HORITA   BSG-50

Blackburst, Sync, Audio Tone Generator

USER MANUAL

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

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1 GENERAL

As your video system grows with the addition of new equipment, you eventually need to have all components operating in synchronism. This means that each piece of video equipment is performing its video signal generation or processing task at exactly the same time, on exactly the same part of the picture. When two or more devices are operating in exact synchronism they are "genlocked".

The BSG-50 is an ideal "house sync" generator for genlocking small video systems, providing an economical means for obtaining the most common "RS-170A" video timing signals, including blackburst, composite sync, composite blanking, horizontal drive, vertical drive, burst flag, and color subcarrier. These signals are used 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 BSG-50 can also operate with various HORITA SMPTE time code reader/generators for striping video tapes with blackburst, SMPTE time code, and an audio tone.

Most genlockable video equipment needs only a composite video signal, such as blackburst or composite sync to genlock, while other equipment may require several individual video timing signals. Some video equipment has no provision for genlocking.

Composite video is a single signal containing all necessary video and timing information. This information consists of the black and white and color picture details, horizontal and vertical sync and blanking timing, and color synchronization information. The horizontal and vertical sync and blanking signals define a precise border in which the actual picture detail is located. You do not normally see this border on a monitor unless the vertical or horizontal controls are misadjusted. The color synchronization signal (called colorburst) allows the color information to be decoded to produce the correct color shades and intensities. Blackburst is an example of a composite video signal consisting simply of a black screen.

2 FEATURES

The BSG-50 provides a total of twelve video timing signals for output, consisting of six blackburst, four syncs, and two subcarriers. The user can select which of these signals are output on the six rear panel BNC connectors. When received from the factory, the BSG-50 is set up to output six blackburst signals. The rack mount RM-50/BSG has two additional BNC connectors and is set up to output six blackburst and two composite sync signals.

A special feature of the BSG-50 is that each of the four sync signals available for output can be individually set to be composite sync, composite blanking, horizontal drive, or vertical drive. Additionally, one of the sync signals can be set to burst flag. When outputs are changed from the factory settings, a special silkscreened area on the rear panel adjacent to each BNC connector can be used to identify the output signal chosen for that individual connector.

In addition to the video timing signals, the BSG-50 also outputs a crystal controlled 1 KHZ, 0dB sine wave audio tone which can be used for audio testing or audio level setup purposes.

The BSG-50 operates from a small AC power adapter which is included, or can be operated in the field from 9-to-13.5 volts DC battery power.

3 CONNECTING AND OPERATING THE BSG-50

3.1 Connecting Power

Included with your BSG-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 BSG-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.

Make sure the plug is inserted all the way into the power connector or else damage to the power adapter may result. The BSG-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 BSG-50 may result.

3.2 Operating From Battery Power

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

The BSG-50 can be operated from 9-to-13.5 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 Cordura cloth case with nylon strap, and convenient wall-type overnight recharger.

3.3 Connecting The Output Signals

You will need to connect the BSG-50 to your video equipment as determined by the requirements of your system. In general, blackburst is usually required by video equipment that processes color information in some manner, such as a TBC, switcher, or effects generator. Their video reference inputs may be labeled "VIDEO IN", "REF VID" or "GENLOCK".

The composite sync signal by itself is usually used by equipment that does not process color information, but needs to be synchronized vertically and horizontally, an example being many models of 3/4" professional VCRs. Generally, apply the composite sync (CS) signals from the BSG-50 to equipment that has reference inputs labeled "EXTERNAL SYNC IN", or "EXT SYNC".

3.4 Selecting The Output Signals

The BSG-50 comes set up from the factory to output six blackburst signals. You can change the outputs to other signals available on the BSG-50 circuit board as follows:

1. Remove power from the BSG-50.

2. The bottom of the BSG-50 is a cover which slides out towards the front. There are two screws which attach the front panel of the BSG-50 to the case. Turn the BSG-50 upside down and remove the two screws from the BSG-50 front panel. Remove the front panel and slide the bottom cover out the front of the unit. If you have a Rackmount or Shortrack packaged BSG-50, remove the four screws from the top cover and remove the cover.

3. Each of the rear panel BNC outputs connects to a signal on the BSG-50 circuit board using small 2-pin connectors. As shown in Figure 3-1, six blackburst signals are output on JP16, JP17, JP18, JP19, JP20, and JP21, the four sync signals on JP8, JP9, JP10, and JP11, and the two subcarrier signals on JP5 and JP6.

   To select a signal for output on a particular BNC connector, follow the black and white wires back from that BNC connector to its 2-pin connector that plugs into the circuit board. Then simply unplug the 2-pin connector from its present location and plug it into the desired location.

   For example, to output a composite sync signal on BNC connector number "4", follow the wires back from BNC connector "4" to the 2-pin connector on the circuit board. Unplug the 2-pin connector from its present location and plug it into one of the remaining available composite sync signals on connectors JP12-JP15.

NOTE

When changing outputs, make sure to get both pins of the 2-pin connector inserted. The connector should slide on smoothly and snap securely in place. Make sure the connector is attached correctly or no signal will be output.
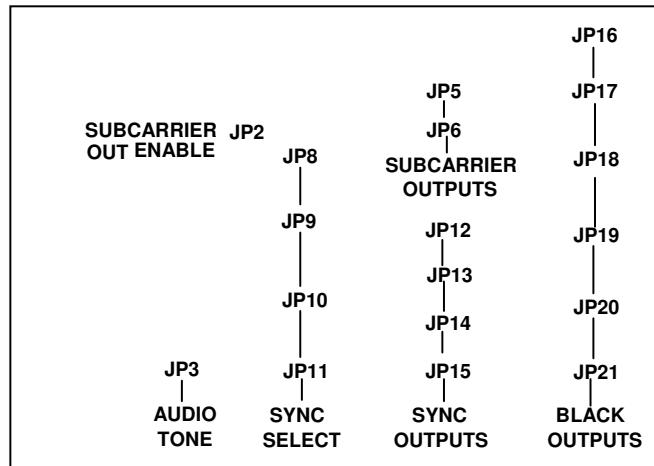
Figure 3-1, Circuit Board Connector Locations

3.5 Sync Signal Selection

The sync signals output on connectors JP12 through JP15 are individually programmable as composite sync (CS) composite blanking (CB), vertical drive (VD), or horizontal drive (HD). Additionally, burst flag (BF) can be output on JP12. These signals are identified next to sync select connectors JP8 thru JP11. Note that JP12 is the only connector that has burst flag (BF) available for selection. JP8 selects sync signals for JP12, JP9 for signals on JP13 , etc.

Signal selection is accomplished by moving the jumpers on JP8 thru JP11 to select the desired output for JP12 through JP15. For example, to output composite blanking on JP13, remove the jumper from CS2 of JP9 and place it on CB2 of JP9. The BNC connector that is connected to JP13 now outputs composite blanking instead of composite sync.

3.6 Subcarrier Output Selection

To select subcarrier for output, connect one of the BNC connectors to JP5 or JP6 via its 2-pin connector (as previously described for sync signal selection).

On JP2, move the jumper over to connect pins 1 and 2. Connect pins 2 and 3 on JP2 when subcarrier is not selected, to keep subcarrier leakage at a minimum. It may be necessary to slightly readjust burst amplitude and SCH when sucarrier is selected.

3.7 Operating the BSG-50

To operate the BSG-50 simply connect the desired output signals and power it up. A red LED above the power switch comes on when the BSG-50 is powered up.

4 MAINTENANCE

4.1 Cleaning

a. Do not attempt to disassemble your BSG-50 to clean it.

b. Clean your BSG-50 using only a damp cloth.

c. NEVER use water or solvents such as alcohol, window cleaner, etc., to clean your BSG-50.

4.2 Service

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

a. Check all coaxial cables for opens or shorts.

b. If using an AC power adapter different from the one supplied with the BSG-50, make sure it supplies the BSG-50 with at least 9 volts (maximum of 13.5 volts) when the BSG-50 is switched on.
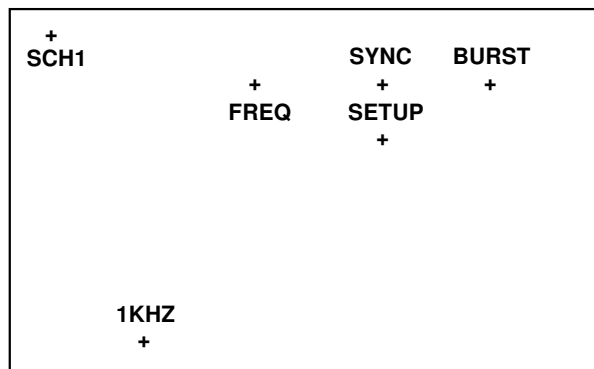
You may return your BSG-50 to HORITA for service. Please contact HORITA first, either by phone or mail, before returning your unit.

4.3 Adjustments

NOTE:

The unit should be powered up for 1/2 hour before any adjustments are performed.

Access to adjustments is made by removing the bottom cover from the BSG-50 as previously described for changing output signal selection. All adjustments are located on the circuit board as shown in Figure 4-1.

```
+
SCH1                        SYNC    BURST
                  +          +       +
                 FREQ      SETUP
                             +




         1KHZ
           +
```

Figure 4-1, Adjustment Locations

4.4 Subcarrier Frequency

Frequency Counter Method

Set up the BSG-50 to output subcarrier on JP6 and to one of the BNC connectors and connect a frequency counter to observe the output. Adjust FREQ ADJ for a frequency reading of 3,579,545 +/- 5HZ. If not using subcarrier out, return the jumper on JP2 to pins 1 and 2 before proceeding.

Off the Air Method

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

1. Connect the BSG-50 Video Out through a BNC "T" connector to the input of a video monitor.

2. Connect the video output from a TV receiver/monitor or VCR 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

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and a "mix" display mode can be used.

3. Set the TV channel to one of the major networks.

NOTE:
Make sure you are viewing a network originated signal. Do not make this adjustment
using a locally originated signal, such as from cable services, colleges, etc.

4. The TV monitor will "lock up" to either the BSG-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 BSG-50 power OFF and ON if necessary.

4.5 Setup, Sync, and Burst Levels

Set up the BSG-50 for a blackburst output and connect a waveform monitor or oscilloscope to observe one of the the outputs. Make sure the blackburst signal is terminated at 75 ohms.

1. Because some adjustments interact, adjust the SETUP LEVEL first. Adjust for +7.5IRE units (53.6 mV P-P, +/-5mV).

2. Next, adjust SYNC AMP for a level of -40 IRE units (285.7 mV P-P, +/-10mV).

3. Adjust BURST AMP for a level of 40 IRE units (285.7 mV P-P, +/-10mV).

4.6 SCH Adjustment

Before proceeding, make sure the subcarrier frequency adjustment step has been performed.

1. Connect a digital voltmeter or oscilloscope to pin-8 of IC U3 and adjust SCH1 (C5) for a reading of 2.5V DC.

2. Disconnect the voltmeter or oscilloscope and fine adjust C5 for a reading of "0" $\pm$ 5° SCH on the equipment you are using to measure SCH.

4.7 Audio Tone Amplitude

Connect an voltmeter or oscilloscope to the 1KHz audio output of the BSG-50 and adjust 1KHz AMP for 775 mV RMS (2.19 volts P-P) for 0 dBm/0dBu output level. If a 0 dBV output level is desired, adjust for a reading of 1 volt RMS (2.83 volts P-P).

5 SPECIFICATIONS

Power
Operation	9-to-13.5V DC, 100 milliamperes
Connector	3.5 MM mini phone jack
AC Adapter	9 volt, 500 milliamperes

Blackburst Output
Standard	RS-170A
Amplitude	Equivalent to 1 volt p-p video signal with 75 ohm load
Setup	+7.5 IRE units, adjustable from 0 to +10 IRE units
Adjustments	Sync amplitude, burst amplitude setup level, subcarrier frequency, SCH.

Sync Pulse Outputs
Type	Composite sync, composite blanking, horizontal drive, vertical drive
Amplitude	-4 volts with 75 ohm load
Standard	RS-170A

Subcarrier Output
Amplitude	2.5 volts p-p with 75 ohm load
Frequency	3.579545 MHz $\pm$ 10HZ adjustable, basic crystal stability 15 PPM 0C to 50C, 10 ppm per year
Phase	Adjustable with SCH adjustment

Audio Tone Output
Type	1 KHz $\pm$2% crystal controlled sine wave
Amplitude	0dB =775mV RMS=0dBm/0dBu, adjustable for OdB=1.0V RMS =OdBV Output
Impedance	Less than 20 ohms
Adjustments	1 KHz amplitude

Connectors
Blackburst,	
Sync Pulse,	
Subcarrier	BNC
Audio Tone	RCA

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 29Oz. including power adapter)

Specifications subject to change without notice.