONTinue:

Tells VLT to continue a script that is currently in a "pause," "delay," or "wait" state. Execution of the script is resumed at the script command following the `pause`, `delay`, or `wait` command.

The `CONTinue` command can also be used with the name of another schedule as an argument. This ability to continue one schedule from inside another allows you to synchronize schedules. For example, consider two schedules, schedule A and schedule B. Schedule A consists of the following commands:

```
#
# ScheduleA.scp
#
@ScheduleB.scp
pause
```

```
... # miscellaneous commands
```

while Schedule B looks like this:

```
#
# ScheduleB.scp
#
... # miscellaneous commands
continue A
exit quiet
```

After executing Schedule B, Schedule A would normally continue without any regard to Schedule B's further behavior, but since A encounters the **pause** command, it waits. Meanwhile, Schedule B executes what it needs to execute, then uses the **continue A** command, which breaks A out of the "pause" state and allows it to execute the rest of its commands. While Schedule A continues to execute, Schedule B exits.

CONSole {Open | Close | Specification ⟨console string⟩ | Height ⟨height⟩}:

Specified with **open**, opens the console window; with **close**, closes the console window. The **specification** suboption lets you specify the console string, while the **height** suboption lets you specify the amount of space left between the bottom of the text above the console window and the bottom of the screen.

In order to implement this command, the old **CONSolewindowadjust** was deleted. If you don't want VLT to change the text display just because there is a console, then specify a console height of 0. The console height that you set with this command does not actually affect the size of the console window— it only specifies how much room to leave at the bottom for a console (or whatever else). The default is 55 pixels.

CURsorheight ⟨height⟩:

Specifies the height of the cursor. If the height specified is larger than eight, the cursor height will adapt to any font changes.

CUStomscreen {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When set to be on, **CUStomscreen** opens VLT on its own custom screen. When **CUStomscreen** is not on, VLT opens on the Workbench.

DELAY ⟨timeout⟩:

Causes the script to pause for the specified amount of time.

DESTructivebackspace {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When **DESTructivebackspace** is set to be on, the backspace key causes the cursor to erase text as it moves backwards.

DISPLAYCrascrlf {ON | OFF}:

Behaves just like the **Display CR as CR/LF** option of the **Communications Menu**.

DISPLAYLfascrlf {ON | OFF}:

Behaves just like the **Display LF as CR/LF** option of the **Communications Menu**.

DSR ⟨number⟩ ⟨device status report string⟩:

Chooses the primary (number = 1) or secondary (number = 2) device status report string. The string is a standard VLT action string.

ECHO {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Lets you switch echo on or off.

ECHOLinefeeds {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When on, the **ECHOLinefeeds** option causes linefeeds to be echoed to the screen as well as carriage returns, when the return key is pressed in local echo mode.

EMIT [RAW] ⟨character string⟩:

Tells VLT to display a character string on the screen at the current cursor position. If the **raw** option is specified, the string is not parsed for ARP style escape sequences.

EXIT [{VLT | [QUiet] ⟨next script⟩}]:

Lets you exit the current script, or quit out of VLT entirely if VLT is specified. When exiting a script, a message is displayed to indicate that the script has terminated, unless the **quiet** option is specified. If a **next script** is specified, that script will then be executed.

EXTRact [⟨field name⟩]:

This command is available from ARexx only. It extracts information from VLT in the form of the VLT. stem variable. If no field is specified, all fields are extracted. *See the section on the* **extract** *command earlier in this chapter.*

FAULT ⟨error number⟩:

This command is available only from ARexx: it reads the error number specified and puts the corresponding text explanation in the variable **VLT.Error.** All VLT commands set the RC (error code number) variable in an ARexx script to a code depending on whether a command was successful or not. One may call the **Fault** command with RC as an argument to find out what the error code meant.

FIFO {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Behaves just like the menu option **Fifo Pipes** in the **VLT Menu**.

FILE {SENd | RECeive | GET} [⟨file name⟩]:

Lets you send or receive the file with the specified file name to or from the host using the currently active transfer protocol.

FONT ⟨fontname⟩:

Used to change VLT's font. The font will still have to pass VLT's notorious test of existing in both an 8 point and an 11 point tall size. The width must be 8 point and the font must be monospaced.

Function ⟨key number⟩ ⟨command⟩:

Set function key indicated by the key number to a command. Key numbers are in the range 1 to 128, where

01 - 10 are the regular unshifted function keys;
11 - 20 are the shifted function keys;
21 - 30 are the ctrl-ed function keys;
31 - 40 are the alt-ed function keys;
41 - 50 are the menu items right-Amiga 1 through 0;
51 - 80 are the screen gadgets;
81 - 90 are the alt-ed keypad keys 0 - 9;
91 & 115 are the alt-ed and shift-alt-ed keypad Enter
92 & 116 are the alt-ed and shift-alt-ed keypad -
93 & 117 are the alt-ed and shift-alt-ed keypad (
94 & 118 are the alt-ed and shift-alt-ed keypad)
95 & 119 are the alt-ed and shift-alt-ed keypad /
96 & 120 are the alt-ed and shift-alt-ed keypad *
97 & 121 are the alt-ed and shift-alt-ed keypad + or Help;*
98 & 122 are the alt-ed and shift-alt-ed keypad .
99 & 123 are the alt-ed and shift-alt-ed up arrow;
100 & 124 are the alt-ed and shift-alt-ed down arrow;
101 & 125 are the alt-ed and shift-alt-ed right arrow;
102 & 126 are the alt-ed and shift-alt-ed left arrow;
103 & 127 are the alt-ed and shift-alt-ed Delete;

---

* Only true if the **HelpKeyLF** option hasn't been used to set the Help key to the linefeed character.

104 & 128 are the alt-ed and shift-alt-ed Help;
105 - 114 are the shift-alt-ed keypad keys 0 - 9.

The command takes the usual form of a VLT-action-string.

GOTO ⟨label-name⟩:

Tells VLT to **goto** a specified label (a name with a colon after it) and execute all the commands after that label. The label name should be specified without the trailing colon when used with the **goto** command, even though, when used as a label elsewhere in the program, it *must* have the trailing colon.

GRAphicslock {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches graphics lock on or off. When on, special characters from the host will not be able to switch you from the text screen to the graphics screen. Otherwise, certain control characters and escape sequences can change VLT's mode to the graphics mode. This script command corresponds to the **Lock Graphics** command found in the **Graphics Menu** of the text screen and in the **Control Menu** of the graphics screen.

HANDshake {None | Xon/xoff | 7-wire} [{Xon/xoff | 7-wire | cts/rts}]:

Lets you specify the handshake mode for the serial port. In case both Xon/Xoff and 7Wire are desired, both options may be specified. In addition, the keyword CTS/RTS can be substituted for the 7Wire option.

HANGup:

Causes a "hangup." This is accomplished by dropping the DTR signal on the serial port for a period of 1 second. Notice that most modems can be set to ignore the DTR status, and that three-wire cables do not usually convey this signal to the modem. If this option does not work, you may have to send a special command sequence to your modem, such as "+ + +" followed by a delay and "ATH" in the case of Hayes compatible modems.

HELpkeylf {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When you turn **HELpkeylf** on using this script command, the help key transmits the line feed character (ctrl-J) to the host. Otherwise, the help key transmits the sequence ⟨esc⟩O l (lower case L) when in application keypad mode.

IF [NOT] ⟨acceptable condition⟩ ⟨command string⟩ [else ⟨command string⟩]:

This command is now comparable to the **if...then** flow control statements of high-level programming languages. The IF recognizes a specific set of conditions listed later in the chapter; it also recognizes their negatives, specified using the **not** option. If the condition is met, the command string included afterwards is executed as if a **schedule** command was used. If the condition is not met, nothing happens and no error message is returned, unless you have specified another course of action using an **else** clause. This command is especially useful when you want to program keys to behave differently in Alphanumeric (VT100) and Graphics (Tektronix) mode.

The commands execute on the same schedule that the **if** command was called from, so you can include **goto**'s that refer to labels outside the **if**'s command string, as well as **exit** commands, and have them work correctly. By contrast with earlier versions of the **if** command, all the commands within the **if** statement execute synchronously with the schedule in which the **if** appears. For example:

```
if VT100 (emit "Avalon"; delay 1; emit "Arthur"); emit "done"
```

If VLT is currently in VT100 mode, then **Avalon** will appear, followed, after a delay of one second, by **Arthur**; **done** will appear immediately afterwards. In previous versions, because the commands within the **if** were executed asynchronously, **Avalon** would appear, followed immediately by **done**, and **Arthur** would appear a second later.

INTerlace {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Lets you switch interlace on or off, for custom screens.

KERmit BYE:
Sends a 'Bye' message to host, if the **Kermit** protocol is currently selected.

KERmit DOWncase {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:
Calling this option with either the YES, ON, or 1 subcommand causes the names of received files to be converted to lower case.

KERmit FINish:
Behaves like **KERmit BYE**, except that it does not log you off the host.

KERmit PACKetsize ⟨packet size⟩:
Sets maximum packet size to be used for **Kermit** transfers.

KERmit MODE {Hostserver | Sendreceive}:
Lets you select **Kermit**'s transfer mode; your choices are "host is server" or regular send/receive.

KEYMap ⟨keymap name⟩:
Lets you select a different special keymap. See the corresponding menu option for more details.

KEYRepeat {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:
Lets you switch key repeat mode on or off. When key repeat is on, any key pressed and held will send characters repeatedly. When not set, keys will never repeat.

KEYScriptcharacter ⟨ASCII character number⟩:
Allows you to select the keyscript character. By default, this is the ANSI character tilde, ~, ASCII number 126. Since many scripts assume the keyscript character to be a tilde, it is usually unwise to change it.

LINES ⟨number of lines⟩:
Changes the number of lines to be displayed on the screen to the number indicated. If necessary/possible, the font will be changed to a smaller or larger size.

LOCAL {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:
Sets VLT to operate in **local** mode, which means that characters typed on the keyboard are not sent on to the host. Note that text sent by other means does get sent to the host (i.e. text sent from the console, pasted from the Review Buffer, or sent from scripts).

MENU ⟨menunum⟩ ⟨itemnum⟩ [⟨subnum⟩]:
Executes specified menu item as if it had been selected from the main window's menus. Note that when counting items, the count starts from zero and the dashed separation bars used in the menus must be counted.

MESsage ⟨message⟩:
Posts a message using VLT's message window. The '\' character may be used to cause line feeds. When the ⟨message⟩ is not specified, the current message window is closed.

MISCFlags {add | remove} ⟨option flag⟩:
MISCFlags allows you to set minor VLT options using the option flags listed below. Adding sets an option flag to be on, while removing sets an option flag to be off. There is also a program included with VLT, **SetMiscFlags**, which allows you to set these flags using a very comfortable graphical user interface. See **Appendix F** for details.

ALPhaonmainscreen: When added, causes Tektronix alpha mode text to appear on the VT100 screen, rather than on the Graphics screen.

AUToactivate: When added, causes the VLT screen to pop back to the front after VLT finishes uploading or downloading files.

DISplayoff: When added, prevents new data from being shown on VLT's screen.

INActivemessages: When added, causes message windows to come up inactive instead of active.

NOEscapescripts: When added, nullifies the escape key's ability to abort scripts.

NOLocalprint: When added, switches off the capability for automatic local printing (see **Appendix C**).

NOMessages: When added, prevents VLT from displaying message windows, including the file transfer status window.

NOOwndevunit: When added, turns off the support for Chris Wichura's OwnDevUnit standard for arbitrating access to serial devices.

PADdedclips: When added, sets the VLT review buffer up to pad files saved to the clipboard so that all clip files (in accordance with IFF specs) contain an even number of characters. Padding of clipboard files disagrees with some editors, so the option is by default off.

SERialshared: When added, causes VLT to open the serial port in shared mode. You must reopen the serial port before this takes effect, either by selecting the **Reset** menu option or **Hangup** option or by issuing the **HANGup** script command.

TEKNOAnsicolors: When added, causes VLT to support ⟨**csi**⟩ **n m** sequences in Tektronix mode, as long as **n** is in the range between 30 and 37.

TEKNOBoundary: When added, prevents panel outlines from being drawn.

TEKNOPointer: Affects the display of cross hairs in Tektronix mode. Normally, when cross hairs are being displayed, the mouse pointer changes to a target box on the graphics screen. When **TEKNOPointer** is added, only the cross hairs are displayed.

UNBufferedcapture: When added, capture to a file is unbuffered. This is occasionally useful when capturing to strange devices; see **The User Interface: Text Screen Menus**'s section on Fifo support for more details.

VT100toprow: When added, forces the top four keys of the numeric keypad to send VT100 sequences under all circumstances.

MISCFlags ⟨number⟩:

The old **MISCFlags** interface, for reasons of compatibility, is supported in addition to the newer interface discussed in the previous entries. The old-style **MISCFlags** assigns a number to each flag; any of these bitflags is set to be off by a value of zero; moreover, all of these flags are by default off. To set a bitflag to be on, add the number specified below after the **MISCFlags** command.

PADdedclips	—	1
DISplayoff	—	2
NOMessages	—	4
SERialshared	—	8
TEKNOPointer	—	16
UNBufferedcapture	—	32
NOLocalprint	—	64
ALPhaonmainscreen	—	256
NOOwndevunit	—	512
TEKNOAnsicolors	—	1024
INActivemessages	—	2048
AUToactivate	—	4096
TEKNOBoundary	—	8192
VT100toprow	—	16384

In order to set more than one bitflag to be on, add the numbers which set the two flags to be on and include the result after the **MISCFlags** command. For example, to set Bit 0 and 1 to be on, type 3 after the **MISCFlags** command. To set Bits 0, 1, and 2 to be on, type 7 after the **MISCFlags** command. To set Bits 1, 2, and 4 to be on, type 22 after the **MISCFlags** command. Et cetera. To reset a bitflag to off, add up the current values of the other bitflags and include that number after the **MISCFlags** command.

MOUsesupport {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }[shift] [ctrl] [alt] [selectup] [selectdown] ⟨program string⟩:

When specified as on, the left mouse button without shift, ctrl, or alt keys is set to **auto** for both mouse button clicks and releases (selectdown and selectup). By default, when you use this command, no qualifiers are specified and selectdown is implied. The program string must start with a ~ to be interpreted as a script command, with the keyword **auto** being the one exception. Since the command is basically the same as the menu option, see **The User Interface: Text Screen Menus** for more details.

MOVecursor ⟨x1⟩ ⟨y1⟩ [⟨x2⟩] [⟨y2⟩]:

Moves the location of the cursor to (x, y) when only the first two coordinates are specified. (1, 1) is the upper left-hand corner. The maximum values are determined by the displayed number of lines and columns. Notice that this command does not notify the host of the new cursor location.

When at least the first three coordinates are specified, this command applies to the secondary cursor. The second set of coordinates are row and column specifications, either in absolute screen coordinates or relative to the text cursor; you indicate which you want used by prefacing the coordinate with either **ABS** or **REL**. The coordinates can also be specified as **MOUSE**, in which case that coordinate is set to the current X or Y position of the mouse, depending on which coordinate you specified in this way. For example, the command

```
move rel 0 mouse 12 mouse
```

would display the secondary cursor with the top/left corner positioned at the column of the current text cursor (rel 0) and at line 12. The bottom/right edge would be at the current mouse position. Note that the coordinates are sorted appropriately to disallow negative-sized cursors. To see this command in action, check the scripts in **NeatStuff.scp** (see **Appendix F**).

NUMerickeypad {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches numeric keypad mode on or off. When set, the keypad transmits the characters as displayed on the key caps. Otherwise, the keypad transmits standard VT100 escape sequences.

ON ⟨character string⟩ ⟨command⟩:

Waits until the specified character string is received and then performs the specified command. Only a single command may be specified. **On** traps remain in force until the context they belong to expires. If another **on** trap is specified with the same character string, the new **on** command supersedes the old one; if an **on** command is specified with the same character string but an empty command string, the trap will be removed.

PARity ⟨parity specification⟩:

Selects the parity to be used for serial port communications. Valid values are given by a sequence of three characters: the number of data bits (7 or 8), the parity mode (N, M, S, E or O), and the number of stop bits (1 or 2), e.g. 7E1 or 8N1. Alternatively, the following shortcuts may be used: None (8N1), Mark (7M1), Space (7S1), Even (7E1) or Odd (7O1).

PASte {CLIP | FILE ⟨filename⟩ | STRING ⟨string⟩ | CANcel} [AUTO] [PREfix ⟨string⟩] [DELays ⟨line-delay⟩ [⟨character delay⟩]]:

Complicated command which the **Paste Menu** uses to accomplish its operations. Requires being used with a loop to actually paste something; described in more detail, along with use of subcommands, earlier in this chapter.

PAUse:

Halts execution at this point in the script and waits for a **continue** or **goto**.

PRELoadgraphics {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When ON, causes VLT to open the graphics screen on startup. When not set, VLT only opens the graphics screen when needed.

PREScroll ⟨number of lines⟩:

Sets the maximum number of lines to be prescrolled. If the currently available data indicates that the screen needs to be scrolled a number of times, all scrolls up to the maximum number set with this command will be performed at once. This increases scrolling speed.

PROGrammode {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches program mode on or off.

REFresh:

Refreshes the text on the screen. Sometimes useful when running on the Workbench screen.

RENdermode {Quick | Color | Normal}:

Sets the rendering mode. "Quick" means that all text will be rendered in monochrome mode, but very quickly, whereas "color" means that all text attributes will be converted to different colors, and also ANSI color sequences are recognized to an extent. See also "ansicolormode." In "Normal" mode, bold text will be displayed in a different color, but all VT100 text attributes are displayed as intended.

REView ⟨review command⟩ [⟨argument⟩]:

Executes a review buffer command. All commands consist of a single character, and some of them allow an argument. There may be white space between the command and the argument but there doesn't have to be. The allowed commands and arguments are shown in the table at the end of this chapter.

REXxportname ⟨name⟩:

Changes the name of VLT's ARexx port to the specified name. This command can only be used if no outstanding ARexx scripts are around.

RX [SYNChronous] ⟨ARexx command⟩:

Submits the specified ARexx command to ARexx. If the synchronous option is specified, the command is executed synchronously: the program will wait until the ARexx command has completed before continuing.

SCHedule ⟨commands⟩:

Creates a new context and starts executing the specified commands in that context. Multiple commands need to be separated by semicolons.

SCHedule FUNCTION ⟨key number⟩:

Similar to **schedule**; can be used to execute the contents of a function key.

SCREENDepth ⟨depth⟩:

Sets the depth of the screen. Values from 1 to 3 are allowed.

SCREENGadgets {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches screen gadgets on or off. When on, the standard screen displays 30 gadgets at the bottom, all of which are programmable. The display will be adjusted to fit the set number of lines in the remaining area.

SEND [RAW] ⟨character string⟩:

Sends a string of characters to the host. If **raw** is specified as an option, the string is not parsed for ARP style escape sequences, but by default it is.

SENDLinefeeds {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When ON, this option causes linefeeds to be transmitted in addition to carriage returns, whenever the return key is pressed.

SERialdevice {⟨device⟩ [⟨unit⟩] | none}:

Selects a different serial device to be used. Optionally, select the unit number to be used. If the unit number is not specified, the previous unit number is assumed. If the **none** option is specified, the current serial device is closed.

SHIfttabesctab {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When this option is ON, the TAB key transmits ⟨esc⟩ ⟨tab⟩ to the host when the shift key is pressed at the same time. Some hosts interpret this sequence as "back tab." When not set, the shifted TAB key transmits just ⟨tab⟩.

STRipbit8 {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches stripping of the high-order bit of data coming in through the serial port on or off. This is only useful with parity settings that have 8 data bits.

SWApbackspacedelete {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When ON, this option swaps the functions of the backspace and delete keys. This option is useful to VAX users.

TEKtronix MENU ⟨menunum⟩ ⟨itemnum⟩ ⟨subnum⟩:

Executes the specified menu item as if it had been selected from the Tektronix window menus. Note that when counting items, the counting starts at zero and the dashed separation bars in the menus must be counted also.

TEKtronix PAN [x1 [y1 [x2 [y2]]]]:

Using the arguments, specify a starting and ending point. The `TEK PAN` command will cause the ending point to wind up in the starting point's original location. If x2 and/or y2 are missing, they are set to equal x1 and/or y1. If x1 and/or y1 are missing, they are set to zero. The coordinates are in pixels, so beware!

TEKtronix PRINT {MAXimum | SMALL | MEDIUM | FULL | LARGE}:

Behaves like the **Print Bitmap** menu option of the Graphics screen's **Image Menu**; lets you print the image currently displayed on your graphics screen using a printer attached to your Amiga. Each option allows you to print the picture in a different size: the maxiumum size, small size (one-third page), medium size (two-thirds page), large size, or full page size (FULL and LARGE are the same option, really).

TEKtronix SAVEas {ILBM ⟨filename⟩ | POStscript ⟨filename⟩ | BINary [⟨filename⟩] | COMmand ⟨filename⟩}:

Corresponds to the various save commands in the **Image Menu**. The `ILBM` option corresponds to the **Save Bitmap As IFF File** option. The `POStscript` option corresponds to the **Save as PostScript** menu option. The `BINary` option corresponds to the **Save As New File** and **Save As Current File** options: if a file is not specified, the current display is saved to a file opened in a previous attempt, overwriting that file's contents. The `COMmand` option corresponds to the **Save As Script Commands** option.

TEKtronix ZOOM [x1 [y1 [x2 [y2]]]]:

The coordinates specify, in pixels, the upper left and lower right corner of the area to be zoomed in on. If x2 and/or y2 are missing, they are set to equal x1 and/or y1. If x1 and/or y1 are missing, they are set to zero. If the size of the box is zero, as it would be if ZOOM were called without any arguments, the action will be to zoom to full size (in other words, to unzoom the picture).

TEKtronix ....:

There are several other `TEKtronix` script commands available. Since they are rather arcane, we won't discuss them here, but you can find out what they are by saving a graphics file as script commands. To do this, use the **Save As Script Commands** option of the **Image**

Menu (see **The User Interface: Graphics Screen Menus**).

TITlebar {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When this is switched on, VLT's custom screen will display a titlebar on both the alphanumeric screen and the Tektronix screen. VLT will correctly take the title bar height into account when calculating where to display text.

TRACE ⟨flags⟩ ⟨command-delay⟩:

When ⟨flags⟩ is set to a non-zero value, certain tracing options are switched on. When ⟨command-delay⟩ is non-zero, a delay is inserted after each line of trace output. The delay is in ticks, i.e. 50 ticks is one second. The flags variable consists of a mask: bit 0 enables tracing of every line in the script, bit 1 enables tracing of all traps (i.e. `ons`, `waits` and `traps`). Also, little tick marks are displayed on the screen at or near the words that caused the trap. Bit 2 causes the output to be displayed in VLT's Console window (if it is open) and bit 3 causes the output to be appended to the file VLT.log in the current default directory. The file is closed after each addition, so that in case of crash the file most often is preserved. Example: trace 15 20 causes both script line tracing, trap tracing, and the output is sent to both the console (if it is open) and to the log file. There will be a .4 second delay after each script line and each trap line. *Note: if you suspect that a particular script may cause a crash, be warned that logging to VLT.log may be hazardous to your hard disk. Better set your default to rad:, and use DiskSalv to recover the file from rad: if rad: doesn't recover by itself. If a script causes a crash, be sure to report the problem.*

TRANsfer Mode {image | text}:

Selects image or text mode for file transfers. In text mode, files are assumed to be text files, and end-of-line sequences are converted. Also, ctrl-Z's in the file may be used as an end-of-file indication.

TRANsfer Protocol {External | Kermit | Xmodem}:

Selects the transfer protocol: one of **Kermit**, **XMODEM** or External. In case of external protocols, use `XPR Select` to determine which external protocol is to be used.

TRAP ⟨trap-operation⟩:

This command was discussed in detail earlier.

VOLume ⟨volume⟩:

Sets the volume of the beep to be used. When zero, the screen is flashed instead. When positive, the usual VT100 beep is sounded. when negative, a higher-pitched shorter beep is used. This is, however, superseded by any `BEEPFunction` setting.

WAIT ⟨character string⟩ [⟨timeout⟩]:

Waits until the specified character string is received from the host, or, if specified, until the timeout period has expired. If this is the last command before returning to a REXX process, the return code will reflect that a timeout ocurred. `Wait` traps with timeout are equivalent to "`on` ⟨character string⟩ continue; delay ⟨timeout⟩;" except that contrary to `on` traps, the `wait` trap is only valid for one occurrence. The character string is parsed for ARP style escape sequences.

WEDGE ⟨item⟩ ⟨port name⟩:

Currently only one item can be wedged: KEYStrokes. If the specified port name exists, a REXX message will be sent to that port of the form: `KEYSTROKE` ⟨`code`⟩ ⟨`qualifier`⟩ ⟨`iaddress`⟩ ⟨`character`⟩ where the code and qualifier numbers are the key code and lowest order 8 qualifier bits of the key pressed by the user. `Iaddress` keeps a history of all keystrokes, while the `character` is the translation of code and qualifier using the current default keymap. If no translation is available, this field will be absent. Note, that the special case where the space bar was pressed will look the same. For an example of the use of this function see earlier in this chapter.

WINDOW ⟨leftedge⟩ ⟨topedge⟩ ⟨width⟩ ⟨height⟩ | OPEN | CLOSE:

Called with any of the first four arguments, allows you to size VLT's main window. All arguments are optional. Specifying 0 for width and/or height will cause the window to open to the right and/or bottom edge of the physical display. Missing arguments default to 0, but the arguments must be given in the order specified above, so, for example, you cannot omit ⟨leftedge⟩ if you wish to specify ⟨topedge⟩. VLT will check to see if the dimensions given are feasible, but only if the main window is already open. If the window size is set while the window is closed, subsequent opening of the window may not work if the sizes are too large; VLT will try to open the window again, probably with the standard 640 by 200 sizes. The size is remembered if you close and then reopen the window, or if you switch to a custom screen and then back to the Workbench during the same session.

Called with the **open** subcommand, this command activates VLT's VT100 screen, but has no effect if the VT100 screen is already active. Called with the **close** subcommand, this command closes down VLT's screen without clearing it. When the window is reopened, the text that used to be there will still be there.

WORkbenchcolors {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

When this option is ON, uses the Workbench colors rather than the saved custom screen colors. Note that this command does *not* change the pen assignments (see the **COLOR** command).

WRAP {{ON | YES | 1} || {OFF | NO | 0} || TOGGLE }:

Switches wrapping of long lines on or off. When set, lines are broken at the current maximum column number and the remainder is displayed on the next line. When off, lines are not wrapped, and the cursor remains at the maximum column accesible while overwriting the last character with all following characters according to VT100 standard.

XMOdemmode {1K | 128 | CHecksum | CRc}:

Sets up to two **XMODEM** options. Options not specified will be carried over from the previous setting.

XPR INIT ⟨init string⟩:

Sends the specified initialization string to the current protocol. See the documentation of the protocol. *NOTE: It used to be the protocol had to be set using the* **External** *option, but since all protocols are effectively external these days, this requirement was relaxed. It is up to you, however, to make sure the correct protocol is currently loaded.*

XPR SELect ⟨external protocol⟩:

Selects a different external protocol. Notice, that this command does not set the current transfer protocol — see **TRANsfer Protocol**.

Conditions Recognized by the IF Command

The **if** command recognizes a large number of possible conditions, which are listed below.

Table of IF Conditions	
Tektronix	True if VLT is in Tektronix mode.
VT100	True if VLT is in VT100 mode.
ECho	True if Local Echo is currently turned on.

Table of IF Conditions (cont).	
NUMerickeypad	True if the keypad is currently in numeric mode.
APPlicationcursor	True if the cursor keys are currently in application mode.
SWApbackspacedelete	True if the backspace and delete keys are swapped.
HELpkeylf	True if the Help key is set to send a linefeed.
SHIfttabesc	True if the Shift-Tab sends both a tab and an escape character.
LOCal	True if VLT is in `local` mode, i.e. keystrokes are not sent to the host.
ECHOLinefeeds	True if the return key, when pressed, echos a carriage return and linefeed.
SENDLinefeeds	True if the return key, when pressed, sends a carriage return and linefeed.
CLIP	True if VLT currently has something in its clipboard buffer.
SECONDcursor	True if the secondary cursor is currently displayed.
SELECTdown	True if the left mouse button is currently pressed down.

The Review Command

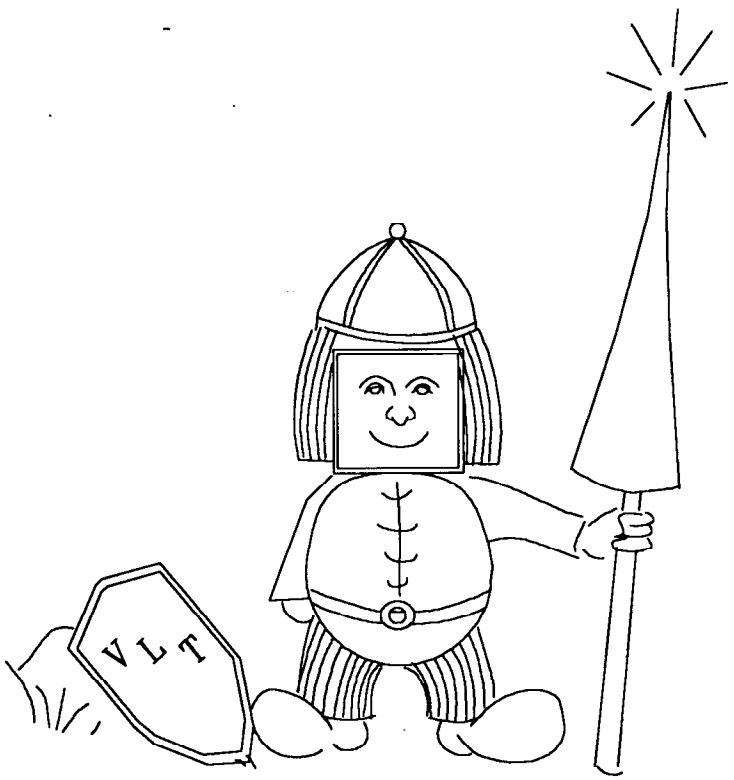
The VLT script command **review** is used to manipulate the history buffer from the Console or from a script. There are a variety of single-character subcommands, which, appended to the basic review command, allow you to manipulate the history buffer and review window in a variety of ways. Some of these subcommands allow or require an argument, some do not. A table of subcommands, arguments, and the subcommands' purposes is therefore included on the following pages. *Note: Most of the commands in this table are available in the menus of the review buffer window.*

Table of Review Subcommands		
Command	Argument	Meaning
A	⟨filename⟩	Save selected lines to filename
B	⟨size⟩	Set buffer size to ⟨size⟩ bytes
C		Clear review buffer
S,D,I		Select, Deselect, Invert all lines
S,D,I	S	Select, Deselect, Invert Search line only
S,D,I	T	Select, Deselect, Invert from search line to top

Review Subcommands, cont.		
Command	Argument	Meaning
S,D,I	B	Select, Deselect, Invert from search line to bottom
J	⟨lines⟩	Jump relative to search line by ⟨lines⟩ lines. Negative numbers jump towards top
K	⟨line⟩	Jump relative to ⟨line⟩ from top. 0 is top line; Negative numbers count from bottom; -1 is bottom line
F	⟨string⟩	Search from top Forward for ⟨string⟩.
R	⟨string⟩	Search from bottom in Reverse for ⟨string⟩.
G		Repeat search Forward.
T		Repeat search Reverse.
H	⟨string⟩	Search from last search position Forward for ⟨string⟩.
Y	⟨string⟩	Search from last search position in Reverse for ⟨string⟩.
M	UL, UP, T, DL, DP, B, LC, LP, LM, RC, RP, RM	Move: Up Line, Up page, to Top, Down Line, Down page, to Bottom, left Char, Left Page, to left Margin, Rigth Char, Right Page, to Right Margin.
N		Append to file
O		Open window
P		New page
Q		Update window
V	⟨filename⟩	Append to specified file
W		Resave to current file (overwrites existing file)
X	⟨Name⟩	If previous command successful, set environment variable ⟨name⟩ to current search line. Else erase the environment variable ⟨name⟩.
Z		Save to Clipboard

5

Troubleshooting



Troubleshooting

This section discusses solutions to some of the more common problems, mistakes, questions, etc. that you may encounter while using VLT. They are listed here so that you do not have to go hunting through the entire manual for your particular problem; there is, however, no guarantee that your problem will be in here, as we are not omniscient, so you may have to do some hunting anyway....

Syntactical Questions, Tricks, and Bloopers

*Q*1. Whenever I invoke the **beep** command or expect a beep, I get a message window telling me that **srx** is not a valid command. My **Beep Volume** is set to call a script. What do I do?

*A*1. This is a pitfall for those users who wrote scripts in VLT's old scripting language. As of version 4.846, the **srx** command is defunct. Just go into program mode, select Beep Volume, and change **srx** to **rx** (for more on the **rx** command, see **Writing Scripts**)

*Q*2. Traps don't work when I funnel text to the screen through **Fifo Pipes**!

*A*2. Yes, well...that happens to be true. There's nothing you can do about it, since text that comes through **Fifo Pipes** bypasses the trap checking code.

*Q*3. How do you send control characters?

*A*3. To send control characters, use ARP sequences: *E *N *R *X01 etc. See **Appendix E**.

*Q*4. Can I have multiple ons?

*A*4. Yes, you can, but watch out for spaghetti code (see next question).

*Q*5. If I don't cancel out-of-date on statements as I go along, my script starts going all over the place.

*A*5. Yes, scripts can become spaghetti code like you've never seen if you don't cancel out-of-date ons. Make it a point of style not to leave on traps hanging around unnecessarily. (This goes for **trap** commands too).

*Q*6. How do you cancel an on?

*A*6. By specifying the same on with an empty command—**on "foo" " "**, for example—or by exiting the current schedule.

*Q*7. I'm having trouble with making the quotes work. How do you program **BEEPFunction** (from a script) to call a script when the quoting has to be like this....

```
beepf "~rx "address 'PingServer' BEEP" "
```

and that doesn't work? It all gets misinterpreted, because the two levels of double quotes just don't nest.

A7. If you take advantage of VLT's ability to interpret various types of brackets and parentheses as well as quotes, you won't have a problem. Anything that's interpreted by VLT can be quoted in 6 or 7 ways using parentheses, braces, etc.; moreover, all these symbols nest. On the other hand, what goes to ARexx must have single or double quotes around it, while what goes to the shell must have double quotes. ARexx also understands double single quotes and double double quotes, which will be translated, respectively, to a single quote and a double quote. Remember that each level of interpretation eats one level of quotes.

As for using **BEEPFunction**...To use this command from the menu, select **Program Mode** as **Function Keys/Menus**, then select **Beep Volume** and enter the string as follows: **~rx "address 'PingServer' beep"**. To use the command from a script, you'll need one more level of quotes, but since these will be interpreted by VLT you can use, for example, parentheses:

```
beepfunc (~rx "address 'PingServer' beep")
```

You need the parentheses to tell VLT that you want both **~rx** and **"add...beep"** to be part of the **beepfunction**. By the way: since **rx** is also a VLT command, its argument can also use parentheses or braces, such that

```
beepfunc [~rx {address 'PingServer' beep}]
```

is also fine, or even

```
beepfunc (~rx (address 'PingServer' beep))
```

since all these brackets nest. With these bracketing conventions you can save the quotes for when you really need them.

Q8. When I try to program the **User Menu** with taglines, it doesn't work: first, no tagline appears, and second, it sometimes decides that the tagline is part of the command! What am I doing wrong? Here's my command syntax:

```
~send "gone" # Gone#
```

A8. Well, your problem is that second # sign. When you type a one-line command string into the programming requester, VLT looks for the last # sign and decides that what follows is the comment/tagline. It looks at the # *after* the **Gone**, sees nothing after it, assumes the tagline is empty, and, if your 'command' is the name of a script file assumes the preceding # **Gone** is part of the command. *Don't follow the tagline with another #.*

Q9. I have been trying to work with traps. Everything I have tried so far works except this line.

```
Trap add (host shut) (hangup; goto quit)
........
......
quit:
beep
exit
```

The script executes fine except for the **goto**, which returns with a **Script error in line 0 -not found- Label does not exist.** I can add a command after the **goto**, such as **BEEP**, and it will get executed, but not the **goto**. I have tried all kinds of quoting to no avail. If you substitute the EXIT for the **goto** the script will not exit.

*A*9. The problem is that the **trap** command can't do a **goto** to what it considers "outside" its domain of influence. The **(hangup; goto quit)** in the trap command is a little script all by itself. This little script knows nothing about labels in the main script. The best way to fix it in this case would be something like:

```
ON (host shut) goto hangupquit
.................
.........
hangupquit:
hangup
beep
exit
```

*Q*10. What's wrong with this line?

```
RX ''send'"'||space(date('n',date('i')-2),0)||'*R"'
```

*A*10. The line **RX ''**etc.... worked in versions of VLT prior to version 4.846 because VLT had this funny system of allowing two quotes (either **''** or **" "**) in front of a line to indicate that all the rest was part of the argument. This is no longer allowed. To fix your line with the minimal amount of pain, replace the **''** with ⟩⟩, or]], or }}. For more information, see the explanation of the **Universal Quote** at the beginning of the **Writing Scripts** chapter.

Programming Problems

*Q*11. What's the right way to manipulate the **User Menu** entries? I tried editing the **VTPrefs.dat** file, but it's a long, tightly-formatted line and editing it yields a VLT that hangs. What do I do?

*A*11. First, the right way to manipulate the **User Menu** is to use **Program Mode**. Switch it on and select the user menu item that you wish to program. A requester will appear....for further detail, see **The User Interface: Text Screen Menus**. Second, you now have a problem. The **VTPrefs.dat** file has a special format and when you tried to edit it, you reformatted it completely. VLT will certainly be quite upset with this.... Delete the **VTPrefs.dat** file completely, open VLT (yes, VLT can open without a **VTPrefs.dat** file), set your parameters, and select **Save Configuration**. Now you have a properly formatted **VTPrefs.dat** file again.

*Q*12. The idea of native VLT and ARexx scripts in parallel is for historical reasons, isn't it? With the addition of the trap facility, is there any reason I shouldn't use ARexx scripts exclusively?

*A*12. There's indeed no reason to use VLT native scripts if you prefer ARexx ones, although you may find some operations are slightly more difficult to accomplish from ARexx. On the other hand, there are operations you can only do from ARexx, so it balances out.

*Q*13. Usually, when I use the @@ command, I can get everything to work, but if the file I want to execute lives in **ram:**, or if the filename has spaces in it, VLT returns an error message.

*A*13. Due to a technical problem with the AREXX port, you cannot use the @@ command if the name of your script file, or the directory/device in which it lives, has one or more spaces.*

*Q*14. I defined a short script that just blinked the cursor and bound it to [*A*] 1. Now, when I hit [*A*] 1 a few dozen times, the cursor goes wild and VLT's response gets jerky.

*A*14. It is definitely true that VLT gets jerky when you have a few dozen scripts running around. Have you tried **Abort All Scripts**? You probably shouldn't have that many scripts running at the same time.

Directory Dilemmas

*Q*15. Whenever I start up VLT from the CLI, I would like its default directory to be the directory I'm currently in. In my case, however, VLT always comes up in **sys:exam/ple**. How do I fix this?

*A*15. You have probably saved your configuration after explicitly changing your current directory using the **Change Directory** menu option. To fix it, select **Change Directory** again, remove all text from the string gadget of the requester, and click on Okay. Then select **Save Configuration**.

*Q*16. When I'm receiving a file using **Kermit**, it always goes to my current default directory. What if I want it to go elsewhere?

*A*16. Before you start the transfer, change VLT's default directory using the **Change Directory** option. Make the new default directory the directory where you want the file to go.

You can also set the download path using **Kermit**'s **External Options** requester or the **xprkermit** environment variable (see the documentation which comes with **xprkermit**).

*Q*17. How do I get VLT to reuse the color/screen/etc settings I set up? It saves them (at least it creates a file) in **S:**, but the next time I load VLT it's back to the old settings.

*A*17. You saved your setting using **Save Configuration**, right? And saved them to the **S:** directory? Well, the **S:** directory does not have a particularly high priority in VLT's search path; if, when you start VLT up from scratch, there is a **VTPrefs.dat** file in a higher priority directory, VLT will use the settings there. So, if you want the settings in your **S:** directory to be used, make sure that there isn't a **VTPrefs.dat** file in any directory ahead of **S:** in VLT's search path (see **Getting Started: VLT's Method of Searching Paths**). This goes for using **VTPrefs.dat** files in all lower-priority directories.

* In this context, AREXX stands for asynchronous REXX, not AmigaREXX.

Data Flow Difficulties

*Q*18. I can't get [A] H to work for hanging up! The menu option does not work either.

*A*18. You should check the docs on your modem to see if it is set to ignore DTR. If it is, then indeed the menu Hangup function won't work, since it relies on the DTR signal. Set your modem to recognize DTR, if you can. Another possible cause of this problem: are you using a cable that doesn't have the DTR line hooked up?

*Q*19. I followed the instructions, but no matter what I do, file transfers to the host don't work. What's wrong?

*A*19. File transfers are tricky things. Very often the problem is that somewhere between the Amiga and the host, some piece of hardware (like a terminal multiplexer or an overly smart modem) is not transmitting all data exactly as the Amiga or the host sent it. These problems can range from flow control problems to parity translations and usually have to be resolved on a case-by-case basis. Talk to your host's system manager.

*Q*20. Sometimes when I'm logged on I get this burst of noise, after which VLT becomes really sluggish. It takes a second or so for every character I type to appear on the screen and I get this message requester saying "Temporarily unable to send data. Waiting...." The requester also has two gadgets, RETRY and RESET. Sometimes the requester goes away by itself. If I click on RETRY, then sometimes everything is just fine, but other times the requester just reappears. Clicking on RESET usually solves the problem but occasionally I lose data, and sometimes I get logged off.

*A*20. This happens occasionally when you are using the Xon/Xoff handshaking mode. In that mode, flow control is performed to keep both VLT's and the host's buffers from overflowing. An Xoff signal from the host tells the Amiga to stop sending data over the line, whereas an Xon tells the Amiga to start sending again, and vice versa. Sometimes on noisy lines the noise will look to VLT like an Xoff character. VLT can't tell whether an Xoff came from line noise or the host, so the next time you try to send something to the host, VLT will sit and wait until the host sends an Xon. Only, since the host never sent the Xoff, it also won't ever send the Xon. In principle, the Amiga is now dead, waiting patiently forever for the Xon which will never come. With lesser terminal programs the only way to recover is to reboot. VLT, however, tries to be a little smarter. Whenever you try to send data to the host, it looks at how much data it is supposed to send, and at the current transmission speed (baud rate). It calculates from this how long it should take to send the data, adds a margin for error, and then starts a timer. Next, it sends the data off to the host; usually this will be accomplished well before the timer times out, and everything's hunky dory. When, however, the Amiga has received an Xoff character (for whatever reason) VLT won't really be able to send anything and the timer will time out while VLT is still trying to send the data. If this happens, VLT will store the data and add any new data you've meanwhile tried to send, and try to send the whole bunch again. If it still fails, it puts up the message requester "Temporarily unable to send data. Waiting....." If you wait, and if the Xoff was indeed sent by the host or modem, the serial port may become unstuck by itself and the requester will go away. If you click on RETRY, then the timer will be restarted, and if the device is still stuck, the requester will reappear. In both of these cases, you are relying on the serial device to unstick itself. If you click on RESET, VLT will reset the serial port, and the serial port then effectively will have forgotten that it ever received an Xoff. However,

you may lose data, even though the data that you were about to send should be sent again after the reset. Moreover, line noise can go both ways. In such a case, it may well be that the connection is broken because of it; this is why you are sometimes logged off of the host. Conversely, when a connection to the host is broken (for whatever reason—including telling the host to log you off) the act of disconnecting sometimes *causes* a lot of line noise, resulting in the same problem. *If you run into this a lot, and if you usually run at low baud rates (2400 or so) you may try to run with Handshaking set to None. While in that case no flow control is performed, it is also fairly unlikely that a lot of data will stack up, so you may not need flow control. At higher baud rates, however, it does become more likely that you could lose some data without flow control. In that case, try to use CTS/RTS handshaking, since it often avoids problems that show up with Xon/Xoff.*

*Q*21. I don't know what's wrong, but when VLT receives data, it loses characters.

*A*21. There are several programs that, when run at the same time as VLT, cause VLT to drop characters from the data it receives. These programs, *not VLT*, are causing the problem. Suspect programs are those that mess with the way the Amiga multitasks or that try to monitor the tasks in the system (although not all of these programs cause difficulties). There are also some hard disk controllers whose software causes problems, in which case data loss usually occurs only during hard disk activity.

*Q*22. When I log off BIX I am getting a burst of noise that has already more than once opened up the graphics screen. This is kind of disconcerting. Is there a way to filter or block that sort of thing?

*A*22. Set your graphics lock on by selecting the menu option **Graphics Lock** and you won't be thrown onto the graphics screen anymore. If you never use graphics anyway, you might also want to consider using VLTjr instead, since it saves memory space.

Review Buffer Riddles

*Q*23. The review buffer doesn't work. VLT says it can't find it!

*A*23. One likely reason: you didn't copy `review.library` to `VLT:libs` (or `libs:`). You may also have problems if you've just installed a new version of VLT, since you need to flush libraries out of memory. Old versions of `review.library`, floating around where VLT might find them, frequently confuse VLT. A surefire method of flushing libraries is to delete them, copy over the new library versions, then reboot.

Incidentally, if you don't want to use the review buffer, you can save memory by not installing this library.

*Q*24. VLT's review buffer clipboard support seems to cause complaints from other applications.

*A*24. Your problem has to do with the fact that a good many applications don't obey IFF file specifications and therefore have trouble with "even-padded clips." As a result, VLT has been set to do things the "wrong" way so as to agree with the majority of applications. If your application insists on even-padded clips, can give it indigestion. To solve this difficulty,

use either the **MISCflags** script command or the **SetMiscFlags** macro included with VLT (see **Writing Scripts: Quick Reference Section**, see **Appendix F**).

*Q*25. I don't understand—is the review buffer's size really limited to 8192 bytes? It doesn't make much sense, but whenever I try to adjust it using the **Buffer Size** option in the **Communications Menu**, VLT won't let me enter a larger number.

*A*25. No, the review buffer's size is not limited to 8192 bytes; you've been adjusting the wrong buffer. The **Communication Menu** option adjusts the buffer VLT uses for the serial device itself. To adjust the review buffer, you need to use the **Buffer Size** option found in the review window's menus.

Miscellaneous Musings

*Q*26. When I type beyond the last column displayed on my screen, then backspace using **Destructive Backspace**, I get a dangling character at the **EOL**. No matter what I do, I can't erase that character.

*A*26. Uh, well...ever heard the saying "It's not a bug, it's a feature?" More seriously, this problem is part of VT100 emulation arcanum. One way to avoid that dangling character is to run with WRAP mode on. You could also switch off **Destructive Backspace**.

*Q*27. How do you run VLT with low memory? (512K, for example)

*A*27. First, don't use **review.library**; delete it. Second, use VLT Jr., not VLT. Third, use VLT on the Workbench screen, not on its own screen, or use a custom screen with a small number of colors (2 or 4) and no interlacing.

*Q*28. Whenever I open VLT on the Workbench screen, all the text is shown in a tiny font. What's wrong?

*A*28. When you open VLT on the Workbench, extra room is taken up by the borders of the VLT window. This means that the number of columns (each column has a width of one character) that fit using a certain font on the Workbench may not be the same as the number of columns that fit on a custom screen. To squeeze in as many columns as possible, VLT uses the small font. If this bothers you, reduce the number of columns to be displayed using the **Number of Columns** option of the **Screen Menu**, or increase the overscan for your Workbench (see your Amiga documentation).

*Q*29. A Console problem: whenever I select **Open Console**, I get this error message: **Menu - Unable to open: con:S*/0/345/640/55/VLTConsole/c**.

*A*29. If you're an AmigaDOS 1.3 user, your console window relies on either Bill Hawes's ConMan version 1.3 or his WShell 2.0. Without ConMan or WShell 2.0, you won't be able to open the console window on VLT's custom screen. Under AmigaDOS 2.04, you can use the console handler that comes with the system, so if you're having difficulties, your problem comes from a different source. When you use the 2.0 console handler instead of ConMan, VLT isn't

happy with the `S*` in the console string. Instead, you should use the following console string: `con:0/345/640/55/VLTConsole/CLose`.

*Q*30. Where are the Console Window menus that you mentioned earlier? I can't find them.

*A*30. You're an AmigaDOS 1.3 user, right? Or a 2.0 user who doesn't have WShell 2.0? For the console menus to work, you need both the 2.0 operating system and WShell 2.0.

*Q*31. How do I reopen VLT's main screen once I've closed it?

*A*31. The first method is to rerun VLT. This causes VLT to reopen the screen and put up the famous message "But I'm already here!". You can also send VLT an ARexx message such as `window open` or `activate vt100`.

*Q*32. When I doubleclick on the phonebook's file requester, nothing happens! Moreover, when the directory requester opens, the drawer gadget isn't activated, and the requester won't respond to my hitting return. What's wrong?

*A*32. At the moment, there are a few moths and spiders in the ASL file and directory requesters. When used in multiple select mode, the file requester can't tell the difference between a double-click and two separate single clicks. So when you double-click on an entry, the file requester thinks that you have selected and then de-selected the entry. Rather than doubleclicking, click on Okay after selecting files. As for the directory requester, you have to click on Okay instead of hitting return. Hopefully these bugs will be fixed in the next version of the operating system.

*Q*33. I want to use a different set of file requesters, but using them sometimes causes VLT to crash. What can I do?

*A*33. There's not much that you can do. While there are several file requester replacements in the public domain, VLT does *not* support them. When you use them, you do so at your own risk; while VLT doesn't do anything to make these requester replacements fail, it isn't specially equipped to deal with them either, and there may very well be problems.

*Q*34. I'm an AmigaDOS 2.0 user, but I'm having trouble getting VLT to use the version 2.0 3D look.

*A*34. Your problem is caused by a mismatch between the color assignments and the actual color values. You can set VLT up so that it uses your color settings and still has proper "shine" and "shadow" colors: see `CustomColors.scp` or `WorkbenchColors.scp` for examples.

*Q*35. I use a "sunmouse" program which causes windows to be activated when the mouse pointer is within the boundaries of that window, but since VLT puts up busy pointers in the main window, my requester windows won't stay active.

*A*35. It is for this reason that we don't recommend using "sunmouse" style programs. VLT, like many other programs, isn't really designed to work with that type of mouse.

*Q*36. VLT says that it can't find **rexx:**, or **VTPrefs.dat**, or **TekPrefs.dat**, or any of the **xprlibraries.** Yet when I looked in the directory, they were all there! What's wrong?

*A*36. Have you made VLT resident, or are you starting VLT from a Workbench menu using an old version of ToolManager? AmigaDOS 2.0 has a new feature, the **progdir:** assign, which assigns **progdir:** locally, within VLT, to the directory containing the VLT executable. VLT depends on this assignment to find all sorts of files. When VLT is resident, or when you are working with old versions of ToolManager, the **progdir:** assignment doesn't get made and VLT has serious problems. Try assigning **VLT:** to your VLT directory; this should make it possible for VLT to find those files.

*Q*37. VLT isn't paying attention when I program the function keys; it accepts the programs just fine, but when I use the function keys, VLT sends funny Amiga sequences instead of using my programs. Could the special keymap support be buggy? I set my special keymap to a Denmark keymap, and most of the keys work just fine, but I can't think of anything else it could be.

*A*37. Your use (or abuse) of the **Special Keymap** option is definitely the culprit. *Don't set the VLT special keymap to that of your country!* The special keymap is supposed to consist of null entries, *except* for those few keys that you want to change. When you set the special keymap to a standard keymap, such as USA1, the rather weird function key settings in the special keymap override VLT's normal treatment of all keys, treatment which includes checking for function keys that you might have programmed. So use the special keymap *only* to set those keys you really need to change. Incidentally, in order to create a special keymap, use a keymap editing program, such as KeyMapEd.

*Q*38. Why are there so many fonts that VLT won't use?

*A*38. The font VLT uses must have both an 8 and an 11 pixel tall version. For example, in order for you to use a font called SubtleBlue, there must be a directory called **fonts:SubtleBlue**, and files called **fonts:SubtleBlue.font**, **fonts:SubtleBlue/8**, and **fonts:SubtleBlue/11**. Furthermore, these fonts must both be 8 pixels wide and monospaced. Under 2.04, only fonts that show up in the font requester are acceptable to VLT. Some day, this restriction may be lifted.

*Q*39. How can I get VLT to put the files it creates during **TekCapture** where *I* want them to be?

*A*39. Assign **TekStore:** to the device or directory where you want the files to be stored.

*Q*40. I'm having real trouble making FifoBBS work in "remote" mode.

*A*40. Consider what happens: someone tries to call the modem of a system running VLT and FifoBBS. The modem sometimes sends "RING" to VLT and VLT thinks someone hit a return. As a result, FifoBBS sends the **Username:** prompt out through the modem. Very often this aborts the connection right there, since modems typically abort the connection process if data is sent before a connection is established. But even if the connection isn't aborted, you have a problem, since, if the connection is not established yet, modems usually echo the data that you send them. So the entire **Username:** banner text is sent back to FifoBBS, which interprets this as a person trying to log on. As you can see, this interferes

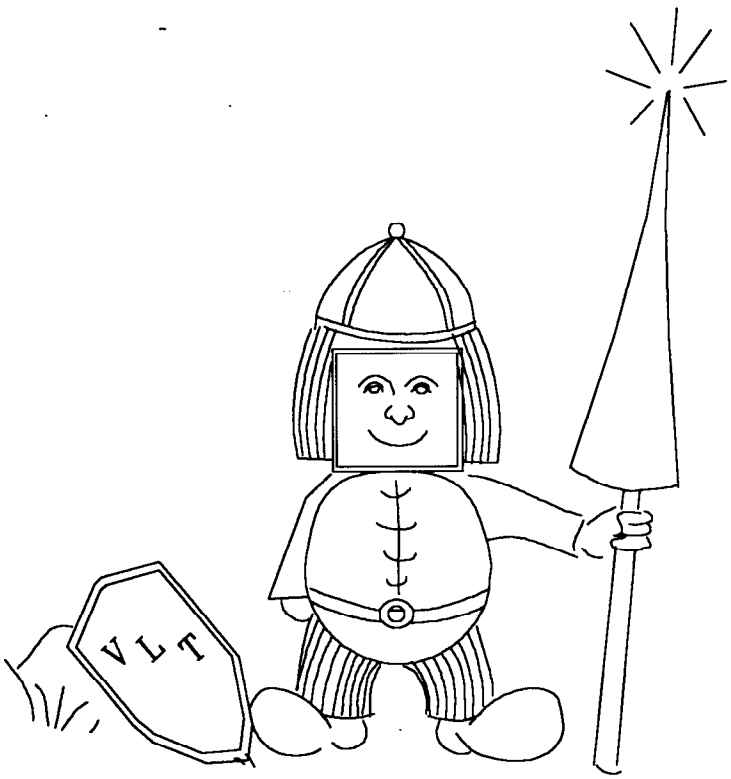
massively with the real logon process. So you'll probably want to set your modem to not report "RING" messages and to not echo data when you're running FifoBBS. Most modems are capable of being set this way. *NOTE: the newest FifoBBS tries to ignore RING messages during the logon sequence.*

*Q*41. When I try to invoke a twenty-sixth session of VLT using the −**N** option, VLT refuses to open.

*A*41. Well, VLT can't open more than twenty-five simultaneous sessions using the −**N** option. If you want to open a twenty-sixth session, use the +**N** option and give the last session a name of your own devising. Frankly, though, it's surprising you have enough memory to run that many sessions of VLT—is there any reason for having *twenty-five* sessions of VLT running simultaneously?

6

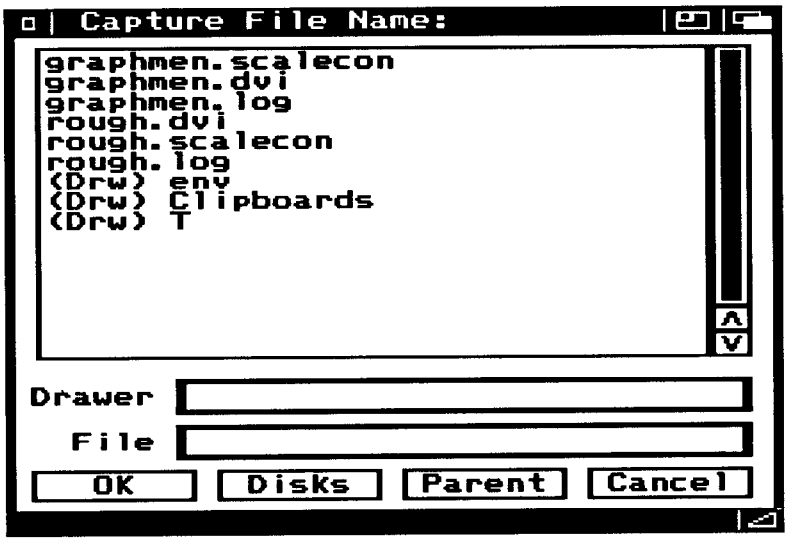
Appendices



Appendix A
The file requester

Using the Requester

The file requester will look something like the picture below.



Every Amiga filename consists of two parts: first, the path which specifies the **device:directory/subdir/subdir/.../** that a file resides in, and second, the file's name.* Hence, there are files like

`SYS:DEVS/KEYMAPS/USA1`

or

`SYS:NOBLES/KNIGHTS/IVANHOE`

In the first case the path is `SYS:DEVS/KEYMAPS` and the filename is `USA1`. In the second case the path is `SYS:NOBLES/KNIGHTS` and the filename is `IVANHOE`. The two rectangular string gadgets at the bottom of the file requester allow you to specify the path and filename of a given file. The string gadget wherein you type the path designation is labelled **drawer**; in this case, **drawer** refers to the file's entire path, although this same term is used differently in other contexts.† The second string gadget, into which the file's name is typed, is labelled **file**. If you click on the drawer gadget with your mouse, you can specify the path of a file you want to create, or give VLT the path of an already existing file. If you now hit the return key, the names of all the files already stored in that path will appear in the region above the drawer and file gadgets. If there

---

* subdir=subdirectory

† Usually, the terms drawer and directory are basically synonymous.

are a sizeable number of files in this directory then it will take a few moments for the names of all files to be loaded. If there are many files, not all names will be visible at once; however, you can view them all by scrolling through the list of names. You scroll through the list using the *scroll bar* at the right hand side of the requester, which works like a rectangular knob sliding in a track. To use it, place your mouse over the rectangular knob, hold down the left mouse button (this grabs the knob) and slide your mouse up or down. As you do this, the list of file names in the directory will be sorted alphabetically and will scroll past. The up and down arrow gadgets beneath the scroll bar allow you to scroll in smaller increments than the scroll bar does; the up arrow gadget moves you backwards in the list while the down arrow gadget moves you forward.

Instead of typing the desired filename into the file gadget, you can take a shortcut; namely, move your mouse cursor over the filename you wish to select and click your left mouse button once. The name will automatically appear in the file gadget. Then, to indicate that you have made your choice, click on the OK gadget or hit the RETURN key. The arrow keys provide another possible shortcut; if you have clicked on the **file** gadget, the up and down arrow keys allow you to scroll through filenames, with the currently selected filename appearing in the **file** gadget.

If the file you are dealing with has a very long filename, `SYS: documents/essays/english/cartonessay.tex`, for instance, you may not be able to remember the device, directory, and subdirectories that make up the file's pathname, or drawer. In such cases, you may want to scroll through a list of directories or subdirectories instead of a list of files. To do this, type the name of the device (such as `SYS:`) into the drawer gadget and hit return. A list will appear in the region above the drawer and file gadgets. This list will probably contain some filenames, but it will also contain names that are preceded by the highlighted letters **(drw)**. Names prefaced by **(drw)** are names of directories or subdirectories. When you click on a name that starts with the highlighted letters **(drw)**, this directory specification will appear in the drawer gadget. Another list will appear, this one of files and subdirectories within the directory you selected.

Now, what about scrolling through device names? (Devices have names which finish in a colon, that is, names like `SYS:`, `DF0:`, `DF1:`, `RAM:`, `VD0:`, etc. Some devices are partitions on your hard disk, others are floppy drives, still others are fake or "logical" devices you yourself have created). Well, this has to be accomplished in a slightly different way. Position the mouse cursor over the body of the requester and click on the right mouse button, or click on the **Disks** gadget, which you will find at the bottom of the requester. The names of all devices, both real and logical, will appear.

We've discussed using the file requester in reverse: that is, we started with scrolling through filenames, then went on to scrolling through directories and subdirectories, and then went to scrolling through device names. When you actually use the file requester, you will probably go in the opposite order, first scrolling through devices, then directories and subdirectories, and then finally through filenames. Going through these various stages is like peeling away the layers of an onion until you find the file you are looking for. Sometimes, you will choose the wrong directory or subdirectory. Clicking on the **Parent** gadget—one of the rectangular gadgets at the bottom of the requester—will get back the list of files that lie outside this directory. First the directory name will revert to the name of the parent directory and then the list of filenames in the parent directory will be redisplayed.

The fourth button at the bottom of the requester is the CANCEL gadget. When you click on the cancel gadget, the file requester disappears without doing anything, allowing you to abort the entire process.

Last (and likely the least), is the small gadget in the right bottom corner of the requester, the gadget which looks like a small triangle. If you grab this gadget with your mouse, you can resize

the requester (between some minimum and maximum sizes) by moving your mouse around. Moving your mouse upwards shrinks the requester vertically, moving your mouse downwards expands the requester vertically, moving your mouse to the left shrinks the requester horizontally, and moving your mouse to the right expands the requester horizontally.

Finally, the Amiga allows you to pull a trick and assign whole path names to a "logical" device. For example, if you type

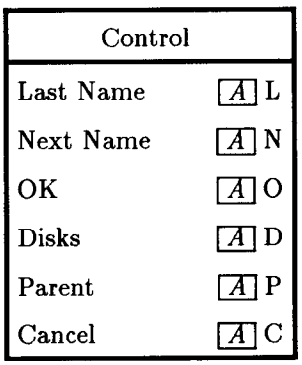
```
ASSIGN REXX: SYS:REXX
```

inside a CLI or put it in your startup-sequence, the requester will display **rexx:** along with the other device names when you click on **Disks**, saving you from plumbing the depths of various directories to find a specific file.

File Requester Menus

The ASL file requester has a single menu associated with it, the **Control Menu**. The various options are described below.

The Control Menu



Last Name The **Last Name** option scrolls the filename in the **file** gadget up one; that is, it takes the preceding file in the list, before the currently selected file, and puts this preceding file in the **file** gadget instead. If no file is currently selected, this option puts the first file in the list in the **file** gadget.

Next Name The **Next Name** option scrolls the filename in the **file** gadget down one; that is, it looks at the currently selected file, takes the next file in the list, and puts it in the **file** gadget instead. If no file is currently selected, this option puts the first file in the list in the **file** gadget.

OK The **OK** option is exactly equivalent to the file requester's **Okay** gadget.

Disks The **Disks** option is exactly equivalent to the file requester's **Disks** gadget.

Parent The **Parent** option is exactly equivalent to the file requester's **Parent** gadget.

Cancel The **Cancel** option is exactly equivalent to the file requester's **Cancel** gadget.

Special Notes

1. Under AmigaDOS 2.0, VLT also uses a directory requester (used to specify default paths and directories) and a multiple-select file requester (used in the phonebook facility). If you understand how the file requester works, you shouldn't have any trouble using the other requesters.
2. Under AmigaDOS 1.3, VLT uses the ARP file requester. This requester is a little different in behavior, but enough of the preceding discussion applies that you should be able to figure it out.

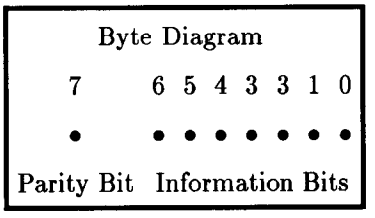
Appendix B
Parity

When you transfer information electronically between computers, errors are sometimes introduced into the file in transit. To make file transfers more accurate, various error-checking schemes have been developed in which the computer on the receiving end checks the information that it has received for errors before accepting more information. Parity is an outmoded method of error checking that is nevertheless still used by several hosts: some IBM mainframes, for instance, still insist on 7E1 parity. In order to comprehend what parity error checking *does*, you need a rudimentary understanding of how information is transferred between computers.

Bits, Bytes, and Nybbles

When computers send information to one another, they break the information up into packages known as bytes. Bytes represent characters, symbols, etc. Each byte is broken up into eight bits; every half-byte, or four bits, is known as a nybble. A bit has only two possible settings: On or Off.

If you look more closely at the nature of bits and bytes, you will realize that every byte is essentially an eight-digit binary number, while every bit is a digit of that number. When information is sent without using parity, all eight bits of the byte are transmitting information; that is, all eight bits are used to determine what the byte "means." When parity is used, only seven bits are used to transmit information, while the eighth bit—the 'parity bit'—is used for parity error checking. What follows is a diagram of a byte with a parity bit.



Actually, parity is sometimes in transmitted in a separate ninth bit, in which case eight bits are used for transmitting information.

Even Parity

In even parity, there must be an even number of total On bits in each byte sent. After the sending computer reads the first seven bits of a byte and counts up the number of On information bits, the computer then sets the parity bit so as to make the total number of On bits even. Therefore, if there are an even number of On information bits, then the parity bit is set to be Off, but if there are an odd number of On information bits, the parity bit is set to be On. For instance, the byte 01011011 has an odd number of On bits, so the last bit will be changed to an On bit before the byte is sent. The computer at the other end will therefore receive this byte: 11011011. After the byte is verified, the parity bit is stripped off and the first seven bits are read.

When the receiving computer gets a byte, it will count up the number of On bits. If it sees an even number of On bits, then everything is okay and it will let the sending computer send the next byte. If it sees an odd number of On bits, however, the receiving computer knows that there is an error. When this happens, the receiving computer will either ignore the error or give the sending computer a message complaining that one of the bytes received had a mistake in it.

Odd Parity

Odd parity is based upon the exact same principle as even parity, except that the setting of the parity bit is chosen so as to make the number of On bits in every byte odd instead of even.

Mark and Space Parities

Mark and space parities are actually not very useful for error checking. They are even more outmoded than the even and odd parities and, despite the fact that VLT supports the mark and space parities, you will rarely have occasion to use them. Mark parity always sets the parity bit to be On, while space parity always sets the parity bit to be Off. There is a simple reason why these parities make such poor error checkers when compared to the even and odd parities—an error only occasionally changes the setting of the parity bit, while an error will usually change the total number of On or Off bits in a byte.

Stop Bits

After a byte is sent, either one or two *stop bits* will be sent as well. Stop bits are blank bits which do not belong to a byte. They merely indicate that one byte has ended and another byte is about to begin.

Parity Abbreviations

You will use the submenu generated by the **Parity** option of the **Communications Menu** to select which parity you are going to use. The various parities are indicated by abbreviations. Each abbreviation consists of three characters—a number, a letter, and another number. The lefthand number stands for the number of bits that are being used to transmit information. For no-parity options, this number will be eight; for most parity options, this number will be seven; for the parity options which transmit parity through a ninth bit, this number will be eight. The letter in the middle stands for the type of parity being used: N stands for Normal, or no parity, E stands for even parity, O stands for odd parity, M stands for mark parity, and S stands for space parity. The number on the right represents the number of stop bits being used: one or two. So, for instance, to choose the parity used by the SLAC IBM mainframe, you would select the 7E1 parity, which uses seven information bits, even parity, and one stop bit.

Appendix C
VLT's Emulations

Introduction

This appendix briefly describes the VT100 and Tektronix emulations implemented in VLT. When in VT100 mode, VLT recognizes a large subset of the standard VT100-style escape sequences. Some of these escape sequences, however, are handled in a somewhat different way. In addition, there are some sequences that a regular VT100 does not recognize. We will discuss these differences and additions later in this appendix. VLT also features full Tektronix 4010/4014 emulation as found, for example, in the DEC VT240 terminal, as well as almost complete Tektronix 4105 emulation and some features found in the Tektronix 4107. A fairly complete description of all graphics escape sequences for the Tektronix emulation can be found in **Appendix D**.

VLT's modes

VLT has two "supermodes": Alphanumeric and Graphic, also called VT100 and Tektronix. In Alphanumeric supermode the program behaves as a VT100 ASCII terminal, in Graphic supermode the program emulates a Tektronix graphics terminal. Usually, each supermode has its own window, such that the text in one does not affect the graphics display in the other. There is also, however, an option to display text and graphics on the same screen. When the terminal is in Alphanumeric supermode, the window usually contains text and the program responds to standard VT100 escape sequences. In Graphic supermode the associated window usually contains graphical displays, and the program responds to Tektronix control sequences.

When in graphics supermode an escape sequence is not recognized, it is handed to the VT100 escape parser to be evaluated as a VT100 escape sequence. The converse is not true: when in VT100 supermode, unrecognized escape sequences are ignored, they are not passed to the Tektronix escape parser. This means, in particular, that the programmer must switch VLT to Tektronix mode **before** sending any Tektronix sequences.

Sequences related to the Tektronix emulation

The following sequences switch between VT100 and Tektronix emulation modes.

⟨ESC⟩ ⟨FF⟩	Switches to Tektronix emulation and clears the Tektronix screen.
⟨ESC⟩ ⟨SUB⟩	Switches to Tektronix emulation and enters GIN mode.
⟨CSI⟩ ? 38 h	Switches to Tektronix emulation without clearing the Tektronix screen.
⟨CSI⟩ ? 38 l	Switches back to VT100 emulation.
⟨ESC⟩ " 0 g	Switches back to VT100 emulation.

Here, ⟨CSI⟩ is the sequence ⟨ESC⟩ [or, when in eight-bit mode, the character hex 9B.

In 4105/4107 emulation mode the following single character sequences are recognized: ⟨US⟩, ⟨GS⟩, ⟨FS⟩, and ⟨CAN⟩. The ⟨US⟩, ⟨GS⟩, and ⟨FS⟩ sequences cause VLT to switch to Tektronix mode, while ⟨CAN⟩ causes VLT to switch to VT100 mode. In addition, ⟨ESC⟩%!0 causes VLT to switch to Tektronix mode while ⟨ESC⟩%!1 makes VLT switch to VT100 mode (see **Appendix D** for more about these sequences).

Two more escape sequences are used in Tektronix mode to switch between "light" and "dark" vectors. They are mentioned here because they are recognized and handled by the VT100 escape parser.

⟨ESC⟩/0d	Draw light vectors with current attributes.
⟨ESC⟩/1d	Draw dark vectors (erasing previously drawn graphics).

One other graphics related sequence is recognized: ⟨ESC⟩#!0. This sequence requests a report on VLT's current emulation mode. The response to this request is a sequence of 6 characters: %!001⟨CR⟩ if the current mode is VT100 and %!000⟨CR⟩ if the current mode is Tektronix.

Differences compared to standard VT100

In the case of a regular VT100, the sequences ⟨CSI⟩1p and ⟨CSI⟩0p switch one of the keyboard LEDs on and off. Since the Amiga does not have a set of keyboard LEDs, this function switches the highlighting status of the on-screen **INS** gadget on or off (when the on-screen PF-key gadgets are being displayed).

Normally, the sequences ⟨CSI⟩ P_0; ...; $P_n m$ are used on VT100's to change the current mode of graphic rendition (e.g. boldface, italic, reverse video). If the **Color** option of the **Rendering Mode** menu item is selected, however, these sequences are associated instead with colors 1 through 5 of the current screen palette. It is recommended that a 3-bitplane custom screen be used in this mode, although this works with a Workbench window as well (though some color information is lost).

The assignments are as follows:

P_n	Normal operation:	Color mode operation:
0	Normal attributes	Use color 1
4	Underlined	Use color 2
1	Bold	Use color 3
7	Reverse video	Use color 4
5	Italic	Use color 5

Additional escape sequences

Some additional sequences of the type ⟨CSI⟩ P_0; ...; $P_n m$ are recognized. They affect only the color selection for text display and work only if the **Color** option of the **Rendition** menu item is selected. The following values of P_n are recognized:

P_n	Color mode operation effect:
30	Change text to color 0
31	Change text to color 1
32	Change text to color 2
33	Change text to color 3
34	Change text to color 4
35	Change text to color 5
36	Change text to color 6
37	Change text to color 7

If the **Color** option is selected *and* the **ANSI Color** option is selected, then VLT will recognize some additional ANSI sequences:

P_n	Color mode operation effect:
40	Change text backfill to color 0 (background)
41	Change text backfill to color 1
42	Change text backfill to color 2
43	Change text backfill to color 3
44	Change text backfill to color 4
45	Change text backfill to color 5
46	Change text backfill to color 6
47	Change text backfill to color 7

If the **Color** option is selected but the **ANSI Color** option is *not* selected, two of the ANSI sequences are used for the following purposes:

P_n	Color mode operation effect:
40	Set normal rendition, color 1, restore saved mode
41	Set normal rendition, color 1, save mode, set color mode on

The latter two sequences allow you, while using the terminal in **Quick** rendition mode, to temporarily switch to **Color** rendition and then return to the saved settings. These two sequences are *not* ANSI compatible, but are used at SLAC by the IBM mainframe.

There are two escape sequences which let you set the number of lines on the screen. One sequence has the form ⟨CSI⟩P_1; P_2; P_3; P_4p, where only P_4 is significant, since it represents the number of lines that the screen should be set to. The second sequence has the form ⟨CSI⟩? P_1; P_2p, where P_1 is the number of columns and P_2 the number of rows.

The VT220 escape sequences ⟨CSI⟩5i and ⟨CSI⟩4i are also supported. All incoming characters between these two sequences are redirected to `prt:`, in accordance with the VT220 standard. The display is not updated during that time. The feature is cancelled by the **Clear Screen** option of the **Screen Menu** and by any option that closes the serial device.

Control sequences that start with the characters ⟨ESC⟩^ are intercepted and disposed of in order to provide support for applications that expect a Modgraph terminal. Such sequences are not effective, but will also not cause visible traces on the display.

Sending commands to VLT from the host

An escape sequence was introduced to allow the host to send a script command to be executed by VLT. Together with VLT's `rx` script command, this allows the host to execute ARexx scripts on the Amiga. The syntax is:

⟨start-of-VLT-command⟩ ⟨SystemPassWord⟩ ⟨VLT command⟩ ⟨end-of-VLT-command⟩

where

⟨start-of-VLT-command⟩	=	⟨CSI⟩?91h or ⟨CSI⟩?91;P_sh
⟨end-of-VLT-command⟩	=	⟨CSI⟩?91l or ⟨CSI⟩?91;P_dl
⟨SystemPassWord⟩	=	current value of environment variable "SystemPassWord"
⟨VLT command⟩	=	a valid VLT script command

In the first escape sequence, the variable P_s represents an optional size: if the size is specified, the command buffer will be allocated at either the specified size or 256 bytes, whichever is larger. The variable P_d in the second escape sequence is also optional and specifies a destination for the

command. Currently, only destination 0 is supported: the command is directly interpreted as a VLT action string.

An example would be:

⟨ESC⟩[?91hMyAmigaPassword~ rx "address command 'WLens 100 100 VLT'"⟨ESC⟩[?91l

Upon receipt of this string from the host, the sequence of events in VLT would be as follows. VLT would enter "command capture" mode after receiving the h of the escape sequence. It would then store every incoming printable ASCII character (with the maximum determined by the buffer size) in a buffer until it received the ⟨ESC⟩ character of the end-of-command sequence; it would then compare the first part of the string with the current value of the environment variable SystemPassWord on the Amiga, and would, if the two matched, execute the rest of the string as a standard VLT command. In the particular case mentioned above, VLT would find the tilde, which indicates that the received string is indeed a VLT script command; it would then send the command **"address command 'WLens 100 100 VLT'"** to ARexx, which, if WLens is installed, would open the WLens window on VLT's screen. The requirement of the SystemPassWord is for security reasons. Obviously, someone with ill intent, working on a not-too-secure mainframe, could send you a command to reformat your hard disk. So, if the password does not match the current value of the environment variable called SystemPassWord, you will get a notice on your screen saying that a command was sent to you; the notice will also show the first part of that command. If you do not have a SystemPassWord, any command sent from the host will always fail this way. -

Device Status Reports and Device Control String

VLT supports two answer-back strings, DSR 1 and 2 (DSR: Device Status Report). These are programmable by means of a script command called DSR. DSR 1 is VLT's response to the sequence ⟨CSI⟩c from the host, and the default is: ⟨ESC⟩[1;7c. DSR 2 is VLT's response to the (VT200) sequence ⟨CSI⟩>c and defaults to ⟨ESC⟩[>1;10;0c. In order to program the device control string, the DSR script command should be used as in the following example:

DSR 1 "*E[1;2;7c"

The DSR string is stored as part of the configuration file.

The Device Control String (DCS) is recognized by VLT as ⟨ESC⟩ P. VLT doesn't actually do anything with the device control string. In effect, all serial input is thrown away until the sequence is interrupted, either by a ⟨CAN⟩ character or another ⟨ESC⟩ character. In the latter case, the device control string is terminated and the beginning of a new escape sequence is signalled. If that escape sequence is ⟨ESC⟩\, the device control string is just terminated.

Appendix D
Tektronix Programmer's Manual

Overview

VLT's Tektronix emulator consists of two parts: a Tektronix 4010/14 emulator and a Tektronix 4105 emulator. Generally, both emulations are in effect at the same time, but the Tektronix 4105 emulation and and several associated features can be suppressed with a menu option.

VLT's Tektronix 4010/14 emulation supports alpha and vector graphics modes, as well as point-plot, incremental plot and Graphic INput (GIN) mode. In alpha mode the program behaves as a dumb ASCII terminal and allows the display of alphanumeric text (please note that this mode is **not** the same as the VT100 Alphanumeric supermode).

In vector mode the program interprets incoming data from the serial port as ⟨x,y⟩ coordinates of vectors and moves the "pen" to the location (x, y) (when the pen is up) or draws a line from the current position to (x, y) (when the pen is down). Vectors can be light or dark. Light vectors can have normal or high intensity and a full set of patterns is provided. VLT supports the extended variable-length vector-mode protocol of the Tektronix 4014 and 4100 series of terminals for a maximum resolution of 4096 × 4096 pixels.

Point-plot mode (also called marker mode) operates the same way as vector mode does, with the exception that all incoming ⟨x,y⟩ coordinates are marked on the screen by a dot. In incremental plot mode incoming data are interpreted as single pixel movements of the pen in any of the 8 possible directions. A line is drawn or continued if the pen is currently down and a move is executed if the pen is currently up.

In GIN mode, VLT displays a graphic cursor (cross hair) and enters a bypass mode; in this mode, VLT ignores all data from the host and intercepts all keyboard keys. In GIN mode, the graphic cursor can be moved with the mouse or the arrow keys. To exit GIN mode, you type an alphanumeric character or press the select button of the mouse. VLT then sends a report to the host, consisting of the character that was typed (or, in case the left mouse button was pressed, its currently selected character) and the current ⟨x,y⟩ position of the graphic cursor, followed by an end-of-report sequence.

In the Tektronix 4105 emulation, almost all of the Tektronix 4105 escape sequences are supported, with some obvious extensions to Tektronix 4107. About the only unsupported feature is the "dialog area" and all commands associated with it. A few highlights of the supported features: area fills (panels) including all 16 Tek-style textures and 125 dithering patterns; scaled and rotated (90/180/270 degrees) fonts using strokefont libraries; almost full support of Tek-style "pixel operations" (bitmaps); and full support for the abovementioned features in the PostScript output.

Pictures are captured and can be saved to disk and reviewed later. They can be saved as IFF bitmap files or sent to the printer as screen dumps. They can also be stored as encapsulated PostScript files and sent to the printer as such. The zoom and pan features allow enlargement of any part of the screen while retaining the full resolution inherent in the graphics primitives sent to the terminal.

This appendix describes the command sequences that the Tektronix emulator will respond to when they are received from the host. In the first section the sequences are described that change

the supermode. The ensuing sections describe, respectively, the sequences that are recognized in alpha mode, vector and point-plot mode, incremental plot mode and GIN mode. A section about the supported Tektronix 4105 sequences follows. The final section describes the various reports to the host.

In the following sections most control characters will be referred to by their ASCII name. Therefore, a table of these control characters and their numerical equivalents is included.

Sequences that change supermode

The sequences that switch between VT100 and Tektronix emulation modes were already mentioned in the previous appendix. In the interest of completeness, we nevertheless repeat them here. In Tektronix 4010/14 emulation mode the folowing sequences are effective.

⟨ESC⟩ ⟨FF⟩	Switches to Tektronix emulation and clears the Tektronix screen.
⟨CSI⟩ ? 38 h	Switches to Tektronix emulation without clearing the Tektronix screen.
⟨CSI⟩ ? 38 l	Switches back to VT100 emulation.
⟨ESC⟩ " 0 g	Switches back to VT100 emulation.

Here, ⟨CSI⟩ is the sequence ⟨ESC⟩ [or, when in eight-bit mode, the character hex 9B.

When 4105/4107 is selected from the **Tek Emulation** item of the **Operation Menu**, several additional control characters and escape sequences, when received in VT100 mode, will change the supermode on reception from the host. When received in Tektronix mode, they only switch between the various graphics modes. A list follows:

⟨CAN⟩	Exit Graphic, enter Alphanumeric supermode. (Only recognized in alpha mode).
⟨FS⟩	Enter Graphic supermode in point-plot mode.
⟨GS⟩	Enter Graphic supermode in vector mode.
⟨RS⟩	Enter Graphic supermode in incremental plot mode.
⟨US⟩	Enter Graphic supermode in alpha mode.
⟨ESC⟩%!0	Switch to Tektronix supermode.
⟨ESC⟩%!1	Switch to Alphanumeric supermode.

There is an **Operation Menu** option, **Switch Screens**, which allows you to determine whether a given escape sequence will cause VLT to switch both modes and screens or only modes. This menu option has an entire set of suboptions, with each suboption representing a specific escape sequence. A list of these correspondences follows here.

Text to Graphics:	
Select Code	⟨ESC⟩%!0
Erase Screen	⟨ESC⟩⟨FF⟩
Enter GIN	⟨ESC⟩⟨SUB⟩
DEC enter 401X	⟨CSI⟩?38h
FS, GS, RS, US	⟨FS⟩ ⟨GS⟩ ⟨RS⟩ ⟨US⟩
Graphics to Text:	
Select Code	⟨ESC⟩%!1
DEC exit 401X	⟨CSI⟩?38l
Special ANSI	⟨ESC⟩"0g
Cancel	⟨CAN⟩

Alpha mode

Once the emulation is in alpha mode it will print incoming printable characters to the graphics window. If the screen is interlaced, a 80 column by 35 line format will be used. While it is true that the Tektronix 4010/14 standard calls for 74 columns, Tektronix 4105 calls for 80, hence VLT uses the latter. If the screen is not interlaced only 24 lines can be displayed. The emulation faithfully mimics the two-column mode of 4010/14 compatible terminals: when the bottom of the screen is reached, the left margin is changed to the center of the screen and printout resumes at the top of the screen obeying the new margin. When a line extends beyond the virtual graphics screen it is wrapped around to the next line.

In addition to the printable characters, the following control characters and escape sequences are recognized.

⟨ESC⟩	Introduce escape sequence.
⟨ESC⟩ ⟨NUL⟩	Same as ⟨ESC⟩.
⟨ESC⟩ ⟨ESC⟩	Same as ⟨ESC⟩.
⟨ESC⟩ ⟨ENQ⟩	Set bypass and return terminal status.[1]
⟨BEL⟩	Ring bell (flash screen).
⟨ESC⟩ ⟨BEL⟩	Ring bell (flash screen).
⟨BS⟩	Move one space left.
⟨ESC⟩ ⟨BS⟩	Move one space left.
⟨HT⟩	Move right to next tab stop.
⟨ESC⟩ ⟨HT⟩	Move right to next tab stop.
⟨LF⟩	Move one line down and return to left margin.
⟨ESC⟩ ⟨LF⟩	Same as ⟨ESC⟩.
⟨CR⟩	Move to left margin.
⟨ESC⟩ ⟨CR⟩	Same as ⟨ESC⟩.
⟨VT⟩	Move one line up.
⟨ESC⟩ ⟨VT⟩	Move one line up.
⟨ESC⟩ ⟨FF⟩	Erase and home.
⟨ESC⟩ ⟨ETB⟩	Make copy.[2]
⟨CAN⟩	Switch to Alphanumeric supermode (VT100).
⟨ESC⟩ ⟨CAN⟩	Set bypass condition.
⟨ESC⟩ ⟨SUB⟩	Set GIN mode and bypass condition.
⟨FS⟩	Set point-plot mode.
⟨ESC⟩ ⟨FS⟩	Set point-plot mode.
⟨GS⟩	Set vector mode.[3]
⟨ESC⟩ ⟨GS⟩	Set vector mode.[3]
⟨RS⟩	Set incremental plot mode.
⟨ESC⟩ ⟨RS⟩	Set incremental plot mode.
⟨SP⟩	Move one space right.
⟨DEL⟩	Same as ⟨BS⟩.
⟨ESC⟩ ⟨DEL⟩	Same as ⟨ESC⟩.
⟨ESC⟩ 8	Select largest character size.[2]
⟨ESC⟩ 9	Select large character size.[2]
⟨ESC⟩ :	Select small character size.[2]
⟨ESC⟩ ;	Select smallest charactersize.[2]
⟨ESC⟩ 0	Same as ⟨ESC⟩ 8.[2]
⟨ESC⟩ 1	Same as ⟨ESC⟩ 9.[2]
⟨ESC⟩ 2	Same as ⟨ESC⟩ :.[2]

⟨ESC⟩ 3 Same as ⟨ESC⟩ ;[2]

Notes:

1. For a description of the report to the host see the section on reports to the host.
2. These sequences are not currently implemented.
3. After vector mode is entered, a move will be executed to the vector that follows. All subsequent vectors will be drawn.

In addition, while this is not strictly in accordance with the VT240 documentation, vector-mode line-style sequences (see next section) are also recognized in alpha mode.

Vector and point-plot (marker) mode

In both vector and point-plot mode, the emulation will interpret incoming printable characters as ⟨x,y⟩ coordinates. After entering vector mode, the "pen" moves to the first vector encountered (the pen is "up"). All subsequent vectors are drawn (with pen "down"). In the case of point-plot mode all vectors are marked with a dot.

Before discussing the encoding scheme of ⟨x,y⟩ pairs, it should be noted that the emulation works internally with a 4096 × 4096 pixel coordinate system as required for the Tektronix 4100 series of graphics terminals. The following protocol for transfer of ⟨x,y⟩ coordinates is, however, completely backwards compatible with the older 4000 series and their internal coordinate system of 1024 × 1024 pixels: when the application running on the host assumes a 4000 series terminal, the emulation simply puts the two lowest-order bits of each coordinate to zero.

The encoding scheme of ⟨x,y⟩ pairs is syntactically described by:

$$\langle x,y\rangle = [\langle HiY\rangle]\ [[\langle Extra\rangle]\ \langle LoY\rangle\ [\langle HiX\rangle]]\ \langle LoX\rangle$$

Each item enclosed in ⟨⟩ on the right hand side represents an ASCII character:

⟨HiY⟩ Bit 0 through 4: most significant 5 bits of y coordinate.
Bit 5 and 6: "01" (Tag bits).
Bit 7: parity.

⟨Extra⟩ Bit 0 and 1: least significant 2 bits of x coordinate.
Bit 2 and 3: least significant 2 bits of y coordinate.
Bit 4: unused.
Bit 5 and 6: "11" (Tag bits).
Bit 7: parity.

⟨LoY⟩ Bit 0 through 4: intermediate 5 bits of y coordinate.
Bit 5 and 6: "11" (Tag bits).
Bit 7: parity.

⟨HiX⟩ Bit 0 through 4: most significant 5 bits of x coordinate.
Bit 5 and 6: "01" (Tag bits).
Bit 7: parity.

⟨LoX⟩ Bit 0 through 4: intermediate 5 bits of x coordinate.
Bit 5 and 6: "10" (Tag bits).
Bit 7: parity.

In the syntactical expression above, an item enclosed in [ ] may be omitted if it is the same as in the previous ⟨x,y⟩ sequence. For example, an applications program running on the host assuming

a 4000 series terminal would send ⟨HiY⟩, ⟨LoY⟩, ⟨HiX⟩ and ⟨LoX⟩ but not ⟨Extra⟩. Note that ⟨LoX⟩ *always* needs to be sent. Notice also, that if either ⟨Extra⟩ or ⟨HiX⟩ or both are sent, ⟨LoY⟩ *must* be sent. To put it differently: sending ⟨HiY⟩ is always optional, but ⟨LoY⟩ can only be left out if neither ⟨Extra⟩ nor ⟨HiX⟩ are to be sent. Again, ⟨LoX⟩ must always be sent.

In addition to these printable characters, the following control characters and escape sequences are recognized.

⟨ESC⟩	Introduce escape sequence.
⟨ESC⟩ ⟨NUL⟩	Introduce escape sequence.
⟨ESC⟩ ⟨ENQ⟩	Set bypass and return terminal status.[1]
⟨BEL⟩	Ring bell (flash screen).
⟨LF⟩	Ignored.
⟨ESC⟩ ⟨LF⟩	Introduce escape sequence.
⟨CR⟩	Set alpha mode.[2]
⟨ESC⟩ ⟨FF⟩	Erase and home.
⟨ESC⟩ ⟨ETB⟩	Make copy.[3]
⟨ESC⟩ ⟨CAN⟩	Set bypass condition.
⟨ESC⟩ ⟨SUB⟩	Set GIN mode and bypass condition.
⟨FS⟩	Set point-plot mode.
⟨ESC⟩ ⟨FS⟩	Set point-plot mode.
⟨GS⟩	Set vector mode.[4]
⟨ESC⟩ ⟨GS⟩	Set vector mode.[4]
⟨RS⟩	Set incremental plot mode.
⟨ESC⟩ ⟨RS⟩	Set incremental plot mode.
⟨US⟩	Set alpha mode.
⟨ESC⟩ ⟨US⟩	Set alpha mode.
⟨ESC⟩ ⟨DEL⟩	Introduce escape sequence.
⟨ESC⟩ `	Set normal vector, pattern: 1111111111111111
⟨ESC⟩ a	Set normal vector, pattern: 1010101010101010
⟨ESC⟩ b	Set normal vector, pattern: 1111101011111010
⟨ESC⟩ c	Set normal vector, pattern: 1110111011101110
⟨ESC⟩ d	Set normal vector, pattern: 1111110011111100
⟨ESC⟩ e	Set normal vector, pattern: 1111111101010101
⟨ESC⟩ f	Set normal vector, pattern: 1111111100111100
⟨ESC⟩ g	Set normal vector, pattern: 1111000011110000
⟨ESC⟩ h	Set bold vector, pattern: 1111111111111111
⟨ESC⟩ i	Set bold vector, pattern: 1010101010101010
⟨ESC⟩ j	Set bold vector, pattern: 1111101011111010
⟨ESC⟩ k	Set bold vector, pattern: 1110111011101110
⟨ESC⟩ l	Set bold vector, pattern: 1111110011111100
⟨ESC⟩ m	Set bold vector, pattern: 1111111101010101
⟨ESC⟩ n	Set bold vector, pattern: 1111111100111100
⟨ESC⟩ o	Set bold vector, pattern: 1111000011110000
⟨ESC⟩ ?	Low Y coordinate.[5]

Notes:

1. For a description of the report to the host see the section on reports to the host.
2. In **4105/4107** emulation ⟨CR⟩ is ignored in vector/marker mode.
3. This sequence is not currently implemented.

4. After vector mode is entered, a move will be executed to the vector that follows. All subsequent vectors will be drawn.
5. This escape sequence is recognized in vector mode as a replacement for the ⟨DEL⟩ character that some hosts cannot send.

In addition, while this is not strictly in accordance with the VT240 documentation, the Alpha mode character-set selection sequences are recognized (though ignored).

Incremental Plot mode

In incremental plot (marker) mode the following control and escape sequences are recognized, as well as some printable characters. It should be noted that the marker type can be selected using a Tektronix 4105 sequence. The default marker is, however, a single dot.

⟨ESC⟩	Introduce escape sequence.
⟨ESC⟩ ⟨NUL⟩	Introduce escape sequence.
⟨ESC⟩ ⟨ENQ⟩	Set bypass and return terminal status.[1]
⟨ESC⟩ ⟨BEL⟩	Ring bell (flash screen).
⟨ESC⟩ ⟨LF⟩	Introduce escape sequence.
⟨CR⟩	Set alpha mode and move to left margin.[2]
⟨ESC⟩ ⟨CR⟩	Introduce escape sequence.
⟨ESC⟩ ⟨FF⟩	Enter alpha mode, erase and home.
⟨ESC⟩ ⟨ETB⟩	Make copy.[3]
⟨ESC⟩ ⟨CAN⟩	Set bypass condition.
⟨ESC⟩ ⟨ESC⟩	Introduce escape sequence.
⟨ESC⟩ ⟨SUB⟩	Set GIN mode and bypass condition.
⟨FS⟩	Set point-plot mode.
⟨ESC⟩ ⟨FS⟩	Set point-plot mode.
⟨GS⟩	Set vector mode.[4]
⟨ESC⟩ ⟨GS⟩	Set vector mode.[4]
⟨US⟩	Set alpha mode.
⟨ESC⟩ ⟨US⟩	Set alpha mode.
⟨SP⟩	Turn beam off (pen up).
P	Turn beam on (pen down).
D	Move up (north).[5]
E	Move up, right (northeast).[5]
A	Move right (east).[5]
I	Move down, right (southeast).[5]
H	Move down (south).[5]
J	Move down, left (southwest).[5]
B	Move left (west).[5]
F	Move up, left (northwest).[5]

Notes:

1. For a description of the report to the host see the section on reports to the host.
2. In **4105/4107** emulation ⟨CR⟩ is ignored in incremental mode for compatibility with Tektronix 4100 series terminals.
3. This sequence is not currently implemented.
4. After vector mode is entered, a move will be executed to the vector that follows. All subsequent vectors will be drawn.

5. These commands move the pen one (Tektronix) pixel. The actual amount of movement therefore depends on whether a 1024×1024 or a 4096×4096 coordinate system is used. This is controlled by the **Operation Menu** item **Incremental Mode Step**.

GIN mode

When the Graphics INput (GIN) mode is set, VLT enters bypass mode. This means that keyboard and mouse actions are handled internally by the emulation and usually sent on to the host in a different form. GIN mode (and the accompanying bypass condition) can be exited transparently to the host by selecting the **Switch Graphic Cursor Off** item of the **Cursor Menu**, but is usually terminated by a report to the host. A report is sent to the host when any alphanumeric character is entered from the keyboard, or when the left mouse button is pressed. For a description of the report see the section on reports to the host.

During any bypass condition, the following escape and control sequences are recognized:

⟨ESC⟩ ⟨ENQ⟩	Set bypass and return terminal status.[1]
⟨BS⟩	Clear Bypass.[2]
⟨BEL⟩	Clear bypass and ring bell (flash screen).
⟨ESC⟩ ⟨BEL⟩	Clear bypass and ring bell (flash screen).
⟨LF⟩	Clear bypass.[2]
⟨ESC⟩ ⟨LF⟩	Clear bypass and introduce escape sequence.
⟨CR⟩	Clear bypass.[2]
⟨VT⟩	Clear bypass.[2]
⟨HT⟩	Clear bypass.[2]
⟨ESC⟩ ⟨CR⟩	Clear bypass and introduce escape sequence.
⟨ESC⟩ ⟨FF⟩	Clear bypass, enter alpha mode, erase and home.
⟨ESC⟩ ⟨ETB⟩	Make copy[3]
⟨ESC⟩ ⟨CAN⟩	Set bypass condition.
⟨ESC⟩ ⟨SUB⟩	Set GIN mode and bypass condition.
⟨US⟩	Clear bypass and set alpha mode.
⟨ESC⟩ ⟨US⟩	Clear bypass and set alpha mode.

Notes:

1. For a description of the report to the host see the section on reports to the host.
2. In **4105/4107** emulation mode, these sequences only clear bypass mode. In **4010/14** emulation mode, however, they also switch the graphics mode to Alpha, and perform the same actions they would perform in Alpha mode.
3. This sequence is not currently implemented.

Tektronix 4105/4107

When **4105/4107** is selected from the **Emulation** menu item of the **Operation Menu**, some control and escape sequences are recognized that otherwise are not. The category of supermode-changing control sequences was already discussed in a prior section; those that generate reports will be discussed in the next section.

Also supported are ⟨csi⟩ $P_n m$ sequences, with n in the range from 30 to 37. These sequences are exactly the same as their VT100 counterparts (see **Appendix C: Additional escape sequences**). This feature can be turned off using a **MISCFlags** command (see **Writing Scripts: Quick Reference Section**).

We will not describe all Tektronix 4105 commands in detail. Many of them have parameters and defaults, and in order to use them properly it is necessary to consult the documentation that is available from Tektronix. We will limit ourselves to giving a list of supported commands, with some remarks where neccssary, followed by some more detail on frequently used sequences (see also **Tektronix 4105 reports** later in this appendix).

⟨ESC⟩ KC ⟨Cancel⟩
⟨ESC⟩ ID ⟨Disable GIN mode⟩
⟨ESC⟩ IE ⟨Enable GIN mode⟩
⟨ESC⟩ KI ⟨Ignore-Deletes⟩
⟨ESC⟩ LE ⟨End Panel⟩
⟨ESC⟩ LF ⟨Move⟩
⟨ESC⟩ LG ⟨Draw⟩
⟨ESC⟩ LH ⟨Draw-Marker⟩
⟨ESC⟩ LP ⟨Begin-Panel-Boundary⟩
⟨ESC⟩ LT ⟨Graphic-Text⟩
Graphic text is always drawn using a stroke font. Alpha mode text uses the default Amiga text font, except in zoom or pan mode.

⟨ESC⟩ MC ⟨Set-Graphtext-Size⟩
4107 extension: since graphic text is drawn using a stroke font, all sizes are allowed.

⟨ESC⟩ MG ⟨Set-Graphics-Area-Writing-Mode⟩
⟨ESC⟩ ML ⟨Set-Line-Index⟩
4107 extension: colors 8 through 15 are supported.

⟨ESC⟩ MM ⟨Set-Marker-Type⟩
Markers are drawn using a stroke font and don't exactly match the Tektronix ones. In the PostScript output they match better.

⟨ESC⟩ MN ⟨Set-Character-Path⟩
⟨ESC⟩ MP ⟨Select-Fill-Pattern⟩
4107 extension: colors 8 through 15 are supported (patterns -8 through -15)

⟨ESC⟩ MR ⟨Set-Graphtext-Rotation⟩
Conform 4105 standard, only 0, 90, 180, and 270 degrees are supported.

⟨ESC⟩ MT ⟨Set-Text-Index⟩
4107 extension: colors 8 through 15 are supported.

⟨ESC⟩ MV ⟨Set-Line-Style⟩
⟨ESC⟩ NU ⟨Set-Bypass-Cancel-Character⟩
This character can also be set using a menu option.

⟨ESC⟩ NT ⟨Set-EOL-String⟩
This string can also be set using a menu option.

⟨ESC⟩ RA ⟨Set-View-Attributes⟩
⟨ESC⟩ RH ⟨Set-Pixel-Beam-Position⟩
⟨ESC⟩ RL ⟨Runlength-Write⟩
⟨ESC⟩ RP ⟨Raster-Write⟩
⟨ESC⟩ RR ⟨Rectangle-Fill⟩
⟨ESC⟩ RS ⟨Set-Pixel-Viewport⟩
4107/Amiga extension: the full range of addressable pixels available in the current window/screen is available.

⟨ESC⟩ RU ⟨Begin-Pixel-Operations⟩

⟨ESC⟩ RW ⟨Set-Window⟩
Only windows that preserve the aspect ratio are allowed. Windows that don't preserve the aspect ratio are rescaled until they do.

⟨ESC⟩ RX ⟨Pixel-Copy⟩
Only straight copies are supported. Copies where the second source x and/or y coordinate is/are smaller than the first will be performed after sorting the coordinates.

⟨ESC⟩ TG ⟨Set-Surface-Color-Map⟩
4107 extension: Surface −1 is supported, as well as colors 8 through 15.

⟨ESC⟩ TM ⟨Set-Color-Mode⟩
4107 extension. RGB, HLS and CMY color coordinate systems are all supported, both in setting color maps as in color reports.

The following two sequences are also recognized.

⟨ESC⟩/0d Draw light vectors with current attributes.
⟨ESC⟩/1d Draw dark vectors (erasing previously drawn graphics).

For some of the more frequently used commands we will now give a little more detail.

⟨ESC⟩LT⟨string⟩ Display the Tektronix 4100-series character string ⟨string⟩ at the current position.
A 4100-series character string starts with a Tektronix 4100-series integer (explained below) indicating the length of the string followed by the string itself as printable ASCII characters.

⟨ESC⟩ML⟨index⟩ Switch to color ⟨index⟩; ⟨index⟩ is a Tektronix 4100 series style integer in the range 0 through 15.

⟨ESC⟩MV⟨pattern⟩ Switch to pattern ⟨pattern⟩. ⟨pattern⟩ is a Tektronix 4100 series style integer. The line patterns are the same as those in vector mode (see there), in the same sequence. The pattern number is in the range −15 through 124.

⟨ESC⟩TG⟨surface⟩⟨colormap⟩ Change the color values. Hues, lightnesses and intensities of the new colors are specified in ⟨colormap⟩. The ⟨surface⟩ number has to be the integer '1', and the ⟨colormap⟩ is a standard 4100-series array of integers in the sequence ⟨color-index⟩, ⟨hue⟩, ⟨lightness⟩, ⟨saturation⟩, ⟨next-color-index⟩ ⟨...⟩, as explained below.

⟨ESC⟩WL0 Private sequence. When this sequence is sent, the emulation will open a new capture file.

Tektronix 4100-series standard integers

The encoding scheme of a standard Tektronix 4100-series integer is syntactically described by:

⟨i⟩ = [⟨HiI⟩ [⟨HiI⟩]] ⟨LoI⟩

Each item enclosed in ⟨⟩ on the right hand side represents an ASCII character:

⟨HiI⟩ Bit 0 through 5: most significant 6 bits of integer.
Bit 6: "1" (Tag bit).
Bit 7: parity.

⟨LoI⟩ Bit 0 through 3: least significant 4 bits of integer.
Bit 4: sign bit. When set, the integer is positive.
Bit 5 and 6: "01" (Tag bits).
Bit 7: parity.

In the syntactical expression above, an item enclosed in [ ] may be omitted if the significant bits are 0. When two ⟨HiI⟩ values are specified, the first one gives the bits 10 through 15 of the resulting integer, the second one bits 4 through 9, and the ⟨LoI⟩ value bits 0 through 3. If only one ⟨HiI⟩ value is specified, it determines bits 4 through 9. If only a ⟨LoI⟩ value is specified, the resulting integer takes the value specified in the bits 0 through 3. ⟨LoI⟩ must always be sent, and its bit 4 determines the sign of the integer.

Notice, that with this convention, the positive integers 0 through 9 happen to coincide with the ASCII characters '0' through '9'.

Tektronix 4100 series integer arrays

A Tektronix 4100 series array of integers is syntactically described as:

⟨array⟩ = ⟨number-of-elements⟩⟨int⟩⟨. . .⟩⟨int⟩

It is simply a list of N integers encoded as explained above, preceded with the number N, also encoded as an integer.

Reports to the host

Tektronix 4010/14 reports

There are several ways in which the host can request a report from the emulation. The details depend on the nature of the request and on the current graphics mode.

While the terminal is in alpha mode, receiving ⟨ESC⟩ ⟨ENQ⟩ from the host causes automatic transmission of the terminal status byte, the ⟨x,y⟩ position of the lower left-hand corner of the alpha (block) cursor, and the end-of-report sequence.

When the terminal is in vector, marker or incremental plot mode, ⟨ESC⟩ ⟨ENQ⟩ causes transmission of the terminal status byte, the current ⟨x,y⟩ position of the beam (pen), and the end-of-report sequence.

During GIN mode, ⟨ESC⟩ ⟨ENQ⟩ leads to transmission of the ⟨x,y⟩ position of the graphic cursor and the end-of-report sequence. The emulation exits GIN mode and returns to alpha mode.

Also during GIN mode, entering a character on the keyboard or pressing the left mouse button causes transmission of the entered character (or, in case the mouse button was pressed, the currently selected character associated with the mouse—see the **Mouse Report Character**

item of the **Operation Menu**), the ⟨x,y⟩ position of the graphic cursor, and the end-of-report sequence.

In the default case, where the **4010** subitem is selected from the **GIN Report Style** menu item, the report has the following appearance:

⟨Status⟩ Bit 0: always "1".
Bit 1: "0" if left margin is at left, "1" if at center of screen.
Bit 2 and 3: "00": mode is point plot.
"01": mode is alpha.
"10": mode is vector.
"11": mode is other.
Bit 7: parity. This byte is sent first.
⟨HiX⟩ Bit 0 through 4: most significant 5 bits of x coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
⟨LoX⟩ Bit 0 through 4: least significant 5 bits of x coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
⟨HiY⟩ Bit 0 through 4: most significant 5 bits of y coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
⟨LoY⟩ Bit 0 through 4: least significant 5 bits of y coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
End-of-report sequence.

If the **Extended** subitem of the **GIN Report Style** menu item of the **Operation Menu** is selected, the report appears as:

⟨Status⟩ Same as above.
⟨HiY⟩ Bit 0 through 4: most significant 5 bits of y coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
⟨Extra⟩ Bit 0 and 1: least significant 2 bits of x coordinate.
Bit 2 and 3: least significant 2 bits of y coordinate.
Bit 4: unused.
Bit 5 and 6: "01".
Bit 7: parity.
⟨LoY⟩ Bit 0 through 4: intermediate 5 bits of y coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
⟨HiX⟩ Bit 0 through 4: most significant 5 bits of x coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
⟨LoX⟩ Bit 0 through 4: intermediate 5 bits of x coordinate.
Bit 5 and 6: "01".
Bit 7: parity.
End-of-report sequence.

The end-of-report sequence is, in either of the above cases, the same. In 4010/14 mode, it is either non-existent, a single ⟨CR⟩, or a ⟨CR⟩ ⟨EOT⟩ sequence, depending on the currently

selected sub-item of the **Report EOL String** menu item. In 4105/4107 mode, all options in that submenu are allowed, including allowing the host to specify the EOL string.

Tektronix 4105 reports

In **4105/4107** emulation mode some other sequences are recognized that cause a report to be sent to the host.

⟨ESC⟩ IQ ⟨Report-Terminal-Settings⟩

All unsupported reports will return a single 0 report. Supported reports are: TF, TG, %!, ?T, ?M. They are briefly described in the following paragraphs.

⟨ESC⟩IQTF Request for report of the current text color map.
⟨ESC⟩IQTG Request for report of the current vector color map.

VLT only maintains one color map, so the reports for the two options above are the same except for the first two letters. The report has the following syntax: TG (or TF) ⟨number of surfaces⟩⟨report-integer array⟩⟨CR⟩, where ⟨number of surfaces⟩ is the report-integer 1, and ⟨integer array⟩ has the structure ⟨color 0⟩⟨surface number⟩⟨color 1⟩ ⟨color 2⟩ ⟨...⟩ ⟨color 7⟩. The ⟨surface number⟩ is the report-integer −1, and the ⟨color n⟩ are three-report-integer sequences describing hue, lightness and saturation of color n. The length of the array is therefore 25 (specified as the first number in the array). A report-integer in this context is always a three-character sequence which is *different* from a regular Tektronix integer, see later.

⟨ESC⟩IQ%! Request for report of the current terminal mode.

This sequence has the same effect as the ⟨Report Syntax Mode⟩ sequence listed later.

⟨ESC⟩IQ?T Request for report of the Tektronix model number.

This sequence causes the report ?T, followed by the number 4105 in the form of a Tektronix integer, to be sent, along with the usual EOL sequence.

⟨ESC⟩IQ?M Request for report of available memory.

This sequence causes the report ?M to be sent, followed by the number of 16-byte blocks of available memory, followed by the size of the largest contiguous block (again in 16-byte units) in the form of two Tektronix integers, plus the usual EOL sequence.

⟨ESC⟩ KQ ⟨Report-Errors⟩

Only a single error is kept track of, and only the last occurrence. The report consists of the two letters indicating the sequence causing the error, a two-digit error code, and (in the case of VLT) the digits 0 (severity) and 1 (occurred once). The most likely error code is 00: not implemented. Only a few commands can generate other error conditions.

⟨ESC⟩ #!0 ⟨Report-Syntax-Mode⟩

This is a request for a report on which emulation mode VLT is currently in. The response to this report is a sequence of characters: %!001 if the current mode is VT100, and %!000 if the current mode is Tektronix. The sequence is followed by the current EOL string.

Tektronix 4100-series report integers

The encoding scheme of a Tektronix 4100-series report integer is different from that of a standard integer and is syntactically described by:

⟨i⟩ = ⟨HiI1⟩ ⟨HiI2⟩ ⟨LoI⟩

Each item enclosed in ⟨⟩ on the right hand side represents an ASCII character:

⟨HiI1⟩ Most significant 6 bits of integer plus 32.
Bit 7: parity.

⟨HiI2⟩ Middle 6 bits of integer plus 32.
Bit 7: parity.

⟨LoI⟩ Least significant 4 bits of integer.
Bit 4: sign bit. When set, the integer is positive.
Bit 7: parity.

Notice, that all three parts of the integer are always sent. Notice also that decoding consists of subtracting 32 from the first two characters, shifting the first by 6, adding the second, shifting the result by 4, and adding the third after masking out the sign bit. If the sign bit is set, the sign of the result is positive.

Table of ASCII control characters

The following is a table of the first 33 ASCII characters.

dec.	hex.	oct.	name	⟨ctrl⟩ equivalent
0	0	0	⟨NUL⟩	⟨ctrl⟩ @
1	1	1	⟨SOH⟩	⟨ctrl⟩ A
2	2	2	⟨STX⟩	⟨ctrl⟩ B
3	3	3	⟨ETX⟩	⟨ctrl⟩ C
4	4	4	⟨EOT⟩	⟨ctrl⟩ D
5	5	5	⟨ENQ⟩	⟨ctrl⟩ E
6	6	6	⟨ACK⟩	⟨ctrl⟩ F
7	7	7	⟨BEL⟩	⟨ctrl⟩ G
8	8	10	⟨BS⟩	⟨ctrl⟩ H
9	9	11	⟨HT⟩	⟨ctrl⟩ I
10	A	12	⟨LF⟩	⟨ctrl⟩ J
11	B	13	⟨VT⟩	⟨ctrl⟩ K
12	C	14	⟨FF⟩	⟨ctrl⟩ L
13	D	15	⟨CR⟩	⟨ctrl⟩ M
14	E	16	⟨SO⟩	⟨ctrl⟩ N
15	F	17	⟨SI⟩	⟨ctrl⟩ O

16	10	20	⟨DLE⟩	⟨ctrl⟩ P
17	11	21	⟨DC1⟩	⟨ctrl⟩ Q
18	12	22	⟨DC2⟩	⟨ctrl⟩ R
19	13	23	⟨DC3⟩	⟨ctrl⟩ S
20	14	24	⟨DC4⟩	⟨ctrl⟩ T
21	15	25	⟨NAK⟩	⟨ctrl⟩ U
22	16	26	⟨SYN⟩	⟨ctrl⟩ V
23	17	27	⟨ETB⟩	⟨ctrl⟩ W
24	18	30	⟨CAN⟩	⟨ctrl⟩ X
25	19	31	⟨EM⟩	⟨ctrl⟩ Y
26	1A	32	⟨SUB⟩	⟨ctrl⟩ Z
27	1B	33	⟨ESC⟩	⟨ctrl⟩ [
28	1C	34	⟨FS⟩	⟨ctrl⟩ \
29	1D	35	⟨GS⟩	⟨ctrl⟩]
30	1E	36	⟨RS⟩	⟨ctrl⟩ ^
31	1F	37	⟨US⟩	⟨ctrl⟩ _
32	20	40	⟨SP⟩	space.

Appendix E
ARP Escape Sequences

This appendix documents ARP escape sequences; that is, escape sequences parsed using the ARP escape parser. ARP escape sequences, as observed before, are supported by VLT; they can be especially useful when you are programming VLT menu options to send material to the host.

The Escape Character and SET ESCAPE comand.

All ARP escape sequences must be preceded by the escape character, which, by default, is the *. You can, however, choose a different escape character using the ARP command SET ESCAPE = ⟨value⟩, which you issue from WShell or ARPShell.

Escape Sequences

The escape sequences recognized by ARP are as follows:

*N — new line

*T — horizontal tab

*V — vertical tab

*B — backspace

*R — carriage return

*F — form feed

*E — escape (ascii 27 decimal)

*X*nn* — the character represented by the hexadecimal value *nn*.

Appendix F

There are a number of programs, written in ARexx, which either provide VLT with extra facilities or modify VLT in some way. Some of these "extras" are included with the VLT distribution and are consequently documented in this appendix. In order to function, most of these "extras" require **rexxarplib.library** version 3.0 or later (available in a separate archive on a BBS near you). In addition, some features, such as multiple-select file requesters, only work under AmigaDOS 2.0. If you are working under AmigaDOS 1.3, you must have ARexx for these programs to work at all (see the **Introduction**).

The ARexx Phonebook facility

A phonebook facility, written in ARexx, is included with VLT. To use it, first run, from VLT, the script called **VLTPhoneBook.vlt** (you may want, later on, to program a function key or menu to run this script). The phonebook will, for the most part, install itself, and a small panel with several gadgets will appear in one corner of the screen, with the following options:

Select VLT PhoneBook

Create PhoneBook Entry
Modify Phonebook Entry
Delete PhoneBook Entry
Show PhoneBook Entry

Select Entries to Dial

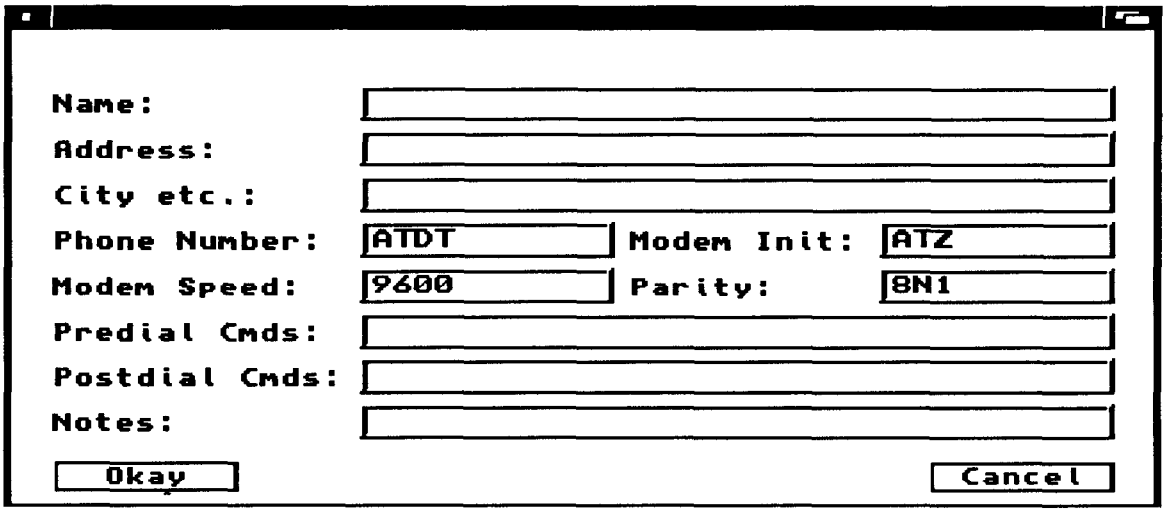
Start Dialing Sequence
Resume Dialing Sequence
Cancel Dialing Sequence

Click on the first option, **Select VLT PhoneBook**, before trying to use any of the other options. A directory requester will appear, asking you if you want to assign the logical device name **VLTPhoneBook:** to a particular location. Say that you do and assign it to the **phonebook** directory that you created during installation. Once this is accomplished, you can create entries, modify them, delete them, and view them. You can invoke these options multiple times, which means that you could have several entries open for viewing and several entries in the process of creation open at the same time.

How to Create A Phonebook Entry

When you click on the **Create Entry...** gadget, a new panel will appear, as shown on the following page. This panel follows the standard entry format for the phonebook facility. The **Name**, **Address**, and **City** gadgets are fairly self-explanatory, since they simply provide space for the information you would put in an ordinary phonebook entry. Some of the other gadgets, however, contain default settings that need explanation. First, the **ATDT** setting in the **Phone Number** gadget is the standard attention sequence for most hosts; if your host requires a different attention sequence, you'll want to change this. In any case, you'll need to add a phone number after the **ATDT** sequence. The **Modem Speed**, set by default at 9600 baud, should be replaced by the real baud rate of your modem. **ATZ**, the default **Modem Init** entry, is the standard initializing string for Hayes style modems, and the parity, set by default to be **8N1**, should be reset if necessary to the parity required by the host being dialed (see **Appendix B**). The next two entries, **Predial Cmds** and **Postdial Cmds**, should contain any commands you wish to be issued before or after

VLT dials the specified host, while the last entry, **Notes**, allows you to jot down an explanatory note about the entry. For instance, if you were creating an entry meant to dial BIX, you might type into **Notes** "This is my BIX account," or something to that effect. Click on the Okay gadget to add the entry to your list; a file requester will pop up, allowing you to specify the filename under which the entry will be saved. To abort the process and get rid of the entry panel, click on the Cancel gadget.



How to Select Entries to Dial and Dial Them

Once you have created entries (some sample entries are included with the distribution) you can select them for dialing using a multiple select file requester. Since the file requester is multiple select,* you can select more than one entry to be dialed; a list of entries to be dialed will be created and stored for later reference. When you've selected an entry or entries, you can click on **Start Dialing Sequence**. The facility dials the first entry in the list of entries to be dialed, then tries to establish a connection with whatever is on the other end. If it succeeds, the facility will wait, allowing you to work with whatever host you have just dialed. Once you have finished your session with a host, you can select **Resume Dialing Sequence** to go on to the next entry in the list. If, on the other hand, the facility fails to make a connection, it will continue on to the next entry on the list and try all entries until a connection is established. The looping will continue until the facility has successfully made all connections on the list once, or until you click on the **Abort Dialing Sequence** button.

A note of caution for the user: make sure that all the **VLTPhone*.vlt** and **.rexx** programs are copied to somewhere on VLT's search path.

The NeatStuff Script

The script **NeatStuff.scp** comes with VLT and resides in the **scp** directory. Among other things, it programs the mouse to provide cut and paste facilities. To see how it works, run

* Warning: the multiple select feature works only under AmigaDOS 2.0.

NeatStuff.scp (if you are using the **VTprefs.dat** file that came with this version, then you don't have to run **NeatStuff.scp**). **NeatStuff** programs the mouse to have the following features:

1. If you click the left mouse button by itself, normally it does nothing, but if there is a highlighted area, it gets rid of it.
2. If you click on the left mouse button while holding down the shift key, VLT sends enough mouse moves to the host to get the cursor to the place where you clicked. This doesn't work with all hosts.
3. If you click on the left mouse button while holding down the ctrl key, you can drag out an area, that, when you let go, is put into the clipboard. The area stays highlighted. If you want to get rid of it, just click the mouse without holding down ctrl. If you want to select another area, just click and drag again, while the ctrl key is down.
4. If you click on the left mouse button while holding down either alt key, and if there is an area already highlighted, then the highlighted text is sent to the serial port and the area loses its highlighting.
5. If you click on a word in the display while holding down the shift and control keys, the word will be highlighted and put in the clipboard. If you want a different word, just click again while shift and ctrl are still down.
6. If you click with the left mouse button while holding down the shift and alt keys, VLT puts up a window displaying the column and row of the point where you clicked.
7. The mouse button plus control and alt keys provides an option for BIX users: click on a conference/topic combination on BIX (like "microsoft/other"), and VLT will resign the topic for you.
8. Clicking with the left mouse button while holding down the shift, control, and alt keys is especially useful when combined with the shift-ctrl-left-mouse option. Suppose you wanted to enter a combination of words on the command line, without typing them in (they are already in various places on the screen). Now usually you want these words to be spaced apart with a number of spaces. What you do is this: use Shift-ctrl left-mouse to highlight the first word. Now also press the alt key and click the left mouse button on the command line where you want the word to appear. Spaces will be sent until the cursor is in the column where you clicked (minimum one space), and then the word will be sent as well. Repeat for the other words.

In addition, you will find that **NeatStuff** has changed your ALT and SHIFT-ALT cursor keys and a few keypad keys. First, when you hold down ALT and use the cursor keys, a second cursor will appear, which you can move around using the ALT cursor keys. When you also hold down the shift key, you can increase the size of the cursor by using the right arrow and down arrow buttons, and decrease the size of the cursor by using the left arrow and up arrow buttons. To get rid of the second cursor if it is currently up there, just hit alt, or shift-alt plus the period key on the keypad. To paste the current clipboard contents to the screen, you can use either alt plus the Enter key on the keypad, or shift-alt with Enter, or the menu options in the Paste menu. Alt-Enter will allow you to edit the lines before they get sent. Second, when you hit the keypad 0 button with ALT, the area currently spanned by the cursor is clipped out and put into the clipboard. The area will stay highlighted. Had you also held down the shift key while pressing the keypad 0, the cursor would have disappeared after clipping.

Technical note: Alt and shift-alt keypad keys used to only perform the preprogrammed functions if the keypad mode was **Application** *(i.e. not* **Numeric***). Now, alt and shift-alt keypad do nothing if they are not programmed (or redefined in the special keymap, see* **The User Inter-**

face: Text Screen Menus), *but if they are programmed, they will perform their preprogrammed function no matter if the keypad is in numeric or application mode.*

Finally, the **NeatStuff.scp** program will also have programmed part of the **User Menu**. You might want to check out these programs and change them if you prefer. If you want to keep all of these programs around indefinitely, save your configuration after running **NeatStuff** and you'll never have to run it again.

If you would like to see how **NeatStuff** has programmed all these keys and options, look directly at the **NeatStuff.scp** code.

The SetMiscFlags Program

The ARexx program **SetMiscFlags.vlt** allows you to set the **MISCFlags** options mentioned in the **Quick Reference Section** of Chapter 4. **SetMiscFlags.vlt** is meant to be run from inside VLT; to run it, go to the **Script Menu** and select the **ARexx Macro** option. When VLT brings up a file requester, find and select **SetMiscFlags.vlt**, then hit return. A panel will appear at the bottom of the screen, with a plethora of gadgets in addition to two buttons, Use and Cancel. Each gadget has a description of the Miscflag that gadget controls, such as **Pad clips to clipboard** or **Do not update screen**. Clicking on the gadget toggles the Miscflag on and off; when the gadget is highlighted, it's selected and Miscflag is turned on; when the gadget is not highlighted, the Miscflag is turned off. At any one time, you can change as many settings as you like.

When everything has been arranged to your satisfaction, click on the Use button at the bottom of the panel. The new Miscflag settings will be put into use and the panel will disappear (in order to have VLT remember these settings after it shuts down, use the **Save Configuration** option). If you want to get rid of the panel without using the new Miscflags settings, click on the Cancel button.

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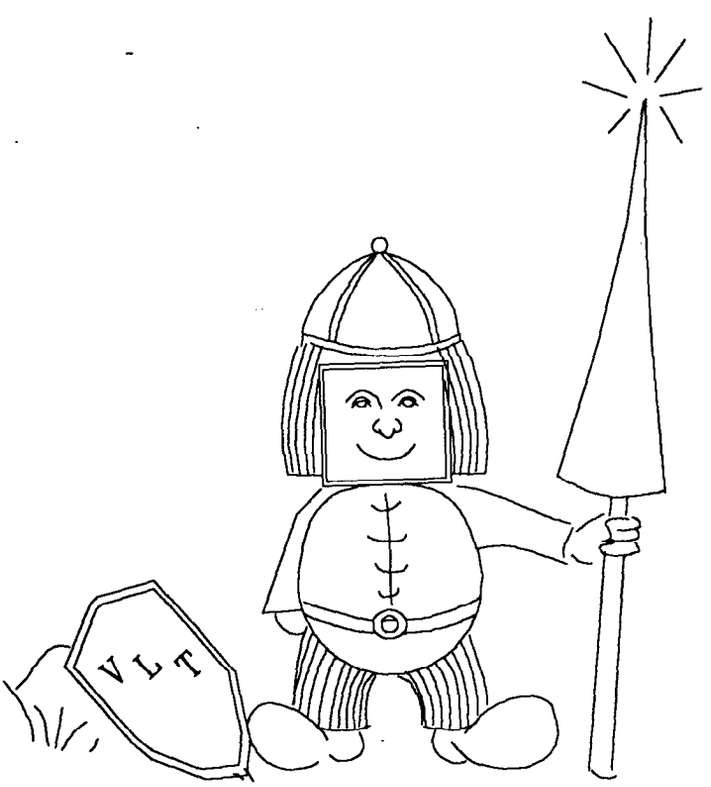

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