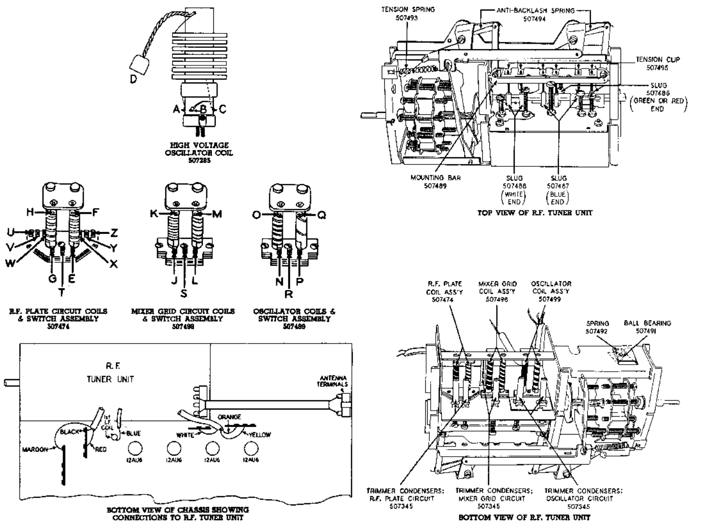
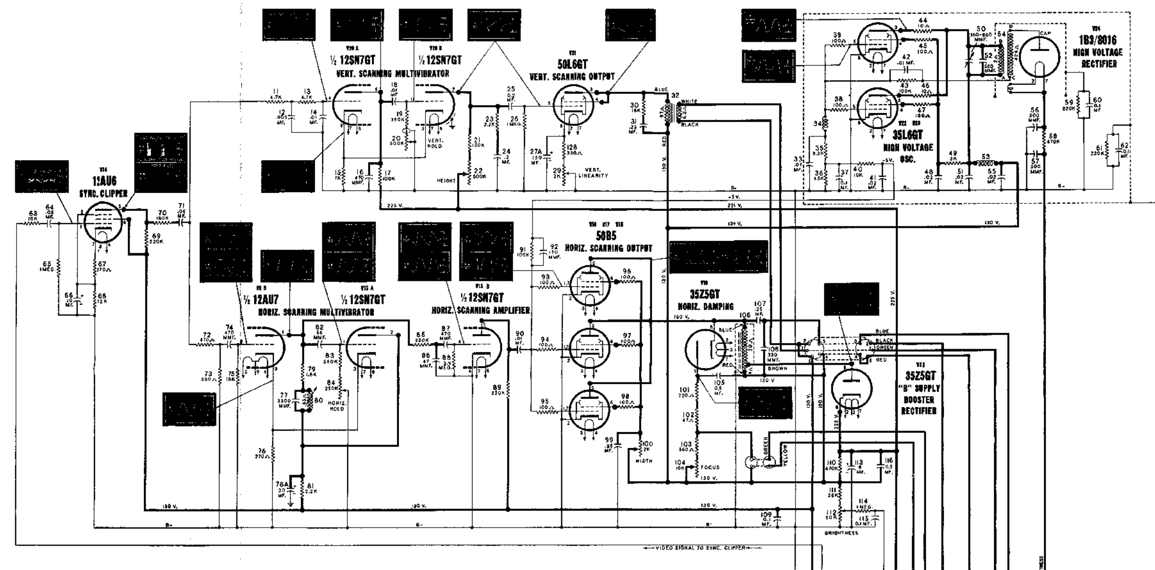
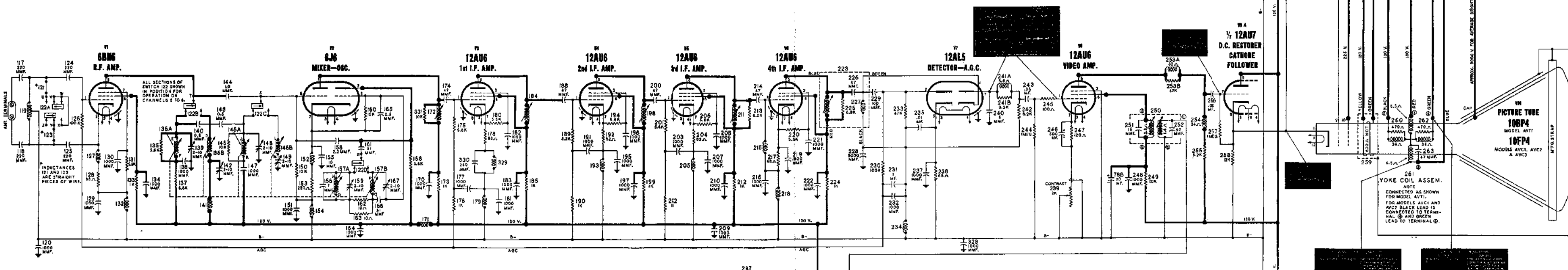
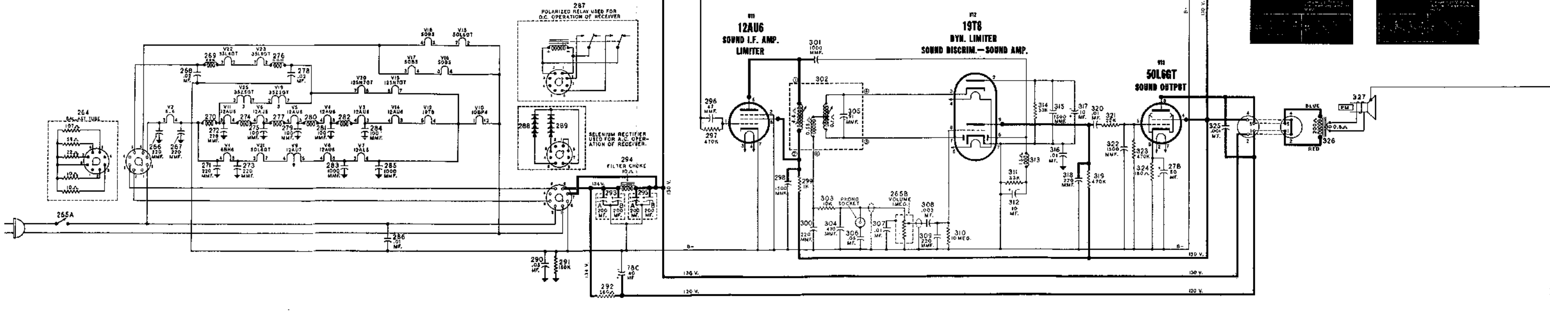
MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A









OSCILLOGRAMS

All oscillograms taken with ground lead of 'scope connected to B— (unless otherwise indicated) and with receiver controls set for normal reception of a station transmitting its standard test pattern.

Number appearing below asterisk specifies setting of horizontal sweep frequency control on 'scope.

*— This symbol on illustration indicates that wave form was observed on a 'scope whose vertical amplifier had very limited high frequency response (50 to 100 Kc).

**— This symbol indicates that wave form was observed on a 'scope whose vertical amplifier frequency response was flat to within 20% up to 2 Mc.

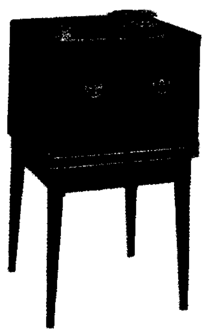
MODELS [AVT1 CODE 9054-A], [AVC1 CODE 9054-B] & [AVC2 CODE 9054-C]

These three models utilize identical circuit arrangement and chassis construction. They are capable of brilliantly reproducing both the visual and aural portions of television broadcasts from stations operating on any of the 12 standard television channels which provide signals of normal strength at the point of reception. All controls are arranged for simplicity and ease of operation.

The major chassis assembly includes three sub-assemblies, namely, R.F. Tuner Unit, High Voltage Power Supply and Selenium Rectifier Unit. Separate suspension of the picture tube, focus coil and deflection yoke contributes to convenience in handling the chassis for service purposes.

A total of 25 tubes are used in a circuit which features operation from either an AC or *DC power supply, inter-carrier sound system, automatic gain control, stabilized horizontal synchronization, an easily serviceable R.F. tuning unit and a safe R.F. type high voltage power supply for the kinescope.

Models AVC1 and AVC2, using the reflector system, lend themselves well to the adaption of an enlarging lens which can be placed directly on top of the picture tube escutcheon. These lens can be obtained from Stewart-Warner in kit form (part #507200) and are supplied with a matching wood frame. The newly developed "extra brilliant" 10FP4 picture tube, with aluminum backed fluorescent viewing surface, is used on reflector models to provide an outstandingly clear and bright picture.



MODEL AVT1

POWER REQUIREMENTS

117 Volts 210 Watts
60 cycles AC or *DC

ANTENNA INPUT IMPEDANCE

Balanced—300 ohms

SPEAKER

P.M. Dynamic

Model	Size	V.C. Imped.
AVT1	5"	3.2 ohms
AVC1 / AVC2	6" x 9"	3.2 ohms

FINE TUNING CONTROL

A screw adjustment is provided for each individual channel which sets the position of all tuning slugs simultaneously for the desired channel. This adjustment is accessible thru a hole in the front panel when the channel selector knob is removed. To remove knob, merely pull it away from panel.

I. F. FREQUENCY

Sound carrier—22.25 Mc.
Picture carrier—26.75 Mc.

FOCUS

Magnetic

DEFLECTION

Magnetic

PICTURE SIZE (Direct View)

Area—58 sq. inches
Height—6¾"
Width—9" (at widest point)

DIMENSIONS

Model AVT1—17½" x 20" x 21"
Base for AVT1 is 21½" high
Models AVC1 & AVC2—34" x 20" x 17¾"

WEIGHTS (packed)

Model AVT1—97 lbs.
Base for AVT1—10 lbs.
Models AVC1 & AVC2 —125 lbs.

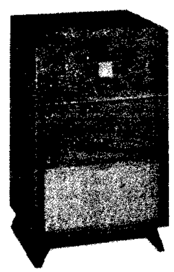
CAUTION

This chassis has its B- system connected directly to one side of the AC power line. Therefore the following precautions must be observed before making connections to test instruments during service operations. Failure to do so may result in severe shock if contact is made between test equipment and "earth" ground or, a short circuit might occur if ground terminal of test equipment is connected to "earth" ground.

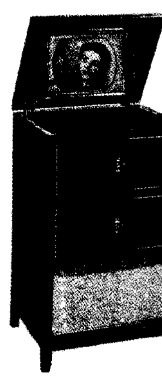
1. **Connect an AC voltmeter between B- of receiver chassis and an "earth" ground (radiator, water pipe, etc.). If meter reading is not zero, reverse receiver power cord plug at wall receptacle.**
2. **Connect an AC voltmeter between ground terminal of test instrument and an "earth" ground (radiator, water pipe, etc.). If meter reads FULL LINE VOLTAGE, reverse instrument power cord plug at wall outlet. If meter reads 60 volts or less, do not disturb instrument power cord plug.**
3. **Ground terminal of test instrument may now be connected to B- system of receiver.**

The foregoing precautions could be avoided if an isolation transformer is connected between receiver power cord and power supply outlet.

*If receiver is to be used for operation from a DC power supply, remove selenium rectifier assembly (see 288 and 289 on circuit diagram) and insert DC polarizing relay 507302 by plugging it into the same socket.



MODEL AVC1 (Mahogany)
MODEL AVC3 (Combed Oak)



MODEL AVC2

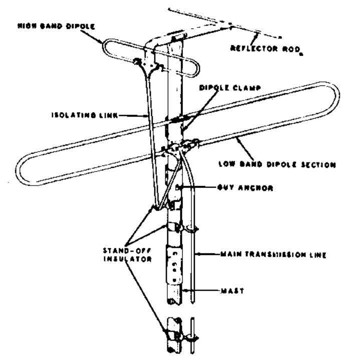


FIG. 1
STEWART-WARNER 506700
TELEVISION ANTENNA SYSTEM

INSTALLATION OF ANTENNA SYSTEM

To properly install an antenna system it is necessary to have some method of communication from the antenna site to the receiver. This communication should be established before the final antenna site has been chosen. A pair of interconnected telephones may be used to conveniently accomplish this purpose. **Do not use the antenna transmission line as the means of interconnecting these telephones.**

TYPE OF ANTENNA—Unlike the ordinary broadcast receiver, the proper selection and installation of the antenna system is one of the most important factors influencing picture quality. It is necessary to have an antenna system with a broad frequency response characteristic whose impedance closely matches the input impedance of the receiver. Stewart-Warner Folded Dipole Antenna Systems (506700 and 505300) have been especially designed to match Stewart-Warner television receivers and to obtain high operating efficiency in the present television transmitting frequency ranges of 54 to 88 Mc. and 174 to 216 Mc. In general, the folded dipole will give excellent results without the addition of a reflector element. However, in cases where reflected signals cause "ghosts" or where the received signal is weak, the addition of reflector element (505301) will improve performance by increasing the antenna directivity and overall gain.

In localities where both high and low band Television Stations are in operation and where these stations are not situated in directions which will permit optimum orientation of a single dipole antenna, use of the Stewart-Warner Combination Hi-Lo Band Antenna System is advantageous (see Figure 1). The Standard single dipole antenna system 505300 can be readily converted to a combination Hi-Lo band system by the addition of Stewart-Warner High Band Adapter Kit 506666.

ANTENNA ASSEMBLY—Complete assembly instructions accompany each antenna kit and these instructions should be followed very carefully.

LOCATING THE ANTENNA—Before attempting to install the antenna it is essential to carefully select a position which allows the following conditions to be fulfilled:

1. Absence of obstructions between the proposed antenna site and the transmitting antenna such as buildings, trees, power lines, other nearby antenna systems, etc.
2. Maximum distance between proposed antenna site and sources of electrical noise such as might originate in ignition systems, elevator relays, diathermy and X-ray machines and arcing from electrical transit systems. Several of these conditions preclude the possibility of mounting the antenna near the edge of the roof adjoining a heavy traffic street even though this site may be preferable with respect to length of antenna lead-in.
3. Greatest possible height above ground level. In general this will allow the antenna to overcome such obstructions as are mentioned in Item 1.

After choosing the antenna site in accordance with the above conditions, make an actual test with the receiver to be sure that a satisfactory picture can be obtained from all transmitting stations before attaching the mast to the building. This is facilitated by the use of an intercommunication system between the man on the roof and the man observing the receiver performance in the home. Although there are a wide variety of intercommunication systems that may be used, the simplest and most reliable is a pair of inter-connected telephones. **Avoid using the antenna transmission line as the means of interconnecting these telephones.**

It is often possible to obtain considerable improvement in performance by moving the antenna location a small distance from the original site. This final test for the most desirable antenna location becomes vitally important in areas where signal strength is low or where reflections from surrounding surfaces produce multiple transmission paths, thereby creating multiple images or "ghosts" on the picture screen.

In areas where the signal strength is sufficient, it may be possible to install the antenna in the attic provided the roof is not made of metal or insulated with metal foil. Should there be any indication that the signal strength is inadequate, the indoor antenna installation should not be attempted and an outdoor antenna is definitely recommended.

If the transmitted signal strength is low and surrounding surfaces cause reflections, or sources of electrical disturbances are present, then proper orientation of the antenna becomes of equal importance with the matter of selecting the correct location.

ORIENTATION—Since the response of a dipole antenna has a directional characteristic it is now necessary to orient the antenna for the position that will give the best receiver performance. Here again it is necessary to maintain direct communication with the man observing receiver performance.

In the case where the signal is to be received from only one transmitter, the problem of orientation is relatively simple. Since the dipole is least responsive in the two directions in which the rods are pointing, the antenna should in general be placed broadside to the transmitter. However, in cases where picture quality is affected by reflections or electrical disturbances picked up at the antenna, the directional characteristic of the antenna may be used advantageously by pointing the rods in the direction of the disturbance. By so doing, the disturbance effect will be minimized and picture quality improved even though the antenna broadside is no longer facing directly toward the transmitter.

In certain areas, where surrounding objects make "line of sight" reception from the transmitter impossible, satisfactory receiver performance may often be attained by orienting the antenna so that it faces broadside to the strongest reflected signal. Under conditions of this type, best reception is not always obtained with the antenna rods in a horizontal plane or with the mast in a vertical position.

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A

In areas where a number of Television Stations exist, the problem of orientation becomes more complicated and requires very careful consideration. In such a case, it is necessary to orient the antenna so as to obtain equally satisfactory reception from all stations. Relative signal strength of different stations may require that considerable antenna misdirection be tolerated with regard to a high power transmitter in order to favor reception from a low power transmitter.

Should the situation be encountered where it is necessary to orient the antenna for stations operating in both the low and high bands, the Stewart-Warner Combination Antenna System (506700) can be used advantageously. It will be found that the low band dipole can be rotated independently of the high band so as to facilitate solution of these orientation problems.

Final position of the antenna can be determined only by observing the quality of the picture on the receiver screen.

MOUNTING—Various methods for mounting the antenna mast may be used. Several preferred methods are illustrated in the figures included in the Installation Instructions for Stewart-Warner Television Antenna Systems.

When using brackets to attach the mast to a wall, be sure that the wall surface of the building is in good enough condition to withstand the strain of supporting the mast and antenna. Spacing between these brackets should be sufficient to hold the mast rigid and should be in proportion to mast height. It is of utmost importance that the mast brackets grip the mast securely to prevent rotation of the antenna due to severe wind storms.

When making a flat roof installation, be sure that the mounting base plate is of sufficient size to prevent shifting of the lower end of the mast. Make sure that the guy wire anchor points are secure and spaced approximately 120° apart. The guy wire clamp holes should point radially outward to the anchor points to prevent a twisting torque on the mast which might cause the antenna to rotate. Turnbuckles placed in each guy wire are recommended for a more rigid installation.

SAFETY AND LIGHTNING PROTECTION—The antenna system should be installed in conformance with local building and fire regulations. Every precaution should be taken to adequately secure the mast to the building to avoid danger of antenna falling from the roof—use of guy wires is recommended wherever deemed necessary as an additional safety measure.

A degree of lightning protection may be obtained by connecting a heavy copper conductor between the aluminum mast of the antenna and a good ground. **When using shielded (coaxial) cable, do not connect cable shield to any part of the antenna system; see Figure 2 for cable shield connection to receiver. Under no circumstances should the chassis be connected to ground.**

SELECTING, ROUTING AND SECURING TRANSMISSION LINE—A properly selected and installed transmission line is as important to the quality of the antenna system as the antenna itself. An improperly installed line causes reflections and high losses. Reflections in the line make it impossible to obtain clear pictures, and in severe cases, the reflections cause "smears" so that the picture appears out of focus even though the receiver is perfectly focused. In general, the longer the transmission line, the more care required in installation.

Television models AVT1, AVC1, AVC2 and AVC3 have a 300 ohm input circuit which is balanced to ground and intended for connection to a 300 ohm antenna system. All Stewart-Warner Folded Dipole antenna systems have a characteristic impedance of 300 ohms and thus will provide optimum results when connected to the receiver with "Ribbon Type" transmission line having a like impedance rating. Failure to observe proper impedance match between antenna, transmission line and receiver will result in less energy delivered to the receiver and undesirable effects of noise and interference may be accentuated.

Types of Transmission Line—Low loss "Ribbon Type" (300 ohm) transmission line is intended for use in a normal installation. However, under conditions where man-made interference may be picked up by the transmission line itself, shielded cable may be used to alleviate this condition. It is recommended that twin conductor RG-22/U cable be used if shielded transmission line is required. This cable is balanced with respect to ground and its characteristic impedance (95 ohms) can be readily matched to receiver input with a minimum of signal loss—see section entitled "Matching Shielded Cable to Receiver". **Cable shield must not be grounded to antenna system.**

Single conductor coaxial cable should not be used for connection of a folded dipole antenna system to a receiver with a balanced input system as the cable would then be susceptible to pick-up of external interference. In addition, accidental contact between cable shield and receiver chassis may cause modulation hum and picture interference.

Length of line—The length of the transmission line should be kept as short as possible. The longer the line, the greater the opportunity for man-made electrical disturbance to introduce undesirable effects. Attenuation of the line, though low, will reduce the energy fed to the receiver in direct proportion to length.

Splicing the Line—If it becomes necessary to splice on an additional length of Ribbon Type line, care should be exercised to avoid a mismatch at the splice. This is done by stripping the two lines back about ½ inch and then twisting the respective conductors together so that the insulation of one butts directly against the insulation of the other. If the splice is made with too large or too small a space between parallel wires, the line impedance will be changed at this point and serious reflections may occur. The twisted pairs should be soldered, avoiding excessive heating which will soften the insulation. Clip the protruding solder joints short and cover the splice with an insulating tape intended or high frequency purposes. Splicing of RG-22/U shielded cable is not recommended—use special connectors available for that purpose.

Routing and Securing—It is well to carefully consider the best route for the transmission line with respect to length and electrical disturbance shielding. A compromise must usually be made on the length so as to be able to take advantage of the shielding effect of the building against such disturbances as ignition noise and arcing from electrical transit systems. Whenever possible, the line should be run in a vertical direction so that rain, sleet, and snow will have less tendency to cling to it. If a horizontal run is necessary, it should be made under an eave or other protection. **Never run the line inside of metal pipes.**

The transmission line must not be allowed to make extensive contact with any surface (especially metal) and for this purpose, special stand-off insulators are supplied with the Stewart-Warner Television Antenna Kit. These insulators provide a means of supporting the line as well as maintaining proper spacing from surrounding surfaces. They may be screwed directly into wood without the aid of any other mounting device; however, when mounting in brick or stone it is necessary to use some type of expansion plug. If the weight supported by these stand-offs is small, the plug hole may be drilled in the mortar provided that this mortar is well bonded. It is preferable to drill the plug holes in the brick or stone proper, making sure that these holes are deep enough to accommodate the full length of the plug. After inserting the line in the slot of the stand-off insulator, the metal band around the insulator should be bent inward so that the insulator grips the transmission line and supports it in both the vertical and horizontal direction. The line should be pulled tight so that a heavy wind will not cause it to swing against any objects. Occasionally it will be physically impossible to install a stand-off insulator on the edge of a protruding parapet. Under such conditions it will be necessary to place some form of abrasion-resistant sleeving around the transmission line, holding it in place with tape. In locations where electrical noise creates an interference problem, the noise pick-up may be minimized by twisting the line about one turn per foot between the supporting stand-off insulators.

Various methods of bringing the transmission line into the house will occur to the installation man and consequently no specific instructions will be given. Irrespective of the method selected, best practice requires that precautions be taken to minimize contact of transmission line with surrounding surfaces and to properly seal the point of entry with a suitable mastic. Do not attempt to use any special lead-in devices at the window.

After the line has entered the home it should be routed by the shortest possible path to the receiver, taking special precautions to avoid contact with pipes, radiators or other metal objects. The line should preferably be supported by indoor type stand-off insulators as it is routed around the floor molding of the room. However, it may be tacked to the molding if run is short and relatively few tacks are required. Allow the line to droop away from the molding between supporting tacks for best efficiency.

Connecting Line to Receiver—A terminal strip such as shown at the bottom of Fig. 2 will be found on the rear of the chassis on Receiver Model AVT1 (see Figure 4), and at the bottom edge of the cabinet on Models AVC1 and AVC2 (see Figure 11). Connect the transmission line to these terminals. Under certain conditions improved reception results from reversing the connection of the line to these terminals, so it is suggested that picture quality be observed for both conditions before making a permanent connection of the transmission line.

When using RG-22/U shielded cable, connect the shield to chassis through a 470 Mmfd. mica condenser (see Figure 2). **Do not connect this shield directly to chassis.**

MATCHING SHIELDED CABLE TO RECEIVER—Where it is necessary to use RG-22/U shielded cable to minimize pick-up of external electrical interference, this cable should be matched to the receiver by a special impedance matching network (consisting of three **carbon resistors**) as illustrated in Figure 2—**Do not use wire wound resistors.** In exceedingly low signal strength areas the signal loss in the resistor matching network may make it advisable to dispense with the network and effect direct connection of the cable to the receiver antenna terminals, thereby tolerating the effects of the mismatch.

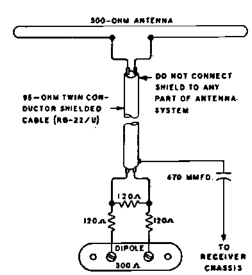


FIG. 2
MATCHING NETWORK FOR RG-22/U CABLE

RECEIVER CONTROLS

The various controls on the receiver may be divided into two classes, Operating and Preset. Operating controls are those which control program selection as well as sound and picture quality. These controls are located on the front panel and their functions are indicated in Figure 3.

The Preset controls are those which require adjustment at the time the receiver is installed and they rarely need attention thereafter. There are six of these controls, one of which is located at the back of the chassis on table models (see Figure 4) or at the bottom of the chassis when it is mounted vertically in the console models. The remaining five controls are accessible by removing the name plate escutcheon and "Channel Selector" knob from the front panel (see Figures 5 and 10).

CONTROL ADJUSTMENT PROCEDURE

CAUTION

This television receiver contains circuits which produce high voltages. Exercise care to avoid contact with the high voltage terminal of the Kinescope.

The picture tube is highly evacuated, and if broken, glass fragments will be violently expelled.

Adjustments of the focus coil or deflection yoke position should be made carefully to avoid undesirable strain on the neck of the tube.

Although the preset controls have been factory adjusted for optimum performance, it is usually necessary to make some fine adjustments of these controls at the time of installation.

To gain access to the centering adjustments (and ion trap used on Table Model only), it will be necessary to remove the back cover of the cabinet by taking out the screws around the rim.

Note that the focus coil is held in place during shipment by a special locking device that must be removed before attempting to re-position the coil as described in the following procedure. On Table Model AVT1 this locking device consists of two plates (see Figure 4) which can be removed by taking out retaining screws. In the case of Console Model AVC1, AVC2 and AVC3, the focus coil locking device is a single bracket (see Figure 11) that can be removed by taking off the wing nut at the right side of the coil frame.

The receiver is now ready for an operational check; proceed as follows:

1. **SETTING BRIGHTNESS AND CONTRAST CONTROLS**—Turn both of these controls to the fully counter-clockwise position so that intense illumination of a small area of the screen is avoided when receiver is first turned on.
2. **TURN SET ON**—Rotate "On-Off Switch" clockwise. Allow several minutes for all tubes in the receiver to warm up and for circuits to stabilize before attempting to obtain a picture on the screen.
3. **SET CHANNEL SELECTOR TO DESIRED CHANNEL**—Channel number on the knob should be opposite the Position Indicator as shown in Figure 3. The following table lists all authorized television channels and their corresponding frequency band.

STATION CHANNEL NUMBER	FREQUENCY BAND
2	54 to 60 Mc.
3	60 to 66 Mc.
4	66 to 72 Mc.
5	76 to 82 Mc.
6	82 to 88 Mc.
7	174 to 180 Mc.
8	180 to 186 Mc.
9	186 to 192 Mc.
10	192 to 198 Mc.
11	198 to 204 Mc.
12	204 to 210 Mc.
13	210 to 216 Mc.

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A

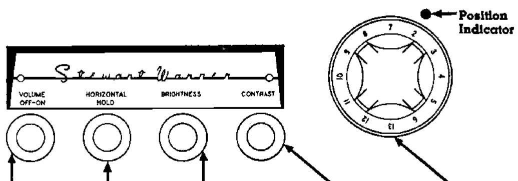


FIG. 3
OPERATING CONTROLS

ON-OFF SWITCH AND VOLUME CONTROL	HORIZONTAL HOLD CONTROL	BRIGHTNESS CONTROL	CONTRAST CONTROL	CHANNEL SELECTOR
Use to turn receiver on or off and to adjust for desired sound volume.	Adjust so that picture is stationary and does not move horizontally or break up into black and white streaks.	Adjust for picture brilliance. Re-adjust after setting "Contrast" control.	Adjust to receive picture and obtain correct contrast between light and dark shades.	Use to select desired television station. Set number on knob to indicator dot.

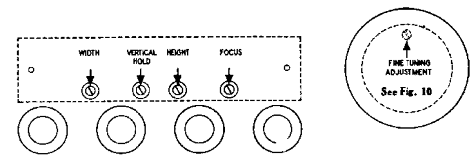


FIG. 5
PRESET CONTROLS

4. **ADVANCE BRIGHTNESS CONTROL**—Turn "Brightness" control clockwise until picture screen is moderately illuminated. In the case of Table Model AVT1 the screen may remain dark or dimly illuminated until ion trap is adjusted as described in next step.

   Should it be noted that a semi-circular portion of the raster is not illuminated, that condition may be disregarded as it will be corrected by subsequent adjustments.

5. **ADJUST ION TRAP (Model AVT1 Only)**—The ion trap is located on the neck of the picture tube as shown in Figure 4 and consists of two magnets held in position by metal bands. The magnet identified by the **blue** band must be in the forward position.

   Loosen the two clamp screws which secure the ion trap to the tube neck. Then rotate the entire trap assembly while sliding it back and forth until picture tube screen is illuminated to maximum brilliance. Reduce "Brightness" control setting and repeat this operation to assure accurate positioning of ion trap.

   If a semi-circular portion of the raster is shaded, it should be corrected as described in step 6.

6. **ELIMINATING SEMI-CIRCULAR SHADOW**—This shadow is caused by the electron stream striking the neck of the tube and it can generally be corrected by applying one or a combination of the following procedures:

   a. Reposition the focus co to the extent permitted by collar and swivel joint in the case of the Table Model AVT1 or swivel bracket assembly on Console Models AVC1, AVC2 and AVC3.

   b. Shift entire focus coil assembly up, down or sideways by loosening screws labeled A and B in Figures 4 and 11.

   c. Shift position of deflection yoke forward as far as possible against kinescope neck. Yoke is held in position by locking screw as illustrated in Figures 4 and 11.

   d. Move position of focus coil forward or backward on the neck of the tube. This is accomplished by releasing screws C and D, as well as yoke locking screw, in the case of Table Model AVT1 (see Figure 4); or by releasing wing nuts labelled B (in Figure 11) in the case of Console Models AVC1, AVC2 and AVC3. Yoke position should not be changed.

   In event the shading cannot be entirely eliminated on Table Model AVT1 by the above procedures, then make a slight change in the position of the ion trap until shading is corrected.

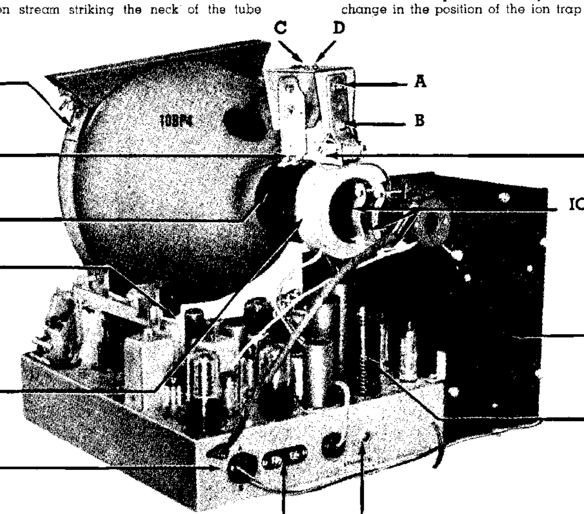


FIG. 4—MODEL AVT1 CHASSIS AND KINESCOPE ASSEMBLY

7. **ADVANCE CONTRAST CONTROL**—Rotate "Contrast" control clockwise until a picture or a series of horizontal black and white streaks appear on the screen.

   If picture or streaks fail to appear on the screen, then it will be necessary to make a **preliminary adjustment** of the "Fine Tuning" screw in order to tune to the desired television channel. This is accomplished by removing the "Channel Selector" knob (as illustrated in Figure 10) and turning channel tuning screw until sound portion of television broadcast is received with maximum volume (advance "Volume" control if nessessary). Then turn screw approximately ½ turn counter-clockwise or until volume is reduced about 25%.

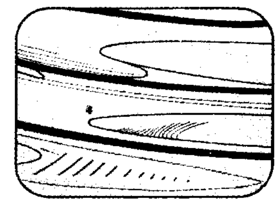


FIG. 6—HORIZONTAL MOVEMENT
ADJUST HORIZONTAL HOLD CONTROL

   Do not force the fine tuning screw if it becomes difficult to turn. This means that the screw has reached the end of its travel in that direction and its direction should be reversed.

8. **HORIZONTAL HOLD**—Should the picture appear to move horizontally across the screen or break up into a series of light and dark streaks as shown in Figure 6, adjust the "Horizontal Hold" control until the picture remains stationary.

   If this control must be rotated to the end of its range for proper "locking" action, then it will be necessary to re-set the position of an adjustable slug in the horizontal sync "flywheel" circuit (see Figures 4 and 11 for location of slug). Adjustment is accomplished by first setting the "Horizontal Hold" Control in the middle of its range and then changing the setting of the "flywheel" circuit slug until picture locks in horizontally.

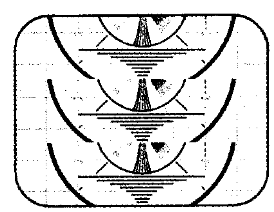


FIG. 7—VERTICAL MOVEMENT
ADJUST VERTICAL HOLD CONTROL

9. **VERTICAL HOLD**—Should the picture appear to roll by in a vertical direction or cause multiple vertical images as shown in Figure 7, it will be necessary to adjust the "Vertical Hold" control located behind the name plate escutcheon (see Figure 5).

   After this adjustment is made, reduce contrast until picture is barely visible and check setting of "Vertical Hold" control for proper picture synchronization.

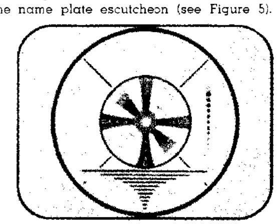


FIG. 8—BLURRED APPEARANCE
ADJUST FOCUS CONTROL

10. **INITIAL FOCUS**—Adjust the "Focus" control, located behind name plate escutcheon, until picture is clearly defined.

11. **SOUND VOLUME**—Adjust the setting of the "Volume" control by rotating it clockwise until the sound accompanying the television broadcast is received at a satisfactory level.

12. **FINE TUNING**—A "bar" pattern, such as shown in Figure 9 flickering across the screen in step with the sound indicates that the receiver may be incorrectly tuned to the desired television station and the sound portion of the broadcast is interfering with the picture. That condition can be remedied by the special tuning adjustment screw which is accessible after removing the "Channel Selector" knob as illustrated in Figure 10.

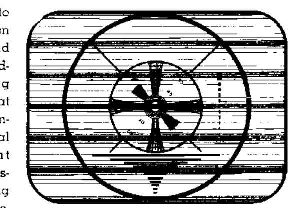


FIG. 9—SOUND-INTERFERENCE
CAUSED BY INCORRECT TUNING

Resetting of the fine tuning adjustment screw may be accomplished as follows:

a. Fine tuning adjustment screws are provided for all twelve television channels and the screw for each channel is accessible as indicated in Figure 10. Insert a screwdriver thru hole to engage this screw.

b. Turn screw slowly counter-clockwise (and then clockwise, if necessary) until sound volume is maximum—if sound portion of television broadcast cannot be heard, turn up the volume control and repeat adjustment of fine tuning screw.

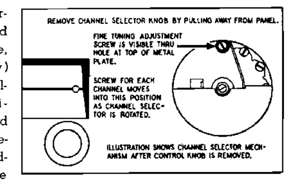


FIG. 10
FINE TUNING ADJUSTMENT

Do not force the fine tuning screw if it becomes difficult to turn. This means that the screw has reached the end of its travel in that direction and its direction should be reversed.

c. When the point of maximum sound volume has been reached by turning the fine tuning screw, it will be noted that the picture has a "ragged" or "saw tooth" appearance or is obscured by "sound bars" (dark horizontal bars of varying width—see Figure 9) moving vertically across the screen. **THE CORRECT SETTING OF THE FINE TUNING ADJUSTMENT is now obtained by turning the screw counter-clockwise from the maximum sound position only far enough to eliminate the "sound bar" interference and ragged appearance of the picture.**

d. This completes the adjustment for the particular channel. If there are stations operating on other channels it will be necessary to apply this fine tuning procedure for each channel. Merely replace "Channel Selector" knob and switch to desired channel; then remove knob again to adjust fine tuning screw for this channel.

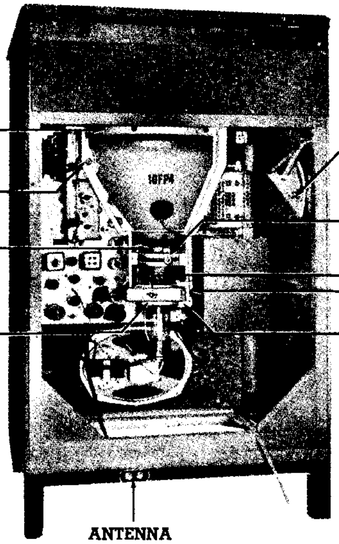


FIG. 11—REAR VIEW OF CONSOLE MODEL

The following adjustments should be made while the station is transmitting its **circular** test pattern.

13. **CENTERING**—Before attempting to center the test pattern on the screen, be sure that the focus coil locking device has been removed. This device is used only for clamping during shipment; see Figures 4 and 11. The pattern can then be readily centered by properly positioning the focus coil. This is done by turning the coil in the desired direction by hand.

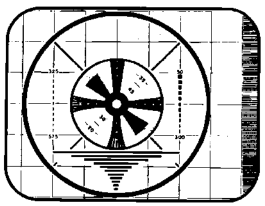


FIG. 12—OFF CENTER
ADJUST FOCUS COIL POSITION

14. **STRAIGHTENING TILTED RASTER**—If the pattern should appear on the screen in a tilted position as shown in Figure 13, loosen the deflection yoke locking screw (see Figures 4 and 11) and rotate the yoke sufficiently to correct this condition. Be sure to re-tighten the screw securely.

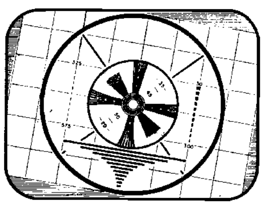


FIG. 13—TILTED PICTURE
ADJUST YOKE POSITION

15. **WIDTH** — Control of picture size in the horizontal direction is accomplished by means of the "Width" control located behind the name plate escutcheon. If abnormally low line voltage makes it difficult to obtain sufficient picture width when using the "Width" control, then changing the position of the deflection yoke on the picture tube may be helpful. Release yoke locking screw (see Figure 4 or 11) and slide the yoke about 1/4 inch toward the socket end of the tube.

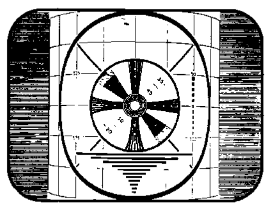


FIG. 14—TOO NARROW
ADJUST WIDTH CONTROL

16. **HEIGHT** — Control of picture size in the vertical direction is accomplished by means of the "Height" control located behind the name plate escutcheon. Height and width adjustments should be checked for all transmitting stations to be sure that picture properly fills the viewing area.

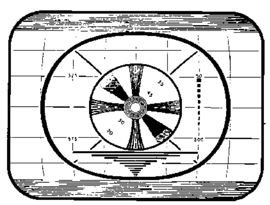


FIG. 15—TOO SHORT
ADJUST HEIGHT CONTROL

17. **VERTICAL LINEARITY** — Improper vertical linearity causes the circular test pattern to appear condensed on the upper edge of the screen and extended on the lower edge or vice versa. This effect is illustrated in Figure 16. Adjust for proper linearity by using "Vertical Linearity" control located on rear of chassis (see Figure 4). It may be necessary to readjust the "Height" control if an appreciable change is made in the linearity control setting.

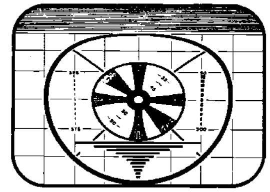


FIG. 16—VERTICAL DISTORTION
ADJUST VERTICAL LINEARITY CONTROL

18. **FINAL ADJUSTMENTS** — Recheck settings of "Brightness", "Contrast" and "Focus" controls for best picture quality.

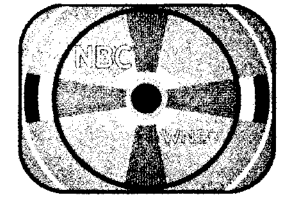


FIG. 17
CORRECTLY ADJUSTED PICTURE

GENERAL INFORMATION ON TELEVISION RECEPTION

The quality of the picture that is reproduced on the screen of a modern television receiver is dependent upon many factors, some of which are beyond the control of the receiver. The information presented in the following paragraphs is therefore intended to aid the installation and serviceman in becoming acquainted with the way a perfectly normal television receiver will perform when it receives transmitted picture signals which have been affected by some unfavorable external condition.

The strength of the transmitted picture signal that reaches the receiver is a vitally important factor in determining the quality of the picture that is reproduced on the screen. A very weak signal will produce a picture similar in appearance to that shown in Figure 18. In cases where the signal is exceedingly weak the picture has a "milky" appearance which is usually accompanied by a "speckled" or "snow" effect.

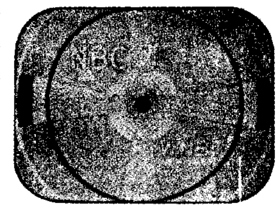


FIG. 18
WEAK SIGNAL

The characteristic of high frequency television signals which permits them to be reflected from the walls of nearby buildings or other objects may, under certain conditions, create "multiple transmission paths." This would permit the reflected signal to arrive at the antenna a short interval of time later than the signal traveling in a direct path from the transmitter and the effect produced on the picture of the television receiver is illustrated in Figure 19. These multiple images, known as "echoes" or "ghosts," may generally be prevented by careful installation and orientation of the antenna.

Aircraft in the vicinity may also produce a temporary "multiple transmission path" as the surfaces of a plane are capable of reflecting television signals. Although this source of interference is usually rare, its effect would be recognized by a temporary fluctuation in picture brightness and sound volume as well as the existence of a "ghost" image. In areas of relatively low signal strength, aircraft interference may cause the picture to temporarily lose synchronization or "tear out."

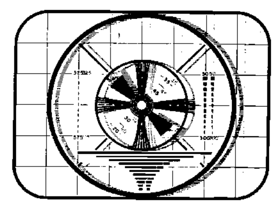


FIG. 19
MULTIPLE IMAGES

Severe static, or man-made electrical interference, which is audible in a conventional receiver may be both audible and visible in a television receiver. For example, interference from automobile ignition systems, inadequately filtered electrical appliances, arcing electrical contacts, elevators, street-cars, or electric signs may cause white streaks in the picture as shown in Figure 20. If the interference is particularly severe, the picture may lose synchronization and effects similar to those shown in Figures 6 and 7 will prevail.

A "herring-bone" pattern in a television picture indicates the existence of interference from electrically operated medical equipment such as diathermy machines. When such equipment is in relatively close proximity to a television receiver, the resulting interference may either partially or completely obliterate the picture as indicated in Figure 21.

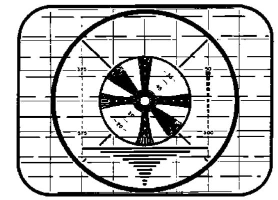


FIG. 20
AUTO IGNITION INTERFERENCE

Interference created by signals coming from a short wave transmitter that may be close to the receiver or operating on the wrong frequency will produce a pattern similar to that shown in Figure 9 but with the interference bars running **diagonally** across the picture.

If the quality of the television picture is unsatisfactory, the fault may not lie in the antenna system or the receiver, but may be due to temporary operating difficulty at the transmitting station. Keep in mind that television picture quality is heavily dependent upon the lighting conditions of the actual scene. Where the "telecast" originates in the studio of the transmitting station, excellent results may be expected since lighting conditions can be closely controlled; however, where the "telecast" originates from locations outside of the studio, lighting conditions may occasionally be inadequate for highest quality picture reproduction.

Should you find that poor quality is noted when observing a "telecast" of a motion picture film, this may be due to the quality of the film—wait until the motion picture program is finished and observe whether picture quality improves when the next studio program begins. If there is more than one television station in the locality it is always desirable to tune in on another station and obtain a quick check on picture quality whenever some transmission fault is suspected.

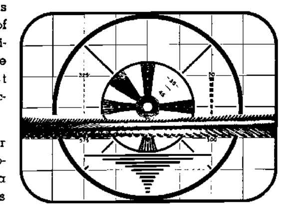


FIG. 21
DIATHERMY INTERFERENCE

ALIGNMENT PROCEDURE
FOR
STEWART-WARNER TELEVISION RECEIVERS
MODELS AVT1, AVC1, AVC2 & AVC3

Alignment of all RF and IF tuned circuits in this receiver may be accomplished by utilizing the procedures described in the following charts.

SEQUENCE OF ALIGNMENT: These procedures should preferably be applied in the order in which they are presented, however, alignment of the Sound Channel or IF Channel may be accomplished individually if desired.

When undertaking alignment of the RF tuner circuits it is vitally important to first check the IF Channel alignment and obtain the proper IF band pass characteristic as results of RF circuit tuning are observed by means of an oscilloscope connected to the output of the detector stage.

REMOVAL OF CHASSIS: The receiver chassis must be removed from the cabinet in order to accomplish alignment of all tuned circuits as there are eight adjustment points located on the underside of the unit.

On table models the chassis should be removed from the cabinet without disturbing the picture tube or speaker. Inter-connection of focus coil, yoke, picture tube, speaker and chassis may be conveniently achieved by using special extension cables which are available for service purposes. These cables can be obtained through the nearest Stewart-Warner distributor by ordering as follows:

507443 High Voltage Ext. Cable & Plugs.
507444 Deflection Yoke Ext. Cable & Plugs.
507445 Picture Tube Ext. Cable & Plugs.
507446 Focus Coil Ext. Cable & Plugs.
507447 Speaker Ext. Cable & Plugs.

On console models the picture tube must be removed from the cabinet before the chassis can be taken out. The picture tube, yoke, focus coil and support frame can be removed as a complete assembly by taking off the wing nuts which hold the frame to top panel of cabinet. Allow speaker to remain in the cabinet. After picture tube and chassis have been removed it will be convenient to inter-connect all units by means of the special extension cables listed above.

CAUTION

The picture tube is highly evacuated and if broken, glass fragments will be violently expelled. Handle with care, using safety goggles and gloves. Avoid contact with high voltage terminal at side of tube even after it has been disconnected from the receiver—this precaution is necessary as inner and outer coatings on the tube form a capacitor which may carry a high voltage charge for an extended period of time after disconnection from the receiver.

The metal shield which covers the bottom side of the RF tuner assembly must be left in position throughout the alignment procedure. Injection of generator signals for IF Channel alignment is accomplished through an opening in the bottom of this shield (see Fig. 3).

INSTRUMENTS: The following instruments will be required as signal sources and output indicators during the alignment process. Since accurate alignment of a television receiver is heavily dependent upon the performance of your instruments, it is imperative that they meet the essential specifications described here.

1. **STANDARD SIGNAL GENERATOR** to provide unmodulated (pure RF) signals at the following frequencies. Maximum output on all ranges should be at least .1 volt with provision for attenuation as desired. This instrument must have good frequency stability and be accurately calibrated. Generators which incorporate a separate crystal controlled oscillator and heterodyne circuit are self calibrating and therefore capable of providing the accuracy of frequency calibration required for television circuit alignment.

   a. IF Frequencies:
   4.5 Mc. Sound Channel
   22.25 Mc. Sound IF marker
   23.2 Mc. 1st and 3rd IF stages
   24.7 Mc. 4th IF stage
   26.3 Mc. Converter and 2nd IF stages
   26.75 Mc. Picture IF marker

   b. RF Frequencies:

CHANNEL NO.	PICTURE CARRIER FREQ.	SOUND CARRIER FREQ.
2	55.25 Mc.	59.75 Mc.
3	61.25 Mc.	65.75 Mc.
4	67.25 Mc.	71.75 Mc.
5	77.25 Mc.	81.75 Mc.
6	83.25 Mc.	87.75 Mc.
7	175.25 Mc.	179.75 Mc.
8	181.25 Mc.	185.75 Mc.
9	187.25 Mc.	191.75 Mc.
10	193.25 Mc.	197.75 Mc.
11	199.25 Mc.	203.75 Mc.
12	205.25 Mc.	209.75 Mc.
13	211.25 Mc.	215.75 Mc.

2. **RF SWEEP GENERATOR** to provide frequency modulated signals at the following frequencies:

   4.5 Mc. with 500 Kc. sweep width.
   20 to 30 Mc. with 10 Mc. sweep width.
   54 to 88 Mc. with 10 Mc. sweep width.
   174 to 216 Mc. with 10 Mc. sweep width.

   Output adjustable with at least .1 volt maximum.

   Output should be "flat" (no amplitude variation) for all settings of the sweep width control.

   Provision for connection of generator sweep modulating voltage to horizontal deflection system of an oscilloscope.

   Provision for blanking the output signal on each return sweep so that oscillogram will not show retrace.

3. **CATHODE RAY OSCILLOSCOPE**, preferably a unit with vertical amplifier having wide range frequency response and low capacity pick-up probe.

4. **VACUUM TUBE VOLTMETER.** The lowest voltage range of this instrument should preferably permit a 1.0 volt reading to be indicated at not less than one third of full scale deflection.

INSTRUMENT CONNECTIONS: This chassis has its B— system connected directly to one side of the AC power line. Therefore the following precautions must be observed before making connections to test instruments during service operations. Failure to do so may result in severe shock if contact is made between test equipment and "earth" ground, or a short circuit might occur if ground terminal of test equipment is connected to "earth" ground.

1. Connect an AC voltmeter between B— of receiver chassis and an "earth" ground (radiator, water pipe, etc.). If meter reading is not zero, reverse receiver power cord plug at wall receptacle.
2. Connect an AC voltmeter between ground terminal of test instrument and an "earth" ground (radiator, water pipe, etc.). If meter reads **FULL LINE VOLTAGE**, reverse instrument power cord plug at wall outlet. If meter reads 60 volts or less, do not disturb instrument power cord plug.
3. Ground terminal of test instrument may now be connected to B— system of receiver.

These instrument connection precautions can be avoided if an isolation transformer is connected between receiver power cord and power supply outlet.

The circuit arrangement, including details of matching and coupling networks, for instruments used in this alignment procedure is given in Figs. 1 to 4 inclusive. Specific instructions for each instrument application will be found in various sections of the alignment charts.

GENERAL INSTRUCTIONS: When aligning IF and RF circuits it is necessary to apply a fixed bias voltage to the AGC system of the receiver. This fixed bias is obtained by using a 1½ volt battery and connecting it as described in Fig. 6.

IMPORTANT

When observing the receiver band pass characteristic on an oscilloscope, it is exceedingly important to avoid distortion of that characteristic which would occur when using a large input signal from the sweep generator or standard generator (marker signal). Always set attenuator on sweep generator so that the reading on a vacuum tube voltmeter, connected across 8200 ohm diode load resistor (symbol 242 on schematic) does not exceed one volt. Standard generator output should also be attenuated so that marker signal does not pull or tear the band pass characteristic as shown on the 'scope.

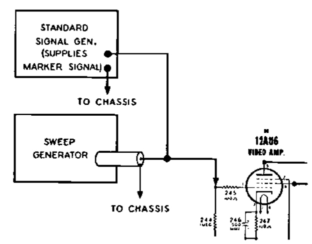


FIG. 1

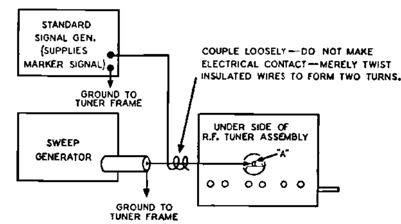


FIG. 3

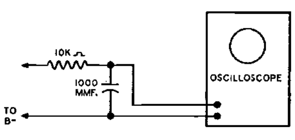


FIG. 2

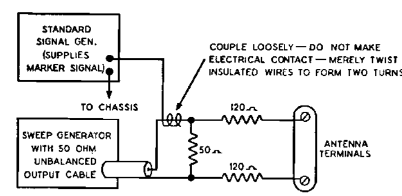
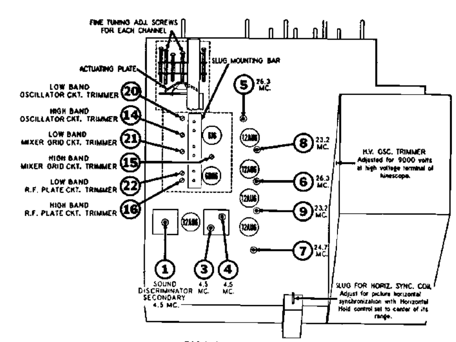
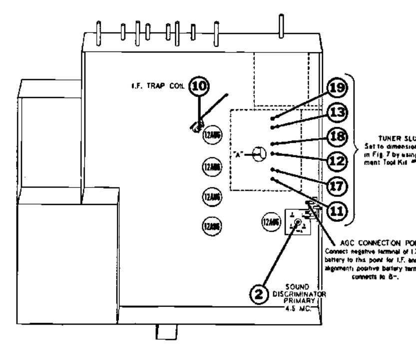


FIG. 4



TOP VIEW OF CHASSIS
FIG. 5



BOTTOM VIEW OF CHASSIS
FIG. 6

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A

SOUND CHANNEL ALIGNMENT PROCEDURE

1. Set Contrast control in maximum clockwise position. Other controls may be left at any desired setting.
2. Two 68,000 ohm resistors will be required for alignment of the discriminator circuit. These resistors must be matched so that their respective resistances do not differ by more than 1%—the accuracy of the total resistance is not critical. Connect the two resistors in series from pin 2 of 19T8 tube to B—.
3. Set receiver Channel Selector to any inactive television channel; also connect a jumper wire between antenna terminals at rear of chassis.
4. A special aligning tool, designed to fit the stems on adjustable cores in the sound take-off transformer, as well as the other IF coils (see points 3, 4, 5, 6, 7, 8 and 9 in Figs. 5 and 6) is available and may be obtained from Stewart-Warner by requesting Alignment Tool Kit #507475. This kit also contains three tools required to position the slugs in the RF tuner assembly.

STANDARD SIGNAL GENERATOR		SWEEP GENERATOR		VTVM CONNECTIONS	OSCILLOSCOPE CONNECTIONS	MISCELLANEOUS INSTRUCTIONS	TRIMMER OR SLUG	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
CONNECTIONS	FREQUENCY	CONNECTIONS	FREQ.					
Connect as shown in Figure 1.	4.5 MC. (unmodulated) IMPORTANT This signal must be accurate within ¼ of 1% of 4.5 Mc. Check generator calibration against a crystal controlled signal source by "zero beating" (heterodyning) with harmonics of the crystal frequency.	Connect as shown in Fig. 1, but keep instrument power switch turned off during this step.	——	Connect from pin 2 of 19T8 tube to B—. "Common" or "ground" lead of VTVM must connect to B— line in receiver.	Not used	——	#1 Discriminator Secondary	Adjust for maximum reading on VTVM.
							#2 Discriminator Primary	Adjust for maximum reading on VTVM.
							#3 Sound Take-off Transformer	Adjust for maximum reading on VTVM.
							#4 Sound Take-off Transformer	Adjust for maximum reading on VTVM.
Same as above	Same as above	Same as above	——	See note #2 at the head of this chart. After resistors are connected in series between pin 2 of 19T8 tube and B— then connect "common" or "ground" lead of meter to the junction of these resistors. D.C. probe lead of meter should now be connected to tertiary winding of discriminator transformer (see terminal 6 on circuit diagram, also in Fig. 6).	Not used	——	#1 Discriminator Secondary	Note that as slug #1 is rotated, a point will be found where the voltmeter will swing rather sharply from a positive to a negative reading or vice versa. The correct setting of slug #1 is obtained when the meter reads zero as the slug is moved thru this point.
IMPORTANT: Remove the two 68,000 ohm resistors which were used in the preceding step (connected between pin 2 of the 19T8 and B—) for special connection of the VTVM.								
Allow instrument to remain connected as shown in Fig. 1 but keep power switch turned off during this step.	——	Connect as shown in Fig. 1 and set controls for operation as specified in next column.	4.5 MC. Sweeping ± 250 Kc.	Not used	Use coupling network shown in Fig. 2. Connect vertical amplifier "high" lead in series with the 10K ohm resistor to high side of receiver volume control (see note "A" in next column). Connect 'scope ground lead to B— line in receiver chassis. —— Set vertical amplifier of 'scope for maximum amplification.	A. Note that "audio" socket near the right rear corner of the chassis provides a convenient means of effecting 'scope connection to high side of volume control. B. Synchronize oscilloscope with sweep generator by connecting "horizontal input" terminals of 'scope to source of horizontal sweep modulating voltage on the sweep generator.		A pattern similar to that shown in Fig. 8 should appear on the oscilloscope screen. Check for symmetry about the 4.5 Mc. center point and linearity of the slope for at least 50 Kc. on either side of this point. If the characteristic is not shaped properly, attempt to obtain symmetry by changing the setting of slug #1. Should that fail to produce the desired result, then a slight adjustment of slugs #3 and #4 should be undertaken.

IF CHANNEL ALIGNMENT PROCEDURE

1. Turn receiver Channel Selector to television channel #13 and short antenna terminals together with a jumper wire.
2. Connect a 1½ volt battery to the receiver AGC system so that negative terminal of battery connects to the AGC line and positive terminal of battery connects to B—. See Fig. 6 for convenient point of connection.
3. Note location of IF Trap Coil #10 by referring to Fig. 6. Before undertaking the alignment of any of the IF stages, Trap Coil #10 must be detuned so that it does not resonate in the IF pass band. Detuning is accomplished by merely compressing the windings so that they are closely spaced. Failure to detune the Trap Coil can cause the IF system to become regenerative thereby preventing alignment.
4. If the IF channel is badly misaligned and two or more immediately adjoining IF stages are tuned to the same frequency, oscillation may occur. Such oscillation shows up as a voltage across the 8200 ohm diode load resistor and is indicated by the VTVM that is connected to this point during alignment. It should be noted that voltage due to IF oscillation is unaffected by strength of signal from the generator.

   Where IF oscillation is encountered, it is generally possible to correct the condition by detuning the IF coils in different directions. If that does not have the desired effect, increase fixed bias on AGC line by using a 3 or 4½ volt battery instead of the 1½ volt battery referred to in instruction #2. After stopping the oscillation in this manner it will then be possible to align all IF stages using the following procedure, however, the AGC bias battery must be changed back to 1½ volts when using the oscilloscope to observe band pass characteristic. Once all stages have been aligned using the 3 to 4½ volt bias, the IF channel should be stable with reduced bias.
5. A special aligning tool, designed to fit the stems on adjustable cores of the IF coils (see points 5, 6, 7, 8 and 9 in Fig. 5), is available and may be obtained from Stewart-Warner by requesting Alignment Tool Kit #507475. This kit also contains three tools required to position the slugs in the RF tuner assembly.

STANDARD SIGNAL GENERATOR		SWEEP GENERATOR		VTVM CONNECTIONS	OSCILLOSCOPE CONNECTIONS	MISCELLANEOUS INSTRUCTIONS	TRIMMER OR SLUG	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
CONNECTIONS	FREQUENCY	CONNECTIONS	FREQ.					
Connect as shown in Fig. 3. The position of terminal "A" on underside of tuner is also illustrated in Fig. 6.	26.3 MC.	Connect as shown in Fig. 3 but keep power switch turned off during this step.	——	Connect a 15K ohm resistor to probe lead of meter and then connect open end of this resistor to junction of .05 Mfd. condenser (#243) and 8.2K ohm resistor (#242) located in the detector plate circuit of the 12AL5 tube. "Common" or "ground" lead of VTVM must be connected to B— line in receiver chassis.	Not used.	——	#5 Converter plate coil	Adjust for maximum reading on VTVM.
							#6 2nd I.F.	Adjust for maximum reading on VTVM.
Same as above.	24.7 MC.	Same as above.	——	Same as above.	Not used.		#7 4th I.F.	Adjust for maximum reading on VTVM.
Same as above.	23.2 MC.	Same as above.	——	Same as above.	Not used.		#8 1st I.F.	Adjust for maximum reading on VTVM.
							#9 3rd I.F.	Adjust for maximum reading on VTVM.
Same as above.	22.25 MC.	With connections made as shown in Fig. 3, turn on this generator and set controls for operation as specified in next column.	25 MC. Sweeping ± 5 Mc.	Same as above.	Use coupling network shown in Fig. 2. Connect vertical amplifier "high" lead in series with the 10K ohm resistor to junction of .05 Mfd. condenser (#243) and 8.2K ohm resistor (#242) located in the detector plate circuit of the 12AL5 tube. Connect 'scope ground lead to B— line in receiver chassis.	IMPORTANT: 1. Adjust output attenuator on sweep generator so that reading on VTVM is one volt. 2. Set attenuator on st'd. signal generator so that 22.25 Mc. marker signal does not distort the pattern on the oscilloscope. 3. Be sure that a 1½ volt battery is connected to AGC line as specified in instruction #2 at the head of this chart. Do not use a battery of any other voltage.		The IF band pass characteristic, now displayed on the 'scope, should be compared with the curve shown in Fig. 9. If top of curve is not properly shaped, make a slight readjustment of slug #7. Should that adjustment fail to yield the desired result, then note whether the curve has a peak on the high or low frequency side. Slugs #5 and #6 control high frequency response (26.3 Mc.) and slugs #8 and #9 affect the low frequency response (23.2 Mc.); by making a small change in the settings of the high or low frequency slugs, it will be possible to obtain correct band pass curve. Sound "plateau" on low frequency side of curve is formed by adjusting trap coil as described in the last paragraph of this chart.

Set standard signal generator to 26.75 Mc. (picture IF carrier frequency) and this marker signal should now appear at the 50% amplitude position on the side of the band pass characteristic. If the position of the marker appears too high or too low, slight readjustment of slugs #5, 6 and 7 is required. Be sure to use a weak marker signal, otherwise it may distort the curve.

Attenuated area ("plateau") on sound carrier side of IF band pass characteristic (Fig. 9) is obtained by adjusting the spacing of the winding of Trap Coil #10 (see Fig. 6 for location of this coil). By spreading the coil winding a small amount, and observing the response curve on the 'scope, it will be possible to form a "plateau" in the vicinity of 22 to 22.5 Mc. The marker signal for 22.25 Mc. should now appear at a position approximately 20% out on the plateau from the steep side of the characteristic.

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A

RF CHANNEL ALIGNMENT PROCEDURE

1. Connect a 1½ volt battery to the receiver AGC system so that negative terminal of battery connects to the AGC line and positive terminal of battery connects to B— (see Fig. 6 for convenient point of connection).
2. Do not remove the shield on the underside of the RF tuner unit. This shield must remain in position during alignment.
3. Before undertaking alignment of the RF tuner it is necessary to set the tuning slugs to their correct mechanical position as shown in Fig. 7 (see slugs numbered 11, 12, 13, 17, 18 and 19). That is accomplished by first turning the receiver Channel Selector Knob to channel #12 and then using three special tools that are supplied by Stewart-Warner in Alignment Tool Kit #507475. Note that bottom tip of each slug is color coded and that the aligning tools are identified by corresponding colors as the tools differ in length.
Using the correct color coded tool for a particular slug, insert the tool thru the coil opening in the bottom of the tuner unit so that it engages a slot in the bottom of the slug. Then turn the slug counter-clockwise several times so as to insure that the tool is properly engaging the slug.
The actuating plate of the tuner mechanism (see Fig. 5) should now be pressed back against its mechanical stop so that the slugs are withdrawn from the coil forms as far as possible. Then, rotate the aligning tool clockwise so that it turns the slug in its support bar. By continuing to rotate the slug in a clockwise direction, a position will be reached where the slug disengages from the aligning tool and this automatically determines the correct setting.

All six slug cores in the tuner mechanism should be mechanically set in this manner, using the aligning tool which corresponds in color to the color on the bottom tip of the tuning slug.

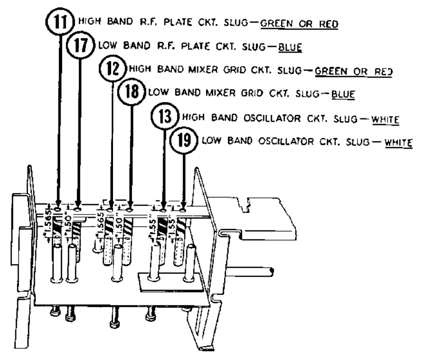


FIG. 7

STANDARD SIGNAL GENERATOR		SWEEP GENERATOR		VTVM CONNECTIONS	OSCILLOSCOPE CONNECTIONS	MISCELLANEOUS INSTRUCTIONS	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
CONNECTIONS	FREQUENCY	CONNECTIONS	FREQ.				

HIGH BAND ALIGNMENT

After the tuning slugs have been positioned as described in step #3 at the head of this chart, leave Channel Selector set to channel #12. The fine tuning screw in the Channel Selector Mechanism (see Fig. 5) must now be correctly positioned. Turn this screw clockwise until tuner actuating plate (shown in Fig. 5) has moved back as far as it will go and presses against its mechanical stop—do not force screw beyond this point. Then, **back off the fine tuning screw by rotating it counter-clockwise 3 full turns.**

Connect as shown in Fig. 4.	205.25 MC.	Connect as shown in Fig. 4 and set controls for a sweep width of 10 Mc. on television channel specified in the next column.	CHANNEL #12 204 to 210 Mc.	Connect a 15K ohm resistor to probe lead of meter and then connect open end of this resistor to junction of .05 Mfd. condenser (#243) and 8.2K ohm resistor (#242) located in the detector plate circuit of the 12AL5 tube. "Common" or "ground" lead of VTVM must be connected to B— line in receiver chassis.	Use coupling network shown in Fig. 2. Connect vertical amplifier "high" lead in series with the 10K ohm resistor to junction of .05 Mfd. condenser (#243) and 8.2K ohm resistor (#242) located in the detector plate circuit of the 12AL5 tube. Connect 'scope ground lead to B— line in receiver chassis.	Receiver Channel Selector Knob set to Channel #12. IMPORTANT During this step and thruout all succeeding steps of the RF alignment procedure it is necessary to: 1. Keep output of sweep generator at a level that does not allow reading on VTVM to exceed one volt. 2. Keep output of st'd. signal generator at a level that provides a readable marker but does not distort the curve that is being observed on the 'scope.	**Adjust High Band Oscillator Trimmer #14** so that band pass characteristic appears on the 'scope and marker signal is located at approximately the 50% amplitude position on the low frequency side of the curve. Do not attempt to shape the curve with this trimmer—that must be accomplished with the RF trimmers as described in the next step. Before proceeding with the alignment of channel #12 it is necessary to turn the Channel Selector Knob to channel #13 and determine whether that channel can be received when the sweep generator is set for operation on channel #13; marker generator should be set to indicate position of pix. carrier at 211.25 Mc. Adjust channel #13 fine tuning screw (in Channel Selector Mechanism; see Fig. 5) and note whether band pass curve can be centered on horizontal trace line of 'scope. If channel #13 curve can be tuned in, then return the Channel Selector Knob to channel #12 and proceed with next step. If channel #13 cannot be tuned in, then return Channel Selector Knob to channel #12 and repeat the operation described above under the heading "High Band Alignment," however, back off the fine tuning screw 3½ turns instead of 3 turns as originally specified. Then set oscillator trimmer #14 as described in this step and also recheck to see that channel #13 signal comes in when selector is set to that channel.
Same as above.	205.25 MC.	Same as above.	CHANNEL #12 204 to 210 Mc.	Same as above.	Same as above.	Receiver Channel Selector Knob set to Channel #12.	**Adjust High Band RF Trimmers #15** and **#16** for properly shaped overall band pass characteristic as illustrated in Fig. 10. If marker signal for picture carrier is not located at the 50% amplitude position, change setting of oscillator trimmer #14 so that pattern shifts in desired direction.

STANDARD SIGNAL GENERATOR		SWEEP GENERATOR		VTVM CONNECTIONS	OSCILLOSCOPE CONNECTIONS	MISCELLANEOUS INSTRUCTIONS	TYPE OF ADJUSTMENT AND OUTPUT INDICATION
CONNECTIONS	FREQUENCY	CONNECTIONS	FREQ.				

(Continued from preceding page)

IMPORTANT: When adjusting trimmers #15 and #16 it will be noted that the band pass characteristic can be broadened by sacrificing amplitude. It is undesirable to overly broaden the curve as that would result in a loss of sensitivity. Band width specified in Fig. 10 must not be exceeded if proper sensitivity is to be achieved.

The band pass characteristics of channels #7, 8, 9, 10, 11 and 13 should now be checked successively without disturbing the settings of the high band trimmers. Adjust the RF sweep generator and marker generator for operation on each of these channels with marker set at picture carrier frequency (see table on first page for pix. carrier frequency of each channel). Band pass characteristic of these channels should conform to the curves shown in Fig. 10. If one or two channels have a slightly peaked response, it is desirable to have the peak fall on the sound carrier side rather than the picture carrier side. A compromise on the magnitude of the peak can be obtained by returning to channel #12 and lowering the response on the side of the characteristic which tends to rise when the tuner was previously set to lower channels.

LOW BAND ALIGNMENT

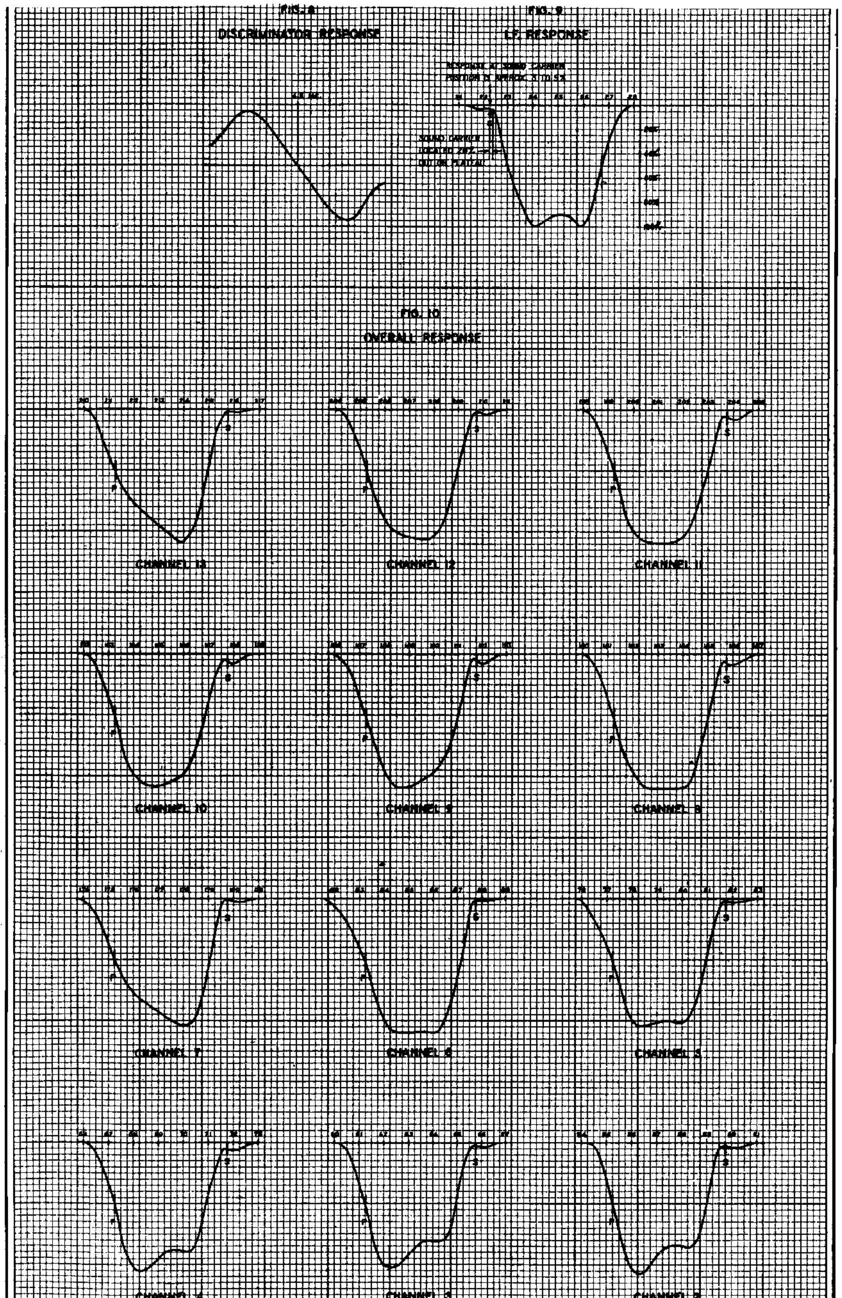
After the tuning slugs have been positioned as described in step #3 at the head of this chart, leave Channel Selector set to channel #6. The fine tuning screw in the Channel Selector Mechanism (see Fig. 5) must now be correctly positioned. Turn this screw clockwise until tuner actuating plate (shown in Fig. 5) has moved back as far as it will go and presses against its mechanical stop—do not force screw beyond this point. Then, **back off the fine tuning screw by rotating it counter-clockwise 1 full turn.**

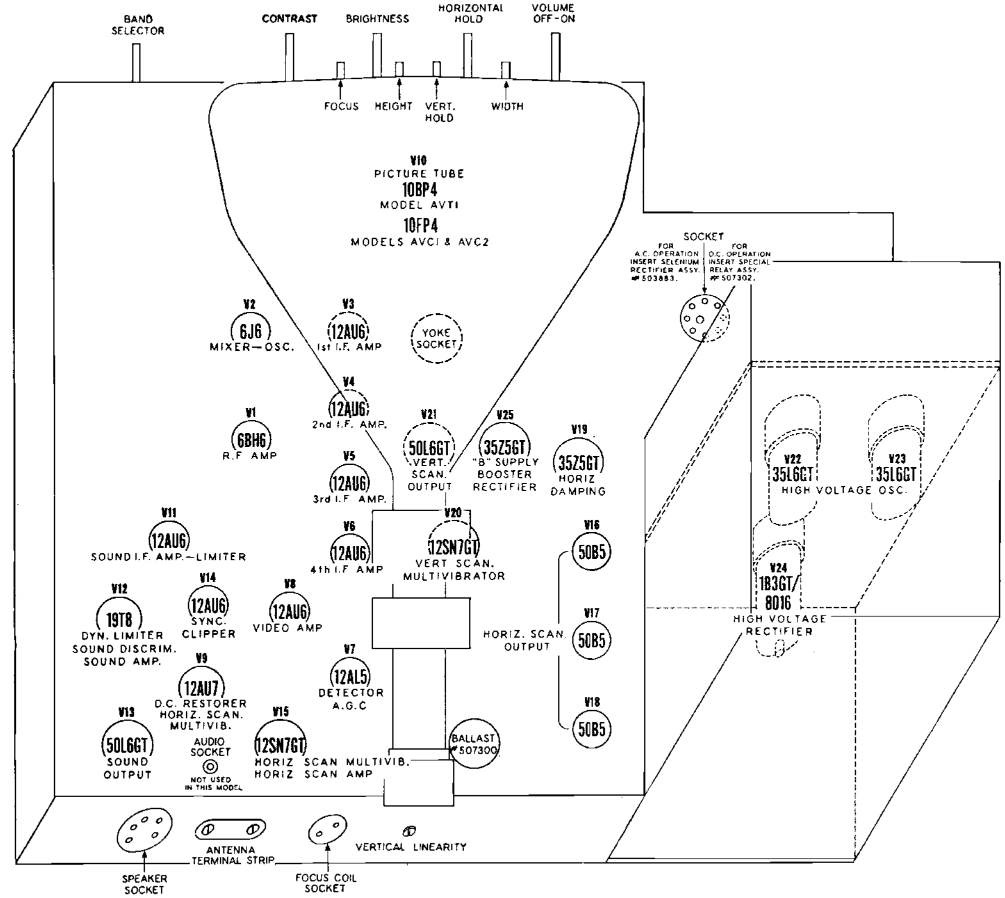
Connect as shown in Fig. 4.	83.25 MC.	Connect as shown in Fig. 4 and set controls for a sweep width of 10 Mc. on television channel specified in the next column.	CHANNEL #6 82 to 88 Mc.	Connect a 15K ohm resistor to probe lead of meter and then connect open end of this resistor to junction of .05 Mfd. condenser (#243) and 8.2K ohm resistor (#242) located in the detector plate circuit of the 12AL5 tube. "Common" or "ground" lead of VTVM must be connected to B— line in receiver chassis.	Use coupling network shown in Fig. 2. Connect vertical amplifier "high" lead in series with the 10K ohm resistor to junction of .05 Mfd. condenser (#243) and 8.2K ohm resistor (#242) located in the detector plate circuit of the 12AL5 tube. Connect 'scope ground lead to B— line in receiver chassis.	Receiver Channel Selector Knob set to Channel #6. IMPORTANT During this step and thruout all succeeding steps of the RF alignment procedure it is necessary to: 1. Keep output of sweep generator at a level that does not allow reading on VTVM to exceed one volt. 2. Keep output of st'd. signal generator at a level that provides a readable marker but does not distort the curve that is being observed on the 'scope.	**Adjust Low Band Oscillator Trimmer #20** so that band pass characteristic appears on the 'scope and marker signal is located at approximately the 50% amplitude position on the low frequency side of the curve. Do not attempt to shape the curve with this trimmer—that must be accomplished with the RF trimmers as described in the next step. Before proceeding with the alignment of channel #6 it is necessary to turn the Channel Selector Knob to channel #2 and determine whether that channel can be received when the sweep generator is set for operation on channel #2; marker generator should be set to indicate position of pix. carrier at 55.25 Mc. Adjust channel #2 fine tuning screw (in Channel Selector Mechanism; see Fig. 5) and note whether band pass curve can be centered on horizontal trace line of 'scope. If channel #2 curve can be tuned in, then return the Channel Selector Knob to channel #6 and proceed with next step. If channel #2 cannot be tuned in, then return Channel Selector Knob to channel #6 and repeat the operation described above under the heading "Low Band Alignment," however, back off the fine tuning screw ¾ turn instead of 1 turn as originally specified. Then set oscillator trimmer #20 as described in this step and also recheck to see that channel #2 signal comes in when selector is set to that channel.
Same as above.	83.25 MC.	Same as above.	CHANNEL #6 82 to 88 Mc.	Same as above.	Same as above.	Receiver Channel Selector Knob set to Channel #6.	**Adjust Low Band RF Trimmers #21** and **#22** for properly shaped overall band pass characteristic as illustrated in Fig. 10. If marker signal for picture carrier is not located at the 50% amplitude position, change setting of oscillator trimmer #20 so that pattern shifts in desired direction.

IMPORTANT: When adjusting trimmers #21 and #22 it will be noted that the band pass characteristic can be broadened by sacrificing amplitude. It is undesirable to overly broaden the curve as that would result in a loss of sensitivity. Band width specified in Fig. 10 must not be exceeded if proper sensitivity is to be achieved.

The band pass characteristic of channels #2, 3, 4 and 5 should now be checked successively without disturbing the settings of the low band trimmers. Adjust the RF sweep generator and marker generator for operation on each of these channels with marker set at picture carrier frequency (see table on first page for pix. carrier frequency of each channel). Band pass characteristic of these channels should conform to the curves shown in Fig. 10. If one or two channels have a slightly peaked response, it is desirable to have the peak fall on the sound carrier side rather than the picture carrier side. A compromise on the magnitude of the peak can be obtained by returning to channel #6 and lowering the response on the side of the characteristic which tends to rise when the tuner was previously set to lower channels.

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A





TUBE LOCATIONS AND FUNCTIONS

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A

SOCKET VOLTAGES

CAUTION

THE PICTURE TUBE is highly evacuated and if broken, glass fragments will be violently expelled. Handle with care and if it is necessary to change this tube, use safety goggles and gloves.

HIGH VOLTAGE (approximately 9200) is produced in a supply circuit of this receiver. Exercise care to avoid contact with elements of this circuit and particularly the tube terminals which are labeled "CAUTION" in the adjoining voltage chart. If measurement of voltage at these points is necessary, see procedure given below under note "N".

INTERMEDIATE B+ VOLTAGES are dangerous and caution should be observed when the receiver chassis components are exposed for service purposes.

INSTRUMENT CONNECTIONS: This chassis has its B— system connected directly to one side of the AC power line. Therefore the following precautions must be observed before making connections to test instruments during service operations. Failure to do so may result in severe shock if contact is made between test equipment and "earth" ground or, a short circuit might occur if ground terminal of test equipment is connected to "earth" ground.

1. Connect an AC voltmeter between B— of receiver chassis and an "earth" ground (radiator, water pipe, etc.). If meter reading is not zero, reverse receiver power cord plug at wall receptacle.
2. Connect an AC voltmeter between ground terminal of test instrument and an "earth" ground (radiator, water pipe, etc.). If meter reads FULL LINE VOLTAGE, reverse instrument power cord plug at wall outlet. If meter reads 60 volts or less, do not disturb instrument power cord plug.
3. Ground terminal of test instrument may now be connected to B— system of receiver.

These instrument connection precautions can be avoided if an isolation transformer is connected between receiver power cord and power supply outlet.

The voltages shown on the adjoining chart were measured on "Series W" chassis and under the following conditions. When servicing chassis other than "Series W", refer to table of Production Changes on schematic diagram page for details of circuit differences which may affect certain operating voltages.

1. Power supply — 117 volts 60 cycle AC.
2. All voltages, with exception of tube filament voltages, are measured between socket terminals and B—. Filament voltages are measured across tube terminals.
3. *— Measurements made with voltmeter having a sensitivity of 1000 ohms per volt except where indicated by (*). The (*) symbol designates a vacuum tube voltmeter measurement.
4. No input signal — antenna terminals shorted together.
5. Channel Selector set for high band operation unless otherwise indicated by notes "J" and "K".
6. All other controls were set to their COUNTER-CLOCKWISE position unless the voltage shown on the chart is followed by a letter to indicate a special condition of measurement as outlined in Step 7.
7. Certain voltages were measured with two different settings of a specific control. It should therefore be understood that in these instances all controls, with exception of one, were set in their counter-clockwise position — a letter following the voltage shown on the chart indicates this exception and is explained below.

A	Vert. Lin. control max. clockwise	F	Focus control max. clockwise
B	Brightness control max. clockwise	G	Vert. Hold control max. clockwise
C	Contrast control max. clockwise	H	Height control max. clockwise
D	Horiz. Hold control max. clockwise	J	Channel Selector set to Chan. #10
E	Width control max. clockwise	K	Channel Selector set to Chan. #4

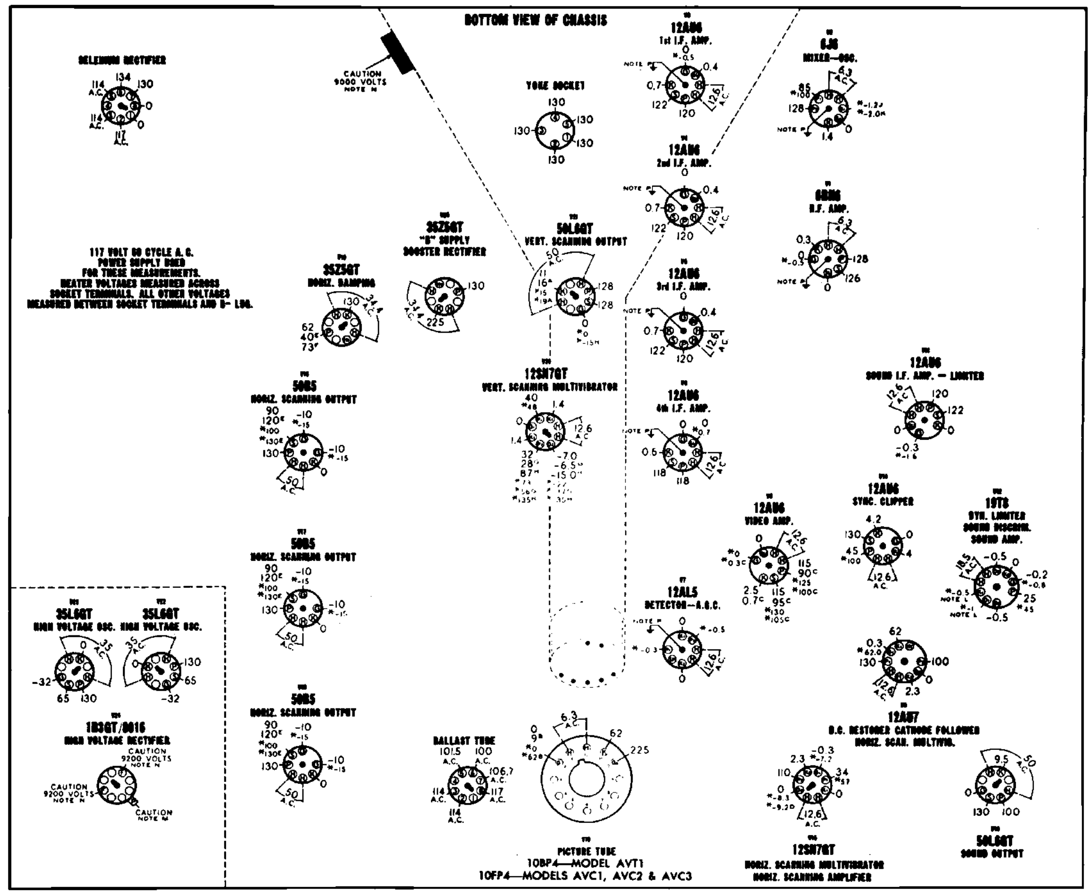
NOTE L. This measurement should NOT be made with a conventional type voltmeter as circuit may break into oscillation due to coupling thru instrument leads; use a vacuum tube voltmeter with short leads.

NOTE M. Do not attempt to measure the voltage at the tube cap. There is a high R. F. potential at this point.

NOTE N. If you do not have an instrument capable of directly measuring voltages in this range, the voltage can be measured by using a voltage divider network consisting of twenty 2.2 megohm 2 watt resistors and one 1 megohm 2 watt resistor, all connected in series. Avoid using resistors of higher values as their individual voltage rating may be exceeded. It is also important to use resistors of equal wattage. Solder all connections between resistors. Accurately measure the overall resistance of the entire combination as well as the resistance of the 1 megohm section.
With the set turned off, connect the 2.2 megohm end of the resistance voltage divider to the filament of the 1B3GT/8016 tube, or H. V. terminal of the kinescope, and connect the 1 megohm end to B—. Now, turn the set on and measure the voltage drop across the 1 megohm resistor with a vacuum tube voltmeter. The voltage at the tube terminal can then be calculated as follows:

$$\left[\begin{array}{c}\text{Volts At}\\\text{Tube}\\\text{Terminal}\end{array}\right] = \frac{\left[\begin{array}{c}\text{Measured Resistance}\\\text{Of Entire Voltage}\\\text{Divider}\end{array}\right]}{\left[\begin{array}{c}\text{Measured Resistance}\\\text{Of The 1 Meg. Section}\end{array}\right]} \times \left[\begin{array}{c}\text{Volts Measured}\\\text{Across 1 Meg.}\\\text{Section}\end{array}\right]$$

NOTE P. Grounding of center stud on tube socket is necessary to reduce capacity coupling between other pins. Oscillation may result if this ground is omitted.



REAR OF CHASSIS

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A

PRODUCTION CHANGES

The following tabulation furnishes complete details on changes which occurred during production. Sequence of these changes is indicated by reverse order alphabetical coding: that is, "SERIES Z", "SERIES Y", etc., stamped on back surface of chassis. Therefore, it should be understood that a "SERIES Y" chassis would be of later type than a "SERIES Z".

The circuit shown on this page applies to "SERIES W" chassis.

CHANGE DESIGNATION STAMPED ON CHASSIS	DESCRIPTION OF CHANGE
UNCODED	INITIAL PRODUCTION
"SERIES Z"	1. Condenser 52 in High Voltage power supply changed from 430 Mmfd to 560 Mmfd. 2. Condenser 92 (150 Mmfd) added in parallel with resistor 91 (100K ohms) in grid circuit of Horizontal Sweep output stage. 3. Resistor 89 in plate circuit of tube V15B (12SN7GT) changed from 33K ohms to 220K ohms. 4. Resistor 85 in grid circuit of tube V15B (12SN7GT) changed from 120K ohms to 220K ohms. 5. Condenser 86 in grid circuit of tube V15B (12SN7GT) changed from 82 Mmfd to 47 Mmfd. 6. Resistor 83 in grid circuit of tube V15A (12SN7GT) changed from 470K ohms to 560K ohms. 7. Resistor 73 in grid circuit of tube V9B (12AU7) changed from 180 ohms to 330 ohms. 8. Resistor 79 in plate circuit of tube V9B (12AU7) changed from 33K ohms to 1.8K ohms. 9. Coil 80 and Condenser 77 (3300 Mmfd), connected in parallel, were added in plate circuit of tube V9B (12AU7). 10. Condenser 228 in output circuit of last I.F. stage changed from 1000 Mmfd to 5000 Mmfd. 11. Choke coil 171 added in series with B+ line to R.F. amplifier and Oscillator stages. 12. Choke coil 270 added in series with filament supply line to tubes V11 (12AU6) and V25 (35Z5GT). 13. Condenser 272 (220 Mmfd) added from pin 3 of tube V11 (12AU6) to ground. 14. Resistor 19 in grid circuit of tube V20B (12SN7GT) changed from 470K ohms to 390K ohms. 15. Movable arm of Vertical Hold potentiometer connected to B– instead of to Cathode (pin 3) of V20 (12SN7GT).
"SERIES Y"	1. Connection from B– to pin 2 of deflection yoke socket (on chassis) was removed. Pins 2 and 5 of this socket were then connected together. This change places vertical deflection coil at same DC potential as horizontal deflection coil, with respect to chassis. 2. Condenser 169 (5 Mmfd) was removed from the circuit. This part was formerly connected from plate (pin 1) of tube V2A (6J6) to chassis ground. 3. Selenium rectifier assembly 288 and 289 was removed from the chassis pan on Console Models AVC1 and AVC2 and mounted on a separate plate which is attached to the cabinet framework. A cable and plug connects rectifiers to socket on chassis.
"SERIES X"	1. Connection of low potential side of Condenser 248 (1000 Mmfd.), located in screen circuit of Video Amplifier tube V8 (12AU6), was changed from B to chassis ground.
"SERIES W"	1. Resistor 331 (10K ohms) added in parallel with coil 172 (1st I.F.). 2. Trap coil (secondary winding of 2nd I.F. Transformer 184) removed by cutting off top of coil form. Associated condensers 186 (47 Mmfd.) and 187 (trimmer) also removed, thereby eliminating 22.4 Mc. trap. 3. Parallel combination of trap coil 329 and condenser 330 (240 Mmfd.) added in cathode circuit of V3 (12AU6), 1st I.F. Amp. stage. 4. Low potential side of resistor 190 (in grid circuit of V4, 12AU6 - 2nd I.F. Amp.) disconnected from AGC bus and reconnected to B–. 5. Low potential side of resistor 202 (in grid circuit of V5, 12AU6 - 3rd I.F. Amp.) disconnected from AGC bus and reconnected to B–. 6. Connection from Contrast control 239 to resistors 236 and 238 was removed. This terminal of Contrast control now remains open. 7. Resistor 236 (82K ohms) removed as 130 volt B+ supply to Contrast control is no longer required. 8. Low side of resistor 238 (68 ohms): in cathode circuit of V7, 12AL5, now connected to B–, using pin 2 of V8 (12AU6—Video Amp.) as the B– connection point. 9. Low side of resistor 244 (1 megohm), in grid circuit of V8 (12AU6—Video Amp.), disconnected from cathode return of this tube and reconnected to B–, using suppressor grid, pin 2, as the B– connection point. 10. The following components were relocated and mounted in an auxiliary shield can that attaches to rear surface of chassis all electrical connections remain unchanged: Horizontal Sync. Coil (80). Condenser (77) 3300 Mmfd. Resistor (79) 1.8K ohms. Condenser (82) 56 Mmfd. Resistor (83) 560K ohms.

PARTS LIST

WARNING: Some parts listed below have special characteristics. Do not use substitutes for replacement purposes.

DIAGRAM NO.	PART NO.	DESCRIPTION
		CONDENSERS
12	512006	Condenser—.005 Mfd. 600 volt
14	512008	Condenser—.01 Mfd. 200 volt
16	512513	Condenser—mica 470 Mmfd. 500 volt
18	512303	Condenser—.01 Mfd. ± 10% 400 volt
24	512302	Condenser—.2 Mfd. 400 volt
25	512304	Condenser—.2 Mfd. 400 volt
27-A,B	507359	Condenser—electrolytic A—150 Mfd. 25 volt B— 50 Mfd. 25 volt
31	512045	Condenser—.25 Mfd. 200 volt
33	512009	Condenser—.01 Mfd. 200 volt
37	512033	Condenser—.1 Mfd. 200 volt
41	512014	Condenser—.02 Mfd. 200 volt
42	512009	Condenser—.01 Mfd. 200 volt
48	512015	Condenser—.02 Mfd. 200 volt
50	507352	Condenser—trimmer 160 to 660 Mmfd
51	512015	Condenser—.02 Mfd. 200 volt
52	512530	Condenser—mica 560 Mmfd. ± 10% 500 V.
55	512014	Condenser—.02 Mfd. 200 volt
56, 57	513021	Condenser—ceramic 500 Mmfd. 10,000 V.
60	512033	Condenser—.1 Mfd. 200 volt
62	512032	Condenser—.1 Mfd. 200 volt
		CONDENSERS—Continued
64	512026	Condenser—.05 Mfd. 200 volt
66	502286	Condenser—electrolytic 10 Mfd. 25 V.
71	512026	Condenser—.05 Mfd. 200 volt
74	512528	Condenser—mica 470 Mmfd. ± 10% 500 V.
77	512531	Condenser—mica 3300 Mmfd. ± 5% 500 V.
78-A,B,C	506798	Condenser—electrolytic A—20 Mfd. 150 volt B—20 Mfd. 150 volt C—40 Mfd. 150 volt
82	513015	Condenser—mica 56 Mmfd. ± 10% 500 V.
86	513020	Condenser—ceramic 47 Mmfd. ± 10% 500 V.
87	512513	Condenser—mica 470 Mmfd. 500 volt
90	512008	Condenser—.01 Mfd. 200 volt
92	513004	Condenser—ceramic 150 Mmfd. 500 volt
99	512044	Condenser—.25 Mfd. 200 volt
105	512051	Condenser—.5 Mfd. 200 volt
107	512045	Condenser—.25 Mfd. 200 volt
108	512524	Condenser—mica 330 Mmfd. ± 10% 1000 V.
109	512032	Condenser—.1 Mfd. 200 volt
113	507386	Condenser—electrolytic 8 Mfd. 300 V.
115	512032	Condenser—.1 Mfd. 200 volt
116	512051	Condenser—.5 Mfd. 200 volt
117	513018	Condenser—ceramic 220 Mmfd. 500 volt
		CONDENSERS—Continued
118	513018	Condenser—ceramic 220 Mmfd. 500 volt
120	513009	Condenser—ceramic 1000 Mmfd. 350 volt
124	513018	Condenser—ceramic 220 Mmfd. 500 volt
125	513018	Condenser—ceramic 220 Mmfd. 500 volt
129	513009	Condenser—ceramic 1000 Mmfd. 350 volt
130	513009	Condenser—ceramic 1000 Mmfd. 350 volt
134	513009	Condenser—ceramic 1000 Mmfd. 350 volt
138	513009	Condenser—ceramic 1000 Mmfd. 350 volt
139	507345	Condenser—trimmer 2 to 10 Mmfd.
140	513019	Condenser—ceramic .5 Mmfd. 500 volt
142	507345	Condenser—trimmer 2 to 10 Mmfd.
143	513019	Condenser—ceramic .5 Mmfd. 500 volt
144	513000	Condenser—ceramic 1.0 Mmfd. 500 volt
147	513009	Condenser—ceramic 1000 Mmfd. 350 volt
148	507345	Condenser—trimmer 2 to 10 Mmfd.
149	507345	Condenser—trimmer 2 to 10 Mmfd.
151	513009	Condenser—ceramic 1000 Mmfd. 350 volt
155	513437	Condenser—ceramic 10 Mmfd. 500 volt (Temperature compensating)
156	513402	Condenser—ceramic 7 Mmfd. ± 10% 500 V. (Temperature compensating)
158	513001	Condenser—ceramic 2.2 Mmfd. 500 volt
159	507345	Condenser—trimmer 2 to 10 Mmfd.
161	513416	Condenser—ceramic 51 Mmfd. ± 10% 500 V. (Temperature compensating)
164	513009	Condenser—ceramic 1000 Mmfd. 350 volt
165	513436	Condenser—ceramic 2.5 Mmfd. 500 volt (Temperature compensating)
166	513416	Condenser—ceramic 51 Mmfd. ± 10% 500 V. (Temperature compensating)
167	507345	Condenser—trimmer 2 to 10 Mmfd.
169	513432	Condenser—ceramic 5 Mmfd. ± 10% 500 V. (Temperature compensating)
170	513009	Condenser—ceramic 1000 Mmfd. 350 volt
174	512526	Condenser—mica 47 Mmfd. ± 10% 500 volt
177	513009	Condenser—ceramic 1000 Mmfd. 350 volt
181, 182	513009	Condenser—ceramic 1000 Mmfd. 350 volt
183	513009	Condenser—ceramic 1000 Mmfd. 350 volt
186	513438	Condenser—ceramic 47 Mmfd. ± 5% 500 V. (Temperature compensating)
187	507345	Condenser—trimmer 2 to 10 Mmfd.
188	512526	Condenser—mica 47 Mmfd. ± 10% 500 volt
191	513009	Condenser—ceramic 1000 Mmfd. 350 volt
195, 196	513009	Condenser—ceramic 1000 Mmfd. 350 volt
197	513009	Condenser—ceramic 1000 Mmfd. 350 volt
200	512526	Condenser—mica 47 Mmfd. ± 10% 500 volt
203	513009	Condenser—ceramic 1000 Mmfd. 350 volt
207, 208	513009	Condenser—ceramic 1000 Mmfd. 350 volt
209, 210	513009	Condenser—ceramic 1000 Mmfd. 350 volt
214	512526	Condenser—mica 47 Mmfd. ± 10% 500 volt
216	513009	Condenser—ceramic 1000 Mmfd. 350 volt
219	513009	Condenser—ceramic 1000 Mmfd. 350 volt
221, 222	513009	Condenser—ceramic 1000 Mmfd. 350 volt
226	513433	Condenser—ceramic 47 Mmfd. ± 10% 500 V. (Temperature compensating)
228	513013	Condenser—ceramic 5000 Mmfd. 450 volt
229	513003	Condenser—ceramic 100 Mmfd. 500 volt
231	512056	Condenser—1 Mfd. 200 volt
232	513009	Condenser—ceramic 1000 Mmfd. 350 volt
235	512008	Condenser—.01 Mfd. 200 volt
237	513009	Condenser—ceramic 1000 Mmfd. 350 volt
240	513432	Condenser—ceramic 5 Mmfd. ± 10% 500 V. (Temperature compensating)
243	512026	Condenser—.05 Mfd. 200 volt
246	507322	Condenser—electrolytic 500 Mfd. 3 volt D.C.
248	513009	Condenser—ceramic 1000 Mmfd. 350 volt
251	513435	Condenser—ceramic 15 Mmfd. ± 5% 500 V.
252	513434	Condenser—ceramic 62 Mmfd. ± 10% 500 V.
256	512026	Condenser—.05 Mfd. 200 volt
263	513002	Condenser—ceramic 47 Mmfd. 500 volt
266, 267	513018	Condenser—ceramic 220 Mmfd. 500 volt
268	512014	Condenser—.02 Mfd. 200 volt
271, 272	513018	Condenser—ceramic 220 Mmfd. 500 volt
273	513018	Condenser—ceramic 220 Mmfd. 500 volt
275	513003	Condenser—ceramic 100 Mmfd. 500 volt
278	512014	Condenser—.02 Mfd. 200 volt
279	513003	Condenser—ceramic 100 Mmfd. 500 volt
281	513003	Condenser—ceramic 100 Mmfd. 500 volt
283	513009	Condenser—ceramic 1000 Mmfd. 350 volt
284	513003	Condenser—ceramic 100 Mmfd. 500 volt
285	513009	Condenser—ceramic 1000 Mmfd. 350 volt
286	512010	Condenser—.01 Mfd. 400 volt
290	512030	Condenser—.05 Mfd. 600 volt
293-A,B	507318	Condenser—electrolytic A—200 Mfd. 150 volt B—200 Mfd. 150 volt
295-A,B	507319	Condenser—electrolytic A—200 Mfd. 150 volt B—200 Mfd. 150 volt
296	513433	Condenser—ceramic 47 Mmfd. ± 10% 500 V.
298	513010	Condenser—ceramic 1500 Mmfd. 350 volt
300	512527	Condenser—mica 220 Mmfd. ± 10% 500 V.
301	513009	Condenser—ceramic 1000 Mmfd. 350 volt
304	512513	Condenser—mica 470 Mmfd. 500 volt
305	512529	Condenser—mica 91 Mmfd. ± 5% 500 volt
306	512026	Condenser—.05 Mfd. 200 volt
307	512008	Condenser—.01 Mfd. 200 volt
308	512002	Condenser—.002 Mfd. 600 volt
309	512508	Condenser—mica 220 Mmfd. 500 volt
312	505174	Condenser—electrolytic 10 Mfd. 150 V.
315	513010	Condenser—ceramic 1500 Mmfd. 350 volt
316	512008	Condenser—.01 Mfd. 200 volt
317	502286	Condenser—electrolytic 10 Mfd. 25 volt
318	512508	Condenser—mica 220 Mmfd. 500 volt
320	512008	Condenser—.01 Mfd. 200 volt
322	513010	Condenser—ceramic 1500 Mmfd. 350 volt
325	512000	Condenser—.001 Mfd. 600 volt
328	513009	Condenser—ceramic 1000 Mmfd. 350 volt
330	512532	Condenser—mica 240 Mmfd. ± 5% 500 volt
		RESISTORS
11	510149	Resistor—carbon 4700 Ohms ½ watt
13	510149	Resistor—carbon 4700 Ohms ½ watt
15	510137	Resistor—carbon 1000 Ohms ½ watt
17	510173	Resistor—carbon 100,000 Ohms ½ watt
19	510719	Resistor—carbon 390,000 Ohms ± 5% ½ W.
20	507296	Potentiometer—vertical hold control (500,000 Ohms)
21	510176	Resistor—carbon 150,000 Ohms ½ watt
22	507296	Potentiometer—height control (500,000 Ohms)
23	510143	Resistor—carbon 2200 Ohms ½ watt
26	510191	Resistor—carbon 1 Meg. ½ watt
28	510128	Resistor—carbon 330 Ohms ½ watt
29	507304	Potentiometer—vertical linearity (2000 Ohms 2 W.)
30	510159	Resistor—carbon 18,000 Ohms ± 10% ½ W.
35	510153	Resistor—carbon 8200 Ohms ± 10% ½ W.
36	510139	Resistor—carbon 1500 Ohms ± 10% ½ W.
38, 39	510119	Resistor—carbon 100 Ohms ½ watt
40	510155	Resistor—carbon 10,000 Ohms ½ watt
43	510173	Resistor—carbon 100,000 Ohms ½ watt
44	510101	Resistor—carbon 10 Ohms ½ watt
45	510119	Resistor—carbon 100 Ohms ½ watt
46	510101	Resistor—carbon 10 Ohms ½ watt
47	510119	Resistor—carbon 100 Ohms ½ watt
49	510713	Resistor—wire wound 3000 Ohms ± 5% 2 W.
58	510185	Resistor—carbon 470,000 Ohms ½ watt
59	510179	Resistor—carbon 220,000 Ohms ½ watt
61	510179	Resistor—carbon 220,000 Ohms ½ watt
63	510155	Resistor—carbon 10,000 Ohms ½ watt
65	510191	Resistor—carbon 1 Meg. ½ watt
67	510126	Resistor—carbon 270 Ohms ± 10% ½ watt
68	510160	Resistor—carbon 22,000 Ohms ± 10% ½ W.
69	510179	Resistor—carbon 220,000 Ohms ½ watt
70	510177	Resistor—carbon 180,000 Ohms ± 10% ½ W.
72	510130	Resistor—carbon 470 Ohms ± 10% ½ W.
73	510127	Resistor—carbon 330 Ohms ± 10% ½ W.
75	510159	Resistor—carbon 18,000 Ohms ± 10% ½ W.
76	510126	Resistor—carbon 270 Ohms ± 10% ½ W.
79	510141	Resistor—carbon 1800 Ohms ± 10% ½ W.
81	510143	Resistor—carbon 2200 Ohms ½ watt
83	510186	Resistor—carbon 560,000 Ohms ± 10% ½ W.
84	507298	Potentiometer—horiz. hold control (250,000 Ohms)
85	510178	Resistor—carbon 220,000 Ohms ± 10% ½ W.
88	510714	Resistor—carbon 3.9 Meg. ± 10% ½ watt
89	510178	Resistor—carbon 220,000 Ohms ± 10% ½ W.

MODELS AVC1, AVC3, Code 9054-B; AVC2, Code 9054-C; AVT1, Code 9054-A

DIAGRAM NO.	PART NO.	DESCRIPTION
91	510173	Resistor—carbon 100,000 Ohms ½ watt
93, 94, 95	510119	Resistor—carbon 100 Ohms ½ watt
96, 97, 98	510119	Resistor—carbon 100 Ohms ½ watt
100	507295	Potentiometer—width control (2000 Ohms 2 watt)
101	510716	Resistor—wire wound 220 Ohms ± 10% 5 W.
102	510213	Resistor—carbon 47 Ohms 1 watt
103	510332	Resistor—carbon 560 Ohms ± 10% 2 watt
104	507297	Potentiometer—focus control (10,000 Ohms 4 watt)
110	510185	Resistor—carbon 470,000 Ohms ½ watt
111	510168	Resistor—carbon 56,000 Ohms ± 10% ½ W.
112	507299	Potentiometer—brightness control (50,000 Ohms)
114	510191	Resistor—carbon 1 Meg. ½ watt
126	510172	Resistor—carbon 100,000 Ohms ± 10% ½ W.
128	510115	Resistor—carbon 68 Ohms ± 10% ½ W.
131	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
133	510137	Resistor—carbon 1000 Ohms ½ watt
135	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
137	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
145	510154	Resistor—carbon 10,000 Ohms ± 10% ½ W.
150	510154	Resistor—carbon 10,000 Ohms ± 10% ½ W.
153	510124	Resistor—carbon 220 Ohms ± 10% ½ W.
160	510154	Resistor—carbon 10,000 Ohms ± 10% ½ W.
162, 163	510100	Resistor—carbon 10 Ohms ± 10% ½ W.
168	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
173	510137	Resistor—carbon 1000 Ohms ½ watt
175	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
176	510137	Resistor—carbon 1000 Ohms ½ watt
178	510117	Resistor—carbon 82 Ohms ± 10% ½ W.
180	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
185	510137	Resistor—carbon 1000 Ohms ½ watt
189	510153	Resistor—carbon 8200 Ohms ± 10% ½ W.
190	510137	Resistor—carbon 1000 Ohms ½ watt
192	510117	Resistor—carbon 82 Ohms ± 10% ½ W.
194	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
199	510137	Resistor—carbon 1000 Ohms ½ watt
201	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
202	510137	Resistor—carbon 1000 Ohms ½ watt
204	510117	Resistor—carbon 82 Ohms ± 10% ½ W.
206	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
212	510137	Resistor—carbon 1000 Ohms ½ watt
213	510153	Resistor—carbon 8200 Ohms ± 10% ½ W.
217	510115	Resistor—carbon 68 Ohms ± 10% ½ W.
220	510150	Resistor—carbon 5600 Ohms ± 10% ½ W.
224	510137	Resistor—carbon 1000 Ohms ½ watt
225	510151	Resistor—carbon 6800 Ohms ± 10% ½ W.
230	510173	Resistor—carbon 100,000 Ohms ½ watt
233	510166	Resistor—carbon 47,000 Ohms ± 10% ½ W.
236	510171	Resistor—carbon 82,000 Ohms ± 10% ½ W.
238	510115	Resistor—carbon 68 Ohms ± 10% ½ W.
239	507305	Potentiometer—contrast control (2000 Ohms 2 watt)
241-B	507376	Resistor—carbon 3300 Ohms ± 10% 1 W. (includes peaking coil 241-A)
242	510153	Resistor—carbon 8200 Ohms ± 10% ½ W.
244	510191	Resistor—carbon 1 Meg. ½ watt
245	510119	Resistor—carbon 100 Ohms ½ watt
247	510120	Resistor—carbon 120 Ohms ± 10 % ½ W.
249	510155	Resistor—carbon 10,000 Ohms ½ watt
253-B	507375	Resistor—carbon 47,000 Ohms ± 10% 1 W. (includes peaking coil 253-A)
255	510253	Resistor—carbon 8200 Ohms ± 10% 1 W.
257	510191	Resistor—carbon 1 Meg. ½ watt
258	510156	Resistor—carbon 12,000 Ohms ± 10% ½ W.
260	510131	Resistor—carbon 470 Ohms ½ watt
262	510131	Resistor—carbon 470 Ohms ½ watt
264	507300	Ballast tube A. 107 Ohms 2.9 watt B. 59 Ohms 6.3 watt C. 22 Ohms 5.3 watt D. 10 Ohms 5 watt E. 10 Ohms 5 watt
265-A,B	507294	Volume control—1 Meg. (with switch)
291	510176	Resistor—carbon 150,000 Ohms ½ watt
292	510332	Resistor—carbon 560 Ohms ± 10% 2 watt
297	510185	Resistor—carbon 470,000 Ohms ½ watt
299	510137	Resistor—carbon 1000 Ohms ½ watt
303	510155	Resistor—carbon 10,000 Ohms ½ watt
310	510197	Resistor—carbon 10 Meg. ½ watt

DIAGRAM NO.	PART NO.	DESCRIPTION
311	510163	Resistor—carbon 33,000 Ohms ± 10% ½ W.
314	510163	Resistor—carbon 33,000 Ohms ± 10% ½ W.
319	510185	Resistor—carbon 470,000 Ohms ½ watt
321	510160	Resistor—carbon 22,000 Ohms ± 10% ½ W.
323	510185	Resistor—carbon 470,000 Ohms ½ watt
324	510223	Resistor—carbon 180 Ohms ± 10% 1 watt
331	510154	Resistor—carbon 10,000 Ohms ± 10% ¼ W.

COILS AND TRANSFORMERS

DIAGRAM NO.	PART NO.	DESCRIPTION
32	507312	Transformer—vertical output
34	507371	Coil—choke
53	507379	Coil—R. F. choke
54	507285	Coil—H. V. oscillator
80	507565	Coil—Horizontal sync. (less slug)
	507429	Slug for horizontal sync. coil
106	507293	Coil—choke; horizontal output
119	507497	Coil—antenna coupling
121	———	Inductor—straight piece of #18 tinned wire
123	———	Inductor—straight piece of #18 tinned wire
127	507496	Coil—R. F. choke
132	507496	Coil—R. F. choke
136-A,B	507474	Coil assembly—R. F. plate circuit coils for high and low band (includes switch sections 122-A and 122-B) less slugs
	507486	Slug for high band R. F. plate coil (end painted green or red)
	507487	Slug for low band R. F. plate coil (end painted blue)
141	507496	Coil—R. F. choke
146-A,B	507498	Coil assembly—mixer grid circuit coils for high and low band (includes switch section 122-C) less slugs
	507486	Slug for high band mixer grid coil (end painted green or red)
	507487	Slug for low band mixer grid coil (end painted blue)
152	507496	Coil—R. F. choke
154	507496	Coil—R. F. choke
157-A,B	507499	Coil assembly—oscillator coils for high and low band (includes switch section 122-D) less slugs
	507488	Slug for high or low band oscillator coil (end painted white)
171	507372	Coil—choke
172	507343	Coil—1st, I. F. (less slug)
	507357	Slug core
179	507372	Coil—choke
184	507343	Coil—2nd I. F. assembly
	507357	Slug core
193	507372	Coil—choke
198	507343	Coil—3rd I. F. (less slug)
	507357	Slug core
205	507372	Coil—choke
211	507343	Coil—4th I. F. (less slug)
	507357	Slug core
215	507367	Coil—choke
218	507372	Coil—choke
223	507344	Coil—5th I. F. assembly; less slug (includes resistor 225, condenser 226 and choke 227)
	507357	Slug core
227	507367	Coil—choke
234	507372	Coil—choke
241-A	507376	Coil—peaking (includes resistor 241-B)
250	507384	Transformer—sound I. F. (includes condensers 251 and 252)
	507357	Slug core
253-A	507375	Coil—peaking (includes resistor 253-B)
254	507374	Coil—peaking
259	506804	Focus coil
261	506805	Yoke—kinescope deflection
269	507378	Coil—R. F. choke
270	507372	Coil—choke
274	507372	Coil—choke
276	507378	Coil—R. F. choke
277	507372	Coil—choke
280	507372	Coil—choke
282	507372	Coil—choke
294	507313	Choke—filter
302	507321	Transformer—discriminator (includes condenser 305)
313	507373	Coil—choke

DIAGRAM NO.	PART NO.	DESCRIPTION
326	507209 507212	Transformer—output, for W-507111 speaker Transformer—output, for W-506806 speaker
329	507567	Coil—I. F. trap

OTHER ELECTRICAL PARTS

DIAGRAM NO.	PART NO.	DESCRIPTION
122-A,B		Switch—high-low band (part of R. F. plate coil assembly 136)
122-C		Switch—high-low band (part of mixer grid coil assembly 146)
122-D		Switch—high-low band (part of osc. coil assembly 157)
264	507300	Ballast Tube A. 107 Ohms 2.9 watt B. 59 Ohms 6.3 watt C. 22 Ohms 5.3 watt D. 10 Ohms 5 watt E. 10 Ohms 5 watt
287	507302	Polarizing relay
288, 289	507301	Selenium Rectifier (receiver uses two of these units); each
327	506806 507111	Speaker—P.M. Dynamic (5") for model AVT1 (includes output transformer) Speaker—P.M. Dynamic (6"x9") for models AVC1 and AVC2

MISCELLANEOUS PARTS

DIAGRAM NO.	PART NO.	DESCRIPTION
	507561	Back for cabinet (Model AVT1)
	507560	Back for cabinet (Models AVC1 & AVC2)
	507491	Ball bearing for detent on R.F. unit
	116467	Base for mounting electrolytic condensers No. 27 and 78
	504981	Base for mounting electrolytic condensers No. 293 and 295
	507325	Base for mounting electrolytic condenser No. 246
	505368	Base for tube shield (miniature)
	504598	Base for tube shield (on R.F. unit)
	507283	Bottom shield for horizontal output choke coil
	507106	Bracket for focus coil (Models AVC1 and AVC2)
	507323	Bracket for mounting selenium rectifiers
	506907	Bracket—supports deflection yoke (Model AVT1)
	506906	Bracket Base for suspension of deflection and focus support brackets from top of cabinet (Model AVT1)
	507348	Bushing—fibre; for mounting volume control
	507287	"C" Washer (bakelite—1⅛") for H.V. osc. coil
	507114	Cable and Plug for deflection yoke
	506834	Catch for door (Model AVT1)
	506908	Clamps for focus coil pivot (section with plain holes); Model AVT1
	506909	Clamp for focus coil pivot (section with threaded holes); Model AVT1
	507339	Clip—for coil mounting
	507353	Clip for connection of internal shield in H.V. power supply
	507495	Clip—tension; for tuning slugs in R.F. unit
	507286	Connector for H.V. terminal of kinescope
	507324	Cover (front) for H.V. power supply
	507326	Cover (rear) for H.V. power supply
	507355	Core (half-section) for horizontal output choke
	506831	Door—left hand (Model AVT1)
	506830	Door—right hand (Model AVT1)
	507122	Escutcheon for lid support
	506918	Escutcheon—name plate
	507449	Frame assembly for picture tube support for Models AVC1, AVC2 and AVC3
	506920	Glass window and escutcheon
	506916	Grounding spring for coating on kinescope
	506833	Handle for door (Model AVT1)
	506077	Handle—ornamental hardware (Models AVC1 and AVC3)
	505466	Handle—ornamental hardware (Model AVC2)
	506832	Hinge for door (Model AVT1); supplied in pairs
	507117	Hinge for lid (Models AVC1, AVC2 and AVC3); supplied in pairs
	506803	Ion trap assembly—includes both magnets
	506904	Knob—Channel Selector
	506913	Knob—for any control except Channel Selector
	170662	Knurled nut for H.V. power supply cover
	507115	Lid for cabinet (Model AVC1) less hardware
	507116	Lid for cabinet (Model AVC2) less hardware
	507573	Lid for cabinet (Model AVC3) less hardware
	507130	Lid support assembly (includes springs) for Models AVC1 and AVC2
	507214	Locking bracket—holds focus coil in position during shipment (Models AVC1, AVC2 and AVC3)
	507208	Locking plate—holds focus coil in position during shipment (Model AVT1)
	507112	Mirror
	507489	Mounting bar (bakelite) for tuning slugs in R.F. unit
	507320	Mounting plate (bakelite) for H.V. power supply
	170193	Nut—retains name plate
	170195	Nut—wing #8-32; for picture tube frame and focus bracket
	170188	Nut—wing #10-24; for tension adjustment on lid support mechanism (Models AVC1, AVC2 and AVC3)
	506915	Pivot for focus coil support (Model AVT1)
	506635	Plug for focus coil cable
	507442	Plug for speaker cable
	507280	Plug—9 pin; for selenium rectifier assembly
	170134	Plug button
	507361	Rubber cover for H.V. terminal
	507422	Rubber sleeve on neck of kinescope
	170196	Screw—#6 x ⅜"; mounts cabinet back
	170180	Screw—#10-32 x 1"; mounts chassis to board (Models AVC1, AVC2 and AVC3)
	170182	Screw—#10-32 x 1½"; mounts chassis (Model AVT1)
	170199	Screw—¼-20 x 1⅛"; mounts chassis board to cabinet (Models AVC1, AVC2 and AVC3)
	507311	Shield can for horizontal output choke
	507292	Shield can for 5th I.F. coil
	507317	Shield—housing; for selenium rectifiers
	507327	Shield—inside of H.V. power supply compartment
	507368	Shield—surrounds H.V. power supply (does not include front or back cover)
	504599	Shield—tube (on R.F. unit)
	505367	Shield—tube (miniature)
	507349	Shield—tube ("GT")
	507357	Slug core for video I.F. coils or sound I.F. transformer
	507486	Slug for high band R.F. plate or mixer grid coil (end painted green or red)
	507487	Slug for low band R.F. plate or mixer grid coil (end painted blue)
	507488	Slug for high or low band osc. coil (end painted white)
	507429	Slug for horizontal sync. coil
	507289	Socket—deflection yoke cable (5 prong)
	507365	Socket—focus coil cable (2 prong)
	507364	Socket—miniature (7 pin)
	506331	Socket—noval
	507290	Socket—octal (for 1B3GT/8016)
	506220	Socket—octal (for 35L6GT)
	160039	Socket—phono input
	507358	Socket—selenium rectifier assembly
	507288	Socket—speaker
	507338	Socket and cable assembly for kinescope
	507360	Spacer—bakelite; for mounting horizontal output coil
	507494	Spring—anti-backlash on rocker arms of R.F. unit
	506760	Spring—compression for lid support mechanism
	507492	Spring for detent bearing on R.F. unit
	507493	Spring—tension; for actuating plate on R.F. unit
	507129	Spring—tension; for lid support mechanism (2¾" long)
	507205	Spring—tension; for lid support mechanism (3⅞" long)
	507490	Spring bar—for high-low channel switch
	506758	Spring washer for lid support mechanism
	507448	Strap assembly for picture tube support; Model AVT1
	507351	Terminal strip for antenna connections
	506912	Washer—felt; for control shafts

SERVICE TOOLS AND CABLES

DIAGRAM NO.	PART NO.	DESCRIPTION
	507475	Alignment tool kit
	507444	Extension cable—deflection yoke
	507446	Extension cable—focus coil
	507443	Extension cable—high voltage
	507445	Extension cable—kinescope
	507447	Extension cable—speaker