HORITA CSG-50

Color Bar, Black-Burst, Sync Generator

USER MANUAL

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

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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, black-burst, 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 black-burst, and time-code.

Color bars and black-burst 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 chromanance, 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, chromanance, or blanking information.

Typical applications of the 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, black-burst, 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 black-burst (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.

* Black-burst 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 black-burst 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

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.

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-14 volts DC, obtained either from a conventional 12 volt video camera battery, or from the HORITA BP-50 12 volt battery pack. The BP-50 consists of eight rechargeable AA sized batteries, battery

holder, power cable, heavy duty cloth case with nylon strap, and convenient wall-type overnight recharger with LED.

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.

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 .

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.

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.

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 power switch (or on the front panel of rackmount models) lights when the CSG-50 is powered up.

Selecting the Pattern

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

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.

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.

GRY (75%)	YEL	CYN	GRN	MAG	RED	BLU

Full-Field Color Bars

GRY (75%)	YEL	CYN	GRN	MAG	RED	BLU

BLU	BLK	MAG	BLK	CYN	BLK	GRY	A

-I	WHT (100%)	+Q	BLK	BLK -4	BLK	BLK +4	BLK

B

A. Chroma Set Pattern   B. Black Set Pattern

SMPTE Color Bars

Figure-1, Color Bars

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.

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.

Brightness and Contrast Adjustment

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

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) takes place during the vertical interval for minimum disturbance to the video signal.

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.
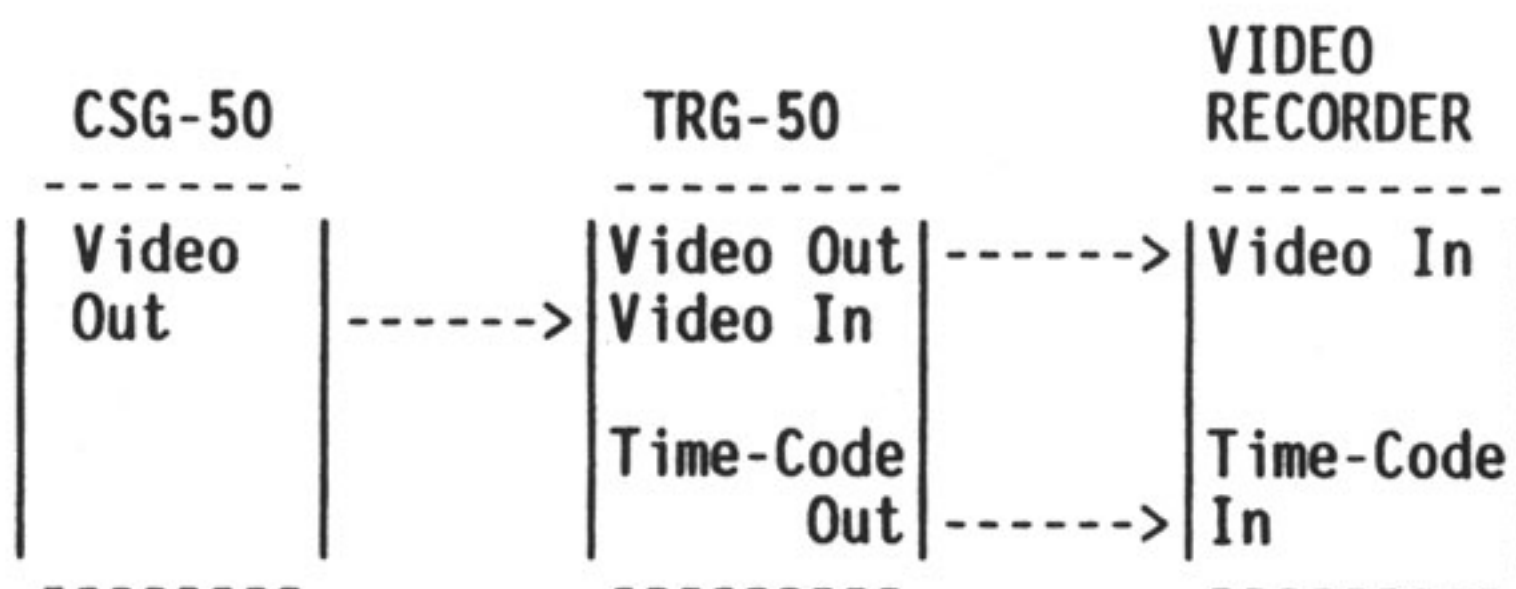
```
                                          VIDEO
   CSG-50              TRG-50             RECORDER
 --------           ---------           ---------
|          |       |Video Out|------->|Video In  |
| Video    |       |Video In |        |          |
| Out      |------>|         |        |          |
|          |       |         |        |          |
|          |       |Time-Code|        |Time-Code |
|          |       |     Out |------->|In        |
 --------           ---------           ---------
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Figure-2, Pre-Striping Tapes

To use the 30/60/90/120 second automatic backtime feature of the TRG-50, power it up while holding the RDR/GEN/SET switch in the SET position. When the window display shows one minute (00:01:00:00), release the RDR/GEN/SET switch to the GEN position and the TRG-50 will immediately backtime the generators start time to "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 and release to start the TRG-50 time-code generator running. Adjust

recording levels, if 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

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 BSG-50.

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.

Adjustments

Adjustments are provided for video amplitude and color frequency and phase. 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, and a standard NTSC waveform monitor and vectorscope 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 cableing and termination values in your system.

Access to the video level adjustment is made through the access hole in the rear panel marked "VIDEO LEVEL".

To access frequency and phase 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.

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 _____
|                                        |
|         C40                R11         |
|          +                  +          |
|        Phase              Level        |
|                                        |
|                                        |
|                                        |
|                                        |
|          +                             |
|         TP1                            |
|                                        |
|       C26                              |
|        +                               |
|     Frequency                          |
|_____|
```
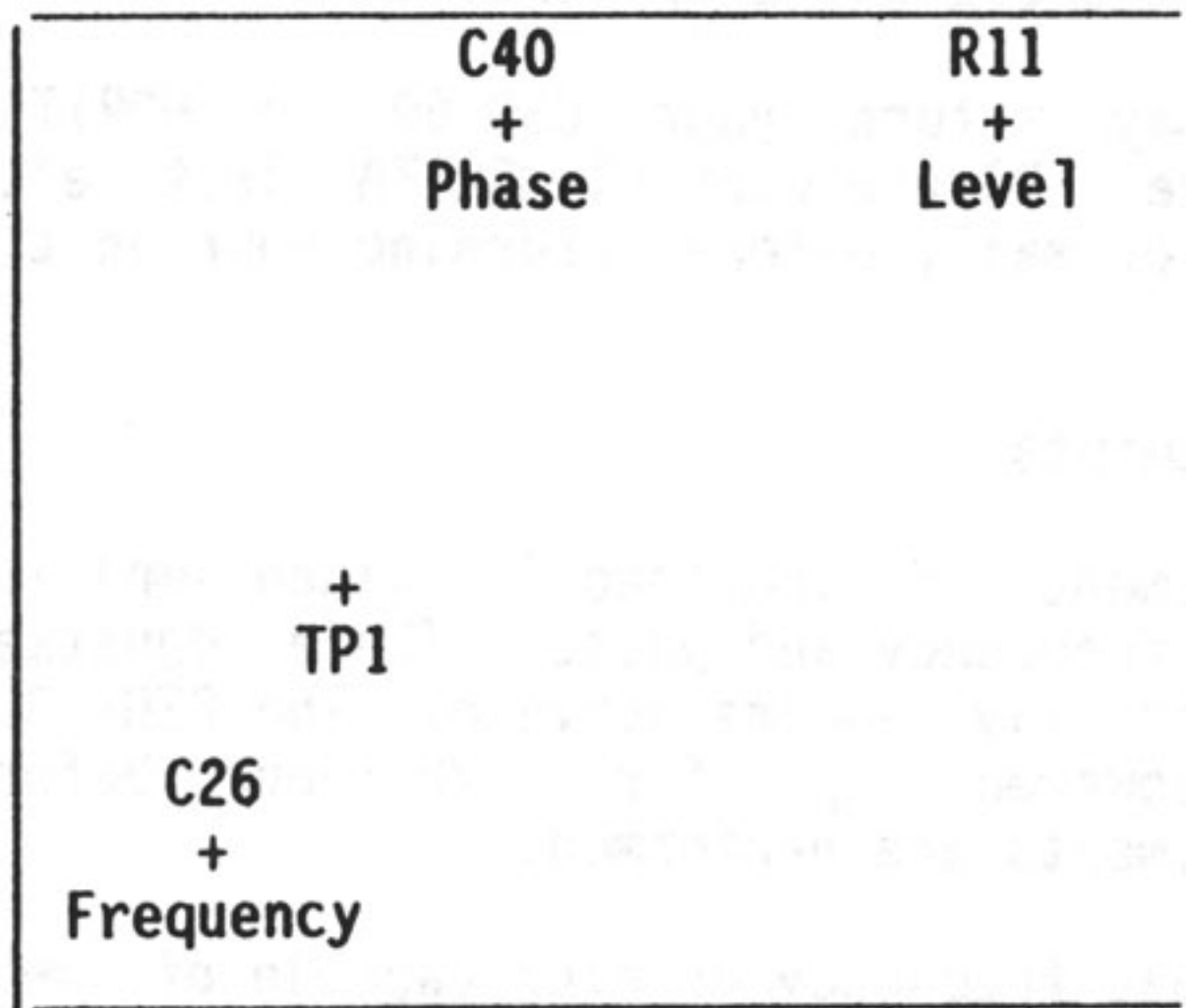
Figure-3, Adjustment Locations

Frequency Adjustment

1. Connect a frequency counter to monitor TP1.

2. Adjust C26 for a frequency reading of 14.318180Mhz +/-40Hz

Video Level Adjustment

1. Using a coaxial cable of not more than 6' of RG-59/U, connect a NTSC video waveform monitor to VIDEO OUT and terminate at 75-Ohms +/-1%.

2. Adjust R11 for a peak-to-peak video level of 1 Volt +/-7 IRE (.05 volt)

Phase Adjustment

1. Using a coaxial cable of not more than 6' of RG-59/U, connect a NTSC vectorscope to VIDEO OUT and terminate at 75-Ohms +/-1%.

2. Adjust C40 for best overall placement of the chroma vectors within the targets.

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   1 volt (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   -4 volts with 75-Ohm termination
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 ON/OFF Switch with red LED
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