VTM-330E

Television Signal Monitor
Installation and Operation Handbook

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OPERATOR'S SAFETY SUMMARY

CAUTION — these instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform this installation or any servicing unless you are qualified to do so. Refer all servicing to qualified service personnel.

To ensure safety:

- The unit should not be exposed to dripping or splashing, and no objects filled with liquids, such as vases, shall be placed on the unit.
- When the unit is to be permanently cabled, connect the protective ground conductor *before* making any other connections.
- Operate built-in units only when they are properly fitted into the system.
- For permanently cabled units without built-in fuses, automatic switches, or similar protective facilities, the AC supply line must be fitted with fuses rated to the units.
- Before switching on the unit, ensure that the operating voltage set at the unit matches the line voltage, if appropriate. If a different operating voltage is to be set, use a fuse with the appropriate rating. Refer to the Installation Instructions.
- Units of Protection Class I with an AC supply cable and plug that can be disconnected must be operated only from a power socket with protective ground contact:
  - Do not use an extension cable—it can render the protective ground connection ineffective.
  - Do not intentionally interrupt the protective ground conductor.
  - Do not break the protective ground conductor inside or outside the unit or loosen the protective ground connection; such actions can cause the unit to become electrically hazardous.
- Before opening the unit, isolate it from the AC supply. Then ensure that:
  - Adjustments, part replacements, maintenance, and repairs are carried out by qualified personnel only.
  - Safety regulations and rules are observed to prevent accidents.
  - Only original parts are used to replace parts relevant to safety (for example, the power on/off switches, power transformers, and fuses).
- Replaceable fuses can be hazardous when live. Before replacing a fuse, disconnect the AC power source.
- Use caution when cleaning the equipment; isopropyl alcohol or similar solvents can damage or remove the labels.
- Observe any additional safety instructions specified in this manual.

These symbols may appear on Videotek equipment:

Explanation of Symbols


Read the *Operator's Handbook* or the *Service and Instruction Manual* and observe the safety symbols used.


Caution: shock hazard


Protective ground connection


Unit ground


Equipotentiality


Ground

Blank Page

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Section 1 ♦ Introduction

The Videotek on-screen multiformat Television Signal Monitor (VTM-330E), with its patented* technology, provides the most cost-effective assurance of quality in the industry today. The VTM-330E continuously evaluates video, audio, and time code; it reports, *in real time,* any detected noncompliance.

Features include:

- Eye pattern with jitter measurement
- Ethernet communications port
- Waveform, vector, eye pattern, picture, and audio are displayed simultaneously on a single XVGA display
- Gamut display for both encoded and RGB signals
- Accepts 601 SDI, Composite (NTSC/PAL) inputs
- Accepts CAV formats
- Multiple waveforms, line selects, and cursors
- Four router control ports (Videotek RS-12 Series)
- Closed Captioning display
- On-screen display of SDI signal strength
- SpyderWeb™ PC software for remote control and monitoring of the VTM-330E via LAN, WAN, Internet, or direct RS-232 connection
- Time and date display
- Time code input with display
- User-definable alarms with alarm log and time stamp
- Assignable GPI's
- XVGA loop and bypass

Options include:

- An XVGA frame capture/storage utility that is triggered manually, by an internal alarm, or by Videotek FC-300 or SpyderWeb PC software
- Analog, AES/EBU, and embedded audio monitoring
- RCU-330E Remote Control Unit

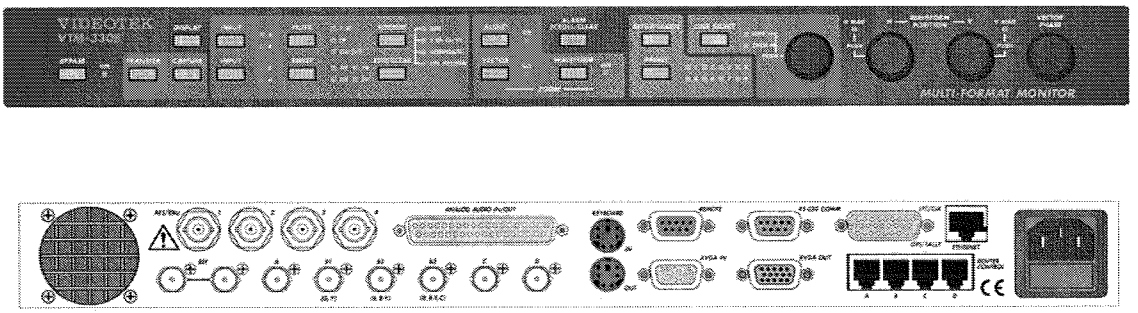
*US Patent 6,069,607. Other US and foreign patents pending.

The VTM-330E is the perfect solution for unattended signal quality monitoring of multiple sites:

- Satellite uplinks and downlinks
- Remote transmitter sites
- Tape and server monitoring
- Editing, digitizing and rendering
- Network and/or remote feeds
- Master Control
- Any television system node that requires quality analysis of video, audio, and time code parameters

The front and back panels of the VTM-330E are illustrated in **Figure 1-1.**

Figure 1-1. VTM-330E Front and Back Panels



For information on the RCU-330E, see Appendix D, "Remote Control Unit (RCU-330E)."

Section 2 ♦ Installation

This section provides information about inspecting the VTM-330E shipment, installing the unit, and optionally configuring the unit for remote control.

Inspecting the Shipment

Before installing the VTM-330E, inspect the box and its contents. Report any damage to the shipper and telephone Videotek's Customer Service Department for service support (see Appendix B, "Service Support").

The box contains the following:

- The VTM-330E
- One *VTM-330E Installation and Operation Handbook*
- One breakout connector (for GPI/TALLY, LTC/CLOCK); if the audio option has been purchased, one additional breakout connector or 37-pin connector is also supplied.
- Hardware kit, Item Number 222730, for rackmounting the VTM-330E
- One SpyderWeb CD
- A warranty registration card

Save the box and packing material for any future shipping requirements.

Installing the VTM-330E

The following subsections provide instructions to rackmount, connect, and configure the unit.

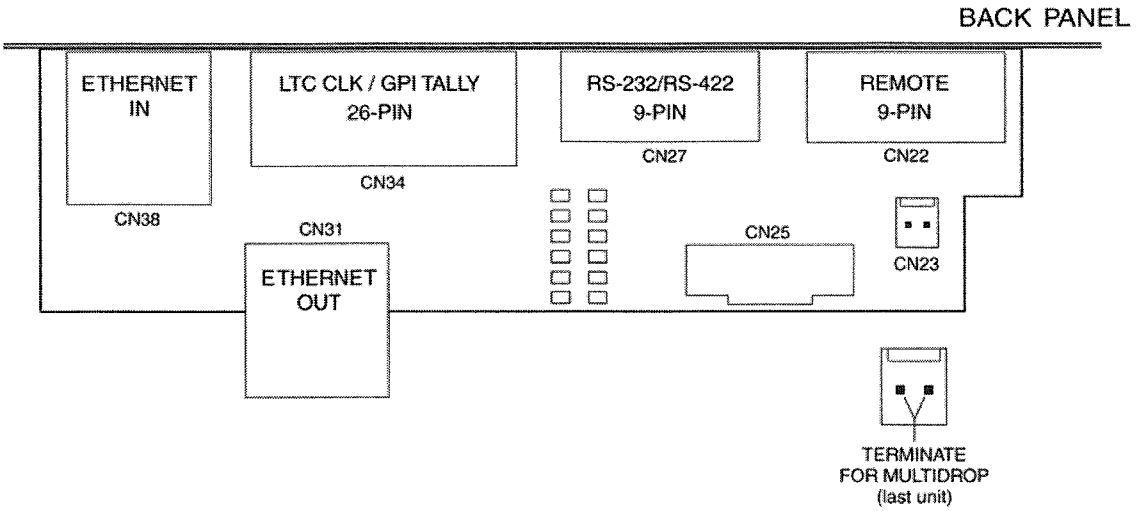
Changing the Jumpers to Support RS-422 Multidrop Operation

The following subsection provides instructions to support RS-422 multidrop operations and to configure the unit.

A VTM-330E has three serial ports:

- The REMOTE port is permanently configured for RS-422 operation and can be connected to one RCU-330E remote control panel and looped on to multiple VTM-330Es. This port should be terminated on the last VTM-330E via internal jumpers, as shown in **Figure 2-1**.
- The RS-232 port is factory-configured for RS-232 operation, but it can be reconfigured for RS-422 multidrop operation. This is a software setup located in the I/O AND COMMUNICATIONS submenu.
- The Ethernet port is permanently configured for 10/100T.

Figure 2-1. Terminating the Remote Port



CAUTION — these instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform this installation or any servicing unless you are qualified to do so. Refer all servicing to qualified service personnel.

To set termination on the remote port:

1. Remove the top cover.
2. Locate CN23 on the I/O board.
3. Place jumpers across the pins to terminate.

NOTE: The factory default for CN23 is not terminated when using one RCU-330E and one VTM-330E.

4. Attach the top cover.

For more information on the RCU-330E, see Appendix D, "Remote Control Unit (RCU-330E)."

Rackmounting the VTM-330E

When selecting the permanent mounting location for the VTM-330E, ensure that the flow of air to the ventilation holes on the top and sides of the chassis is not obstructed. Rackmounting of the VTM-330E is illustrated in **Figure 2-2**; the parts required to rackmount the VTM-330E are listed in **Table 2-1.**

Figure 2-2. Mounting the VTM-330E in Rack

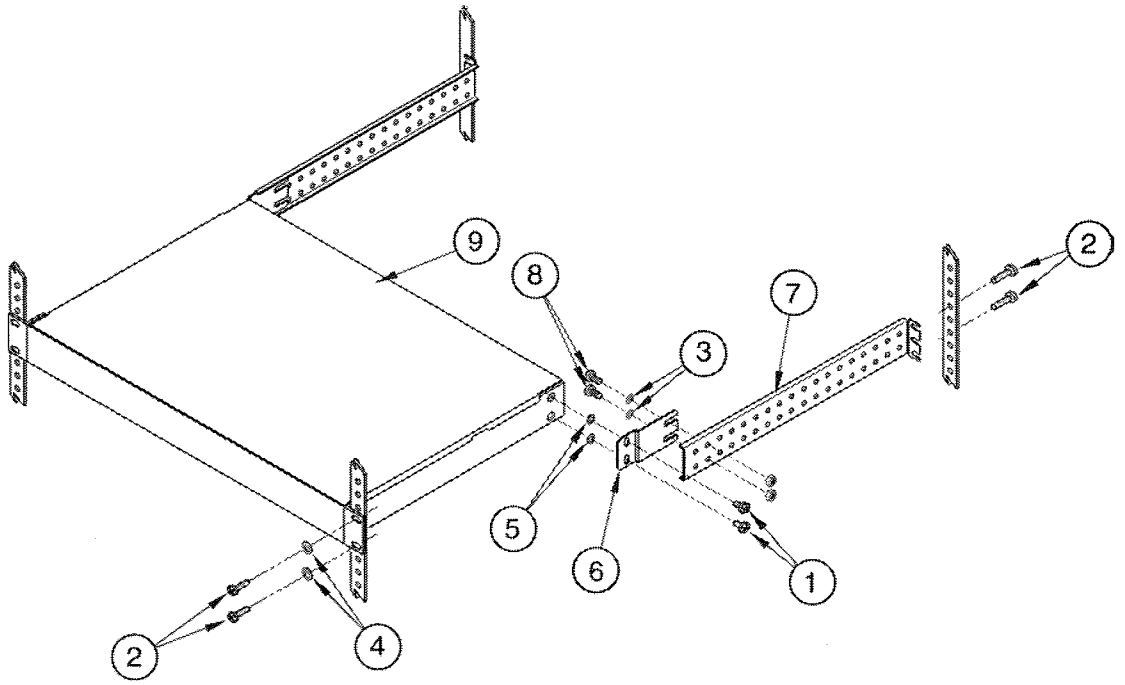


Table 2-1. Parts Required to Rackmount the VTM-330E

Key	Item Number	Quantity	Description
1	044027	4 (2 each side)	Screw 10-32 X 1/4" pan head truss
2	044030	8 (4 for each side)	Screw 10-32 X 3/4" pan head Phillips black
3	044040	4 (2 for each side)	Washer flat #10
4	045020	4 (2 for each side)	Nylon washer 7/16" X 3/16" X 1/32"
5	144078	4 (2 for each side)	Nylon washer ¼" X 7/16" X .05
6	200061	2 (1 for each side)	Extension bracket mount
7	200070	2 (1 for each side)	Extension bracket
8	243200	4 (2 for each side)	Screw 10-32 X 3/8" pan head Phillips
9	1 Unit	-	Standard 1 ¾" rack height unit

To rackmount the VTM-330E:

1. Install extension bracket mounts (ITEM 7) on rear of unit as shown using screws (ITEM 1) and washers (ITEM 5).
2. Install the 1.75" height unit in a rack by fastening through the rack ears in the front of the unit using screws (ITEM 2) and washers (ITEM 4).
3. Temporarily hold the extension bracket (ITEM 7) in place and note which pair of holes align with the slots on the extension bracket mount (ITEM 6).
4. Assemble screws (ITEM 8) and washers (ITEM 3) loosely in the proper holes.
5. Slip the extension bracket (ITEM 7) into position and install and tighten the remaining hardware.

Connecting the VTM-330E

The back panel connectors are illustrated in **Figure 2-3**; the function of each connector is described in **Table 2-2**.

Figure 2-3. VTM-330E Back Panel Connectors

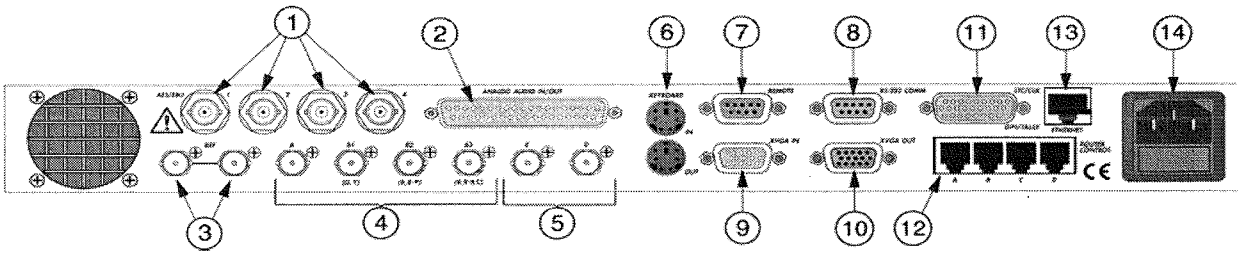


Table 2-2. Description of Back Panel Connectors

Key	Label	Description
1	AES/EBU 1, 2, 3, 4	Optional female BNC connectors for AES digital audio input
2	ANALOG AUDIO IN/OUT	Optional 37-pin, D-sub, male connector; the supplied breakout board can be used for solderless connections*
3	REF	Female BNC connectors for reference input (passive loop-through); if used, terminate with 75Ω
4	A, B1 (G, Y), B2 (B, B-Y), B3 (R, R-Y, C)	Female BNC connectors for analog video inputs
5	C, D	Female BNC connectors for digital video inputs
6	KEYBOARD IN, OUT	DIN connectors for an IBM PS2®-type keyboard*
7	REMOTE	9-pin, D-sub, female connector for the remote control panel*
8	RS-232 COMM	9-pin, D-sub, female connector for a configurable serial port to a PC*

*See Appendix C, "Pinouts," for the connections.

(Table continues on next page)

Table 2-2. Description of Back Panel Connectors (*continued*)

Key	Label	Description
9	XVGA IN	15-pin, high-density, D-sub, male connector for XVGA input*
10	XVGA OUT	15-pin, high-density, D-sub, female connector for XVGA output*
11	LTC/CLK, GPI/TALLY	26-pin, High Density D-sub, male connector for LTC, Clock, GPI, and TALLY input*
12	ROUTER CONTROL A, B, C, D	RJ11 to control RS-12 series routing switchers A, B, C, D
13	ETHERNET	RJ45 Female, 10/100 T connection
14	No Label (POWER)	IEC 170VA max

*See Appendix C, "Pinouts," for the connections.

Ethernet Setup

1. Prior to VTM-330E Network configuration, obtain Transmission Control Protocol/Internet Protocol (TCP/IP) addresses from the system administrator or from the Internet Service Provider (ISP).

   These addresses are:

   - A static IP address (unless a Dynamic Host Configuration Protocol (DHCP) will be used)
   - A subnet mask
   - An optional gateway IP

   Be sure to record all addresses.

   The IP address and subnet mask are always necessary.
   The gateway address is not needed unless routing to an outside network..

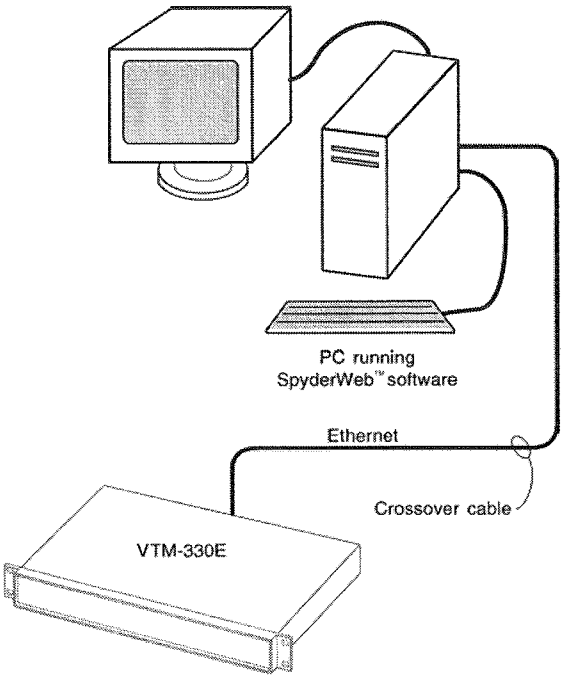
   Record the addresses:

VTM-330E Interface Static IP Address	
VTM-330E Interface Subnet Mask	
Gateway IP Address	

2. Identify a host PC to be used to configure and test the VTM-330E.
   The configuration and testing consists of installing and running the SpyderWeb application and setting network addresses in the VTM-330E menu system.

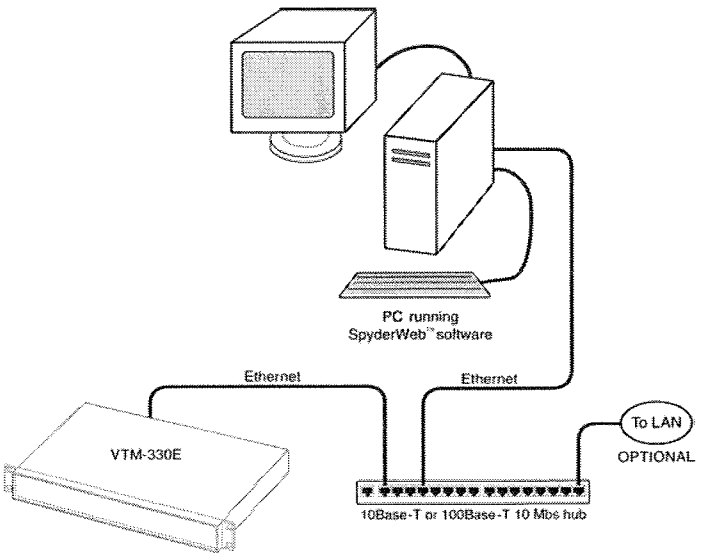
3a. (If a dedicated PC connection) Connect the host PC with a network card to the "ETHERNET" connector on the back panel of the VTM-330E, using a CAT5 crossover cable (not included). See **Figure 2-4.**

Figure 2-4. VTM-330E Dedicated PC Connection



3b. (If a network connection) Connect the hub located on the network to the back panel of the VTM-330E, using a CAT5 network cable (not included). See **Figure 2-5.**

Figure 2-5. VTM-330E Network PC Connection



4. Ethernet Configuration
    a) Press the "SETUP/LEARN" button on the front panel of the VTM.
    b) Using the Horizontal Waveform Position knob, highlight the "I/O AND COMMUNICATIONS" menu, then press the knob to enter the submenu.
    c) Enter the "ETHERNET SETUP" submenu.
    d) (If using a DHCP) Highlight "DHCP ENABLE" and press the Horizontal Waveform Position knob to toggle the state to "ON". The IP Address retrieved from the DHCP server is under its appropriate submenu.
    e) (If not using DHCP) Select "IP ADDRESS" and enter the value obtained from the system administrator using the Vertical Waveform Position knob to change the value selected and the Horizontal Waveform Position knob to highlight the next value.
    f) Press the Vertical Waveform Position knob to save the value.

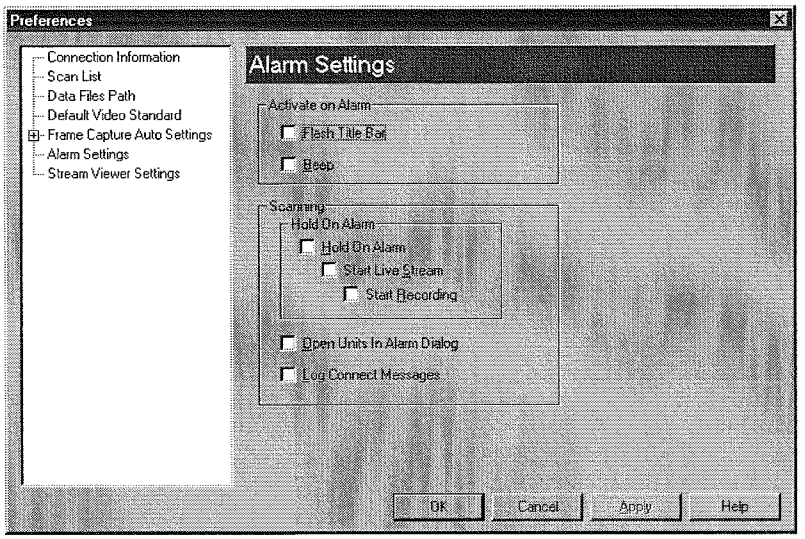
NOTE: Test the configuration before proceeding!

Testing the Configuration

1. Install SpyderWeb on the host PC. Refer to the *SpyderWeb Installation Guide* for instructions.
2. Run SpyderWeb.
3. Do either:
    - Select any "Settings…" button on the main SpyderWeb window
    - Select "View" from the main menu bar, then select "Preferences."

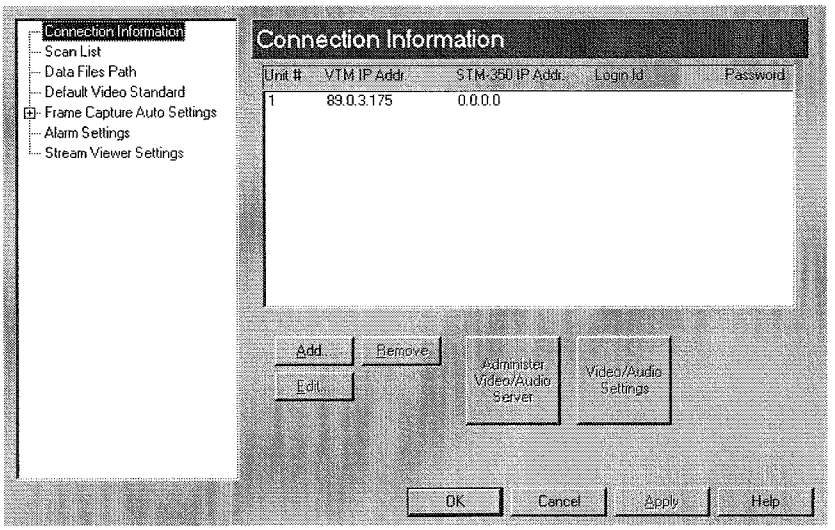
This window appears:

Figure 2-6. Preferences Screen



4. Click on "Connection Information" on the Configuration Tree. The Connection Information screen appears:

Figure 2-7. Connection Information Screen



NOTE: The fields for "STM-350 IP Addr.", "Login Id" and "Password" are used only for the STM-350 streaming test and measurement product and is not required for VTM-330E network Operation.

To add information for a new VTM unit, click "Add."

To edit information about an existing VTM unit, highlight the line to be edited and click "Edit."

5. The "Unit (ID) #" is the VTM unit number. The VTM unit number is menu-selected through the VTM and must match the SpyderWeb setting.

NOTE: The included SpyderWeb software can only be configured for single unit operation.

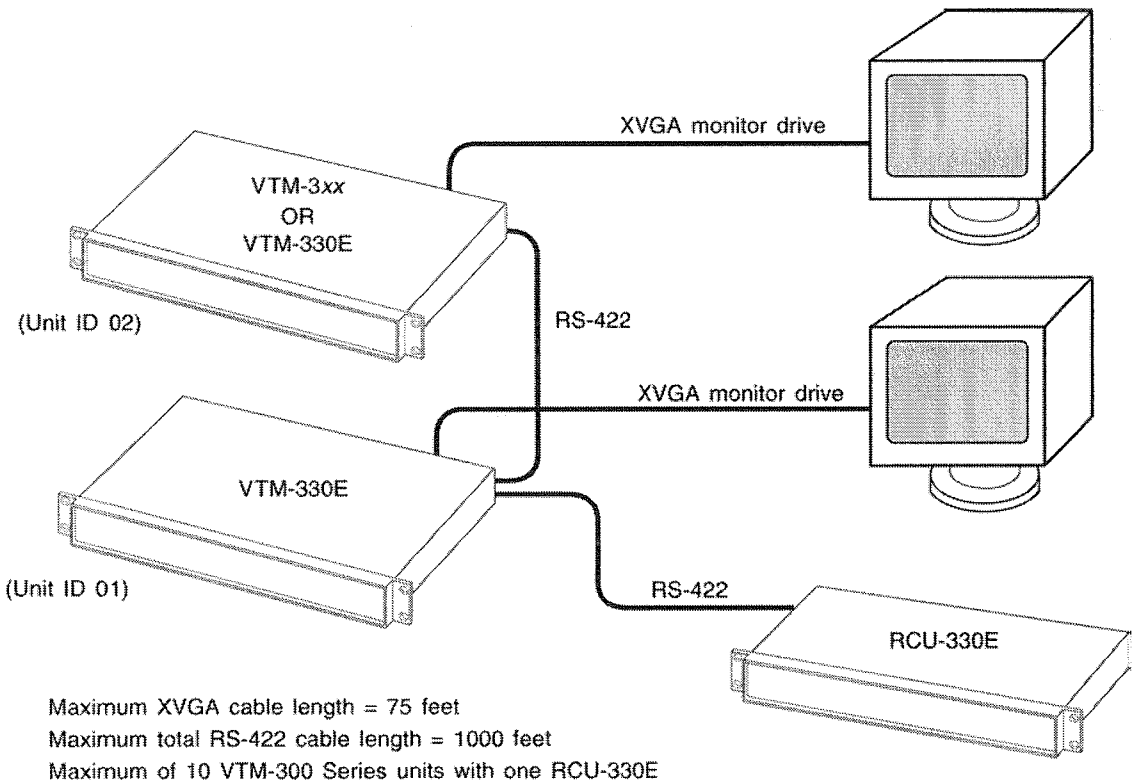
6. Enter or edit the VTM-330E Ethernet Interface IP Address ("VTM IP Addr.") into the SpyderWeb Connection Information dialog.
7. Click "OK" twice to return to the SpyderWeb main dialog.
8. Verify that SpyderWeb is communicating with the VTM. SpyderWeb connects when the VTM ID number is selected:
   - Use the SpyderWeb "Unit #/Source" controls to select the unit ID of the VTM-330E.
   - The number in the "Unit #/Source" window turns from red to green when a connection is made. The time of connection is dependant upon network traffic.

Configuring the VTM-330E for Remote Control

For the following configurations, the interconnecting cables can be extended using electronic distribution. There are several ways to configure the VTM-330E for remote control:

- One RCU-330E connected to one VTM-330E using the REMOTE port.
- One RCU-330E connected to multiple VTM-330Es using the REMOTE ports and unique unit IDs, as illustrated in **Figure 2-8**.

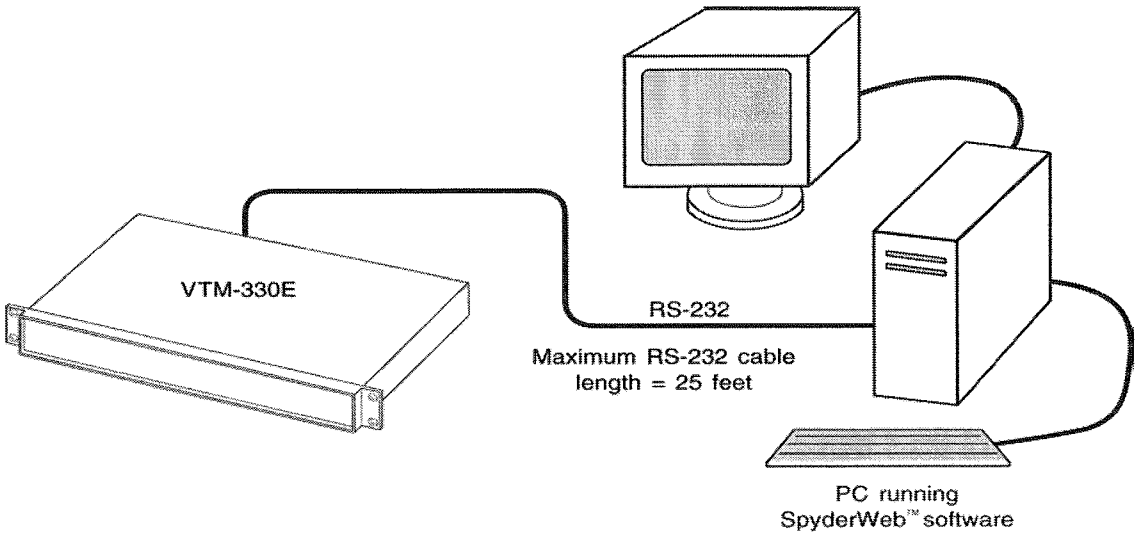
Figure 2-8. Connecting the RCU-330E Remote Control Panel



Maximum XVGA cable length = 75 feet
Maximum total RS-422 cable length = 1000 feet
Maximum of 10 VTM-300 Series units with one RCU-330E

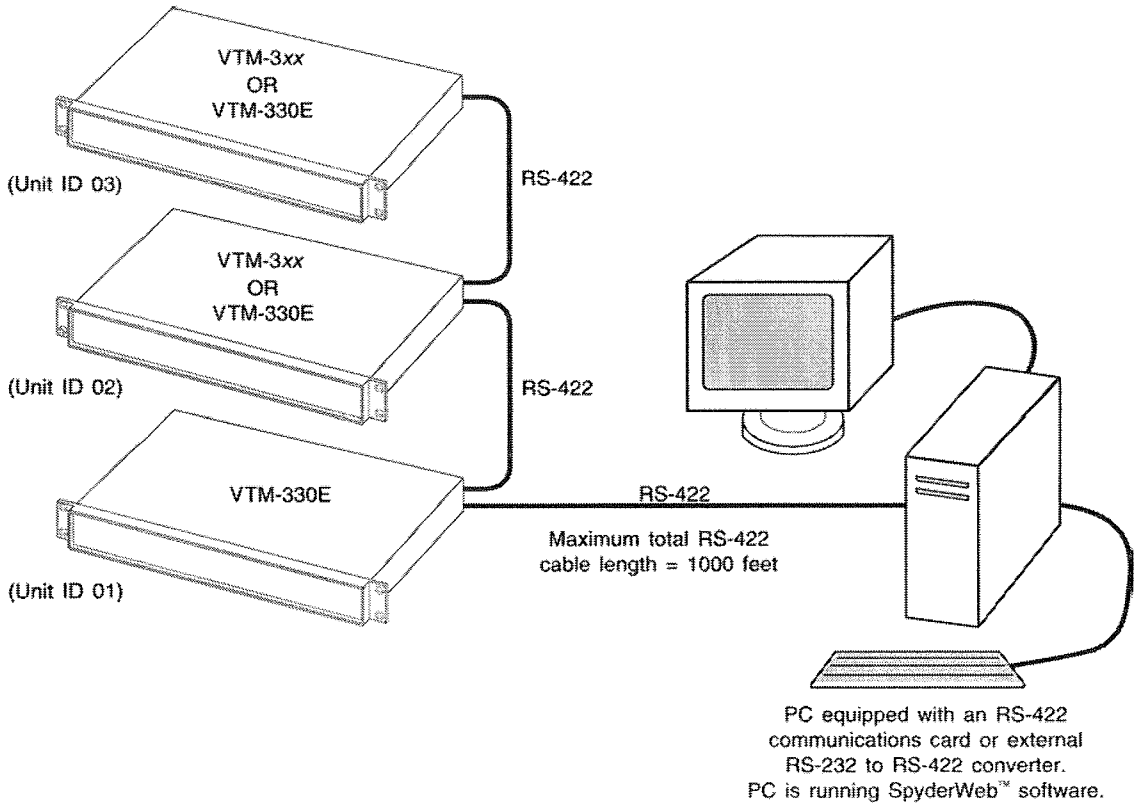
- One PC running SpyderWeb software connected to one VTM-330E using the RS-232 port, as illustrated in **Figure 2-9.**

Figure 2-9. Connecting a PC Running SpyderWeb Software



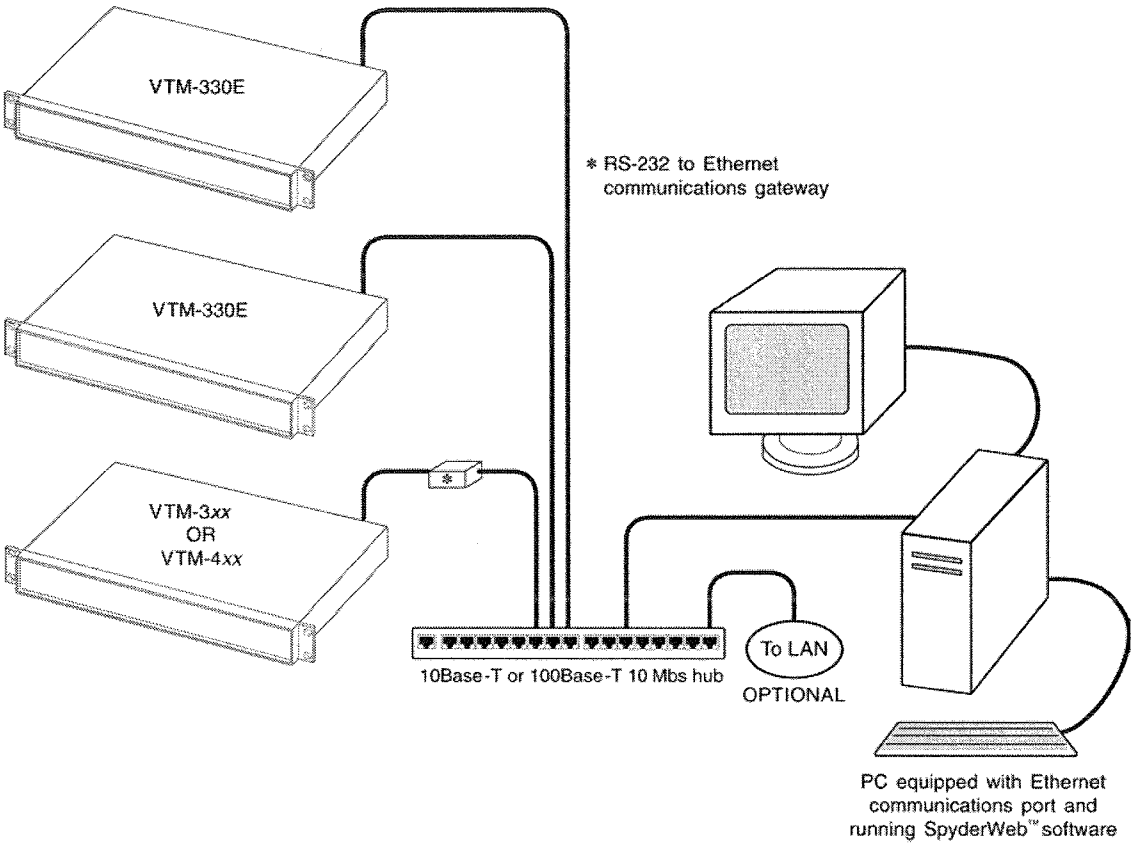
- One PC running SpyderWeb software and equipped with an RS-422 communication card to multiple VTM-330Es using the RS-422 port and unique unit IDs, as illustrated in **Figure 2-10**.

Figure 2-10. Connecting Multiple VTM-330Es to a PC Using RS-422



- One PC running SpyderWeb software and equipped with an Ethernet card to multiple VTM-330Es equipped with an external RS-232 to Ethernet communications gateway or a direct connection to the VTM-330E, as illustrated in **Figure 2-11**.

Figure 2-11. Multiple VTM-330E/3*xx*/4*xx* Network PC Connection



As many as 99 VTM-330E/3*xx*/4*xx*s can be connected on one network, but this requires a unique unit ID for each one. The unit ID is factory set to 01. The value on the I/O AND COMMUNICATIONS menu, which is listed under the SETUP MENU, can be changed. To change the unit ID, *connect one unit at a time* and then access the SETUP MENU by using one of the following:

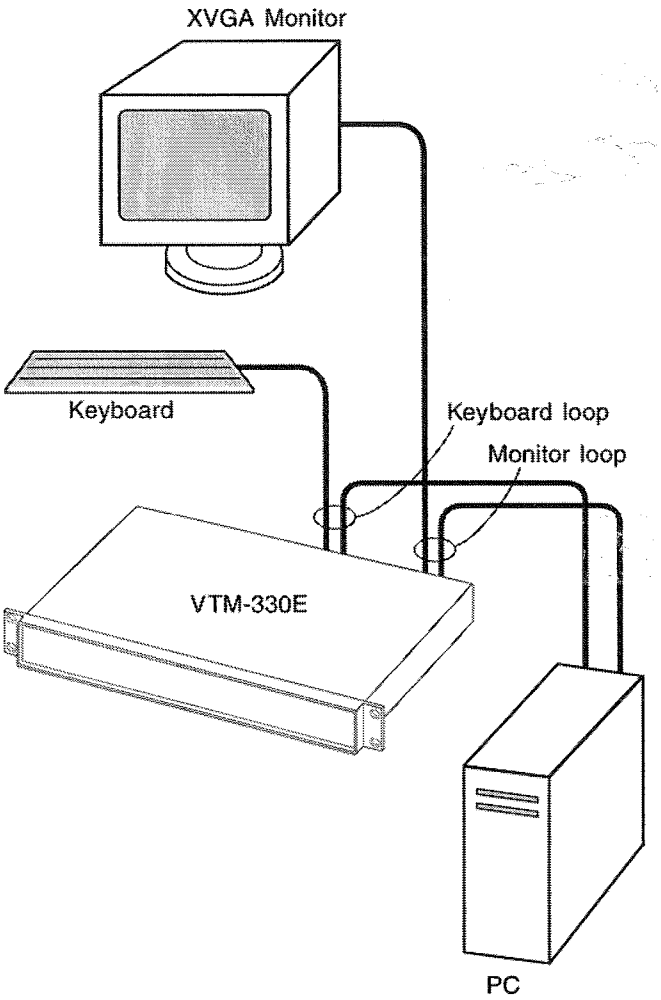
- The front panel of the VTM-330E
- A VTM-330EL (which does not have front panel controls); in such a case, use one of the following:
  - An RCU-330E or
  - A PC and the SpyderWeb software

NOTE: The included SpyderWeb software can only be configured for single unit operation. For multi-unit configuration software contact a Videotek representative.

Using the Bypass Feature

The bypass feature can be used in conjunction with an existing PC and monitor to save space and improve system efficiency, as illustrated in **Figure 2-12.**

Figure 2-12. Using the Bypass Feature



BYPASS can be used to switch the monitor display from the output of the PC to the output of the VTM-330E. When viewing the output of the VTM-330E, the keyboard can be used to access all front panel functions of the VTM-330E.

NOTE: In order for the PC to properly communicate with the PC keyboard port, the VTM-330E must be powered up.

Section 3 ♦ Operation

Front Panel Controls and Indicators

The front panel controls and indicators are illustrated in **Figure 3-1**; the function of each control or indicator is described in **Table 3-1**.

Figure 3-1. VTM-330E Front Panel Controls and Indicators

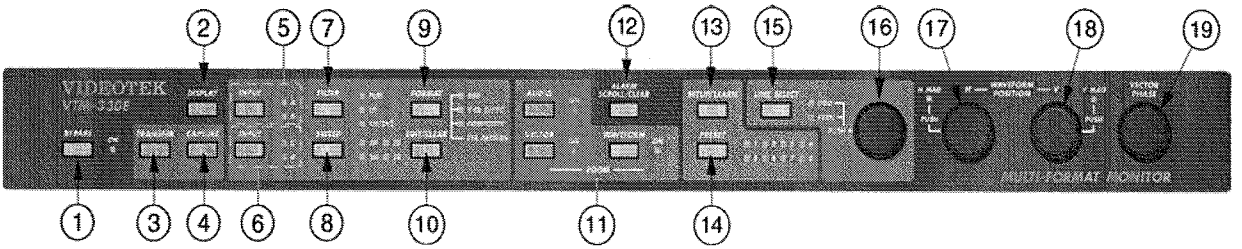


Table 3-1. Description of Front Panel Controls and Indicators

Key	Label	Description
1	BYPASS Button	Press to toggle BYPASS on and off: ▪ When BYPASS is on (the ON LED is illuminated), the extended video graphics adapter (XVGA) input and keyboard input signals are routed to the XVGA OUT and KEYBOARD OUT connectors. ▪ When BYPASS is off, the XVGA output is the VTM-330E signal and the keyboard connected to KEYBOARD IN controls the VTM-330E.
2	DISPLAY Button	Press to cycle through a full-screen display of picture, waveform, vector, audio, optional captured display, and then back to a simultaneous display of picture, waveform, vector, audio, and alarm information.
3	TRANSFER Button	Press to transfer the captured display to a PC connected to a PC running SpyderWeb software connected to an Ethernet or RS-232 port. (The FC-300 option enables this feature.)
4	CAPTURE Button	Press to store the current screen. (The FC-300 option enables this feature
5	INPUT A and B Buttons	Press to select analog input A, analog input B, or inputs A and B.
6	INPUT C and D Buttons	Press to select digital input C, digital input D, or digital inputs C and D.
7	FILTER Button	Press to select the FLAT, LP (low pass), or CH (chroma) filter. (Select the Bowtie filter when viewing a CAV signal on channel B.)
8	SWEEP Button	Press to select the 1H, 2H, 1V, or 2V Sweep Display mode.
9	FORMAT Button	Press to select the RGB, YC_BC_R (YC if selected on the SETUP MENU), COMPOSITE or Eye Pattern Display mode.
10	EDIT/CLEAR Button	Use in conjunction with the INPUT and SWEEP buttons to display paraded filters or individual components.
11	AUDIO, VECTOR, and WAVEFORM ZOOM Buttons	Press to display an expanded portion of each section. (Press and hold AUDIO ZOOM to clear peak hold.)

(Table continues on next page)

Table 3-1. Description of Front Panel Controls and Indicators (*continued*)

Key	Label	Description
12	ALARM SCROLL/CLEAR Button	Press to scroll through the current alarm list using the WAVEFORM POSITION-V knob; press and hold to clear the current alarm list.
13	SETUP/LEARN Button	Press to enter or exit the SETUP MENU; press SETUP and PRESET simultaneously to store the current display and setup parameters in memory.
14	PRESET Button	Press to step through the eight preset memories.
15	LINE SELECT Button	Press to toggle the line select function on or off.
16	LINE SELECT Knob	Press to select odd or even fields; rotate to select an individual line.
17	WAVEFORM POSITION-H Knob	▪ When not in the Setup mode, press to cycle through the different H MAG (horizontal magnification) settings; rotate to move the waveform display left or right. ▪ When in the Setup mode, press to select a menu item; rotate to move the menu cursor or to change a menu value.
18	WAVEFORM POSITION-V Knob	▪ When not in the Setup mode, press to cycle through the V MAG (vertical magnification) settings; rotate it to move the waveform display up or down. ▪ When in the Setup mode press to exit one level in the menu, or rotate to change a selected value or move the on-screen cursor lines.
19	VECTOR PHASE Knob	▪ Rotate to change the phase alignment of the vector display. ▪ Press to toggle between last setup screen and normal display mode.

XVGA Display

A sample XVGA display is illustrated in **Figure 3-2** and described in **Table 3-2**. This simultaneous display shows picture, waveform, vector, audio, eye pattern and alarm information.

Figure 3-2. Sample XVGA Display

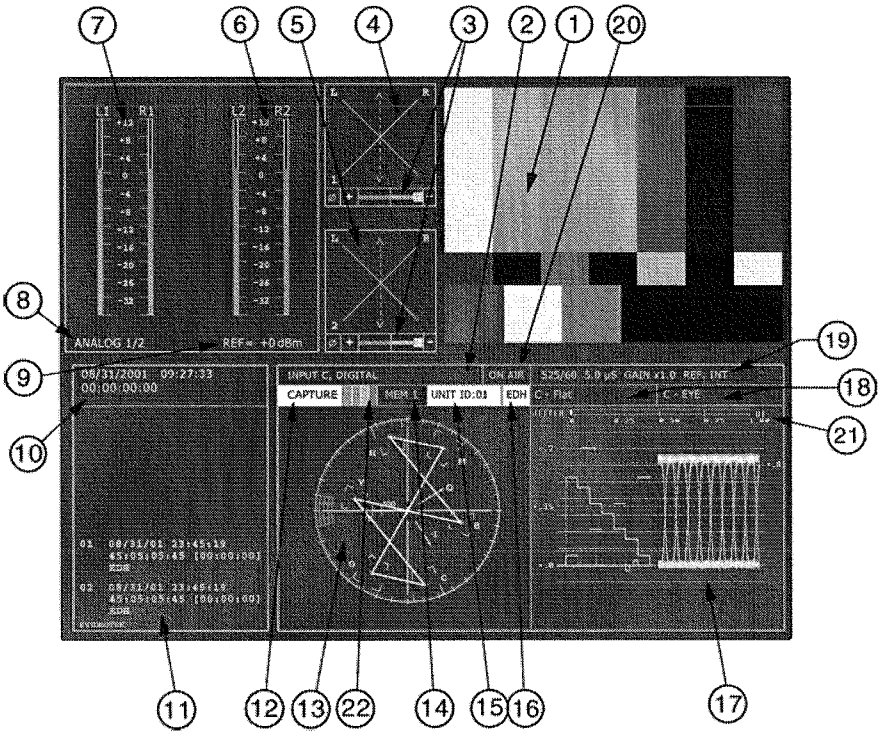


Table 3-2. Description of Simultaneous XVGA Display

Key	Description
1	Picture of the selected input
2	Source ID display; the default shows input selection, but the text can be changed by connecting a keyboard (see "Using the Keyboard Commands" shown on page 3-54).
3	Audio phase bar; the default condition indicates 0 degrees phase difference when the yellow moving marker is at far right; 90 degrees is the center position, 180 degrees is far left position.
4	Lissajous (X,Y) display of audio input pair 1 (option with 1 or 2 pair selected)
5	Lissajous (X,Y) display of audio input pair 2 (option with 2 pair selected)
6	Audio input pair 2 level meters (option with 2 pair selected)
7	Audio input pair 1 level meters (option with 1 or 2 pair selected)

(Table continues on next page)

Table 3-2. Description of Simultaneous XVGA Display (*continued*)

Key	Description
8	Indicates the audio input being displayed
9	Indicates the audio input reference level (selectable on the AUDIO SETUP menu)
10	Date and time of internal clock and time code readout
11	Alarm display, SETUP MENU, or CRC Display.
12	Capture status: ▪ Green = The capture option is installed and ready for use. ▪ Yellow = A transfer to the PC is in process and a new capture cannot be performed. ▪ Clear = The capture option is not installed.
13	Vector or Gamut display of selected inputs
14	Indicates the selected Preset number; nothing appears when in the default mode.
15	Indicates the unit ID number, which can be changed on the I/O AND COMMUNICATIONS Menu
16	EDH status: ▪ Green = EDH detected and OK ▪ Red = EDH errors detected ▪ Clear = No EDH detected
17	Waveform or Eye Pattern display of selected inputs
18	The current waveform is divided into two cells: when multiple inputs or filters are applied, the status may be different for each cell.
19	Indicates the input format, divisions of horizontal scale, vertical gain multiplier, and reference selection
20	An ON AIR indication that is controlled through GPI #7 on the back panel: ▪ Red = GPI dry-contact closed ▪ Clear = GPI dry-contact open
21	Jitter Meter
22	Signal Strength Display Meter

Waveform, Vector, and Audio Graticule Scales

Waveform Graticule Scales

The waveform graticule scales change according to the video format being displayed, as listed in **Table 3-3**.

Table 3-3. Video Formats and Units of Measure

Video Format	Unit of Measure
NTSC composite	IRE
PAL composite	Units or V (selectable)
Digital 525	V
Digital 625	V
CAV	V
EYE	V

Figures 3-3, 3-4, 3-5, and **3-6** show examples of the critical amplitude limits, and **Table 3-4** lists the critical amplitude limits, which are indicated by special dashed lines, for the video formats that can be displayed by the VTM-330E.

Figure 3-3. NTSC Composite Display Shown in Zoom Mode

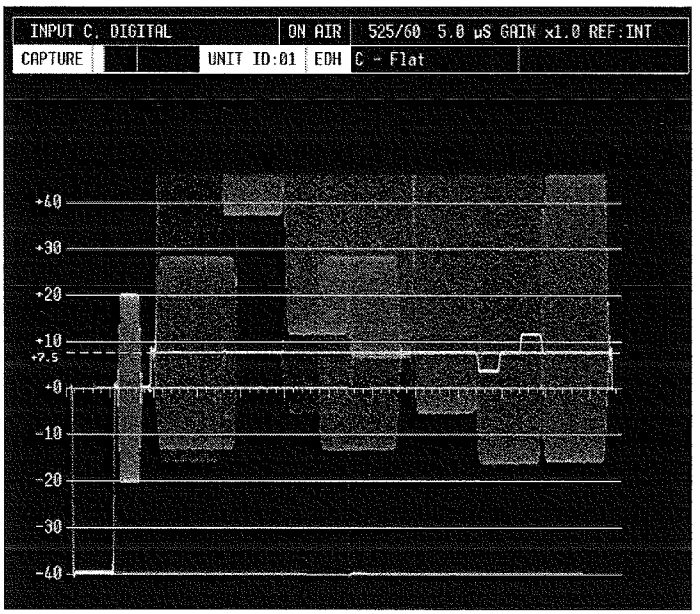


Figure 3-4. Digital 525 Display (75% Chroma)

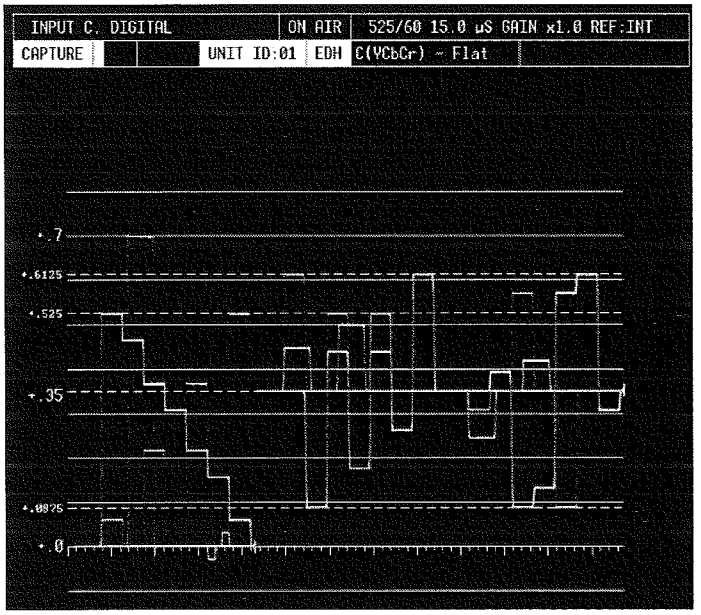


Figure 3-5. Digital 625 Display (75% Chroma)

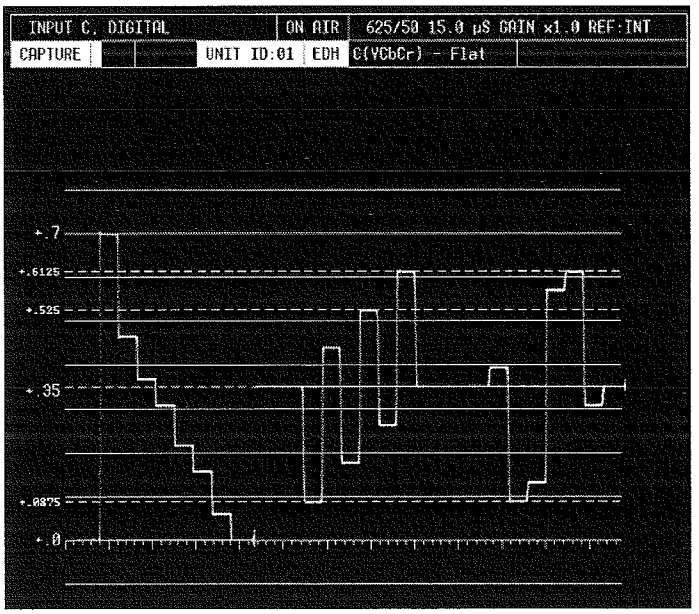


Figure 3-6. CAV Display (100% Chroma)

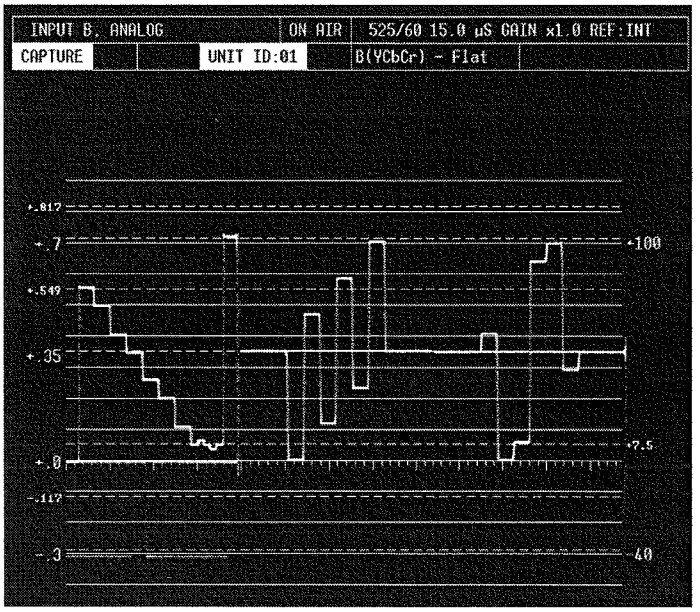


Table 3-4. Video Formats and Critical Amplitude Limits

Video Format	Critical Amplitude Limits
NTSC composite	7.5 IRE black level
Digital 525 and 625	350 mV = 50% point; black for color difference channels 525 mV = 75% luminance limit 612.5 mV = upper 75% chroma limit 87.5 mV = lower 75% chroma limit
CAV	Standard graticules change with selected formats.

Vector Graticule Scales

The vector graticule scales also change according to the video format being displayed; these scales are illustrated in **Figure 3-7**, **Figure 3-8**, and **Figure 3-9**.

Figure 3-7. Vector Graticule Differential Gain and Differential Phase Markings

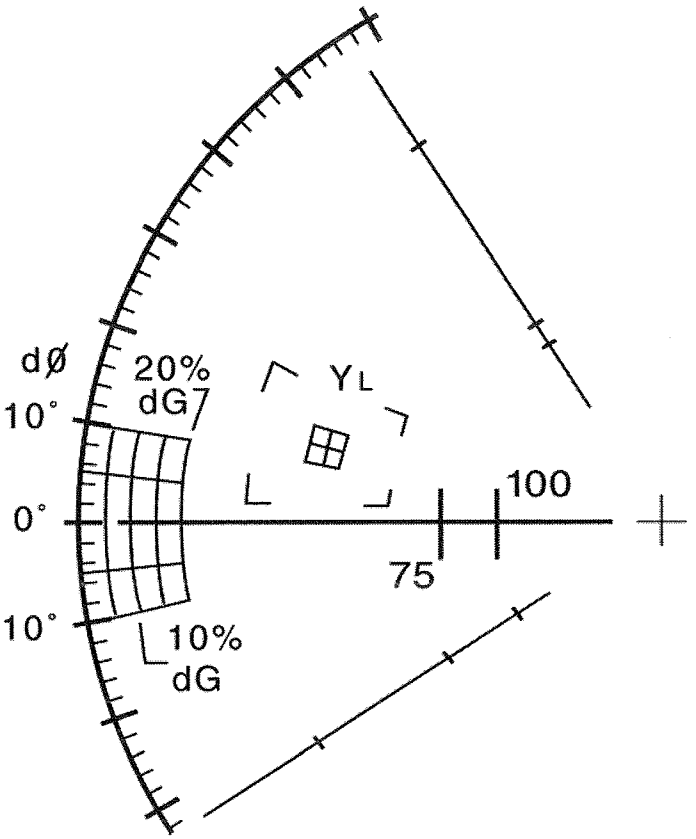


Figure 3-8. Vector Graticule NTSC Markings

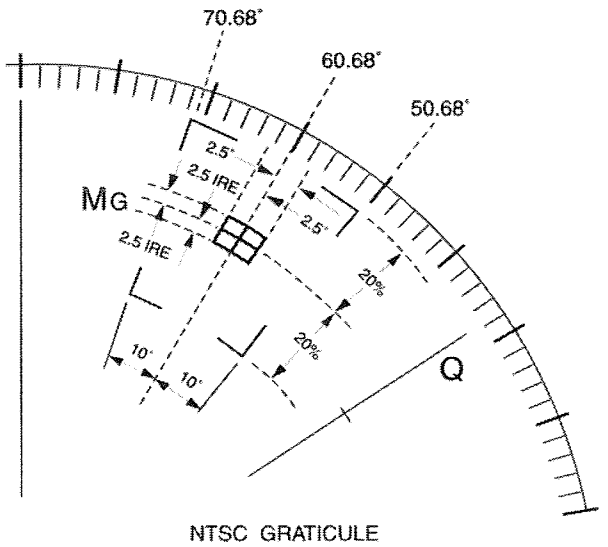
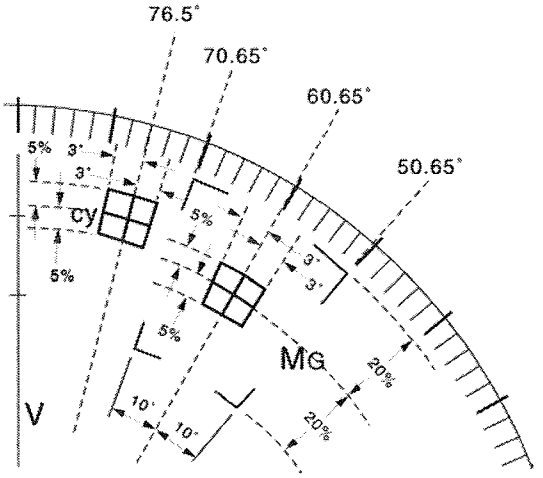


Figure 3-9. Vector Graticule PAL Markings



CCIR (PAL) GRATICULE

Audio Ballistics

The audio scales and ballistics are based on the IEC 268-10 and 268-17 standards. These standards describe meter scale markings and both attack and delay times for meter movement. The following meter responses can be selected:

- NORMAL
- PEAK
- PEAK HOLD
- PEAK HOLD INFINITE
- TRUE PEAK
- TRUE PEAK HOLD
- TRUE PEAK HOLD INFINITE
- RESET PEAK HOLD

PEAK HOLD INFINITE can be cleared by selecting RESET on the AUDIO SETUP menu or by pressing and holding AUDIO ZOOM.

Gamut Display

A constant setback in video production is the difference between the allowable ranges of dissimilar component and composite color spaces. Combinations of values that are within the range of a color difference component video system produce signal amplitudes outside the ranges when the signal is transcoded to composite or RGB color space.

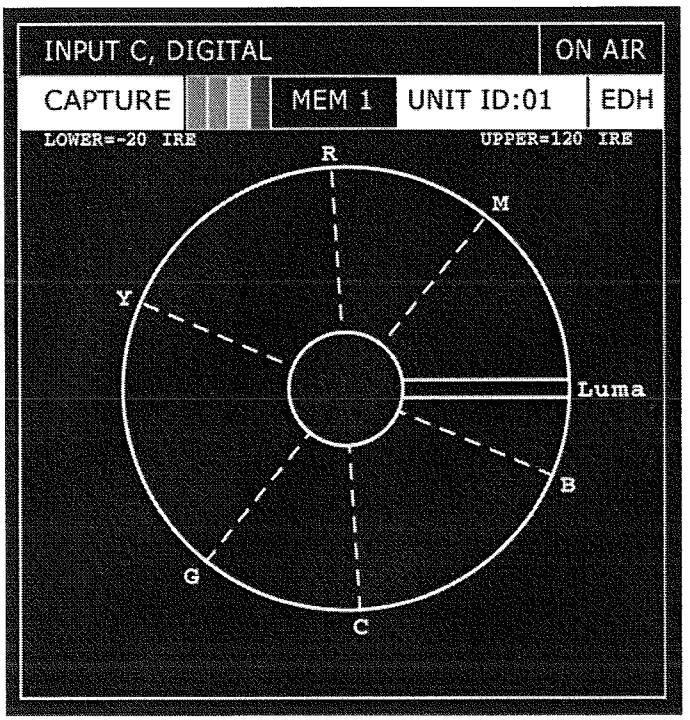
The Gamut Displays are selected in the VECTOR SETUP menu. The displays show RGB limits and composite video limits that are selected by pressing the FORMAT button. Note that when selecting YC_BC_R or Eye Pattern the Digital vector, instead of the Gamut vector, is displayed. Both Gamut displays illustrate what colors are causing

illegal excursions and whether these digressions are above or below the allowable limits.

Composite Gamut Display

The graticule for the composite gamut vector, as shown in **Figure 3-10,** is two concentric circles with other identifiers. The larger circle represents the highest allowable amplitude in standard composite units (i.e. IRE for NTSC and units for PAL). The smaller circle represents the lowest allowable amplitude. The other identifiers are radials that extend at the angle of the designated color. These six lines follow the same displacement as the vector display. Note that since the PAL display is derived solely from component information, there will not be two phases for PAL signals. The +V phase is used (making the vectors look similar to NTSC).

Figure 3-10. Composite Gamut Vector Display Graticule Markings



NOTE: Transitions from one vector point to another can pass through the lower limit circle. Do not confuse these pass-through transitions with an actual error condition.

RGB Gamut Display

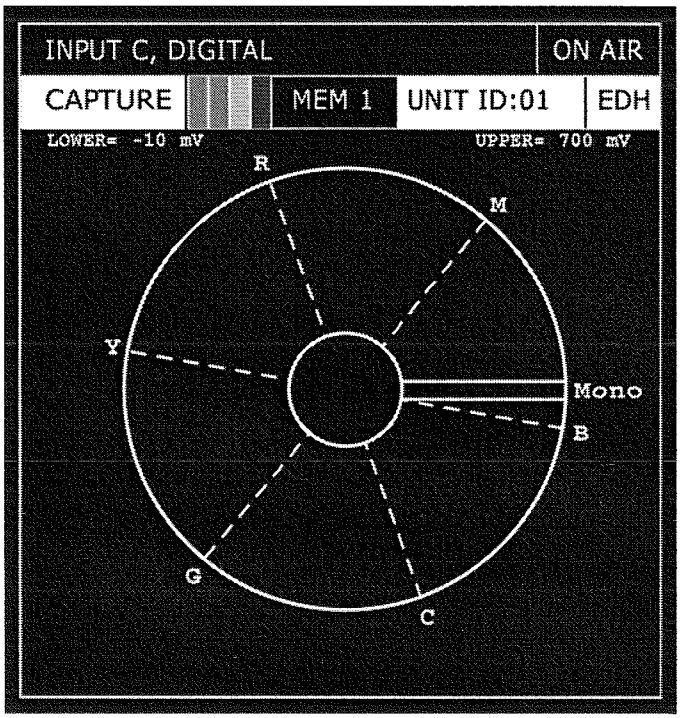
When setting the upper and lower limits, the upper and lower gamut rings represent the values set from the gamut alarm setup menu. The RGB Gamut Display shown in **Figure 3-11** is similar to the Composite Gamut Display because the RGB Gamut vector displays video amplitudes (which are in mV) in a polar format to represent color information. Each R, G, and B pixel amplitude is plotted along a radial representing the color on the Cb Cr plane (just like the component vector display). Unlike the composite Gamut vector, which plots two points per pixel, the RGB Gamut vector

plots three points. Also, Luma only signals are displayed as a separate bar graph on the Gamut display.

The RGB graticule is nearly identical to the composite graticule. The only differences are:

- Amplitudes are displayed in mV rather than composite units.
- The radials representing color vectors are 60° apart, since they are displayed in a component color space.
- The graticule turns red based on the RGB Gamut Alarm.
- The composite Gamut display turns red based on the encoded gamut alarm.

Figure 3-11. Component Gamut Vector Display Graticule Markings



NOTE: Transitions from one vector point to another can pass through the lower limit circle. Do not confuse these pass-through transitions with an actual error condition.

CineSound™ Audio Display (Option 5)

This unique, optional audio display shown in **Figure 3-12** provides an intuitive view of 5.1 and 7.1 channels of surround sound audio. The default meter movement is from the center outward but can be reversed by a selection in the AUDIO SETUP menu. Two additional channels of audio can be viewed next to the CineSound display, if required, thereby providing a total of eight channels on the screen. When the CineSound display is selected, the audio inputs follow a SMPTE 320M mapping scheme as listed in **Table 3-5**.

Figure 3-12. CineSound Audio Display

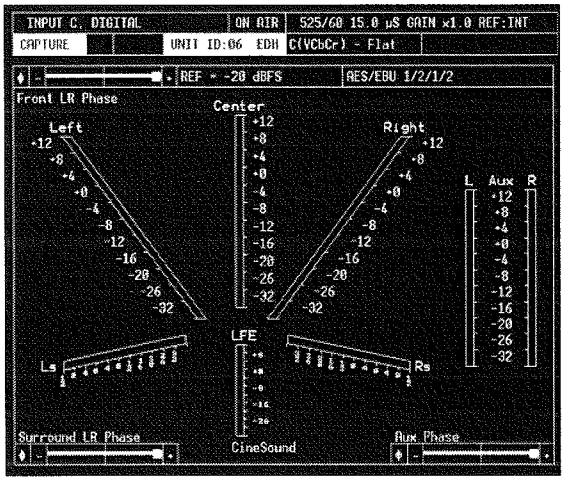


Table 3-5. CineSound Audio Input Mapping

Analog Input	AES/EBU Input	CineSound Display Assignment	8-Bar Display Assignment
1	1	Left	1 Left
2	1	Right	1 Right
3	2	Center	2 Left
4	2	Low Frequency Effects (LFE)	2 Right
5	3	Left Surround (LS)	3 Left
6	3	Right Surround (RS)	3 Right
7	4	Left Aux	4 Left
8	4	Right Aux	4 Right

Factory-Default Settings

When the VTM-330E is powered on for the first time, it assumes the factory-default settings. These default settings are listed in **Table 3-6**; the numbers in the "Key" column correspond to the callouts in **Figure 3-1**.

Table 3-6. Default Settings

Key	Label	Default Setting
1	BYPASS	Unit not bypassed
2	DISPLAY	Simultaneous display (picture, waveform, vector, audio, and alarm information)
3	TRANSFER	No transfers performed
4	CAPTURE	No captures performed
5	INPUT A and B	INPUT A selected (See Figure 3-1)
6	INPUT C and D	N/A
7	FILTER	Flat
8	SWEEP	1H
9	FORMAT	Composite
10	EDIT/CLEAR	Edit mode off
11	AUDIO, VECTOR, and WAVEFORM ZOOM	ZOOMS off
12	ALARM SCROLL/CLEAR	Off
13	SETUP/LEARN	Setup mode off
14	PRESET	No PRESET selected
15	LINE SELECT (button)	Off
16	LINE SELECT (knob)	Disabled
17	WAVEFORM POSITION-H	Centered
18	WAVEFORM POSITION-V	Blanking level on 0 line
19	VECTOR PHASE	Random

The VTM-330E can be configured for many signals and custom displays. Review any site-specific signal monitoring requirements and use the SETUP MENU to configure the VTM-330E. The VTM-330E retains all configuration changes in Nonvolatile RAM (NVRAM).

Video Inputs

The VTM-330E accepts three video formats: composite, CAV, and serial digital.

Selecting Video Inputs

- Press INPUT next to the A and B LEDs to select A, B, or A+B. A and B are the two composite analog inputs. The default condition for A+B is Parade mode.

NOTE: To change to Overlay mode, use the SETUP MENU.

- Press INPUT next to the C and D LEDs to select in succession C, D, and C+D. C and D are the two serial digital inputs.

NOTE: The composite (A or B) and digital (C or D) inputs cannot be viewed at the same time.

Selecting Component Video Inputs

The component video input is selected on channel B only. To select component video input format:

1. Press SETUP/LEARN to display the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to move cursor to the VIDEO SETUP MENU.
3. Press the H knob.
4. Rotate the H knob to move cursor to VIDEO-GENERAL.
5. Press the H knob.
6. Rotate the H knob to select INPUT B FORMAT.
7. Press the H knob.
8. Rotate the H knob to select the desired format.
9. Press the WAVEFORM POSITION-V knob four times to exit.

Selecting Filters

There are four filters available: Flat, Low Pass, Chroma, and Bowtie. Press FILTER to select the next filter. The Bowtie filter is available when viewing a CAV signal only; it is used to check the timing relationships between CAV components. Multiple filters can function simultaneously (see "Selecting Multiple Inputs and Filters").

Selecting Sweep Modes

Press SWEEP to select one of the four sweep modes: 1H (1 Horizontal), 2H (2 Horizontal), 1V (1 Vertical), and 2V (2 Vertical). Under DISPLAY SETUP, there are two settings for the PIXEL CLOCK RATE that affect the appearance of the waveform in vertical sweep modes: VESA 60Hz and OPTIMIZE FOR INPUT. Select VESA 60Hz to keep the monitor output fixed at 60 Hz. This ensures that interruption of the input signal does not cause the monitor to blank. OPTIMIZE FOR INPUT locks the monitor very close to the input sweep rate. The difference between these two settings is most noticeable with PAL signals.

When viewing multiple inputs or a CAV display, certain sweep modes may not be available (see "Selecting Multiple Inputs and Filters").

Selecting a Display Format

Press FORMAT to select one of five display formats: RGB, YC_BC_R, YC, COMPOSITE, and EYE. **Table 3-7** lists the relationships between the input and display formats:

Table 3-7. Input and Display Format Relationship

Input/Format	RGB	YC_BC_R	YC	Composite	Eye
Composite	No	No	No	Yes	No
CAV	Yes	Yes[1]	Yes[2]	Yes	No
Digital	Yes	Yes	No	Yes	Yes

1 Not available for RGB formats.

2 Available with YC input only.

The SETUP MENU provides eight CAV standards for input B. Graticule markings change according to the CAV standard selected.

Expanding the Display Capability of INPUT SWEEP or FILTER Using the EDIT/CLEAR Button

Press EDIT/CLEAR in conjunction with INPUT, SWEEP, or FILTER to expand the display capability. In Composite Format mode, select 2H sweep. A different cell will be highlighted each time the EDIT/CLEAR button is pressed. Two cells comprise the horizontal waveform display: the active cell (available for edit) is indicated at the top of the waveform display area; cell #1 is to the left and cell #2 is to the right.

When viewing a CAV or digital input, press EDIT/CLEAR to sequence through individual components. For example, when viewing a digital input in YC_BC_R format, repeatedly press EDIT/CLEAR to display the Y channel, C_B channel, C_R channel, and then all three channels combined. "Selecting Multiple Inputs and Filters" describes how to use the buttons in combination.

Selecting Multiple Inputs and Filters

Numerous filter and input combinations can be displayed by using a combination of the INPUT, FILTER, SWEEP, and EDIT/CLEAR buttons. Some examples of combination displays are as follows:

To display the FLAT and LOW PASS filters of INPUT A:

1. Press INPUT to select INPUT A.
2. Press SWEEP to display 2H.
3. Press FILTER to select FLAT.
4. Press EDIT/CLEAR to highlight cell #2.

5. Press FILTER to select LP.

To display the INPUT A and B OVERLAY:

1. Press SETUP/LEARN to access the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to move cursor to VIDEO SETUP MENU.
3. Press the H knob.
4. Rotate the H knob to select WAVEFORM SETUP.
5. Press the H knob.
6. Rotate the H knob to select WAVEFORM OVERLAY.
7. Press the H knob.
8. Rotate the H knob to select OVERLAY.
9. Press the WAVEFORM POSITION-V knob four times to exit.

To display the INPUT C and D Y (luminance) channel PARADE:

1. Press INPUT until the C and D LEDs are illuminated.
2. Press FORMAT to select Y, C_B, or C_R.
3. Press EDIT/CLEAR until cell #1 indicates C (Y) and cell #2 indicates D (Y). The default condition of digital inputs C + D is an overlay of YC_BC_R.

AUDIO, VECTOR, and WAVEFORM ZOOM Buttons

There are three ZOOM buttons: WAVEFORM, VECTOR, and AUDIO. The following subsections explain their use.

Expanding the Audio Display

- To expand the audio scales around the 0 dB reference point and enable increased resolution of readings, press AUDIO ZOOM.
- To clear the peak hold scale indicator, press and hold AUDIO ZOOM for approximately two seconds.

Expanding the Vector Display

Press VECTOR ZOOM to select one of five expanded display options:

- Expand the center
- Expand the upper-left quadrant
- Expand the upper-right quadrant
- Expand the lower-right quadrant
- Expand the lower-left quadrant

As with AUDIO ZOOM, the VECTOR ZOOM is helpful when increased resolution of phase or saturation readings is required.

Expanding the Waveform Display

Press WAVEFORM ZOOM to select one of three display options:

- NORMAL or no expansion
- ZOOM positioned on the 0 IRE or 0 mV graticule line
- ZOOM positioned on the 100 IRE or 700 mV graticule line (or 800 mV for Eye Pattern)

At each zoom position, the graticule scale and waveform displays expand to provide more resolution around the zoom point.

Scrolling Through or Clearing the Alarm List

- To scroll up or down the alarm list using the WAVEFORM POSITION-V knob, press ALARM SCROLL/CLEAR.
- To clear the alarm list, press and hold ALARM SCROLL/CLEAR for approximately two seconds.

For more information on setting and reading alarms, see **Setting Alarms** on page 3-46.

EYE PATTERN DISPLAY

The Eye Pattern display is created by the sampling rate derived from the recovered serial clock and the horizontal display rate. A fixed number of data patterns is displayed in every horizontal scan, with a larger number displayed with greater frequency offset from the sub multiple of the data rate used. The Eye Pattern display is used to measure signal amplitude, jitter, rise time and other irregularities. Measurement of the transition widths is done by manually setting the calibrated cursors on the transition limits of the display and reading the offset in picoseconds (pS). The amount of jitter can also be estimated from the bar display above the Eye Pattern display. Waveform amplitude is similarly measured using manual cursors.

To access the Eye Pattern display, press the FORMAT button on the front panel until the Eye Pattern is selected (all three LEDs associated with the FORMAT button are illuminated).

Jitter High Pass Filter Selection

Because jitter on the data can develope from many sources, and have its own unique frequency distribution, the bandwidth of the sampling clock recovery circuit will affect the displayed jitter if the frequency of the jitter is within the bandwidth of the clock recovery circuits. Above the loop bandwidth the loop has no effect on the jitter, while within the bandwidth the apparent jitter displayed will be satisfied by the loop response. There are available jitter high pass filters of 10, 100, and 1000 Hz. When 10 Hz is selected the –3 db response points allow jitter over 10 Hz to be displayed, or successively high frequencies of jitter can be excluded from the display. This is useful with estimating the effects of jitter on clock recovery circuits of similar bandwidths in receivers and inferring the sources of the observed jitter based on frequency components present.

To access the bandwidth selection do the following:

1. Press SETUP/LEARN to access the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to move cursor to VIDEO SETUP MENU.
3. Press the H knob.
4. Rotate the H knob to select EYE PATTERN SETUP.
5. Press the H knob.
6. Rotate the H knob to select JITTER HPF.
7. Press the H knob.
8. Rotate the H knob to select 10, 100 or 1000 Hz.
9. Press the WAVEFORM POSITION-V knob four times to exit.

Trigger Mode

Two modes of operation are available; 10 Eye and Overlay. These modes correspond to specific frequency offsets between the sampling rate and a sub-multiple of the data rate. In the 10 EYE mode the offset is half of the displayed horizontal scan frequency; this results in invariant positions for data distortions related to the 10-bit word length or the horizontal scan rate. In Overlay mode distortions are all displayed in the visible eye locations of the Eye Pattern display, giving a more easily observed display of the total jitter.

To access the Trigger mode selection:

1. Press SETUP/LEARN to access the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to move cursor to VIDEO SETUP MENU.
3. Press the H knob.
4. Rotate the H knob to select EYE PATTERN SETUP.
5. Press the H knob.
6. Rotate the H knob to select TRIGGER MODE.
7. Press the H knob.
8. Rotate the H knob to select either OVERLAY or 10 EYE.
9. Press the WAVEFORM POSITION-V knob four times to exit.

Waveform Observation

The waveform displayed can show both amplitude variations and timing variations. The combination of these "closes" the decision window for determining whether a bit received is "1" or "0". Common errors including overshoot, bandwidth limitations and ringing are easily observed with the Eye Pattern display and provide indications of the general quality of the transmission channel and source.

Waveform Rise Time

Rise times of the waveform can be calculated by measuring the 20% to 80% rise time points with the time cursors. After obtaining the measurement, calculate the actual rise time:

$$\text{Actual rise time} = \sqrt{(\textit{measured rise time})^2 - (.56)^2}$$

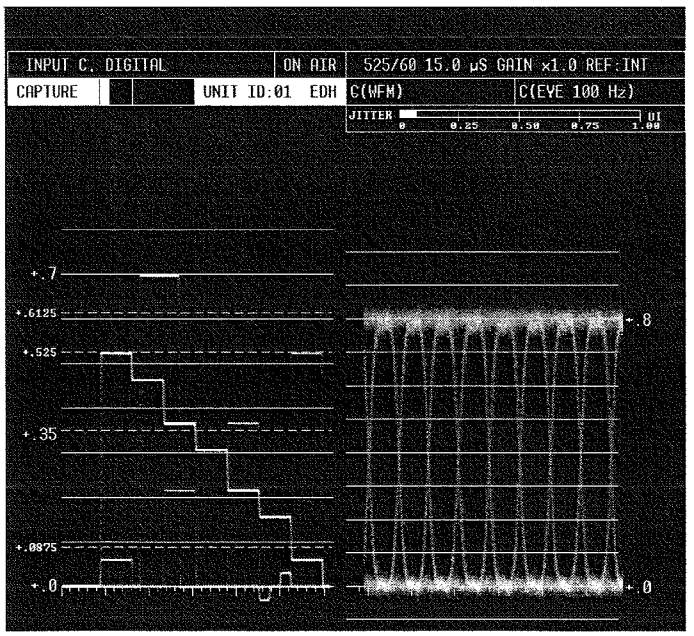
Jitter Display Type

Under the EYE PATTERN in the VIDEO SETUP menu, there is a sub-menu called JITTER DISPLAY TYPE which provides capability to change the scale of the jitter meter.

WAVEFORM/EYE COMBINATION DISPLAY

The VTM-330E in Parade mode can simultaneously display the Eye Pattern and the Waveform for a given serial digital signal. To obtain this display, press the FORMAT button on the front panel to select the Eye Pattern display. Once the Eye Pattern is shown, press the EDIT/CLEAR button to obtain a parade display of the waveform Y channel and eye display. Both the waveform and the eye display appear as their own graticules shown in **Figure 3-13.**

Figure 3-13. Waveform/Eye Pattern Combination Display



NOTE: Cursors are not available in this mode.

Ethernet Interface

The VTM-330E Ethernet interface provides a high speed communication link to the Videotek SpyderWeb application over standard LAN and Internet networks. The interface conforms to industry Ethernet standards:

- Connection via a standard RJ45 socket
- Automatic detection and switching between 10BaseT and 100BaseT
- TCP/IP stack is fully compliant with RFC2500, "Internet Official Protocol Standards"
- Fully compliant with IEEE 802.3 Ethernet standard

The interface can accept a static IP address or it can obtain an IP address dynamically from a DHCP server. The IP address, subnet mask, gateway address and DHCP enable are all programmable from the VTM-330E menu system.

ROUTER CONTROL

There are four RJ11 router control ports located on the back panel. The ports are used to control Videotek RS-12 series routers and one 12x1 router can be connected to each port. The router can be switched manually or set to scan all 12 inputs. This is especially useful when the alarms are activated. The router can be set to continuously scan inputs searching for alarm conditions. All alarm conditions that are detected by the VTM-330E will be logged on the display (maximum 100 alarms) or a PC can be used (running SpyderWeb software) to produce a continuous log file.

Router control is accessed in the SETUP menu under the VIDEO SETUP/VIDEO GENERAL/INPUT A, B, C, or D ROUTER. Selecting the "ROUTER" will allow manual control, and "SCANNER" will force the router to sequentially switch through all activated inputs. The "DWELL TIME" can be used to pause the router on each input for the selected time. Each input of the router can also be given a unique name that will be placed in the log file when an alarm is detected on that input. The names are entered using a keyboard connected to the back panel.

EXTERNAL GPI

There is an INPUT and OUTPUT General Purpose Interface (GPI). The VTM-330E has nine input GPI and two output GPI connections. The pinout and default functions are listed in **Table C-5** on page C-7 in **Appendix C**.

INPUT GPI

The input GPIs have two selectable functions. The first function is to allow external control of the unit using the default settings. The second function of the GPI is to show an onscreen alarm with a user-selected identification from an external input.

To setup GPI for USER FUNCTION:

1. Press SETUP/LEARN to display the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to move the cursor to I/O AND COMMUNICATIONS.

3. Press the H knob.
4. Rotate the H knob to move the cursor to GPI INPUT FUNCTION.
5. Press the H knob.
6. Rotate the H knob to select desired input.
7. Press the H knob.
8. Rotate the H knob to select USER GPI.
9. Press the H knob.
10. Use the keyboard to insert a new name.
11. Press the WAVEFORM POSITION-V knob five times to exit.

OUTPUT GPI

There are two OUTPUT GPIs with a list of 60 GPI alarm activations to choose from. All GPI alarm activation selections are set to the default OFF. When a selection is turned ON it allows the GPI to function according to the GPI Output Polarity Setting (NORMALLY OPEN, NORMALLY CLOSED). The default polarity setting is NORMALLY OPEN.

LTC/CLOCK

There are inputs for an external Longitudinal Time Code (LTC) and Clock (CLK) on the GPI/TALLY, LTC/CLK connection listed in **Table C-5** on page C-7 in **Appendix C**. The LTC/CLK shows when and how long an error occurs. When an error develops, the captured time of that error from the internal clock is expressed with the specific alarm in the lower left hand corner of the screen.

Navigating the SETUP MENU

Press SETUP/LEARN to display or exit the SETUP MENU. Use the following knobs to navigate and select values on the SETUP MENU:

- WAVEFORM POSITION-H
  - Rotate the knob left or right to move the menu cursor or to change a value or condition in a menu.
  - Press the knob to select a menu item.
- WAVEFORM POSITION-V
  - Rotate the knob to change a selected value or move a graticule cursor line.
  - Press the knob to exit one level.
- VECTOR PHASE
  - Press the knob to toggle between last setup screen and normal display mode.

Enter the Setup mode to display the SETUP MENU. The SETUP MENU consists of nine major groups, which are listed in **Table 3-8**.

Table 3-8. SETUP MENU Groups

Group	Description
VIDEO SETUP	General video setup conditions, standards, cursors, and vector position
AUDIO SETUP	Levels, scales, and audio-follow configurations
WFM/VEC ALARMS, ANALOG	Waveform and vector alarm-limit configurations for analog video
WFM ALARMS, DIGITAL	Waveform alarm-limit configurations for serial digital video
WFM ALARMS, CAV	Waveform alarm-limit configurations for CAV signals
AUDIO ALARMS	Alarm-limit configurations for audio signals
TIME CODE ALARMS	Alarm-limit configurations for time codes
I/O AND COMMUNICATIONS	Communication, clock, and GPI settings
DISPLAY SETUP	Intensity, graticule colors, and special display conditions

The tables on the following pages detail the group menus.

Table 3-9. VIDEO SETUP Menu

VIDEO – GENERAL	**REFERENCE**	INTERNAL	-
		EXTERNAL	-
	VIDEO STANDARD	AUTO DETECT	-
		NTSC (525/60)	-
		PAL (625/50)	-
	NTSC PEDESTAL	OFF	-
		ON (7.5 IRE)	-
	INPUT A ROUTER	**CONFIGURATION**	OFF
			ROUTER
			SCANNER
		DWELL TIME	OFF/1-60 SECONDS
		INPUT-A1 - INPUT A12	OFF/ON RENAME
	INPUT B ROUTER	**CONFIGURATION**	OFF
			ROUTER
			SCANNER
		DWELL TIME	OFF/1-60 SECONDS
		INPUT-A1 - INPUT A12	OFF/ON RENAME
	INPUT C ROUTER	**CONFIGURATION**	OFF
			ROUTER
			SCANNER
		DWELL TIME	OFF/1-60 SECONDS
		INPUT-A1 - INPUT A12	OFF/ON RENAME
	INPUT D ROUTER	**CONFIGURATION**	OFF
			ROUTER
			SCANNER
		DWELL TIME	OFF/1-60 SECONDS
		INPUT-A1 - INPUT A12	OFF/ON RENAME

(Table continues on next page)

Table 3-9 VIDEO SETUP Menu (*continued*)

VIDEO – GENERAL (CONT)	**INPUT B FORMAT**	COMPOSITE	-
		BETA	-
		MII	-
		SMPTE/EBU	-
		RGB W/SETUP	-
		RGB NO SETUP	-
		RGB SMPTE	-
		Y/C	-
		Y,R,G,B	-
	SAFE AREA	OFF	-
		ON	
	BLUE GUN	OFF	-
		ON	-
	EXIT BYPASS ON ALARM	OFF/ON	-
	CLOSED CAPTION DISPLAY	OFF	-
		CC1	-
		CC3	-
WAVEFORM SETUP	**DC RESTORER**	OFF/ON	-
	DIGITAL BLANKING	FULL	-
		SHOW SAV/EAV	-
		SHOW ALL	-
	CALIBRATION PULSE	OFF/ON	-
	WAVEFORM OVERLAY	PARADE	-
		OVERLAY	-
	PAL WAVEFORM SCALE	UNITS	-
		VOLTS	-
EYE PATTERN SETUP	**TRIGGER MODE**	OVERLAY	-
		10 EYE	-
	JITTER HPF	10Hz	-
		100 Hz	-
		1000Hz	-
	LINE SELECT	1 LINE	-
		15 LINE	-
		1 FIELD	-
	JITTER DISPLAY TYPE	0-1.0 UI	-
		0-0.2 UI	-
		0-3700 PS	-
		0-740 PS	-

(Table continues on next page)

Table 3-9 VIDEO SETUP Menu (*continued*)

VECTOR SETUP	**VECTOR H POSITION**	-512 TO +511	-
	VECTOR V POSITION	-512 TO +511	-
	VECTOR DISPLAY TYPE	STANDARD VECTOR	-
		GAMUT DISPLAY	-
	VECTOR ANALOG STD	75%	-
		100%	-
	VECTOR DIGITAL STD	75%	-
		100%	-
	VECTOR CAV STD	75%	-
		100%	-
	VECTOR PAL OVERLAY	NORMAL	-
		OVERLAY	-
CURSOR SETUP	**AMPLITUDE**	OFF/ON	-
		REF	-
		DELTA	-
	TIME	OFF/ON	-
		REF	-
		DELTA	-
	PHASE	OFF/ON	-
		REF	-
		DELTA	-
CAPTURE (FC-300 OPTION) SETUP	**CAPTURE DISPLAY**	HOLD IN DISPLAY CYCLE	-
		CAPTURE ONLY	-
	CAPTURE TRANSFER	MANUAL	-
		AUTO	-
	CAPTURE TRIGGER	FROM ALARM (OFF/ON)	-
		FROM CLOCK (OFF/ON)	-
	CAPTURE TRIGGER TIME	**DAY**	1-31
		HOUR	0-23
		MINUTE	0-59
		SECOND	0-59
	RETURN TO ACTIVE PIC	MANUAL	-
		AUTO	-

Capture on
Push display - off Capt.

Table 3-10. AUDIO SETUP Menu

CONFIGURE INPUT A	**1 STEREO + 1 LISSAJOUS**	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
		INPUT PAIR	PAIR 1-4	-
	2 STEREO + 2 LISSAJOUS	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
		METER 1	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	PAIR 1-4
		METER 2	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	PAIR 1-4
	6 CHANNELS	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
		METER 1	PAIR 1-4	-
		METER 2	PAIR 1-4	-
		METER 3	PAIR 1-4	-
	8 CHANNELS (OPTION 5)	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
		METER 1	PAIR 1-4	-
		METER 2	PAIR 1-4	-
		METER 3	PAIR 1-4	-
		METER 4	PAIR 1-4	-
CONFIGURE INPUT B	**1 STEREO + 1 LISSAJOUS**	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
		INPUT PAIR	PAIR 1-4	-
	2 STEREO + 2 LISSAJOUS	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
		METER 1	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	PAIR 1-4
		METER 2	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	PAIR 1-4

(Table continues on next page)

Table 3-10. AUDIO SETUP Menu (*continued*)

CONFIGURE INPUT B (CONT)	**6 CHANNELS**	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
		METER 1	PAIR 1-4	-
		METER 2	PAIR 1-4	-
		METER 3	PAIR 1-4	-
	8 CHANNELS (OPTION 5)	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
		METER 1	PAIR 1-4	-
		METER 2	PAIR 1-4	-
		METER 3	PAIR 1-4	-
		METER 4	PAIR 1-4	-
CONFIGURE INPUT C	**1 STEREO + 1 LISSAJOUS**	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		INPUT PAIR	*PAIR 1-4 or 1-8	-
	2 STEREO + 2 LISSAJOUS	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		METER 1	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	*PAIR 1-4 OR 1-8
		METER 2	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	*PAIR 1-4 OR 1-8
	6 CHANNELS	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		METER 1	*PAIR 1-4 or 1-8	-
		METER 2	*PAIR 1-4 or 1-8	-
		METER 3	*PAIR 1-4 or 1-8	-

*Varies with options installed and audio type selected

(Table continues on next page)

Table 3-10. AUDIO SETUP Menu *(continued)*

CONFIGURE INPUT C (CONT)	**8 CHANNELS (OPTION 5)**	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		METER 1	*PAIR 1-4 or 1-8	-
		METER 2	*PAIR 1-4 or 1-8	-
		METER 3	*PAIR 1-4 or 1-8	-
		METER 4	*PAIR 1-4 or 1-8	-
CONFIGURE INPUT D	**1 STEREO + 1 LISSAJOUS**	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		INPUT PAIR	PAIR 1-4	-
	2 STEREO + 2 LISSAJOUS	**AUDIO TYPE**	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		METER 1	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	PAIR 1-4
		METER 2	SUM(M) & DIFF(S) OFF/ON	-
			INPUT PAIR	PAIR 1-4
	6 CHANNELS	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		METER 1	PAIR 1-4	-
		METER 2	PAIR 1-4	-
		METER 3	PAIR 1-4	-
	8 CHANNELS (OPTION 5)	**DISPLAY TYPE**	VERTICAL	-
			CINESOUND (OPTION 5)	-
		AUDIO TYPE	ANALOG	-
			AES/EBU	-
			EMBEDDED (OPTIONS 4 & 5)	-
		METER 1	PAIR 1-4	-
		METER 2	PAIR 1-4	-
		METER 3	PAIR 1-4	-
		METER 4	PAIR 1-4	-

*Varies with options installed and audio type selected

(Table continues on next page)

Table 3-10. AUDIO SETUP Menu *(continued)*

ANALOG AUDIO SCALE	TYPE I	-	-	-
	TYPE Iia	-	-	-
	TYPE Iib	-	-	-
	TYPE I +8	-	-	-
	NORDIC	-	-	-
ANALOG INPUT LEVEL (reference)	0 dBm	-	-	-
	+4 dBm	-	-	-
	+6 dBm	-	-	-
	+8 dBm	-	-	-
	+12 dBm	-	-	-
DIGITAL AUDIO SCALE	TYPE I	-	-	-
	TYPE Iia	-	-	-
	TYPE Iib	-	-	-
	TYPE I +8	-	-	-
	NORDIC	-	-	-
	DBfs	-	-	-
	ZERO REF dBfs	-	-	-
DIGITAL INPUT LEVEL (reference)	–22 dBfs	-	-	-
	–20 dBfs	-	-	-
	–18 dBfs	-	-	-
	-15 dBfs	-	-	-
	–9 dBfs	-	-	-
AUDIO METER RESPONSE	NORMAL	-	-	-
	PEAK	-	-	-
	PEAK HOLD	-	-	-
	PEAK HOLD INFINITE	-	-	-
	TRUE PEAK	-	-	-
	TRUE PEAK HOLD	-	-	-
	TRUE PEAK HOLD INFINITE	-	-	-
	RESET PEAK HOLD	-	-	-
AUDIO OUTPUT LEVEL	–6 dB to +6 dB	-	-	-
PHASE BAR	NORMAL	-	-	-
	REVERSE	-	-	-

(Table continues on next page)

Table 3-10. AUDIO SETUP Menu *(continued)*

LFE OFFSET (OPTION 5)	0 (NONE)	-	-	-
	-10 dB	-	-	-
CINESOUND DIRECTION (OPTION 5)	OUTWARD	-	-	-
	INWARD			
METER LABLES	STEREO PAIRS	-	-	-
	SMPTE 320M	-	-	-

Table 3-11. WFM/VEC ALARMS, ANALOG Menu

LOSS OF SIGNAL	OFF/ON	-	-
	DURATION	0-60 SECONDS	-
LOSS OF REFERENCE	OFF/ON	-	-
	DURATION	0-60 SECONDS	-
PEAK VIDEO LEVEL	OFF/ON	-	-
	UPPER [limit]	NTSC: +50 TO +140 IRE PAL: +51 TO +143 UNITS PAL V: +357 TO +1000 mV	-
	LOWER [limit]	NTSC: -40 TO +20 IRE PAL: -41 TO +20 UNITS PAL V: -285 TO +143 mV	-
	SENSITIVITY	1-20 CES	-
	DURATION	0-60 SECONDS	-
LUMINANCE LEVEL	OFF/ON	-	-
	UPPER [limit]	NTSC: +50 TO +140 IRE PAL: +51 TO +143 UNITS PAL V: +357 TO +1000 mV	-
	LOWER [limit]	NTSC: -40 TO +20 IRE PAL: -10 TO 0 UNITS PAL V: -70 TO +143 mV	-
	SENSITIVITY	1-20 CES	-
	DURATION	0-60 SECONDS	-
HORIZONTAL SYNC LEVEL	OFF/ON	-	-
	UPPER [limit]	NTSC: -50 TO –42 IRE PAL: -51 TO -46 UNITS PAL V: -356 TO +320 mV	-
	LOWER [limit]	NTSC: -38 TO –20 IRE PAL: -41 TO –20 UNITS PAL V: -285 TO -142 mV	-
	DURATION	0-60 SECONDS	-
BURST LEVEL	OFF/ON	-	-
	UPPER [limit]	NTSC: +42 TO +50 IRE PAL: +46 TO +51 UNITS PAL V: +321 TO +357 mV	-
	LOWER [limit]	NTSC: +20 TO +38 IRE PAL: +20 TO +42 UNITS PAL V: +143 TO +293 mV	-
	DURATION	0 – 60 SECONDS	-

(Table continues on next page)

Table 3-11. WFM/VEC ALARMS, ANALOG Menu (*continued*)

BURST TO CHROMA PHASE	OFF/ON	-	-
	LINE	1 TO 50	-
	FIELD	ODD/EVEN	-
	PHASE	0 TO 360 DEGREES	-
	POSITION	0 µS TO +64 µS	-
	RANGE	±5 TO ±20 DEGREES	-
	DURATION	1 - 60 SECONDS	-
HORIZONTAL BLANKING	OFF/ON	-	-
	DURATION	0 - 60 SECONDS	-
VERTICAL BLANKING	OFF/ON	-	-
	DURATION	0 - 60 SECONDS	-
SCH PHASE	OFF/ON	-	-
	RANGE	5 TO 89 DEGREES	-
	DURATION	0-60 SECONDS	-
VITS	**LINE** [number]	**006 ODD TO 336 EVEN**	OFF
			ACTIVE
			INACTIVE
	THRESHOLD	NTSC: 0 TO +100 IRE PAL: 0 TO +102 UNITS PAL V: 0 TO +74 mV	-
	DURATION	0 – 60 SECONDS	-
LOSS OF ACTIVE VIDEO	OFF/ON	-	-
	THRESHOLD	NTSC: 0 TO +50 IRE PAL: 0 TO +51 UNITS PAL V: 0 TO +357 mV	-
	DURATION	0-60 SECONDS	-

Table 3-12. WFM ALARMS, DIGITAL Menu

EDH	OFF/ON	-
	DURATION	0-60 SECONDS
CRC DISPLAY	OFF/ON	-
CARRIER DETECT	OFF/ON	-
	DURATION	0-60 SECONDS
RGB GAMUT	OFF/ON	-
	UPPER	NTSC V: +650 TO +750 mV PAL V: +650 TO +750 mV
	LOWER	NTSC V: -50 TO +50 mV PAL V: -50 TO +50 mV
	SENSITIVITY	1-20 CES
	DURATION	0-60 SECONDS
ENCODED GAMUT	OFF/ON	-
	LUMA UPPER	NTSC: +90 TO +110 IRE PAL: +92 TO +112 UNITS PAL V: 643 mV TO 786 mV
	LUMA LOWER	NTSC: 0 TO +20 IRE PAL: -10 TO 20 UNITS PAL V: -70 TO 143 mV
	PEAK UPPER	NTSC: +50 TO +140 IRE PAL: +51 TO +143 UNITS PAL V: +357 TO +1000 mV
	PEAK LOWER	NTSC: -40 TO 20 IRE PAL: -41 TO 0 UNITS PAL V: -285 mV TO +143 mV
	LUMA SENSITIVITY	1 – 20 CES
	PEAK SENSITIVITY	1 – 20 CES
	DURATION	0-60 SECONDS
LOSS OF ACTIVE VIDEO	OFF/ON	-
	THRESHOLD	0 TO +350 mV
	DURATION	0 – 60 SECONDS

Table 3-13. WFM ALARMS, CAV Menu

SYNC LEVEL	OFF/ON	-
	UPPER	NTSC: -56 TO -40 IRE PAL: -57 TO -43 UNITS PAL V: -400 TO -300 mV
	LOWER	NTSC: -40 TO -28 IRE PAL: -43 TO -29 UNITS PAL V: -286 TO -300 mV
	DURATION	0-60 SECONDS
HORIZONTAL BLANKING	OFF/ON	-
	DURATION	0-60 SECONDS
VERTICAL BLANKING	OFF/ON	-
	DURATION	0-60 SECONDS
RGB GAMUT	OFF/ON	-
	UPPER	NTSC V: +650 TO +750 mV PAL: +650 TO +750 mV
	LOWER	NTSC V: -50 TO +50 mV PAL V: -50 TO +50 mV
	SENSITIVITY	1-20 CES
	DURATION	0-60 SECONDS
ENCODED GAMUT	OFF/ON	-
	LUMA UPPER	NTSC: +90 TO +110 IRE PAL: +92 TO +112 UNITS PAL V: +643 TO +786 mV
	LUMA LOWER	NTSC: -10 TO +20 IRE PAL UNITS: -10 TO +20 UNITS PAL V: -70 TO 143 mV
	PEAK UPPER	NTSC: +50 TO +140 IRE PAL: +51 TO +143 UNITS PAL V: +357 mV TO +1000 mV
	PEAK LOWER	NTSC: -40 TO +20 IRE PAL: -41 TO +20 UNITS PAL V: -285 mV TO +143 mV
	LUMA SENS	1-20 CES
	PEAK SENS	1-20 CES
	DURATION	0 - 60 SECONDS

(Table continues on next page)

Table 3-13. WFM ALARMS, CAV Menu (*continued*)

Y,R,G,B	OFF/ON	-
	LUMA UPPER	NTSC V: +650 TO +750 mV PAL V: +650 TO +750 mV
	LUMA LOWER	NTSC V: -50 TO 0 mV PAL V: –50 TO 0 mV
	RGB UPPER	NTSC: +650 TO +750 mV PAL V: +650 TO +750 mV
	RGB LOWER	NTSC V: -50 TO 0 mV PAL VOLTS: –50 TO 0 mV
	LUMA SENS	1 - 20 CES
	RGB SENS	1 - 20 CES
	DURATION	0 - 60 SECONDS
LOSS OF ACTIVE VIDEO	OFF/ON	-
	THRESHOLD	0 TO +350 mV
	DURATION	0 - 60 SECONDS

Table 3-14. AUDIO ALARMS Menu

PEAK AUDIO	OFF/ON	-
	LEVEL	0 TO 24 dB
	DURATION	0 - 60 SECONDS
PHASE	OFF/ON	-
	VALUE	0 TO 180 DEGREES
	DURATION	0-60 SECONDS
LOSS OF SOUND	CHANNEL 1-8 OFF/ON	-
	LEVEL	-50 TO 0 dB
	DURATION	0-60 SECONDS
LOSS OF DATA	CHANNEL 1-4 OFF/ON	-
	DURATION	0-60 SECONDS
AES / EBU PHASE	OFF/ON	-
	REFERENCE INPUT	INPUT 1-4
	THRESHOLD	5 PERCENT
		25 PERCENT
	DURATION	0-60 SECONDS
AUDIO MARKERS	OFF/ON	-
	POSITION	-50 TO +12 dB

Table 3-15. TIME CODE ALARMS Menu

TIME CODE LEVEL (LTC)	OFF/ON	-
	DURATION	0-60 SECONDS
TIME CODE FRAMING	OFF/ON	-
	RANGE	1.5 TO 10.5 LINES
	DURATION	0-60 SECONDS
CONTINUITY	OFF/ON	-
DISPLAY WITH ALARM	TIME CODE	-
	CLOCK	-
	BOTH	-

Table 3-16. I/O AND COMMUNICATIONS Menu

TIME CODE INPUT	(D) VITC	-	-
	LTC	TIME CODE	-
		CLOCK	-
CLOCK SET	**YEAR**	1980 TO 2079	-
	MONTH	JAN TO DEC	-
	DAY	1 TO 31[1]	-
	HOUR	0 TO 23	-
	MINUTE	0 TO 59	-
	SECOND	0 TO 59	-
BAUD RATE	19200	-	-
	38400	-	-
	57600	-	-
	115200	-	-
SERIAL PORT	RS-232	-	-
	RS-422 UNTERMINATED	-	-
	RS-422 TERMINATED	-	-
GPI INPUT FUNCTION	**INPUT 1**	**SELECT INPUT A USER GPI 1**	RENAME
	INPUT 2	**SELECT INPUT B USER GPI 2**	RENAME
	INPUT 3	**SELECT INPUT C USER GPI 3**	RENAME
	INPUT 4	**SELECT INPUT D USER GPI 4**	RENAME
	INPUT 5	**CAPTURE FRAME USER GPI 5**	RENAME
	INPUT 6	**SEND CAPTURED FRAME USER GPI 6**	RENAME
	INPUT 7	**ON AIR USER GPI 7**	RENAME
	INPUT 8	**MEMORY SEQUENCE USER GPI 8**	RENAME
	INPUT 9	**BYPASS USER GPI 9**	RENAME
GPI OUTPUT #1	**AUDIO PEAK**	OFF/ON	-
	AUDIO PHASE	OFF/ON	-
	AUDIO QUIET	OFF/ON	-
	AUDIO DATA	OFF/ON	-
	AES/EBU PHASE	OFF/ON	-
	VIDEO SIGNAL	OFF/ON	-
	VIDEO REFERENCE	OFF/ON	-

(Table continues on next page)

[1] Last day available changes depending on the number of days in the month.

Table 3-16 I/O AND COMMUNICATION Menu (*continued*)

GPI OUTPUT #1 (CONT)	H SYNC LEVEL (ANL)	OFF/ON	-
	BURST LEVEL	OFF/ON	-
	BURST/CHROMA PHASE	OFF/ON	-
	H BLANKING	OFF/ON	-
	V BLANKING	OFF/ON	-
	SC/H PHASE	OFF/ON	-
	VITS	OFF/ON	-
	LOSS OF VIDEO (ANL)	OFF/ON	-
	EDH	OFF/ON	-
	LOSS OF CARRIER	OFF/ON	-
	LOSS OF VIDEO (601)	OFF/ON	-
	H SYNC LEVEL (CAV)	OFF/ON	-
	H BLANKING (CAV)	OFF/ON	-
	V BLANKING (CAV)	OFF/ON	-
	YRGB	OFF/ON	-
	LOSS OF VIDEO (CAV)	OFF/ON	-
	LTC TIME CODE LEVEL	OFF/ON	-
	TIME CODE FRAMING	OFF/ON	-
	TIME CODE CONTINUITY	OFF/ON	-
	GPI ALARM 1-9	OFF/ON	-
	CRC - SAV	OFF/ON	-
	CRC – LINE LENGTH	OFF/ON	-
	CRC – FIELD LENGTH	OFF/ON	-
	CRC – RESV'D VALUES	OFF/ON	-
	CRC – ANC CHECKSUM	OFF/ON	-
	CRC - ANC PARITY	OFF/ON	-
	CRC – ANC PLACEMENT	OFF/ON	-
	CRC – NO VIDEO	OFF/ON	-
	CRC – RESET ERRORS	OFF/ON	-
	RGB GAMUT UPPER 601	OFF/ON	-
	RGB GAMUT LOWER 601	OFF/ON	-
	LUM GAMUT UPPER 601	OFF/ON	-
	LUM GAMUT LOWER 601	OFF/ON	-
	PK GAMUT UPPER 601	OFF/ON	-
	PK GAMUT LOWER 601	OFF/ON	-
	RGB GAMUT UPPER CAV	OFF/ON	-
	RGB GAMUT LOWER CAV	OFF/ON	-
	LUM GAMUT UPPER CAV	OFF/ON	-

(Table continues on next page)

Table 3-16 I/O AND COMMUNICATION Menu (*continued*)

GPI OUTPUT #1 (CONT)	LUM GAMUT LOWER CAV	OFF/ON	-
	PK UPPER CAV	OFF/ON	-
	PK LOWER CAV	OFF/ON	-
	LUM UPPER ANALOG	OFF/ON	-
	LUM LOWER ANALOG	OFF/ON	-
	PEAK UPPER ANALOG	OFF/ON	-
	PEAK LOWER ANALOG	OFF/ON	-
GPI OUTPUT #2	AUDIO PEAK	OFF/ON	-
	AUDIO PHASE	OFF/ON	-
	AUDIO QUIET	OFF/ON	-
	AUDIO DATA	OFF/ON	-
	AES/EBU PHASE	OFF/ON	-
	VIDEO SIGNAL	OFF/ON	-
	VIDEO REFERENCE	OFF/ON	-
	H SYNC LEVEL (ANL)	OFF/ON	-
	BURST LEVEL	OFF/ON	-
	BURST/CHROMA PHASE	OFF/ON	-
	H BLANKING	OFF/ON	-
	V BLANKING	OFF/ON	-
	SC/H PHASE	OFF/ON	-
	VITS	OFF/ON	-
	LOSS OF VIDEO (ANL)	OFF/ON	-
	EDH	OFF/ON	-
	LOSS OF CARRIER	OFF/ON	-
	LOSS OF VIDEO (601)	OFF/ON	-
	H SYNC LEVEL (CAV)	OFF/ON	-
	H BLANKING (CAV)	OFF/ON	-
	V BLANKING (CAV)	OFF/ON	-
	YRGB	OFF/ON	-
	LOSS OF VIDEO (CAV)	OFF/ON	-
	LTC TIME CODE LEVEL	OFF/ON	-
	TIME CODE FRAMING	OFF/ON	-
	TIME CODE CONTINUITY	OFF/ON	-
	GPI ALARM 1-9	OFF/ON	-
	CRC – SAV	OFF/ON	-
	CRC – LINE LENGTH	OFF/ON	-
	CRC – FIELD LENGTH	OFF/ON	-
	CRC – RESV'D VALUES	OFF/ON	-

(Table continues on next page)

Table 3-16 I/O AND COMMUNICATIONS Menu

GPI OUTPUT #2 (CONT)	CRC – ANC CHECKSUM	OFF/ON	-
	CRC – ANC PARITY	OFF/ON	-
	CRC – ANC PLACEMENT	OFF/ON	-
	CRC – NO VIDEO	OFF/ON	-
	CRC – RESET ERRORS	OFF/ON	-
	RGB GAMUT UPPER 601	OFF/ON	-
	RGB GAMUT LOWER 601	OFF/ON	-
	LUM GAMUT UPPER 601	OFF/ON	-
	LUM GAMUT LOWER 601	OFF/ON	-
	PK GAMUT UPPER 601	OFF/ON	-
	PK GAMUT LOWER 601	OFF/ON	-
	RGB GAMUT UPPER CAV	OFF/ON	-
	RGB GAMUT LOWER CAV	OFF/ON	-
	LUM GAMUT UPPER CAV	OFF/ON	-
	LUM GAMUT LOWER CAV	OFF/ON	-
	PK UPPER CAV	OFF/ON	-
	PK LOWER CAV	OFF/ON	-
	LUM UPPER ANALOG	OFF/ON	-
	LUM LOWER ANALOG	OFF/ON	-
	PEAK UPPER ANALOG	OFF/ON	-
	PEAK LOWER ANALOG	OFF/ON	-
GPI #1 POLARITY	NORMALLY OPEN	-	-
	NORMALLY CLOSED	-	-
GPI #2 POLARITY	NORMALLY OPEN	-	-
	NORMALLY CLOSED	-	-
UNIT ID	1-99	-	-
BYPASS KEY	CTRL+A TO CTRL+Z, CTRL+0 TO CTRL+9	-	-
PANEL LOCKOUT	PASSWORD #1	-	-
	PASSWORD #2	-	-
	PASSWORD #3	-	-
	LOCK	-	-
ALT PAUSE/CAPTURE GPI	FRAME CAPTURE/TRANSFER	-	-
	ALARM PAUSE/RESUME	-	-
ETHERNET SETUP	IP ADDRESS	ENTER VALUE	-
	SUBNET MASK	ENTER VALUE	-
	GATEWAY	ENTER VALUE	-
	DHCP ENABLE	OFF/ON	-

Table 3-17. DISPLAY SETUP Menu

WAVEFORM INTENSITY	+32 TO –32
WAVEFORM CONTRAST	0 TO +15
WAVEFORM COLOR	(16 COLORS)*
VECTOR INTENSITY	+32 TO –32
VECTOR COLOR	(16 COLORS)*
ATTACK	NORMAL
	MAXIMUM
PERSISTENCE	NORMAL
	HIGH
	INFINITE
GAMMA	FLAT
	2.0
	3.0
PICTURE BRIGHTNESS	-128 TO 127
PICTURE CONTRAST	-128 TO 127
PICTURE SATURATION	-128 TO 127
PICTURE HUE	-128 TO 127
BACKGROUND COLOR	(16 COLORS)*
GRATICULE COLOR	(15 COLORS)*
GRATICULE INTENSITY	25% TO 200%
CURSOR COLOR	(16 COLORS)*
PICTURE ENABLE	OFF/ON
PICTURE COLOR	COLOR
	MONO
SCREEN SAVER	OFF/1 TO 60 MIN
PIXEL CLOCK RATE	VESA 60 Hz
	OPTIMIZE
ASPECT RATIO	4:3
	14:9
	16:10
	16:9

*See Display Colors Menu on page 3-41

Display Colors Menu

Black*

Blue

Green

Cyan

Red

Purple

Brown

LT Gray

DK Gray

LT Blue

LT Green

LT Cyan

LT Red

LT Purple

Yellow

White

* Not available on the GRATICULE COLOR menu.

NOTE: LT=Light and DK=Dark

Configuring the Audio Display

The VTM-330E is capable of displaying analog or digital audio. To take advantage of this flexibility, use the SETUP MENU to select specifications unique to your studio environment.

The following discussion is useful for determining your specific setup requirements. The AUDIO SETUP menu is detailed in **Table 3-10**.

There are eight analog audio input channels (four stereo pairs), eight AES/EBU digital input channels (four stereo pairs), and 16 embedded audio channels (Options 4 & 5, serial digital video input only) available for selection in the menu. Up to six channels can be displayed simultaneously (eight with Option 5). Analog and AES/EBU inputs can be assigned to track video input A, B, C, or D. Embedded audio (Options 4 & 5) can be read from only track inputs C and D. The displayed inputs can be monitored as analog signals on the 37-pin, ANALOG AUDIO IN/OUT connector. The AES/EBU or embedded audio being displayed will be converted to analog audio for the monitoring output. The output audio level can be adjusted from -6 dB to +6 dB around the reference-input level. This adjustment is on the AUDIO SETUP menu.

Adjustable markers can be placed in the audio meters to show a specific critical level. In addition, alarms can be activated to monitor peak levels, phase differences, loss of sound, and loss of data.

The flexibility provided in the assignment of audio-follow-video enables such things as analog audio inputs to track a serial digital video input or an AES/EBU audio input to be displayed with analog video input. This type of cross-format tracking is done on the AUDIO SETUP menu under CONFIGURE INPUT A, B, C, or D.

The optional CineSound display (Option 5) can be used to monitor 5.1 or 7.1 channels of surround sound. The input mapping for CineSound follows a SMPTE 320M standard. (Input mapping is detailed in **Table 3-5**.)

The phase bars are used to monitor the instantaneous phase relationship between two channels of audio. The + marking indicates a phase difference of 0 degrees, and the - marking indicates a phase difference of 180 degrees. A properly phased stereo pair will produce a phase pointer (yellow mark) that moves within the green zone, whereas a reversed channel will produce a pointer that moves within the red zone.

For example, to set four channels of analog audio to follow input A:

1. Press SETUP/LEARN to display the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to highlight AUDIO SETUP.
3. Press the H knob.
4. Rotate the H knob to highlight CONFIGURE INPUT A.
5. Press the H knob to select it.
6. Rotate the H knob to highlight 2 STEREO/LISSAJOUS.
7. Press the H knob.

8. Rotate the H knob to highlight AUDIO TYPE.
9. Press the H knob.
10. Rotate the H knob to highlight ANALOG.
11. Press the WAVEFORM POSITION-V knob (V knob) to exit one level.
12. Rotate the H knob to highlight METER 1.
13. Press the H knob.
14. Rotate the H knob to select INPUT PAIR.
15. Press the H knob to select it.
16. Rotate the H knob to highlight PAIR 1.
17. Press the V knob two times to exit two levels.
18. Rotate the H knob to highlight METER 2.
19. Press the H knob.
20. Rotate the H knob to select INPUT PAIR.
21. Press the H knob.
22. Rotate the H knob to highlight PAIR 2.
23. Press the V knob six times to exit.

Using the Cursors

Cursors are available for precise measurement of waveform amplitude, waveform time, and vector phase. To access them:

1. Press SETUP/LEARN to display the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to highlight VIDEO SETUP.
3. Press the H knob.
4. Rotate the H knob to select CURSOR SETUP.
5. Press the H knob.
6. Rotate the H knob to select AMPLITUDE, TIME, or PHASE. Each selection displays three options: OFF/ON, REF, and DELTA.
7. To toggle the cursor on or off, rotate the H knob to position the menu cursor on OFF/ON and then press the H knob.
8. To move the solid cursor line, rotate the H knob to position the menu cursor on REF.
9. Rotate the WAVEFORM POSITION-V knob (V knob).
10. To move the dashed line, rotate the H knob to position the menu cursor on DELTA.
11. Rotate the V knob.

In all cases, a numeric readout at the bottom of the associated display indicates the difference between the REF and DELTA lines.

Recalling and Storing Front Panel and SETUP MENU Configurations

NOTE: Information must be stored in a preset location before being recalled.

Press PRESET to recall and store front panel and SETUP MENU configurations. Press PRESET to advance through the presets. Press PRESET one more time after position 8 to exit the Preset mode without storing information.

To store a new preset:

1. Make all changes to the front panel controls and/or the SETUP MENU.
2. Press PRESET and SETUP/LEARN simultaneously and then release them.
3. Press PRESET to advance to the desired preset number (the selected LED blinks, indicating that it is ready to store the new settings).
4. Press SETUP/LEARN. The LED is illuminated and steady. Any previous setup conditions at the position are erased and the new settings are stored.

Placing the Waveform and Vector Display in Line Select Mode

1. Press LINE SELECT to place the waveform and vector display in Line Select mode and illuminate the ODD or EVEN field LED.
2. Press the LINE SELECT knob to alternate between the ODD and EVEN fields.
3. Rotate the LINE SELECT knob to locate the line to be displayed.

A marker on the edge of the picture indicates the position of the line being displayed.

Eye Pattern in the Line Select Mode

Eye Pattern in the Line Select mode displays a line or field of data that corresponds to the picture currently being viewed on the monitor. In order to activate the Eye Pattern in the Line Select mode:

1. Press SETUP/LEARN to enter the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to VIDEO SETUP.
3. Press the H knob.
4. Rotate the H knob to select EYE PATTERN SETUP.
5. Press the H knob.
6. Rotate the H knob to select LINE SELECT.
7. Press the H knob.
8. Rotate the H knob to select the desired line or field.
9. Press the LINE SELECT button on the front panel.

When Eye Pattern is in the Line Select mode it will display data depending on the option that is selected. There are three options to choose from:

- If 1 LINE is selected, then one line of data will be represented in the Eye Pattern.
- If 15 LINE is selected, then 15 lines of data will be represented in the Eye Pattern starting with the line indicated by the markers.
- If 1 FIELD is selected, then the entire field selected (ODD and EVEN) will be represented in the Eye Pattern.

10. Press the WAVEFORM POSITION-V knob four times to exit.

Moving the Waveform

When in normal operating mode (not in the SETUP MENU), use the WAVEFORM POSITION-H (horizontal) and WAVEFORM POSITION-V (vertical) knobs to move the waveform display relative to the graticule. Press the respective knob to cycle H MAG (horizontal magnification) or V MAG (vertical magnification) through the available magnifications and OFF.
In 1H sweep mode, the horizontal magnification is 5X or 10X and the vertical magnification is 2.5X or 5X with an additional 10X for the digital display.

These two knobs can also be used to navigate through the SETUP MENU.
(See "Navigating the SETUP MENU." page 3-22)

Rotating the Vector Display in Composite Mode

Use the VECTOR PHASE knob to rotate the vector display when the FORMAT button is in composite mode.

Capturing and Transferring the Entire XVGA Display (FC-300 Option)

The VTM-330E is capable of holding one captured display in memory. Once captured, the display can be transferred to a connected PC for file storage and placed in the display button cycle.

1. Press CAPTURE to freeze the entire XVGA display.
2. Press DISPLAY to return to normal operation. If CAPTURE is pressed again, a new frozen display overwrites the previous one.
3. Press TRANSFER to begin the transfer, which cannot be interrupted. The transfer begins and the display returns to live video.

To place a captured display in the display button cycle:

1. Press SETUP/LEARN to enter the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to VIDEO SETUP.
3. Press the H knob.
4. Rotate the H knob to select CAPTURE SETUP.

5. Press the H knob.
6. Rotate the H knob to select CAPTURE DISPLAY.
7. Press the H knob.
8. Rotate the H knob to select HOLD IN DISPLAY CYCLE
9. Press the WAVEFORM POSITION-V knob four times to exit.

To recall the most recently captured display, press DISPLAY five times to cycle through the normal full-screen display modes. The captured display follows the full-screen audio display.

Setting Alarms

Most alarms monitor all lines of the video signal. The VITS alarm is an exception; it monitors activity or the lack of activity on a particular line. The GAMUT alarm is more typical; it monitors the entire active picture for errors over the preset limits chosen on the menu.

Limits are selected by choosing a value using the WAVEFORM POSITION-H or WAVEFORM POSITION-V knobs while additionally causing a limit cursor line to appear in the waveform or vector display. Do not confuse these limit cursor lines with the cursor lines selected on the VIDEO SETUP menu. The limit cursor lines disappear when exiting the alarm menu.

Sensitivity and Duration are two general terms used on the alarm menus:

- Sensitivity

  Sensitivity is set in Consecutive Errored Samples (CES). When setting amplitude limits, a noise spike may exceed the limit but the video amplitude may be within the limit. With the CES set to a low number, a spike is detected and an alarm is displayed. Set the CES to a higher number to ignore the fast spike. Each CES occurs at a 37 ns interval. Use this as a guideline to select the appropriate CES value.

  Not all alarms have CES associated with them; in such cases, use the duration to increase or decrease the general sensitivity.

- Duration

  This value, from 0–60 seconds, determines how long an error must persist before it is reported. Set the duration to 0 to cause an error to be displayed as soon as the CES value is met.

Alarm Message Contents and Limitations

Figure 3-14. Sample Alarm Message

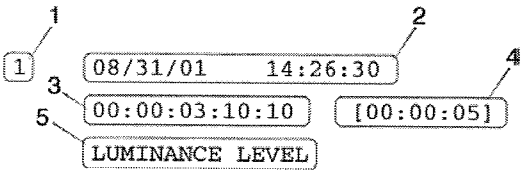


Table 3-18. Description of Sample Alarm Message

Key	Description
1	Index number, from 1-100
2	Date and time (the internal clock setting in month/day/year and hour:minute:second)
3	Time code, which is from the LTC/CLOCK rear panel connector, VITC, or D-VITC (shown in day:hour:minute:second:frame)
4	Duration, which is the length of time that the error occurred (shown in hour:minute:second)
5	Error type, which describes the error

When an error is first registered, it appears at the bottom of the error display area and is highlighted in yellow. If the error is short term (i.e., two seconds or less), the error text reverts to the original graticule color after approximately two seconds. If the error continues longer than two seconds, the text remains highlighted in yellow and the error duration is incremented. When the next error occurs, the previous one moves up one position.

When 100 different error events have occurred, error number 01 is dropped and the most recent error is tagged as 100. There are 100 error events per input. To overcome the 100-event limit, connect a PC to the RS-232 COMM or Ethernet port and use the SpyderWeb software included; all errors are passed to the PC and saved.

Press ALARM SCROLL/CLEAR to scroll or press and hold to erase the current group of 100 errors. A GPI output dry-contact closure can be used to alert other devices when an error occurs. Use the I/O AND COMMUNICATIONS menu to setup GPI.

An alarm can also trigger a screen capture. To capture and store a complete screen when an alarm occurs, set the Capture Trigger mode to Alarm. If the screen capture is saved to a PC, the transfer can take up to a few minutes depending on if the transfer is being run over an RS-232 or Ethernet connection. While other alarms can occur during this transfer, the feature is helpful when unattended monitoring is required.

Alarm Accuracy

When setting analog alarm limits, the signal-to-noise ratio (SNR) becomes a factor. As the amount of noise increases, the accuracy of the alarm limits decrease. Some trial and error may be required when setting alarm limits with SNRs lower than 45 dB.

LEVEL	in excess of the duration setting. Peak video includes luminance and/or chrominance.
LUMINANCE LEVEL	This alarm occurs when the luminance portion of the active picture falls outside the upper or lower limits for a period in excess of the duration setting.
HORIZONTAL SYNC LEVEL	This alarm occurs when the horizontal sync pulse falls outside the upper or lower limits for a period in excess of the duration setting.
BURST LEVEL	This alarm occurs when the peak absolute value of burst falls outside the upper or lower limits for a period in excess of the duration setting.
BURST TO CHROMA PHASE	This alarm occurs when the relative phase between burst and a particular color on a selected line and location on the line exceeds a user-defined phase tolerance for a period in excess of the duration setting. For example, assume that the Vertical Interval Test Signal of color bars on line 17, field 2 is selected. Also, assume the line position is set to monitor the blue color packet with a range of 5 degrees and duration of 0 seconds. If the phase error between burst and the blue vector point exceeds ±5 degrees, an alarm occurs.
HORIZONTAL BLANKING	This alarm occurs when the time interval between the end of active video and the start of active video violates the specified limits for a period in excess of the duration setting. **NOTE**: For this measurement to be accurate, active video must be higher than 20 IRE (NTSC) or 350 mV (PAL).
VERTICAL BLANKING	This alarm occurs if the number of lines during the vertical blanking period violates the specified limit for a period in excess of the duration setting.
SCH PHASE	This alarm occurs when the phase angle of burst compared to the 50% point of the leading edge of horizontal sync on line 10 of field 1 (NTSC) or line 1 (PAL) exceeds the range setting for a period in excess of the duration setting. The range is ±5 to 90 degrees in NTSC and ±5 to 45 degrees in PAL.
VITS	This alarm occurs when the selected lines become active or inactive as set by the amplitude threshold for a period in excess of the duration setting. One or more lines can be monitored and they do not have to be successive. For example, line 17/E can be monitored for activity over 50 IRE while line 20/O is monitored for inactivity under 50 IRE. The threshold and duration settings are global.
LOSS OF VIDEO	This alarm occurs when active video falls below the adjustable threshold for a period in excess of the duration setting.

To monitor for PEAK VIDEO errors in an analog signal:

1. Press SETUP/LEARN to display the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to move the cursor to WFM/VEC ALARMS, ANALOG.
3. Press the H knob.
4. Rotate the H knob to move the cursor to PEAK VIDEO LEVEL.
5. Press the H knob.
6. Rotate the H knob to move the cursor to OFF.
7. Press the H knob to select ON.
8. Rotate the H knob to select UPPER.
9. Press the H knob.
10. Rotate the H knob and use the cursor line on the waveform display to adjust the upper limit to +120 units (other limits include IRE for NTSC and mV for PAL).
11. Press the WAVEFORM POSITION-V knob (V knob) to exit one level.
12. Rotate the H knob to select LOWER.
13. Press the H knob.
14. Rotate the H knob and use the cursor line on the waveform display to set the lower limit at –20 units (other limits include IRE for NTSC and mV for PAL).
15. Press the V knob to exit one level.
16. Rotate the H knob to select SENSITIVITY.
17. Press the H knob.
18. Rotate the H knob to set the CES value to 3.
19. Press the V knob to exit one level.
20. Rotate the H knob to select DURATION.
21. Press the H knob.
22. Rotate the H knob to set the DURATION to 0 seconds.
23. Press the V knob four times or press SETUP/LEARN once to exit the SETUP MENU.

The VTM-330E will now monitor active video for any peaks that exceed +120 units or -20 units (other limits can be IRE for NTSC and mV for PAL). Because the CES is set to a low number and the DURATION is set to 0, an alarm occurs if the video exceeds the limits for three consecutive clock cycles.

Digital Waveform Alarm Error Types

Table 3-20. Digital Waveform Alarm Error Types

Error Type	Description
EDH	Per SMPTE RP 165-1994; the alarm occurs when one or more errors are detected for a period in excess of the duration setting.
CRC DISPLAY	These groups of alarms are triggered when an active picture in a particular field drops below its adjustable value for a period in excess of the duration setting. The alarm also detects how many groups of audio are available and any other ancillary information.
CARRIER DETECT	This alarm occurs when there is no signal detected.
RGB GAMUT	This alarm occurs when any component of the transcoded RGB signal falls outside the upper or lower limits for a period in excess of the duration setting. The CES can be increased to provide immunity to fast transcoding spikes.
ENCODED GAMUT	This alarm scans the composite encoded signal derived from the selected serial digital input. The alarm occurs when the luminance or peak video falls outside the adjustable limits for a period in excess of the duration setting. The CES can be increased to provide immunity to fast noise spikes.
LOSS OF ACTIVE VIDEO	This alarm occurs when active video falls below the adjustable threshold for a period in excess of the duration setting.

To monitor for RGB GAMUT errors in a serial digital video signal:

1. Press SETUP/LEARN to display the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H knob (H knob) to select WFM ALARMS, DIGITAL.
3. Press the H knob.
4. Rotate the H knob to select RGB GAMUT.
5. Press the H knob.
6. Rotate the H knob to select OFF.
7. Press the H knob to toggle to ON.
8. Rotate the H knob to select UPPER.
9. Press the H knob.
10. Rotate the H knob and use the waveform cursor to set the upper limit to 703 mV.
11. Press the WAVEFORM POSITION-V knob (V knob) to exit one level.
12. Rotate the H knob to select LOWER.
13. Press H knob.
14. Rotate the H knob and use the waveform cursor to set the lower limit to –3 mV.
15. Press the V knob to exit one level.
16. Rotate the H knob to select SENSITIVITY.

17. Press the H knob.
18. Rotate the H knob to set the CES to 3.
19. Press the V knob to exit one level.
20. Rotate the H knob to select DURATION.
21. Press the H knob.
22. Rotate the H knob to set the DURATION to 0 seconds.
23. Press the V knob four times or press SETUP/LEARN once to exit the SETUP MENU.

The VTM-330E will now monitor active video for any peaks that exceed 703 mV and -3 mV for three consecutive clock samples.

CRC Alarms

Under WFM ALARMS, DIGITAL, a submenu called CRC DISPLAY is used for CRC evaluation. When the CRC DISPLAY is set to OFF, this display is not active, but when it is set to ON, then the CRC errors are detected and the information is displayed.

When the CRC DISPLAY is ON, the following information is displayed:

DISPLAY					DESCRIPTION
Time since Reset			**00:00:00**		Hr:min:sec, elapsed time since last reset
FF	**CRC**	**Seconds**		***value***	Full field CRC error in seconds
AP	**CRC**	**Seconds**		***value***	Active Picture CRC error in seconds
	F1	**AP**	**CRC**	***value***	CRC value (Check Sum) for active picture, field one
	F2	**AP**	**CRC**	***value***	CRC value (Check Sum) for active picture, field two
Embedded Audio				***value***	Detects how many groups of audio are available
Ancillary Data				**Present**	Detects other ancillary information
Format Errors					Detects a format error

NOTE: When activated the CRC display replaces the alarm display when a digital signal is selected.

The following are CRC Window Alarm Error Types:

- SAV PLACED INCORRECTLY
- LINE LENGTH ERROR
- FIELD LENGTH ERROR
- RESERVED VALUES USED IMPROPERLY
- ANC DATA CHECKSUM ERROR
- ANC DATA PARITY ERROR
- ANC DATA PLACEMENT ERROR
- ABSENCE OF SERIAL VIDEO INPUT

The CRC elapsed time can be reset to zero and the EDH errors will clear by pressing and holding the ALARMS SCROLL/CLEAR button on the front panel for five seconds.

CAV Waveform Alarm Error Types

Table 3-21. CAV Waveform Alarm Error Types

Error Type	Description
SYNC LEVEL	This alarm occurs when the negative peak level of sync falls outside the upper or lower limits for a period in excess of the duration setting. The limits are adjustable and the measurement is taken on the Y or G channel only, depending on the format selected.
HORIZONTAL BLANKING	This alarm occurs when the time interval between the end of active video and the start of active video violates the specified limits for a period in excess of the duration setting. This is monitored on the Y or G channel, depending on the video-format selection. **NOTE**: For this measurement to be accurate, active video must be higher than 20 IRE (NTSC) or 350 mV (PAL).
VERTICAL BLANKING	This alarm occurs if any video is detected at the limits of the vertical interval. Lines 525, 20, and 21 are evaluated in 525 and lines 625, 25, and 26 are evaluated in 625. If video is present on line 525 (or 625), no video is present on line 20 (or 25), and video is present on line 21 (or 26), the vertical interval blanking is correct.
RGB GAMUT	This alarm occurs when any of the RGB components fall outside the adjustable upper and lower limits for a period in excess of the duration setting. Increasing the CES provides immunity to noise spikes.
ENCODED GAMUT	This alarm looks at the encoded composite signal derived from the selected CAV input. The alarm occurs when the luminance or peak video falls outside the adjustable limits for a period in excess of the duration setting. The CES can be increased to provide immunity to noise spikes.
Y, R, G, B LEVELS	With input B set to a Y, R, G, and B format, this alarm occurs when any of the components fall outside the adjustable limits for a period in excess of the duration setting. Increasing the CES provides immunity to noise spikes.
LOSS OF VIDEO	This alarm occurs when the active video of the luminance channel falls below the adjustable threshold for a period in excess of the duration setting.

Audio Alarm Error Types

Table 3-22. Audio Alarm Error Types

Error Type	Description
PEAK AUDIO	This alarm occurs when the peak audio level exceeds the adjustable limit for a period in excess of the duration setting. This alarm is not tied to the format selection; it monitors analog, AES/EBU, or embedded input.
PHASE	This alarm occurs when the phase difference between any audio pair (L and R) exceeds an adjustable range for a period in excess of the duration setting. If two channels (two pairs) are displayed, the setting is valid for both pairs.
LOSS OF SOUND	This alarm occurs when the peak amplitude falls below an adjustable limit for a period in excess of the duration setting. This alarm is valid for the displayed input (analog, AES/EBU, or embedded). The range point is global and is independent of the scale type or input format.
LOSS OF DATA	This alarm monitors the AES/EBU data stream. The alarm occurs when a loss of data is detected in the displayed audio for a period in excess of the duration setting.
AES/EBU PHASE	This alarm compares the X preamble data from the displayed AES/EBU inputs to a selected reference input X preamble. The alarm occurs when the alignment exceeds the selected range for a period in excess of the duration setting.

Time Code Alarm Error Types

Table 3-23. Time Code Alarm Error Types

Error Type	Description
TIME CODE LEVEL	This alarm occurs when the peak-to-peak level of the LTC input signal is below 0.75 V p-p or above 2.25 V p-p (±5%) for a period in excess of the duration setting.
TIME CODE FRAMING (LTC)	This alarm occurs when the alignment of the start of LTC (ANSI/SMPTE 12M-1995) exceeds the limit for a period in excess of the duration setting. The limits are: ▪ NTSC = beginning of line #5 ±1.5 lines ▪ PAL = beginning of line #2 ±1.5 lines
TIME CODE CONTINUITY	This alarm occurs when a break or interruption in the time-code count occurs. The drop frame flag is monitored in NTSC.

Using the Keyboard Commands

Table 3-24 lists the keyboard commands used for remote operation of a single VTM-330E or multiple VTM-330E units. This table continues on the next page.

Table 3-24. Keyboard Commands

Function	Keystroke	Description
Bypass	Ctrl+(A–Z & 0–9)*	Toggles BYPASS on and off
Capture	P p	Captures the current display
Transfer	D d	Selects Transfer
Display	F1	Provides full-screen display
Display	F2	Displays full-screen WAVEFORM display
Display	F3	Displays full-screen VECTOR display
Display	F4	Displays full-screen AUDIO display
Display	F5	Multiscreen
External Reference	X x	Toggles Internal/External Reference
Input	1	Selects INPUT A
Input	2	Selects INPUT B
Input	3	Selects INPUT A+B
Input	4	Selects INPUT C
Input	5	Selects INPUT D
Input	6	Selects INPUT C+D
Filter	F f	Cycles through Flat, LP, and Chroma
Sweep	S s	Cycles through 1H, 2H, 1V, 2V
Format	T t	Cycles through RGB, YC_BC_R, COMPOSITE, and EYE
Edit/Clear	E e	Selects Edit/Clear
Waveform Zoom	W w	Cycles through WAVEFORM ZOOM modes
Vector Zoom	V v	Cycles through VECTOR ZOOM modes
Audio Zoom	A a	Cycles through AUDIO ZOOM mode
Alarm Scroll	O o	Selects/deselects Alarm Scroll
Alarm Clear	Alt+O o	Clears the displayed alarm list
Setup	U u	Selects/deselects SETUP
Preset 1	Alt+1	Selects Preset 1
Preset 2	Alt+2	Selects Preset 2
Preset 3	Alt+3	Selects Preset 3
Preset 4	Alt+4	Selects Preset 4

*To ensure that a fixed keystroke does not interfere with any programs on the remote control PC, use the BYPASS CONFIGURE option on the I/O AND COMMUNICATIONS menu. This option allows selection of a letter (A–Z) or a number (0–9) as the second keyboard key along with the Ctrl key. The default is Ctrl+B b.

(Table continues on next page)

Table 3-26. Keyboard Commands *(continued)*

Function	Keystroke	Description
Preset 5	Alt+5	Selects Preset 5
Preset 6	Alt+6	Selects Preset 6
Preset 7	Alt+7	Selects Preset 7
Preset 8	Alt+8	Selects Preset 8
Learn	Alt+U u	Turns on the "Preset Learn" function
Line Select	L l	Toggles Line Select on and off
Line Select	Alt+L l	Toggles odd/even lines
Line Select	[{	Decrements the line number
Line Select	] }	Increments the line number
Menu Item Select or Waveform H Mag	Home	Same as pressing the H Mag knob
Menu Item Select or Waveform V Mag	End	Same as pressing the V Mag knob
Waveform Position-V	up arrow	Moves waveform up
Waveform Position-V	down arrow	Moves waveform down
Waveform Position-H	left arrow	Moves waveform left (moves cursor down in SETUP mode)
Waveform Position-H	right arrow	Moves waveform right (moves cursor up in SETUP mode)
Vector Phase	, <	Rotates vector counterclockwise
Vector Phase	. >	Rotates vector clockwise
Vector Level	C c	Toggles 75%/100% vector chroma level
Source ID	F10	Toggles source ID edit mode
Source ID	Arrows	Moves cursor
Source ID	Backspace	Deletes character at cursor and backspace

*To ensure that a fixed keystroke does not interfere with any programs on the remote control PC, use the BYPASS CONFIGURE option on the I/O AND COMMUNICATIONS menu. This option allows selection of a letter (A–Z) or a number (0–9) as the second keyboard key along with the Ctrl key. The default is Ctrl+B b.

Calibration Interval

Calibration is recommended under any of the following conditions:

- Every 12 months
- When critical components are replaced
- After exposure to temperatures outside of the specified operating or storage temperatures

NOTE: If calibration is needed, refer to **Appendix B** for service and support.

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Section 4 ♦ Troubleshooting

CAUTION — these instructions are for use by qualified personnel only. To reduce the risk of electric shock, do not perform this installation or any servicing unless you are qualified to do so. Refer all servicing to qualified service personnel.

NOTE: When power is applied to the unit, the display will remain blank for about 30 seconds.

If the VTM-330E is not functioning properly, first verify that:

1. The VTM-330E is connected to a power source (90–264 VAC, 50/60 Hz nominal)
2. All cables are correctly connected (see Section 2, "Installation")

Initial difficulties with operation or display can be due to improper setup. Review the SETUP MENU (see Section 3, "Operation") to ensure that the proper adjustments have been made for your signal requirements.

For information on troubleshooting the RCU-330E, see Appendix D, "Remote Control Unit (RCU-330E)."

Cold Starting the VTM-330E

If the cables are correctly connected and the setup seems to be correct but the problem persists, perform a cold start.

NOTE: A cold start resets all front panel and SETUP MENU selections to their factory-default settings. All user settings are lost. See Section 3, "Operation," for the factory-default settings.

To perform a cold start:

1. Disconnect the AC power cord.
2. Wait 30 seconds.
3. Press and hold the SETUP BUTTON.
4. Re-apply power while holding SETUP.
5. Release the SETUP button after the graticules appear on the XVGA monitor.

NOTE: A cold start will reset the Ethernet values to their default settings.

The Ethernet default settings for the VTM-330E are:

- Gateway: 0.0.0.0
- IP: 192.0.0.100
- Subnet Mask: 255.255.255.0

Problems, Causes, and Solutions

Table 4-1. VTM-330E: Problems, Causes, and Solutions

Problem/Symptom	Possible Cause	Solution or Explanation
No display on XVGA monitor	The VTM-330E is set to **BYPASS** mode.	Press BYPASS to toggle it off.
	The monitor is not powered up.	Check to see that the monitor is plugged in and powered up.
	The full-screen picture display is selected but no signal is present on the input selected.	Press DISPLAY to de-select the full-screen picture display.
Display on XVGA monitor is not centered	The XVGA monitor is not correctly adjusted.	Use the monitor controls to center the display.
Waveform not locked when External Reference (EXT REF) is selected	The video signal is too low in amplitude or the sync edge is too noisy.	Verify that the External Reference signal is of sufficient amplitude.
	EXT REF is selected but there is no reference input, or the External Reference is non-synchronous.	Select Internal Reference (INT REF) and/or verify that the External Reference signal is synchronous.
Monochrome picture when Input B is selected	Input B is set to accept a CAV signal.	Use the SETUP MENU to change the input from CAV to COMPOSITE.
Audio level reading too low	The input reference level is not correctly set.	Use the SETUP MENU to check the input reference level setting.
When displaying an A+B or C+D parade, the second display is not locked or is offset	The two signals are not genlocked or are not timed.	Genlock or time the signals.
The composite vector is not displayed when viewing a CAV signal with the Composite format selected	Working properly	Only the CAV vector is displayed in this mode.
Eye Pattern not clear	Excessive cable length Excessive jitter	Add digital DA to cable run. Add Reclocking DA to cable run or source is causing jitter.
Vector is not standard display	Vector display is set to Vector Gamut.	Change display type in setup menu.
Picture width or vector circle not correct	Aspect ratio not set correctly.	Change aspect ratio in setup menu.
Input switches by itself	Router control is on.	Turn off router control in setup menu.
No communications on serial port	Baud rate not correct Wrong serial standard	Select proper baud rate and either RS-232 or RS-422 in setup menu.
No communications on Ethernet port	Wrong IP address	Provide correct IP address in setup menu.

If the problem still exists after troubleshooting the VTM-330E, see Appendix B, "Service Support," for further instructions.

Appendix A ♦ Specifications

Video

Inputs A and B (analog)	NTSC/PAL composite video
Signal level	1 V p-p
Maximum displayable signal	1.4 V p-p
Input impedance	75Ω nominal
Return loss	45 dB, to 5 MHz
Input C and D (digital)	ITU-R BT.601, SMPTE 259M
Data rate	270 Mb/s, 525/625 line rate
Input impedance	75Ω nominal
Return loss	18 dB, 5 to 270 MHz

Reference

Input	Blackburst or NTSC/PAL analog composite video
External/internal sync requirements	286 mV p-p NTSC/300 mV p-p PAL sync and burst ±6 dB
Input impedance	Hi-Z looping
Return loss	45 dB, to 5 MHz

XVGA Output

R, G, B output levels	1 V p-p nominal
R, G, B output impedance	75Ω nominal
Horizontal sync	Negative TTL pulse @ 48,363 ±1%
Vertical sync	Negative TTL pulse @ 60.004 ±1%

XVGA Monitor Requirements

Display

Must be capable of displaying 1024 x 768 progressive @ 60 Hz (VESA standard #901101A)

Connector

15-pin, XVGA, mini D-sub connector

Audio (Optional)

Analog Inputs

- Option 3: Eight mono or four channels
  Four AES/EBU inputs
  Six channels on screen
- Option 4: Eight mono or four stereo channels
  Four AES/EBU inputs
  Group 1, 2, 3 or 4 embedded audio
  Six channels on screen
- Option 5: Same as Option 4 and CineSound display
  Eight channels on screen

Maximum input level

+24 dBm (600Ω)

Input impedance

>20 KΩ

Digital Inputs

AES/EBU, Embedded

Input impedance

75Ω nominal

Output signal format

- Option 3: Six monophonic or three stereo channels, balanced, analog audio
- Option 4: Six monophonic or three stereo channels, balanced, analog audio
- Option 5: Eight monophonic or four stereo channels, balanced

Output signal level

0 dB ± 6 dB relative to audio input; for digital audio, a -20 dBfs input produces a 0 dBm analog output level (600Ω); output level adjustment is ± 6 dB (1 dB increments)

Output impedance

50Ω unbalanced or 100Ω balanced (nominal)

Controls

GPI

Includes:

- A, B, C, and D input selection
- On-air tally
- Memory sequence
- XVGA bypass
- Capture frame
- Transfer captured frame
- User defined alarm on ground contact

GPI output

Alarm(s) see pages 3-36 to 3-39

Input impedance

10 KΩ returned to +5 VDC

Alarm output

Relay closure

Maximum relay current

0.35A @ 30 VDC

Absolute maximum current

1.0A @ 30 VDC

Remote control keyboard interface

PC/PS2-compatible for remote control

RS-232/RS-422 communication parameters

No parity, eight data bits, one stop bit; supported baud rates are 19200, 38400, 57600, and 115200 (default setting).

Displays

Picture, waveform, vector, and audio are shown simultaneously in a four-quadrant display, or in a separate, full-screen display for each one.

Waveform

- Digital inputs: waveforms derived from digital inputs can be displayed as native YC_BC_R; as RGB, or as encoded composite (NTSC or PAL, dependent on input field rate).
- Analog inputs: waveforms derived from composite inputs can be displayed as composite only.
- Component inputs: waveforms derived from component format can be displayed as YC_BC_R, RGB, or composite for Beta, MII, Y/C, and SMPTE/EBU input formats; RGB input format can be displayed only as RGB.
- Eye pattern replaces waveform when active.
- Waveform/Eye Combination can be displayed.

Vector

- Analog: R-Y vs. B-Y
- Digital: C_R vs. C_B or R-Y vs. B-Y for encoded display
- Gamut Display- composite or RGB

Time base for sweeps

One or two lines, one or two fields; each sweep can be magnified x5 or x10; component displays are paraded or overlaid (1H for overlay, 3H for parade).

Waveform accuracy

<1%

Vector accuracy

±1°

SC/H accuracy	±5° @ SC/H=0°

Eye Pattern

Method	Sub-Nyquist repetitive sampling- sampling phase locked but offset to line time converts 9 or 10 eye times (33.33 ns or 37.03 ns) to one video line time.
Input bandwidth	100 kHz to 450 MHz +1, -3 dB
Input data rate	270 Mb/s
Input connection	75Ω BNC
Input return loss	≤ -18 dB, 5 to 270 MHz
Through path frequency response	+1, -3 dB, DC to 450 MHz
Eye display input points	Pre equalized waveforms
Eye displays	3 eye (overlay) 10 eye (word-synchronized)

Ethernet

Standard	10/100 Base-T conforms to IEEE802.3
Minimum throughput	1 Mb/s
Connector	RJ45
Performance metric	Transfer a captured frame to a PC in ≤ 15 seconds, dedicated LAN

External Routing Control

Switcher protocol	RS-12X
Number of RS-12X	4
Physical interconnection standard	RS-485

Gamut Display

Monitored parameters	Composite gamut (positive and negative chroma packet excursions about luma levels) RGB gamut
Display type	Polar. Angle of display always represents hue (as in a vectorscope). Composite display amplitude plots luma plus half of saturation and luma minus half of saturation, with magnitude in IRE or units. Concentric circles represent minimum and maximum ranges. Component display plots R,G, and B amplitudes, with magnitude in mV. Concentric circles represent minimum and maximum ranges.
Display position	Replaces vector display

Magnification

HMAG selection

x1, x5, and x10. Pressing the HPOS knob will cycle through x1, x5, and x10 horizontal magnification.

VMAG selection

x1, x2.5, and x5. Pressing the VPOS knob will cycle through x1,x2.5, and x5 vertical magnification.

- 10x are available for YC_BC_R and RGB displays only.

Output Aspect Ratio

Aspect ratios supported

4:3, 14:9, 16:9, 16:10

Jitter Display

Display type

Bar graph showing jitter magnitude

Jitter display range

0 UI to 1.0 UI

Bandwidth

Jitter display follows selected eye pattern high pass filter select (10 Hz, 100 Hz, or 1 kHz)

Display location

Always displayed when eye pattern is selected, and always selects whatever input is being shown with the eye pattern.

Signal Strength Display

Display type

Four element bar graph; first two indicators are green representing the highest received signal strength, the next indicator yellow, the last red.

Display range

Third (yellow) indicator should first illuminate at 150 M ±10 M of Belden 8281 when driven with an 800 mV ±10 mV signal source.

Power Requirements

AC power source

90–264 VAC, 50/60 Hz, nominal

Power consumption

170 VA maximum

Mechanical

Dimensions

Height: 1.75" (4.45 cm)
Width: 19.00" (48.26 cm)
Depth: 20.00" (50.80 cm)

Weight

9.38 lb (4.26 kg)

Environmental

Operating temperature	0° to +50°C
Storage temperature	-40° to +65°C
Humidity	0 to 90% (non-condensing)
Altitude	▪ Operating: to 10,000 feet (3,050 meters) ▪ Non-operating: to 50,000 feet (15,240 meters)
Transportation	24" (9.5 cm) impact-drop survivable in original factory packaging

Standard Accessories

Standard accessories	▪ *VTM-330E Installation and Operation Handbook* ▪ Breakout connector for GPI/TALLY/LTC/CLOCK

Options

VTM-OPT 3	Four analog stereo inputs and four AES/EBU inputs
VTM-OPT 4	Four analog stereo inputs, four AES/EBU inputs, and monitoring of embedded audio
VTM-OPT 5	Four analog stereo inputs, four AES/EBU inputs, monitoring of embedded audio, and CineSound™ display
FC-300	Internal frame capture
RCU-330E	Remote control panel

Configurations

"L" version	No front panel controls
"R" version	Combines RCU-330E and "L" versions

Specifications are subject to change without notice.

For RCU-330E specifications, see Appendix D, "Remote Control Unit (RCU-330E)."

Appendix B ♦ Service Support

For service support, telephone our Customer Service Department at **610-327-2292**. If the problem cannot be resolved over the telephone and the instrument must be shipped to Videotek for service or repair:

1. Obtain a Return Authorization (RA) number.
2. Attach a tag to the unit with:
   - Your company name, address, and telephone number
   - The name of the contact person at your company
   - The RA number
   - The unit serial number
   - An explanation of the problem
3. To prevent shipping damage, repackage the unit in the same manner that it was received.
4. Ship the unit to:

   Videotek, Inc.
   243 Shoemaker Road
   Pottstown, PA 19464-6433
   Attn: Service Dept.

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Appendix C ♦ Pinouts

Figure C-1. ANALOG AUDIO IN/OUT 37-pin Male "D" Connector For Audio Options 3 and 4

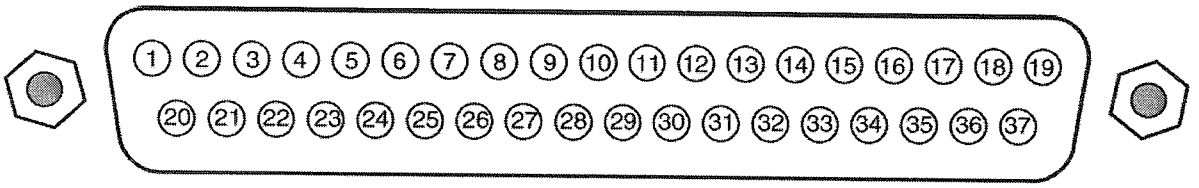


Figure C-2. Audio Breakout Board For Audio Options 3 and 4

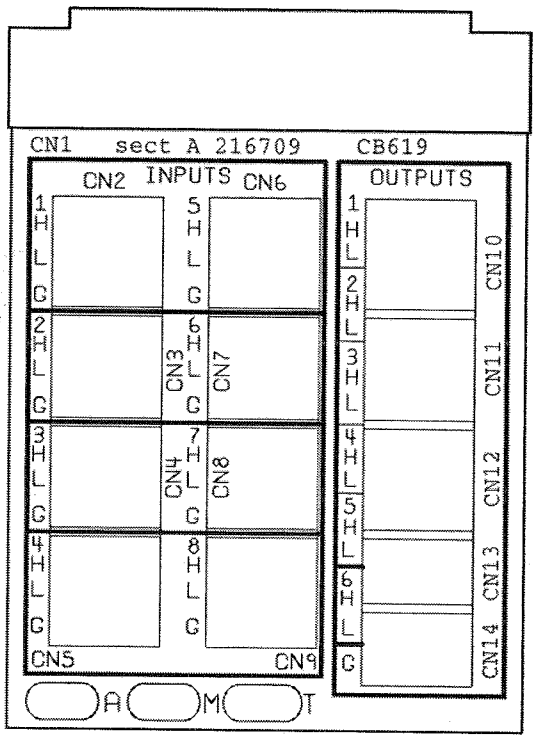


Table C-1. Pinouts for ANALOG AUDIO IN/OUT Connector and Audio Breakout Board

Pinout	Signal
1	Analog input 1 –
2	Analog input 2 –
3	Analog input 3 –
4	GND
5	Analog input 4 –
6	Analog input 5 –
7	Analog input 6 –
8	Analog input 7 –
9	Analog input 8 –
10	GND
11	Analog output 1 –
12	Analog output 2 –
13	GND
14	Analog output 3 –
15	Analog output 4 –
16	GND
17	Analog output 5 –
18	Analog output 6 –
19	GND

Pinout	Signal
20	Analog input 1 +
21	Analog input 2 +
22	Analog input 3 +
23	Analog input 4 +
24	Analog input 5 +
25	Analog input 6 +
26	GND
27	Analog input 7 +
28	Analog input 8 +
29	Analog output 1 +
30	Analog output 2 +
31	GND
32	Analog output 3 +
33	Analog output 4 +
34	GND
35	Analog output 5 +
36	Analog output 6 +
37	GND

Figure C-3. ANALOG AUDIO IN/OUT 37-pin Male "D" Connector For Audio Option 5

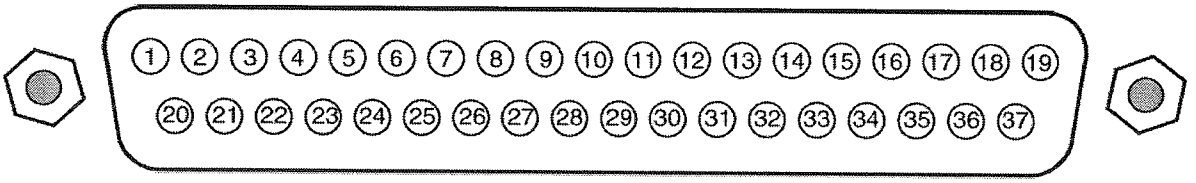


Figure C-4. Audio Breakout Board For Audio Option 5

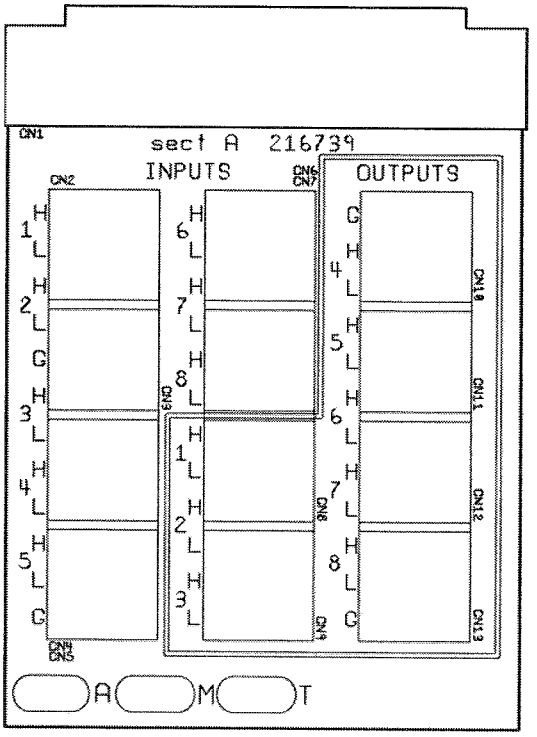


Table C-2. Pinouts for AUDIO OPTION 5 Connector and Audio Breakout Board

Pinout	Signal
1	Analog input 1 –
2	Analog input 2 –
3	Analog input 3 –
4	GND
5	Analog input 4 –
6	Analog input 5 –
7	Analog input 6 –
8	Analog input 7 –
9	Analog input 8 –
10	GND
11	Analog output 1 –
12	Analog output 2 –
13	Analog output 3 –
14	Analog output 4 –
15	Analog output 5 –
16	Analog output 6 –
17	Analog output 7 –
18	Analog output 8 –
19	GND

Pinout	Signal
20	Analog input 1 +
21	Analog input 2 +
22	Analog input 3 +
23	Analog input 4 +
24	Analog input 5 +
25	Analog input 6 +
26	GND
27	Analog input 7 +
28	Analog input 8 +
29	Analog output 1 +
30	Analog output 2 +
31	Analog output 3 +
32	Analog output 4 +
33	Analog output 5 +
34	Analog output 6 +
35	Analog output 7 +
36	Analog output 8 +
37	GND

Figure C-5. RS-232/422 COMM 9-pin Female "D" Connector

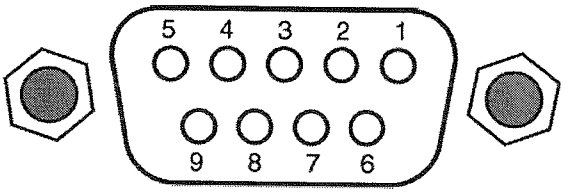


Table C-3. RS-232 COMM Connector Pinouts (for RS-232 and RS-422)

RS-232 Pinout	Signal
1	N.C.
2	TX
3	RX
4	N.C.
5	GND
6	N.C.
7	N.C.
8	N.C.
9	N.C.

RS-422 Pinout	Signal
1	N.C.
2	TX –
3	RX –
4	N.C.
5	GND
6	N.C.
7	TX +
8	RX +
9	N.C.

Figure C-6. REMOTE 9-pin Male "D" Connector

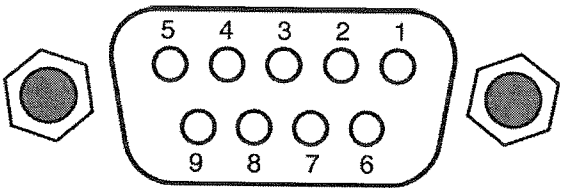


Table C-4. REMOTE Connector Pinouts

Pinout	Signal
1	N.C.
2	TX –
3	RX –
4	N.C.
5	GND

Pinout	Signal
6	N.C.
7	TX +
8	RX +
9	N.C.

Figure C-7. GPI/TALLY, LTC/CLOCK 26-pin Female "D" Connector

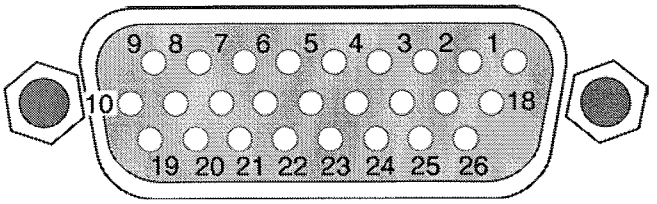


Figure C-8. GPI/TALLY, LTC/CLOCK Breakout Board

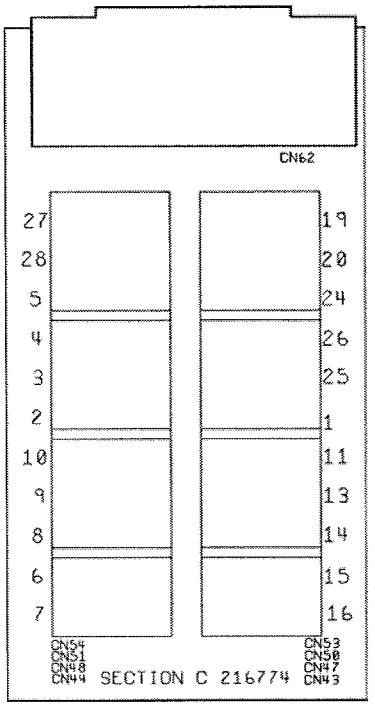


Table C-5. Pinouts for GPI/TALLY/LTC/CLOCK Connector and GPI/TALLY/LTC/CLOCK Breakout Board

Pinout	Signal
1	GND
2	GPI input #4 (Select input D in standard GPI set)
3	GPI input #3 (Select input C in standard GPI set)
4	GPI input #2 (Select input B in standard GPI set)
5	GPI input #1 (Select input A in standard GPI set)
6	GPI input #8 (~~Memory Sequence~~ in standard GPI set) ON AIR
7	GPI input #9 (VGA ~~Bypass~~ in standard GPI set) MEM. SEQUENCE
8	GPI input #7 (~~On Air~~ in standard GPI set) BYPASS
9	GPI input #6 (Transfer captured frame in standard GPI set)
10	GPI input #5 (Capture frame in standard GPI set)
11	GND
12	Reserved
13	GPI output #1

Pinout	Signal
14	Return for GPI #1
15	GPI output #2
16	Return for GPI #2
17	Reserved
18	Reserved
19	Clock high in
20	Clock low in
21	Reserved
22	Reserved
23	Reserved
24	LTC high in
25	LTC ground
26	LTC low in

Figure C-9. XVGA IN 15-pin Male "D" Connector

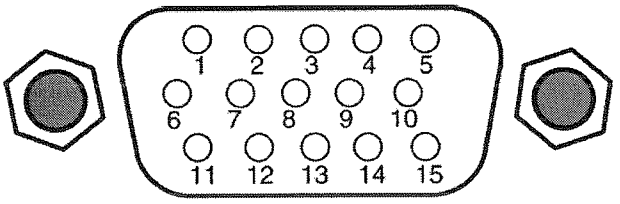


Table C-6. XVGA IN Connector Pinouts

Pinout	Signal
1	XVGA red input
2	XVGA green input
3	XVGA blue input
4	N.C.
5	GND
6	GND
7	GND
8	GND

Pinout	Signal
9	N.C.
10	GND
11	N.C.
12	SDA
13	XVGA horizontal sync input
14	XVGA vertical sync input
15	SCL

Figure C-10. XVGA OUT 15-pin Female "D" Connector

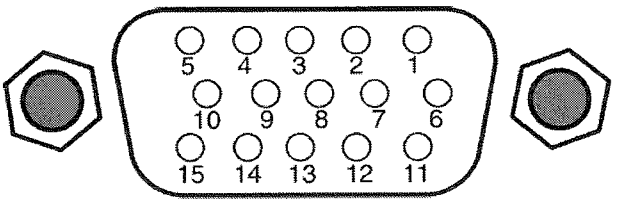


Table C-7. XVGA OUT Connector Pinouts

Pinout	Signal
1	XVGA red output
2	XVGA green output
3	XVGA blue output
4	N.C.
5	GND
6	GND
7	GND
8	GND

Pinout	Signal
9	N.C.
10	GND
11	N.C.
12	N.C./SDA
13	XVGA horizontal sync output
14	XVGA vertical sync output
15	N.C./SCL

Figure C-11. KEYBOARD 6-pin Female Connectors

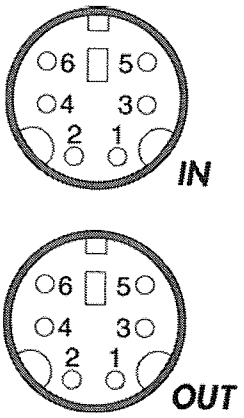


Table C-8. KEYBOARD Connector Pinouts

Pinout	Signal
1	Keyboard data
2	N.C.
3	GND
4	+5 V power source to keyboard
5	Keyboard Clock
6	N.C.

Pinout	Signal
1	Keyboard data
2	N.C.
3	GND
4	N.C.
5	Keyboard Clock
6	N.C.

Figure C-12. Ethernet Connector

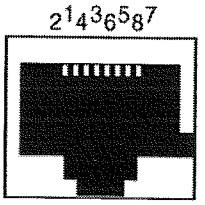


Table C-9. ETHERNET Connector Pinouts

1	TX+
2	TX-
3	RX+
4	NC

5	NC
6	RX-
7	NC
8	NC

Figure C-13. Router Control Connector

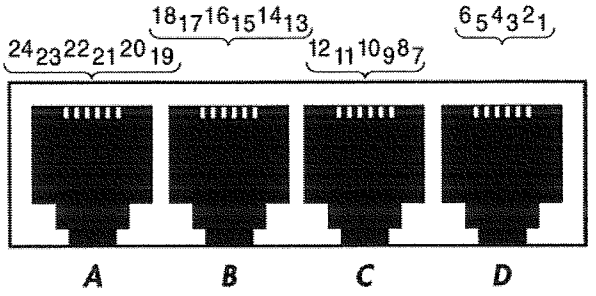


Table C-10. Router Control Connector Pinouts

1	OPEN
2	OPEN
3	RX
4	TX
5	OPEN
6	OPEN
7	OPEN
8	OPEN
9	RX
10	TX
11	OPEN
12	OPEN
13	OPEN

14	OPEN
15	RX
16	TX
17	OPEN
18	OPEN
19	OPEN
20	OPEN
21	RX
22	TX
23	OPEN
24	OPEN

Appendix D ♦ Remote Control Unit (RCU-330E)

The RCU-330E remote control unit enables remote control of as many as 30 VTM-330E units.

Installing the RCU-330E

Figure D-1. RCU-330E Back Panel Connectors

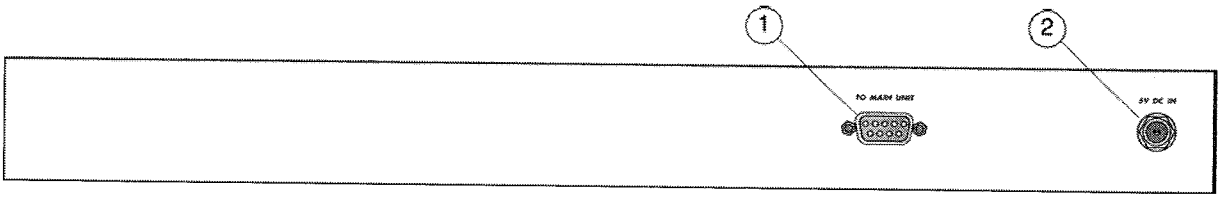


Table D-1. Description of RCU-330E Back Panel Connectors

Key	Label	Description
1	TO MAIN UNIT	9-pin, D-sub, male connector connects to the REMOTE connector on the VTM-330E to provide RS-422 communication; the communication parameters are 8 data bits, no parity, with the baud rate fixed at 38,400 bps.
2	5V DC IN	Connects to the DC power plug on the RCU-330E DC power supply; a knurled ring enables the power plug to be secured to the jack after the plug is fully inserted. This connection must be made before AC power is supplied.

To install the RCU-330E:

1. Connect the DC power supply to the 5V DC IN connector.
2. Connect the power cord to a properly grounded AC outlet. The INPUT LEDs should flash in alternate pairs (A+D and B+C); if they do not, check steps 1 and 2.
3. If multiple VTM-330E units are being connected, ensure each has a unique unit ID (from 1-32) *before connecting them to the RS-422 bus:*
   - If a VTM-330E does not have a unique unit ID, change it on the I/O AND COMMUNICATIONS submenu.
   - If a VTM-330EL does not have a unique ID:
     - Physically connect the RCU-330E directly to one VTM-330EL at a time.
     - To select the VTM-330E to be controlled by the RCU-330E, on the RCU-330E simultaneously press SETUP/LEARN and LINE SELECT (this VTM-330E selection mode is restricted to the RCU-330E). While in the selection mode, the LINE SELECT ODD and EVEN LEDs alternately flash.
     - Rotate the LINE SELECT knob to select the unit.

- Simultaneously press SETUP/LEARN and LINE SELECT to end the selection process. When communication is established between RCU-330E and the VTM-330E, the RCU-330E INPUT LEDs will stop flashing in alternate pairs. The RCU-330E LEDs now reflect the settings of the VTM-330E and RCU-330E front-panel operations affect the VTM-330E. To indicate connection to the RCU-330E, the selected VTM-330E changes the background for the UNIT ID on the XVGA display from red to green (see **Figure 3-1** and **Table 3-1**).
- The RCU-330E polls the selected base unit every 100 ms. If the VTM-330E fails to receive the poll, it assumes that there is a communication break.
  A communication break is indicated by changing the background for the UNIT ID on the XVGA display from green to red and alternately flashing the A+D and B+C INPUT LEDs on the RCU-330E. When communication is re-established, the INPUT LEDs stop flashing.

4. If multiple VTM-330ELs are configured, the RCU-330E must be at one end of the RS-422 bus. The last VTM-330E must be terminated at the other end by using a jumper, as shown in Section 2 by **Figure 2-1** for the VTM-330E.

Operating the RCU-330E

Operating the RCU-330E is the same as operating a VTM-330E with one exception: selecting a VTM-330E with which to communicate.

To select a VTM-330E:

1. Press SETUP/LEARN and LINE SELECT simultaneously to enable the selection mode.
2. Rotate the LINE SELECT knob to select the unit ID. Each subsequent rotation moves up (or down) to the next higher (or lower) VTM-330E connected to the communication line.
3. Press SETUP/LEARN and LINE SELECT simultaneously to end the selection process.

Troubleshooting

Table D-2. RCU-330E: Problems, Causes, and Solutions

Problem/Symptom	Possible Cause	Solution or Explanation
No LEDs are illuminated.	DC power supply cable is not properly connected to back panel 5V DC IN connector.	Properly connect the DC power supply.
	DC power supply has no AC power applied.	Apply AC power.
INPUT LEDs flash in alternate pairs (e.g., A+D and B+C); no other LEDs are illuminated.	Cable from VTM-330E to RCU-330E defective or not properly connected.	Check the cable and the connection.
	VTM-330E not powered up.	Apply power to the VTM-330E.
	VTM-330E not selected.	Select a VTM-330E.

If the problem still exists after troubleshooting the RCU-330E, see Appendix B, "Service Support," for further instructions.

Specifications

Power Requirements (External Power Supply)

AC power source 115–230 VAC, 50/60 Hz nominal

Power consumption 30 VA maximum

DC output 5 V

Mechanical

Dimensions

Height: 1.75" (4.45 cm)
Width: 19.00" (48.26 cm)
Depth: 2.3" (5.85 cm)

Weight 3.64 lb (1.65 kg)

Environmental

Operating temperature 0° to +50°C

Storage temperature -40° to +65°C

Humidity 0 to 90% (non-condensing)

Altitude
Operating: to 10,000 feet (3,050 meters)
Non-operating: to 50,000 feet (15,240 meters)

Transportation 24" (9.5 cm) impact-drop survivable in original factory packaging

Standard Accessories

Standard accessories

- DC power supply (115–230 VAC, 50–60 Hz capability) with detachable AC power cord
- 25' RCU-330E/VTM-330E interface cable

Specifications are subject to change without notice.

Pinouts

Figure D-2. RCU-330E TO MAIN UNIT 9-pin Male "D" Connector

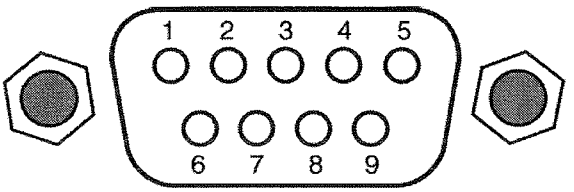


Table D-3. Pinouts for RCU-330E TO MAIN UNIT Connector

Pinout	Signal
1	N.C.
2	RX-
3	TX-
4	N.C.
5	GND

Pinout	Signal
6	N.C.
7	RX+
8	TX+
9	N.C.

Appendix E ♦ Option 5 Field Upgrade Instructions

Special Menu Selections

Option 5 for the VTM-330E provides the following features:

1. Analog, AES/EBU, and embedded inputs
2. Two, four, six, or eight simultaneous channels displayed on the screen
3. Lissajous pattern displayed with two or four channels
4. Unique CineSound display for 5.1 and 7.1 surround sound channels
5. Simultaneously view eight channels with phase indications
6. Output up to eight analog channels for monitoring regardless of input format

Two steps are required to upgrade a VTM-300 series instrument for Option 5:

1. Flash-update the VTM-330E firmware using the CD provided.
2. Remove any installed Option 3 or Option 4 circuit board, and then install the Option 5 circuit board.

The following menu selections that appear in **bold** are unique to Option 5. Use this menu information in conjunction with the *VTM-330E Installation and Operation Handbook* to make specific setup selections for a specific application.

AUDIO SETUP

CONFIGURE INPUT A

. 1 STEREO / LISSAJOUS

. 2 STEREO / LISSAJOUS

. 6 CHANNELS

. **8 CHANNELS**

. **DISPLAY TYPE**

. **VERTICAL**

. **CINESOUND**

.

LFE OFFSET

O (NONE)

-10 dB

CINESOUND DIRECTION

OUTWARD

INWARD

LFE OFFSET can be used to shift the markings of the LFE scale by 10 dB if the LFE channel has a -10 dB prerecorded offset.

CINESOUND DIRECTION can be used to reverse the direction of meter movement for the Left, Right, Center, Left Surround, and Right Surround channels. This is a customer preference selection and does not affect the meter performance or calibration.

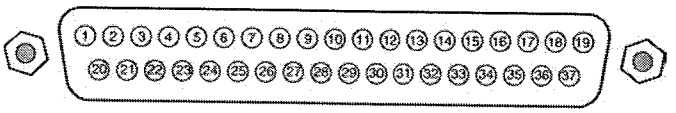
Input channels are aligned to follow the SMPTE 320M standard. Refer to **Table E-1** for input-display assignments.

Table E-1. VTM-330E Option 5 Audio Input Mapping

Analog Input	AES/EBU Input	CineSound Display Assignment	8-Bar Display Assignment
1	1	Left	1 Left
2	1	Right	1 Right
3	2	Center	2 Left
4	2	LFE	2 Right
5	3	Left Surround	3 Left
6	3	Right Surround	3 Right
7	4	Left Aux	4 Left
8	4	Right Aux	4 Right

The 37-pin ANALOG AUDIO IN/OUT connector on the back panel and its associated pin breakout are shown on the next page in **Figure E-1**.

Figure E-1. ANALOG AUDIO IN/OUT 37-pin Male "D" Connector



Pin	Description	Pin	Description
1	Analog input 1–	20	Analog input 1+
2	Analog input 2–	21	Analog input 2+
3	Analog input 3–	22	Analog input 3+
4	GND	23	Analog input 4+
5	Analog input 4–	24	Analog input 5+
6	Analog input 5–	25	Analog input 6+
7	Analog input 6–	26	GND
8	Analog input 7–	27	Analog input 7+
9	Analog input 8–	28	Analog input 8+
10	GND	29	Analog output 1+
11	Analog output 1–	30	Analog output 2+
12	Analog output 2–	31	Analog output 3+
13	Analog output 3–	32	Analog output 4+
14	Analog output 4–	33	Analog output 5+
15	Analog output 5–	34	Analog output 6+
16	Analog output 6–	35	Analog output 7+
17	Analog output 7–	36	Analog output 8+
18	Analog output 8–	37	GND
19	GND		

Updating the VTM-330E Using VFlash

VFlash is a utility program required to download firmware updates into the VTM-330E. Located on the SpyderWeb CD is a folder titled VFlash. A VTM-330E will not operate correctly with SpyderWeb without a compatible firmware version. To perform an update:

1. Locate and open the VFlash folder on the CD.
2. Double-click the SETUP.EXE file and follow the instructions to install VFlash.
3. When installation is complete, double click on the VFlash icon to open the program.
4. Connect a standard RS-232 serial cable from the PC to the RS-232 port on the VTM-330E.
5. Use the SETUP menu on the VTM-330E to access the I/O COMMUNICATIONS BAUD RATE menu and set the baud rate to 115200.
6. Exit SETUP mode.
7. Click on BROWSE and select the **.flu** file from the VTM330E folder on the SpyderWeb CD. Once selected it will take a few seconds to appear in the update window.
8. Click on UPDATE. Notice that the UNIT ID box in the middle of the VTM-330E display changes from red to green, indicating that VFlash has connected to the unit.

   NOTE: Do not disturb the flash update once it begins.

A status bar will also indicate the progress of the update. The update can take as many as 10 minutes to complete. To complete the update a cold start must be performed (refer to **Cold Starting the VTM-330E** on page 4-1).

Appendix F ♦ Glossary

601 An international standard (ITU-R BT.601) for component digital television. It defines the sampling systems, matrix values, and filter characteristics for digital television.

8 VSB Vestigial sideband modulation with 8 discrete amplitude levels.

16 VSB Vestigial sideband modulation with 16 discrete amplitude levels.

Advanced Television Systems Committee (ATSC) The parent organization that developed, tested and described the form and function of the US digital television formats.

AES/EBU A digital audio standard established jointly by the Audio Engineering Society (AES) and the European Broadcasting Union (EBU).

Artifacts Unwanted visible effects in the picture created by disturbances in the transmission or image processing, such as edge crawl or 'hanging dots' in analog pictures or 'pixelation' in digital pictures.

Aspect Ratio The ratio of horizontal to vertical dimensions. A square has an aspect of 1:1 since the horizontal and vertical measurements are always equal. Current television screen aspect ratios are 4:3 and 16:9.

Asynchronous Serial Interface (ASI) A transmission method adopted by the DVB, and called DVB-ASI. The transmission method allows for the transport of varying data payloads in a constant data stream. The DVB-ASI transport stream rate is 270 Mb/s.

Audio Breakaway Routing video and accompanying audio in separate signal paths.

Audio-Follow Routing video and accompanying audio together in the same signal path.

Auto Trans Automatic transition. The execution of a single wipe or fade from current picture to another picture by way of an automatic device.

Bandwidth The range of frequencies used to transmit information such as picture and sound.

Baseband Video An unmodulated video signal.

Black Also color black, blackburst. A composite color video signal that has the composite sync, reference burst, and a black video signal.

Blanking Processor A circuit which removes sync, burst and blanking from the program video and then replaces it with sync, burst and blanking from the reference input. The process ensures constant sync and burst levels on program video.

Border An electronically-generated picture member which is used in wipes to separate the two video sources used in the wipe. It is of even thickness and has color produced by the matte generator.

Broadcast Legal Encoding video signal parameters to conform to prescribed limits for broadcast. Encoding rules vary by NTSC, PAL, country and broadcast facility.

BTSC Broadcast Television Standards Committee. A US standard for stereo audio encoding in NTSC broadcast television.

CAV Component Analog Video

CES Consecutive Errored Samples

Composite Video A single video signal that includes all color video and timing information. A composite signal includes luminance, chrominance, blanking pulses, sync pulses and color burst information.

Chrominance The color portion of a video signal that represents the saturation and hue. Black, gray and white have no chrominance; color signals have both chrominance and luminance.

CH Chroma

Chrominance/Luminance Delay (C/L Delay) A measurement that indicates the amount to which chrominance and luminance are aligned with respect to each other. A low C/L delay figure can minimize the effects of ghosts or color offset on the received picture.

Clipping The electronic process of shearing off the peaks of either the white or black excursions of a video signal for limiting purposes. Clipping is often performed prior to modulation to limit the signal.

CMRR Common Mode Rejection Ratio

Color Burst The portion of a color video signal which contains a short sample of the color subcarrier. It is used as a color synchronization signal to establish a reference for the color information following it and is used by a color monitor to decode the color portion of a video signal. The color burst acts as both amplitude and phase reference for color hue and intensity. The color oscillator of a color television receiver is phase locked to the color burst.

Composite Sync A signal consisting of horizontal sync pulses, vertical sync pulses and equalizing pulses only.

CRC Cyclical Redundancy Check

Crosspoint An electronic switch, usually controlled by a button on the panel. Control logic will allow for only one crosspoint, for each bus, to be switched "ON" on at a time.

D/A Conversion of digital to analog signals.

DA Distribution Amplifier

Data Element An item of data as represented before encoding and after decoding.

Decoded Stream The decoded reconstruction of a compressed bit stream.

Decibel (dB) A logarithmic measure of the ratio between two powers, voltages, currents, sound intensities, etc. Signal-to-noise ratios are expressed in decibels.

Default A factory preset value or condition.

Demodulator A receiver, such as for television broadcast, cable, and closed circuit applications. A TV demodulator receives and processes off-air or cable RF signals and provides baseband video and audio outputs.

DHCP Dynamic Host Configuration Protocol

Differential Gain A measurement that specifies how much the chrominance gain is affected by the luminance level. Expressed as a percentage showing the largest amplitude change between any two levels, it indicates how much color saturation variance occurs when the luminance level changes.

Differential Phase A peak-to-peak measurement that specifies the extent to which the chrominance phase is affected by the luminance level. Expressed in degrees of subcarrier phase, it indicates how much hue shift occurs with luminance level changes.

Digital Video Broadcasting (DVB) A specific project office of the European Broadcast Union. This group has produced a set of digital broadcasting standards.

DSK Down Stream Key, a keyer which is electronically located after (or down stream from) all other functions of a switcher. The key resulting will appear to be on top of all other pictures from the switcher.

D-VITC Digital Vertical Interval Time Code. Timecode information stored on specific lines in the vertical blanking interval of a television signal.

EAV End of Active Video in component digital systems.

EBU European Broadcasting Union

Editor A device or system which controls video tape recorders, video switchers, and other related devices in order to electronically splice segments of recorded video into a finished production.

EDH Error Detection and Handling. A recommended practice defined in SMPTE RP 165. A system to generate and then detect video data errors in serial digital video systems.

Effects Keyer A keyer which is electronically located in the mix/wipe generator portion of a switcher. The resulting key would appear under the down stream key.

EIA Rack Space or Unit A specific size as designated by the Electronics Industry Association. The rack unit is 19 inches wide, and is 1.75 inches tall. A device which requires 3 EIA rack units is 19 inches wide and 5.25 inches (3x1.75 = 5.25) tall.

Elementary Stream (ES) A generic term for one of the coded video, audio or other variable length bit streams which are packetized to form MPEG-2 transport streams. Consists of compressed data from a single source (audio, video, data, etc.). One elementary stream is carried in a sequence of PES packets with one and only one stream ID.

Embedded Audio Digital audio information multiplexed onto a serial digital data stream. Up to sixteen channels can be multiplexed on a single stream of 601 video, minimizing cabling and routing requirement.

ENG Electronic News Gathering

Encoded Clip Softness In the encoded legalization process, "softness," as applied to encoded clips, refers to the processing of the video at the point of the clip. The clips are applied in YC_BC_R color space. The clip point is either an immediate limit (no softness) or will have a range of values leading to the clip point, all reduced to smooth the clip point to a less immediate limit (softness).

Encoded Legalization Limiting of the luminance and color difference signals such that, once encoded into a composite video signal, the resultant encoded video does not violate the maximum or minimum signal levels as defined by the specific encoding rules. NTSC and PAL video plus various users of these types of video have many varied rules for maximum and minimum encoding limits. Encoded legalization usually calculates first the encoded luminance value and then the corresponding chroma value to make legalization judgements.

Encoded Video A combined single video signal that is constructed from either separate RGB or luminance and two color difference video signals. NTSC, PAL, and SECAM are all examples of encoded video.

Envelope Detection An RF signal detection technique that does not respond to phase variations in the carrier signal, enabling measurement of a transmitter's incidental phase. When used together with synchronous detection, envelope detection helps isolate either video and/or RF as the causes of phase distortion.

External Key Input This is an alternate source for key cut. This is usually a separate external input to a switcher

Fade-thru-Black A production technique which is a two step process. The first step will fade the program video to black. The second step will fade from black to the video selected on the preview bus. This is usually used in major scene transitions.

Fade-to-Black A production technique which simply fades the program video to black and program audio to silent. This is used to end programs and to escape from embarrassing pictures or sounds.

Field A picture or picture portion which is produced within one cycle of vertical synchronization. In interlaced systems, a full picture or frame requires two consecutive fields.

FM Trap A circuit designed to minimize potential interference from strong FM signals in receiving equipment, such as a TV demodulator. For example, an FM trap can attenuate signals between 88-108 MHz to reduce interference on NTSC television channel 6.

Frame A single full resolution picture as viewed in either a video or film system. In the case of interlaced video, two consecutive fields provide all of the information of one frame. In non-interlaced systems, one cycle of vertical synchronization produces a frame. A 60 Hz interlaced system, produces 30 frames of video in one second. A 60 Hz progressive (or non-interlaced) system, produces 60 frames of video in one second. Common frame rates are 24 (film) 25, 29.97, 30, 50, 59.94 and 60.

Frame Synchronizer An electronic device that synchronizes two or more video signals. Using one input as a reference, it locks a second signal to the reference.

Frame Store An electronic method of capturing and storing a single frame of video.

Gamma This term applies to the linearity of the change from black to white. Gamma controls adjust the gray or 50% point of the video either up or down, with the effect of changing the gray level of the video.

Gamut The whole or total of whatever is being addressed. In color space, gamut refers to all colors which are included in a particularly defined color group, such as 601 gamut.

Genlock (Generator Lock) A method of synchronization involving the generation of a video signal that is time and phase locked with another signal.

GPI General Purpose Interface

Headend In a cable TV system, the facilities where program sources (satellite, terrestrial, VTR, local) are received and remodulated for distribution through a cable plant.

High Definition Television (HDTV) High definition television has a resolution of approximately twice that of conventional television in both the horizontal (H) and vertical (V) dimensions and a picture aspect ratio (H to V) of 16:9.

High Level A range of allowed picture parameters defined by the MPEG-2 video coding specification which corresponds to high definition television.

HRC Harmonically-Related Carrier

Hue Color tint

ICPM Incidental Carrier Phase Modulation. A measurement of picture carrier phase distortion (affected by the video signal level) that occurs in the transmitter.

IP Internet Protocol

IRC Incrementally-Related Carrier

I.R.E. Refers to the Institute of Radio Engineers, and is used as a unit of measurement. In NTSC television, 1 volt of signal equals 140 IRE units.

ISP Internet Service Provider

Jitter A deformation of a signal affected by poor synchronization.

Key An effect in television where a selected portion of background video is removed and replaced with another video.

Key Cut In a key effect, this is the video which designates the portion of background video which is removed.

Key Fill In a key effect, this is the video which is used to replace the portion of background video which was removed. This may be the same video as the Key Cut video.

Key Invert In a key effect, this is an electronic action which reverses the polarity of the key cut signal. It makes black appear as white, and white appear as black.

Key Mask In a key effect, it uses a wipe pattern from the wipe pattern generator to restrict the key cut from removing video in a portion of the screen. This requires the use of the wipe pattern generator and the Mask/Preset Size controls.

Key Source Another term which is the same as key cut.

Legalization The modification of serial digital video to conform to analog color space rules, as required by users.

LCD Liquid Crystal Display

LED Light-Emitting Diode

LFE Low Frequency Effects

Lissajous A display of the amplitude and phase relationships between two input signals.

LS Left Surround

LTC Longitudinal Time Code, A SMPTE timecode standard usually recorded onto the linear audio track of a VTR.

Luminance The degree of brightness (black and white portion of the video signal) at any given point in the video image. A video signal is comprised of luminance, chrominance and sync. If luminance is high, the picture is bright and if low the picture is dark. Changing the chrominance does not affect the brightness of the picture.

Main Level A range of allowed picture parameters defined by the MPEG-2 video coding specification with maximum resolution equivalent to standard definition television.

Main Profile A subset of the syntax of the MPEG-2 video coding specification that is supported over a large range of applications. Applications include, MP@HL (Main profile at high level) and MP@ML (Main profile at main level).

Mask/Preset Size Uses the wipe pattern generator in the keyer portion of the effects generator. This is used to adjust the size of a preset pattern or for adjusting the size of a mask to block a portion of the key cut (source) from use in the keyer.

Matte Generator An internal generator which can make any color, is used for border color and may be used for key fill. It is identical to the Color Background Generator, but simply used in other areas of the switcher.

Mbps Megabits Per Second

mV Millivolts

M/E Mix/Effects System

MP@HL Main profile at high level

MP@ML Main profile at main level

MPEG Refers to standards developed by the ISO/IEC JTC1/SC29 WG11, Moving Picture Experts Group.

MPEG-2 Refers to ISO/IEC standards 13818-1 (Systems), 13818-2 (Video), 13818-3 (Audio), and 13818-4 (Compliance).

Multi-Level Effects Applies to any effects generator which can do more than one effect at a time. Typically, a multi level switcher can produce a Key and a Background transition in the same effects generator at one time.

NTSC National Television Systems Committee, the color television system used in the United States, Canada, Mexico and Japan.

NVRAM Nonvolatile RAM

Packet Identifier (PID) A unique integer value used to associate elementary streams of a program in a single or multi-program transport stream.

Packet A packet consists of a header followed by a number of contiguous bytes from an elementary data stream. It is a layer in the system coding syntax.

Packetized Elementary Stream (PES) The data structure used to carry elementary stream data. The packets consist of a header followed by payload data, and a stream is a series of packets which form an elementary stream and have a single stream identification.

PAL Phase Alternation Line; the standard color television system in many European and other countries.

Passive Looping Video and audio signals routed through components, even if power is removed. Signals are not amplified or processed, maintaining transparency.

Pedestal Level An offset used in a video system to separate the active video from the blanking level by maintaining the black level above the blanking level by a small amount.

Pixel A Picture cell or Picture element representing one sample of picture information, such as an individual sample of R, G, B, luminance or chrominance.

Preset Refers to establishing any condition prior to use on the Program output. This term is used in reference to wipe patterns and is often interchanged with Preview.

Preview The video output channel used to view the intended Program results prior to the execution of the next transition.

PRO Audio A transmitted audio channel for talent cueing via Interrupt Foldback (IFB) to ENG vans and remote applications. Some demodulators support PRO audio monitoring.

Program A transport stream combination of a video stream and one or more audio and data streams associated with that video stream. In analog terms, "Program" refers to the Base Band video and audio produced by the final output of a switcher.

Program Association Table (PAT) A list of all programs that are in the ATSC data stream.

Program Map Table (PMT) A listing of all elementary streams that comprise a complete (television) program.

Program Clock Reference (PCR) This is a time reference signal that is placed in MPEG streams for the purpose of time coordinating various data streams.

Program and System Information Protocol (PSIP) Information sent out as part of an ATSC transport stream which lists all of the video, audio, data and program information contained in the stream. This is the "TV guide" for a given stream.

Progressive Scanning Also non-interlaced. A system of video scanning where lines of a picture are transmitted consecutively, such as with VGA monitor displays.

Push-push Toggle Switch An electro-mechanical device which, when pushed, alternates the condition of the switch. Push once, it's off, push again, it's on.

Quadrature Output An output in a television demodulator used for measuring Incidental Carrier Phase Modulation (ICPM) in a transmitter.

QPSK Quadrature Phase Shift Keying, typically used by satellite downlinks.

QAM Quadrature Amplitude Modulation, the technique used by cable TV systems (64-QAM and 256-QAM) to remodulate signals for distribution in a cable plant.

RGB Legalization Limiting of luminance and color difference video signals such that, once transcoded into RGB component video signals, the resultant video does not violate the maximum or minimum signal levels as defined by component video level rules. Typically, the maximum value for R, G, or B is 700 mV, and the absolute minimum value for any of these signals is 0 mV.

Reclocking The process of regenerating digital data with a clock recovered from the input data.

Resolution A measure of the finest detail that can be seen, or resolved, in a reproduced image.

RS Right Surround

RS-422 Recommended Standard number 422, an E.I.A. standard which describes a type of data interchange. Television products use this standard as its communication format between the electronics frame and editors, control panel and computers. An RS-422 line may be extended up to 1,000 feet (304m).

Sampling Process by which an analog signal is sampled to convert the analog signal to digital.

SAP Secondary Audio Program, used in television broadcast for second language broadcasting, simulcasting, and separate audio programming.

Saturation Color intensity

SAW Filter Surface Acoustic Wave filter

Segment Error Rate (SER) A calculated average of uncorrected transport stream packets vs. total packets as accumulated over a designated period of time.

Signal to Noise Ratio -Analog (SNR) A measurement of the noise level in a signal expressed in dB (decibels) as a ratio of between the audio or video signal's maximum peak-to-peak signal voltage and the measured voltage of noise present when the signal is removed. Higher SNR figures indicate that any noise introduced by system components will not be perceived in the picture and sound output signals.

Signal to Noise Ratio-8VSB (SNR) As applies to 8VSB transmissions, this is a calculated average power of the ideal signal divided by the actual demodulated signal power.

SMPTE Society of Motion Picture and Television Engineers

Standard Definition Television (SDTV) This term is used to signify a digital television system in which the quality is approximately equivalent to that of NTSC. This equivalent quality may be achieved from pictures originated at the 4:2:2 level of ITU-R BT.601 and subjected to processing as part of the bit rate compression. The results should be such that when judged across a representative sample of program material, subjective equivalence with NTSC is achieved. The displayed picture may be either the traditional 4:3 or the wide-screen 16:9 aspect ratio.

STL Studio Transmitter Link

Synchronous Detection A common detection technique used in television demodulators that removes quadrature distortion, enabling comparison of transmitter output with video input signal.

S-Video Also Y/C. Transmits luminance and color portions separately via multiple wires, thus avoiding the color encoding process and resulting loss of picture quality.

Tally A system used to light lamps and indicate usage. Most production switchers have an internal tally system to indicate selected functions, and which selected functions are currently involved with Program.

TCP Transmission Control Protocol

Telecine A device used to convert film to video; movie film is digitally sampled and converted to video frame by frame in real-time.

TCXO Temperature Compensated Crystal Oscillator

THD Total Harmonic Distortion

Transport Stream-ATSC (TS) Consists of the following: (1) Packets: 188 bytes - fixed length with descriptive data, (2) Carries several programs, (3) has a PID which identifies the type of TS packet (video, audio, other), and (4) carries descriptive information about the program.

UHF Ultra High Frequency

Unity Gain An electronic term indicating that a signal will be neither amplified or attenuated. One volt of signal level in results in one volt of signal level out.

Vector A measure that has two individual properties: magnitude and direction.

Vector Clip A special encoded clip version that limits only the C_B and C_R input video signals and does not affect (nor is it affected by) the luminance component. This color-only clip limits the maximum vector excursions as viewed in an encoded state and is intended for users who wish to prevent encoded vectors from ever exceeding the perimeter circle of an encoded vector display.

VHF Very High Frequency

VITC Vertical Interval Time Code, a method for recording on to video tape the timecode address for each video frame inserted in the vertical interval.

Waveform A visual representation of a signal in the shape of a wave that plots amplitude versus time.

White Level The brightest part of a video signal, corresponding to approximately 1.0 Volt.

White Balance An electronic process used to calibrate the picture for accurate color display in different lighting conditions.

Wipe A special effect in which two pictures from different video sources are displayed on one screen. Production switchers and special effects generators provide numerous wipe patterns varying from simple horizontal and vertical wipes to multi-shaped, multi-colored arrangements.

XGA High resolution 1024x768 non-interlaced (progressive) display monitor

XVGA Extended Video Graphics Adapter

YP_BP_R: CAV format composed of luminance (Y) and two color difference signals (P_B and P_R)

Y/C Also S-video. Describes the separation of video signal luminance and chrominance components.

Zero Carrier Pulse (chopper) In a TV demodulator, removes the carrier in the vertical interval for a short period, enabling depth of field measurement.

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VIDEOTEK™
A Zero Defects Company

Addendum to Operator's Handbook
Rev. – 10/01

Date : December 19, 2001

Model : VTM-330E

Serial No. Affected : -

Subject : New Feature- PRESET LOCKOUT

Section of Operator's Handbook : Operation

Symptom : New software containing Preset Lockout is incorporated into the hardware.

Solution : Refer to attached

VTM-330E Preset Lockout

When the VTM-330E activates the Panel Lockout, the entire front panel of the unit cannot alter any internal information until the proper password is entered. Within the Panel Lockout Menu is a Preset Lockout feature. The Preset Lockout will disallow a user to store information into a certain number of presets. The Preset lockout can affect one to all of the presets. Similar to the Panel Lockout feature, the Preset Lockout is also password protected. When a user locks a preset configuration into the VTM-330E, it will not be able to be altered until the password is entered. To use the Preset Lockout feature:

1. Press SETUP/LEARN to display the SETUP MENU.
2. Rotate the WAVEFORM POSITION-H Knob (H Knob) to move the cursor to the I/O AND COMMUNICATION MENU.
3. Press the H Knob.
4. Rotate the H knob to move the cursor to the PANEL LOCKOUT feature.
5. Press the H Knob.
6. Rotate the H knob to move the cursor to the PRESET LOCKOUT feature.
7. Press the H knob.
8. Rotate the V knob to move the cursor to select 00-09 (first digit in password).
9. Rotate the H knob to select the second password number.
10. Rotate the V knob to move the cursor to select 00-09 (second digit in password).
11. Rotate the H knob to select the third password number.
12. Rotate the V knob to move the cursor to select 00-09 (third digit in password). When all the digits are correct, UNLOCK will appear.
13. Rotate the H knob to move the cursor to select UNLOCK.
14. Press the H knob.
15. Rotate the H knob to move the cursor to select the Preset.
16. Press the H knob to toggle between Lock and Unlock on the highlighted Preset.
17. After the settings are complete press the V knob five times to exit.

Table 3-16 I/O AND COMMUNICATIONS MENU (changed from page 3-39)

PANEL LOCKOUT	**PRESET LOCKOUT**	00-09 (first password number)	-
		00-09 (second password number)	-
		00-09 (third password number)	-
		UNLOCK	PRESET 1 (LOCK/UNLOCK)
			PRESET 2 (LOCK/UNLOCK)
			PRESET 3 (LOCK/UNLOCK)
			PRESET 4 (LOCK/UNLOCK)
			PRESET 5 (LOCK/UNLOCK)
			PRESET 6 (LOCK/UNLOCK)
			PRESET 7 (LOCK/UNLOCK)
			PRESET 8 (LOCK/UNLOCK)
	LOCK PANEL	-	-
	CHANGE PASSWORD	00-09 (first number of new password)	-
		00-09 (second number of new password)	-
		00-09 (third number of new password)	-
		ACCEPT	-