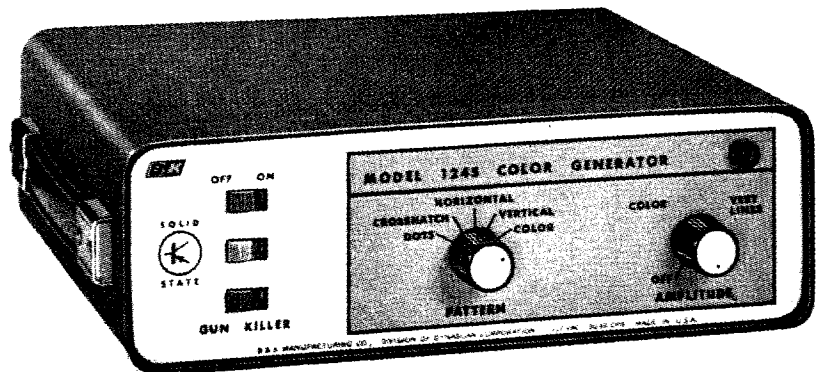


# COLOR GENERATOR



INSTRUCTION MANUAL

MODEL  
1245



DYNASCAN CORPORATION

6460 W. Cortland St., Chicago, Illinois 60635

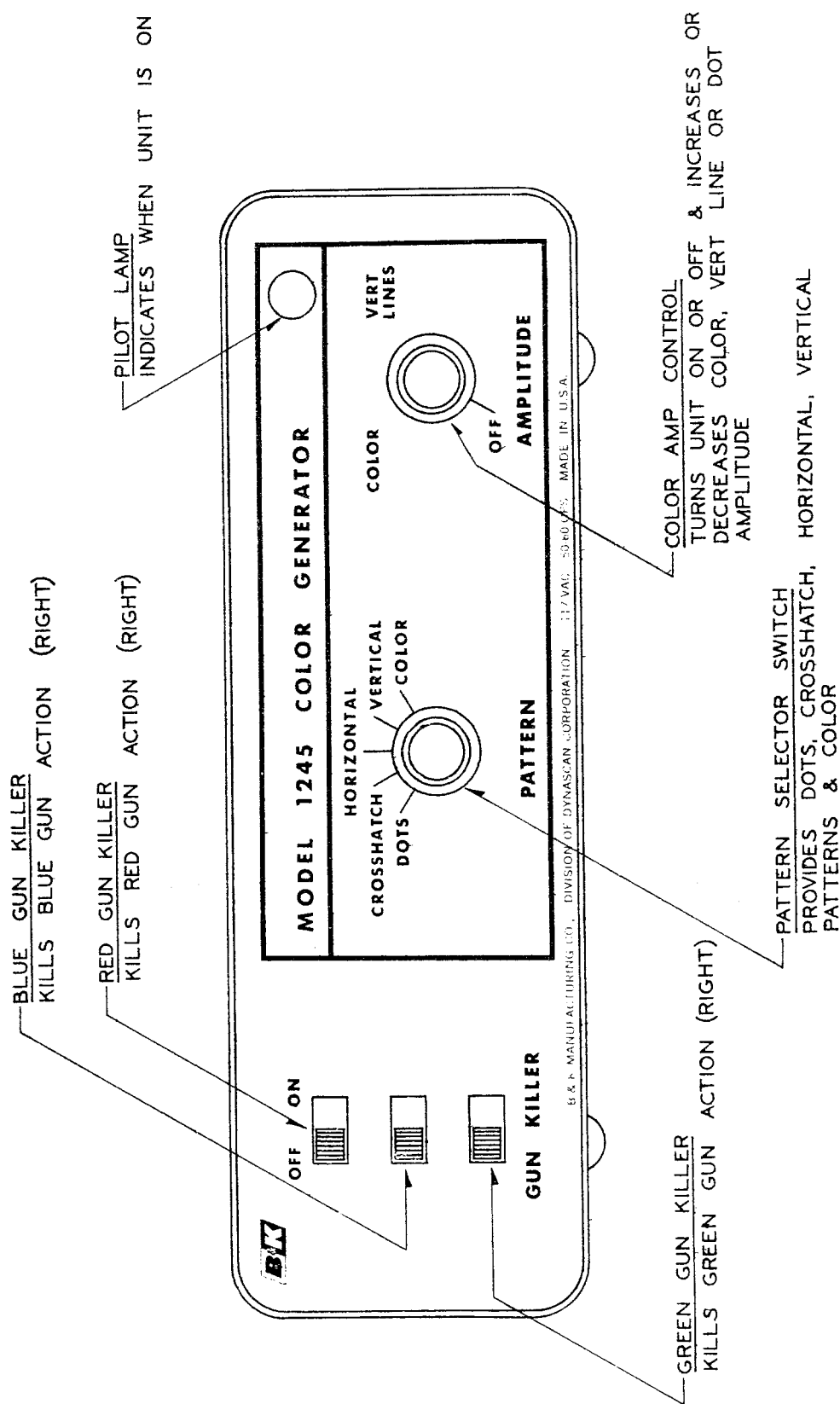


Figure 1.

# **INSTRUCTION MANUAL**

**FOR**

## **Model 1245**

### **SOLID STATE**

### **Color Generator**

**B & K** DIVISION OF DYNASCAN CORPORATION

**6460 West Cortland Street  
Chicago, Illinois 60635**

## SPECIFICATIONS — MECHANICAL

WEIGHT: 3 lbs.

HEIGHT: 2 $\frac{7}{8}$ "

WIDTH: 8 $\frac{7}{8}$ "

DEPTH: 8 $\frac{3}{8}$ "

## INTRODUCTION

### B & K MODEL 1245 SOLID STATE COLOR GENERATOR

This fine quality, easy to use, portable generator has been designed by B & K for quick, easy convergence and adjustment of color TV sets.

Crystal controlled, keyed rainbow color display is provided to test color circuits, range of hue control and align color demodulators. A color level control provides the ability of displaying color to any degree of saturation.

Dot pattern, crosshatch, horizontal lines and vertical lines are provided for adjusting horizontal and vertical linearity and size on color or black and white TV receivers. These patterns are *indispensable* when adjusting convergence on color receivers.

In order to achieve the sharpest dots, and the finest horizontal lines, for ease of convergence, a unique horizontal line generator was developed with the thickness of just one horizontal raster line. For color servicing this is the *finest pattern possible*. This is a result of the stable count down circuit, the heart of this instrument. No effort has been denied in design to make this a reliable piece of equipment.

Output is at RF with 5000 $\mu$ v of signal on Channel 3, 4, or 5. The 1245 utilizes the "offset-subcarrier" principle to generate the color bars. The frequency of the subcarrier is offset 15,750 cycles below the normal frequency of 3,579.545 Kc. The frequency of the offset subcarrier is therefore 3,563.795 Kc. This signal is fed into the receiver, together with horizontal sync pulses of 15,750 cycles. (These sync pulses have a "backporch," of controlled width which makes them identical to a station sync pulse.)

The offset-subcarrier in the B & K 1245 is gated to produce ten color-bar signals which are accurately spaced at 30° phase intervals. Many other features, including complete crystal control, are incorporated in the generator to insure accurate and stable performance.

This introduction has been a brief preview into the operation and capabilities of the B & K Model 1245. This instruction book covers the use of this instrument completely and should be read thoroughly before using.

**NOTE:** An apparent brightness "flicker" of the crosshatch or horizontal display patterns may be noted if the TV receiver brightness/contrast is set too high. Reducing the level of these controls will eliminate this condition. (The brightness control may require adjustment for proper display of dot pattern.)

## CONTROLS AND OUTPUTS: — WHAT THEY DO

For ease of use, the B & K 1245 Color Generator has only two front panel controls.

1. *Color/vert Line Amp:* This is the A.C. power off/on switch, as well as the Color Amplitude control. This control sets the level of the color subcarrier and is used to check the color sync lock ability of the TV receiver. Amplitude is variable from 0 to 200% with the midpoint providing normal or 100% output. In tandem with this is the vertical lines brightness control which establishes the proper ratio between the vertical and horizontal line brightness.
2. *Pattern Selector Switch:* This switch allows the choice of the following patterns:
  - A. In the DOTS position, the unit provides a stable dot pattern, enabling proper convergence of the receiver.
  - B. In the CROSSHATCH position the unit produces a sharp, well-defined crosshatch pattern. This function of the generator may be used for adjusting the vertical and horizontal linearity in both black and white and color receivers, and for adjusting convergence. It also provides a check of the receiver overscan, since the crosshatch pattern has a fixed number of bars.
  - C. In the HORIZONTAL LINES position a pattern of pure horizontal lines is produced for vertical linearity and horizontal convergence adjustments. Note that the lines are only one scanning line in height!
  - D. In the VERTICAL LINES position a pattern of pure vertical lines is produced. This is preferred by some technicians for horizontal linearity adjustments and for ease of vertical color convergence.
  - E. In the COLOR pattern position the unit provides ten color bars simultaneously, including R-Y, B-Y, G-Y, I and Q, spaced at 30 degrees phase intervals. When operated in this position, the generator may be used to check the phase and matrix of a receiver, and to perform automatic frequency and phase alignment. In addition it provides a constantly available color signal for use in servicing color receivers.

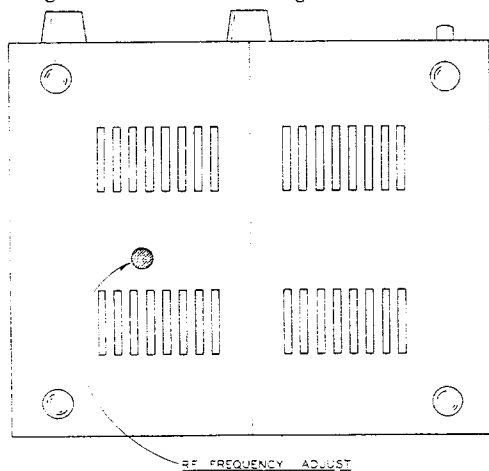


Fig. 2

3. The 1245 Color Generator provides RF output from the shielded cable. This cable is connected directly to the antenna terminals of the TV receiver.

*NOTE:* This unit is factory aligned for channel 3, but can be retuned for channel 4 or 5 by adjustment of the RF coil from the bottom of the cabinet. To tune for channel 4, rotate the slug 1½ turns in a CCW direction from its channel 3 setting. To tune for channel 5, rotate the slug 4 turns in a CCW direction from its channel 3 setting. See Fig. 2.

4. *Gun Killer:* These three switches allow you to control the color guns of the picture tube from the front panel of the 1245. By simply connecting the three colored clip leads to the picture tube control grids and operating the appropriate switches on the 1245, the tube color guns can be activated or killed.

## OPERATION

Operation of the B & K Model 1245 Color Generator is simple and straight forward.

1. Completely disconnect the antenna line from the receiver. Attach the two generator output alligator clips to the antenna terminals.
2. Turn the receiver on and tune to Channel 3. (Unless generator has been reset to another channel).
3. Turn 1245 power switch on.
4. Turn the pattern switch to color bar position and the color amplitude control to mid range.
5. Turn the receiver fine tuning till you get the sharpest color bar pattern.
6. Advance the TV receiver color saturation control until color appears on bars.
7. If the receiver is in operating condition, with proper width adjustment, ten bars will be seen on the screen.
8. If you wish to deactivate the guns in the CRT, first determine which are the control grids leads coming from the CRT socket. They are usually colored a solid red, green and blue and are connected to exposed terminals on top of the TV chassis. Connect the black alligator clip to the TV chassis.

*NOTE:* If you find it more desirable, you can attach the alligator clips directly onto the control grid leads, making sure that the needle points of the clips pierce the insulation and make contact with the copper wire.

To kill the action of any gun (or combination of guns), select the Gun Killer Switch whose color matches the gun to be killed and move it to the ON position. To reactivate the gun, move the switch to the OFF position.

### Hue Control Adjustment

Adjust the "hue" or tint control on the receiver so that the colors appear as indicated in Figure 3, where the eighth bar is cyan. Incorrect adjustment to one side will cause the eighth bar to be predominantly blue, while incorrect adjustment to the other side will cause the bar to be predominantly green.

### Checking Color Sync Lock Action

The CHROMA control may be used to check the color sync lock ability of the receiver. The 100% or midpoint of the Color Amp control represents normal color sync burst amplitude.

To check color sync lock action, turn the CHROMA control slowly counter-clockwise. The color should become pale, and finally disappear. Since some receivers are equipped with an automatic chroma control circuit, the rate of fading will depend upon the model under test. Most receivers will hold color lock through the entire range, however some sets may lose color sync just before the color disappears, evidenced by diagonal running of the colors. Both of these conditions indicate normal operation of the color sync circuits. If, however, a slight reduction of the chroma amplitude causes the color to fall out of lock, it indicates that the color synchronization ability of the receiver may be inadequate.

When the CHROMA control is turned beyond the 100% position, the relative amplitude of the color subcarrier sync is increased. At the full clockwise position, the amplitude is approximately doubled. This additional range is helpful in diagnosing receiver trouble in cases where the response of the RF/IF bandpass amplifiers may be subnormal, or in cases when the sync lock action is not normal.

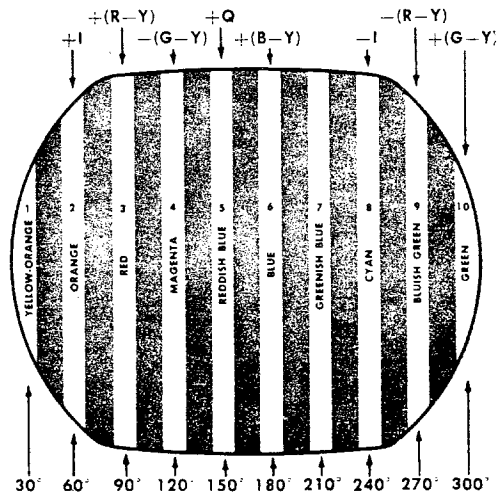


Fig. 3 — Color Bar Pattern

### Checking Color Fit

The ten bars of color in the pattern should "fit" in the positions shown in Figure 3. The colors should not lap over into the blank spaces between the bars. Improper fit may be caused by incorrect delay in the video amplifier, or by incorrect alignment of the bandpass amplifier.

Normal receiver overscan may hide some of the bars of the pattern. These can be seen by reducing the raster width.

### ***Overscan Adjustment***

Turn pattern switch to CROSSHATCH.

Adjust Vert. Amp. on 1245 and fine tuning of TV receiver for equal brightness of vertical and horizontal lines.

Adjust TV receiver brightness/contrast for thinnest possible display lines.

Service notes for color receivers usually specify a recommended amount of over scan horizontally and vertically, the recommended over scan varies with different models. The B & K Model 1245 provides a fixed number of lines, 10 vertical and 14 horizontal. The vertical retrace blanking signal may cover the 1st line. This line is *outside* the normal picture area and only 13 horizontal lines as shown below should be used for centering, size, linearity and convergence.

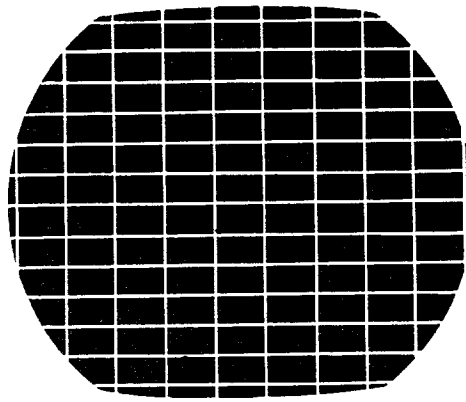


Fig. 4 — Crosshatch Pattern

### ***Horizontal and Vertical Linearity Adjustment***

The crosshatch pattern also permits accurate checks of the horizontal and vertical linearity in both black-and-white and color receivers. Adjust the horizontal adjustment controls of the receiver so that the vertical bars of the crosshatch pattern are equally spaced. Adjust the vertical controls so that the horizontal bars of the crosshatch pattern are equally spaced.

### ***Convergence Adjustment***

Before adjusting convergence, it is necessary to check other adjustments, especially purity, as specified in the service data for the receiver. These adjustments also include degaussing, horizontal tuning, horizontal drive, high-voltage regulation, height, width, linearity, focusing, etc. It is advisable to adhere to the manufacturer's recommended procedure for making convergence adjustments.

Either the dot or crosshatch pattern of the 1245 can be used in adjusting convergence.

### ***Color Killer***

To set the color killer threshold, tune the TV to the same channel as the 1245. While displaying either vertical lines or crosshatch, adjust the color killer control of the TV until the vertical lines start to tear. Back this control off until the tearing is removed, then give a slight turn more for a comfort margin.



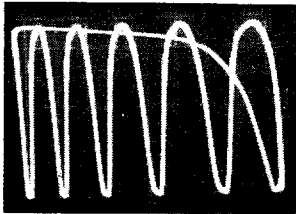
## COUNT CIRCUIT ADJUSTMENTS

The count circuits will not require readjustment unless you have accidentally misaligned them or performed a repair that may have thrown them out of calibration. If you find it necessary to recalibrate, perform the following:

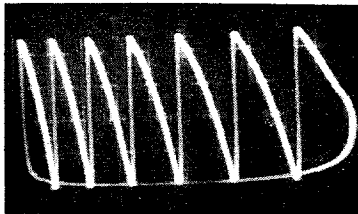
Rotate the horizontal sweep control of an oscilloscope to EXTERNAL INPUT (a general purpose, narrow band scope will be quite satisfactory for these adjustments). Connect the VERTICAL and HORIZONTAL inputs of the scope to the test points indicated directly below the figure that corresponds to the adjustment being made. Figure 12 indicates the chassis locations of the test points. Connect the scope ground to the "common" point on the 1245. See Figure 14.

**NOTE:** The whole calibration procedure must be followed. (Fig. 5 thru 9.)

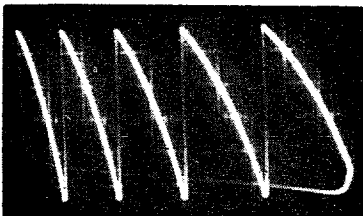
To make the adjustments, you may either insert a small screwdriver through the access holes in the chassis or rotate the thumb wheel on each of the controls with your finger. Your adjustment will be satisfactory if your scope traces closely approximate those shown in the figures. It is important to adjust for precisely the number of cycles shown.



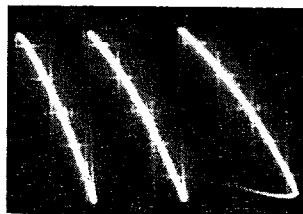
**Fig. 5 31.5 KC**  
Horiz. to B. Vert. to A.  
Adjust R-17 for 5½ cycles.



**Fig. 6 4.5 KC**  
Horiz. to C. Vert. to B.  
Adjust R-21 for 7 cycles.



**Fig. 7 900 Cycles**  
Horiz. to D. Vert. to C.  
Adjust R-25 for 5 cycles.



**Fig. 8 300 Cycles**  
Horiz. to E. Vert. to D.  
Adjust R-29 for 3 cycles.



Fig. 9 60 Cycles  
 Horiz. to F. Vert to E.  
 Adjust R-34 for 5 cycles.

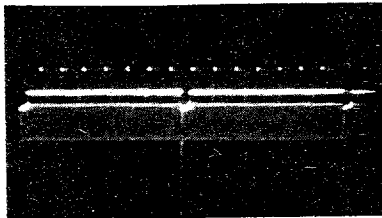


Fig. 10  
 Scope Freq. = 30 ~  
 Pattern Switch in Crosshatch Position  
 Scope Connected to Point "G"  
 and Common

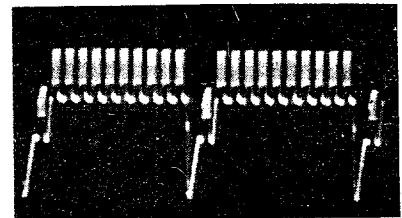


Fig. 11  
 Scope Freq. = 7875 ~  
 Pattern Switch in Color Position  
 Scope Connected to Point "G" and Common  
 Note: Wideband Scope Required for This Pattern

Fig. 10 and Fig. 11 are representative video patterns in "crosshatch" and "color" positions of the pattern switch.

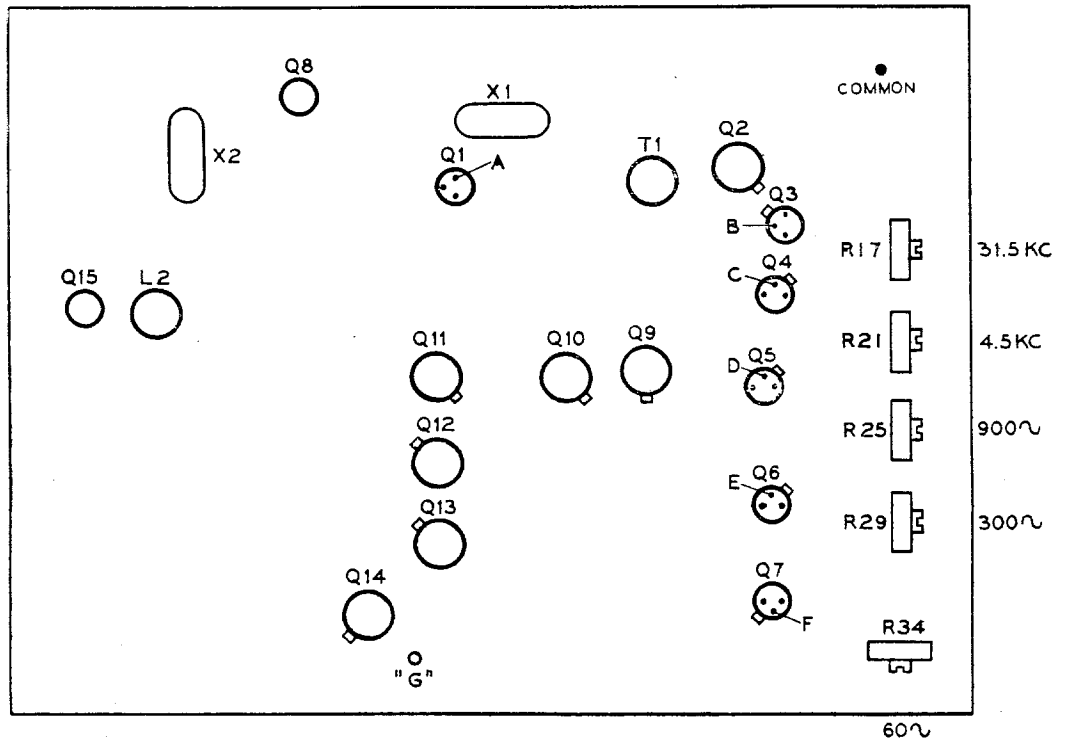


Figure 12 — TEST POINT LOCATIONS  
 8

## CIRCUIT DESCRIPTION OF MODEL 1245

*See block diagram:*

The circuits of the Model 1245 can be conveniently divided into two sections. One section is composed of the frequency divider circuits which divide a crystal controlled 189 kc frequency down to 60 cycles. The second section consists of a crystal controlled color oscillator, RF oscillator, and modulator.

The frequency divider circuit's function is to provide a fixed relationship between the horizontal and vertical sync pulses, and all video patterns. This is the same technique employed in a TV broadcasting station. This frequency relationship between horizontal and vertical sync pulses and all video patterns is important, as it results in a highly stable video pattern without jitter or movement, which is so necessary for color servicing.

The beginning of the frequency divider chain is a 189 kc crystal oscillator and shaper whose pulses are used to synchronize a 31.5 kc unijunction relaxation oscillator. A second output from the 189 kc is used to supply the vertical lines information, which appear when the pattern switch is in the dots, crosshatch, and vertical lines position. A third output from the 189 kc is used to form the white bars which when mixed with color, form color bars.

The 900 cycle unijunction relaxation oscillator has two outputs. One is used to lock the 300 cycle unijunction relaxation oscillator and the other is used to synchronize the 450 cycle flip flop.

The 300 cycle locks the 60 cycle unijunction relaxation oscillator which in turn provides the vertical sync signal for the patterns.

The 450 cycle flip flop provides the horizontal lines patterns. The use of 450 cycles in alternate fields allows only one single scanning line of thickness in the horizontal line pattern.

The horizontal line and vertical line information converge at the pattern switch to provide a selection of the various functions of the instrument. These patterns are passed on to the video mixer where they are mixed with sync information. The color oscillator is turned on only in the color position of the function switch. This information is also fed to the video mixer.

The RF oscillator is on during all functions of the pattern switch. It feeds its energy to the modulator where it is combined with sync and video information, and is brought out through the RF cable.

The 3,563.795 Kc offset-subcarrier signal and the signal from the 3,579.545 Kc oscillator in the receiver are applied to each of the color demodulators. The difference in frequency between these two signals is then 15.570 cycles, or one cycle difference for each complete horizontal scanning period. Hence the relative phase between the two signals changes through one complete cycle, from 0° to 360°, in each complete horizontal scanning period. Consequently each demodulator produces a sine wave output of one cycle in each complete horizontal scanning period. The sine wave output signal has maximum positive amplitude at 90° in an R-Y demodulator, at 180° in a B-Y demodulator, and at approximately 300° in a G-Y demodulator. These three output signals, if ungated, produce a "rainbow" on the picture tube, with maximum red intensity toward the left, maximum blue intensity near the center, and maximum green intensity at the right. Ultimately, we gate or key this rainbow into color bars approx. 30° apart. The 3rd bar produces an R-Y color signal. The 6th bar produces a B-Y color signal and the 10th bar produces a G-Y color signal.

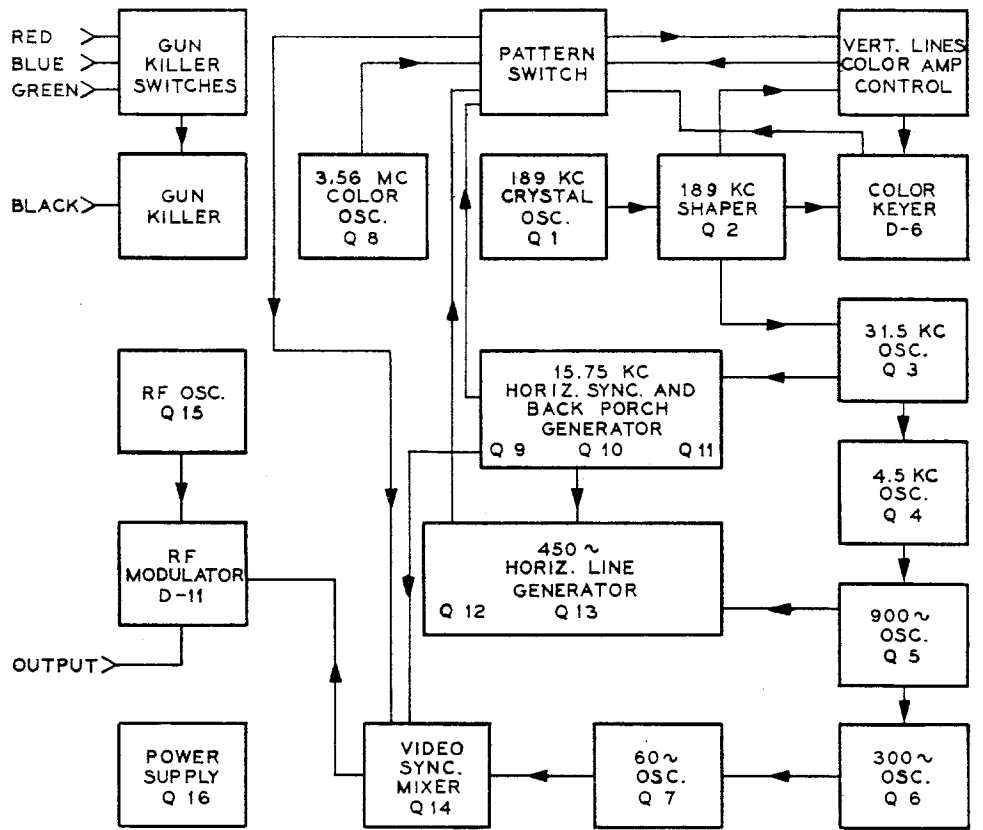


Figure 13 — BLOCK DIAGRAM

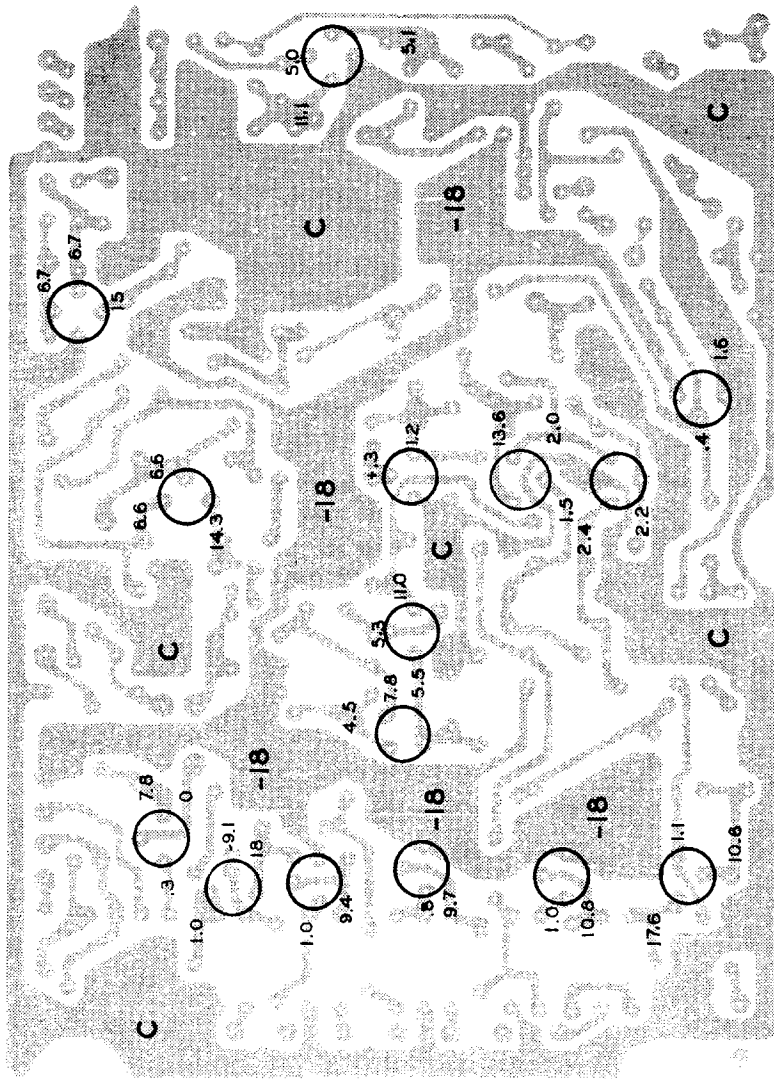


Figure 14 — Voltage points on Foil Side of Board  
 All voltages measured with 11 meg. VTVM with pattern switch in COLOR position.  
 All voltages are negative with respect to point C (common). See Fig. 10.