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Video Tester (VT-1)

PN: 45-111-000-D

- Includes: 1 (one) 78099 - 75 Ohm Terminator
- 1 (one) 99990 - 9V Battery
- 1 (one) 99922 - 18" Jumper Cable

ProSeries Products

All VAC products are assembled in Boulder, CO, USA

Video Accessory Corporation

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Two Year Limited Warranty

All Video Accessory Corporation (VAC) products have a full two year limited warranty. Exclusions to the warranty include but are not limited to damage to external components, power LED failure where the product continues to function, and electrical damage due to lightning. The warranty shall be void if any alteration or repair of a VAC product is attempted by anyone not authorized by VAC.

This warranty is expressly in lieu of all other warranties express or implied, including warranties of merchantability and fitness for use, and of all other obligations or liabilities on the part of VAC, and it neither assumes nor authorizes any other person to assume for it any liability in connection with the sale of this product.

This warranty shall not apply to the product or any part thereof subjected to accident, negligence, alteration, abuse, or misuse. No warranty whatsoever is made with respect to accessories or parts supplied by anyone other than VAC, and this warranty shall extend only to the original purchaser of this product.

The warranty provided in this article is exclusive and in lieu of, and buyer hereby waives, all other remedies, express or implied, arising by law or otherwise, including consequential damages, whether or not occasioned by negligence of VAC.

This warranty shall not be extended, altered or varied except by written instrument signed by VAC and buyer, and shall only apply within the boundaries of the continental United States. Liability of VAC is limited to repair or replacement at the option of VAC.

Warranty work is to be sent to VAC. Freight charges will be the responsibility of the purchaser.

Product Overview:

The VT-1 Video Tester is an accurate, low-cost, and easy-to-use tester for measuring composite video gain and equalization levels.

The VT-1 provides a visual display that allows the user to determine gain and equalization (EQ) levels at a glance. It automatically detects and measures NTSC (RS-170A) and PAL signal formats.

The compact tester measures 4.5" (L) x 3.25" (W) x 1.5" (D), and will operate for approximately 8 hours of continuous use on a single 9V alkaline battery.

Operation:

Prior to using the VT-1, either install a 9V battery, or connect to an external 9-24V AC/DC source. **If using an external grounded AC or DC source, the barrel of the P5 connector must be connected to ground.** (See Power Connectors under Specifications)

To make measurements using the VT-1:

1. Place the tester in-line with the signal to be checked -OR- attach the video cable to one BNC connector and place a 75 Ohm terminator on the second BNC connector. Either BNC connector on the VT-1 may be used as the input or the output connection. (See **Figure 1** for additional information on where to locate the tester in the video system.)
2. Turn the tester on, and verify that the Power LED is ON. When the VT-1 is turned on, it will complete a self-diagnostics test, during which all LEDs will turn on in sequence.
3. Once the self-diagnostics is completed, the VT-1 will automatically display the signal format (NTSC or PAL). If the correct signal format LED is not ON, then see the Troubleshooting guide.
4. If the VT-1 is able to determine the signal format, it will automatically display gain and EQ levels. The optimum levels are indicated by the Green LEDs in the center of the Gain and EQ displays, as illustrated in **Figure 2**. Gain and EQ LED values are shown in **Figure 3**.

Attention!

- The EQ display will not be accurate unless the signal gain is at or near the optimum level, with either the Green or the Green+Yellow LEDs ON.
- The VT-1 is designed for use with color composite video signals. If using the VT-1 with a black & white video signal, the EQ display will not be accurate and should be ignored.
- Rapid or erratic changes on either the gain and/or EQ display levels indicate the incoming signal is intermittent or that ground loop noise or other interference is present on the video signal.
- The VT-1 does not have gain and EQ adjustments: a separate amplifier or other adjustable device must be used to vary the gain and EQ levels.

Using the VT-1 to adjust a video amplifier or other device with variable gain and EQ:

Accurate video levels are critical for many applications, including digital recording (DVRs), projectors displays, and video editing. VAC's offers many video amplifiers with variable gain and EQ, which can be used to optimize video signal levels. The DRVx-1 video amplifier, for example, provides adjustable gain and EQ, along with a humbucking input and DC restore to eliminate ground loop noise.

1. Follow the steps outlined above to connect and power on the VT-1, and to measure the initial gain and EQ levels.
2. Adjust the gain control FIRST for the best possible reading on the Gain LED display, with the center (green) LED being optimal. If the gain level cannot be adjusted so that the Green or Green+Yellow LEDs are on, then the EQ reading will not be accurate.
3. After setting the gain, adjust the EQ for the best possible reading on the EQ LED display, with the center (green) LED being optimal.

Congratulations! Once you have adjusted the gain and EQ levels to the center you will have a high-quality video signal.

Using the VT-1 Video Tester

While the VT-1 can be used to measure gain and EQ levels at almost any point in a video system, in typical use, measurements are made at one of the following locations:

- At the camera or other signal source, to verify the signal levels prior to distribution
- Immediately before the terminating equipment (monitor, recorder, etc.), either to verify signal levels or to set gain and EQ levels on an amplifier in the signal path
- Following any component in the distribution system, to verify signal levels

These locations, along with options for video connections to the VT-1 tester, are shown in **Figure 1**.

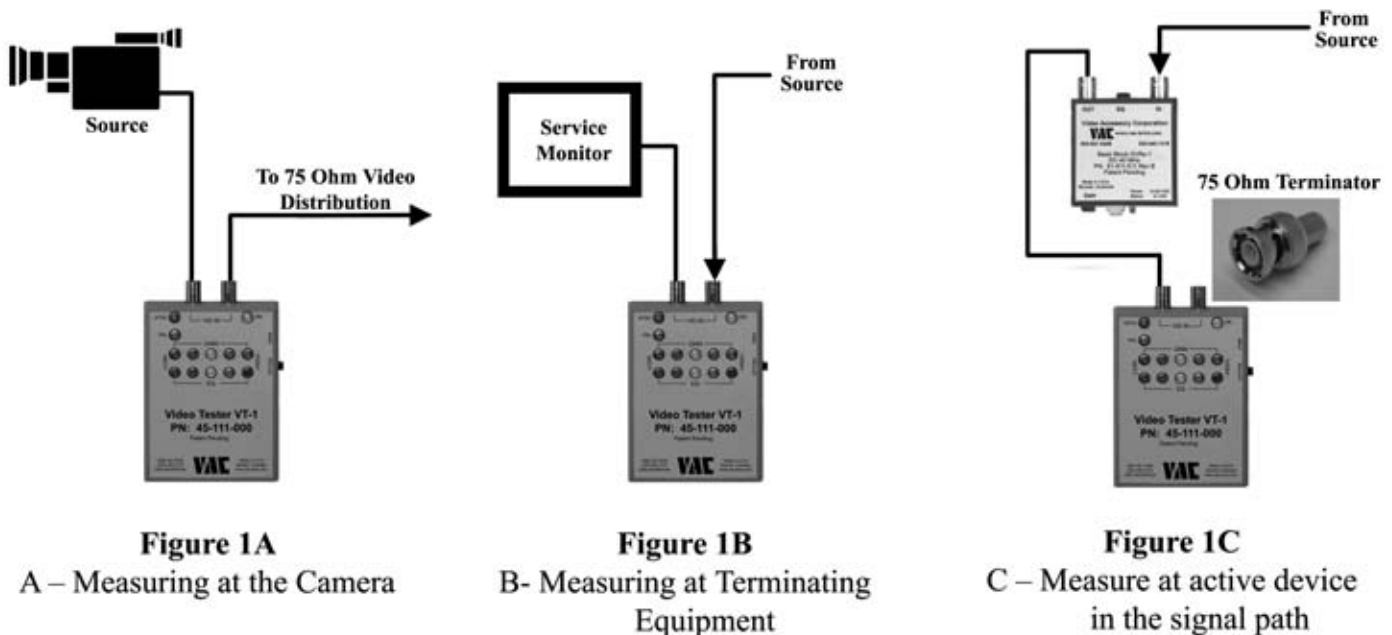


Fig 1 - Common Test Points in a Video Distribution System

Theory of Operation

The following section provides additional technical detail on how the VT-1 works, and how to interpret the LED indicators.

Detecting Video Format

The tester detects the video format by monitoring the horizontal sync (Hsync) during the vertical sync time. NTSC and PAL differ in the number of Hsync pulses per video field.

Determining Gain Level

The tester establishes gain levels by measuring the horizontal sync tip amplitude, and comparing this to the specified level for the detected signal format. For NTSC, this level is -40IRE; for PAL the level is -43IRE. The sync tip is measured in 1 IRE steps. Gain LEDs are activated at the IRE levels shown in the **Figure 4**.

Determining EQ Level

The tester establishes EQ levels by measuring the peak amplitude of the color burst, and comparing this amplitude to the specified level for the detected signal format. For NTSC, this level is 20IRE; for PAL this level is 21IRE. Color burst is measured in 1 IRE steps. EQ LEDs are activated at the IRE levels shown in the **Figure 4**.

Note that the VT-1 Tester cannot be used to measure EQ levels on a black and white video signal, since the black and white video format does not include a color burst.

<i>Gain (Sync Tip) Level Measured in IRE</i>		<i>EQ (Color Burst Peak) Level Measured in IRE</i>		LED Display State
NTSC	PAL	NTSC	PAL	
<26	<30	<10	<11	Left-side Red LED flashing
27-30	30-33	10-12	11-13	Left-side Red LED ON
31-34	34-37	13-15	14-16	Left-side Yellow LED ON
35-38	38-41	16-18	17-19	Left-side Yellow + middle Green LEDs ON
39-41	42-44	19-21	20-22	Middle Green LED ON
42-45	45-48	22-24	23-25	Middle Green and right-side Yellow LEDs ON
46-49	49-52	25-27	26-28	Right-side Yellow LED ON
50-53	53-56	28-30	29-31	Right-side Red LED ON
>53	>56	>30	>31	Right-side RED LED flashing

Figure 4 - Interpreting VT-1 Video Signal Tester LED States

Calibration Requirements

For continued optimum performance, the VT-1 should be calibrated annually. Calibration can be easily accomplished in the field, and requires only a digital volt meter (DVM) with millivolt (mV) accuracy. To calibrate the VT-1:

- Remove the four inset screws on the back of the VT-1, and remove the back cover.
- Locate the Calibration Adjustment (R25) and Test Points (Pin 1 of U6 and ground) shown in **Figure 5** below

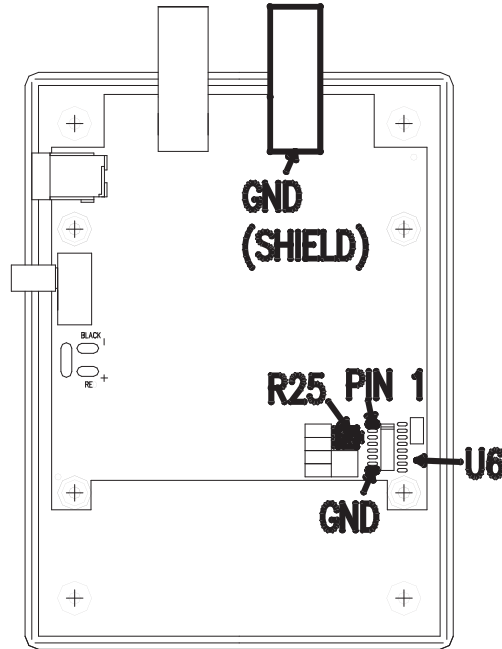


Figure 5 -

Calibration Adjustment and Test Points

- Turn the VT-1 ON; the VT-1 should NOT be connected to a video signal source during the calibration process.
- Attach the DVM leads to the two Test Points shown in **Figure 5**.
 - o The positive (+) lead of the DVM should go to pin 1 of U6 in the lower right-hand corner of the circuit board
 - o The ground lead of the DVM can be connected to pin 8 of U6 or to the shield of either BNC connector.
- Using a small screwdriver, adjust potentiometer R25 (located immediately to the left of U6) so that the DC voltage reading on the DVM is 1.785V
 - o Adjusting R25 clockwise increases the voltage
 - o Adjusting R25 counterclockwise decreases the voltage
- Turn the VT-1 OFF
- Replace the back cover of the VT-1

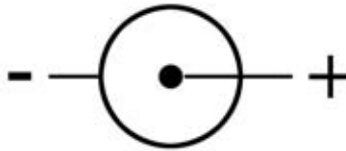
Troubleshooting Guide for the VT-1

Please refer to the following chart for information on troubleshooting the VT-1. If the condition persists after following the guide, or if the symptom is not described below, please contact VAC for technical support.

Symptom	Check
Power LED does not light when VT-1 turned on	<ul style="list-style-type: none"> • Replace 9V battery • If using an external power supply, verify that the supply output is within 9 -24V AC/DC • If using a grounded external power supply, verify that the barrel of the P5 connector is ground.
Signal Format (NTSC or PAL) LED not ON	<ul style="list-style-type: none"> • Verify the unit is turned on, and the Power LED is ON • Verify that the signal source is ON • Check the video cable and all connectors • If the video signal is severely attenuated or there is sever interference on the signal, then the format LEDs may not function
No Gain (and/or EQ) LEDs are ON	<ul style="list-style-type: none"> • Verify the unit is turned on, and the Power LED is ON • Verify that the correct signal format LED is ON • Verify that both BNC connectors are properly terminated to a 75 Ohm load • Calibrate the VT-1
Rapid and erratic changes between display states on Gain and/or EQ LEDs	<ul style="list-style-type: none"> • Verify that both BNC connectors are properly terminated to a 75 Ohm load • Signal may have ground loop noise or other interference; use a monitor or other test equipment to determine if noise is present. Use VAC amplifiers with differential input to remove ground loops. • Two adjacent LEDs may blink on and off sequentially If the signal amplitude is at the "boundary" between the two LED display states; this is normal operation

VT-1 Specifications

Signal Format:	NTSC or PAL
Input:	Hi-Z Loop-Thru
Input Connectors:	2 each 75 Ohm BNC (75 Ohm Terminator included)
LED Visual Indicators:	
ON	Green LED; ON when tester is turned on
NTSC	Green LED; ON when NTSC video detected
PAL	Green LED; ON when PAL video detected
GAIN	Series of 5 LEDs, from Left to Right: Red, Yellow, Green, Yellow, Red
EQ	Series of 5 LEDs, from Left to Right: Red, Yellow, Green, Yellow, Red
Power:	9V Battery (included); or external 9-24V AC/DC source; 75mA max current consumption
Power Connectors:	Internal polarized connector for 9V battery P5 barrel connector for external power; center pin of the P5 connector is positive (see connector diagram below)



P5 Connector

Size: 5" x 3.375" x 1.5" (H x W x D)

Shipping Weight: 1 lb

Accessories:

Padded Carrying Case:	PN: 00601
12V AC Wall Transformer:	PN: 55560
18" Coax Jumper Cable:	PN: 99922
75 Ohm BNC Terminator	PN: 78099