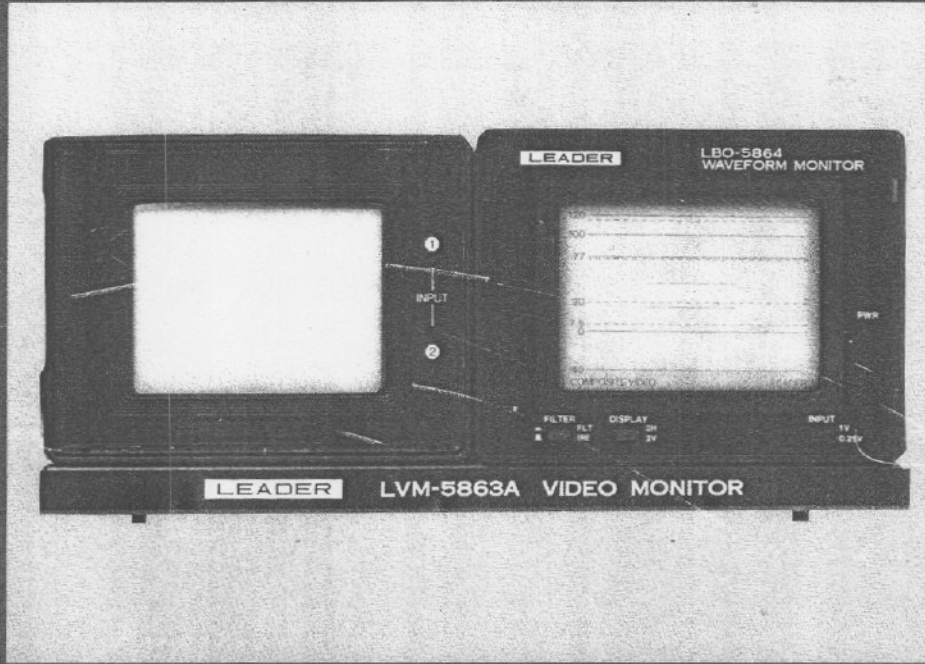


\$35

LVM-5863A

EFP Monitor



instruction manual

For professionals
who
know
the
difference.

LEADER
Instruments Corporation

LVM-5863A
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EFP/ENG MONITOR

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1. GENERAL INFORMATION

1-1 INTRODUCTION

The LVM-5863A combines a miniaturized color picture/audio monitor with a waveform display to provide full monitoring facilities for electronic field production (EFP) and electronic news gathering (ENG) operations. Powered from its own batteries, or any source of 12 Vdc such as battery belts or vehicular power, the unit adds the confidence of immediate monitoring with minimum weight, bulk and power drain.

1-2 FEATURES

- Small and light, only 8 lbs. without batteries.
- Fixed 2H and 2V waveform display provides the most useful monitoring waveforms with a minimum of operator controls.

1-3. SPECIFICATIONS

WAVEFORM MONITOR (LBO-5864)

Sensitivity (full scale)	1 Vp-p (for 140 IRE units) or 0.25 Vp-p, switchable
Video Bandwidth (switchable)	Flat: 25 Hz to 5 MHz, $\pm 5\%$ IRE: Based on response per IEEE 205-1958 (28 dB down at 3.5 MHz)
Time Base	2H or 2V, switchable
DC Restoration	Back Porch Clamp
Graticule	Internal, calibrated in IRE units

POWER REQUIREMENTS

Supply Voltage	12 Vdc (nominal)
Current Drain, total	1.2 A
Power Consumption, total	14 W
Batteries	Sony NP-1 or equivalent (side mounted)
(not included)	Sony BP-90 or equivalent (bottom mounted)

GENERAL

Color System	NTSC
Screen Size (measured diagonally)	Waveform Monitor: 2.75 inches Picture Monitor: 2.6 inches
Video Input Impedance	1 Vp-p 75 Ω (automatic hi Z for loop-through operation)

- Internal IRE graticule for accurate checks of signal components.
- Full color picture display.
- Built-in speaker for audio monitoring.
- Low battery drain; only 1.2 A for extra battery life.
- Independent power switches permit lower power drain if only picture or waveform monitoring is needed.
- Accepts dc power from a variety of available sources.
- Low battery warning.
- Rugged carrying case and shoulder strap.
- Companion vectorscope, Model LVS-5854, adds chroma monitoring facilities.

Video Input

Connector	BNC
Audio Input	390 mVrms nominal
Audio Input Impedance	47 k Ω , unbalanced
Audio Connector	RCA-type phono jack
Operating Time (approximate)	1 hr., 20 min. with NP-1 3 hrs. with BP-90
Power Connector	Coaxial type, center pin negative

PHYSICAL

Size (W x H x D)	8 x 3 $\frac{1}{2}$ x 10 $\frac{1}{4}$ inches
Weight	8 lbs. (3.5 kg) without batteries or carrying case 9 $\frac{1}{4}$ lbs. (4.2 kg) with carrying case and NP-1 battery 13 $\frac{1}{4}$ lbs. (6.0 kg) with carrying case and both batteries

SUPPLIED ACCESSORIES

Soft carrying case with hood; Shoulder strap
DC power plug with pigtail leads
CH2 input plug with phono plugs

OPTIONAL ACCESSORIES

Carrying Case for BP-90 Battery, LC-2220

OPTIONAL CONFIGURATION

Waveform Monitor only. Order Model LBO-5864.

2. OPERATING INSTRUCTIONS

This section contains the information needed to operate the LVM-5863A. Included are identification of controls,

connectors and indicators, system connections, basic operating routines and selected measurement applications.

2-1 CONTROLS, CONNECTORS AND INDICATORS

Before turning on this instrument, familiarize yourself with the controls, connectors, indicators and other features described in this section. The descriptions that follow are keyed to the items called out in Figures 2-1 to 2-4.

2-1-1 Front Panel

Refer to Figure 2-1 for references ① to ⑦

- ① Color CRT Displays full color pictures from NTSC input feeds.
- ② Waveform CRT Displays 2H and 2V video waveforms on an internal graticule graduated in IRE units.
- ③ Input Channel LED's Glows to show which input channel, 1 or 2, has been selected by the INPUT SELECT button (19). One or the other LED also serves as the power-on indicator for the picture monitor section.
- ④ PWR LED Glows to show when the waveform monitor section is on. This LED also serves as the low-battery warning. It flashes when battery voltage falls below 10.5 Vdc.

- ⑤ FILTER switch Alters video frequency response. For the FLT (flat) setting (button in) frequency response is normal. Press to release (button out) to insert a low-pass filter to remove most subcarrier components. Response in the IRE setting complies with IEEE Standard 205-1958.
- ⑥ DISPLAY switch Selects the horizontal time base. Two horizontal lines are shown in the 2H setting (button in). Press to release (button out) to display 2 vertical fields in the 2V setting.
- ⑦ INPUT switch Alters vertical deflection sensitivity. The normal 1V setting (button in) provides the standard sensitivity wherein a 1V p-p signal occupies 140 IRE units. Press the button to release it (button out) to boost sensitivity by a factor of four. This makes the 7.5 IRE units for setup appear at 30 IRE units.

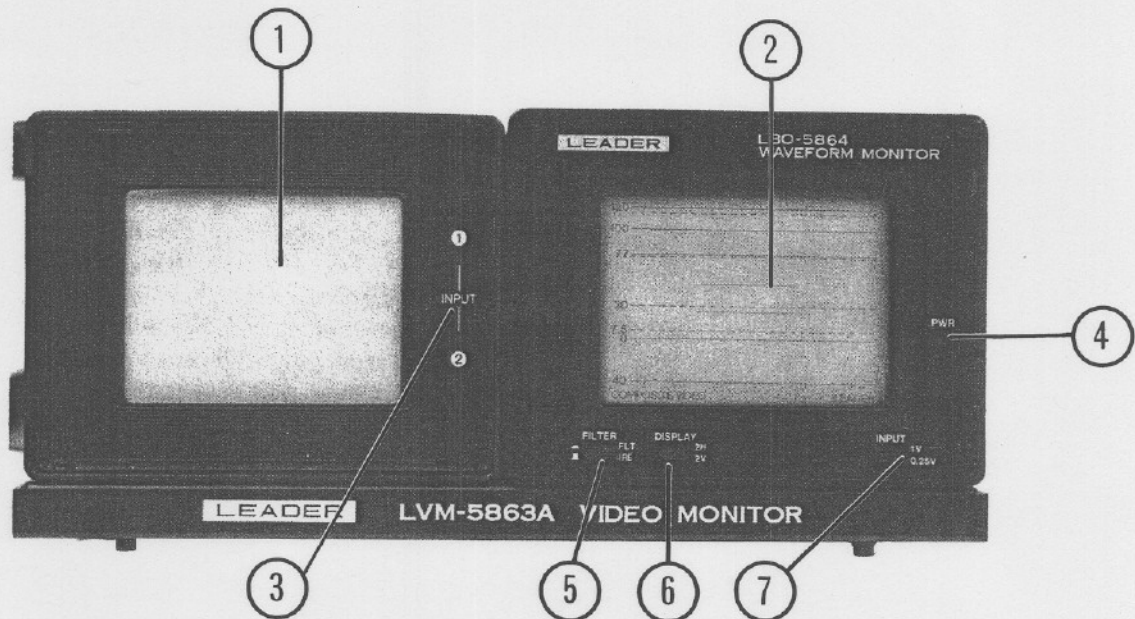


Figure 2-1. Front panel

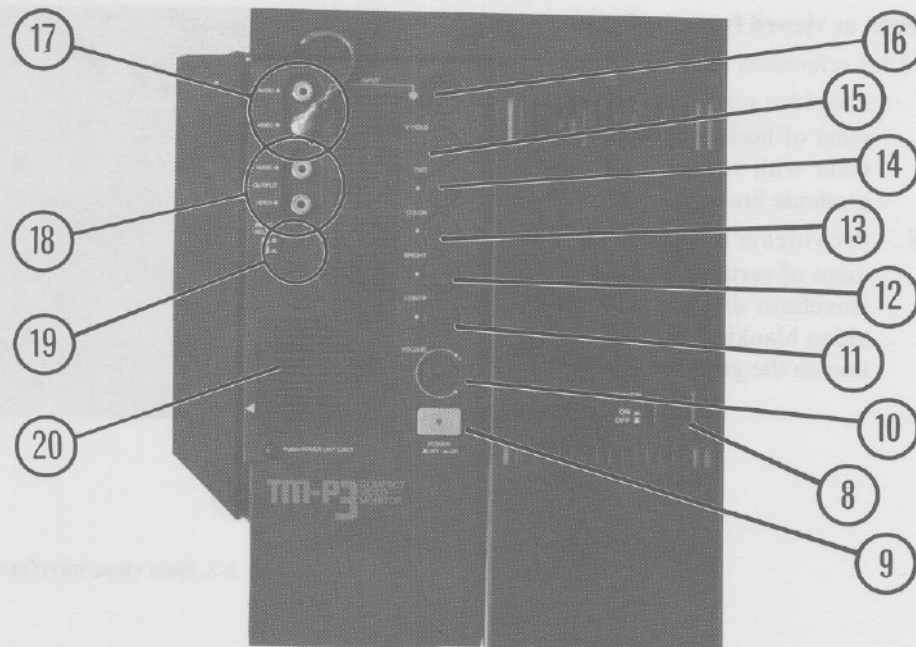


Figure 2-2. Top panel

2-1-2 Top Panel

Refer to Figure 2-2 for references (8) to (20).

- ⑧ POWER OFF-ON switch Push to switch on the waveform monitor section. Push again to switch off. The red PWR LED (4) glows when power is on.
- ⑨ POWER OFF-ON switch Push to switch on the picture/sound monitor section. Push again to switch off. One of the red LED's (3) on the front panel glows when power is on.
- ⑩ VOLUME control Turn clockwise to increase volume.
- ⑪ CONTRAST control Turn clockwise to increase picture contrast. The control is detented at the normal setting for correct video levels.
- ⑫ BRIGHTNESS control Turn clockwise to raise picture brightness. The control is detented for normal brightness setting at average viewing conditions.
- ⑬ COLOR control Turn clockwise to increase color saturation. The control is detented at the correct setting for signals with the correct Y:C ratio.
- ⑭ TINT control Adjusts decoder phase for correct hues. The control is detented at mid-range for correct color for normal NTSC input signals.

- ⑮ V-HOLD Adjusts vertical scan frequency. Set as needed to prevent vertical rolling of the picture.
- ⑯ 6-pin CH-2 connector Accepts audio and video inputs to CH-2 via a six-pin connector supplied as a standard accessory.
- ⑰ Phono-type CH-1 jacks Accepts audio and video inputs to CH-1 via phono-type plugs. Note: The CH-1 video input jack is normally connected to the loop-through cable from the waveform monitor section.
- ⑱ Phono-type output jacks These jacks are for loop-through connections to other video and audio components. Note: The picture monitor is internally terminated for video at the VIDEO OUTPUT jack. Insertion of a male phono plug into this jack removes the terminator automatically.
- ⑲ INPUT SELECTOR switch Press in to select the CH-2 input from the 6-pin connector (16). Press again to release (button out) to select the CH-1 input. The latter is the normal setting for use with the waveform monitor.
- ⑳ Speaker

2-1-3 Side panel (right as viewed from the front).

Refer to Figure 2-3 for references (21) and (22).

- ②① ROTATION control Provides screwdriver adjustment of horizontal trace alignment with regard to the CRT graticule lines.
- ②② V. POSITION control Provides screwdriver adjustment of vertical position of the waveform display. Set to align video blanking with the 0 IRE line on the graticule.

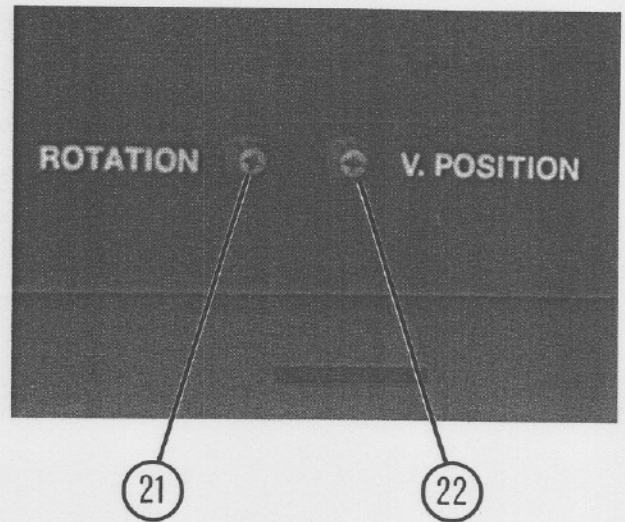


Figure 2-3. Side view, waveform monitor side

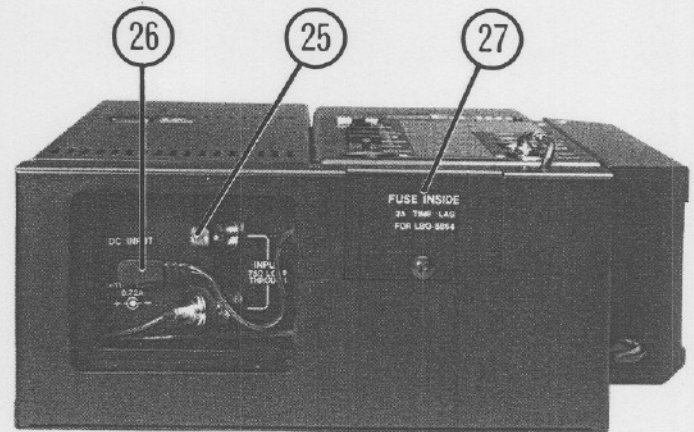
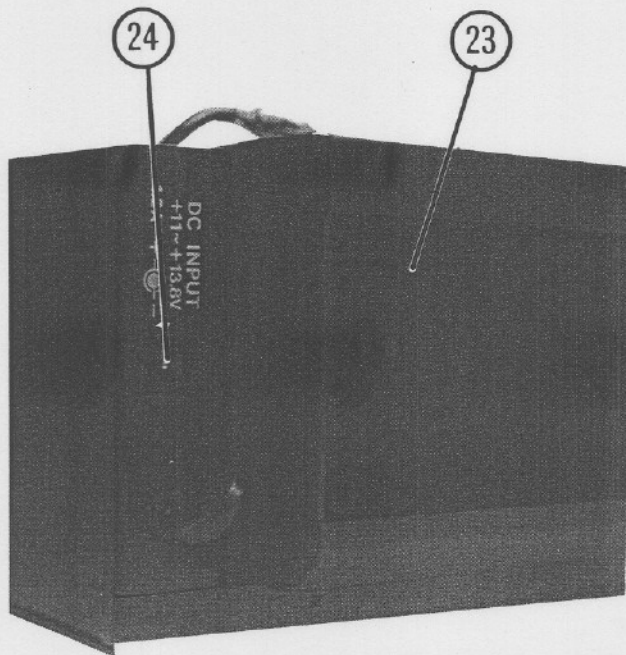


Figure 2-4. Rear panel

2-1-4 Rear Panel and Battery Holder

Refer to Figure 2-4 for references (23) to (27)

- ②③ Battery compartment Houses the Sony type NP-1 battery.
- ②④ DC INPUT jack Coaxial-type jack accepts 12 Vdc power from the extra BP-90 battery or any source of 12 Vdc power. Note: The NP-1 in the battery compartment is disconnected automatically when a battery or other source of 12 Vdc is connected to the DC INPUT jack (24).
- ②⑤ Video INPUT jack This BNC jack accepts video signal inputs at standard levels. The video signal is looped through the waveform monitor section and terminated in the picture monitor.
- ②⑥ DC INPUT jack Coaxial type jack accepts a male plug from the main frame to provide dc power to the waveform monitor.
- ②⑦ Fuse compartment 2A time lag fuse inside. Remove cover by removing the single Phillips head screw.

2-2 VIEWING HOOD

To position the viewing hood, unsnap the lower snap fasteners at each side of the unit and the three snap fasteners at the lower edge. Swing the front cover upwards and open the stiffeners on either side of the display outwards. Reset the two snap fasteners at the lower sides to hold the hood in the viewing position.

2-3 POWER CONSIDERATIONS

The LVM-5863A is designed to operate from the Sony NP-1 battery installed in the battery compartment. This battery may be augmented with the addition of a larger BP-90 that is housed in a compartment that affixes to the bottom of the unit. In addition, any available source of 12 Vdc (11 to 13.8 V) can be used to power the LVM-5863. Note: The NP-1 battery is disconnected automatically when any source of 12 Vdc is plugged into the DC INPUT jack (24).

2-3-1 Operation From the NP-1 Battery

1. Make sure that the NP-1 battery is fully charged before it is installed in the battery compartment. Refer to material supplied with the battery charger. Recommended battery charger: Sony Model BC-1WA or equivalent.
2. If the carrying case is in use, open the flap on the forward edge of the battery compartment.
3. Hold the NP-1 as shown in Figure 2-5 and slide it into the battery compartment as far as it will go. Close the flap on the carrying case.



Figure 2-5. Installing the NP-1 battery

4. Press the waveform monitor POWER ON-OFF button (8). Confirm that the red PWR LED (4) is on. After a few seconds a single horizontal trace should appear on the waveform monitor screen.
5. Switch off POWER if the monitor is not to be used at this time.

2-3-2 Low Battery Warning

The red PWR LED (4) glows steadily when battery voltage is within the range required for normal operation. It begins to flash when battery voltage falls below 10.5 V.

To maintain long battery life, do not continue operation with a depleted battery. Recharge the battery as directed by the literature supplied with the battery charger.

2-3-3 Operation Using the BP-90 Battery

1. Insert the BP-90 into the LC-2220 carrying case so that the power plug can be passed through the hole in the cover flap.
2. Press the cover flap in place using the fastener tape.
3. The soft carrying case for the LVM-5863A should be in place. Stand the LVM-5863A on the four feet at the rear of the unit (CRT screens facing upwards).
4. Remove the clips for the shoulder strap.
5. Slip the buckles of the BP-90 carrying case over the metal feet to which the shoulder strap is normally clipped.
6. Press the BP-90 carrying case against the main unit carrying case to engage the fastener strips. See Figure 2-6.



Figure 2-6. BP-90 installation

2-3-4 Operation From Vehicular, Battery Belt or Other Sources of 12 Vdc

1. Connect the source of nominal 12 Vdc to the Power jack (24). Note: The plug required for this connection is of the type used on the Sony BP-90 battery. A mating plug with leads is supplied as a standard accessory. The coaxial type power plug is wired with the outer shell positive and the inner conductor negative. Refer to Figure 2-7.

CAUTION

Double check voltage polarity at the plug before connecting any source of dc voltage to the LVM-5863A. The center conductor must be negative with respect to the outer shell. Reversed connections could damage the LVM-5863 and/or the source of power.

2. Confirm that the power source supplies between 11 and 13.8 Vdc. The power source must be capable of delivering 1.2 amperes continuously.
3. Switch on the waveform monitor at the POWER ON-OFF switch (8) and confirm that the PWR LED (4) on the front panel comes on.

2-4 SIGNAL CONNECTIONS

2-4-1 Basic Video Connection

The basic operating mode makes use of the LVM-5863A as a camera and/or VCR monitor. Connect the source of video to the input BNC VIDEO INPUT jack (25) on the rear panel. In this mode the signal is looped through the waveform monitor section and terminated in 75 ohms in the picture monitor section. Select CH-1 on the picture monitor with the INPUT SELECT switch (19).

2-4-2 Video Loop-Through Connections

Video signal may be looped through the LVM-5863A to drive another video load, such as the line input of a VCR, as shown in Figure 2-8. Connect the outgoing cable to the OUTPUT VIDEO jack as shown using a cable or cable adapter equipped with a male phono plug. Insertion of this plug automatically disconnects the internal terminator and the feed should be terminated in the connected load.

2-4-3- Audio Connections

Connect the source of audio to the INPUT AUDIO jack (17) on the top panel of the picture monitor. Select CH-1 with the INPUT SELECT switch (19).

Audio input is normally high impedance (47 k Ω). The signal level should be approximately -6 dB.

Bridged audio output is available at the OUTPUT AUDIO jack (18).

2-4-4 Use of the 6-Pin CH-2 Jack

Video and audio signals may be fed into the picture monitor section only by means of the 6-pin CH-2 input connector. A six pin plug with cables using RCA phono type plugs is supplied as a standard accessory. Figure 2-9 shows the wiring and feed connections for this unit. Select CH-2 with the INPUT SELECT switch (19).

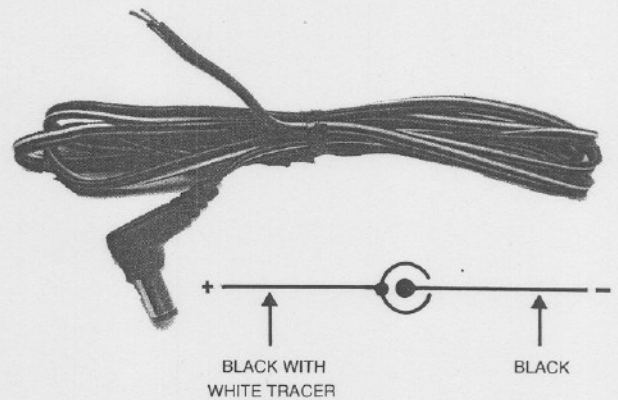


Figure 2-7. DC plug wiring

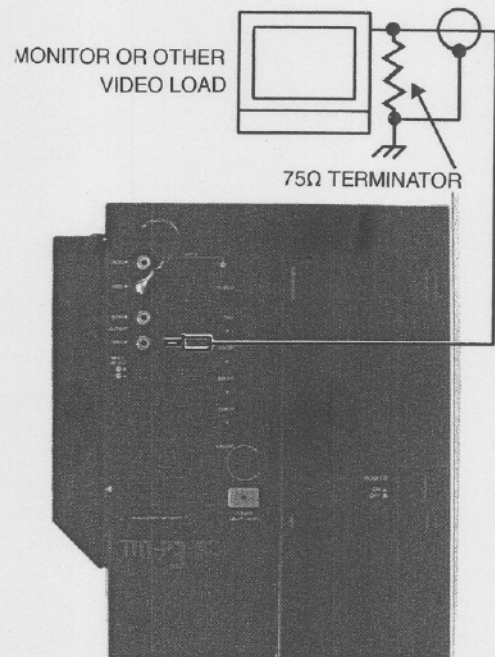


Figure 2-8. Video loop-through from the picture monitor

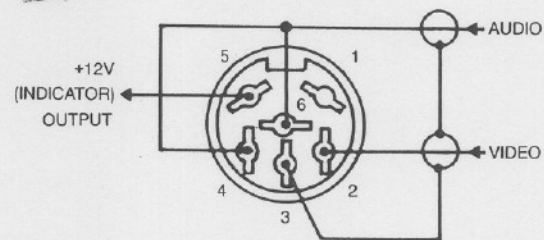
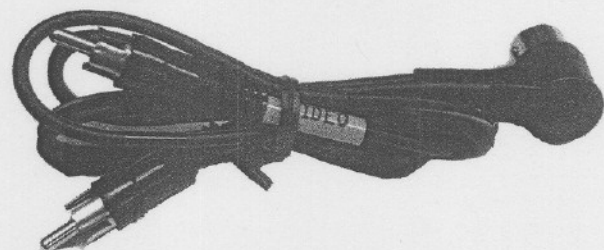


Figure 2-9. Wiring of the 6-pin CH-2 input accessory

2-5 BASIC OPERATING PROCEDURES

2-5-1 Initial Checkout

Equipment required:

- Color Bar Generator
Leader LCG-400S/M or equivalent
- Audio Generator
Leader LAG-120B or equivalent

1. Connect the LVM-5863A to a source of 12 Vdc power or insert a fully-charged NP-1 battery. Refer to Section 2-2.
2. With no input signal connected, switch on power for the waveform monitor section (8).
3. Wait a few moments and a green trace will appear on the monitor screen.
4. Check for parallelism between the trace and the horizontal lines on the graticule.
5. Using a miniature Phillips screwdriver, adjust the ROTATION control (21) on the right side panel, if necessary, to make the trace parallel with the graticule lines.
6. Preset operating controls as follows:

INPUT SELECT (19):	mid range
TINT (14):	at detented setting
COLOR (13):	at detented setting
BRIGHT (12):	at detented setting
CONTR (11):	at detented setting
VOLUME (10):	fully CCW
FILTER switch (5)	in (FLT)
DISPLAY switch (6)	in (2H)
INPUT switch (7)	in (1V)
7. Connect the color bar generator output signal to the VIDEO INPUT jack (25) on the rear panel. Set the generator to produce EIA color bars at standard 1V p-p level.
8. Switch on power at the picture monitor and waveform monitors (8) and (9). Refer to Figure 2-10 for identification of waveform graticule markings.
9. Allow a few moments for warm-up and check to confirm that the color bar display appears normal on the picture monitor.
10. Observe the waveform monitor and using a miniature Phillips screwdriver, adjust the V-POSITION control (22) on the right side panel to place the blanking part of the signal on the 0 IRE graticule line. Refer to Figure 2-11(a).
11. Check that the 100% peak-white bar and the positive tips of subcarrier are at the 100 IRE graticule line. Refer to Figure 2-11(a). Check sync level, burst level and setup as shown in the figure.
12. Depress the DISPLAY switch (6) to release it (button out) to obtain the 2V waveform. Confirm that the waveform appears as shown in Figure 2-11(b). Press again (button in) to restore the 2H display.
13. Depress the FILTER switch (5) to release it (button out). This inserts the IRE filter to remove most of the

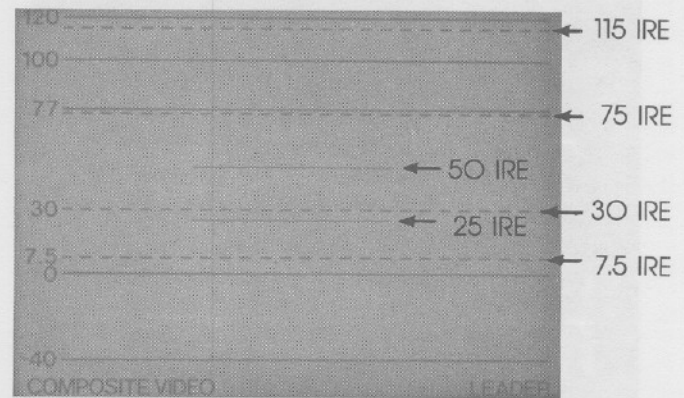


Figure 2-10. Graticule markings

3.58 MHz chrominance signal. Confirm that the waveform appears as shown in Figure 2-11(c). Press again (button in) to restore normal frequency response.

14. Depress the INPUT switch (7) to release it (button out). This boosts vertical gain by 4X, and makes the 7.5 IRE unit setup level appear at 30 IRE units. Confirm that setup appears at +30 IRE as shown in Figure 2-11(d). Press again (button in) to restore normal sensitivity.
15. Connect the audio generator to the CH-1 audio input jack (17). Set frequency to 1000 Hz, output to -6 dB (0.4 Vrms).
16. Advance the VOLUME control and check for adequate sound level.
17. Switch off power on both units (8) and (9).

2-5-1 Graticule Markings

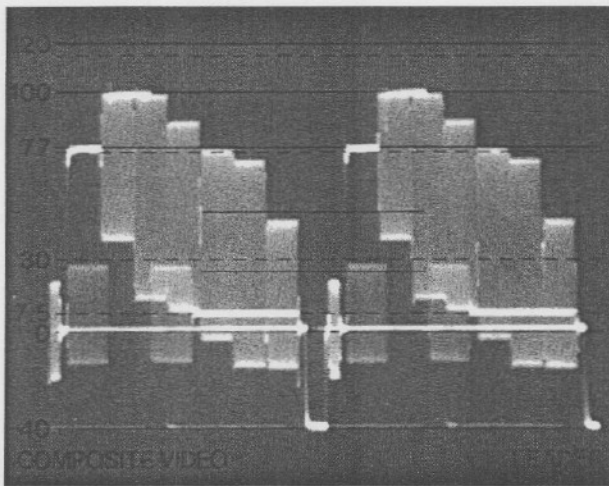
Refer to Figure 2-10 for identification of the internal graticule marks on the waveform monitor. The solid line at zero IRE is the blanking level and V POSITION should be adjusted, if necessary, to place the blanking level of the observed signal at this zero level.

The dashed line just above blanking is at 7.5 IRE, the setup level used in common practice in the U.S. Shorter lines identify 25 and 50 IRE. The next higher dashed line marks 75 IRE units or the level of the 75% white bar in the color bar signal in the absence of setup. The solid line just above the dashed 75 IRE line identifies 77 IRE, the level for the 75% white bar in the color bar signal when 7.5% setup is in use.

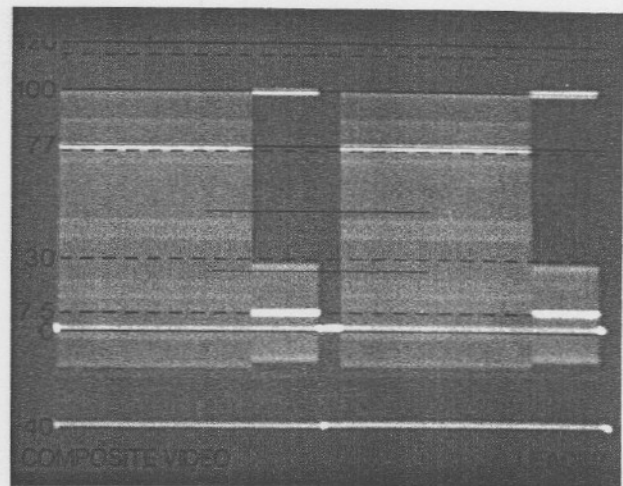
Solid lines at 100 and 120 identify standard peak white and saturation (white clip) levels respectively. A dashed line at 115 IRE identifies the saturation level when setup is zero or 2-3 IRE units.

2-6 APPLICATIONS

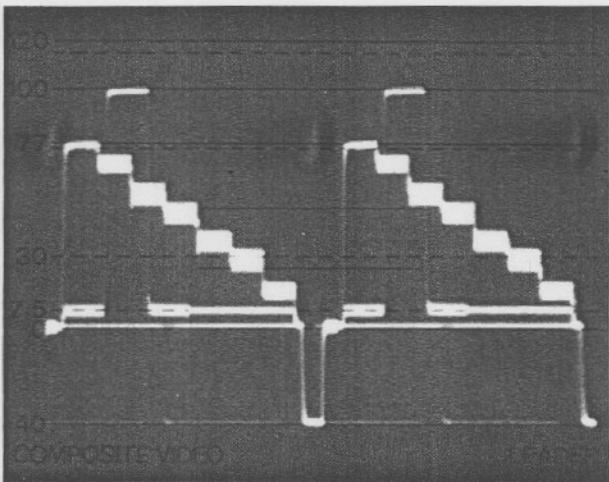
This section shows some of the ways in which the LVM-5863A can be used to verify camera/VCR performance.



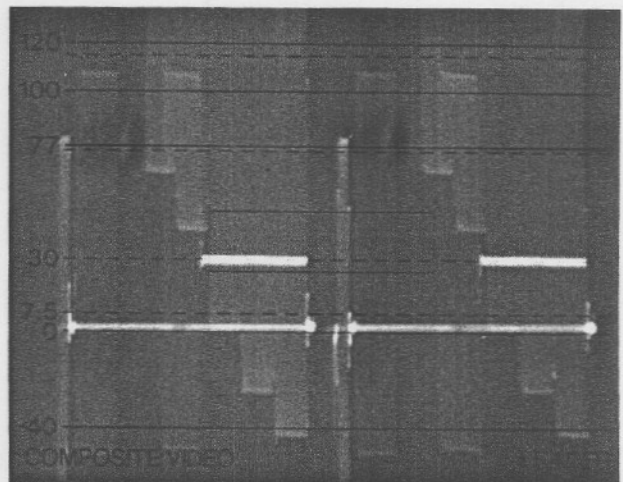
(a) 2H



(b) 2 V



(c) IRE filter



(d) X4

Figure 2-11. Checkout waveforms

2-6-1 Checking Video Camera Signal Components

1. Connect the video output of the camera to the VIDEO INPUT jack on the rear panel of the LVM-5863A.
2. Switch on power to the camera and both units of the LVM-5863A. Leave the camera lens cap in place or set the camera filter wheel to the "blind" setting.
3. Set up AUTO BLACK for the camera, if it is so equipped.
4. Check the waveform as shown in Figure 2-12 for correct sync amplitude, burst amplitude and setup. Reset master pedestal on the camera if necessary for the correct 7.5 IRE setup level.

Note: For a more accurate indication of setup level, depress the INPUT switch (7) to release it (button out) to produce the 0.25 V setting. This boosts deflection sensitivity by a factor of 4 so that the normal 7.5 IRE setup level appears at 30 IRE units. The first

horizontal graticule line above the dashed line for normal setup is at 25 IRE.

5. Remove the lens cap and set the camera filter wheel for the appropriate illuminant (3200 K for studio lighting, 6400 K with neutral density filter for outdoor shots).
6. Frame the camera on a flat white card, such as the registration chart, or a neutral gray-scale chart. Execute the auto-white balance for cameras so equipped.
7. Using automatic iris, confirm that the peak-white part of the test chart comes to 100 IRE. See Figure 2-13.
8. Note: For a better indication of peak white levels, depress the FILTER switch to release it (button out). This removes most of the subcarrier from the waveform so that the peak level of the luminance signal can be judged more easily.

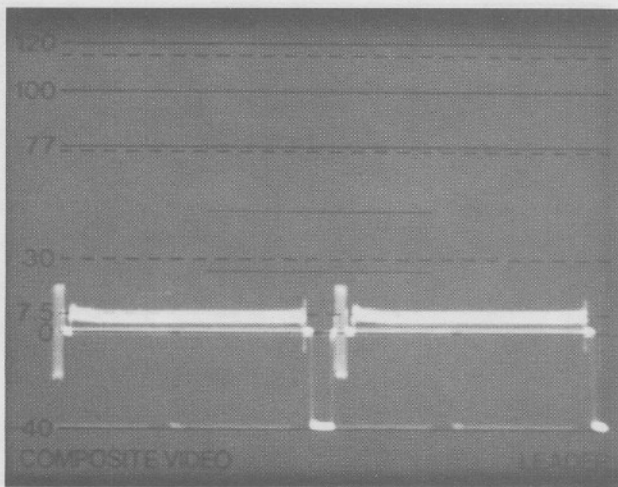


Figure 2-12. Lens capped waveform

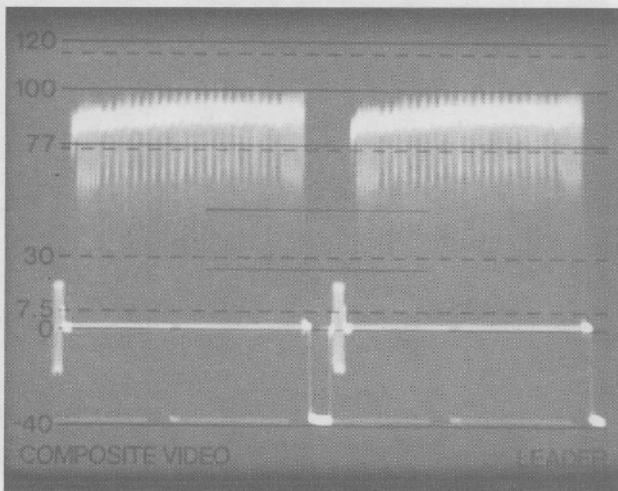


Figure 2-13. Setting peak white at 100 IRE using the white camera registration chart

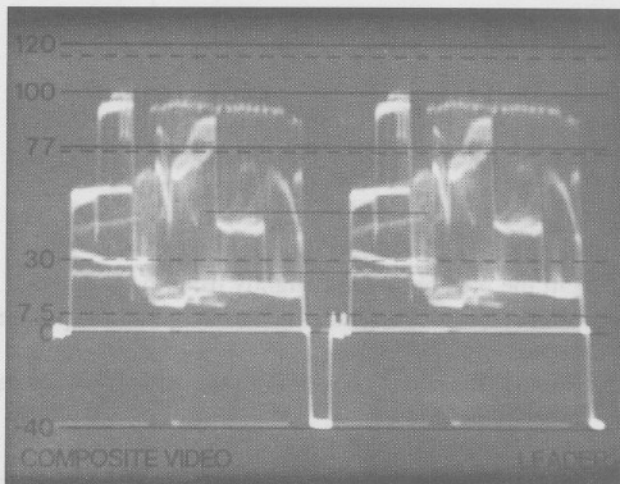


Figure 2-14. Use of the IRE filter on a color scene to set peak white level

2-6-2 Manual Lens-Opening Settings

Automatic iris control is avoided in many shoots to prevent the changes in background brightness that accompanies the appearance of lighter or highly reflective items in the picture frame. To set the iris manually for a given lighting condition, set the camera for manual iris control and aim at a white or nearly white object in the center of the frame. A white card, performer's shirt or any convenient object can be used for this purpose.

1. Locate the white object on the waveform display. See Figure 2-14.
2. Set iris opening so that the peak white signal identified in Step 1 reaches 100 IRE. Note: For a clearer indication of peak luminance signal levels, depress the FILTER switch (5) to release it (button out). This inserts the IRE FILTER, and removes most of the sub-carrier signal to make luminance values easier to see.

2-6-3 White and Black Balance Checks

For accurate color rendition the camera must be balanced using the lighting conditions that are used for shooting. When the camera is properly balanced the red, green and blue signals input to the NTSC encoder are equal when the camera is framed on a white or neutral gray subject. Under these conditions, the R-Y-/B-Y or I and Q signals go to zero. Subcarrier output from the encoder then goes to zero as well. Thus the indication that the camera is properly balanced is the disappearance of the subcarrier from the waveform.

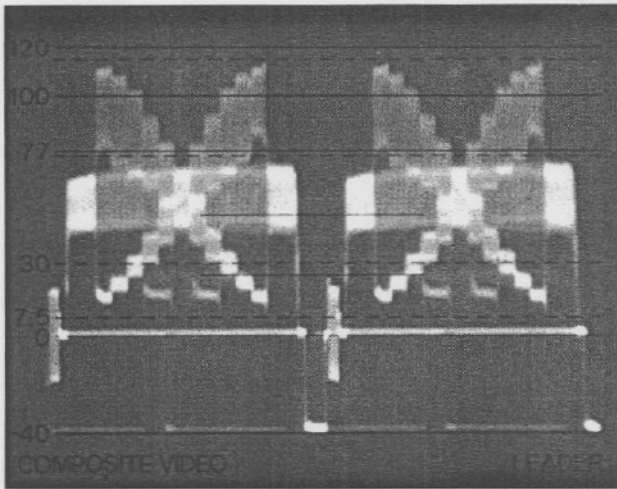
Figure 2-15 shows typical waveforms for a camera framed on a white gray scale card. The left waveform shows the unbalanced condition. The right shows optimum balance. A correctly balanced camera will show little or no subcarrier on all the steps produced by the gray scale chart. At this time the picture monitor will display a neutral gray scale. Imbalance, which causes subcarrier to appear on the steps of the waveform, causes a definite hue to appear on the corresponding chips of the picture display.

While it is easy to check camera balance, and check auto-balance operation, manual adjustments to effect camera balance should be made under controlled (bench) conditions.

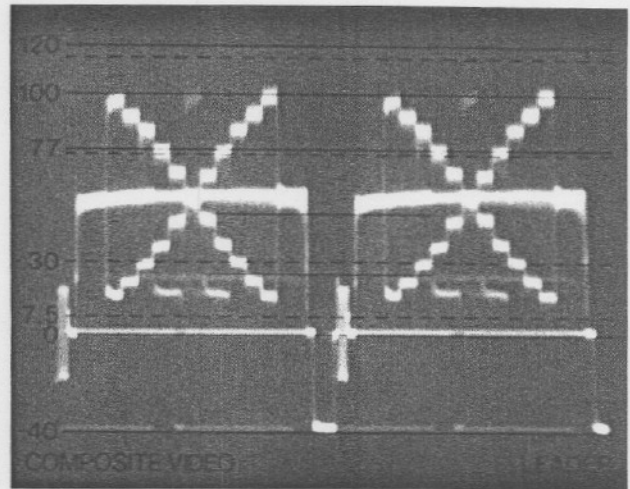
2-6-4 VCR Output Level and Y/C Ratio

VCR's that make use of the color-under technique, such as Beta, VHS and U-Format, separate and process the luminance (Y) and chrominance signal separately. To check to see that the VCR has re-established correct Y/C ratios proceed as follows:

1. Make a trial recording using the color bar signal from the camera.
2. Connect the video input jack of the VCR to the VIDEO INPUT jack on the rear panel of the LVM-5863A.
3. Play back the color-bar segment of the cassette.



(A) UNBALANCED



(B) BALANCED

Figure 2-15. Checking camera balance with a neutral gray scale chart

4. Check for correct:

Luminance level: For the 75% white bar in full field bars the correct level is 77 IRE. See Figure 2-16. For EIA type bars (100% white chip below yellow and cyan in the lower quarter of the picture display) the correct level is 100%.

Chrominance level: Correct chrominance level is indicated for 75% color bars when the positive peaks of subcarrier on the yellow and cyan bars are at the 100 IRE level. See Figure 2-16.

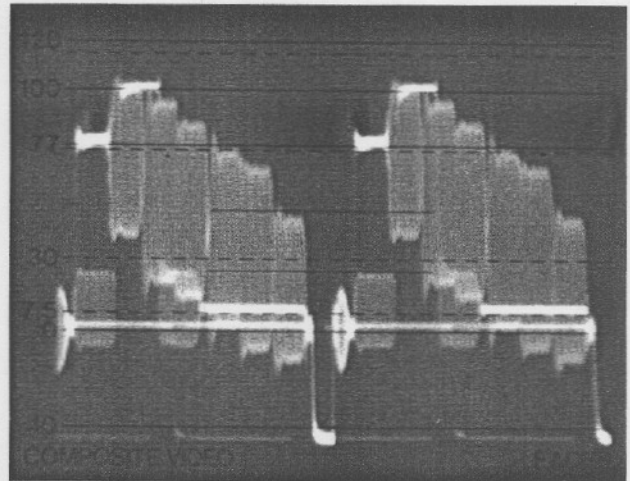


Figure 2-16. VCR playback

3. PICTURE MONITOR MAINTENANCE

3-1 TEST EQUIPMENT REQUIREMENTS

Color Bar Generator: EIA color bars, dot-crosshatch pattern
 Leader LCG-400S/M or equivalent

DVM

3-2 DISASSEMBLY

1. Remove power from all units.
2. Remove the 1/4-20 hex-head cap screw marked A in

Figure 3-1. Use a 3/16" hex key.

3. Lift the picture monitor slightly from the front edge.
4. Lift to clear locating holes in the base plate and put the picture monitor aside.
5. Remove the battery holder from the side of the picture monitor as follows.
6. Press the PUSH POWER UNIT EJECT button.
7. Slide the battery holder toward the rear of the monitor to align the arrows.
8. Gently pull the battery holder from the monitor.