VTM-100

Television Signal Monitor
Installation and Operation Handbook

TWO-YEAR LIMITED WARRANTY

Videotek, Inc. warrants that this product is free from defects in materials and workmanship for a period of two years from the date of purchase, except for CRTs and LCDs, which are warranted for a period of one year. During this warranty period, Videotek will, at its option, repair or replace defective products at no charge for the parts or labor. Batteries are not covered in the warranty.

For warranty service or repair, this product must be returned to a service facility designated by Videotek in the original packing or its equivalent. The purchaser shall insure the product and prepay shipping charges to Videotek, and Videotek shall insure the product and pay shipping charges to return the product to the purchaser.

The foregoing warranty shall not apply to defects or damage resulting from improper or inadequate maintenance by the purchaser, connecting the product to incompatible equipment, misuses, operation outside any environmental specification for the product, improper site preparation or maintenance, or attempts by personnel other than authorized Videotek representatives to repair or service the product.

No other warranty is expressed or implied. Videotek specifically disclaims the implied warranties of merchantability and fitness for a particular purpose. The remedies provided by the foregoing warranty are the purchaser's sole and exclusive remedies. Videotek shall not be liable for any direct, indirect, special, incidental or consequential damages, whether based on contract, tort, or otherwise.

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OPERATOR'S SAFETY SUMMARY

Refer all servicing to qualified service personnel

To maintain and to ensure safe operation, observe the following instructions, symbols and precautions.

1. When the unit is to be permanently cabled, first connect protective ground conductor before making any other connections.
2. Built-in units should only be operated when properly fitted into the system.
3. For permanently cabled units without built-in fuses, automatic switches or similar protective facilities, the AC supply line shall be fitted with fuses rated to the units.
4. Before switching on the unit, ensure that the operating voltage of the unit matches the line voltage.
5. Units of protection class I with disconnectable AC supply cable and plug may only be operated from a power socket with protective ground contact.
   a. The protective ground connection should not be made ineffective by an extension cable.
   b. Any breaking of the protective ground conductor within or outside of the unit or loosening of the protective ground connection may cause the unit to become electrically hazardous.
   c. The protective ground conductor shall not be interrupted intentionally.
6. Before opening the unit, isolate it from the AC supply.
   a. Adjustments and replacement of parts as well as maintenance and repair should be carried out only by qualified personnel.
   b. Observe safety regulations and rules for the prevention of accidents.
   c. Use only original parts for replacing parts relevant to safety (e.g. power on/off switches, power transformers or fuses).
7. Operator replaceable fuses may be hazardouss live. When replacing fuse, turn unit off by isolating it from the AC supply.
8. Also observe the additional safety instructions specified in this manual.

Explanation of Symbols Used

Read Operator's Handbook and Service Manual; observe the safety symbols used.

Protective ground connection

Use of Cleaning Solvents

Cleaning of the equipment with isopropyl alcohol or similar solvents may cause degradation of labels. Use caution when cleaning so that labels are not removed.

Fuse Information

The fuse located in the rear AC connector is of the following type and rating:

Type T (time lag) 1A 250V

The fuse located on the power supply is of the following type and rating:

Type T (time lag) 2.5A 250V

SPECIFICATIONS

GENERAL

STANDARDS : NTSC/PAL (Auto Detect)

FORMATS : Composite/Component

DISPLAY WAVEFORM ACCURACY : ± 1% @ 1V

VIDEO RESPONSE : 25Hz - 6 MHz ± 1% of 50 kHz

CHROMA FILTER RESPONSE : Within 3% of flat @ 3.58 MHz and 4.43 MHz

TRANSIENT RESPONSE : Preshoot and/or overshoot ≤ 1%

TIME BASE MODES :
Line Rate: 1H, 2H, 3H Field Rate: 1V, 2V, 3V Sweep Mags: x5, x10, x20 relative to 1H or 1V

INPUT GAIN RANGE : Fully adjustable from 50% to 500%

COMPONENT FORMATS : GBR, BETA 75% and 100%, MII 75% and 100%, SMPTE, EBU 75% and 100%, YC using YC-1 adaptor option

COMPOSITE VECTOR ACCURACY : ± 1°

COMPOSITE VECTOR PHASE CONTROL : > 360°, continuously variable

SC/H PHASE MEASUREMENT ACCURACY : ± 5° @ SC/H 0°

MEMORY : 5 user-defined setups, with total instrument settings

DISPLAY : Input displays, graticule and background colors are user-selectable

INPUTS

VIDEO : Three BNC loop-thru NTSC/PAL composite or one component video input into 75Ω load, sync negative

VIDEO LEVEL : 1V p-p ± 6 dB

VIDEO RETURN LOSS : ≥ 50 dB, DC - 5 MHz

EXTERNAL REFERENCE : 286 mV NTSC, 300 mV PAL SYNC and BURST ± 6 dB

AUDIO : Two balanced stereo pairs using push-on connector (provided)

AUDIO LEVEL : 0, +4, +8, +12 dBm (menu selectable)

OUTPUTS

VIDEO : Two 75Ω BNC video outputs. In component mode, output is "Y" or green channel with selected displays.

POWER REQUIREMENTS

POWER SOURCE : 115-240V AC, 50-60 Hz

POWER CONSUMPTION : 35 Volt amps typical

ENVIRONMENTAL

OPERATING TEMPERATURE : 0°C to 50°C

STORAGE TEMPERATURE : -40°C to 65°C

TRANSPORTATION : 24" impact drop

HUMIDITY : 90% (non-condensing)

ALTITUDE : Operating: to 10,000 ft.
Non-operating: to 50,000 ft.

MECHANICAL

CABINET : Height: 1.75" (4.5cm)
Width: 19" (48.3cm)
Depth: 16" (40.6cm)

WEIGHT : 15.0 lb (6.8kg)

INTERFACE

REMOTE CONTROL : RS-232 port for control by remote computer, or Microsoft or Logitech mouse

ACCESSORIES

Operator's Handbook (with Quick Reference Card), power cord, terminator, rackmounting hardware

OPTIONS

Service Manual

Specifications subject to change without notice.

INSTALLATION OF THE VTM-100

Inspect the shipping box of the VTM-100 prior to installation. Report any external or subsequent internal shipping damage to your shipper. The box contains the VTM-100, an operator's handbook with quick reference card, one 75Ω terminator, a power cord, rack mounting hardware, and your warranty registration card. The audio input connector on the rear panel has a mating connector attached to the input connector.

Rack mount the VTM-100 with the enclosed rack mounting rear support rails. The ideal installation would leave 1 rack unit (1.75") of rack space above and below the unit; this is not required, but it is suggested. Insure that air flow around ventilation holes on top and sides of the chassis and from the back panel cooling fan is not obstructed when mounting.

Connect 1 composite video signal to input A and terminate that input with a 75Ω load (one terminator is provided). Connect more video inputs, as your system requires, in a similar fashion, always checking that all inputs are properly terminated. If your system uses component video (GBR or Y, B-Y and R-Y, or similar), then connect the three inputs as labeled on the rear panel. Input A is for G or Y, input B is for B or B-Y, and input C is for R or R-Y. For YC systems, connect Y to input A, C to input B and composite video to input C and loop through to the External Reference input. Use of the external reference connection is otherwise optional, and should be used where the system requires an external reference.

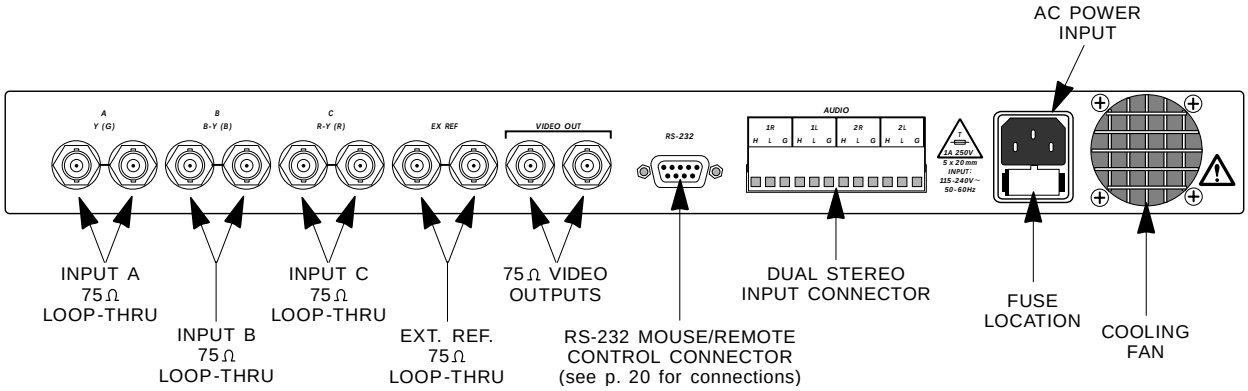
Connect up to two stereo pairs to the audio input connector. The input is balanced and can be set for 0, +4, +8 or +12 dBm nominal input levels. The input is high impedance, so it may be bridged or terminated as your system requires.

The two video output connectors function identically. They provide two outputs of the VTM-100 for viewing on a picture monitor. The displays and menus of the VTM-100 are presented on these video output connectors. Connect and terminate at least one output to a convenient monitor for use in the operation of the unit. If the other output is not used, it does not need to be terminated.

If a PC or a mouse is to be used with the system, then connect either the PC or a mouse to the RS-232 port. A PC will require a null modem cable and a terminal control program such as ProComm for proper operation with the VTM-100. The configuration of the mouse or the PC is described on page 14 under the Control Menu section.

Connect the power cord to the AC input and connect to a properly grounded outlet. The VTM-100 will automatically adjust to any AC input from 90 to 260V, 50 or 60Hz.

Front Panel

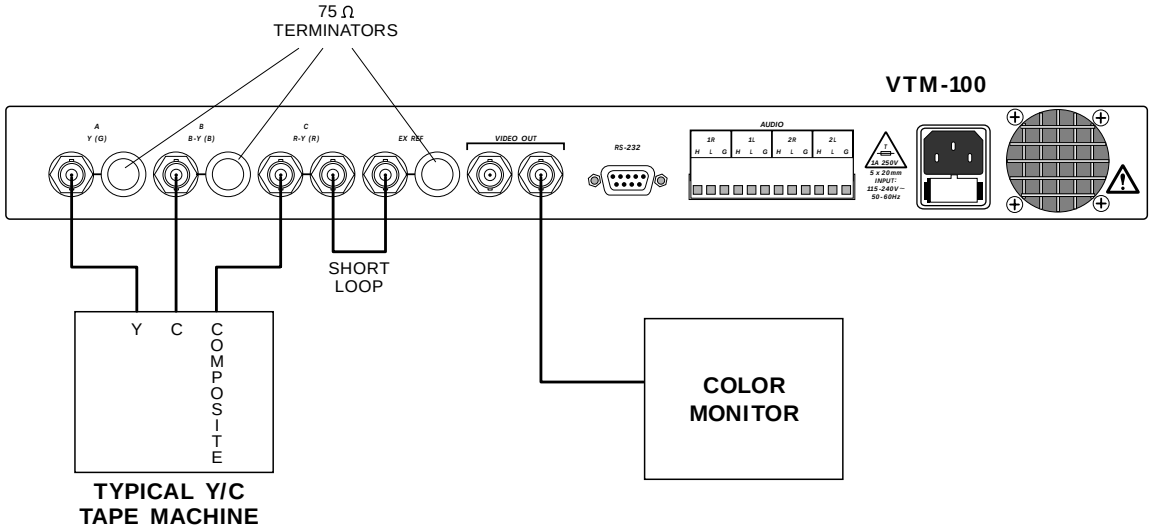


BACK PANEL

CONNECTING A Y/C SIGNAL

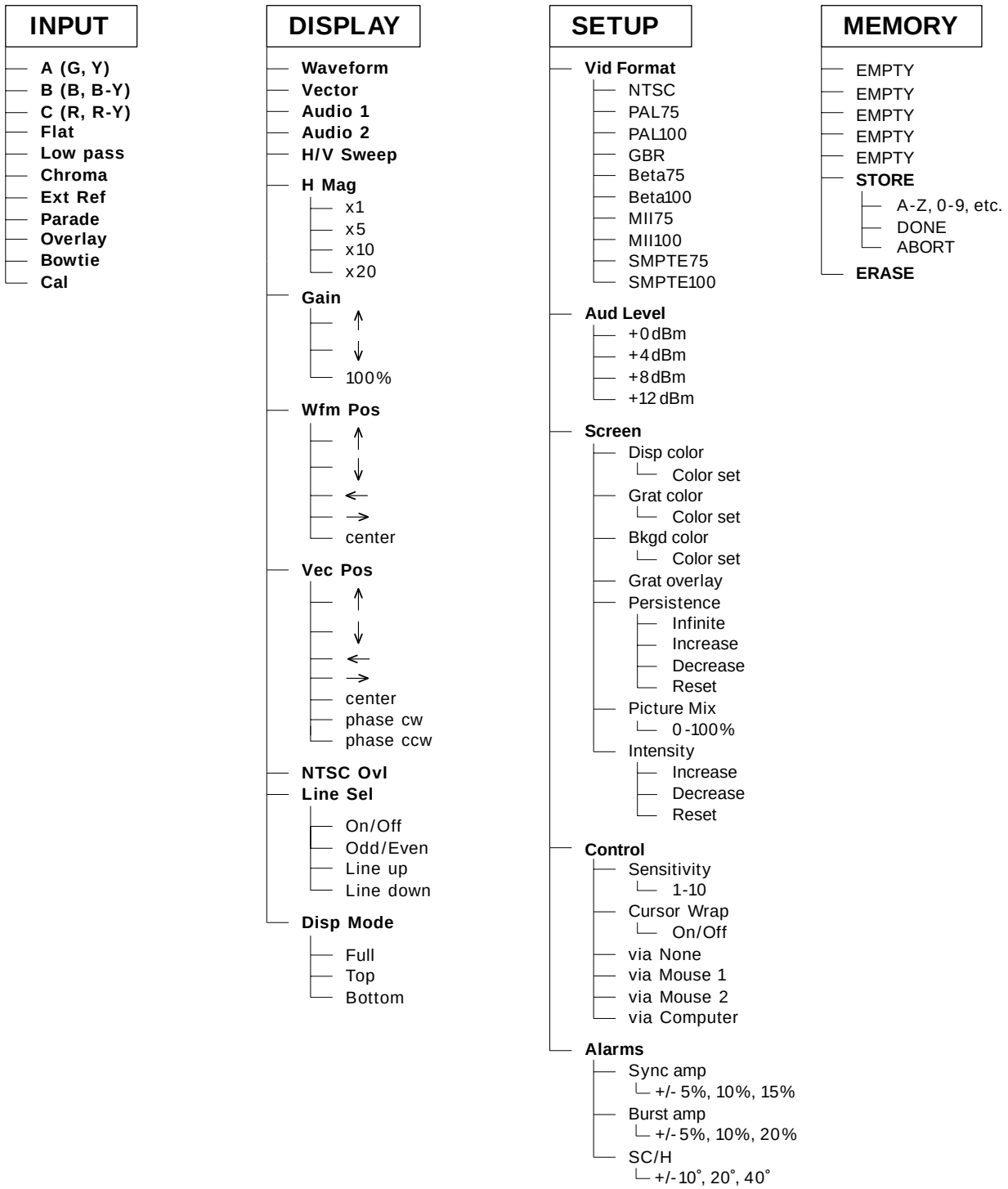
The VTM-100 can display a Y/C signal in composite mode (not component mode) by following the steps and diagram shown below. Note that a composite signal must be available to use as a reference. The interconnection shown below allows the user to view not only the Y and C sources but also the composite waveform and vector (on the C input to the VTM-100). Insure that the composite input is connected to the C input on the VTM-100, looped through to the External Reference input, and terminated with 75Ω.

From the VTM-100 menu, select NTSC (composite) on the SETUP/VID FORMAT menu. Next, select A and B inputs with FLat filters and parade mode on the INPUT menu. Finally, select External Reference on the INPUT menu. The monitor will then display Y (luminance) on Input A followed by C (Chroma) on Input B.



Note: If your Y/C source does not have BNC connectors, an optional YC-1 adaptor kit is available from Videotek.

VTM-100 FULL MENU SYNOPSIS



OPERATING INSTRUCTIONS

The VTM-100 provides a rasterized output waveform/vector/audio display with an on-screen menu system for operator control and setup of the unit. These controls allow for selection of inputs, filters, display parameters, video formats, and access to memory for storage and recall of user-defined setups.

User-Interface Controls: Front Panel Buttons/Joystick or Mouse

The VTM-100 can be operated directly by using the front panel push buttons and joystick, by a user-provided mouse, or with ASCII input from a remote terminal. On the front panel the left push button, marked SELECT, enables the menu system, chooses lower level menus, and selects items. The right push button, marked EXIT, moves to upper level menus or removes the menus completely from the display. The joystick controls cursor movements through the menu. Moving the joystick causes the cursor to move in a corresponding direction; for example, up or down through a menu. At the top menu levels, moving the joystick left or right moves the cursor from one menu to the next.

A two or three button serial mouse can also be used to control the VTM-100. The use of a mouse is identical to the push buttons and joystick of the front panel. The left mouse button is the SELECT function; the right mouse button is the EXIT function; and moving the mouse up, down, left, or right is identical to the joystick movements. On a three button mouse, the middle button is not used.

Screen Overview

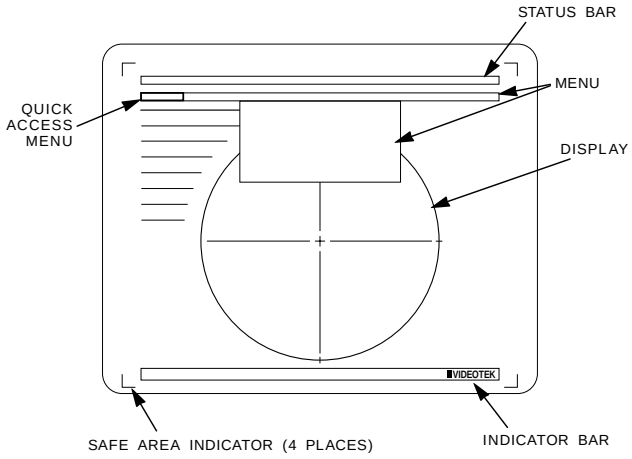


Figure 2

The VTM-100 display on your monitor is divided into four major sections: Status Bar, Indicator Bar, Display, and Menu.

STATUS BAR - found along the top of the display. Indicates selections that the user has made, which include:

Input and filter - up to three inputs can be selected along with three filters. In composite format, these are indicated by input (**A, B**, or **C**), a colon (**:**), and the filter (**Fl**at, **L**ow**p**ass, or **Ch**roma). In GBR format, inputs are labeled **G**, **B**, **R**, and in other component formats they are labeled **Y**, **B-Y**, **R-Y**. No filters are available in component formats.

Reference - the reference is indicated as either one of the three input channels (**A**, **B**, or **C**) or the **Ex**ternal reference input. In component format, the reference is either **G**, **Y**, or **Ex**ternal.

Sweep mode and magnification - indicates whether waveforms are displayed in **H**orizontal (line) or **V**ertical (field) and the magnification (**x1, x5, x10,** or **x20**).

Gain - indicates the **Gain** as a percentage of full scale.

Scale - represents the time between major divisions of the waveform graticule, based upon the number of inputs displayed and current horizontal magnification.

INDICATOR BAR - provides the user with the following information:

NTSC, PAL, *or* ***selected component standard*** - based upon the input signal on the reference input, and the menu selected standard.

Line number and odd or even field - when line select mode is invoked.

SCH *phase* - when selected the SC/H phase of the first selected input is calculated and presented to the user in degrees and is available in composite mode only.

Burst *alarm* ***Err****or* - if burst amplitude falls outside the user-defined limits.

Sync *alarm* ***Err****or* - if sync amplitude falls outside the user-defined limits.

Alarm off - is indicated when no alarms are enabled.

DISPLAY - the major portion of the screen area where waveforms, vectors, and audio levels appear along with their corresponding graticules.

MENU - is composed of two major portions: Quick Access Menu and Full Menu.

Quick Access Menu - provides easy access to the control of the most common functions on a standard waveform monitor and vector scope.

Full Menu - as shown in diagram on page 8 provides complete access to all of the VTM-100 features. Details of each feature and how it is selected are discussed in the following sections. Depending on modes selected, certain items on the menu are not selectable and are displayed dimly on the menu. The menu also indicates selected items (when appropriate) by prefixing a bullet (●) in front of the item.

Quick Access Menu - provides the ability to change:

- Waveform position - left, right, up, or down.
- Vector position - left, right, up, or down.
- Gain - up or down.
- H Mag: x1, x5, x10, or x20 - up for increased mag, down for decreased.
- Vector phase - right for clockwise, or left for counter-clockwise.
- Intensity - up or down.
- Line number - up or down, when in Line Select mode.
- Persistence - up for infinite, down for normal, when in Line Select mode.

When the Full Menu has not been invoked, pushing the EXIT button or right mouse button cycles through these Quick Access Menu items. The joystick or mouse movement then effects the desired change. Only those functions relevant to the currently selected display modes will be available when cycling through the Quick Access Menu options.

Full Menu - The SELECT button in combination with the joystick (or mouse) provides access to the Full Menu. The SELECT button gains access to a lower level menu and chooses or toggles the item highlighted. The EXIT button moves back up the menu levels. The EXIT button may be pressed repeatedly to clear all levels of menus from the screen. To use the Full Menu, press SELECT once. A menu bar will appear at the top of the screen, consisting of four main menu items, **Input**, **Display**, **Setup**, and **Memory**. To access the functions of one of these menus, move the cursor left or right to highlight the desired menu title and press SELECT. A drop-down menu will appear, and the cursor will move down to the last valid selected menu item on the list. When finished with a menu, continually press EXIT until all menus, including the top menu bar, have been removed from the screen. The content of each main menu, along with corresponding submenus, is described below.

Input Menu - The Input menu allows for selection of one to three inputs each with their own composite filter (flat, low pass or chroma). The External Reference also may be toggled. Display of multiple inputs in either Parade or Overlay mode is also accomplished from this menu. For component video, a Bowtie display mode (**A-B**, **A-C**) can be selected. Finally, a calibrated 1V peak-to-peak square wave may be selected. To access any of these functions, move the cursor to **Input** on the menu bar and press SELECT. A menu with the following options will appear:

I. *Input signal:* One to three input signals [(**A**, **B**, **C**), (**G**, **B**, **R**), or (**Y**, **B-Y**, **R-Y**)] can be selected. A filter (**Flat**, **Lowpass**, **Chroma**) may be selected when working with composite signals. To select any of the three inputs, move the cursor to the desired input and press SELECT. The chosen input appears on the *Status Bar* along with the default filter (**Flat**). To change the filter of a composite signal, move the cursor to the desired filter and press SELECT. To select an additional input, move the cursor to the desired input

and press SELECT. If three inputs have already been chosen, the new selection will become the first and only input displayed. To change the filter of the additional input, move the cursor to the desired filter and press SELECT. If the operator wishes to change previously selected inputs or filters, continue selecting additional inputs until only one is displayed.

A. *External Reference:* The reference signal for the display can be toggled between internal or external reference input. For composite formats, the internal reference is the first input selected, while in component it is either the **Y** or **G** channel. To select the external reference, move the cursor to **Ext Ref** on the menu and press SELECT. To return to internal reference, press SELECT again while the cursor is on the **Ext Ref** item. The current reference is displayed on the *Status Bar*.

B. *Parade/Overlay:* Two or three inputs and filter combinations can be either displayed in a parade mode or overlay mode. To select parade mode, move the cursor to **Parade** and press SELECT. To select the overlay mode, move the cursor to **Overlay** and press SELECT.

C. *Bowtie:* When a component video format is selected, a bowtie display may be viewed. To select the Bowtie, move the cursor to **Bowtie** and press SELECT.

D. *Cal:* Selecting Cal will toggle between the normal display and a 1V p-p square wave. To display the Cal pulse, move the cursor to **Cal** and press SELECT. To turn off the square wave and return to normal display, press SELECT again. No other display modes are available when Cal mode is selected.

Display Menu - allows the user to:

- Select a waveform, vector or audio display.
- Change the horizontal magnification, vertical gain, position, or phase of the display.
- Enable the line select mode to view a single line in odd or even fields.
- Change the display mode between full screen or quarter screen (top or bottom).
- Modify the vector display for a PAL input to NTSC overlay format.

To access any of these functions, move the cursor to **Display** and press SELECT. A menu with the following options will appear:

A. *Waveform/Vector/Audio:* A display on the monitor may consist of a waveform only, vector only or audio only, or combinations of waveform and vector, or waveform and audio. Selection of the desired display is performed by moving the cursor to a display type and pressing SELECT. To view a combo display, select a second display type. For example, to display a combo waveform and vector, move the cursor to **Waveform** and press SELECT, then move the cursor to **Vector** and press SELECT. To turn off a display type, move the cursor to that menu item and press SELECT. Note that a vector and audio display cannot be viewed simultaneously. Selecting vector will turn off any audio displays, and choosing an audio display will turn off the vector display.

B. *H/V Sweep*: Horizontal or Vertical Waveform Sweeps may be selected by moving the cursor to **H/V Sweep** and pressing SELECT. The current sweep mode is indicated by the letters "H" or "V" on the *Status Bar*. Pressing SELECT with the cursor on this item will toggle the display between the two modes.

C. *Horizontal Magnification:* Waveform inputs may be displayed in four horizontal magnification modes: x1, x5, x10, and x20. To change the magnification, move the cursor to **H Mag** and press SELECT. A submenu showing the magnification factors will appear. Move the cursor to the desired magnification and press SELECT. The display will be updated and the new magnification factor and graticule timebase will be shown on the *Status Bar*. Press EXIT to remove the H Mag menu from the screen.

D. *Gain:* The gain of the waveform/vector inputs may be changed by moving the cursor to **Gain** and pressing SELECT. A submenu will appear with three position selections: increase the gain (↑), decrease gain (↓) or set gain to **100%**. The gain is variable, in 1% steps, from 50% to 500%. The gain affects both the waveform and the vector displays. To increase the gain, move the cursor to ↑ and hold down the SELECT button. The button has ballistics, i.e., the rate of increase in gain accelerates the longer the button is held down. To decrease the gain, move the cursor to ↓ and hold down SELECT. Move the cursor to the **100%** item and press SELECT to set the gain back to its nominal calibrated value. Press EXIT to remove the Gain menu from the screen.

E. *Waveform Position:* The waveform position can be moved up (↑), down (↓), left (←), right (→), or to a nominal center point (**center**) by moving the cursor to **Wfm Pos** and pressing SELECT. A sub-menu menu will appears listing the position options. Move the cursor to the direction desired and press SELECT. If SELECT is held down, waveform movement accelerates. Press EXIT to remove the Waveform Position menu from the screen.

F. *Vector Position:* The vector position can be moved up (↑), down (↓), left (←), right (→), or to a nominal center point (**center**), and the phase can be rotated either clockwise (**phase cw**) or counterclockwise (**phase ccw**) direction. The selection is identical to the waveform movement. Move the cursor to **Vec Pos** and press SELECT. A submenu will appear listing the movement options. Move the cursor to the desired action and press SELECT. If SELECT is held down, the vector movement accelerates. Press EXIT to remove the Vector Position menu from the screen.

G. *NTSC Overlay:* To display PAL vectors in NTSC overlay mode, move the cursor to **NTSC Ovl** and press SELECT. To deselect this mode move the cursor to **NTSC Ovl** and press SELECT.

H. *Line Select:* A full-field single line display of either the odd or even fields is available. To select this option, move the cursor to **Line Sel** and press SELECT. A submenu will appear. Move the cursor to **On/Off** and press SELECT again to turn on line select. To choose a particular field, move the cursor first to the **Odd/Even** item and press SELECT to toggle between odd and even fields. The *Indicator Bar* at the bottom of the screen indicates whether **O**dd or **E**ven is selected. To change the line number, move the cursor to either **Line** ↑ or **Line** ↓ and press and hold SELECT to change the line number. The currently selected line number is displayed on the screen along the *Indicator Bar*. Press EXIT to remove the Line Select menu from the screen. Note: Line select displays the selected line for the first input only, and alarms are turned off when line select mode is enabled.

I. *Display Mode:* Input signals may be displayed as either full screen waveform/vector/audio displays or quarter screen displays (waveform and vector, either top or bottom) with the picture of the reference input displayed behind the waveforms. To change the display mode, move the cursor to **Disp Mode** and press SELECT. A submenu will appear, listing three choices: **Full** screen display, quarter screen display with the waveforms placed near the **Top**, or quarter screen display with the waveforms placed near the **Bottom**. Move the cursor to the desired selection and press SELECT. The display mode changes immediately. Press EXIT to remove the Display Mode menu from the screen.

Setup Menu - allows the user to select the input video format and the audio level, modify screen display colors (graticule, signal, and background), change the signal persistence and intensity, adjust the picture mix, configure mouse and remote computer communication, and set up alarms. To access any of these functions, move the cursor to **Setup** and press SELECT. A menu with the following options will appear:

A. *Video Format:* The user may select the desired input format - either composite (**NTSC**, **PAL75**, **PAL100** depending on autodetect of field rate) or a number of standard component formats (**GBR, Beta75, Beta100, MII75, MII100, SMPTE75, SMPTE100, EBU75, EBU100**). To choose a format, move the cursor to **Vid Format** and press SELECT. A submenu will appear listing possible video formats. Move the cursor to the desired format and press SELECT again. The input format changes immediately. Press EXIT to remove the Video Format menu from the screen. Note: Field rate in composite (NTSC/PAL) or component (50/60 Hz) is always automatically detected by the VTM-100.

B. *Audio Levels:* The user may select the nominal audio input level for both audio input channels. The nominal value is then reflected by the center line on the audio graticule. To select an audio input level, move the cursor on the SETUP menu to **Aud Level** and press SELECT. The submenu will appear listing four nominal input levels, **0 dBm**, **+4 dBm**, **+8 dBm**, and **+12 dBm**. Move the cursor to the desired input level standard for your application and press SELECT. Press EXIT to remove the Audio Level menu from the screen.

C. *Screen parameters:* The user may change the output display characteristics, which include display color, graticule color, background color, graticule overlay, persistence, picture mix, and intensity. To change any of these settings, move the cursor to **Screen** and press SELECT. A submenu with the following options will appear:

1. *Display color:* To change the signal display color, move the cursor to **Disp color** and press SELECT. A submenu will appear, listing fourteen color selections. Move the cursor to the desired color and press SELECT. The color of the displayed signal changes immediately. Depending on the color selected, the user may wish to make changes to intensity and persistence as well. Note: Red is reserved for alarm indication. Press EXIT to remove the Display Color menu from the screen.
2. *Graticule color:* To change the graticule color, move the cursor to **Grat color** and press SELECT. A submenu will appear, listing fourteen color selections. Move the cursor to the desired color and press SELECT. The color of the graticule changes immediately. Press EXIT to remove the Graticule Color menu from the screen.
3. *Background color:* To change the background color, move the cursor to **Bkgd color** and press SELECT. A submenu will appear, listing fourteen color selections. Move the cursor to the desired color and press SELECT. The color of the background changes immediately. Press EXIT to remove the Background Color menu from the screen.
4. *Graticule Overlay:* Unlike traditional waveform/vector scopes, the graticule on the VTM-100 is drawn electronically and therefore can appear in front of or behind the signals displayed. To toggle between these two settings, move the cursor to **Grat overlay** and press SELECT.
5. *Persistence:* Persistence controls how rapidly the intensity of signal pixels decay over time. Infinite persistence provides no decay. There are seventeen persistence settings, the highest persistence being infinite; line select mode has only two, infinite and nominal. To change the persistence, move the cursor to **Persistence** and press SELECT. A submenu will appear. To increase the persistence, move the cursor to **Increase** and press SELECT, and the persistence will be increased. To lower the persistence, move the cursor to **Decrease** and press SELECT, and persistence will be decreased. To set the persistence to infinite, move the cursor to **Infinite** and press SELECT. This will cause an accumulation of pixels on the display, which will remain until another change in persistence is made. To set the persistence to the default value, move the cursor to **Reset** and press SELECT. Press EXIT to remove the Persistence menu from the screen.
6. *Picture Mix:* The user may select the relative mix of background picture (the reference input as indicated on the *Status Bar*) and the displayed signals and graticule. The relative ratio of each is on a scale from 0% to 100%. A 0% selection is all signal and graticule display and no picture. A 100% selection is all picture and no signal or graticule display. To change the picture mix, move the cursor to **Picture Mix** and press SELECT. A submenu will appear listing a percentage of picture mix ranging from 0% to 100% in 10% increments. A bullet in front of one of the selections indicates the current ratio. To change the mix, move the cursor to the desired value and press SELECT. Press EXIT to remove the Picture Mix menu from the screen.
7. *Intensity:* To change the overall signal intensity, move the cursor to **Intensity** and press SELECT. A submenu will appear. To increase the intensity, move the cursor to **Increase** and press SELECT. Hold down SELECT to increase the intensity further. To lower the intensity, move the cursor to **Decrease** and press SELECT. Continue to press SELECT to decrease the intensity further. To set the intensity to the default value, move the cursor to **Reset** and press SELECT. Press EXIT to remove the Intensity menu from the screen.

D. *Control:* The Control menu defines hardware parameters for the user interface, related to sensitivity, cursor wrapping of menus, and RS-232 input options. To change any of these settings, move the cursor to **Control** and press SELECT. A submenu with the following options will appear:

1. *Sensitivity:* The Sensitivity menu defines the rate of change for the joystick or mouse. When using a mouse, the greater the sensitivity, the farther the cursor moves for each unit of mouse movement. Similarly for the joystick, when the sensitivity is increased, the cursor moves faster when the joystick is held in a position. To make a change in sensitivity, move the cursor to **Sensitivity** and press SELECT. A submenu will appear, listing numbers from 1 to 10. The value 1 represents the lowest sensitivity and 10 the highest. Move the cursor to the desired value and press SELECT. Press EXIT to remove the Sensitivity menu from the screen.
2. *Cursor Wrap:* To change the cursor wrap functionality, move the cursor to **Cursor wrap** and press SELECT. A submenu will appear, listing two option: **On** and **Off**. The default setting is **Off**, which will not allow the cursor to continuously wrap around the top menu bar or drop-down

menus. With cursor wrap turned **On**, attempting to move the cursor down past the last item will cause it to "wrap" back to the first item at the top of the menu. This functionality is also true of left/right movements. To change modes, move the cursor to the desired option and press SELECT. Press EXIT to remove the Cursor Wrap menu from the screen.

3. *via None:* The system will ignore all input received from the RS-232 port, and nothing will be output to the port when **via None** is selected.
4. *via Mouse 1:* This item should be selected if the operator wishes to connect to the RS-232 port a Microsoft Mouse, or Microsoft compatible mouse, which includes newer model Logitech mice, such as MouseMan and First Mouse. Users unsure of which type of mouse they are using should try using their mouse first with **via Mouse 1** and test it. If the mouse is able to control the system properly, then this is the correct setting. Otherwise, the second mouse protocol described below should be used. Only mouse commands will be sent through the RS-232 port when either **via Mouse 1** or **via Mouse 2** is selected.
5. *via Mouse 2:* This item should be selected if the operator wishes to connect to the RS-232 port an older protocol Logitech mouse, such as the Series 7 or Series 9, or if the mouse has failed to properly control the system when set to **via Mouse 1**. Only mouse commands will be sent through the RS-232 port when either **via Mouse 1** or **via Mouse 2** is selected.

   Note: The system will not allow the user to deselect **via Mouse 1** or **via Mouse 2** when the mouse is used to enter the Control menu.
6. *via Computer:* When selected, this item configures the RS-232 port for computer control to the following fixed settings: 1200 baud, no parity, 8 data bits, 1 stop bit. (No other settings are available). Details of the remote computer commands are found in a later section of this manual. Note: If a mouse is connected to the port when **via Computer** is selected, the system may "freeze up", requiring momentary physical disconnection of the mouse from the port before normal operations may be resumed.

E. *Alarms:* The Alarms menu allows the user to enable SC/H phase measurement numeric readout, and to provide error indication via signal color change (to red) when SC/H phase, burst amplitude, or sync amplitude are outside of user-defined thresholds. To enable these measurements and alarms from the SETUP menu, move the cursor to **Alarms** and press SELECT. A submenu showing the three measurements and alarm thresholds will appear. To enable any or all of the measurements, move the cursor to either **SCH phase**, **Burst Amp**, or **Sync Amp** and press SELECT. The three thresholds below the selected measurement will change from dim to bright. The currently selected threshold will be bulleted. To change the threshold, move the cursor to the desired threshold and press SELECT. Once enabled, the SC/H phase measurement will appear along the *Indicator Bar*. The SC/H phase measurement range is from ± 90° in NTSC and ± 45° in PAL. SC/H phase operation is limited to one input only and the reading is relative to that input. If burst is not locked, missing, or not readable, then the SC/H phase will be indicated as "???". For sync and burst amplitudes, the percentages are relative to 40 IRE in NTSC or 43 units in PAL. If either the burst or sync amplitude thresholds are exceeded, then the displayed signals will turn red and an error message (BURST ERR or SYNC ERR) will appear on the *Indicator Bar*. If the RS-232 port is set to **via Computer** and thresholds are exceeded, the VTM-100 will output through the port the ASCII messages "BURST AMPLITUDE ERROR", "SYNC AMPLITUDE ERROR", or "SC/H PHASE ERROR". Measurement alarms are only enabled in composite, non-line-select modes, using the first input selected. Press EXIT to remove the Alarms menu from the screen.

Memory Menu - allows the user to store and recall up to five different setups. These setups are stored even during power removal from the unit. All user-changeable parameters are stored except via mouse/computer, sensitivity, and cursor wrap. Move the cursor to **Memory** and press SELECT. A menu with the following options will appear:

A. *Store:* To store a setup from the MEMORY menu, move the cursor to **STORE** and press SELECT. Then move the cursor to one of the five storage locations. (Empty locations are marked **EMPTY**). Press SELECT. A menu of alphanumeric characters appear for naming a setup. Using the joystick, move the cursor to the desired character(s), pressing SELECT to enter the character into the selected area. Select **BACK** to backspace over the current character. When all characters are entered, move the cursor to **DONE** and press SELECT. Select **ABORT** to exit the character menu

and the memory will not be saved.

B. *Recall:* To recall a user setup, move the cursor to the desired saved setup and press SELECT.

C. *Erase:* Any setup can be overwritten by storing new parameters. Follow the store procedure above. A user setup can also be removed. To erase a location, go to the MEMORY menu, move the cursor to **ERASE**, press SELECT, move the cursor to the memory to be erased and press SELECT. The location will then be marked **EMPTY**.

Default Values

On initial power-up or after a user-initiated cold start, the system comes up in the following state:

- All menus off.
- Composite video format (NTSC is the default if no input is present for auto-detection).
- Full-screen waveform mode only.
- Input A selected, 1H sweep, x1 H Mag, internally referenced.
- Gain reset to 100%.
- Waveform (and vector) positions centered.
- Line select off.
- Audio level at 0 dBm.
- Default colors consisting of a green waveform display on a black background with a dark gray graticule.
- Default intensity and persistence settings.
- Control of RS-232 port to **via None**.
- Alarms off.
- Valid memories retained, corrupted memories deleted.

If the system becomes unstable or the operator simply wishes to return to factory default settings, perform a cold start as follows:

1. Remove power from unit.
2. Press and hold the SELECT button while reapplying power.
3. Release SELECT button only after 5 seconds.

Graticules and Measurement Scales

Because the entire display is electronically generated, graticules are redrawn to correspond to the modes selected by the user: waveform and/or vector or audio, composite or component, normal or magnifi-cation modes. For example, the screen will not present waveform amplitude markings if only a vector is being displayed. Below are descriptions of the graticules available when their respective modes are enabled.

COMPOSITE WAVEFORM GRATICULE

A composite waveform graticule consists of calibrated time markings for the X axis and calibrated amplitude markings for the Y axis. The horizontal reference line at 0 IRE or units level is ten major divisions long in normal mode (x1), and six divisions long in magnification modes (x5, x10, x20). In a normal 1H mode (one horizontal line displayed), each major horizontal division is equal to 5µs. When two video lines are displayed (2H mode) the horizontal scale then becomes 10µs per division and finally in 3H mode each horizontal division becomes 15µs. The time base of a major division is indicated in the upper right corner of the display for horizontal sweeps. For vertical sweeps, the divisions are not calibrated, so no value is shown. For magnification modes, this number will be scaled relative to a 1H sweep.

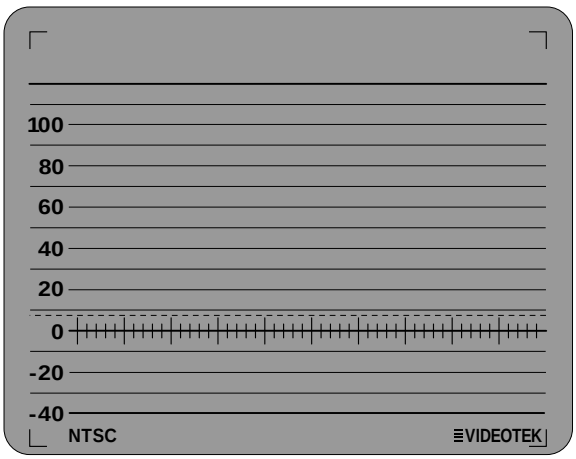


Figure 3 **NTSC Waveform**

The NTSC graticule has a vertical scale in IRE units for peak-to-peak amplitude measurements. The left side of the graticule scale is labeled –40 IRE to +100 IRE. The conversion factor for IRE to voltage for a standard 1V p-p video signal is 1 IRE = 7.14mV. The scale is drawn in 10 IRE vertical divisions, but labeled every 20 IRE. An additional dashed line at 7.5 IRE is available for black level reference setup. Refer to Figure 2. The four corner brackets indicate the safe title area of the video display.

The PAL graticule is labeled similar to the NTSC graticule with units ranging from –40 to +100 units, plus an additional –43 units line. The conversion factor for units to volts is 1 unit = 6.99mV for a 1V p-p PAL signal. The right side has a millivolt scale for easy conversion, with –0.3 and +0.7 levels labeled. Refer to Figure 3.

COMPONENT WAVEFORM GRATICULE

The horizontal scale for component waveform graticule is identical to that described for composite graticules. Vertical amplitude measurement is in millivolts, with the scale drawn in 0.1 volt divisions. The labeled divisions on the left are –0.3, 0, and +0.7 volts. An additional dashed line indicating offset level is shown at +0.35 volts, also labeled on the left. Refer to Figure 4.

COMPOSITE AND COMPONENT VECTOR GRATICULES

The vector graticules allow measurement of composite chroma phase and saturation relative to burst. It also permits component signals to be displayed for amplitude and timing checks.

For NTSC vector targets, the chrominance vector places the color bar dots into a system of targets, as is shown in Figure 5. A small target represents ± 2.5 IRE chroma amplitude and ± 2.5° of chroma phase, and a larger target is equivalent to ± 10° and ± 20% of chroma level.

On the PAL vector graticule each chrominance vector related to the +V burst terminates into a target with outer and inner dimensions. The outer target dimensions are all equal to ± 10° of chroma phase and ± 20% of chroma level, and inner targets which are ± 3° and ± 5%. A vector dot related to the –V burst terminates into a target with only inner dimensions shown as described above. (See Figure 6).

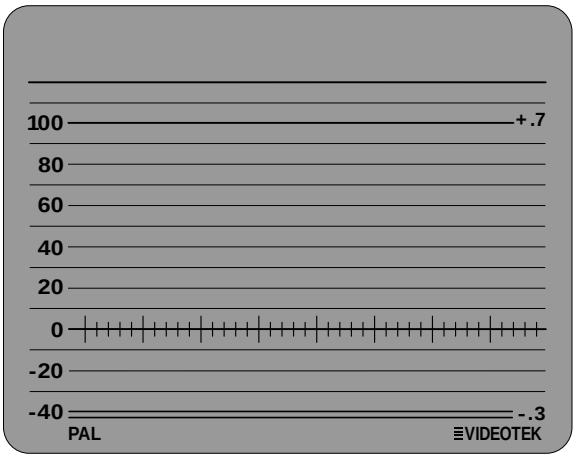


Figure 4 **PAL Waveform**

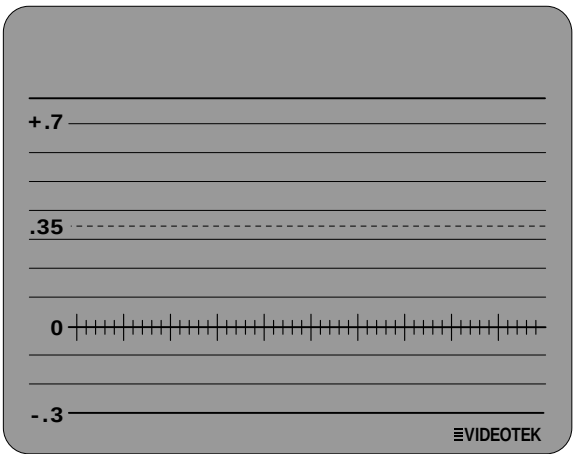


Figure 5 **Component Waveform**

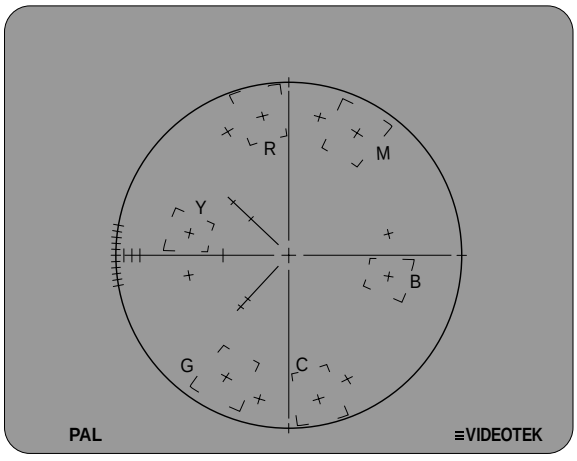


Figure 7 **PAL Vector**

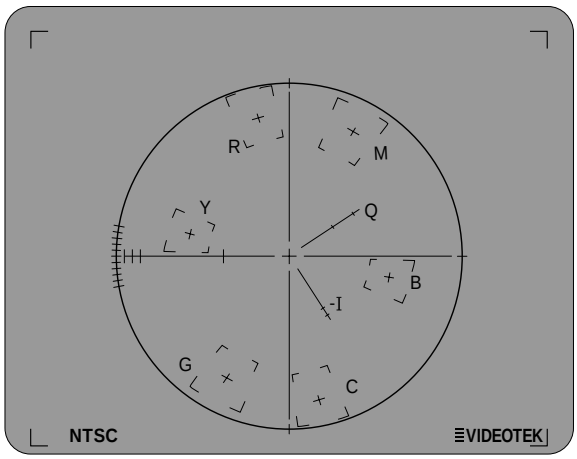


Figure 6 **NTSC Vector**

The composite vector graticules also have markings for coarse differential phase and gain measurements. Degree ticks on the left side of the vector graticule circle are spaced at 2° increments for differential phase measurement. The horizontal radial line on the left side of the circle has a mark indicating nominal burst amplitude. Amplitude lines near the edge of the circle indicate 5%, 10%, and 15% differential gain. The NTSC version has I and Q graticule lines, with tick marks indicating nominal amplitude for each bar. The PAL version has ± V radial lines with 75% and 100% burst marks.

For an example of a component vector graticule, see Figure 7. The markings follow the color bar boxes only; there is no burst reference in component color.

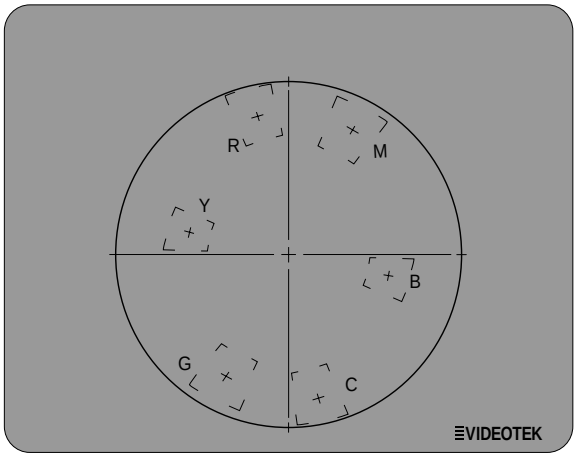


Figure 8 Component Vector

AUDIO

Two horizontal scales, one for each stereo channel, appearing in the bottom right portion of the display, comprise the audio graticule. The letters "L" and "R" designate left and right channel levels, and a number, either "1" or "2", indicates which of the two audio input pairs is currently selected. The large tick mark on each scale indicates nominal signal amplitude for the selected audio level. Smaller marks on either side of the larger one represent ± 1 dB levels. Refer to Figure 8.

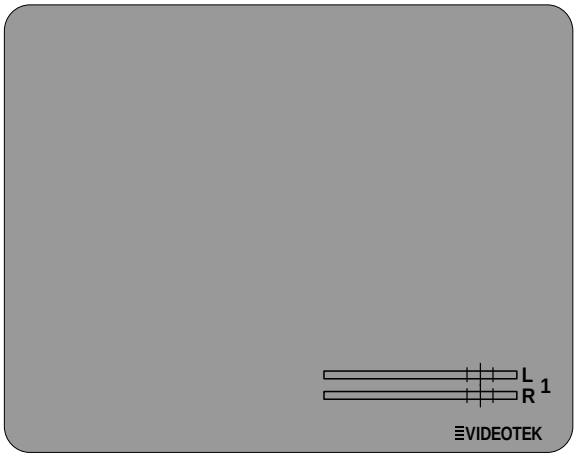


Figure 9 Audio

COMBO GRATICULES

When several modes are selected at once, such as waveform/vector or waveform/audio, a combo graticule is displayed, which is made up of the two graticules of the current display modes. The waveform/vector combo graticule is drawn similarly to that of an etched CRT scope, with waveform amplitude lines omitted within the vector graticule circle. (See Figure 9, Figure 10, and Figure 11). For the waveform/audio combo graticule, waveform amplitude lines are eliminated from the lower right portion of the display as shown in Figure 12, Figure 13 and Figure 14. Deselecting a display type when a combo mode is currently displayed will cause the graticule to be redrawn.

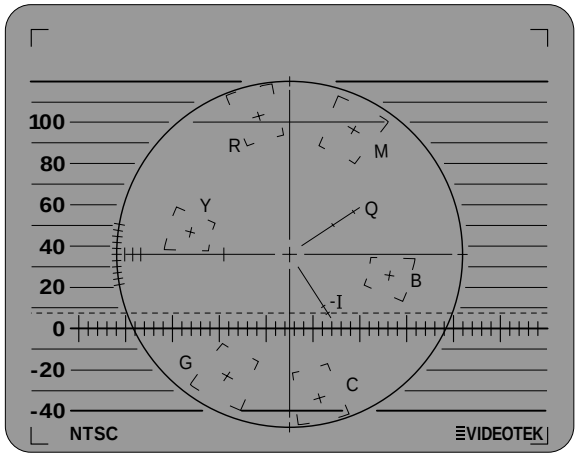


Figure 10 NTSC Waveform/Vector Combo

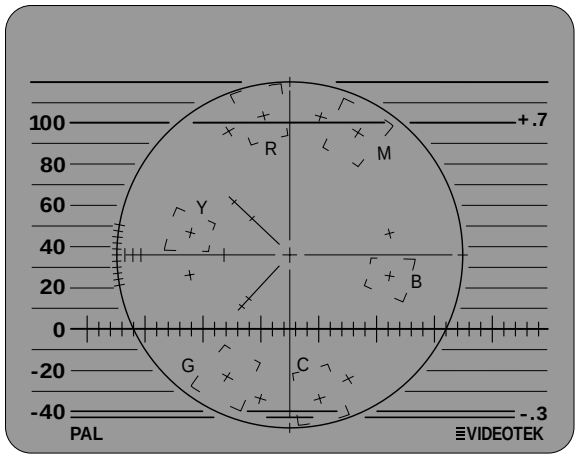


Figure 11 PAL Waveform/Vector Combo

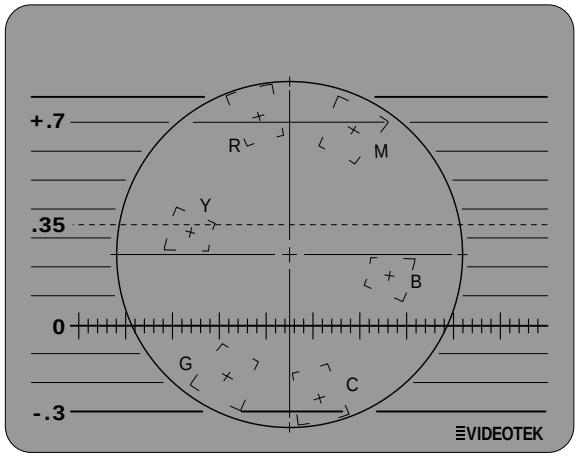


Figure 12 **Component Waveform/Vector Combo**

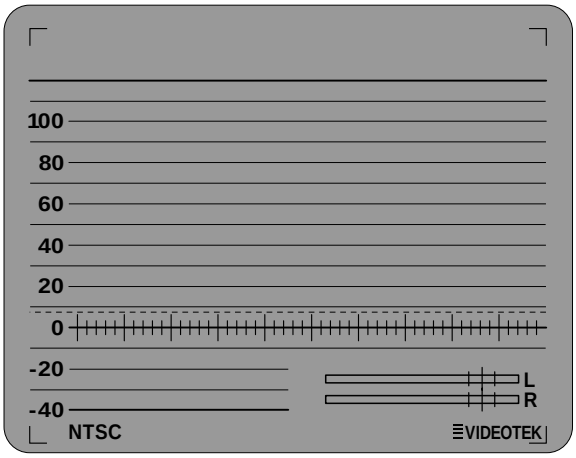


Figure 13 **NTSC Waveform/Audio Combo**

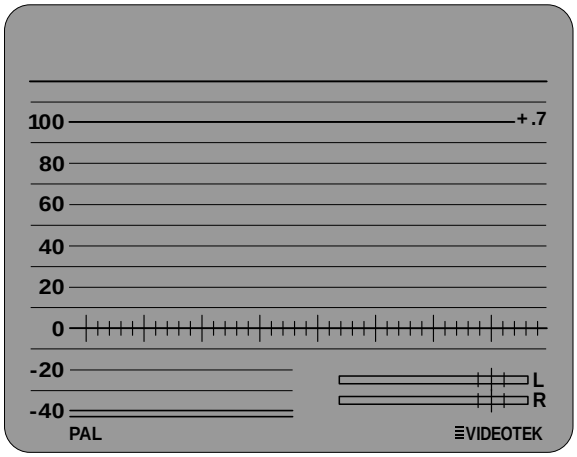


Figure 14 **PAL Waveform/Audio Combo**

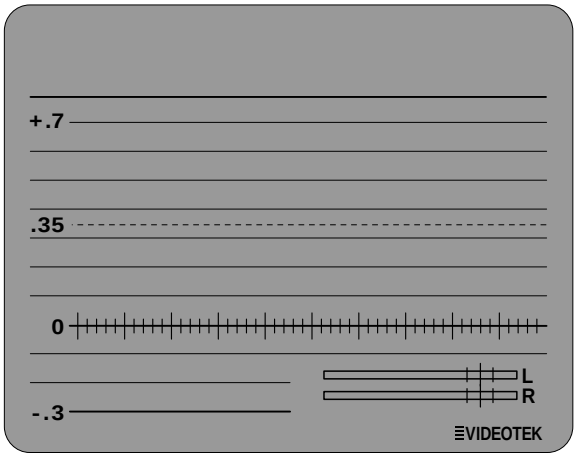


Figure 15 **Component Waveform/Audio Combo**

Operating the VTM-100 From a PC

Communication between the VTM-100 and a computer requires an RS-232 serial link configured as 1200 baud, no parity, 8 data bits and one stop bit. A null modem adaptor is required to connect the computer's RS-232 port with the RS-232 port on the VTM-100. The chassis connector on the VTM-100 back panel is a DB-9M. (See Figure 15). The computer must be running a terminal emulation program, such as the commercially available ProComm, which the operator uses as the interface to enter and transmit commands to the VTM-100.

Upon power up, or after selecting **via Computer** in the Setup/Control menu, the VTM-100 will display on the computer a welcome message, and the prompt "VTM100>". At this prompt the operator can type a command, or HELP to get a list of available commands. All characters are converted to uppercase, meaning the operator input is case insensitive; any combination of upper and lowercase characters is acceptable. The backspace key (ASCII character 8) erases the last character. Parameters are separated by one or more spaces or tabs.

When entering a command, the operator need only type as many characters as is necessary to distinguish it from another command. For example, "RE" is ambiguous because both "RECALL" and "REF" start with it, but "REC" will be recognized as "RECALL". In the summary to follow, the minimum abbreviation for a command to be recognized is indicated by the required letters being shown in upper case.

The summary that follows lists each command followed by parameters enclosed in brackets [ ], with individual parameter choices separated by "|". The brackets should not be used when entering the parameters. The brackets indicate that including those parameters is optional when entering a command. Entering a command with no parameters will return the current status of that selection, if appropriate. Otherwise, the

operator may choose to enter along with the command one of the parameters listed inside the brackets as specified in the command description.

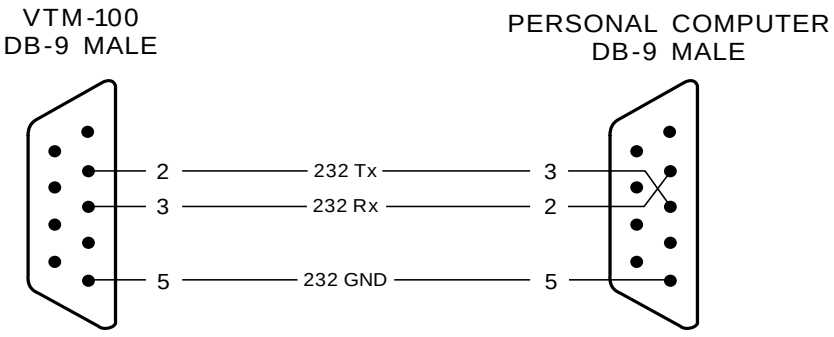


Figure 16 **RS-232 Connection Diagram**

Computer Command Summary

DISPLAY SELECTION COMMANDS

WFM [ON | OFF]

Turn the waveform display on or off. Type WFM by itself to get the current waveform status.

VECtor [ON | OFF]

Turn the vector display on or off. If vector is turned on, audio display is automatically turned off. Type VECTOR by itself to get the current vector status.

Audio [1 | 2 | OFF]

Turns on the audio display and displays audio input 1 or 2, or turns audio off. If audio is turned on, vector display is automatically turned off. Type AUDIO by itself to get the current audio status.

MEMORY COMMANDS

STore [1 | 2 | 3 | 4 | 5] { name }

Store the current system settings in one of five memory locations, and optionally give the memory a name. The default name is "MEMORY". If a memory is already stored in the selected location, it is overwritten. A name can be up to 8 characters in length.

RECall [1 | 2 | 3 | 4 | 5 | memname]

Retrieve the system settings stored in the given memory location number, or the first location with the name "memname". Type RECALL by itself to list the names of all currently stored memories.

Erase [1 | 2 | 3 | 4 | 5 | memname]

Erase the memory stored under the given memory location number, or the first location with the name "memname".

POSITION COMMANDS

VHpos [0 | offset | -offset]

Change the vector horizontal position from its current location by the specified integer offset. An offset of 0 will center the vector horizontally. A positive offset will move the vector right, and a negative offset will move the vector left. Type VHPOS by itself to get the current vector horizontal position. The vector horizontal position range is approximately –80 to +160.

VVpos [0 | offset | -offset]

Change the vector vertical position from its current location by the specified integer offset. An offset of 0 will center the vector vertically. A positive offset will move the vector up, and a negative offset will move the vector down. Type VVPOS by itself to get the current vector vertical position. The vector vertical position range is approximately –180 to +60.

WHpos [0 | offset | -offset]

Change the waveform horizontal position from its current location by the specified integer offset. An offset of 0 will center the waveform horizontally. A positive offset will move the waveform right, and a negative offset will move the waveform left. Type WHPOS by itself to get the current waveform horizontal position. The waveform horizontal position range varies with the display mode. The overall range is plus or minus approximately 430 times the number of inputs in horizontal sweeps, 520 times the number of inputs in 60 Hz vertical sweep, and 620 times the number of inputs in 50 Hz vertical sweep.

WVpos [0 | offset | -offset]

Change the waveform vertical position from its current location by the specified integer offset. An offset of 0 will center the waveform vertically. A positive offset will move the waveform up, and a negative offset will move the waveform down. Type WVPOS by itself to get the current waveform vertical position. The waveform vertical position range is approximately –120 to +120.

PHase [–360 ... +360]

Rotate the vector by the specified integer offset in degrees. A positive offset will rotate the vector clockwise, and a negative offset will rotate it counterclockwise.

INPUT SETTING COMMANDS

Input [input { filter } { input { filter } { input { filter } } }]

Set up the inputs and filters. Up to three inputs and filters can be entered. In composite mode, a filter can be specified after each input, or the input will default to flat filter. In component mode, no filters can be entered. Type INPUT without any parameters to get the current input status. Valid input parameters are for composite { A | B | C }, for component GBR { G | B | R }, for component color difference { Y | B-Y | R-Y }. Optional filter parameters, which are only valid for composite formats, are { FL | LP | CH }, representing flat, low pass, and chroma filters respectively.

REF [INT | EXT]

Set the reference to internal (the first input selected in composite format, or the G/Y input in the component formats), or external. Type REF by itself to get the current reference.

DISPLAY SETTING COMMANDS

PArade

In waveform mode, multiple inputs will be displayed side by side.

Overlay

In waveform mode, multiple inputs will be displayed on top of each other.

Gain [50 ... 500]

Set the waveform and vector gain from 50% to 500% of full scale. Type GAIN by itself to get the current gain.

Mag [1 | 5 | 10 | 20]

Set the waveform time magnification to x1, x5, x10, or x20. Type MAG by itself to get the current magnification.

SWeep [H | V]

Set the waveform sweep to Horizontal (line rate) or Vertical (field rate). Type SWEEP by itself to get the current sweep rate.

Bowtie [ON | OFF]

In component video, set bowtie mode on or off. Type BOWTIE by itself to get the current bowtie status.

Format [NTSC | PAL75 | PAL100 | GBR | BETA75 | BETA100 | MII75 | MII100 | SMPTE75 | SMPTE100 | EBU75 | EBU100]

Change the video format to one of the above formats. NTSC, SMPTE75, and SMPTE100 are available only if the input video is at 60Hz, and PAL75, PAL100, EBU75, and EBU100 are available only at 50Hz. Type FORMAT by itself to get the current video format.

MISCELLANEOUS COMMANDS

Help

Display a list of commands.

?

Display a list of commands.

VERsion

Display the system software version number.

TROUBLESHOOTING

Verify that all cables are connected properly.
Verify that power is applied, and that cooling fan operates and front panel LED is lit.

SYMPTOM	POSSIBLE CAUSE
Video output from VTM-100 not visible on picture monitor.	● Cable between VTM-100 output and video picture monitor not connected properly.
Video picture monitor unable to lock to VTM-100 output.	● Monitor is not compatible with the video standard autodetected by the VTM-100 (NTSC/60Hz or PAL/50Hz). ● Reference video is not stable.
Autodetection not working.	● Desired input to autodetect is not the current reference. ● Externally referenced with no input present. ● Reference video is not stable.
Stable VTM-100 display but no graticule or signal visible.	● No display modes (waveform/vector/audio) currently selected. ● Signal display and graticule colors the same as background color.
Stable graticule but no signal display visible.	● Intensity turned all the way down. ● Signal display color same as background color. ● Waveform/vector position off screen.
Waveform/vector displays not locked.	● Externally referenced with no input. ● Displayed input not synchronous with reference.
Waveform/vector amplitudes too large.	● Video input not terminated. ● Variable gain not set to 100%.
Signal display creating smear on screen.	● Persistence set too high or at infinite.
Incorrect format graticule displayed.	● Wrong video format selected from on-screen menus.
Invalid vector display.	● Wrong video format selected from on-screen menus.
Graticule present but no audio signal level visible.	● Audio input not connected properly. ● Wrong audio channel selected.
Too much or too little audio signal.	● Input sensitivity and signal source level not matched.
Picture mix ratio incorrect.	● Wrong mix ratio selected from on-screen menus. ● Externally referenced with no input. (Background picture mix is the reference video when Ext Ref is ON.)
Alarms not available.	● More than one input or filter selected. ● Current video format is component. ● Alarms only available in 1H or 1V composite displays. ● Alarms not available in line select mode.
Mouse not responsive.	● Mouse incorrectly connected to RS-232 port. ● Wrong mouse type selected from on-screen menus.
Remote PC unable to communicate with VTM-100.	● Null modem adapter not present between VTM-100 and PC. ● RS-232 port on VTM-100 not set for via computer. ● Terminal emulation program on PC not configured for 1200 baud, no parity, 8 data bits, 1 stop bit.
Unable to display vector & audio combo	● Feature not available in VTM-100.

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Addendum