HORITA CSG-50

COLOR BAR, BLACKBURST,
SYNC, AUDIO TONE GENERATOR

USER MANUAL

For Models CSG-50, RM-50/CSG, SR-50/CSG

Doc. 070950
Rev. C

HORITA®

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1 GENERAL

The CSG-50 provides an economical means of obtaining high quality split-field SMPTE color bars, full-field EIA color bars, blackburst, and composite sync signals. The CSG-50 can be used with HORITA SMPTE time code reader-generators for striping video tapes with color bars and/or blackburst, and time code.

Color bars and blackburst are examples of composite video signals. Composite video is a combination of several signals made into one. It contains the picture's black and white information, called luminance, color information, called chrominance, and timing information, called horizontal and vertical sync and blanking.

Composite sync is -4 Volt pulse signal made by combining horizontal and vertical sync into one signal. It does not provide luminance, chrominance, or blanking information.

Typical applications of the CSG-50 include use as a "house sync" generator in a video editing system to synchronize operation of various video switchers, special effects generators, VCRs/VTRs, cameras, monitors, video edit controllers, video titlers, time-base correctors, SMPTE time code, and other types of professional video equipment.

The CSG-50 can also be used as a video test signal generator to align and maintain video equipment in the studio, or as a portable color bar generator for use in the field.

2 FEATURES

* Generates color bars, blackburst, and composite sync signals, as well as a 15Hz reference frame timing signal.

* Front panel selection of full-field or SMPTE color bar patterns or blackburst (color black) video output.

* Video signals generated by the CSG-50 are in accordance with the industry standard EIA RS-170A video timing specification.

* Fully RS-170A SC/H phased and always correct. Never needs adjustment.

* SMPTE color bars meet SMPTE specification EG-1-1990.

* Full-field color bars meet EIA RS-189A specifications for video levels and colors.

* Blackburst signal has a standard setup level (black level) of +7.5 IRE units.

* A unique feature of the CSG-50 is the automatic timer. The timer switches the CSG-50 from color bars to blackburst after a delay of 30 or 60 seconds following activation of the front panel timer switch. This feature is especially convenient for "pre-striping" a tape with SMPTE time code and with a video leader consisting of color bars followed by black for the remainder of the tape.

* Operates from a small AC power adapter, which is included, or can be operated in the field from 9-to-14 volts DC battery power.

* Available in Desktop (CSG-50), Rackmount (RM-50/CSG), or Shortrack (SR-50/CSG) models.

3 CONNECTING THE CSG-50

3.1 Connecting Power

Included with your CSG-50 is an AC power adapter that provides a 9 volt, 500 milliamperes DC output. This adapter is equipped with a miniature phone plug with the "+" (positive) voltage output connected to the front tip of the plug.

Insert the power plug into the CSG-50 "+9V POWER" connector and plug the adapter into 110-120 volt, 60-Hz AC power.

WARNING

ELECTRICALLY OPERATED PRODUCT

As with all electrical products, precautions should be observed during handling and use to prevent electrical shock.

NOTE

Make sure the plug is inserted all the way into the power connector or else damage to the power adapter may result. The CSG-50 has internal protection circuitry to prevent it from being damaged should the wrong polarity of power be applied. However, do not use an adapter of more than 9 volts at 500 milliamperes or damage to the CSG-50 may result.

3.2 Operating From Battery Power

You can operate your CSG-50 from battery power in order to use it in the field as a portable color bar or sync generator.

The CSG-50 can be operated from 9-to-12 volts DC, obtained either from a conventional 12 volt video camera battery or other 9-12 volt DC source.

3.3 Connecting The Output Signals

Connect the CSG-50 to your video equipment as determined by the requirements of your system. In general, the CSG-50 "VIDEO OUT" signal is for equipment with composite video inputs labeled "VIDEO IN", REF VID", "GENLOCK", etc. The CSG-50 "SYNC OUT" signal is for composite sync inputs labeled "EXTERNAL SYNC IN", "EXT SYNC", etc.

As with other video equipment, the CSG-50 VIDEO OUT and SYNC OUT signals need to be terminated by a single 75-Ohm termination in order to provide proper video levels to your system.

3.4 Connecting the CSG-50 to Operate Multiple Pieces of Video Equipment

The are two methods of connecting the CSG-50 to multiple video inputs: by using "loop-through" or "T" connectors or by using a video distribution amplifier.

3.5 Using a Distribution Amplifier

To use the CSG-50 with a distribution amplifier (DA) connect the desired CSG-50 output to the input of the DA. Terminate the CSG-50 input to the DA. Use a video DA for the CSG-50 VIDEO OUT signal and a pulse DA for the SYNC OUT signal. Connect the outputs from the DA to each of the components of your video system as required, making sure each DA output is terminated only once.

3.6 Using Loop-Through or T Connectors

The single video (or sync) output of the CSG-50 can operate two or more video units without the need of a distribution amplifier if the equipment can be connected to present only one 75-Ohm terminating load to the CSG-50 output.

Some video equipment has an internal termination which can be connected or disconnected by way of a switch, usually labeled "TERM ON/OFF", "75-OHM/HI-Z", or equivalent. This is the most versatile. Other video equipment may have no terminator and needs to be externally terminated. This is the next most versatile. The least versatile is equipment having internal termination that is always connected and cannot be disconnected. This is the most common.

If your video equipment has two BNC video connectors for video "loop-through", connect the CSG-50 video output to one of the connectors and switch the terminator off. Next, route the video signal from the looping BNC connector to the input of the next piece of equipment. Repeat this process until all video equipment is connected. Then, on the last unit in line, switch the termination on.

For equipment that does not have looping connectors, use "T" connectors at the input of each piece of video equipment to provide the necessary video in/out connections.

When you have a single piece of equipment with a terminator that cannot be switched off, use it as the last piece of equipment in the line, if possible. If you have multiple pieces of video equipment with terminators that can not be switched off, you must use a distribution amplifier.

If none of your equipment has terminators, install a 75-Ohm BNC type external terminator at the loop-through output (or T connector) of the last piece of equipment.

4 OPERATING THE CSG-50

To operate the CSG-50 simply connect the desired output signals, apply power and set the POWER switch to ON. A red LED in the front panel lights when the CSG-50 is powered up.

4.1 Selecting the Pattern

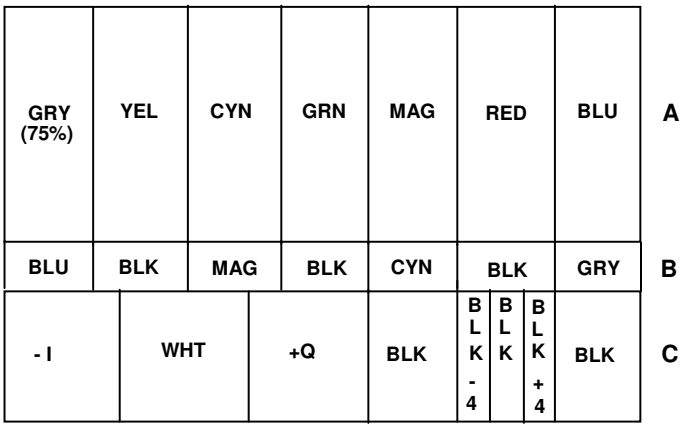
The three position PATTERN switch allows selection of split-field SMPTE color bars (top position), blackburst (middle position), or full-field EIA bars (bottom position). Note that the composite SYNC OUT signal is continuously output regardless of video pattern is selected.

4.2 Full-Field Color Bars

Full-field color bars, shown in Figure-1, consist of a full-field of the color bar portion (top half) of the standard split-field EIA RS-189A color bar pattern.

4.3 SMPTE Color Bars

SMPTE color bars, as shown in Figure-1, consist of the standard split field EIA RS-189A color bar pattern with the addition of special chroma set and black set patterns.



A. Full Field Color Bars or top half of SMPTE Bars
B. Chroma Set Pattern (Reverse Blue)
C. Black Set Pattern (IYQB)

Figure 1, Color Bars

4.4 Monitor Adjustment Using SMPTE Color Bars

The chroma set color bar pattern is used to adjust monitor hue and intensity. The black set pattern is used to adjust brightness and contrast.

4.5 Color Hue and Intensity Adjustment

To adjust color hue (phase) and intensity (gain) using SMPTE color bars requires a video monitor that permits the red and green CRT guns to be switched off.

1. Switch off the red and green guns and adjust the color intensity to match the outer left or right main blue or grey bar with the intensity of the chroma set bar just below.

2. Adjust chroma hue by matching the brightness of either center main blue bar with the chroma set bar just below.

4.6 Brightness and Contrast Adjustment

To correctly set monitor brightness and contrast, adjust the controls so that the whiter-than-black (BLK +4) is visible with respect to the black surround, but the blacker- than-black bar (BLK -4) is not visible.

4.7 Operating the 30/60 Second Timer

The thirty or sixty second timer is started whenever the CSG-50 TIMER switch is set to 30-SEC or 60-SEC respectively. The timer causes the VIDEO OUT signal to change from the selected color bar pattern to black after the indicated time has elapsed. The color bar pattern is again selected whenever the TIMER switch is set to the center OFF position.

It should be noted that the change from bars to black (or black to bars) is color framed and takes place during the vertical interval for minimum disturbance to the video signal.

4.8 Using the Timer to Stripe Tapes With Color Bars, Black, and Time code

The CSG-50 timer allows you to conveniently pre-stripe video tapes with SMPTE time code and a video leader consisting of color bars followed by black for the remainder of the tape.

For example, to use the CSG-50 with a HORITA TRG-50 SMPTE time code generator, connect them as shown in Figure-2. Power up the CSG-50 and select the desired color bar pattern.

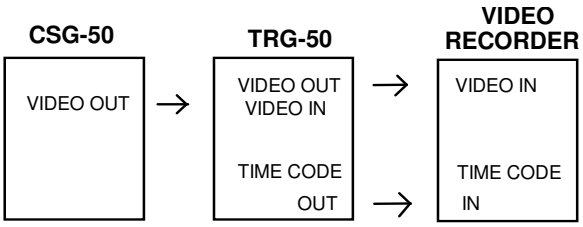


Figure-2, Pre-Striping Tapes

Use the 30/60/90/120 second automatic backtime feature of the TRG-50, to automatically backtime it 1 minute, leaving it ready to start at "23:58:00:00".

When ready to start the recording, place the video recorder into record mode, set the CSG-50 TIMER to 30-SEC, then momentarily switch the RDR/GEN/SET switch to GEN to start the TRG-50 time code generator running. Adjust recording levels as desired.

After thirty seconds the video will change from color bars to black, then after another thirty seconds the time code will roll through 00:00:00:00 time. 00:00:00:00 time is generally the "IN time" of the first edit on the tape if it is later used as an edit master.

5 MAINTENANCE

5.1 Cleaning

1. Do not attempt to disassemble your CSG-50 to clean it.
2. Clean your CSG-50 using only a damp cloth.
3. NEVER use water or solvents such as alcohol, window cleaner, etc., to clean your CSG-50.

5.2 Service and Troubleshooting

If you suspect your CSG-50 is not operating properly, check the following:

1. Check all coaxial cables for opens or shorts.
2. If using an AC power adapter different from the one supplied with the CSG-50, make sure it supplies the CSG-50 with at least 9 volts (maximum of 14 volts) when the CSG-50 is switched on.

You may return your CSG-50 to HORITA for service. Please contact HORITA first, either by phone or mail, before returning your unit.

5.3 Adjustments

Adjustments are provided for overall video amplitude, chroma amplitude and frequency, and audio level. These adjustments do not normally require service. The CSG-50 should be powered up for 1/2 hour before any adjustments are

performed.

A stable frequency counter capable of measuring up to at least 15MHz, a standard NTSC waveform monitor and vector scope, and an AC voltmeter are required to adjust the CSG-50.

Note that the VIDEO LEVEL control permits minor adjustment of the video level and is set at the factory for an output amplitude of 1 volt. Although not recommended unless you have ready access to a NTSC waveform monitor (or oscilloscope) for re-calibration, the VIDEO LEVEL control can be used to compensate for slight amplitude variations resulting from cabling and termination values in your system.

To access the adjustments, remove the bottom cover from the CSG-50 by removing the two screws from the front panel and then sliding the bottom cover out towards the front.

If you have a Rackmount or Shortrack packaged CSG-50, remove the four screws from the top cover and remove the cover.

All adjustments are located on the circuit board as shown in Figure-3.

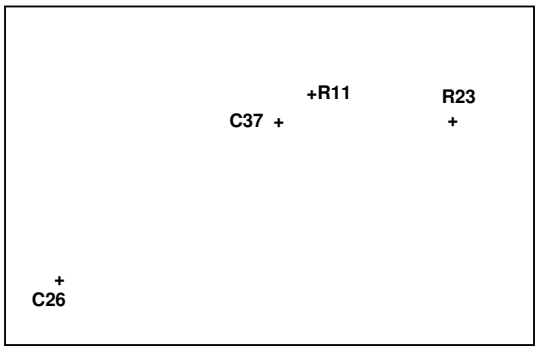


Figure-3, Adjustment Locations

5.4 Chroma Frequency Adjustment

Frequency Counter Method

1. Connect a frequency counter to monitor U6 pin-8.
2. Adjust C26 for a frequency reading of 14.318180Mhz +/-10Hz

Off the Air Method

The frequency of the CSG-50 master oscillator can be set very accurately by using off the air television broadcast signals.

1. Connect the CSG-50 Video Out through a BNC "T" connector to the input of a video monitor.
2. Connect the composite video output from a TV receiver/monitor or tuner to the other input of the "T" so that the two video signals mix and are simultaneously displayed on the monitor. Alternately a monitor with separate A and B video inputs and a "mix" display mode can be used.
3. Set the TV channel to one of the major networks. ***NOTE:*** For best frequency accuracy, make sure you are viewing a network originated signal. Generally, a locally originated signal, such as from cable services, colleges, etc. may not be as stable as that from a major television network.
4. The TV monitor will "lock up" to either the CSG-50 or the off air signal, sometimes switching back and forth between the two. There will be a relatively dark vertical bar going from top to bottom of the screen and it will appear to be stationary or to be moving slightly from left to right or from right to left. The bar will also have a colored stripe in its right half, and the stripe will be continuously changing colors.
5. Carefully adjust C26 for minimum movement of the bar across the screen, and then for the slowest change of the colored stripe. It should be possible to have the stripe go through all its colors only a few times a second or less. Switch CSG-50 power OFF and ON if necessary.

5.5 Video Amplitude and Equalization

The video level is set at the factory for an output amplitude of 1 volt. Whenever the video amplitude is adjusted, the video equalization should also be adjusted.

a. Select the SMPTE color bar pattern from the CSG-50

b. Connect the waveform monitor to Video Out and set it to observe 2H lines with the DC restorer set to ON, and the blanking level positioned to 0 IRE.

c. Adjust R11 AMP for a video level of 1 volt p-p (140 IRE), ±1.4 IRE (1%) as measured from the -40 IRE sync tip level to the 100 IRE white level.

d. Switch to the vector scope and adjust C37 EQ to place the chroma vectors at the centers of the targets. If only a waveform monitor is available, adjust C37 so the tops of the yellow and cyan chroma levels (next to the SMPTE 100 IRE white level) are also at 100 IRE.

5.6 Audio Tone Amplitude

a. Connect the voltmeter to the 1KHz 0dB output and set it to measure AC RMS volts.

b. Adjust R23 for a reading of 776mV RMS (2.19V p-p), ±7.8mV (1%).

6 SPECIFICATIONS

Power

Operation	9-to-14V DC, 250 milliamperes
Connector	3.5 MM mini phone jack
AC Adapter	9 volt, 500 milliamperes

Color Bar Output

Standard	RS-170A timing
SMPTE	SMPTE EG-1-1990
Full-Field	EIA RS-189A colors
Amplitude	1volt (140 IRE) peak-to-peak with 75-Ohm termination

Black-Burst Output

Standard	RS-170A timing
Amplitude	Equivalent to 1 volt p-p video with with 75-Ohm termination. +7.5 IRE black level

Sync Pulse Output

Standard	RS-170A timing
Type	Composite sync
Amplitude	-4volts $\pm$ .5volts with 75-Ohm termination

Audio Tone Output

Type	1 KHz .05% crystal controlled sine wave
Amplitude	OdB =775 mV RMS =OdB/OdBu, adjustable for OdB=1.0V RMS=OdBV
Impedance	Less than 20 ohms

Ref Frame Output

Type	1H pulse (63.5uS) on line 262 of color field 4
Amplitude	+5 volts, (HCMOS)

Connectors

VIDEO OUT SYNC OUT	BNC
REF FRAME OUT	RCA
POWER	3.5MM Mini Phone

Switches And Controls

Power	0N/OFF toggle switch with associated red LED

Timer	30/60 SECOND, 3 position toggle
Pattern	SMPTE/BLACK/FULL, 3 position toggle

Environment

Operating	5C to 40C (41F to 104F)
Storage	-10C to 60C (14F to 140F)

Dimensions

1.75"H, 3.5"W, 4.5"D

Weight

Approximately 13 Oz. (shipping weight approximately. 29 Oz. including power adapter)

Specifications subject to change without notice.