

User Manual



VMTerminal Software User Instructions

070-8394-02

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Preface

Purpose and Audience This manual explains how to install and use the VMTerminal software package. It is addressed to users of the Tektronix VM700 family of Video Measurement Sets (VM700, VM700A, or VM700T) and to system administrators where these Video Measurement Sets are used.

Terms and Conventions PC refers to a personal computer that runs the DOS operating system. Commands you must enter on the computer are shown on a separate line, as shown below:

```
command_name
```

When you are instructed to “enter a command,” it means to type the specified command on the PC keyboard and press the Enter key.

For More Information For information on installation and use of the Video Measurement Set or its communication capabilities and requirements, refer to the appropriate Video Measurement Set Option 01 and Option 11 User Manual.

For information on installing and using a personal computer, its communication capabilities and requirements, refer to the installation and user manuals for your personal computer.

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Getting Started

Getting Started

The VMT terminal program facilitates communication between a PC or PC-compatible computer and the VM700, VM700A, and VM700T Video Measurement sets. Further references to the VM700 in the text apply as well to both the VM700A and the VM700T. Any exceptions will be noted where there is a difference between the VM700 and the VM700A or VM700T.

The terminal program features a menu-driven interface for common operations. Additional commands add decision making and conditional branching capabilities.

Features

This section briefly describes some of the features of the VMT program that differentiate it from a generic terminal program.

Command Files

VMT users can create text files containing VMT commands and run them, either within a VMT session or as a startup command line option. Command files can call other command files to a nesting depth limited only by available PC memory.

Command Line Options

The command line options of the VMT program tell the program if the measurement set connected is a VM700 or VM700A (the VM700A and VM700T are functionally identical), which PC communications port to use, what baud rate to use, and if there is a command file to run on startup. The first time you run the VMT program, it uses default values for any command line options not supplied. It then writes the parameter values used to establish communication into a file that is read whenever the VMT program is again executed. The only time command line options are ever needed again is to change any of the values written in the saved file.

An additional command line option searches all available PC and VM700 serial ports and baud rates until communication is established. The parameter values that establish communication are then written to the parameter file used for future VMT executions.

Yet another command line option provides a screen of help information about all the command line options of the VMT program.

Conditional Action Two VMT commands are provided to specify actions to take based on either data coming from the VM700 or commands going to it. The `whendata` command specifies an action to take when a user-specified string is found in the incoming data stream. For instance, the following command:

```
whendata ** display Failed
```

shows the message “Failed” whenever incoming data contains the characters ‘**’.

Similarly, the `whencmd` command specifies an action to take when a user-specified string is found in the command going to the VM700.

The VMT program also keeps count of caution and alarm violations in VM700 measurements. Two additional commands, `ifcaution` and `ifalarm`, check these counters and take action if their values are non-zero. For example, the following command:

```
ifalarm run pcfiler.txt
```

runs a command file called “pcfiler.txt” if the alarm counter is non-zero. Two complementary commands, `ifnocaut` and `ifnoalarm`, execute a command if the caution or alarm counter is zero. The `clearcaution` and `clearalarm` commands are provided to clear the caution and alarm counters, respectively.

Data Logging The VMT program can capture incoming data, outgoing commands, or both in text files on the PC. The program also includes commands to rename, delete or view these files.

Keyboard History Commands are saved into a buffer that can be stepped through to bring up past commands for reuse (thus saving typing and eliminating a common source of error and frustration). The up-arrow key steps back through previous commands. The down-arrow, PageUp, and PageDown keys can be used as well. Control Home brings up the first command in the buffer, and Control End goes to the end of the buffer. Left and right arrow keys, Home, End, Ins, and Delete can be used to edit commands that have been recalled.

Looping Command files can be repeated a set number of times or infinitely. Conditional action commands can be used to exit loops early.

- Alt commands** Holding down the Alt key and pressing any of several alphabetic keys executes commands from pop-up menu selections. This simplifies the task of running applications, making Auto mode selections on the fly and setting up the VM700 measurement environment. When the VMT program is running, a window at the top of the screen lists the Alt-command keys available. The letter used to activate each entry is capitalized and in a different color from the remaining characters in the word.
- On-Line Help** Built-in help support is included for most VMT commands. Typing `help` lists the commands for which help is available. Typing `help` followed by a command name brings up help about that command.
- Printer Support** Data can be captured into a PC file or sent directly to a printer attached to the VM700 or the PC.

Installation

The VMT program uses no special communications protocol. Instead, it handles all data exchanges between the PC and the VM700 by itself. The VMT program will even find the correct COMM port and baud rate over which it can communicate with the VM700. References to the VM700 in the text apply as well to both the VM700A and the VM700T Video Measurement Sets. Any exceptions will be noted where there is a difference between the VM700 and the VM700A or VM700T. Perform the following tasks in order to run the VMT program.

1. Copy the VMT program to your PC.
2. Attach the correct cable between the PC and the VM700.
3. Ensure that communication parameters are set correctly on the VM700.
4. Run the VMT program with the -s option.

Cabling

The VMT program requires communication between the VM700 and the PC over a null modem RS-232C communications cable connected to their serial communication ports. If you are making your own cable, its connectors must have the connections shown in Table 1–1. These are the minimum connections. The cable must include the RTS and CTS lines in case the program uses them to control data flow.

Table 1–1: Typical RS-232C Cable Connections

VM700T (DTE) to Terminal (DTE) (null modem cable)			
VM700 or VM700A Pin No. (DB-25 Female)	VM700T Pin No. (DB-9 Female)	PC Cable End Pin No. (DB-9 Female)	PC Cable End Pin No. (DB-25 Female)
3 (RD)	2 (RD)	3 (TD)	2 (TD)
2 (TD)	3 (TD)	2 (RD)	3 (RD)
7 (Chassis GND)	5 (Chassis GND)	5 (Chassis GND)	7 (SG)
4 (RTS)	7 (RTS)	8 (CTS)	5 (CTS)
5 (CTS)	8 (CTS)	7 (RTS)	4 (RTS)

Installing the VMT Software

Installing VMT simply involves copying the VMT.EXE file from the VMT diskette onto your hard disk. The recommended procedure is as follows:

1. Create a directory for VMT files with the `mkdir` command. For example, to create a directory named `VMTDIR` on drive `C:`, type the following commands:

```
c:  
mkdir \vmtdir
```

2. Make the directory in which the VMT files will reside current, using the `cd` command. For example, if the directory in which the VMT files will reside is named `C:\VMTDIR`, type this command:

```
cd \vmtdir
```

to make it the current directory.

3. Insert the VMT diskette into a floppy disk drive on your PC.
4. Copy the VMT.EXE file from the floppy diskette into the current directory, using the `copy` command. For example, if the VMT diskette were in drive `A:`, you would type:

```
copy a:\vmt.exe
```

to copy the VMT.EXE file into your current directory.

After the copy command is complete, you can verify that the file was copied properly by using the `dir` command. Type the following command:

```
dir
```

and you should see a directory listing that includes file `VMT.EXE`.

If you will be using the VMT program often, you may wish to add the directory in which the VMT.EXE file resides to the search path in your `AUTOEXEC.BAT` file. That way, your PC will always find the VMT program and its related files from whatever your current directory is.

Configuring the VM 700

The following communications parameter settings are needed on the VM700 for the VMT program to work correctly:

- Non-SLIP Interfacing Mode must be set to Computer.
- The protocol of the Remote Control port must be set to None.

Communication Parameter Verification Procedure

- The flow control of the Remote Control port should be set to CTS/RTS if a five-wire cable is being used; set it to XON/XOFF if otherwise. Be aware, though, that XON/XOFF flow control can cause problems if binary (non-ASCII) data has to be transmitted, such as when transferring screen captures in Epson LQ format. In general, it is best to use a five-wire cable and CTS/RTS flow control.
- Character Size must be set to 8.
- Parity must be set to None.

The procedure for verifying that the VM700 communications parameters are set correctly is as follows:

1. Press the Configure button on the VM700 front panel to obtain the Configure Mode screen.
2. Touch the Configure Files soft key to display the contents of the /nvram0/ConfigFiles window.
3. Touch the icon for the Communication Setup file in the directory window to view the contents of the file.

4. Turn the knob until Non-SLIP Interfacing Mode, is highlighted.

If its value is set to Computer, proceed immediately to step 5.

If its value is set to Terminal, touch the word Terminal on the display screen. Terminal should be surrounded by a small box. Turn the knob until Computer is displayed in the box. Touch the Accept Input soft key.

5. Note which port is designated as the Remote Control port, then scroll to the section of the Communication Setup file that sets the parameters for that port.

6. Turn the knob until the Protocol line for the remote control port is highlighted.

If its value is set to None, proceed immediately to step 7.

If its value is set to SLIP, touch the word SLIP on the display screen. The word SLIP should be surrounded by a small box. Turn the knob until the word None is displayed. Touch the Accept Input soft key.

7. Turn the knob until the Flow Control line for the remote control port is highlighted.

If you are using a five-wire cable, Flow Control should be set to CTS/RTS. If you are using a three-wire cable, Flow Control should be set to XON/XOFF.

If Flow Control is already set correctly, proceed immediately to step 8.

Otherwise, touch the value on the screen to surround it with a small box. Then, turn the knob until the correct value for Flow Control appears, and touch the Accept Input soft key.

8. Turn the knob until the Character Size line for the remote control port is highlighted.

If its value is set to 8, proceed immediately to step 9.

Otherwise, touch the displayed value on the screen to surround it with a small box. Turn the knob until the number 8 is displayed. Touch the Accept Input soft key.

9. Turn the knob until the Parity line for the remote control port is highlighted.

If its value is set to None, proceed immediately to step 10.

Otherwise, touch the displayed value on the screen to surround it with a small box. Turn the knob until the word None is displayed. Touch the Accept Input soft key.

10. Touch the Update & Exit soft key.

Establishing Communication

If the cable being used is correct and connecting the VM700 and the PC, if the VMT program has been installed correctly, and if the VM700 communication parameters are set correctly, the VM700 and the PC should be ready to communicate.

The following procedure enables you to determine if all of the above has been done correctly. It also creates a number of files in the VMT program directory. In addition, it sets up the command line defaults to minimize typing when you run the VMT program.

1. Make the VMT program directory current. For example, if the VMT.EXE file is in directory C:\VMTDIR, type:

```
cd \vmtdir
```

2. Execute the VMT program, using the -s option. If you are using a five-wire cable, type:

```
vmt -s
```

If you are using a three-wire cable, and thus need to use XON/XOFF flow control, type:

```
vmt -s -x1
```

3. The VM700 should now be in remote. (The Configure light should be blinking.) The PC screen should now look like Figure 1–1. If it does not, refer to *What To Do If Something Goes Wrong* on page 1–12.

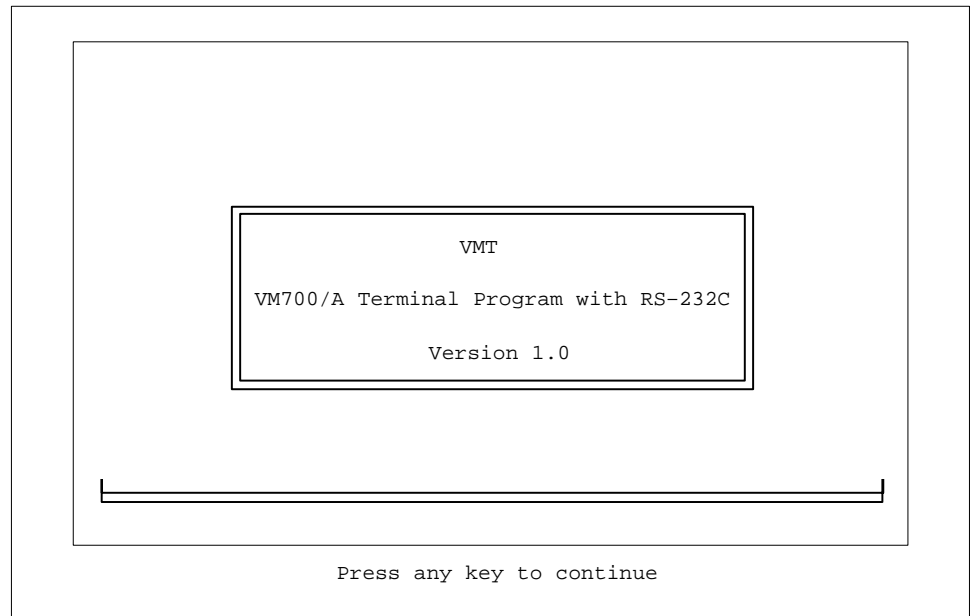


Figure 1–1: Initial PC screen

4. Press any key, or wait about 20 seconds. The PC screen should now look like Figure 1–2.

NOTE. *The VM700T is capable of 38400 baud. Make sure the baud rate is set to one of the baud rates that the VMT program can use for communication. A baud rate of 9600 is recommended as the fastest setting.*

At this point, the VMT program searches COM1 and COM2 through various baud rates (300, 600, 1200, 2400, 4800, 9600, and 19200 baud) to establish communication with the VM700. If the search is unsuccessful, the program displays a message indicating that communication could not be established, then exits. Refer to *What To Do If Something Goes Wrong* on page 1–12 if this happens.

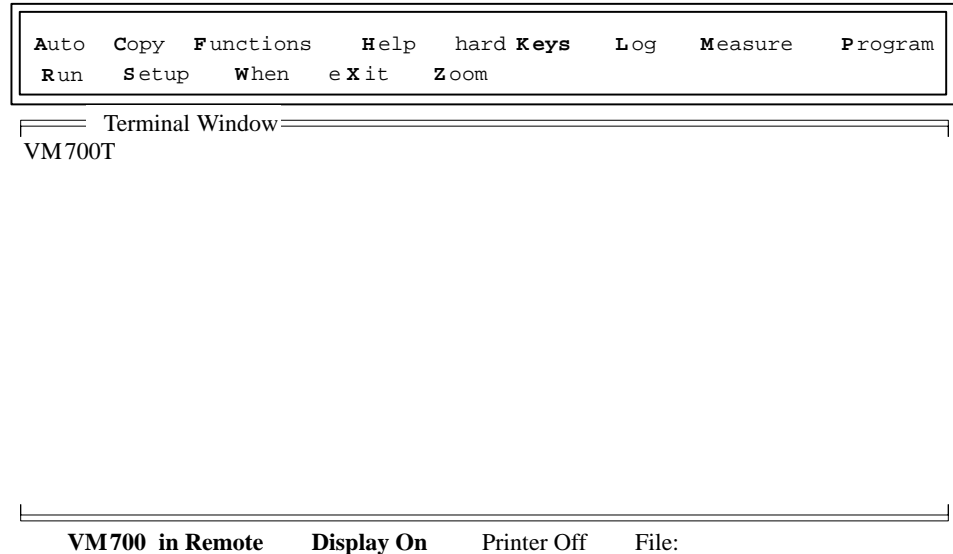


Figure 1-2: Second PC screen

When the VMT program establishes communication with the VM700, it sends out queries and reads files from the instrument to set up for operation. This entire process usually takes under a minute. When completed, the VM700 Remote Control prompt appears on the PC screen, and the VMT program is ready to accept commands to send to the VM700.

For those interested readers, the VMT program performs the following activities. Skip to step 5 if you are not interested in the implementation details.

- It saves the option settings used to execute the program in a file called VMT.DEF. When you next type the VMT command, the program uses the option settings found in this file as defaults. When the VMT program is invoked with the -s option, it saves the settings with which it established communication with the VM700, and uses those settings the next time VMT is executed.
- It queries the VM700 for its prompt (the string that the VM700 sends to terminate messages).
- It queries the VM700 to find out what options are available, and writes the results into file VERSION.VMA.
- It reads a Selected Measurements File for each available standard on each channel (three files for NTSC- or PAL-standard instruments, six files for dual-standard instruments), and writes the four-letter keywords of each selected measurement into files of the form <standard><channel-letter>.SEL (for example, NTSCA.SEL, PALA.SEL, and so on).

- It reads the names of any user-defined functions available for execution, writes them into files with names of the form FUNCn.TRE. It then combines these files into a file named FUNCTION.LST.
 - It reads the names of all executable files and the directories containing them, and writes these into files with names of the form EXECn.TRE.
 - It reads file /rom/ConfigData into file CONFIG.DAT. From this information, it generates a list of all four-letter keywords (and their descriptions) of video measurements available for selection with the NTSC and PAL standards. It stores the keywords in files NTSC0.SEL and/or PAL0.SEL, as appropriate. It stores the descriptions in files NTSC.TMP and/or PAL.TMP, as appropriate.
5. To exit from the VMT program, type Alt-X (press X while holding down the Alt key).

What to Do If Something Goes Wrong

Here's a list of things to check if the VMT program does not establish communication with the VM700.

- Are the PC and the VM700 both plugged in and powered on?
- Are you using the correct cable? Refer to *Cabling* on page 1–5 to find out what pin connections the VM700 requires.
- Is the cable securely attached to both the PC and the VM700?
- Is your current directory of your PC the same one in which the VMT program resides? If not, is the VMT program directory included in your search path?
- Are the VM700 communication parameters set correctly? The required values are as follows:
 - Non-SLIP Interfacing Mode to Computer
 - Protocol for the remote control port to None
 - Flow Control for the remote control port to CTS/RTS for five-wire cable, XON/XOFF for three-wire
 - Character Size for the remote control port to 8
 - Parity for the remote control port to None
 - Baud rate setting on the VM700T is set to 19200 or below (a baud rate setting of 9600 is the fastest recommended setting, though 19200 may work for your application).

Refer to *Configuring the VM700* on page 1–6 for instructions on setting these parameters on the VM700.

- Did you invoke the VMT program correctly? The command is “vmt -s” if you are using a five-wire cable, “vmt -s -x1” if you are using three-wire.

If you have checked all the items above and still can not get the VMT program to work, contact your local Tektronix representative for assistance.



Operating Basics

Operating Basics

This section describes the command line options of the VMT program and the files read in at program startup. It then describes the following three ways of entering VMT commands:

- typing
- menu selection
- history keys

Command Line Options

To run VMT, type VMT followed by one or more command line options at the DOS prompt.

Whenever you run the VMT program, the command line options you used are saved in a file called VMT.DEF. This file is read the next time you start the program. The option values it contains become the default values for the next run. You can see the contents of the defaults file by issuing the DOS command “type vmt.def”. To change a value in an option, just include the option on the command line the next time you run VMT.

- a#** The -a# option tells the VMT program whether the Video Measurement Set is a VM700 or a VM700A. -a0 specifies the VM700. The -a1 option specifies either the VM700A or the VM700T. Their functionality is identical. The original default is -a0.
- b#** The -b# option specifies the baud rate to use for communication. Valid settings are 300, 600, 1200, 2400, 4800, 9600, and 19200. See also the -s option.

NOTE. The VM700T is capable of 38400 baud. Make sure it is set to one of the baud rates that the VMT program searches for, as indicated above, in the communication setup file. The recommended baud rate setting is 9600.

- f** The -f option specifies a command file to read in and execute upon startup. The file must be in the current directory if only a file name is given. It must be in a subdirectory of the current directory if a partial path is given. It can be in any directory if a complete path is given. The argument is separated from the -f by one or more spaces.

- h** The **-h** option brings up a help screen, showing the command line options and their meanings.

- m** The **-m** option specifies a modem command string. This option takes one argument (separated from the **-m** by a space) specifying a phone number for the VMT program to dial in an attempt to establish communication with the VM700. An argument of None disables modem dialing. The value of this option is recorded in the VMT.DEF file, and is used the next time you execute the VMT program. The default is tone dialing (that is, VMT affixes the characters ATDT to the argument typed in, if the argument is a number). Commas cause dialing to pause for two to three seconds. Dashes are ignored. Spaces are interpreted as argument delimiters, so do not include spaces in the argument. The modem connected to the VM700 must be in auto-answer mode.

- p#** The **-p#** option specifies the PC communications port to use. **-p1** specifies port COM1; **-p2** specifies port COM2. See also the **-s** option.

- q#** The **-q#** option tells whether or not to start the VMT program quickly (that is, without querying the VM700 about its function directory contents, selected measurements, or available option). **-q0** reads in this information; **-q1** does not. The original default is **-q0**.

NOTE. Do not use the **-q1** option setting unless you are *certain* that the function directory contents, selected measurements, and available options of the VM700 have not changed since the last time you ran VMT.

- s** The **-s** option searches all available baud rates on the COM1 and COM2 ports to establish communication with the VM700. When communication is established, the port number and baud rate are recorded in the VMT.DEF file. These values become the default the next time the VMT program is executed. See also the **-b#** and **-p#** options.

NOTE. The VM700T is capable of 38400 baud. Make sure it is set to one of the baud rates that the VMT program can search for in the communication setup file (refer to the **-b** option for the usable baud rates).

- x#** The `-x#` option specifies the method of flow control to be used. `-x0` specifies CTS/RTS flow control; `-x1` specifies XON/XOFF flow control. The original default is `-x0`. Note that CTS/RTS flow control can only be used with a five-wire connecting cable between the PC and the VM700. Note also that if XON/XOFF flow control is used, transmission of binary (that is, non-ASCII) data may be interrupted unexpectedly. An example of binary data exchange is transmitting a screen copy in Epson LQ printer format.

VMT Files

The VMT program creates a number of files in the directory in which it resides. These files, and the circumstances under which they are created or recreated, are as follows:

- **VERSION.VMA:** This file tells the VMT program what options are available on the VM700. It is created the first time that the VMT program is run. It is recreated if the VMT program is run and the file is not found in the VMT directory. The VERSION.VMA file lets the VMT program know which instrument operations and measurements are valid.

It is important that that contents of the VERSION.VMA file be accurate. Therefore, if you connect a different VM700 to your PC, or if you change options or software versions on your existing VM700, erase the VERSION.VMA file and run VMT again. The contents of the file can then be updated.

- **VMT.DEF:** This file contains the option settings last used to execute the program. When you next type the VMT command, the program uses the command line option settings found in this file as defaults. To change a command line option setting, simply include the option and the desired setting on the VMT command line the next time you run VMT.

The following files are created the first time you run the VMT program, and recreated each time thereafter, with two exceptions. The files are NOT recreated in the following circumstances:

- if you (1) run VMT using the `-q1` (quickstart) option
- if you use the `remote` command to resume execution of a suspended VMT program

NOTE. Do not use the `-q1` option or the `remote VMT` command if you did any of the following:

- *switched to a different VM700*
 - *changed VM700 options*
 - *modified the contents of the Function Keys directory (`/nvram0/FunctionKeys`) or any of its sub-directories since VMT was last executed or suspended.*
-
- **NTSCx.SEL, PALx.SEL:** These files contain the four-letter keywords from the Selected Measurements File for each available standard on each channel. There are three files for NTSC- or PAL-standard instruments, six files for dual-standard instruments. The file names take the form `<standard><channel-letter>.SEL` (for example, `NTSCA.SEL`, `PALA.SEL`, and so on).
 - **FUNCn.TRE, FUNCTION.LST:** Upon startup, the VMT program reads the names of any user-defined functions available for execution. It writes them into files with names of the form `FUNCn.TRE`. It then combines these files into a file named `FUNCTION.LST`.
 - **EXECn.TRE:** Upon startup, the VMT program reads the names of all executable files and the directories containing them. It writes this information into files with names of the form `EXECn.TRE`.
 - **CONFIG.DAT, NTSC0.SEL, PAL0.SEL, NTSC.TMP, PAL.TMP:** Upon startup, the VMT program reads file `/rom/ConfigData` on the VM700, and stores its contents in file `CONFIG.DAT` on the PC. From this information, it generates a list of all four-letter keywords and descriptions of the video measurements available. It stores the keywords in files `NTSC0.SEL` and/or `PAL0.SEL`, as appropriate. It stores the descriptions in files `NTSC.TMP` and/or `PAL.TMP`, as appropriate.

Issuing VMT Commands

Typing Commands The most obvious way to enter commands into the VMT program is by typing them in the terminal window. Any VM700 commands can be entered in this manner. Simply type the command and any accompanying arguments; then press the Enter key. The *Reference* section, beginning on page 3–1, gives a complete list of available commands for the VMT program.

Menu Selections, or Alt Commands An even simpler way to enter commands into the VMT program is to use the menu keys provided. Available menu keywords are shown at the top of the VMT screen, in the Menu window. Holding down the Alt key while pressing the capitalized letter of a menu keyword brings up a menu that allows you to select further actions with the arrow keys. If certain commands require arguments, these are prompted for on the screen. The Alt commands and their menus are described in detail in the *Reference* section beginning on page 3–1.

History Keys As VMT commands are issued, they are stored in a buffer. These commands can be brought up for reuse with the following keys:

- The up-arrow key steps back through the list of previously issued commands.
- The down-arrow key steps forward through the list of previously issued commands.
- The Page Up key steps back 10 commands.
- The Page Down key steps forward 10 commands.
- Control-Home goes to the beginning of the list.
- Control-End goes to the end of the list.

The left- and right-arrow keys, as well as the Home, End, Ins, and Delete keys, can be used to edit commands once they are recalled to the command line.

A Typical VMT Session

This section walks you through a typical VMT session that shows you how to do the following tasks:

- start the VMT program
- set up a file to record commands from the terminal
- run a Measure mode measurement
- view its results on the terminal screen
- save the results in a file
- print the results
- put the VM700 into Auto Mode
- select Auto Mode measurements and view results on the terminal screen
- save Auto Mode results in a file
- print Auto Mode results
- exit VMT
- edit the command file
- run the command file
- exit VMT

Preliminaries

Make the directory where the VMT program resides current (cd to the directory where the VMT.EXE file is located). This step is not necessary if the directory of the VMT program is already in the search path.

Delete the files TUTOR.RUN and AUTO.RES, if they already exist. The tutorial saves commands or results to these files. If they already exist, their contents will be appended to, which might not produce the desired results.

Starting the VMT Program

To start the VMT program, type the following command:

```
vmt -s
```

This command searches the available PC and VM700 ports and baud rates until communication is established. The VMT program records this information in the VMT.DEF file. In future VMT runs, if neither the communication port nor the baud rate are changed, typing the following command:

```
vmt
```

starts the VMT program and establishes communication between the PC and the VM700. The ports and baud rate recorded in the VMT.DEF file are used.

The VMT initialization screen appears. Press any key (or wait about 20 seconds) and the program continues. The VM700 goes into Remote mode, indicated by the blinking light on the Configure button. VMT then reads the contents of several VM700 directories. When a blinking cursor appears alongside the VM700 prompt, the program is ready for you to enter commands.

Recording Commands

You can now tell the VMT program to record the commands sent to the VM700 and save them in a file. You will do something with the file later on.

Press Alt-C to bring up the Copy menu. When it appears, use the down-arrow key to highlight the line that starts “Command logging,” and then press ENTER.

A dialog box appears, prompting for the name of a file. Type the following command:

```
tutor.run
```

in the dialog box and press ENTER. This saves the commands in a file named TUTOR.RUN.

The following command:

```
fileon out tutor.run
```

appears next to the VM700 prompt. Then, a new VM700 prompt appears with the blinking cursor alongside it. What happened was that the Alt-C/dialog box sequence set up a command. The command was sent to the VM700 when you pressed ENTER after typing the file name. You can get the same results by typing the `fileon` command directly at the prompt, but the Alt-menu/dialog box sequence is easier to remember.

Many Alt-menu operations in VMT are similar to this one. Pressing an Alt-key brings up a submenu or dialog box. Commands are sent when the last set-up action is complete. Sometimes, an entire sequence of commands is sent in response to a single Alt-menu selection.

Running the H_Timing Measurement

Next, you will run a Measure mode measurement. You will use the H_Timing measurement, since it's one that you can run with any kind of video signal (no special test signals needed).

Executing the Measurement

Press Alt-M.

Use the arrow keys to scroll up or down, as necessary, until the Video~Measurements line is highlighted.

Press ENTER.

Use the arrow keys to scroll up or down, as necessary, until the H_Timing line is highlighted.

Press ENTER.

Use the arrow keys to scroll up or down, as necessary, until the **execute** line is highlighted.

Press ENTER.

The VMT program sends the following command:

```
execute H_Timing
```

to start the H_Timing measurement.

Viewing the Results

Press Alt-M, highlight the Video~Measurements line, press ENTER, then highlight the H_Timing line and press ENTER.

Then, highlight the show line and press ENTER again.

The VMT program sends the following command:

```
show H_Timing
```

to display the H_Timing measurement results file.

Storing the Results in a File

Press Alt-M, highlight the Video~Measurements line, and press ENTER. Then, highlight the H_Timing line and press ENTER.

Now, highlight the show & capture line and press ENTER again.

Press ENTER.

This brings up a dialog box, prompting you for the name of a file in which to store the H_Timing measurement results.

Type the following command:

```
h_timing.txt
```

The VMT program then sends the following command:

```
textcopy h_timing.txt H_Timing
```

which stores the H_Timing measurement results in a file called h_timing.txt in the current directory.

Printing the Results

Press Alt-M, highlight the Video~Measurements line, and press ENTER. Then, highlight the H_Timing line and press ENTER.

Highlight the print line and press ENTER again.

The VMT program sends the following command:

```
print H_Timing
```

to send the H_Timing measurement results to the VM700 copy port.

Running Auto Measurements

Next, you will run some Auto measurements. To obtain results from this portion of the exercise, all the VM700 needs is a signal (NTSC or PAL) with a sync pulse.

Executing Auto Mode Measurements

Type the following command:

```
execute Auto
```

Viewing Results on the Screen

If your VM700 is receiving an NTSC signal, type this command:

```
getresults RSRN RSFN RSYU RRSW
```

to start making the following measurements on the sync pulse: Sync Risetime, Sync Falltime, FCC Sync Width, and RS-170A Sync Width.

If your VM700 is receiving a PAL signal, type this command:

```
getresults PLSD PSRT PSFT
```

to start making the following measurements: Sync Duration, Sync Risetime, Sync Falltime.

You can achieve the same results as the above commands by typing Alt-A to bring up the Auto menu, then selecting or deselecting Auto measurements with the arrow keys and the space bar. Pressing the space bar when an Auto measurement is highlighted toggles the selection status of that measurement. However, when only a few Auto measurements are to be run (as in this case), it is often easier to use the procedure shown above.

Saving Auto Mode Results in a File

Type the following command:

```
textcopy auto.res Auto
```

to save the Auto measurement results for the selected measurements in a file called AUTO.RES on the PC.

Printing Auto Mode Results

Type the following command:

```
print Auto
```

to send the Auto measurement results to the VM700 copy port.

Turn Command Logging Off

Next, turn off command logging. Press Alt-C to bring up the Copy menu. When it appears, highlight the line that starts "Close file." Then, press ENTER.

The fileoff command is issued to turn off command and data logging.

Editing the Command File

Next, edit the saved command file so that you can use it as a macro (a pre-defined sequence of commands). Press Alt-R to bring up the Alt-Run menu. Highlight TUTOR.RUN and press ENTER. Highlight the “edit” item and press ENTER.

This brings up a window showing the contents of the TUTOR.RUN file. You can use the arrow keys, as well as the Home, End, PageUp, PageDown, Insert, and Delete keys, to move the cursor around the file and insert or delete characters.

Press the End key to move the cursor to the end of the file. Press the Delete key to remove the fileoff command from the end of the file. Press function key F10 to save the changes you made to the file. Press ‘Y’ in response to the “Do you want to overwrite this file?” prompt.

Using the Command File

Next, use the command file you just saved. Press Alt-R to bring up the Alt-Run menu again. Highlight TUTOR.RUN and press ENTER. Highlight the “run” item and press ENTER.

The VMT program now executes the commands contained in the TUTOR.RUN file. When it is finished, the VM700 prompt appears again in the VMT terminal window.

Exiting VMT

To quit the VMT program, either type the following command:

```
quit
```

or press Alt-X.

Using VMT for Remote-Control Tasks

This section tells you how to accomplish various remote-control tasks in VMT. The section describes what menus, commands, or combinations thereof you can use to accomplish each task.

The tasks are divided into the following major groupings:

- Using Auto mode
- Using Measure mode
- Using the VM700 front panel
- Using VM700 soft keys
- Capturing and printing VM700 screens and files
- Command and data logging
- Program files
- Getting help
- Setting and using “if” and “when” conditions
- Exiting the VMT Program

Using Auto Mode

You can select and unselect Auto-mode measurement and run the Auto-mode measurements.

To select/unselect and execute Auto measurements:

1. Press Alt-A.
2. Use the arrow keys to highlight Auto measurements of interest, or to scroll through the list of Auto measurements.

An auto measurement is selected when a plus sign (+) appears to the left of its name in the Auto measurements list. A measurement is unselected when no plus sign appears to the left of the measurement's name. Selected measurements are executed when the execute Auto command is given.

To select/unselect an Auto measurement:

1. Highlight the measurement, using the arrow keys.
2. Press the space bar to toggle the measurement's selection status. A selected measurement becomes unselected. An unselected measurement becomes selected.

To execute selected Auto measurements:

Press Enter while the Auto measurements list is displayed. The VMT program sends the following sequence of commands to the VM700.

```
execute Auto
getresults <keyword-list>
show Auto
```

The selected measurements are executed. Results appear on the PC screen. The VM700 remains in Auto mode.

To save Auto-mode results in a file on the PC:

1. Press Alt-C.
2. Highlight the line that starts "Text files" and press Enter.
3. Type the name of the PC file to create and press Enter.
4. Type "Auto;" and press Enter.

To rename an Auto-mode results file on the VM700:

The VM700 saves the latest results from each measurement application it runs in a separate file stored in directory /nvram0/ConfigFiles/Measurement~Results. New results overwrite the contents of previous results files. Therefore, if you want to run a measurement twice and retrieve results for comparison, you have to rename the earlier results file. This is easily done with the rename command.

To rename the Auto-mode results file:

Type the following command:

```
rename Auto <new-name>
```

at the VM700 prompt.

To get numeric Auto measurement results only:

Auto measurement results typically include both measurement names and numeric measurement data. In some cases, you may wish to get measurement data only from the VM700. (For example, you may be collecting data to be passed to another program.) To do this with Auto measurement results, proceed as follows:

With the VM700 in Auto mode, type the following commands:

```
getresults  
data Auto
```

The numeric data from the Auto measurement results file appears on the screen.

If you append the modifier `time` to the `data` command, as shown in the following command:

```
data Auto time
```

the date and time that the results were generated precedes the numeric data.

Using Measure mode

You can select a measurement to make and send the measurement results to the screen or capture the measurement results in a PC file.

To execute a Measure-mode measurement:

1. Press Alt-M.
2. Highlight a measurement group (for example, Video~Measurements or Video~Options) and press Enter.
3. Highlight a selected measurement and press Enter.
4. Highlight the line that begins “execute” and press Enter.

To execute a Measure-mode measurement and send results to the screen:

Do steps 1 through 3, above.

Highlight the line that begins “execute & show” and press Enter.

To send the latest results file of a measurement to the screen:

Do steps 1 through 3, above.

Highlight the line that begins “show” and press Enter.

NOTE. *This procedure does not start the measurement, It only reads the latest results file written by that measurement and sends the file to the PC.*

To capture the latest results file any measurement in a PC file:

Do steps 1 through 3 of the procedure on page 2–15.

Highlight the line that begins “show & capture” and press Enter.

Type the name of the file to create on the PC and press Enter.

The results file, if it exists on the VM700, is written to the PC file you specify. If the PC file already exists, the new data are appended to it.

NOTE. *This procedure does not start the measurement, It only reads the latest results file written by that measurement and sends the file to the PC.*

To send measurement results to the VM700 printer:

Do steps 1 through 3 of the procedure on page 2–15.

Highlight the line that begins “print” and press Enter.

To rename a measurement results file on the VM700:

The VM700 saves the latest results from each measurement application it runs in a separate file stored in directory /nvram0/ConfigFiles/Measurement~Results. New results overwrite the contents of previous results files. Therefore, if you want to run a measurement twice and retrieve results for comparison, you have to rename the earlier results file. This is easily done with the rename command.

To rename a results file:

Type the following command:

```
rename <measurement-name> <new-name>
```

at the VM700 prompt.

To get numeric measurement results only:

Measure mode measurement results typically include both measurement names and numeric measurement data. In some cases, you may wish to get measurement data only from the VM700. (For example, you may be collecting data to be passed to another program.) To do this with Measure-mode measurement results, proceed as follows:

1. With the VM700 running a Measure-mode measurement, type the following commands:

```
getresults
data <measurement-name>
```

2. The numeric data from the results file of the measurement appears on the screen.
3. If you append the modifier `time` to the data command, as in the following command:

```
data <measurement-name> time
```

the date and time that the results were generated precede the numeric data.

Using the VM700 Front Panel Interface

You can operate the front panel controls of the VM700 Video Measurement Set.

To press a button on the VM700:

1. Press Alt-K.
2. Highlight the line corresponding to the button you wish to press and press Enter.

To press and release a soft key:

Type the following command:

```
softkey <name>
```

at the VM700 prompt.

To press a soft key without releasing it:

Type the following command:

```
softpress <name>
```

at the VM700 prompt.

To release a previously pressed soft key:

Type the following command:

```
softrelease <name>
```

at the VM700 prompt.

NOTE. Any soft key named in a `softkey`, `softpress`, or `softrelease` command must be visible on the VM700 display for the command to take effect.

With a few exceptions, the general rule for forming a soft key name is to take the spelling and capitalization from the soft key on the display, omit the variable part and join the words with an underscore (`_`). For example, the soft key name for the “Noise 15.03 dB” soft key is “Noise_dB”, and for the “1H Display” soft key it is “H_Display”.

The exceptions are the Line soft keys in Select Line mode, which change the display to the specified line. In Measure mode (except for the TwoField measurement), the names for these soft keys are “Preset1”, “Preset2”, “Preset3”, and “Preset4.” In Waveform and Vector modes and in the TwoField measurement, only the first two lines are available. Their soft key names are Preset1NTSC and Preset2NTSC (for an NTSC-standard VM700) and Preset1PAL and Preset2PAL (for a PAL-standard VM700).

Capturing and Printing VM700 Screens and Files

You can capture the VM700 display to a PC file and print the files to a printer on the PC or to a printer on the VM700.

To capture the contents of the VM700 display in a PC file:

1. Press Alt-C.
2. Highlight the line that starts “Screen capture” and press Enter.
3. Type the name of the PC file to create and press Enter.

To print a VM700 file on the PC printer:

1. Press Alt-C.
2. Highlight the line that starts “Screen capture” and press Enter.
3. Type the name of the PC file to create and press Enter.
4. Type the name of the VM700 file to copy. The path defaults to the Measurement~Results directory (for the current standard, if using a dual-standard VM700).

To find out what VM700 files are available in a VM700 directory:

Type the following command:

```
filesin <directory-name>
```

To print the contents of the VM700 display on the VM700 printer:

1. Press Alt-C.
2. Highlight the line that starts “Screen print” and press Enter.

To print a VM700 file on the VM700 printer:

1. Press Alt-C.
2. Highlight the line that starts “File print” and press Enter.
3. Type the name of the VM700 file to print. The path defaults to the Measurement~Results directory (for the current standard, if using a dual-standard VM700).

To select PC printer formats:

1. Press Alt-C.
2. Highlight the line that starts “Format” and press Enter.
3. Highlight the format you want to use and press Enter.

To capture a VM700 file in an ASCII-format PC file:

1. Press Alt-C.
2. Highlight the line that starts “Text files” and press Enter.
3. Type the name of the PC file to create and press Enter.
4. Type the name of the VM700 file to capture. The path defaults to the Measurement~Results directory (for the current standard, if using a dual-standard VM700).

Command and Data Logging

You can log (record) commands you send to the VM700, data returning from the VM700, or both.

To log commands sent to the VM700:

1. Press Alt-C.
2. Highlight the line that starts “Command logging” and press Enter.
3. Type the name of the PC file to log commands into.

To log data coming from the VM700:

1. Press Alt-C.
2. Highlight the line that starts “Data logging” and press Enter.
3. Type the name of the PC file to log data into.

To log both command and data:

1. Press Alt-C.
2. Highlight the line that starts “Data & commands” and press Enter.
3. Type the name of the PC file to log data and commands into.

To turn off command and data logging:

1. Press Alt-C.
2. Highlight the line that starts “Close file” and press Enter.

Using Program Files

There are two ways to create program files:

- by logging commands and editing the resulting file
- by creating the command sequence from scratch with a text editor (either the one provided by the Alt-R menu, or your own favorite text editor)

If you use your own favorite text editor to create a program file, make sure to save the file as ASCII text. The VMT program will not read formatted word-processor files.

Also, no matter which editor you choose, save the program file with an extension of .RUN.

To create/edit a program file:

1. Press Alt-R.
2. Either highlight “Create new file” to start from scratch, or highlight the name of a .RUN file you wish to view or edit and press Enter.
3. If you selected an existing file, highlight either “View” to examine the contents of the file (read-only) or “Edit” to open the file for editing and press Enter.
4. Use the arrow, Insert, Delete, Home, End, PageUp, and Page Down keys to navigate around the file. To enter text when editing, just type the text.
5. Press function key F10 to save any changes to the file and return to the VMT prompt.
6. Press ESC to throw away any changes and return to the VMT prompt.

To run a program file:

1. Press Alt-R.
2. Highlight the name of a .RUN file and press Enter.
3. Highlight “Run” and press Enter.

Getting Help

To get help on a VMT command:

1. When you know the name of the command type the following command:
`help <command-name>`
2. If you do not know the name of the command you want help on, press Alt-H to get a list of command names.
3. Type a command name from the displayed list and press Enter.

Setting and Using “if” and “when” Conditions

If and when conditions test incoming data, and take user-specified actions based on the results of those tests.

A `whendata` condition monitors incoming data for the occurrence of a user-specified string. If the string is found in the data, the VMT program immediately executes a command specified by the `whendata` condition.

An `ifalarm` condition tests the results of `show` commands for the string “**”, and executes a user-specified command if the string is found. This command can be used to search for alarm violations from Auto measurement results.

An `ifcaution` condition tests the results of `show` commands for the string “*”, and executes a user-specified command if the string is found. This command can be used to search for caution violations from Auto measurement results, or alarm conditions from Measure-mode measurement results.

The major difference between `if` and `when` conditions is that `when` conditions monitor incoming data continuously for the specified string, while `if` conditions are only checked when the `if` command is executed.

To monitor data continuously for a string:

1. Press Alt-W.
2. Highlight the line that starts “`whendata`” and press Enter.
3. Type the string to look for in the data.
4. Type a command to execute when the string is found.

This feature is often best used with the `display off`, in order to isolate data items of interest. Thus, the following command sequence:

```
whendata string display line
execute measurement
getresults
display off
show measurement
display on
```

executes `measurement` and displays only the lines containing `string`.

To clear “when” conditions:

1. Type the following command:

```
clearwhen
```

or press Alt-W.

2. Highlight the line that starts “Clearwhen” and press Enter.

To check Auto measurement results for alarms or cautions, use the following command sequence:

```
clearwhen
clearcaution
clearalarm
whendata ' * ' display line
whendata ' ** ' display line
display off
execute Auto
getresults
show Auto
ifalarm display "Auto - Alarm found"
ifcaution display "Auto - Caution found"
ifnoalarm display "Auto - no Alarm found"
ifnocautions display "Auto - no Caution found"
clearwhen
clearcaution
clearalarm
display on
```

To check Measure mode measurement results for alarms, use the following command sequence:

```
clearwhen
clearcaution
whendata ' * ' display line
display off
execute <measurement>
getresults
show <measurement>
ifcaution display "<measurement> - Alarm found"
ifnocautions display "<measurement> - no Alarm found"
clearwhen
clearcaution
display on
```

Exiting the VMT Program

To exit VMT, either type the following command:

```
quit
```

or press Alt-X.



Reference

VMT Commands

This section and the two following sections describe the different commands that can be executed from within the VMT program. VMT commands can be grouped into three categories:

- Alt commands – executed by holding the Alt key and pressing a letter
- VM700 commands – standard VM700 commands executed by typing at the prompt
- Extended commands – VMT specific commands, also executed by typing at the prompt

Alt Commands

Alt Commands are executed by holding down the Alt key and pressing a letter, usually the first letter of the command.

Auto

The Alt-Auto command allows you to select or deselect Auto mode measurements. It then puts the VM700 in Auto mode, and displays the results of the selected measurements.

Pressing Alt-A displays the Alt-Auto window (Figure 3–1). The window lists all Auto mode measurements for the current channel and video standard. A plus sign (“+”) to the left of a measurement’s name indicates that the measurement is currently selected, and will be executed the next time the VM700 goes into Auto mode.

You can use the up-arrow and down-arrow keys to scroll through the list of measurements, highlighting them one at a time. Pressing the space bar toggles the selection status of the highlighted measurement. Pressing the Escape key aborts the Alt-Auto command.

Pressing the Enter key completes Auto measurement selection. The Alt-Auto window disappears, and the `execute Auto` command is sent to the VM700, followed by the `getresults` command. The results of the Auto measurement appear on the PC screen a short time later. The time required for results to appear varies from a few seconds to a few minutes, depending on the Auto measurements selected.

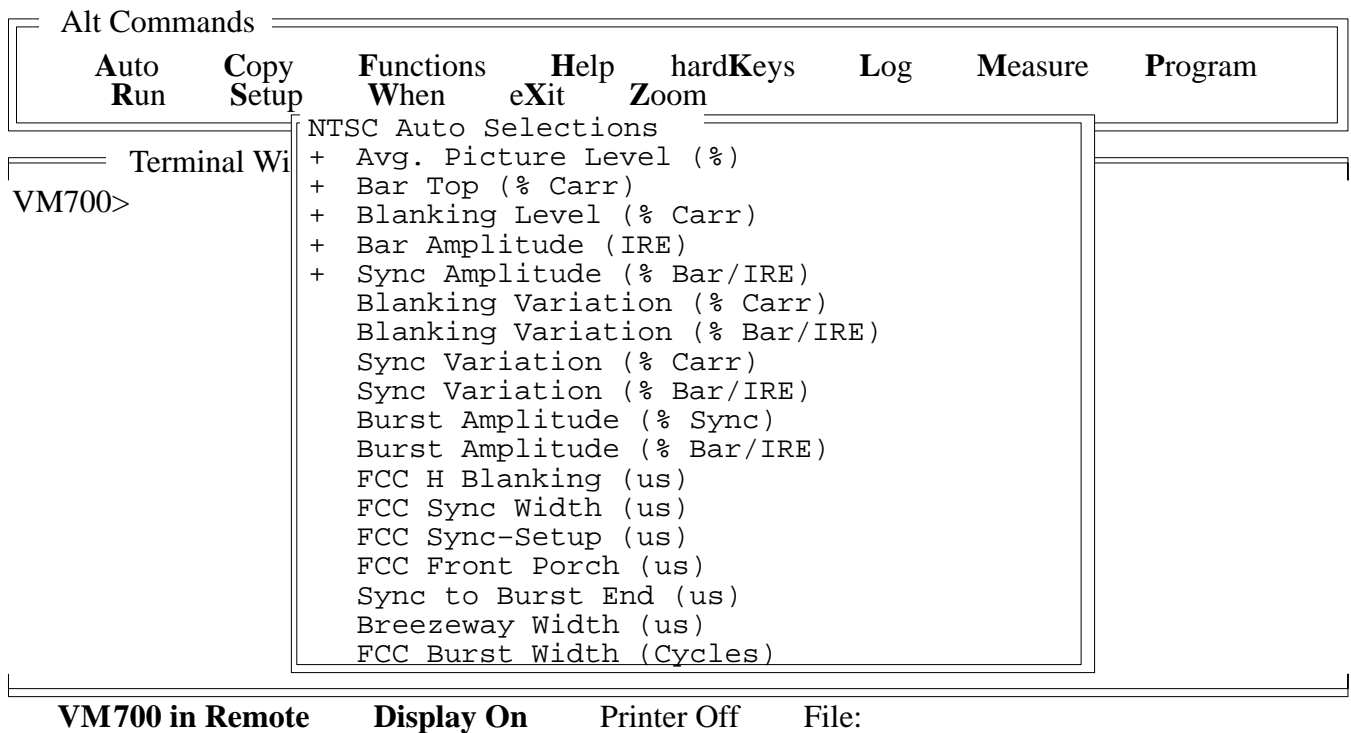


Figure 3-1: Alt-Auto window

Copy The Alt-Copy command performs various functions related to capturing VM700 screens or files and recording commands and data exchanged between the PC and the VM700.

Pressing Alt-C displays the Alt-Copy window (Figure 3-2). The window lists several options and their meanings. You can use the up-arrow and down-arrow keys to scroll through the list of options, highlighting them one at a time. Pressing the Escape key aborts the Alt-Copy command.

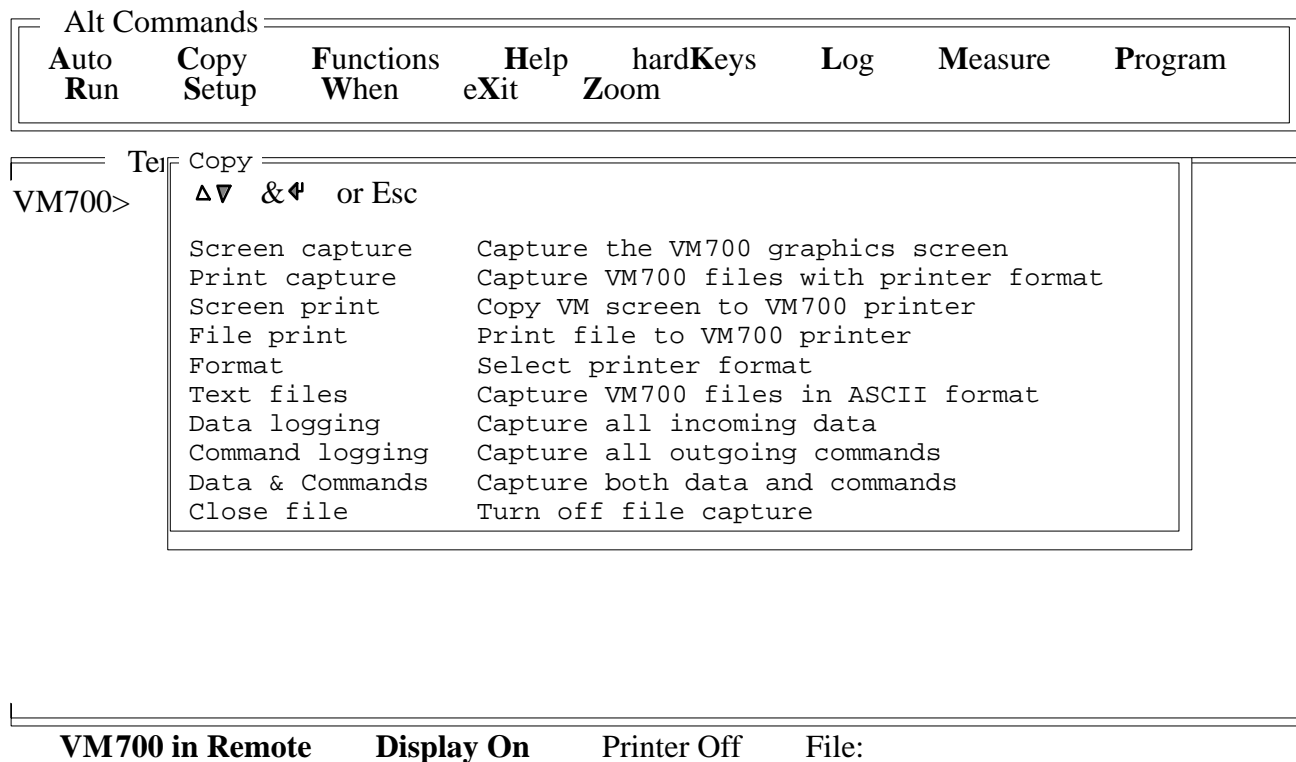


Figure 3–2: Alt-Copy window

Pressing the Enter key has different results, depending on the option selected, as follows:

- **Screen capture:** stores the image of the current VM700 screen in a file on the PC. The file is stored in the format specified by the VM700’s Copy port. You can change the format by using the “Format” item, described below, or the “Copy Format” item in the Communications Setup item under the Alt-Setup (Alt-S) command. (A format of “ASCII Printer”, however, is not allowed.)
- **Print capture:** stores the contents of a VM700 file into a file on the PC. This item first prompts for the name of a PC file to create, then prompts for the name of the VM700 file to print. If only a file name is specified, the file is assumed to be in the /nvram0/ConfigFiles/Measurement~Results directory on the VM700. You can also specify complete paths on the VM700, such as, /nvram0/ConfigFiles/Communication~Setup. The format of the file is determined by the VM700 Copy port.
- **Screen print:** sends the image of the VM700 screen to the VM700 printer.

- File print: sends the contents of a VM700 file to the VM700 printer.
- Format: selects the format for the current VM700 Copy port.
- Text files: sends a file from the VM700 to the PC in ASCII text format. The command prompts for a PC file to create and a VM700 file to send.
- Data logging: prompts for the name of a file in which to log the VM700's responses to commands. If this command is issued and a file is already open for logging, the earlier file is closed. If the named log file already exists, new log information is appended to it.
- Command logging: prompts for the name of a file in which to log commands issued to the VM700. If this command is issued and a file is already open for logging, the earlier file is closed. If the named log file already exists, new log information is appended to it.
- Data & commands: prompts for the name of a file in which to log commands issued to the VM700 and the VM700's responses. If this command is issued and a file is already open for logging, the earlier file is closed. If the named log file already exists, new log information is appended to it.
- Close file: closes the log file, if one is open, and halts command and data logging.

Functions

The `Alt-Function` command allows you to select and execute a user-defined function.

Pressing `Alt-F` displays the `Alt-Function` window (Figure 3-3). The window lists the user-defined functions contained in directory `/FunctionKeys`. You can use the up-arrow and down-arrow keys to scroll through the list of options, highlighting them one at a time. Pressing the `Escape` key aborts the `Alt-Functions` command. Pressing the `Enter` key executes the currently selected function.

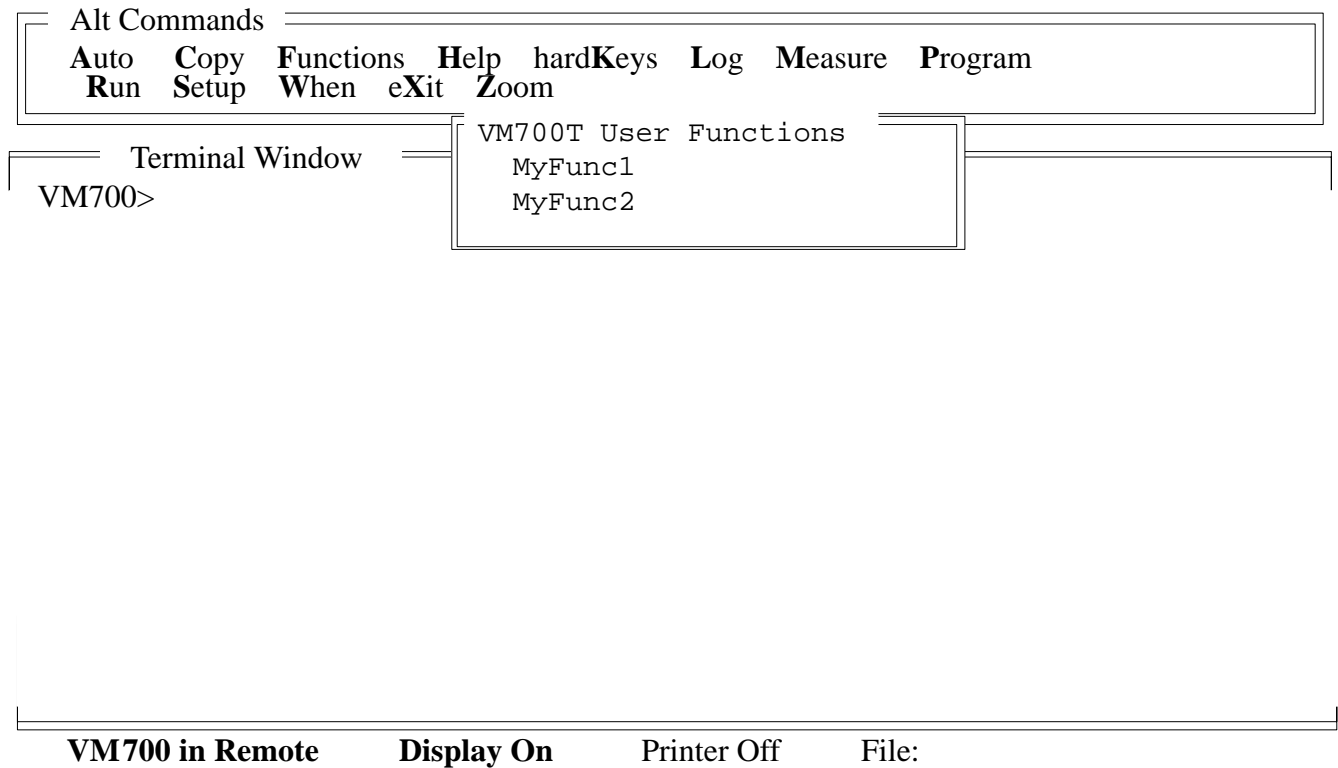


Figure 3–3: Alt-Function window

Help The Alt-Help command selects and executes a user-defined function.

Pressing Alt-H displays the Alt-Help window (Figure 3–4). The window lists the commands for which help is available. Pressing the Escape key aborts the Alt-Help command. Typing a command and pressing the Enter key brings up help information for that command.

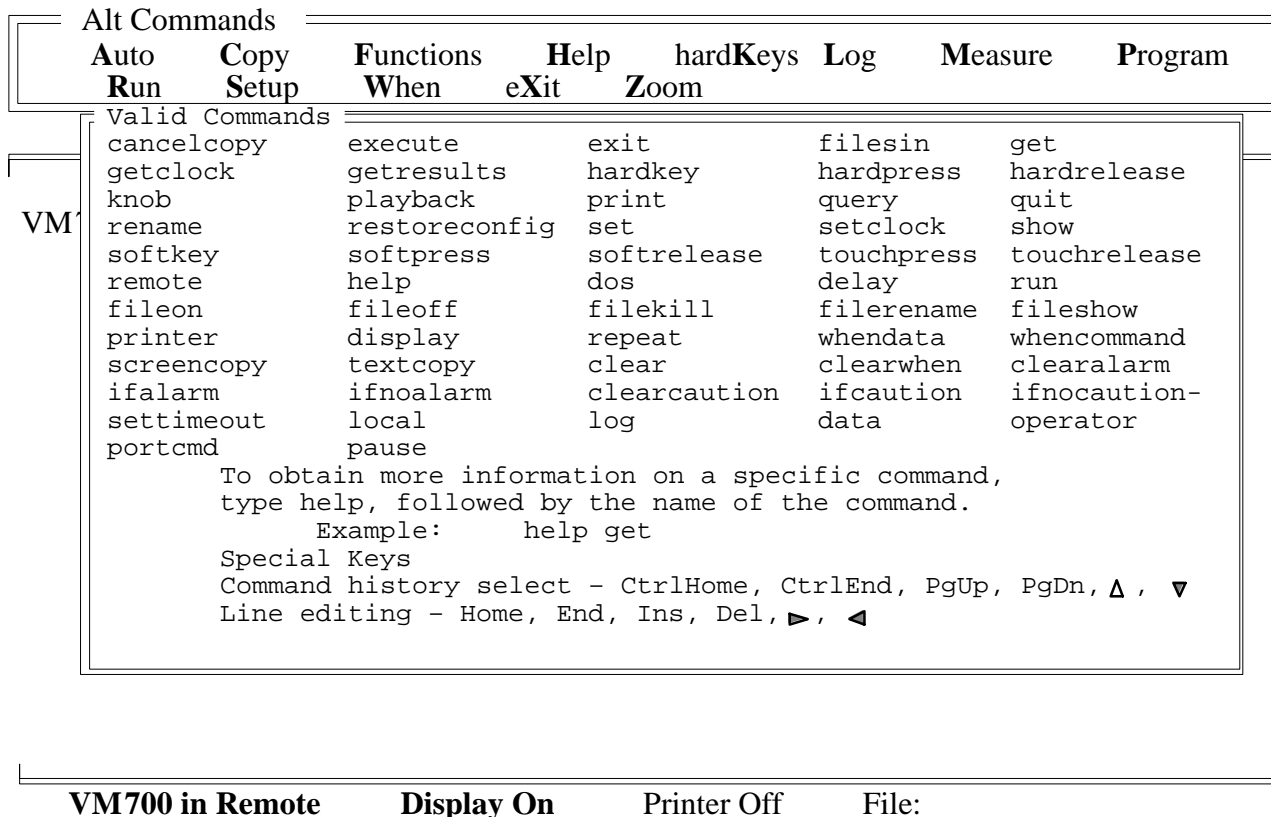


Figure 3-4: Alt-Help window

hardKeys The Alt-hardKeys command selects and executes commands equivalent to pressing front-panel buttons.

Pressing Alt-K displays the Alt-HardKeys window (Figure 3-5). The window lists the names of the VM700 front panel buttons. You can use the up-arrow and down-arrow keys to scroll through the button names, highlighting them one at a time. Pressing the Escape key aborts the Alt-hardKeys command. Pressing the Enter key executes a command equivalent to pressing the currently highlighted button.

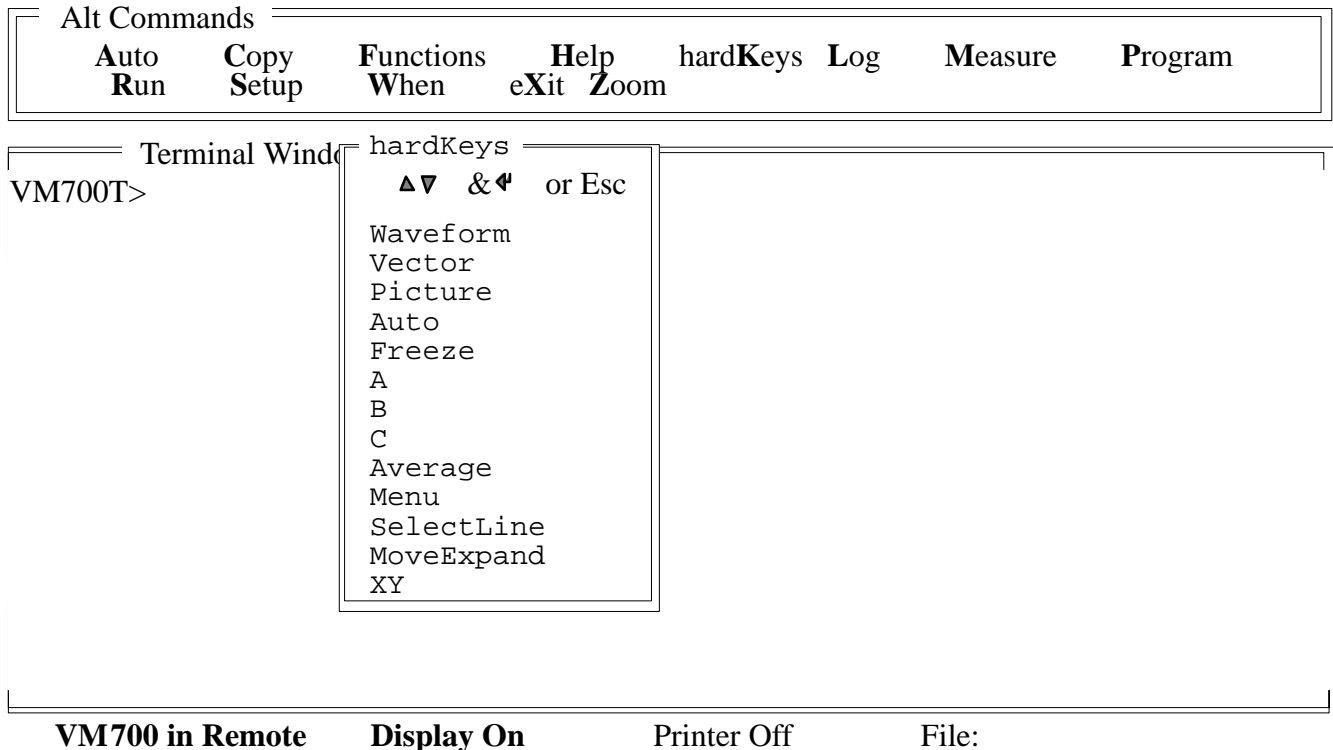


Figure 3–5: Alt-hardKeys window

Log The Alt-Log command controls the capture and display of unexpected or asynchronous data from the VM700. The VM700 generates asynchronous data when logging is turned on (that is, the Log Port entry in the Communication-Setup file is set to the same value as the Remote Control port) and any of the following events occur:

- The VM700 goes into Auto mode.
- The Copy button is pressed, or the hardkey Copy or hardkey Print VMT commands are executed.
- A Timed Event occurs that directs output to the remote control port.

Pressing Alt-L displays the Alt-Log window (Figure 3–6). The window lists several options and their meanings. You can use the up-arrow and down-arrow keys to scroll through the list of options, highlighting them one at a time. Pressing the Escape key aborts the Alt-Log command. Pressing the Enter key has different results, depending on the option selected, as indicated in the following list:



Figure 3-6: Alt-Log window

- Local: determines whether or not to handle asynchronous data with local variable settings, or with the variable settings displayed in the VMT status window. This option brings up another window, allowing you to choose the values ON or OFF. The default is OFF.
- Log: sets up port assignments so that asynchronous data are sent to the remote control port.
- Display: when set to ON, asynchronous data are displayed in the VMT terminal window.
- Printer: when set to ON, asynchronous data are printed on the printer connected to the PC.
- File: specifies a PC file in which to store asynchronous data. If the file already exists, asynchronous data are appended to it.
- Format: specifies the format in which logged data are sent to the PC. The format may be set to Epson LQ, PostScript, ASCII Printer, or HP LaserJet.

Measure The Alt-Measure command performs Measure-mode measurements and other VM700 operations.

Pressing Alt-M displays the Alt-Measure window (Figure 3-7). The window lists the names of several VM700 directories where measurements or other instrument operations are found. You can use the up-arrow and down-arrow keys to scroll through the directory names, highlighting them one at a time. Pressing the Escape key aborts the Alt-Measure command.

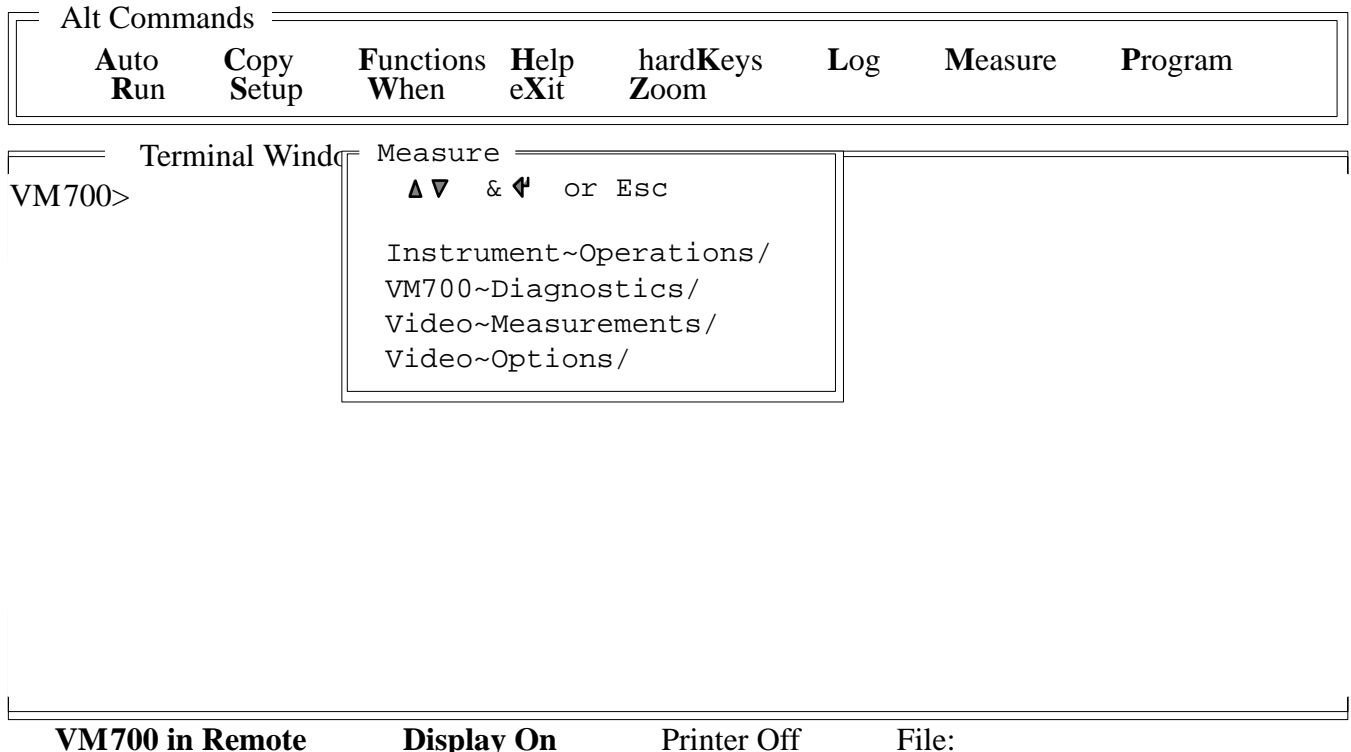


Figure 3-7: Alt-Measure window

Pressing the Enter key opens another window, showing the contents of the highlighted directory. You can use arrow keys to scroll through the directory names, highlighting them one at a time. Pressing the Escape key at this point also aborts the Alt-Measure command. Pressing the Enter key brings up another window, with the following options:

- Execute: executes highlighted measurement or instrument operation.
- Show: shows results of last execution of highlighted measurement.
- Execute & show: executes highlighted measurement, gets results, displays them on the PC screen.

- Show & capture: shows results of last execution of highlighted measurement, then captures results in a file.
- Print: send the results of the last execution of the highlighted measurement to the VM700 printer. This option has no effect on items from the Instrument~Operations directory.
- Rename: renames the results file from the highlighted measurement on the VM700. This allows you to accumulate results files from successive executions of the same measurement.

Program The Alt-Program command controls the display and the printer attached to the PC.

Pressing Alt-P displays the Alt-Program window (Figure 3–8). You can use the up-arrow and down-arrow keys to scroll through the window entries, highlighting them one at a time. Pressing the Escape key aborts the Alt-Program command.

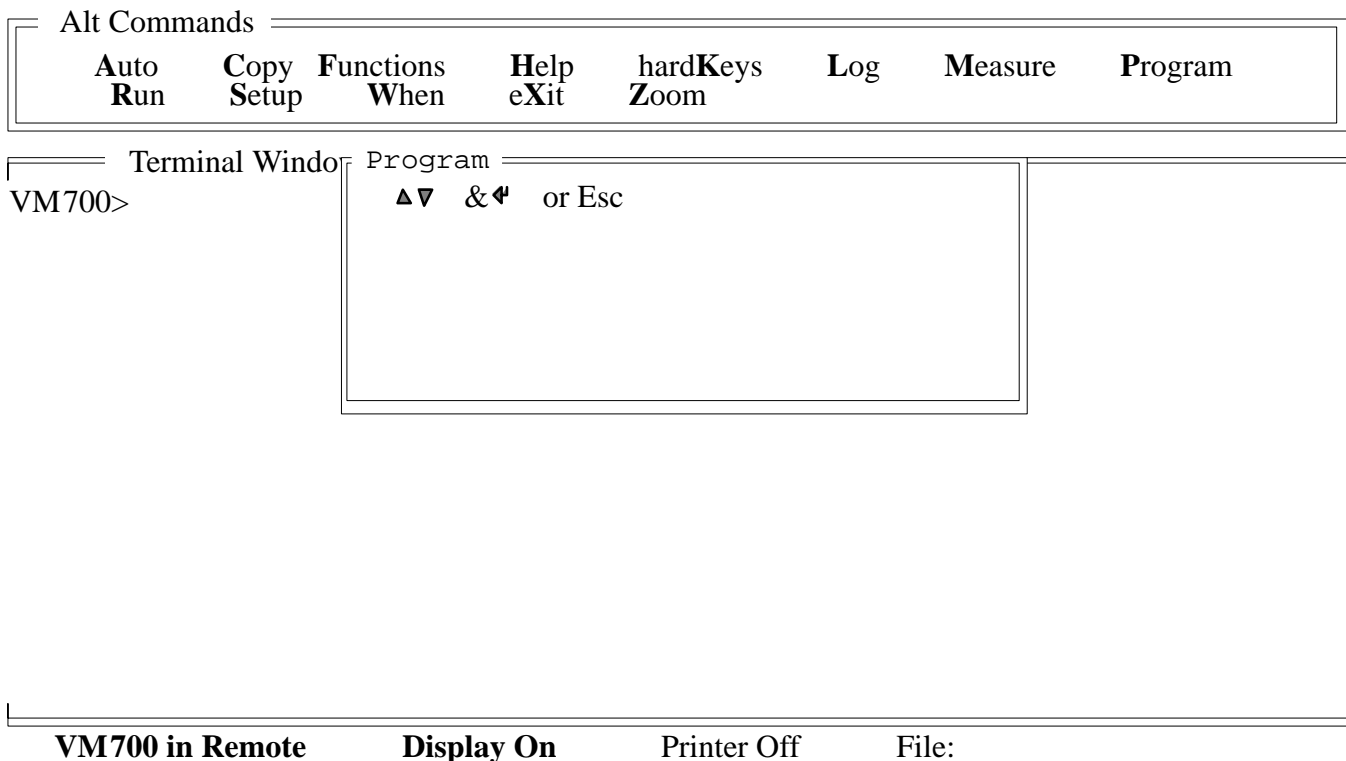


Figure 3–8: Alt-Program window

Entries listed on the Program menu include the following:

- **Display:** brings up a sub-window with the following entries:
 - **On:** displays all text sent to or coming from the VM700.
 - **Off:** displays only text sent to the VM700, except for VM700 responses satisfying a “whendata” condition.
 - **Line:** displays the current line in the terminal window.
 - **String:** prompts for a string, then displays it.
 - **File:** prompts for a file on the PC, then displays its contents.
- **Printer:** brings up a sub-window with the following entries:
 - **On:** prints all text sent to or coming from the VM700.
 - **Off:** prints only text sent to the VM700, except for VM700 responses satisfying a “whendata” condition.
 - **Line:** print the current line in the terminal window.
 - **String:** prompts for a string, then prints it.
 - **File:** prompts for a file on the PC, then prints its contents.
- **Clear:** clears the terminal window.
- **DOS:** suspends execution of VMT, and returns to the DOS prompt. Typing `exit` at the DOS prompt resumes VMT execution.

Run The `Alt-R` command creates, views, edits, or executes PC files containing VMT commands.

Pressing `Alt-R` displays the `Alt-Run` window (Figure 3–9). The VMT program lists all files with a `.RUN` extension in this window. The window also contains another entry, “Create new file.” You can use the up-arrow and down-arrow keys to scroll through the window entries, highlighting them one at a time. Pressing the `Escape` key aborts the `Alt-R` command.

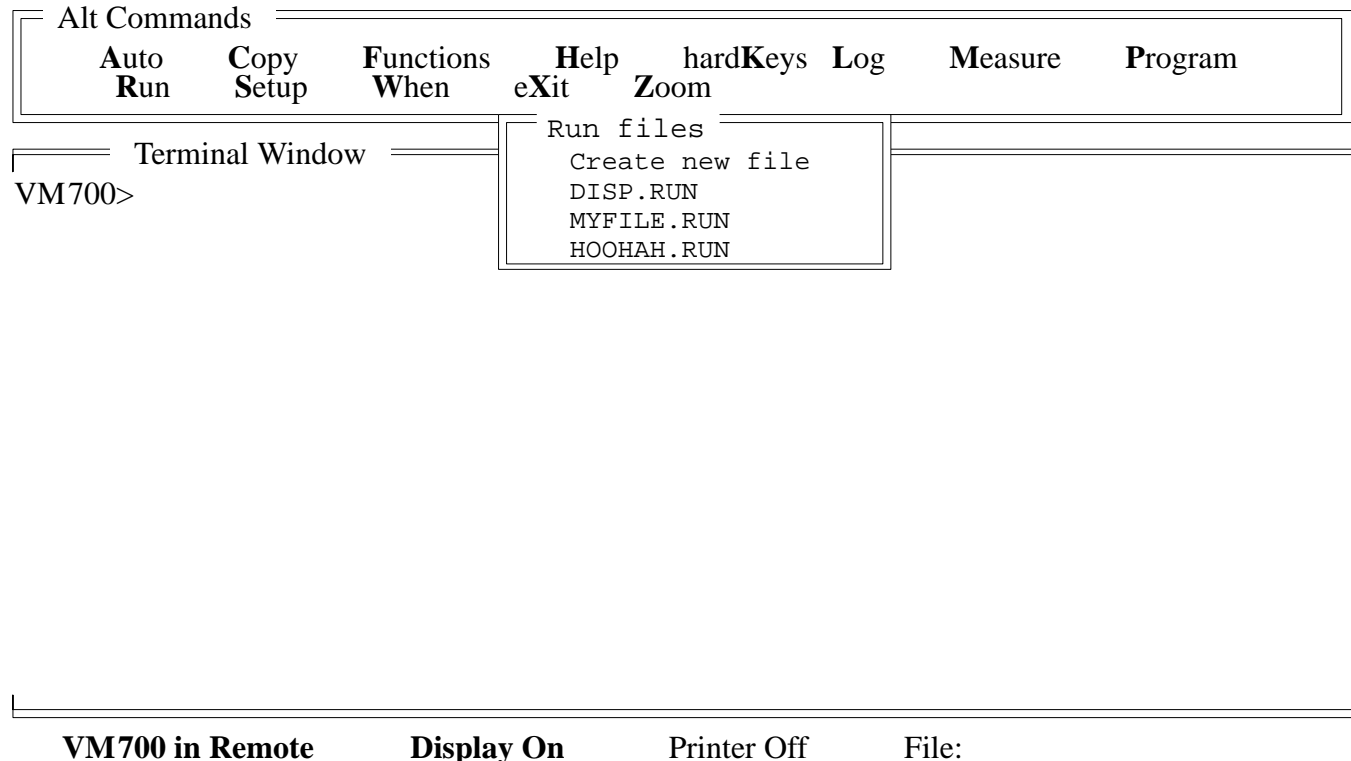


Figure 3-9: Alt-Run window

Pressing the Enter key brings up a window displaying either the contents of the highlighted file or, if the “Create new file” entry was highlighted, a blank window. The window provides a simple word processing functionality. Typing enters characters into the window. The following special keys are also provided:

- Up-arrow: moves the cursor to the previous line.
- Down-arrow: moves the cursor to the next line.
- Left-arrow: moves the cursor to the previous character.
- Right-arrow: moves the cursor to the next character.
- Insert: toggles the insertion mode of the word processor. One press puts the word processor in “insert” mode, which inserts characters to the left of the cursor position. Another press puts the word processor in “overwrite” mode, which overwrites the character the cursor is on.
- Delete: deletes the character the cursor is on.
- Home: positions the cursor on the first character in the line.
- End: positions the cursor on the last character in the line.

- Page Up: scrolls upward through the file by one full screen.
- Page Down: scrolls downward through the file by one full screen.

When editing is complete, pressing the F10 function key prompts for a file name for the edited file. If you want to use the file with the Alt-Run command, give it an extension of “.RUN”.

Setup The Alt-Setup command provides an easy way to change VM700 configuration-related parameters.

Pressing Alt-S displays the Alt-Setup window (Figure 3–10). The window lists all the files that contain user-definable parameters. You can use the up-arrow and down-arrow keys to scroll through the list of files, highlighting them one at a time. Pressing the Escape key aborts the Alt-Setup command.

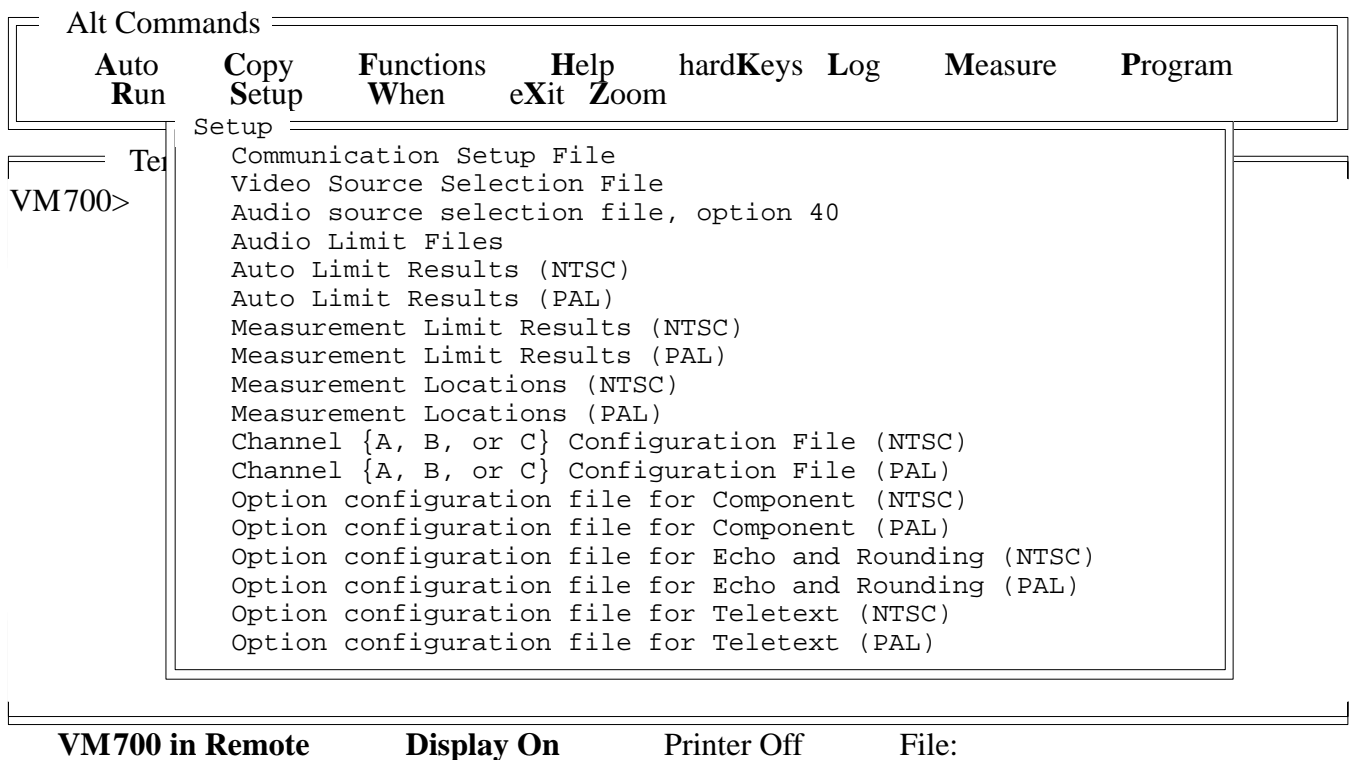


Figure 3–10: Alt-Setup window

Pressing the Enter key brings up another window, listing the user-definable parameters contained in the highlighted file. You can use the up-arrow and down-arrow keys to scroll through the list of parameters, highlighting them one at a time, or press the Escape key to abort the Alt-Setup command.

Pressing the Enter key after an item is highlighted brings up a dialog box that allows you to enter new values for parameters. You can use the following special keys when entering numeric parameter values:

- Left-arrow, right-arrow: selects the previous or the next parameter in a multi-parameter dialog box.
- Up-arrow, down-arrow: increases or decreases the current parameter value by a convenient small amount (depending on the parameter being set).
- Page-up, Page-down: works the same as up-arrow and Down-arrow, but increases or decreases the current parameter value by an amount 10 times greater.
- Home: sets the current parameter to its maximum allowed value.
- End: sets the current parameter to its minimum allowed value.
- 'U': sets the current parameter to an "Undefined" value ('----').
- Enter: accepts the parameter values currently displayed and sends the appropriate SET command to the VM700.
- Escape: aborts the Alt-Setup command.

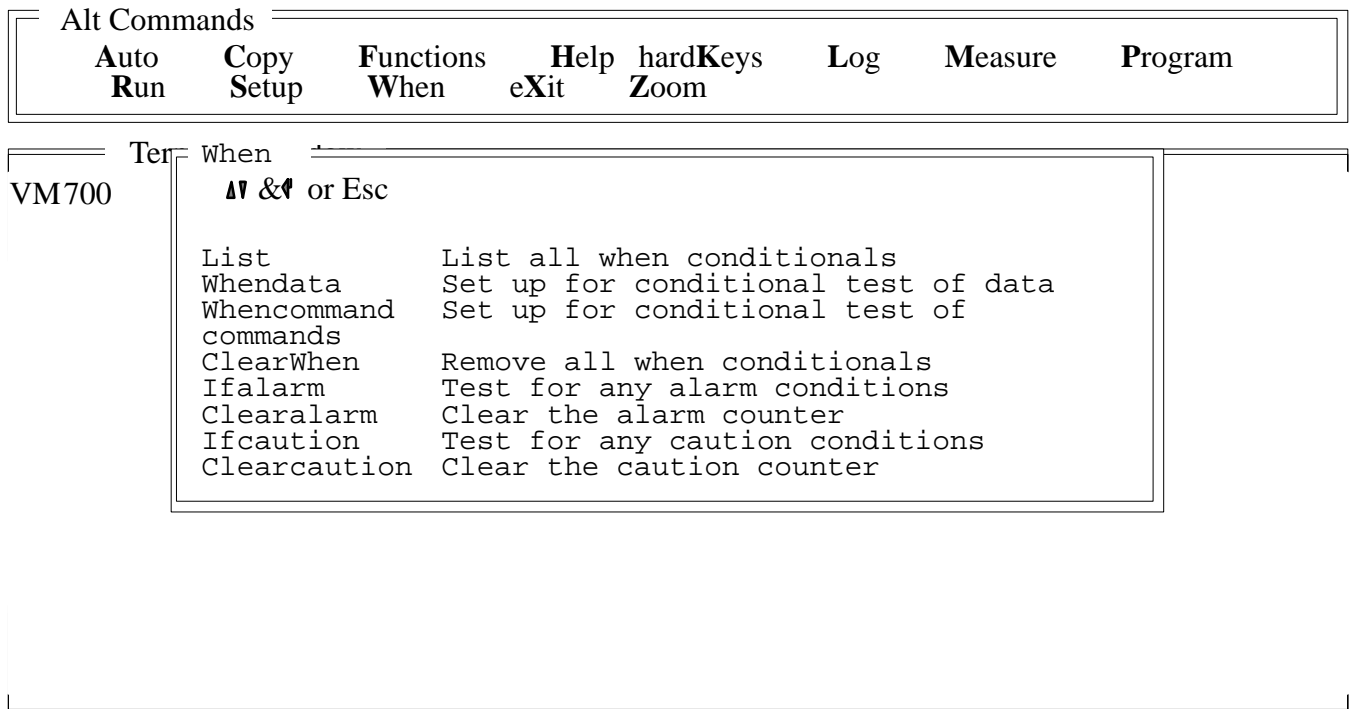
If you enter a value lower than the lowest allowed for a parameter, the parameter is set to its lowest legal value. If you enter a value higher than the highest allowed for a parameter, the parameter is set to its highest legal value. If you enter a value with too many digits of resolution, excess digits are truncated after the limit of resolution is reached.

When The Alt-When command sets up or clears conditional tests for data strings, command strings, cautions, or alarms. Pressing Alt-W displays the Alt-When window (Figure 3-11).

The Alt-W menu contains the following entries:

- List: lists all currently defined conditionals.
- Whendata: defines a string to look for in data coming from the VM700, followed by a command to be executed when that string is found.
- Whencommand: defines a string to look for in commands being sent to the VM700, followed by a command to be executed when that string is found.
- Clearwhen: clears all currently defined conditionals.
- Ifalarm: defines a command to be executed if one or more alarms have occurred since power-up or since the last Clearalarm statement.

- Ifnoalarm: defines a command to be executed if no alarms have occurred since power-up or since the last Clearalarm statement.
- Clearalarm: resets the alarm counter to 0.



VM700 in Remote Display On Printer Off File:

Figure 3–11: Alt-When window

- Ifcaution: defines a command to be executed if one or more cautions have occurred since power-up or since the last Clearalarm statement.
- Ifnocautions: defines a command to be executed if no cautions have occurred since power-up or since the last Clearalarm statement.
- Clearcaution: resets the caution counter to 0.

Commands executed in response to Whendata, Whencommand, Ifalarm, and Ifcaution conditions can be simple one-line commands (such as, display line) or an instruction to run a command file (such as, run myfile.run).

eXit The Alt-Exit command, executed by pressing Alt-X, terminates remote operations and exits the VMT program.

Zoom The Alt-Zoom command toggles the VMT program's display. One press of Alt-Z sets the terminal window to the size of the entire screen. The next press returns the terminal window to its original size, displaying the Alt commands window and the VMT status bar as well.

VM700 Commands

The VM700 commands are given here for reference. Refer to the *VM700A Programmers Reference Manual* or the *VM700T RS-232 Interface Programmer Manual* for further information on the VM700 commands. Refer to either of these manuals for the list of get and set command keywords that the VM700 recognizes. The list is very extensive as every settable parameter of every option has its own keyword that must be used for controlling the VM700 instruments. Much more detailed information on all the VM700 commands and file structure are found in the programmer manuals.

cancelcopy The `cancelcopy` command clears the printer spooler of any pending print files. Sending `cancelcopy` is equivalent to touching the Cancel Copy soft key in the Configure top menu. The `cancelcopy` command has no arguments and returns no response.

```
VM700> cancelcopy
```

execute *application* The `execute` command starts the specified VM700 *application*. An application is one of the executable files (with exceptions noted below) found in the Instrument~Operations, VM700~Diagnostics, or Video~Measurements directories in the Executable~Files directory. Selecting an operational mode applications, such as Vector, is equivalent to pressing the front panel button: the LED on the selected button is lit. Selecting a measurement or diagnostic application is equivalent to touching the desired soft key.

Example:

```
VM700> execute ChromLum~GainDelay
```

Table 3–1 lists the applications that you can execute under remote control. Be sure to use the same capitalization and tildes (~) as shown in the table.

exit The `exit` command terminates the remote session and closes the connection between the VM700 and the computer or terminal. The `exit` command has no arguments. The `exit` command is equivalent to `quit`.

Example:

```
VM700> exit
```

Table 3-1: Applications Available With Remote Control

Instrument Operations				
Configure ¹	FTP	Function ¹	Measure ¹	Picture
SystemInit	Vector	Waveform		
Acquisition~ Diagnostic ²	AdcGain~ Adjustment	AnalogInput~ Diagnostic	AudioAnalog~ Diagnostic	AudioProcessor~ Diagnostic
CalDac~ Adjustment	Controller~ Diagnostic	DiagsLoop	FilterBoard~ Diagnostic	Genlock~ Diagnostic
Measure~ Sinewave	Measure~ Squarewave	Measure~ Temperature		
Video Measurements				
Bar~LineTime	Bounce	Burst~Frequency	ChromLum~GainDelay	Chrominance~AMPM
Chrominance~ FreqResp (NTSC only)	Chrominance~ NonLinearity	ColorBar	DGDP	GroupDelay~SinX_X
H_Blank	H_Timing	ICPM	Jitter	Jitter~Long_Time
K_Factor	Line~Frequency	Luminance~ NonLinearity	MultiBurst	Noise~Spectrum
SCH_Phase	TwoField	VITS~ID (NTSC only)	V_Blank	Video~Standard
Echo/Rounding (Option 1G)				
Echo	Rounding~Errors			
Teletext (Option 20)				
SoundInSync	Teletext			
Component (Option 30)				
Bowtie	Lightning			
Audio (Option 40)				
Audio~Analyzer	Audio~Monitor	Audio~Spectrum	Calibrate~AudioBoard	Identify~ Audio_Hardware
View_Audio~ Auto_Test				

¹ The Configure, Function, and Measure files in the *Instrument~Operations* directory cannot be selected via remote control.

² Diagnostic routines can be selected via remote control, but passed test results are not returned. However, errors are logged to the *Diagnostic Errors* file which can be read via remote control

- filesin *directory*** The `filesin` command returns the names of all files in the specified directory.
- Example:
- ```
VM700> filesin /nvram0/FunctionKeys
Timed~Functions
MyFunc1
MyFunc2
```
- get *keyword***  
**[*channel\_letter*]** The `get` command returns the configuration file value specified by *keyword* on the channel specified by *channel\_letter*. The keywords available are listed in Appendix B of the *VM700A Programmers Reference Manual* and Appendix A of the *VM700T RS-232 Interface Programmer Manual*. The *channel\_letters* available are A, B, or C.
- Example:
- ```
VM700> get DHAF A
EndToEnd
```
- The above example returns the name of the current Auto Limits file.
- getclock** The `getclock` command returns the date and time from the system clock in the form:
- ```
mon dd hh:mm:ss yyyy
```
- where *mon* is the first three letters of the month, *dd* is the day of the month, *hh* is the current hour, *mm* is the minute, *ss* is the second, and *yyyy* is the current year. The `getclock` command has no arguments.
- Example:
- ```
VM700> getclock
Aug 30 14:54:37 1996
```
- getresults** The `getresults` command stores Measure or Auto mode measurement results in default files in the Measurement~Results directory. In Measure mode, entering `getresults` with no argument(s) stores the measurement results for the current measurement. If no measurement is currently being executed, the message Request not supported is returned. If a measurement is being executed, the message Results in file: *filename* is returned. Use the `show filename` command to view the results.
- Example:
- ```
VM700> getresults
Results in file: ChromLum~GainDelay
```

Entering `getresults verbose` in Measure mode stores additional information for DGDP, GroupDelay~SinX\_X, Luminance~NonLinearity, and Noise~Spectrum measurements only. The additional information is displayed as one or more rows of unlabeled numbers and is set off from the main file display by a line of plus signs (++++). For DGDP and Luminance~NonLinearity, the additional data are the readouts at each step level in the display. GroupDelay~SinX\_X and Noise~Spectrum data are described below.

For GroupDelay~SinX\_X, 82 additional data at various frequencies are provided for each measurement. The first group of additional data represents energy (in dB) and the second group is the delay (in ns). The initial frequency is 138.5 kHz, with a frequency increment of 69.3 kHz. The frequency and increment are calculated using the following formula, based on  $F_{sc}$  (frequency sub-carrier) of 4.43316875 MHz:

$$freq (GroupDelay) = 2 \times F_{sc}/64, \text{ increment } (GroupDelay) = F_{sc}/64$$

For Noise~Spectrum, 198 additional data at various frequencies are provided. The additional data represents noise energy (in dB) at the frequency. The initial frequency is 34.6 kHz, with a frequency increment of 34.6 kHz. The frequency and increment are calculated using the following formula, based on  $F_{sc}$  (frequency sub-carrier) of 4.43316875 MHz:

$$freq (Noise~Spectrum) = F_{sc}/128, \text{ increment } (Noise~Spectrum) = F_{sc}/128$$

In Auto mode, entering `getresults` with no argument(s) executes the current selected measurement list and stores the results in the Measurement~Results Auto file. The message Results in file: Auto is returned.

You can also enter `getresults` in Auto mode with one or more keyword arguments. The keywords specify a temporary Selected Measurements list that overrides the active Selected Measurements file. The new selected measurements stay in effect until a `restoreconfig` command or a `set` command specifying the Selected Measurements file is issued.

Example:

```
VM700> getresults PBAA PBRT PSTB
Results in file: Auto
```

The above example creates a temporary selected measurements list of three measurements: Luminance Bar Amplitude, Bar Rise Time, and Sync-to-Burst Start.

**hardkey *button\_name*** The hardkey command (hard key used as one word) indicates the press and release of the specified front panel button, *button\_name*. Using hardkey is equivalent to entering hardpress and hardrelease; however, in general hardkey should be used instead of these commands.

Example:

```
VM700> hardkey Vector
```

Front panel button names are listed in Table 3–2.

**Table 3–2: Front Panel Button Names**

|         |            |                     |
|---------|------------|---------------------|
| A       | Display    | Picture             |
| Auto    | Freeze     | SelectLine          |
| Average | Graticule  | Vector              |
| B       | Help       | Waveform            |
| C       | Menu       | XY (Arrow selector) |
| Copy    | MoveExpand |                     |

---

**NOTE.** *The Configure, Function, and Measure buttons cannot be selected via remote.*

---

**hardpress *button\_name*** The hardpress command indicates the specified front panel button, *button\_name*, has been pressed. The button remains pressed until a hardrelease command is received. The hardpress and hardrelease commands are normally used with buttons which need to be held while another action takes place. For all other buttons, use the hardkey command. Front panel button names are listed in Table 3–2.

Example:

```
VM700> hardpress Display
```

**hardrelease *button\_name*** The hardrelease command indicates the specified front panel button, *button\_name*, has been released. Front panel button names are listed in Table 3–2.

Example:

```
VM700> hardrelease B
```

**knob *number\_of\_clicks***     The knob command indicates the amount of rotation of the control knob. A positive integer value rotates the knob clockwise; a negative integer value rotates the knob counterclockwise. The rotation takes place at once; there is no time delay. The range of integer depends upon the current function.

Example:

```
VM700> knob -50
```

**playback  
*function\_key\_name***     The playback command calls a Function Key that has been created in the Function Keys directory. The default directory for *Function\_Key\_name* is the top Function Key directory.

Example:

```
VM700> playback test_1
```

**print *filename***     The print command sends a file to the print spooler. The default path for *filename* is the Measurement~Results directory, but other files can be specified with a full pathname or a path relative to the Measurement~Results directory. (See the show command for examples.)

Example:

```
VM700> print ChromLum~GainDelay
```

**query *keyword***     The query command returns information about the keyword used as a command argument. The information returned tells if the keyword is channel-specific (that is, whether a get or set command using the keyword must be followed by a channel letter), as well as the number of fields, or arguments, that follow the keyword. Information about each argument is returned as well. If the argument is a file, the available file names are listed. If the argument is an integer or floating point number, that information is shown, as well as the lower and upper bounds for the argument. The VM700 remote keywords and their meanings are given in the *VM700A Programmers Reference Manual* and the *VM700T RS-232 Interface Programmer Manual*. Individual VM700T option user manuals list the keywords for the applicable option.

Example:

```
VM700> query DHAF
F1: file list:
 EndToEnd
 LongHaul
 MediumHaul
 Satellite
 ShortHaul
```

```

VM700> query RBAT
F1: float 0.00 50.00
F2: float 0.00 50.00
F3: float 0.00 50.00
F4: float 0.00 50.00
VM700>

```

The first query command returns the information that the DHAF keyword takes one argument, a file name, and that legal file names for that argument include EndToEnd, LongHaul, MediumHaul, Satellite, and ShortHaul.

The second query command returns the information that the RBAT command takes four arguments, each of them a floating-point number with range 0 to 50, inclusive.

**quit** The `quit` command terminates the remote session and closes the connection between the VM700 and the computer or terminal. The `quit` command has no arguments. The `quit` command is equivalent to `exit`.

Example:

```
VM700> quit
```

**rename *filename1* *filename2*** The `rename` command changes the name of *filename1* in the Measurement~Results directory to *filename2*. Each time a measurement executes, it writes a file with its own name in directory `/nvram0/ConfigFiles/Measurement~Results`. Subsequent executions overwrite earlier results files. The `rename` command allows you to give a results file a different name, so it can be saved for later comparison with another results file.

Example:

```
VM700> rename H_Timing H_Timing_1
```

This command changes the name of the file `H_Timing` in directory `/nvram0/ConfigFiles/Measurement~Results` to `H_Timing_1`.

**restoreconfig** The `restoreconfig` command restores the configuration values from the Configure files that were in effect when the remote session began. Exiting remote does not automatically restore these values; `restoreconfig` must be issued to do so. Note that the system line and other global variables are not restored with the `restoreconfig` command.

Example:

```
VM700> restoreconfig
```

**set *keyword***  
**[*channel\_letter*] *value1***  
**[*value2 ...*]**

The set command defines the configuration values to be used during the remote session. The keywords available to use with set are listed in Appendix B of the *VM700A Programmer Reference Manual* and in Appendix A of the *VM700T RS-232 Interface Programmer Manual*. The *channel\_letter* can be A, B, or C. The configuration values changed with set remain in effect until they are restored to their original (pre-remote) values with the `restoreconfig` command, or power to the instrument is switched off and back on. Note that the system line and other global variables can be changed with set but are not restored with `restoreconfig`.

Example:

```
VM700> set PCEP A 3
```

The above example changes the number of consecutive errors before printing to 3 on channel A.

**setclock *date\_time***

The setclock command sets the date and time on the system clock, using the following format:

```
mon dd hh:mm:ss yyyy
```

where *mon* is the first three letters of the month, *dd* is the day of the month, *hh* is the current hour, *mm* is the minute, *ss* is the second, and *yyyy* is the current year.

Example:

```
VM700> setclock Aug 30 17:07:22 1996
```

**show *filename***

The show command returns the contents of the specified filename. The default path is the Measurement~Results directory, but other files can be specified with a full pathname or a path relative to the Measurement~Results directory.

Example:

```
VM700> show /nvram0/ConfigFiles/Video~Source
 The default file for video sources
Channel A Video Source: xmiter
Channel B Video Source: switcher
Channel C Video Source: System~Default
```

**softkey *softkey\_name***

The softkey command (soft key used as a single word) indicates the press and release of a specified soft key, such as Cursors. Sending the softkey command is equivalent to entering `softpress` and `softrelease`; however, in general softkey should be used instead of these commands.

Example:

```
VM700> softkey ITS_Search
```

With a few exceptions, the general rule for forming a *softkey\_name* is to take the spelling and capitalization from the soft key name on the display, omit the variable part and join the words with \_ (underscore). For example, the *softkey\_name* for the Noise 15.03 dB soft key is Noise\_dB, and for 1H Display it is H\_Display.

The exceptions are the Line soft keys in Select Line mode which change the display to the specified line. In Measure mode (except the TwoField measurement), the *softkey\_names* for these are: Preset1, Preset2, Preset3, and Preset4. In Waveform and Vector modes, and the TwoField measurement, only the first two Line are available and their *softkey\_names* are: Preset1PAL and Preset2PAL.

**softpress *softkey\_name*** The softpress command indicates the specified soft key has been touched and held. Use the softrelease or touchrelease commands to release the soft key. Note that if the function toggles, you can simply enter softpress again to turn it off.

Example:

```
VM700> softpress Rescale
```

**softrelease** The softrelease command indicates a soft key has been released.

Example:

```
VM700> softrelease
```

**touchpress *X Y*** The touchpress command indicates the specified X,Y location on the touchscreen has been touched. The 0,0 location is the upper left corner of the screen. The X range is 0 to 639; Y range is 0 to 479. If the X,Y location is within a soft key screen location, the soft key is executed.

Example:

```
VM700> touchpress 200 330
```

**touchrelease** The touchrelease command indicates a soft key or touchscreen location has been released.





## Extended Commands

Extended commands are VMT specific commands that are executed by typing the command at the VM700 prompt.

|                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>clear</b>                           | The <code>clear</code> command clears the terminal window (same as <code>cls</code> ).                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>clearalarm</b>                      | The <code>clearalarm</code> command resets the VMT program's alarm limits counter to 0. See also <code>ifalarm</code> .                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>clearcaution</b>                    | The <code>clearcaution</code> command resets the caution limits counter of the VMT program to 0. See also <code>ifcaution</code> .                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>clearwhen</b>                       | The <code>clearwhen</code> command clears all when conditions. See <code>whencommand</code> and <code>whendata</code> .                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>cls</b>                             | The <code>cls</code> command clears the terminal window (same as <code>clear</code> ).                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>data <i>results-file [time]</i></b> | The <code>data</code> command returns the measurement results contained in the specified filename. It is similar to the <code>show</code> command, but only numeric results are returned. The optional modifier <code>time</code> sends the date and time stamp of the results file ahead of the numeric results.                                                                                                                                                                                                               |
| <b>delay <i>number_of_seconds</i></b>  | The <code>delay</code> command is used within command files. It pauses for the amount of time specified before reading the next command from the file.                                                                                                                                                                                                                                                                                                                                                                          |
| <b>display <i>argument</i></b>         | The <code>display</code> command controls the display of incoming data on the PC screen. It takes a single argument, from among the following choices: <ul style="list-style-type: none"><li>■ <code>on</code>: turns the display on (default)</li><li>■ <code>off</code>: turns the display of incoming data off, except in response to <code>when</code> command conditions</li><li>■ <code>line</code>: displays the last line read in from the VM700</li><li>■ <code>string</code>: displays the specified string</li></ul> |

- dos** The `dos` command suspends execution of the VMT program and returns you to the DOS prompt. To resume execution of the VMT program, type `exit` at the DOS prompt.
- exit** The `exit` command terminates execution of a nested program and returns to the level from which it was called. If executed at the main level, the `exit` command terminates the VMT program and returns to DOS.
- filekill filename** The `filekill` command deletes the named file on the PC. This allows you to make sure you have an empty file before appending to it.
- fileoff** The `fileoff` command closes the command/data capture file.
- fileon [ in | out | both ] [filename]** The `fileon` command sets up a file to capture data and commands. Data and commands are captured as they are displayed or printed. If data or commands are neither displayed nor printed, they were not captured.
- The `fileon` command takes an optional first argument, consisting of the word `in`, `out`, or `both`:
- `in`: sets up a file to capture data coming from the VM700
  - `out`: sets up a file to capture commands going to the VM700
  - `both`: sets up a file to capture both commands going to and data coming from the VM700. The default is `both`.
- The `fileon` command takes an optional second argument, consisting of the name of the PC file to open, in append mode. The default file name is `capture.vmt`.
- If both arguments are used, then the filename should be last.
- Only one file at a time can be open for data or command capture. Executing a `fileon` command when a capture file is already open closes the previous file and opens a new one.
- Example:
- ```
VM700> fileon in data.txt
```
- Opens a file named `data.txt` to record data coming from the VM700.
- ```
VM700> fileon out commands.txt
```
- Opens a file named `commands.txt` to record commands sent to the VM700.
- ```
VM700> fileon session.txt
```

Opens a file named session.txt to record commands going to and data coming from the VM700.

```
VM700> fileon
```

Opens a file named capture.vmt to record commands going to and data coming from the VM700.

filerename *oldfilename*
newfilename

The `filerename` command renames *oldfilename* on the PC to *newfilename*.

fileshow *filename*

The `fileshow` command displays the contents of the named file.

help [*command*]

The `help` command with no arguments displays the Help screen. It is the same as pressing Alt-H.

The `help` command followed by the name of a command displays help for that command.

ifalarm *command*

The `ifalarm` command checks the count of alarm violations that have occurred since either the start of the program or the last `clearalarm` command. If there were one or more alarm violations, then the program executes the command designated by `ifalarm`.

The `ifalarm` command should appear after measurement results have been sent from the VM700 to the PC with the `show` command or by logging VM700 responses.

Example:

```
clearalarm
execute Auto
getresults
show Auto
ifalarm playback function_2
```

This program segment demonstrates the proper use of the `clearalarm` and `ifalarm` commands. The `clearalarm` command is executed first, to reset the alarm counter of the VMT program. Then, the program puts the VM700 into Auto Mode (`execute Auto`), gets the results of the Auto Mode measurement (`getresults`), and sends the results to the PC (`show Auto`). After the results have been sent to the PC, the program sends the command `ifalarm playback function_2` to execute a function if an alarm violation has been detected.

ifcaution command The `ifcaution` command checks the count of caution violations that have occurred since either the start of the program or the last `clearcaution` command. If there were one or more caution violations, then the program executes the command designated by `ifcaution`.

The `ifcaution` command should appear after measurement results have been sent from the VM700 to the PC with the `show` command or by logging VM700 responses.

Example:

```
clearcaution
execute Auto
getresults
show Auto
ifcaution playback function_2
```

This program segment demonstrates the proper use of the `clearcaution` and `ifcaution` commands. The `clearcaution` command is executed first, to reset the VMT program's caution counter. Then, the program puts the VM700 into Auto Mode ("execute Auto"), gets the results of the Auto Mode measurement ("getresults"), and sends the results to the PC ("show Auto"). After the results have been sent to the PC, the program sends the command `ifcaution playback function_2` to execute a function if a caution violation has been detected.

ifnoalarm command The `ifnoalarm` command is similar to the `ifalarm` command except that it specifies an action to be taken if no alarm violations are found.

ifnocauton command The `ifnocauton` command is similar to the `ifcaution` command except that it specifies an action to be taken if no caution violations are found.

local The `local` command suspends communication between the PC and the VM700. Use it to perform operations with the VM700 front panel. You can re-establish communication between the PC and the VM700 with the `remote` command.

**log { local | mode | display | printer } { on | off } ;
log file { filename | off } ;
log format formatname** The `log` command controls how the VMT program handles unexpected or asynchronous data from the VM700. The VM700 generates asynchronous data when logging is turned on (that is, the Log Port entry in the Communication ~Setup file is set to the same value as the Remote Control port) and one of the following actions occurs:

- The VM700 goes into Auto mode.
- The Copy button is pressed, or the `hardkey Copy` or `hardkey Print` VMT commands are executed.

- A Timed Event occurs that directs output to the Remote Control port.

The `log` command takes the following modifiers:

- `local`: takes an argument of ON or OFF. When set to ON, specifies that settings given by other log commands should be used to handle asynchronous data. When set to OFF, asynchronous data are handled the same way as synchronous data.
- `mode`: takes an argument of ON or OFF. When set to ON, sets up port assignments so that asynchronous data are sent to the remote control port.
- `display`: takes an argument of ON or OFF. When set to ON, asynchronous data are displayed in the VMT terminal window.
- `printer`: takes an argument of ON or OFF. When set to ON, asynchronous data are printed on the printer connected to the PC.
- `file`: takes an argument of a filename or OFF. When set to a filename, asynchronous data are written to the specified PC file. If the file already exists, asynchronous data are appended to it.
- `format`: takes an argument of Epson LQ, PostScript, ASCII Printer, or HP LaserJet.

operator *info-to-display*

The `operator` command prompts the user for information. Executing the command brings up a dialog box with *info-to-display* prompting the user for information. This command is useful for getting information into log files.

pause { *on / off* }

The `pause` command allows the user to control the rate at which data are displayed. The command takes one argument, either ON or OFF. When the screen fills with data from the VM700, the status line reminds the user to press any key in order to display more data. Pressing the Escape key cancels this mode.

Example:

```
pause ON
```

This statement causes the VMT program to stop accepting data when the screen fills, and to display a message telling the user to press any key in order to see more data.

portcmd

The `portcmd` command reads a command from the VM700. The purpose of the command is to allow you to start a VMT session, then put the VM700 in local mode (using the `local` command). You could then operate the VM700 from its front panel, then execute a user-defined function to put the VM700 back in remote mode and continue the VMT session.

Use the following sequence of steps with the `portcmd` command:

1. Start the VMT program.
2. Execute the local command from VMT. This puts the VM700 in local mode.
3. Operate the VM700 from its front panel.
4. When you want to resume operation from the VMT program, execute a `portcmd` command at the VMT program. Then, on the VM700, execute a user-defined function of the form:

```
control run filename.run
```

where `filename.run` is the name of a program file stored on the PC. The first line of this file should contain the command `remote`.

printer { *on* / *off* / *line* / *string* }

The printer command controls the printer attached to the PC. The printer command takes a single argument, which can be any of the following:

- `on`: sends commands and data to the PC printer.
- `off`: disables sending of commands and data to the PC printer.
- `line`: prints most recent line of data received from VM700 (regardless of whether the PC printer has been set on or off).
- `string`: sends *string* to the PC printer.

remote

The remote command reestablishes communication between the PC and the VM700. Use it to resume execution of the VMT program if you take the VM700 out of Remote mode by pressing the Configure button, or by executing the `local` command.

repeat { *number* / *always* }

The repeat command repeats execution of a command file. The command should appear at the end of the list of commands in a file. The single argument used indicates how many more times to run the command file, after its first execution. The command `repeat 1` runs the command file one more time, for a total of twice for that command file. If the argument is `always`, the program continuously repeats the command file until an `exit` command is encountered.

Example:

```
clearalarm
execute ColorBar
getresults
show ColorBar
ifalarm exit
```

```
delay 300
repeat always
```

This program segment demonstrates the use of the `repeat` command to execute a program continuously. In this case, the program clears the alarm counter, executes the ColorBar measurements, then gets the results from the ColorBar measurement and sends them to the PC. If an alarm violation has occurred, the program exits. Otherwise, it waits 5 minutes (300 seconds) and repeats from the beginning.

run *filename* The run command executes the named command file.

Example:

```
run myfile.run
```

Executes commands from a PC file named “myfile.run.”

**screencopy *PCfilename*
[*VMfilename*]**

The screencopy command writes the results of a VM700 print command or hardkey Copy process to a PC file. If the PC file already exists, the data are appended to it. The data are stored in the PC file in the printer format specified by the Communication~Setup file for the Copy Port (SPCF). The data are not seen by the operator when the transfer occurs.

The screencopy command takes one or two arguments. The first is the name of the PC file to create. The second is the name of the VM700 file to print to the PC. If the second argument is not provided, then the screencopy command performs a hardkey Copy instruction, so that the PC file will contain graphics data for use with the appropriate printer.

Before using the screencopy command, be sure to set the Copy Format to the desired printer. You must provide two arguments with the screencopy command if the ASCII Printer format is selected.

Examples:

```
set SPCF Epson LQ
execute Waveform
screencopy wave1.eps
```

This command sequence captures the Waveform display in Epson LQ format.

```
set SPCF PostScript
execute Auto
screencopy auto.ps
```

This command sequence captures a screenful of Auto measurement results in PostScript format.

settimeout *seconds* The `settimeout` command is used to set the amount of time to wait when reading data from the VM700. This value is only used during screencopy operations. The default timeout value is 10 seconds.

Example:

```
settimeout 20
```

This example sets the timeout value to 20 seconds.

**textcopy *PCfilename*
*VMfilename*** The `textcopy` command writes ASCII text from a VM700 file to a PC file. If the PC file already exists, data are appended to it. The `textcopy` command takes two arguments. The first is the name of the PC file to create. The second is the name of the VM700 file to transfer. If the second argument does not include a complete path, the path defaults to the Measurement~Results directory.

Example:

```
textcopy color.txt ColorBar
```

This command sends the file `/nvram0/ConfigFiles/Measurement~Results/ColorBar` to the PC, and stores it in file called `color.txt`.

**whencommand *string*
*command*** The `whencommand` command checks commands originating from the keyboard or a command file for a match with a specified string. If the string is found, a specified task is performed. The command takes two arguments: the string to match and the command to perform. If spaces are included in the first argument, the phrase should be enclosed in quotes. The second argument may have command arguments of its own, which should be included as well.

Example:

```
VM700> whencommand 'show Auto' logon auto
```

This command appends data from the Auto Measurement Results file into a file called `auto`.

whendata string command

The `whendata` command checks data coming from the VM700 for a match with a specified string. If the string is found, a specified task is performed. The command takes two arguments: the string to match and the command to perform. If spaces are included in the first argument, the phrase should be enclosed in quotes. The second argument may have command arguments of its own, which should be included as well.

Example:

```
VM700> whendata 'RS-170A' display line
VM700> display off
VM700> fileon in rs170a.txt
VM700> execute Auto
VM700> getresultsVM700> show Auto
```

This command sequence sets up the VMT program to display the latest line received from the VM700 if it contains the string “RS-170A”. It then turns the display off, sets up a file in which to log incoming data, then executes the Auto measurement and gets and shows its results. All lines containing the string “RS-170A” will then be displayed on the screen and appended to a file called `rs170a.txt`.



Appendices

Appendix A: Measurement Result Files

This appendix shows the text of the files returned by each VM700 measurement when the following command sequence is executed:

```
execute measurement
getresults
show measurement
```

These files are provided so that users can know what strings may be useful to search for with a whendata command.

Option 01/11 (NTSC/PAL) Results Files

Note that results files from NTSC measurements frequently contain a line in the header that reads “Field = X Line = Y”. The corresponding line in results files from PAL measurements reads simply “Line = Y”. Except for this line, NTSC and PAL measurement results files do not differ (with the exception of the Auto measurement results), unless otherwise noted.

Auto (NTSC)

Channel A	Source	System Default		Fri Aug 30 10:22:40 1996		
				VM700A Video Measurement Set		
				System Default		
				Violated Limits		
				Lower	Upper	
Avg. Picture Level	24.3	%				At Meas. Cycle Start
Bar Top	-----	% Carr	**	10.0	15.0	ZC Pulse Unselected
Blanking Level	-----	% Carr	**	72.5	77.5	ZC Pulse Unselected
Bar Amplitude	92.0	IRE	**	96.0	104.0	
Sync Amplitude	46.2	% Bar	**	36.0	44.0	
Blanking Variation	-----	% Carr				ZC Pulse Unselected
Blanking Variation	2.2	% Bar				
Sync Variation	-----	% Carr	**	0.0	5.0	ZC Pulse Unselected
Sync Variation	2.9	% Bar				
Burst Amplitude	54.9	% Sync				
Burst Amplitude	25.4	% Bar	**	36.0	44.0	
FCC H Blanking	10.99	us				
FCC Sync Width	4.79	us				
FCC Sync-Setup	9.66	us				
FCC Front Porch	1.33	us	*	1.40	-----	
Sync to Burst End	7.75	us				
Breezeway Width	0.71	us				
FCC Burst Width	8.1	Cycles				
Sync Risetime	408	ns	**	0	250	
Sync Falltime	272	ns	**	0	250	
RS-170A H Blanking	14.08	us	**	10.65	11.15	

Appendix A: Measurement Result Files

RS-170A Sync Width	4.51 us	**	4.58	4.82	
RS-170A Sync-Setup	9.51 us	*	9.31	9.49	
RS-170A Front Porch	1.48 us				
Sync to Burst Start	5.38 us				
RS-170A Burst Width	8.1 Cycles				
V Blank 4 IRE F1	20.0 Lines				
V Blank 4 IRE F2	20.1 Lines				
V Blank 20 IRE F1	20.1 Lines	*	20.1	20.9	
V Blank 20 IRE F2	20.5 Lines				
FCC Equalizer	51.2 % S.W.				
FCC Serration	4.47 us				
RS-170A Equalizer	2.16 us	**	2.18	2.42	
RS-170A Serration	4.80 us	*	4.61	4.79	
VIRS Setup	7.6 % Bar				
VIRS Luminance Ref	50.6 % Bar				
VIRS Chroma Ampl	88.2 % Burst	**	90.0	110.0	
VIRS Chroma Ampl	22.2 % Bar	**	36.0	44.0	
VIRS Chroma Phase	-0.7 Deg				
Line Time Distortion	1.5 %	**	0.0	1.5	
Pulse/Bar Ratio	86.0 %	**	94.0	106.0	
2T Pulse K-Factor	2.6 % Kf	**	0.0	2.5	
IEEE-511 ST Dist	----- % SD	**	0.0	2.0	No NTC-7 Comp VITS
S/N NTC7 Unweighted	49.6 dB	**	67.0	-----	RMS
S/N NTC7 Lum-Wgtd	56.7 dB	**	67.0	-----	RMS
S/N Unif Unweighted	49.5 dB				RMS
S/N Unif Lum-Wgtd	57.5 dB	**	60.0	-----	RMS
S/N Periodic	----- dB	**	67.0	-----	Random >> Periodic
Chroma-Lum Delay	-31.9 ns	**	-25.0	25.0	
Chroma-Lum Gain	59.8 %	**	96.0	104.0	
Differential Gain	7.47 %	**	0.00	3.00	At 40% APL
Differential Phase	3.24 Deg	**	0.00	3.00	At 40% APL
Lum Non-Linearity	7.88 %	**	0.00	6.00	At 23% APL
Relative Burst Gain	5.30 %				At 40% APL
Relative Burst Phase	-0.17 Deg				At 40% APL
FCC Multiburst Flag	----- % Carr	**	10.0	15.0	ZC Pulse Unselected
FCC Multiburst Flag	99.1 % Bar				
FCC MB Packet #1	54.9 % Flag	**	59.2	60.8	
FCC MB Packet #2	53.0 % Flag	**	58.9	61.1	
FCC MB Packet #3	47.3 % Flag	**	58.8	61.2	
FCC MB Packet #4	43.6 % Flag	**	58.7	61.4	
FCC MB Packet #5	35.7 % Flag	**	59.3	60.7	
FCC MB Packet #6	12.6 % Flag				
NTC7 Multiburst Flag	----- % Carr	**	10.0	15.0	No NTC-7 Combination
NTC7 Multiburst Flag	----- % Bar	**	90.0	110.0	No NTC-7 Combination
NTC7 MB Packet #1	----- % Flag	**	44.0	56.0	No NTC-7 Combination
NTC7 MB Packet #2	----- % Flag	**	44.0	56.0	No NTC-7 Combination
NTC7 MB Packet #3	----- % Flag	**	44.0	56.0	No NTC-7 Combination
NTC7 MB Packet #4	----- % Flag	**	44.0	56.0	No NTC-7 Combination
NTC7 MB Packet #5	----- % Flag	**	44.0	56.0	No NTC-7 Combination
NTC7 MB Packet #6	----- % Flag	**	44.0	56.0	No NTC-7 Combination
NTC7 20 IRE Chroma	----- IRE	**	18.0	22.0	No NTC-7 Combination
NTC7 80 IRE Chroma	----- IRE	**	78.0	82.0	No NTC-7 Combination

NTC7 Chr NL Phase	-----	Deg	**	0.0	2.0	No NTC-7 Combination
NTC7 Chr-Lum Intmd	-----	IRE	**	-4.0	4.0	No NTC-7 Combination
ICPM	-----	Deg	**	-3.0	3.0	ZC Pulse Unselected
SCH Phase	70.3	Deg	*	-45.0	45.0	
Field Time Dist	-----	% Bar	**	-4.00	4.00	Not Found
FCC Color Bars						

	Amplitude Error (%)		Phase Error (Deg)		Chr/Lum Ratio Error (%)	
Yellow	-42.2	**	-0.9		-43.9	**
Cyan	-41.3	**	-2.5		-43.9	**
Green	-40.1	**	-2.9		-44.2	**
Magenta	-38.6	**	-4.1		-44.3	**
Red	-39.2	**	-2.4		-46.6	**
Blue	-37.9	**	-2.1		-47.2	**

Auto (PAL)

Channel C	Source	System Default		Fri Aug 30 10:25:13 1996
		VM700A Video Measurement Set		
System Default			Violated Limits	
			Lower	Upper
Source ID	----			Not Found
Luminance Bar Ampl	-----	mV	**	600.0 800.0 Bar Not Found
Luminance Bar Ampl	-----	% Carr	**	55.0 73.0 Bar Not Found
Lum Bar Ampl Err	-----	%	**	-10.0 10.0 Bar Not Found
Line Time Distortion	-----	% Bar	**	0.0 10.0 Bar Not Found
Bar Tilt (Rec 569)	-----	% Bar	**	-10.0 10.0 Bar Not Found
Bar Rise Time	-----	ns	**	160.0 240.0 Bar Not Found
Baseline Distortion	-----	% Bar	**	-2.0 2.0 Bar Not Found
Blanking Level	-----	% Carr	**	69.0 79.0 Bar Not Found
Sync/Bar (Rel 3/7)	-----	%	**	80.0 120.0 Bar Not Found
Sync to Bar Top	-----	mV	**	870.0 1130.0 Bar Not Found
Pulse/Bar Ratio Err	-----	% Bar	**	-20.0 20.0 Pulse Not Found
2T Pulse K-factor	-----	% Kf	**	0.0 4.0 Pulse Not Found
C/L Gn Err (Mod Bar)	-----	% Bar	**	-20.0 20.0 Not Found
Chr/Lum Delay Ineq	-----	ns	**	-50.0 50.0 Pulse Not Found
C/L Gn Err (Mod Pls)	-----	% Bar	**	-20.0 20.0 Not Found
Lum. Nonlin. Dist.	-----	%	**	----- 10.0 No Luminance Steps
Chrom Ref Ampl Err	-----	%	**	-10.0 10.0 Not Found
Pk-Pk Diff Gain	-----	%	**	----- 20.0 Not Found
Peak Diff Gain	-----	%	**	----- 20.0 Not Found
Pk-Pk Diff Phase	-----	Deg	**	----- 20.0 Not Found
Peak Diff Phase	-----	Deg	**	----- 20.0 Not Found
Chr/Lum Intermod	-----	% Bar	**	-10.0 10.0 Not Found
Sync Amplitude	300.7	mV		
Sync Ampl Error	0.2	%		
Residual Carrier	-----	% Carr	**	7.5 15.0 Bar Not Found
Sync-to-Burst Start	5.61	us		
Burst Duration	2.30	us		
Burst Duration	10.2	Cycles		
Burst Amplitude	299.4	mV		
Burst Ampl Error	-0.2	%		
Burst Ampl Diff	0.2	%		

Appendix A: Measurement Result Files

Burst Quad Error	-87.2	Deg	**	-5.0	5.0	
SCH Phase	2.0	Deg				
Sync Duration	4.68	us				
Sync Rise Time	184.4	ns				
Sync Fall Time	190.4	ns				
Front Porch	2.01	us	*	1.20	1.80	
Line Blanking	13.98	us	*	11.70	12.30	
Broad Pulse Sep	4.66	us				
Equalizing Pulse	2.33	us	*	2.34	2.36	
Multiburst Flag	-----	% Bar	**	50.0	70.0	No Multiburst
Multiburst Flag	-----	mV	**	350.0	490.0	No Multiburst
MB Packet #1	-----	% Flag	**	80.0	120.0	No Multiburst
MB Packet #2	-----	% Flag	**	80.0	120.0	No Multiburst
MB Packet #3	-----	% Flag	**	80.0	120.0	No Multiburst
MB Packet #4	-----	% Flag	**	80.0	120.0	No Multiburst
MB Packet #5	-----	% Flag	**	80.0	120.0	No Multiburst
MB Packet #6	-----	% Flag	**	80.0	120.0	No Multiburst
CCIR LF Error	0.2	% Bar				No Bar - Ref. 700 mV
50-550 Hz LF Error	0.3	% Bar				No Bar - Ref. 700 mV
10-1000 Hz LF Error	0.2	% Bar				No Bar - Ref. 700 mV
S/N Unweighted (567)	62.0	dB				No Bar - Ref. 700 mV
S/N Lum-wgtd (567)	74.9	dB				No Bar - Ref. 700 mV
S/N Chr-wgtd	61.7	dB				No Bar - Ref. 700 mV
S/N Periodic	-----	dB	**	40.0	-----	Random >> Periodic
S/N Unweighted (569)	73.5	dB				No Bar - Ref. 700 mV
S/N Lum-wgtd (569)	84.7	dB				No Bar - Ref. 700 mV
ICPM (Absolute)	-----	Deg	**	-20.0	20.0	No Luminance Steps
ICPM (Rel Blanking)	-----	Deg	**	-20.0	20.0	No Luminance Steps
Field Time Dist	-----	%	**	-2.0	2.0	Not Found

Bar-LineTime (NTSC & PAL)

Measurement Results Channel A Fri Aug 30 16:00:05
 Bar & LineTime Waveform->FCC Composite
 Field = 1 Line = 18
 Average Off

Bar Level(Ref. b1)	99.5	IRE
Bar Level(Back Porch)	99.6	IRE
Sync Level	40.0	IRE
Sync to Bar Top	139.6	IRE
Sync/Bar Ratio	100.5	%
LineTime Dist (Rec. 567)	0.1	%
Bar Tilt (Rec. 569)	0.1	%
Bar Width	18.0	u sec

Bounce (NTSC & PAL)

Measurement Results Channel A Fri Aug 30 16:02:06
 Bounce APL change 10.0% to 90.0%

Peak deviation	50.68%
Settle to 1.0% in	0.30 sec

Burst-Frequency (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:03:45
Burst Frequency Measurement	(Ref. Ch-B Burst)	
Average Off		

Burst Frequency Error	-0.2 Hz	

ChromLum~GainDelay (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:04:22
Chrom/Lum Gain Delay		Waveform->FCC Composite
Field = 1 Line = 18		
Average Off		

Chroma Gain	92.5 %	
Chroma Delay	-3.7 n sec	

Chrominance~AMPM (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:04:59
Chrominance AMPM		Waveform->appropriate
Full Field (Both Fields)		
Band width 100Hz to 500kHz		
Average Off		

AM Noise	-64.3 dB rms	
PM Noise	-64.2 dB rms	

(0 dB = 714 mV p-p with AGC for 100% Chrominance Level)		

Chrominance~FreqResp (NTSC only)

Measurement Results	Channel A	Fri Aug 30 16:06:41
Chrominance Freq Resp		Waveform->FCC Multi Burst
Field = 1 Line = 50		
Average Off		

0 dB = Packet #3	56.4 IRE	
Packet #1 0.5 Mhz	0.15 dB	
Packet #2 1.2 Mhz	0.10 dB	
Packet #3 2.0 Mhz	0.00 dB	
Packet #4 3.0 Mhz	-5.88 dB	* -2.00 1.00
Packet #5 4.1 Mhz	-5.14 dB	* -3.00 1.00

Chrominance~NonLinearity (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:07:20
Chrominance NonLinearity		Waveform->Mod 3 Step
Field = 1 Line = 50		
Average Off		

Chroma Amp (Packet 1)	1.4 %	
Chroma Amp (Packet 2)	0.0 Ref.	
Chroma Amp (Packet 3)	-0.6 %	
Chroma Phase (Packet 1)	-0.7 deg.	

Appendix A: Measurement Result Files

Chroma Phase (Packet 2)	0.0	Ref.
Chroma Phase (Packet 3)	-0.4	deg.
Chroma Intermod. (Packet 1)	0.2	%
Chroma Intermod. (Packet 2)	0.1	%
Chroma Intermod. (Packet 3)	-0.1	%

ColorBar (NTSC & PAL)

NOTE. Notice that the name of this measurement (according to the results file) is “ColorBar” for NTSC, “ColourBar” for PAL.

Measurement Results	Channel A	Fri Aug 30 16:07:45	
ColorBar		Waveform->FCC Color Bar	
Field = 1 Line = 50			
Average Off			

Luma Level (Gray)	95.2	IRE		
Luma Level (Yellow)	64.3	IRE		
Luma Level (Cyan)	50.7	IRE		
Luma Level (Green)	42.8	IRE	*	43.5 53.2
Luma Level (Magenta)	30.0	IRE	*	32.3 39.5
Luma Level (Red)	22.1	IRE	*	25.5 31.1
Luma Level (Blue)	8.2	IRE	*	13.6 16.7
Luma Level (Black)	0.1	IRE	*	6.7 8.3
Chroma Level (Gray)	0.1	IRE		
Chroma Level (Yellow)	60.1	IRE		
Chroma Level (Cyan)	86.3	IRE		
Chroma Level (Green)	81.4	IRE		
Chroma Level (Magenta)	81.7	IRE		
Chroma Level (Red)	87.4	IRE		
Chroma Level (Blue)	61.8	IRE		
Chroma Level (Black)	0.0	IRE		
Chroma Phase (Yellow)	166.7	deg		
Chroma Phase (Cyan)	283.5	deg		
Chroma Phase (Green)	240.9	deg		
Chroma Phase (Magenta)	60.9	deg		
Chroma Phase (Red)	103.5	deg		
Chroma Phase (Blue)	347.0	deg		

DGDP (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:08:06	
Differential Gain & Phase		Waveform->NTC-7 Composite	
Field = 2 Line = 18			
Average Off			

Differential Gain (min)	-6.10	%	*	-5.00 5.00
Differential Gain (max)	0.79	%		
Differential Gain (p-p)	6.83	%		
Differential Phase (min)	-1.41	deg		
Differential Phase (max)	1.02	deg		
Differential Phase (p-p)	2.43	deg		

GroupDelay-SinX_X (NTSC & PAL)

Measurement Results Channel A Fri Aug 30 16:08:52
 Group Delay & Gain vs Frequency (SinX/X) Waveform->Sin X/X
 Field = 2 Line = 44
 Reference Frequency at 0.20 MHz
 Average Off

Amplitude (0.5 MHz)	-0.0	dB		
Amplitude (1.0 MHz)	-0.1	dB		
Amplitude (2.5 MHz)	-0.2	dB		
Amplitude (3.0 MHz)	-0.2	dB		
Amplitude (3.6 MHz)	-0.4	dB		
Amplitude (4.0 MHz)	-0.6	dB	*	-0.5 0.5
Amplitude (4.2 MHz)	-0.6	dB		
GroupDelay (0.5 MHz)	-5.5	n sec		
GroupDelay (1.0 MHz)	15.9	n sec	*	-15.0 15.0
GroupDelay (2.5 MHz)	2.9	n sec		
GroupDelay (3.0 MHz)	3.2	n sec		
GroupDelay (3.6 MHz)	19.3	n sec	*	-15.0 15.0
GroupDelay (4.0 MHz)	13.8	n sec		
GroupDelay (4.2 MHz)	-6.5	n sec		
Cursor (3.58 MHz)	-0.4	dB		19.3 n sec

H_Blank (NTSC & PAL)

Measurement Results Channel A Fri Aug 30 16:09:28
 H_Blank 4 IRE (Field 1) (Line 22 to 260)

H Blank Start	-1.69	u sec
H Blank End	9.47	u sec
H Blank Width	11.15	u sec

H_Timing (NTSC & PAL)

Measurement Results Channel A Fri Aug 30 16:09:50
 H Timing (RS-170A)
 Field = 2 Line = 44
 Average Off

Sync Rise Time	148.8	n sec
Sync Fall Time	143.0	n sec
Sync Width	4.71	u sec
Sync Level	40.9	IRE
Burst Level	39.2	IRE
Sync to Burst Start	5.31	u sec
Burst Width	9.0	cycles
Front Porch	1.70	u sec
Sync to SetUp	9.48	u sec

ICPM (NTSC & PAL)

Measurement Results Channel A Fri Aug 30 16:10:27
 ICPM
 Field = 2 Line = 44
 Average Off

```

Min Angle          = -67.71 degrees   *   -5.0   5.0
Max Angle          =  66.33 degrees   *   -5.0   5.0
Pk-Pk Angle       = 134.04 degrees
(Absolute)
    
```

Jitter (NTSC & PAL)

```

Measurement Results      Channel A      Fri Aug 30 16:10:50
Jitter Measurement      (Line 20 to 250)
Average Off
    
```

```

Peak to Peak Jitter      4.2 n sec
    
```

Jitter~Long_Time (NTSC & PAL)

```

Measurement Results      Channel A      Fri Aug 30 16:11:20
Jitter Long Time Measurement  Frequency Lock Speed  1 sec
Average Off
    
```

```

Peak to Peak Jitter      0.006 u sec
    
```

K_Factor (NTSC & PAL)

```

Measurement Results      Channel A      Fri Aug 30 16:11:49
2T Pulse K Factor      Waveform->FCC  Composite
Field = 1 Line = 18
Graticule EIA-2T
Average Off
    
```

```

K-2T          0.3 % KF
K-PB          -0.1 % KF
PB Ratio      99.6 %
HAD           254.9 n sec
    
```

Line~Frequency (NTSC & PAL)

```

Measurement Results      Channel A      Fri Aug 30 16:12:03
Line Frequency Measurement
Average Off
    
```

```

Line Frequency Error    -0.007 %
Line Frequency          15.733 kHz
Field Frequency         59.94 Hz
    
```

Luminance~NonLinearity (NTSC & PAL)

```

Measurement Results      Channel A      Fri Aug 30 16:12:17
Luma Non Linearity      Waveform->FCC  Composite
Field = 1 Line = 18
Average Off
    
```

```

LumaNonLinearity (p-p)  3.3 %
    
```

MultiBurst (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:12:40
Multi Burst		Waveform->FCC Multi Burst
Field = 1 Line = 17		
Average Off		

0 dB = 60 % of Flag	101.9 IRE	
Packet #1 0.50 MHz	0.15 dB	
Packet #2 1.25 MHz	0.10 dB	
Packet #3 2.00 MHz	0.04 dB	
Packet #4 3.00 MHz	-0.06 dB	
Packet #5 3.58 MHz	-0.24 dB	
Packet #6 4.10 MHz	-0.37 dB	

Noise-Spectrum (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:13:50
Noise Spectrum		Waveform->Pedestal
Field = 1 Line = 10		
Band width 100kHz to 5.0MHz (SC trap) (Tilt Null)		
Average Off		

Noise Level	-60.3 dB rms	
Cursor 1	-70.0 dB p-p	at 1.96 MHz
Cursor 2	-107.2 dB p-p	at 3.58 MHz
Noise Area in Cursors	-66.3 dB rms	-37.2 dB Diff

SCH_Phase (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:14:36
SCH Phase		
Average off		

SCH Phase	-2.3 deg	

ShortTime-Distortion (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:15:07
Short Time Distortion		Waveform->NTC-7 Composite
Field = 2 Line = 18		
Graticule IEEE-511		
Average Off		

Rising Edge	0.7 % SD	
Rise Time	131.5 nSec	* 120.0 130.0
Falling Edge	0.9 % SD	
Fall Time	130.0 nSec	

TwoField (NTSC & PAL)

Measurement Results	Channel A	Fri Aug 30 16:15:37
TwoField		
Average Off		

Field Time Dist 13.1 %

APL = 51.8 %
Slow Clamp at Back Porch
Luminance at (35.0 usec), Sync & Back Porch are displayed

VITS-ID (NTSC only)

Measurement Results Channel A Fri Aug 30 16:16:09
Signal ID (System Line) Waveform->NTC-7 Composite
Field = 2 Line = 18

Field 1	Field 2
Line 15 --> GCR 8 Fields Seq.	Line 15 --> GCR 8 Fields Seq.
Line 16 --> VIRS	Line 16 --> Sin X/X
Line 17 --> FCC Multi Burst	Line 17 --> NTC-7 Combination
Line 18 --> FCC Composite	Line 18 --> NTC-7 Composite
Line 19 --> Pedestal	Line 19 --> Red Field
Line 20 --> Luminance Bar	Line 20 --> Mod Pedestal F-line

V_Blank (NTSC & PAL)

Measurement Results Channel A Fri Aug 30 16:16:49
V Timing Measurement
Average Off

Equalizer Pulse	2.33	u sec
Equalizer Pulse 10%	2.47	u sec
Serration Pulse	4.66	u sec
Serration Pulse 10%	4.51	u sec

Video-Standard (NTSC & PAL)

Video Standard Fri Aug 30 16:17:56

Source A: NTSC
Source B: NTSC
Source C: PAL

Option 1G (Echo/Rounding)

Echo

Echo Application Results: Fri Aug 30 16:33:33
Channel A

Cursor	Time	percent of Peak	dB rel Curve 1
1	406 nsec	0.14	-36.96
2	605 nsec	0.00	-129.50

Rounding

Measurement Results Channel A Fri Aug 30 16:33:59

Rounding Errors
 Line = 96
 Average Off

Waveform->Pulse

(From 0.40 uS to 1.00 uS)
 Rounding of White 0.3 %
 Rounding of Black 0.0 %

Option 20 (Teletext)

Teletext

Measurement Results Channel A Fri Aug 30 16:19:59
 Teletext Waveform->Teletext
 Field = 1 Line = 15
 Accumulation 400 times
 Timing Average Off

(Eye Threshold = 1/250)

Eye Height	45.9 %	*	70.0	100.0
	28.1 IRE	*	49.0	70.0
(At Clock)				
Eye Width	58.1 %	*	70.0	100.0
(At Middle)				
'1' Level	66.0 IRE	*	67.5	72.5
'0' Level	4.7 IRE	*	-2.5	2.5
P-P Amplitude	156.8 %	*	100.0	130.0
	96.1 IRE	*	70.0	91.0
Run-In Start	9.91 u sec			
Run-In Bits	16.0 bits			
Data Line Width	50.32 u sec	*	52.00	59.00
Data End to Sync	3.32 u sec	*	1.00	3.00
Run-In Amplitude	52.7 IRE	*	67.5	72.5

SoundInSync

Measurement Results Channel A Fri Aug 30 16:37:29
 SoundInSync
 Line = 96 (SIS mode)
 Accumulation 200 times

(Eye Threshold = 1/250)

Eye Height	86.2 %
	201.0 mV
(At Clock)	
Eye Width	77.5 %
(At Middle)	
'3' Level	370.8 mV
'2' Level	147.1 mV
'1' Level	-86.1 mV
'0' Level	-310.9 mV
P-P Amplitude	106.0 %
	722.5 mV

Option 30 (Component)

NOTE. Note that results files from Component measurements on 525-line systems contain a line in the header that reads “Field = X Line = Y”. The corresponding line in results files from Component measurements on 625-line systems reads simply “Line = Y”. Except for this line, Component measurement results files from 525-line and 625-line systems do not differ, unless otherwise noted.

Bowtie

Measurement Results Channels A, B, and C Fri Aug 30 16:26:37
 Bowtie
 Field = 1 Line = 45
 Artificial Reference in use at: 35.50 uSec
 Average Off

Relative Timing B-Y	-4.7 ns
Relative Timing R-Y	-4.8 ns
Relative Amplitude B-Y	-3.15 mV
Relative Amplitude R-Y	-2.03 mV

Lightning

Measurement Results Channels A, B, and C Fri Aug 30 16:20:50
 Lightning
 Field = 1 Line = 86
 Average Off

Reference
 Colorbars: 75% SMPTE/EBU (60Hz)
 Pk-white (100%) 700.0 mV Setup 0.0% Color Pk-to-Pk 525.0 mV

Measured

Color Pk-to-Pk B-Y	701.79 mV	33.67%
Color Pk-to-Pk R-Y	700.22 mV	33.37%
Pk-white	713.47 mV (100%)	1.92%
Delay B-Y	-6 ns	
Delay R-Y	-7 ns	

Bowtie (PAL)

Measurement Results Channels A, B, and C Fri Aug 30 16:24:21
 Bowtie
 Line = 46
 Marker line: F166 L 0
 Average Off

Relative Timing B-Y	-6.2 ns
Relative Timing R-Y	-6.2 ns
Relative Amplitude B-Y	-3.14 mV
Relative Amplitude R-Y	-1.78 mV

Lightning (PAL)

Measurement Results Channels A, B, and C Fri Aug 30 16:23:35

Lightning
Line = 46
Average Off

Reference

Colorbars: 75% SMPTE/EBU (50Hz)
Pk-white (100%) 700.0 mV Setup 0.0% Color Pk-to-Pk 525.0 mV

Measured

Color Pk-to-Pk	B-Y	526.46 mV	0.28%
Color Pk-to-Pk	R-Y	525.47 mV	0.09%
Pk-white		699.31 mV (100%)	-0.10%
Delay	B-Y	-8 ns	
Delay	R-Y	-9 ns	

Option 40 (Audio)**Audio~Analyzer**

Audio Analyzer Measurement Results: Fri Aug 30 12:20:17

	Frequency	Level	THD+N
Left Channel :	2.302 kHz	-75.37 dBu	65.310 %
Right Channel:	1.702 kHz	-75.49 dBu	68.252 %
Level Difference (L - R):		0.121 dB	
Phase Difference (L - R):		-22.97 deg	

Audio~Monitor

Audio Monitor Results: Fri Aug 30 12:20:38

Left Meter Level = -50.58 dBu
Right Meter Level = -51.69 dBu
Sum Meter Level = -51.70 dBu

Audio~Spectrum

Audio Spectrum Measurement Results: Fri Aug 30 12:21:02

Active Channel: LEFT
Input Gain: 0 dB
Weighting Filter: None
Level (188 Hz - 20 kHz): -77.253 dBu
Average on

View_Audio~Auto_Test

Measurement Results
View Audio Auto Test

Fri Aug 30 12:21:44

At Tue Dec 18 14:34:58 1990 Video Source: A Audio Input: 1
Test Type 0.33 Program 00 Expected TEST level: 0 dBu
Source TEK1

	Left	Right	Violated Limits	
			Lower	Upper
Insertion Gain Error (dB)	0.03	0.02		
Sweep Max. Gain (dB)	0.05	0.05		
Sweep Min. Gain (dB)	-0.05	-0.05		
THD+N (at 1020Hz) (%)	0.016	0.019		
2nd Harmonic (at 1020Hz) (%)	0.001	0.001		
THD+N (at 60Hz) (%)	0.016	0.019		
2nd Harmonic (at 60Hz) (%)	0.002	0.002		
3rd Harmonic (at 60Hz) (%)	0.003	0.003		
SNR (unweighted) (dB)	91.65	90.41		
SNR (weighted) (dB)	88.35	88.01		
Max Compandor Error (rise) (dB)	-0.00	-0.00		
Max Compandor Error (fall) (dB)	0.00	0.01		
Gain Difference (dB)	0.00			
Phase Difference (deg.)	0.53			



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