COLOR CONVERTER

Technician CIRCUIT DIGEST 264

WIRING INSTRUCTION PROCEDURE
(Continued from reverse side)

The size control box should be mounted in a position which requires as short leads as possible and still permit access to the size switch. All leads, except the connections to picture tube grid and cathode, should be brought out between the television back and the cabinet. This will permit removing the back for servicing without removing the connections to the converter. The picture tube grid and cathode wires can be brought through ventilation holes in the back since the connectors provided are very small in diameter. The grid and cathode wires should be separated from each other and other wires by at least 1 inch.

All receivers, as far as conversion goes, fall into two categories:

1. Having the video signal fed to the cathode of the picture tube;
2. Having the video signal fed to the grid of the picture tube.

Please note that operations 1 and 2 are different for these two types of receivers.

NOTE: All units are shipped with the color phasing connections correct for cathode-fed receivers. For grid-fed receivers the secondary leads of the phasing coil (L2) should be reversed. These leads are clearly marked by red tape in the converter.

1. (Cathode Fed)--Solder yellow lead (Item H) to cathode lead at picture tube socket and tape.
   (Grid Fed)--Solder yellow lead (Item H) to grid lead at picture tube socket and tape.

2. (Cathode Fed)--Cut picture tube grid lead near socket and solder the 47k 1/2-watt resistor (Item F) in series. Solder the green lead (Item H) to the end of the resistor nearest the picture tube grid. Tape connections to prevent short.
   (Grid Fed)--Cut picture tube cathode lead near socket and solder the 47k 1/2-watt resistor (Item H) to the end of the resistor nearest the cathode of the picture tube. Tape to prevent short.

3. Connect the free end of the .01 mfd condenser (Item E) to the plate connection on the receiver horizontal output tube and solder. Connect the free end of the 10k 1/2-watt resistor to circuit ground (usually chassis). Connect the orange lead of the connecting cable (Item D) to the junction of the 10k 1/2-watt resistor and the 270k 2-watt resistor.

4. The blue lead of the cable (Item D) connects to the plate of the vertical output tube. Four (4) spring clips (Item G) are provided for connection to the plate prong of the tube. Use the size which fits the particular tube used. Solder the blue wire to the clip and insert tube. Carefully dress leads to prevent shorts. If the chassis can be easily removed the connection should be soldered to the socket plate connection.

5. Connect black lead of cable (Item D) to circuit ground (usually chassis).

6. Connect red lead of picture size control box to high potential side of horizontal deflection coil and black lead to low potential end. Connect green and yellow leads across the vertical deflection coil. Polarity is not important on the vertical coil.

7. Dress leads for proper connection to converter and install back on television receiver.

8. Mount converter and size control box with screws provided.

9. Connect yellow lead from picture tube (Item H) to the yellow lead on converter, thru the smear filter (Item J).

10. Connect the green lead (Item H) from picture tube to the green lead on the converter.

11. Plug connector on converter into connector on cable (Item D).

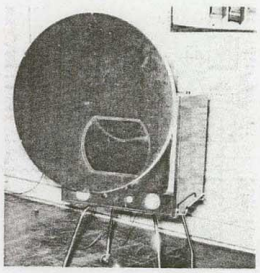

Fig. 1 - Front view.

COLOR SCANNING WHEEL INSTALLATION

1. Mount the angle brackets to the shelf and back of the scanning wheel housing, using the proper holes in the brackets that will position the scanning wheel window near the center of the picture tube with the shelf resting on top of television cabinet. Use extension brackets if necessary.

2. Connect connecting cable to converter.

PICTURE SIZE CONTROL BOX ADJUSTMENT

1. Turn size switch to "normal".

2. Tune in picture on television set.

3. Turn size switch to "color" position and adjust height and width controls on box until picture is correct size for scanning wheel window. For best viewing, the picture on the television picture tube should be from 1 inch to 1 1/2 inches larger than the window of the scanning wheel.

4. The vertical size control (250 ohms) is shunted across the vertical deflection coils for reducing the picture height. Some older television receivers with low resistance deflection coils require the resistance to be in series with the deflection coils. Contacts are provided on the size switch to permit this change. If the 250 ohm control, when wired in series, is too critical for adjustment, a fixed resistor of the correct value should be used in parallel with the control.

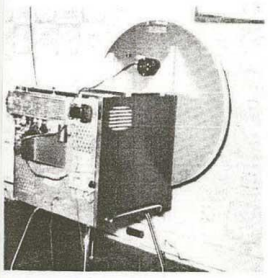

Fig. 2 - Rear view.

5. The width coil consists of two windings that are normally wired in series, having a range of 12 to 50 millihenries. For very low impedance deflection coils it may be necessary to wire the coils in parallel to reduce the picture sufficiently. For parallel connection connect the start of each winding together and the finish together.

OPERATING INSTRUCTIONS

1. Turn "PICTURE SIZE" Switch located on size control box to "COLOR". Always have TV set turned off when operating this switch.

2. Place Col-R-Tel scanning wheel assembly in front of TV picture screen and attach connecting socket on cable to plug on rear of scanning wheel.

3. Adjust TV receiver to sharpest picture possible with its fine tuning control. Generally the "CONTRAST" and "BRIGHTNESS" of the TV receiver should be increased for color pictures.

4. Set converter "OFF-ON" switch to "ON". After 15 seconds warm up time, depress "MOTOR START" switch until the scanning wheel reaches full speed. Then adjust "MOTOR SPEED" control until no scanning wheel seams are visible. Due to the inertia of the wheel the speed does not change immediately as the control is adjusted. Therefore, turn this control slowly.

5. Turn "COLOR GAIN" control to the desired amount of color.

6. Turn "COLOR-LOCK" control to obtain the proper color on picture objects. Flesh colors provide the most accurate adjustment for natural flesh color of face.

7. The scanning wheel should always be stored in a vertical position to prevent warpage.

SERVICE HINTS

Poor or no color:

1. Improper installation or color transmission.
2. Check all tubes except V6.
3. Quick rotation of color gain control should produce temporary fluctuation of brightness. If no fluctuation is noticed the trouble is in the V4 and V5A circuitry.
4. Shorts or poor connections in cable to scanning wheel.
5. Improperly aligned contacts on commutator.
6. Improper antenna, poor antenna location or improper impedance match to lead in. Multiple set and antenna distribution systems often degrade color.
7. Fine tuning control on TV set out of adjustment. This control must permit tuning to edge of sound bars.

Lack of certain colors:

1. Defective 6BC7 tube (V3), cable, commutator or contacts.
2. 3.58 mc trap incorrectly tuned.

Incorrect colors:

1. Incorrect adjustment of "COLOR LOCK" control.
2. Misalignment of tuned circuits, T2 being most critical.
3. Wrong polarity on L2 secondary.

No scanning wheel sync.:

1. Check V5B and V6 tube.
2. Extreme high or low line voltage.
3. No vertical sync. Pulse from set, check at C26 with scope.
4. Poor connections in cable or improper contacting in commutator.
5. Slipping or worn belt.
6. Lubrication--use Sillicote Spinning Reel Lubricant or Lubriplate.

Streaks in picture:

1. Dirty commutator.

Incorrect pressure; adjust contacts for 1/16" compression.

Some receivers may have sufficient band width but, due to the design of the video output stage, the 3.58mc color carrier frequency is attenuated by the series peaking coil feeding the picture tube, resulting in poor color. This can be corrected by connecting the input of the converter ahead of the peaking choke. If dc is present, a blocking condenser of approximately .01 mfd should be inserted to prevent shock.

The proper point of connection can be determined experimentally during a color broadcast or with the aid of a color bar generator. This connection is shown in Fig. 5.

There is a slight misregistration of color due to the selectivity of the tuned circuits and the overall selectivity of the TV receiver amounting to approximately .8 microsecond and which is not compensated for in the converter. Field research has proven that the greater part of apparent misregistration and color smear is caused by ghosts and reflections from the antenna system and its relation to surrounding objects. However for the very critical viewer who has eliminated the trouble caused by external conditions, a delay line kit can be purchased from the manufacturer for insertion between the converter input connection and the picture tube control element.

A circuit diagram is shown in Fig. 6. Inasmuch as the delay line does reduce contrast, a switch is provided to remove it from the circuit when using the receiver for black and white reception.

The 15k resistor and .002 mfd condenser load the delay line to reduce reflections. Some receivers may require slightly different values, which should be determined experimentally.

If the technician will follow the instructions step by step as outlined in the instruction manual, he can install the converter in about 30 minutes.

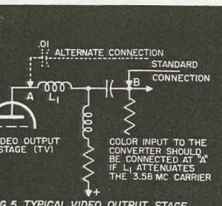

FIG.5 TYPICAL VIDEO OUTPUT STAGE

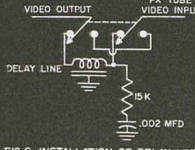

FIG.6 INSTALLATION OF DELAY LINE

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TECHNICIAN 264 COLOR CIRCUIT DIGEST

COLOR CONVERTER

April • 1956 Col-R-Tel color TV converter

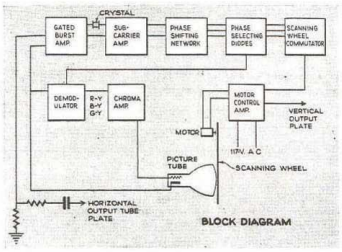

Fig. 4 - Block diagram.

INSTALLATION

The COL-R-TEL converter will operate on any black and white TV receiver having a bandwidth of at least 3 mc wide at 50% amplitude. Receivers with wider band pass will produce pictures with more color and less color smear than the narrowband type.

The receiver must be in good condition if satisfactory pictures are to be obtained. It must be possible, with the fine tuning control, to adjust the TV receiver to the high frequency edge of each channel received to permit reception of the color carrier frequency of 3.58 mc. Since this frequency is only 920 kc below the sound carrier, sound bars will be visible in the picture just past the correct fine tuning setting for color. TV sets as delivered from the factory are usually adjusted correctly. Sets that have been serviced, especially the turret type tuners, should be carefully checked and if necessary adjusted to permit tuning just to the sound bar region. THIS IS VERY IMPORTANT!

PARTS INCLUDED FOR INSTALLATION

Item	Quantity	Description
A	1	Col-R-Tel Converter
B	1	Scanning Wheel
C	1	Picture Size Control Box
	1	Installation Kit consisting of items D, E, F, G, and H
D	1	Connecting Plug and Cable
E	1	Horizontal Voltage Divider (1--.01 Mfd. Cond., 2--270K 2-Watt resistors and 1--10K 1/2 Watt resistor wired in series)
F	1	47K 1/2 Watt Resistor
G	4	Coil Spring Contacts (for connection to vertical output tube plate prong)
H	2	Wires with Connectors (1 green, 1 yellow)
J	1	Smear Filter

WIRING INSTRUCTION PROCEDURE

Before proceeding with the wiring connections to the television receiver it should be determined where the converter and the picture size control box are to be mounted and connecting leads cut accordingly.

Most installations will be made with the converter mounted on the back of the television receiver with the controls extending above the top of the cabinet, although some customers may prefer a vertical mounting with the controls accessible from the side.

(Continued on reverse side)

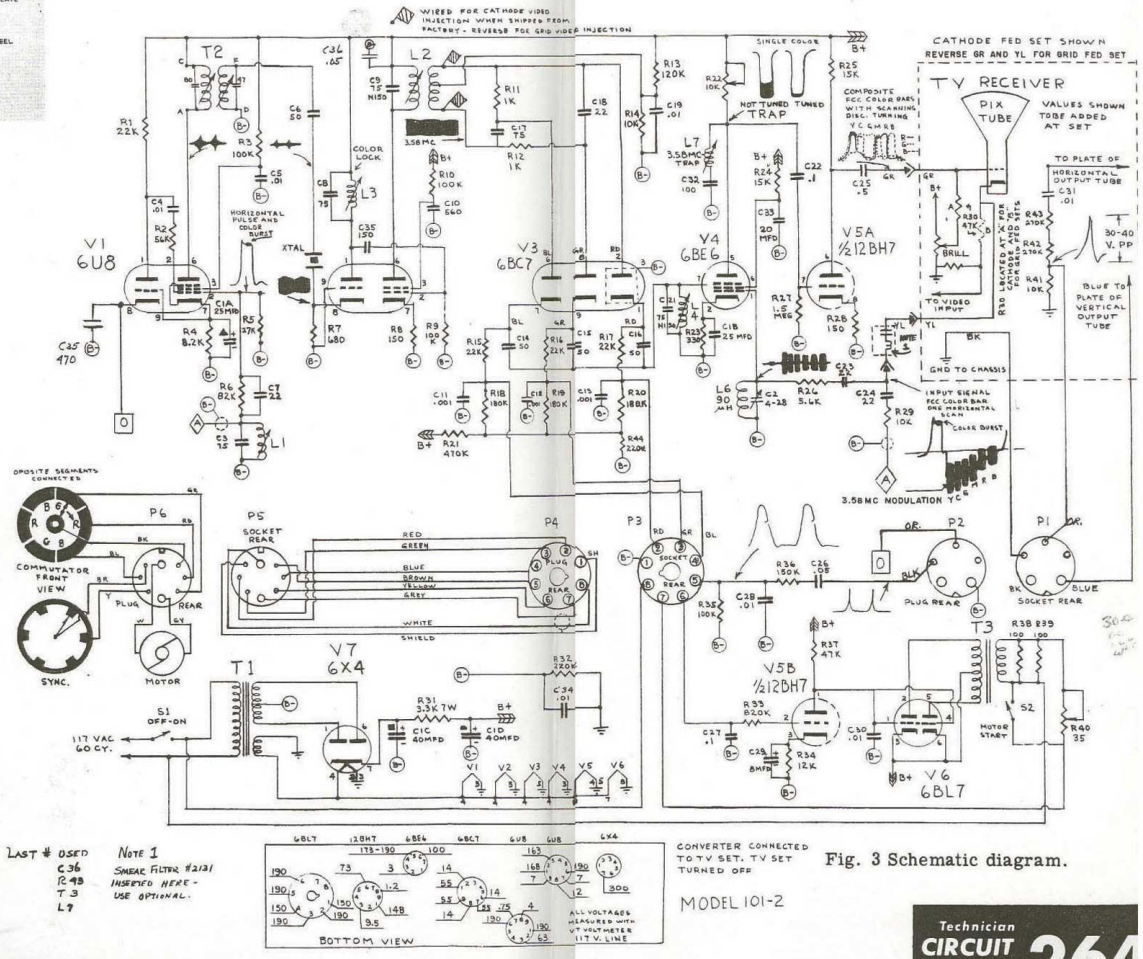

Fig. 3 Schematic diagram.

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Courtesy of Cliff Benham