SERVICE DATA

MODELS VR721, VR751 and DV882

TELEVISION RECEIVERS

Model DV882

Model VR721

Model VR751

Television Receiver Models VR721, VR751 and DV882

Television, Radio Phonograph Combination Model VR751

GENERAL INFORMATION

Models VR721 and DV882 are 21 tube (including the 16″ picture tube) television receivers designed for operation on 115 volts, 25 or 60 cycle power. A phono socket and switch is provided on the rear of the receiver.

Model VR751 is a home entertainment unit consisting of the VR721 television receiver plus a 9 tube standard and short wave radio receiver and an automatic record changer. The unit is designed in two versions: 115 volts, 25 cycles; and 115 volts, 60 cycles. For service information on the radio receiver refer to the R290 service manual. For information on the record changer refer to the Webster Model 100 changer service manual.

TELEVISION ANTENNA CONNECTIONS

An antenna is built into the cabinet with provision for an external antenna using a 300 ohm transmission line.

To service this receiver satisfactorily a good external antenna installation is needed. Make certain the transmission line is as short as possible, has 300 ohms impedance and is kept clear of all surrounding objects including the antenna mast itself by at least 6 inches. Unless the signal strength in the area of operation is several hundred microvolts, it is advisable to use a transmission line having very low attenuation.

The antenna itself should be designed to afford a good match to the 300 ohm transmission line, either directly or by transformer coupling. Disconnect the built-in antenna when using the external antenna.

For lightning protection, the antenna mast should be connected to a good ground, and the transmission line connected to an approved type of lightning arrestor, one terminal of which is grounded.

All electrical joints must be carefully made. A coating of glyptal on each joint exposed to the weather will assist in maintaining trouble-free performance over a long period of time.

TELEVISION TUBE COMPLEMENT

V1	6BC5 (6CB6)	1st RF Amplifier	V107	6J5GT	Vertical Oscillator
V2	6BC5	2nd RF Amplifier	V108	6AU6	Sound IF Amplifier
V3	6J6	Oscillator Mixer	V109	6AL5	FM Detector
V101	6AU6	1st Video IF Amplifier	V110	6AV6	Audio Amplifier
V102	6AU6	2nd Video IF Amplifier	V112	5U4G	Low Voltage Rectifier
V103	6AU6	3rd Video IF Amplifier	V113	6SN7GT	Horizontal Oscillator
V104	12AU7	Video Detector and 1st Video Amplifier	V114	6BQ6GT	Horizontal Amplifier
			V115	1X2	High Voltage Rectifier
V105	12AU7	2nd Video Amplifier and 1st Sync. Separator	V116	6W4GT	Damper
			V117	6SN7GT	Vertical Amplifier
V106	12AU7	Sync. Amp. and 2nd Sync. Separtor	V118	16RP4	Picture Tube 16″

Television Controls

Function	Location	Description
Brightness	Front Panel	Outer Knob } Dual
Volume	Front Panel	Inner Knob }
On-Off Switches and	Front Panel	Center Knob
Picture (Contrast)	Front Panel	
Range Selector	Front Panel	Outer Knob } Dual
Channel Selector		Inner Knob }
and Fine Tuning	Front Panel	
Horizontal Centering	Rear of Chassis	Slotted Stud

Function	Location	Description
Focus	Rear of Chassis	Slotted Stud
Vertical Linearity	Rear of Chassis	Slotted Stud
Height	Rear of Chassis	Slotted Stud
Vertical Hold	Rear of Chassis	Knob
Horizontal Drive	Rear of Chassis	Slotted Stud
Horizontal Hold	Rear of Chassis	Knob
Horizontal Linearity	Rear of Chassis	Slotted Core
Width	Rear of Chassis	Slotted Core

Intermediate Frequencies: Video 26.25 Mc., Sound 21.75 Mc.
Intercarrier: Sound System 4.5 Mc.
Scanning: 525 lines, interlaced.
Vertical Scanning Frequency: 60 c.p.s.
Frame Frequency: 30 c.p.s. (picture repetition rate).

CARRIER vs I-F FREQUENCY CHART

Channel No.	Channel Freq. (mc)	Picture Carrier Freq. (mc)	Sound Carrier Freq. (mc)	Receiver Osc. Freq. (mc)	Picture IF Freq. (mc)	Sound IF Freq. (mc)	Picture IF less Sound IF (mc)
2	54-60	55.25	59.75	81.5	26.25	21.75	4.5
3	60-66	61.25	65.75	87.5	26.25	21.75	4.5
4	66-72	67.25	71.75	93.5	26.25	21.75	4.5
5	76-82	77.25	81.75	103.5	26.25	21.75	4.5
6	82-88	83.25	87.75	109.5	26.25	21.75	4.5
7	174-180	175.25	179.75	201.5	26.25	21.75	4.5
8	180-186	181.25	185.75	207.5	26.25	21.75	4.5
9	186-192	187.25	191.75	213.5	26.25	21.75	4.5
10	192-198	193.25	197.75	219.5	26.25	21.75	4.5
11	198-204	199.25	203.75	225.5	26.25	21.75	4.5
12	204-210	205.25	209.75	231.5	26.25	21.75	4.5
13	210-216	211.25	215.75	237.5	26.25	21.75	4.5

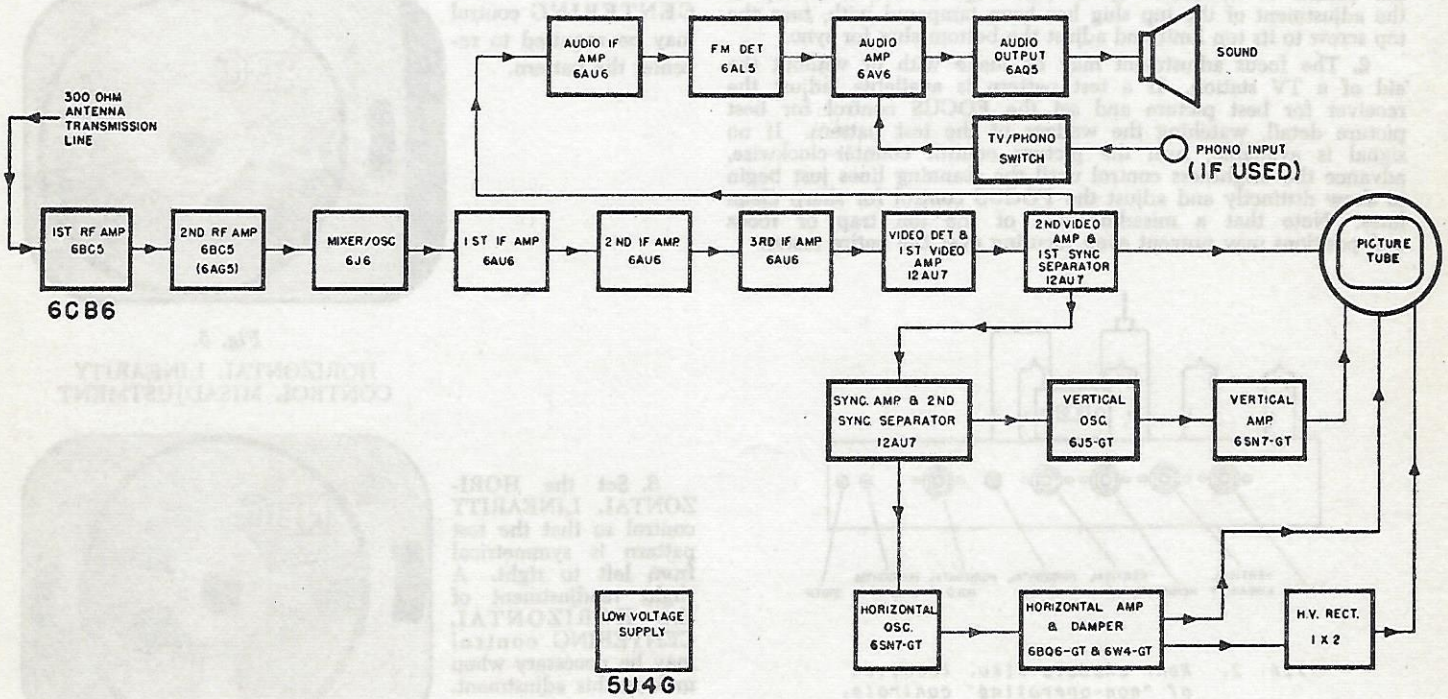


Fig. 1. Functional block diagram.

CARE OF THE KINESCOPE WINDOW

The window in front of the picture tube is made of safety glass, hence may be cleaned by any of the conventional window cleaning processes. Abrasive or strong solvent type cleaning solutions that may scratch the glass or damage the cabinet finish, however, should be avoided.

HIGH VOLTAGE WARNING

Operation of the receiver chassis outside of the cabinet involves a shock hazard. An interlock in the line cord disconnects the power when the back cover is removed. The HIGH VOLTAGE supply, while of low current capacity, operates at a 11,000 volt potential. Exercise all normal HIGH VOLTAGE precautions while working this equipment.

KINESCOPE HANDLING PRECAUTIONS

The kinescope housing provides adequate protection against possible tube implosure while in the cabinet. Do not expose the kinescope or handle it in any way without providing personal protection in the form of shatterproof goggles and heavy gloves. The kinescope should be handled by qualified personnel only.

The kinescope envelope encloses a high vacuum and with the large surface area of glass involved, the stresses set up, particularly at the front rim of the tube, are considerable. An abnormal handling stress, accidental blow at a highly stressed surface, or even a scratch on the surface of the tube could cause it to implode or collapse with destructive violence.

NON-OPERATING CONTROLS ADJUSTMENTS

The "non-operating" or screw-driver adjustments normally will require an occasional minor adjustment if any circuit work or tube changing is required. A test pattern, generated either locally in the shop or obtained from a television station is recommended for best results. Normal picture contrast and brightness should be maintained during the following adjustments for best results.

HORIZONTAL HOLD, VERTICAL HOLD, HORIZONTAL OSC., BRIGHTNESS AND FOCUS ADJUSTMENTS

1. Set the HORIZONTAL and VERTICAL HOLD controls for a steady test pattern. Should the HORIZONTAL HOLD control fail to hold the test pattern in the normal manner, set the HORIZONTAL HOLD control in the center of its range and adjust the HORIZONTAL OSC. ADJ. screw on the under side of the chassis or horizontal sync. (See Fig. 11 for location.) If the adjustment of the top slug has been tampered with, turn the top screw to its top limit and adjust the bottom slug for sync.

2. The focus adjustment may be made with or without the aid of a TV station. If a test pattern is available, adjust the receiver for best picture and set the FOCUS control for best picture detail, watching the wedges of the test pattern. If no signal is available, turn the picture control counter-clockwise, advance the brightness control until the scanning lines just begin to show distinctly and adjust the FOCUS control for sharp clean lines. Note that a misadjustment of the ion trap or focus coil positions may prevent even focusing over the entire raster.

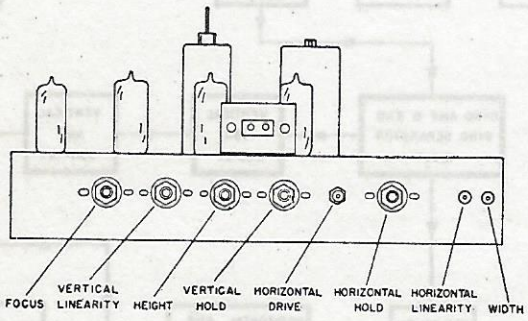


Fig. 2. Rear chassis view, location of "non-operating" controls.

HORIZONTAL — DRIVE, — LINEARITY, — CENTERING AND WIDTH ADJUSTMENTS

1. Advance the HORIZONTAL DRIVE control (clockwise) as far as posisble without causing fold over of the test pattern. (Vertical white line.) Insufficient horizontal drive will cause low second anode voltage with consequent loss of picture brilliance.

HORIZONTAL DRIVE CONTROL MISADJUSTMENT

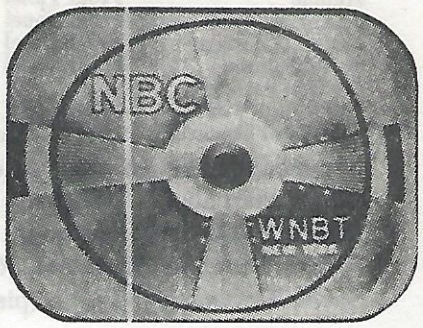


Fig. 3.

2. Set the WIDTH control so that the test pattern fits the horizontal dimension of the kinescope escutcheon. A minor adjustment of the HORIZONTAL CENTERING control may be required to re-center the pattern.

WIDTH CONTROL MISADJUSTMENT

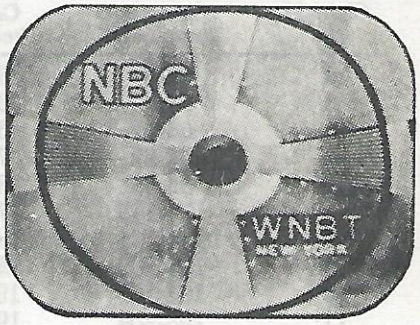


Fig. 4.

HORIZONTAL CENTERING CONTROL MISADJUSTMENT

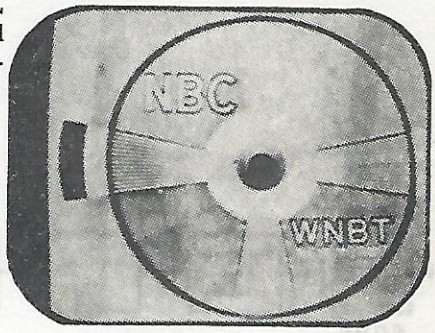


Fig. 5.

3. Set the HORIZONTAL LINEARITY control so that the test pattern is symmetrical from left to right. A slight readjustment of the HORIZONTAL CENTERING control may be necessary when making this adjustment.

HORIZONTAL LINEARITY CONTROL MISADJUSTMENT

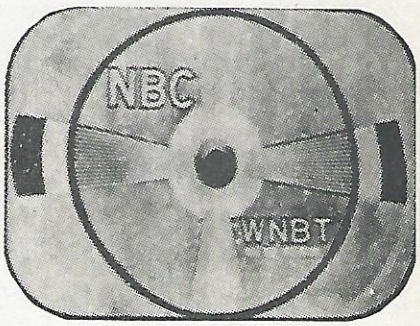


Fig. 6.

VERTICAL — CENTERING, — LINEARITY, AND HEIGHT ADJUSTMENTS

HEIGHT CONTROL MISADJUSTMENT

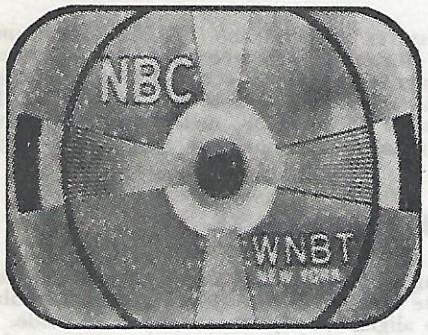


Fig. 7.

1. Set the HEIGHT control so that the test pattern fits and centers in the vertical dimension of the kinescope escutcheon. A minor adjustment of the focus coil position may be required to recenter the pattern.

VERTICAL CENTERING MISADJUSTMENT

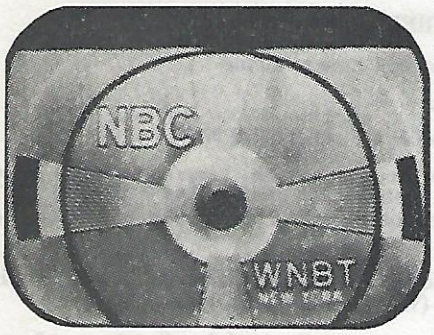


Fig. 8.

VERTICAL LINEARITY CONTROL MISADJUSTMENT

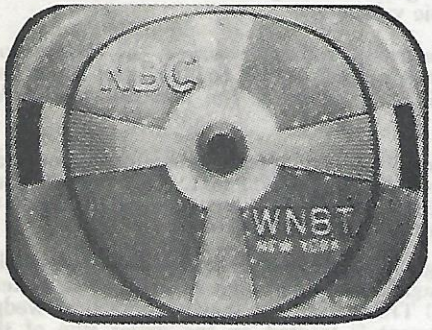


Fig. 9.

2. Set the VERTICAL LINEARITY control for a symmetrical test pattern in the vertical dimension. A slight readjustment of the HEIGHT control may be required when making this adjustment.

Note—The sequence of "non-operating" control adjustments outlined above is suggested as a convenient method of approach and not an arbitrary procedure. Variations of the procedure is permitted to obtain the final result.

DISMANTLING FOR KINESCOPE REPLACEMENT OR ALIGNMENT ADJUSTMENTS

1. Remove the three front panel control knobs by pulling them straight from their shafts. The dual control knob must be removed in two pieces, removing the center unit first.

2. Remove the back cover, disconnecting the cable connector for the phono socket and switch (if used). Note that the line cord and half of the interlock connector come along with the back cover.

3. Disconnect the speaker and power unit. Remove the two wood screws holding the antenna terminal strip bracket to the cabinet.

4. Remove the five chassis bolts holding the receiver chassis in the cabinet and slide the entire assembly from the cabinet. The KINESCOPE is now accessible for replacement or adjustment.

REMOVING THE KINESCOPE

Refer to the warning KINESCOPE HANDLING PRECAUTIONS. Read all warning notices on both tube and carton. Follow the dismantling instructions above to expose the KINESCOPE and proceed as follows:

1. Disconnect the KINESCOPE SOCKET at the base of the kinescope.

2. Slip the ION TRAP from the neck of the tube past the kinescope base connector.

3. Measure the distance from the front edge of the steel band to the face of the tube. Keep this dimension handy for installation of a new tube.

4. Remove the steel band at the front rim of the Kinescope and carefully slip the neck of the kinescope out of the FOCUS COIL and DEFLECTION YOKE. If the tube fails to slip out smoothly, investigate and remove the cause of the trouble. Do not use force.

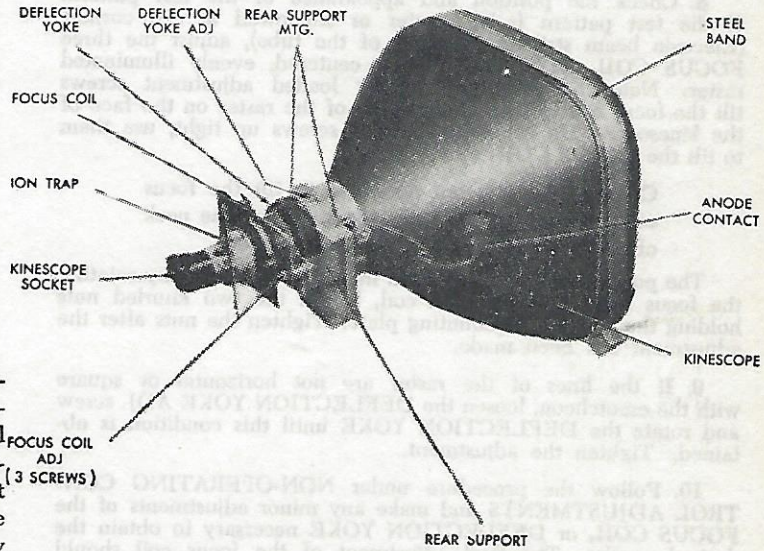


Fig. 10. Kinescope mounting detail.

INSTALLING AND ADJUSTING THE KINESCOPE

1. Wrap the RUBBER STRIP around the front rim of the kinescope and position the tube so that the anode contact is located at the left side of the tube as viewed from the screen.

2. Slip the neck of the kinescope through the REAR SUPPORT, DEFLECTION YOKE and FOCUS COIL and seat the tube firmly against the REAR SUPPORT. If it fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube. Check the distance from the face of the tube to the front edge of the steel band. Refer to the measurment made in step 3 above. If this dimension is off; loosen the two REAR SUPPORT MTG. screws, position the tube correctly and fasten the steel band firmly about the rim of the tube.

3. The REAR SUPPORT must seat firmly against the flare of the tube and be securely anchored in place by the two REAR SUPPORT MTG. screws. Check the SPRING CONTACT grounding the outer coating of the kinescope tube. A high potential is developed on the outer coating of the tube if this contact is faulty.

4. The DEFLECTION YOKE must seat firmly against the flare of the kinescope. Check by loosening the single DEFLECTION YOKE ADJ. screw and pushing the DEFLECTION YOKE forward as far as it will go. Take up the slack in the screw temporarily to hold the coil in place.

5. Slip the ION TRAP over the neck of the tube; the arrow points toward the face of the tube.

6. Reconnect the KINESCOPE SOCKET and anode connector and turn on the receiver.

7. After allowing a few minutes for warm up, turn up the BRIGHTNESS control and set the ION TRAP for maximum raster brilliance, backing off the brightness control adjustment as the maximum point is approached. The ION TRAP must be rotated about the axis of the tube as well as shifted along the neck of the tube to obtain the proper setting. The arrow on the ion trap will generally point at the HV anode connector when properly positioned as far as rotation is concerned, hence a rough setting may be obtained immediately with this type of trap.

With the BRIGHTNESS control set for slightly above average brilliance and the PICTURE control full counter-clockwise, adjust the FOCUS control until the line structure of the raster is clearly visible and reajust the ION TRAP for maximum raster brilliance. The final touches on this adjustment should be made with the BRIGHTNESS control at the maximum position with which good line focus can be maintained, then back off the setting of the BRIGHTNESS control until the retrace lines disappear.

8. Check the position and appearance of the test pattern. If the test pattern is off center or shadowed at the corners (Electron beam striking the neck of the tube), adjust the three FOCUS COIL ADJ. screws for a centered, evenly illuminated raster. Note that the three spring loaded adjustment screws tilt the focus coil to shift the position of the raster on the face of the kinescope. Do not turn all three screws up tight, use them to tilt the FOCUS COIL only.

> CAUTION—It is not necessary to tilt the focus coil excessively. Excessive tilt may snap the neck of the kinescope if sufficient force is used.

The position of the test pattern may also be shifted by rotating the focus coil. To rotate the coil, loosen the two knurled nuts holding the coil to the mounting plate. Tighten the nuts after the adjustment has been made.

9. If the lines of the raster are not horizontal or square with the escutcheon, loosen the DEFLECTION YOKE ADJ. screw and rotate the DEFLECTION YOKE until this condition is obtained. Tighten the adjustment.

10. Follow the procedure under NON-OPERATING CONTROL ADJUSTMENTS and make any minor adjustments of the FOCUS COIL or DEFLECTION YOKE necessary to obtain the desired results. The final adjustment of the focus coil should leave the test pattern approximately centered.

MEASUREMENT OF H.V. POTENTIAL ON KINESCOPE ANODE

The second anode potential will be approx. 11,000 V. on a receiver that is functioning properly. Since the high potential for the kinescope anode is obtained from the horizontal output transformer, the "non-operating" control adjustments outlined above must be made or be known to be in proper adjustment before the H.V. measurement will have any meaning. Improper operation of the horizontal sweep circuit or circuit faults in the high voltage filter will generally account for an abnormal anode potential. If the anode potential is low, check the HORIZONTAL DRIVE adjustment outlined above.

CAUTION HIGH VOLTAGE

> Do not use hand held flexible test leads when making the following measurement. Keep the hands clear of the circut during measurement. A 11 KV. potential exists in this circuit. Exercise all normal high voltage precautions.

1. Connect a 50-megohm resistor string in series with a 300 microampere meter. Connect the free meter terminal to the chassis and the high side of the resistor string to the anode cap of the kinescope. The connection to the anode cap may be made with a fine wire slipped under the connector. Make up the resistor string with 5-megohm one or two watt resistors to provide a safety factor for voltage breakdown. If 5-megohm resistors are used, a total of ten will be required to obtain the 50 megohms. Make the setup self-supporting and allow adequate clearance between the resistor string and chassis parts to prevent high voltage breakdown.

2. Turn on the receiver and set the BRIGHTNESS and PICTURE controls at minimum. The microammeter will read approx. 220 microamperes for 11,000 V. at the kinescope anode. The anode potential is measured in this manner (PICTURE and BRIGHTNESS control at minimum; meter current approx. 200 microamperes) to simulate the kinescope load on the high voltage power supply.

I-F AMP. ALIGNMENT PROCEDURE

Note—The following alignment adjustments do not require the use of the kinescope tube. It is recommended that the tube be removed if extensive alignment adjustments are to be made.

CAUTION — Removal of the kinescope tube exposes the HIGH VOLTAGE anode connector contact. Keep this lead and contact clear of personnel servicing equipment and grounded objects on the service bench. Exercise all normal high voltage precautions while working with the exposed units.

EQUIPMENT REQUIRED

Signal generator covering 4 mc to 30 mc

Electronic voltmeter

F-M SOUND CHANNEL I-F ALIGNMENT

1. Connect the low frequency signal generator output across resistor (R-118) in the plate circuit of the 12AU7 VIDEO DET. tube (V-104). This resistor is located at the terminal strip near the tube socket.

2. Connect the elctronic voltmeter between pin 7 of the 6AL5 FM DET. tube (V-109) and chassis ground.

3. With the signal generator (unmodulated) set at 4.5 mc. set the 4.5 MC LIMITER GRID ADJ. and FM DET PRI. ADJ. (See Fig. 11) for maximum d-c voltage as measured by the electronic voltmeter. Adjust the limiter grid transformer (T-105) before adjusting the f-m detector transformer (T-108) primary. Use just enough signal generator output to obtain approximately one volt at the electronic voltmeter.

4. Connect the electronic voltmeter across the 1000 mmf condenser (C-135) at the output of the f-m detector stage and adjust the FM DET. SEC. ADJ. of the f-m detector transformer (T-108) for the null.

5. Shift the frequency of the signal generator either side of 4.5 mc and touch up the FM DET. PRI. ADJ. for approximately equal peaks. Use just enough signal generator output to obtain one volt peaks for the best results.

6. After completing the alignment procedure and placing the receiver in operation again, carefully tune in a TV test pattern and adjust the 4.5 MC TRAP ADJ. for maximum vertical wedge definition. This adjustment is located on the under side of the chassis and on the same coil form as the 4.5 MC LIMITER GRID ADJ. shown in Fig. 11.

NOTE—The primary adjustment of T-108, the coarse frequency adjustment of T-111 and the 4.5 mc trap adjustment may all be made through the holes in the cabinet bottom or chassis mtg. board.

I-F AMPLIFIER ALIGNMENT

1. Connect the electronic voltmeter across resistor R-118 in the plate circuit of the 12AU7 VIDEO DET. tube (V-104). This resistor is located on the terminal strip near the tube socket.

2. Couple the high side of the signal generator to the OSC./MIXER tube (V-3) by removing its shield and slipping a tight fitting tube shield or length of copper braid over the bulb of the tube and connecting the generator lead to it. Connect the ground side of the signal generator to the frame of the tuning unit.

3. Set the channel selector at cannel 2.

4. Set the signal generator output (unmodulated) to develop one or two volts at the electronic voltmeter and adjust the four i-f amplifier coils, according to the following chart, for maximum d-c voltage as measured by the electronic voltmeter. Readjust the signal generator output as required to maintain the two-volt potential at the electronic voltmeter.

I-F AMPLIFIER ALIGNMENT CHART

Signal Generator Frequency (No Modulation)	Adjustment (Refer to Fig. 11)	Stage Adjusted
21.75 mc	21.75 MC SOUND TRAP ADJ.	1st IF amp
24.5 mc	*24.5 MC IF ADJ.	1st IF amp
23.6 mc	23.6 MC IF ADJ.	2nd IF amp
24.6 mc	24.6 MC IF ADJ.	3rd IF amp
25.6 mc	25.6 MC IF ADJ.	Video detector

5. Check the i-f amplifier frequency response by tuning the signal generator from 21 mc through 26.25 mc and observing the change in d-c voltage at the electronic voltmeter. If the signal generator output is set for an electronic voltmeter reading of 1.5 volts at the peak i-f amplifier response, the d-c voltage should not drop below one volt between the two peaks normally obtained with this i-f amplifier. If the response is unsatisfactory, repeat the procedure or try slight modifications of the recommended settings to obtain the desired response. Avoid resonating the coils with the iron core at the bottom end of the coil form. (Adjustment screw near limit of its travel). If a sweep type signal generator and oscilliscope is available the problem of making the final adjustments will be much easier. Check the two carrier i-f responses, 21.75 mc and 26.25 mc. The 21.75 mc response should not be less than 22 db below the peak response (Approx. 0.15 volt) and the 26.25 mc response will fall approximately 6 db below the peak (Approx. 0.4 volt). Refer to Fig. 12.

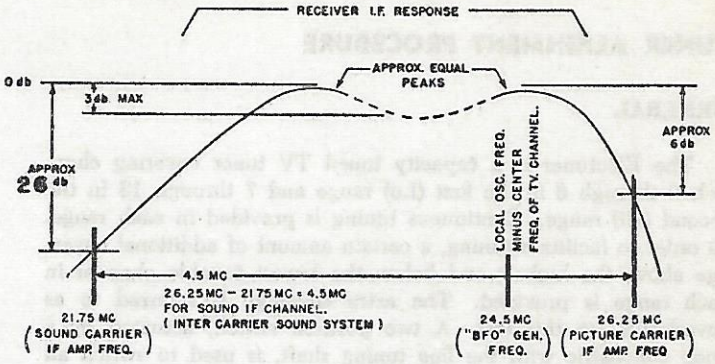


Fig. 12. I-F amplifier response

The average i-f amplifier sensitivity, when feeding the signal generator output through the receiver as described in step 2, will run approx. 2000 to 5000 microvolts for the one volt d-c peak measured at resistor R-118. (Receiver's oscillator operating on channel 2.)

*NOTE—The 1st IF amp coil (T-101 has two iron cores and must be adjusted from both top and bottom for 24.5 mc. response. Since this is an overcoupled transformer with a broad response, it will be necessary with this method of alignment to connect a 1,000 ohm resistor across the primary winding (at the tuner terminals) when tuning the secondary (bottom core) and then connect the same resistor across the secondary winding when adjusting the primary (top) core.

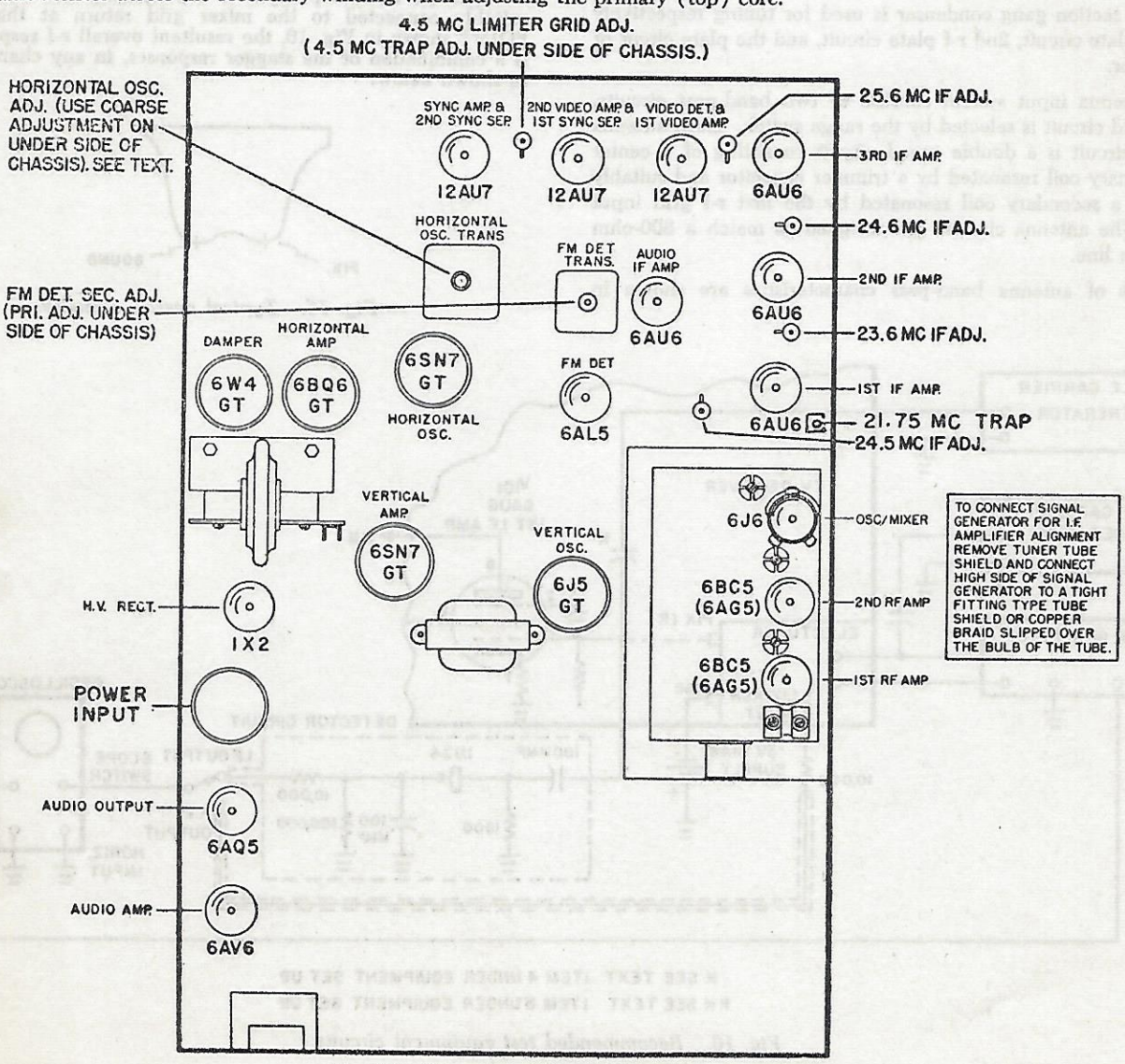


Fig. 11. Top view, i-f amplifier alignment points.

TUNER ALIGNMENT PROCEDURE

GENERAL

The Electuner is a capacity tuned TV tuner covering channels 2 through 6 in the first (Lo) range and 7 through 13 in the second (Hi) range. Continuous tuning is provided in each range. In order to facilitate tuning, a certain amount of additional coverage above the highest and below the lowest tunable channel in each range is provided. The extra coverage is referred to as "overtravel" in this text. A two position switch, actuated by a knob concentric with the fine tuning shaft, is used to switch all circuits and will be referred to in this text as a "Range Switch."

Three tubes are employed as follows:

6AG5 or 6BC5 *first r-f amplifier
6AG5 or 6BC5 *second r-f amplifier
6J6 oscillator-mixer

*Field replacement of r-f amplifier tubes should be with 6BC5 tubes only. After the start of Electuner production, the tube manufacturers reduced the transconductance (Gm) rating of 6AG5 tubes and designated the high Gm version as 6BC5. A reduction in receiver sensitivity will result unless 6BC5 tubes are used for replacement. The 6BC5 tube is completely interchangeable with the 6AG5 tube, so no socket wiring changes are involved.

A three section gang condenser is used for tuning respectively the 1st r-f plate circuit, 2nd r-f plate circuit, and the plate circut of the oscillator.

The antenna input system consists of two band-pass circuits. The required circuit is selected by the range switch. Each antenna band-pass circuit is a double tuned circuit consisting of a center tapped primary coil resonated by a trimmer capacitor and suitably coupled to a secondary coil resonated by the first r-f grid input capacity. The antenna circuits are designed to match a 300-ohm transmission line.

Sketches of antenna band-pass characteristics are shown in Fig. 13.

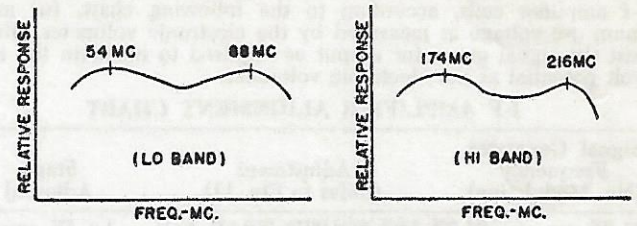


Fig. 13. Antenna band pass characteristics.

The r-f amplifiers are used as stagger tuned amplifiers to provide a band pass circuit of the proper band width. In both Hi and Lo ranges, the plate circuit of the 1st r-f amplifier provides the low frequency stagger component, and the plate circuit of the second r-f amplifier provides the high frequency stagger component as indicated below in a sketch of a typical r-f pass band.

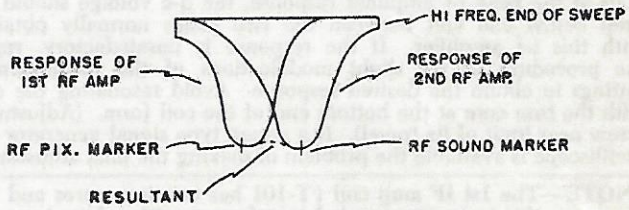


Fig. 14. Typical r-f pass band.

With an r-f sweep input to the antenna and an oscilloscope suitably connected to the mixer grid return at the LOOKER POINT shown in Fig. 19, the resultant overall r-f response, which is a combination of the stagger responses, in any channel appears as shown below:

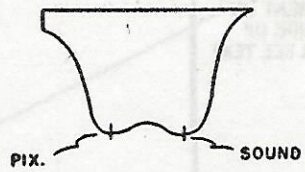
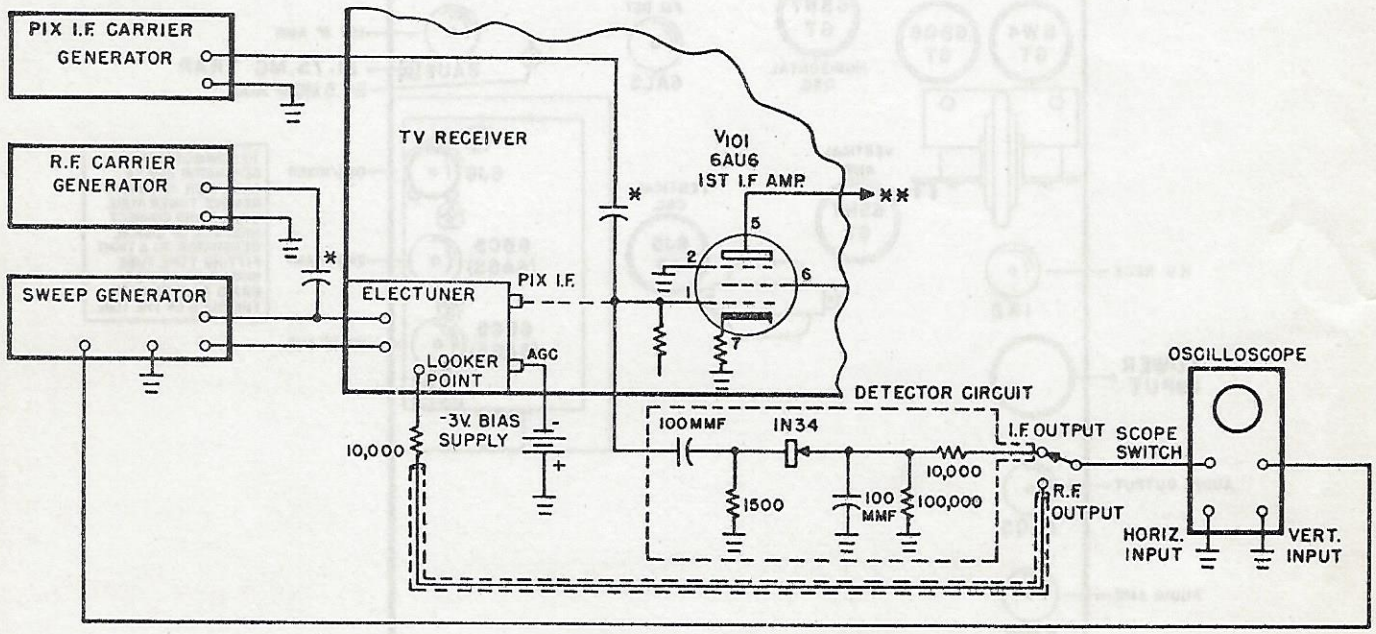


Fig. 15. Typical overall response.



* SEE TEXT ITEM 4 UNDER EQUIPMENT SET UP
** SEE TEXT ITEM 5 UNDER EQUIPMENT SET UP

Fig. 16. Recommended test equipment circuits.

The oscillator employs a modified Colpitts circuit with one plate of the 6J6 tuned by the third section of the variable condenser.

In accordance with Fig. 19, the following tuning elements are brought out at the top of the tuner chassis:

Hi and Lo band antenna band-pass primary tuning trimmers
1st and 2nd r-f plate tuning trimmers
Oscillator plate tuning trimmer

EQUIPMENT REQUIRED

Sweep Generator
Oscilloscope
Electronic Voltmeter
R-F Marker Generator
Pix I-F Marker Generator
Bias supply 2-1.5 volt Dry Cells
1N-34 Crystal Detector

EQUIPMENT SPECIFICATIONS

Sweep Generator similar to RCA type WR59A, covering frequencies of 54 to 88 Mc, and 174 to 216 Mc with a minimum sweep of 10 Mc in any channel, and a 300-ohm balanced output at least 0.1 volt line to line.

Oscilloscope equivalent in vertical deflection sensitivity to Dumont type 208-B.

Electronic voltmeter similar to the Voltohmyst.

RF marker generator similar to RCA type WR-39-A.

Pix IF marker generator may be a crystal controlled oscillator in vicinity of 26.25 Mc. As alternates, either a second WR-39-A or an all wave signal generator of suitable accuracy may be used to supply a picture IF marker.

EQUIPMENT SETUP

In reference to Fig. 16, the following precautions should be taken in making the equipment set up.

(1) The detector circuit should be so constructed as to maintain leads as short as possible. Connection of the detector circuit to the 1st i-f amplifier grid terminal should also be made with short leads.

(2) Shielded leads should be used in making the following connections to reduce hum and synchronous voltage pick up.

(a) The lead for observations of the r-f response from the scope isolating resistor (10,000 ohms located at the tuner LOOKER POINT) to the RF output switch position of the scope switch.

(b) The connection from the i-f detector circuit output to the IF switch position of the scope switch.

(c) The connection from the sweep generator to the horizontal input of the scope. (Use the externally generated sweep instead of internal oscilloscope sweep in order to obtain synchronization.)

(3) The single pole double throw SCOPE SWITCH should be located at the vertical input terminals of the scope. This switching arrangement will permit observation of either the i-f response or the overall r-f response. The aforementioned positions will be referred to in subsequent text as the "IF" and "RF" positions respectively.

(4) The marker generator coupling condenser should be as small a value as possible to prevent any effect on tuner response, but must be large enough to permit easy observation of markers on either the i-f response or overall r-f response. (Approximately 2 or 3 mmf should be satisfactory in most cases.)

(5) For all tests which are outlined in this text, remove the second i-f amplifier tube to prevent coupling back from the receiver i-f system.

PROCEDURE FOR OSCILLATOR ALIGNMENT

TV CHANNEL VS. PIX AND SOUND CARRIER FREQUENCY

Channel No.	Picture Carrier (Mc)	Sound Carrier (Mc)
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

OVERTRAVEL CHART FOR OSCILLATOR COVERAGE

Channel No.	Overtravel	RF Overtravel Marker Frequency
13	+ 1.5 Mc	Pix carrier + 1.5 Mc = 212.75 Mc
7	— 2.5 Mc	Pix carrier — 2.5 Mc = 172.75 Mc
6	+ 1.5 Mc	Pix carrier + 1.5 Mc = 84.75 Mc
2	— 1.0 Mc	Pix carrier — 1.0 Mc = 54.25 Mc

In all of the following tests the oscilloscope vertical gain should be as close to maximum gain as possible, consistent with hum and synchronous voltage interference limitations. This precaution will allow the use of low levels from the r-f sweep generator and increase the visibility of i-f and r-f markers.

HI BAND OSCILLATOR ALIGNMENT

(1) Turn range switch of the tuner to the Hi band (counterclockwise rotation of switch knob), rotate variable condenser to minimum capacity (clockwise rotation of tuning shaft), and adjust sweep generator for channel 13.

(2) With the scope switch in IF position, adjust scope gain, r-f sweep input level, inject required i-f picture marker (i.e., 26.25 Mc), and an r-f overtravel marker of 212.75 Mc.

(3) Adjust OSC. TRIMMER (Fig. 19) so that picture i-f marker and 212.75 Mc overtravel markers coincide on the i-f response characteristic on the scope.

(4) Remove the two self tapping screws used for fastening the tuner shield and slide shield off until a point is reached where coils on switch are exposed and accessible.

(5) Rotate variable condenser to maximum capacity (counterclockwise) and adjust sweep generator for channel 7.

(6) Inject r-f overtravel marker of 172.75 Mc.

(7) With a bakelite alignment tool, adjust the spacing of the turns of the HI BAND OSC. COIL (Fig. 19) so that Pix i-f marker and 172.75 Mc markers coincide. Spreading the coils apart will raise the oscillator frequency; squeezing the coils together will lower the frequency. After adjustment, slide shield back into its original position and note any frequency shift of markers. Slide shield off and compensate for the freqency shift by a slight readjustment of the Hi band oscillator coil. Slide shield back into original position and note if markers coincide. If they do not, repeat this process until proper adjustment is made and markers coincide.

(8) Repeat steps 1 to 7 inclusive until correct oscillator coverage of entire Hi band is obtained.

LO BAND OSCILLATOR ALIGNMENT

(9) Remove tuner shield completely, turn tuner range switch to Lo band position (clockwise), rotate variable condenser to minimum capacity and adjust sweep generator for channel 6.

(10) Inject Pix i-f marker and r-f overtravel marker of 84.75 Mc.

(11) With a bakelite alignment tool, adjust LOW BAND OSC. COIL (Fig. 19) so that the Pix i-f marker and 84.75 Mc marker coincide.

(12) Rotate variable condenser to maximum capacity (counter-clockwise) and adjust sweep generator for channel 2.

(13) Inject r-f overtravel marker of 54.25 Mc.

(14) Adjust LOW BAND OSC. SERIES PAD (See Fig. 19) until Pix i-f marker and 54.25 Mc marker coincide.

(15) Repeat steps (9) to (14) inclusive for satisfactory coverage of entire Lo band.

PROCEDURE FOR RF PASS BAND ALIGNMENT

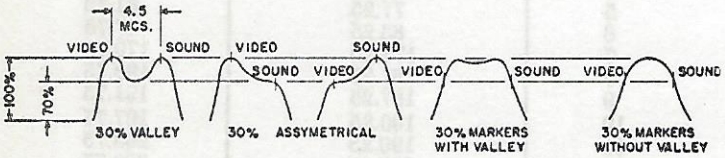


Fig. 17. Acceptable r-f pass bands

HI BAND RF PASS BANDS

(16) Repeat step (1).

(17) Replace tuner shield. set scope switch to i-f position, and adjust scope gain.

(18) Inject a Pix i-f marker and a channel 13 Pix r-f marker (211.25 Mc).

(19) Rotate tuning shaft until Pix i-f marker and 211.25 Mc marker coincide on the i-f response. Do not disturb this setting of the variable condenser for the remainder of alignment of channel 13 r-f pass band.

(20) Set scope switch to RF, adjust scope gain and turn 1ST RF TRIMMER (Fig. 19) for maximum amplitude of first r-f amplifier response in the region of the r-f Pix marker.

(21) Inject Channel 13 sound r-f marker (215.75 Mc) and adjust 2ND RF TRIMMER (Fig. 19) for maximum amplitude of second r-f amplifier response in the vicinity of the r-f sound marker.

(22) Repeat steps (20) and (21) until desired pass band is obtained. See Fig. 17 for acceptable r-f band pass response shapes.

(23) Remove tuner shield as in step (4) and repeat step (5).

(24) Set scope switch to IF position, adjust scope gain, and inject required Pix i-f marker and channel 7 Pix r-f marker of 175.25 Mc.

(25) Rotate tuning shaft until Pix i-f marker and channel 7 Pix r-f markers coincide in i-f response. Do not disturb this variable setting for remainder of alignment of channel 7 r-f pass band.

(26) Set scope switch to RF position and with a bakelite alignment tool, adjust 1ST RF HI BAND COIL (Fig. 19) for maximum amplitude of 1st r-f amplifier response in region of the Pix r-f marker.

(27) Inject a channel 7 r-f sound marker of 179.75 Mc and adjust 2ND RF HI BAND COIL (Fig. 19) for maximum amplitude of 2nd r-f amplifier response in the region of the sound r-f marker.

(28) Repeat steps (26) and (27) until desired pass band is obtained, consistent with shapes shown in Fig. 17.

(29) Repeat steps (16) to (28) inclusive for satisfactory coverage of entire Hi band r-f response.

LO BAND RF PASS BANDS

(30) Repeat step (9), set scope switch to IF position, adjust scope gain, and inject a channel 6 Pix r-f marker (83.25 Mc).

(31) Rotate tuning shaft until Pix i-f marker and 83.25 Mc markers coincide. Do not disturb this variable condenser setting for remainder of alignment of channel 6 r-f pass band.

(32) Set scope switch to RF position and adjust scope gain.

(33) Adjust 1ST RF LO BAND COIL (Fig. 19) for maximum amplitude of 1st r-f amplifier response in the region of channel 6 Pix r-f marker.

(34) Inject channel 6 sound r-f marker of 87.75 Mc and adjust 2ND RF LO BAND COIL (Fig. 19) for maximum amplitude of 2nd r-f amplifier response in the region of the channel 6 sound r-f marker.

(35) Repeat step (32) until desired pass band is obtained in accordance with acceptable r-f pass bands shown in Fig. 17.

(36) Rotate variable to maximum capacity (counter-clockwise) and adjust sweep generator for channel 2.

(37) Set scope switch to IF position, adjust scope again, and inject a channel 2 Pix r-f marker (55.25 Mc).

(38) Rotate fine tuning shaft until Pix i-f markers and 55.25 Mc markers coincide. Do not disturb this variable condenser setting for remainder of alignment of channel 2 r-f pass band.

(39) Set scope switch to RF position and adjust scope gain.

(40) Adjust 1ST RF LO BAND COIL (Fig. 19) for maximum amplitude for 1st r-f amplifier response in region of channel 2 Pix r-f marker.

(41) Inject channel 2 sound r-f marker (59.75 Mc) and adjust 2ND RF LO BAND COIL (Fig. 19) for maximum amplitude for 2nd r-f amplifier response in region of channel 2 sound r-f marker.

(42) Repeat step (40) until desired pass band is obtained in accordance with acceptable r-f pass band shown in Fig. 17.

(43) Repeat steps (30) through (42) inclusive for satisfactory coverage of entire Lo band r-f response.

PROCEDURE FOR ANTENNA PASS BAND ALIGNMENT

The band pass antenna stages are normally aligned in the factory for minimum standing waves with a wide range sweep oscillator and a delay line. The coupling between the primaries and secondaries are carefully adjusted and in general should not be disturbed. Minor corrections of the primary trimmer tuning may be necessary, if they are accidentally or otherwise varied after leaving the factory. The procedure for resetting antenna primary trimmers is outlined below.

HI BAND PRIMARY ANTENNA TRIMMER ALIGNMENT

With scope switch in RF position and equipment set for observation of channel 13 r-f pass band (see step 1) turn HI BAND PRIMARY ANT. TRIMMER screw (counter-clockwise) i.e., to a reduced capacity setting. Start turning trimmer screw clockwise (increasing capacity) while observing the channel 13 r-f pass band amplitude and shape. It will be noticed that the amplitude will increase to a certain point and thereafter the shape of the response will change as shown in Fig. 18, indicating the antenna to be cutting into the r-f pass band. Back out the trimmer screw to a maximum amplitude and minimum "cutting-in" position.

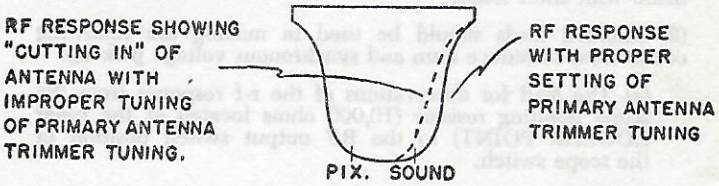


Fig. 18. Effect of primary antenna trimmer on r-f pass band response

LO BAND PRIMARY ANTENNA TRIMMER ALIGNMENT

Procedure for aligning LO BAND PRIMARY ANT. TRIMMER is the same as outlined for HI band primary antenna trimmer except the tuner should be tuned to channel 6 and adjustment of the Lo band antenna primary trimmer screw should be done while observing the r-f response characteristic of channel 6.

FINAL CAUTION NOTE

Upon completion of tuner alignment, remove crystal detector in 1st IF grid. Replace tuner shield and fastening screws, reinsert 2nd i-f amplifier tube removed at start of alignment, and check performance of receiver with all available local stations.

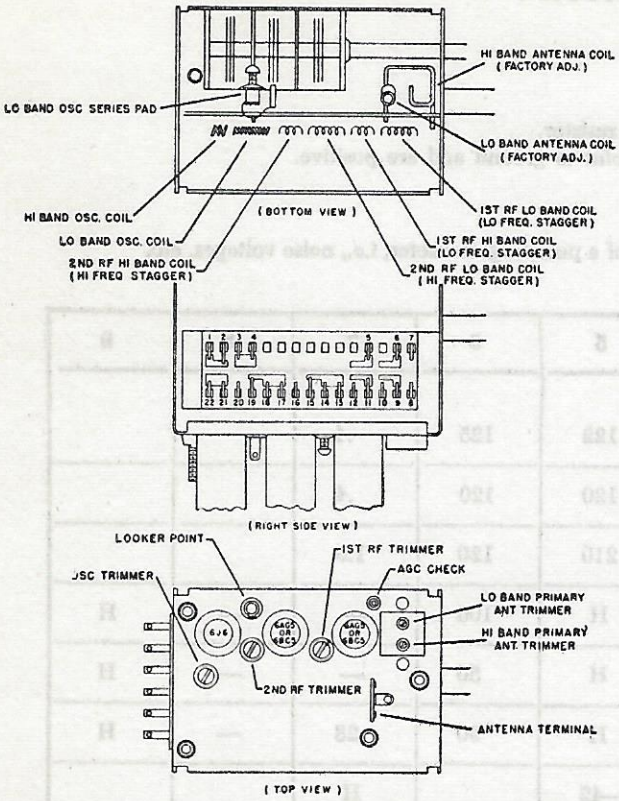


Fig. 19. Location of tuner alignment adjustments

TUNER SERVICE NOTES

OSCILLATOR INJECTION VOLTAGE

The oscillator injection voltage is specified as 2 volts minimum with normal B+ applied and is measured from the LOOKER POINT (Fig. 19) to ground with a Voltohmyst through a 10,000 ohms isolating resistor.

In the event of failure to meet these specifications, it is necessary to replace the 6J6 tube.

NOTE—If a tube is changed, it may be necessary to realign tuner to compensate for difference of tube characteristics. A slight adjustment of the oscillator trimmer (Fig. 19) will correct for any change of tube capacitance. Follow instructions for alignment of Hi Band and Lo Band oscillator alignment. Low oscillator injection voltage will reduce conversion gain with resulting loss in picture sensitivity.

REPLACING TUBES

See note under Oscillator Injection Voltage concerning replacement of oscillator-converter tube (6J6).

If either r-f tube is replaced, it may be necessary to realign tuner to compensate for a variation of tube characteristics. A slight adjustment of the r-f trimmers (Fig. 19) will compensate for this. Follow instructions for alignment of Hi band and Lo band r-f pass band alignment.

VARIABLE CONDENSER

Do not attempt to bend variable condenser plates, as they have been calibrated in the factory on special equipment.

RESTRINGING PULLEY DRIVE

CONDENSER DRIVE

Wrap drive cord assembly 1½ turns on drive pulley (Fig. 20) and slip other end over pulley on rotor shaft, keeping prong clip in center of slot, hook one end of spring over cord, and the other end over tab on pulley.

POINTER DRIVE

With condenser at maximum capacity and hole in pointer sleeve pulley in position shown, press prong clip on pointer cord assembly into hole and wrap end of loop around end of condenser rotor shaft (Fig. 20), making certain that cord is seated in groove in rotor shaft. Loop loose end of cord assembly over anti-backlash pulley as shown. Apply a drop of "Duco" household cement over cord seated in groove in rotor shaft to prevent cord from slipping.

RESETTING POINTER SLEEVE EXTENSION

If pointer cord breaks, it may be necessary to reset the pointer sleeve ferrule after restringing in order to maintain coincidence of pointer and dial escutcheon.

(1) Tune unit to channel 13 (station or signal generator).

(2) Unsolder pointer sleeve ferrule and rotate until pointer registers on number 13 of dial escutcheon.

(3) Solder pointer sleeve extension to pointer sleeve (Fig. 20).

TROUBLE SHOOTING GUIDE

(1) No sound or picture, but no B+ short.	Defective oscillator - mixer tube (6J6); open filament; prongs on sockets shorted to each other; open cathode to ground; open i-f coil; open converter plate lead; open i-f coupling condenser.
(2) No sound or picture with B+ short.	Tube shorted internally; r-f trimmer shorted; screen by-pass shorted; r-f choke shorting; B+ by-pass condenser shorted; leads from variable to switch shorting.
(3) One tube does not light.	Bad tube; open filament return (from socket to chassis).
(4) All tubes do not light.	Filament short at socket to chassis; open filament lead; filament by-pass shorted.
(5) No high band response.	Open contact; high band antenna trimmer shorted; open or shorted high band oscillator or r-f coils.
(6) No low band response.	Open low band r-f or oscillator coil; low band antenna coil open; antenna trimmer shorted; open contact on switch.
(7) Intermittents.	Socket pins not tight; switch contacts loose; accidental shorting between components.

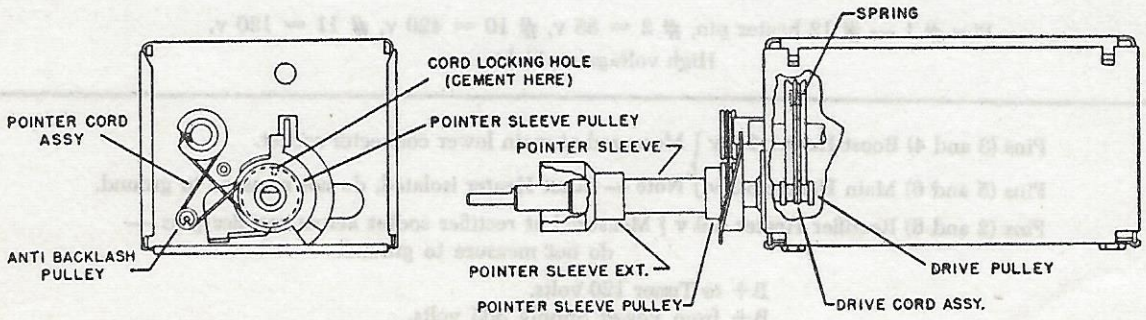


Fig. 20. Dial drive detail.

VOLTAGE CHART

CONDITION OF MEASUREMENT

1. Nominal line voltage 117, 25-60 cycles.
2. All controls set for normal picture operation.
3. Antenna then disconnected and terminated in 300 ohm carbon resistor.
4. All voltages unless otherwise indicated, read from terminal point to ground and are positive.
5. All voltages taken with V.T.V.M.
6. Voltage reading tolerances ±20%.

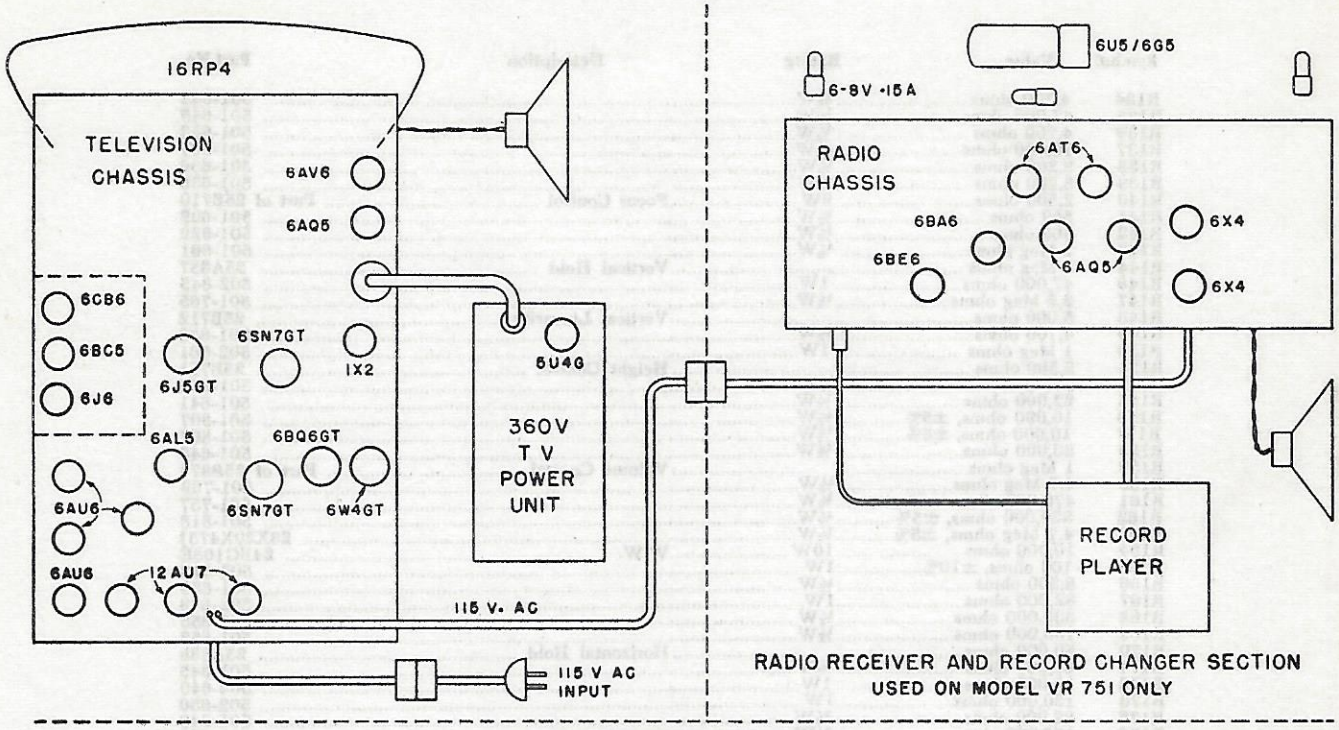
Note—* Asterisk denotes terminal points where readings are of a pulsating character, i.e., noise voltages, etc.

Pin	1	2	3	4	5	6	7	8	9
V101 — 6AU6			H	H	122	125	.4		
V102 — 6AU6			H	H	120	120	.4		
V103 — 6AU6			H	H	210	120	1.5		
V104 — 12AU7	—	—	—	H	H	100	—	—	H
V105 — 12AU7	310	—	—	H	H	50	—	—	H
V106 — 12AU7	28	—	6	H	H	90	28	—	H
V107 — 6J5		H	170	T.P.	—42		H		
V108 — 6AU6			H	H	52	52	.5		
V109 — 6AL5			H	H					
V110 — 6AV6			H	H			90		
V111 — 6AQ5	115	125	H	H	300	320	115		
V112 — 5U4G								365	
V113 — 6SN7	—22	200	—5	—64	190		H	H	
V114 — 6BQ6	T.P.	H	T.P.	T.P.	—22	T.P.	H	T.P.	
V115 — 1X2									
V116 — 6W4			490		*		H	H	
V117 — 6SN7		325	15		325	15	H	H	
V118 — 16RP4									

Pins # 1 — # 12 heater pin, # 2 = 85 v, # 10 = 420 v, # 11 = 120 v.
High voltage = 11 kv.

Pins (3 and 4) Boost Heater 6.5 v } Measured at main lower connector socket.
Pins (5 and 6) Main Heater 6.3 v } Note — Boost Heater isolated, do not measure to ground.
Pins (2 and 8) Rectifier Heater 4.9 v } Measured at rectifier socket across rectifier pins — do not measure to ground.

B+ to Tuner 120 volts.
B+ from Power Supply 365 volts.
T.P. = Terminal Points.



INTERCONNECTION DIAGRAM

REPLACEMENT PARTS

For dependable repairs use only genuine replacement parts. When ordering always give description and part number and model of receiver.

RESISTORS

Symbol	Value	Rating	Description	Part No.
R1	560 ohms, ±10%	½W	Part of RF Tuner Assembly	501-621
R2	150 ohms, ±10%	½W		501-615
R3	1,000 ohms, ±10%	½W		501-625
R4	1,200 ohms, ±10%	½W		501-626
R5	10,000 ohms, ±10%	½W		501-637
R7	220 ohms, ±10%	½W		501-617
R9	5,600 ohms, 10%	½W		501-634
R10	100,000 ohms, ±10%	½W		501-649
R11	10,000 ohms, ±10%	½W		501-637
R12	10,000 ohms, ±10%	½W		501-637
R102	100 ohms, ±10%	½W		501-613
R104	5,600 ohms, ±10%	½W		501-634
R105	47 ohms, ±10%	½W		501-609
R106	150 ohms, ±10%	½W		501-615
R107	33,000 ohms, ±10%	½W		501-643
R108	100 ohms, ±10%	½W		501-613
R109	150 ohms, ±10%	½W		501-615
R110	47 ohms, ±10%	½W		501-609
R111	3,300 ohms, ±10%	½W		501-631
R112	150 ohms, ±10%	½W		501-615
R113	1 Meg ohms,	½W	Part of L101	
R114	22,000 ohms, ±10%	½W		501-641
R115	1 Meg. ohms	½W	Part of L102	
R116	1 Meg ohms	½W	Part of L103	
R117	1 Meg ohms, ±10%	½W		501-661
R118	10,000 ohms, ±10%	1W		502-637
R119	2,200 ohms, ±10%	1W		502-629
R120	4,700 ohms, ±10%	2W		503-333
R121	1 Meg ohms, ±10%	½W	Part of L104	
R122	1 Meg ohms	½W		501-761
R123	7,500 ohms		Contrast "Picture" Control	25B791
R124	22,000 ohms	½W		501-641
R125	27,000 ohms	½W		501-642
R126	270,000 ohms	½W		501-654
R127	2,200 ohms	½W		501-629
R128	6,800 ohms	½W		501-635
R129	50,000 ohms		Brightness Control	Part of 25A858
R130	470,000 ohms	½W		501-757
R131	2,200 ohms	½W		501-629
R132	820,000 ohms	½W		501-660
R133	270,000 ohms	½W		501-654

RESISTORS (Continued)

Symbol	Value	Rating	Description	Part No.
R134	4,700 ohms	½W		501-633
R135	47,000 ohms	½W		501-645
R136	4,700 ohms	½W		501-633
R137	10,000 ohms	½W		501-637
R138	8,200 ohms	½W		501-636
R139	8,200 ohms	½W		501-636
R140	2,500 ohms	2W	Focus Control	Part of 25B710
R141	560 ohms	½W		501-622
R142	560 ohms	½W		501-622
R143	1 Meg ohms	½W		501-661
R144	1 Meg ohms		Vertical Hold	25A857
R146	47,000 ohms	1W		502-645
R147	2.2 Meg ohms	½W		501-765
R148	5,000 ohms		Vertical Linearity	25B712
R149	4,700 ohms	½W		501-633
R150	1 Meg ohms	1W		502-661
R151	2,500 ohms		Height Control	25B711
R152	150 ohms	½W		501-615
R154	22,000 ohms	½W		501-641
R156	10,000 ohms, ±5%	½W		501-807
R157	10,000 ohms, ±5%	½W		501-807
R158	33,000 ohms	½W		501-643
R159	1 Meg ohms		Volume Control	Part of 25B874
R160	4.7 Meg ohms	½W		501-769
R161	470,000 ohms	½W		501-757
R162	330,000 ohms, ±5%	½W		501-818
R163	4.7 Meg ohms, ±5%	½W		23X20X475J
R164	10,000 ohms	10W	W.W.	24BG103E
R165	100 ohms, ±10%	1W		502-613
R166	8,200 ohms	½W		501-636
R167	82,000 ohms	1W		502-648
R168	330,000 ohms	½W		501-655
R169	180,000 ohms	½W		501-652
R170	50,000 ohms		Horizontal Hold	25A858
R171	47,000 ohms	½W		501-645
R172	18,000 ohms	1W		502-640
R173	120,000 ohms	1W		502-650
R175	82,000 ohms	½W		501-648
R176	150,000 ohms	½W		501-751
R177	120,000 ohms, ±5%	1W		23X30BF124J
R178	22,000 ohms	½W		501-641
R179	470,000 ohms	½W		501-757
R180	47 ohms	½W		501-609
R181	15,000 ohms	5W		24BF153E
R183	100 ohms	2W		503-313
R184	10,000 ohms	1W		502-637
R187	1 Meg. ohms	1W		502-761
R188	100 ohms	½W		501-613
R189	8,200 ohms	½W		501-636
R190	560,000 ohms	½W		501-658
R192	1 Meg ohms	½W		Part of L109
R193	470,000 ohms	½W		501-761
R194	33,000 ohms	½W		501-643
R195	33 ohms	1W		502-607
R196	400 ohms	2W	Horizontal Centering	Part of 25B713
R202	390 ohms	1W		502-656
R203	820,000 ohms	½W		501-660
R204	4,700 ohms	½W		501-633
R205	30,000 ohms	10W		24BG30FS
R206	47,000 ohms	½W		501-645
R208	2.2 Meg ohms	½W		501-665

CAPACITORS

C1	50 mmf	500V	Ceramic	Part of RF Tuner Assembly
C2	1,500 mmf	500V	Ceramic	
C3	.005 mf	450V	Ceramic	
C4	.14 mmf	500V	Ceramic	
C5	.005 mf	450V	Ceramic	
C6	4.7 mmf	500V	Ceramic	
C7	680 mmf	500V	Ceramic	
C8	100 mmf	500V	Ceramic	
C9	.005 mf	450V	Ceramic	
C10	14 mmf	500V	Ceramic	
C11	.005 mf	450V	Ceramic	
C12	100 mmf	500V	Ceramic	
C13	2.2 mmf	500V	Ceramic	
C14	30 mmf	500V	Ceramic	
C15	18 mmf	500V	Ceramic	
C16	19 mmf	500V	Ceramic	
C17	10 mmf	500V	Ceramic	
C19	10 mmf	500V	Ceramic	
C21	5,000 mmf	500V	Ceramic	
C22	5,000 mmf	500V	Ceramic	
C101	.005 mf	450V	Ceramic Disc	514-011
C102	3.3 mmf	500V	Ceramic	514-501
C103	.005 mf	450V	Ceramic Disc	514-011
C104	.005 mf	450V	Ceramic Disc	514-011
C105	.005 mf	450V	Ceramic Disc	514-011
C106	.005 mf	450V	Ceramic Disc	514-011
C107	.005 mf	450V	Ceramic Disc	514-011
C108	.005 mf	450V	Ceramic Disc	514-011
C109	.005 mf	450V	Ceramic Disc	514-011

CAPACITORS (Continued)

Symbol	Value	Rating	Description	Part No.
C110	5 mmf	500V	Ceramic Disc	514-201
C111	.25 mf	500V	Tubular	517-227
C112	22 mmf	200V	Mica	512-417
C113	.25 mf	200V	Tubular	517-227
C115	.05 mf	600V	Tubular	517-620
C116	.01 mf	400V	Tubular	515-513
C118	.05 mf	600V	Tubular	517-620
C119	.25 mf	200V	Tubular	517-227
C120	47 mmf	500V	Ceramic	514-312
C121	47 mmf	500V	Ceramic	514-312
C123	.002 mf	600V	Tubular	517-603
C124	.005 mf	600V	Tubular	517-609
C125	.005 mf	600V	Tubular	517-609
C126	4,700 mmf	500V	Mica	512-445
C127A	50 mf	250V	Dual Electrolytic	45B165
C127B	75 mf	50V		
C128	.1 mf	600V	Tubular	515-575
C129	.25 mf	600V	Tubular	517-627
C130	.005 mf	450V	Ceramic	514-011
C131	.1 mf	200V	Tubular	517-475
C132	.005 mf	450V	Ceramic	514-011
C133	5 mf	50V	Electrolytic	45A109
C134	330 mmf	500V	Ceramic	514-322
C135	1,000 mmf	500V	Ceramic	514-328
C136	.01 mf	400V	Tubular	515-513
C137	.01 mf	200V	Tubular	515-463
C138	330 mmf	500V	Mica	512-431
C139	.01 mf	600V	Tubular	515-563
C141	.01 mf	600V	Tubular	515-563
C142	50 mf	300V	Electrolytic	45-171
C143	4 mf	350V	Electrolytic	516-010
C144	56 mmf	500V	Mica	512-422
C145	.01 mf	600V	Moulded	46BR103L6
C146	.01 mf	600V	Moulded	46BR103L6
C147	40+40 mf	450V	Electrolytic	45A159
C148	60 mf	450V	Electrolytic	45B166
C149	.25 mf	200V	Tubular	45B166
C150	220 mmf	500V	Mica	512-429
C151	.1 mf	600V	Tubular	515-575
C152	.002 mf	600V	Tubular	517-603
C153	.02 mf	600V	Tubular	517-616
C154	390 mmf	500V	Mica	512-432
C155	10,000 mmf	500V	Mica	512-449
C156	47 mmf	500V	Mica	512-421
C157	.01 mf	600V	Tubular	515-563
C158	1,500 mmf	500V	Mica	512-439
C159	Mica Variable		Horizontal Drive	44A361
C160	.25 mf	200V	Tubular	517-227
C161	.05 mf	600V	Tubular	517-620
C162	47 mmf	500V	Ceramic	514-362
C164	500 mmf	20,000V	H.V. Capacitor	47A216
C165	.05 mf	600V	Tubular	517-620
C167	.035 mf	600V	Tubular	515-569
C168	5 mmf	500V	Ceramic	514-201
C169	330 mmf	500V	Ceramic	514-322
C171	47 mmf	500V	Ceramic	514-312
C172	1,000 mmf	500V	Ceramic	514-328
C174	1,000 mmf	500V	Ceramic	514-328
C175	1,000 mmf	500V	Ceramic	514-328
C178	1,000 mmf	500V	Mica	512-437
C180	100 mf	10V	Electrolytic	1B504
C181	8 mf	475V	Electrolytic	45A103
C182	330 mmf ±10%	500V	Mica	512-042
C183	100 mmf	500V	Mica	512-425
C184	1,000 mmf	500V	Mica	512-437
C185	2.2 mmf	500V	Ceramic	47A160-4
C187	.1 mf	200V	Tubular	515-475
C188	.5 mf	200V	Tubular	517-230
C189	.05 mf	600V	Tubular	517-620
C190	.005 mf	500V	Ceramic	514-011
C191	270 mmf	500V	Ceramic	514-321
C192	.1 mf	200V	Tubular	515-463
C193	47 mmf	500V	Ceramic	514-312
C194	.05 mf	200V	Tubular	517-220
C195	40+40 mf	450V	Dual Electrolytic	516-512

TRANSFORMERS and COILS

L101	Video Peaking Coil 150 MH	51A1154
L102	Video Peaking Coil 150 MH	51A1154
L103	Video Peaking Coil 450 MH	51A1155
L104	Video Peaking Coil 450 MH	51A1155
L105	Focus Coil	51B1159
L106	Deflection Yoke	53C195
L107	Width Control Coil	51B1230
L108	Horizontal Linearity Control Coil	51A1232
L109	Video Peaking Coil 150 MH	51A1154
L110	Antenna Choke	53B009
L111	Antenna Choke	53B009
L112	Heater Choke	53A191
L113	Sound Trap Coil 21.75 Mc	51B1231
L114	Filter Choke Assembly	050-107
L115	Filter Choke Assembly	050-107
T101	1st I-F Transformer	50B458
T102	2nd I-F Transformer	50A431
T103	3rd I-F Transformer	50A431
T104	4th I-F Transformer	50A431
T105	Coil 4.5 Mc Sound Trap	50B432
T106	Vertical Oscillator Transformer	55B115
T107	Vertical Output Transformer	55B128
T108	Ratio Detector Transformer	50H406
T109	Audio Output Transformer	55C134
T110	Power Transformer	050-163-2
T111	Horizontal Oscillator Transformer	55B115B
T112	Horizontal Output Transformer	55C145

MISCELLANEOUS PARTS

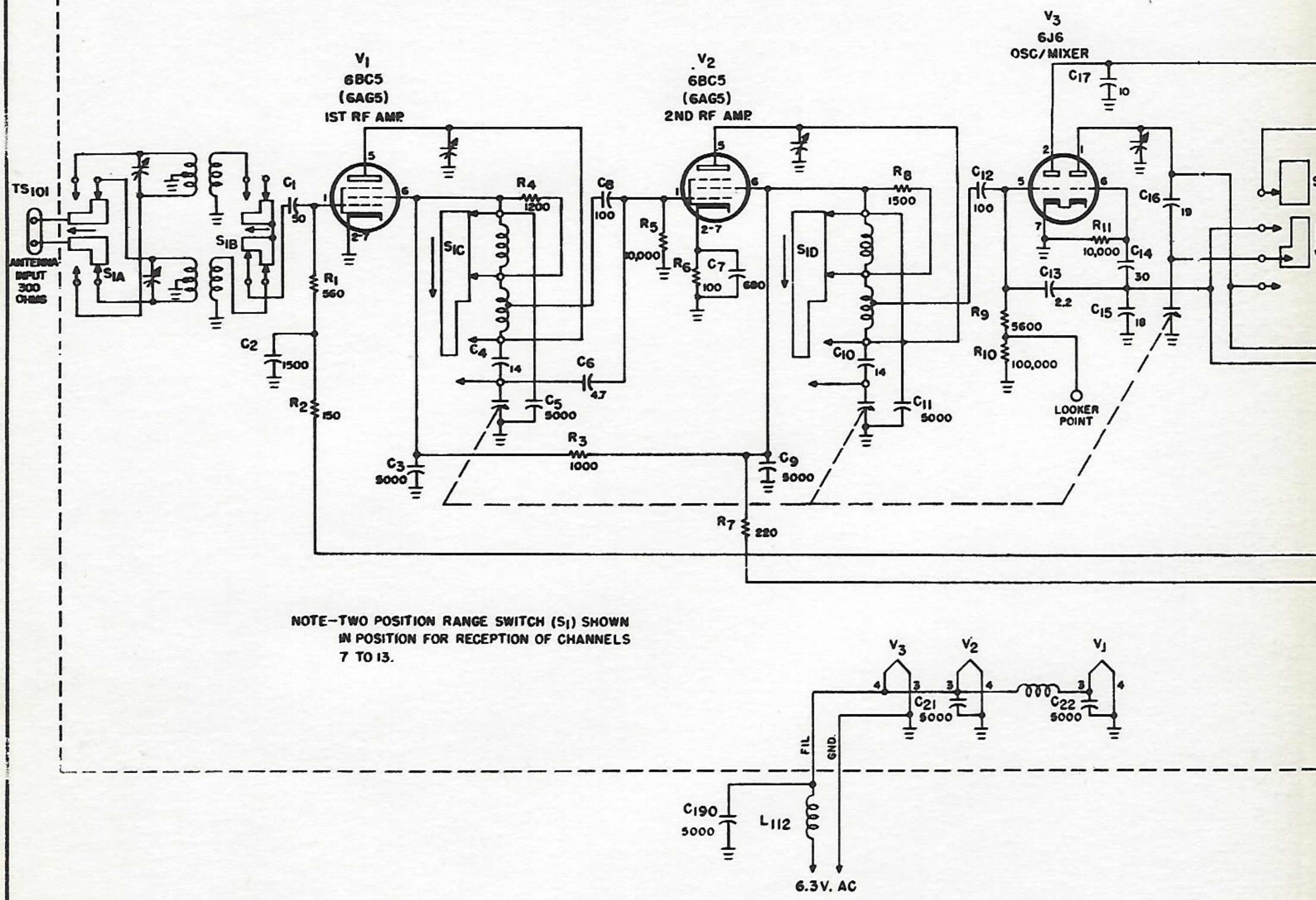
Part No.	Description
120-774	Antenna Terminal Strip Assembly
88A020	Antenna Terminal Strip
67B1060	Antenna Terminal Strip Bracket
120-749	Back Cover Assembly, VR721
303-238	Back Cover Only, VR721
120-764	Back Cover Assembly, VR751
303-243	Back Cover Only, VR751
030-201	Cabinet—Walnut, VR721
030-202	Cabinet—Mahogany, VR721
030-203	Cabinet—Blonde, VR721
030-219	Cabinet—Walnut, VR751
030-220	Cabinet—Mahogany, VR751
030-221	Cabinet—Blonde, VR751
120-732	Cable and Plug Assembly, Power Supply
100-043	Cable and Connector, Radio Power, VR751
100-026	Cable Assembly Phono Power, VR751
120-777	Cable and Phono Plug Assembly, VR721
609-206	Chassis Plug Buttons, ⅞" dia.
16A185	CRT Rubber Cushion, 1½"
16C163	CRT Rubber Cushion, 14"
76B558	CRT Metal Mounting Strap
10A300-3	CRT Anode Lead
21A101	CRT Ion Trap Magnet
6A348	CRT Socket
75A161	CRT Spring Ground Strap
16A187	CRT Rubber Channel
16A188	CRT Rubber Channel
120-772	CRT Mounting Hood Bracket Assembly
120-773	CRT Mounting Hood Bracket Assembly Mounting
22D303	CRT Window
53C195	Deflection Yoke Assembly
67B1189	Deflection Yoke Support Bracket
350-101	Door Pull, VR751
332-626	Escutcheon—Knob Function
7D185	Escutcheon—Bezel
7D184	Escutcheon—Mask
51B1159	Focus Coil
67B1127	Focus Coil Mounting Bracket
2A2025	Focus Coil Thumb Nut, Large
2A2026	Focus Coil Thumb Nut, Small
75A170	Focus Coil Mounting Spring
15C230	Knob—(Indicator)
75A175	Knob Spring—(Indicator)
15C231	Knob—(Channel Switch)
15B229	Knob—(Tuning)
15C232	Knob—(Off-Picture)
15C233	Knob—(Brightness)
15B234	Knob—(Volume)
15A244	Knob—(Rear Controls)
572-054	Knob Assembly—Radio, VR751
572-123	Knob Assembly—Radio, with dot, VR751
100-036	Line Cord and Plug
10A286	Line Cord Receptacle
120-771	Line Cord Receptacle Assembly
8B1029	Line Cord Insulator
60A381	Phono-Television Switch, VR721
36A041	Phono-Jack, VR721
10A302	Phono-Plug, VR721
10A305	Phono-Plug Cover and Insulator, VR721
041-111	Speaker, 8" PM, 3 ohms, VR721
041-112	Speaker Cone and Voice Coil Assembly for 041-111
120-776	Speaker Cable and Connector Assembly .. VR721
041-079	Speaker, 8" PM, 3 ohms, VR751
041-080	Speaker Cone and Voice Coil Assembly on 041-079
627-043	Speaker Grille Cloth, 12" x 18", VR751
627-043	Speaker Grille Cloth, 15" x 18", VR751
627-021	Speaker Grille Cloth, 19" x 13", Walnut, VR721
627-022	Speaker Grille Cloth, 19" x 13", Mahogany, VR721
120-765	Speaker Leads and Pins Assembly
570-001	Tube Socket Octal
570-009	Tube Socket, 7 Pin Miniature
570-020	Tube Socket, 9 Pin Miniature
69C317	Tube Shield

MISCELLANEOUS PARTS FOR DV882

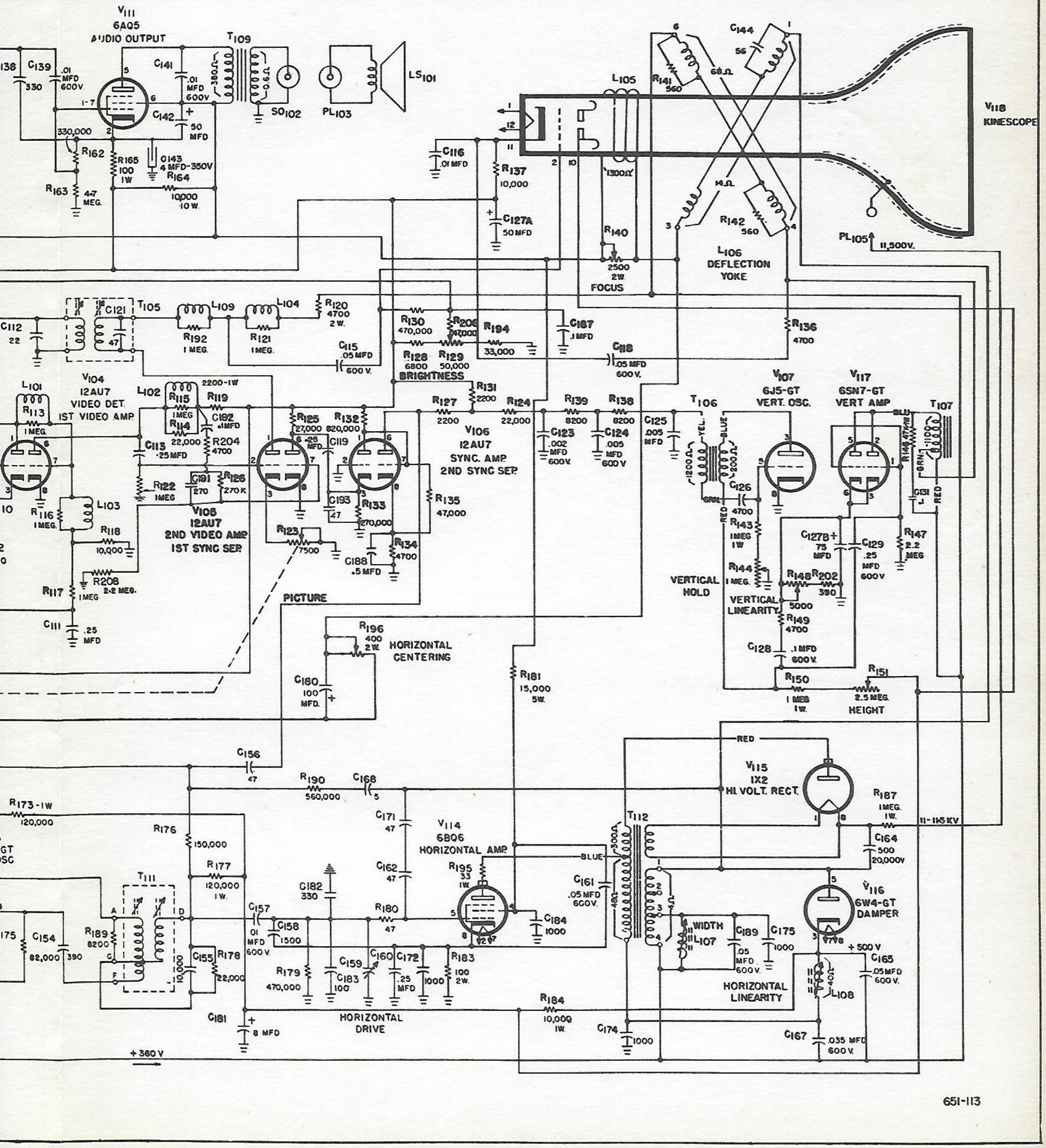
Part No.	Description
120-774	Antenna Terminal Strip Assembly
88A020	Antenna Terminal Strip
67B1060	Antenna Terminal Strip Bracket
120-749	Back Cover Assembly
303-238	Back Cover Only
030-204	Cabinet—Walnut, DV882
030-205	Cabinet—Mahogany, DV882
030-206	Cabinet—Blonde, DV882
120-732	Cable and Plug Assembly, Power Supply
120-777	Cable and Phono Plug Assembly
609-206	Chassis Plug Buttons, ⅞" dia.
16A185	CRT Rubber Cushion, 1½"
16C163	CRT Rubber Cushion, 14"
76B558	CRT Metal Mounting Strap
10A300-3	CRT Anode Lead
21A101	CRT Ion Trap Magnet
6A348	CRT Socket
75A161	CRT Spring Ground Strap
16A187	CRT Rubber Channel
16A188	CRT Rubber Channel
120-772	CRT Mounting Hood Bracket Assembly
120-773	CRT Mounting Hood Bracket Assembly Mounting
22D303	CRT Window
53C195	Deflection Yoke Assembly
67B1189	Deflection Yoke Support Bracket
332-627	Escutcheon—Knob Function
7D185	Escutcheon—Bezel
7D184	Escutcheon—Mask
51B1159	Focus Coil
67B1127	Focus Coil Mounting Bracket
2A2026	Focus Coil Thumb Nut, Small
2A2025	Focus Coil Thumb Nut, Large
67B1127	Focus Coil Mounting Bracket
75A170	Focus Coil Mounting Spring
15C230	Knob—(Indicator)
75A175	Knob Spring—(Indicator)
15C231	Knob—(Channel Switch)
15B229	Knob—(Tuning)
15C232	Knob—(Off-Picture)
15C233	Knob—(Brightness)
15B234	Knob—(Volume)
15A244	Knob—(Rear Controls)
100-036	Line Cord and Plug
10A286	Line Cord Receptacle
120-771	Line Cord Receptacle Assembly
8B1029	Line Cord Insulator
60A381	Phono-Television Switch
36A041	Phono-Jack
10A302	Phono-Plug
10A305	Phono-Plug Cover and Insulator
041-111	Speaker, 8" PM, 3 ohms
041-112	Speaker Cone and Voice Coil Assembly for 041-111
627-044	Speaker Grille Cloth, 13" x 21"
120-776	Speaker Cable and Connector Assembly,
120-765	Speaker Leads and Pins Assembly
570-001	Tube Socket Octal
570-009	Tube Socket, 7 Pin Miniature
570-020	Tube Socket, 9 Pin Miniature
69C317	Tube Shield

L.T									L112						
C		1					8				12			17	
C	2			3	4, 5, 6			7	9	10		11, 13			15, 16, 14
C								190				21, 22			
R			1			4									
R			2			3		5, 6, 7			8		9, 10		11
R															

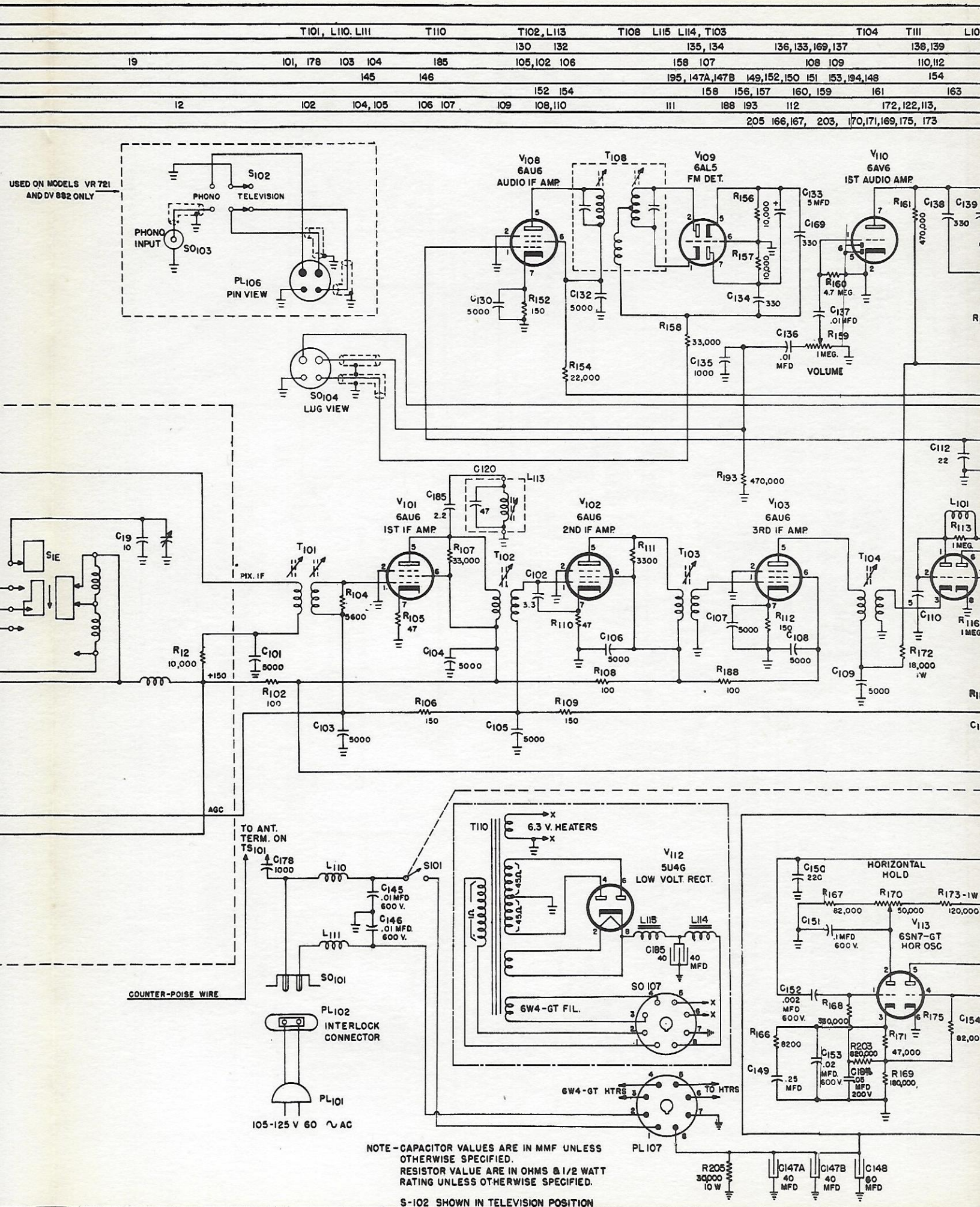
USED ON
AND D



L101 L103 T105 L102 T109, L109, L104 L107 L105 T112 T106, L106 L108 T107
139 141, 142, 143 116 127A 187 118 144
,112 111 113 191 192 119, 193, 180, 115 123 124 125 128 127B 129 131
154 181 155 157 158 156 188 168 171 162, 182 159 160 183 172 184 161 174 189 175 167 164 165
163 162 165 164 130 128 206 129 194 127, 131, 124, 137, 140 141 142 136
5, 116, 117 208, 118 192, 204, 121, 114, 120, 115, 119, 126, 125, 132, 123 133, 134, 135, 181 139 138 149 202 143 144 148, 150, 146, 151 147
73 189, 168 176 177 178, 190 196 179 180 183 195 184 187



651-113



NOTE - CAPACITOR VALUES ARE IN MMF UNLESS OTHERWISE SPECIFIED.
RESISTOR VALUE ARE IN OHMS & 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.

S-102 SHOWN IN TELEVISION POSITION

SCHEMATIC DRAWING