NOTES ON TEST EQUIPMENT

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Vectorscopes

The vectorscope promises to take a lot of the mystery out of chroma circuits. Vectors, phase angles, etc., have always seemed a cloudy issue to the majority of service technicians. The ability of the vectorscope to display a vector pattern on the scope screen allows the service technician to develop a variety of new service techniques to provide faster and more efficient service. It can be used for alignment and troubleshooting procedures throughout the chroma circuitry. By viewing the "petals" displayed on the screen, color alignment, tint range and possibly bandpass touch-up can be performed.

Vector Pattern

The vector pattern is obtained by connecting a color bar generator to the receiver in the conventional manner. R-Y and B-Y signals from the receiver CRT grids are then applied to the vectorscope. The pattern obtained is dependent upon the color bar system used. This discussion will be concerned with the gated color bar system, although, if the operator understands the system he is using, other systems may be used.

The gated color bar system produces the vector pattern illustrated in Fig. 1. This is an ideal pattern for demonstration purposes and will seldom be displayed under practical conditions. The ten petals indicate the ten color bars generated by the color bar generator, amplified and demodulated by the receiver circuitry. The vector pattern provides visual evidence of how effectively the receiver circuitry is responding to the input signal. The positions of the petals on the screen indicate the angle of demodulation. If the third and sixth petals fall on the R-Y and B-Y points on the graphs, respectively, the demodulation angle is 90 degrees. Should the sixth petal fall approximately halfway between the B-Y and the No. 7 point on the graph, the demodulation angle is 105 degrees. This knowledge of petal position on the vector display provides the service technician with a simple and fast method of adjusting the demodulation angle. This is accomplished by adjusting the injection transformer slug while viewing the vector display. The demodulation angle can be varied from 90 to 116 degrees and should be adjusted to conform to the manufacturer's specifications.

Tint Range Control Adjustment

The tint range of a specific color receiver can be easily checked using the vectorscope. While viewing the vector pattern on the scope, rotate the tint control. The third petal should move in accordance with rotation of the tint control through an arc 30 degrees each side of the R-Y point on the graph. Should the third petal fail to move in the arc as outlined, the tint range should be adjusted as follows: Set the tint range control to the exact physical center of its range and adjust the tint or hue transformer slug until the third petal is centered on the R-Y point of the graph.

3.58-MHz Oscillator Adjust

While viewing the vector pattern, short out the chroma reference oscillator control signal. If the vector pattern rotates in the manner of a wheel turning, the 3.58-MHz oscillator requires adjustment. Adjust the oscillator slug until the vector pattern "locks-in" or slows to its slowest rotation. With some types of oscillator control circuits, the vector pattern will not rotate as a wheel turns but will pulsate from a minimum to a maximum.

Symptoms

Loss of B-Y signal is illustrated in Fig. 2. This straight vertical line indicates a loss of blue, and trouble can be expected in either the B-Y demodulator circuit or in the matrix system.

Loss of R-Y signal is illustrated in Fig. 3. The indication is a straight horizontal line across the screen. Trouble can be expected in either the R-Y demodulator circuit or in the matrix system.

The G-Y signal is not used in obtaining the vector pattern. Therefore, when a complete vector pattern is visible on the screen and the complaint is "loss of green," it follows that trouble can be expected in the G-Y demodulator or matrix system.

There are still many service problems that a vectorscope will not isolate. A good wide-band scope will still be required in color servicing. However, the addition of a vectorscope to your equipment inventory will cut service time on many jobs, resulting in faster, more efficient and more complete repair jobs.

Sencore Model PS-148

The Sencore Model PS-148 is a dual purpose instrument, combining the features of a wide-band and vector scope in a single unit. Very quick conversion from a wide-band oscilloscope to a vectorscope is accomplished by flicking two slide switches located on the rear apron of the cabinet. The test leads can be connected to the R-Y and B-Y chroma circuits or directly to the red and blue grids of the CRT. Circuit loading is kept to a minimum, preventing undue distortion of the vector pattern. Lead lengths and proximity capacitance are reduced to a minimum through the use of the rear vectorscope connections. The wide-band scope utilizes the features of the Sencore Model PS-127 previously covered in the May '65 issue of PF Reporter.

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Sencore Model PS-148 Features

Peak to Peak Voltage Measurements
Peak to peak voltages are read directly.

Frequency Response
Vertical amplifier frequency response is from 10 Hz to 5.2 MHz ± 1 dB. Rise time of .055 microseconds.

Sensitivity
0.17 volts RMS per inch vertical deflection.

Horizontal Sweep Freqencies
Horizontal sweep ranges 5 Hz to 500 KHz in 5 overlapping ranges. TV horizontal and vertical ranges are preset on coarse control.

Input Impedance
27 megohms shunted by 9 pf (Lo-Cap probe)
2.7 megohms shunted by 99 pf (Direct probe)

Horizontal Frequency Response
3 dB from 10 Hz to 650 KHz

Standby Switch
Cuts instrument to half power when not in use and provides "instant on" when required.

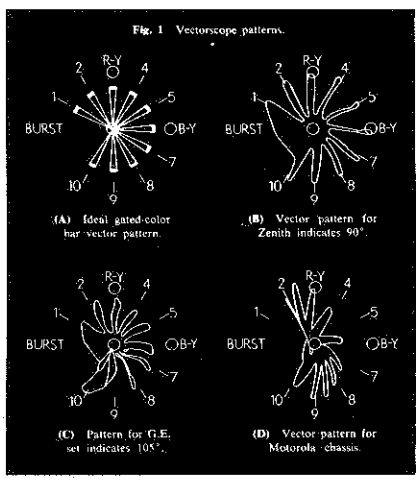


Fig. 1 Vectorscope patterns.
(A) Ideal gated-color bar vector pattern.
(B) Vector pattern for Zenith indicates 90°.
(C) Pattern for G.E. set indicates 105°.
(D) Vector pattern for Motorola chassis.

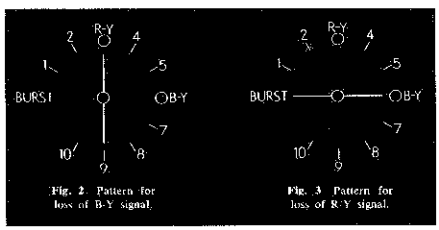


Fig. 2 Pattern for loss of B-Y signal.
Fig. 3 Pattern for loss of R-Y signal.

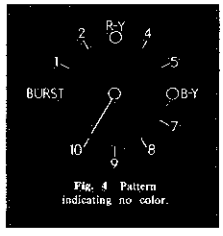
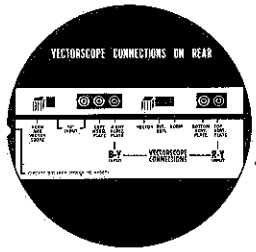
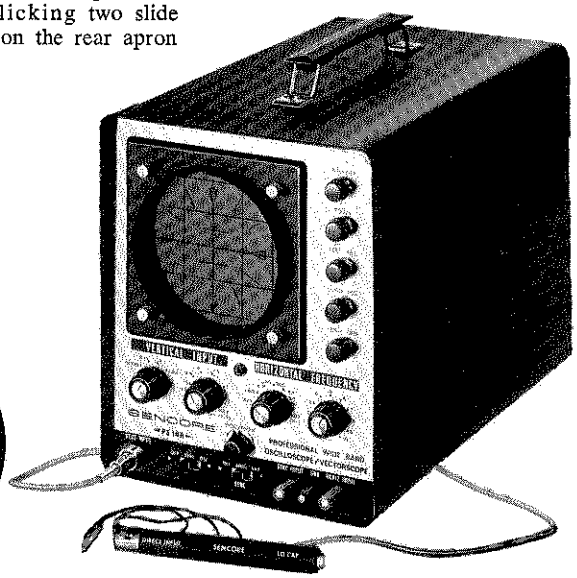


Fig. 4 Pattern indicating no color.





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