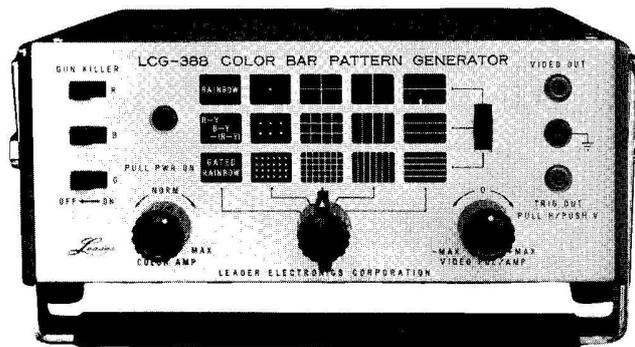


LEADER TEST INSTRUMENTS

MODEL LCG-388

COLOR BAR PATTERN GENERATOR

INSTRUCTION MANUAL



LEADER ELECTRONICS CORP.

INSTRUCTION MANUAL

LCG-388

1. General.

LCG-388 is designed specially for the servicing of the color and monochrome TV receivers. It generates 15 different patterns and provides outputs for two selectable TV channels, video signals, both + and -, trigger signals for the oscilloscope use, and in addition the gun killers.

The internal logic circuitry is made up of binary counters (flipflops) and logic gates for the formation of highly stable signals for the patterns. For this reason, there is no need for temperature compensation in the frequency dividers or the tedious preliminary checking and adjustments usually required in the conventional instruments. A regulated power supply is incorporated to eliminate the effects of changes in the line voltage. All in all, high quality and reliable patterns are always available.

2. Specifications.

1. Patterns

- | | |
|---------------------|--|
| A. Color bars | Gated rainbow R-Y, B-Y and -(R-Y) Rainbow Level adjustable from 0 to 200 % of the sync signal |
| B. Dots | Fine : 15 × 21 Coarse : 7 × 11 Single at center of raster |
| C. Crosshatch | Fine : 15 × 21 Coarse : 7 × 11 Single crossbar intersecting at center of raster |
| D. Vertical lines | Fine : 21 Coarse : 11 Single : at center |
| E. Horizontal lines | Fine : 15 Coarse : 7 Single : at center |

2. RF Output

- | | |
|-------------|--|
| A. Channels | TV5 (77.25 MHz) and TV6 (83.25 MHz) within ±0.5% |
| B. Output | 10 mV approx. on open circuit ; impedance : 300 ohms, balanced |

3. Video Signal
 - A. Polarity + or - ; amplitude continuously adjustable
 - B. Output -3 to +3 volts p-p approx. on open circuit ; impedance : approx. 150 to 350 ohms at 100kHz
4. Trigger Signal Output

| | <u>Pulse Width</u> | <u>Amplitude</u> |
|---------------|--------------------|------------------|
| A. Horizontal | 10 μ s | - 10 volts |
| B. Vertical | 190 μ s | - 10 volts |
5. Sync Signal (H=63.5 μ s)
 - A. Horizontal 15.75 kHz ; pulse width 0.08 H
 - B. Vertical 60.11 Hz ; pulse width 3 H
6. Return Trace Blanking

| | <u>Interval</u> | <u>Front Porch</u> |
|---------------|-----------------|--------------------|
| A. Horizontal | 0.17 H | 0.02 H |
| B. Vertical | 22 H | 3 H |
7. Gun Killers For Red, Blue and Green, grounded through 100k Ω
8. Power Supply 105-125 volts, 50/60 Hz ; 2 VA approx.
9. Size and Weight 4 $\frac{1}{8}$ H \times 7 $\frac{3}{4}$ W \times 7 $\frac{3}{4}$ D in. ; 4.3 lbs

3. Operation.

3.1 RF Output.

1. Connection leads. Open the storage compartment by pulling up the captive nylatch plugs on the bottom cover, see Fig. 1, and take out the 300 Ω feeder and three leads.
The AC cord and the three gun killer leads are led out of the notch on the cover.
The handle can be used for tilting the instrument for easy control setting, see Fig. 2.
2. Connect the AC plug to the AC line supply at 105-125 volts, 50/60 Hz.
3. Connect the 300 Ω feeder line between the two-pin connector at the back of the case and the antenna input terminals of the receiver, see Fig. 3.
4. Set the channel selector at the back of the case to one of the unused TV channels, No. 5 or No. 6. Interference will prevent satisfactory testing if made on the same locally used channel.

5. Set the white dot on the COLOR AMP knob at NORM and pull the knob forward gently to turn on the AC power. The LCG-388 is ready for use.

It is advisable to turn on the AC power to the receiver under examination 15 to 30 minutes before the tests.

6. Any of the 15 patterns to be used are selected by the combination of the five position switch at the panel center and the slide switch at the right for the vertical and horizontal rows respectively.
7. Set the receiver channel selector to No. 5 or No. 6 depending on the RF channel in use.
8. Adjust the fine or vernier tuning control in the receiver so that the selected pattern is displayed properly.
9. Adjust the following receiver controls as required for the clear and easy-to-observe pattern :

- Color contrast, or saturation
- Hue, or tint
- Brightness
- Contrast

If the conditions are satisfied but the pattern is not steady, the AFC on the local oscillator should be turned off and manual tuning should be performed.

If the pattern is not locked or not clear, check the following :

- a. 300 Ω feeder for loose or open connections.
- b. Channel setting : generator and receiver.
- c. Interference from other TV stations or noise.
- d. Fine tuning adjustment in the receiver.
- e. Condition of the horizontal and vertical sync hold in the receiver.
- f. Overall operation of the TV receiver.

When the color bars are not displayed properly, make the following checks :

- a. Fine tuning adjustment in the receiver.
- b. Setting of the COLOR AMP control which should be at the NORM position.
- c. Adjustment of the color contrast, hue and brightness controls.
- d. Gun killer connections which should not be made at this step.

- e. Purity, convergence and white balance adjustments in the receiver.
- f. Color sync circuit and/or color demodulator adjustments in the receiver.

NOTES:

1. In the above adjustments, the brightness and contrast should never be set to the point where defocussing is apparent.
2. In small screen receivers, it may be necessary to reduce the contrast slightly since the vertical lines tend to be a little darker than the horizontal lines.
This effect is due to the narrower response in such receivers and the higher frequency components are cut off.
3. When the dots or the vertical lines in color receivers are tinged with color, adjust the color killer control to remove the effect.
4. In the color bar display, small slanted patterns may appear which run up or down; this is a normal condition.
5. When small foldovers appear on the vertical lines at the top, the effects can be reduced by adjusting the horizontal sync hold control in the receiver.
This is due to the horizontal circuit characteristic in the receiver and is more noticeable where the pulse width AFC is employed.
6. In the gated rainbow, bars No. 1 and No. 10 at the left and right sides respectively may not be displayed when the horizontal sync hold, positioning and/or width controls are not adjusted correctly.

3.2 Video Output.

The pattern signals can be applied directly to the video circuit in the receiver when desired. In this manner, the internal circuits can be checked and inspected. The procedures are given below.

1. Preparation.
 - a. Set the AC power switches of the generator and receiver at off.
 - b. Set the channel selector to No. 5 or No. 6, whichever is not in use locally.
 - c. Set the AGC control at maximum.
 - d. Disable the video IF amplifier action by tube removal or disconnect.

tion of the DC power supply to this section.

- e. Remove the video detector, or otherwise disable this circuit.

2. Connections.

Connect the ground lead (black) provided between the GND jack and the receiver chassis. (The black lead of the gun killer can be used if desired since this lead is grounded.) Connect a lead (red) from the VIDEO OUT pin jack to the video circuit input.

NOTES :

1. The video output signal is approximately 3 volts p-p of which 1 volt p-p is the sync signal component. Therefore the signal must be injected at the point where the level is low, such as across the detector load or at the video amplifier input.
The video output impedance at 100kHz is between a low of 150Ω to a high of 350Ω approximately; a 1μF blocking capacitor is built-in. If the connection is made where the load impedance is lower than 1kΩ, there will be an increase in the sag of the 60Hz vertical sync signal. At the same time the output voltage will be decreased.
2. The video signal should not be connected at the point where a DC voltage of more than + or -200 volts or a pulse voltage of more than 3 volts p-p may exist.
3. Adjustments.
 - a. Set the AC power switches of the receiver and the generator to ON.
 - b. Set the VIDEO POL/AMP control in the direction of the desired polarity; the amplitude increases in towards the -MAX and +MAX respectively. At the 0 position, the output voltage is minimum.
 - c. Adjust the receiver controls, namely color contrast, hue, brightness and contrast for the clear display of the pattern selected.
When the proper display is not achieved, then check the horizontal and vertical hold sync circuit adjustments, settings of the different color adjusters and/or refer to the NOTES for Sect. 3, Part 9. In addition, check whether the input signal polarity and amplitude are properly adjusted.

3.3 Use of Trigger Output

When it is desired to observe the different pattern signals in the receiver circuits on an oscilloscope, the trigger (sync) signals are available for triggering, or synchronizing the sweep. This feature eliminates the need for the tedious adjustments each time a different signal, horizontal or vertical, is under observation.

1. Connect the lead (black) from the GND pin jack to the receiver chassis.
2. Connect a lead (red) from the TRIG OUT pin jack to the external trigger or sync signal input connection on the oscilloscope.
3. Set the trigger or sync control on the oscilloscope for the external input and the polarity to – (negative).
4. The trigger signal is determined by the setting of the VIDEO POL/AMP control knob as follows :

Vertical : at the in position, i.e. PUSH V.

Horizontal : at the out position, i.e. PULL H.

Adjust the trigger level and the timing speed controls on the oscilloscope as required. Once set, further adjustments are not necessary for the respective waveforms or voltages.

Note that the trigger signals are applicable only when signals are being traced for the LCG-388 output.

3.4 Use of Gun Killers.

The generator is provided with three switches and leads for cutting out the Red, Blue and Green guns of the CRT. Each lead is equipped with a 100k Ω fixed resistor in series. This permits easy adjustments of the convergence and white balance in the receiver.

1. Connections.

Connect the black lead of the gun killer to the receiver chassis.

Connect the Red, Blue and Green clips on the leads to the respective guns of the CRT.

2. Switch settings.

At the ON setting of the GUN KILLER switches, the respective guns will be inoperative by grounding through the 100K Ω resistor.

When not in use, set the switches at the OFF position and remove the clips from the guns.

NOTE: When the CRT is set for extreme brightness, it is possible that the color may not be extinguished.

3.5 Use of Patterns.

In the actual adjustments of the receiver circuits, the many patterns available from the generator, either the modulated RF output or directly, can be utilized to maximum advantage. In their application, the operator is referred to the specific directions given in the manufacturer's servicing information for the particular receiver model.

A brief listing is given in the following chart.

USE OF PATTERNS

| Adjustments for : | Patterns |
|--|--|
| 1. Color sync and demodulator circuits | Gated rainbow ; Note 1 below R-Y, B-Y, and -(R-Y) ; Note 2 below Rainbow |
| 2. Centering, or positioning | Single crossbar, or single horizontal and vertical lines |
| 3. Height, Linearity, and Pin-cushion effect | Horizontal and vertical lines, fine and coarse crosshatches |
| 4. Static convergence | Single crossbar, single dot, single horizontal and vertical lines |
| 5. Dynamic convergence | Fine and coarse dots, crosshatches, horizontal and vertical lines |

NOTES :

1. The pattern is shown in Fig. 5 and the phase relations of the signals in Fig. 6.
Typical signal waveforms at the respective CRT grids are shown in Fig. 7.
2. Typical signal waveforms at the respective CRT grids are shown in Fig. 8.

Fig.1 Bottom view of case.

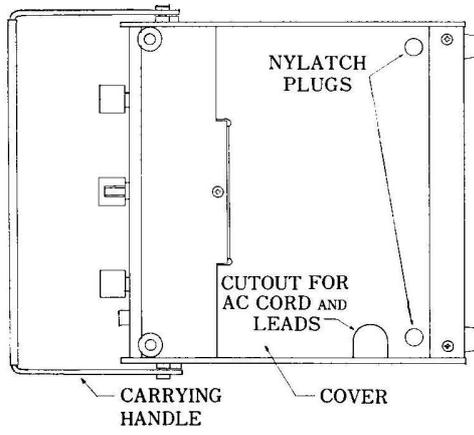


Fig.2 Use of handle for tilting.

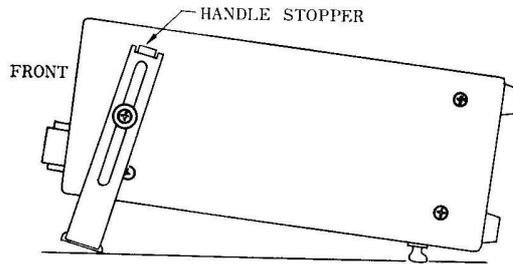


Fig.3 Rear view of case.

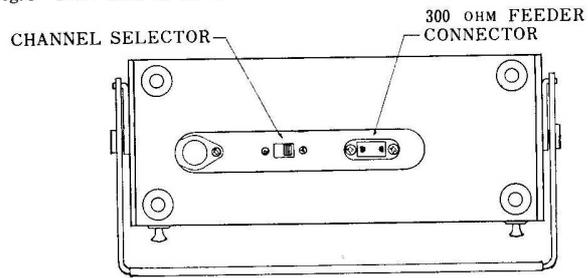


Fig.4 Front view of LCG-388

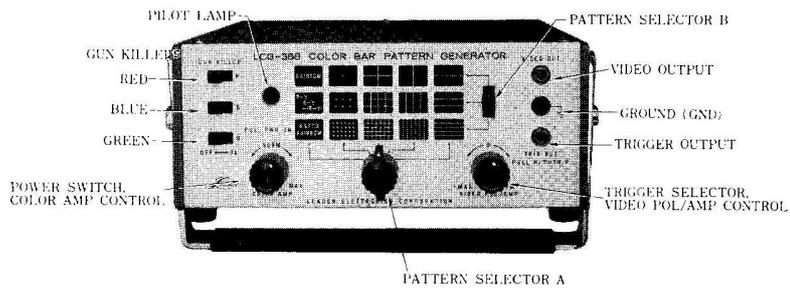


Fig. 5 Gated rainbow pattern.

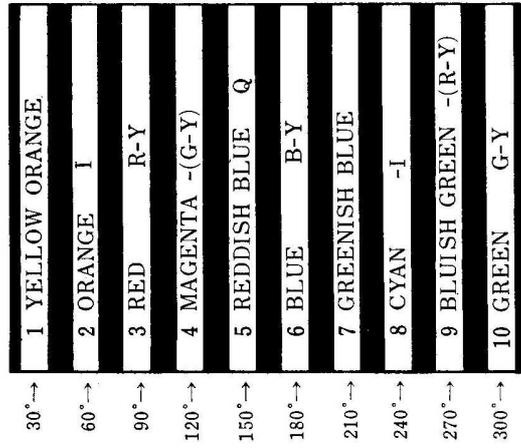


Fig. 6 Phase relations in the gated rainbow signal.

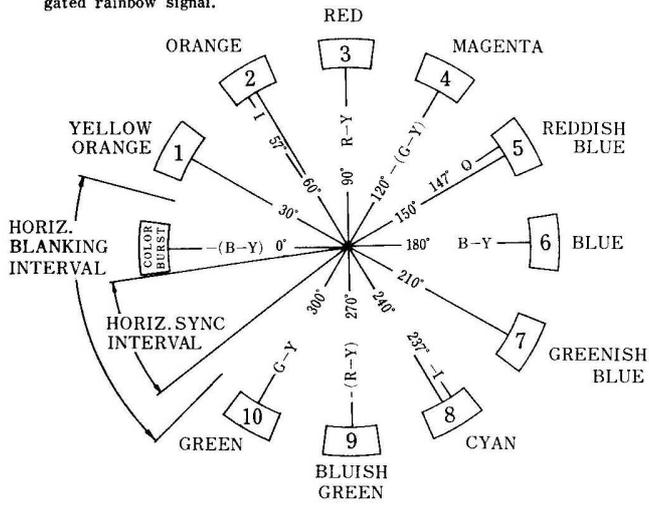


Fig. 7 Gated rainbow signal waveforms.

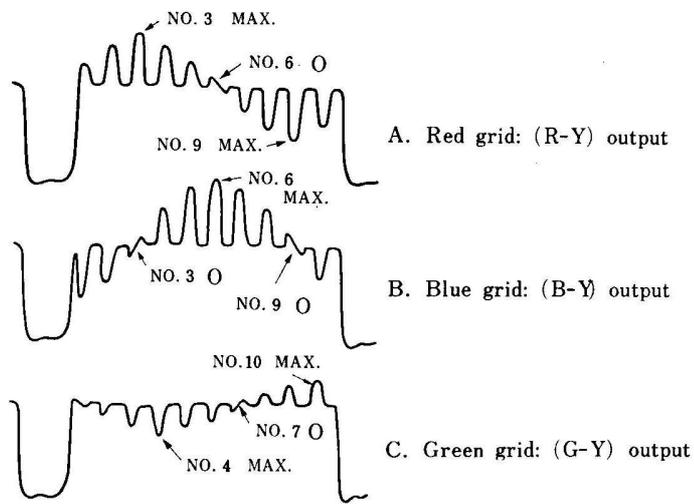


Fig. 8 R-Y, B-Y and -(G-Y) waveforms.

