

PLAIN TALK

AND

Technical Tips

a monthly publication for the service industry prepared by:



RCA VICTOR



VOL. 10

NO. 10

OCTOBER, 1967

PRODUCT PERFORMANCE
RCA SALES CORPORATION

THE CTC 35 COLOR CHASSIS

The CTC 35 is similar in many respects to the CTC 28—featured in the July issue. It is a three video IF chassis incorporating AUTOMATIC CHROMA CONTROL and AUTOMATIC FINE TUNING.

The major differences between the CTC 28 and CTC 35 lie with the tuner mounting assembly, auxiliary customer controls, and video peaking control. The

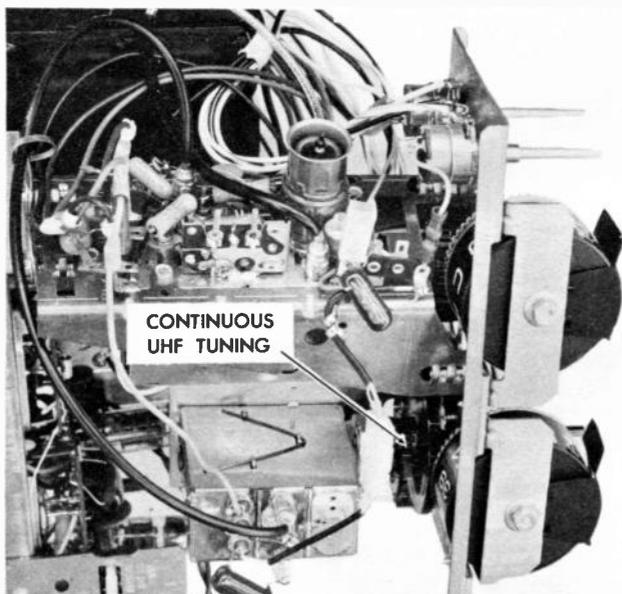


Figure 1—TMA Used With CTC 35

CTC 35 is equipped with continuous UHF tuning as opposed to the detented UHF tuning system on the CTC 28. The VHF drive mechanism is the same on both chassis.

The CTC 35 does not incorporate AFT defeat switching in conjunction with the UHF and VHF fine tuning mechanisms. Customer AFT defeat is accomplished by a push-pull switch located on the rear of the BRIGHTNESS control. Initial fine tuning on the CTC 35 equipped instruments is accomplished in this manner:

For VHF: First, AFT is defeated by pulling out on the BRIGHTNESS knob. This activates the AFT "de-

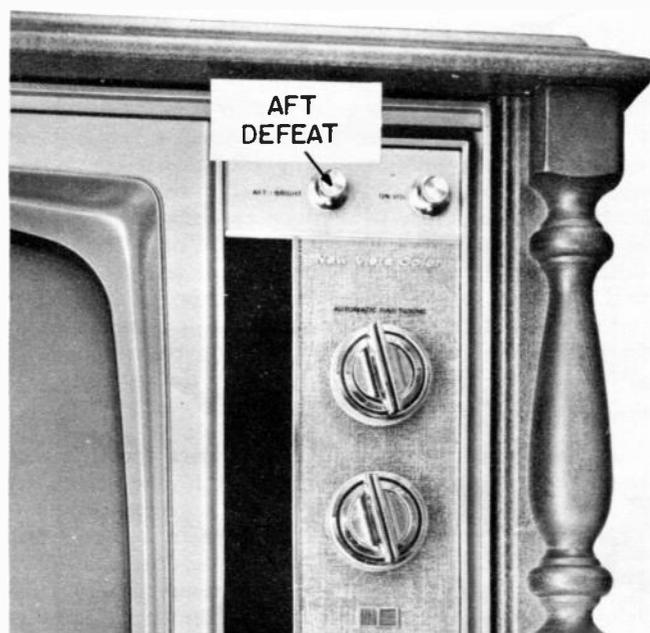


Figure 2—Front Panel Controls

feat" switch. The fine tuning knob is now manually adjusted until the sound bars (beats) just start to interfere with the picture. The AFT system is then activated by pushing in the brightness knob. At this time AFT will cause the local oscillator to lock on the correct frequency for that particular channel; therefore, the instrument will be correctly fine tuned.

For UHF: First switch AFT "on" with the "defeat" switch . . . then turn the channel selector to the desired channel (AFT helps to find it) . . . then turn AFT "off" and adjust the channel selector until a good picture is obtained (this is fine-tuning UHF) . . . then switch AFT back "on" to "lock-on" the local oscillator. **This Process Must Be Repeated Each Time UHF Channels are changed on CTC 35 equipped instruments.**

Auxiliary customer controls on the CTC 35 are accessible behind a horizontally pivoted door located on the lower part of the control panel escutcheon. Concentric controls are used for HORIZONTAL/TONE and VERTICAL/CONTRAST. The COLOR and TINT controls are located below the two dual controls. BRIGHT-

Continued on page 4

TELEVISION ANTENNA CONSIDERATIONS

Most television technicians are fully aware of the importance of an adequate antenna system in providing for good television reception. They know that the antenna system must be in good condition and properly oriented if best results are to be obtained, but in many instances insufficient consideration is given to the actual characteristics of the antenna being used with a given receiver in a particular location. Antenna characteristics vary widely making some antennas suitable for use in one area and others in another area. A technician should be familiar with these characteristics.

Two characteristics of an antenna that are of prime concern to the technician are its *polar pattern and gain* at the frequencies wherein it is expected to pick up signal information with a minimum of interference and distortion.

Polar Patterns

Polar patterns show the signal pickup response of an antenna in all directions. The vast differences between antenna polar patterns can readily be seen by comparing those shown for antenna types A and B in figures 3 and 4. Note how they differ from channel to channel as well as between antennas. A good knowledge of antenna polar patterns is essential if a technician is to analyze the suitability of a given antenna for use with areas subject to critical reflections or interference, since the object is to choose and orient an antenna that will minimize response in the direction of the interfering signal source without sacrificing any needed forward gain. Polar patterns, by showing the response in all directions, provide the means for doing this.

Gain Curves

Antenna gain curves show the relative sensitivity of an antenna expressed in comparison to the sensitivity of a half-wave dipole type antenna at a given frequency. Typical antenna gain curves are shown in figures 3 and 4. For example, suppose a half wave dipole antenna at a given location and for a fixed received signal develops a signal voltage of 500 microvolts. Another more sensitive antenna which develops 1000 microvolts under the same conditions is said to have a voltage gain of 2 or a power gain of 4. However, voltage gains are more often expressed in terms of decibels which can be calculated from either the voltage or power gain. For simplicity the table below shows voltage and power gain in terms of db. Reference to this table reveals that a voltage gain of 2, as in the example above, can be expressed as a db gain of 6.

| Power Gain | Voltage Gain | Gain in db |
|------------|--------------|------------|
| 1 | 1 | 0 |
| 2 | 1.41 | 3 |
| 3 | 1.73 | 4.8 |
| 4 | 2 | 6 |
| 5 | 2.24 | 7 |
| 6 | 2.45 | 7.8 |
| 7 | 2.65 | 8.5 |
| 8 | 2.82 | 9 |
| 9 | 3 | 9.5 |
| 10 | 3.16 | 10 |
| 20 | 4.47 | 13 |
| 50 | 7.07 | 17 |
| 100 | 10 | 20 |
| 400 | 20 | 26 |
| 1000 | 31.6 | 30 |
| 10,000 | 100 | 40 |

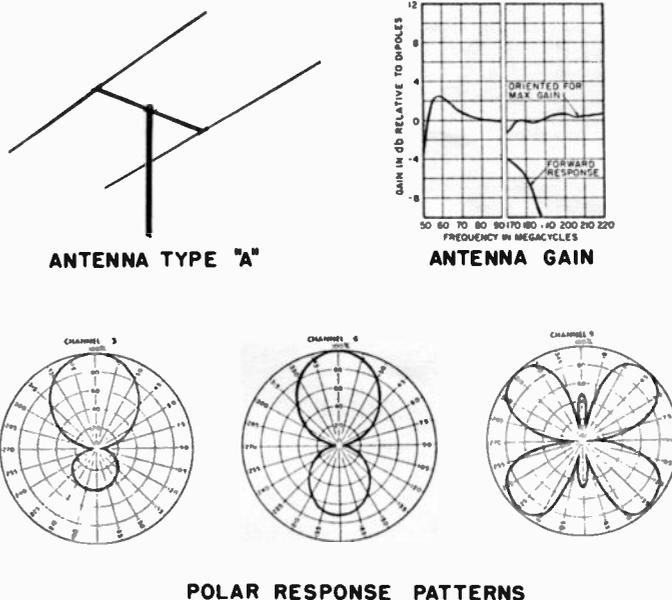


Figure 3—Polar Patterns and Gain Characteristics of Dipole and Reflector Type Antenna.

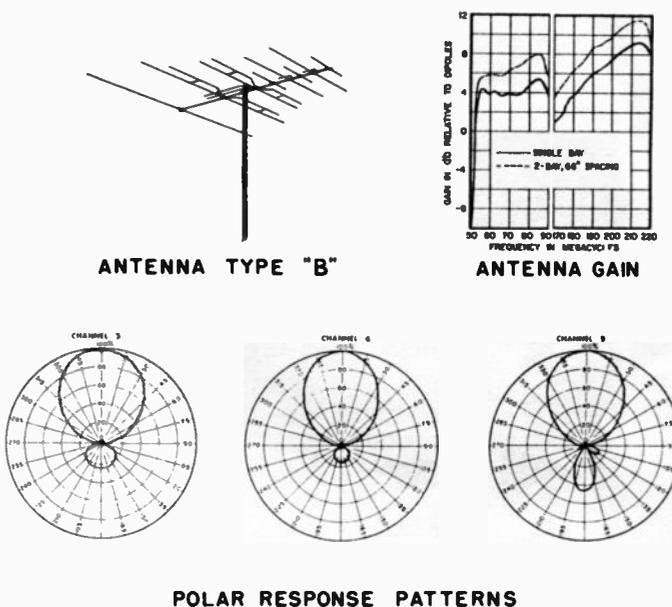


Figure 4—Polar Patterns and Gain Characteristics of Antenna Having High-Gain and Good Directivity.

An antenna should have a reasonably flat frequency response over the frequency range of the channels on which station signals are to be received. For color use, 2 db maximum gain variation within the individual channel spectrum has been determined to be a reasonable tolerance in antenna response.

No matter how well the circuits in a television set are performing a receiver cannot provide good reception unless the antenna is providing an undistorted station signal to the receiver antenna terminals. Weak sync, distorted sound, poor definition, reflections, interference; there's an infinite number of effects that can be caused by an inadequate antenna—that antenna is important, don't overlook it.



**SOLID
STATE**

NEW COLOR REMOTE CIRCUITS

Many 1968 color television instruments are using a new remote system. Highlights of the system include an integrated circuit preamplifier in the remote receiver and a new more efficient hand unit transmitter.

Receivers

There are three variations of the basic remote receiver. These minor changes have been made to tailor the system to each particular color chassis in this year's product line. Models include:

The CTP 11D receiver is utilized with seven function remote systems. (CTC 27, 31, 35) The CTP 12C receiver is utilized with eight function remote systems in instruments with tube audio sections. (CTC 28)

The CTP 12B receiver is utilized with eight function remote systems in instruments with solid state audio sections. (CTC 30)

The integrated circuit (IC 1901) contains the equivalent of 10 transistors, 15 resistors, and one diode. IC preamplifier performance is equivalent to the discrete

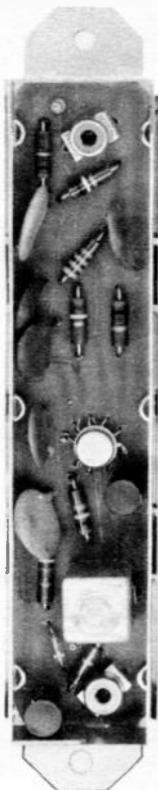
component preamplifier used with 1967 model instruments.

The keying amplifier and relay sections of the remote receivers are basically unchanged from those used in 1967 model instruments. One minor difference is the addition of a 12-volt AC supply for the preamplifier. The CTP 12B keying amplifier and relay section (in CTC 30) includes wiring additions to provide proper supply voltages to the sound muting transistor.

Hand Units

The remote hand unit transmitter has been redesigned. It utilizes a less complex, more reliable, and more efficient circuit.

IC UNIT



TRANSISTOR UNIT



Figure 5—Discrete Component Preamplifier Compared to IC Preamplifier

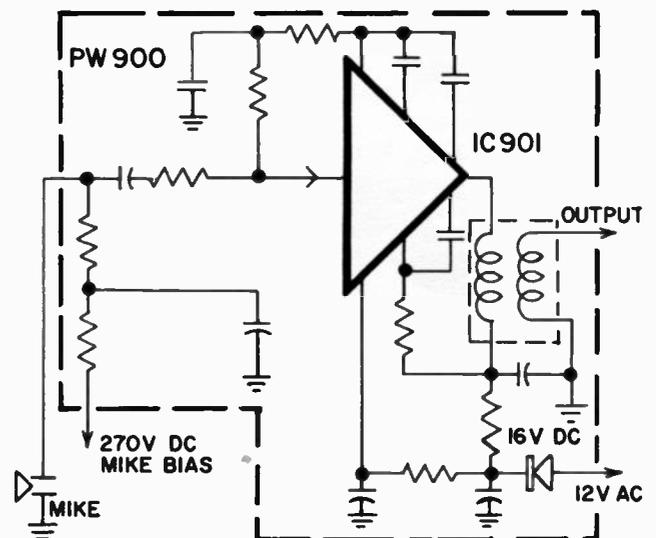


Figure 6—IC Preamplifier Simplified Schematic

The major change in the transmitter (from both an electrical and physical standpoint) is the elimination of the individual frequency trimmer capacitors. By holding the keying frequency tuning capacitor tolerances very close, only one "master trimmer" capacitor is needed to align all frequencies.

Alignment is accomplished by depressing the "color up" button and adjusting the master trimmer, C2003, for an oscillator frequency of 44.750 kHz. This frequency can best be determined in average field situations by comparing the output to a known correct frequency source. This source could be a crystal calibrated generator or another hand unit, which is known to be correctly aligned.

Another change incorporated in the new hand unit circuitry is the operation of the oscillator at the actual

Continued on page 4

NEW CTC 35

Continued from page 1

NESS/AFT and ON-OFF/VOLUME controls are located on the top part of the control panel escutcheon—see Figure 2.

The CTC 35 also features a video peaking control. On the CTC 35 video peaking is not a front panel customer control as on the CTC 28 and CTC 30. It is a continuous variable control, located on the rear apron of the chassis.

REMOTE CIRCUITS

Continued from page 3

keying frequencies. Previously the oscillator operated at one-half the keying frequencies. The characteristics of the unbiased transducer produced an output which doubled the frequency of the oscillator. Thus the actual keying frequencies were produced by the hand-unit transducer.

In the new units, however, the transducer is DC biased by a voltage doubler rectification network, consisting of rectifiers CR 2001 and CR 2002, capacitors C2019 and C2018, and resistor R2002. The output from the oscillator, which is applied to the transducer through C2017, acts as the AC supply for the voltage doubler rectifier circuit. This DC bias allows the transducer to emit energy at the fundamental oscillator frequencies.

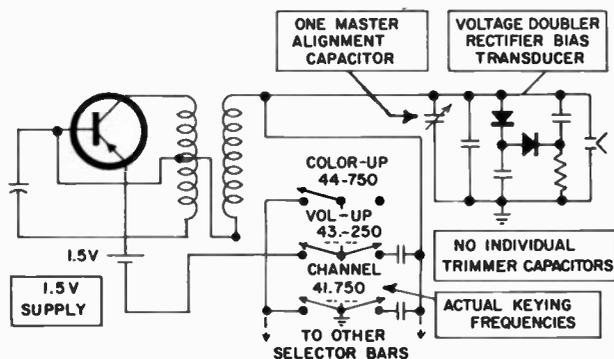


Figure 7—Remote Transmitter Simplified Schematic

Operating in this manner results in a much more efficient circuit. In fact the efficiency is improved to the point whereby sufficient operating power is supplied by a 1.5-volt battery instead of the previous utilized 9-volt battery. Battery drain is also reduced.

The performance of the hand unit is equivalent to that of the unit utilized in the 1967 product line.

The model designation for the new color television remote hand units are:

- CRK 9—Seven function unit
- CRK 10—Eight function unit

The additional function incorporated in the CRK 10 is the UHF Channel function which operates the detented UHF tuner in instruments so equipped.

CHECKING THE VDR

The vertical output circuit of RCA Victor color chassis incorporates a voltage dependent resistor (VDR). This special component regulates the bias on the vertical output tube, permitting the vertical picture size to remain constant with wide variations of line voltage.

The VDR is generally trouble-free; however, there could be instances where the service technician might wish to check its operation.

An open circuited VDR will cause vertical over scan and some loss of vertical hold due to an excessive feedback pulse from the output section to the oscillator section.

A shorted VDR will cause a loss of vertical deflection, because of an absence of feedback from the output stage to the oscillator section.

Checks

One quick check of a VDR is to substitute a new part. Another method of checking a VDR is to sub-

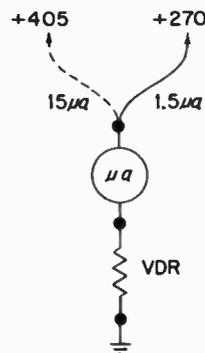


Figure 8—VDR Test Circuit

stitute a 1 meg resistor; if the VDR is defective this resistor will allow the circuit to operate, however vertical size will be excessive and no voltage regulation would be realized. A simple out-of-circuit test is illustrated in Figure 8. This test is performed by measuring the current through the VDR when two different positive voltages are applied. A voltage difference of approximately 1.5 to 1 results in a 10 to 1 current change. Notice that the voltages used in the test setup are readily available from the operating television chassis and the test actually demonstrates the characteristics of the VDR. Remember that the VDR is a reliable device and chances of it being defective are remote.

RCA SALES CORPORATION

600 NORTH SHERMAN DRIVE
INDIANAPOLIS, INDIANA 46201
A RADIO CORPORATION OF AMERICA SUBSIDIARY
Trademark(s) ® Registered Marca(s) Registrada(s)
Copyright 1967—RCA Sales Corporation