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THE CTC 16X - 21" COLOR CHASSIS

The CTC 16X chassis will be used in all 1966 color instruments having a 21" picture tube. Although the chassis is basically continued from the CTC 16 of last year, the "X" version has several refinements to improve performance and reliability.

A new color picture tube is used with receivers equipped with the CTC 16X chassis. This new tube—the 21FJP22A—has phosphors made with rare earth material, and is capable of giving brighter, clearer, and purer rendition of color scenes.

The video circuits have been redesigned to take full advantage of these new high efficiency phosphors.

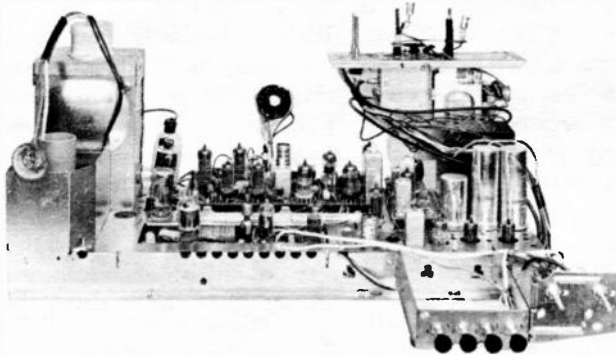


Figure 1—The CTC 16X Chassis

Tube Applications

In the CTC 16 chassis, 6GY6's were used in the color demodulator stages. In the CTC 16X, 6HZ6's function in those stages. The use of this tube type in the demodulator stages further reduces the possibility of UHF interference affecting the color picture.

Type 6EW6 (7-pin miniature), used in the burst amplifier stage in the previous CTC 16 color chassis, is replaced by a 6JC6 frame-grid constructed type. The 6JC6 is a 9-pin miniature. The burst amplifier circuitry is basically the same as in the CTC 16. The only change is in the screen circuit—it returns directly to the 270-volt B+ source. The use of a frame-grid tube gives higher gain to the burst signal (approximately 50% more than available with the 6EW6 circuit).

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THE CTC 17X - 25" COLOR CHASSIS

Basically, the new CTC 17X from RCA Victor follows closely the CTC 17 introduced last year. However, several circuit refinements and the use of different tube types combine to improve overall performance. A new transistorized circuit (see page 3) is incorporated to insure positive vertical blanking of the color picture tube.

All instruments employing CTC 17X are equipped with the 25AP22A rectangular picture tube. The new "A" version has more efficient phosphors, improving color fidelity in 25" receivers.

Tube Applications

A change in the tube type used in the burst amplifier and color demodulator stages further improve the performance of RCA's 25" color chassis. A frame-grid 6JC6 is used in the burst amplifier stage. In last year's "17" chassis, a 6EW6 performed this function. The use of the frame-grid tube in the burst amplifier stage improves the performance of color lock-in during fringe reception.

As in the new 21" color chassis (the CTC 16X) 6HZ6's function in the demodulator stages. Other tube type changes include 6JE6A horizontal output; 2AV2 focus rectifier; 6DW4B damper; and 6BK4B Hi Voltage Rectifier.

Circuit Variations

Refinement of the side pincushioning circuit now makes the use of a side pincushioning control un-

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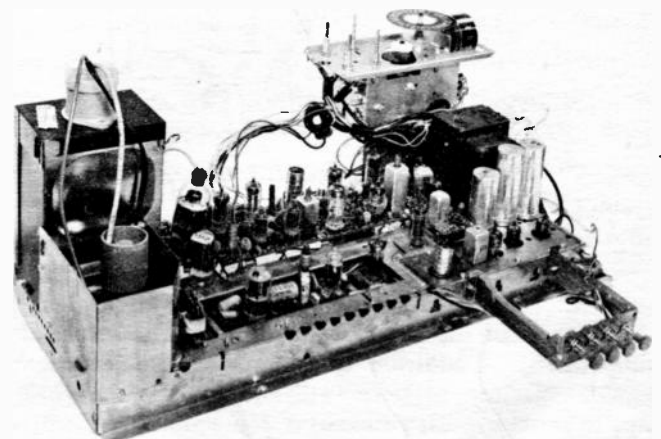


Figure 2—CTC 17X Chassis

THE CTC 16X - 21" COLOR CHASSIS

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The 1V2 focus rectifier and the 3A3 high voltage rectifier (used in several of RCA's previous color chassis) have been displaced by a 2AV2 and 3CA3, respectively. Although both rectifier tubes are different than those types used previously, the circuitry is similar to that in the CTC 16; with these two tubes the filament dropping resistors in both stages have been deleted, as they are not necessary. The 6DW4

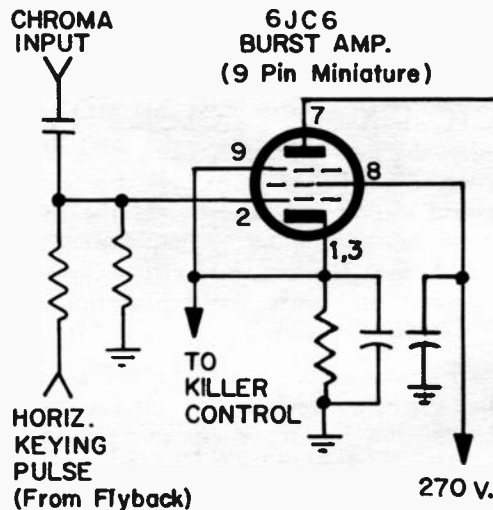


Figure 3—Burst Amplifier Schematic

damper is now a 6DW4B (interchangeable); the horizontal output has changed from 6JE6 to 6JE6A. Higher reliability in the shunt regulator stage is ensured in the CTC 16X. The 6BK4B used in the new chassis is a further refinement of the 6BK4 family. The new "B" version has an increased plate dissipation rating.

Another feature which has been incorporated in the

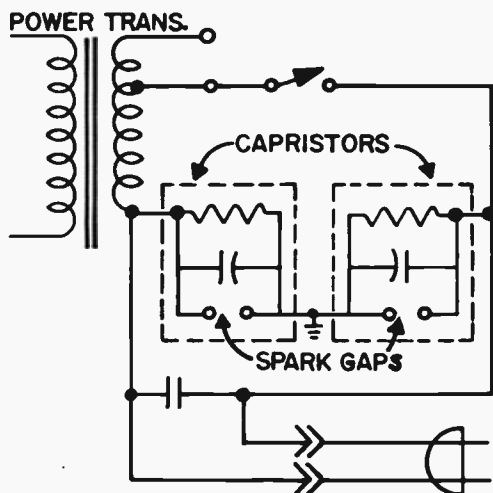


Figure 4—Simplified Power Input Circuit

new "X" chassis is the use of *capristors* in the primary circuit of the power transformer. These special components, in addition to containing the isolation resistor-capacitor network, are equipped with spark gaps to provide positive arc-over protection.

THE CTC 17X - 25" COLOR CHASSIS

(Continued from Page 1)

necessary. The circuit now uses fixed value components. A closer control of the tolerance in the side pincushioning transformer made the change feasible. The top-bottom pincushion circuit is basically the same as CTC 17. The adjustment of the top and bottom pin and amplitude controls—to obtain straight horizontal sweep at the top and bottom of the screen

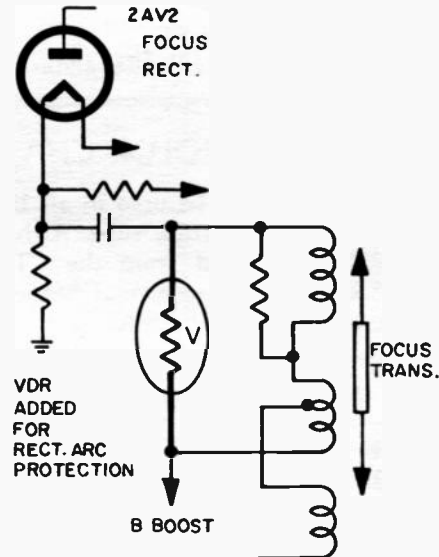


Figure 5—Simplified Focus Circuit

—is the same as that in the previous 25" chassis.

The CTC 17X focus circuit is basically that used in the CTC 17. However, the tube has been changed (2AV2), and the circuit is slightly revised to provide arc protection. A VDR now shunts the majority of the focus transformer windings. This device will protect the focus transformer from damage if arcing in the focus rectifier occurs.

The color picture tube (25AP22A) used with the CTC 17X chassis has a very efficient red phosphor. To permit gray-scale tracking the video drive to

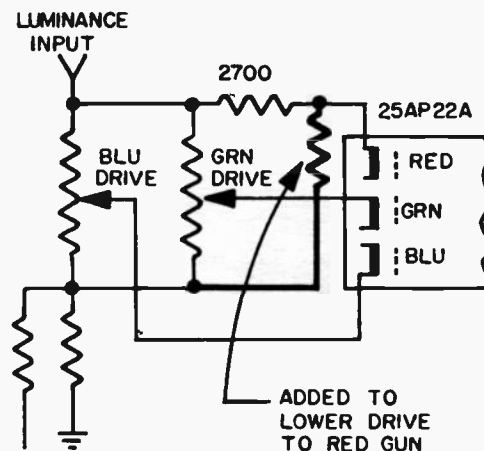


Figure 6—Simplified Picture Tube Drive Circuit

the cathode of the red gun is reduced by adding a shunt resistor (15K) as shown in the simplified schematic.



**SOLID
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In modern television design it is common practice to supply, from within the receiver circuits, blanking pulses in addition to those transmitted by the station. Most receivers supplement vertical blanking; some also include horizontal blanking. Usually, pulses obtained via fixed-value components perform this function. In RCA's new CTC 17X color chassis, however, *active* vertical blanking is realized by inclusion of a separate transistorized stage. The new Solid State circuit permits precise timing and shaping of a pulse to be used for elimination of vertical retrace lines.

An NPN transistor functioning in a grounded base configuration is used, as shown in Figure 7. In this

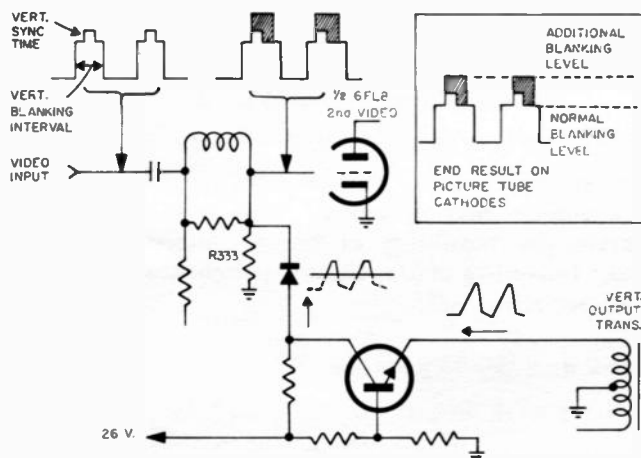


Figure 7—Transistor Vertical Blanking Circuit

circuit, the emitter is the signal input element—that is, a pulse obtained from the vertical output transformer is coupled to the emitter. The transistor is so biased that during active scanning time the transistor is conducting. During the time that the positive vertical pulse is applied to the emitter (during vertical retrace time) the transistor is forced into cutoff. Now, recall that in a common base circuit, with the signal takeoff in the collector circuit, the input signal to the emitter has no phase reversal. Therefore, a selected portion of the positive input pulse is developed in the collector output circuit. The positive signal, shaped by the transistor circuit, is coupled via the diode to the grid of the second video tube; this added positive signal increase at the grid causes more tube conduction during the time indicated by the shaded portion of the waveform. (The waveform illustrated at the input to the video stage is

CTC 17X VERTICAL BLANKING

indicating the vertical blanking interval and the vertical sync pulse). R333 (27K) is a bias resistor to limit the positive excursion on the grid, thus protecting the tube. The output signal available at the plate is, of course, a negative going signal, modified to include the additional blanking level. The transistor actually acts as a switch—during scanning time the transistor is conducting; during vertical retrace time, the transistor is driven into cutoff. The block diagram shows the end result on the picture tube cathodes—after inversion and amplification in the third video amplifier. The *additional* level appears during vertical retrace time; the increased positive signal impressed on the cathodes of the pic-

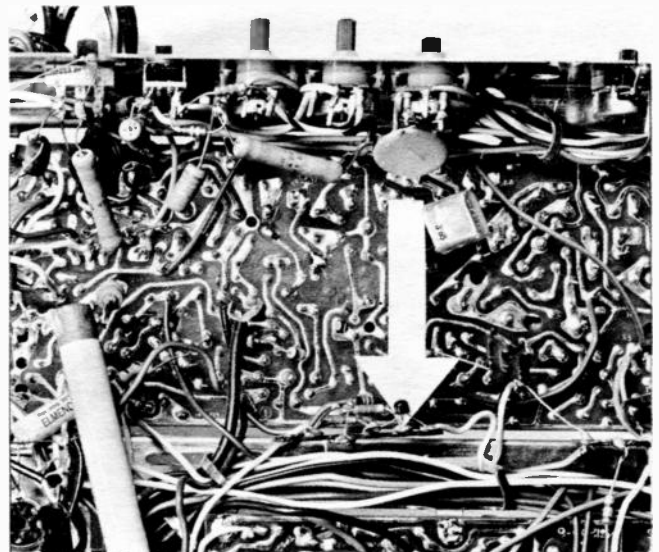


Figure 8—Location of Blanking Transistor

ture tube is sufficient to insure complete blanking of vertical retrace lines.

In other RCA color chassis (past and present), vertical blanking is accomplished using a different arrangement. A positive pulse, usually obtained via a dividing network from the vertical output transformer, is coupled to the plate circuit of the final video amplifier and thus to cathodes of the color picture tube. The new transistorized vertical blanking stage used in the CTC17X color chassis, results in more efficient elimination of vertical retrace lines.

The transistor used in the vertical blanking stage is soldered-in, epoxy type, located on the underside of the chassis. The physical location, in close proximity to the 3.58 mc crystal, is shown in Figure 8.

REMOTE CONTROL

The 1966 line of 21" and 25" color television receivers will utilize the CRK6A transmitter and the CTP10F or G version of RCA's seven function remote control system. The transmitter is identical to last year's. The receiver is basically the same as last year's CTP10E, but new low noise type transistors are used in the amplifier circuits.

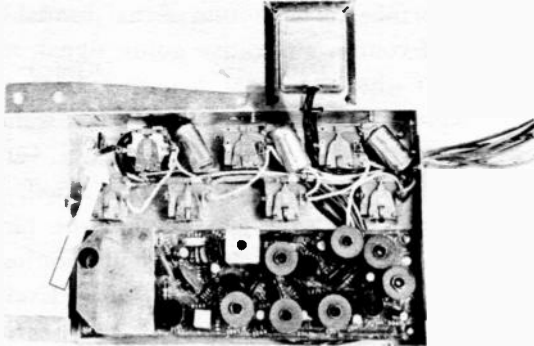


Figure 9—The CTP10F Remote Chassis

Several refinements have been made in the CTP10F and G versions to provide better reliability of the motor control circuits. An improved channel motor is used, and the motor control switches are contained on a single assembly. The relays used in the remote receiver chassis are also new. They are designed to a closer tolerance to provide a more positive "kick-in" action.

In previous versions of the color remote system the tint and color motors were of the *low voltage* variety;

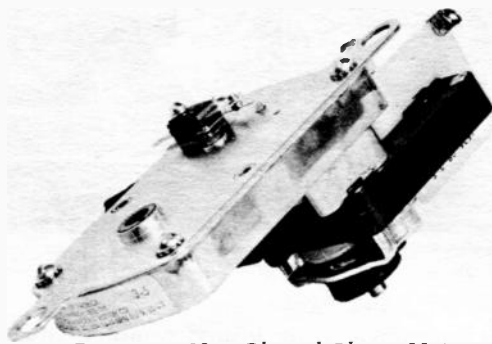


Figure 10—New Channel Change Motor

the volume control motor and the channel motor were 117-volt motors. In the F and G version of this year the tint, color and volume motors are low voltage types; the channel motor remains a 117-volt type. The master and standby switch assembly located on the volume control is a new design. The master cams that controls the on/off positions of these two switches (when the volume control is rotated) have been revised. The new assembly prevents erroneous operation of the standby switch if the receiver is jarred. The new low-voltage volume control motor circuit used in RCA's color remote control systems is fairly simple. Notice in the schematic that the volume up and volume down switches complete the ground path for one set of windings. If either is closed the motor will run.

Control Circuits

The control circuits used in both the black-and-white and color receivers this year are of the low voltage type. That is, the only switch that will be required to handle line voltage is the channel-start switch located on the remote control unit. The other switches associated with motor operation—the manual-remote switch, the motor-hold switch, and the program switch are only required to handle ap-

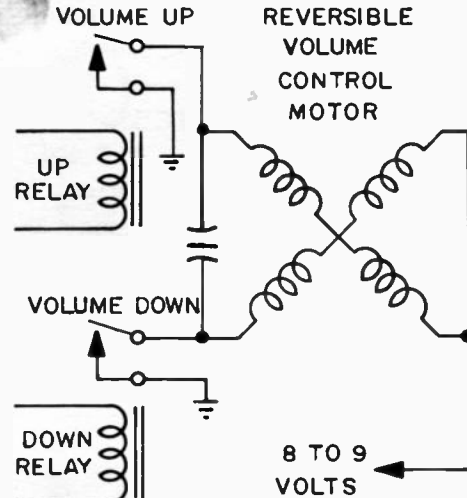


Figure 11—Simplified Circuit—Volume Control

proximately 16 volts. The program switch also serves as a volume muting switch. This new system will prevent the possibility of burnt contacts, result in better reliability of the control switches, and provide safer servicing.

Black and White Remote

The KRS28 remote amplifier used in 1966 instruments is basically the same as the KRS28 remote receiver used in last year's black-and-white television

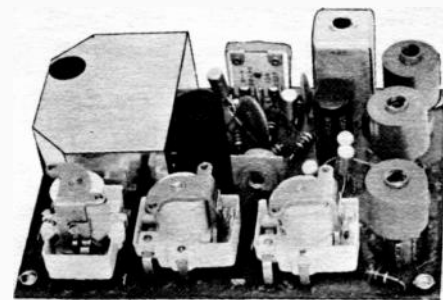


Figure 12—The KRS28 Remote Chassis

receivers. The operation of the KRS28 parallels that of the CTP10F with the exception of a fewer number of keying circuits.

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