CTC 19 CHASSIS FEATURES

The new CTC 19 Color chassis exemplifies RCA's continuing advance in the field of Color Television. The new chassis is designed to operate the newly engineered 19EYP22, a 19" rectangular 90° picture tube.

While the physical size and shape of the chassis is new (for accommodation of the 19" picture tube), the general operation of the receiver follows that of the current RCA color sets. Two "Solid Copper Circuit" boards are used in the main chassis. One board contains the chroma, audio output, and the video output stage. The second board contains the picture IF's, first

RCA VICTOR 19" COLOR

RCA's recently introduced compact 19-inch color television receiver offers many new advantages to the color television customer.

Most outstanding is the smaller overall size of the receiver—it measures 18-3/8" high, 24-1/2" wide and only 18-7/8" deep. Yet the 19" color picture tube delivers a 180 square inch picture. This compact, space saving table model color set fits most anywhere permitting color television to virtually become a part of any room setting.

A newly designed chassis, designated as the CTC 19 coupled with the 19" rectangular 90° color picture tube and advanced cabinet styling make this space saving color television instrument possible.

All of the high performance characteristics are maintained in the new 19-inch color receiver. The picture tube, using rare earth phosphors for truer color rendition, is glare-proof and dust-proof. Built in VHF and UHF antennas are provided; VHF is tuned with an advanced design four-circuit tuner, and UHF is tuned with a solid state UHF tuner. Signals are handled throughout the chassis with highly efficient circuits making use of RCA "Solid Copper Circuity" in the majority of the overall chassis.

The CTC 19 color chassis is power transformer operated and 24,000 volts are developed by the high voltage circuits. Automatic degaussing, automatic gain control, and automatic scene control networks are included. This issue of "Plain Talk and Technical Tips" covers some of the many circuit advances of the new RCA 19-inch color television chassis.

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In the CTC 19 chassis, color and sync signals (obtained from the grid-cathode circuit of the first video amplifier) are fed to a sync, AGC, and chroma amplifier stage (the pentode section of a 6GH8A).

Color information receives special attention in the first video and chroma amplifier stages. The chroma signals are obtained from the cathode circuit of the first video amplifier via networks selective to high frequencies. Additional peaking to recover maximum chroma is obtained by a series resonant network in the input grid of the AGC, sync, chroma amplifier tube. Sync, AGC, and high-level chroma are available at the plate circuit of the sync/AGC/chroma stage.

The sound circuit has a separate diode detector; and as in previous chassis, the signal is taken from the plate of the last picture IF. The sound signal is handled by a three stage sound circuit, using a fram grid 6JC6 as the sound IF amplifier, a 6H26 de-modulator, and a 6AQ5 in the output stage.

The CTC 19 uses one stage of chroma amplification, "X" and "Z" demodulators, and color-difference amplifiers to recover R-Y, B-Y, and G-Y signals. The progress of chroma signals through these stages closely follows the signal flow in previous RCA color receivers. Notice in the block diagram that type 6GH8A is used exclusively for all functions in the color circuits.

One of the most interesting circuits in the CTC 19 is found in the color sync stages. The output of the burst amplifier stage (pentode of 6GH8A), injects the color burst signal directly to an Injection-Locked oscillator. Burst is coupled into the crystal oscillator grid circuit, which in turn locks the 3.58 mc oscillator in step with the incoming burst signal. Temperature drift in the burst transformer has a minimum effect on the frequency and phase of the oscillator. The oscillator can be adjusted for the correct frequency, and the burst transformer can be peaked for maximum burst signal independently of each other. A capacitor trimmer located in the grid circuit of the 3.58 mc oscillator is used to adjust the oscillator on frequency;
Many present-day vacuum tube products use semiconductors extensively for various purposes. A color television chassis, because of the additional circuitry required, employs semiconductors to special advantage. RCA's new CTC 19 color chassis, for example, uses many components that are members of the semiconductor family (silicon, selenium, and germanium units) to perform various circuit functions.

Other semiconductors in the CTC 19 are two 1N60 type germanium diodes. One is used for video detection, while the other is used for sound detection.

The task of stability or special purpose applications in RCA's 19-inch color chassis is performed quite well by components that are basically semiconductor units. Voltage Dependent Resistors (resistors which change their value depending upon the voltage impressed across them) and Thermisters (resistors which change their value in accordance with temperature variations) are both used.

Circuits in the CTC 19 using VDR's include focus, pin cushioning, vertical sweep, horizontal sweep, and automatic degaussing. Thermisters are found in degaussing circuitry and in deflection yoke circuitry.

Additional use of semiconductors in the CTC 19 include the UHF transistor tuner in which a transistor serves as the local oscillator, and a diode functions as the mixer.

Other devices, while not semiconductors in the strict sense, are used for protective reasons. These are the combination capacitor/spark gap units located in the picture tube control grid and screen grid circuits.

It is interesting to observe that even in a tube type instrument, such as the CTC 19 color chassis the use of semiconductors in one form or another serve to accomplish many circuit functions.
the burst transformer is adjusted for maximum transfer of the burst signal to control the oscillator. The frequency of the oscillator is determined mainly by the crystal circuitry; any variation in loading on the output plate has little effect on the oscillator frequency. The TINT control is part of a phase shifting network in the plate circuit. Rotating the control alters the phase fed to the color demodulators.

![Diagram of injection locked oscillator (burst controlled)](image)

**Figure 9—Simplified Schematic CTC 19—3.58 mc Oscillator**

Control voltage for the killer stage (and thus the chroma bandpass stage) is derived directly from the grid of the oscillator circuit. During conditions of no color, negative voltage on the oscillator grid is approximately 4 volts; with color, negative 8 volts (the actual voltage will depend on the amplitude of the incoming burst signal). This voltage change in a more-negative direction is fed to the killer grid, and is sufficient to cut off the killer, allowing the bandpass stage to conduct. The circuit and operation of the horizontal blanker and the three-position kine bias switch is very similar to that of previous RCA color receivers. Most of the circuits in the CTC 19 are very closely related to the reliable circuits used in other RCA color chassis.

The vertical oscillator-output stage uses a 6GF7 and the basic circuit follows closely the vertical circuits in previous color chassis. Similarly the horizontal oscillator-AFC circuit is related to previous circuits, with the commonly used 6FQ7 as the oscillator. The application of voltage dependent resistors (VDR) in the vertical, and horizontal circuits of RCA’s color chassis, to provide circuit stability, is continued in the CTC 19. Several new tube types in the horizontal and high voltage circuits are being used for the first time in RCA’s 19” color chassis. Among these are the 2AV2 focus rectifier, and the 6BS3 damper. The horizontal output tube is a new type 6KM6. The use of a new tube type, the 6BK4B, ensures higher reliability in the shunt regulator stage. The familiar 3A3 high voltage rectifier tube furnishes the 24KV second anode voltage for the 19” picture tube. Slightly modified versions of the focus and horizontal linearity circuits are used in the CTC 19. Adjustments for high voltage, regulator current, and horizontal output current are made using the same procedures as used in previous RCA color chassis.

The high-quality, performance, reliability, and service-features expected of RCA color engineering is continued in the new CTC 19. The following notes will serve to summarize some of the features of the new color chassis: There are 20 tubes in the CTC 19 chassis. Seven 6GH8A’s are used. A 19EYP22 color picture tube is employed in instruments using this new color chassis. The UHF tuner is transistorized. The power supply is a full-wave bridge circuit using four silicon rectifiers. Protection for the B+ line is a reset circuit breaker. A wire link fuse protects the main filament line. All receivers using the new chassis are equipped with automatic degaussing. Vertical pinch cushion circuits are used. Adjustments for top and bottom pinch cushion are the same as in the CTC 17. A side pinch cushion circuit is not needed with this 19” color picture tube. The CTC 19 features RCA “Solid Copper Circuit” construction; two main chassis boards are used. Receiver setup adjustments (purity, convergence, etc.) are accomplished with the same procedures as used previously. Two video amplifiers are used: 6GH8A, first video; 12HG7 second video. The CTC 19 demodulates on “X” and “Z” axes to recover R-Y, B-Y and G-Y difference signals. Color sync processing is by means of an injection-locked 3.58 crystal oscillator, directly controlled by the incoming burst signal, and color killer signal bias is obtained from the grid circuit of the 3.58 mc oscillator.

The service technician will find that the CTC 19 has many similarities to previous color receivers. The few circuit areas which are different are straightforward and service techniques presently used can be easily applied to this new color receiver.