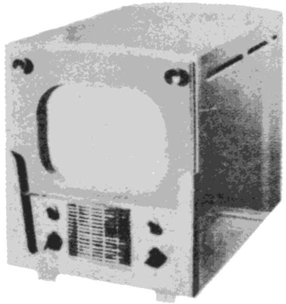
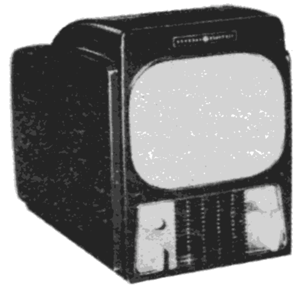
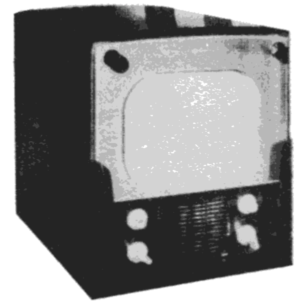


MODEL 807

MODEL 809



MODEL 805



MODEL 806

SPECIFICATIONS

OVER-ALL DIMENSIONS:

	805	806	807	809
Height	14 11/16 in.	17 1/16 in.	17 1/16 in.	35½ in.
Width	11¾ in.	13½ in.	13½ in.	20 in.
Depth	20¼ in.	19⅞ in.	19⅞ in.	21⅛ in.

ELECTRICAL RATING:

Frequency .... 60 cycles
Voltage .... 115 v. ac
Watts .... 150 w.

INTERMEDIATE FREQUENCIES:

Video .... 26.3 mc
Audio .... 4.5 mc

AUDIO POWER OUTPUT:

Undistorted .... 1.0 watt
Maximum .... 2.0 watts

LOUDSPEAKER:

Type .... Electrodynamic or PM (see production changes)
Cone Diameter (805, 806, 807) .... 4 inches
(809), ... 10 inches
Voice Coil Impedance @ 400 Cycles. 3.2 ohms

R-F FREQUENCY:

Selector Switch Position	Frequency Range MC	Picture Carrier Frequency MC	Sound Carrier Frequency MC
No. 2	54–60	55.25	59.75
No. 3	60–66	61.25	65.75
No. 4	66–72	67.25	71.75
No. 5	76–82	77.25	81.75
No. 6	82–88	83.25	87.75
No. 7	174–180	175.25	179.75
No. 8	180–186	181.25	185.75
No. 9	186–192	187.25	191.75
No. 10	192–198	193.25	197.75
No. 11	198–204	199.25	203.75
No. 12	204–210	205.25	209.75
No. 13	210–216	211.25	215.75

ANTENNA:

Type .... Folded dipole, or equivalent
Impedance .... 300 ohms

PICTURE SIZE:

Model 805, 806, 807, 809
Early .... 8½ in. x 6⅜ in.
Model 806, 807, 809 Late ... 9½ in. x 7½ in.

TUBES:

SYMBOL	PURPOSE	TYPE
V1	R-F Amplifier	6AU6
V2	R-F Amplifier	6AU6
	(W version)	6AG5
V3	Converter-Oscillator	12AT7
V4	1st I-F Amplifier	6AU6
V5	2nd I-F Amplifier	6AU6
V6	3rd I-F Amplifier	6AU6
V7	Video Detector, D-C Restorer and Clipper	6AL5
V8	Video Amplifier	12AU7
V9	Picture Tube (Model 805)	10BP4
V9	Picture Tube (Models 806, 807, and 809)	10FP4
V10	Vertical Multivibrator and Sweep Output	12SN7GT
V11	Phase Inverter and Clipper (early and "T" versions)	12SN7GT
V12	AFC and Hor. Sweep Generator (early and "T" versions)	12SN7GT
V13	Hor. Sweep Output	19BG6-G
V14	Hi-voltage Rectifier	1B3GT/8016
V15	Damper ("Early" version);	25Z6GT
	Damper ("T" "U" and "W" version)	25W4
V16	Audio I-F Limiter and Amplifier	6AU6
V17	Ratio Detector	6AL5
V18	1st Audio Amplifier	6SQ7
V19	Audio Output	25L6GT
V20	Sync Inverter and Clipper ("U" and "W" version)	6SL7GT
V21	Hor. Control & Oscillator ("U" and "W" version)	12SN7GT
V22	AFC Disc ("U" and "W" version)	6AL5

CAUTION NOTICE

The regular B+ voltages are dangerous and precaution should be observed when this chassis is removed from its cabinet for service purposes. The high-voltage supply (9000 v.) at the picture tube anode will give an unpleasant shock but will not supply enough current to give a fatal burn or shock. However, secondary human reactions to otherwise harmless shocks have been known to cause injury. Since the high voltage is obtained from the B+ supply, certain portions of the high-voltage generating circuit are dangerous and extreme precautions should be observed.

The picture tube is highly evacuated and if broken, glass fragments will be violently expelled. If it is necessary to change the picture tube, use safety goggles and gloves. Always wear goggles when servicing a chassis which has been removed from the cabinet.
Always use an isolation transformer in the power line when servicing or aligning these receivers.

GENERAL INFORMATION

The General Electric Models 805, 806 and 807 are table model type television receivers providing reception on all twelve commercial television channels. The Model 809 is a consolette type receiver, providing reception on all twelve commercial channels. The picture is reproduced on a 10-inch picture tube electromagnetically deflected.

Features of this television receiver include a two stage r-f amplifier, balanced input impedance, selenium type rectifiers, inter-carrier sound system, ratio detector, improved focus control, safe high voltage for the picture tube, automatic frequency control for horizontal sweep synchronization. Models 806, 807 and 809 employ a picture tube with aluminized screen for brighter pictures.

INSTALLATION AND OPERATING INSTRUCTIONS:

Models 805, 806, 807 ..... Installation Instructions ER-A-805
Models 805, 806, 807 ...... Operating Instructions ER-I-805B
Model 809 .... Installation Instructions ER-A-809
Model 809 .... Operating Instructions ER-I-809

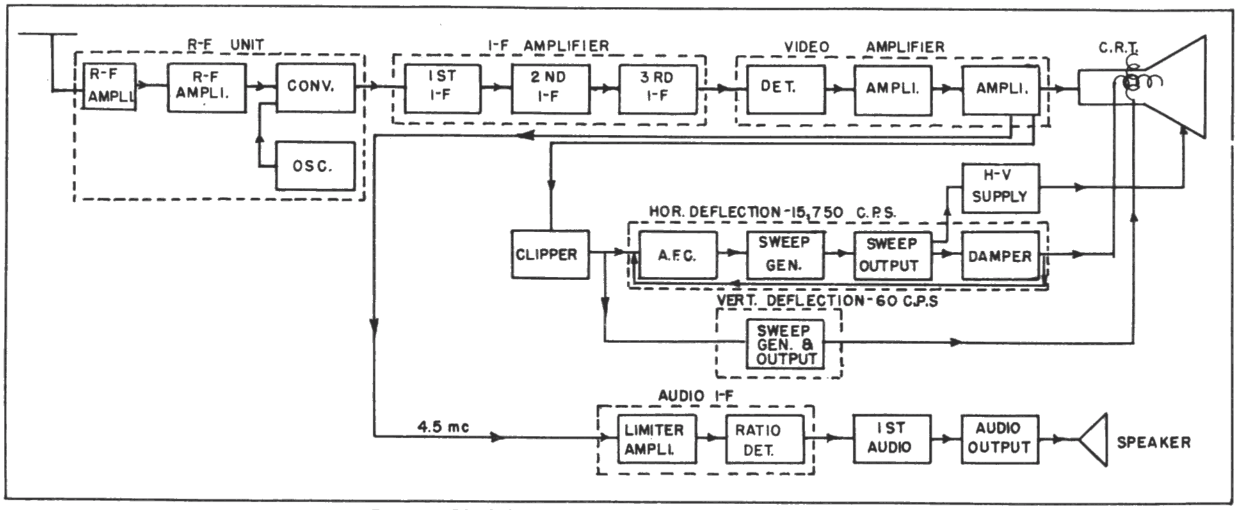


Fig. 1. Block Diagram Models 805, 806, 807, and 809

DESCRIPTION—TELEVISION RECEIVER CIRCUITS

The television receiver circuits are divided into the following sections:

1. R-F Amplifier, Oscillator, and Converter (Head-End).
2. Video and Audio I-F Amplifier.
3. Video Detector and Video Amplifier.
4. Horizontal and Vertical Sync. Pulse Separator.
5. Vertical Sweep Generator and Output.
6. Horizontal Sawtooth Generator & AFC.
7. Horizontal Sweep Output.
8. High Voltage Power Supply for Picture Tube.
9. B+ Power Supply.

A brief description of the operation of each circuit is given in the following paragraphs. This is supplemented by simplified circuit diagrams of each portion of the circuit under discussion. Reference is also made to the complete schematic diagrams

A block diagram of the receiver is shown in Figure 1 to assist in signal tracing and to better visualize the operation of the receiver.

1. R-F AMPLIFIER, CONVERTER AND OSCILLATOR (SEE FIGURE 2).

The r-f head-end unit which includes two r-f amplifier stages, a converter and local oscillator is constructed as a self-contained subassembly which can be demounted readily from the main chassis. The tube complement consists of two Type 6AU6 tubes used as r-f amplifiers (V1, V2) and a twin triode Type 12AT7, one section of which is the converter (V3A) and the other section is the local oscillator (V3B). The 1st r-f amplifier, V1, is connected as a triode amplifier.

The antenna input circuit provides a 300 ohm balanced input. To obtain this, the antenna input is coupled between the grid and cathode sections of the tube so that both of these tube elements perform as signal input elements. The Gm of a 6AU6 tube connected as a triode is adjusted so the input impedance to the cathode is approximately 300 ohms, the grid input is made the equivalent by shunting its input impedance by a resistor, R201, to give a balance. The addition of the center-tapped choke L201 from grid to cathode provides a balance to ground and, at the same time, transfers the cathode and grid impedances so as to give a total of 300 ohms across the choke terminals, which is the point of signal input. The inductance of L201 is chosen to resonate broadly with the capacity in the grid and cathode circuits so as to provide a uniform impedance for all of the lower channels. Chokes L203 and L207 are shunted across the choke L201 on the high frequency channels for the same reason.

The resistors R216 and R217 are used to drain static charges from the antenna to ground. C201 and C203 are employed to keep line voltage off from the antenna and to form a high-pass filter with L201, L203, and L207 to remove any low frequency interference.

Tuning of the r-f amplifier is provided by a shunt tuned circuit in the plate circuit of each of the r-f amplifier tubes, V1 and V2.

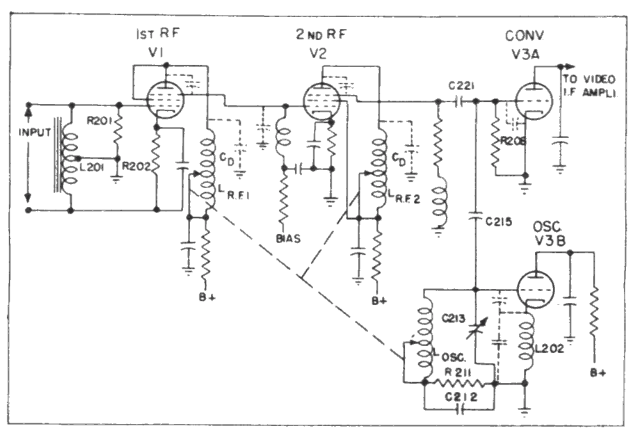


Fig. 2. R-F Amplifier, Converter, and Oscillator

The bandwidth is acquired on the low frequency channels by stagger tuning these two tuned circuits so that the 1st r-f amplifier tunes to a lower frequency than that of the 2nd r-f amplifier plate circuit. On the upper channels, the tube loading provides a rounded top of sufficient bandwidth. The plate circuit coils are selected by a wafer-type rotary switch and are pretuned at the factory so that the inductance of the coil resonates with the distributed and tube capacity to give the desired frequency.

It will be noted that the V1 suppressor grid is connected directly to the control grid of V2. Since the suppressor grid is in the tube plate electron stream and has interelectrode capacity with the plate, it provides an efficient coupling device. The r-f choke coils in the output of V1 and the output of V2 are used as a high-pass filter to shunt out any r-f interference of a low frequency which may be passed from the 1st r-f amplifier. A bias derived from the contrast control circuit is applied to the 2nd r-f amplifier grid circuit.

The output of the 2nd r-f amplifier is coupled by the suppressor grid, to the converter V3A, through the coupling capacitor C221. Converter grid rectification of the local oscillator voltage charges C221 which in conjunction with R208 provides the necessary bias for the converter grid.

The triode tube section, V3B, is connected in a modified Colpitts oscillator circuit which operates on the high frequency side of the r-f channel frequencies for all channels. Oscillation is provided by the split capacity across the inductance, L202, consisting of the cathode-to-grid and cathode-to-plate interelectrode and distributed capacities. The choke L202 provides a d-c ground path to the cathode of the tube and maintains the cathode off-ground at the r-f frequencies. C213 is variable and is the tuning control, permitting a limited variation in frequency for each channel selected. C212 and R211 is the grid leak and capacitor used for self bias on the oscillator. Coupling of the oscillator voltage into the converter grid is provided through the capacitor C215.

2. VIDEO AND AUDIO I-F AMPLIFIERS (SEE FIGURE 3).

The video i-f amplifier makes use of three Type 6AU6 pentode tubes in a stagger tuned band-pass amplifier. A single-tuned choke is included in each stage, each tuned to a different frequency and then loaded with suitable resistance to give an adequate over-all band-pass frequency characteristic. The choke inductance in conjunction with the tube and distributed circuit capacity represented by C_D in the diagram are tuned to the approximate frequencies shown in Figure 3 by the variable core adjustments in the chokes.

Since intercarrier sound is used in these receivers, the sound i-f of 21.8 mc formed at the converter is passed through the entire video i-f amplifier to the detector. It is attenuated in passage through the video i-f to give the proper ratio of sound i-f to video i-f signal at the detector. At the detector, the video modulation components are detected from the 26.3 mc video i-f and, also, a 4.5 mc frequency-modulated sound i-f results from the beat between the 21.8 MC sound i-f and the 26.3 mc video i-f. This 4.5 mc is amplified by the video amplifier tube sections V8A and V8B and then applied to a limiter-amplifier tube V16. Detection of the 4.5 mc signal is accomplished by a ratio detector, V17.

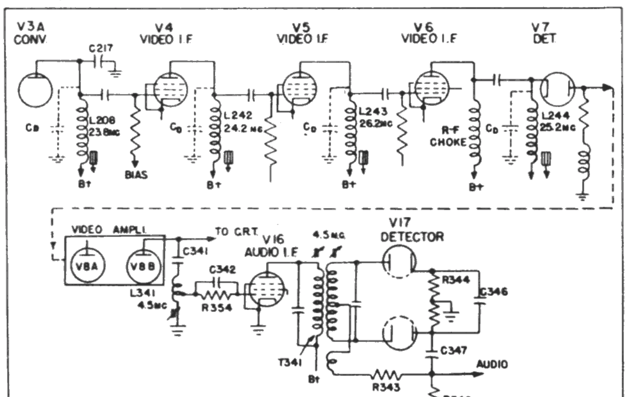


Fig. 3. Video and Audio I-F Amplifier

No trap circuits are required in the video i-f amplifier. The shaping of the skirts of the i-f response is accomplished by the choise of frequencies to which each tuned i-f choke resonates and by the loading across this tune circuit. At the output of the video amplifier, a 4.5 mc series tuned circuit, consisting of C341 and L341, is used to attenuate the 4.5 mc FM i-f prior to application of the video signal to the picture tube. By taking voltage across the inductive reactive element of this trap, it will provide a means of obtaining a slug tuned input to the limiter stage at the sound i-f of 4.5 mc.

The contrast control bias is applied to the 1st video i-f amplifier as well as the 2nd r-f amplifier. On early production receivers, the contrast control obtained its bias from a fixed negative voltage source, while on "U" and "W" version receivers this bias was obtained from the video detector and clipper tube circuits which furnished a variable source of bias for AGC purposes.

3. VIDEO DETECTOR AND VIDEO AMPLIFIER (SEE FIGURE 4).

The video i-f amplifier output is applied to one section of a 6AL5 dual diode, V7A, which is connected as a series diode so as to develop a negative-going signal across the diode load resistance, R265. The signal is then amplified by two triode amplifier stages using a Type 12AU7 dual triode tube, V8. L255 and L258 are series compensating chokes, while L256, L260, and L257 are shunt compensating chokes. These are used to obtain good high frequency response and provide sharp cut-off at frequencies above the useable pass-band. The combination of C266, C281, L249, and L255 serve as an i-f filter to prevent any of the i-f or harmonic frequencies thereof from being amplified by the video amplifier.

In addition to amplification, the first video amplifier tube V8A operates as a noise limiter. The B+ voltage applied to this tube is relatively low and the video signal applied to the grid is negative-going. Any large excursions of voltage above sync level, such as introduced by transient noise, will drive the grid voltage sufficiently negative to cause plate current cut-off. Thus, the interference will be limited close to the level of the super-sync signal. This improves the signal to transient noise interference ratio without affecting the video signal.

Since capacity coupling of the video amplifier stage is used, the d-c component of the video signal must be restored to maintain the proper background illumination. This is accomplished by the diode V7B. The negative-going output signal of V8B, which is coupled to the picture tube, is also applied to the cathode of V7B through the resistor capacitor coupling (R266 and C274) components. The rectification of this signal causes the capacitor C274 to charge to the peak value of the sync pulse. Since this charge will vary with the amplitude of the pulse above the a-c axis, the resulting d-c voltage will provide the required restoration of the d-c component. This d-c is supplied to the a-c video component through the resistor R269, so that the grid of the picture tube will have a composite video signal with a d-c component.

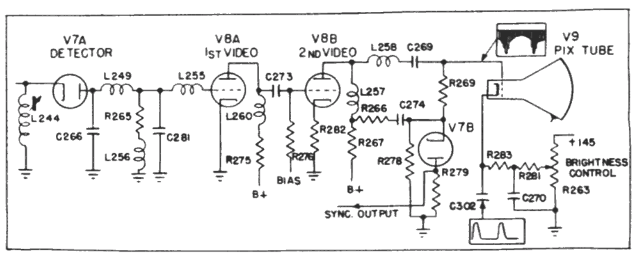


Fig. 4. Video Detector and Amplifier

On early production receivers, the diode V7B also performs the function of the 1st clipper, developing the sync pulse voltage across R279 to be passed on to an additional clipper and the sync circuits which follow. On "U" and "W" version receivers, this tube is not used as a clipper, its only function being to restore the d-c component at the picture tube grid.

By connecting the cathode of the picture tube to a variable positive voltage source, the picture tube may be biased so as to change the brilliance. The potentiometer control, R263, which changes this bias voltage, is brought out to the front panel as the Brightness Control. In addition to the bias supplied the cathode, a voltage waveshape (shown in Figure 4) derived from the vertical sweep output, is supplied through the capacitor C302. The positive peak voltage corresponds to retrace time so that by application to the cathode circuit, it causes the picture tube to be biased to cut-off during its duration. This results in the removal of most of the retrace lines.

4. SYNC SEPARATION (SEE FIGURE 5).

Figure 5 shows the circuit used in the early production and "T" version receivers for amplification and shaping of the sync pulses and their separation (clipping) from the composite video signal. This circuit incorporates two clippers. Partial clipping of the sync pulse from the video signal is performed by the diode, V7B. This tube also performs the function of the d-c restorer for the video amplifier output to the picture tube as described in the previous section. With the polarity of the sync pulses of

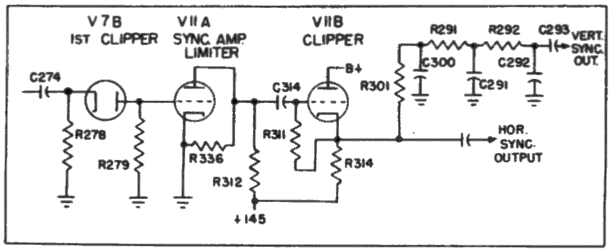


Fig. 5. Sync Separator Circuit

the composite video signal being negative-going as applied through capacitor C274, the diode V7B will conduct on negative peaks of the composite video signal, resulting in negative polarity sync pulses developed across R279. The application of this signal to tube V11A performs the following. The signal is (1) amplified, (2) limited in amplitude so as to reduce any noise riding above the sync pulse amplitude and, (3) invert the phase of the signal so that a positive-going signal can be applied to the following tube V11B, which functions as a second clipper.

The clipper tube V11B is operated at a low plate voltage with its bias derived by grid rectification of the positive polarity signal applied to the grid. Thus, conduction in V11B will occur only during the sync pulse intervals which are the most positive component of the signal applied, resulting in clipping action. The horizontal and vertical synchronizing pulses are developed across R314 in the cathode of V11B and are positive-going.

An integrating network, consisting of R301, R291, R292, C300, C291 and C292, is used to separate the horizontal sync from the vertical sync pulses before passage of the sync signal to the vertical sweep generator.

In the "U" and "W" version receivers which use a different type of horizontal AFC circuit, the clipper circuit is used. The diode V7B is used only as a d-c restorer, R279 being omitted in the "U" and "W" version. The only clipper is the second section of V20. This particular type of AFC circuit requires negative-going sync pulses taken from the clipper plate instead of from the cathode. The negative-going sync pulse output of V20 is applied to the cathode of the AFC diodes as indicated in Figure 9 and also to the vertical integrating circuit. The negative-going vertical sync pulses are applied to the grid of V10B of the vertical sweep generator rather than V10A.

5. VERTICAL SWEEP GENERATOR AND OUTPUT (SEE FIGURE 6).

The vertical sawtooth waveshape is generated by a Type 12SN7GT, V10, connected as a multivibrator. The tube section, V10B, also serves the function of an output tube supplying a sawtooth current wave to the vertical sweep yoke, D291, through the impedance matching transformer T291. Vertical frequency is controlled by changing the bias on V10A by the (Hold) potentiometer, R298. This bias change results in the free running conduction level for tube V10A being made variable which controls the frequency of the discharge rate of C295, across which the sawtooth voltage waveshape is formed. Vertical size (Height) of the picture is changed by the potentiometer R302, which changes the B+ voltage applied to the sawtooth waveshape forming capacitor, C295, in the plate of V10A. By changing the operating bias on tube, V10B, by the potentiometer R300, the conduction characteristics of this tube may be changed to compensate for non-linearity in the current output waveshape of V10B.

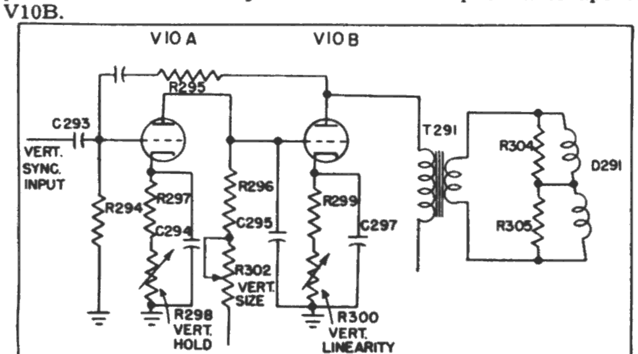


Fig. 6. Vertical Sweep and Output

6. HORIZONTAL SAWTOOTH GENERATOR AND AFC SYNC (SEE FIGURE 7 AND FIGURE 9).

The horizontal sawtooth generator makes use of one section of a Type 12SN7GT tube, V12B, connected in a blocking oscillator circuit. Instead of its frequency being controlled directly by

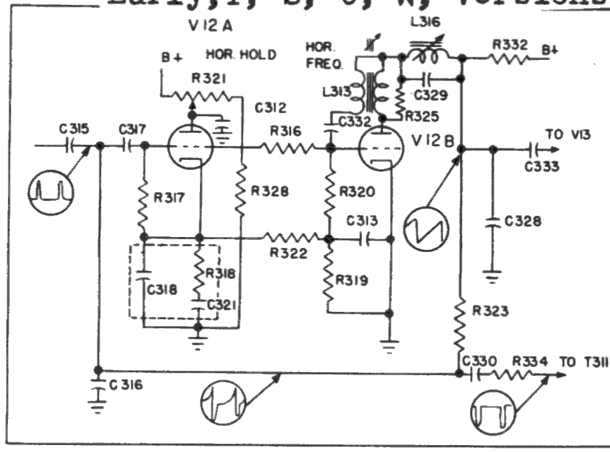


Fig. 7. Horizontal Sweep and AFC Sync (Early and "T" Version)

the horizontal sync pulse, it is controlled by the adjustment of the operating bias in the grid of this tube. A control tube consisting of the other triode tube section, V12A, is incorporated which compares the phase between the incoming horizontal sync and the blocking oscillator frequencies, the result of which produces a voltage proportional to the phase displacement. This voltage, which is called an automatic frequency control (AFC) voltage, is applied as bias to the grid of the blocking oscillator tube V12B and results in the oscillator frequency being maintained at the proper phase relation with the incoming sync signals.

The tube V12A obtains its operating bias through its connection to the grid circuit of the blocking oscillator tube, V12B, through resistor, R316. This bias is sufficiently great to keep the tube V12A cut off except when the sync pulse rides up on the fed-back waveform, as shown in Figure 8(B). If the sweep generator frequency changes phase in relation to the sync pulse such as when the generator is operating at too low a frequency, the pulse will slide up the slope of the waveshape as shown in Figure 8(A), resulting in longer plate conduction. If the blocking oscillator frequency is operating at too high a frequency, the sync pulse will slide down the slope of the waveshape as shown in Figure 8(C), resulting in a shorter plate conduction than in Figures 8(A) or 8(B). During the conduction of tube V12A, the cathode filter capacitors consisting of C318 and C321 charge to a d-c potential proportional to the plate conduction time. With this potential applied to the grid circuit of tube V12B, through resistor R322, the resulting change in bias voltage in this tube changes the oscillator frequency so as to pull it in phase with the incoming horizontal sync pulses.

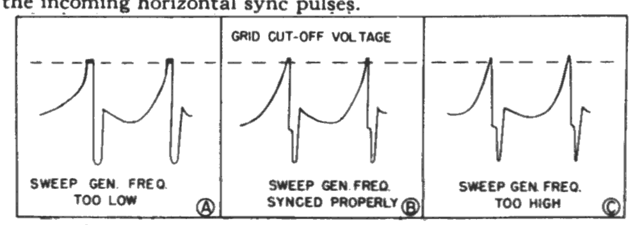


Fig. 8. AFC Waveshapes (Early and "T" Version)

A tuned circuit consisting of L316 and C329, adjusted for the horizontal frequency, is used in series with the plate return lead to the blocking oscillator of later production "T" version receivers to stabilize the sync, especially in the presence of noise. It is shock excited into oscillation by the pulses of plate current and adds to the sawtooth wave developed across C328 in proper phase to increase the slope of the wave just prior to discharge (retrace portion of sawtooth). This increase in slope gives greater sensitivity of control. This voltage applied through resistor R323, to the integrated pulse from transformer, T312, is the waveshape fed-back from the sweep generator and applied to the input of the control tube grid.

The Horizontal Hold Control R321 is used to vary the frequency about the mean horizontal sweep frequency by varying the AFC tube V12A plate voltage. By varying the iron core slug in the blocking oscillator transformer, the frequency of the sweep generator is also changed. The choke L316 is made variable so that it may be used to change the slope of the oscillator waveform.

During production of these receivers, another form of horizontal oscillator and AFC control circuit was incorporated, as shown in Figure 9. Chassis with this circuit were marked "U" or "W."

One section of a Type 12SN7GT tube, V21B, functions as a 15,750 cycle/sec. sine wave oscillator and sawtooth generator, while the other section, V21A, is the reactance control tube. A Hartley oscillator circuit, consisting of coil L316 and capacitors C403 and C401, is connected to oscillate at a mean frequency of 15,750 cycles/sec. in the grid of V21B. This sine wave voltage generated in the grid circuit, biases tube V21B by the grid leak bias developed across R394 and C402, so as to give a class C operation to tube V21B. In the plate circuit of V21B is a capacitor C404 which charges and discharges as plate current is turned off-and-on by the tube, thus forming a sawtooth type of waveshape across this capacitor.

Across the tank circuit of the sine wave oscillator is connected an AFC reactance tube V21A. It derives its name because it appears like a variable resistance in series with C400, and shunts the Hor. Osc. tank circuit. When the bias on tube V21A changes, the frequency of the sine wave oscillator changes; as for example, when the bias becomes more negative, the tube plate resistance rises and makes C400 have less capacity effect on the tank circuit with the result that the frequency of the sine wave oscillator will rise. The opposite effect is true if the bias changes in the positive direction. The bias change for V21A is obtained by a sync discriminator circuit.

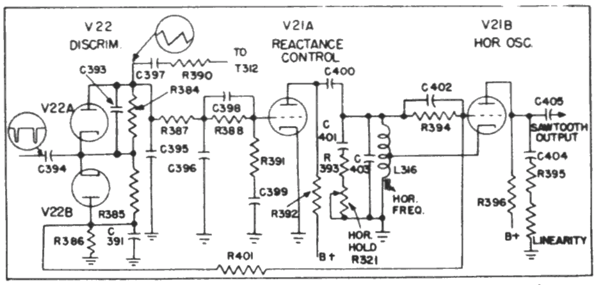


Fig. 9. Hor. Sweep and AFC Sync (U and W Version)

The discriminator circuit makes use of a Type 6AL5 dual diode V22, which produces a d-c voltage (AFC) proportional to the phase displacement of the incoming sync pulse as compared to the output sawtooth voltage. The output sawtooth voltage is developed across C395. When in phase as shown in Figure 10(A), the d-c voltages across resistors R384 and R385 are of equal and opposite polarity resulting in zero voltage developed across C395. When the sawtooth voltage lags the sync pulse, as shown in Figure 10(B), a minus control voltage exists because the d-c voltage E_{D2} across R384 exceeds the voltage E_{D1} across R385. This minus voltage applied to V21A caused C400 to become less effective across the sine wave oscillator tank and the frequency is raised. In (C), the reverse condition exists and the correction takes place in the opposite direction. Thus the output of the discriminator swings from positive through zero to negative, depending upon the phase relation of the sync pulse and the sawtooth output.

The control shown in Figure 9 is the Horizontal Hold Control which establishes the correct operating frequency for the sine wave oscillator.

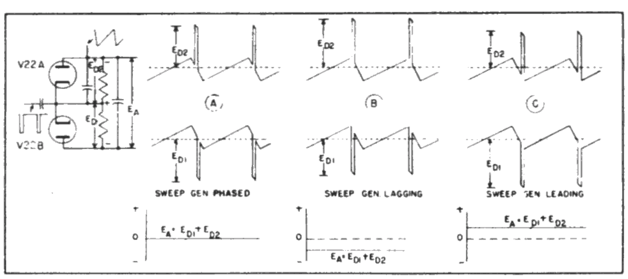


Fig 10. AFC Waveshape (U and W Version)

7. *HORIZONTAL SWEEP OUTPUT (SEE FIGURE 11).*

The horizontal sawtooth waveshape formed across capacitor C328 (C404 in "U" and "W" version) is amplified by a power pentode Type 19BG6G tube, V13. The output of this tube which is essentially a sawtooth current wave is applied to the horizontal deflection coils through an impedance matching transformer T312. The damping tube diode V15 is connected across a part of the secondary and functions principally to remove a transient oscillation created during rapid retrace of the current in the high inductance of the plate circuit and still retain the positive overshoot in the primary of T312 for use in the high voltage supply. The damping tube circuit provides control of linearity and is used to recover some of the energy from the inductive kick-back to help supply the B+ requirements of the tube V13. During conduction of V15, capacitors C322 and C335 are charged up and since they are in series with the B+ voltage to tube V13, they contribute a sizeable portion of the plate voltage. The variable inductance L315 and capacitor C322 constitute a phase shift network which alters the phase of the ripple voltage developed across C335 and permits control of linearity.

The Horizontal Size Control is a variable inductance shunted across the secondary of T312. When the inductance is at a minimum, more of the output is shunted through L314 resulting in less sweep width. The opposite is true for greater sweep width.

A Horizontal Drive Control C319 forms a capacity voltage divider in conjunction with capacitor C333 to control the amount of sawtooth voltage applied to the grid of V13. This permits adjustment of grid voltage to compensate for variations in output tubes. Its adjustment supplements the Horizontal Linearity Control in the control of linearity.

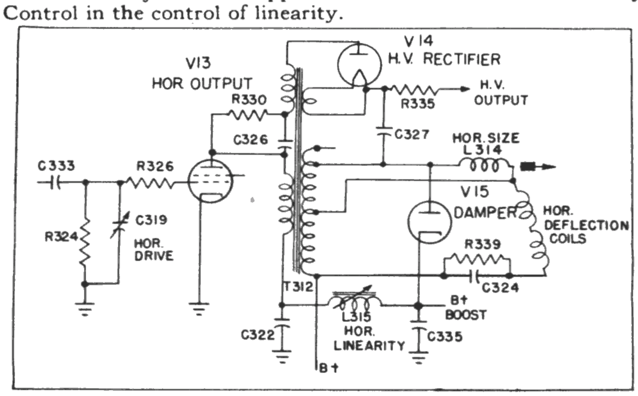


Fig. 11. Horizontal Sweep Output

8. *HIGH VOLTAGE SUPPLY (SEE FIGURE 11).*

The high voltage required by the second anode of the picture tube is derived by making use of the inductive "kick" voltage produced during retrace in the horizontal output transformer T311 or T312. This kick voltage has a magnitude of several thousand volts and is positive-going, appearing between the plate of V13 and ground. Since this voltage is insufficient to produce the required anode voltage, an additional winding connected electrically and magnetically with the primary is added to provide further step-up of this voltage. The output of this tertiary winding connects to the plate of a rectifier tube, V14. This tube is a Type 1B3GT/8016 which derives its filament voltage from the sweep transformer T311 or T312 by a single turn around the core. Since the frequency supplied the rectifier tube is higher (15,750 cps), a 500 mmf filter capacitor, C327, is adequate to give a smooth d-c voltage output. Due to the low capacitance in the filter, this supply is relatively safe to work with.

R330 and C326 are connected in parallel between the primary and tertiary winding for safety purposes. The resistance thus introduced in this circuit prevents harmful currents in case accidental contact is made with the circuit when power is turned on.

9. *B+ POWER SUPPLIES (SEE FIGURES 12 AND 13).*

Two types of voltage doublers were used in production of these receivers. Early production used a full-wave voltage doubler, as shown in Figure 12. "T," "U," and "W" productions used a half-wave voltage doubler circuit, as shown in Figure 13.

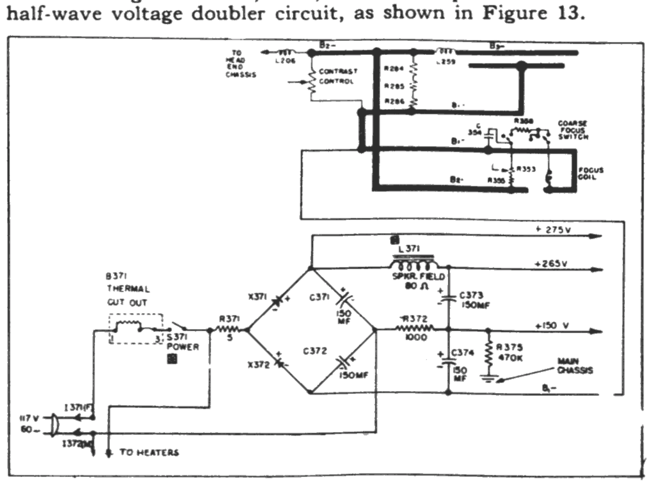


Fig. 12. B+ Voltage Supply (Early Production)

The rectifiers in Figure 12 are connected to conduct on alternate half cycles of the line voltage. When the line voltage at R371 is positive, X371 selenium rectifier will conduct and charge C371 to approximately 150 v., the peak voltage of one half the sine wave. On the other half cycle when the power line at the junction of R372, C371 and C372 is positive, X372 will conduct and charge C372 to approximately 150 volts. The B+ voltage may be tapped off across either C371 or C372, or across these two capacitors in series giving a B+ voltage which is the sum of the two capacitor potentials. L371, C373, C374, and R372 give additional filtering. C373 and C374 are capacity dividers which give voltage division.

B − bus is connected to the junction of X372 and C372. B_2− bus is connected to B_1− bus through R284, R285, and R286. The current drain from the video i-f, the video amplifier, and the audio sections through R284, R285, and R286 develops a bias voltage to operate the contrast control which is also connected between B_2− and B_1− buses.

"T," "U," and "W" version receivers used a half-wave voltage doubler circuit shown in Figure 13 to obtain a B+ voltage supply. Selenium rectifier X372 will conduct when the power line at S372 is negative, charging C371 and C372 (as shown in Figure 13) to approximately 150 volts. On the next half cycle when the power line at S372 is positive, the charge across C371 and C372 is in series with the power line voltage and will add to the power line voltage to charge C383 and C384 through X371 to approximately 300 volts, the sum of the half cycle peak voltage and the charge across C371 and C372. L376, C373, and C374 give additional filtering. Capacitors C373 and C374 in series act as a voltage divider to obtain a low and a high B+ source.

Contrast bias in "T" version receivers is obtained in the same manner as explained for early production receivers. "U" and "W" version receivers obtained their contrast bias from other sources and, therefore, there is only one B− return bus on "U" and "W" version receivers.

On late production "T" versions, choke L259 was removed and B_3− bus was connected directly to B_2− bus.

B371 is a thermal cutout to protect the receiver in cases of excessive current drain from the power line or from excessive

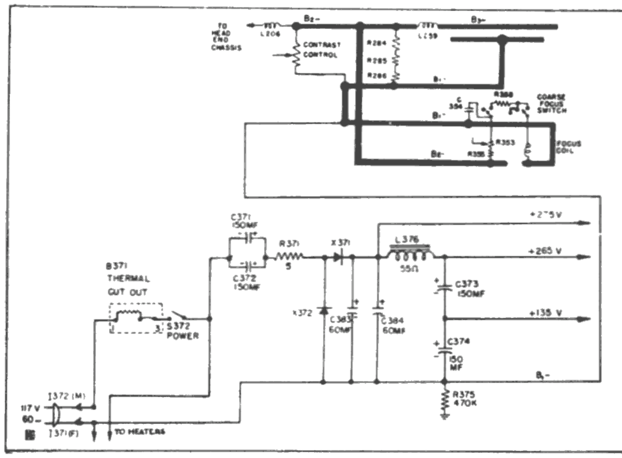


Fig. 13. B+ Voltage Supply ("T," "U," and "W")

If the cutout continues to trip, the receiver circuits should be checked for defects.

R373 and R374 are resistors with a negative temperature coefficient and are placed in series with each heater series string. These resistors have a high resistance when voltage is first applied to the filament string. As the filaments heat up, the resistance of these resistors R373 and R374 gradually decreases to a final operating value of approximately 75 ohms. Therefore, the initial surge of current through the heaters is limited to a low value, extending the life of the tube heaters.

CAUTION: One side of the power line is connected to B_1− through a capacitor on early production and directly to B_1− on "T," "U," and "W" production receivers. Always use an isolation transformer in the power line when servicing or aligning this receiver to protect test equipment.

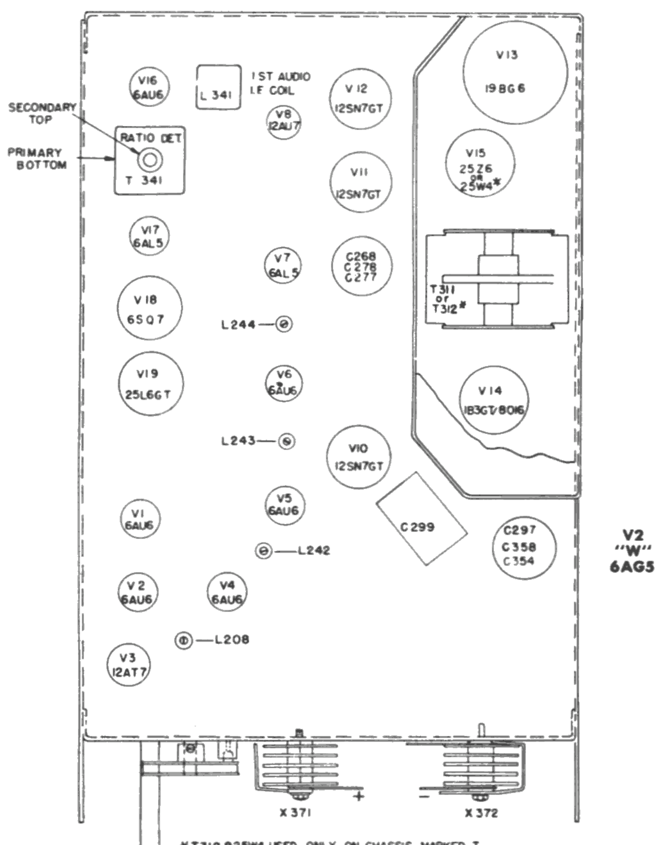


Fig. 14. Tube and Trimmer Location (Early and "T")

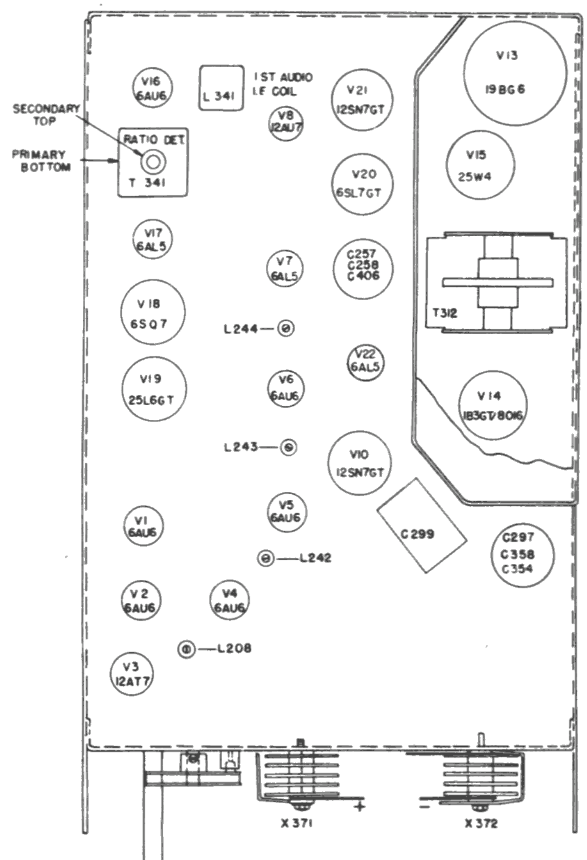


Fig. 15.

Tube and Trimmer Location (U and W Versions)

CIRCUIT ALIGNMENT

(CAUTION: TO PROTECT TEST EQUIPMENT ALWAYS USE AN ISOLATION TRANSFORMER)

GENERAL—A complete alignment of the receiver tuned circuits is given in the following charts.

NOTE: Care should be taken when making connections to the correct B— bus with low side of the signal generator, the scope, and the vacuum tube voltmeters. On "early" and "T" productions of these receivers the contrast bias was obtained between the B_2 − bus and the B_1 − bus. The B_3 − bus was isolated from the B_2 − bus by a choke. The head-end chassis ground was isolated from the B_2 − bus by another choke. The B_1 − bus was isolated from main chassis by a 470,000 ohm resistor. On "U" and "W" versions of this receiver all of the busses are common for both d-c and r-f. The head-end chassis on "U" and "W" versions is also common to B_1 −. The B_1 − bus is isolated from main chassis by 470,000 resistance ohms and a capacitor, C331.

TEST EQUIPMENT—To provide alignment as outlined, the following test equipment is required.

1. *R-F Sweep Generator.*
   a. Frequency Requirements:
      20 – 30 MC with 10 MC sweep width.
      40 – 90 MC with 15 MC sweep width.
      170–220 MC with 15 MC sweep width.
   b. Constant output in the sweep width range.
   c. At least 0.1 volt output.
2. *Signal Generator (Marker Generator).*
   Must have good frequency stability and must be accurately calibrated. It should be capable of tone modulation and should cover the following frequencies. Sufficient marker signal may be supplied in most cases, except at the last stage by merely connecting the high side of the signal generator to the television chassis. At last stage, couple the marker generator through a small capacitor in parallel with the sweep input; keep the input low enough so that it doesn't influence the shape of the response curve.
   21.8 MC for Video I-F
   23.3 MC for Video I-F
   25.55 MC for Video I-F
   26.3 MC for Video I-F
   4.5 MC for Sound I-F
   54 MC to 110 MC and 174 MC to 238 MC for R-F and Oscillator Adjustments
3. *Oscilloscope.*
   This oscilloscope should have good sensitivity and preferably have a 5-inch screen and a good wide-band frequency response on the vertical deflection circuits. Although the high frequency response is unnecessary for alignment, it is necessary when making the waveform measurements.
4. *Crystal Calibrator.*
   This unit is necessary to establish calibration check points for the marker generator to provide accurate marker frequencies.
5. *Wave Traps.*
   Accurately calibrated wave trap may be used to supply markers in place of the marker generator for video alignment and r-f alignment.
6. *Isolation Transformer.*
   Always use an isolation transformer in the power line to protect test equipment.
7. *Vacuum Tube Voltmeter.*
   Vacuum tube voltmeter should have a d-c voltage scale.

VIDEO I. F. ALIGNMENT

1. In most receivers it may be only necessary to make an over-all video alignment check, as in Step 4, and make only minor adjustments of L208, L242, L243 and L244 to obtain video i-f response curve of Figure 16-D. In cases where a simple over-all check of video i-f alignment is not possible, complete video i-f alignment as in Steps 1 thru 4 is necessary.

2. Sweep generator cable should be properly terminated in its characteristic impedance. See Figure 18.

3. The signal should be coupled to the point of input through a 100 mmf. capacitor using short leads and short B_1 − connections. Use a K27 ohm resistor when coupling to the converter grid to prevent loading.

4. Set contrast control to obtain −4 volts bias between junction of R243, R241, and head-end chassis B− as measured on a vacuum tube voltmeter. Disconnect vacuum tube voltmeter leads during alignment. On "U" and "W" version receivers where bias voltage is obtained from the grid of V20, it is necessary to connect a bias battery between junction of contrast control C385, R382, and B_1 − to obtain −4 volts bias at same point as above. Connect positive of battery to B_1 −.

5. Adjust the signal input to give a video output curve of approximately 3 volts peak-to-peak value, as measured on a calibrated oscilloscope.

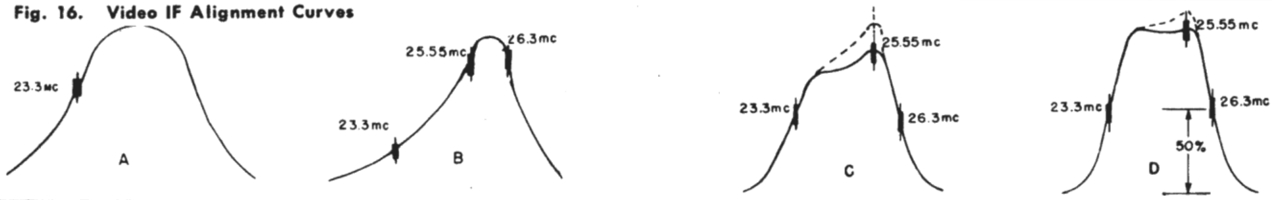
6. The 23.3 mc and the 26.3 mc marker should fall at the 50 per cent mark, as shown in Figure 16-D.

7. When checking the over-all video i-f alignment curve (Step 4), check for oscillator influence, by turning the tuning control, if this changes the shape of the curve switch to another channel where there is no oscillator interference noted.

VIDEO I-F ALIGNMENT CHART (See Fig. 27 or 29,

STEP	SIGNAL GENERATOR FREQUENCY	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINTS	CONNECT OSCILLOSCOPE BETWEEN	CHANNEL SWITCH SETTING	ADJUST	REMARKS
1	23.3 MC Marker	20-30 MC	V6 grid (Pin 1) and B_2 − (or B_1 − on "U" and "W" version)	Plate V8A (Pin 1) and B_3 − on V8A socket (or B_1 − on "U" or "W" version thru 10K Resistor)	5 or 6. See note for osc. interference.	Core of L244 for curve of Fig. 16(A)	Readjust L243 to place 26.3 mc marker at the 50% mark on the curve and 25.55 mc, as shown in Figure 16-D. Readjust L242 to place 23.3 mc marker at the 50% point on the curve as in Figure 16-D. L208 and L244 should be adjusted for maximum over-all gain while getting an approximate flat top curve. Reduction of L208 inductance with a corresponding increase in L244 will tend to reduce excessive saddleback in the top of the curve. See Figs. 14, 15
2	23.3 MC 25.55 MC 26.3 MC Markers		V5 grid (Pin 1) and B_2 − (or B_1 − on "U" and "W" version)			Core of L243 for curve of Fig. 16(B)	
3			V4 grid (Pin 1) and B_2 − (or B_1 − on "U" and "W" version)			Core of L242 for curve of Fig. 16(C)	
4			V3A grid (Pin 7) thru 27K resistor and B− at head-end			Core of L208 and L244 for curve of Fig. 16(D). Retrim L243 and L242. See remarks	

Fig. 16. Video IF Alignment Curves



AUDIO I-F ALIGNMENT

Two alignment methods are given below for sound i-f alignment. The first uses a vacuum tube voltmeter to measure the d-c voltage output of the ratio detector with an unmodulated 4.5 mc input. The second method uses a scope to show the output wave of the ratio detector with a ±1 mc sweep, about a 4.5 mc center frequency input.

In steps 5-a through 7-a, the secondary of T341, ratio detector transformer, is first detuned to produce approximately ¼ volt d-c volts output measured with VTVM at 4.5 mc unmodulated input, and then the primary of T341 and coil L341 are aligned for maximum output. In step 8-a, the secondary of T341 is readjusted for zero d-c output.

Steps 5-b through 8-b give visual alignment of T341 and L341. In step 5-b the secondary is aligned for minimum output with 4.5 mc modulated input. In step 6-b, the primary is adjusted for maximum peak-to-peak amplitude and symmetry about the base line. The trace between the peaks should be linear.

When making sound i-f alignment, it is important that the secondary of T341 be aligned to exactly the difference frequency of the video and sound carrier of the station on which the receiver will operate. If the secondary is not aligned to this difference frequency, buzz modulation may be evident in the sound output when receiving the station program. A final check on sound i-f alignment is to tune in a television station, reduce the input to the sound i-f to a relative weak input by reducing the antenna input to the receiver. While listening to the speaker output, adjust L341 for maximum audio output. Adjust the secondary of T341 for best quality audio output, minimum buzz modulation, and minimum noise in the speaker.

AUDIO IF ALIGNMENT CHART (METER) (See Fig. 27 or 29,

STEP	SIGNAL GENERATOR FREQUENCY	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINTS	CONNECT OSCILLOSCOPE BETWEEN	ADJUST	REMARKS
5-a	4.5 MC at approx. 1/10 volt unmod. or below limiting level of receiver	—	Grid V8B (Pin 7) and B_3 — bus on V8 socket (or B_1 — bus on V8 socket on "U" or "W" versions)	—	Secondary of T341 for approx. ¼ volt as measured on a vacuum tube voltmeter.	Connect a vacuum tube voltmeter (D-C) between junction of R343, R346, C347, and B_2 — bus (or B_1 — bus on "U" and "W" versions)
6-a		—		—	Primary of T341 for max reading on VTVM	
7-a		—		—	Adjust core of L341 for max. readings on VTVM.	
8-a		—		—	Adjust secondary of T341 for zero reading on VTVM.	

AUDIO I-F ALIGNMENT CHART (VISUAL) (See Fig. 27 or 29,

STEP	MARKER GENERATOR FREQUENCY	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINTS	CONNECT OSCILLOSCOPE BETWEEN	ADJUST	REMARKS
5-b	4.5 MC with tone mod.	—	Grid of V16 (Pin 1) and B_2 — (or B_1 — on "U" and "W" version)	Junction R346, R343, C347 and B_2 — (or B_1 — on "U" and "W" version chassis)	Secondary of T341 for min. sine wave amplitude or for min. tone from loudspeaker.	
6-b	—	4.5 MC with ±1 MC sweep			Primary of T341 for max peak-to-peak amplitude and symmetry about base line.	See Fig. 17 for curve. Curve should be linear.
7-b	Repeat Step 5b.					
8-b	—	4.5 MC with ±1 MC sweep	Grid of V8B (Pin 7) and B_2 — (or B_1 — on "U" and "W" version)	Junction R346, R343, C347 and B_2 — (or B_1 — on "U" and "W" version chassis)	Adjust core of L341 for max. amplitude of peaks.	See Fig. 17

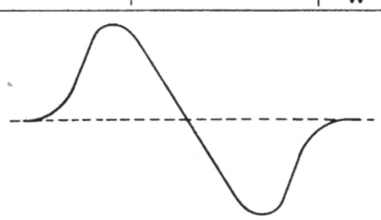


Fig. 17. Sound Alignment Curves

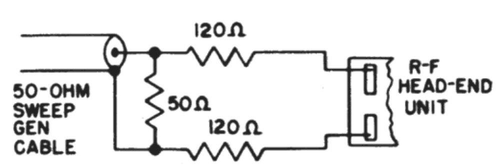


Fig. 18. Generator Termination

R-F ALIGNMENT

1. Disconnect 300 ohm line from head-end terminals. Sweep generator cable should be properly terminated and coupled to the antenna terminals at the head end through a capacitor, Figure 18.
2. Adjust the contrast control for r-f alignment to give a −4 volts bias measured from P in 1 of V2 to head-end chassis.
3. Shunt L208 with a 220-ohm resistor during r-f alignment to prevent oscillator from affecting the response curve.
4. When aligning the high frequency coils (Steps 9 thru 15), the video carrier marker and the sound carrier marker should fall one on each side of the peak of the curve. See Figure 20.
5. Since the coils for Channels 12 through 7 are fixed inductances, it is only necessary to check the alignment on these channels. It might be necessary to slightly readjust Channel 13 alignment (Step 9) to give best over-all tracking on Channels #13 thru #7.
6. Check tracking on Channels #6, #5 and #4. Slight readjustment of Channel #6 (Step 16) may be necessary for best tracking on Channels #5 and #4.
7. Check tracking on Channels #3 and #2. Slight readjustment of Channel #3 may be necessary for best tracking on Channels #2 and #3.
8. The video carrier marker on Channels #6 through #2 (Steps 16 through 20) should always fall at the top of the response curve. The sound carrier marker should fall at least ½ the distance up the right side of the response curve. See Figure 22.

R.F. ALIGNMENT CHART (See Fig. 27 or 29,

STEP	SIGNAL GENERATOR FREQUENCY	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINTS	CONNECT OSCILLOSCOPE BETWEEN	CHANNEL SWITCH SETTING	ADJUST	REMARKS
9	211.25 MC and 215.75 MC markers	Channel No. 13 with 15 MC sweep			No. 13	Screws of L228 to place 211.25 MC marker and L238 to place 215.75 MC marker approx. as shown in Fig. 20.	See RF alignment Notes 4 and 5. See Figs. 19 and 21 for location of components.
10	205.25 MC and 209.75 MC markers	Channel No. 12 with 15 MC sweep			No. 12		
11	199.25 MC and 203.25 MC markers	Channel No. 11 with 15 MC sweep	Ant. terminals at head-end unit	Junction L208, R209, C216, and B − of head-end (On "U" and "W" to L208, R219, C214, and B − of head-end)	No. 11		
12	193.25 MC and 197.75 MC markers	Channel No. 10 with 15 MC sweep			No. 10		
13	187.25 MC and 191.75 MC markers	Channel No. 9 with 15 MC sweep			No. 9		
14	181.25 MC and 185.75 MC markers	Channel No. 8 with 15 MC sweep			No. 8		
15	175.25 MC and 179.75 MC markers	Channel No. 7 with 15 MC sweep			No. 7		

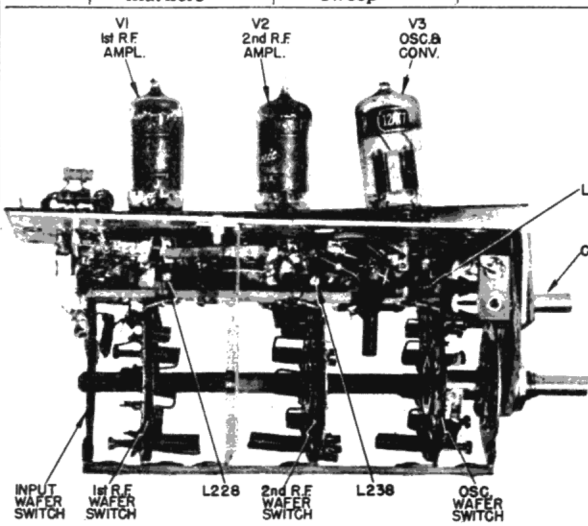


Fig. 19.
R.F. Head End

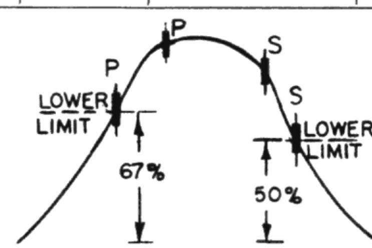


Fig. 20. Channels 13–7 Alignment Curve
P = Picture carrier marker
S = Sound carrier marker

RF ALIGNMENT (Cont'd)

STEP	SIGNAL GENERATOR FREQUENCY UNMOD.	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINTS	CONNECT OSCILLOSCOPE BETWEEN	CHANNEL SWITCH SETTING	ADJUST	REMARKS
16	83.25 MC and 87.75 MC markers	Channel No. 6 with 15 MC sweep			No. 6	Screws of L226 to place 83.25 MC marker and L236 to place 87.75 MC marker, as shown in Fig. 22.	See RF alignment Notes 6 and 8
17	77.25 MC and 81.75 MC markers	Channel No. 5 with 15 MC sweep	Ant. terminals and head-end chassis	Junction L208, R209, C216, and B– of head-end. (On "U" and "W" versions junction L208, R219 and C214)	No. 5	See Fig. 21.	
18	67.25 MC and 71.75 MC markers	Channel No. 4 with 15 MC sweep			No. 4		
19	61.25 MC and 65.75 MC markers	Channel No. 3 with 15 MC sweep			No. 3	Screws of L223 to place 61.25 MC marker and L233 to place 65.75 MC marker, as shown in Fig. 22.	See RF alignment Notes 7 and 8
20	55.25 MC and 59.75 MC markers	Channel No. 2 with 15 MC sweep			No. 2	See Fig. 21.	

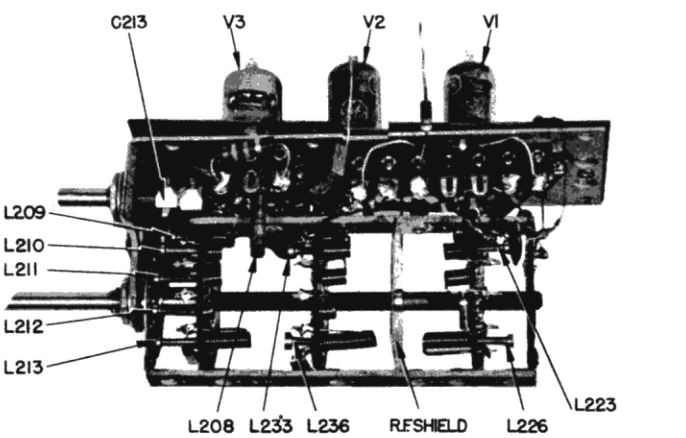
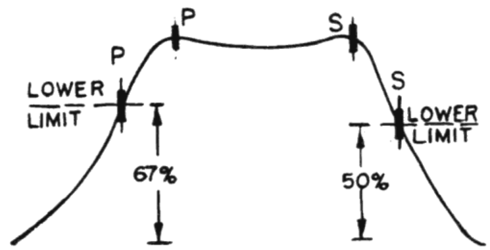


Fig. 21. RF Head End



P = PICTURE CARRIER MARKER
S = SOUND CARRIER MARKER LIMITS

Fig. 22. Channels 6-2 Alignment Curve

OSCILLATOR ALIGNMENT

1. Adjust indicated adjustment for zero beat between the signal generator frequency, which is equal to the correct oscillator frequency, and the local oscillator frequency on the scope.

2. Signal input should be at antenna terminals or at the grid (Pin 1) of V2 signal, whichever will give sufficient signal to obtain a zero beat with the oscillator signal as indicated at the scope.

3. Set tuning control at center of rotation for Step 21. Check Channels #12 thru #7 (Steps 22 thru 27) to see that zero beat may be obtained at least ⅓ of a rotation from either end of the tuning knob rotation.

4. On Channels #6 thru #2 (Steps 28 thru 32), the tuning control should be set at mid-position of its rotation.

OSCILLATOR ALIGNMENT CHART (Fig. 27 or 29,

STEP	SIGNAL GENERATOR FREQUENCY UNMODULATED	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINTS	CONNECT OSCILLOSCOPE BETWEEN	CHANNEL SWITCH SETTING	ADJUST	REMARKS
21	237.55 MC	—		Junction R209, L208, and C216 and B– of head-end chassis ground. (On "U" and "W" versions, junction L208, R219, C214, and B– of head-end chassis	No. 13	L215 by squeezing or spreading turns for zero beat. See Fig. 19.	See oscillator alignment note 3.
22	231.55 MC	—	Ant. terminals at head-end		No. 12	See note 3.	
23	225.55 MC	—			No. 11	See note 3.	
24	219.55 MC	—			No. 10	See note 3.	
25	213.55 MC	—			No. 9	See note 3.	

OSCILLATOR ALIGNMENT CHART (Cont'd)

STEP	SIGNAL GENERATOR FREQUENCY UNMODULATED	SWEEP GENERATOR FREQUENCY	SIGNAL INPUT POINTS	CONNECT OSCILLOSCOPE BETWEEN	CHANNEL SWITCH SETTING	ADJUST	REMARKS
26	207.55 MC	—	Ant. terminals at head-end	Junction R209, L208, and C216 and B— at head-end. (On "U" and "W" versions, junction L208, R219, C214, and B— at head-end chassis)	No. 8	See note 3.	
27	201.55 MC	—			No. 7	See note 3.	
28	109.55 MC	—			No. 6	Adjust screw in L213 for zero beat. See Fig. 21.	See note 4.
29	103.55 MC	—			No. 5	Adjust screw in L212 for zero beat. See Fig. 21.	See note 4.
30	93.55 MC	—			No. 4	Adjust screw of L211 for zero beat. See Fig. 21.	See note 4.
31	87.55 MC	—			No. 3	Adjust screw of L210 for zero beat. See Fig. 21.	See note 4.
32	81.55 MC	—			No. 2	Adjust screw of L209 for zero beat. See Fig. 21.	See note 4.

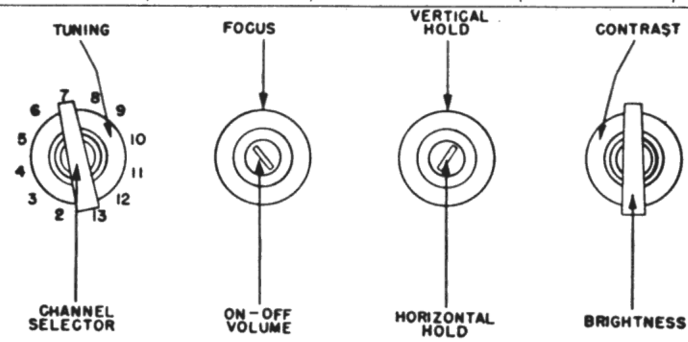


Fig. 24. Control Location, Model 809

OPERATING CONTROLS

OFF-VOLUME—This control turns on power to the receiver by rotation clockwise from the extreme counterclockwise position, and increases the volume of the sound portion of the program as it is turned clockwise.

NOTE: It takes approximately one minute for the receiver to warm up after the switch is first turned "on"; therefore a picture will not appear or the sound be heard instantly.

FOCUS—This control focuses the received picture or raster on the screen. It is necessary to adjust this control until the picture looks the sharpest in detail.

SELECTOR—The twelve positions of this switch permit selection of the twelve commercial television program channels. The switch is numbered from 2 through 13, and these numbers correspond to the channel numbers assigned to the television stations as they appear in the program section of your newspaper.

TUNING—This control tunes the frequency of your receiver to the television channel to be received. Correct adjustment is essential for optimum picture detail.

HORIZONTAL HOLD—This control synchronizes the horizontal sweep circuit and should be adjusted so that the picture is steady and does not move sideways or tilt.

VERTICAL HOLD—This control synchronizes the vertical sweep circuit and should be adjusted to a position where the picture does not move up or down in the picture frame.

CONTRAST—The correct setting of this control is dependent upon the location of the receiver with respect to the station. For a weak television signal, this control may have to be operated almost fully clockwise, while for a strong signal, it may be necessary to operate this control almost fully counterclockwise. This control adjusts the black and white contrast of the picture elements. Too much contrast is apparent when the picture is lacking in gradations between black and white, or when the picture loses form. Too little contrast causes the picture to appear faded so that it seems composed entirely of grey picture elements. When the contrast control is operated too far clockwise, the video amplifier may overload, causing poor picture reproduction and a buzz in the sound reproduction may be heard.

BRIGHTNESS—This control has to be adjusted simultaneously with the contrast control to regulate the brilliance of the received picture. Too much brilliance will have the same effect as too little contrast, making it advisable to strike a proper balance between the contrast and the brightness control settings.

Fig. 23. Control Location, Models 805, 806, 807

INSTALLATION AND SERVICE ADJUSTMENTS

Note unpacking and installation instructions for Models 805, 806, and 807 are contained in ER-A-805. Unpacking and installation instructions for Model 809 are contained in ER-A-809. Some of this data is repeated here.

To remove or replace the picture tube, it is necessary to remove the chassis from the cabinet. Loosen the picture tube strap and the deflection yoke. Disconnect the picture tube socket and the high voltage anode lead. The tube may be removed from the front of the chassis.

Install the new picture tube from the front of the chassis by inserting the neck of the tube through the deflection yoke and the focus coil. Connect the picture tube socket.

Connect the high voltage anode and tighten the picture tube strap. Place the chassis in the cabinet and replace the mounting screws. Push the tube forward against the mask. Push the deflection yoke forward against the bell of the picture tube and clamp in position.

On early production receivers a centering ring was used between the focus coil and the deflection yoke. On "T," "U," and "W" versions, the focus coil adjustment is used to effect centering. Fig. 26.

On Model 805, which uses a 10BP4 picture tube, an ion trap was used which should be placed between the focus coil and the base of the tube about the neck of the tube with the arrow on the ion trap pointing towards the focus coil.

Centering, tilt and ion trap adjustments must be made before the cabinet back, or on the 805 the cabinet body, is replaced. Wipe the safety glass and the screen surface of the picture tube to remove dirt before installation. *Do not handle, remove or install a picture tube unless safety glasses and gloves are worn.*

VENTILATION OF RECEIVER.

Air circulation about the chassis is provided through ventilation slots in the cabinet. Do not cover or partially obstruct these slots in any way.

ANTENNA.

The proper antenna and lead-in installation is of the utmost importance in order to obtain optimum signal strength with freedom from noise. Antenna installation is covered in booklets ER-A-805 or ER-A-809 and, also, in the booklet accompanying each G-E antenna. Antenna Cat. No. UKA-005 is a 300-ohm, folded dipole easy to install and provides good reception on all of the twelve commercial channels in medium and high signal strength areas.

Antenna Cat. No. UKR-005 is a 300-ohm, folded dipole with a reflector to increase the front-to-back ratio of the dipole. This will increase pick-up from stations when used in low signal area. Also, the use of a reflector tends to discriminate against reflected signals.

Antenna Cat. No. UKR-007 is a stacked array 300-ohm antenna. This antenna gives considerable signal gain over a single dipole. It also will discriminate against reflected waves.

Adapter UKT-002 is a high-band adapter to be used in conjunction with one of the above antennas. It is connected in parallel with the low-band antenna but may be oriented separately to give maximum signal pick-up from a high frequency station. This adapter may also be used alone for reception from a high frequency station.

UKT-003 is a high-band stacked array adapter designed to resonate on the high frequency channels. It is mounted on and connected in parallel with a low-band antenna. This adapter may be oriented separately to give better reception from high frequency channels.

A lightning arrester, Cat. No. REM-001, should be installed with each outdoor antenna installation. When a metal mast is used, it should be connected to a good ground with No. 6 copper wire or copper strap.

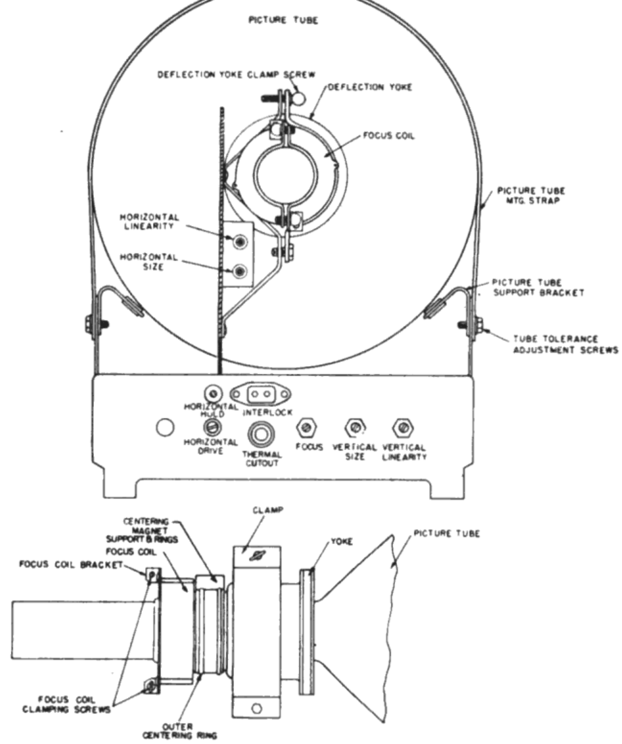


Fig. 25. Preset Adjustments (Early Production)

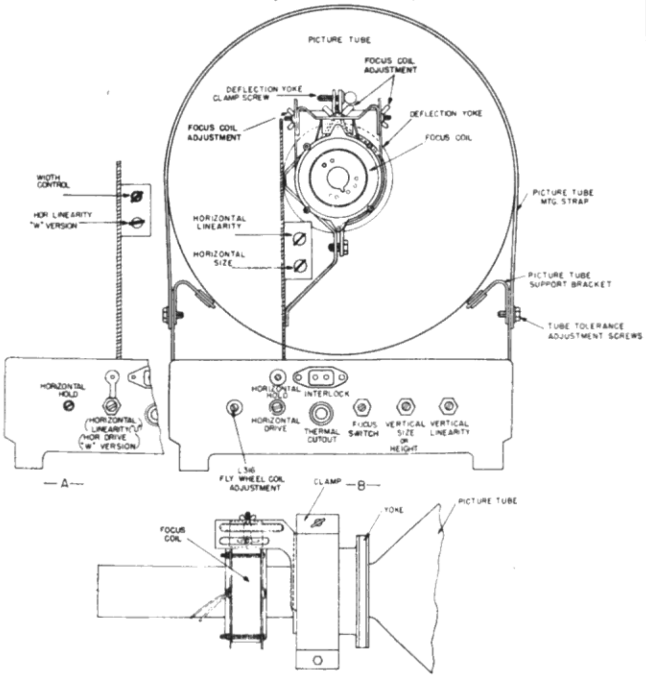


Fig. 26. (A) Special U and W Controls
(B) T Version Controls

ION TRAP (Used only on Model 805).

The ion trap should be adjusted to give maximum brightness on the screen. With the trap placed around the neck of the tube with the arrow pointing towards the focus coil, the ion trap should then be rotated and moved forward or backwards to give maximum brightness. If the illuminated area gets too bright, reduce the brightness control and readjust the ion trap for maximum brightness. Always adjust the ion trap for maximum brightness. Do not leave the ion trap adjusted for less than maximum brightness as this may shorten the life of the picture tube.

The following is a listing of possible troubles and their cures. This is not intended as a comprehensive coverage of all troubles possible, but only serves as a guide in locating some of the more difficult problems. From time to time this information will be supplemented by service bulletins.

TROUBLE SHOOTING CHART

SYMPTOM	CHECK	REMARKS
(1.) No Raster on Picture Tube.	(a.) Waveform at output of T311 or T312. (b.) V14, 1B3GT/8016. (c.) Filter circuit of V14. (d.) V9 picture tube. (e.) Check high voltage anode cap for good connection to picture tube. (f.) For defective brightness control. (g.) Anode voltage low. (h.) Check (V13) (V12 or V21) for waveforms. (i.) Defective damper tube (V15).	(a.) Check waveforms, using waveform diagrams. (b.) If filament of V14 glows orange, high voltage is being generated. (g.) Check deflection yoke for shorted turns.
(2.) Raster Normal. No Picture or Sound.	(a). Oscillator V3-B defective. (b.) Defective antenna or lead-in. (c.) R-f amplifiers, converter, i-f amplifier or video amplifier stages.	(b.) With contrast full clockwise, a noise pattern should be seen on screen, and noise heard in speaker.
(3.) Picture Normal. No Sound.	(a.) V16, V17, V18, V19. (b.) Defective speaker. (c.) Alignment of T341 or L341. (d.) Audio amplifier stage.	
(4.) No Raster. Sound Normal.	(a.) Picture tube. (b.) D-c restorer, V7-B.	
(5.) Normal Picture. No Vertical Sync.	(a.) V11 (clipper and inverter) waveforms. (V20 on U and W versions). (b.) Input to V10-A waveform.	
(6.) Picture Normal. No Horizontal Sync.	(a.) Clipper waveform. (V11 early versions or V20 late versions). (b.) V12-A and V12-B, on U and W versions. Check V21-A and V21-B. (c.) Check for free-running speed of 15,750 cps.	
(7.) Raster Edge Not Straight—Keystoning.	Deflection yoke.	
(8.) Picture Jumpy.	(a.) Operating at incorrect contrast setting. (b.) Gassy or noisy 19BG6 (V13) tube. (c.) Noisy sweep or sync circuit tubes. (d.) Excess noise picked up on antenna or lead-in. (e.) Adjustment of hold controls.	
(9.) Poor Picture Detail.	(a.) Mismatch between transmission line and antenna or receiver. (b.) Misalignment of i-f and r-f circuits. (c.) Defective video chokes. (d.) Focus control to make sure to be of sufficient range. (e.) Overload of video amplifier; check contrast control operation.	(a.) Transmission line too close to metal objects. (b.) Alignment chart. (d.) Check position of focus coil.
(10.) Neck Shadow.	(a.) Centering of focus coil about neck of picture tube. (b.) Ion trap assembled too close to the base of the picture tube. (c.) Yoke not against bell of picture tube.	(b.) Ion trap is used only on receivers using a 10BP4 picture tube.
(11.) Fold-over of Picture at the Left Side of Picture When Horizontal Hold is Set for Best Sync.		See Production Change No. 2.
(12.) Audio Instability. Early "T" Versions.		See Production Change No. 3.

(13.) Poor Vertical Linearity.		See Production Change No. 4.
(14.) Horizontal Linearity. "T" Versions.		See Production Change No. 5.
(15.) Poor Focus.	(a.) Adjustment of coarse focus switch and setting of focus coil.	(a.) In some cases it may be necessary to move the focus coil back slightly along the neck of the picture tube.
(16.) Barkhausen oscillation (one or several vertical dark lines), when program is being received.	(a.) Readjust drive control (or linearity control U versions). (b.) 19BG6 sweep output tube.	
(17.) Picture Flutter on strong signals.		See Production Change No. 17.

PICTURE CENTERING ADJUSTMENTS.

Centering (Early Production Using Centering Rings).

The centering ring and support assembly is shown in Fig. 25 between the focus coil and the deflection yoke. The centering assembly consists of a large cunifee ring which can be moved forwards or backwards along the ring support assembly. Therefore, to center the electron beam move the large cunifee ring towards the focus coil. Rotate the whole centering assembly until the beam moves in the proper direction, then move the large cunifee ring forward until the beam is centered.

Centering ("T" "U" and "W" versions Using Focus Coil Adjustment). Fig. 26.

Five adjustments are used to center the electron beam and secure uniformity of focus over the greatest picture area.

A. By loosening the two side wing nuts, the focus coil may be adjusted in three dimensions:

1. It may be moved forwards or backwards along the neck of the tube.
2. It may be tilted with respect to the picture tube neck.
3. It may be moved slightly up or down across the neck of the tube.

B. By loosening the top wing nut on the focus coil mounting bracket, two adjustments of the focus coil are possible.

4. The focus coil may be moved slightly to the right or left across the tube neck.
5. The focus coil may be rotated about a vertical axis.

The focus coil should be operated as near as possible to the base of the picture tube to secure uniformity of focus over the greatest area of the picture or raster.

The tilting, as in steps 2 and 5, and the offset of the focus coil about the neck of the tube, as in steps 3 and 4, govern the centering of the beam.

If the focus coil air gap is too near the base of the picture tube, a dimming of the picture will be noted as the coil is tilted further from normal.

Adjust the focus coil first for uniformity of focus by moving the focus coil along the neck of the picture tube. The front and the rear focus controls should be adjusted simultaneously with the focus coil to give maximum uniformity of focus over the greatest picture area. Second, adjust the focus coil for centering of the picture. Tighten all wing nuts after a satisfactory setting is secured.

FOCUS.

With the front panel control set approximately to its mid-position, the rear panel coarse focus control should be switched to the position which allows the front panel control to obtain best focus within its range.

In some cases it may be necessary to move the focus coil backwards slightly to achieve uniform focus, over the greatest picture area, with the coarse focus switch and the front panel focus control.

TILT.

If the raster is slightly tilted and does not square with the picture tube mask, rotate the deflection yoke in its clamp bracket by loosening the wing screw.

THERMAL CUT-OUT.

This is a protection device to protect the receiver against excessive current drain or excessive heat within the chassis. A five minute period should elapse after this control has tripped before resetting. If the control continues to trip out upon resetting, the receiver circuits should be checked.

VERTICAL SIZE OR HEIGHT.

The control adjusts the picture height. When adjusted to the correct size, the picture should extend for approximately 1/8 inch beyond the edge of the picture tube mask, so that the top and bottom edges of the picture are not visible.

VERTICAL LINEARITY.

This control gives the proper vertical proportions to the picture. Improper adjustment will either crowd the lower or upper half of the picture, as shown in the illustration . This is best adjusted on a test pattern by adjusting the vertical linearity control until the distance from the center of the test pattern to the top or bottom edges measures the same. The adjustment of this control will alter the height of the picture so as to necessitate the readjustment of the vertical size control.

HORIZONTAL HOLD ADJUSTMENT (EARLY AND "T" VERSIONS).

Rotate the front panel horizontal hold control to the maximum clockwise end. Turn the horizontal frequency control core all the way into the coil.

Turn the horizontal hold control on the rear of the chassis until the picture is synced.

Adjust the rear Horizontal Hold Control counterclockwise until the picture loses sync. Rotate this control 1/2 turn further counterclockwise. This is the best setting for the rear Horizontal Hold

Control to give a steady picture. The front panel Horizontal Hold control will now have to be readjusted to sync the picture.

FLYWHEEL COIL ADJUSTMENT ("T" VERSION).

In order to improve the horizontal sync in the presence of noise, a "flywheel circuit" was added to the late production "T" version receivers. This circuit consists of L316 and C329, tuned to 15,750 cycles. For the adjustment of the horizontal hold control, proceed as follows:

1. Run adjustment screw all the way in or out for minimum inductance on flywheel coil L316, and short circuit it with jumper.
2. Tune in TV signal and lock picture in usual manner with normal setting of contrast control.
3. Turn front panel Horizontal Hold control fully clockwise, whereby picture may tear out.
4. Run core of blocking oscillator transformer L313 all the way out and slowly run it back in, until picture just locks in. Then gradually bring core out until the blanking bar appears on left edge of screen just before picture tears out completely.
5. With the blanking bar still visible, move front panel control in a counterclockwise direction until picture *just* locks in.
6. Remove short across flywheel coil L316 and bring its core out until picture *just* locks in.
7. Switch off receiver and allow to cool off; switch on again with hold control fully clockwise. If sweep breaks into half frequency, readjust flywheel coil L316 for approximately 6 horizontal bars across screen. Repeat this operation and check for half frequency condition. If it still persists, turn core half a turn into coil L316 and recheck for normal frequency.

HORIZONTAL DRIVE CONTROL (EARLY, "T" AND "W" VERSIONS).

This control should be turned full counterclockwise. In some receivers a white vertical line will appear on the screen. The control should be rotated clockwise until this line just disappears. In other receivers this control can be operated fully counterclockwise without encountering the white vertical line.

HORIZONTAL LINEARITY CONTROL (EARLY, "T" AND "W" VERSIONS).

This control L315 adjusts the picture for correct horizontal proportions. A maladjustment shows an elongation or crowding of either side of the picture. This is best adjusted on a test pattern by adjusting the Horizontal Linearity Control until the distance from the center to the left and right edges of the test pattern measures the same. The adjustment of this control should be made simultaneously with the adjustment of the Horizontal Size Control to get proper width and good linearity. The Horizontal Drive Control can be slightly readjusted to give a good compromise between linearity and hi-voltage.

HORIZONTAL SIZE OR WIDTH (EARLY, "T" AND "W" VERSIONS).

This control changes the horizontal size or width of the picture. When adjusted to the proper position, the picture should extend approximately 1/8 inch beyond the edge of the picture tube mask so that the left and right edges of the picture are not visible. In the picture showing incorrect adjustments of the width control, it will be noted that this condition makes inner circle of the test pattern egg-shape instead of a circle.

HORIZONTAL HOLD ADJUSTMENT ("U" AND "W" VERSION CHASSIS).

Set the contrast control to minimum setting (counterclockwise). Adjust the front panel horizontal hold control to the approximate center of its rotation.

Adjust the rear panel horizontal hold control to sync the picture or test pattern and place it at the center of the raster. Rotation of the front panel horizontal hold control slowly in either direction should shift the picture slightly left or right. The picture should not lose sync when the front panel Horizontal Hold control is rotated slowly.

HORIZONTAL SIZE AND LINEARITY ADJUSTMENTS ("U" VERSION).

Adjust the Horizontal Linearity control R402 to give maximum high voltage on the picture tube. As the high voltage is increased, vertical size will decrease. Therefore, maximum high voltage can be determined by noting the point of minimum vertical size. On some receivers a vertical white line (fold-over) will appear as the Horizontal Linearity is turned counterclockwise. The Horizontal Linearity control should be turned clockwise until this white line just disappears.

Adjust the Horizontal Size control to fill the picture tube mask. Check for linearity. The distance from the center to left and to the right-hand edge of the picture should be approximately equal. If the horizontal linearity is not correct, it will be necessary to compromise between high voltage and linearity by readjusting the Horizontal Linearity control. Readjust the Horizontal Size control so that the picture extends approximately 1/8 inch beyond the edge of the picture tube mask so that the left- and right-hand edges of the picture are not visible.

PPODUCTION CHANGES

(1) CHASSIS MARKINGS.

As production of these models proceeded, major production changes were identified by stamping a large letter on the chassis front apron. These letters are "T", "S", "U", or "W".

"T" Version (*See production change #9*)	—Change from a molded type horizontal output transformer T311 to a ceramic iron core type transformer T312.
"S" Version (*See production change #16*)	—In addition to the "T" change a larger picture opening was incorporated into the cabinets. Chassis are marked "S".
"U" Version (*See production change #11*)	—This change changed to a new Horizontal Automatic Frequency control and Automatic Gain control circuits. "U" also incorporates the "T" version changes.
"W" Version (*See production change #15*)	—This letter "W" is used to identify the change from a 6AU6 second r-f amplifier (V2) to a 6AG5 second r-f amplifier (V2). "T", "U", and "S" versions changes are also included in "W" version.

Note chassis marked BCF in addition to "U" or "W" have the broadcast filter added in the antenna circuit as described in Production Change No. 10.

(2) FOLD-OVER ON "T" VERSION RECEIVERS.

On "T" versions of these receivers, fold-over at the left edge of the picture when the horizontal hold control is set for best synchronization has been corrected in late production "T" versions by the following:

(a) Change R334 from 220K, to 560K, 1/2 watt resistor, Cat. No. URD-115. √
(b) Connect a 12 mmf., 880 v., mica capacitor, C336, from the junction of R334 and C330 to B_1-, Cat. No. RCU-286. √
(c) Disconnect R315 from 277 volt, B+, and reconnect to the B+ boost voltage at the junction of C322 and L315. √
(d) Change C315 from 68 mmf. to 220 mmf., mica, Cat. No. UCU-1036. √

(3) AUDIO INSTABILITY (IN EARLY "T" VERSION RECEIVERS).

This appeared as tweets when operating the focus control at maximum clockwise rotation and has been cured in late production by reconnection of the 25L6GT (V19) screen by-pass capacitor, C367. On "T" version receivers, C367, ground connection was removed from the B_2- bus and connected to the junction of R352, R353, and S341.

(4) TO IMPROVE THE VERTICAL LINEARITY.

R299 has been changed from 3K to 2.2K, 1 w. resistor. This change also centers the operation of the vertical linearity control.

(5) HORIZONTAL LINEARITY "T" VERSION MODELS.

A transient oscillation which appears as wiggles on vertical running lines at the top one-half inch of the picture may be removed by shunting C324 (0.47 mfd.) with a 1200 ohm, ½ w., carbon resistor (R339). C324 is the capacitor in series with the horizontal deflection coils.

(6) IMPROVEMENT IN VERTICAL SYNC—EARLY AND "T" VERSIONS CHASSIS.

To improve vertical synchronization under noisy conditions such as encountered in "fringe" areas, the following changes have been made in production:

(a) Short C265 with a bus wire.
(b) Remove V8-A grid resistor, R274 (2.2 meg.).
(c) Change value of R280 in plate circuit of V8-A from 8200 ohms to 39,000 ohms, ½ w., carbon resistor, Cat. No. URD-087.
(d) Change value of C314 (couples V11-A to V11-B) from 5000 mmf. to 1000 mmf., mica, Cat. No. UCU-052.
(e) Change the value of R311 (in grid of V11-B) from its 2.2 meg. to 470,000 ohms, ½ w., carbon URD-113. R311 should be reconnected between pin 1 and pin 3 of V11-B.
(f) Change value of C293 (grid of V10-A) from .001 mfd. to a 150 mmf., mica capacitor, Cat. No. UCU-1532.

(7) TO IMPROVE THE R-F STABILITY WHEN OPERATING ON CHANNEL NO. 2 IN WEAK SIGNAL AREAS.

The following changes have been made in late production. When operating on Channel No. 2 with the contrast control near maximum clockwise, the picture may become streaked or blacked out entirely, due to regeneration. This may be corrected as follows:

(a) Replace or short out L206 with a piece of bus wire No. 20 or larger.

(b) At the rear of C213, the tuning capacitor is a terminal board mounted on the head-end unit. From the ground lug of this terminal board, connect a 5000 mmf. capacitor, C208, Cat. No. RCW-3014, to the main chassis. This main chassis ground may be made by adding a ground lug under the self-tapping screw which holds the vertical sweep output transformer.

(8) IMPROVED STABILITY OF HORIZONTAL SWEEP GENERATOR IN EARLY AND "T" VERSION RECEIVERS.

A tuned circuit, L316, Cat. No. RLD-014, and capacitor C329, Cat. No. UCU-2568, is tuned to 15,750 cycles and will stabilize the blocking oscillator to reduce the effects of noise on sync.

For adjustment, see installation control adjustments, flywheel circuit.

L316 and C321 are added in the B+ supply of V21B as shown in Figure 30, L316 is mounted at the rear of the chassis at the left-hand side, as shown in Figure 26.

(9) NEW TYPE TRANSFORMER ("T" VERSION).

In late production Model 805, 806, 807, and 809's, a new type horizontal sweep output transformer was employed. The new transformer uses a ceramic iron core. All receivers using this core will be identified by a large "T" ink-stamped on the chassis front apron. Receivers ink-stamped "U" "S" or "W" on the chassis front apron have this new transformer and other new developments incorporated, as explained below. The schematic diagram for receivers stamped "T" is shown on Fig. 30.

On early production receivers, a 25Z6GT damper tube was used. Because of the higher peak inverse voltage of this new transformer, it is necessary to use a 25W4GT damper tube which has a higher peak inverse voltage rating.

(10) BROADCAST INTERFERENCE.

To eliminate interference from strong broadcast signals, which appear as r-f interference in the picture, choke L259 was removed and B_2- bus was connected to B_3- bus directly with a short piece of bus wire. A broadcast filter has been added in the antenna input circuit, and is connected as shown on the schematic diagram, Fig. 31,

(11) NEW HORIZONTAL AUTOMATIC FREQUENCY CONTROL CIRCUIT AND AUTOMATIC GAIN CONTROL CIRCUIT ("U" AND "W" VERSIONS).

A schematic diagram showing these two circuits is shown on Fig. 31. Chassis incorporating this change can be identified by the large "U" or "W" ink-stamped on the chassis front apron.

(12) VOLTAGE DOUBLER CHANGE.

Early production receivers used a full-wave voltage doubler type of transformerless power supply. This is shown in schematic diagram Fig. 28,

"T" versions and "U" and "W" versions were changed to a half wave voltage doubler type of circuit shown in schematic diagrams, Figs. 30 and 31, respectively.

(13) SHIPMENT WITH PICTURE TUBE INSTALLED.

Late production receivers were shipped from the factory with the picture tube installed. Another picture tube mounting strap was added on these models to secure the picture tube. Though this extra strap does not have to be removed when the receiver is installed, it is not necessary to replace it when the picture tube has been removed or replaced, unless the receiver is to be reshipped.

(14) LOW SENSITIVITY, EARLY PRODUCTION.

A few early production models were built with the plate of V6 (3rd video i-f) amplifier connected to B+ supply through a 10K resistor, R278, or to B+ supply through R278 and choke L248 in parallel.

To improve the sensitivity of these models, R278 should be removed and pin 5 of V6 should be connected to the junction of R253, C253, and R252 through choke L248. Catalog number for L248 is RLF-027.

(15) SECOND R-F AMPLIFIER ("W" VERSION).

Early production chassis used a 6AU6 second r-f amplifier V2. This tube was replaced by a 6AG5 tube in later production. Connections for V2, 6AU6, "U" versions are the same as connections for V2, 6AU6 of "T" version, as shown on schematic for "T" version, Fig. 30,

Chassis with (V2) second r-f amplifier 6AG5 are stamped "W".

(16) CHANGE TO LARGER PICTURE ("S" VERSION).

Models 806 and 809 stamped with a large S on the chassis front apron indicate a cabinet change from a picture size 8½" wide, by 6⅜", to a picture size of 9½" by 7½". Model 807 changed to 9½" x 7½" picture opening at the same time the "W" changes were incorporated. The left and right sides of the new large picture are now arcs of a circle 9½" in diameter. See replacement parts list for cabinets and cabinet parts.

(17) FLUTTER ON STRONG SIGNALS "U" AND "W" VERSIONS.

Intermittent flutter (similar to low frequency airplane flutter) of picture brilliance on "U" and "W" versions, in very strong signal areas, which requires the contrast control be set at minimum, has been corrected in production as follows.

Change C255 from a .05 mfd. capacitor to a .5 mfd. capacitor, 200 v., Cat. No. RCC-016. This capacitor is in the automatic gain control circuit.

Change R280 plate dropping resistor of V8A from 39,000 ohms to 18,000 ohms, ½ watt, Cat. No. URD-079.

(18) LINEARITY CONTROL ("U" VERSION)

"U" version chassis were built with the potentiometer R402 acting as both linearity and drive control. L315 linearity control shown in Figure 31, was removed and the junction of T312 terminal one and R303 was connected directly to the junction of C412, R303 and pin 3 of V15. Capacitor C335 was removed.

On "W" versions, L315 and C325 were added to give better linearity control and are connected as shown in Figure 31,

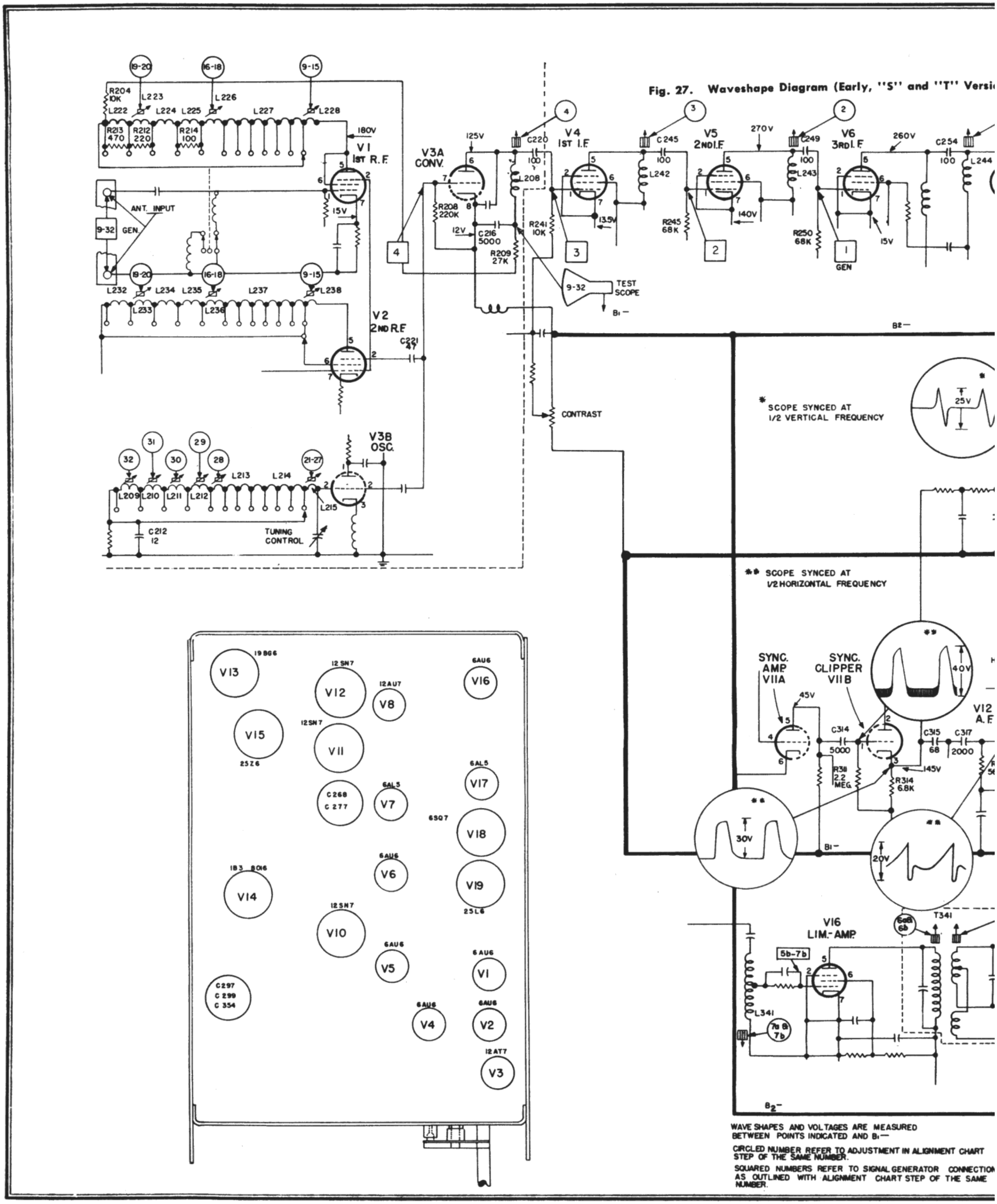


Fig. 27. Waveshape Diagram (Early, "S" and "T" Versi

* SCOPE SYNCED AT 1/2 VERTICAL FREQUENCY

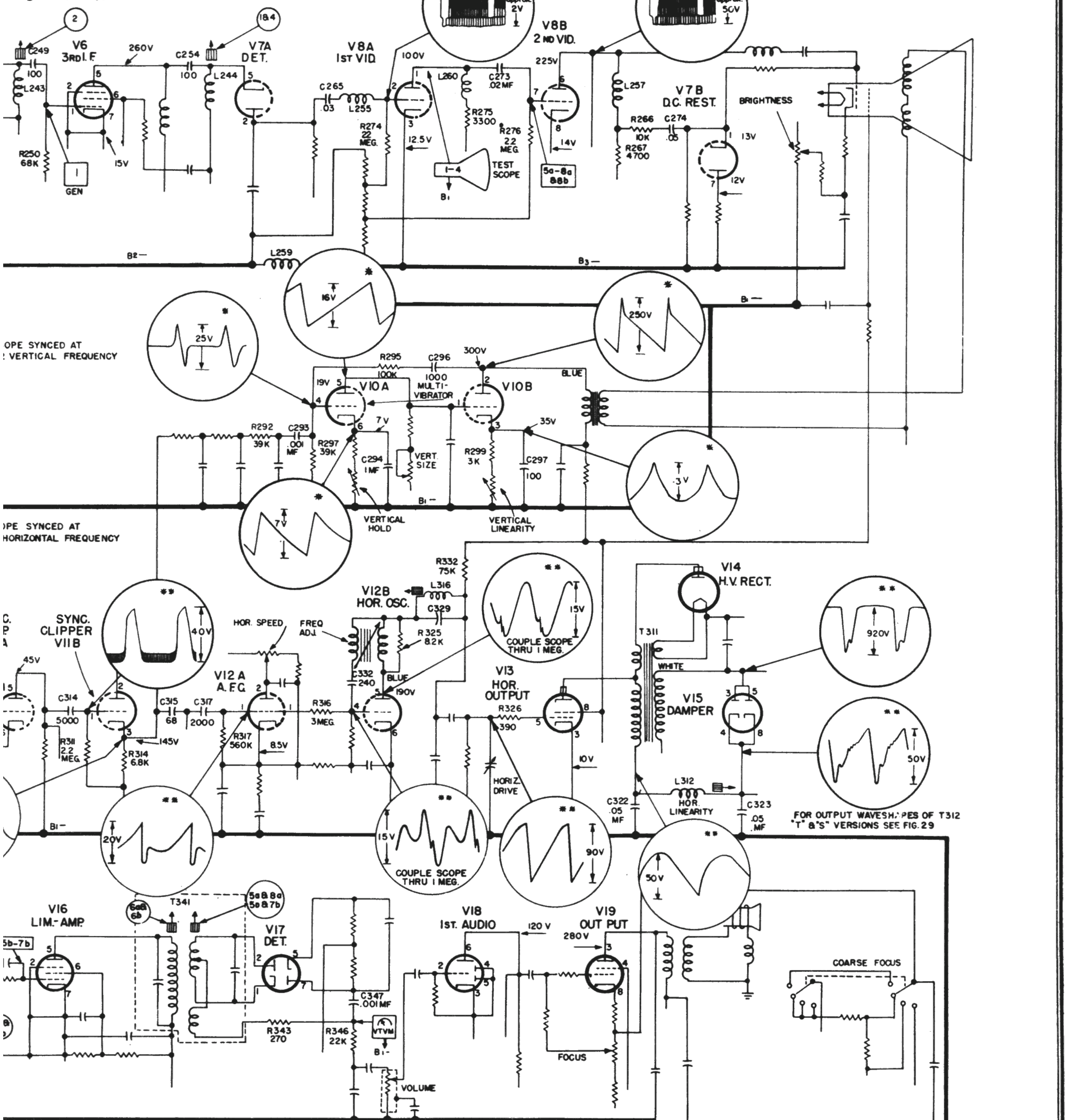
** SCOPE SYNCED AT 1/2 HORIZONTAL FREQUENCY

WAVE SHAPES AND VOLTAGES ARE MEASURED BETWEEN POINTS INDICATED AND B1—

CIRCLED NUMBER REFER TO ADJUSTMENT IN ALIGNMENT CHART STEP OF THE SAME NUMBER.

SQUARED NUMBERS REFER TO SIGNAL GENERATOR CONNECTION AS OUTLINED WITH ALIGNMENT CHART STEP OF THE SAME NUMBER.

Diagram (Early, "S" and "T" Versions)



; AND VOLTAGES ARE MEASURED
OINTS INDICATED AND B1—
IBER REFER TO ADJUSTMENT IN ALIGNMENT CHART
E SAME NUMBER.
UMBERS REFER TO SIGNAL GENERATOR CONNECTION
D WITH ALIGNMENT CHART STEP OF THE SAME

USE SCOPE WITH GOOD WIDE-BAND FREQUENCY RESPONSE
COUPLE SCOPE THRU .5MFD CAPACITOR EXCEPT AS
NOTED ON V12B

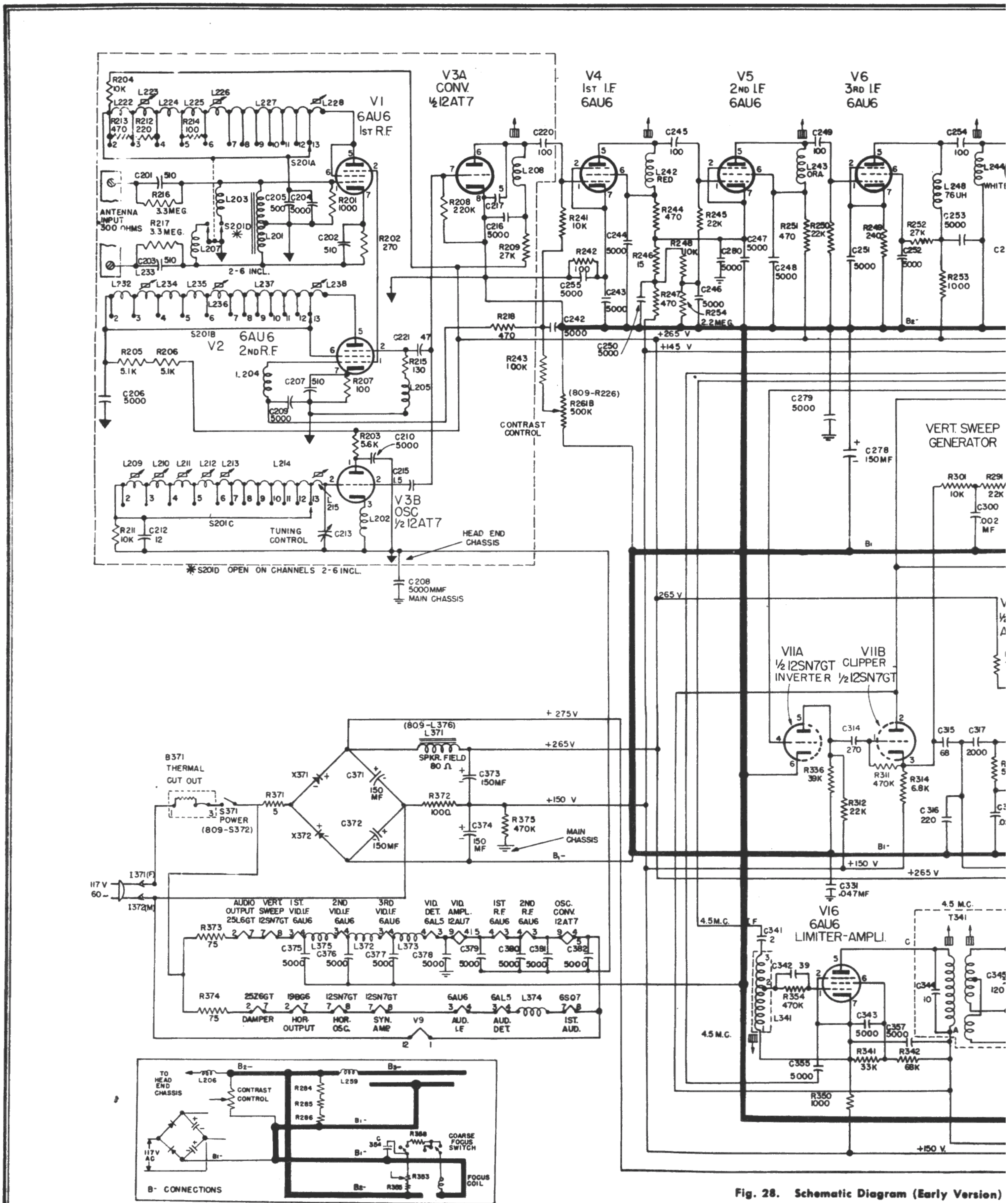
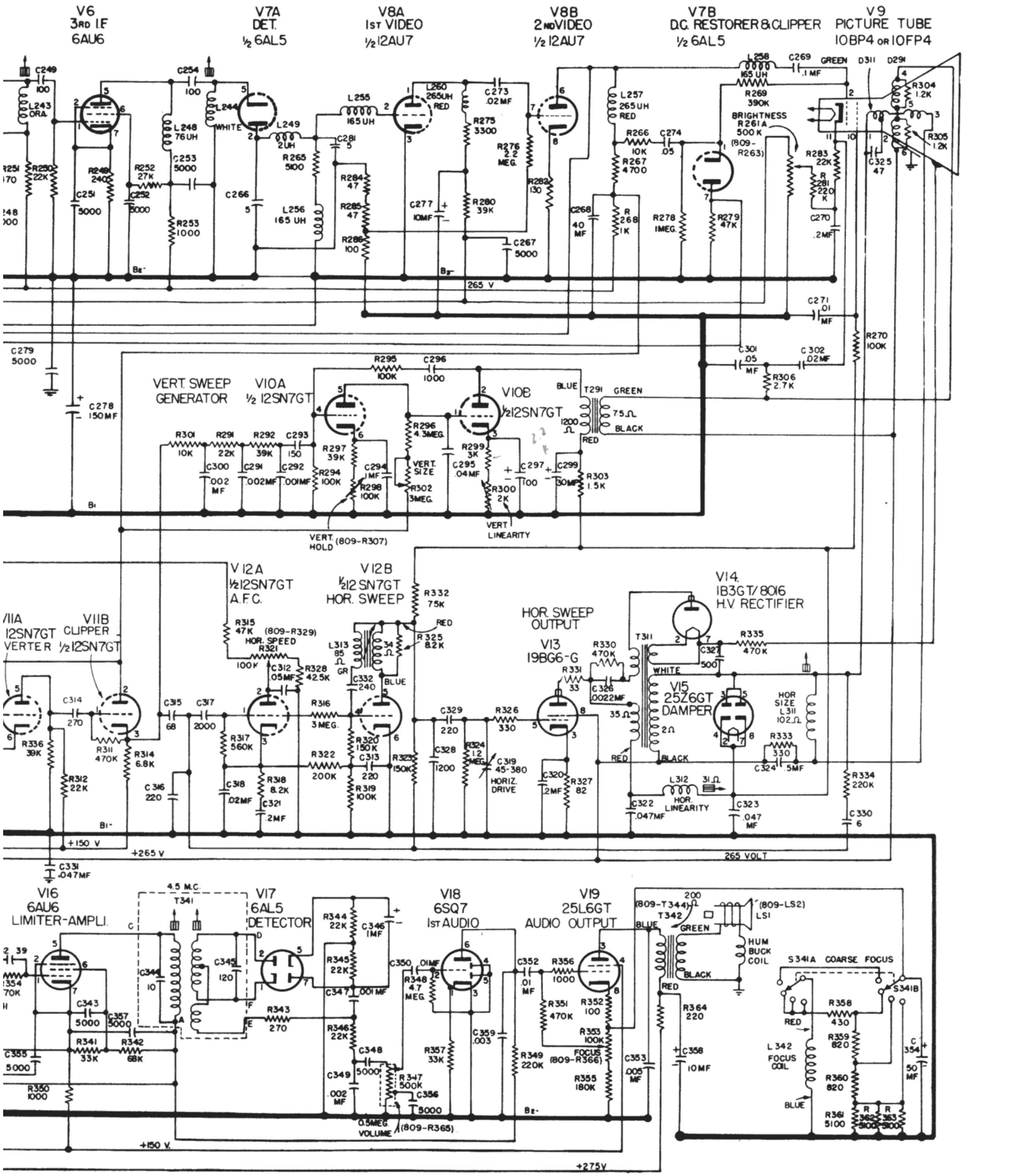


Fig. 28. Schematic Diagram (Early Version)

MODELS 805, 806, 807, 809; Early Version



Schematic Diagram (Early Version)

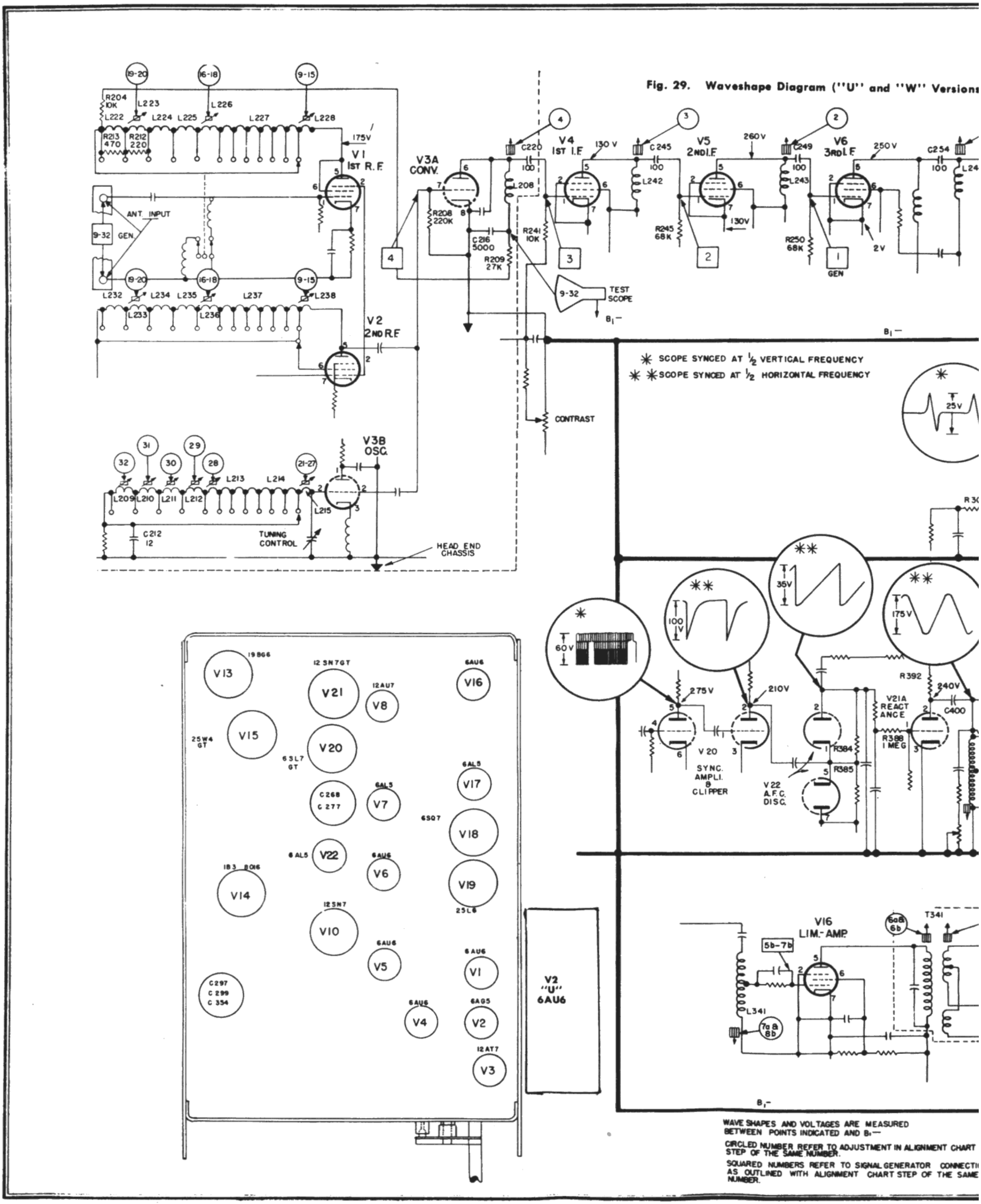


Fig. 29. Waveshape Diagram ("U" and "W" Versions

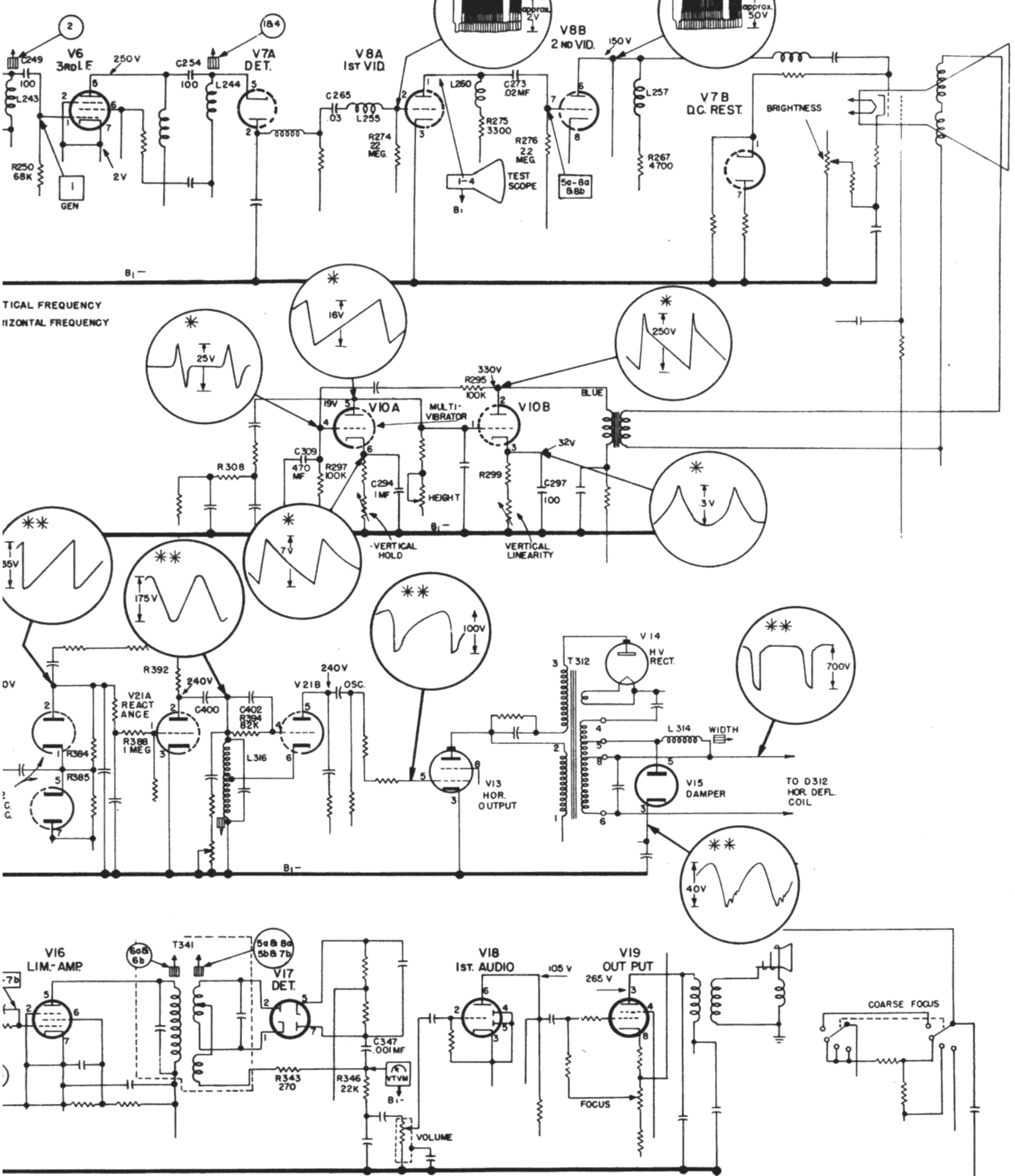
✳ SCOPE SYNCED AT ½ VERTICAL FREQUENCY
✳✳ SCOPE SYNCED AT ½ HORIZONTAL FREQUENCY

WAVE SHAPES AND VOLTAGES ARE MEASURED BETWEEN POINTS INDICATED AND B₁—

CIRCLED NUMBER REFER TO ADJUSTMENT IN ALIGNMENT CHART STEP OF THE SAME NUMBER.

SQUARED NUMBERS REFER TO SIGNAL GENERATOR CONNECTI AS OUTLINED WITH ALIGNMENT CHART STEP OF THE SAME NUMBER.

Diagram ("U" and "W" Versions)



AND VOLTAGES ARE MEASURED
INTS INDICATED AND B1 –

USE SCOPE WITH GOOD WIDEBAND FREQUENCY RESPONSE
COUPLE SCOPE TO POINT INDICATED THROUGH .5 MFD CAPACITOR

BER REFER TO ADJUSTMENT IN ALIGNMENT CHART
SAME NUMBER.

MBERS REFER TO SIGNAL GENERATOR CONNECTION
D WITH ALIGNMENT CHART STEP OF THE SAME

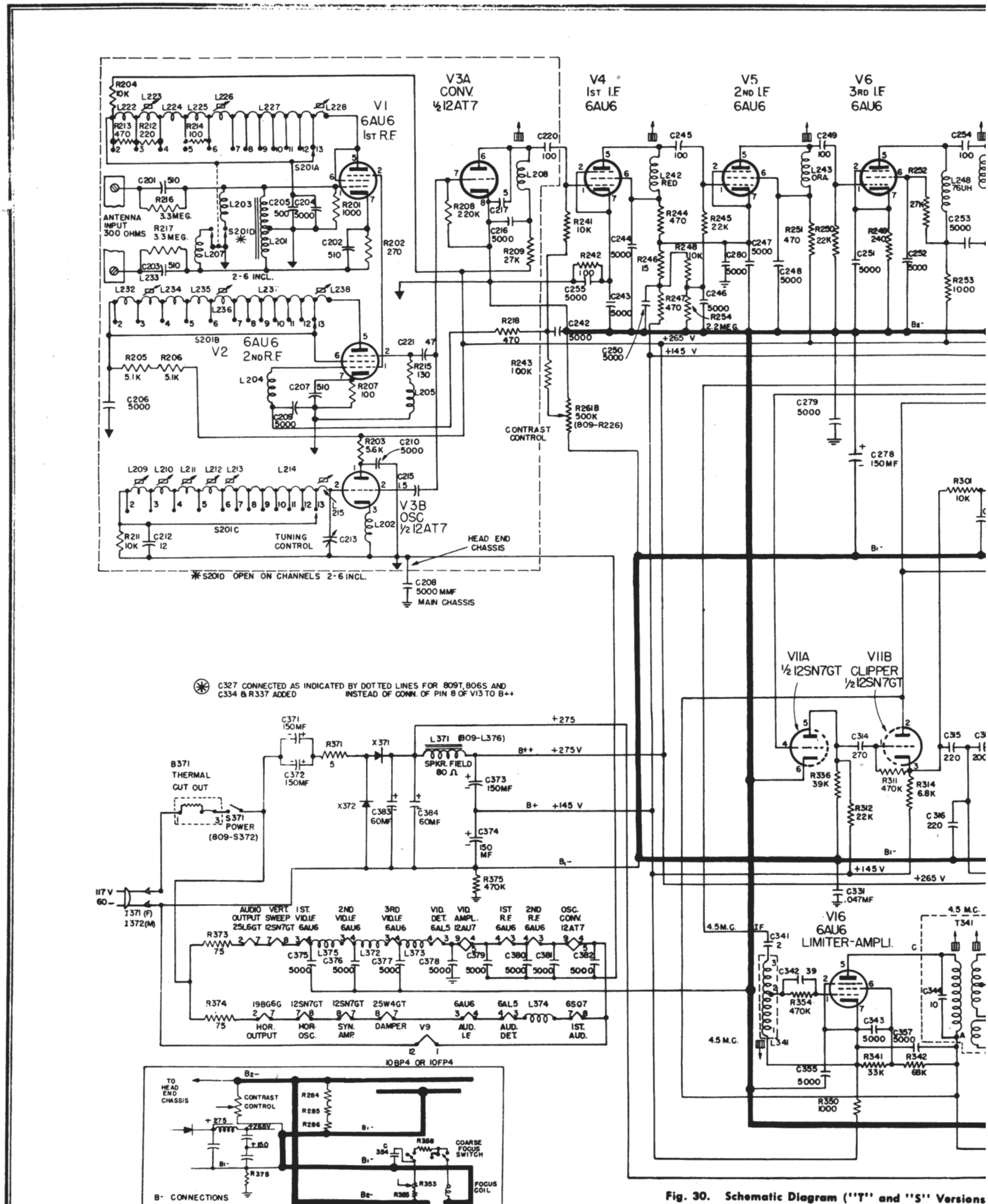


Fig. 30. Schematic Diagram ("T" and "S" Versions

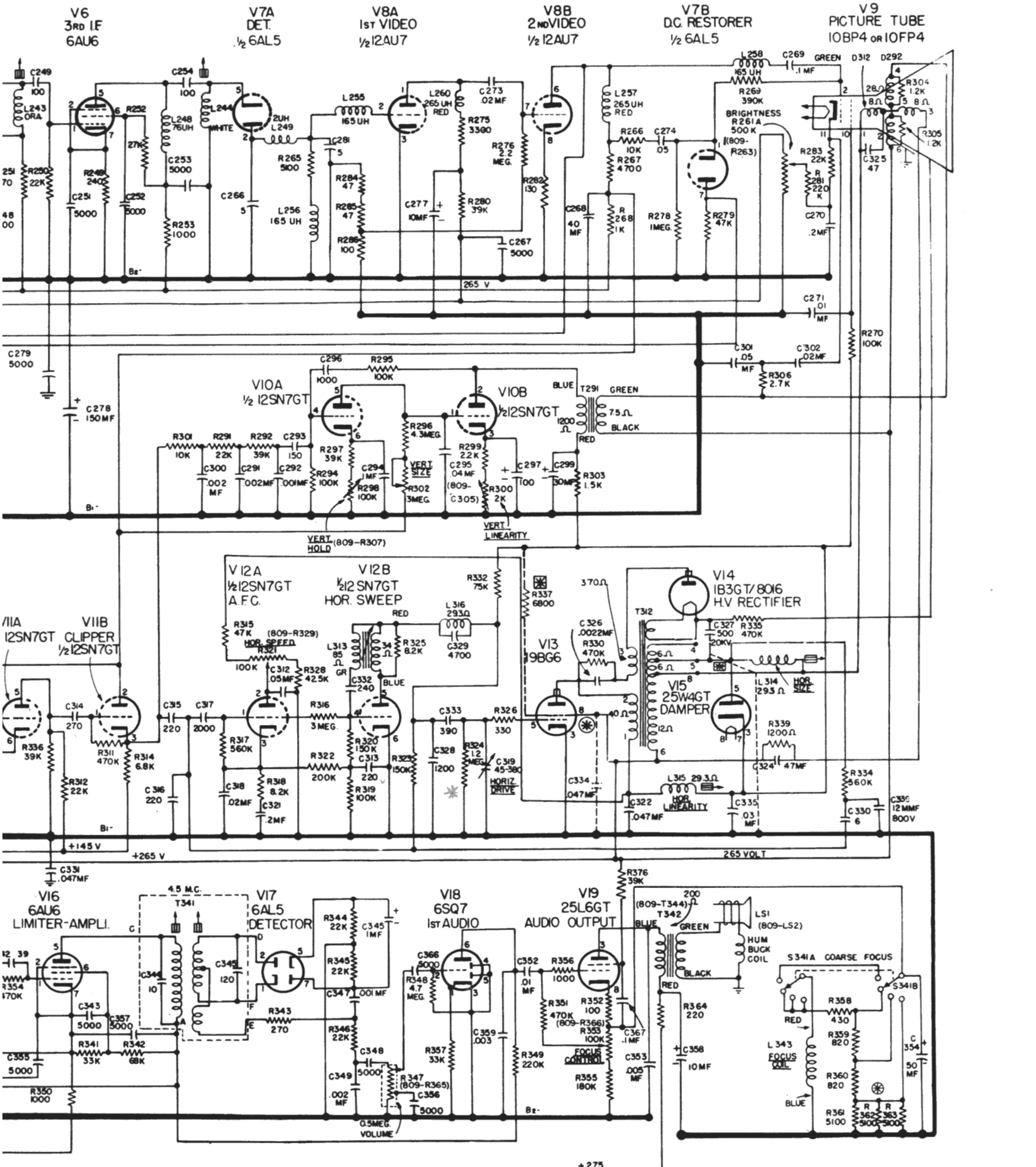


Diagram ("T" and "S" Versions)

NOTE:
LATE PRODUCTION R361, R362, R363
REPLACED BY ONE RESISTOR R377
(1700Ω 5W)

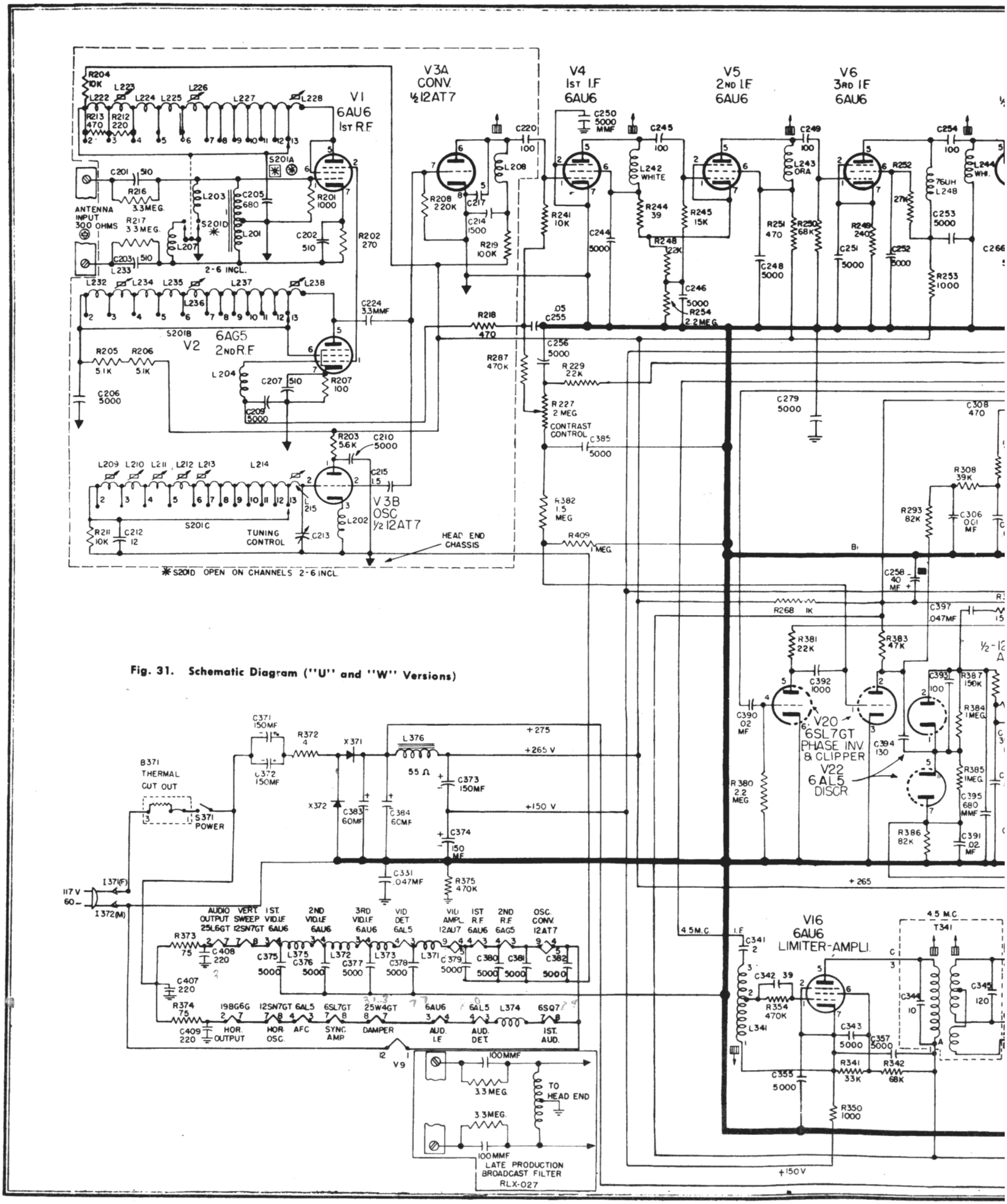
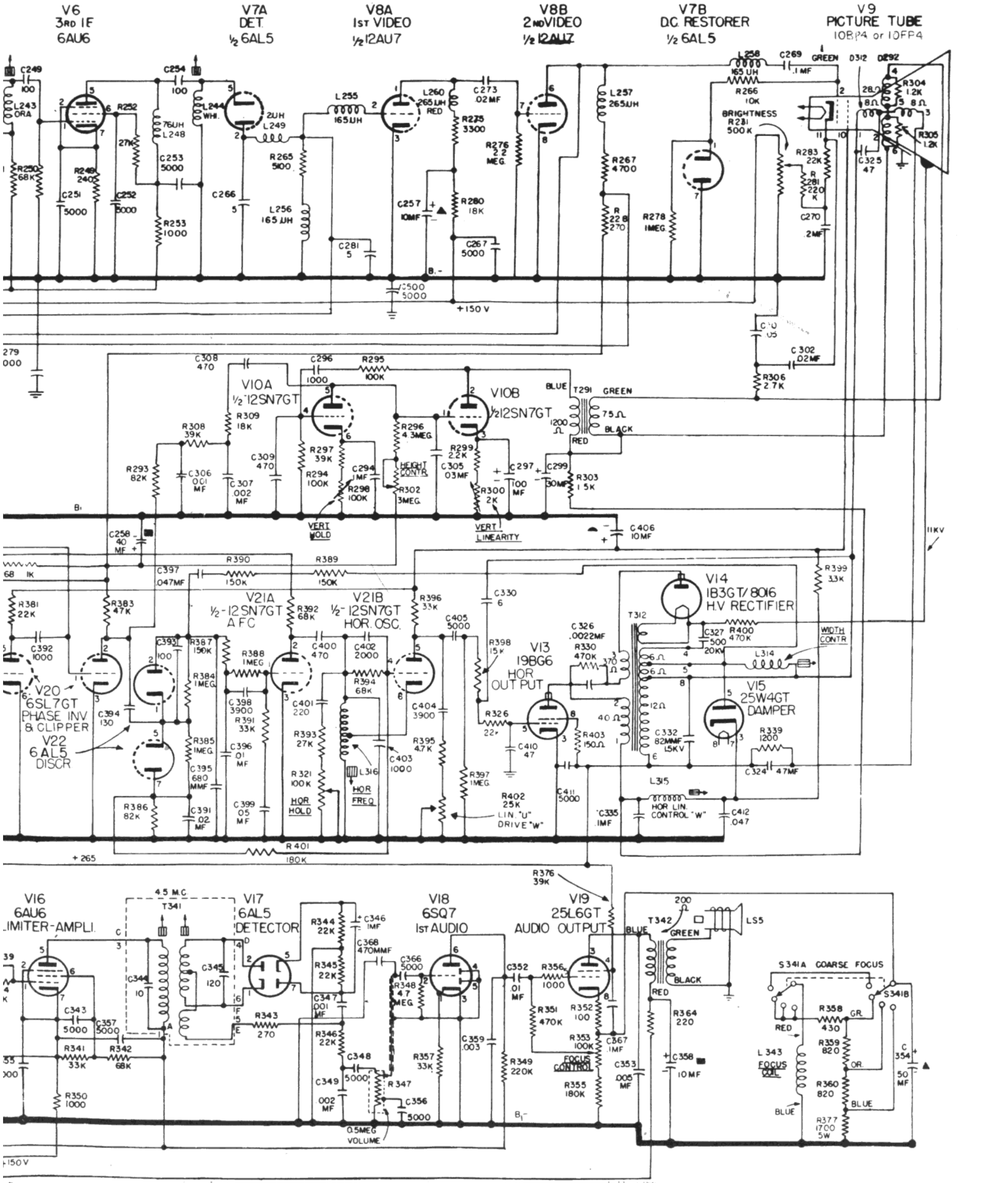
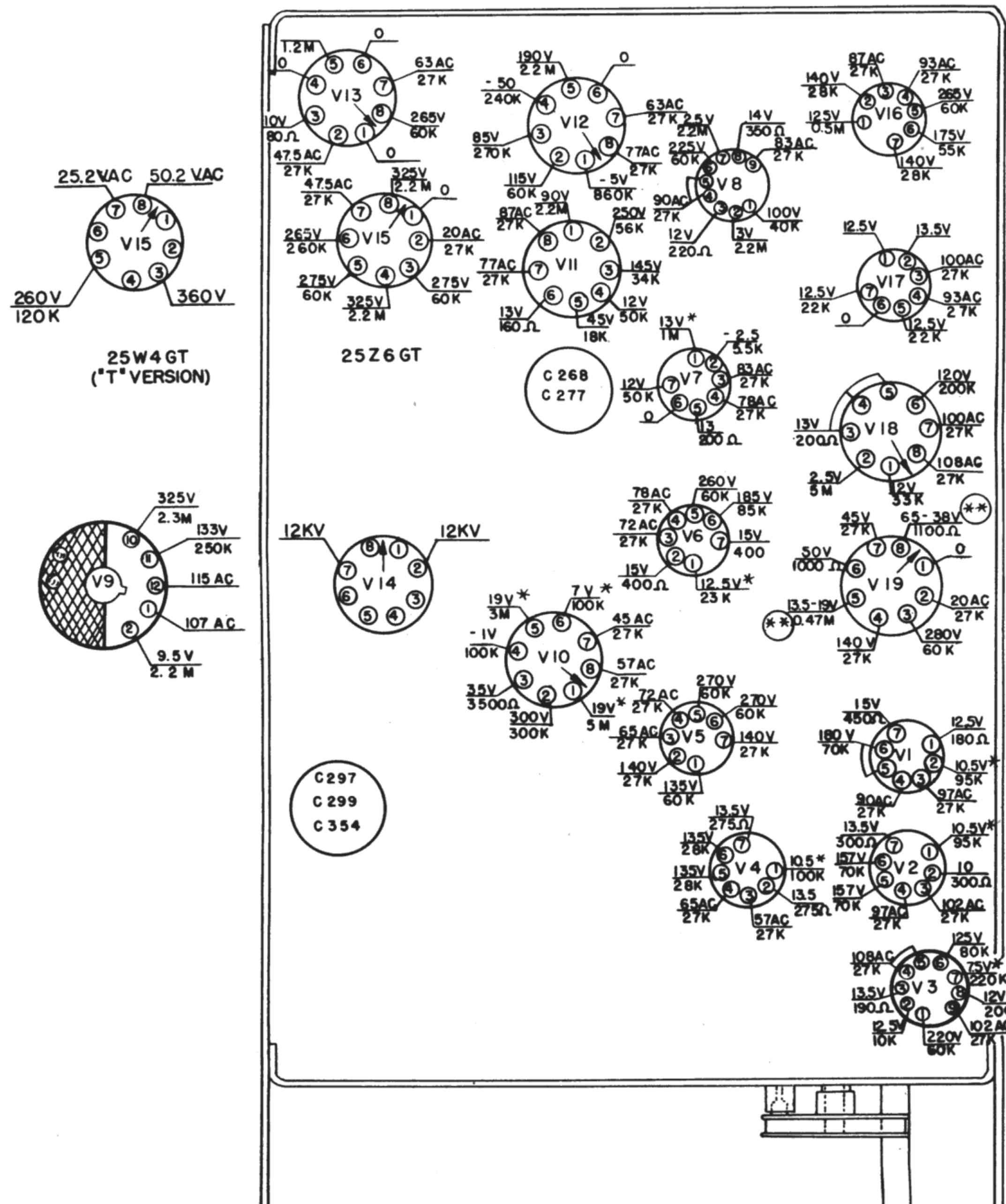


Fig. 31. Schematic Diagram ("U" and "W" Versions)

MODELS 805, 806, 807, 809;
U, W, Versions





VOLTAGES
MEASURED TO B_1–
CONTROLS SET AT

VOLUME - MIN.
FOCUS - NORMAL
H. HOLD - NORMAL
V. HOLD - NORMAL
BRIGHTNESS - MIN.
CONTRAST - MAX.

METERS

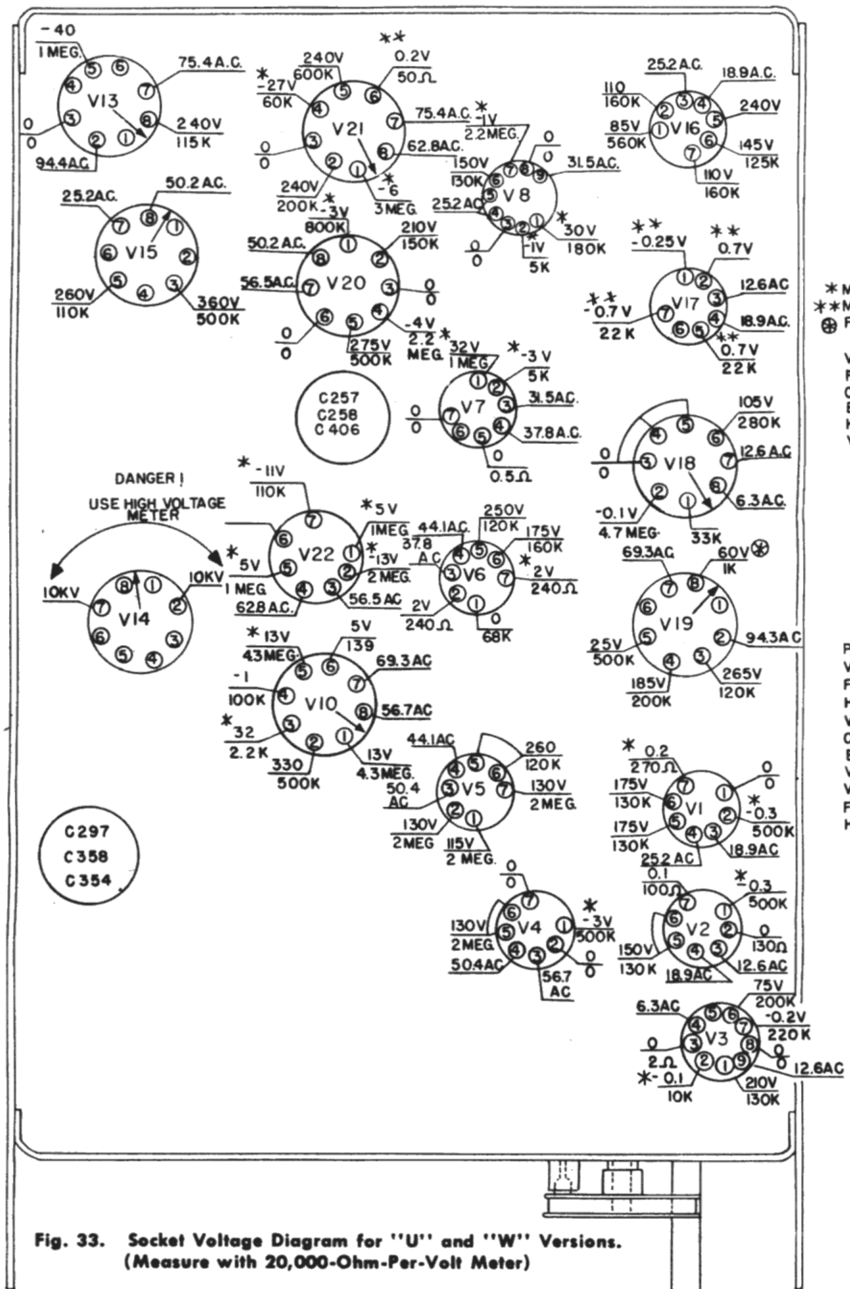
AC 1000Ω/V
DC 20,000Ω/V
* USE SCALE 50V OR HIGHER
(* *) MIN. - MAX. OF FOCUS CONTROL
LINE VOLTS - 117V

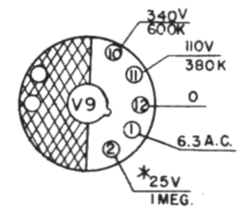
RESISTANCE
MEASURED TO B_1–
CONTROLS SET AT

VOLUME	- MIN. SW. OFF
FOCUS	- MAX.
H. HOLD	- MAX.
V. HOLD	- MAX.
BRIGHTNESS	- MIN.
CONTRAST	- MAX.
FOCUS SW.	- TAP 4

METER
20,000Ω/V

Fig. 32. Socket Voltage Diagram for "Early", "S" and "T" Versions.
(Measure with 20,000-Ohm-Per-Volt Meter)





VOLTAGES - TO - B_1-

* MEASURED ON 50V SCALE
** MEASURED ON 2.5V SCALE
⊛ FOCUS CONTROL MAX. – FOCUS SWITCH MAXIMUM CLOCKWISE
VOLUME CONTROL OFF
FOCUS CONTROL NORMAL
CONTRAST MAXIMUM
BRIGHTNESS MINIMUM
H-SPEED NORMAL
V-SPEED NORMAL

RESISTANCE - TO - B_1-

POWER CORD OFF
VOLUME CONTROL MINIMUM
FOCUS CONTROL MAXIMUM
H-SPEED CONTROL MAXIMUM
V-SPEED CONTROL MAXIMUM
CONTRAST CONTROL MAXIMUM
BRIGHTNESS CONTROL MINIMUM
VERT. LIN. CONTROL MAXIMUM
VERT. SIZE CONTROL MAXIMUM
FOCUS SW CONTROL MAXIMUM
HOR. LIN. CONTROL MAXIMUM

Fig. 33. Socket Voltage Diagram for "U" and "W" Versions. (Measure with 20,000-Ohm-Per-Volt Meter)

REPLACEMENT PARTS LIST—MODELS 805, 806, 807, AND 809

Cat. No.	Symbol	Description
		UNIVERSAL REPLACEMENT PARTS
UCC-008	C350	CAPACITOR—.01 mf., 200 v., paper
UCC-009	C318, 391	CAPACITOR—.02 mf., 200 v., paper
UCC-013	C294	CAPACITOR—.1 mf., 200 v., paper
UCC-014	C270, 320, 321	CAPACITOR—.2 mf., 200 v., paper
UCC-025	C271	CAPACITOR—.01 mf., 400 v., paper
UCC-026	C273, 302, 390	CAPACITOR—.02 mf., 400 v., paper
UCC-028	C274, 301, 312	CAPACITOR—.05 mf., 400 v., paper
UCC-030	C269, 367	CAPACITOR—.1 mf., 400 v., paper
UCC-037	C359	CAPACITOR—.003 mf., 600 v., paper
UCC-045	C255, 399	CAPACITOR—.05 mf., 200 v., paper
UCC-048	C335	CAPACITOR—.1 mfd., 600 v., paper
UCC-620	C292, 293, 347, 306, 396	CAPACITOR—.001 mf., 600 v., paper
UCC-621	C291, 300, 307, 349	CAPACITOR—.002 mf., 600 v., paper
UCC-630	C352	CAPACITOR—.01 mf., 600 v., paper
UCC-634	C295	CAPACITOR—.04 mf., 600 v., paper
UCC-635	C301, 322, 323, 331, 334, 397	CAPACITOR—.05 mf., 600 v., paper
UCU-028	C245, 249, 254, 221	CAPACITOR—100 mmf., mica
UCU-048	C395	CAPACITOR—680 mmf., 500 v., mica
UCU-052	C296, 392, 403	CAPACITOR—1000 mmf., 500 v., mica
UCU-1018	C342	CAPACITOR—39 mmf., 500 v., mica
UCU-1036	C313, 316, 359, 401, 407, 408, 409	CAPACITOR—220 mmf., 500 v., mica
UCU-1044	C368, 308, 309, 400	CAPACITOR—470 mmf., 500 v., mica
UCU-1526	C394	CAPACITOR—82 mmf., 500 v., mica
UCU-2024	C315	CAPACITOR—68 mmf., 500 v., mica
UCU-2054	C328	CAPACITOR—1200 mmf., 500 v., mica
UCU-2059	C317, 402	CAPACITOR—2000 mmf., 500 v., mica
UCU-2066	C398	CAPACITOR—3900 mmf., 500 v., mica
UCU-2583	C332	CAPACITOR—240 mmf., 500 v., mica
UOP-487	LS-5	SPEAKER—4 inch P.M.
URD-005	R246	RESISTOR—15 ohms, ½ w., carbon
URD-015	R244	RESISTOR—39 ohms, ½ w., carbon
URD-017	R284, 285	RESISTOR—47 ohms, ½ w., carbon
URD-025	R207, 214, 242, 286, 352	RESISTOR—100 ohms, ½ w., carbon
URD-029	R403	RESISTOR—150 ohms, ½ w., carbon
URD-033	R212	RESISTOR—220 ohms, ½ w., carbon
URD-035	R202, 228, 343	RESISTOR—270 ohms, ½ w., carbon
URD-037	R244, 247, 251, 326, 333	RESISTOR—330 ohms, ½ w., carbon
URD-041	R213, 218, 244, 247, 251	RESISTOR—470 ohms, ½ w., carbon
URD-045	R405	RESISTOR—680 ohms, ½ w., carbon
URD-049	R201, 253, 350, 356	RESISTOR—1000 ohms, ½ w., carbon
URD-051	R304, 305, 339	RESISTOR—1200 ohms, ½ w., carbon
URD-057	R368	RESISTOR—2200 ohms, ½ w., carbon
URD-059	R306	RESISTOR—2700 ohms, ½ w., carbon
URD-061	R275	RESISTOR—3300 ohms, ½ w., carbon
URD-065	R395	RESISTOR—4700 ohms, ½ w., carbon
URD-071	R318	RESISTOR—8200 ohms, ½ w., carbon
URD-073	R266, 248, 301	RESISTOR—10,000 ohms, ½ w., carbon
URD-077	R245, 398	RESISTOR—15,000 ohms, ½ w., carbon
URD-079	R309	RESISTOR—18,000 ohms, ½ w., carbon
URD-081	R250, 229, 248, 245, 283, 291, 312, 326, 346	RESISTOR—22,000 ohms, ½ w., carbon
URD-083	R252, 393	RESISTOR—27,000 ohms, ½ w., carbon
URD-085	R341, 357, 370, 391	RESISTOR—33,000 ohms, ½ w., carbon
URD-087	R280, 292, 297, 308, 336	RESISTOR—39,000 ohms, ½ w., carbon
URD-089	R279, 315, 383	RESISTOR—47,000 ohms, ½ w., carbon
URD-093	R250, 340, 342	RESISTOR—68,000 ohms, ½ w., carbon
URD-095	R293, 386, 394	RESISTOR—82,000 ohms, ½ w., carbon
URD-097	R243, 270	RESISTOR—100,000 ohms, ½ w., carbon
URD-101	R387	RESISTOR—150,000 ohms, ½ w., carbon
URD-103	R355	RESISTOR—180,000 ohms, ½ w., carbon
URD-105	R208, 281, 334, 349	RESISTOR—220,000 ohms, ½ w., carbon
URD-107	R401	RESISTOR—270,000 ohms, ½ w., carbon
URD-108	R344, 345	RESISTOR—22,000 ohms, ½ w., carbon
URD-111	R269	RESISTOR—390,000 ohms, ½ w., carbon
URD-113	R287, 330, 335, 354, 351, 375	RESISTOR—470,000 ohms, ½ w., carbon
URD-115		RESISTOR—560,000 ohms, ½ w., carbon
URD-121	R278, 384, 385, 388, 397, 409	RESISTOR—1 meg., ½ w., carbon
URD-123	R324	RESISTOR—1.2 meg., ½ w., carbon
URD-125	R382	RESISTOR—1.5 meg., ½ w., carbon
URD-129	R254, 276, 311, 380	RESISTOR—2.2 meg., ½ w., carbon
URD-133	R216, 217	RESISTOR—3.3 meg., ½ w., carbon
URD-137	R348	RESISTOR—4.7 meg., ½ w., carbon
URD-1028	R215, 282	RESISTOR—130 ohms ±5%, ½ w., carbon
URD-1034	R249	RESISTOR—240 ohms ±5%, ½ w., carbon
URD-1057	R299	RESISTOR—2200 ohms ±5%, ½ w., carbon
URD-1066	R265	RESISTOR—5100 ohms ±5%, ½ w., carbon
URD-1069	R314	RESISTOR—6800 ohms ±5%, ½ w., carbon
URD-1073	R211, 241	RESISTOR—10,000 ohms ±5%, ½ w., carbon
URD-1081	R344, 345	RESISTOR—22,000 ohms ±5%, ½ w., carbon
URD-1097	R294, 295	RESISTOR—100,000 ohms ±5%, ½ w., carbon
URD-1115	R317	RESISTOR—560,000 ohms ±5%, ½ w., carbon
URD-1136	R296	RESISTOR—4.3 meg. ±5%, ½ w., carbon
URE-049	R268	RESISTOR—1000 ohms, 1 w., carbon
URE-053	R303	RESISTOR—1500 ohms, 1 w., carbon
URE-061	R399	RESISTOR—3300 ohms, 1 w., carbon
URE-067	R203	RESISTOR—5600 ohms, 1 w., carbon
URE-073	R204	RESISTOR—10,000 ohms, 1 w., carbon
URE-081	R381	RESISTOR—22,000 ohms, 1 w., carbon
URE-083	R209	RESISTOR—27,000 ohms, 1 w., carbon
URE-085	R396	RESISTOR—33,000 ohms, ½ w., carbon
URE-087	R376	RESISTOR—39,000 ohms, ½ w., carbon
URE-089	R367	RESISTOR—47,000 ohms, 1 w., carbon
URE-093	R392	RESISTOR—68,000 ohms, 1 w., carbon
URE-101	R387, 389, 390	RESISTOR—150,000 ohms, 1 w., carbon
URE-097	R219	RESISTOR—100,000 ohms, 1 w., carbon
URE-113	R400	RESISTOR—470,000 ohms, 1 w., carbon
URE-1033	R364	RESISTOR—220 ohms ±5%, 1 w., carbon
URE-1040	R358	RESISTOR—430 ohms ±5%, 1 w., carbon
URE-1047	R359, 360	RESISTOR—820 ohms ±5%, 1 w., carbon
URE-1060	R299	RESISTOR—3000 ohms ±5%, 1 w., carbon
URE-1066	R205, 206	RESISTOR—5100 ohms ±5%, 1 w., carbon
URE-1097	R319	RESISTOR—100,000 ohms ±5%, 1 w., carbon
URE-1101	R320, 323	RESISTOR—150,000 ohms ±5%, 1 w., carbon
URE-1104	R322	RESISTOR—200,000 ohms ±5%, 1 w., carbon
URE-1132	R316	RESISTOR—3 meg. ±5%, 1 w., carbon
URF-049	R372	RESISTOR—1000 ohms 2 w., carbon
URF-065	R267	RESISTOR—4700 ohms 2 w., carbon
URF-1023	R327	RESISTOR—82 ohms ±5%, 2 w., carbon
URF-1094	R332	RESISTOR—75,000 ohms ±5%, 2 w., carbon
		SPECIALIZED REPLACEMENT PARTS
RAB-089		BACK—Cabinet back (Models 806, 807)
RAB-090		BACK—Cabinet back (Model 809)
RAB-100		BACK—Cabinet back (Model 806, 807 "U" version)
RAC-061		CABINET BODY—Model 805
RAC-062		CABINET FRONT—Model 805 (small pix)
RAV-079		CABINET—Model 807 (small pix opening)
RAV-080		CABINET—For Model 809, early production, with 8½" x 6⅜" picture opening
RAV-081		CABINET—Model 806 (small pix opening)
RAV-085		CABINET—Model 809 (large pix) "S"
RAV-091		CABINET—Model 807 (large pix)
RAV-093		CABINET—Model 806 (large pix)
RCC-016	C324	CAPACITOR—.5 mf., 200 v., paper
RCC-059	C353	CAPACITOR—.005 mf., 1000 v., paper
RCE-088	C268, 277, 278	CAPACITOR—40 mf., 300 v., electrolytic
		CAPACITOR—10 mf., 150 v., electrolytic
		CAPACITOR—150 mf., 15 v., electrolytic
RCE-089	C354, 358, 297	CAPACITOR—10 mf., 350 v.; 50 mf., 100 v.; 100 mf., 50 v., electrolytic
RCE-090	C346	CAPACITOR—1 mf., 50 v., electrolytic
RCE-091	C371, 372, 373, 374	CAPACITOR—150 mf., 150 v., electrolytic
RCE-092	C299	CAPACITOR—30 mf., 450 v., electrolytic
RCN-023	C327	CAPACITOR—Hi-voltage, 500 mmf., 20,000 v.
RCN-024	C332	CAPACITOR—82 mmf., ceramic
RCU-286	C330	CAPACITOR—6 mmf., 800 v., mica
RCW-026	C214	CAPACITOR—1500 mmf., ceramic
RCW-1045	C215	CAPACITOR—1.5 mmf., 500 v., ceramic
RCW-2006	C212	CAPACITOR—12 mmf., 500 v., ceramic
RCW-2035	C217, 266	CAPACITOR—5 mmf., 500 v., ceramic
RCW-3014	C204, 206, 209, 210, 242, 243, 244, 246, 247, 248, 250, 251, 252, 253, 267, 279, 280, 314, 343, 348, 355, 356, 357, 375, 376, 377, 378, 379, 380, 381, 382, 256,	CAPACITOR—5000 mmf., 450 v., ceramic

REPLACEMENT PARTS LIST (Cont'd)

Cat. No.	Symbol	Description
RCW-3014	C282, 385, 411, 405, 366	
RCW-3020	C201, 202, 203, 207	CAPACITOR—510 mmf., 300 v., ceramic
RCW-3021	C205	CAPACITOR—500 mmf., stand-off, ceramic
RCW-3022	C341	CAPACITOR—2 mmf., 500 v., ceramic
RCW-3023	C221	CAPACITOR—47 mmf., ceramic
RCY-051	C319	CAPACITOR—45-380 mmf., horizontal drive trimmer capacitor
RCY-053	C213	CAPACITOR—1.25-1.95 mmf., 500 v. trimmer capacitor
RDB-016		BUTTON—Ornamental button, Models 806, 807
RDC-032		DIAL CORD 25 yds.
RDE-044		ESCUTCHEON—Knob escutcheon, Model 805
RDE-045		ESCUTCHEON—Knob escutcheon, Models 806, 807
RDE-054		MASK—Metal overlay, Models 806, 807
RDK-159		KNOB—Off-volume, horizontal hold knob, Model 807
RDK-160		KNOB—Focus, vertical hold, contrast knob, Model 807
RDK-161		KNOB—Tuning control knob, Model 807
RDK-162		KNOB—Brightness control knob, Model 807
RDK-163		KNOB—Selector switch knob, Model 807
RDK-168		KNOB—OFF-volume or Hor. Hold Models 805, 806, 809
RDK-169		KNOB—Focus, Vert. Hold or Contrast Models 805, 806, 809
RDK-170		KNOB—Tuning Models 805, 806, 809
RDK-171		KNOB—Brightness Control Models 805, 806, 809
RDK-172		KNOB—Selector Switch Models 805, 806, 809
RDM-014		MASK—Rubber mask, Models 806 and 807, with small picture opening, 8½" x 6⅜"
RDM-015		MASK—Rubber for Model 805, for RAC-062
RDW-014		OVERLAY—Safety glass for Models 806, 807; cabinets RAV-079 or RAV-081
RDW-015		SAFETY GLASS—For Model 805, for RAC-062, 8½" x 6⅜" opening
RDW-016		SAFETY GLASS—For Model 809, 8½" x 6⅜" picture
RDW-020		SAFETY GLASS—For Model 809, with large picture 9½" x 7½" for RAV-085
RDW-027		SAFETY GLASS—For Models 806, 807, large picture (9½" x 7½"); for cabinets RAV-091 or RAV-093
REI-027		SLUG—Tuning slug for L314 and L315
RER-004	X371, X372	RECTIFIER—Selenium rectifier
RET-002		ION TRAP—Used only on 10BP4 type picture tubes
RHC-023		CLIP—Safety glass clip (Model 805)
RHF-007		CABINET FEET—For Model 805
RHM-059		RING—Large outside centering ring (early prod)
RHM-060		RING—Small inside centering ring (early prod)
RHS-032		SCREW—Brown oxide head for front of 805 cabinet
RHS-033		SCREW—10-24X½ in. Filister head for bottom of 805 cabinet
RHS-034		SCREW—Self tapping, 8 x ⅜"
RHS-035		SCREW—Holds safety glass molding, Models 806, 807
RII-021		INSULATOR—Volume control insulator for Model 809
RII-023		YOKE INSULATOR
RII-024		INSULATOR—For volume control (Models 805, 806, 807)
RII-025		INSULATOR—For rectifier
RII-026		HI-VOLTAGE INSULATOR—Rubber
RJC-017		ANODE CONNECTOR
RJJ-007		POWER CORD—Receptacle
RJS-003		TUBE SOCKET—V10, V11, V15, V18, V19
RJS-030		TUBE SOCKET FOR V13
RJS-120		TUBE SOCKET FOR V8
RJS-127		TUBE SOCKET—For V3 rubber mica composition
RJS-132		TUBE SOCKET FOR V17
RJS-133		TUBE SOCKET FOR V5, V6, V16
RJS-135		TUBE SOCKET FOR V12
RJS-136		TUBE SOCKET FOR V4, V7, V1, V2
RJX-027		R-F HEAD-END—Completely aligned with tubes (Model 809)
RJX-028		R-F HEAD-END—Completely aligned with tubes (Models 805, 806, 807)
RJX-030		PICTURE TUBE SOCKET ASSEMBLY
RJX-032		SOCKET ASSEMBLY—For picture tube of Model 809
RLC-081	L209	COIL—Oscillator Channel No. 2
RLC-082	L210	COIL—Oscillator Channel No. 3
RLC-083	L211	COIL—Oscillator Channel No. 4
RLC-084	L212	COIL—Oscillator Channel No. 5
RLC-087	L215	COIL—Oscillator Channel No. 13
RLC-091	L316	COIL—Hor. oscill. coil (U and W)
RLD-010	D291, 311	DEFLECTION COIL—Early version receivers

Cat. No.	Symbol	Description
RLD-011	L311	HORIZONTAL SIZE CONTROL—Early production
RLD-012	L312	HORIZONTAL LINEARITY CONTROL—Early production
RLD-013	D292, 312	DEFLECTION YOKE—Late production, used with transformer T312
RLD-014	L314, 315	COIL—Horizontal size control or horizontal linearity control (late prod.)
RLF-023	L201	INPUT COIL
RLF-024	L204	R-F CHOKE
RLF-025	L342	FOCUS COIL—Early production
RLF-026	L343	FOCUS COIL—Late production
RLF-027	L248	COIL—I-F choke coil
RLI-032	L202, 205	R-F AND OSC. CHOKE—8.2 uh
RLI-038	L255, 256, 258	VIDEO COMPENSATING CHOKE—165 uh
RLI-063	L206, 259, 372, 373, 374, 375, 249	HEATER CHOKE COIL—2.0 uh
RLI-068	L257	VIDEO COMPENSATING CHOKE
RLI-069	L341	1st AUDIO I-F COIL
RLI-070	L222	R-F COIL—Channel No. 2
RLI-071	L223	R-F COIL—Channel No. 3
RLI-072	L224	R-F COIL—Channel No. 4
RLI-073	L225	R-F COIL—Channel No. 5
RLI-074	L213, 226	R-F COIL—Channel No. 6
RLI-075	L228	R-F COIL—Channel No. 13
RLI-076	L232	R-F COIL—Channel No. 2
RLI-077	L233	R-F COIL—Channel No. 3
RLI-078	L234	R-F COIL—Channel No. 4
RLI-079	L235	R-F COIL—Channel No. 5
RLI-080	L236	R-F COIL—Channel No. 6
RLI-081	L238	R-F COIL—Channel No. 13
RLI-082		R-F COIL
RLI-083	L203, 207	R-F COIL
RLI-086	L313	COIL—Blocking oscillator coil
RLP-014	L208, 242, 243, 244	COIL—Video I-F plate coil, plus core
RLT-005	T311	HORIZONTAL OUTPUT TRANSFORMER COILS—Less laminations
RLX-027		BROADCAST FILTER
RMF-003		TUBE CLAMP
RMM-089		CENTERING RING SUPPORT
RMM-090		TUBE CUSHION
RMM-091		CUSHION—For safety glass (806, 807)
RMM-104		CUSHION—For safety glass, for Model 809
RMS-130		SPRING—Tuning spring
RMS-184		TUBE STRAP—For pix tube
RMU-050		SHAFT—Tubular, for tuning control
RMU-052		SHAFT—Tubular tuning shaft for Model 809
RMU-053		SHAFT—Replacement switch shaft for RJX-028
RMX-124		PULLEY AND HUB ASSEMBLY
RMX-138		SCREEN—For top of Model 805 cabinet
ROP-018	LS2	SPEAKER—Model 809, 10 in. diameter
ROP-019	LS1, L371	SPEAKER—4 in. electrodynamic (Early Model 805, 806, 807)
RRC-095	R300	VERT. LINEARITY POTENTIOMETER
RRC-096	R302	HEIGHT POTENTIOMETER
RRC-097	R261A, 261B, 121B	BRILLIANCE AND CONTRAST POTENTIOMETER (DUAL)—Model 805, 806, 807, early and "T" versions
RRC-098	R298, 321	VERTICAL HOLD AND HORIZONTAL HOLD POTENTIOMETER—Models 805, 806, 807
RRC-099	R347, 353, S371	FOCUS AND VOLUME CONTROL POTENTIOMETER (DUAL)—Models 805, 806, 807
RRC-102	R226, 263	CONTROL—Brilliance and contrast potentiometer, Model 809
RRC-103	R307, 329	CONTROL—Vertical and horizontal hold potentiometer, Model 809
RRC-104	R365, 366, S372	CONTROL—Focus and volume potentiometer, and ON-OFF switch, Model 809
RRC-108	R402	HOR. LINEARITY CONTROL (U & W)
RRC-109	R231, 227	BRILLIANCE AND CONTRAST Control "U" and "W" versions 805, 806 and 807
RRC-110	R227, 231	POTENTIOMETER—Contrast and brightness control, Model 809, "W" version
RRN-007	R328	RESISTOR—42.5K, temperature compensating
RRW-041	R373, 374	GLOBAR RESISTOR—75 ohms
RRW-043	R371	RESISTOR—5 ohms, 4 w., w.w.
RSR-001	B371	THERMAL CUTOUT
RSW-066	S341	FOCUS SWITCH
RTD-008	T341, C344, 345	RATIO DETECTOR TRANSFORMER
RTL-096	L376	FILTER REACTOR
RTO-062	T342	AUDIO OUTPUT TRANSFORMER
RTO-064	T291	VERTICAL SWEEP TRANSFORMER
RTO-065	T311	TRANSFORMER—Horizontal output transformer, early production
RTO-066	T344	TRANSFORMER—Audio output transformer, Model 809
RTO-071	T312	TRANSF. Hor. output (Late prod.)
RWL-019		POWER CORD
RYN-004		G-E NAMEPLATE—Model 805