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## 1969 Color Television Chassis

The 1969 RCA color television line features a variety of new and continuing chassis. New chassis for this year include the CTC 36 (used in portable color instruments), the hybrid CTC 38, and the recently announced solid-state CTC 40 chassis. Several familiar chassis continue for 1969; these include the CTC 27X (equipped with AFT), the CTC 31, the CTC 35, and two versions of the portable CTC 22 chassis.

### The CTC 36 Color Chassis

The CTC 36 will be employed in portable color instruments equipped with the new 19HNP22 color picture tube.

All models using the CTC 36 chassis are equipped for both VHF and UHF reception using a four-circuit **nuvistor** VHF tuner, the KRK 128. The UHF tuner used in conjunction with the CTC 36 is the transistorized KRK 122.

Styling features on instruments equipped with the CTC 36 include an illuminated channel indicator window using neon bulbs to provide long term reliability. The instruments also feature a disappearing handle which recesses into the cabinet

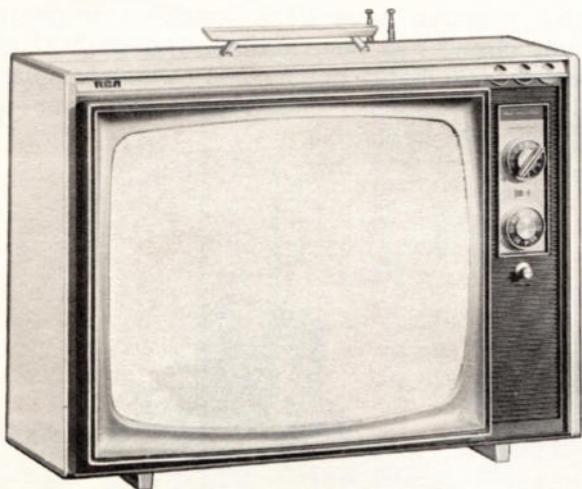


Figure 1—Model EL-442 (CTC36)

when not in use. As a deluxe option, many instruments equipped with the CTC 36 will feature a three-function remote control system. Provisions are made for adjustment of volume, channel and on/off (with standby).

Physically and electrically, the CTC 36 resembles the familiar CTC 22 chassis. The chassis photograph of (Figure 2) illustrates the wrap-around construction in this portable instrument. This chassis uses basically the same IF circuitry (PW 200 IF board) and color circuitry (PW 700 board) as the CTC 22. New circuitry is used in the vertical sweep section; horizontal circuitry is similar (with modifications) to that used in the CTC 22 chassis.

### The CTC 38 Color Chassis

The CTC 38, in several variations, will find wide usage in this year's color instrument production. Instruments using the CTC 38 will be equipped with either the 25XP22 or the 22UP22 color picture tube. Basically, there are three mechanical versions of the CTC 38: The first chassis variation is used in console and table model instruments

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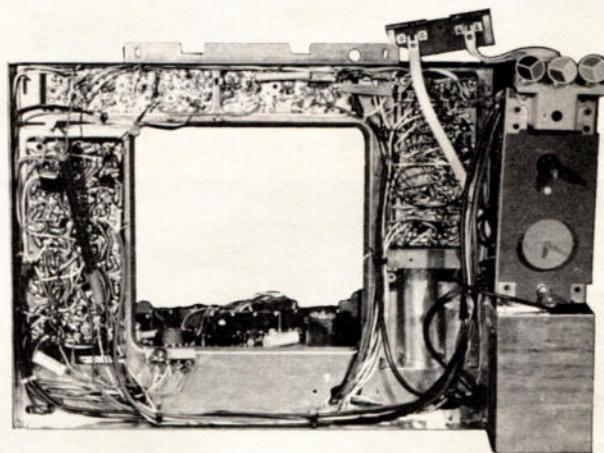


Figure 2—CTC 36 Rear View



## Color Chassis

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equipped with the 25XP22 color picture tube. This chassis physically resembles the previous CTC 31; the Tuner Mounting Assembly (TMA) features separate direct-drive channel and fine tuning for both VHF and UHF. In addition, the auxiliary customer controls are located on a swing-out bracket assembly, identical to that used in the CTC 31 chassis. A step-up version of this chassis ("X") features integrated circuit AFT. The third version, a CTC 38X, is used in consoles and combination instruments equipped with the 25XP22 color picture tube. The difference between this chassis and the previous two is the auxiliary controls which are located on the TMA rather than a separate control bracket.

Although the CTC 38 physically resembles the previous CTC 31, it is electrically different in many respects. This is the first RCA color chassis to use extensive hybridization. The KRK 140 series VHF tuner used with this chassis features a transistor oscillator, and transistor mixer; a **nuvistor** serves as the RF amplifier. Tuner output is applied to a **three-stage transistor IF system**. The chassis also utilizes solid-state devices in a **balanced-diode**

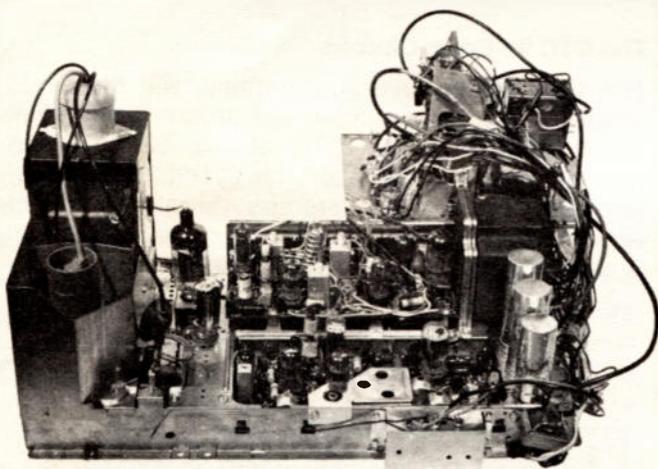


Figure 3—CTC 38X Chassis

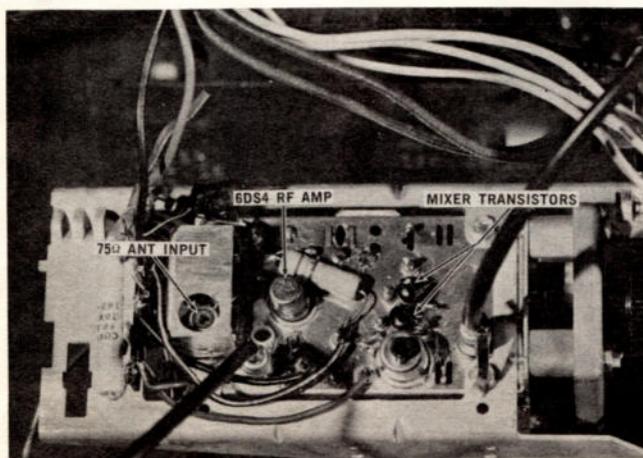


Figure 4—Top of Hybrid KRK 140 Tuner

**color demodulator system**, which replaces the familiar tube-type demodulators. The remaining circuitry in the CTC 38 is similar in many respects to that found in the previous CTC 31.

## The CTC 40 Color Chassis

This year, RCA announces its fully solid-state color television chassis, the CTC 40. This chassis utilizes solid-state devices in all circuit areas with the exception of the high voltage rectifier. The tuner employed with the CTC 40 (KRK 142) is similar in some respects to that employed in the CTC 38, with the exception that the RF amplifier stage employs an MOS field effect transistor (FET). Also, the CTC 40 employs silicon controlled rectifiers (SCR's) in a new type horizontal sweep system, capable of supplying the deflection and high voltage requirements of the color television instrument—with optimum reliability.

## Continuing Color Chassis

Color chassis continuing in 1969 include the CTC 27, CTC 31, CTC 35, CTC 22AA and the CTC 22D. The CTC 31 and the CTC 35 chassis are continued with only minor changes. This year the CTC 27 is available in the "X" version, featuring automatic fine tuning.

The two versions of the CTC 22 chassis are electrically very similar. Physically however, there are some differences. The CTC 22D (used in model EL-424) is equipped with an earphone jack. The Tuner Mounting Assembly used in this chassis is quite similar to that used last year; using one knob for VHF tuning and a slide rule UHF indicator. The new CTC 22AA is not equipped with the earphone provision. It does however, feature a new two knob-TMA assembly with separate VHF and UHF control knobs. In both chassis versions minor circuitry changes have been made—a brightness limiter circuit has been added. The CTC 22 now features automatic degaussing, which displaces the manual degauss circuit used last year—another significant change.

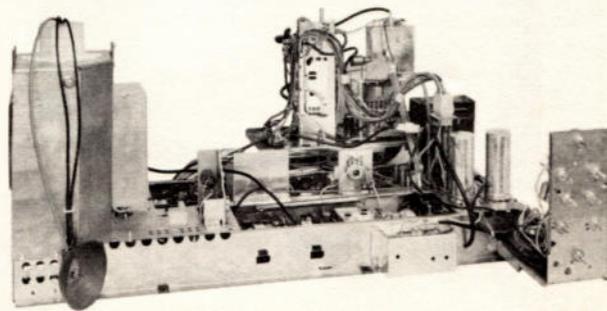


Figure 5—CTC 40 Chassis



## New Substrate Amplifiers

Four new solid-state amplifiers are featured in the 1969 portable phonograph line. These amplifiers feature a substrate construction technique, wherein, nearly all amplifier components are contained on a ceramic wafer or substrate, similar to the familiar packaged electronic component (p.e.c.) units that are used in other RCA products.

The substrate is interesting because it includes (in addition to passive components, resistors, small capacitors, etc.) active devices such as transistors and diodes. Circuitry wise, the substrate contains the majority of the components of a two-watt, complementary symmetry amplifier—similar to the familiar RS 225.

Beginning with a ceramic wafer, circuit components (such as resistors, and small value capacitors) plus inter-connecting wiring are silk-screened on the wafer, utilizing special resistive and conductive paints. After each paint application, the substrate is "fired." During this firing process, the special paints are reduced to a film of carbon or silver. Once the passive components are formed, the transistors and diodes are assembled to the substrate base. After a final check, the entire assembly is dipped in a protective resin.

The photographs at the bottom of the page show two of the substrate amplifiers included in the 1969 product line. The monophonic unit (RS 249) illustrated in Figure 7 is designed for use in small portable phonographs. Deluxe stereo portable

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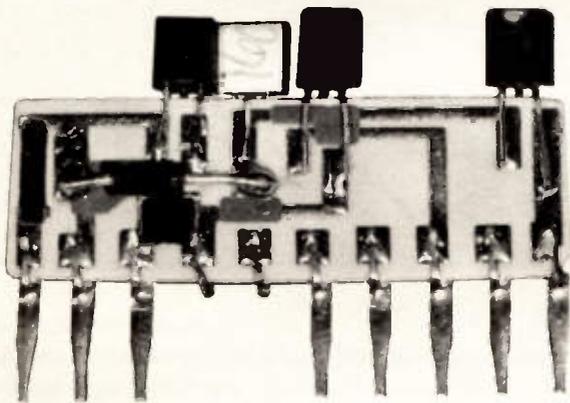


Figure 6—Substrate without Coating

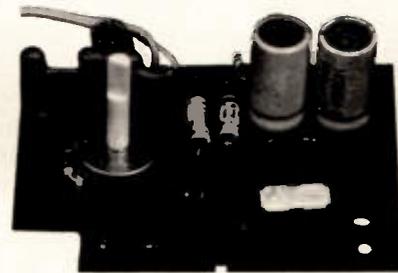


Figure 7—RS249 Monophonic Amplifier

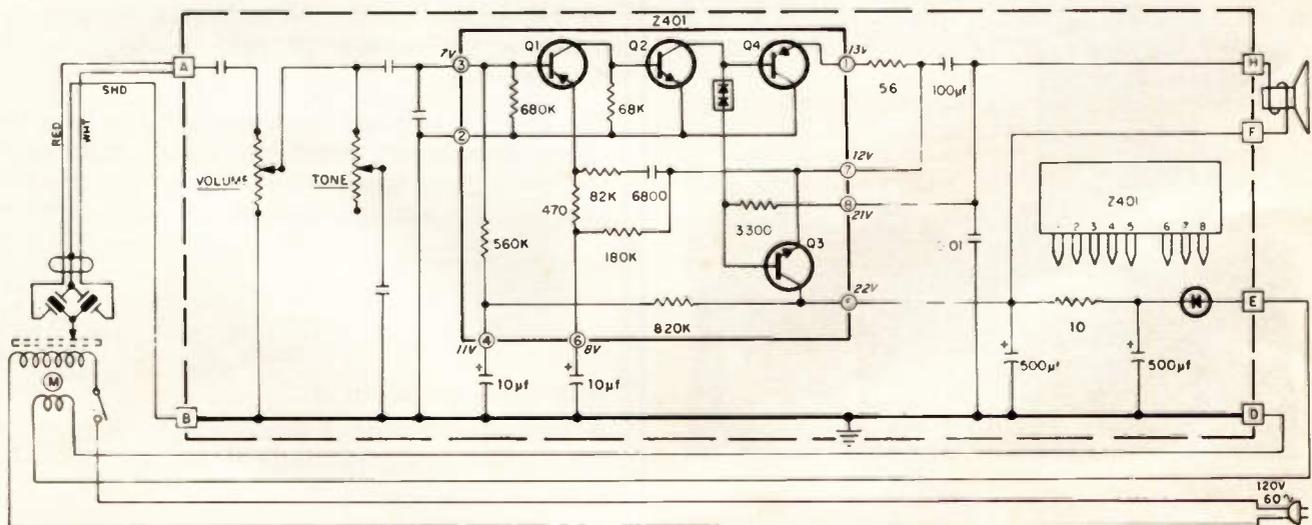


Figure 8—Typical Substrate Amplifier Circuit

## B Boost Voltage Measurements

Many service technicians make a practice of measuring the B boost voltage to evaluate the performance of the high voltage section of a television receiver. This is a good procedure since this voltage is derived from the horizontal output stage.

Black and White receivers generally use B boost voltage to power several circuits such as: plate voltage for the vertical oscillator, the first anode of the picture tube, and sometimes as the source voltage for the sound detector. In color receivers, B boost is also utilized as the screen grid supply for the color picture tube, and as a control voltage for the shunt regulator stage.

Care should be exercised whenever B boost is measured, since a pulse of several thousand volts will be present in the damper circuit where this voltage originates. The preferred point to read B boost is at one of the circuit locations which are powered by boost—at these points the high amplitude pulse is filtered out.

If the pulse voltage in the damper circuit is read with a meter such as the RCA WV-38, be sure to use the 5KV scale.

## Substrate

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phonographs will use the RS 248 (shown in Figure 9). Notice that the stereo amplifier utilizes two substrates—one for each channel.

In addition, two other substrate amplifiers will be found in this year's RCA products. The RS 243 is a four-watt stereo amplifier, featuring individual volume controls for each channel and a dual tone control. The RS 245 is this year's AC/battery amplifier that replaces last year's RS 228 in three way portable instruments. This amplifier is used in conjunction with an RP 229 series record changer, which has a DC motor.

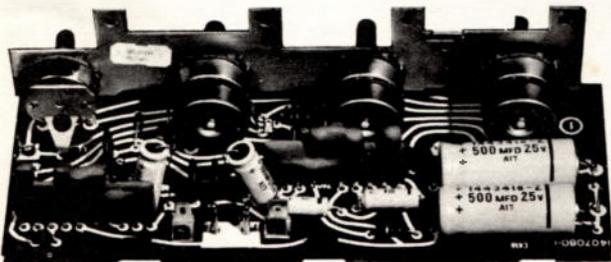


Figure 9—RS248 Stereophonic Amplifier

## Electrolytic Capacitors

Have you ever wondered how shelf-storage affects electrolytic capacitors? Under certain conditions, electrolytic capacitors that have been stored for a long time may appear to be defective if checked out quickly—excessive leakage current and below normal capacity. In most cases, these capacitors need only be reactivated to function properly. This should be done by applying reduced voltage to the capacitor starting at approximately one-third of the rated working voltage and gradually increasing the applied voltage over a period of one or two minutes. Once properly polarized, the capacitor should then check out normal in every respect. The degree to which the characteristics of an electrolytic capacitor change when left inactive depends upon the quality of the capacitor, and the length of inactive time.

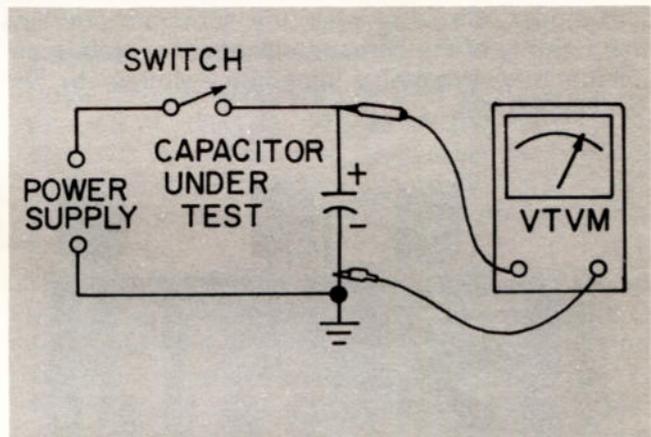


Figure 10—Capacitor Test Circuit

An electrolytic capacitor can be quickly checked by applying a voltage near its "working" voltage. Remove the power supply and check the voltage across the capacitor after five or ten seconds. After this period of time, a good capacitor should retain its charge and measure practically the same as the applied voltage. A defective capacitor will reveal a low reading or zero reading after this time interval.

The electrolytic capacitors employed in RCA Consumer Electronics Products are of high quality standards and have the ability to retain normal characteristics during periods of inactive service.

## RCA Sales Corporation

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