RCC TELEVISION Service Manual

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FEATURES

The "Slim Line" portable television receivers covered in this manual have many electrical and mechanical differences over previous models. In designing these new receivers, ease of service was one of the prime considerations. Our new design techniques and use of the newly developed 110° short neck picture tube have made it possible to produce a more compact, lightweight and easier to service large screen portable television receiver.

These receivers were designed to provide excellent performance under all signal conditions. Use of newly developed multi-purpose tubes, improved sound detector circuit, germanium diode as the video detector and dual selenium diode as the horizontal sync discriminator and two selenium or silicon rectifiers as B+ power supply have made superb receiver performance possible with the use of a minimum number of tubes.

A major portion of receiver circuit wiring is contained in a printed circuit wiring board. Use of printed circuit wiring (made possible by automation) permits uniform quality, improved performance and eliminates possibility of human errors in circuit wiring.

All tubes (except high voltage rectifier) have been specially designed for series heater operation. The heater of these tubes feature controlled warm-up characteristics and very low tolerance of the heater current. This prevents voltage and current surges during warm-up thereby improving life expectancy of tubes.

A SUPER RANGE FINDER (threshold control for noise-gated AGC tube V401, 3BU8) is used for improved TV reception in fringe areas or in areas where there is interference.

All operating and set-up controls are accessible from side or rear of receiver without need for removing cabinet back.

All tubes (except picture tube), detector diode, horizontal sync discriminator diode and B+ rectifiers are accessible for replacement after removing the cabinet back.

The picture window and face of the picture tube may be cleaned by merely removing the front bezel from cabinet.

An improved, short neck 110 degree magnetic deflection picture tube is used. The design of this tube permits a smaller dimensioned cabinet and lighter over-all weight. These new tubes do not require an ion trap, service attention is therefore minimized.

An improved disc type turret VHF tuner is used. This tuner features an improved cascode circuit with higher sensitivity, better signal-to-noise ratio and a minimum of local oscillator radiation. A 41 MC interference trap is contained in the antenna circuit of the tuner for attenuating RF interference from radio transmitters of other interference sources.

A three stage (41 MC) broadband IF amplifier is used. Use of a 41 MC IF amplifier rejects interferences common to other IF frequencies. Adjacent channel and accompanying sound traps are contained in the IF amplifier for eliminating possibility of interferences from adjacent channels or accompanying sound frequencies.

The sound detector is an improved version of the "quadrature grid-lock oscillator" circuit using a 3DT6 tube. This circuit features excellent limiting ability thus enabling high quality sound with constant sound level under all signal conditions, especially in fringe areas or in noisy areas where weak or fading signals occur.

A newly improved dual selenium diode (horizontal sync discriminator) is used. This new selenium diode is of the plug-in type for ease in replacement. The diode is capsuled in a cushion of silicone grease to provide protection against mechanical shock and twisting of leads which may result in intermittent or erratic operation due to poor internal contact.

INTERMEDIATE FREQUENCIES:
Video IF; 45.75 MC
Sound IF; 41.25 MC
Intercarrier Sound IF; 4.5 MC

DIFFERENCES BETWEEN CHASSIS

The chassis covered in this manual are similar in construction and circuitry. The basic differences are below.

The 16H1 chassis utilizes a 14 inch rectangular picture tube. This chassis uses two plug-in type 500 milliampere silicon rectifiers in a voltage doubler circuit. A 12AX4GTA tube is used as damper tube V406.

The 16F1 chassis utilizes a 17 inch rectangular picture tube. This chassis uses two wire-in 350 milliampere selenium rectifiers in a voltage doubler circuit. A 19AU4GTA tube is used as damper tube V406.

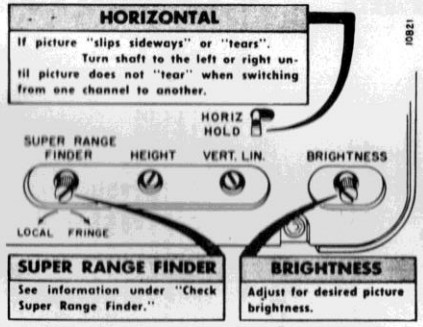


Figure 6. Auxiliary Controls at Rear of 17" Picture Tube Sets.

CHANNEL ADJUSTMENT FOR SETS USING THE 94E144-19 TUNER

VHF Channel adjustment of each station should be checked upon installation and at every service call. With proper adjustment, best picture is generally obtained at approximate center rotation of FINE TUNING control. Note: Channel adjustment does not require chassis removal.

IMPORTANT: Always make adjustment on lowest channel first, then work up, in order of channel number to the highest channel. (For example, if channels 2, 9, 7 and 5 are received, adjust in this order: 2, 5, 7, 9.)

Before proceeding with adjustment, see figure 4 for location of VHF channel slugs, then adjust as follows:

a. Turn the set on and allow 15 minutes to warm up.
b. Set VHF CHANNEL SELECTOR for lowest channel to be adjusted. Set other controls for normal picture and sound.
c. Set FINE TUNING control at center of its range by rotating it approximately two turns in either direction and then one-quarter turn in the opposite direction.
d. Remove VHF CHANNEL SELECTOR and FINE TUNING knobs.
e. Using a 1/8" blade non-metallic tool (part number 98A30-19), carefully adjust the channel slug for best picture. (Note that sound is not loudest at this point.) Repeat procedure for remaining stations, adjusting them in order of their channel number (from lowest channel to highest channel.)

CHANNEL ADJUSTMENT FOR SETS USING 94N6-1, 94Z151-5 STANDARD COIL TUNER

Adjust as follows:

a. Turn set on and allow 15 minutes to warm up.
b. Set FINE TUNING control at center of its range.
c. Remove CHANNEL SELECTOR and FINE TUNING knob and metal escutcheon under knobs.
d. Using a 1/8" blade, flexible non-metallic screw driver (part number 98A30-19), engage the proper channel screw and carefully adjust it for best picture. (Note that sound is not loudest at this point.) Repeat procedure for other channels.

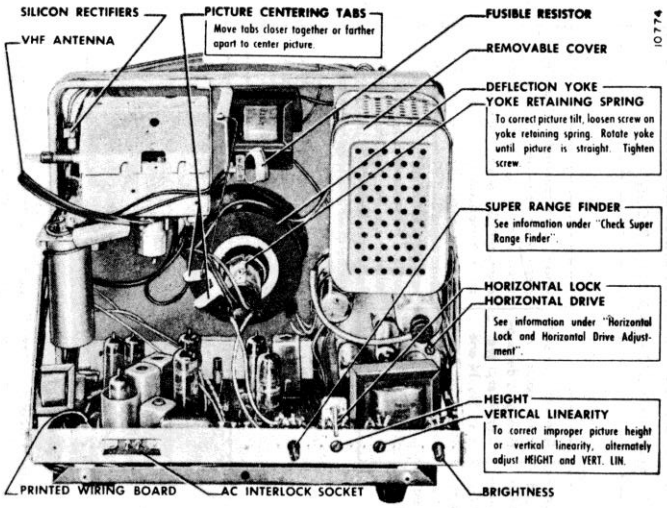


Figure 2. Rear View of 14" Picture Tube Sets Showing Adjustment Locations.

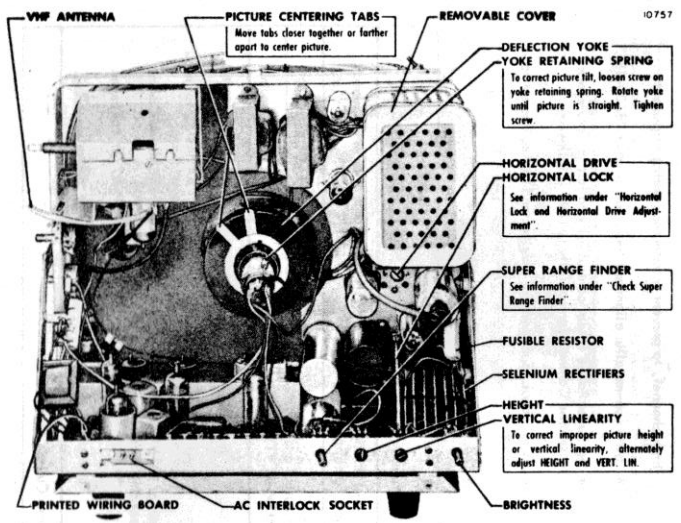


Figure 3. Rear View of 17" Picture Tube Sets Showing Adiustment Locations.

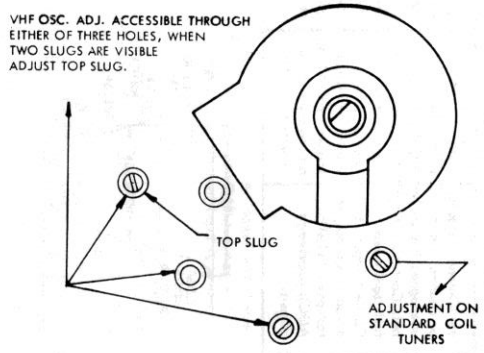
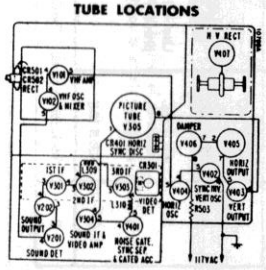
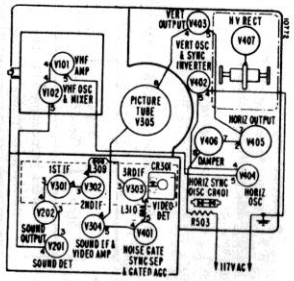


Figure 4. Side Cabinet View of VHF Tuner Tuning Knobs Removed.

16H1 TUBE LOCATIONS



16F1 TUBE LOCATIONS



IF AMPLIFIER ALIGNMENT

- Connect isolation transformer between power line and receiver.
- Connect negative of 3.0 volt bias supply through 10K resistor to test point "T" (IF AGC), see figures 14 and 15, positive to chassis.
- Disconnect antenna. Connect a jumper wire across the antenna terminals.
- Set Channel Selector to channel 12 or other unassigned high channel, to prevent interference during alignment.
- Use a non-metallic alignment tool, part number 98A30-12.
- Set Super Range Finder control fully to left (counterclockwise) and Contrast control fully to right (clockwise).
- Allow about 15 minutes for receiver and test equipment to warm up.
- Use lowest DC scale on VTVM.

Step	Signal Gen. Freq.	Instructions	Adjust
Before proceeding, be sure to check the signal generator used in alignment against a crystal calibrator or other frequency standard for absolute frequency calibration required for this operation.			
1	41.25 MC	If necessary, increase generator output and/or reduce bias to —1-1/2 volts to obtain a definite indication on VTVM.	A1 for minimum.
2	47.25 MC		A2 for minimum.
3	42.3 MC	Use —3 volts bias. When adjusting, keep reducing generator output to prevent VTVM reading from exceeding 2 volts.	A3 for maximum.
4	45.3 MC		A4 and A5 for max.
5	41.5 MC		A6 for maximum.
6	42.0 MC		A7 for maximum.
7	43.5 MC		A8 for maximum.
8	To insure correct IF alignment, make "IF Response Curve Check".		

IF RESPONSE CURVE CHECK (USING SWEEP GENERATOR AND OSCILLOSCOPE)

Receiver Controls and Bias Battery	Sweep Generator	Marker Generator	Oscilloscope	Instructions
Set Channel Selector on channel 3 or an unassigned low channel. Contrast control fully to the left. Connect negative of 3 volt bias supply to test point "T" (IF AGC); positive to chassis.	Connect high side to 5CG8 mixer - osc. insulated tube shield, see fig. 9. Connect low side to chassis near tube shield. Set sweep frequency to 43MC, and sweep width approximately 7 MC.	If an external marker generator is used, loosely couple high side to sweep generator lead on tube shield, low side to chassis. Marker frequencies indicated on IF Response Curve.	Connect high side to test point "V" through a decoupling filter, see figs. 11, 14 and 15.	Check curve obtained against ideal response curve in fig. 12. Note tolerances on curve. Keep marker and sweep outputs at very minimum to prevent overloading. A reduction in sweep output should reduce response curve amplitude without altering the shape of the response curve. If the curve is not within tolerance of the markers are not in the proper location on the curve, touch-up with IF slugs as instructed below. Important: If curve changes shape with hand capacity, see section 1 of "Important Alignment Hints".

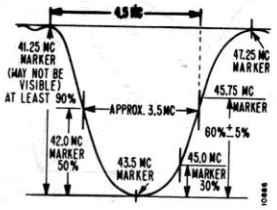


Figure 12. Ideal IF Response Curve

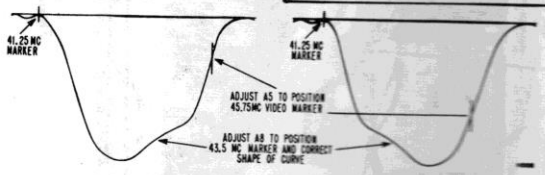


Figure 13. IF Response Curves, Incorrect Shape.

If it is necessary to adjust for approximate equal peaks and marker location, carefully adjust alignment slugs as instructed under the above figures. It should not be necessary to turn the slugs more than one turn in either direction.

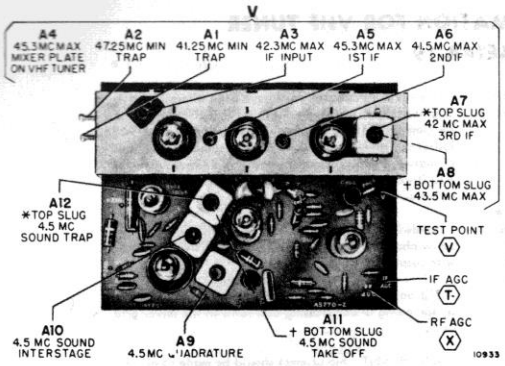
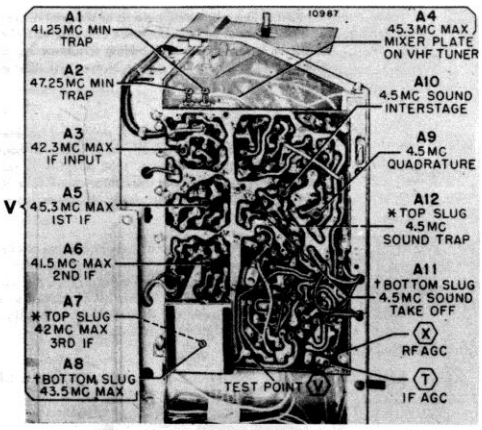


Figure 14. Inside Chassis View of Printed Wiring Board Showing Test Point Locations and IF Alignment Data.



† Bottom slug is nearest bottom of shield can.
* Top slug is nearest top of shield can.

Figure 15. Bottom View of Chassis Showing Test Point Locations and IF Alignment Data. VHF Tuner at Top of Illustration.

ALIGNMENT OF 4.5 MC TRAP USING A TELEVISION SIGNAL

Beat interference (4.5 MC) appears in picture as very fine vertical or diagonal lines, very close together, having a "gauze-like" appearance, the pattern will vary with speech, forming a very fine herringbone pattern.

The trap can be tuned by watching the picture and adjusting the slug *A12 for minimum 4.5 MC interference.

4.5 MC SOUND IF ALIGNMENT USING TELEVISION SIGNAL

For simplicity and required accuracy of the 4.5 MC signal frequency, the sound alignment procedure given in the manual uses a transmitted TV signal rather than test equipment.

IMPORTANT: Note that step 3 of the sound IF alignment procedure requires the use of a strong transmitted TV signal. Steps 5 and 6 requires the use of a weak (attenuated) TV signal. Failure to use a television signal of the required level as instructed for each of the steps will cause incorrect alignment with resulting weak or distorted sound.

Make alignment adjustments as follows:

1. Remove cabinet back. Turn set on and allow 15 minutes for warm up.

2. Select the strongest TV station received. Adjust set for normal operation. Turn Super Range Finder Control fully to the left (counterclockwise). See figures 14 and 15 for adjustment locations.

3. Using a non-metallic alignment tool (for hexagonal core IF slugs, Part No. 98A30-12), very slowly turn slug "A9" several turns counterclockwise until the slug reaches the top of coil. Then turn it clockwise until the loudest and clearest sound is obtained. NOTE: There will be two points (approximately 1/2 turn apart) at which sound is loudest. The slug should be set at the center range of the second point of loudest sound noted as the slug is turned in from top of coil.

4. Reduce the signal to the antenna terminals until there is a considerable amount of hiss in the sound. For best results, it is recommended that a step attenuator be connected between the antenna and the antenna terminals. The signal can also be reduced by disconnecting the antenna and placing it in close proximity of the antenna terminals or tuner antenna lead-in.

5. Carefully adjust slug "A10" for loudest and clearest sound with minimum hiss level. If hiss disappears during alignment, reduce signal input to maintain hiss level; readjust "A10".

6. Carefully adjust slug "A11" for loudest and clearest sound with minimum hiss level. If hiss disappears during alignment, reduce signal input to maintain hiss level; readjust "A11".

7. If the above steps are correctly made, no further adjustment should be required. However, if sound remains distorted at normal volume level when receiver is tuned for best sound, repeat entire procedure.

   CAUTION: Do not readjust slug "A9" unless sound is distorted. If "A9" is readjusted, all steps in alignment procedure should be repeated exactly as instructed above.

   NOTE: For steps 5 and 6 the most satisfactory method is to turn the slug clockwise to the bottom of the coil and slowly back out counterclockwise to the first peak of clear sound with minimum hiss.

ALIGNMENT INFORMATION FOR VHF TUNER 94E144-19

NOTE: Since this VHF tuner is of the semi-incremental type (contains series inductance circuits) VHF channel selection is accomplished by adding or subtracting portions of inductance with rotation of the VHF Channel Selector (turret drum).

The tuner has been designed for stable and trouble-free operation. Tubes may generally be replaced without the need for alignment. However, tube selection is recommended when replacing the Oscillator-Mixer tube V102 (5CG8) for selecting a tube which will cause least oscillator frequency shift.

VHF amplifier and Mixer alignment consists of checking the VHF response curve with a sweep generator and an oscilloscope, then comparing curves with the ideal curve given in figure 19. Adjustment of trimmer screws at top of tuner is generally adequate for proper alignment.

If individual channel coils have been altered from original shape, tracking adjustment (starting with highest channel) will be required. The chart and the illustrations given below show the location and function of individual coils or adjustments. Note that "gimmick" A15 (free lead of capacitor C116) is used for adjustment of bandwidth of low channels 2 through 6.

Bandwidth adjustment of high channels is accomplished by changing the spacing of VHF amplifier plate coils with respect to mixer grid coils.

Tilt adjustment (at center of curve) is accomplished by spreading or compressing coil turns in the mixer grid circuit.

IMPORTANT: No attempt should be made to align the tuner until the balance of the receiver is known to be in proper operating condition and in proper alignment.

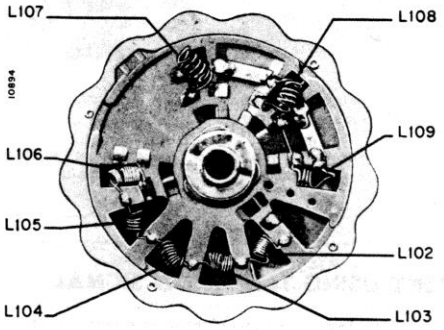


Figure 16. View of Antenna Rotor Disc in VHF Tuner 94E144-19

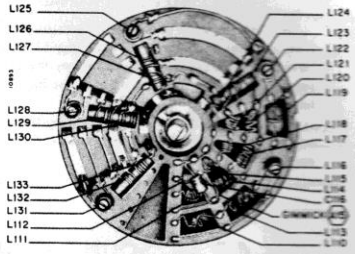


Figure 17. View of Oscillator-Mixer Rotor Disc in VHF Tuner 94E144-19

COIL AND ADJUSTMENT IDENTIFICATION FOR VHF TUNER 94E144-19

Sym. or Adj.	Function
A4	Slug, Mixer IF Output (coil L140)
A14	Trimmer, Mixer Grid (capacitor C118)
A13	Trimmer, VHF Amplifier Plate (capacitor C110)
A16	Slug, Channel (oscillator)
A15	Gimmick, Lead of Capacitor C116 (low band coupling adj.)
A16	Channel oscillator (coils L116, L122, L125, L128 and L131)
A17	43.95 MC interference trap (coil L136)
L102	Antenna Coil (Channel 2)
L103	Antenna Coil (Channel 3)
L104	Antenna Coil (Channel 4)
L105	Antenna Coil (Channel 5)
L106	Master Antenna Coil (Channels 2 through 6)
L107	Master Antenna Coil (Channels 7 through 9)
L108	Master Antenna Coil (Channels 10 and 11)
L109	Master Antenna Coil (Channels 12 and 13)
L112	VHF Amp. Plate Coil (Channel 2)
L115	VHF Amp. Plate Coil (Channel 3)
L118	VHF Amp. Plate Coil (Channel 4)
L121	VHF Amp. Plate Coil (Channel 5)
L124	Master VHF Amp. Plate Coil (Channels 2 through 6)
L127	Master VHF Amp. Plate Coil (Channels 7 through 9)
L130	Master VHF Amp. Plate Coil (Channels 10 and 11)
L133	Master VHF Amp. Plate Coil (Channels 12 and 13)
L111	Mixer Grid Coil (Channel 2)
L114	Mixer Grid Coil (Channel 3)
L117	Mixer Grid Coil (Channel 4)
L120	Mixer Grid Coil (Channel 5)
L123	Master Mixer Grid Coil (Channels 2 through 6)
L126	Master Mixer Grid Coil (Channels 7 through 9)
L129	Master Mixer Grid Coil (Channels 10 and 11)
L132	Master Mixer Grid Coil (Channels 12 and 13)
L110	Oscillator Coil (Channel 2)
L113	Oscillator Coil (Channel 3)
L119	Oscillator Coil (Channel 5)
L116	Master Oscillator Coil (Channels 2 through 4)
L122	Master Oscillator Coil (Channels 5 and 6)
L125	Master Oscillator Coil (Channels 7 through 9)
L128	Master Oscillator Coil (Channels 10 and 11)
L131	Master Oscillator Coil (Channels 12 and 13)

VHF AMPLIFIER AND MIXER ALIGNMENT

- Connect isolation transformer between power line and receiver.
- Connect negative of 4.0 volt bias supply to test point "X" (RF AGC), positive to chassis. See figures 14 and 15.
- Set Super Range Finder control fully to left (counter-clockwise) and Contrast control fully to right (clockwise).
- Connect sweep generator 300 ohm output to antenna terminals. If sweep generator does not have a built-in marker generator, loosely couple a marker generator to antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visible.
- Connect oscilloscope through a 15,000 ohm resistor to test point "W" on tuner. Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Do not remove bottom shield during alignment.
- Set scope sensitivity at .03 volt RMS for 1" P to P deflection.
  Adjust for 3" pattern on each channel.
- See figure 20 for adjustment locations and identification.

Step	Marker Gen. Freq. (MC)	Sweep Gen. Frequency.	Instructions
1	193.25 MC (Video Carrier) 197.75 MC (Sound Carrier)	Sweeping Channel 10. See "Frequency Table".	Set Channel Selector to channel 10 Check response obtained with VHF response curve shown in figure 19. Alternately adjust A13 and A14 (figure 20) as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location.
2	83.25 MC (Video Carrier) 87.75 MC (Sound Carrier)	Sweeping Channel 6. See "Frequency Table".	Set Channel Selector to channel 6. Check response obtained with VHF response curve shown in figure 19. If curve is not within limits, compromise adjustment is required. Alternately adjust A13 and A14 as required to obtain curve having maximum amplitude, symmetry and flat top appearance consistent with proper bandwidth and correct marker location. After completing adjustment, recheck adjustment of step 1.
3	Set the sweep generator to sweep the channel to be checked. Set the marker generator for the corresponding video carrier frequency and sound carrier frequency.		Check each channel operating in the service area for curve shown below. In general, the adjustment performed in steps 1 and 2 are sufficient to give satisfactory response curves on all channels. However, if reasonable alignment is not obtained on an operating channel, repeat above steps as a compromise adjustment to favor the particular channel. If a compromise adjustment is made, other channels operating in the service area should be checked to make certain that they have not been appreciably affected. If windings of turret coils have been greatly disturbed, complete tracking adjustment may be required.

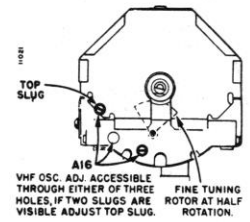


Figure 18. Front View of VHF Tuner.

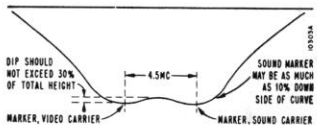


Figure 19. Ideal VHF Response Curve.
Note: Full skirt of curve will not be visible unless generator sweep width extends beyond 10 MC.

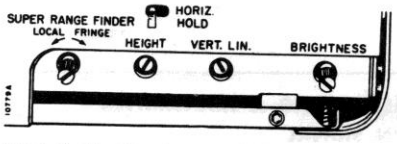


Figure 5. Auxiliary Controls at Rear of 14" Picture Tube Sets.

PICTURE TUBE: Short neck 14" and 17" rectangular, 110° magnetic deflection, electrostatic focus, gray filter face-plate, aluminized screen, no ion trap magnet required.

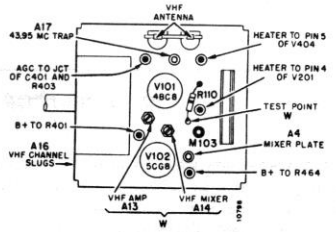


Figure 20. Top View of VHF Tuner **94D144-19** Showing Adjustment Locations.

OVER-ALL VHF AND IF RESPONSE CURVE CHECK

Receiver Controls and Bias Supply	Sweep Generator	Marker Generator	Oscilloscope	Instructions
Use isolation transformer between power line and receiver. Set Super Range Finder control fully to left (counterclockwise) and Contrast control fully to right (clockwise). Channel Selector on channel 12 or other unassigned high channel. Connect negative of 3 V bias to test point "T" (IF AGC) and test point "X" (RF AGC), positive to chassis.	Connect to antenna terminals. Keep generator output as low as possible to prevent overloading.	If an external marker generator is used, loosely couple high side to sweep generator lead. Marker frequencies are shown in frequency table.	Connect to point "V" through a decoupling filter. See figures 11, 14 and 15	Compare the response curve obtained against the ideal curve shown in figure 21. If the curve is not within tolerance, touch up the IF slugs as instructed below. It should never be necessary to turn slugs more than one turn in either direction. If the curve is satisfactory on the channel checked, all other channels should also be satisfactory. IMPORTANT: When sweep output is reduced, response curve amplitude on scope should also decrease, but curve shape should remain the same. If curve shape changes, reduce sweep output and/or the scope gain until the shape does not change.
		Note that video marker on the "Over-all VHF-IF Response Curve" will appear on the opposite side of the curve as compared to the "Ideal IF Response Curve", figure 12. This is due to action of the mixer tube.		

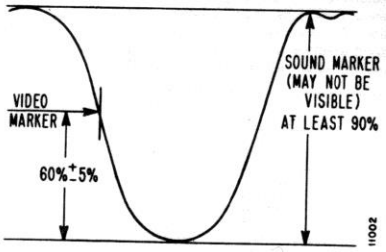


Figure 21. Ideal Over-all VHF and IF Response Curve.

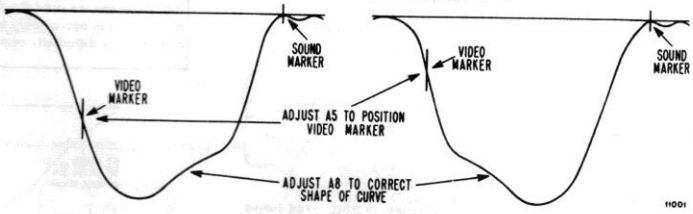


Figure 22. Over-all VHF and IF Response Curves, Incorrect Shape

VHF OSCILLATOR ADJUSTMENT USING A TRANSMITTED TELEVISION SIGNAL

It is always advisable to make VHF oscillator (channel) adjustments using a transmitted Television Signal as instructed on page 4. If a television signal is not available, VHF oscillator (channel) adjustment can be made while observing the Over-all VHF and IF Response Curve. Align oscillator adjustments to position the video carrier marker 60 per cent down from the peak of the over-all response curve, see figure 21. For location of oscillator adjustments and adjustment procedure, refer to instructions on page 3

SERVICE HINTS

TROUBLE SHOOTING

The television receivers covered in this manual incorporate the latest developments in circuitry and chassis construction. The different chassis covered and similar, with exception of tuners, B+ rectifier and picture tube size. The 16H1 and 16F1 chassis use only the VHF tuner. A description of B+ distribution is given in the paragraphs below.

As an aid in trouble shooting, views of the wiring side and component side of the printed circuit board is given in figures 25 and 26. A view of the wiring side of the main chassis is given in figures 27 and 28.

B+ DISTRIBUTION

The B+ power supply of these receivers consists of a transformerless circuit utilizing two rectifiers in a half wave voltage doubler circuit. Efficient filtering with excellent voltage regulation is obtained through use of a pi type filter network consisting of two 100 mf electrolytic capacitors and an iron core filter choke. The B+ voltage at output of the filter network is approximately 250 volts. See B+ Distribution Diagram, figure 23.

Note that the cathode of damper tube V406 supplies B+ boost voltage to horizontal output stage V405 and to the 1st anode of picture tube V305.

In addition to its regular function, the sound output tube V202 (12CU5), also operates as a voltage dropping tube for supplying 150 volts B+ to the VHF tuner, sound detector, 3rd IF amplifier and video amplifier circuits. The cathode of the sound output tube operates at approximately 150 volts positive with respect to chassis ground. If sound output tube becomes inoperative, both sound and picture are affected. See B+ Distribution Diagram, figure 23.

Note also, that the 2nd IF amplifier V302 operates as a voltage dropping tube in addition to its regular function. B+ voltage to V301 and V302 (1st and 2nd IF amplifiers) is effectively connected in series since the cathode of V302 connects to the plate and screen of V301.

SERVICING TUBES

IMPORTANT: To prevent possibility of electrical shock, do not remove or install tubes unless the set is disconnected from the power line.

Tapping the vertical output tube lightly will aggravate this condition. Replace 12DB5 tube with another known to be good.

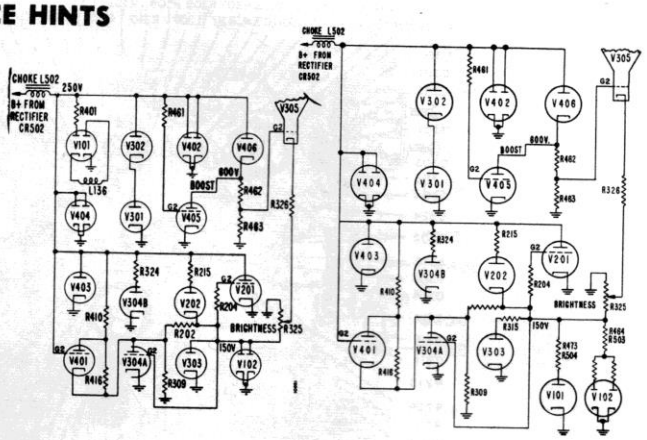


Figure 23: Simplified B+ Distribution Diagram for VHF Receivers using 94E144-19 Tuner.

Figure 23A: Simplified B+ Distribution Diagram for VHF Receivers using 94Z151-94N6 Tuners.

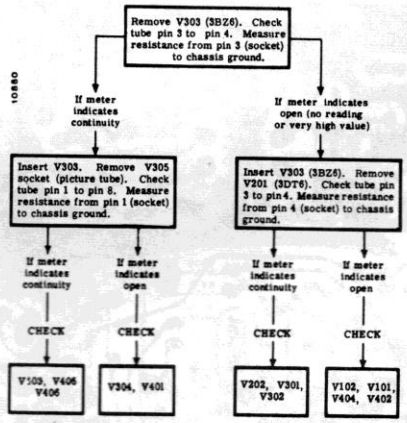


Figure 24. Simplified Test Procedure for Locating an Open Circuit Heater Tube in VHF only Receivers.

HORIZONTAL BARS IN PICTURE WHEN CABINET OR CHASSIS IS TAPPED

Horizontal bars or bunching of vertical trace lines in raster when the cabinet or chassis is tapped, may be caused by a microphonic vertical output tube V403 (12DB5).

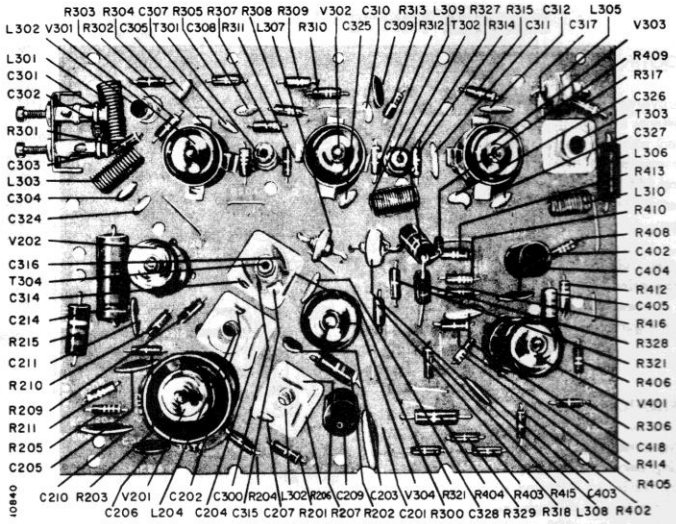


Figure 25. View of Component Side of Printed Wiring Board.

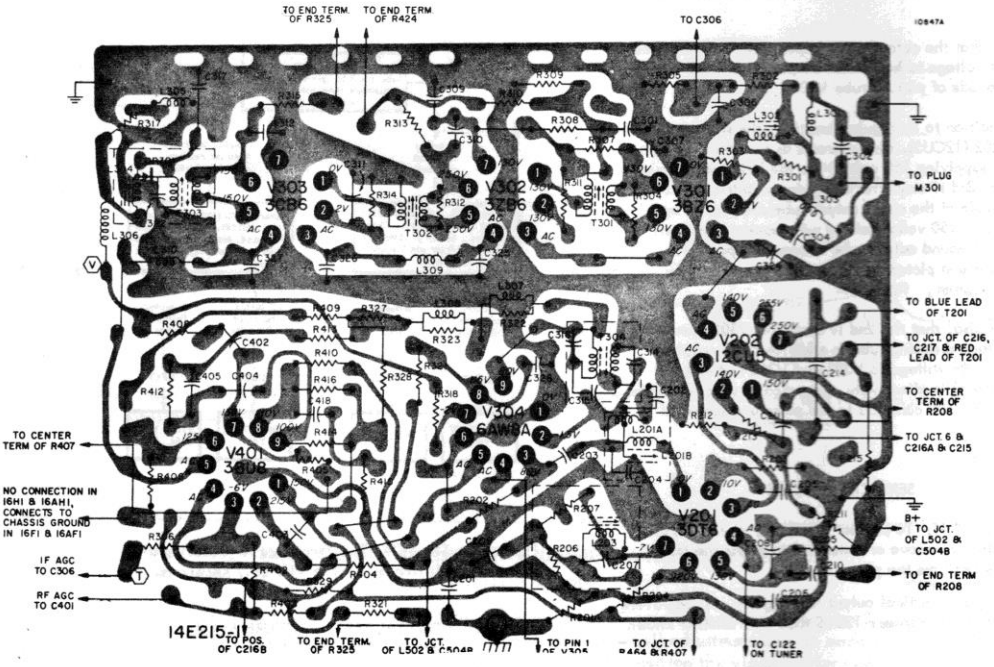


Figure 26. View of Wiring Side of Printed Wiring Board. Gray area represents printed wiring; black symbols and lines represent components and connections on opposite side.

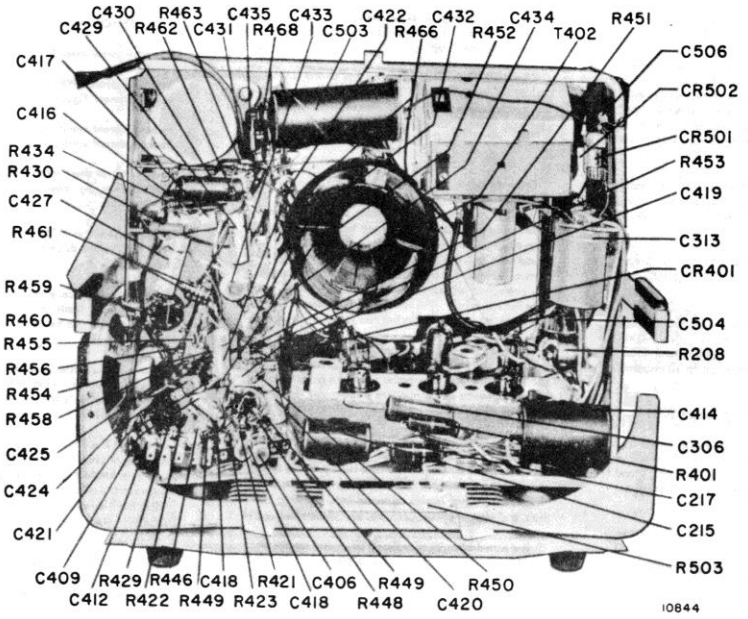


Figure 27. Wiring Side of 14" Picture Tube Chassis.

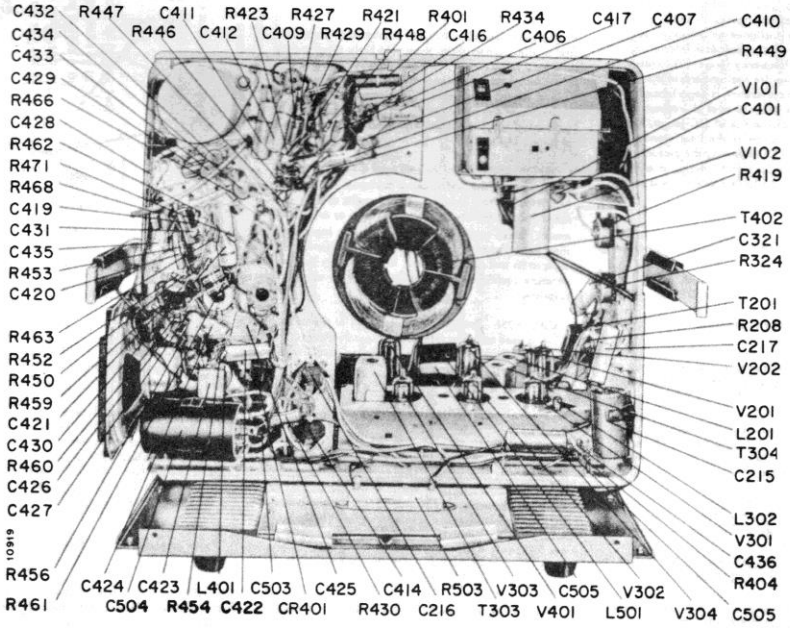


Figure 28. Wiring Side of 17" Picture Tube Chassis

RASTER CORRECTOR MAGNETS USED IN DEFLECTION YOKE

The 110° deflection yoke used in these receivers contains four built-in raster correction magnets. These are permanent magnets used for preventing pin cushion distortion (bowing) at the top, bottom or sides of the raster. The raster correction magnets are contained in pockets molded in the plastic insulation at the front of the yoke coil.

IMPORTANT: Do not disturb position of magnets. Pin cushion distortion may be visible in the raster if the magnets are removed or are incorrectly placed (end for end).

AGC BLOCKING ON STRONG SIGNALS AND AT HIGH BRIGHTNESS SETTINGS

To prevent AGC blocking on strong signals and high brightness settings, change capacitor C428 (plate circuit of V401) from 300 mmf to .001 mf, 1600 volts, part number 64B2-32. Also change resistor R403 (plate circuit of V401) from 7.5 megohms to 10 megohms.

DISTORTION AND BUZZ IN SOUND

If the sound is distorted or has buzz, touch-up adjustment of 4.5 MC intercarrier sound IF amplifier is required. Instructions for making "4.5 MC Sound IF Alignment Using A Television Signal" is given on page 15

Frequent need for sound touch-up adjustment may be due to frequency drift of quadrature coil L203. Drift may be eliminated by changing resistor R207 from 220,000 ohms to 100,000 ohms, 1/2 watt, 10%. After replacing resistor R207, make touch-up adjustment as mentioned above.

ELIMINATING RF INTERFERENCE BY ALIGNMENT OF ANTENNA TRAP L136 (94E144-19), L101 (94N6-1) (94Z151-5)

An RF interference trap is contained in the antenna circuit of the VHF tuners, see figures 20, 33 and 36. At the factory, this trap is aligned for minimum response at 43.95 MC. The trap attenuates interfering signals in the 41 MC IF frequency range. The trap should generally never require realignment in the field. However, if RF interference is experienced from radio transmitters or other sources at frequencies (harmonics or fundamentals) in the 41 MC range, the trap may be realigned to minimize the interference. The trap may be tuned while observing the picture. However, if the interference is intermittent, it will be difficult to adjust and the following procedure is recommended.

Adjust trap as follows:

a. Determine the exact frequency of the interfering signal.

b. Set channel selector to channel 2.

c. Connect VTVM to test point "V", see figures 14 and 15.

d. Set AM signal generator to exact frequency of interference. Increase signal generator output for 2 volt reading on VTVM.

e. Using a non-metallic alignment tool with 5/16" hexagonal shank (part number 98A30-12), adjust trap A17 (see figure 20) for minimum VTVM reading at test point "V".

CAUTION: It should not be necessary to turn the slug A17 more than a few turns in either direction. Do not turn the slug completely counterclockwise, as channel 2 interference may result.

ELIMINATING CORONA AT ANODE BUTTON OF THE PICTURE TUBE.

Under extreme conditions of high humidity, corona discharge may occur from the 2nd anode button of the picture tube to the dag coated area surrounding it.

If corona discharge is experienced, remove the electrostatic charge on the picture tube by shorting the 2nd anode button to the dag coating.

Clean the area surrounding the 2nd anode button with carbon tet and wipe dry. Then paint the area between the 2nd anode button and the dag coating with a good commercial high voltage insulating dope.

GENERAL

This new tuner incorporates the latest advancements in mechanical design and circuitry of turret type VHF tuners. The tuner is approximately 20 per cent smaller than the conventional turret-type tuners. For simplicity of circuitry, servicing convenience and purpose of automation, the turret assembly is built in the form of two channel discs. All channel coils or inductors are contained on two turret discs and are easily accessible for servicing. The turret can be disassembled from the tuner by merely removing two retainer springs.

An antenna matching transformer (balun) is used to provide a more constant antenna input impedance at all VHF channels. Increased sensitivity, better overall performance with improved picture quality result from the many circuit advances.

An improved type FINE TUNING control is used. The metal surface of the fine tuning rotor and the silver coated surface of the fine tuning stator form a variable capacitor. The normal range of the FINE TUNING control is plus or minus 2MC for high channels and plus or minus 1 MC for low channels.

The tuned circuits of the cascode VHF amplifier V101 (4BC8) and mixer grid and oscillator circuits V102 (5CG8) are contained on the two low loss mica filled discs. Since this tuner is of the semi-incremental type (contains series inductance circuits) channel tuning is accomplished by adding or subtracting portions of inductance with rotation of the Channel Selector (turret drum).

SERVICING TUNERS

The simplified circuitry and mechanical construction of these tuners make them relatively trouble-free and easy to service. Tuner voltages (B plus, AGC and heater) may be measured from terminals on top side of tuner. See figure 20. All components at the underside of the tuner can be serviced without the removal of the turret assembly. See exploded view of tuner, figure 30.

IMPORTANT: Location and lead dress of most components at the underside of the tuner are generally critical. Parts location, lead lengths of components and ground connections should be as originally made. When replacing components, it is important that they be replaced with parts of identical electrical characteristics and physical size. Refer to parts list for temperature coefficients, tolerances and other essential description.

CAUTION: The free end (lead A15) of the capacitor C116 is used as a low band coupling adjustment. Location of this lead is critical. When servicing tuner, avoid contact with coils or wiring leads.

CLEANING AND LUBRICATING TUNER CONTACTS

For cleaning rotating contacts of turret discs, remove bottom cover from tuner. Using a small stiff brush, apply a non-corrosive contact cleaner to all the contact points. With a soft canvas cloth, remove cleaner and buff contact points until surface is bright. After cleaning contacts, apply a thin film of switch contact oil, part number 98A64-1, to surfaces of contacts. Lubricate bearing surfaces of other moving parts with light vaseline or preferably part number 98A64-2 lubricant.

CAUTION: Do not use lubriplate or other similar lubricant containing zinc or cadmium.

REMOVING TURRET ASSEMBLY

To remove turret assembly, proceed as follows:

a. Remove bottom cover shield M119. See exploded view of tuner, figure 30.

b. Remove detent mounting screw M106 at side of tuner. Remove detent spring M108 and roller M109.

c. Remove turret shaft retaining springs M118 from inside of tuner, by pressing end of springs out of retaining tabs.

d. Remove the turret M116 from the tuner by grasping it at the shaft ends and carefully guide it out of the tuner.

CAUTION: Use care so as to avoid contact with coils or wiring leads on turret disc. Oscillator (upright) coils can be damaged or loosened by careless handling.

e. To reassemble turret in tuner, follow the above procedure in reverse, using care to avoid damage to stationary contacts M112, M123 and fine tuning rotor disc M111.

f. To engage the fine tuning disc M111 into clutch surfaces of fine tuning rotor M114, insert the edge of a thin blade knife or a single edge razor blade between the plastic discs of the fine tuning rotor until the blade just contacts fine tuning disc; then carefully press disc into the rotor and remove blade.

ADJUSTING STATIONARY CONTACT SPRINGS

The stationary springs of the front end rear contact plates M112 and M123 can be adjusted if they make poor contact due to insufficient tension.

To adjust the contact springs, remove the turret assembly from the tuner, as instructed in paragraph on removing turret assembly.

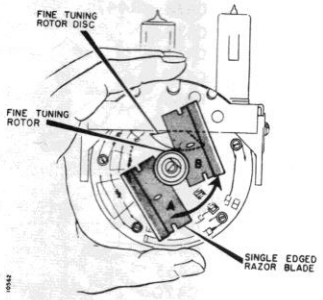


Figure 31. Front View of VHF Tuner Showing Method of Inserting Fine Tuning Disc and Fine Tuning Rotor.

Using a thin narrow blade screwdriver, adjust contact spring tension by carefully bending the contact springs upward until the clearance between the highest point on the spring extends about 9/64 of an inch above the plastic surface of the contact strip. With correct tension, the bowed portion of the contact spring should clear the plastic surface of the rotor disc by about 1/64 of an inch.

REPLACEMENT OF CERAMIC FEED-THROUGH CAPACITORS

The B+, heater and AGC leads of VHF tuners are terminated through ceramic feed-through capacitors. When soldering leads to VHF tuners, care should be exercised to prevent damage to the ceramic feed-through capacitors.

Replacement of ceramic feed-through capacitors may be required if silver coated surface is peeled, if ceramic is cracked, or if center conductor has loosened.

To replace a ceramic feed-through capacitor, proceed as follows:

1. Using diagonal cutters, clip off the terminals at each end of the capacitor. CAUTION: Be careful not to cut the connecting leads.
2. Remove the terminals from the connecting leads using hot soldering iron.
3. Apply the tip of a hot soldering iron to the metal plate, surrounding the capacitor. When the solder melts, withdrew the capacitor.
4. Clean off excess solder from plate, then draw the iron tip over the hole, on the oscillator side of the shield, to cover surface of hole with a thin film of solder.
5. With the soldering iron held at one side of the metal plate (approximately 3/16 inches from the hole), quickly push the new capacitor into the hole as soon as the plate is heated sufficiently to melt solder.
6. Reconnect the leads to the capacitor terminals.

If resistor leads break while replacing capacitor, new resistors may be soldered in place using a pencil point soldering iron.

94N6-1 TUNER

GENERAL

Tuners 93N6-1 is an improved turret type VHF tuner. It is especially designed for use In transformerless receivers using a series heater string. A high gain pentode (3BC5) is used as the VHF amplifier V101. A twin triode (5CG8) is used as the VHF mixer and oscillator V102.

The antenna circuit has been designed to provide a more constant impedance match for all VHF channels.

The channel coils for each channel are combined on a single coil form to provide better matching and more uniform response curves for all VHF channels.

The turret drum has been redesigned to simpify removal or replacement of channel coils.

A two piece bottom shield is used to provide greater accessibility for servicing the underside of the tuner.

A removable cover plate is used to provide access to components and test points located in the shielded section at the top side of the tuner.

To indentify parts for servicing, see Exploded Views of Tuners.

Important tuner service information is given in the following paragraphs.

REMOVING CHANNEL COILS

The channel coils are hald in the turret drum at one end by the protrusion on the coil form extending into the detent plate. The ohter end of the coil is held in the turret by the metal tab extending through the coil form.

To remove a channel coil, proceed as follows:

With the thumb of the left hand, press the metal tab (extending through the coil form) toward the rear of the tuner; at the same time, using the forefinger, lift the end of the coil form up and out of the drum.

Caution: Do not use force when removing channel coils from the turret as coils may be damaged. Use care so as not to disturb coil windings at underside of the coil form.

CLEANING CONTACTS

Remove several sets of coils from turret and rotate turret to a position, making contact springs of contact plate accessible for cleaning.

Using a small, stiff brush and a good non-corrosive contact cleaner, clean contact surfaces of contact springs.

Use a soft canvas cloth to remove dust or grease from contacts and contact plate.

Clean contact surfaces of rotating coils in same manner.

ADJUSTING CONTACT SPRINGS

The stationary contacts consist of contact springs M703, see figure 34. The contact springs are inserted through the cut-outs molded in the contact strips. The stationary contacts (springs) are of the self-wiping type and should gerferally maintain their tension and provide good contact without further attention.

Should the stationary contact springs make poor contact due to insufficient tension, or dirty surface, remove serval sets of coils from the turret. Rotate the turret to position making the bottom of the contact strip accessible for servicing. With a narrow blade screwdriver, adjust contact spring tension by carefully bending the bowed portion of the contact spring upward slightly until the shape of the spring conforms with the shape of other springs on the contact strip. If the free end of the contact spring slips out of the contact strip, the end may be reinserted by bowing the spring slightly and pressing inward. If a contact spring is damaged or bent badly, a replacement spring may be reinserted. Restore the spring to its original shape by comparing it with other springs. If the majority of contact springs are bent out of shape or damaged, tuner replacement is recommended.

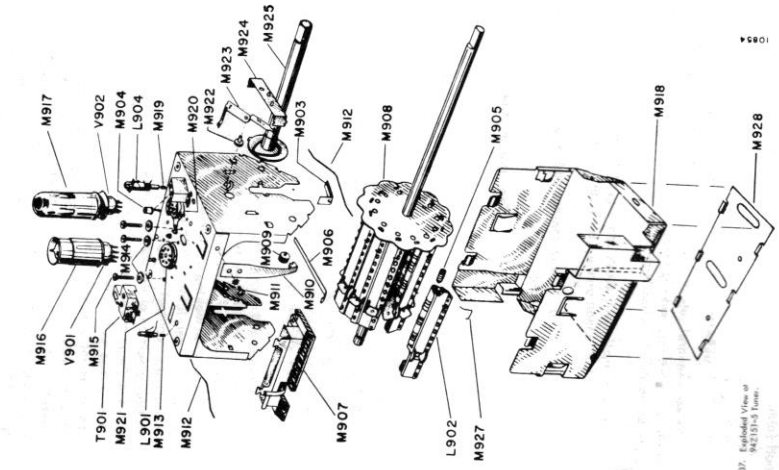


Figure 34: Exploded View of 94N6 Tuner.

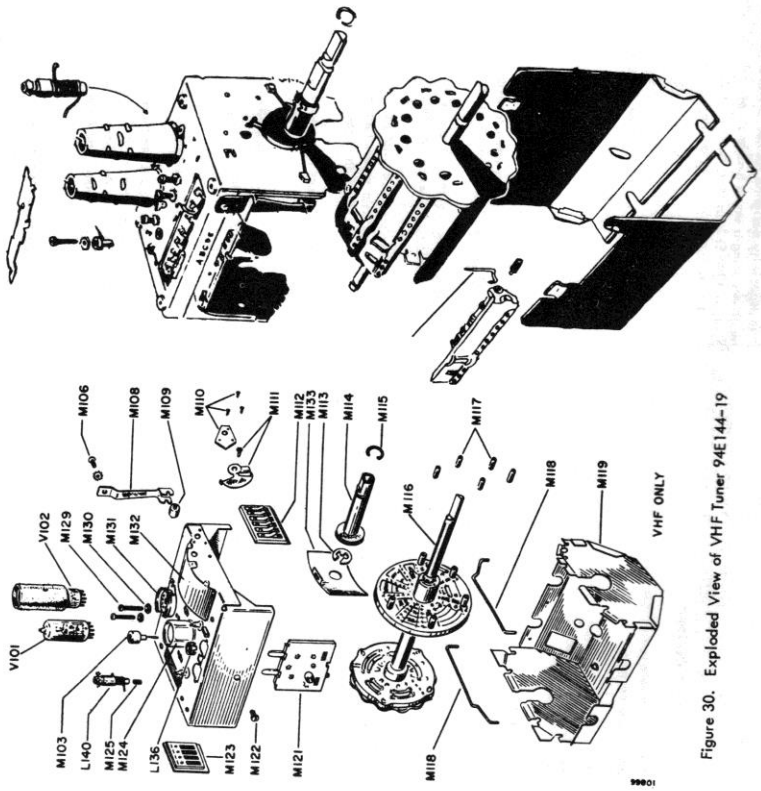


Figure 30. Exploded View of VHF Tuner 94E144-19

RF AND MIXER ALIGNMENT

- Connect isolation transformer between power line and receiver.
- Connect negative of 3 volt bias battery to AGC buss (test point "X"), positive to chassis.
- Set Super Range finder control fully to left (counter-clockwise) and contrast control fully to right (clockwise).
- Connect sweep generator 300 ohm output to antenna terminals. If sweep generator does not have a built-in marker generator, loosely couple a marker generator to the antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visible.
- Connect oscilloscope through a 15,000 ohm resistor to test point "W" on tuner. Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.

Step	Marker Gen Freq. (MC)	Sweep Gen. Frequency	Instructions
1	193.25MC (Video Carrier) 197.75 MC (Sound Carrier)	Sweeping Channel 10. See frequency table below.	Check for RF response curve below. Alternately adjust A11 and A12 as required to obtain equal peak amplitudes and symmetry, consistent with flat top appearance, proper band width and correct marker location.
2	83.25 MC (Video Carrier) 87.75 MC (Sound Carrier)	Sweeping Channel 6. See frequency table	Check for RF response curve below. Adjust A10 as required to obtain curve having maximum amplitude and flat top appearance consistent with proper bandwidth and correct marker location. After completing adjustment, recheck adjustment of step 1.
3	Set the sweep generator to sweep the channel to be checked. Set the marker generator for the corresponding video carrier frequency and sound carrier frequency.		Check each channel operating in the service area for curve shown below. In general, the adjustment performed in steps 1 and 2 are sufficient to give satisfactory response curves on all channels. However, if reasonable alignment is not obtained on a particular channel, (a) check to see that coils have not been intermixed or (b) try replacing the coil for that particular channel, or (c) repeat step 1 for a weak high channel as a compromise adjustment to favor the particular channel. Repeat step 2 for the weak low channel to favor the particular low channel. If a compromise adjustment is made, other channels operating in the service area should be checked to make certain that they have not been appreciably affected.

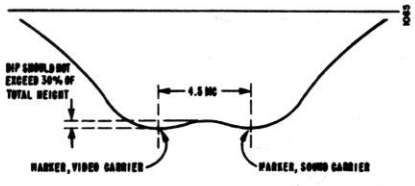


Figure 32. Ideal VHF Response Curve. Note: Full skirt of curve will not be visible unless generator sweep width extends beyond 12 MC.

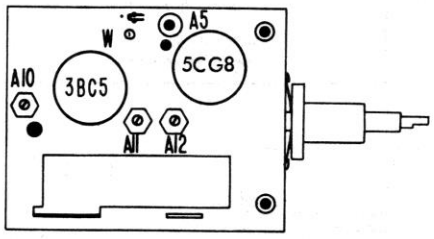


Figure 33. Top view of 93N6-1

R. F. AND NEUTRALIZING ALIGNMENT

94Z151-5

- Connect isolation transformer between power line and receiver.
- Connect negative of 3.0 volt bias supply to test point "X" (RFAGC), positive to chassis. See figures 14 and 15.
- Set Super Range finder control fully to left (counter-clockwise) and contrast control fully to right (clockwise).
- Connect sweep generator 300 ohm output to antenna terminals. If sweep generator does not have a built in marker generator, loosely couple a marker generator to antenna terminals. To avoid distortion of the response curve, keep sweep generator output at a minimum, marker pips just barely visable.
- Connect oscilloscope through a 15,000 ohm resistor to test point "W" on tuner. Keep scope leads away from chassis.
- Allow about 15 minutes for receiver and test equipment to warm up.
- Adjust sweep generator to sweep channel 10.
- Adjust marker generator for 193.25 MC (Video Carrier) and 197.75 MC (Sound Carrier).
- See figure 35 for adjustment locations and identification.

STEP	INSTRUCTIONS
1	Set Tuner Channel selector and sweep generator to channel 10.
2	Alternately adjust R. F. and Mixer trimmers A1 & A2, for maximum response between carrier frequencies consistant with correct video and sound carrier marker location.
3	Adjust the channel 10 antenna coil for maximum response between carrier frequencies by spreading or compressing turns. (CAUTION): Do not remove tilt by adjusting antenna coil to lower response gain.
4	Increase tuner bias to approximately -9 volts or disconnect B+ from tuner and increase sweep generator output to maximum. Adjust neutralizing trimmer A3 for minimum response with valley centered between carrier frequencies as shown by Figure 35.
5	If the sweep generator output or oscilloscope gain is too low to obtain a satisfactory response curve at the tuner Test Point with the RF amplifier biased to cut-off, the Neutralization trimmer can be adjusted for minimum IF response with connected scope to video detector Test Point V.
6	Repeat Steps, 3, 4, and 5 in order. Do not readjust neutralizing trimmer during the remainder of alignment procedure.
7	Repeat Steps 3 and 4, adjusting RF and Mixer trimmers and antenna coil for maximum response consistent with response curve symmetry.
NOTE:	If RF response curve is not within limits on any channel, it will be necessary to make a compromise adjustment of the RF and/or Mixer trimmers. IMPORTANT: Any large readjustment of the RF or Mixer trimmers will require that the Neutralization trimmer adjustment be checked. If the IF traps within the tuner are incorrectly adjusted, the channel 2 response curve may be distorted. See IF Trap Alignment.

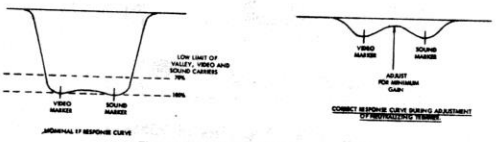


Figure 35: Ideal VHF Response Curve. Note: Full skirt of curve will not be visible unless generator sweep width extends beyond 12 MC.

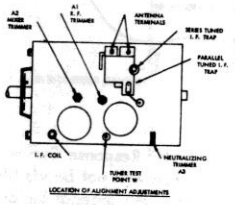


Figure 36: Top view of 94Z151-5

PARTS FOR 94N6-1 TUNER

COILS AND TRANSFORMERS

L102	Parrallel Trap Assembly	94N6-86
L104	VHF Channel Coil "AA"	
	For Channel 2	94N6-52
	For Channel 3	94N6-53
	For Channel 4	94N6-54
	For Channel 5	94N6-55
	For Channel 6	94N6-56
	For Channel 7	94N6-57
	For Channel 8	94N6-58
	For Channel 9	94N6-59
	For Channel 10	94N6-60
	For Channel 11	94N6-61
	For Channel 12	94N6-62
	For Channel 13	94N6-63
L108	Mixer Screen Coil	25A-159
L109	IF Coil	94N6-90
L110	Fil. Choke	94N6-91
T101	Ant. Transformer Assembly	94N6-92

94Z151-5 TUNER PARTS

COILS AND TRANSFORMERS

L901	(L101)	Trap Coil (series tuned)	94D 131-51
		Tuning Core (for L901)	94D 131-77
L902	(L102)	Channel Coil (stamped 2N4A, 3N4A, 4N4A, etc.)	
		for Channel #2	94D 131-52
		for Channel #3	94D 131-53
		for Channel #4	94D 131-54
		for Channel #5	94D 131-55
		for Channel #6	94D 131-56
		for Channel #7	94D 131-57
		for Channel #8	94D 131-58
		for Channel #9	94D 131-59
		for Channel #10	94D 131-60
		for Channel #11	94D 131-61
		for Channel #12	94D 131-62
		for Channel #13	94D 131-63
L903	(L103)	Screen Coil	94D 131-65
L904	(L104)	Mixer Plate Coil	94D 151-50
		Tuning Core (for L904)	94D 131-78
L905	(L105)	Trap Coil (parallel tuned)	94D 131-64

94E144-19 TUNER PARTS

COILS AND TRANSFORMERS

L102, L103, L104, L105	Increment Antenna Coil, Channels 2 through 5	73D 30-12
L106	Master Antenna Coil, Channels 2 through 6	73D 30-17
L107	Master Antenna Coil, Channels 7 through 9	73D 30-18
L108	Master Antenna Coil, Channels 10 and 11	73D 30-21
L109	Master Antenna Coil, Channels 12 and 13	73D 30-40
L112, L115, L118, L121	Plate Increment Coil, Channels 2 through 5	73D 30-19
L124	Master Plate Coil, Channels 2 through 6	73D 30-27
L127	Master Plate Coil, Channels 7 through 9	73D 30-8
L130	Master Plate Coil, Channels 10 and 11	73D 30-5
L133	Master Plate Coil, Channels 12 and 13	73D 30-25
L110	Increment Oscillator Coil,	73D 30-11
L113	Channels 2 and 3.	
L116	Master Oscillator Coil, Channels 2 through 4	73D 30-37
L119	Increment Oscillator Coil, Channel 5	73D 30-34
L122	Master Oscillator Coil, Channels 5 and 6	73D 30-36
L125	Master Oscillator Coil, Channels 7 through 9	73D 30-1
L128	Master Oscillator Coil, Channels 10 and 11	73D 30-33
L131	Master Oscillator Coil, Channels 12 and13	73D 30-32
L111, L114, L117, L120	Mixer Increment Coil, Channels 2 through 5	73D 30-20
L123	Master Mixer Coil, Channels 2 through 6	73D 30-38
L126	Master Mixer Coil, Channels 7 through 9	73D 30-45
L129	Master Mixer Coil, Channels 10 and 11	73D 30-1
L132	Master Mixer Coil, Channels 12 and 13	73D 30-31
L136	IF Trap Coil	73D 30-43
L138	Peaking Coil	73A 2-9
L139	Peaking Mixer Coil	73D 30-29
L140	Mixer Output Coil	73D 30-44

MISC. CHASSIS PARTS

(16F1 - 16H1)

Description	Part No.
100 K ohms (AGC) Brightness Control	75K2-1
500 ohm Vertical Linearity Control	75D20-100
1.5 Meg ohm VHT Control	75D20-104
10000 ohm Hor. Drive Control	75D20-106
3-1/2" P.M. Speaker .45 oz. Mag. (16H1)	78B120-2
4" P.M. Speaker 1 oz. Mag. (16F1)	78B122-2
Audio Output Transformer	79D33-15
Vertical Output Transformer (16H1)	79B43-12
Vertical Output Transformer 7/8 x 3/4 (16F1)	79B43-13
Horizontal Output Transformer (16H1)	79D77-1
Horizontal Output Transformer (16F1)	79D77-2
Rect. Mtg. Board (16H1)	84B16-8
Octal Socket (12DQ6)	87A5-1
Socket & Plate Ass'y (16H1)	87A14-8
9 Pin Mica Fill Socket (12DB5) (16F1)	87A25-2
9 Pin Bot. Mtg. Socket (6CG7) (2)	87A25-3
Mica Fill. Octal Socket Damper	87A38-1
Picture Tube Socket for 17" Picture Tube	87L1-2
Picture Tube Socket for 14" Picture Tube	87L1-3
Duo Diode Socket (16F1)	87A82
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Plate Cap Connector (12DQ6A)	88B16-73
Anode Connector (16H1)	88D16-76
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Coax Cable 15" (16H1) (Use only with 94N6-1)	89K3-1
Selenium Rect. 350 Ma. (16F1)	93A4-4
Dual Selenium Diode	93B5-5
Silicone Rectifier (16H1)	93A11
Horiz. Osc. Coil	94D17-7
Std. Coil Tuner (16H1)	94N6-1 or
Admiral Cascade 12 Pos. Tuner (16H1-16F1)	94E144-19 or
Standard Coil Tuner (16F1)	94Z151-5
Yoke Assembly 110° Defl.	94D147-1
Centering Device for 110° Defl.	94D148-1

MISC. PARTS FOR A5770-2X PRINTED CIRCUIT BOARD ASSEMBLY

Description	Part No.
P.C. Board	14E215-1
Trimmer Bridge	158163 9
Insulating Paper (Video Detector & Sound Coils)	32A32-12
Quadrature Coil (L203)	72C132-37
1st & 2nd IF Transformer (T301, T302)	72C132-38
1st IF Grid Input Coil (L302)	72C132-31
4.5 MC Trap & Sound Take-off Coil (T304)	72C185-2
Inter Stage Sound Coil (L201)	72B186-1
3rd IF Transformer (Includes 1N295) (T303)	72B191-2
Series Video Peaking Coil (L307)	73B5-23
Peaking Coil Video Det. (L305)	73B5-34
Shunt Video Peaking Coil (L308)	73B5-36
R.F. Choke (L306)	73B31-3
43.5 MC Resonant Choke (L304)	73B31-4
47.25 MC & 41.25 MC Trap Coil (L301, L303)	73B37-3 or 73B37-1
Filament Choke (L309, L310)	73B37-2
3rd IF Shield Can with Tap	85B10-1 or -2
9 Pin P.C. CCT. Socket (6AW8A) (3BU8)	87D35-19
7 Pin P.C. Socket (3BZ6) (3CB6) (12CU5) (3DT6)	87D35-23
Quad. Coil Shield Can	87B64-3
Coil Shield Can (Sound CCT.)	87B64-4
Captive Tube Shield (3DT6)	87A67
Tube Shield (I.F.)	87A78
Jumper 3/8"	95A3-13
Jumper 1/2"	95A3-13
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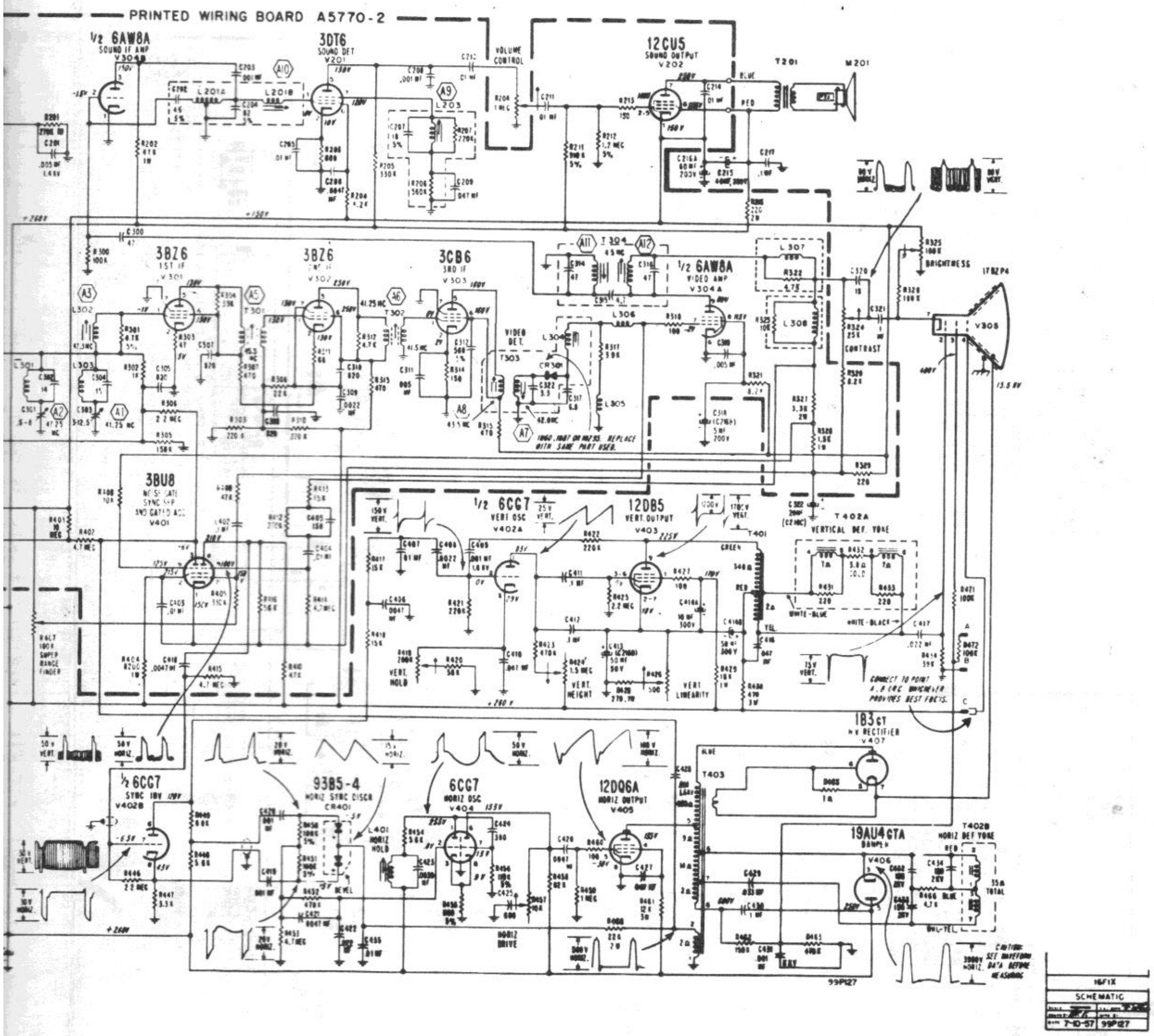
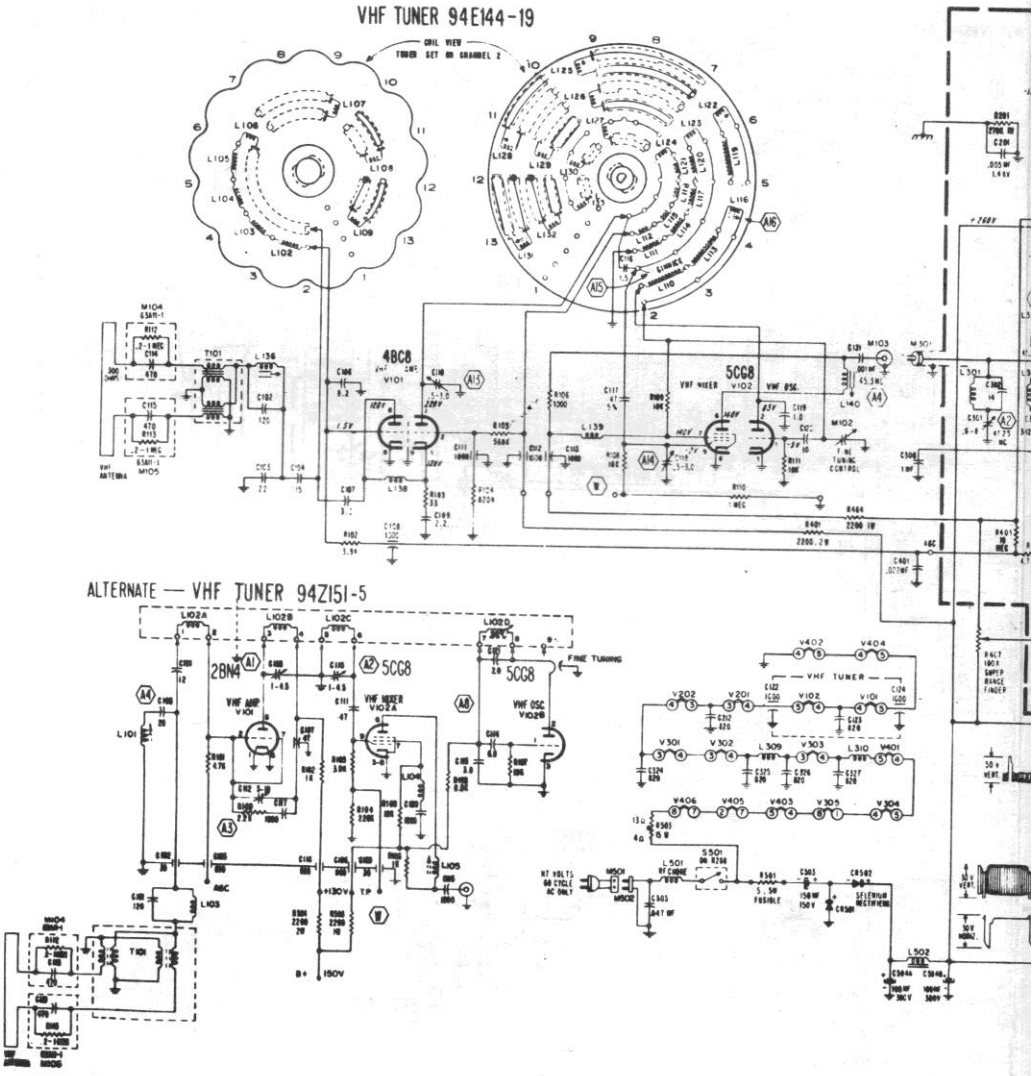
Plastic Tubing (For R.F. Choke)	96B19-2-3-0
Plastic Tubing (over Resonant Choke)	96B19-2-6-0
R.F. Radiation Choke	73B31-1
B+ Filter Choke	74B18-24
A.C. Switch & 1 Meg Volume Control	75D1-93
200 K ohm Vertical Hold Control	75K3-1
25,000 ohm Contrast Control	75K3-2

ADMIRAL

16F1X




VHF TUNER 94E144-19
4BC8
5CG8
VHF MIXER
VHF OSC.
ALTERNATE — VHF TUNER 94Z151-5
2BN4
5CG8
VHF AMP
VHF MIXER
VHF OSC
FINE TUNING
VHF TUNER
TUNING CONTROL
RF CHOKE
SELENIUM RECTIFIER
FUSIBLE
150V
TP

RCC TELEVISION Service Manual

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1959 Supplement No. 34

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ADMIRAL

ELECTROHOME

HALLICRAFTERS

MARCONI

PHILCO

PHILIPS

RCA-VICTOR

ROGERS-MAJESTIC

SIMPSONS-SEARS

VIKING

WESTINGHOUSE

ZENITH

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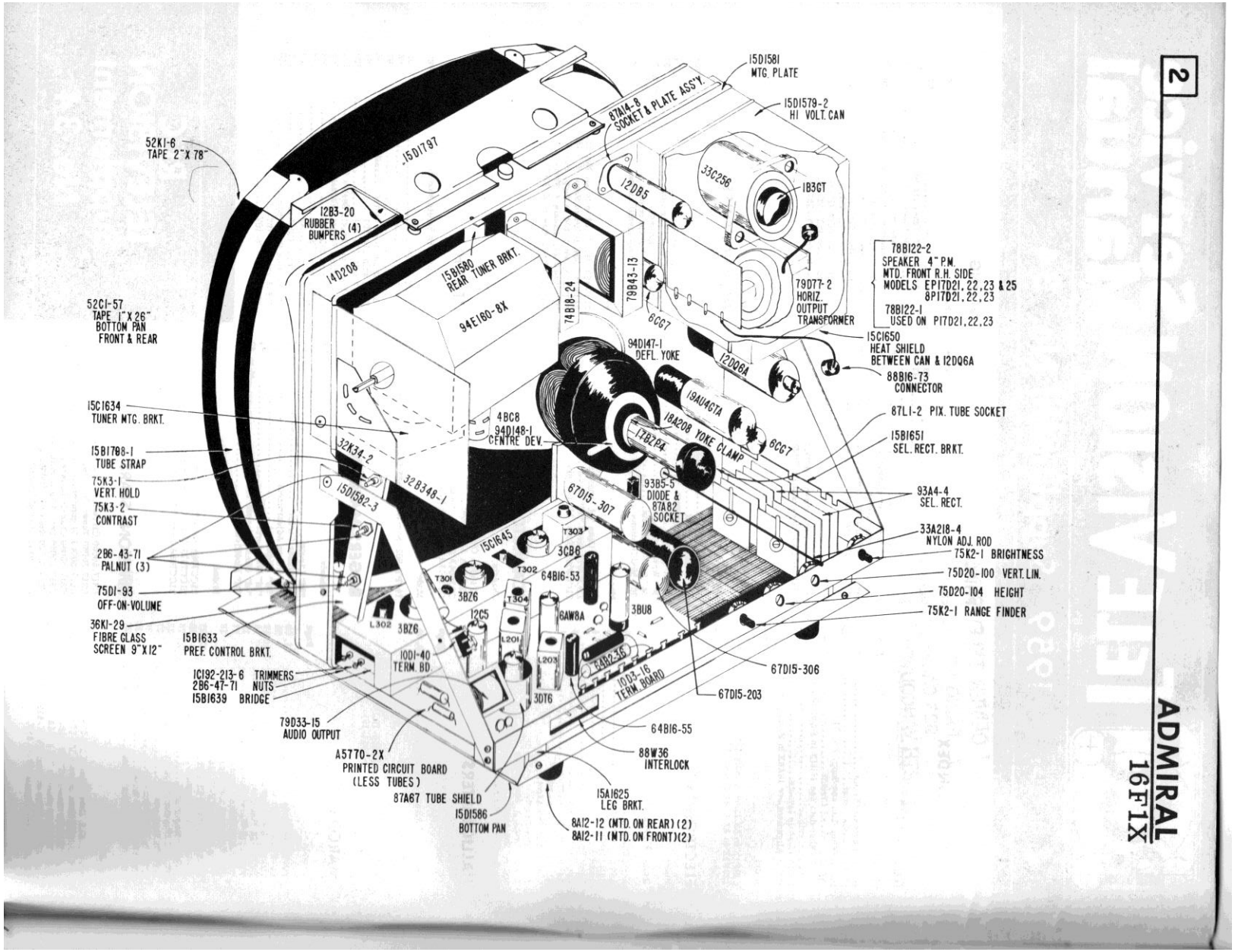
15D1581 MTG. PLATE
15D1579-2 HI VOLT. CAN
87A14-8 SOCKET & PLATE ASS'Y.
52K1-6 TAPE 2"X 78"
15D1797
12B3-20 RUBBER BUMPERS (4)
14D208
15B1580 REAR TUNER BRKT.
94E160-8X
33C256
1B3GT
12D85
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74B18-24
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79D77-2 HORIZ. OUTPUT TRANSFORMER
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88B16-73 CONNECTOR
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12DQ6A
19AU4GTA
18A208 YOKE CLAMP
6CG7
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52C1-57 TAPE 1"X 26" BOTTOM PAN FRONT & REAR
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75K3-2 CONTRAST
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2B6-47-71 NUTS
15B1639 BRIDGE
79D33-15 AUDIO OUTPUT
A5770-2X PRINTED CIRCUIT BOARD (LESS TUBES)
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15D1586 BOTTOM PAN
15A1625 LEG BRKT.
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8A12-11 (MTD. ON FRONT) (2)
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88W36 INTERLOCK
67D15-203
67D15-306
10D1-16 TERM. BOARD
10D1-40 TERM. BD.
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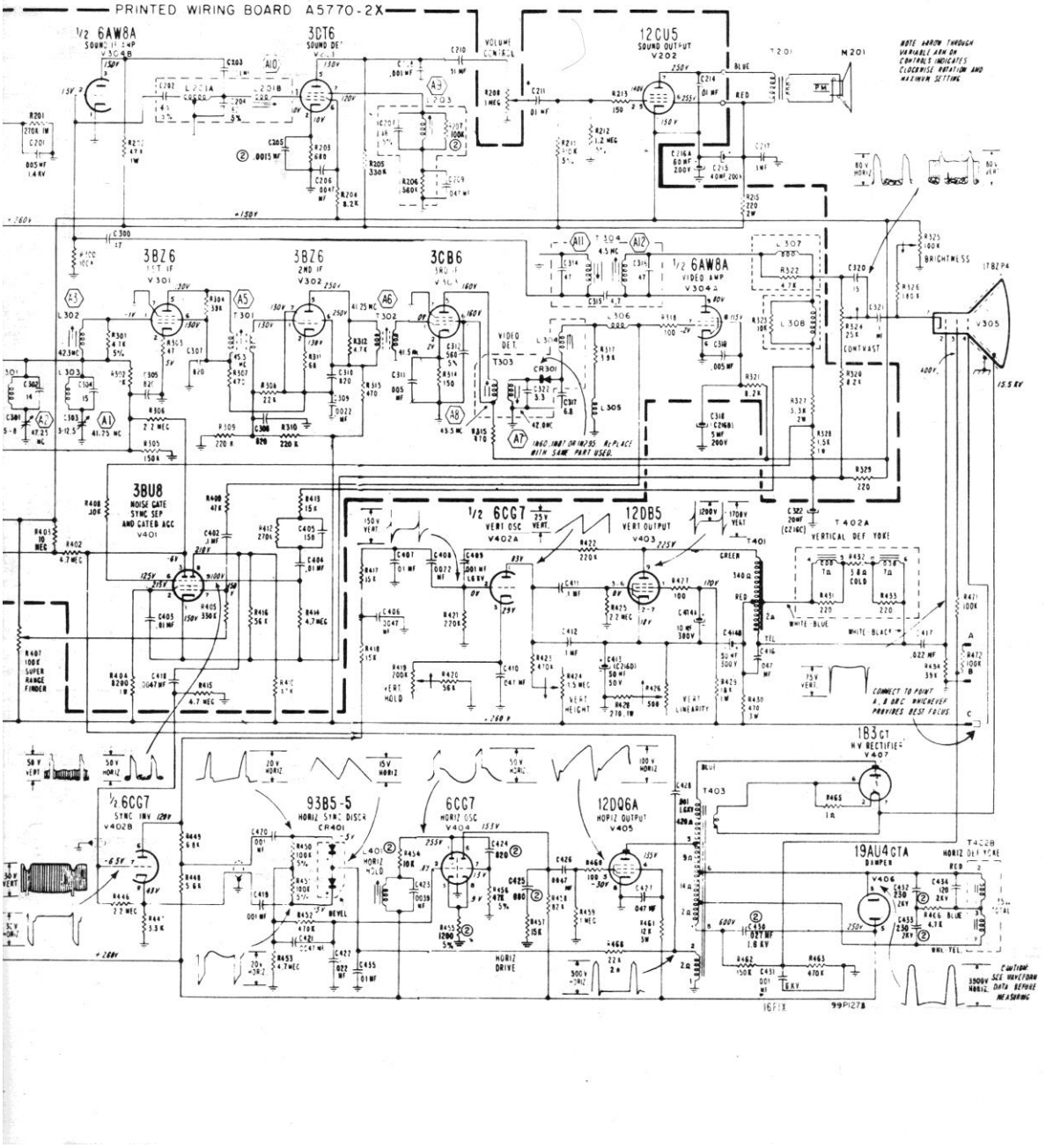
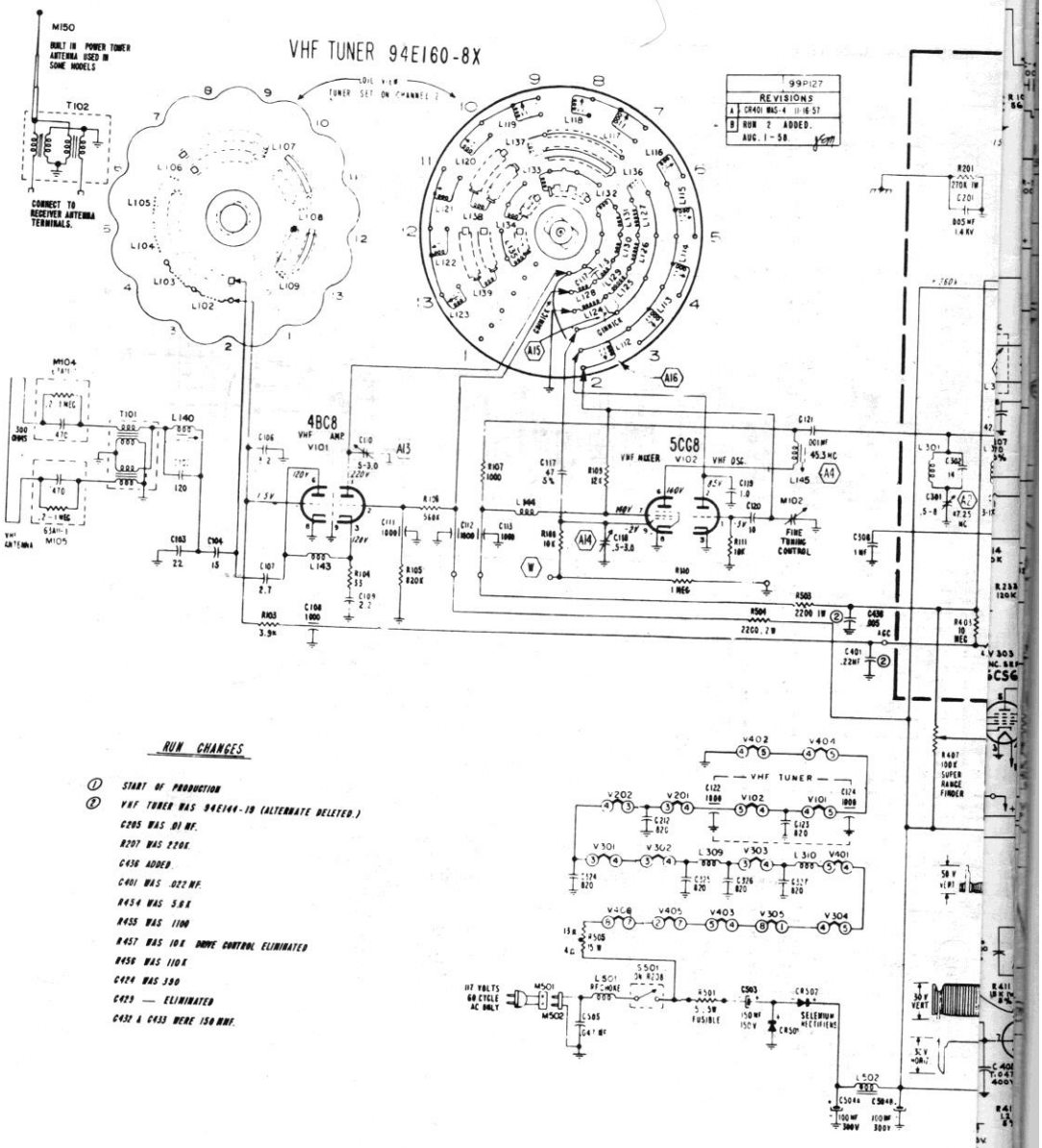
3BZ6
12C5
6AW8A
6AB2-35
30T6
T301
T302
T303
T304
L201
L203
L302

ADMIRAL
16F1X





RUN CHANGES

① START OF PRODUCTION

② VHF TUNER WAS 94E144-10 (ALTERNATE DELETED.)

C205 WAS .01 MF.

R207 WAS 220K.

C436 ADDED.

C401 WAS .022 MF.

R454 WAS 5.6K

R455 WAS 1100

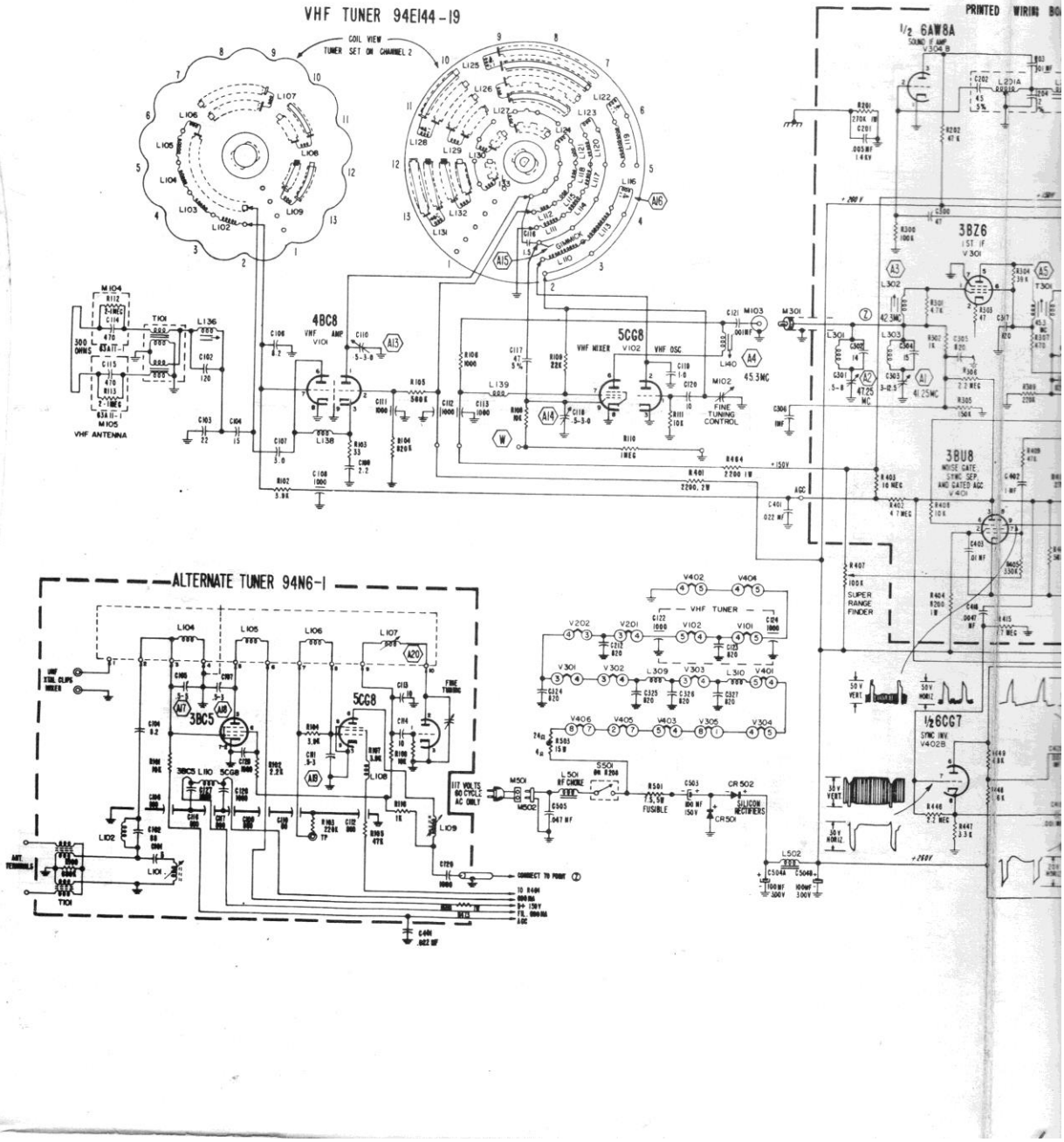
R457 WAS 10K DRIVE CONTROL ELIMINATED

R456 WAS 110K

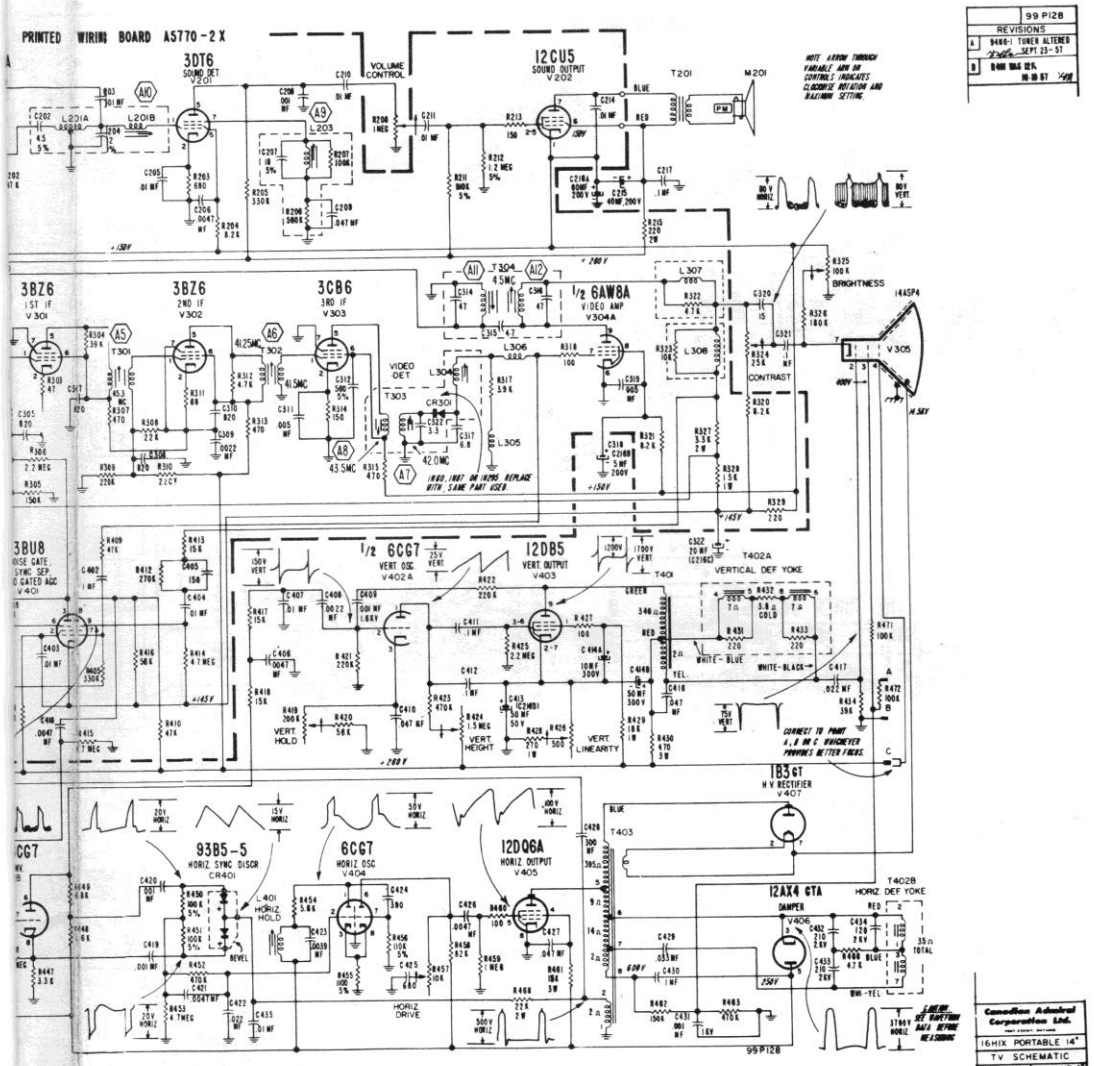
C424 WAS 330

C429 — ELIMINATED

C432 & C433 WERE 150 MMF.


VHF TUNER 94E144-19
COIL VIEW
TUNER SET ON CHANNEL 2
PRINTED WIRING BO
1/2 6AW8A
SOUND IF AMP
V304 B
3BZ6
1ST IF
V301
3BU8
NOISE GATE
SYNC SEP
AND GATED AGC
V401
1/2 6CG7
SYNC INV
V402 B
4BC8
VHF AMP
V104
5CG8
VHF MIXER
V102
VHF OSC
FINE TUNING CONTROL
45.3MC
42.3MC
41.25MC
47.25 MC
+200 V
+150V
AGC
SUPER RANGE FINDER
VHF ANTENNA
300 OHMS
ALTERNATE TUNER 94N6-1
3BC5
5CG8
VHF TUNER
V402
V404
V202
V201
V102
V101
V301
V302
V303
V401
V406
V405
V403
V305
V304
117 VOLTS 60 CYCLE AC ONLY
RF CHOKE
FUSIBLE
SILICON RECTIFIERS
CONNECT TO POINT 7
TO R404
9+ 150V
AGC

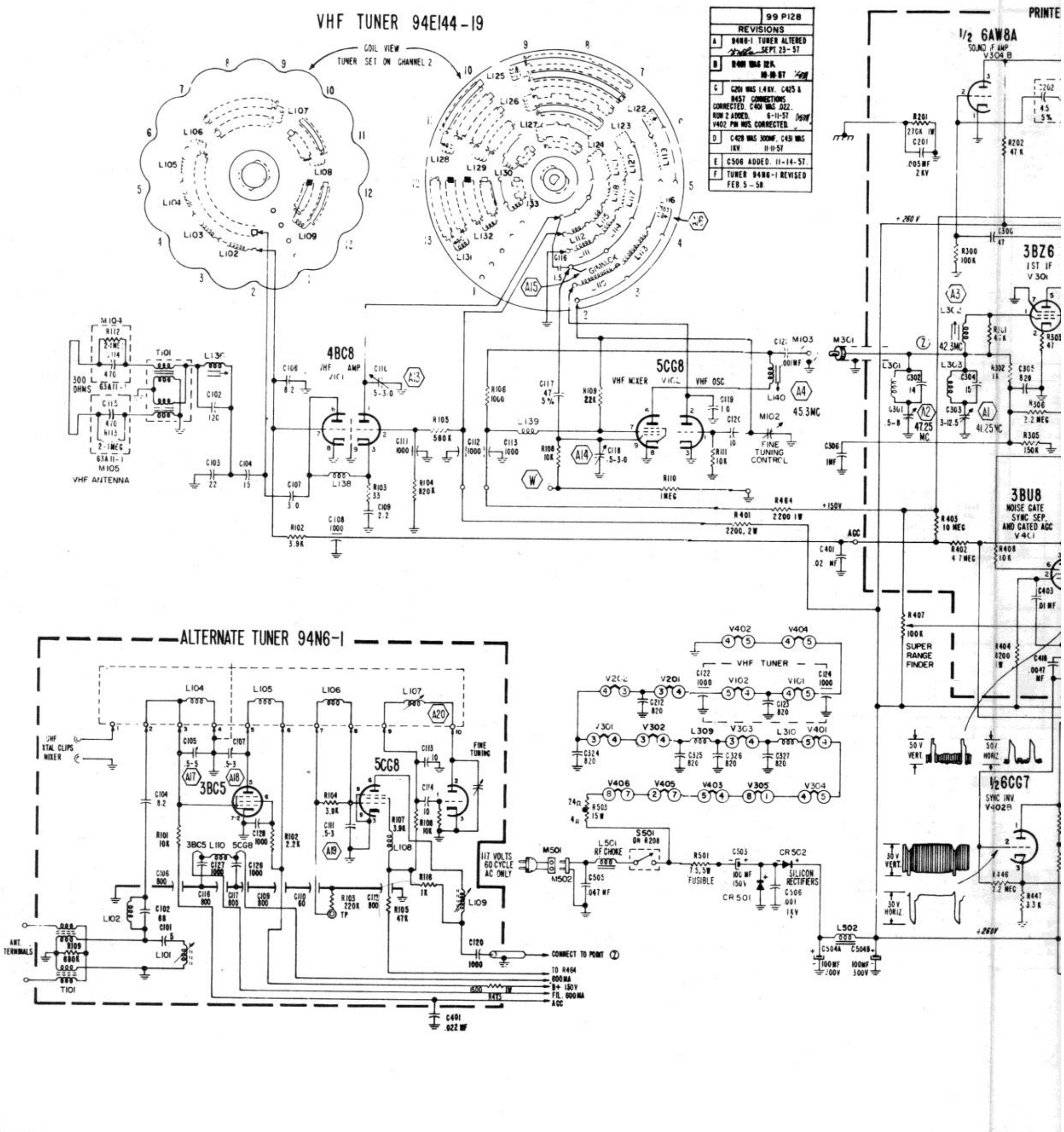
ADMIRAL
16H1X

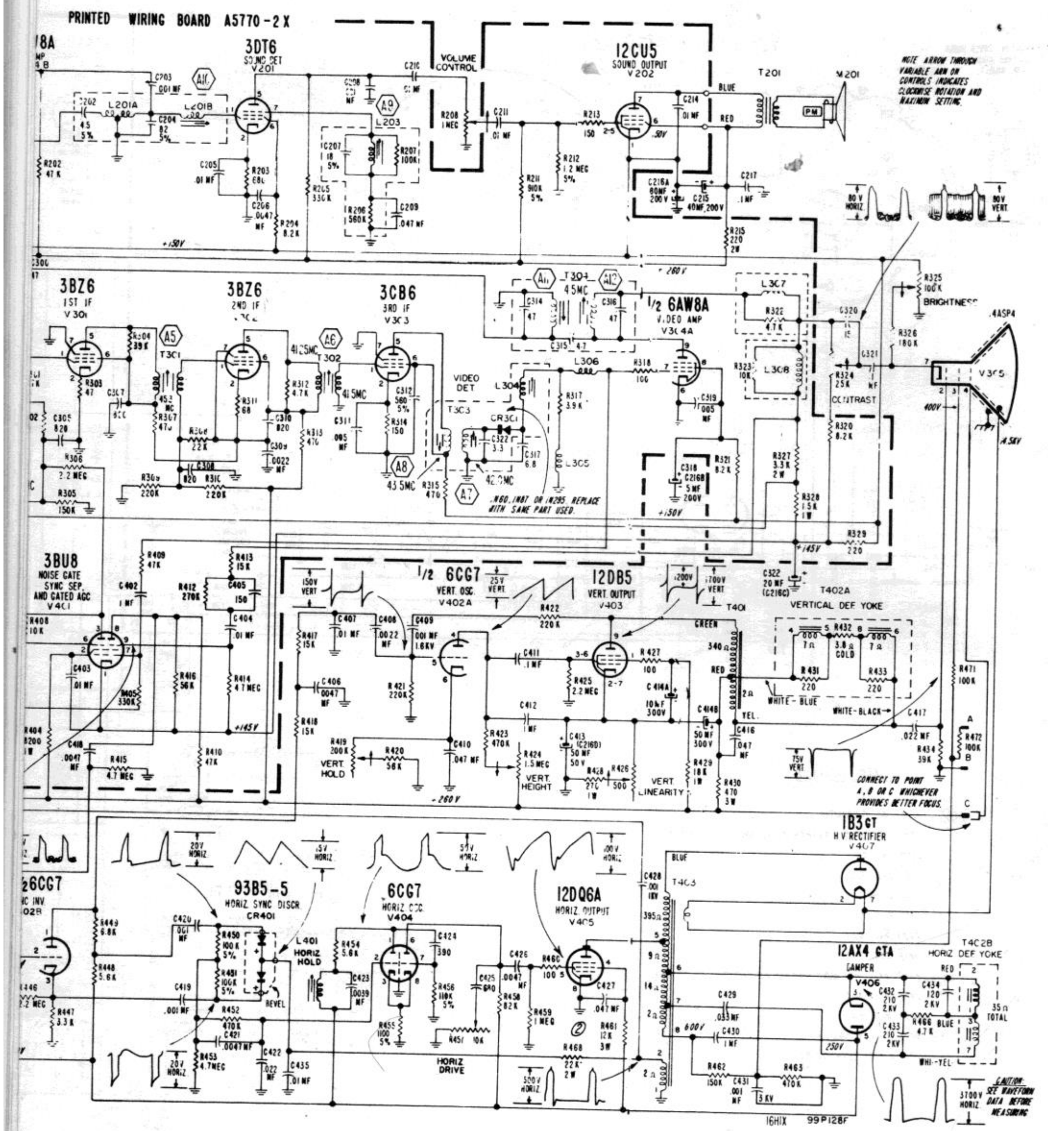


PRODUCTION RUN CHANGES

② R461 CHANGED FROM 15K TO 12K TO INCREASE WIDTH.

	99 P128
REVISIONS	
A	94N6-1 TUNER ALTERED SEPT. 23-57
B	R461 WAS 12K. 10-10-57
C	C201 WAS 1.4 KV. C425 & R457 CONNECTIONS CORRECTED. C401 WAS .022. RUN 2 ADDED. 6-11-57 V402 PIN NOS. CORRECTED.
D	C428 WAS 300MF. C431 WAS 1KV. 11-11-57
E	C506 ADDED. 11-14-57.
F	TUNER 94N6-1 REVISED FEB. 5-58.




PRINTED WIRING BOARD A5770-2X
3DT6
SOUND DET
V201
VOLUME CONTROL
12CU5
SOUND OUTPUT
V202
T201
M201
NOTE ARROW THROUGH VARIABLE ARM OR CONTROLS INDICATES CLOCKWISE ROTATION AND MAXIMUM SETTING.
3BZ6
1ST IF
V301
3BZ6
2ND IF
3CB6
3RD IF
V303
VIDEO DET
1/2 6AW8A
VIDEO AMP
V304A
BRIGHTNESS
CONTRAST
14ASP4
V305
NGO, IN87 OR IN295 REPLACE WITH SAME PART USED.
3BU8
NOISE GATE
SYNC SEP.
AND GATED AGC
V401
1/2 6CG7
VERT OSC
V402A
12DB5
VERT OUTPUT
V403
T401
T402A
VERTICAL DEF YOKE
VERT HOLD
VERT HEIGHT
VERT LINEARITY
CONNECT TO POINT A, B OR C WHICHEVER PROVIDES BETTER FOCUS.
1B3GT
H.V RECTIFIER
V407
1/2 6CG7
93B5-5
HORIZ SYNC DISCR
CR401
L401
HORIZ HOLD
6CG7
HORIZ OSC
V404
12DQ6A
HORIZ OUTPUT
V405
HORIZ DRIVE
T403
12AX4 GTA
DAMPER
V406
T402B
HORIZ DEF YOKE
CAUTION: SEE WAVEFORM DATA BEFORE MEASURING
16H1X 99P128F