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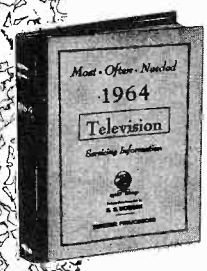

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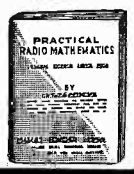

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Chassis G760-1, -2, -3, 1G755-1

PRESET FINE TUNING OR OSCILLATOR ADJUSTMENT

All models are equipped with a VHF tuner having preset fine tuning for each VHF channel. Adjust the fine tuning knob for best picture consistent with good sound after the set has warmed up for five minutes. Repeat this procedure for each used VHF channel. There is no other oscillator slug adjustment.

PICTURE CENTERING AND TILT RASTERING

For picture centering move the metal tabs on the back of the deflection yoke closer together or farther apart while monitoring picture. Adjust tabs so that picture is centered and does not leave shadowed areas. If the raster does not fill the screen it may be necessary to adjust the height, linearity or width adjustment.

If the raster is tilted, loosen the yoke retaining clamp and rotate the yoke assembly to produce horizontal trace lines with respect to the top or bottom of the set.

AGC CONTROL ADJUSTMENT

The AGC control is an AGC threshold control which is used solely to adjust the receiver for optimum operation under all signal conditions.

Note: This control is set at the factory and will not normally require field readjustment.

Improper AGC control adjustment can result in picture bending, tearing (overloading) or buzz in the sound. However, these same conditions can also be caused by other troubles in the set. Make adjustment as follows:

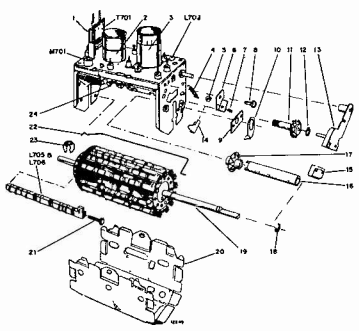
1. Turn set on and allow 15 minutes to warm up.
2. Turn Channel Selector to strongest station in the area.
3. Turn Contrast and Brightness controls fully to the right.
4. Very slowly turn AGC control to the left, just to the point where picture is weak (loses contrast).
5. Adjust Horizontal Lock (at rear of set) and Vertical Hold control (at side of set) for steady picture, without bending of vertical lines at top of picture.
6. Very slowly turn AGC control to the right, until picture just begins to bend, tear, shift, or buzz is heard in sound. Then very slowly turn the AGC control to the left, to the point at which picture bending, tearing, shifting and buzz is removed.
7. Make final adjustment by turning AGC control an additional 10 degrees to the left.
8. Recheck at maximum contrast on all channels. Picture should not overload and should reappear immediately after changing channels.

IMPORTANT: AGC adjustment should always be made on the strongest TV station received. If adjustment is made only on a weak station, AGC overload may occur when a strong TV station is tuned in.

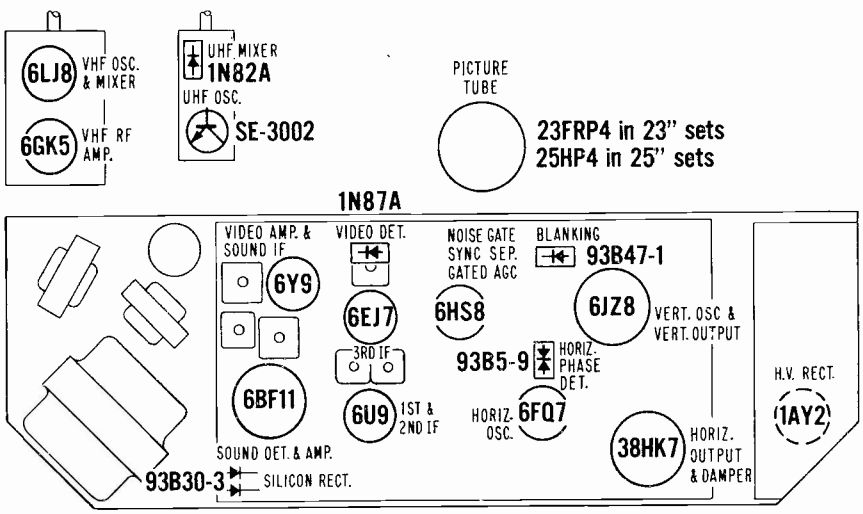
MODEL CHART

MODEL	NAME	FINISH	TUNER CLUSTER	CHASSIS
TG3710	Landon	Charcoal	GB2360-1	G760-1
TG3711	Landon	Brown		
TG3713	Landon	Beige		
TG3721	Palmer	Walnut	GB2360-2	G760-2
CG3731	Hubbard	Walnut	GB2360-1	G760-1
CG3732	Hubbard	Mahogany		
LG3741	Ingram	Walnut		
LG3742	Ingram	Mahogany		
LG3745	Monticello	Maple		
LG3771	Nording	Walnut	GB2360-2	G760-2
LG3775	Henderson	Maple		
LG3801	Dunholm	Walnut	GB2355-1	1G755-1
LG3805	Greensboro	Maple		
LG3819	Devereux	Cherrywood		
LG5401	Bristol	Walnut		
LG5411	Ardmore	Walnut		
LG5415	Lee	Maple		
*SMG3701	Trenton	Walnut	GB2360-3	G760-3
*SMG3705	Collingwood	Maple		
*SMG3711	Norborg	Walnut		

*Also take 22C5A radio chassis and RC7W4P-71AN or 87AN changer.



EXPLODED VIEW OF 94E282-5



TUBE LOCATION DRAWING OF CHASSIS

ADMIRAL Chassis G760-1, -2, Schematic Diagram

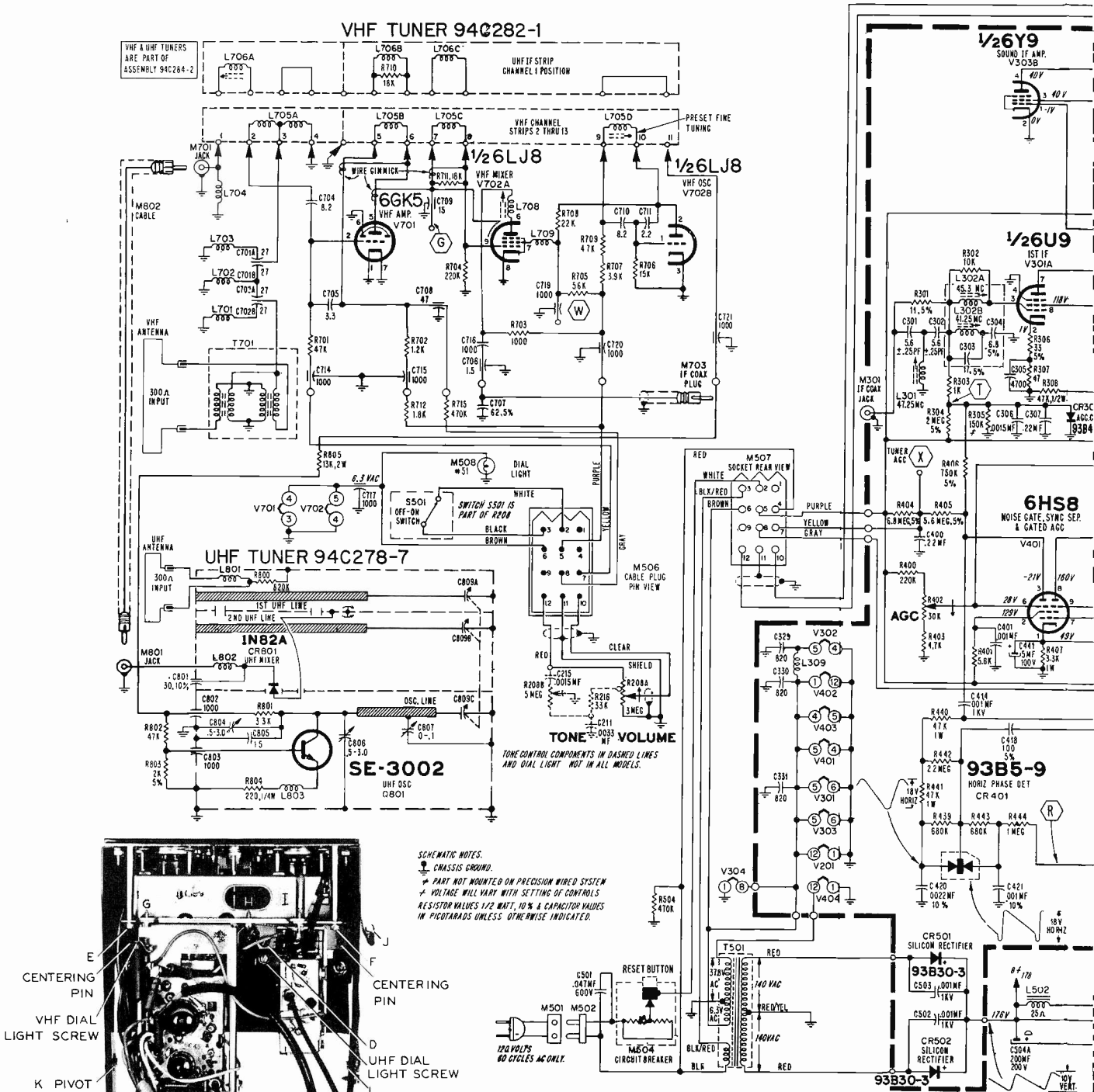


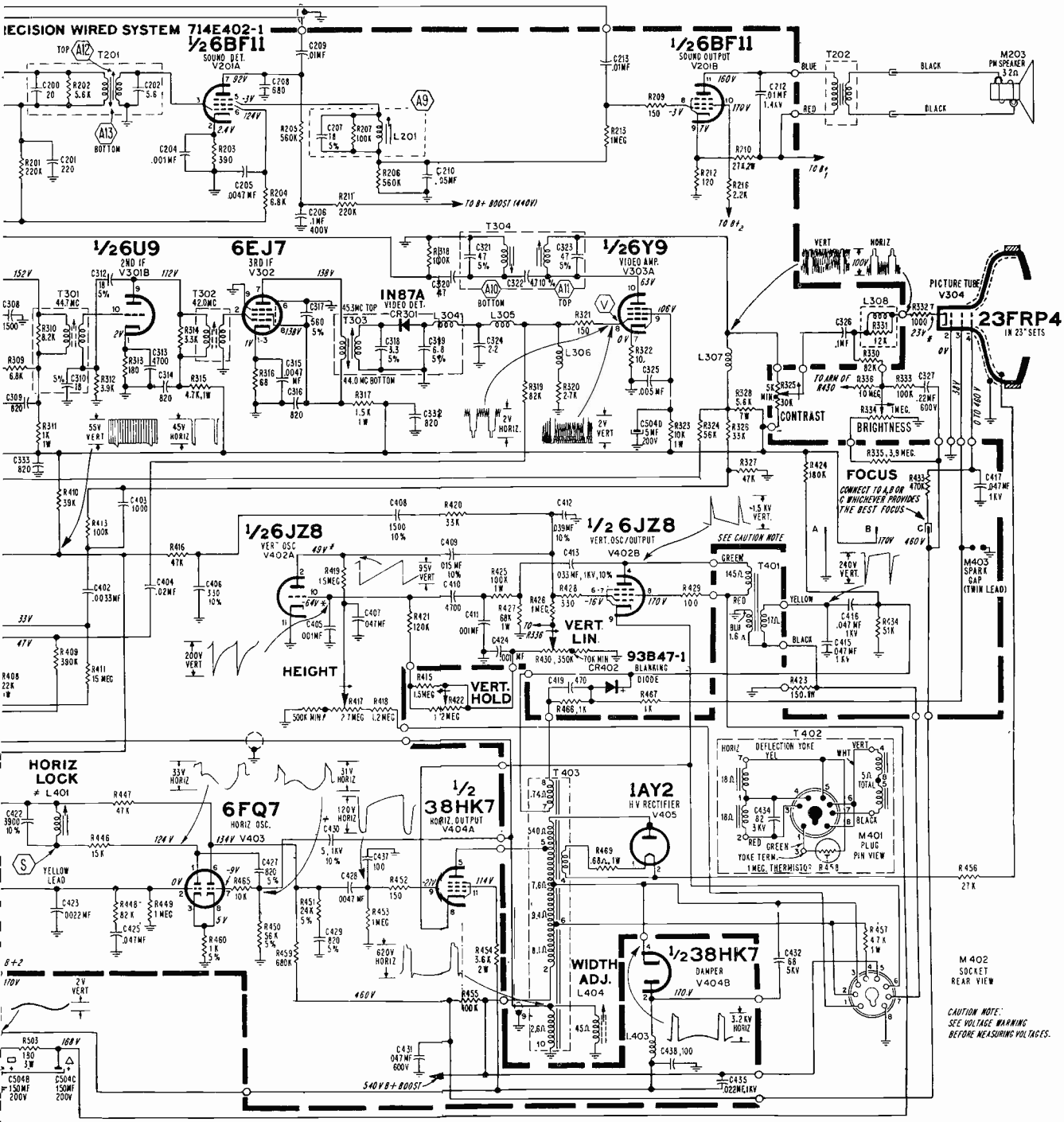
Fig. B 1G7 Tilt-Out Assembly View For Removal Instructions

CHASSIS TILT-OUT ASSEMBLY REMOVAL

To remove tuners and control assembly:

1. Pull off all knobs on tilt-out panel.
2. Remove cabinet back and unplug tuner IF coax lead at chassis.
3. Disconnect the white plug connecting the tuner assembly wires to the chassis.
4. Disconnect the contrast control cable by pulling connector from end of control shaft.

ADMIRAL Chassis G760-1, -2, Schematic Diagram, Continued



G760-1 & -2 CHASSIS SCHEMATIC DIAGRAM WITH TUNING CLUSTER ASSY. CB2360-1 & -2

(Chassis 1G755-1 and G760-3 circuitry is similar to diagram shown)

5. Disconnect spring A from bracket on inside of cabinet front. (See fig. B below for the remaining steps).

6. Remove screws B & C.

7. Remove screw D located between the tuners.

8. Remove screws E & F while supporting tuner assembly. Ease tuner assembly off centering pins, then down and out.

Screws G, H & I retain the control cluster bracket.

To remove tilt-out escutcheon assembly:

9. Remove the screw that fastens ground lug J to the picture tube escutcheon.

10. Remove retaining rings at pivot point K & L. Lift assembly carefully up and out from front of cabinet.

ADMIRAL Chassis G760-1, -2, -3, 1G755-1, Service Data, Continued

HORIZONTAL LOCK ADJUSTMENT

Make adjustment if picture "slips sideways" or "tears" when switching channels. Adjustment is made by rotating flexible shaft extending from rear of set. Adjust as follows:

1. Allow a few minutes for set to warm up. Tune in weakest station, set Brightness and Contrast controls for normal Picture. Important: Before proceeding, be sure that AGC control has been adjusted according to instructions in this manual.
2. Reduce Contrast to minimum. Very slowly turn Horizontal Lock adjustment to the right or left until picture is in sync. Interrupt the television signal by switching Channel Selector off and on channel. Picture should remain in sync. If picture bends or loses sync, adjust Horizontal Lock so that picture remains in sync and bending of vertical lines does not appear at top of picture. Check adjustment on all channels.

IMPORTANT: If adjustment cannot be made using the Horizontal Lock control, it will be necessary to make Horizontal Range adjustment as instructed.

HORIZONTAL RANGE ADJUSTMENT

The Horizontal Range control is set at the factory and seldom requires readjustment. Adjustment need only be made if 6FQ7 tube (V403) has been replaced and the picture cannot be locked-in with the Horizontal Lock adjustment or if the Horizontal Lock adjustment has insufficient range (adjustment only possible at extreme end rotation). Note: Horizontal Range adjustment is accessible after removing cabinet back.

Caution: Before proceeding with adjustment, be sure that the picture will sync vertically, as lack of both vertical and horizontal sync indicates sync circuit trouble. Lack of only horizontal sync generally indicates trouble in the horizontal sync (phase detector) circuit. Adjust as follows:

1. Remove cabinet back. Connect interlock cord.
2. Allow a few minutes for set to warm up. Tune in weakest station, set Brightness and Contrast controls for a normal picture. Important: Before proceeding, be sure that the AGC control has been adjusted according to instructions in this manual.
3. Using a piece of hook-up wire, short test point "R" (pin 2 of V403, 6FQ7 tube), to chassis ground. See schematicfor test point locations.
4. Connect a .22 mf 400 volt capacitor from test point "S" (junction of horizontal lock coil L401 and resistor R446, 15 K) to chassis ground. Caution:To avoid B+ shock, turn receiver off when making this connection.
5. With picture in vertical sync, set Horizontal Range control at point where picture is in horizontal sync and almost remains stationary with tendency to shift to left or right.
6. Remove the .22 mf capacitor from the horizontal lock coil. Set horizontal lock coil at point where picture is in horizontal sync and almost remains stationary with tendency to shift to left or right.
7. Remove wire short from test point "R" Set Channel Selector to weakest station. Switch Channel Selector on and off channel, picture should remain in horizontal sync. If necessary, adjust horizontal lock coil slightly to bring picture in sync.

VERTICAL HEIGHT AND LINEARITY ADJUSTMENT

If the raster does not fill the screen at the top or bottom, or if the top or the bottom of the picture is squeezed or stretched, this adjustment will be required after centering picture:

Alternately adjust the Vertical Height and Vertical Linearity controls on the back of the chassis so that the raster is equally scanned with approximately 3/8" overscan on both the top and bottom. Incorrect setting of these controls is likely to cause vertical foldover or vertical instability.

IMPROVING FOCUS

The picture tube of these receivers utilizes electrostatic focus in connection with a three position focus adjustment.

For obtaining best overall sharpness of pictures, focus adjustment should be checked at installation and when servicing. Once focus adjustment is properly made, no further need for readjustment is required.

From rear view of chassis (See fig. G) note that there are three focus (pin) connections at top rear of the chassis board, points shown as "A", "B" and "C". To make adjustment, connect plug-in focus lead to either of the three focus pins, whichever provides best focus at central area of picture tube. Important: Focus adjustment should be made with controls set for picture with normal contrast and brightness.

Caution: High B+ potential is present at focus terminals. To prevent electric shock, use care to avoid accidental contact with focus terminals.

WIDTH ADJUSTMENT

If the picture is too wide or too narrow, adjust the Width adjustment knob by turning it to the left or to the right until the picture overscans the picture tube screen about ½" on both sides. If the picture is not centered vertically then center it with the yoke centering tabs before making the width adjustment.

ALIGNMENT OF 4.5 MC TRAP

Alignment of 4.5 MC (beat interference) trap "A11" requires use of a hexagonal non-metallic alignment tool (part number 98A30-12).

To align 4.5 MC trap "A11", tune in television station with beat interference pattern in picture. While closely observing picture, adjust slug "A11" for minimum interference pattern.

Note that adjustment "A11" is top slug (slug farthest from bottom of coil). Use caution so as not to disturb bottom slug (slug nearest bottom of coil) as sound IF alignment will be affected.

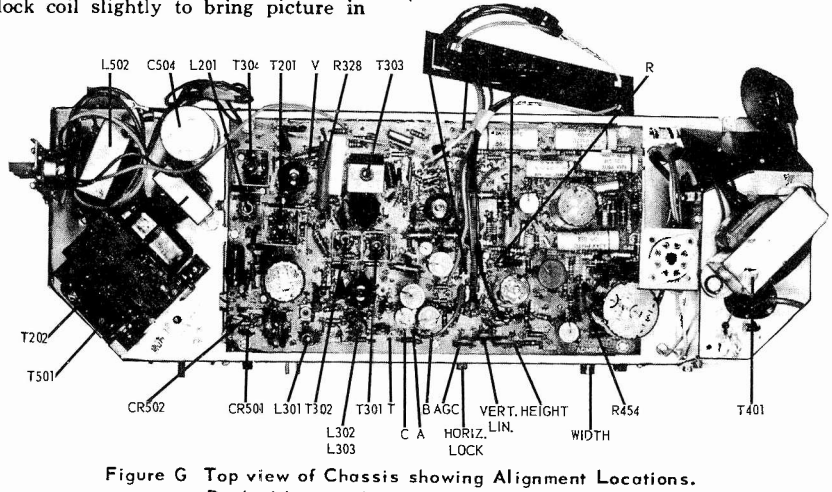


Figure G Top view of Chassis showing Alignment Locations. Dashed lines indicate adjustment nearest chassis.

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Chassis G2-1 and G2-2 used in
Models PG910, PG912, PG919, PG927

HORIZONTAL LOCK ADJUSTMENT

The Horizontal Lock control is set at the factory and seldom requires readjustment. Adjustment need only be made if 8FQ7 tube (V403) has been replaced and the picture cannot be locked-in with slight adjustment of the Horizontal Lock control.

Before proceeding with adjustment, be sure that the picture will sync vertically, as lack of both vertical and horizontal sync generally indicates sync circuit trouble. Lack of only horizontal sync generally indicates trouble in the horizontal sync (phase detector) circuit.

1. Remove cabinet back. Connect interlock cord.
2. Allow a few minutes for set to warm up. Tune in weakest station, set Brightness and Contrast controls for a normal picture.
3. Using a piece of hook-up wire, short pin 2 of V403, 8FQ7 tube, to chassis ground.
4. Adjust Horizontal Lock control at point where picture is in horizontal sync and almost remains stationary with tendency to shift to left or right.
5. Remove wire short from pin 2 of V403. Set Channel Selector to weakest station. Switch Channel Selector on and off channel, picture should remain in horizontal sync.

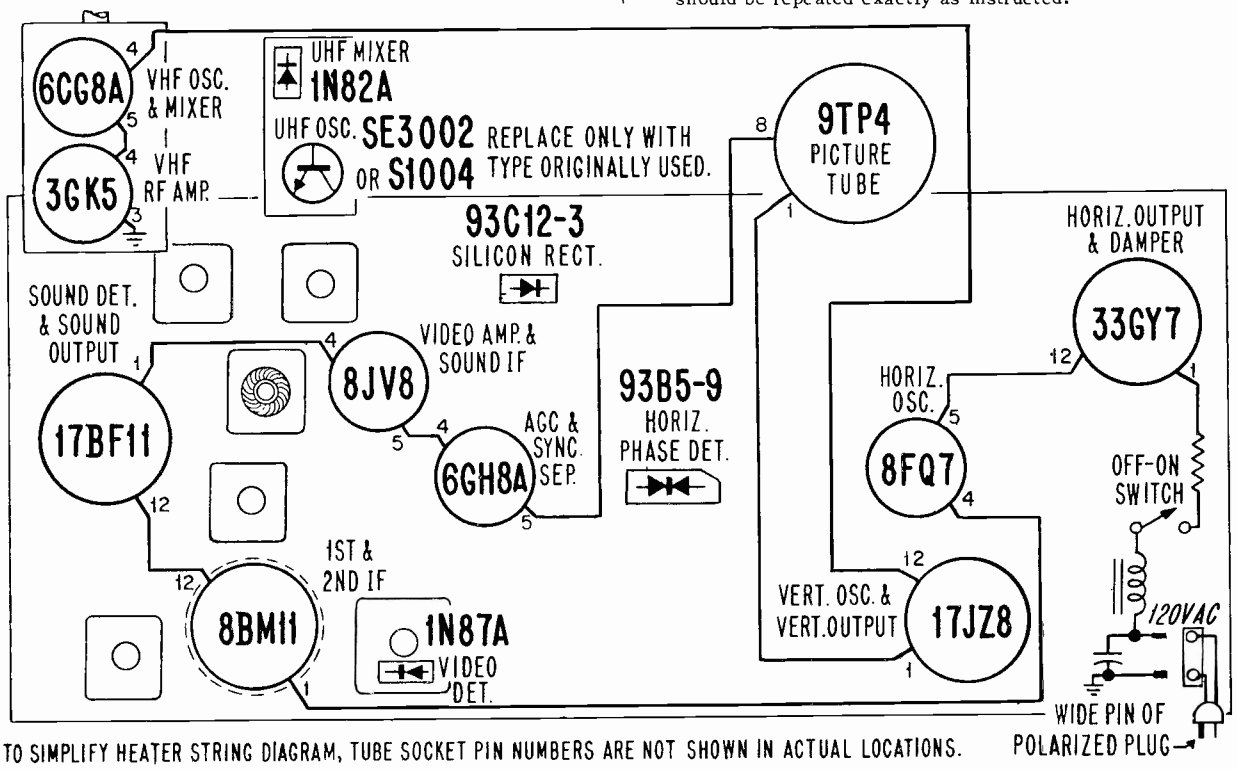
HEIGHT AND VERTICAL LINEARITY ADJUSTMENT

If the picture is of incorrect height (vertical size), adjust the Height control. This adjustment may affect the vertical linearity of the picture. If necessary, alternately adjust the Vert. Lin. control and Height control. Note: Upper portion of the picture is affected mostly by the Vertical Linearity control; lower by the Height control.

4.5MC SOUND IF ALIGNMENT

1. Tune in normal picture on strongest TV station. Allow about 15 minutes for set to warm up.
2. Using non-metallic alignment tool, slowly turn slug L202 to several turns to left until a buzz is heard in sound. Then slowly turn slug L202 to the right for loudest and clearest sound. NOTE: There may be two points (approximately ½ turn apart) at which sound is loudest. The slug should be set at center of second point of loudest sound noted as slug is turned in (toward bottom of coil).
3. Reduce signal to antenna terminals until there is considerable hiss in sound. For best results, use a step attenuator, connected between antenna and antenna terminals. Signal can also be reduced by disconnecting antenna and placing it close to antenna terminals or leads.
4. Carefully adjust slug L201B for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug L201B. NOTE: Slug L201B should be at end nearest bottom of coil.
5. Carefully adjust slug T303 bottom slug for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug T303. Caution: Slug T303 is located nearest bottom of coil. Use care so as not to disturb slug nearest top of coil.
6. If above alignment is correctly made, no further adjustment is required. However, if sound remains distorted at normal volume level (when receiver is tuned for best sound) repeat entire procedure.

CAUTION: Do not re-adjust slug L202 unless sound is distorted. If L202 is re-adjusted, all steps in alignment procedure should be repeated exactly as instructed.



TO SIMPLIFY HEATER STRING DIAGRAM, TUBE SOCKET PIN NUMBERS ARE NOT SHOWN IN ACTUAL LOCATIONS.

ADMIRAL Chassis G2-1, G2-2, Schematic Diagram

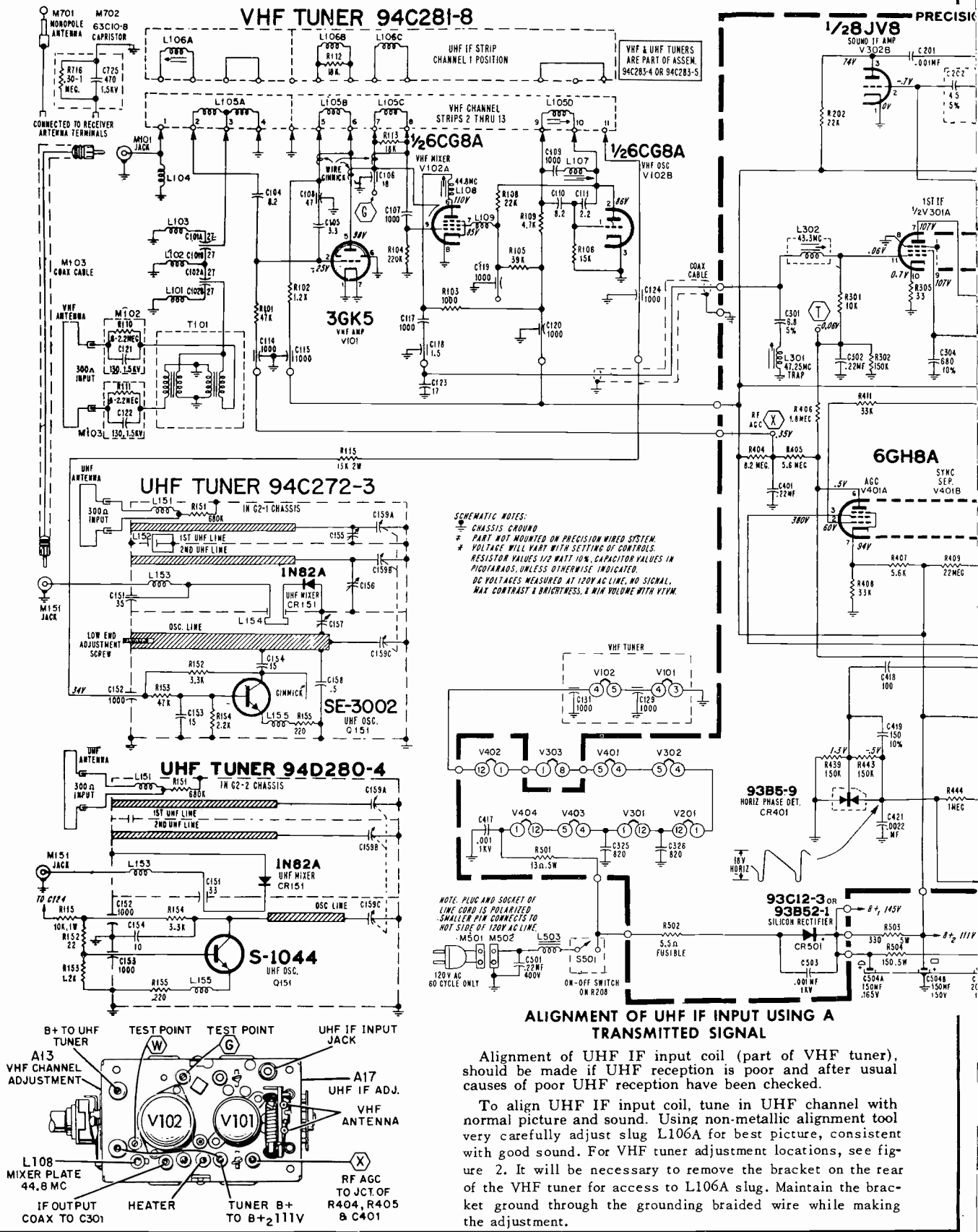
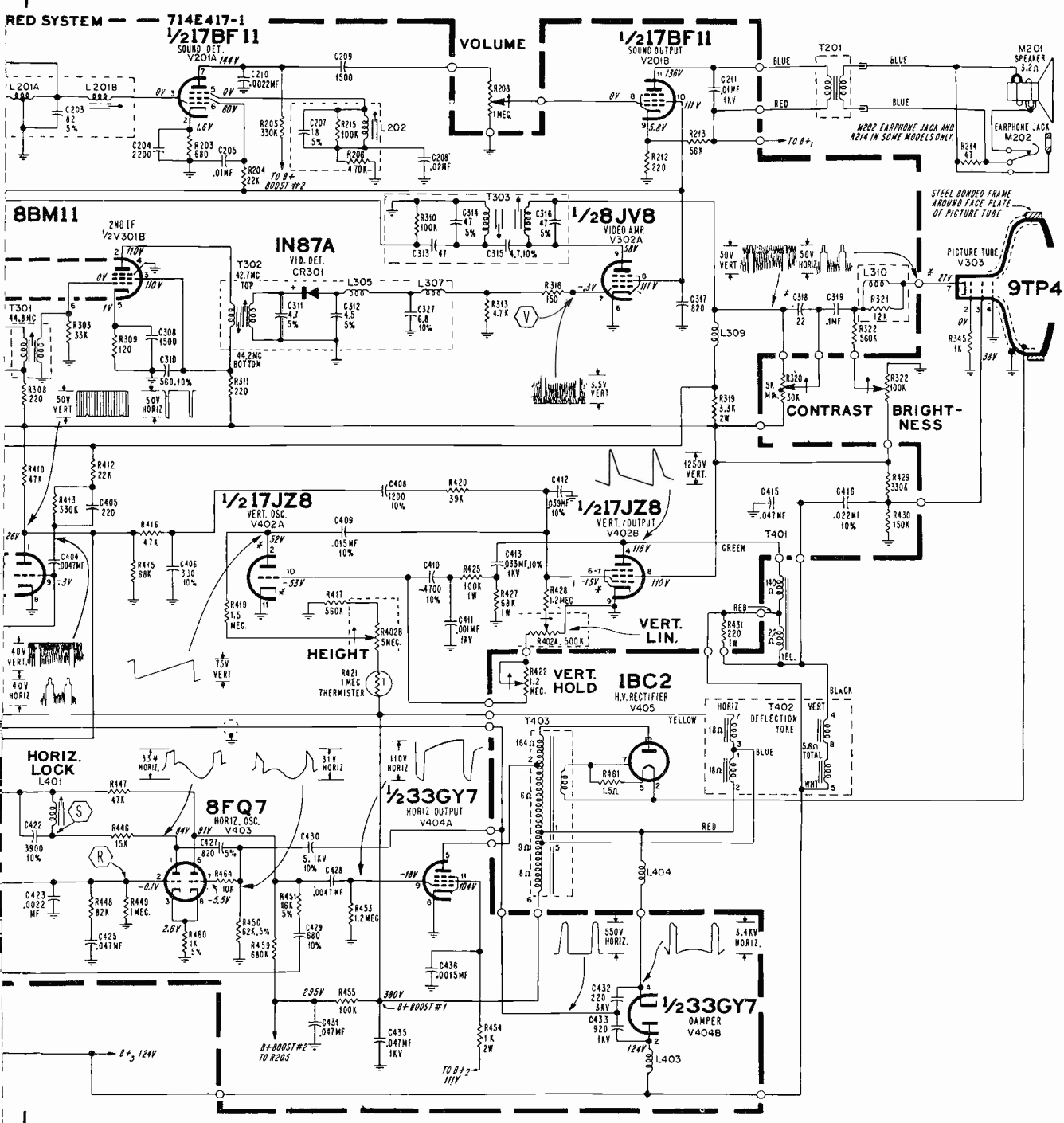


Fig. 2 TOP DRAWING OF VHF TUNER

Alignment of UHF IF input coil (part of VHF tuner), should be made if UHF reception is poor and after usual causes of poor UHF reception have been checked.

To align UHF IF input coil, tune in UHF channel with normal picture and sound. Using non-metallic alignment tool very carefully adjust slug L106A for best picture, consistent with good sound. For VHF tuner adjustment locations, see figure 2. It will be necessary to remove the bracket on the rear of the VHF tuner for access to L106A slug. Maintain the bracket ground through the grounding braided wire while making the adjustment.

ADMIRAL Chassis G2-1, G2-2, Schematic Diagram, Continued



RASTER TILT ADJUSTMENT

If raster is tilted, loosen deflection yoke clamping screw at rear of yoke. Rotate yoke until raster is straight. Tighten yoke clamping screw. Do not allow yoke to move back on neck of picture tube.

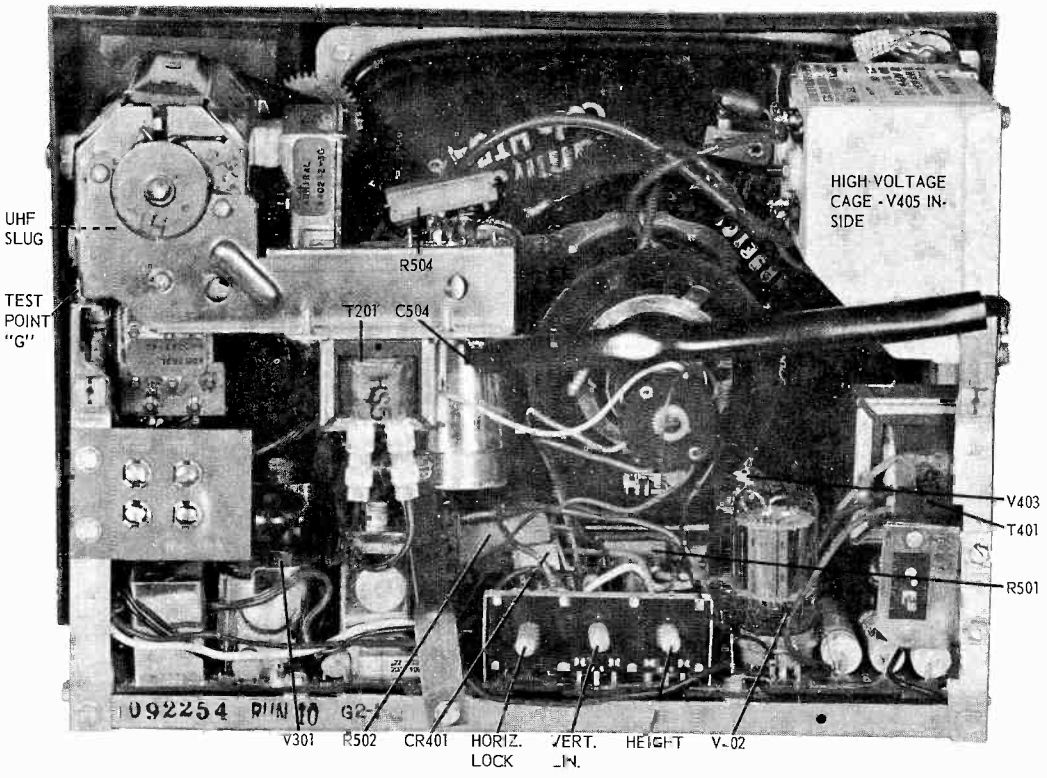
PICTURE CENTERING

The picture may be centered vertically and/or horizontally by moving the centering tabs, which are located on the back of the deflection yoke assembly.

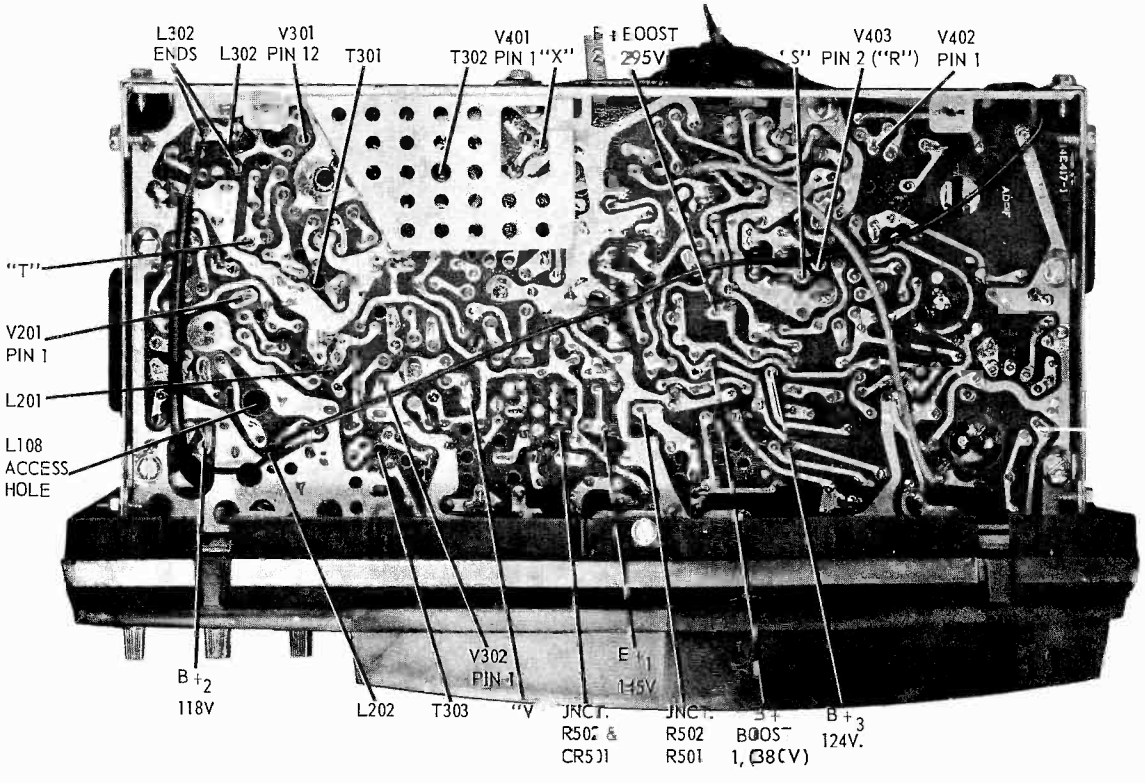
VHF CHANNEL ADJUSTMENT

1. Turn receiver on and allow 15 minutes warm up.
2. Set Channel Selector at highest channel to be adjusted. Set Fine Tuning control at center of tuning range, by rotating it one third turn counter-clockwise from full clockwise rotation. Set other tuning controls for normal picture and sound.
3. Remove Channel Selector knob.
4. Using a non metallic alignment tool, carefully adjust channel slug for best picture. Note: Sound may not be loudest at this point. Repeat procedure for each channel to be adjusted.

ADMIRAL Chassis G2-1, G2-2, Service Information, Continued



BACK VIEW OF CHASSIS SHOWING IMPORTANT SERVICE LOCATIONS



BOTTOM VIEW OF CHASSIS SHOWING IMPORTANT SERVICE LOCATIONS

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MODEL IDENTIFICATION CHART

MODEL	NAME	COLOR	CHASSIS
PG9201	Vicroy	Brown	G310-1 or G336-1
PG9210	Skipper	Black	
PG9211		Brown & White	
PG9218		Gray & White	
PG9227	Cornell	Walnut	
TG9201H	Caravan	Gray	G310-4

The material below and the next four pages is exact for the group of sets listed in the first Model Identification Chart at upper right. The group of sets in the lower chart use 17ELP4 picture tube, slightly different tuners, and may have other minor differences.

MODEL CHART

MODEL	COLOR	NAME	CHASSIS
PG7021	Beige	Elite	1G310-1 or 1G311-1 or 1G312-1 or 1G313-1
PG7030	Black	Suburban	
PG7031	Tan		
PG7039	White		
PG7047	Walnut	Terrace	

IMPROVING FOCUS

The picture tube of these receivers utilizes electrostatic focus in connection with a three position focus adjustment.

For obtaining best overall sharpness of pictures, focus adjustment should be checked at installation and when servicing. Once focus adjustment is properly made, no further need for readjustment is required.

From rear view of chassis on front page, note that there are three focus (pin) connections at top rear of the chassis board, points shown as "A", "B" and "C". To make adjustment, connect plug-in focus lead to either of the three focus pins, whichever provides best focus at central area of picture tube. Important: Focus adjustment should be made with controls set for picture with normal contrast and brightness.

Caution: High B+ potential is present at focus terminals. To prevent electric shock, use care to avoid accidental contact with focus terminals.

HORIZONTAL LOCK ADJUSTMENT

The Horizontal Lock control is set at the factory and seldom requires readjustment. Adjustment need only be made if 8FQ7 tube (V403) has been replaced and the picture cannot be locked-in with slight adjustment of the Horizontal Lock control.

Before proceeding with adjustment, be sure that the picture will sync vertically, as lack of both vertical and horizontal sync generally indicates sync circuit trouble. Lack of only horizontal sync generally indicates trouble in the horizontal sync (phase detector) circuit.

1. Remove cabinet back. Connect interlock cord.
2. Allow a few minutes for set to warm up. Tune in weakest station, set Brightness and Contrast controls for a normal picture.
3. Using a piece of hook-up wire, short test point "R" (pin 2 of V403, 8FQ7 tube), to chassis ground.
4. Adjust Horizontal Lock control at point where picture is in horizontal sync and almost remains stationary with tendency to shift to left or right.
5. Remove wire short from test point "R". Set Channel Selector to weakest station. Switch Channel Selector on and off channel, picture should remain in horizontal sync.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENT

If the picture is of incorrect height (vertical size), adjust the Height control. This adjustment may affect the vertical linearity of the picture. If necessary, alternately adjust the Vert. Lin. control and Height control. Note: Upper portion of the picture is affected mostly by the Vertical Linearity control; lower by the Height control.

RASTER TILT ADJUSTMENT

If raster is tilted, loosen deflection yoke clamping screw at rear of yoke. Rotate yoke until raster is straight. Tighten yoke clamping screw. Do not allow yoke to move back on neck of picture tube.

PICTURE CENTERING

The picture may be centered vertically and/or horizontally by moving the centering tabs, which are located on the back of the deflection yoke assembly.

VHF CHANNEL ADJUSTMENT

These sets are provided with a channel adjustment slug for each channel, see illustration. Adjust as follows:

1. Turn receiver on and allow 15 minutes warm up.
2. Set Channel Selector at highest channel to be adjusted. Set Fine Tuning control at center of tuning range, by rotating it one third turn counter-clockwise from full clockwise rotation. Set other tuning controls for normal picture and sound.
3. Remove Channel Selector knob.
4. Using a non metallic alignment tool, carefully adjust channel slug for best picture. Note: Sound may not be loudest at this point. Repeat procedure for each channel to be adjusted.

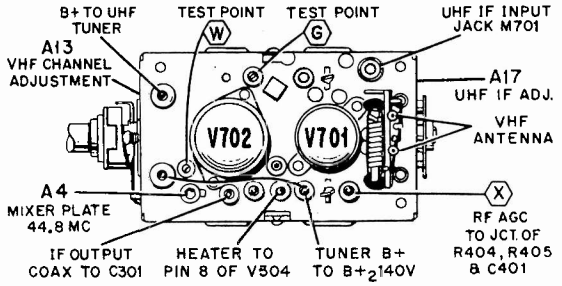


Fig. 2 TOP DRAWING OF VHF TUNER

ALIGNMENT OF UHF IF INPUT USING A TRANSMITTED SIGNAL

Alignment of UHF IF input coil (part of VHF tuner), should be made if UHF reception is poor and after usual causes of poor UHF reception have been checked.

To align UHF IF input coil, tune in UHF channel with normal picture and sound. Using non-metallic alignment tool very carefully adjust slug A17 for best picture, consistent with good sound. For VHF tuner adjustment locations, see figure 2.

ADMIRAL Chassis G310-1, -4, G336-1, 1G310-1, etc., Alignment

IF AMPLIFIER ALIGNMENT

Connect isolation transformer between AC line and receiver. Connect negative of 6 volt bias supply to test point "T" (IF AGC) and "X" (RF AGC), positive to chassis. See figure 7.

Using needle nose alligator clip or looped end of hookup wire, connect signal generator high side to test point "G", low side directly to tuner, see Figure 2.

Connect VTVM high side to test point "V" through a decoupling filter, see Figures 5 & 7. Connect low side to chassis.

Set Channel Selector to channel 12 (Or other high end channel which does not affect indication). Connect jumper wire across antenna terminals.

Allow about 15 minutes for receiver and test equipment to warm up. Use a non-metallic alignment tool.

IMPORTANT: Before proceeding check signal generator against frequency standard for calibration.

SUGGESTION: Alignment is best accomplished by first removing chassis and reconnecting facing backwards.

1. Set generator at 42.7 mc and adjust A1 for maximum.
2. Set generator at 44.2 mc and adjust A2 for maximum.
3. Set generator at 44.3 mc and adjust A3 for maximum.
4. Connect jumper wire across IF input coil L302.
5. Set generator at 44.8 mc and adjust A4 on VHF tuner for maximum.
6. Remove jumper wire of Step 4.
7. Set generator at 42.7 mc and adjust A5 for maximum.
8. Reduce bias to -1½ volts.
9. Set generator at 47.25 mc and adjust A6 for minimum. If A6 was off considerably, repeat steps 4 through 9.
10. Restore -6 volt bias.
11. Disconnect generator and connect sweep generator to "G" on VHF tuner through matching network in Figure 4.
12. Disconnect VTVM, and connect oscilloscope to decoupling filter in Figure 5.
13. Set sweep frequency at 43 mc, sweep width approximately 7 mc. Keep marker low and sweep output at 3 volt peak to peak level to prevent over-loading. A reduction in sweep output should reduce curve amplitude without altering the shape of the response curve.
14. If 45.75 mc marker is not within tolerance or markers not in proper location on curve, adjust A4 to position 45.75 mc marker Adjust A1 to correct shape of curve. Avoid reducing amplitude of curve as much as possible.

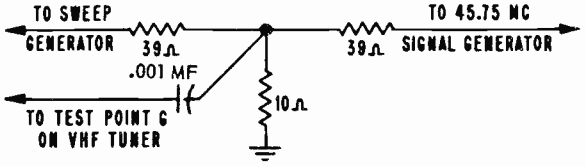


Fig. 4 MATCHING NETWORK

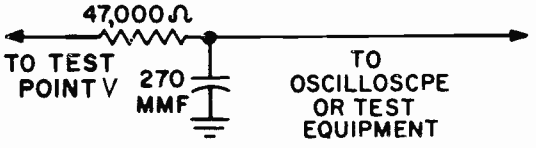


Fig. 5 DECOUPLING FILTER

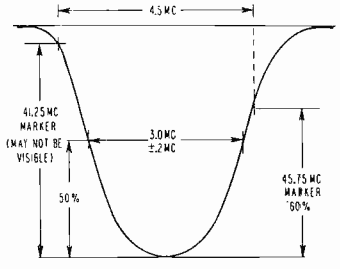


Fig. 6 IF CURVE

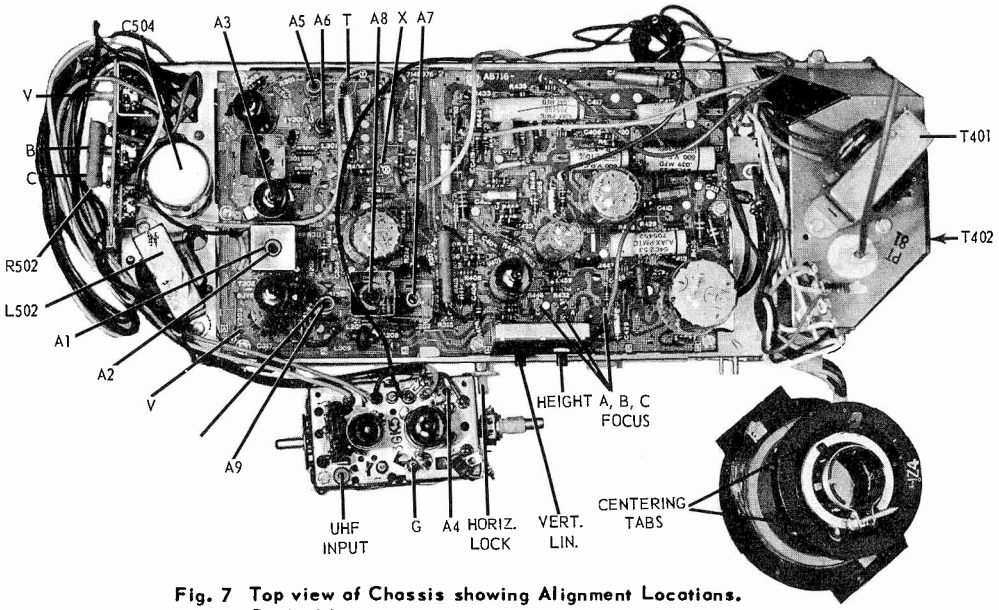


Fig. 7 Top view of Chassis showing Alignment Locations. Dashed lines indicate adjustment nearest chassis.

ADMIRAL Chassis G310-1, -4, G336-1, 1G310-1, etc., Alignment, Continued

OVER-ALL VHF AND IF RESPONSE CURVE CHECK

Set VHF Channel Selector on channel 12. Connect negative of -6 volt bias supply to test point "T" (IF AGC) and -1.75 volt to test point "X" (RF AGC) positive to chassis. See Fig. 7.

Connect isolation transformer between AC line and receiver. Allow about 15 minutes for receiver and test equipment to warm up.

Attach the sweep generator at the VHF tuner antenna terminals, high side through 1200 ohm resistor, low side through 1200 ohm resistor. Place a 330 ohm resistor across the antenna terminals and a 47 ohm resistor across the generator output.

Connect oscilloscope high side to test point "V" through decoupling filter, low side to chassis. Adjust sweep generator for 3 volt peak to peak at test point "V".

Compare response curve obtained against ideal curve shown in figure 8. If the curve is not within tolerance, adjust A4 to position video marker; adjust A1 to correct shape of curve. It should never be necessary to turn slugs more than one turn in either direction. If curve is satisfactory on channel checked, all other channels should be satisfactory. IMPORTANT: When sweep output is reduced, response curve amplitude on scope should also decrease, but curve shape should remain the same.

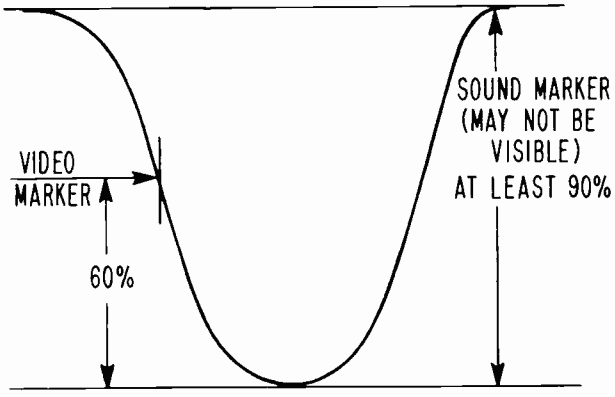


Fig. 8 Ideal Response Curve

VHF AMPLIFIER AND MIXER ALIGNMENT

VHF tuners used in these receivers feature high stability and trouble-free operation. In general, RF and mixer alignment is permanent. However, individual channel oscillator screws or slugs are provided, should oscillator adjustment be required after replacement of VHF oscillator tube. For tuner adjustment locations, see Figure 2. If it is definitely determined that complete tuner alignment is required, return tuner to your Admiral Distributor for repair or replacement. Note: VHF Channel Adjustment can be made from side of set after removing VHF Channel and Fine Tuning knobs.

ALIGNMENT OF 4.5 MC TRAP

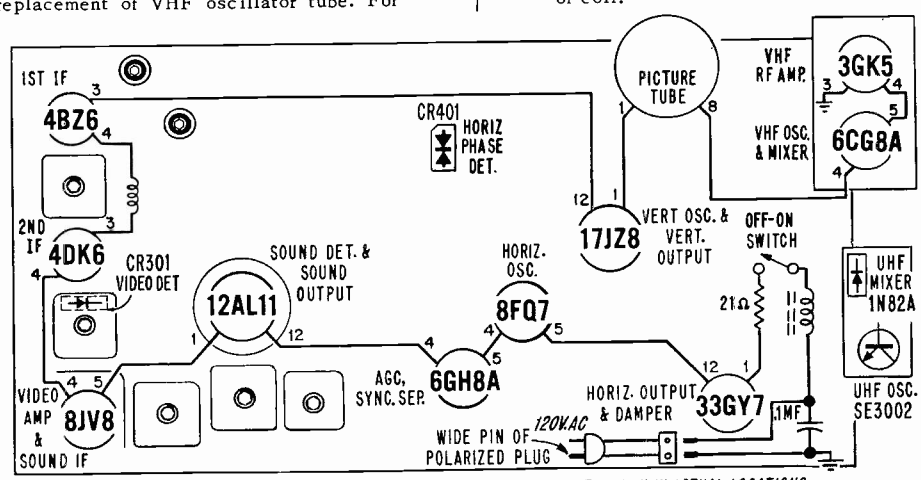
Alignment of 4.5 MC (beat interference) trap "A10" requires use of a hexagonal non-metallic alignment tool.

To align 4.5 MC trap "A10", tune in television station with beat interference pattern in picture. While closely observing picture, adjust slug "A10" for minimum interference pattern.

Note that adjustment "A10" is top slug (slug farthest from bottom of coil). Use caution so as not to disturb bottom slug (slug nearest bottom of coil) as sound IF alignment will be affected.

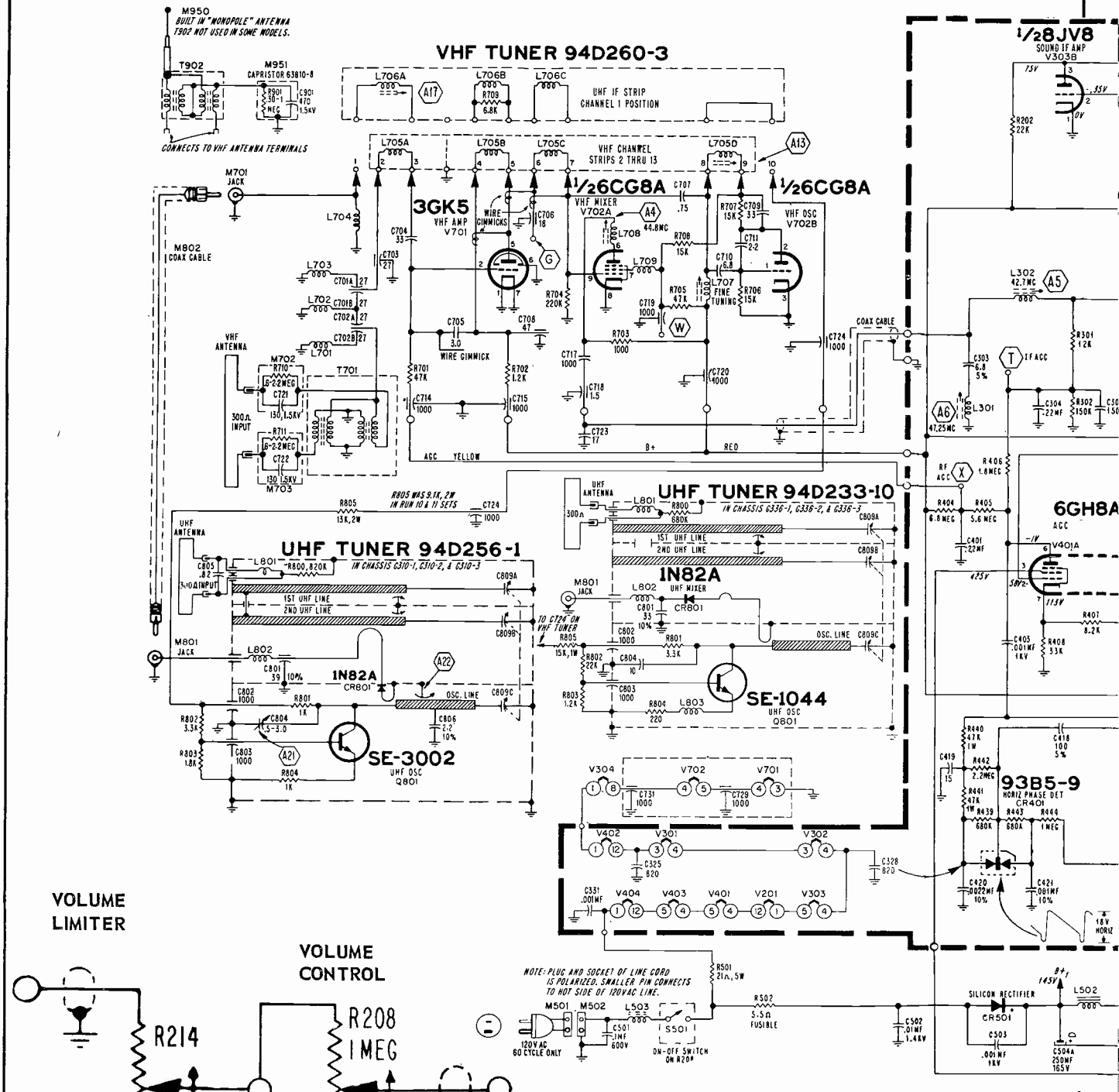
4.5 MC SOUND IF ALIGNMENT

1. Tune in normal picture on strongest TV station. Allow about 15 minutes for set to warm up. See figure 7 for adjustment locations.
2. Using non-metallic alignment tool, slowly turn slug "A7" several turns to left until a buzz is heard in sound. Then slowly turn slug "A7" to the right for loudest and clearest sound. NOTE: There may be two points (approx. ½ turn apart) at which sound is loudest. The slug should be set at center of second point of loudest sound noted as slug is turned in (toward bottom of coil).
3. Reduce signal to antenna terminals until there is considerable hiss in sound. For best results, use a step attenuator, connected between antenna and antenna terminals. Signal can also be reduced by disconnecting antenna and placing it close to antenna terminals or leads.
4. Carefully adjust slug "A8" for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug "A8". NOTE: Slug "A8" should be at end nearest bottom of coil.
5. Carefully adjust slug "A9" for loudest and clearest sound with minimum hiss. If hiss disappears during alignment, reduce signal to maintain hiss level. Re-adjust slug "A9". Caution: Slug "A9" is located nearest bottom of coil. Use care so as not to disturb slug nearest top of coil.

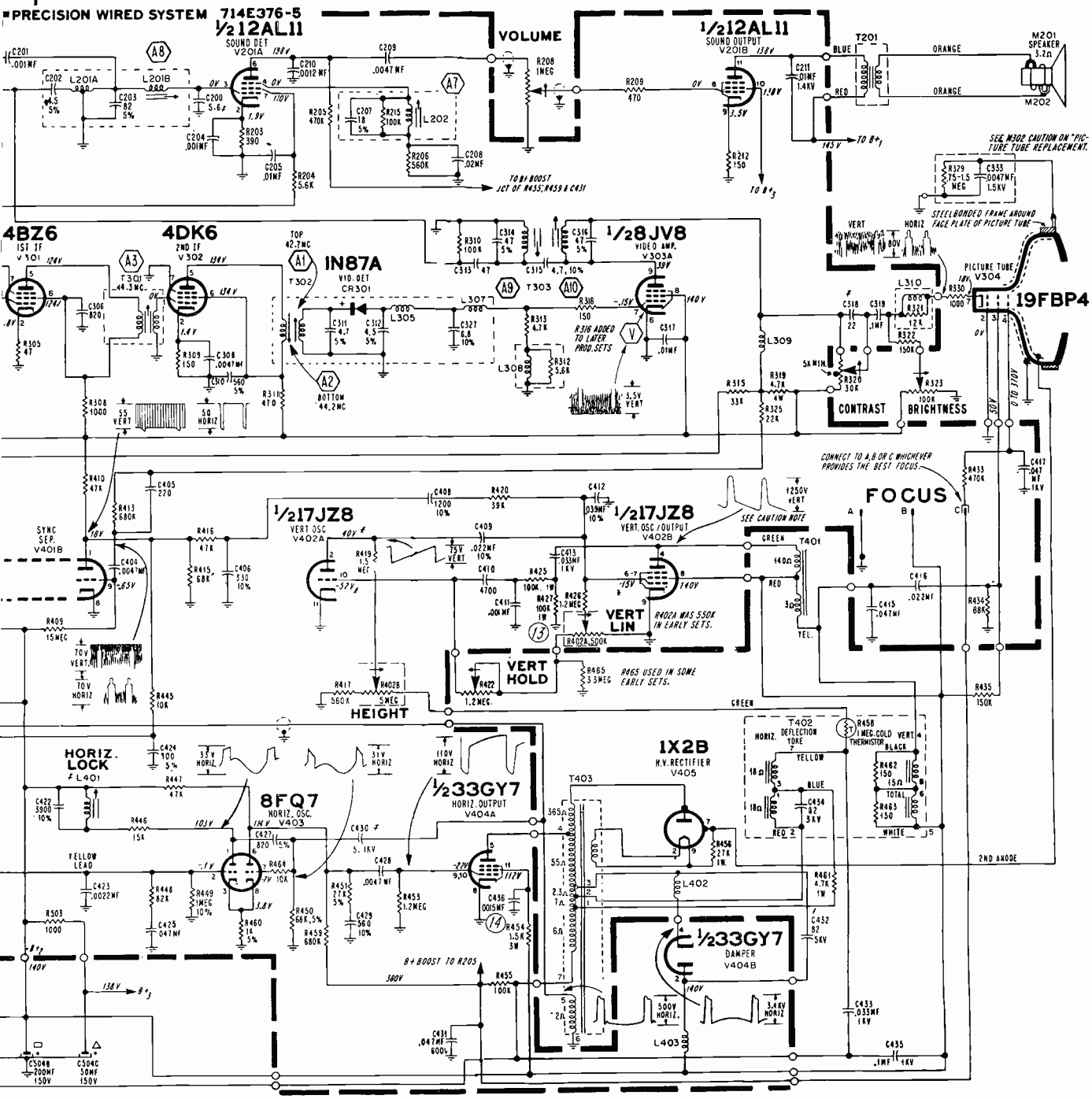


TO SIMPLIFY HEATER STRING DIAGRAM, TUBE SOCKET PIN NUMBERS ARE NOT SHOWN IN ACTUAL LOCATIONS.

ADMIRAL Chassis G310-1, -4, G336-1, Schematic Diagram



ADMIRAL Chassis G310-1, -4, G336-1, Schematic Diagram, Continued.



SCHEMATIC DIAGRAM OF G310-1, -4 & G336-1 CHASSIS

CLEANING CABINET

Never operate set when washing cabinet and picture tube face. Wash cabinet and picture tube face with cloth dampened and thoroughly wrung out in mild soapy water. Never use scouring abrasives which may scratch cabinet or picture tube face. Rinse cloth in clear water and wipe thoroughly.

WARNING: Do not attempt to clean plastic cabinet and picture tube face with hydrocarbon solvents.

PICTURE TUBE REPLACEMENT NOTE

These receivers use a picture tube with steel bonded frame mounted around face plate of picture tube. To prevent possibility of static discharge, capristor M302 should connect from chassis ground to solder lug on steel bonded frame of picture tube. Shield braid (grounding lead) should connect from chassis to VHF tuner mounting bracket.

Do not connect steel bonded frame (around faceplate of picture tube) directly to picture tube dag or chassis ground.

Admiral

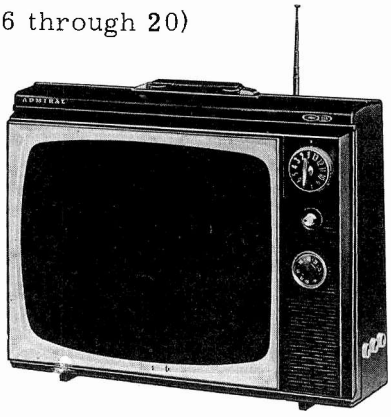
(Service material on pages 16 through 20)

MODEL IDENTIFICATION CHART

MODEL	COLOR	NAME	SIZE	CHASSIS
PG9300M	Black	Ranger	19"	8G423-1
PG9309M	White			
PG9420M	Black	Carousel	19"	G422-1
PG9421M	Tan			
PG9621M	Sandalwood	Central Park	19"	G417-1 OR
PG9625M	Green			
PG9637M	Walnut	Jubilee	19"	G416-1
PG2101M	Brown	Festival	21"	9G410-1 OR
PG2108M	Gray			
PG2110M	Black	Capri	21"	9G413-1 OR
PG2119M	White			
PG2127M	Walnut	Promenade	21"	9G416-1
LG3001M	Walnut	Carlyle	23"	2G424-1

Later Released Models

MODEL	COLOR	NAME	CHASSIS
PG2151M	Brown	Fireside	9G410-1 or 9G412-1 or 9G413-1 or 9G414-1
LG3701	Walnut	Kilmer	2G421-1
LG3721	Walnut	Greenbriar	
LG3722	Mahogany	Greenbriar	
LG3725	Maple	Clarke	



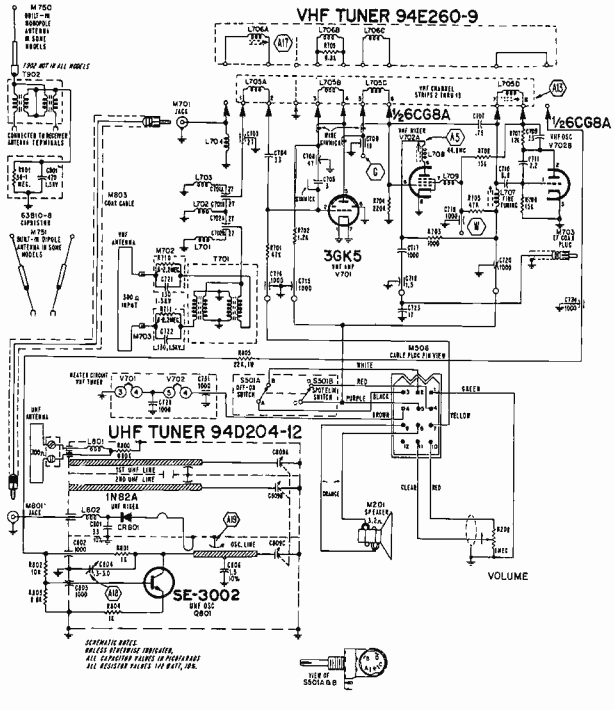
PG9300M SERIES

RUN CHANGES

(10) *Start of production*

(11) *For improved performance T403 was changed from part # 750C647-2 to 750C647-4. T402 was changed from part #750C305-28 to #750C305-25, C432 was changed from 110pf to 68pf in 2G4 chassis only*

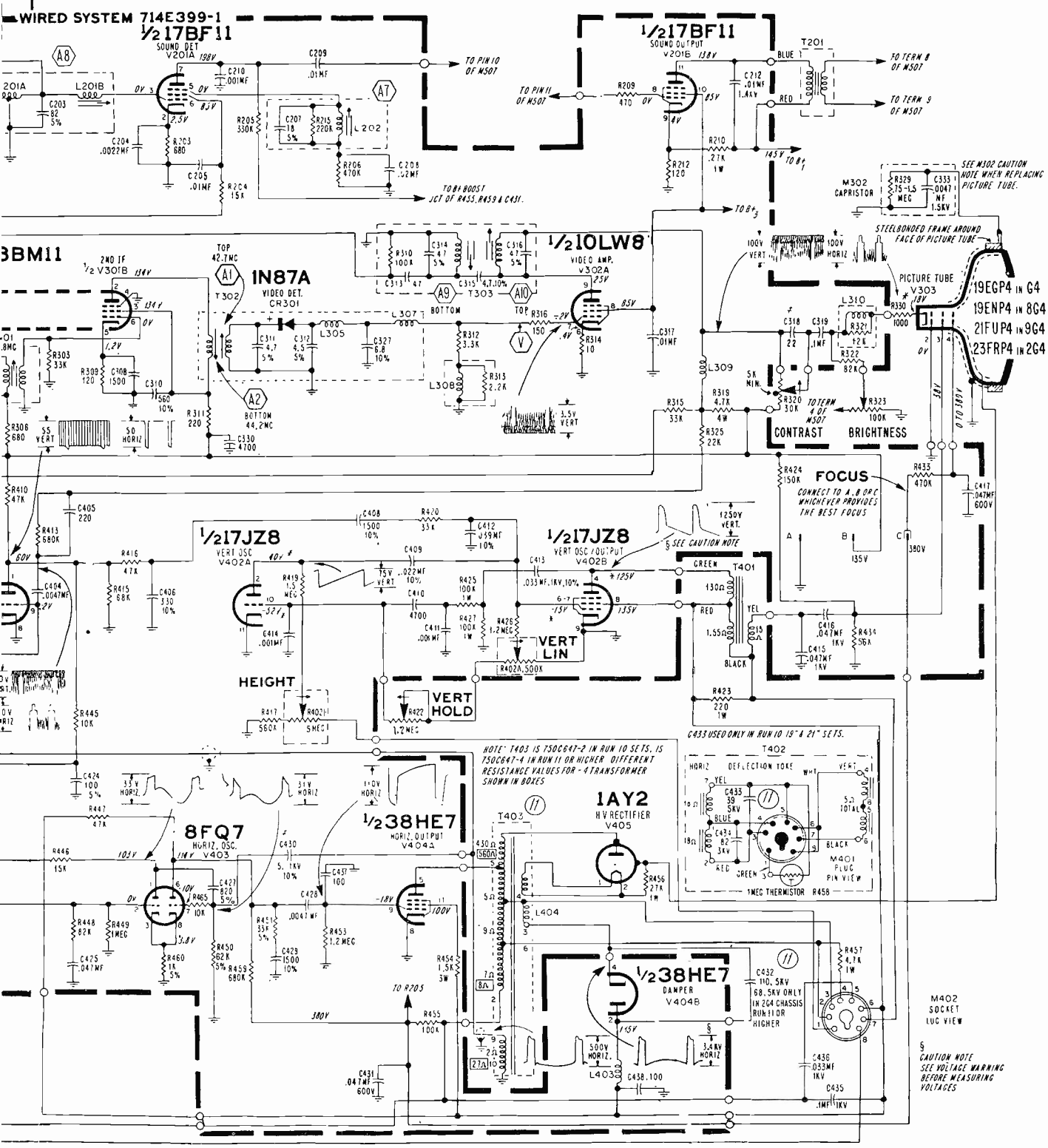
SCHEMATIC NOTES:
⏚ CHASSIS GROUND
‡ PART NOT MOUNTED ON PRECISION WIRED SYSTEM
** VOLTAGES WILL VARY WITH SETTING OF CONTROLS.*
UNLESS OTHERWISE INDICATED, ALL CAPACITOR VALUES IN PICOFARADS. ALL RESISTOR VALUES ARE 1/2 WATT 10% 6G, 2G4, 8G4 & 9G4 CHASSIS ARE ELECTRICALLY IDENTICAL, EXCEPT FOR VALUE OF C432. SEE SEPERATE SCHEMATIC FOR VHF-UHF TUNERS AND CONTROL CIRCUITRY



TUNER CLUSTER FOR CHASSIS 8G423-1

NOTE PLUG AND SOCKET OF LINE CORD IS POLARIZED SMALLER PIN CONNECTS TO HOT SIDE OF 120V AC LINE

ADMIRAL Schematic Diagram of models listed on page at left.



G4, 2G4, 8G4 AND 9G4 SCHEMATIC DIAGRAM

ADMIRAL Alignment for Various Sets, see page 16, Continued

VHF CHANNEL ADJUSTMENT

These sets are provided with a channel adjustment slug for each channel, see illustration. Adjust as follows:

1. Turn receiver on and allow 15 minutes warm up.
2. Set Channel Selector at highest channel to be adjusted. Set Fine Tuning control at center of tuning range, by rotating it one third turn counter-clockwise from full clockwise rotation. Set other tuning controls for normal picture and sound.
3. Remove Channel Selector knob.
4. Using a non metallic alignment tool, carefully adjust channel slug for best picture. Note: Sound may not be loudest at this point. Repeat procedure for each channel to be adjusted.

IMPROVING FOCUS

The picture tube of these receivers utilizes electrostatic focus in connection with a three position focus adjustment.

For obtaining best overall sharpness of pictures, focus adjustment should be checked at installation and when servicing. Once focus adjustment is properly made, no further need for readjustment is required.

From rear view of chassis on front page, note that there are three focus (pin) connections at top rear of the chassis board, points shown as "A", "B" and "C". To make adjustment, connect plug-in focus lead to either of the three focus pins, whichever provides best focus at central area of picture tube. Important: Focus adjustment should be made with controls set for picture with normal contrast and brightness.

HORIZONTAL LOCK ADJUSTMENT

The Horizontal Lock control is set at the factory and seldom requires readjustment. Adjustment need only be made if 8FQ7 tube (V403) has been replaced and the picture cannot be locked-in with slight adjustment of the Horizontal Lock control.

Before proceeding with adjustment, be sure that the picture will sync vertically, as lack of both vertical and horizontal sync generally indicates sync circuit trouble. Lack of only horizontal sync generally indicates trouble in the horizontal sync (phase detector) circuit.

1. Remove cabinet back. Connect interlock cord.
2. Allow a few minutes for set to warm up. Tune in weakest station, set Brightness and Contrast controls for a normal picture.
3. Using a piece of hook-up wire, short test point "R" (pin 2 of V403, 8FQ7 tube), to chassis ground. See Fig. B for test point locations.
4. Adjust Horizontal Lock control at point where picture is in horizontal sync and almost remains stationary with tendency to shift to left or right.
5. Remove wire short from test point "R". Set Channel Selector to weakest station. Switch Channel Selector on and off channel, picture should remain in horizontal sync.

IF AMPLIFIER ALIGNMENT

Connect isolation transformer between AC line and receiver. Connect negative of 6 volt bias supply to test point "T" (IF AGC), positive to chassis. See Fig. B.

Using needle nose alligator clip or looped end of hook-up wire, connect signal generator high side to test point "G", low side directly to tuner. See Fig. E.

Connect VTVM high side to test point "V" through a decoupling filter. See Fig. C. Connect jumper wire across antenna terminals at tuner.

Allow about 15 minutes for receiver and test equipment to warm up. Use non-metallic alignment tools, part no. 98A30-12 and 98A30-14.

IMPORTANT: Before proceeding, check calibration of generator with crystal frequency standard.

*1. Set generator to 47.25MC and adjust A6 for minimum.
2. Connect a jumper wire across L302.
3. Set generator to 44.8MC and adjust A5 for maximum.
4. Remove jumper connected in Step 2.
5. Set generator to 43.3MC and adjust L302 for maximum.
6. If A5 and L302 were off considerably, recheck A6 as in Step 1.
7. Set generator to 42.7MC and adjust A1 for maximum.
8. Set generator to 44.2MC and adjust A2 for maximum.
9. Set generator to 44.8MC and adjust T301 for maximum.
10. To insure correct alignment, make "If Response Curve Check."

*NOTE: If necessary, increase generator output and/or reduce bias to obtain useable reading.

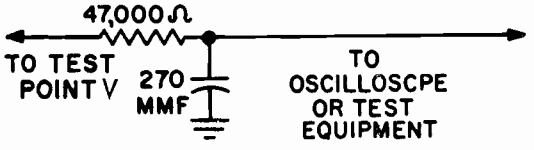


Fig. C Decoupling Filter

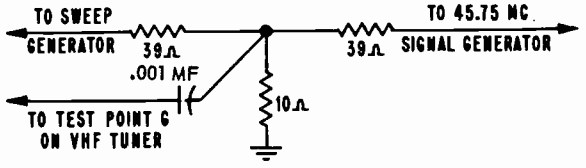


Fig. D Matching Network

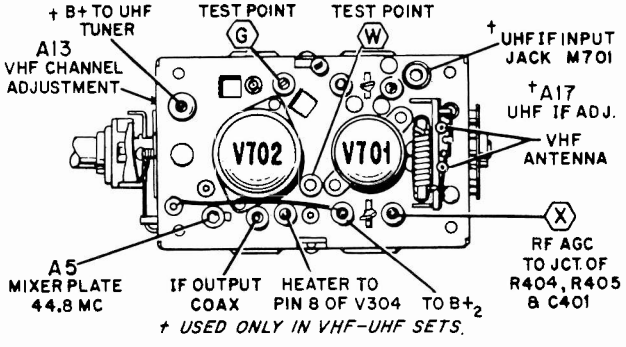


Fig. E Top View of VHF Tuner

IF RESPONSE CURVE CHECK

1. Connect isolation transformer between AC line and receiver. Allow about 15 minutes for receiver and test equipment to warm up.

2. Set VHF tuner on channel 12. Connect negative of 6 volt bias supply to test point "T" and "X" (IF & RF AGC), positive to chassis. See figure B.

3. Using needle nose alligator clip or looped end of hookup wire, connect sweep generator high side through matching network to test point "G", low side directly to tuner, see Fig. D & E. Set sweep frequency to 43MC, sweep width approximately 7MC. If external marker generator is used, loosely couple high side to sweep generator lead, low side directly to tuner. Marker frequencies are indicated on IF Response Curve.

ADMIRAL Alignment for Various Sets, see page 16, Continued

4. Connect oscilloscope high side to test point "V" through a decoupling filter (figure C), low side to chassis.

5. Check curve obtained against ideal response curve, figure F, maintain sweep at 3V peak to peak. Keep marker at very minimum to prevent over-loading. A reduction in sweep output should reduce curve amplitude without altering the shape of the response curve.

If curve is not within tolerance or markers not in proper location on curve, adjust A5 to position 45.75MC Video Marker. Adjust A1 to correct shape of curve. See figure F.

OVER-ALL VHF AND IF RESPONSE CURVE CHECK

Set Channel Selector on Channel 12. Connect negative of 3V bias supply to test points "T" (IF AGC) and "X" (RF AGC), positive to chassis. See Fig. B. Maintain 3V peak to peak at Video Detector Test Point "V".

Connect isolation transformer between AC line and receiver. Allow about 15 minutes for receiver and test equipment to warm up.

Attach the sweep generator at the VHF tuner antenna terminals, high side through 1200 ohm resistor, low side through 1200 ohm resistor. Place a 330 ohm resistor across the antenna terminals and a 47 ohm resistor across the generator output. If an external marker generator is used, loosely couple high side to sweep generator lead.

Connect oscilloscope high side to test point "V" through decoupling filter, low side to chassis.

Compare response curve obtained against ideal curve shown in Figure G. If the curve is not within tolerance, adjust A5 to position video marker; adjust A1 to correct shape of curve. It should never be necessary to turn slugs more than one turn in either direction. If curve is satisfactory on channel checked, all other channels should be satisfactory.

VHF AMPLIFIER AND MIXER ALIGNMENT

Tuner 94E260 is a turret type VHF tuner featuring high stability and trouble-free operation. The inductors of this tuner consist of individual channel strips and in general, RF and mixer alignment is permanent. Individual channel oscillator slugs are provided for each channel, should oscillator adjustment be required after replacement of VHF oscillator tube. See figure E for tuner adjustment locations. If it is definitely determined that complete tuner alignment is required, return tuner to Admiral Distributor for repair or replacement.

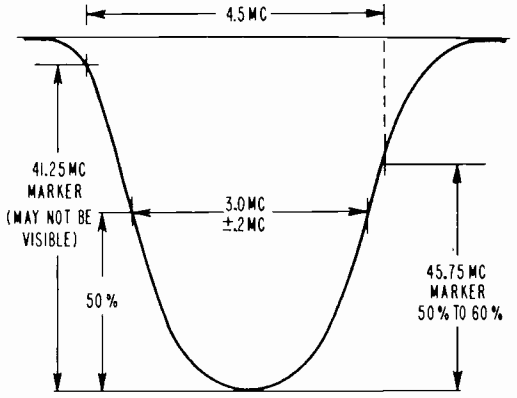


Fig. F Ideal IF Response Curve

ALIGNMENT OF UHF IF INPUT USING A TRANSMITTED SIGNAL

Alignment of UHF IF input coil (part of VHF tuner) should be made if UHF reception is poor and after usual causes of poor UHF reception have been checked.

To align UHF IF input coil, tune in UHF channel with normal picture and sound. Using non-metallic alignment tool very carefully adjust slug A17 for best picture, consistent with good sound. For VHF tuner adjustment locations, see figure E.

4.5MC SOUND IF ALIGNMENT

1. Tune in normal picture on strongest TV station. Allow about 15 minutes for set to warm up. AGC control must be in proper adjustment. Adjust other controls for normal operation. Refer to chassis views and schematic for alignment locations.
2. Using a non-metallic alignment tool (part no. 98B30-12), and starting with L202 turned slug to the top of its form, screw it several turns into the form until the loudest and clearest position is found. There may be two points (approximately ½ turn apart) at which the sound is loudest. The slug should be centered over the innermost of the two points.
3. Reduce the signal at the antenna terminals until there is considerable hiss in the sound. For best results, use a step attenuator connected between antenna and antenna terminals. The signal can also be reduced by disconnecting the antenna and fastening it near the antenna terminals. It is important to keep the signal below limiting (hissing) as the alignment progresses.
4. Adjust T201 top slug for maximum output and minimum hiss. If this slug requires considerable adjustment, touch-up L202.†
5. Adjust T201 bottom slug for maximum output and minimum hiss.
6. Adjust T303 bottom slug for maximum output and minimum hiss. NOTE: The top slug is a 4.5mc trap. Do not adjust it it as part of sound alignment.
7. If above alignment is correctly made, no further adjustment is required. However, if sound remains distorted at normal volume (when receiver is properly tuned), repeat entire procedure.

†Do not readjust L202 further unless sound is distorted. Readjustment of L202 beyond this point will require all sound adjustments to be repeated.

ALIGNMENT OF 4.5 MC TRAP

Alignment of 4.5 MC (beat interference) trap "A12" requires use of a hexagonal non-metallic alignment tool (part number 98A30-12).

To align 4.5 MC trap "A12", tune in television station with beat interference pattern in picture. While closely observing picture, adjust slug "A12" for minimum interference pattern.

Note that adjustment "A12" is top slug (slug farthest from bottom of coil). Use caution so as not to disturb bottom slug (slug nearest bottom of coil) as sound IF alignment will be affected.

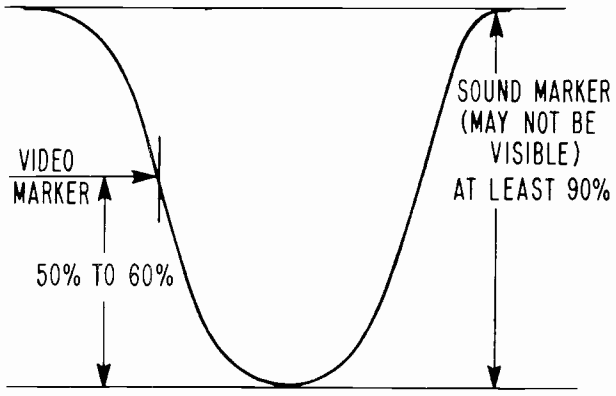


Fig. G Ideal Over-all VHF & IF Response Curve

ADMIRAL Service Material for Various Sets, see page 16, Continued

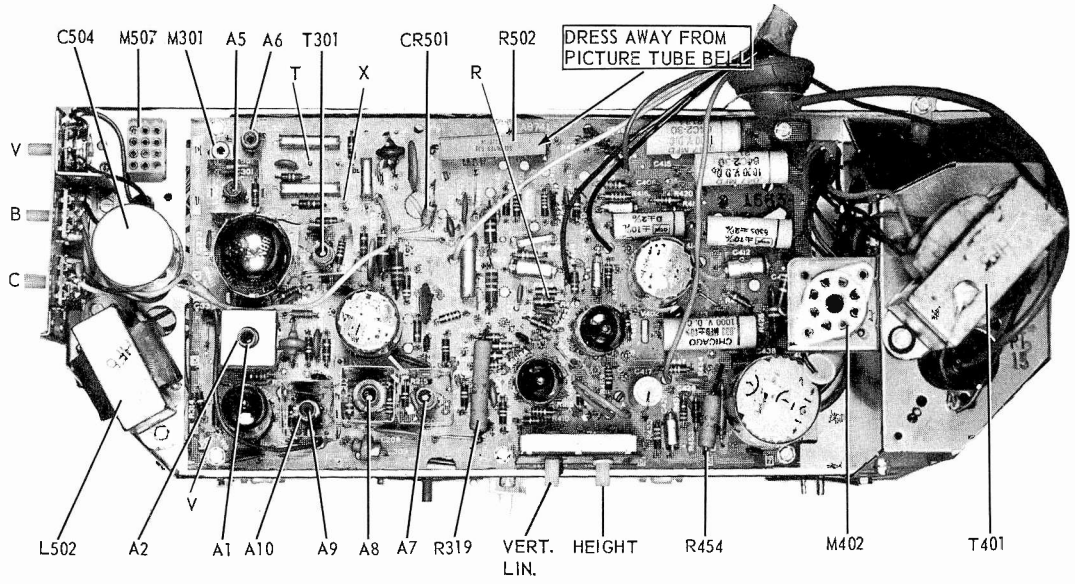


Fig. B Top view of Chassis showing Alignment Locations

PICTURE TUBE REPLACEMENT NOTE

These receivers use a picture tube with steel bonded frame mounted around face plate of picture tube. To prevent possibility of static discharge, capristor M302 should connect from chassis ground to solder lug on steel bonded frame of picture tube. Shield braid (grounding lead) should connect from chassis to VHF tuner mounting bracket.

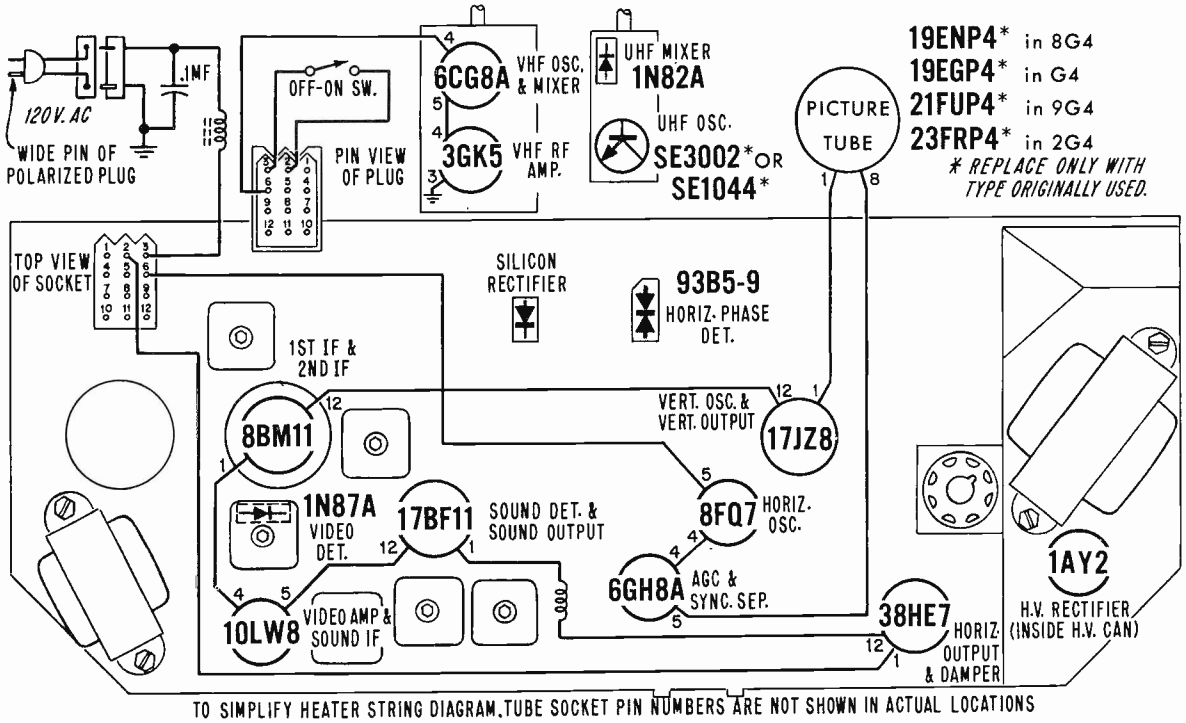
Do not connect steel bonded frame (around faceplate of picture tube) directly to picture tube dag or chassis ground.

RASTER TILT ADJUSTMENT

If raster is tilted, loosen deflection yoke clamping screw at rear of yoke. Rotate yoke until raster is straight. Tighten yoke clamping screw. CAUTION: Do not allow yoke to move back on neck of picture tube.

PICTURE CENTERING

The picture may be centered vertically and/or horizontally by moving the centering tabs, which are located on the back of the deflection yoke assembly.



Emerson

Model 11P04A, using Chassis 120771

SERVICING TRANSISTOR TV CHASIS

NOTE: The following precautions should be adhered to when servicing this transistor television receiver:

1) The GCS (gate controlled switch) might be damaged if the horizontal oscillator is operated far off frequency or in an intermittent manner. It is for this reason that it is recommended that the anode lead (spade lug) of this device be disconnected before any attempt is made to service the horizontal oscillator or drive circuits. This includes the insertion of an oscilloscope or VTVM into the circuit. Shorting the CRT high-voltage lead to the the chassis, as is so often done with tube receivers, can also have a detrimentol effect upon the GCS due to surge currents that are developed.
2) Be familiar with your test equipment before using to check transistors and diodes. It is very possible that the open circuit voltoge of the leads on your VTVM or scope is of such an amplitude as to damage the components under test. It is also possible that the ground lead of your VTVM has a hum component that exceeds the voltage roting of the device under test. It is for this reason that it is not recommended to use o VTVM, or other AC operated piece of equipment, to meosure the voltages from one element of a transistor to another. Meosure only from various elements to chassis ground.
3) Do not use an oscilloscope without capacity isolation, but be sure to use a low capacity probe (10 – 15 uuf.).
4) Resistance readings of transistors are of little value due to the effect of ohmmeter currents biasing the transistors under test to various states of conduction.
5) Do not replace transistors with universol types. Use only exact replacements as per the chassis parts list included herein.
6) Use extreme care when soldering transistors and diodes. Soldering heat sinks made out of copper and aluminum are commercially available for this purpose. Be sure to apply silicone grease to the required surfaces of transistors, as noted in the chassis parts list.
7) Watch out for extremely worm transistors. These transistors might be defective or have wrong bias voltages applied to their elements.
8) Do not use capacity checkers to check the electrolytic capacitors used in this chassis. The voltage used to test the capacitor could very well exceed the rating of the capacitor. When replacing capacitors be sure to observe the correct polarity.
9) Exercise coution when probing. Do not haphazardly short leads to ground to test for operation of various circuits. Transistors give no warning when they are being mistreated. They usually are damaged immediately.
10) Caution should be exercised to dress the yoke leads away from the high-voltage transformer in the event that either of these two components are replaced.

FIELD MODIFICATION – MINIMIZING AUDIO HUM

If it is found that the audio hum is of a discernable amplitude the following procedure may be followed:

1) Remove the green lead connected between the bottom end of the Volume Control (R-16) and terminal strip lug (junction of 220 ohm 2 Watt resistor R-17 and .01 Mfd. capacitor C-16).
2) Remove the white lead connected between the center of the Volume Control (R-16) and the terminal strip.
3) Make a twisted pair of green wire and of white wire to a length of 6½ inches, with two twists per inch.
4) Connect one end of the white lead, of this twisted pair, to the center of the Volume Control, then run the twisted pair according to the procedure outlined in step 6, below, and connect the other end of the white lead to the terminal lug to which it was connected previously.
5) Connect one end of the green lead of this twisted pair from the bottom end of the Volume Control, where it was previously attached, ta the lug on the terminal strip which is the junction of the emittor of the audio amplifier (Q-3) and the red lead.
6) This twisted pair will emerge from the top of the Volume Control and then be captivated under the .01 Mfd. capacitor (C-16) and the 27 ohm resistor (R-21). It should then be run parallel along the terminal strip, and the end of which should be bent to make a 90° turn. From the turn it should be placed abave the 50 Mfd. capacitor (C-14) and below the 5 Mfd. capacitor (C-13).

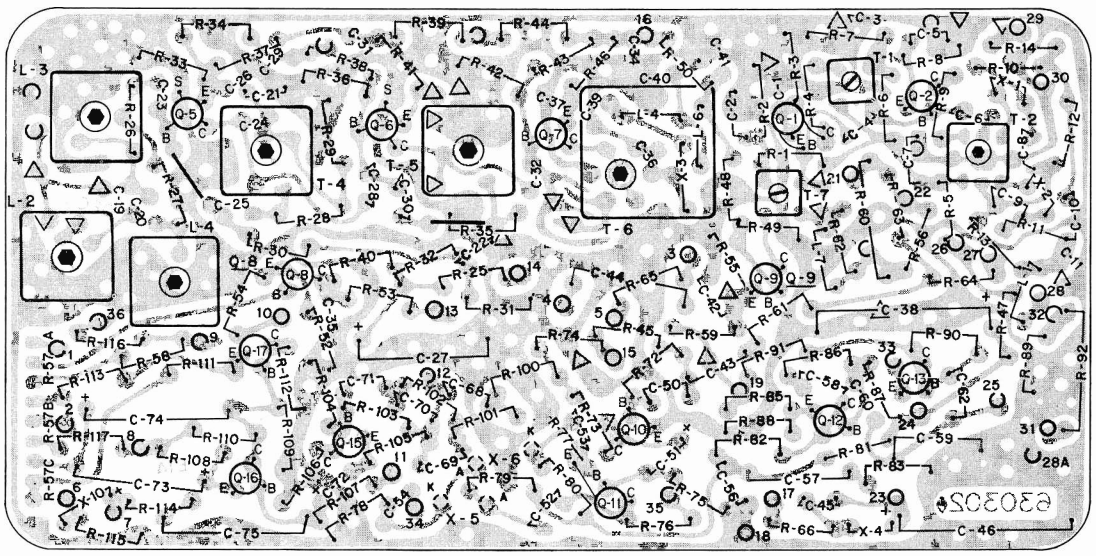
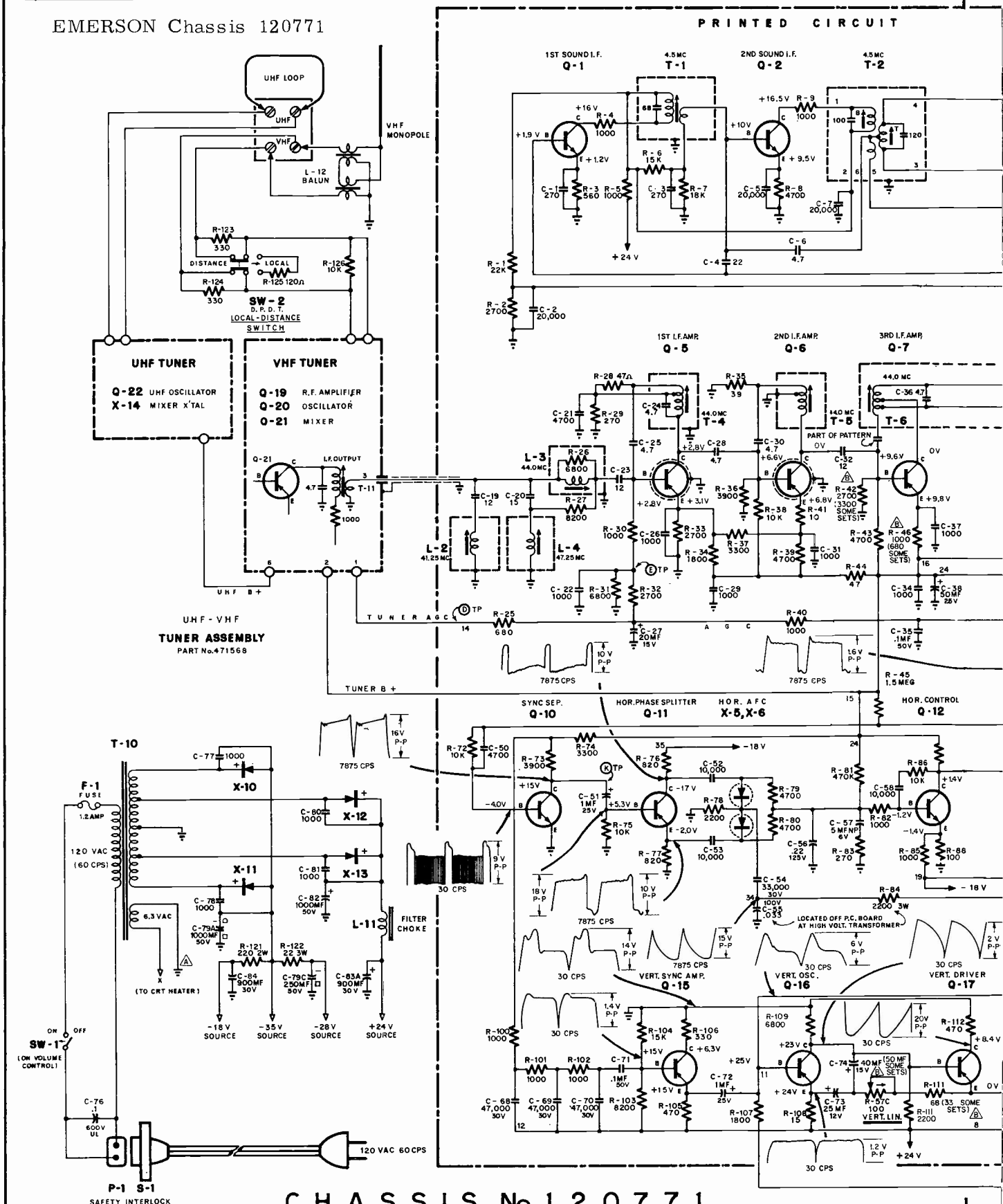


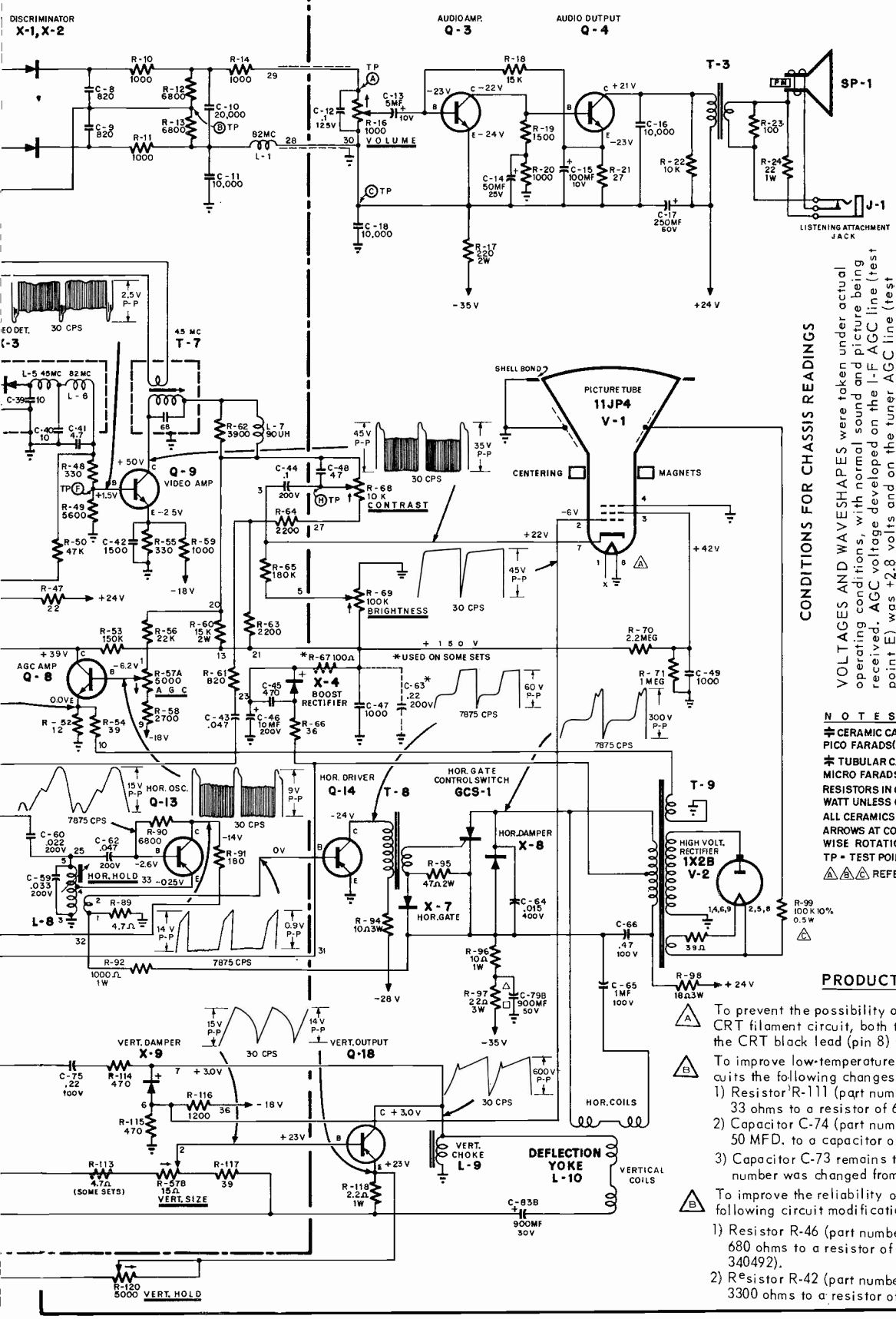
FIG. 1 – ETCHED CIRCUIT BOARD (TOP VIEW)

EMERSON Chassis 120771



CHASSIS No. 120771

EMERSON Chassis 120771



CONDITIONS FOR CHASSIS READINGS

VOLTAGES AND WAVESHAPES were taken under actual operating conditions, with normal sound and picture being received. AGC voltage developed on the I-F AGC line (test point E) was +2.8 volts and on the tuner AGC line (test point D) was +3.5 volts. Input voltage to chassis under test was 120 volts, 60-cycle AC. Frequencies indicated for the waveshapes shown are approximate sweep settings for the oscilloscope being used (one-half actual frequency of signal being measured).

ALL MEASUREMENTS were taken between points indicated and chassis ground (unless otherwise noted), using an RCA Voltohmyst or equivalent VTVM. A low-capacity probe was used for all waveshapes shown in the schematic diagram. All readings obtained may vary ±10% due to normal component tolerances and strength of input signal to chassis under test.

NOTES:

- ≠ CERAMIC CAPACITORS, CAPACITY IN PICO FARADS (pF) UNLESS NOTED
- ≠ TUBULAR CAPACITORS, CAPACITY IN MICRO FARADS
- RESISTORS IN OHMS (K = 1000) AND 1/2 WATT UNLESS OTHERWISE SPECIFIED
- ALL CERAMICS 500 VOLT UNLESS NOTED
- ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION
- TP = TEST POINT
- Ⓐ Ⓑ Ⓒ REFER TO PRODUCTION CHANGES

PRODUCTION CHANGES

Ⓐ To prevent the possibility of charge building-up in the CRT filament circuit, both the transformer green lead and the CRT black lead (pin 8) were grounded to the chassis.

Ⓑ To improve low-temperature operation of the vertical circuits the following changes were made:

1) Resistor R-111 (part number 340132) was changed from 33 ohms to a resistor of 68 ohms (part number 340212).
2) Capacitor C-74 (part number 925614) was changed from 50 MFD. to a capacitor of 40 MFD. (part number 925639)
3) Capacitor C-73 remains the same value, but the part number was changed from 925627 to 925640.

Ⓑ To improve the reliability of the video I-F stages the following circuit modifications were made:

1) Resistor R-46 (part number 340452) was changed from 680 ohms to a resistor of 1000 ohms (part number 340492).
2) Resistor R-42 (part number 340612) was changed from 3300 ohms to a resistor of 2700 ohms

EMERSON Chassis 120771 Alignment Information, Continued

I-F STAGES, TRAPS AND TUNER OUTPUT COIL

GENERAL ALIGNMENT NOTES:

A. Set tuner to highest unused channel and allow both chassis and equipment to warm-up for ten minutes or more.
B. Ground tuner AGC (T.P.–D) to chassis and connect +5.0 volts bias to I-F AGC (T.P.–E).
C. Set AGC control fully clockwise.
D. Maintain signal generator output no higher than necessary to produce a reading not to exceed two volts at the base of the video amplifier (scope connecting point–T.P.–F) and use insulated alignment tools for adjustments.

ALIGNMENT PROCEDURE:

1. Connect an oscilloscope (through a 10K isolation resistor) to the base of Q-9 – Video Amplifier (T.P.–F). Set scope to D.C. position and adjust so that 2 inches of vertical deflection represents approximately 2 volts P–P output.
2. Connect a terminated sweep generator, adjusted to sweep between 40 and 50 MC., to tuner I-F test point (C-11 on VHF tuner) through a 1K resistor in series with a 1,000 pf. isolation capacitor.

   NOTE: If sweep generator does not have internal markers, a separate marker should be loosely coupled to the output of the generator.
3. Adjust sweep generator to lowest signal consistant with usable response.
4. Tune L–4 (47.25 MC trap) away from board for maximum response of 47 25 MC marker.
5. Tune L–2 (41.25 MC trap) away from board for maximum response of 41.25 MC marker.
6. Adjust tuner I-F output coil (T-11) so that the top of the slug is flush with the top of the tuner chassis.
7. With the sweep generator adjusted to produce 2.0V P-P on scope, adjust T-6, T-5, T-4, in that sequence, for maximum response of the 44 MC marker on I-F curve.
8. Adjust L-3 and T-11 for maximum response of 44 MC marker on I-F curve. If two peaks are encountered use the position where the slug is farthest out of coil.
9. Increase the generator signal so that the 41.25 and 47.25 MC traps traps are visible on I-F curve.
10. Adjust L-4 and L-2 for maximum attenuation of 47.25 and 41.25 MC markers, respectively.
11. Change I-F AGC bias (T.P.–E) to +4.0 volts and adjust generator to produce 2.0 volts P-P on scope. I-F curve should conform to illustration below.
12. Minor deviations may be corrected by slight touch-up of specific coils, as indicated below:
    a) To position 45.75 marker adjust L-3
    b) To position 42.25 marker adjust T-11
    c) To position 47.25 marker adjust L-4
    d) To position 41.25 marker adjust L-2
13. Varying the I-F AGC bias (T.P.E.) from +3.0 to +7.0 volts should show no evidence of I-F instability.

SOUND TAKE-OFF, INTERSTAGE AND DETECTOR – SHOP PROCEDURE

GENERAL ALIGNMENT NOTES:

A. Short I-F AGC (T.P.–E) to chassis.
B. Place a 3 ohm 2 Watt load resistor across the audio output transformer. Disconnect speaker and replace with scope.

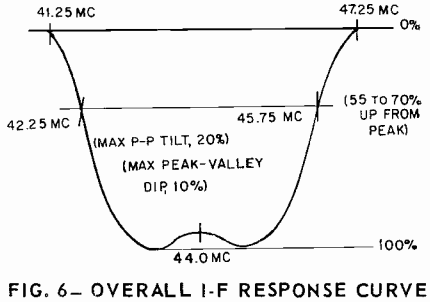


FIG. 6– OVERALL I-F RESPONSE CURVE

C) Connect a 4.5 MC FM±25KC, 400 cps modulated signal, through a .001 MFD. capacitor, to the junction of R-48, R-50, L-6 and C-41.
D) Sync the scope externally at 400 cps and adjust vertical gain of scope so that 2.5 V P-P will be represented by 2" of deflection.

NOTE: If in any of the following steps, two peaks are encountered, use the one where the slug is most outside the coil. The term "Maximum Sine Wave Recovery" refers to recovering the original sine wave shape of the 400 cps. modulated signal. If adjustment is difficult, reduce the input signal and readjust coil.

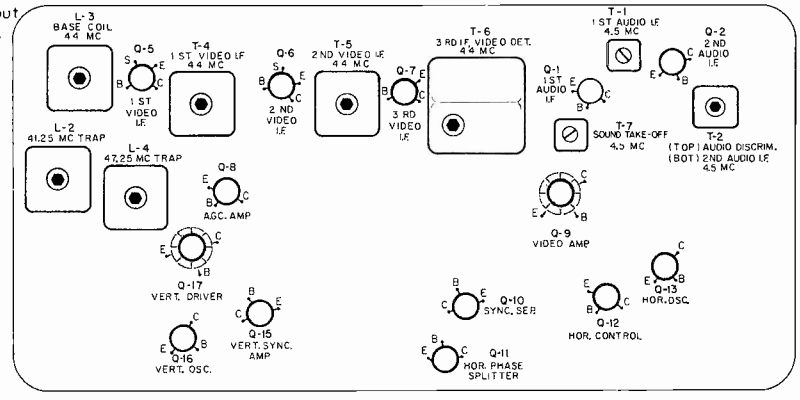
ALIGNMENT PROCEDURE:

1) Set input signal to 100 mv.
2) Adjust volume control for a usable display on scope, not to exceed 2.5 V P-P.
3) Adjust Discriminator primary (T-2, bottom) for maximum sine wave recovery.
4) Set input signal to 2 mv.
5) Adjust discriminator secondary (T-2, top), interstage transformer (T-1) and sound take-off transformer (T-7), in the order given, for maximum sine wave recovery. Maintain output of 2.5 V P-P, on scope, by adjustment of volume control.
6) Reset input signal to 100 mv. Maintain output of 2 5 V P-P on scope.
7) Adjust discriminator primary (T-2, bottom) for maximum sine wave recovery.
8) Increase output by adjusting turning volume control in a clockwise direction. The output signal should clip at approximately 3.5 V P-P and in the full clockwise position output should be about 5.5 V P-P.
9) Decrease input signal to 1 mv. A 2.5 V P-P sine wave should be displayed on scope.

SOUND TAKE-OFF, INTERSTAGE AND DETECTOR – FIELD PROCEDURE

1) Connect antenna directly to VHF antenna terminals, allow receiver to warm-up for ten minutes and tune to a strong local station.
2) Adjust the discriminator primary (T-2, bottom) for loudest sound consistent with minimum buzz. Use outside peak, if two are encountered.
3) Using some form of attenuation between the antenna and the VHF input terminals, gradually reduce the level of the input signal until distortion is heard in the output.
4) Adjust the discriminator secondary (T-2, top), interstage transformer (T-1) and sound take-off transformer (T-7), in that order for loudest and clearest sound.
5) Keep reducing the level of the input signal until sound distortion again occurs, and retune T-2, top, T-1 and T-7 for loudest and clearest sound. Repeat this procedure until no further improvement can be noted.
6) Reconnect the antenna directly to the VHF antenna terminals and, again, adjust the discriminator primary (T-2, bottom) for minimum buzz. in sound.

NOTE: If in any of the above procedures two peaks are encountered when tuning a coil, use the peak that places the slug most outside the coil.



Emerson

MODEL & CHASSIS CROSS-REFERENCE CHART

MODEL NO.	CHASSIS NUMBER	VHF TUNER	UHF TUNER	CRT
16P01	120779-A (or 764-J)	471565	471570	16CEP4
16P02A	120780-A (or 753-J)			
16P03	120780-A			
19P08	120781-A (or 765-K)		471566	19FJP4
19P09A	120782-A (or 698-K)			
19P11	120783-A (or 775-G)	471590	471569	
19P12	120784-A (or 776-G)			
*19P13	120785-A (or 777-G)			

*NOTE: Model 19P13 is equipped with a built-in AM radio utilizing chassis 120741.

DUMONT

MODEL– CHASSIS CROSS-REFERENCE

MODEL NO.	MODEL NAME	CABINET STYLE	TV CHASSIS	VHF TUNER	UHF TUNER	C.R.T.
46P01	LARK	PORTABLE	120780A	471565	471570	16CEP4
46P02	ROBIN					
49P03	MARINER		120783A	471590	471569	19FJP4
49P06	SURVEYOR		120810A	471617	471618	

The material on the next six pages is exact for the group of chassis listed above. An additional group of chassis listed in the table at right differ from the original group in minor details. Chassis 120779/782 with suffix other than "A" differ in tuner assemblies. Type 120810A and 120811A are electrically identical to 120783A and 120784A, but use other volume control assemblies and tuners. Chassis 120813A is similar to 120873A except for use of different UHF and VHF tuners.

EMERSON

MODEL NO.	CHASSIS NUMBER	CRT TYPE
16P04	120780-A, B, H	16CEP4
16P05	120779-A, B	
19P16	120782-A, B, C, D, H, J	19FJP4 (or) 19FJP4A
*19P17	120810-A	
*19P18	120811-A	
*19P20	120813-A	
19P23	120781-A, B, C, D, H, J	

*SPECIAL FEATURES (Refer to descriptions below):

Models 19P17, 19P18, 19P20 - Equipped with "Quick-On" starting feature.
Model 19P18 only - Equipped with an Automatic Timer unit.
Model 19P20 only - Equipped with wireless Remote Control.

(Material continued on pages 26 through 30)

EMERSON Chassis 120779A through 120785A, Alignment Information

ALIGNMENT INFORMATION

ADJUSTMENT PROCEDURE – I-F STAGES, TRAPS AND TUNER OUTPUT COIL

1. Connect an oscilloscope (through a 10k isolation resistor) to pin 7 of V–6B (grid of video amplifier). Scope should be adjusted so that 2 inches of vertical deflection represents approximately 2 volts P–P output.
2. Connect –4.5 volts bias to the I-F AGC test point (Test point "C"), the junction of C–11 and C–13.
3. Connect a terminated sweep generator, adjusted to sweep between 40 and 50 mc, to pin 2 of V–5 (grid of second I-F amplifier) through a 1,000 pf isolation capacitor.
   Note: If sweep generator does not have internal markers, a separate marker should be loosely coupled to the output of the sweep generator.
4. Adjust T–4 top and bottom simultaneously for maximum gain and symmetry about the 44.0 mc marker as shown in Fig. 1. (Use core positions nearest outside ends of coil.) With input signal maintained to produce 2 volts P–P output during final adjustment, bandwidth markers should fall between the tolerances indicated.
5. Disconnect generator output leads from grid of second I-F amplifier and connect them to pin 2 of V–4 (grid of first I-F amplifier).
6. Adjust T–3 top and bottom simultaneously for overcoupled response as shown in Fig. 2. (Use core positions nearest outside ends of coil.) With input signal maintained to produce 2 volts P–P output during final adjustment, bandwidth markers should fall between the tolerances indicated.

   Note: The correct overcoupled response is indicated when slight rocking of T–3 core settings do not change the amplitude of the 44.0 mc marker, but cause the response to rock or slide about this marker.
7. Reduce the amount of bias applied to the I-F AGC test point (test point "C") to –1.5 volts.
8. Disconnect generator output leads from grid of the first I-F amplifier and couple them to the mixer tube (V–14) of the VHF tuner, using the signal injection shim described below. If this is impractical, connect the generator output leads to the I-F mixer point on the tuner, using the coupling network shown in Fig. 3.

   Note: A signal injection shim may be easily constructed by pasting a thin piece of metal foil (approx. ½" x 2") on a slightly larger piece of heavy paper. Insert this shim between the mixer tube and its shield in such a manner that the foil side faces the tube, and rotate for maximum signal coupling.
9. Open trimmer CT–1 three turns from its fully closed position and adjust output of generator to produce approximately 2 volts P–P indication on scope.
10. Adjust the tuner output coil (T–8) for maximum gain and symmetry about the 44.0 mc marker.
11. Adjust the 41.25 mc trap (L–4) and the 47.25 mc trap (L–3) for minimum output at these frequencies (as indicated by their respective markers on the 'scope), increasing generator output as required to insure maximum effectiveness of the trap settings.
12. Reduce output of generator to produce approximately 2 volts P–P deflection on 'scope and re-adjust the tuner output coil (T–8) for maximum gain and bandwidth about the 44.0 mc marker.
13. Disconnect oscilloscope from pin 7 of V–6B and connect to pin 7 of V–4 (plate of first I-F amplifier), using a low impedance crystal detector probe as shown in Fig. 8. 'Scope should be calibrated so that 2 inches of vertical deflection now represents approximately 0.2 volts P–P.
14. Reduce output of generator until a usable display is produced on the oscilloscope and again adjust the tuner output coil (T–8), this time tuning for maximum gain midway between the peaks of the band-pass as indicated in Fig. 4. The 44.0 mc marker should fall between the tolerances indicated.
15. Maintain generator output to produce approximately 0.2 volts P–P indication on the oscilloscope (as above) and adjust the grid coil (L–5) to center the 44.0 mc marker on the peak of the response as indicated in Fig. 5, disregarding the tilt of the overall waveshape.
16. Adjust the input trimmer (CT–1) to position the 42.25 and 45.75 mc markers at equal amplitudes and center the 44.0 mc marker with the tuner output coil (T–8), if necessary.
17. With generator output increased to maximum, check the position of the 41.25 mc and 47.25 mc traps (L–4 and L–3), and re-adjust if necessary.
18. Re-adjust generator output to produce a 0.2 volt P–P indication on the scope and observe the response. The curve obtained should conform to Fig. 6.
19. Disconnect the crystal detector probe and connect the oscilloscope to pin 7 of V–6B (grid of the video amplifier) directly through a 10K isolation resistor.
20. Increase bias voltage to –4.5 volts and adjust the oscilloscope so that 2 inches of vertical deflection is equivalent to approximately 2 volts P–P output. Adjust output of signal generator until a 2 volt P–P indication is obtained on the 'scope. Response curve and marker positions should conform to Fig. 7.
21. Remove AGC bias from test point "C". Output signal as indicated on the 'scope should increase, and noise signal on baseline should have an amplitude of at least 1/8 inch.

    CAUTION – No attempt should be made to improve a response curve which conforms to that shown in Fig. 7. Minor deviations may be corrected by slight touch-up of specific coils to make response conform to Fig. 7, as indicated below:

a) To position the 45.75 mc marker adjust T-3, bottom slug.
b) To position the 42.25 mc marker adjust T-4, bottom slug.
c) To correct tilt, adjust T-8, the tuner output coil.

EMERSON Chassis 120779A through 120785A, Alignment Information, Continued

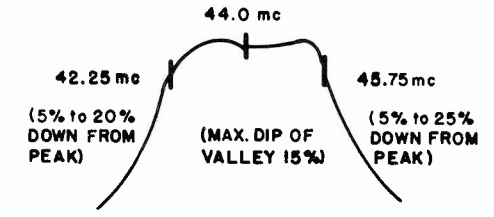


FIG. 1

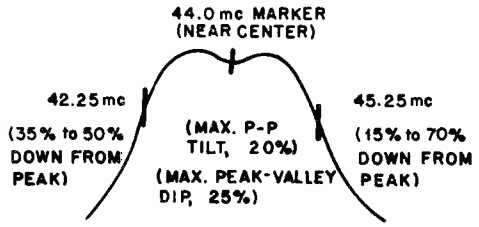


FIG. 2

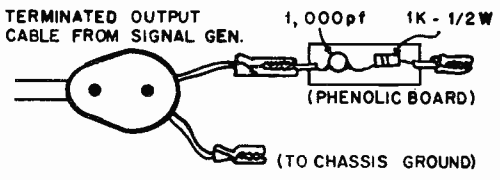


FIG. 3 - GENERATOR COUPLING NETWORK (REFER TO STEP NO. 8)

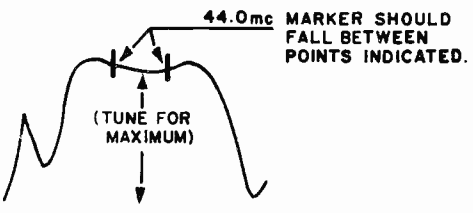


FIG. 4

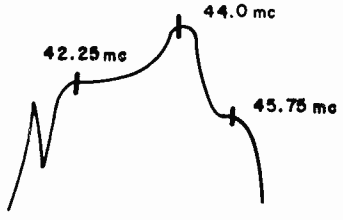


FIG. 5

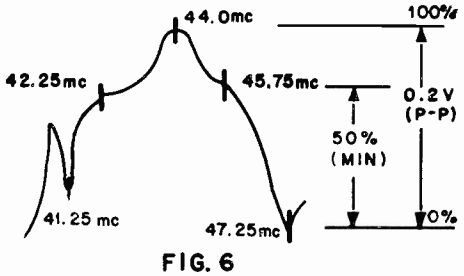


FIG. 6

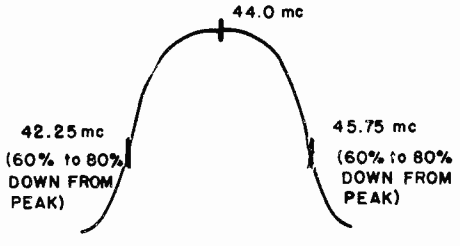


FIG. 7

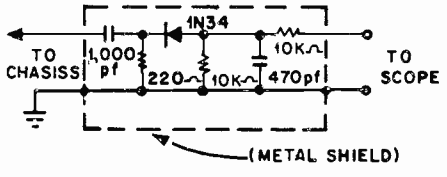


FIG. 8 - LOW IMPEDANCE CRYSTAL DETECTOR PROBE. (REFER TO STEP NO. 13)

ADJUSTMENT PROCEDURE – SOUND TAKE-OFF, SOUND INTERSTAGE, SOUND DETECTOR & 4.5 MC TRAP

1. With antenna connected directly to VHF terminals of receiver, set the channel selector to a strong local station and adjust the fine-tuning control until a 4.5 mc beat is just visible in the picture being viewed.
2. Adjust the 4.5 mc sound trap (T–5, top slug) until the 4.5 mc beat in the picture is either at minimum or is completely eliminated.
3. Adjust the sound quadrature coil (L–2) for loudest sound consistent with minimum buzz, using the second peak from the top of the coil.
4. Using some form of attenuation between the antenna and the VHF input terminals, gradually reduce the level of the input signal until distortion is noticeable in the audio output.
5. Adjust the sound take-off transformer (T–5, bottom slug) and the sound interstage coil (L–1) for loudest and clearest sound.
6. Keep reducing the level of the input signal until sound distortion again occurs, and re-tune T–5 bottom slug and L–1 for loudest and clearest sound. Repeat this procedure until no further improvement can be noted.
7. Re-connect antenna directly to VHF terminals of receiver (attenuator removed) and touch-up quadrature coil (L–2) for minimum buzz in sound.

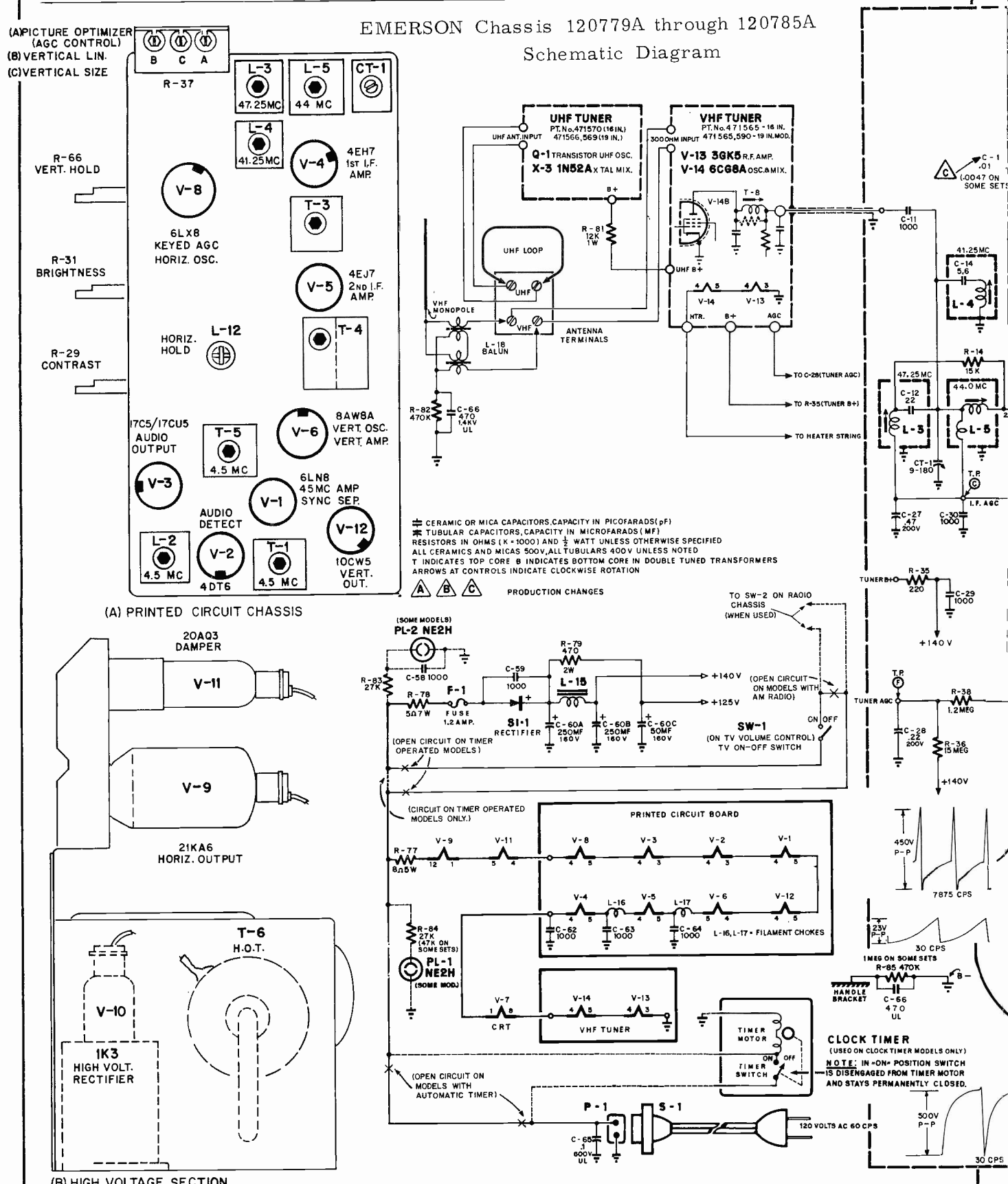
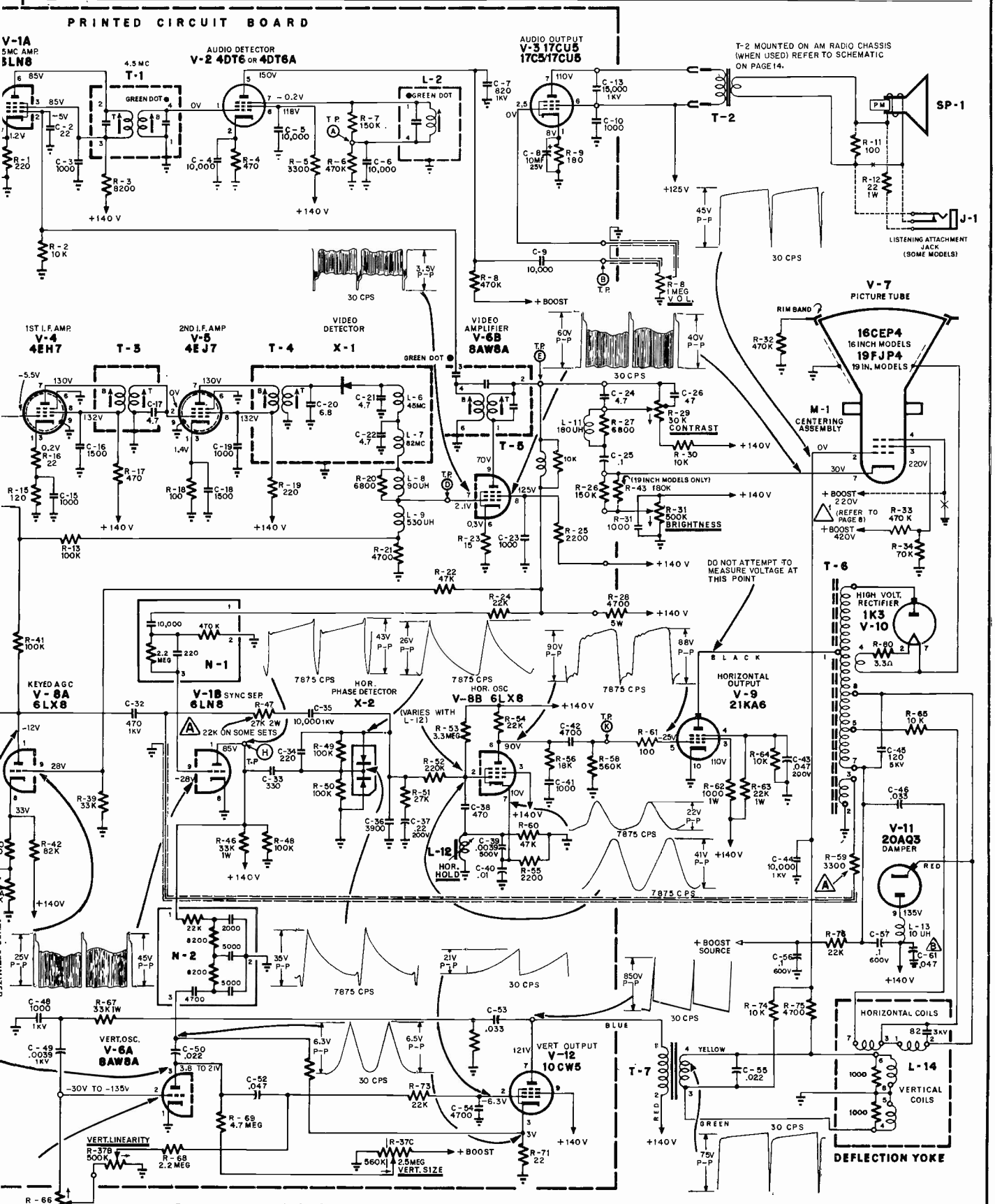


FIG. 10 TUBE LOCATION AND ALIGNMENT POINTS


PRINTED CIRCUIT BOARD
V-1A
5MC AMP.
6LN8
AUDIO DETECTOR
V-2 4DT6 OR 4DT8A
4.5 MC
T-1
L-2
AUDIO OUTPUT
V-3 17CU5
17C5/17CU5
T-2 MOUNTED ON AM RADIO CHASSIS (WHEN USED) REFER TO SCHEMATIC ON PAGE 14.
SP-1
J-1
LISTENING ATTACHMENT JACK (SOME MODELS)
+125V
45V P-P
30 CPS
+140 V
+ BOOST
V-7
PICTURE TUBE
RIM BAND
16CEP4
16 INCH MODELS
19FJP4
19 IN. MODELS
M-1
CENTERING ASSEMBLY
1ST I.F. AMP.
V-4
4EH7
2ND I.F. AMP
V-5
4EJ7
T-3
T-4
T-5
VIDEO DETECTOR
X-1
VIDEO AMPLIFIER
V-6B
8AW8A
CONTRAST
BRIGHTNESS
(19 INCH MODELS ONLY)
+ BOOST 220V
(REFER TO PAGE 8)
+ BOOST 420V
T-6
DO NOT ATTEMPT TO MEASURE VOLTAGE AT THIS POINT
HIGH VOLT. RECTIFIER
1K3
V-10
KEYED AGC
V-8A
6LX8
V-8B SYNC SEP.
6LN8
HOR. PHASE DETECTOR
X-2
HOR. OSC
V-8B 6LX8
HORIZONTAL OUTPUT
V-9
21KA6
HOR. HOLD
V-11
20AQ3
DAMPER
+ BOOST SOURCE
VERT. OSC.
V-6A
8AW8A
VERT. LINEARITY
VERT. OUTPUT
V-12
10CW5
T-7
HORIZONTAL COILS
VERTICAL COILS
L-14
DEFLECTION YOKE
CHAS. 120779, 780, 781, 782, 783, 784, 785

EMERSON Chassis 120779A through 120785A, Service Data, Continued

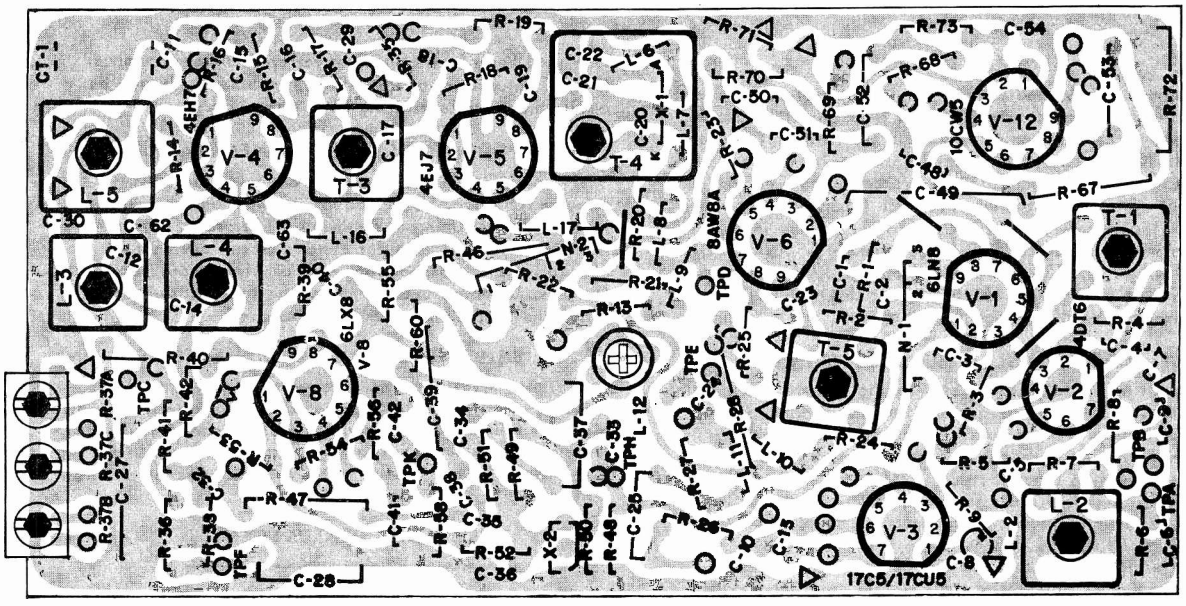


FIG. 12 ETCHED CIRCUIT BOARD (TOP VIEW)

CONDITIONS FOR CHASSIS READINGS

VOLTAGES AND WAVESHAPES were taken under actual operating conditions, with normal picture and sound being received. AGC voltage developed on the I-F AGC line (test point C) was minus nine volts. Input voltage to chassis under test was 120 volts, 60-cycle AC. Frequencies indicated for the waveshapes shown are approximate sweep settings for the oscilloscope being used (one-half actual frequency of signal being measured).

RESISTANCE MEASUREMENTS were taken with no power. Where readings are affected by control settings, both maximum and minimum values are shown.

ALL MEASUREMENTS were taken between points indicated and chassis ground (unless otherwise noted), using an RCA Voltohmyst or equivalent VTVM. A low-capacity probe was used for all waveshapes shown in the schematic diagram. All readings obtained may vary ±10% due to normal component tolerances and strength of input signal to chassis under test.

SYMBOL NO.	TUBE TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9	PIN 10	PIN 11	PIN 12
V-1	6LN8	*33K	10K	*8.2K	(FILAMENT)		*8.2K	220	0	2.7M			
V-2	4DT6A	10	470	(FILAMENT)		1.4M	*3.3K	470K	–	–			
V-3	17C5/17CU5	180	20 to 1M	(FILAMENT)		20 to 1M	*470	*600	–	–			
V-4	4EH7	142	100K	142	(FILAMENT)		0	*470	*470	0			
V-5	4EJ7	100	0	100	(FILAMENT)		0	*220	*220	0			
V-6	8AW8A	0	500K to 2M	5M to 6.2M	(FILAMENT)		15	90	*2.2K	*4.4K			
V-7	C.R.T.	(FIL)	3.4K	440K	0	–	–	90K to 300K	(FIL)	–			
V-8	6LX8	205K	320K	0	(FILAMENT)		*22K	2.2K	5 to 32K	33K			
V-9	21KA6	(FIL)	–	*1.1K	10K	560K	–	–	–	–	0	–	(FIL)
V-10	1K3	–	INF.	–	INF.	–	–	INF.	–	(CAP) 800K			
V-11	20AQ3	–	–	–	(FILAMENT)		–	–	–	*0	(CAP) 800K		
V-12	10CW5	–	2.2M to 2.7M	22	(FILAMENT)		–	250	–	*0			

NOTES: All resistance readings are in ohms, unless otherwise specified.
"K" denotes kilohms, "M" denotes megohms.
*Indicates measurements taken with common lead of meter connected to junction of L-15 and C-60B (B+ point).

Emerson

MODEL & CHASSIS CROSS-REFERENCE CHART

MODEL NO.	CABINET STYLE	TV CHASSIS	VHF TUNER	UHF TUNER	CRT
13C01A	Consolette	120758-A	471556	471561	23GFP4
13C02	Console				
13C02A					
13C03	Lowboy				
13C03A					
13C04					
13C05					
13C06	Console				
13C07	Table Model				
13T01A					
19P04	Portable	120759-A			19EDP4 (or) 19DRP4
19P05		120760-A			
19P06		120759-A			
19P10		120760-A			

The additional models listed below and released at a later date use chassis types that correspond identically to those listed above and described on pages 31 through 36, except that they utilize two silicon diode rectifiers in the power supply as compared to tube rectifier in earlier chassis.

MODEL AND CHASSIS CROSS-REFERENCE CHART

MODEL NO.	CABINET STYLE	TV CHASSIS	VHF TUNER	UHF TUNER	CRT
13C08	Console	120772-A	471556	471561	23GFP4
13C09					
13C10					
13C11					
*13K01	Lowboy				
*13K02					
*13K03					
*13K04					
‡13T01A	Table Model				
‡19P04	Portable	120773-A			19EDP4 (or) 19DRP4
‡19P10		120774-A			

NOTES: * The models indicated by an asterisk are combination receivers utilizing a separate transistorized stereo amplifier (chassis 120761), AM/FM/MPX tuner assembly (chassis 120801 or 803) and four-speed stereo record changer (part number 819226).

‡ The models indicated by a dagger symbol also utilize alternate chassis assemblies (120758-A, 759-A and 760-A, respectively), which are fully described

EMERSON Chassis 120758A/60A, 120772A/74A, Service Information

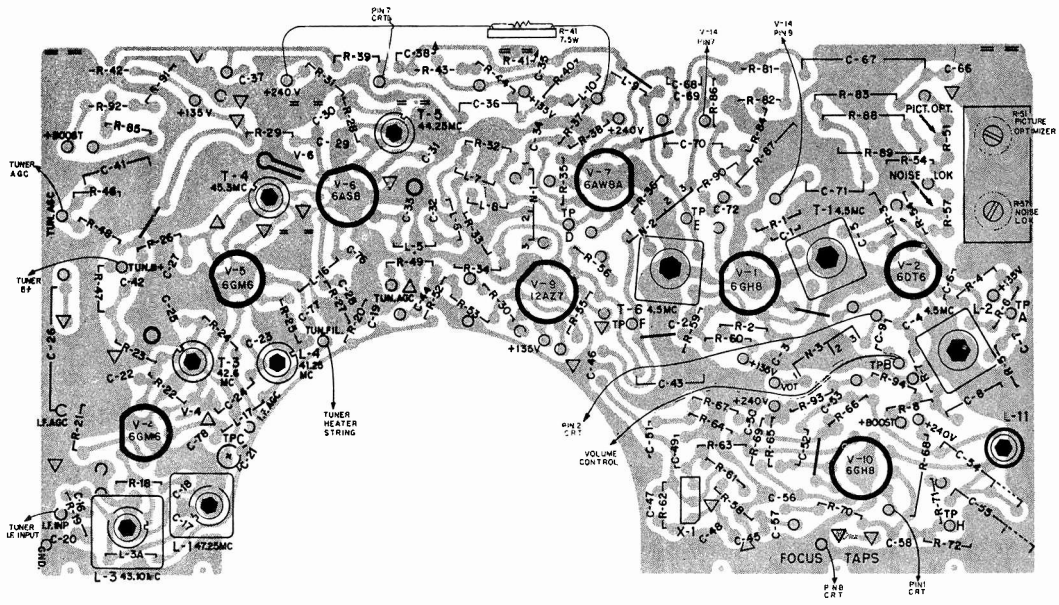


Fig. 3 – Etched Printed Circuit Board, Top View.

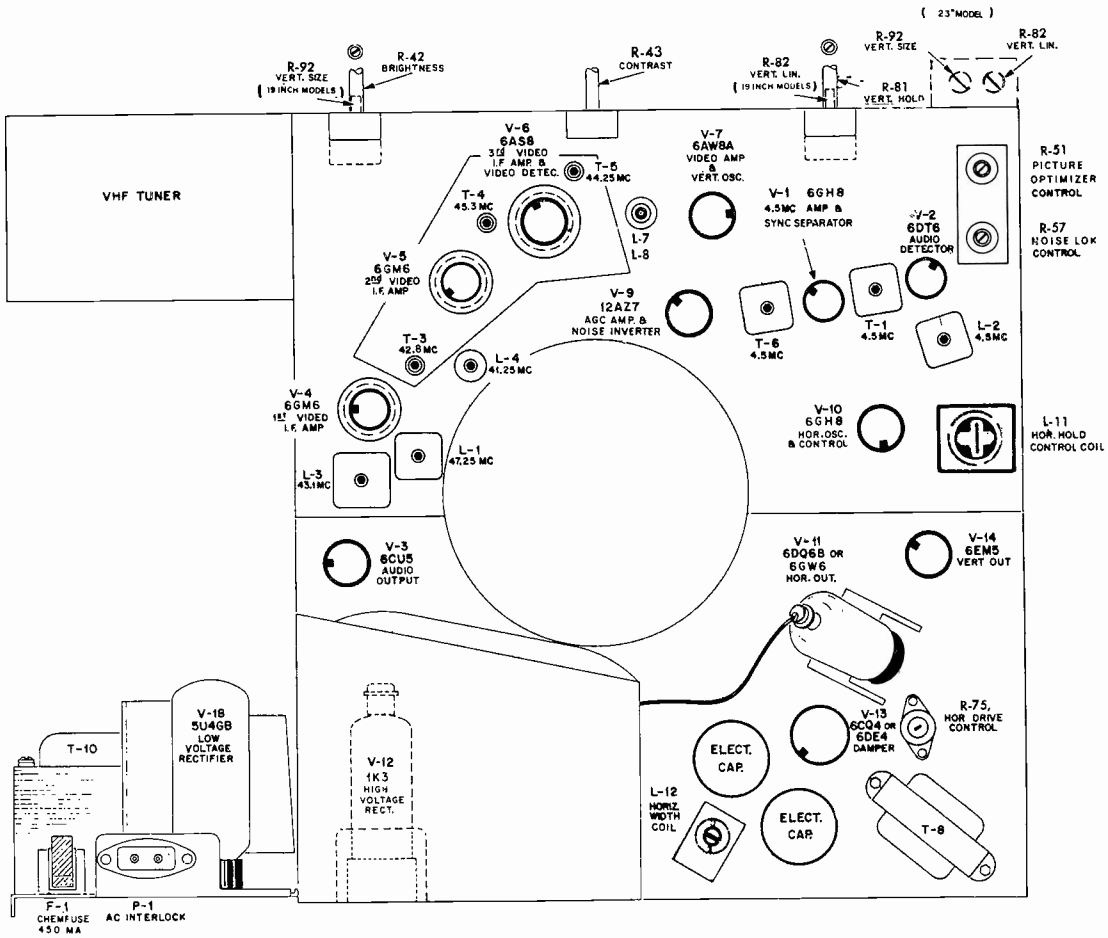


FIG. 4 – TUBE LOCATION AND ALIGNMENT POINTS

EMERSON Chassis 120758A/60A, 120772A/74A, Continued

ALIGNMENT INFORMATION

GENERAL ALIGNMENT NOTES:

A. Set tuner to highest unused channel and allow both chassis and equipment to warm up for ten minutes or more.

B. Connect -3 volts bias through a 10K resistor to the AGC test point (junction of C-19 C-21 and R-20).

C. Maintain signal generator output no higher than necessary to produce a reading not to exceed two volts on VTVM and use insulated alignment tools for adjusting.

D. Video IF alignment requires the use of a shim for signal injection. This can be easily constructed by pasting a thin piece of metal foil, (approx. ½ x 2") on a slightly larger piece of heavy paper. Insert this shim between the tuner mixer tube and its shield in such a manner that the foil side faces the tube.

VIDEO IF ALIGNMENT

1. Connect high side of signal generator to metal foil on shim, low side to chassis through a .001 mfd. capacitor.
2. Place a VTVM (-5 volt range) at video detector test point (junction of L-7 and L-8), common lead to chassis.
3. Peak the following for MAXIMUM response at the frequencies specified:
   T-5 at 44.25 MC, T-4 at 45.3 MC, T-3 at 42.8 MC
4. Tune the following for MINIMUM response, increasing signal generator output as necessary:
   L-4 at 41.25 MC, L-1 at 47.25 MC, L-3 at 45.0 MC
5. Peak T-9 on tuner for MAXIMUM output at 45.0 MC.
6. Set generator at 43.1 MC and re-tune L-3 for MAXIMUM output.

To observe the IF response curve connect an oscilloscope, thru a 10,000 ohm isolation resistor, in place of the VTVM. Inject a sweep signal (40 to 50 MC) along with a loosely coupled marker generator at the mixer tube in the manner described above. Adjust the output of the sweep generator to produce about 2 volts peak to peak curve on the oscilloscope and reduce the marker signal so as not to upset the response curve. The 45.75 MC marker should appear between 55% and 65% down with respect to the peak.

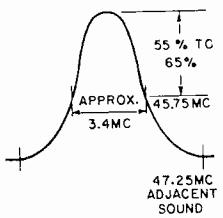


FIG. 5 – OVERALL I.F. RESPONSE CURVE

SOUND IF ALIGNMENT

1. Using a strong T.V. transmitted signal, adjust T-6, sound take-off transformer, bottom, and T-1, sound interstage transformer, top and bottom, for the loudest sound.
2. Adjust L-2, quadrature coil, for clearest and loudest sound. If two peaks are encountered, use the position where the slug is closer to the circuit board.
3. With the antenna loosely coupled to the set, (simulating a weak signal) repeat step No. 1, tuning for maximum volume and minimum distortion.
4. If a VTVM is available, measure the voltage across R-5, 470K resistor. Voltages should be between -3 and -10 volts and not vary by more than 3 volts between a strong and weak signal.
5. Check sound on all channels and repeat entire procedure if necessary.

4.5 MC VIDEO TRAP ALIGNMENT

1. Tune in a local station and adjust the fine-tuning control until a 4.5 MC beat is visible in the picture.
2. Adjust T-6 (top) for minimum 4.5 MC beat on screen.

HORIZONTAL SIZE ADJUSTMENT

The chassis described in this Service Note have been designed to provide proper horizontal sweep under the normal variations usually encountered in line voltages. Should unusually low or high line voltages be encountered, it may be necessary to re-adjust the width control (L-12) for proper horizontal sweep. Turning the control clockwise (inward) will result in increased width, while turning the control counter-clockwise (outward) will reduce the width. When adjusting the width, the Horizontal Drive control setting should also be checked, as outlined below.

HORIZONTAL DRIVE ADJUSTMENT

The horizontal drive control, located just below the horizontal output tube, should normally be in its most clockwise position (minimum resistance in circuit). If overdrive bars (indicated by white vertical lines in the raster) appear at this setting, slowly rotate R-75 in a counterclockwise direction until the lines just disappear.

VERTICAL SIZE AND LINEARITY ADJUSTMENTS

In 19 inch models, vertical size and linearity may be adjusted by inserting a fiber alignment tool into the hollow shafts of the brightness and vertical hold controls, respectively. Insert alignment tool into the hollow brightness control shaft to adjust vertical size, and into the hollow vertical hold control shaft to adjust vertical linearity.

On 23" models the vertical size and linearity controls are mounted on a separate bracket, located at the top right of the chassis, and are accessible through the two openings in the cabinet back.

FOCUS ADJUSTMENT

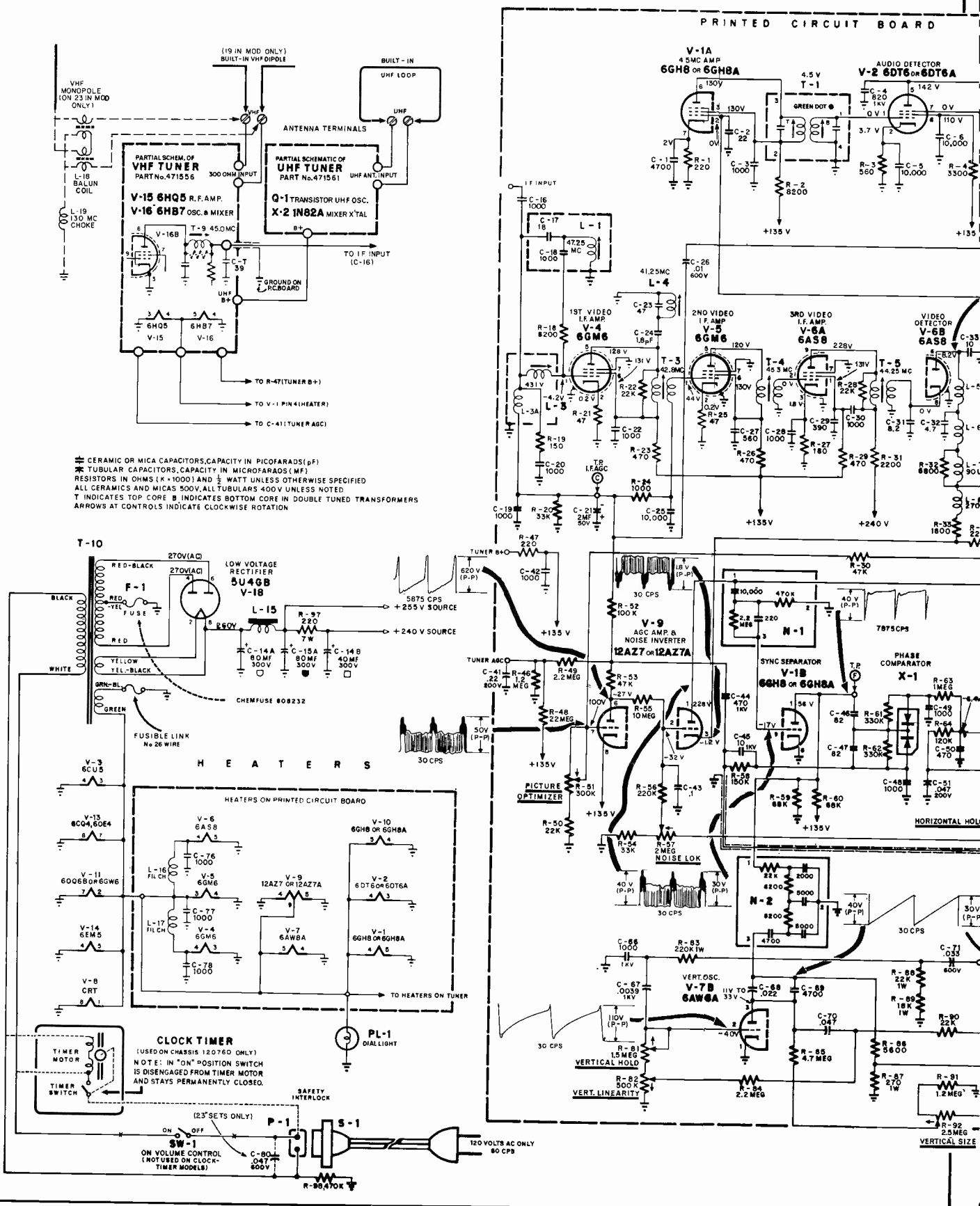
Any one of four different voltages (available at the quadruple terminal strip mounted directly below the 6CG8 tube) may be utilized as a focus potential. Remove the insulated clip-lead connector (attached to one of the terminals on this strip) and alternately try connecting it to each possible terminal, leaving it connected to the one which gives the best overall focus.

PICTURE OPTIMIZER AND NOISE-LOK ADJUSTMENTS

1. Rotate the Picture Optimizer and Noise Lok controls fully counterclockwise (as viewed from rear of cabinet).

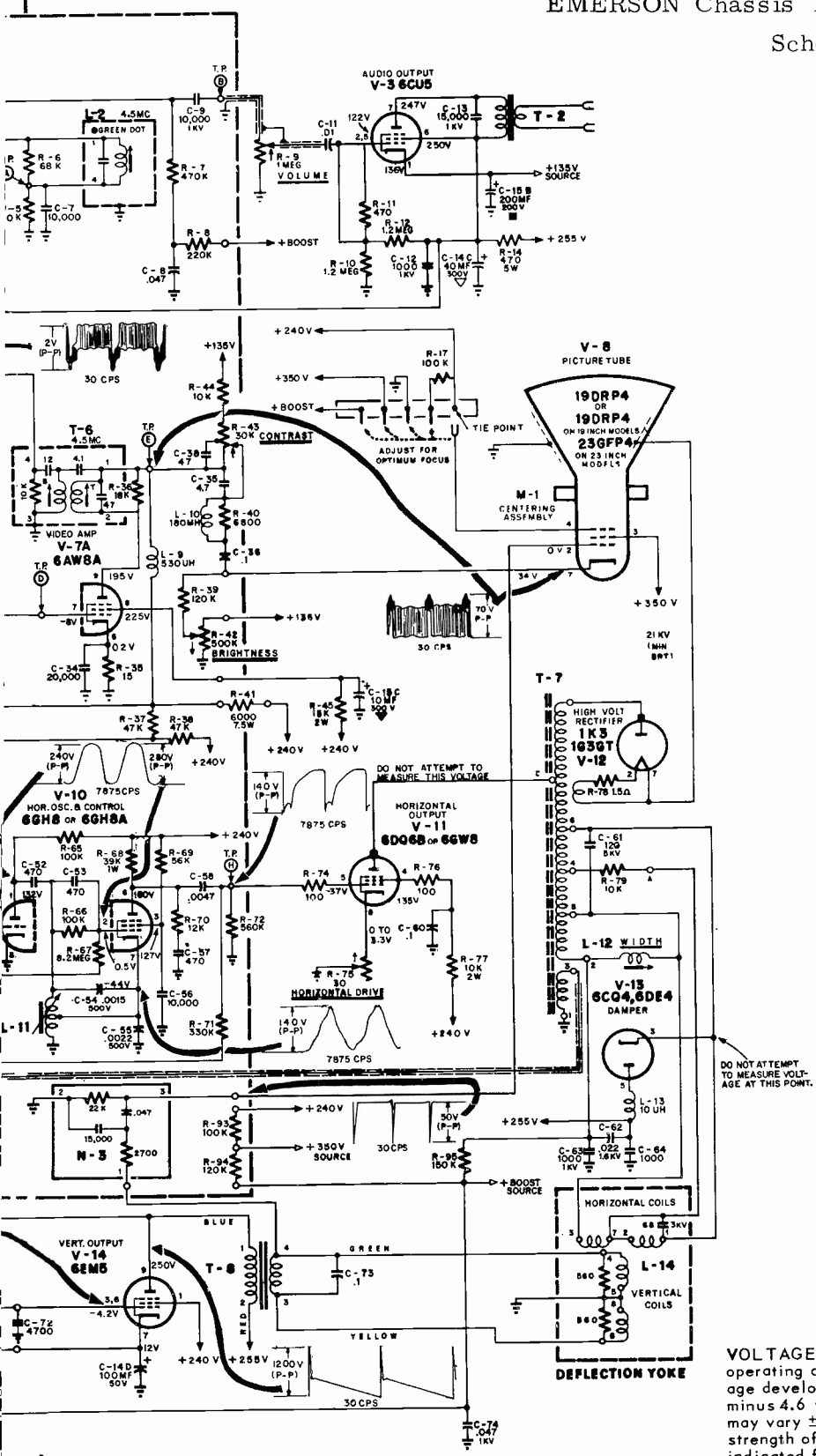
2. Tune to the strongest channel and rotate the Picture Optimizer slowly clockwise until the receiver begins to overload (sync instability, sound buzz, kinks in picture), then back off slightly counterclockwise to eliminate overload, continuing an additional approximate ten degrees beyond this point to assure a proper safety factor. If the receiver does not overload when the control has been rotated fully, leave it in this position.

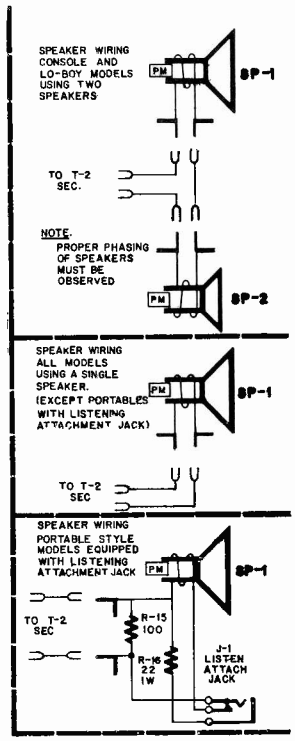
3. With the receiver still tuned to strongest channel, rotate the Noise Lok control slowly clockwise until the picture begins to overload (sync instability, sound buzz, kinks in picture), then back off slightly to eliminate this condition. With controls properly set, switch channels to verify setting for strongest signals. This optimizes operation of the Noise Lok for mixed signal conditions (strong and weak). However, in extreme fringe areas it is possible to improve the picture stobility by further clockwise adjustment of the control.


PRINTED CIRCUIT BOARD
(19 IN MOD ONLY) BUILT-IN VHF DIPOLE
BUILT-IN UHF LOOP
VHF MONOPOLE (ON 23 IN MOD ONLY)
ANTENNA TERMINALS
L-18 BALUN COIL
L-19 130 MC CHOKE
PARTIAL SCHEM. OF VHF TUNER PART No. 471556
300 OHM INPUT
V-15 6HQ5 R.F. AMP.
V-16 6HB7 OSC. & MIXER
PARTIAL SCHEMATIC OF UHF TUNER PART No. 471561
UHF ANT. INPUT
Q-1 TRANSISTOR UHF OSC.
X-2 1N82A MIXER X'TAL
TO I.F. INPUT (C-16)
GROUND ON P.C. BOARD
TO R-47 (TUNER B+)
TO V-1 PIN 4 (HEATER)
TO C-41 (TUNER AGC)
CERAMIC OR MICA CAPACITORS, CAPACITY IN PICOFARADS (pF)
TUBULAR CAPACITORS, CAPACITY IN MICROFARADS (MF)
RESISTORS IN OHMS (K = 1000) AND 1/2 WATT UNLESS OTHERWISE SPECIFIED
ALL CERAMICS AND MICAS 500V, ALL TUBULARS 400 V UNLESS NOTED
T INDICATES TOP CORE B INDICATES BOTTOM CORE IN DOUBLE TUNED TRANSFORMERS
ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION
V-1A 4.5MC AMP. 6GH8 OR 6GH8A
T-1
AUDIO DETECTOR V-2 6DT6 OR 6DT6A
I.F. INPUT
L-1
L-4
1ST VIDEO I.F. AMP. V-4 6GM6
2ND VIDEO I.F. AMP. V-5 6GM6
3RD VIDEO I.F. AMP. V-6A 6AS8
VIDEO DETECTOR V-6B 6AS8
T-3
T-4
T-5
L-5
T.P. I.F. AGC
+135 V
+240 V
T-10
270V(AC)
LOW VOLTAGE RECTIFIER 5U4GB V-18
F-1 FUSE
L-15
+255 V SOURCE
+240 V SOURCE
CHEMFUSE 808232
FUSIBLE LINK No 26 WIRE
H E A T E R S
HEATERS ON PRINTED CIRCUIT BOARD
V-3 6CU5
V-13 6CQ4, 6DE4
V-11 6DQ6B OR 6GW6
V-14 6EM5
V-8 CRT
V-6 6AS8
V-5 6GM6
V-4 6GM6
V-9 12AZ7 OR 12AZ7A
V-7 6AW8A
V-10 6GH8 OR 6GH8A
V-2 6DT6 OR 6DT6A
V-1 6GH8 OR 6GH8A
L-16 FILCH
L-17 FILCH
TO HEATERS ON TUNER
PL-1 DIAL LIGHT
CLOCK TIMER (USED ON CHASSIS 120760 ONLY)
NOTE: IN "ON" POSITION SWITCH IS DISENGAGED FROM TIMER MOTOR AND STAYS PERMANENTLY CLOSED.
TIMER MOTOR
TIMER SWITCH
SAFETY INTERLOCK
(23" SETS ONLY)
SW-1 ON VOLUME CONTROL (NOT USED ON CLOCK-TIMER MODELS)
P-1
S-1
120 VOLTS AC ONLY 60 CPS
V-9 AGC AMP. & NOISE INVERTER 12AZ7 OR 12AZ7A
SYNC SEPARATOR V-1B 6GH8 OR 6GH8A
PHASE COMPARATOR X-1
PICTURE OPTIMIZER
NOISE LOK
HORIZONTAL HOLD
VERT. OSC. V-7B 6AW8A
VERTICAL HOLD
VERT. LINEARITY
VERTICAL SIZE
30 CPS
7875 CPS

EMERSON Chassis 120758A, 120759A, 120760A

Schematic Diagram





VOLTAGES and WAVESHAPES were taken under actual operating conditions (normal picture and sound). AGC voltage developed at junction of C-19, C-21 and R-20 was minus 4.6 volts. Voltage and waveshape readings obtained may vary ± 10% in value due to component tolerances and strength of input signal to chassis under test. Frequencies indicated for waveshapes shown in schematic diagram are approximate sweep settings for oscilloscope used (one-half actual frequency of signal being measured).

CHASSIS No.120758, 759, 760.

EMERSON Chassis 120758A/60A, 120772A/74A, Continued

GENERAL DESCRIPTION

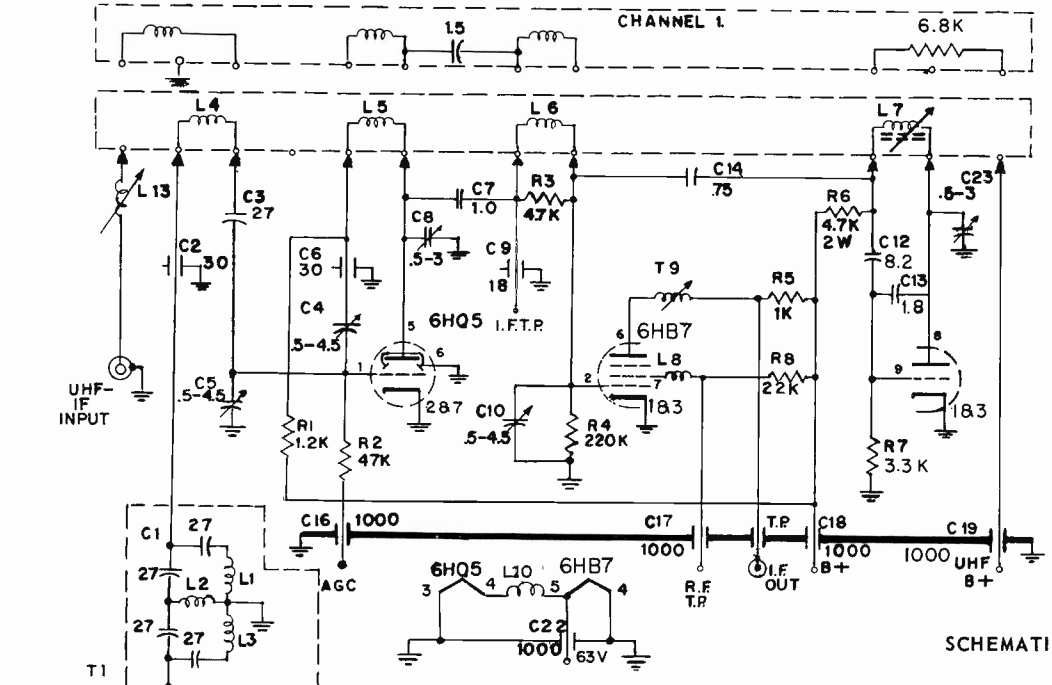
VHF tuner 471556 is a 13 position rotary turret assembly utilizing a type 6HQ5 as an R-F amplifier and a type 6HB7 as a combined mixer and local oscillator. This tuner is equipped with individually adjustable channel strips which can be pre-set for optimum reception of each channel by means of the permanent-type fine tuning control on the receiver's front panel.

TUNER REPLACEMENT INFORMATION

VHF tuner 471556 is shipped from the factory complete with tubes, bottom cover, nylon fine tuning housing assembly, fine tuning cam and the front bracket, as depicted in the illustration of this tuner. Therefore, if returning one of these units for repair or replacement, it should be shipped with all the items noted above, but less the tuner mounting assembly and all the items which couple the UHF & VHF tuners together, including the large plastic gear at the rear of the tuner.

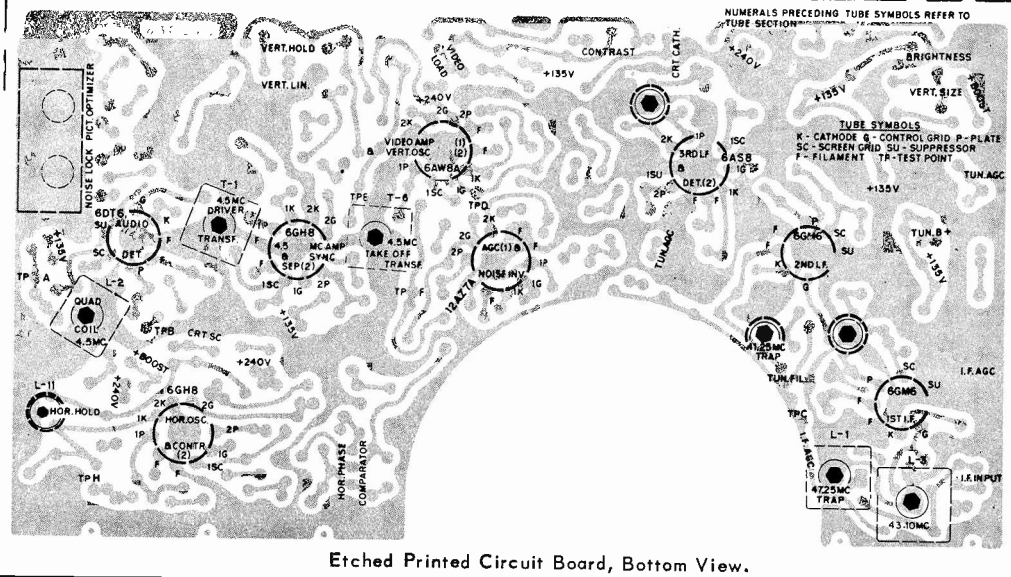
UHF I-F ALIGNMENT

A tuning slug is provided in the UHF I-F input coil (L-13) for adjustment of the UHF I-F band-pass. This slug has been factory pre-set for optimum performance. However, if field adjustment is required, it may be done while viewing UHF reception.



SCHEMATIC, VHF TUNER 471556

NOTE: ALL RESISTORS SHOWN ARE .5 WATT 20% TOLERANCE, UNLESS OTHERWISE NOTED.
ALL CAPACITOR VALUES ARE IN PICOFARADS (pf).



Etched Printed Circuit Board, Bottom View.

GENERAL ELECTRIC

AB CHASSIS

MODELS	MODELS	MODELS
M730BMD	M720BMD	CAM722BBG
M730BMP	M720BWD	CAM723BBG
M730BWD	M740BWD	CAM726BBG
M733BWD	M741BPN	CAM726BEB
M734BMP	M742BMF	CAM727BBG
M760BMD	M743BCL	CAM727BEB
M760BMP	M751BWD	
M760BWD	M752BMP	
M762BMD	M771BMD	
M763BWD	M771BWD	
M764BMP		

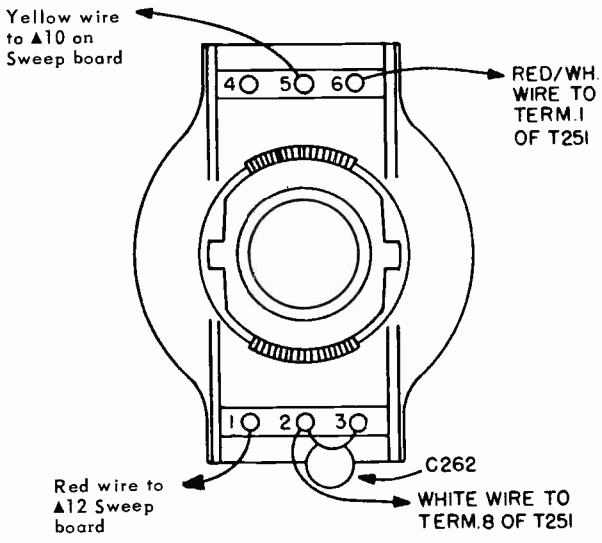
ELECTRICAL ADJUSTMENTS

HEIGHT AND VERTICAL LINEARITY: Adjust R208 and R214 simultaneously for proper vertical size and linearity. Picture should extend 1/8-inch beyond top and bottom edges of mask.

WIDTH CONTROL: Adjust this control for largest picture necessary to fill mask.

HORIZONTAL HOLD:

1. Remove the cabinet back.
2. Tune the receiver to a weak signal and adjust the controls for normal operation.
3. Short Test Point VI to the chassis with a jumper wire.
4. Connect a 1000 ohm resistor from Test Point VIII to Test Point IX (in parallel with L251.)
5. Adjust HORIZONTAL HOLD potentiometer, R257, until picture just "floats" back and forth across the screen. Leave R257 set in this position.
6. Remove the 1000 ohm resistor from Test Point VIII and Test Point IX. Adjust L251 (stabilizer coil) so that the picture again just "floats" across the screen, turning the core toward the printed board. Leave L251 set in this position.
7. Remove the chassis jumper from Test Point VI. Repeat adjustments if the picture does not "lock".



YOKE WIRING

AGC CONTROL:

Field Adjustment: Tune in the strongest available signal and adjust R201 to the point where overloading is indicated by "tearing" of the picture. Then back off the AGC control to just beyond the point where the overload condition disappears. Before adjusting the AGC control, set the automatic brightness control defeat switch to the "defeat" position.

Instrument Adjustment:

1. Tune in a broadcast signal, preferably a monoscope signal that is monitored to assure that the percentage of sync does not exceed 25 percent.
2. Connect an oscilloscope to the high side of the contrast control. Synchronize the scope to vertical rate.
3. Adjust the fine tuning for smear and the AGC control for 100 to 110 volts peak to peak with no sync compression.

PICTURE TUBE ADJUSTMENTS

FOCUS: The proper focus potential for the tube was chosen at the time the set was manufactured. If it becomes necessary to install a new picture tube or change the focus potential, any of three potentials may be chosen for best focus. Connection points for the four potentials may be selected by referring to main schematic diagram.

PICTURE TILT: To correct picture tilt, loosen the YOKE CLAMP by squeezing spring over the bend in the clamp. Adjust yoke to correct tilt. Secure yoke with clamp.

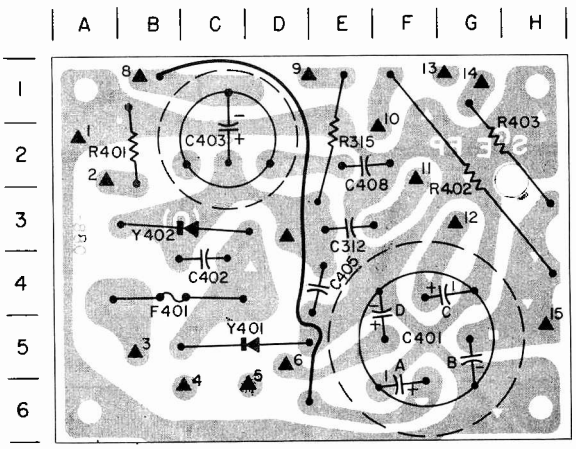
PICTURE CENTERING: Rotate the two centering rings located at the rear of the yoke assembly until picture is properly centered.

POWER SUPPLY BOARD COMPONENT LOCATION

TRIANGLE (▲-0) NUMBERS REPRESENT INTERCONNECTING WIRES ON COMPONENT BOARD FOR CONNECTION TO POINTS INDICATED

- ▲1 GREEN & YELLOW WIRE TO T401
- ▲2 BLACK WIRE TO S401 & T401
- ▲3 RED WIRE TO T401
- ▲4 BROWN & YELLOW WIRE TO AC INTERLOCK & BROWN & YELLOW TO T401
- ▲5 BROWN WIRE TO S401 & TO AC INTERLOCK
- ▲6 YELLOW WIRE TO ▲8 ON SWEEP BOARD
- ▲7 GREEN WIRE TO L401
- ▲8 BLUE WIRE TO T401
- ▲9 VIOLET WIRE TO ▲6 ON I-F BOARD
- ▲10 RED & BLACK WIRE TO TUNER RF B+
- ▲11 VIOLET WIRE TO ▲8 ON IF BOARD.
- ▲12 ORANGE WIRE TO ▲11 ON I-F BOARD, ▲5 ON SWEEP BOARD, & CONTRAST CONTROL
- ▲13 GREEN WIRE TO T401, & F402 FUSE WIRE
- ▲14 RED & YELLOW WIRE TO TUNER OSC. B+
- ▲15 RED WIRE TO L401, & TO ▲3 ON SWEEP BOARD, & RED & VIOLET WIRE TO ▲20 ON I-F BOARD.

RESISTORS
R315—E2
R401—B2
R402—F2
R403—H2
CAPACITORS
C312—E3
C401—F5
C402—C4
C403—C2
C405—E4
MISCELLANEOUS
F401—B4
Y401—C5
Y402—B3



POWER SUPPLY CIRCUIT BOARD

GENERAL ELECTRIC Chassis AB, Alignment Information

RECEIVER ALIGNMENT

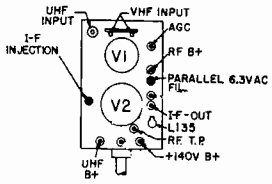
VIDEO I-F SYSTEM

AM PRE-PEAKING & TRAP FREQUENCIES

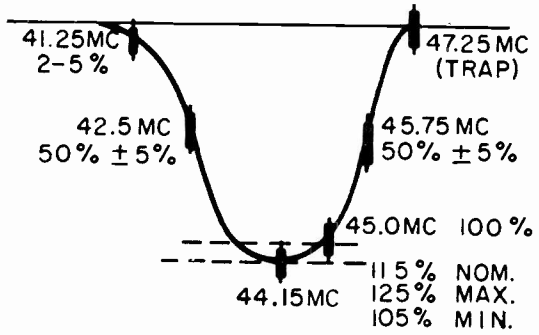
L150 . . . . .Min. 47.25 MC	T151 . . . . Max. 43.0 MC
L135 . . . . Max. 45.75 MC	T152 . . . . Max. 45.2 MC
L151 . . . . Max. 42.50 MC	L153, L154 Max. 44.15 MC

GENERAL: Allow receiver and test equipment at least 20 minutes warm-up.

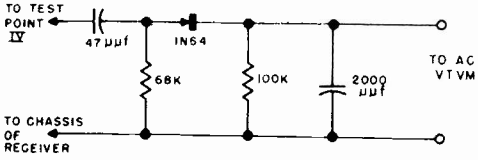
1. Turn volume control to minimum and contrast control fully clockwise. Set channel selector to unused high VHF channel (9-13) and fine tuning fully counterclockwise.
2. Short antenna terminals together.
3. Connect oscilloscope to Test Point III thru 22,000 ohms resistor not more than 1.5 inches away from Test Point III. Connect −4.5V bias between Test Point II and chassis.
4. Inject signals from a properly terminated AM signal generator or sweep generator, through 1000uuf. capacitor To the I F injection point on the VHF Tuner as shown in the illustration.
5. Align the receiver to produce the response curve illustrated.
6. All cores are positioned away from printed board.
7. Either a speaker or 3.2 ohm 5W load resistor must be connected to speaker terminals.



I-F INJECTION



I-F RESPONSE CURVE



DETECTOR NETWORK

VIDEO I-F ALIGNMENT CHART

STEP	SIGNAL FREQUENCY	ADJUST	REMARKS
1	47.25 MC AM	Adjust L150 for minimum scope deflection	Use maximum scope sensitivity and smallest possible signal. Do not retouch this adjustment.
2	38–48 MC sweep generator, with scope calibrated 4 volts peak to peak for 2 inch deflection.	Adjust L154 and L153 in the following sequence: A. Tune L153 core so top of core is flush w/top of coil. B. Tune L154 for max. deflection of 44.15 MC marker. (Do not re-adjust scope) C. Tune L153 for max. deflection of 44.15 MC marker.	Do not retouch these adjustments.
3		L135 (converter plate) for max. deflection of the 45.75 MC marker.	
4		L151 (1st I-F grid) for maximum deflection of the 42.5 MC marker and proper nose shaping.	Symmetry of the nose is important. No portion of the nose should be out of symmetry by more than 3%.
5		T152 (2nd I-F Plate) to place 45.75 MC marker properly on the curve.	
6		T151 (1st I-F Plate) to place 42.5 MC marker properly on the curve.	Repeat 5, 6, and 7 if necessary.
7		L151 if necessary to shape the nose.	

GENERAL ELECTRIC Chassis AB, Alignment Information, Continued

RECEIVER ALIGNMENT (CONT'D)

4.5 MC TRAP ALIGNMENT

1. Connect a −7.5V bias to Test Point II, with the positive bias lead grounded to chassis.
2. Turn contrast control to maximum, volume to minimum.
3. Connect the DETECTOR NETWORK shown to Test Point IV and feed its output to an AC VTVM.
4. Apply a 4.5 MC AM signal through a 5μμf capacitor at Test Point III.
5. Adjust the top core of T154 for minimum reading on Test Point IV. Two core positions will give an apparent minimum indication, the correct one is the first reached while turning the core from the top end of the coil form toward the circuit board.

NOTE: Retouching of the trap adjustment may be necessary after alignment of the audio takeoff.

AUDIO ALIGNMENT WITH ON-THE-AIR SIGNALS

1. Tune in a strong local signal and set receiver volume to a low audible level.
2. Adjust L301 for maximum undistorted, buzz-free audio output. Start with the core at the outermost position away from the printed board and tune for the second "peak" encountered on the way into the coil form.
3. Connect a variable bias supply (3 to 15V) to the AGC test point with the positive lead to the chassis. Adjust bias until audio signal distorts on peaks slightly, then adjust core of T301 to curb distortion. Repeat this procedure several times at increased bias levels until maximum clarity of audio is obtained.
4. Adjust the bottom core of T154, repeating the bias advances in step 3, to achieve the optimum setting for noise-free performance at low signal levels.

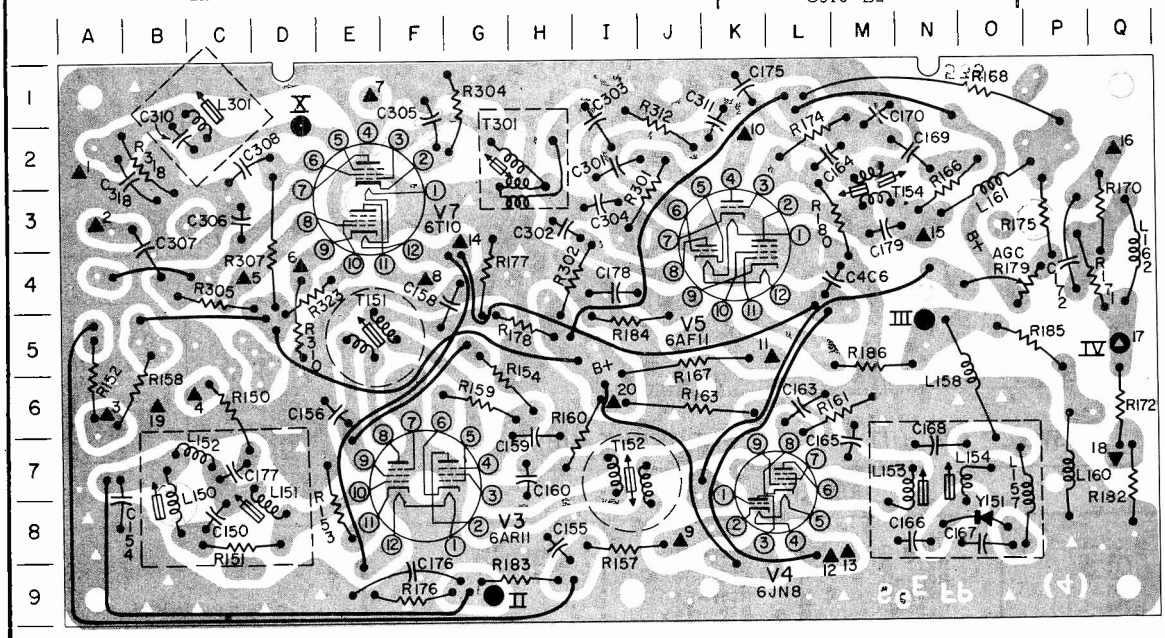
IF BOARD COMPONENT LOCATION

TRIANGLE (▲-0) NUMBERS

REPRESENT WIRE WRAP TERMINALS ON COMPONENT BOARD FOR CONNECTION OF WIRES TO POINTS INDICATED.

- ▲1. WIRE TO T302 (SECONDARY)
- ▲2. YELLOW AUDIO CABLE WIRE TO R309 (VOLUME)
- ▲3. GREY WIRE TO TUNER AGC
- ▲4. WHITE SHIELDED CABLE FROM TUNER I-F OUTPUT
- ▲5. GREEN AUDIO CABLE WIRE TO R309 (VOLUME)
- ▲6. VIOLET WIRE TO ▲-9 ON POWER SUPPLY BD.
- ▲7. WIRE TO T302 (SECONDARY)
- ▲8. VIOLET WIRE TO ▲-11 ON POWER SUPPLY BD
- ▲9. BLUE WIRE TO ▲-15 ON SWEEP BD.
- ▲10. GREEN WIRE TO ▲-6 ON SWEEP BD.
- ▲11. ORANGE WIRE TO ▲-12 ON POWER SUPPLY
- ▲12. NO.26 GAUGE (LINK) TO ▲-13 ON POWER SUPP
- ▲13. BROWN WIRE TO ▲-1 ON SWEEP BD.
- ▲14. BROWN WIRE TO TUNER FILIMENT SUPPLY
- ▲15. ORANGE AND WHITE WIRE TO R169 (CONTRAST)
- ▲16. GREEN WIRE TO R169 (CONTRAST)
- ▲17. YELLOW WIRE TO PIN 7 OF PICTURE TUBE
- ▲18. BLUE WIRE TO R173 (BRIGHTNESS)
- ▲19. SHIELDED CABLE GROUND CONNECTION
- ▲20. RED WIRE TO ▲-15 ON POWER SUPPLY BD.

CAPACITORS	COILS & TRANSFORMERS
C150—C8 C154—A8 C155—H8 C156—E6 C158—G4 C159—H6 C160—H7 C163—L6 C164—L2 C165—M7 C166—N8 C167—O8 C168—N7 C169—N2 C172—P4 C175—K1 C176—F9 C177—C7 C178—I4 C179—M3 C303—I2 C304—I3 C305—F2 C306—C3 C307—A3 C308—C2 C311—K1 C318—B2	L150—B7 L151—D7 L152—B7 L153—N7 L154—O7 L157—P7 L158—O5 L160—P7 L161—O3 L162—Q4 L301—C1 T151—E5 T152—I7 T154—M3 T301—H2
TEST POINTS	
II —G9 III—N5 X —D1	

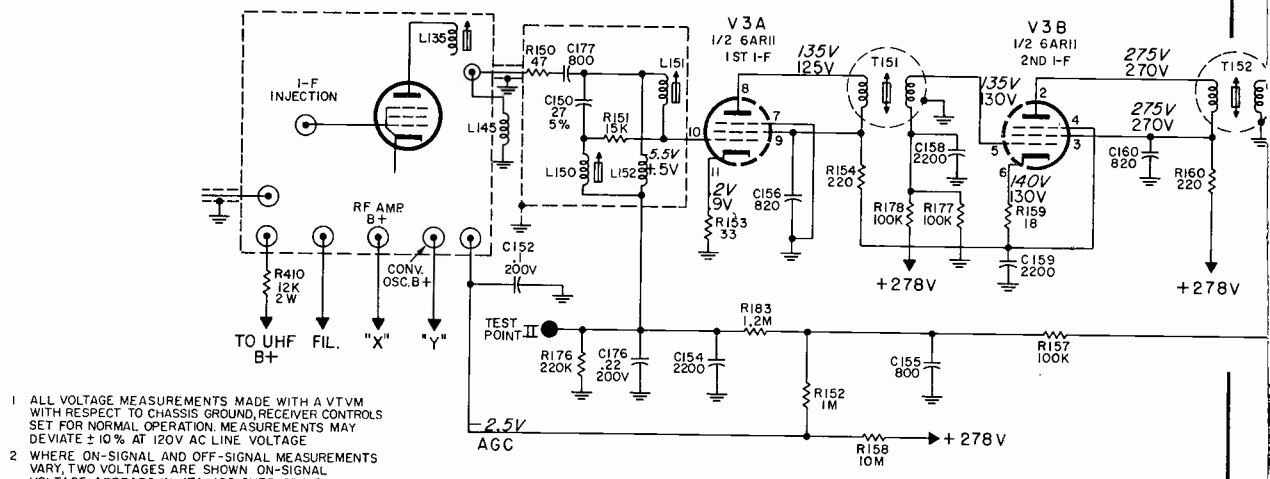


IF CIRCUIT BOARD COMPONENT VIEW

RESISTORS

R151—C8
R152—A6
R153—E8
R154—H6
R157—I8
R158—B6
R159—G6
R160—H6
R161—M6
R163—J6
R166—O2
R167—J5
R168—M1
R170—Q3
R171—Q4
R172—Q6
R174—L2
R175—P3
R176—F9
R177—G4
R178—H5
R179—O4
R180—L3
R182—Q7
R183—H9
R184—I5
R185—O5
R302—I4
R304—G1
R305—C4
R307—D4
R310—D5
R312—J1
R318—B2

GENERAL ELECTRIC Chassis AB, Schematic Diagram



1 ALL VOLTAGE MEASUREMENTS MADE WITH A VTVM WITH RESPECT TO CHASSIS GROUND, RECEIVER CONTROLS SET FOR NORMAL OPERATION. MEASUREMENTS MAY DEVIATE ± 10% AT 120V AC LINE VOLTAGE

2 WHERE ON-SIGNAL AND OFF-SIGNAL MEASUREMENTS VARY, TWO VOLTAGES ARE SHOWN ON-SIGNAL VOLTAGE APPEARS IN *ITALICS* OVER OFF-SIGNAL VOLTAGE

ON-SIGNAL VOLTAGES & WAVE SHAPES TAKEN WITH A NOISE FREE SIGNAL PRODUCING -2.5 TO -3.5 VOLTS AGC AT VHF TUNER

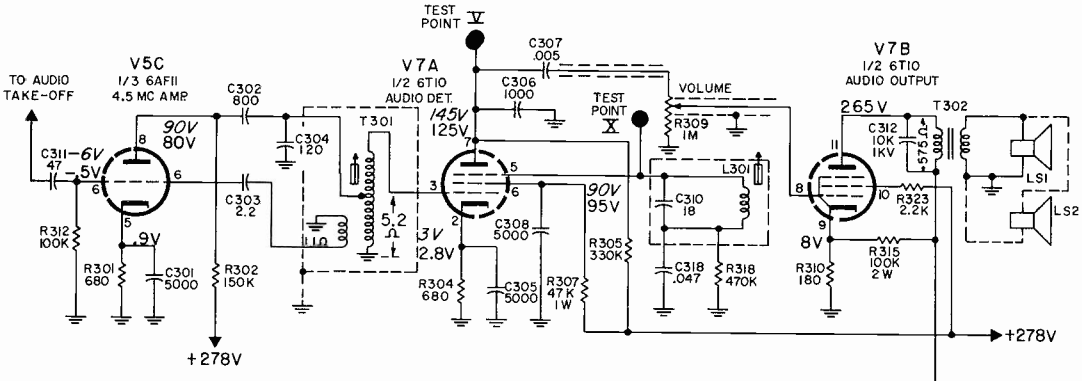
OFF-SIGNAL VOLTAGES TAKEN WITH ANTENNA DISCONNECTED & ANTENNA TERMINALS SHORTED TOGETHER ON UNUSED CHANNEL

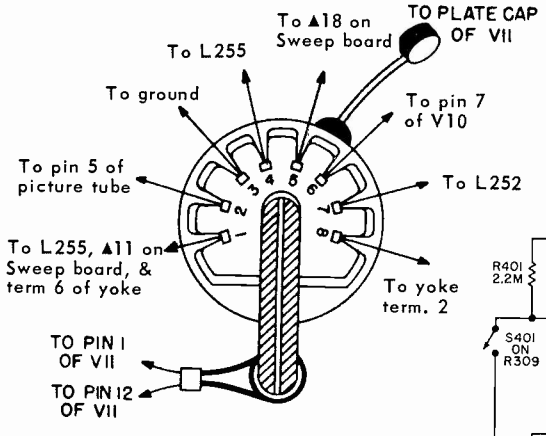
—● INDICATES VARIATION WITH CONTROL SETTING

** - INDICATES SCOPE SYNCHED AT 1/2 VERT FREQ

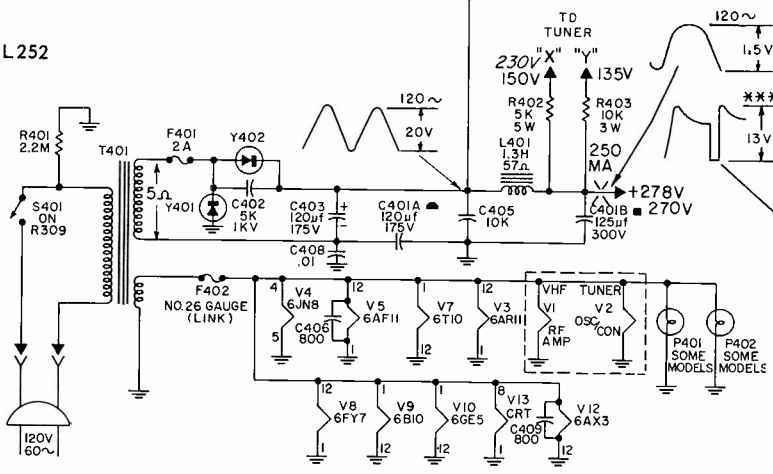
*** - INDICATES SCOPE SYNCHED AT 1/2 HORIZ FREQ

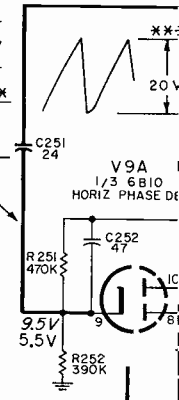
UNLESS OTHERWISE NOTED
K=1000 M=1,000,000
CAPACITORS MORE THAN 1=μμf=pf
CAPACITORS LESS THAN 1=μf
RESISTORS ARE 1/2 WATT



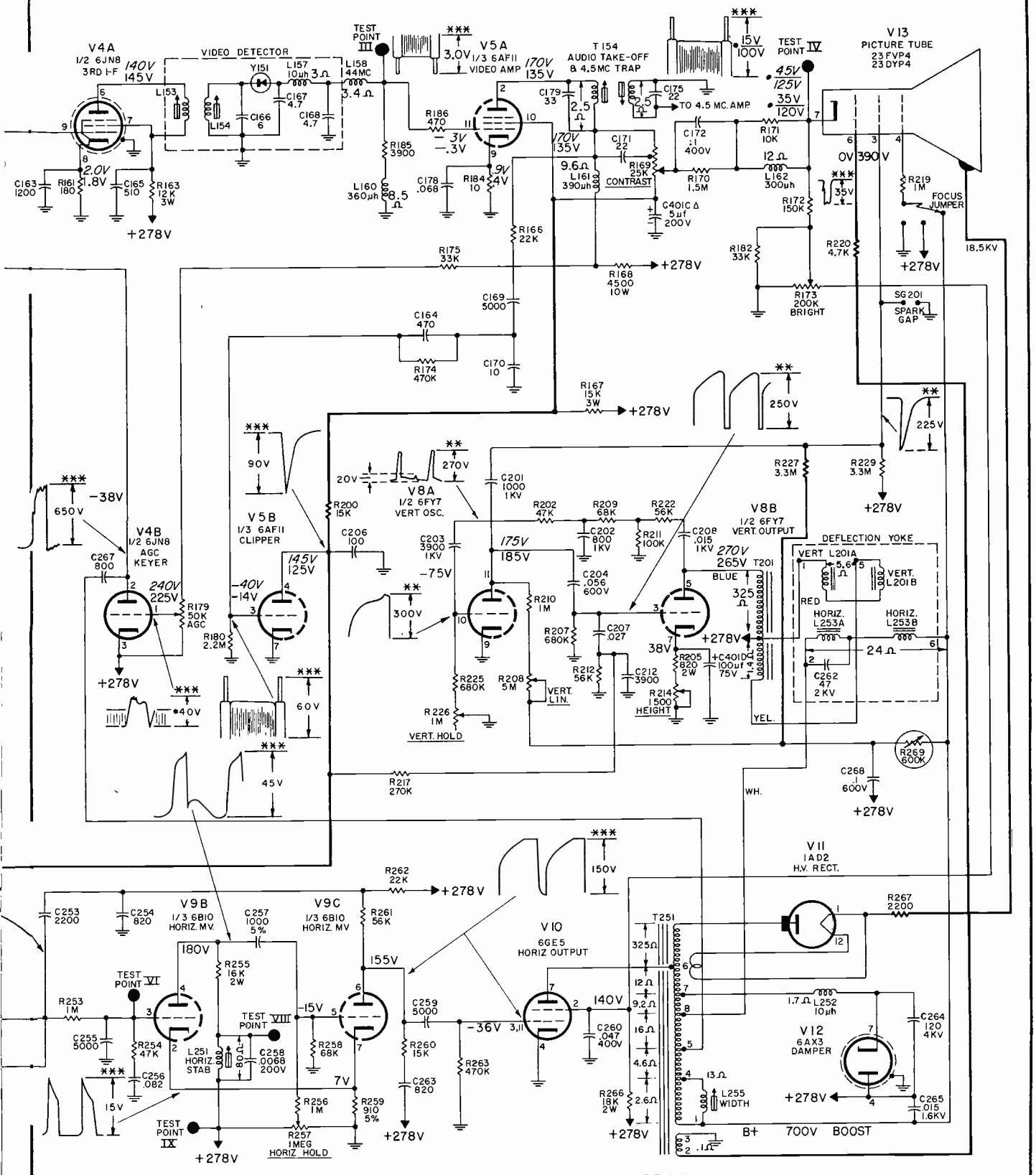


T251 WIRING





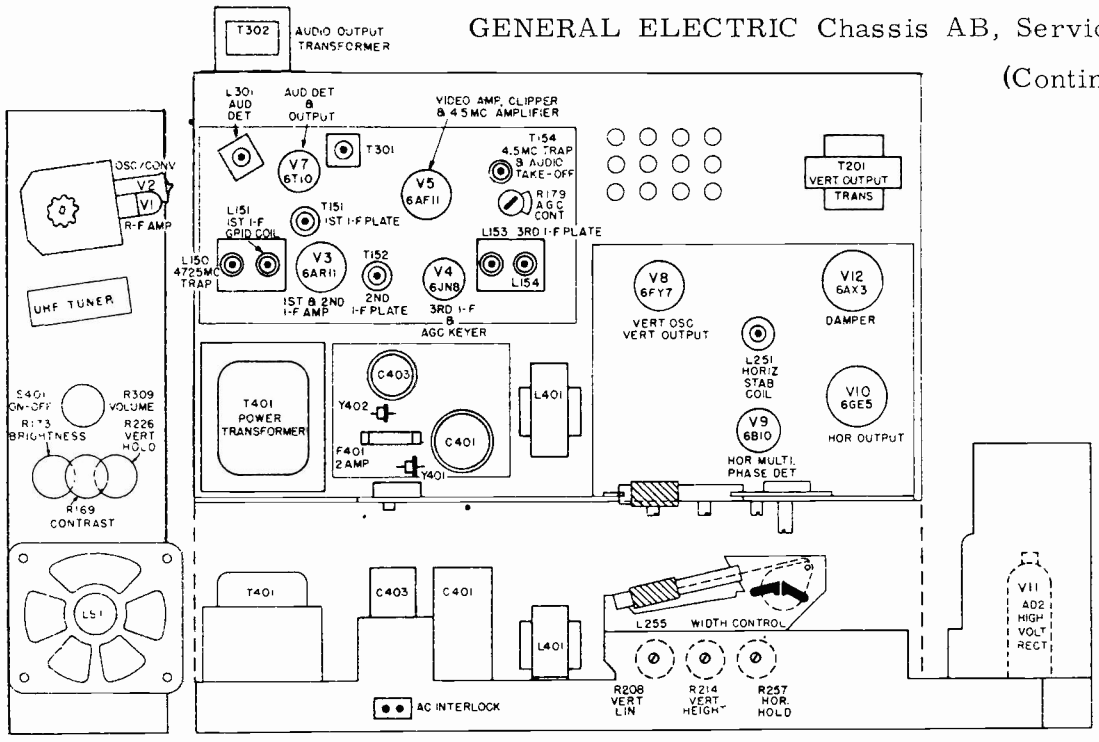
GENERAL ELECTRIC Chassis AB, Schematic Diagram, Continued



AB CHASSIS SCHEMATIC DIAGRAM

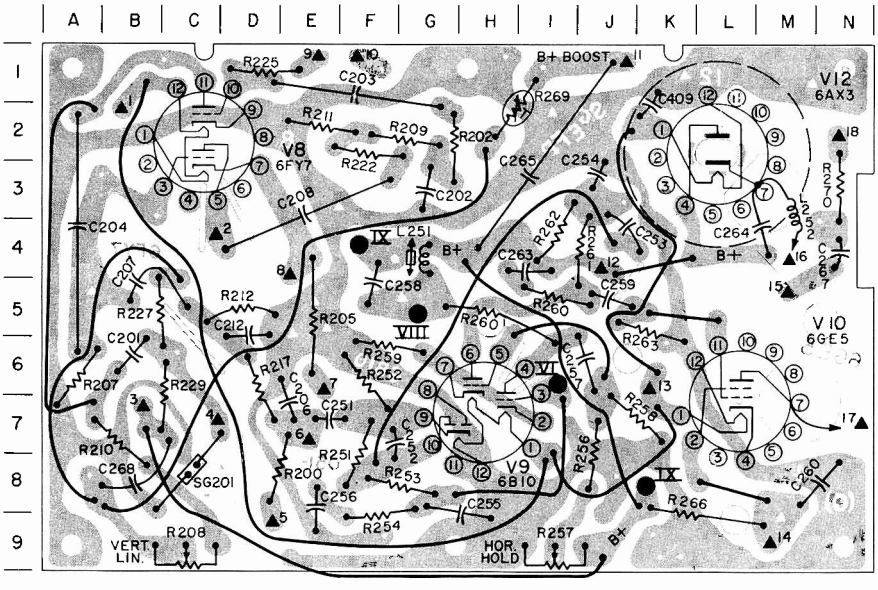
GENERAL ELECTRIC Chassis AB, Service Data

(Continued)



TUBE AND ADJUSTMENT LOCATIONS

SWEEP BOARD COMPONENT LOCATION



SWEEP CIRCUIT BOARD COMPONENT VIEW

TRIANGLE (▲-0) NUMBERS

REPRESENT INTERCONNECTING WIRES ON COMPONENT BOARD FOR CONNECTION TO POINTS INDICATED.

- ▲ 1. BROWN WIRE TO ▲13 ON I-F BOARD
- ▲ 2 BLUE WIRE TO T201
- ▲ 3 RED WIRE TO ▲15 ON POWER SUPPLY BOARD
- ▲ 4 RED & GREEN WIRE TO PICTURE SOCKET PIN 3
- ▲ 5. ORANGE WIRE TO ▲12 ON POWER SUPPLY BOARD
- ▲ 6. GREEN WIRE TO ▲10 ON I-F BOARD
- ▲ 7 YELLOW WIRE TO R214 HEIGHT CONTROL
- ▲ 8 YELLOW WIRE TO ▲6 ON POWER SUPPLY BOARD
- ▲ 9. GREY WIRE TO R226 VERT HOLD CONTROL
- ▲ 10 YELLOW WIRE TO T201, & TERM 5 OF YOKE
- ▲ 11 RED & WHITE TO T251 TERM 1
- ▲ 12 RED TO T201, & TO TERM.1 OF YOKE
- ▲ 13 BROWN TO PIN 8 OF PICTURE TUBE SOCKET
- ▲ 14 ORANGE TO R173 BRIGHTNESS CONTROL
- ▲ 15 BLUE LEAD ▲9 ON I-F BOARD
- ▲ 16 WHITE WIRE TO T251 TERM 7
- ▲ 17 WHITE WIRE TO T251 TERM 6
- ▲ 18 BLUE WIRE TO T251 TERM 5

ROMAN (● XIV) NUMBERS

INDICATE TEST POINTS

CAPACITORS

C202—G3	C256—F9
C203—F1	C257—J5
C204—A5	C258—F4
C206—E6	C259—J5
C207—B5	C260—M8
C208—E3	C263—I4
C212—D5	C264—M4
C251—E7	C265—I2
C252—F7	C267—N4
C253—J3	C268—A8
C254—J3	C409—K1

RESISTORS

R200—E8	R217—D6	R256—J8	R269—H2
R202—G2	R222—F2	R257—I9	R270—N3
R205—E5	R225—D1	R258—J7	
R207—A6	R227—B5	R259—F5	
R208—C9	R229—C6	R260—I5	
R209—F2	R251—F7	R261—J4	
R210—B7	R252—F6	R262—I4	
R211—E2	R253—G8	R263—K5	
R212—D5	R254—F8	R266—K8	

TEST POINTS

VI —I7
VIII—G5
IX —K8

GENERAL ELECTRIC

SB CHASSIS
MODELS

M150BBG M150BBN M150BSD
M152BBL M152BEB M152BVY M154BBN
M500BBG M503BBG M503BSD M505BBN M509BEB M509BVY

(Service material on pages 43 through 46)

RECEIVER ALIGNMENT

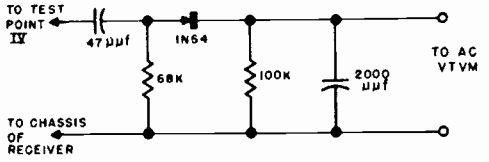
AM PRE-PEAKING & TRAP FREQUENCIES

L151	Min. 47.25 MC	T150	Max. 44.4 MC
		L152	Max. 44.4 MC
L135	Max. 45.75 MC	L154, L153 .	Max. 44.4 MC

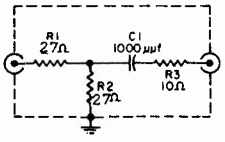
VIDEO I-F SYSTEM

GENERAL: Allow receiver and test equipment at least 20 minutes warm-up. Power the receiver from an isolation transformer.

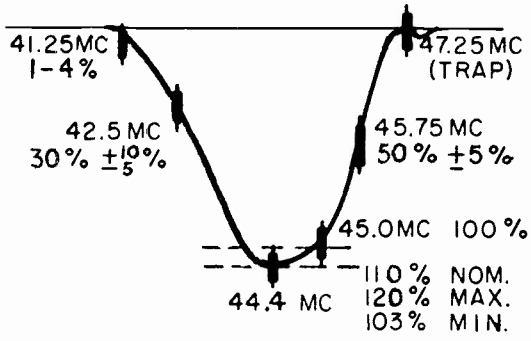
1. Turn volume control and fine tuning counterclockwise, and contrast control fully clockwise. Set channel selector to Channel 11. Short antenna terminals together.
2. Connect oscilloscope to Test Point III thru 22,000 ohms resistor not more than 1.5 inches away from Test Point III. Connect a variable bias supply (0—20V) between Test Point II and chassis. Set bias at -3.5V.
3. Inject signals from a properly terminated AM signal generator or sweep generator, through the I-F INJECTION NETWORK shown, to the I-F injection point. This point is accessible at the base of the Converter (V2) on the top deck of the VHF tuner.
4. Align the receiver to produce the response curve illustrated.
5. Position all cores at ends of coils away from circuit board except as noted below.



DETECTOR NETWORK



I-F INJECTION NETWORK



I-F RESPONSE CURVE

VIDEO I-F ALIGNMENT CHART

STEP	SIGNAL FREQUENCY	ADJUST	REMARKS
1	47.25 MC AM	Adjust L151 for minimum scope deflection.	Use maximum scope sensitivity and smallest possible signal.
2	44.4 MC AM	Adjust L154, then L153 for maximum.	Position L153 core at end of coil nearer circuit board.
3		Align T150 for maximum.	
4		Adjust L135 for maximum deflection of the 45.75 MC marker.	
5		Adjust L152 for proper nose shaping.	
6	38—48 MC sweep generator, with scope calibrated 3 volts peak to peak for 2 inch deflection; markers at 41.25, 42.5, 44.4 , 45.0 MC & 45.75 MC	Turn L135 core clockwise to place 45.75 MC marker at 50%.	Symmetry of the nose is important. No portion of the nose should be out of symmetry by more than 3%.
7		Readjust L152 to shape nose around s 44.4MC pivot.	
8		Readjust T150 for proper placement of 42.5MC marker if curve is too narrow.	Repeat Step 7 to shape nose after Steps 8 and 9.
9		Spread or knife turns of L150 if 42.5MC marker is above 30% on curve.	

4.5 MC TRAP ALIGNMENT

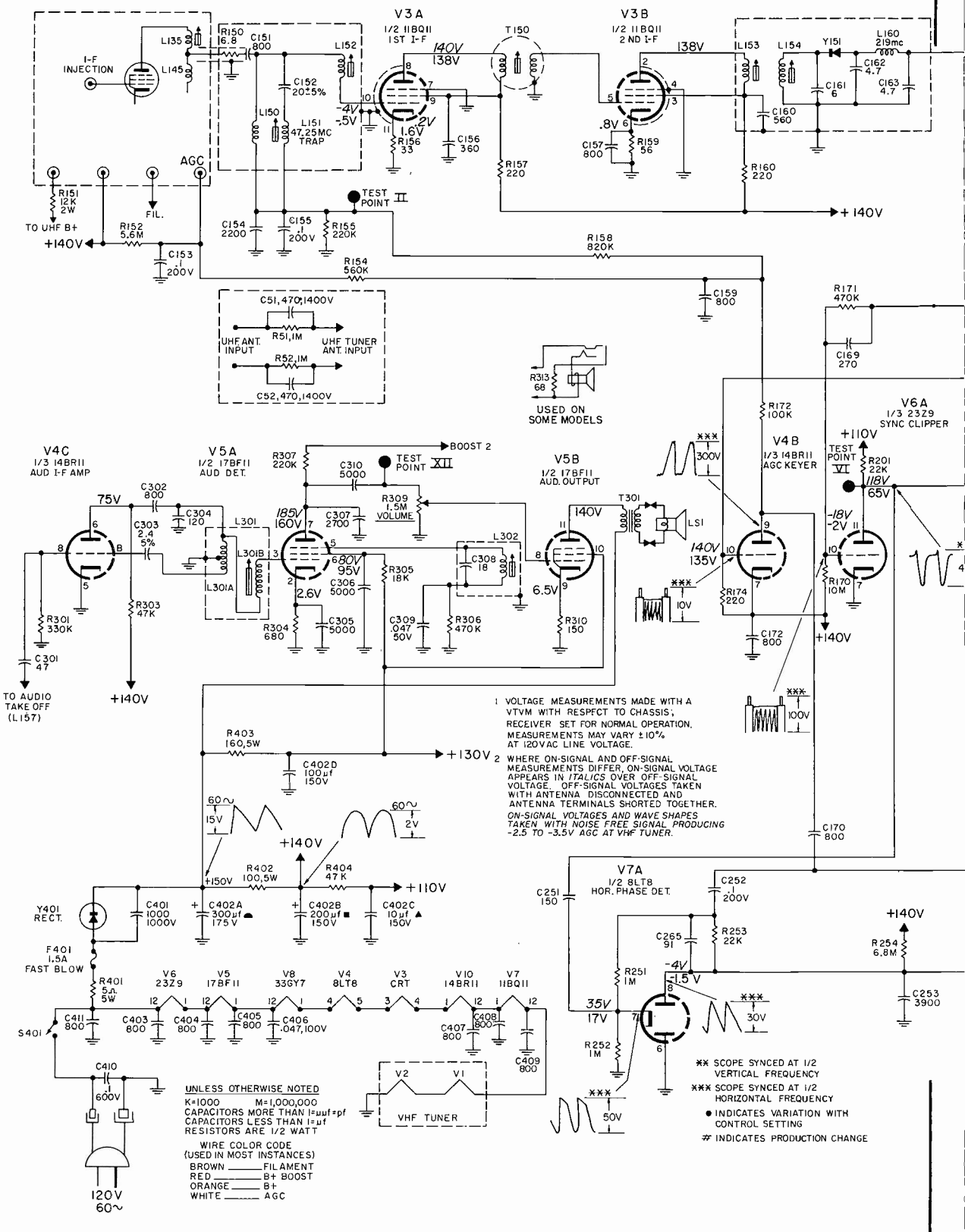
1. Connect a -10V bias to Test Point II, with the positive bias lead grounded to chassis.
2. .05µf capacitor between Pin 5 of V5A and chassis.
3. Turn contrast control to maximum, volume to minimum.
4. Connect the DETECTOR NETWORK shown to Test Point IV and feed its output to an AC VTVM.
5. Apply a 4.5 MC AM signal through a capacitor at Test Point III.
6. Adjust the L157 takeoff core for minimum reading on Test Point IV. Two core positions may give an apparent minimum indication, the correct one is nearer the top end of the coil form.

NOTE: Retouching of the trap adjustment may be necessary after alignment of the audio takeoff.

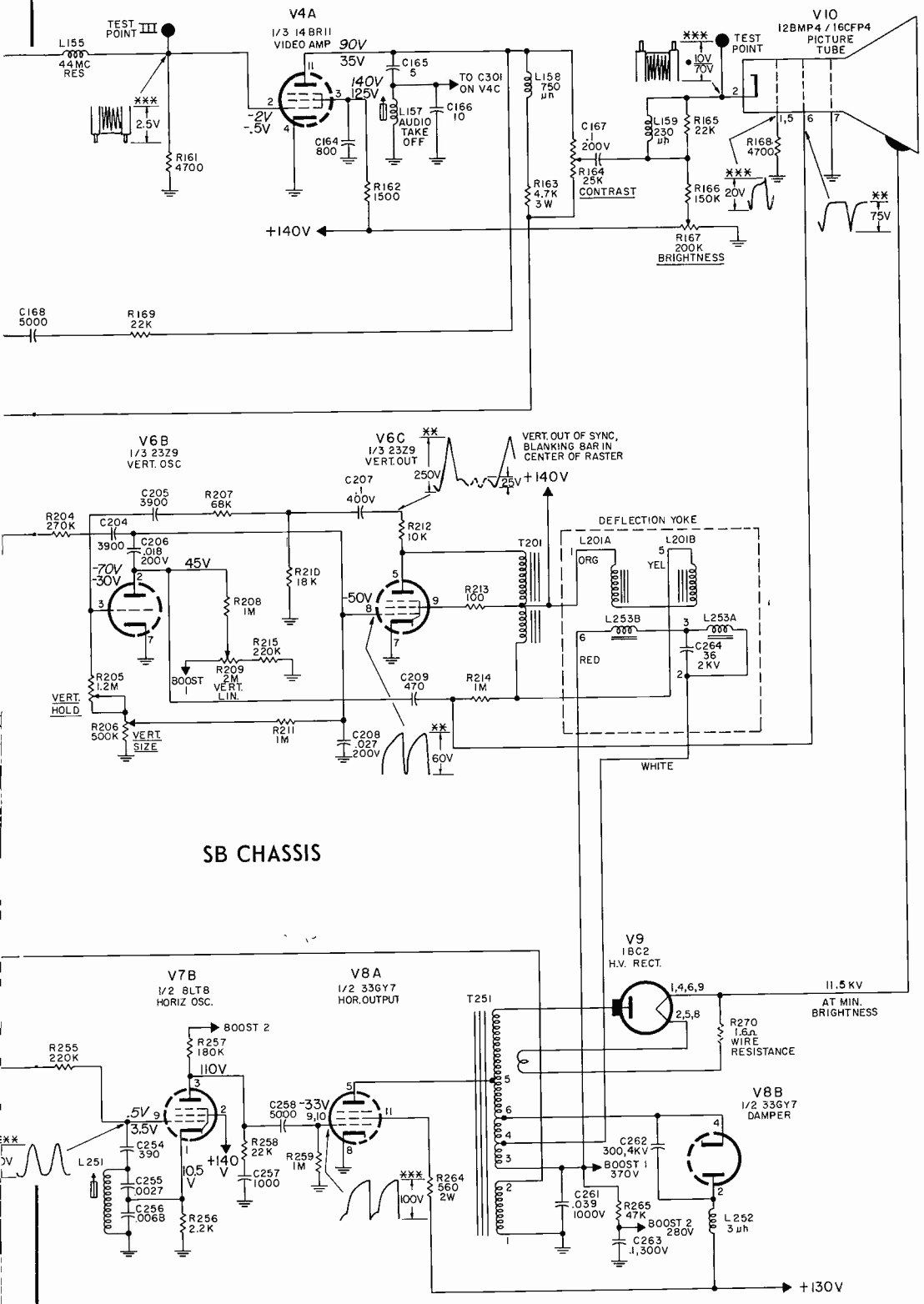
AUDIO ALIGNMENT WITH ON-THE-AIR SIGNALS

1. Tune in a strong local signal and set receiver volume to a low audible level.
2. Adjust L302 for maximum undistorted, buzz-free audio output. Start with the core at the outermost position away from the printed board and tune for the second "peak" encountered on the way into the coil form.
3. Connect a variable bias supply (3 to 15V) to the AGC test point with the positive lead to the chassis. Adjust bias until audio signal distorts on peaks slightly, then adjust core of L301 to curb distortion. Repeat this procedure several times at increased bias levels until maximum clarity of audio is obtained.
4. Adjust audio takeoff core L157, repeating the bias advances in step 3, to achieve the optimum setting for noise-free performance at low signal levels.

GENERAL ELECTRIC Chassis SB, Schematic Diagram



GENERAL ELECTRIC Chassis SB, Schematic Diagram, Continued



PICTURE TUBE ADJUSTMENTS

PICTURE TILT: To correct picture tilt, loosen the clamp on the yoke and carefully adjust the yoke for proper picture display. Then release the clamp to secure the yoke.

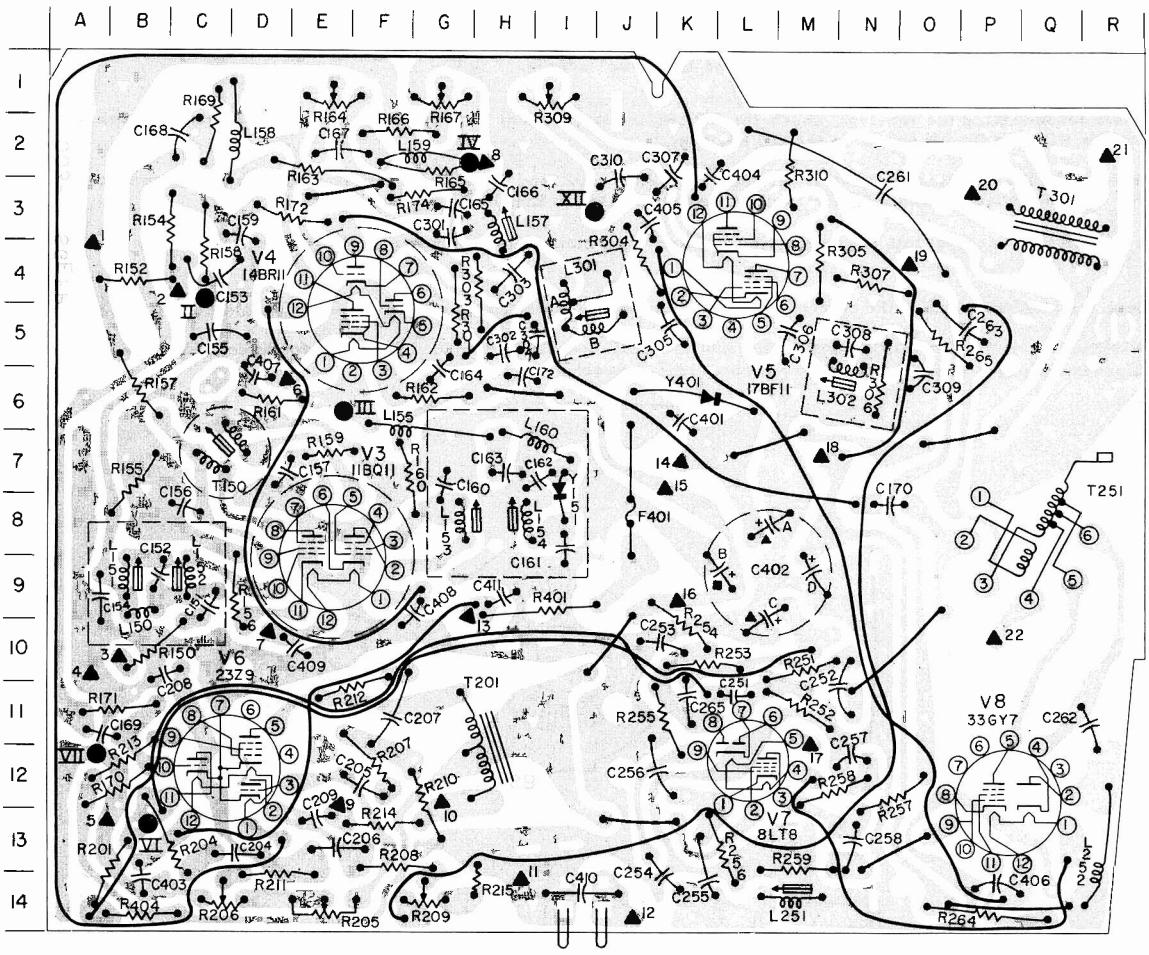
PICTURE CENTERING: Rotate the two centering rings located at the rear of the yoke assembly until picture is properly centered.

ELECTRICAL ADJUSTMENTS

HEIGHT AND VERTICAL LINEARITY: Adjust R209 and R206 simultaneously for proper vertical size and linearity. Picture should extend 1/8-inch beyond top and bottom edges of mask.

HORIZONTAL HOLD: With controls set for normal operation, tune in a station. Connect a .1 µf capacitor between Test Point VI and ground. Adjust L251 for a picture which barely floats across the screen; then remove the capacitor.

GENERAL ELECTRIC BOARD COMPONENT LOCATIONS Chassis SB



RESISTORS				CAPACITORS		XFMRS
R150–B10	R257–N12			C151–C9	C261–N3	T150–C7
R152–B4	R258–M12			C152–B9	C262–R11	T201–H12
R154–C4	R259–M13			C153–C4	C263–P5	T251–Q8
R155–B7	R264–P14			C154–A9	C265–K11	T301–Q3
R156–D9	R265–O5			C155–C5	C301–G3	
R157–B6	R301–G5			C156–C8	C302–H5	
R158–C4	R303–H4			C157–D7	C303–H4	
R159–E7	R304–J4			C159–D3	C304–I5	
R160–F7	R305–M4			C160–G7	C305–K5	
R161–D6	R306–N6			C161–I8	C306–M5	
R162–G6	R307–N4			C162–I7	C307–K3	
R163–E2	R310–M2			C163–H7	C308–N5	
R165–G2	R401–I9			C164–G6	C309–O6	
R166–F2	R404–B14			C165–G3	C310–J3	
R169–C2		COILS		C166–H3	C401–K6	
R170–B12		L150–B9		C167–E2	C402–L9	
R171–A11		L151–B9		C168–C2	C403–B14	
R172–E3		L152–C9		C169–B11	C404–K3	
R174–G3		L153–G8		C170–N8	C405–J3	
R201–A13		L154–H8		C172–H6	C406–P14	
R204–C13		L155–F7		C204–D13	C407–D6	
R207–F12		L157–H3		C205–F12	C408–G9	
R208–F13		L158–D2		C206–E13	C409–E10	
R210–G12		L159–G2		C207–F11	C410–I14	
R211–D14		L160–I6		C208–B10	C411–H9	
R212–E11		L251–M14		C209–D13	POTS	
R213–B12		L252–R13		C251–L11		
R214–F13		L301–I4		C252–N11	R164–E1	
R251–M10		L302–N6		C253–K10	R167–G1	
R252–M11				C254–K14	R205–E14	
R253–K10				C255–K14	R206–C14	
R254–K10				C256–K12	R209–G14	
R255–K11				C257–N12	R309–I1	
R256–L13				C258–N13		

CIRCUIT BOARD VIEWED FROM COMPONENT SIDE

TRIANGLE (▲-0) NUMBERS

INDICATE WIRE CONNECTIONS

- ▲1. ORANGE LEAD TO TUNER B+ SUPPLY (+140V)
- ▲2. WHITE LEAD TO TUNER AGC
- ▲3. SHIELDED LEAD FROM TUNER I-F OUTPUT
- ▲4. SHIELD GROUND
- ▲5. BLACK LEAD FROM TUNER GROUND
- ▲6. BROWN LEAD TO PIN 3 OF PICTURE TUBE
- ▲7. BROWN LEAD TO TUNER FILAMENT SUPPLY
- ▲8. YELLOW LEAD TO PIN 2 OF PICTURE TUBE
- ▲9. GREEN LEAD TO PIN 6 OF PICTURE TUBE
- ▲10. YELLOW LEAD TO TERMINAL 2 OF YOKE
- ▲11. BLACK LEAD TO PIN 7 OF PICTURE TUBE
- ▲12. BROWN LEAD TO S401 ON R309
- ▲13. BROWN LEAD FROM S401 ON R309
- ▲14. ORANGE & BLACK LEAD TO R403 & R402
- ▲15. ORANGE LEAD TO R402
- ▲16. ORANGE LEAD TO TERMINAL 4 OF YOKE
- ▲17. BROWN LEAD TO PIN 4 OF PICTURE TUBE
- ▲18. ORANGE & WHITE LEAD TO R403
- ▲19. RED LEAD TO TERMINAL 1 OF YOKE
- ▲20. RED & WHITE LEAD TO SPEAKER
- ▲21. RED & WHITE LEAD TO SPEAKER
- ▲22. WHITE LEAD TO TERMINAL 5 OF YOKE

ROMAN (● VIII) NUMBERS

INDICATE TEST POINTS

Magnavox

T-914 SERIES TELEVISION CHASSIS

Power Source Rating	
Frequency	60 cycles
Voltage	117 volts
Wattage	140 watts
Tuning Range	Channels 2-83
Antenna Input Impedance	Balanced 300 ohms

IF System	
Video IF	45.75MC
Sound IF	41.25MC
Intercarrier Sound IF	4.5MC
Audio System	
Output Impedance	3.2 ohms
Power Output	1 watt

ADJUSTMENTS

Centering--To center the raster properly, adjust the two centering rings on the rear of the deflection yoke. They should be rotated about the neck of the tube until proper centering is obtained.

Focusing--These chassis employ electrostatic focus picture tube. The focus is accomplished by varying the voltage applied to the focus anode (pin 4). Three pins located on the deflection board identified as 3N, 3R and 3S are used for selecting the best overall focus.

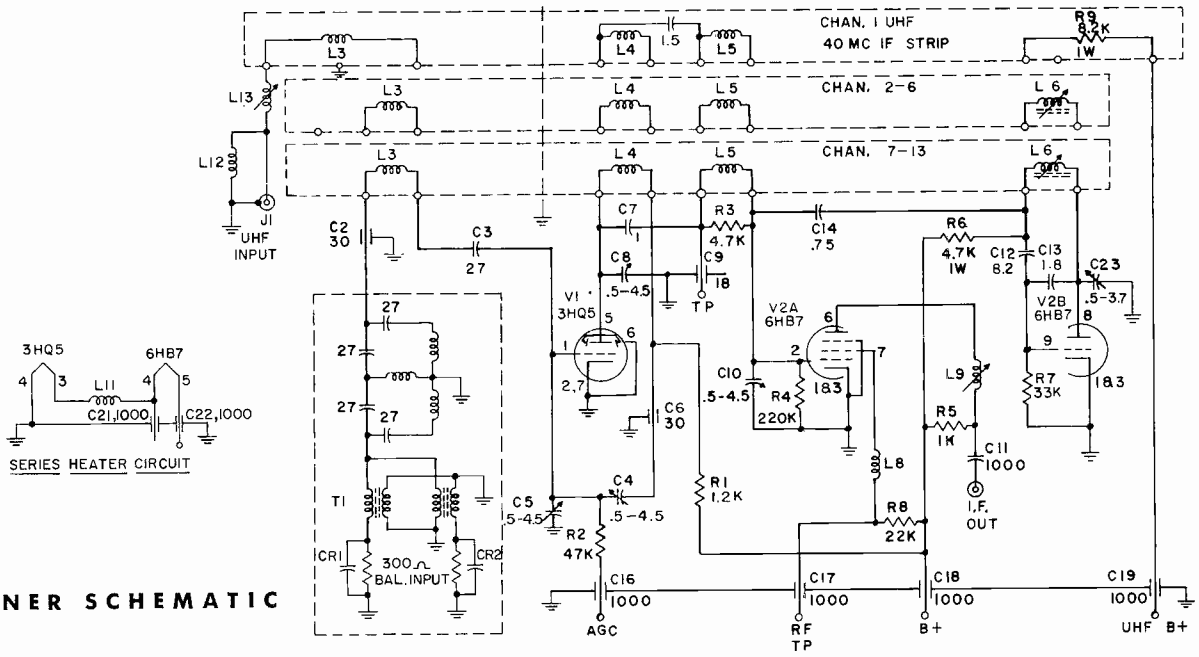
Vertical Linearity and Height--Adjust these controls until the picture slightly overfills the mask with the linearity uniform from top to bottom. Adjustment of either of these controls may necessitate adjustment of the vertical hold.

Horizontal Oscillator--The horizontal oscillator coil is also used as the horizontal hold control. Adjust this coil until the picture falls into sync.

VHF Oscillator--The VHF tuner is designed so rotating the Fine Tuning Control, or Fine Tuning Shaft, rotates the slug in the oscillator coil. All channels should be checked and the Fine Tuning Control set to provide the clearest picture and sound on all channels.

LDR Range Adjust--The control for making this adjustment is accessible through the hollow shaft of the contrast control and requires the use of a small non-metallic screwdriver. The procedure outlined assumes that the adjustment must be made under normal lighting conditions where it is not possible to darken the room.

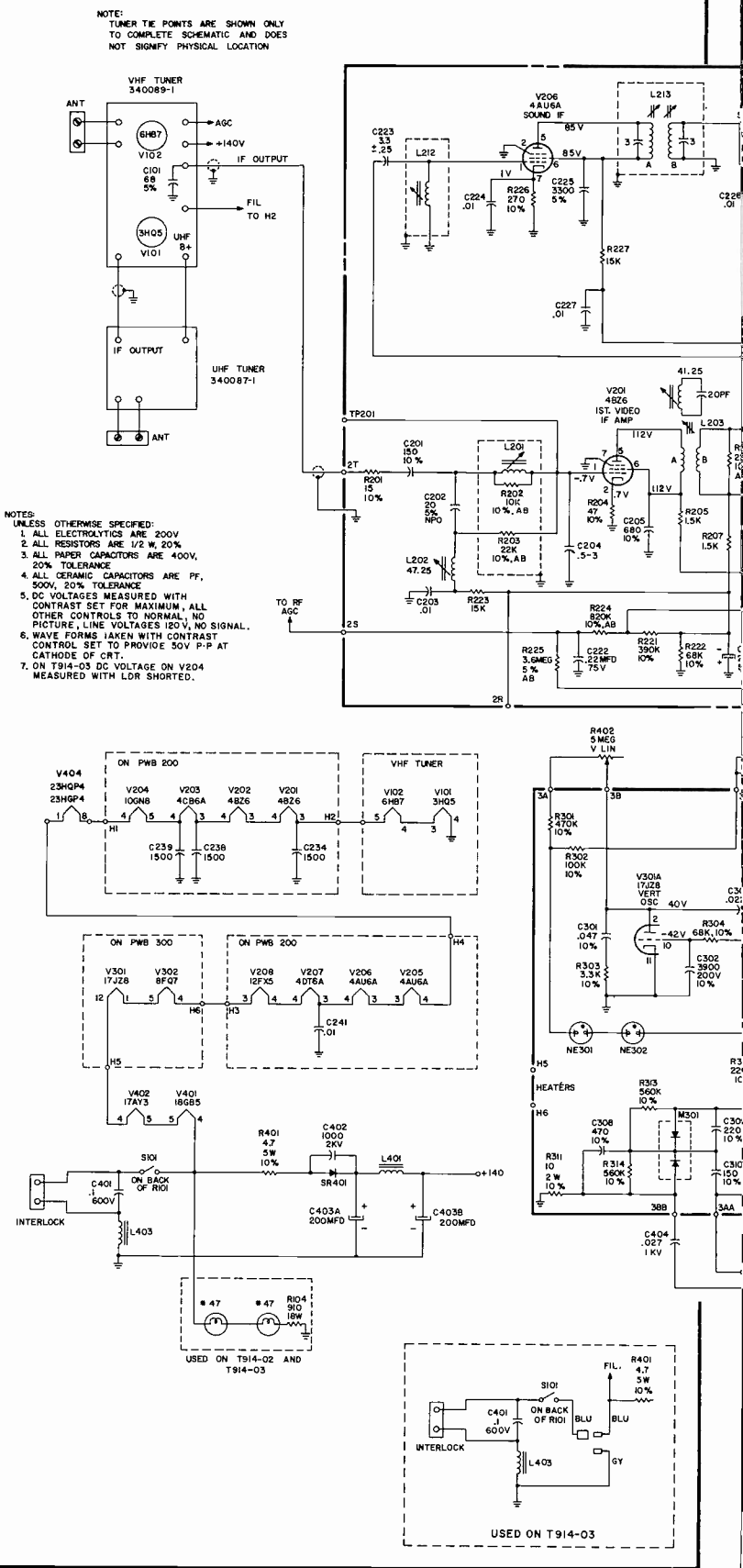
As a prelimary step, set the LDR Range Control to its maximum clockwise position. Adjust the brightness and contrast controls for a normal picture in semi-darkness. If the room lighting cannot be subdued, a semi-darkness condition, insofar as the amount of light striking the LDR, can be assimilated by placing your hand over the window of the LDR. Check the contrast to brightness ratio by slowly moving your hand away from the window. If the picture appears to bright under normal lighting conditions, rotate the LDR Range Control slightly counter-clockwise. Repeat this procedure until the contrast to brightness ratio remains the same throughout the variations in room lighting.



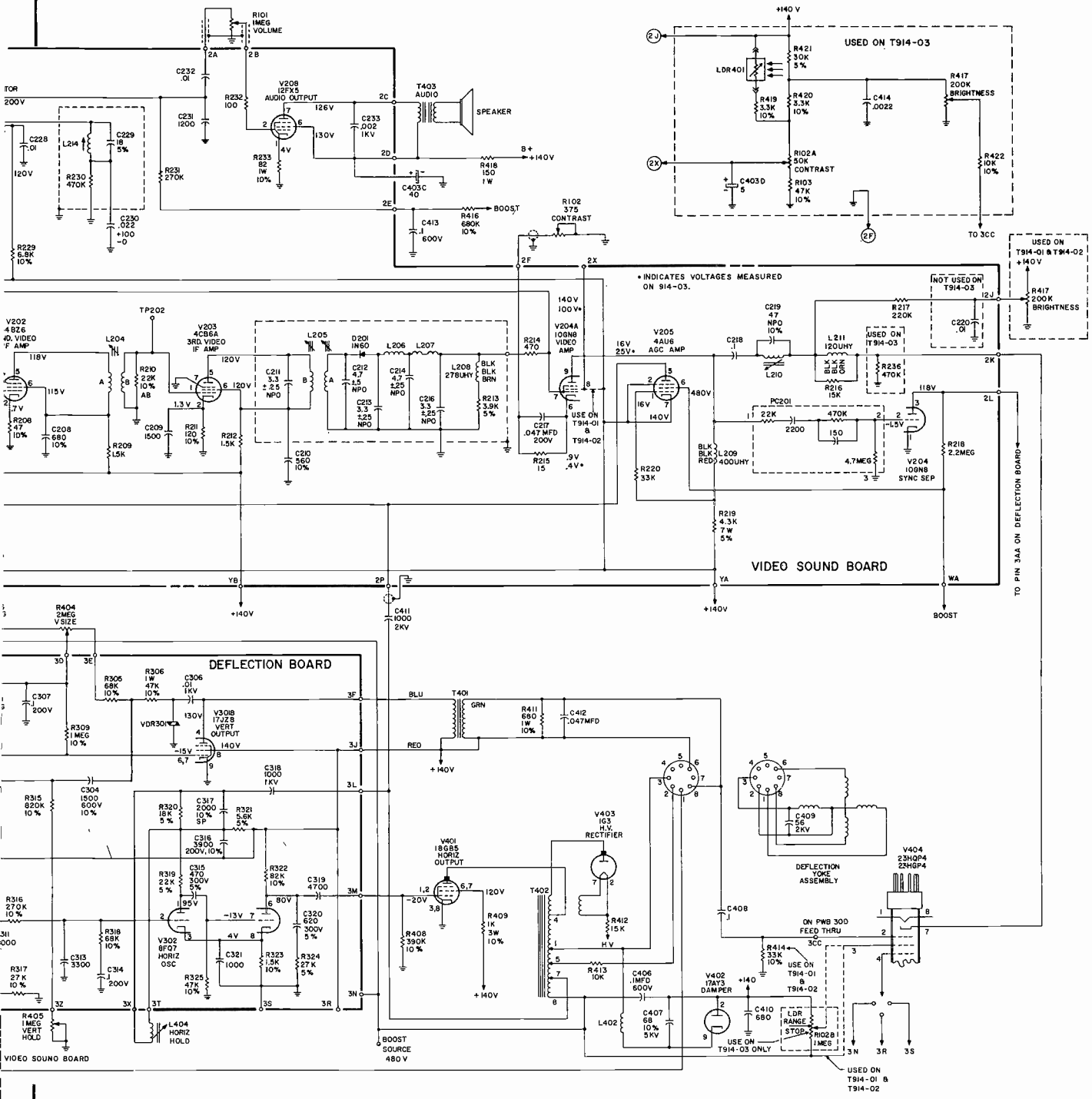
VHF TUNER SCHEMATIC

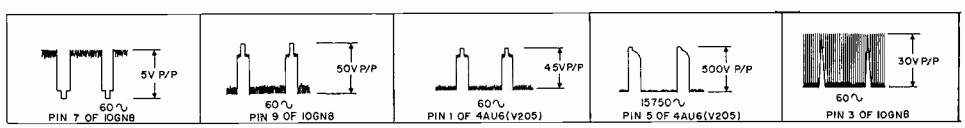
MAGNAVOX T-914 Series (Continued)

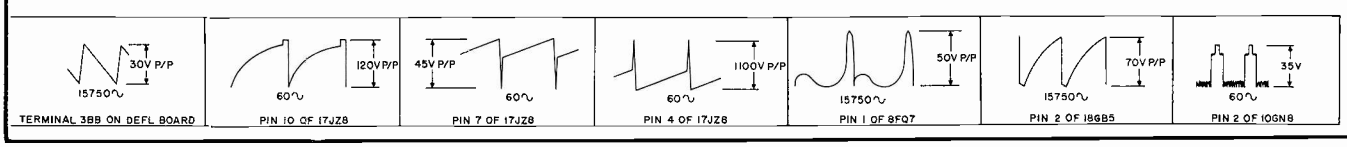
REF NO.	DESCRIPTION	PART NO.
	TRANSFORMERS & COILS	
L201	IF Input Coil	360848-1
L202	47.25MC Trap	360842-1
L203	1st IF Coil & 41.25MC Trap	361178-1
L204	2nd IF Coil	360849-2
L205	3rd IF Coil	361161-1
L206	90MC Tweet Coil	360852-4
L207	90MC-160MC Tweet Coil	361157-1
L208	270 uhy Peaking Coil	360853-1
L209	400 uhy Peaking Coil	360853-7
L210	4.5MC Trap	360851-1
L211	120 uhy Peaking Coil	360853-8
L212	Sound Take-Off Coil	360845-1
L213	Sound IF Coil	360846-2
L214	Quadrature Coil	360847-2
L301	Horizontal Oscillator Coil	361171-1
L401	Filter Choke	320125-1
L402	Damper Choke	360783-3
L403	Choke	361075-1
T401	Vertical Output Transformer	320314-2
T402	H.V. Transformer	361113-1
T403	Audio Output Transformer	320379-7
	Deflection Yoke	703046-6
	CAPACITORS All capacitors are 20%, 500V unless specified otherwise	
C101	Ceramic, 68 mmf., 5% (NPO)	--------
C201	Ceramic, 150 mmf., 10%	--------
C202	Ceramic, 20 mmf., 5% (NPO)	--------
C203	Ceramic, .01 mfd.	--------
C204	Trimmer, .5-3 mmf.	250371-1
C205	Ceramic, 680 mmf., 10%	--------
C207	Ceramic, 1000 mmf.	--------
C208	Ceramic, 680 mmf., 10%	--------
C209	Ceramic, 1500 mmf.	--------
C210	Ceramic, 560 mmf., 10%	--------
C211	Ceramic, 3.3 mmf., ± .25 mmf. (NPO)	--------
C212	Ceramic, 4.7 mmf., 10% (NPO)	--------
C213	Ceramic, 3.3 mmf., ± .25 mmf. (NPO)	--------
C214	Ceramic, 4.7 mmf., 10% (NPO)	--------
C215	Ceramic, 1000 mmf.	--------
C216	Ceramic, 3.3 mmf., ± .25 mmf. (NPO)	--------
C217	Paper, .047 mfd., 200V	--------
C218	Paper, .1 mfd., 400V	--------
C219	Ceramic, 47 mmf., 10% (NPO)	--------
C220	Ceramic, .01 mfd.	--------
C221	Electrolytic, 2 mfd., 50V	270082-701
C222	Paper, .22 mfd., 75V	250555-41
C223	Ceramic, 3.3 mmf., ± .25 mmf. (NPO)	--------
C224	Ceramic, .01 mfd.	--------
C225	Ceramic, 3300 mmf., 5%	--------
C226	Ceramic, .01 mfd.	--------
C227	Ceramic, .01 mfd.	--------
C228	Ceramic, .01 mfd.	--------
C229	Ceramic, 18 mmf., 5%	--------
C230	Ceramic, .022 mfd., GMV	--------
C231	Ceramic, 1200 mmf., 10%	--------
C232	Ceramic, .01 mfd.	--------
C233	Ceramic, 2000 mmf., 1000V	--------
C234	Ceramic, 1500 mmf.	--------
C238	Ceramic, 1500 mmf.	--------
C239	Ceramic, 1500 mmf.	--------
C241	Ceramic, .01 mfd.	--------
C301	Paper, .047 mfd., 10%, 400V	--------
C302	Mylar, 3900 mmf., 10%, 200V	250369-1
C303	Paper, .022 mfd., 400V	--------
C304	Paper, .0015 mfd., 10%, 600V	--------
C305	Paper, .001 mfd., 10%, 500V (Special)	250525-1023
C306	Paper, .01 mfd., 1000V	--------
C307	Paper, .1 mfd., 200V	--------
C308	Ceramic, 470 mmf., 10%	--------
C309	Ceramic, 220 mmf., 10%	--------
C310	Silver Mica, 150 mmf., 10%	250364-434
C311	Ceramic, 2000 mmf.	--------
C312	Paper, .047 mfd., 10%, 400V	--------
C313	Ceramic, 3300 mmf.	--------
C314	Paper, .1 mfd., 200V	--------
C315	Silver Mica, 470 mmf., 5%, 300V	250365-347
C316	Mylar, 3900 mmf., 10%, 200V	250369-1
C317	Paper, 2000 mmf., 10% (Special)	250442-2
C318	Silver Mica, 1000 mmf., 1000V	250542-1020
C319	Ceramic, 4700 mmf.	--------
C320	Silver Mica, 620 mmf., 5%, 300V	250365-350
C321	Ceramic, 1000 mmf.	--------
C401	Paper, .1 mfd., 600V	--------
C402	Ceramic, 1000 mmf., 2000V	--------
C403	Electrolytic, 200 mfd., 200V, 200/40/5 mfd., 150V	270021-121
C404	Paper, .027 mfd., 1000V (Special)	250290-13
C406	Paper, .1 mfd., 600V	--------
C407	Ceramic, 68 mmf., 10%, 5000V	--------
C408	Paper, .1 mfd., 400V	--------
C410	Ceramic, 680 mmf.	--------
C411	Ceramic, 1000 mmf., 2000V	--------
C412	Paper, .047 mfd., 400V	--------
C413	Paper, .1 mfd., 600V	--------
C414	Ceramic, 2200 mmf.	--------



MAGNAVOX T-914 Series Schematic Diagram, Continued





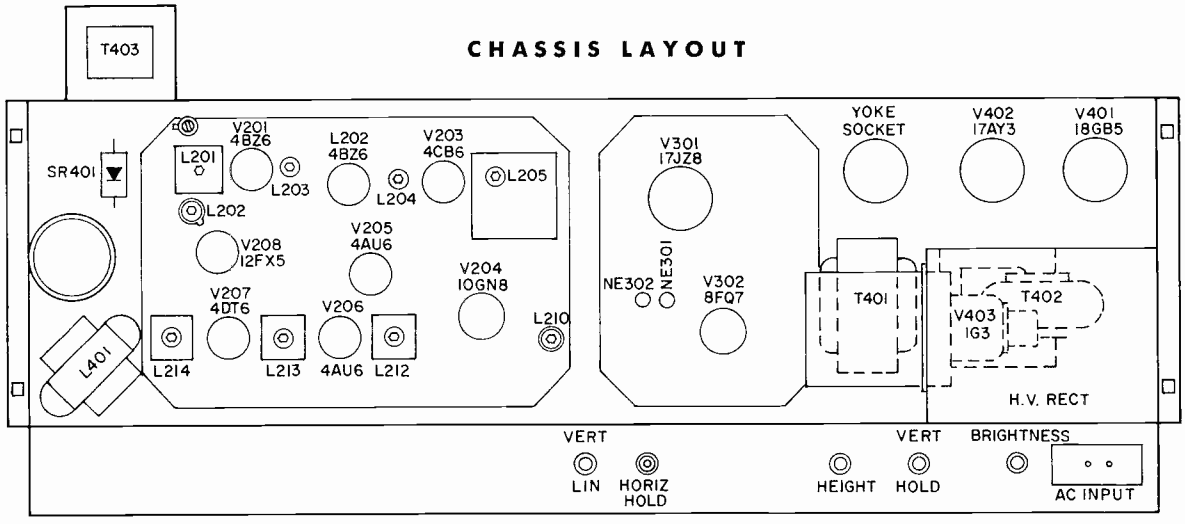


MAGNAVOX T-914 Series Chassis, Service Material, Continued

REPLACEMENT PARTS LIST (CONT.)

REF. NO.	DESCRIPTION	PART NO.
	RESISTORS All resistors are 10%, 1/2W unless specified otherwise	
R103	47K	--------
R104	910, 18W	240088-1
R201	15	--------
R202	10K	--------
R203	22K	--------
R204	47	--------
R205	1500	--------
R206	22K	--------
R207	1500	--------
R208	47	--------
R209	1500	--------
R210	22K	--------
R211	120	--------
R212	1500	--------
R213	3900, 5%	--------
R214	470	--------
R215	15	--------
R216	15K	--------
R217	220K	--------
R218	2.2 meg.	--------
R219	4300, 5%, 7W	240086-2
R220	33K	--------
R221	390K	--------
R222	68K	--------
R223	15K	--------
R224	820K	--------
R225	3.6 meg., 5%	--------
R226	270	--------
R227	15K	--------
R228	680	--------
R229	6800	--------
R230	470K	--------
R231	270K	--------
R232	100	--------
R233	82-1W	--------
R234	470K	--------
R236	470K	--------
R301	470K	--------
R302	100K	--------
R303	3300	--------
R304	68K	--------
R305	68K	--------
R306	47K, 1W	--------
R307	220K	--------
R309	1 meg.	--------
R310	1 meg.	--------
R311	10, 2W	--------
R313	560K	--------
R314	560K	--------
R315	820K	--------
R316	270K	--------
R317	27K	--------
R318	68K	--------
R319	22K, 5%	--------
R320	18K, 5%	--------
R321	5600, 5%	--------
R322	82K	--------
R323	1500	--------
R324	27K, 5%	--------
R325	47K	--------
R401	4.7, 5W (WW)	240080-19
R403	5.6 meg.	--------
R408	390K	--------
R409	1000, 3W (Glass)	230150-318
R411	680, 1W	--------
R412	15K	--------
R413	10K	--------
R414	33K.	--------
R416	680K	--------
R418	150, 1W	--------
R419	3300	--------
R420	3300	--------
R421	30K, 5%	--------
R422	10K	--------
	CONTROLS	
R101	1 meg., Off-On-Volume	220135-1
R102	375, Contrast (T914-01 & 02)	220126-85
R102	50K, Contrast, 1 meg., LDR Range (T914-03)	220149-22
R402	5 meg., Vertical Linearity	220189-24
R404	2 meg., Vertical Size	220189-23
R405	1 meg., Vertical Hold	220189-19
R417	200K, Brightness	220189-22
	MISCELLANEOUS	
D201	Video Detector Diode	530065-1
M301	Horizontal AFC Diode	530093-1
SR301	Silicon Rectifier	530082-2
PC201	Printed Pac	250526-1
VDR201	Varistor	230167-2
LDR401	Light Dependant Resistor (LDR)	230168-1
NE301	Neon Bulb (NE83)	180716-1
NE302	Neon Bulb (NE83)	180716-1
	18GB5 Cap & Lead Assembly	180574-4
	17AY3 Tube Socket	180694-3
	1G3 Tube Socket	180695-1
	18GB5 Tube Socket	180738-3
	Anode Connector Lead	180617-4
	17JZ8 Tube Socket	180788-1
	VHF Tuner	340089-1
	UHF Tuner	340087-1

CHASSIS LAYOUT



MAGNAVOX T-914 Series Alignment Information, Continued

VIDEO IF ALIGNMENT

1. Use an isolation transformer when aligning and allow approximately 20 minutes warm-up time. Remove the 18GB5 plate cap.
2. Using a low-impedance bias supply, apply a -2.0 volts to 2S and a -3.0 volts to 2R on the Video IF Printed Board.
3. Connect an oscilloscope through a 10K isolation resistor to Pin 7 of V204.

CONNECT SWEEP AND MARKER GENERATOR	MARKER FREQUENCIES	ADJUST
TP-202	42.5 MC 45.75MC	Adjust L205, top and bottom, to obtain symmetrical curve with markers at equal amplitude. (See Fig. 1)
TP-201	41.25MC	Adjust L203 (Top Slug) until marker falls in center of trap suckout.
TP-201	42.5MC 45.0MC 45.75MC	Adjust L204 until 45.75 marker is at 50% response and L203 until 42.5MC marker is at 50% response. Repeat these adjustments. (See Fig. 2)
Tuner Converter Grid	42.5MC 45.75MC	Adjust Tuner Converter Plate Coil for maximum gain between markers.
Tuner Converter Grid	47.25MC	Reduce IF Bias to zero and adjust L202 until marker falls in center of trap suckout. Adjust L201 for maximum attenuation of 47.25MC marker.
Tuner Converter Grid	45.75MC 42.5MC	Reset IF Bias to -3.0 volts and adjust Tuner Converter Plate Coil and C206 for symmetrical curve. (See Fig. 3)

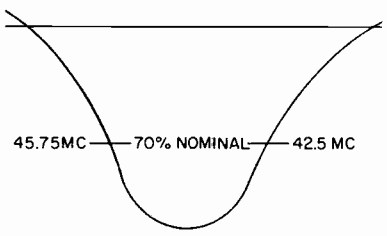


Figure 1

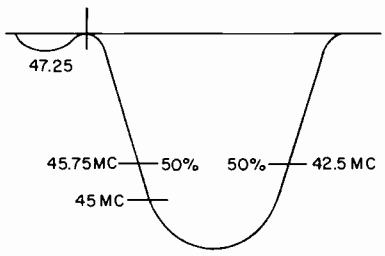


Figure 2

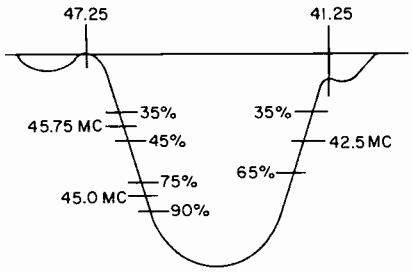
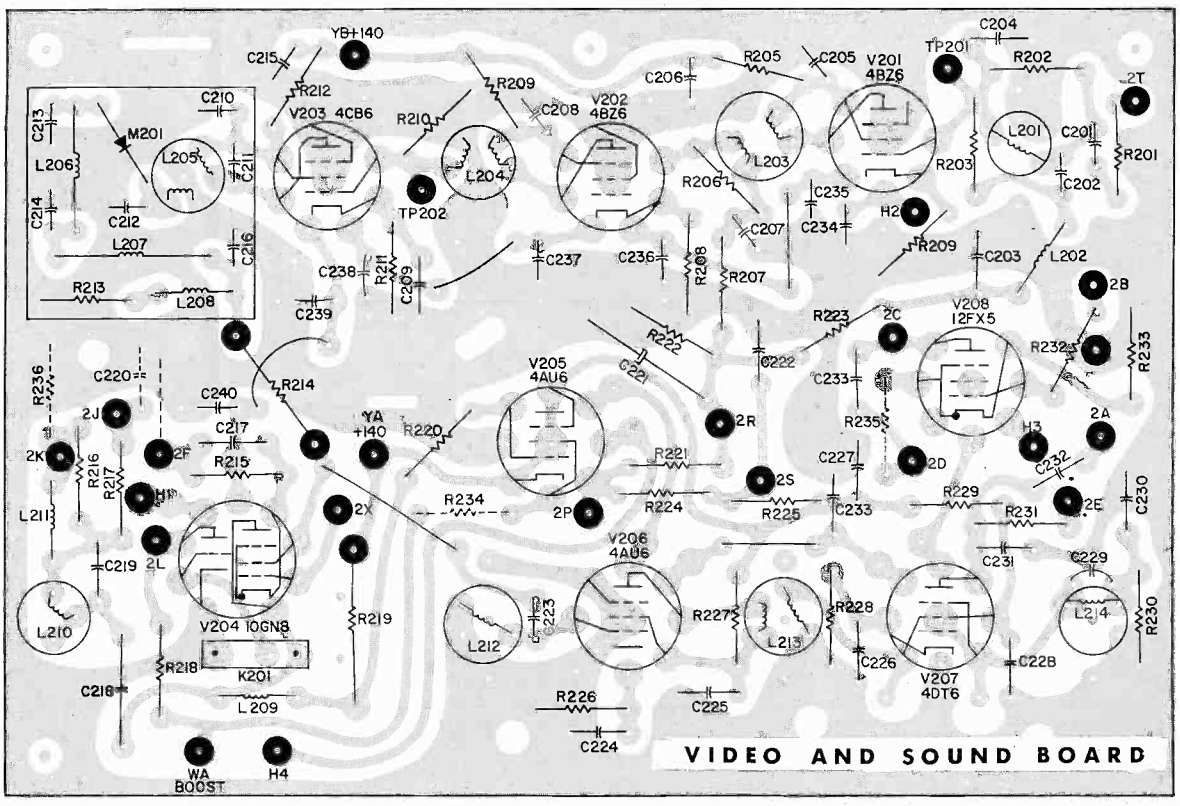


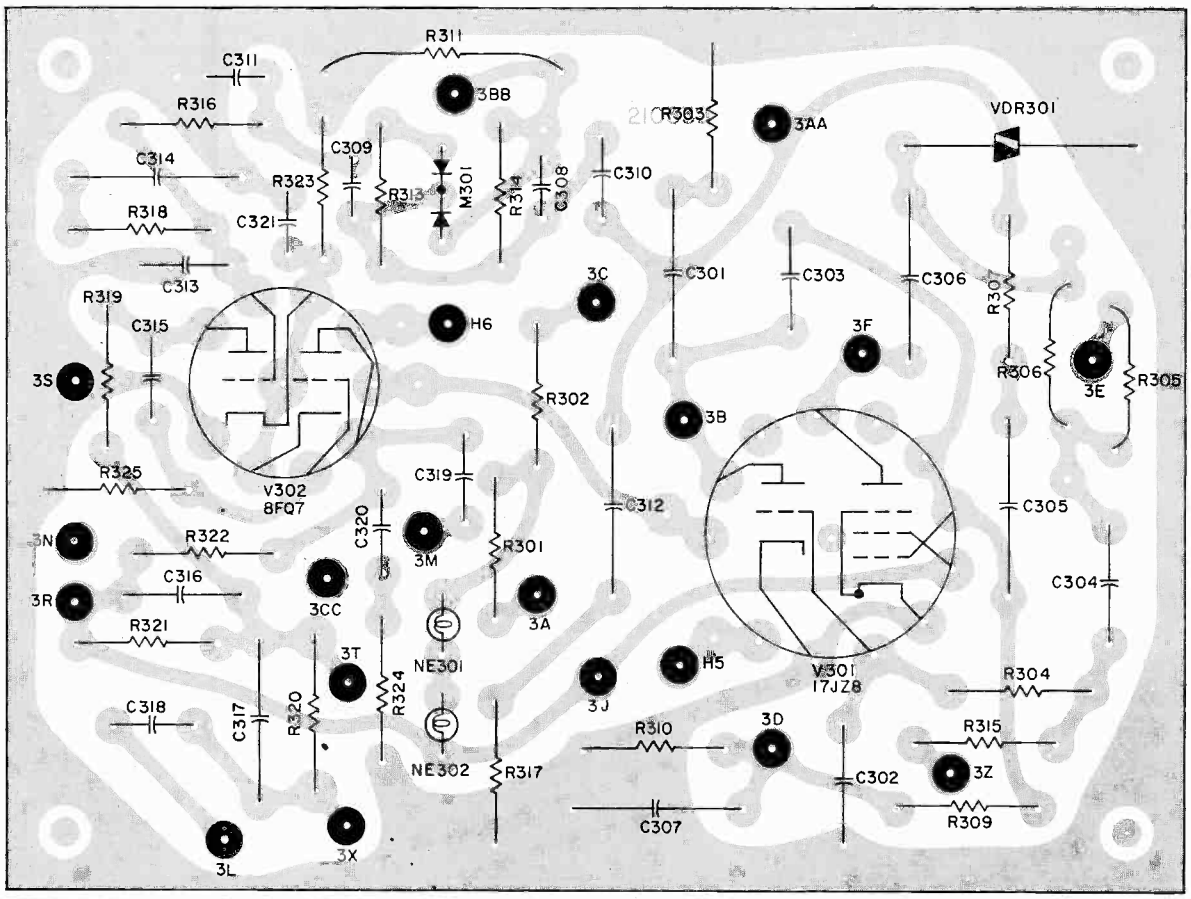
Figure 3

SOUND ALIGNMENT

1. Turn quadrature coil L214 to minimum inductance (core out).
2. Tune receiver to a strong local station (preferably a tone signal or music). Adjust quadrature coil L214 just past the point of maximum sound with minimum distortion.
3. Reduce signal input by removing antenna or placing an adjustable pad across the antenna terminals so that with Volume control set at near maximum, sound is at a low level. Tune the Fine Tuning control through undistorted sound. Set Fine Tuning control to the verge of distortion.
4. Adjust bottom core (grid tuning) of detector drive transformer L213 top core of L213 (plate tuning) and sound take-off coil L212 for minimum distortion.
5. Readjust Fine Tuning control as necessary during adjustment of L212 and L213 to maintain conditions as indicated in step 3 above.

MAGNAVOX **PRINTED WIRING BOARDS VIEWED FROM COPPER SIDE**



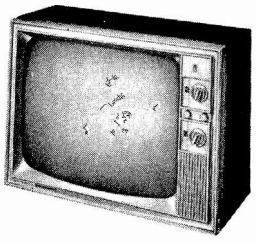


 DEFLECTION BOARD

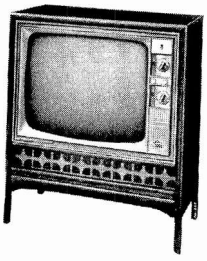
MOTOROLA

Chassis TS-588 types KTS-588, Y, SKTS-588, VKTS-588, -Y

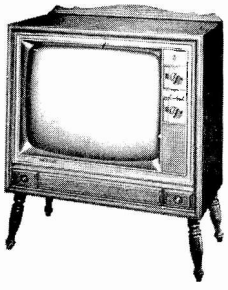
(Material and diagrams on pages 53-56; for alignment and other service data see TV-23, Early 1965 TV manual, beginning with page 79)



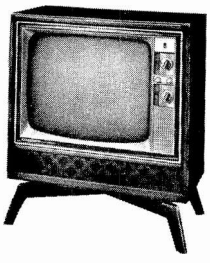
MODEL 23BT101



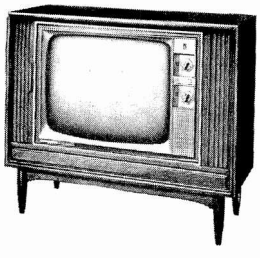
MODEL 23BU170



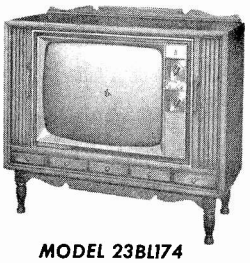
MODEL 23BU172



MODEL 23BS171



MODEL 23BU173



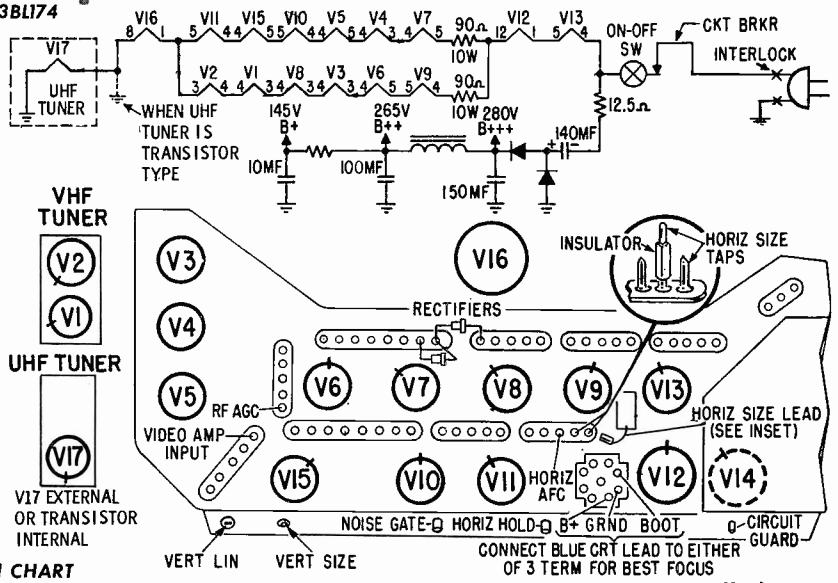
MODEL 23BL174

MODEL BREAKDOWN CHART

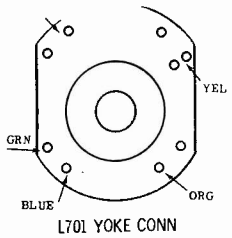
MODEL	CHASSIS	VHF TUNER	UHF TUNER	CRT
Y23T35E	KTS-588	LCMTT-365Y or CPTT-361Y	STT-600	23ARP4
Y23T35EF	SKTS-588	CPTT-361Y	STT-600	23ARP4
Y23K136M,W	KTS-588	LCMTT-365Y or CPTT-361Y	STT-600	23ARP4
Y23K136MF,WF	SKTS-588	CPTT-361Y	STT-600	23ARP4
23BT101AN,AE	VKTS-588	OPTT-385Y	HTT-615	23FSP4 or 23GSP4
23BK164AW,AM	KTS-588Y	LCMTT-365Y	STT-600	23ARP4
23BL165BW	VKTS-588Y	OPTT-385Y	HTT-615 or HTT-620	23ARP4
23BU170AM,AW	VKTS-588Y	OPTT-385Y	HTT-620 or HTT-615	23FSP4 or 23GSP4
23BS171AM,AW	VKTS-588Y	OPTT-385Y	HTT-620 or HTT-615	23FSP4 or 23GSP4
23BU172AS	VKTS-588Y	OPTT-385Y	HTT-620 or HTT-615	23FSP4 or 23GSP4
23BL173AM,AW	VKTS-588Y	OPTT-385Y	HTT-620 or HTT-615	23FSP4 or 23GSP4
23BL174AS	VKTS-588Y	OPTT-385Y	SAME AS ABOVE	

REF NO.	TUBE TYPE	FUNCTION
V1	4GK5	RF AMP (TT-365)
	4HQ5	RF AMP (TT-385)
	4HA5	RF AMP (TT-361)
V2	9A8	MIX-OSC (TT-365)
	9KZ8	MIX-OSC (TT-361 & 385)
V3	6BZ6A	1ST IF AMP
V4	6BZ6	2ND IF AMP
V5	6BZ6	3RD IF AMP
V6	16GK6	VIDEO AMP
V7	9A8/PCF80	SOUND IF & VERT OSC
V8	6DT6	AUDIO DET
V9	16GK6/PL84	AUDIO OUTPUT
V10	9A8/PCF80	NOISE INV & SYNC CLIP
V11	9A8/PCF80	AGC AMP & HORIZ OSC
V12	12JN6,	HORIZ OUTPUT
V13	16AQ3/XY88	DAMPER
V14	3AT2	HV RECT
V15	16GK6	VERT OUTPUT
V16	23ARP4	PICT TUBE — REPLACE WITH SAME TUBE ONLY
	23FSP4/23GSP4	
V17	2AF4/2DZ4	UHF OSC

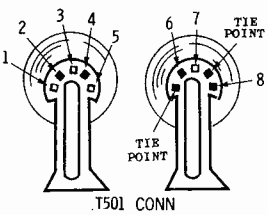
TUBE COMPLEMENT & LOCATION CHART



MOTOROLA Chassis +TS-588 Schematic Diagram



L701 YOKE CONN



T501 CONN

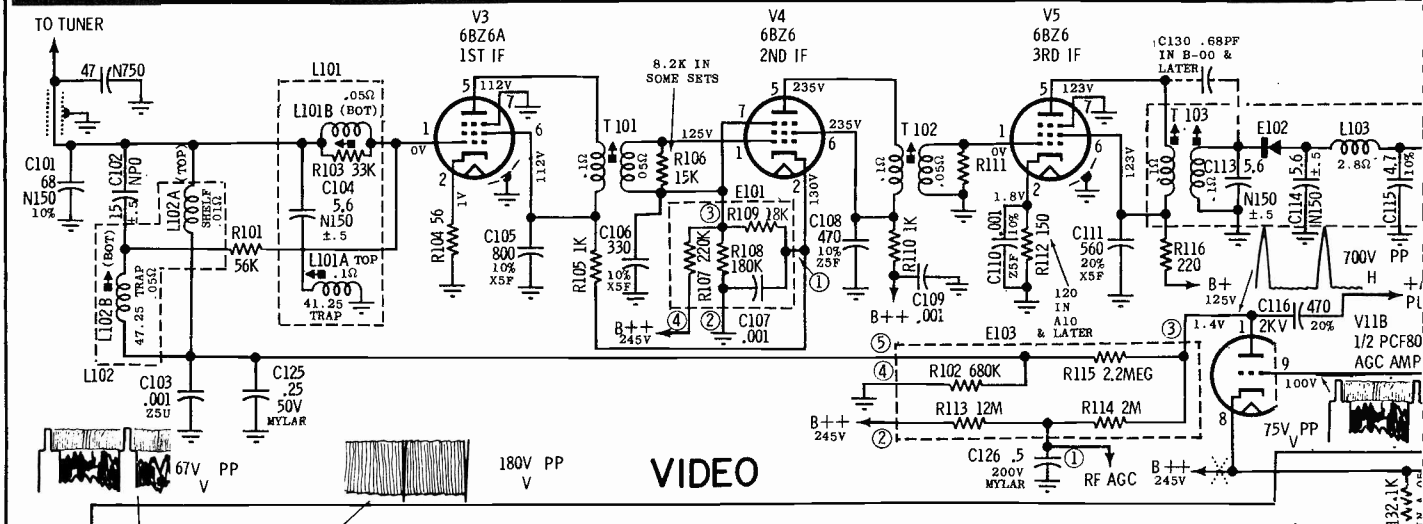
UNLESS OTHERWISE SPECIFIED: CAPACITORS ARE DISC CERAMIC 500V DC, TOLERANCE & CHARACTERISTIC AS NOTED; IF TOLERANCE IS NOT GIVEN CAPACITORS ARE GMV (GUARANTEED MIN. VALUE) TYPE. TUBULAR CAPACITORS ARE 20% 400V DC. DECIMAL VALUES IN MF, ALL OTHERS IN MMF RESISTORS ARE ALL 10% 1/2W.

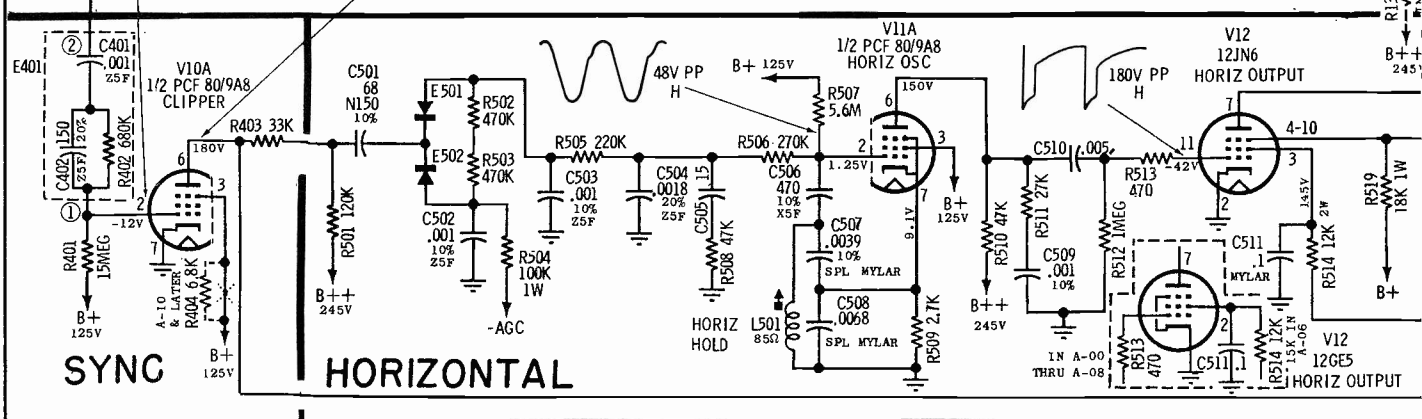
NOTES:

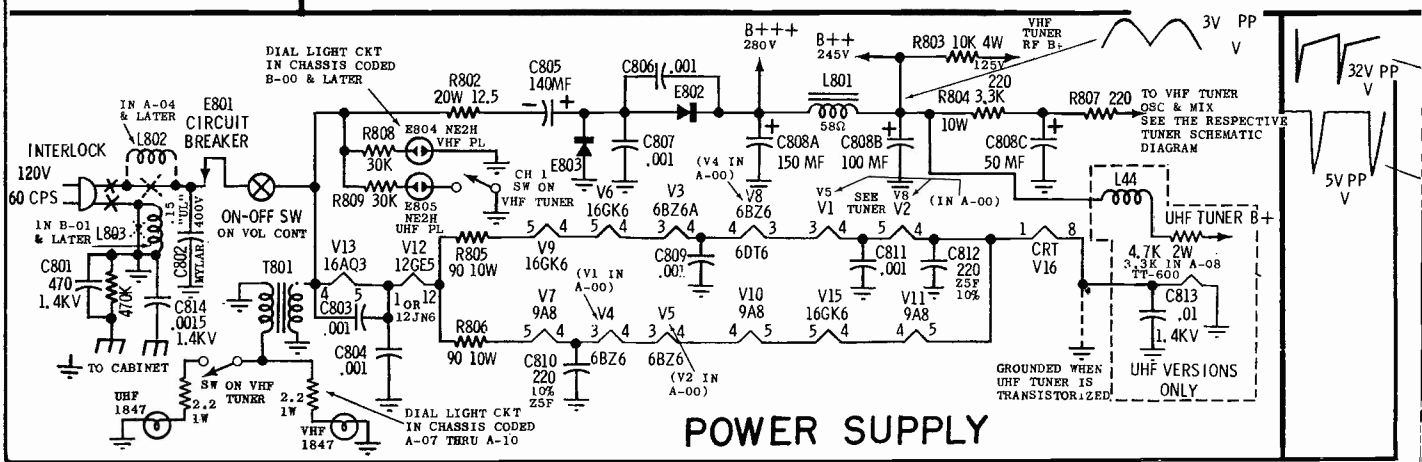
VOLTAGE MEASUREMENTS
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM. ±20%
2. LINE VOLTAGE MAINTAINED AT 120V AC.
3. TAKEN WITH CONTRAST CONTROL AT MINIMUM AND ALL OTHER CONTROLS IN NORMAL OPERATING POSITION WITH NO SIGNAL INPUT.
4. TUNER ON CHANNEL 13 OR CHANNEL OF LEAST NOISE WITH ANTENNA TERMINALS SHORTED.

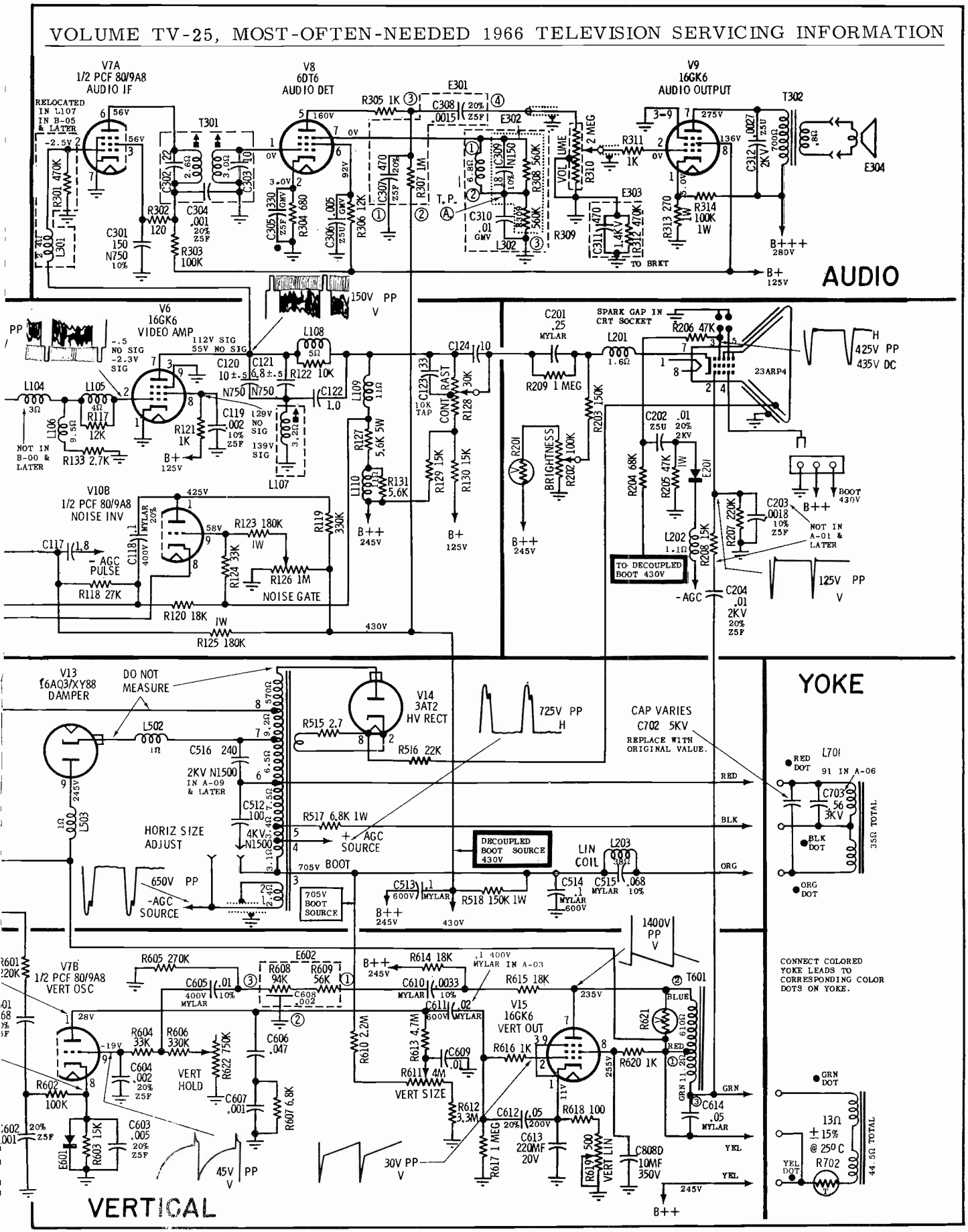
WAVEFORM MEASUREMENTS
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE
2. OSCILLOSCOPE SYNCED NEAR SWEEP RATE INDICATED.
3. TAKEN WITH STRONG SIGNAL, CONTRAST CONTROL AT MAXIMUM; ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

SCHEMATIC DIAGRAM - TS-588A-00 THRU B-01

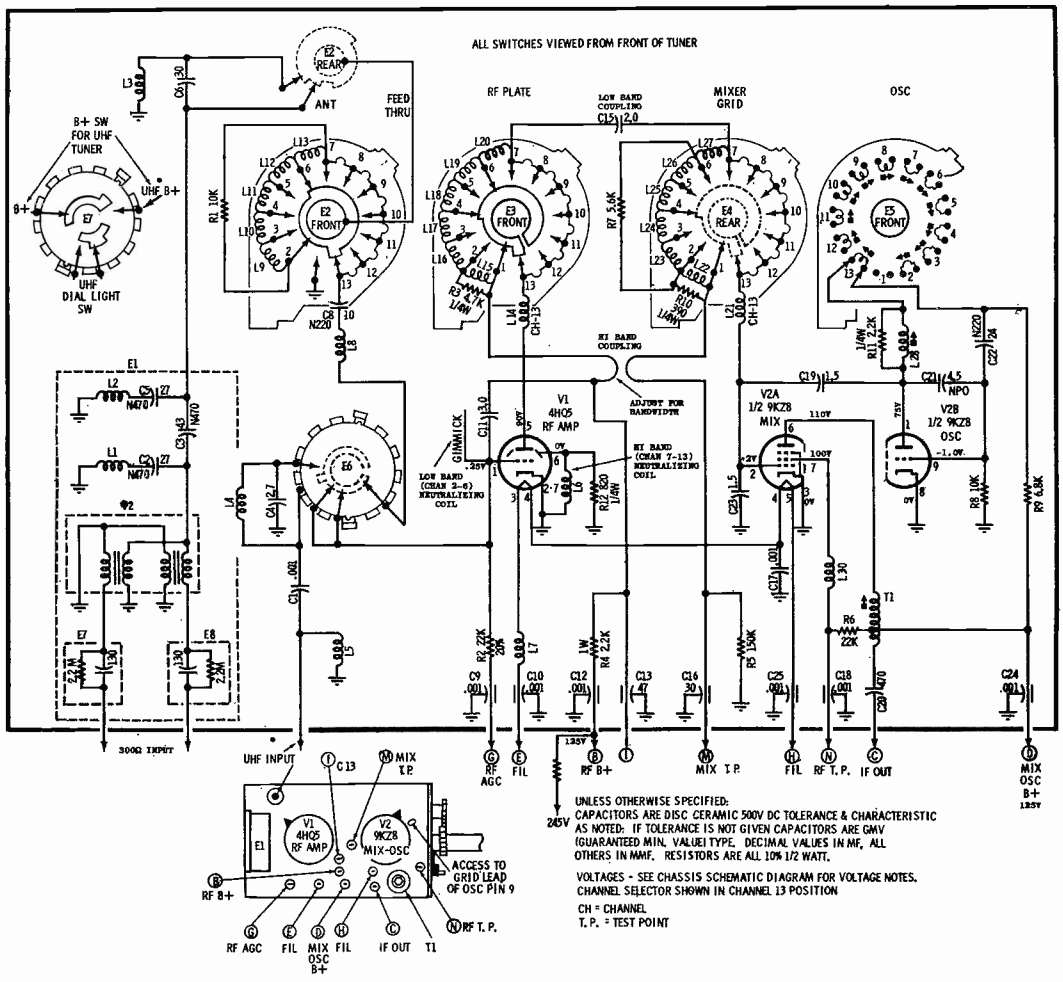




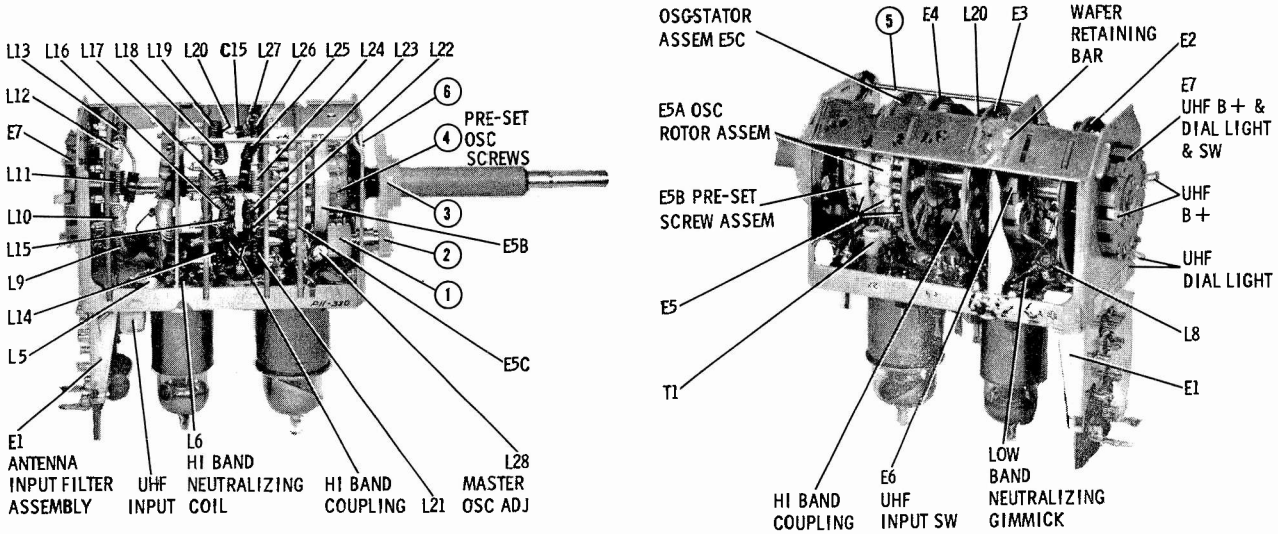



V7A
1/2 PCF 80/9A8
AUDIO IF
V8
6DT6
AUDIO DET
V9
16GK6
AUDIO OUTPUT
T302
E304
E301
E302
E303
T301
R305 1K
R307 1M
R309
R310 2 MEG
R311 1K
R313 270
R314 100K 1W
C301 150 N750 10%
C304 .001 20% Z5F
C305 330 GMV
C306 .005 Z5U
C307 470 20%
C308 .0015 Z5F
C310 .01 GMV
C312 .0027 Z5U 2KV
L301
L302
T.P. A
TO BRT
B+++ 280V
B+ 125V
AUDIO
V6
16GK6
VIDEO AMP
150V PP V
L108
C120
C121
C122 1.0
C123 10K TAP
C124 10
R122 10K
R127 5.6K 5W
R128 30K
R129 15K
R130 15K
R131 5.6K
L109 11Ω
L110
C201 .25 MYLAR
L201 1.6Ω
SPARK GAP IN CRT SOCKET
R206 47K
23ARP4
H 425V PP 435V DC
R209 1 MEG
R203 150K
R201
BRIGHTNESS
R202 100K
C202 .01 Z5U 20% 2KV
R204 68K
R205 47K 1W
E201
C203 .0018 10% Z5F
NOT IN A-01 & LATER
BOOT 430V
B++ 245V
B+ 125V
L202 1.1Ω
R208 15K
TO DECOUPLED BOOT 430V
-AGC
C204 .01 2KV 20% Z5F
125V PP V
L104 3Ω
L105 4Ω
L106 9.5Ω
R117 12K
R133 2.7K
NOT IN B-00 & LATER
R121 1K
C119 .002 10% Z5F
L107 3.2Ω
112V SIG 55V NO SIG
-.5 NO SIG -2.3V SIG
129V NO SIG
139V SIG
V10B
1/2 PCF 80/9A8
NOISE INV
C117 1.8
C118 MYLAR 20% 400V
R123 180K 1W
R124 33K
R126 1M
NOISE GATE
R119 330K
- AGC PULSE
R118 27K
R120 18K 1W
R125 180K
430V
V13
16AQ3/XY88
DAMPER
DO NOT MEASURE
L502 1Ω
C516 240
2KV N1500 IN A-09 & LATER
L503 1Ω
HORIZ SIZE ADJUST
650V PP
-AGC SOURCE
C512 100
4KV N1500
R517 6.8K 1W
+ AGC SOURCE
705V BOOT
705V BOOT SOURCE
V14
3AT2
HV RECT
R515 2.7
R516 22K
725V PP H
CAP VARIES C702 5KV
REPLACE WITH ORIGINAL VALUE.
DECOUPLED BOOT SOURCE 430V
LIN COIL L203 38Ω
C513 .1 600V MYLAR
R518 150K 1W
C514 .1 MYLAR 600V
C515 MYLAR .068 10%
B++ 245V
430V
YOKE
L701
RED DOT
91 IN A-06
C703 .56 3KV
35Ω TOTAL
BLK DOT
ORG DOT
RED
BLK
ORG
CONNECT COLORED YOKE LEADS TO CORRESPONDING COLOR DOTS ON YOKE.
GRN DOT
13Ω ±15% @ 25° C
R702
44.5Ω TOTAL
YEL DOT
V7B
1/2 PCF 80/9A8
VERT OSC
R602 100K
R603 15K
C603 .005 20% Z5F
E601
R604 33K
R606 330K
R622 750K
VERT HOLD
C604 .002 20% Z5F
C606 .047
C607 .001
R607 6.8K
45V PP V
R605 270K
E602
R608 94K
R609 56K
C605 .01 10% 400V MYLAR
C608 .002
R610 2.2M
C610 .0033 MYLAR 10%
C611 .02 600V MYLAR
R613 4.7M
C609 .01
R611 4M VERT SIZE
R612 3.3M
R614 18K
.1 400V MYLAR IN A-03
R615 18K
235V
V15
16GK6
VERT OUT
R616 1K
R617 1 MEG
C612 .05 20% 200V
C613 220MF 20V
R618 100
R619 500 VERT LIN
C808D 10MF 350V
30V PP V
1400V PP V
T601
BLUE
R621 610Ω
RED
R620 1K
GRN
C614 .05 MYLAR
YEL
245V
B++
VERTICAL

MOTOROLA Chassis +TS-588 VHF Tuner TT-385, Continued



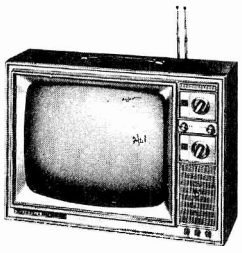
VHF TUNER SCHEMATIC DIAGRAM - TT-385



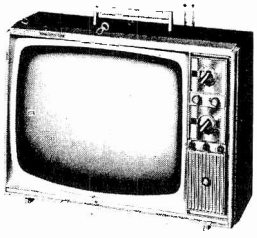
VHF TUNER COMPONENT LOCATION - TT-385

MOTOROLA

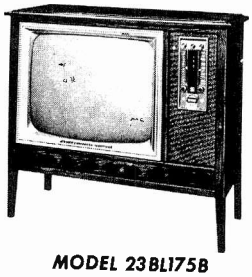
(Service material on pages 57-60. For alignment and other service facts see such material in TV-23, Early 1965 TV, beginning page 87.)



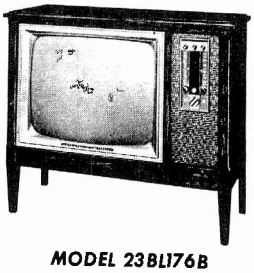
MODEL 19BT124B



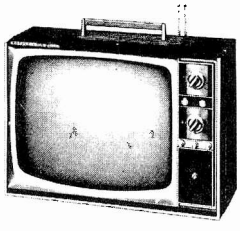
MODEL 21BT131B



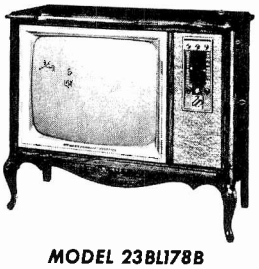
MODEL 23BL175B



MODEL 23BL176B



MODEL 21BT132B



MODEL 23BL178B

TO REMOVE IF COILS FROM SHIELDS

The coils located in the shields are locked into position. In order to gain access to the coil and components located within the shield, grip one side of the coil form with long-nose pliers and carefully pull it out of the shield. If leads are too short to permit access to the coil, unsolder leads from chassis components, not from coil form. Heating the coil terminals may result in component damage or loss of wax protection against moisture.

When re-inserting coil assembly in shield, be sure coil form locks into position inside the shield.

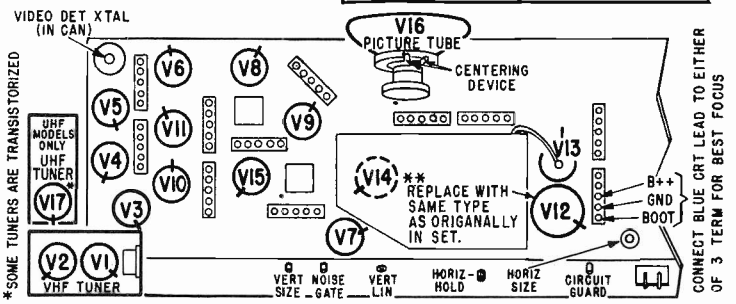
Coils which are dipped in wax must be replaced as an assembly in order to maintain proper moisture protection in high humidity areas.

MODEL BREAKDOWN CHART

MODEL	CHASSIS	VHF TUNER	UHF TUNER	CRT
19BT120AN,U	ZDTS-589C	OPTT-386Y	HTT-621	19EBP4
19BT121AW,H	ZDTS-589C	OPTT-386Y	HTT-621	19EBP4
19BT122AW,H,S	ZDTS-589C	OPTT-386Y	HTT-621	19EBP4
19BT124BE,H	ZDTS-589	OPTT-386Y	HTT-621	19EBP4
21BT130BE,H	JTS-589	OPTT-386Y	HTT-621 or HTT-623	21FVP4 or 21FZP4
21BT130BE,H	NJTS-589	OPTT-366Y	HTT-621 or HTT-623	21FVP4 or 21FZP4
21BT131BN,U	JTS-589	OPTT-386Y	HTT-621	21FVP4 or 21FZP4
21BT132BW,H,S	JTS-589	OPTT-386Y	HTT-621	21FVP4 or 21FZP4
23BL175BM,W	ZKTS-589	OPTT-386Y	TT-611	23FSP4 or 23GSP4
23BL176BM	ZKTS-589	OPTT-386Y	TT-611	23FSP4 or 23GSP4
23BL177BS	ZKTS-589	OPTT-386Y	TT-611	23FSP4 or 23GSP4
23BL178BC	ZKTS-589	OPTT-386Y	TT-611	23FSP4 or 23GSP4
23BT102AN,U	WKTS-589C	OPTT-386Y	HTT-621	23FSP4/23GSP4
23BT103AW	WKTS-589C	OPTT-386Y	HTT-621	23FSP4/23GSP4

REF. NO.	TUBE TYPE	FUNCTION
V1	6HA5	RF AMP (TT-366, 368)
	6HQ5	RF AMP (TT-386)
	6GK5	RF AMP (TT-334)
V2	6KZ8	MIX-OSC (TT-366, 368, 386)
	6CG8	MIX-OSC (TT-334)
V3	6BZ6A	1ST IF
V4	6BZ6	2ND IF
V5	6BZ6	3RD IF
V6	6GK6	VIDEO AMP
V7	6BL8	HORIZ OSC & AGC
V8	6BL8	VERT OSC & AUDIO IF

REF. NO.	TUBE TYPE	FUNCTION
V9	6DT6	AUDIO DET
V10	6GK6	AUDIO OUTPUT
V11	6BL8	CLIPPER & NOISE INV
V12	6GE5 OR 6JN6 **	HORIZ OUTPUT
V13	6AL3	DAMPER
V14	3AT2	HV RECT
V15	6GK6	VERT OUTPUT
V16	19XP4, 19EBP4, 19BRP4, 19AFP4, 21FVP4, 21FZP4,- 23FSP4/23GSP4,- 23CMP4/23ARP4	REPLACE WITH SAME TUBE ONLY
V17	6DZ4*	UHF OSC



TUBE COMPLEMENT & LOCATION CHART

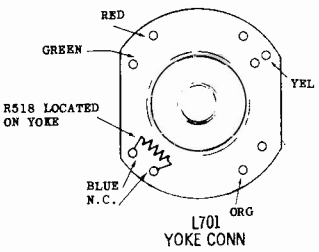
MOTOROLA Chassis +TS-589 Schematic Diagram

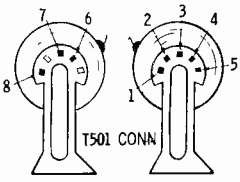
NOTES:
VOLTAGE MEASUREMENTS
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM ±20%.
2. LINE VOLTAGE MAINTAINED AT 120V AC.
3. TAKEN WITH CONTRAST CONTROL AS MINIMUM AND ALL OTHER CONTROLS IN NORMAL OPERATING POSITION WITH NO SIGNAL INPUT.
4. TUNER ON CHANNEL 13 OR CHANNEL OF LEAST NOISE WITH ANTENNA TERMINALS SHORTED.

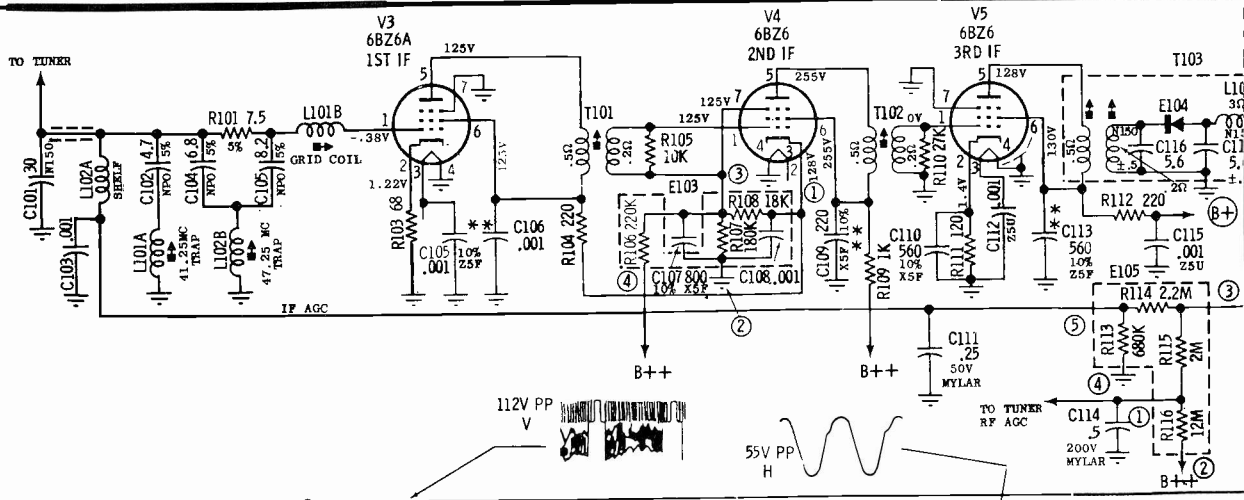
WAVEFORM MEASUREMENTS
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE.
2. OSCILLOSCOPE SYNCED NEAR SWEEP RATE INDICATED.
3. TAKEN WITH STRONG SIGNAL. CONTRAST CONTROL AT MAXIMUM: ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

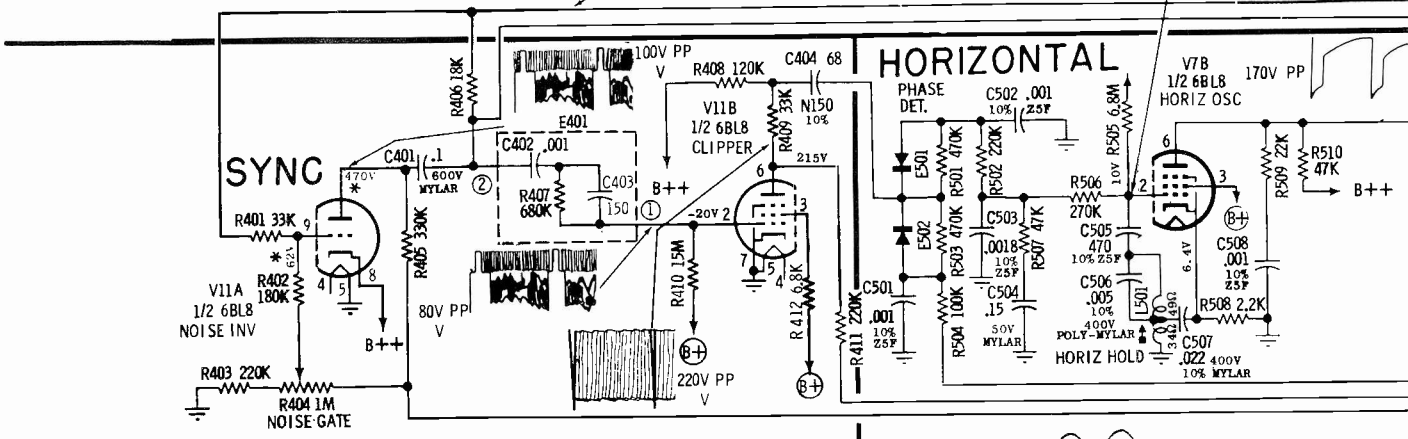
* INDICATES VOLTAGE VARIES WITH CONTROL SETTINGS.
** INDICATES SPECIAL COMPONENTS.

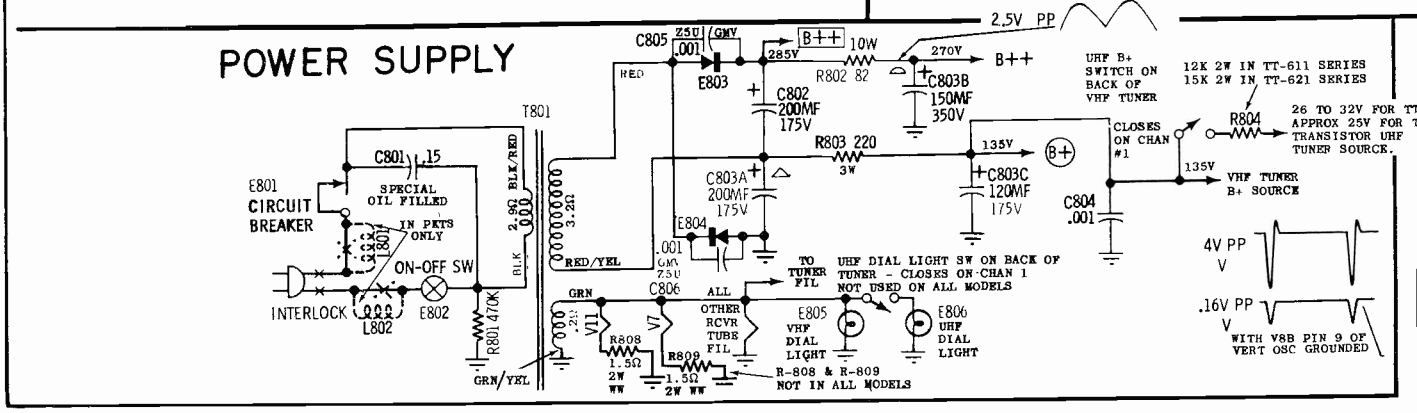
UNLESS OTHERWISE SPECIFIED CAPACITORS ARE DISC CERAMIC 500V DC TOLERANCE & CHARACTERISTIC AS NOTED: IF TOLERANCE IS NOT GIVEN CAPACITORS ARE GMV (GUARANTEED MIN VALUE) TYPE TUBULAR CAPACITORS ARE 20% 400V DC. DECIMAL VALUES IN MF ALL OTHERS IN MMF RESISTORS ARE ALL 10% 1 2 WATT.



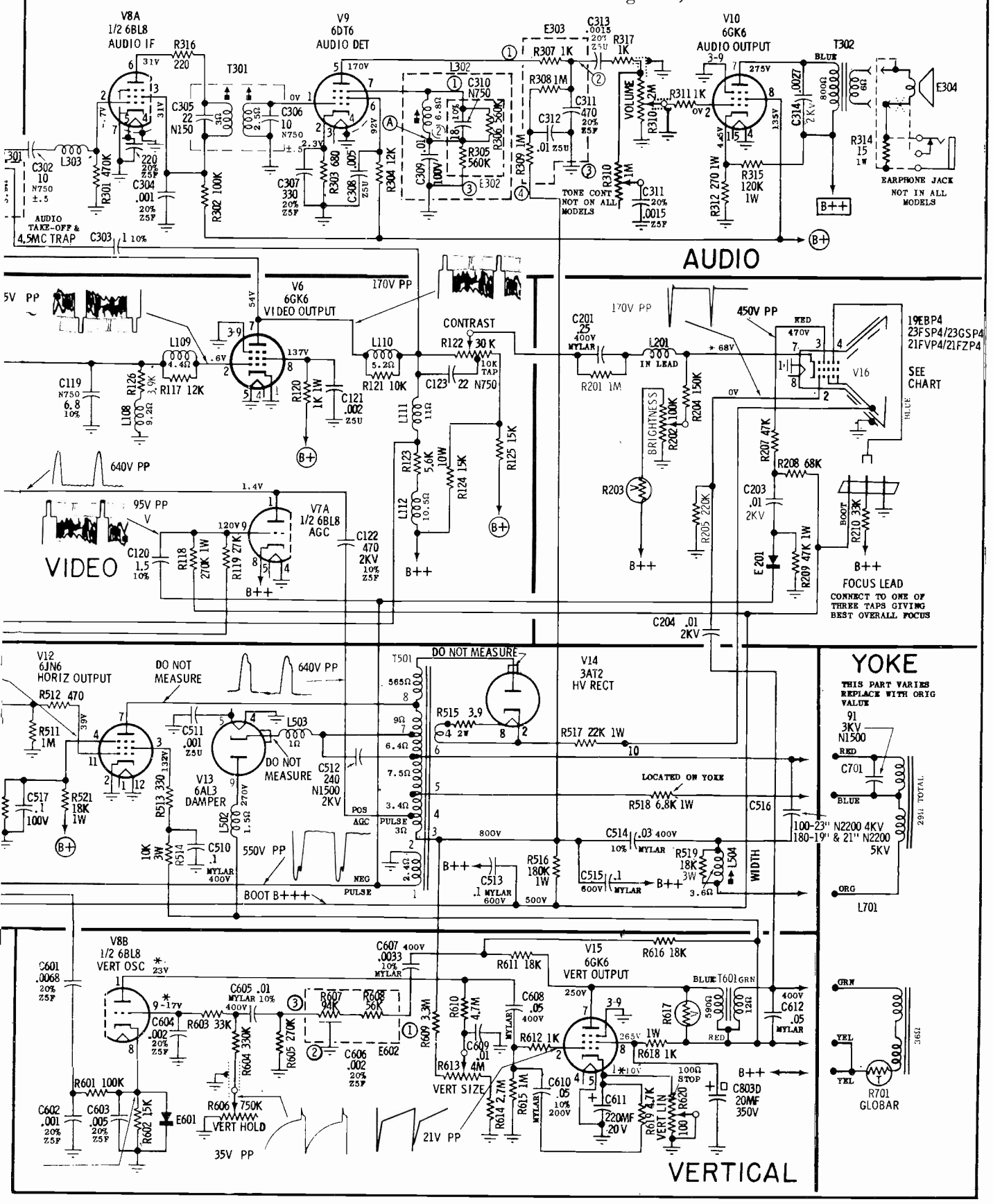




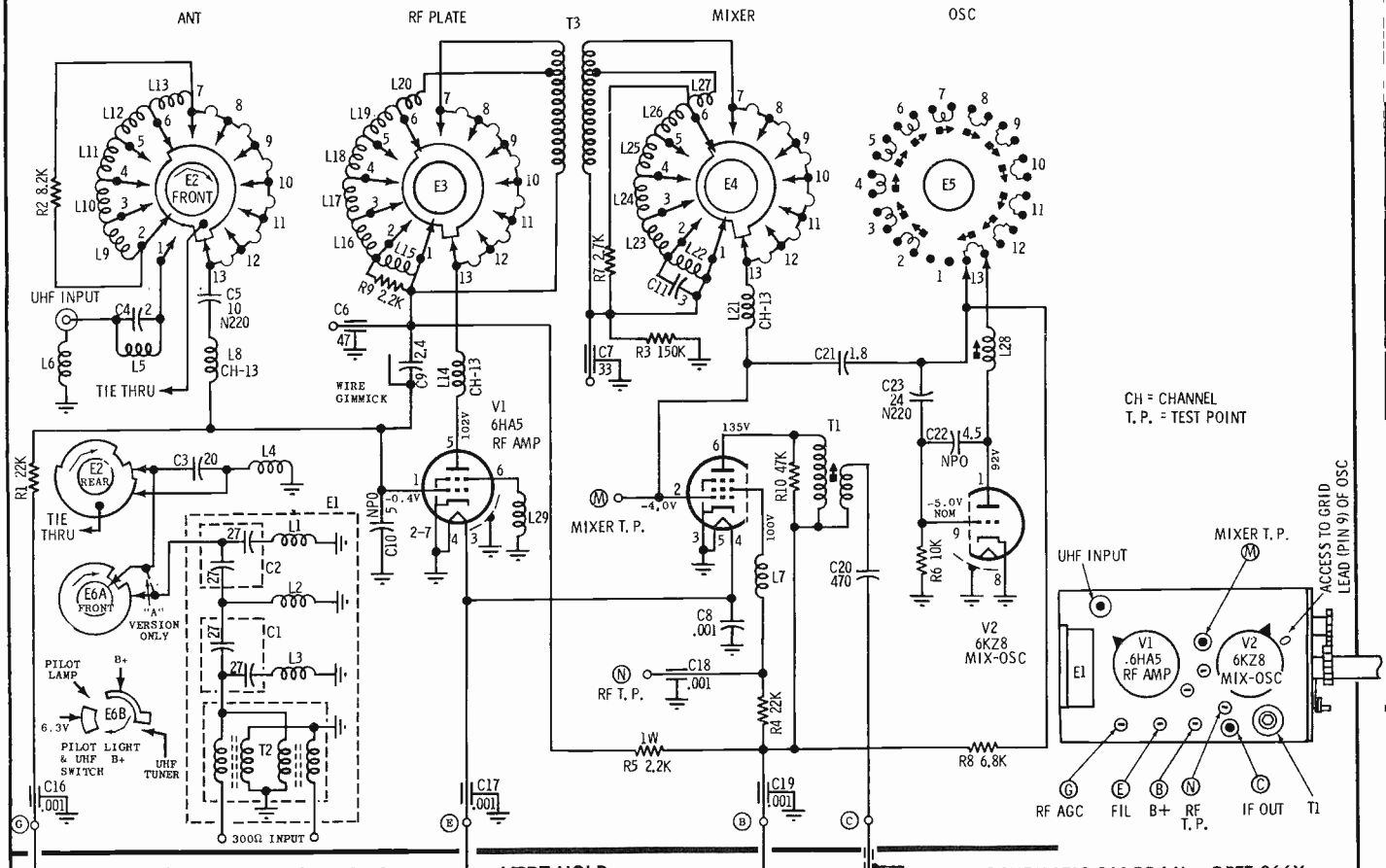




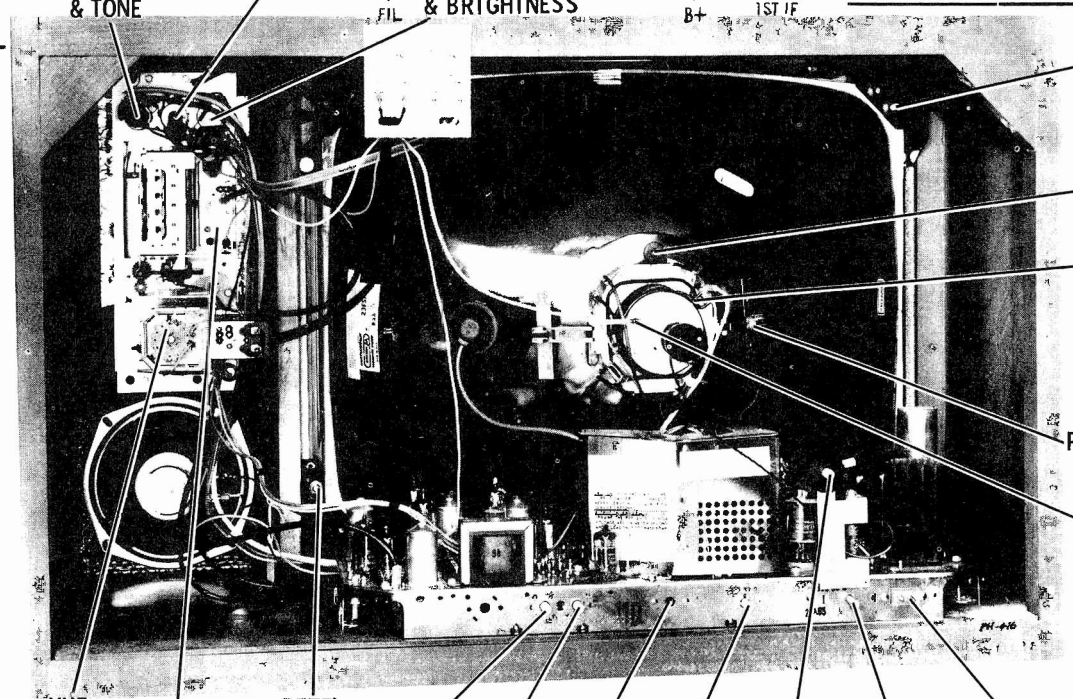
MOTOROLA Chassis +TS-589 Schematic Diagram, Continued



MOTOROLA Chassis +TS-589 Service Information, Continued



SCHEMATIC DIAGRAM - OPTT-366Y



TYPICAL 23" RECEIVER REAR VIEW - CHASSIS ZKTS-589C

MOTOROLA

MODEL BREAKDOWN CHART

MODEL	CHASSIS	VHF TUNER	UHF TUNER	CRT
19BP100BE	SDTS-596	CMTT-393Y	NTT-615	19EAP4 or 19ENP4
19BP116BE,N	NDTS-596	CMTT-393Y	NTT-615	19EAP4 or 19ENP4
19BP117BA	DTS-596	CMTT-393Y	HTT-615	19EGP4
19BP118BB,C,W	DTS-596	CMTT-393Y	HTT-615	19EGP4

(Service material on pages 61 through 68)

INSTALLATION & SERVICE NOTES

FINE TUNING ADJUSTMENT

Center the fine tuning control mechanically. Set tuner to the highest numbered available channel and with an insulated screwdriver, adjust the channel oscillator screw for best picture and sound. Adjust all other available oscillator screws in descending order. Only a slight adjustment should be necessary to bring in each channel.

FOCUSING ADJUSTMENT

To provide for differences in the picture tube gun structure, a focus adjustment is provided by three (3) lugs located on the chassis. They provide a ground potential point, a B+ voltage point and a bootstrap voltage point. Connect the blue lead from the picture tube socket to the lug which provides the best over-all focus, center to edge of screen (see top chassis photo for location).

HORIZONTAL SIZE CONTROL

To provide for differences in line voltages, either of the two end lugs of the terminal strip next to the audio output tube may be selected to provide proper horizontal size. The lead must be connected to one of the lugs. Remove power before making adjustment (see top chassis photo for location).

NOISE GATE CONTROL

The noise gate control is used to adjust the receiver for best hold stability under noise and different signal strength conditions.

To adjust, tune in a channel for best picture and sound. Turn the noise gate control clockwise (when viewed from rear of receiver) until the picture becomes unstable (rolls down or slips, etc.). Then, turn control counter-clockwise until the picture returns to normal. Check all channels; if any are unstable, continue turning control counter-clockwise until the picture is normal on all channels.

CIRCUIT GUARD

The circuit guard is a thermal cut-out type of overload relay. It is in series with the power into the receiver for protection against shorts in the chassis.

The circuit guard will remain in the "closed circuit" state when the current requirements are normal. In the event of a continuous high current overload, the bi-metallic elements of the unit will become heated to the extent of "opening" the contacts and disconnecting the AC power. After the bi-metallic elements have cooled, the circuit guard may be re-set by depressing the plastic re-set button.

The circuit guard is designed to remain "closed" on the higher-than-normal instantaneous surge currents encountered during the initial warm-up. The circuit guard is unique in the fact that when a short exists in the associated circuitry, power is not re-applied when the re-set button is held depressed.

RES-CAP REPLACEMENT AND REPAIR

If it is desirable to repair a defective res-cap component and the replacement unit is not immediately available, it is possible to repair the existing unit in the following manner. Merely remove the defective component from the circuitry by cutting the appropriate lead(s) and then substitute conventional capacitors or resistors back into the circuitry. When this method is used, it is always desirable to replace the circuitry in such a manner that the defective component is removed entirely from the system. In other words, do not bridge the defective component with the replacement unit. This is to avoid any detrimental effect that the defective component might inject into the system.

TO REMOVE IF COILS FROM SHIELDS

The coils located in the shields are locked into position. In order to gain access to the coil and components located within the shield, grip one side of the coil form with long-nose pliers and carefully pull it out of the shield. If leads are too short to permit access to the coil, unsolder leads from chassis components, not from coil form. Heating the coil terminals may result in component damage or loss of wax protection against moisture.

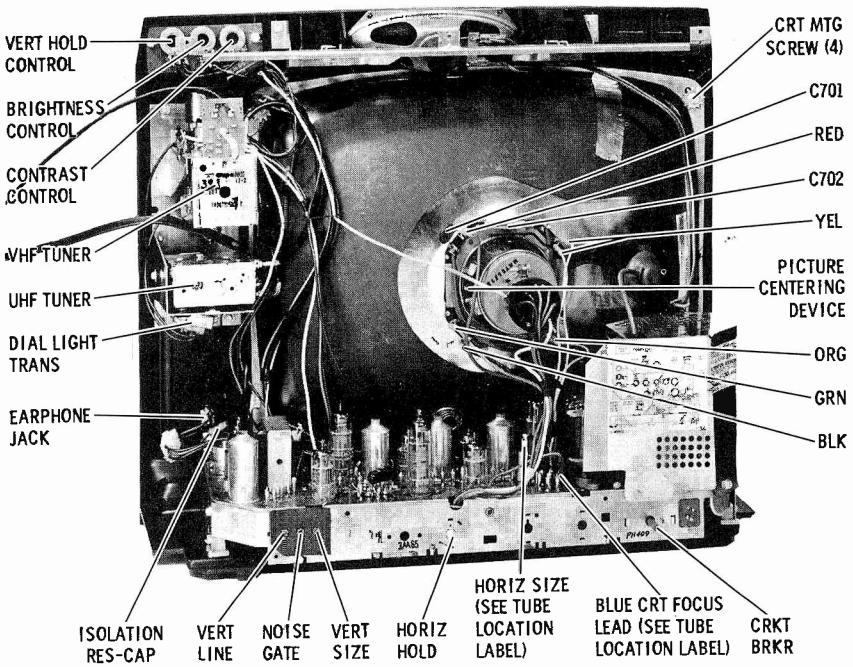
When re-inserting coil assembly in shield, be sure coil form locks into position inside the shield.

Coils which are dipped in wax must be replaced as an assembly in order to maintain proper moisture protection in high humidity areas.

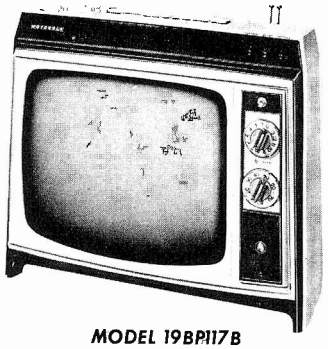
PICTURE TUBE REPLACEMENT

Use extreme care in handling the picture tube as rough handling may cause it to implode due to atmospheric pressure. Do not nick or scratch glass or subject it to any undue pressure in removal or installation. Use goggles and heavy gloves for protection.

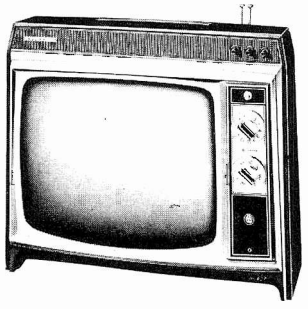
MOTOROLA Chassis ++TS-596 (Continued)



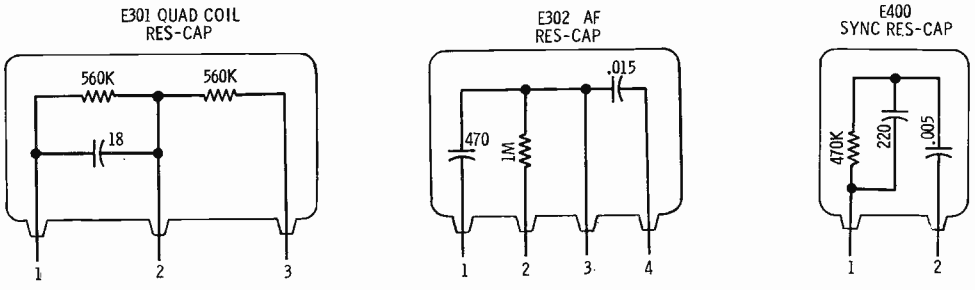
TYPICAL RECEIVER - REAR VIEW



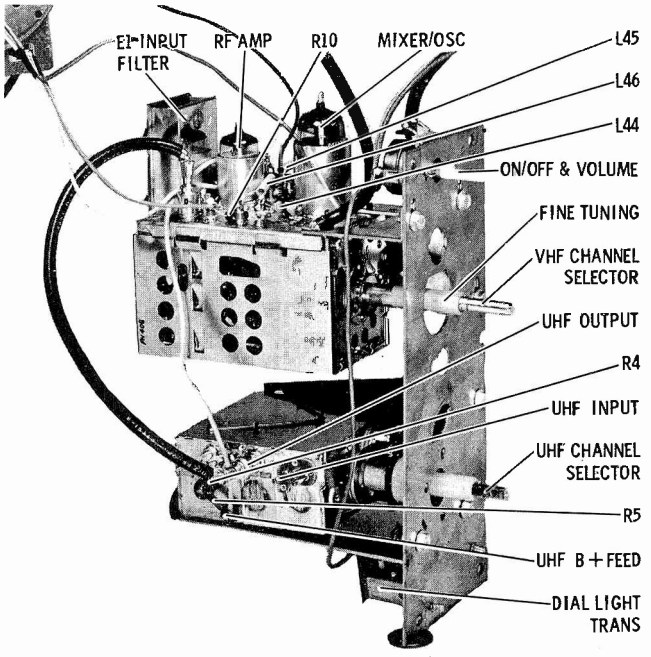
MODEL 19BP117B



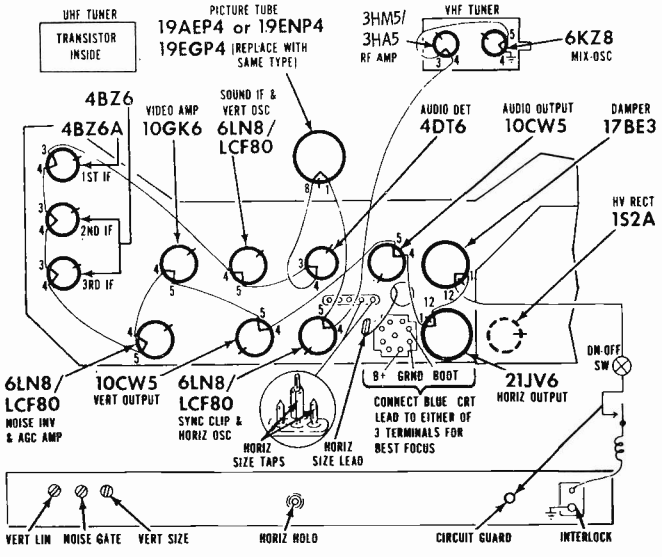
MODEL 19BP118B



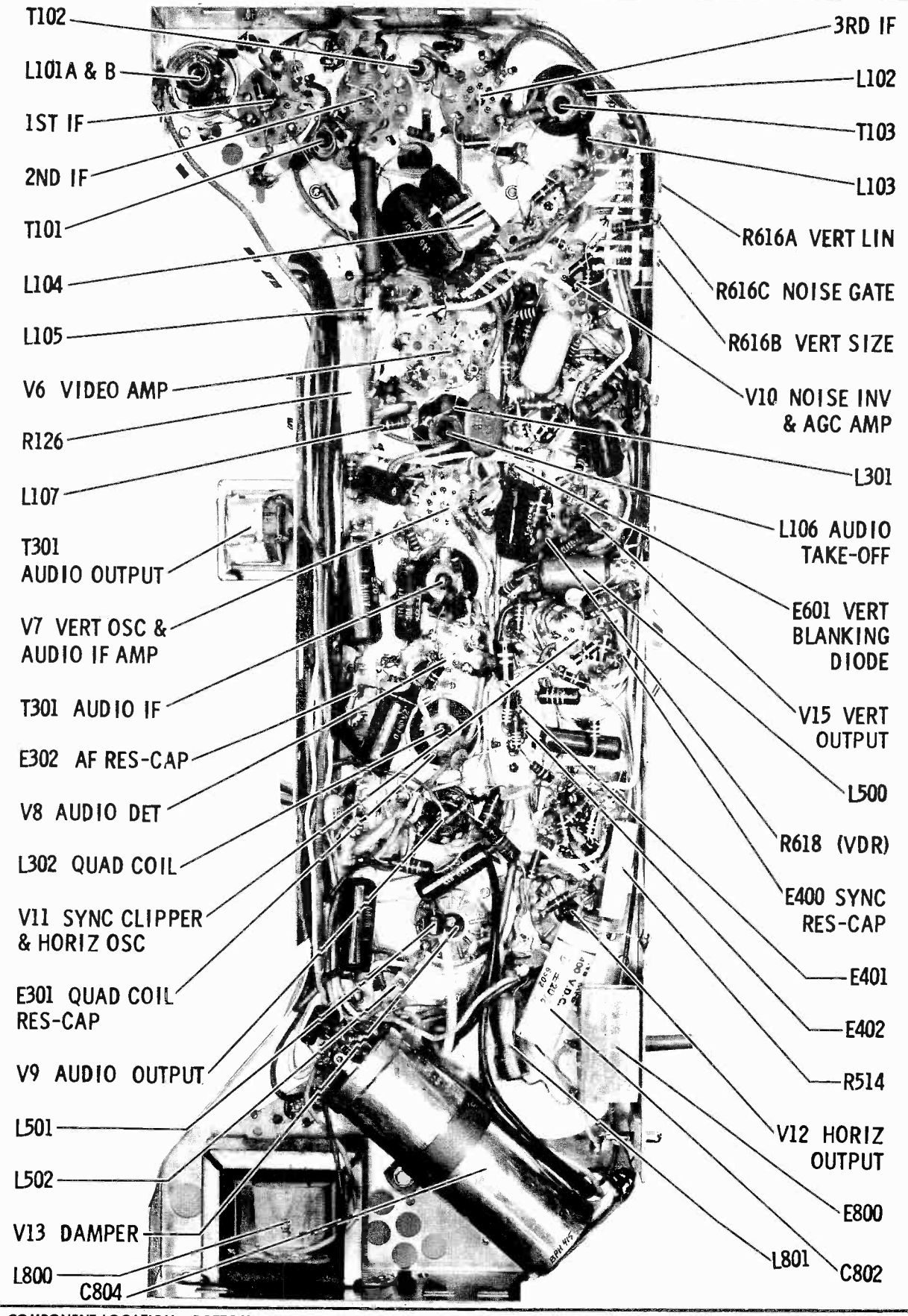
RES-CAP DIAGRAMS



PARTS LOCATION - CONTROL STRIP



TUBE LOCATION & FILAMENT WIRING DETAIL



COMPONENT LOCATION - BOTTOM CHASSIS VIEW TS-596

VOLUME TV-25

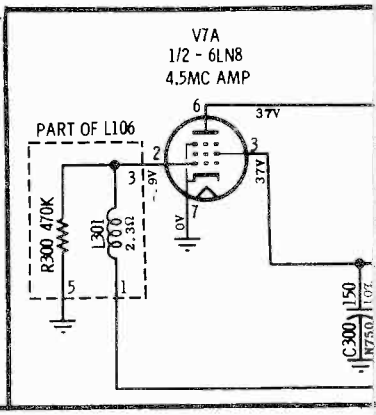
MOTOROLA Schematic of Chassis DTS-596, NDTS-596, and SDTS-596.

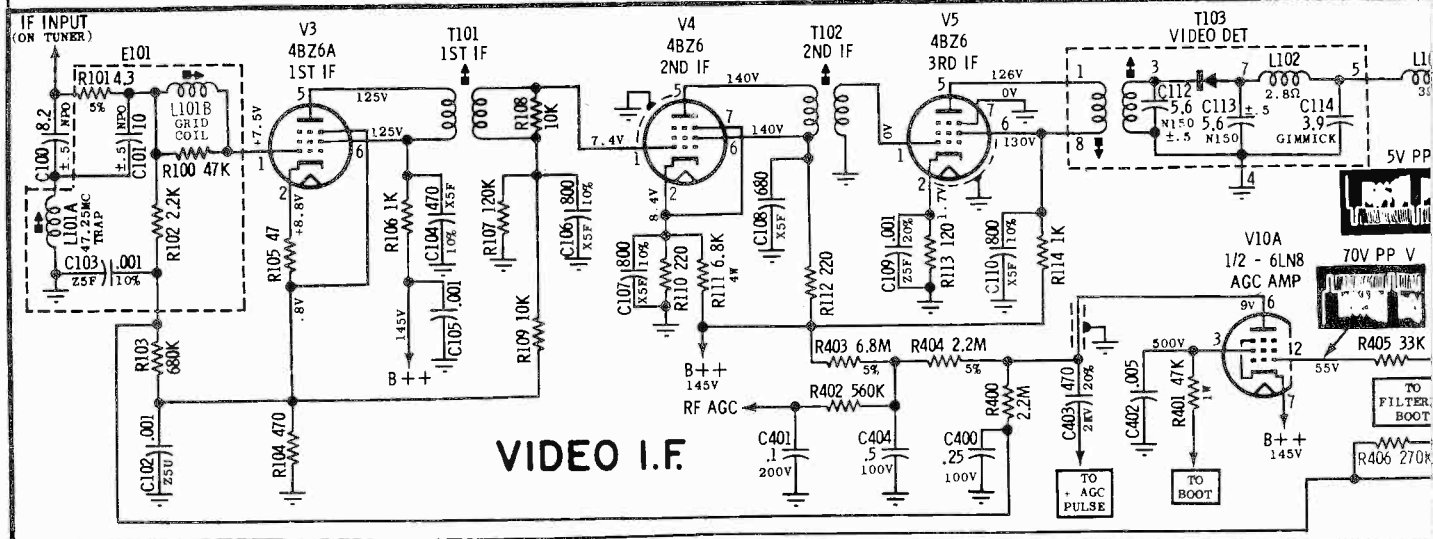
VOLTAGE MEASUREMENTS

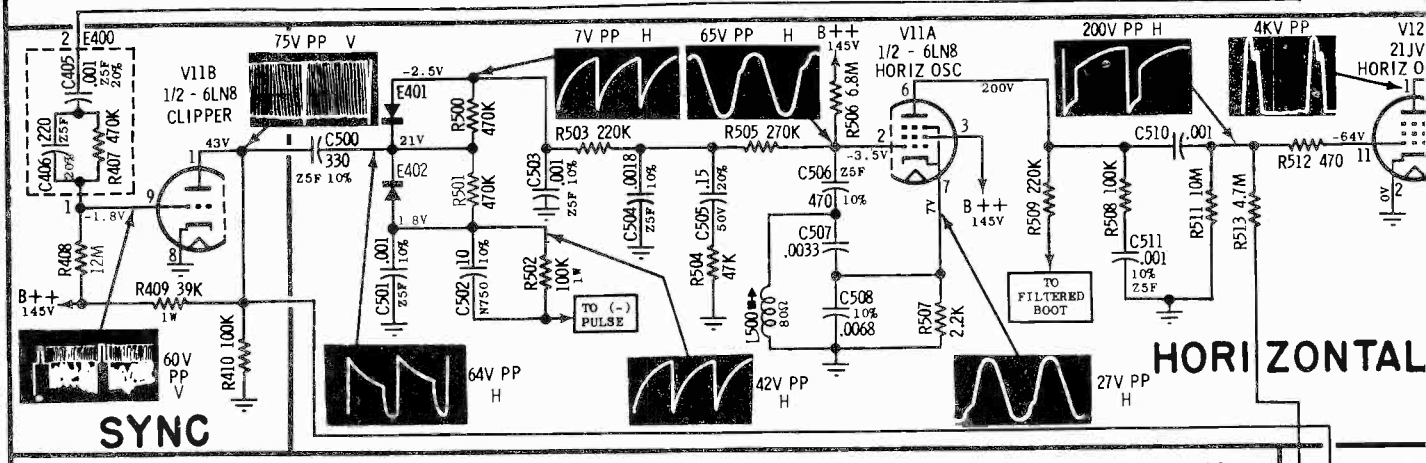
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM. ± 20%
2. LINE VOLTAGE MAINTAINED AT 120V AC.
3. VOLTAGES INDICATED BY AN ASTERISK WILL VARY WITH ASSOCIATED CONTROL SETTINGS.
4. TAKEN WITH CONTRAST CONTROL AT MINIMUM AND ALL OTHER CONTROLS IN NORMAL OPERATING POSITION WITH NO SIGNAL INPUT.
5. TUNER ON CHANNEL 13 OR CHANNEL OF LEAST NOISE WITH ANTENNA TERMINALS SHORTED.

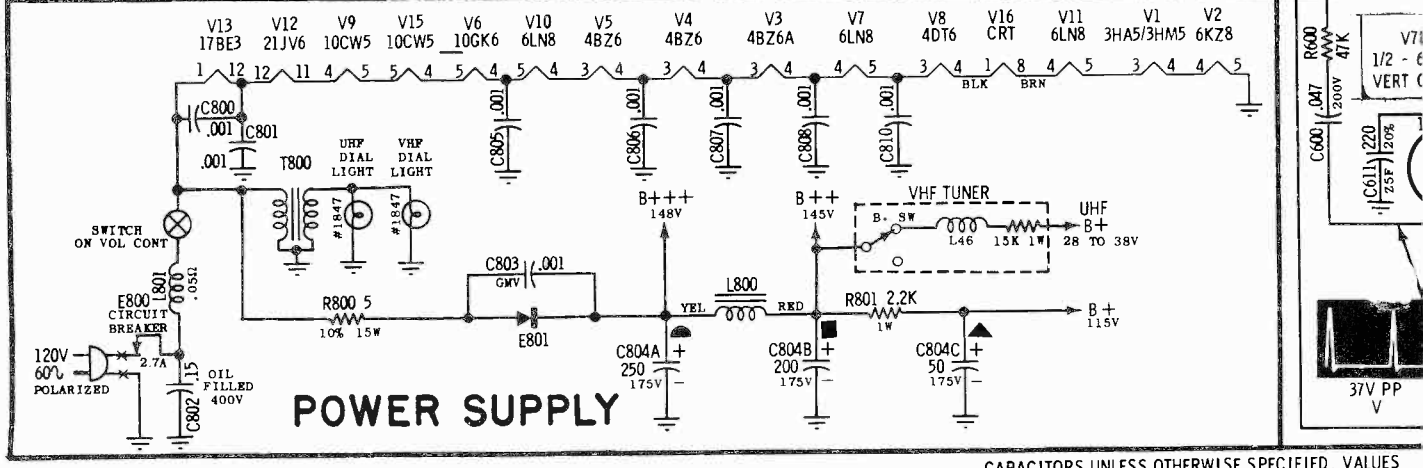
WAVEFORM MEASUREMENTS

1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE.
2. OSCILLOSCOPE SYNCED NEAR SWEEP RATE INDICATED.
3. TAKEN WITH STRONG SIGNAL, CONTRAST CONTROL AT MAXIMUM; ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

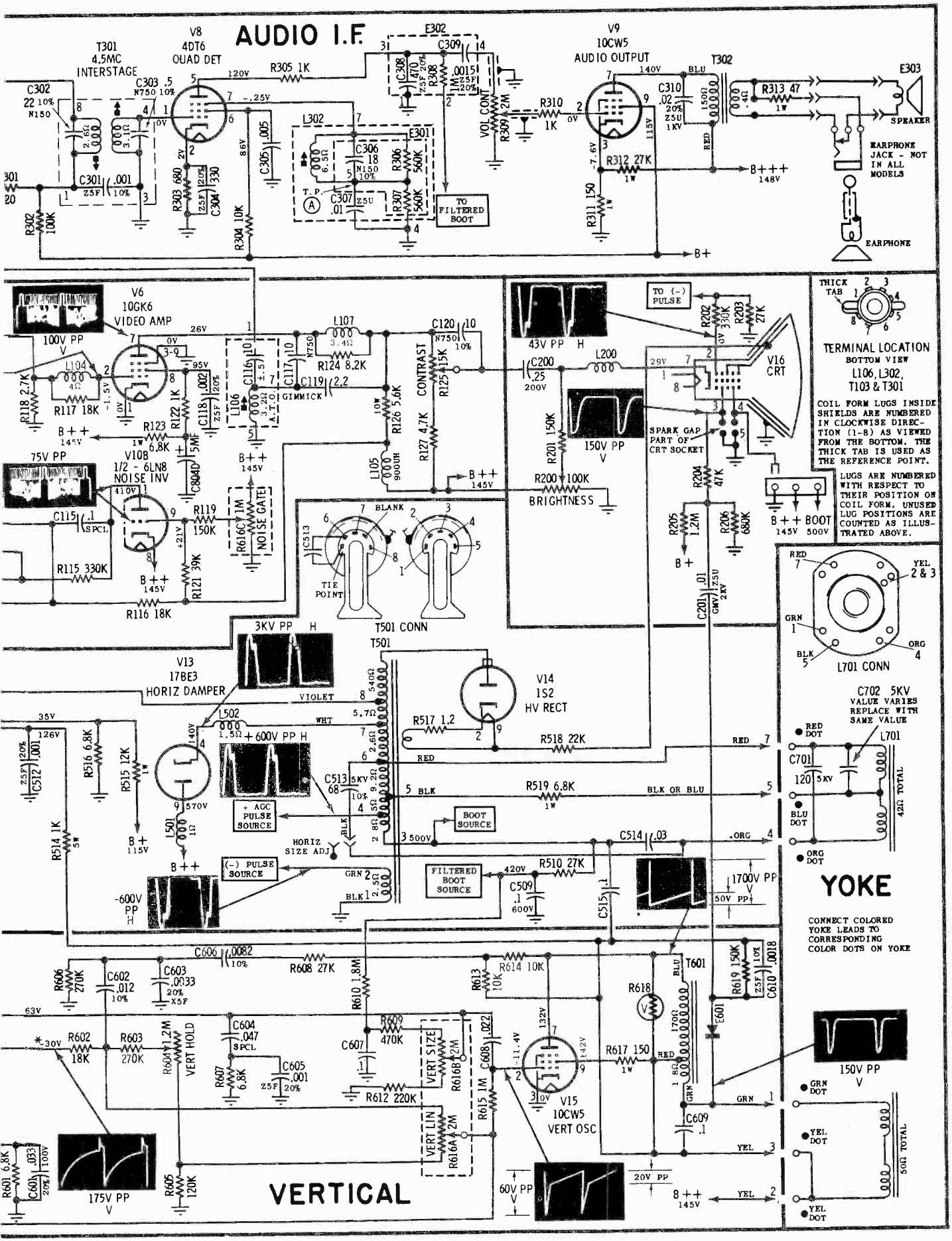








CAPACITORS UNLESS OTHERWISE SPECIFIED, VALUES LESS THAN ONE IN MF; ALL OTHERS IN PF.



*INDICATES SPECIAL COMPONENTS

MOTOROLA Chassis ++TS-596 Alignment Information, Continued

ALIGNMENT CHASSIS TS-596

PRE - ALIGNMENT INSTRUCTIONS

Before alignment of the video I.F. section is attempted, it is advisable to thoroughly check the system. If alignment is attempted on an I. F. section in which a faulty component exists, successful alignment will probably be impossible and the entire procedure will have to be repeated when the real cause of the trouble is corrected. Preliminary tests of the system should include voltage and resistance measurements, routine checks for bad soldering connections and visual inspection of the circuits for overheated components as well as for obvious wiring defects.

VIDEO IF & MIXER ALIGNMENT

Pre - Alignment Steps

1. Maintain line voltage at 120 with variac.

2. Remove the yellow lead from yoke to eliminate RF interference radiation.

3. Disable local oscillator. Ground oscillator grid of mixer-oscillator tube with a piece of bare wire to the tube shield.

4. Apply the negative lead of a 6.0 volt bias supply to I.F. AGC buss and positive lead to chassis ground. See "Alignment Detail".

5. Connect a 750 ohm, 60 watt voltage normalizing resistor from B+ to chassis.

6. Set the contrast control at minimum (extreme counter-clockwise position).

7. Short across tuner input terminals.

8. Maintain 2 volts peak-to-peak at the grid of video amp except when specific values are given in the procedure chart.

9. Refer to "Video I.F. and Sound Alignment Detail" for component and test point locations.

NOTE: To reduce the possibility of inter-action between the two tuning cores in a double tuned transformer or coil, each core should be adjusted for optimum response in the tuning position nearest its respective end of the coil form.

VIDEO IF & MIXER ALIGNMENT PROCEDURE

STEP	SWEEP GENERATOR AND MARKER	INDICATOR	ADJUST	ADJUST FOR AND/OR REMARKS
1.	To grid of 3rd I.F. thru .001mf capacitor. Set sweep to approximately 44Mc, markers as required	Scope to grid of video amp thru 47K ohm resistor	Both cores of 3rd I.F. transformer (T-103)	Equal peaks and marker placement as shown in curve #1.
2.	To grid (pin #1) of 1st I.F. amp thru .001mf capacitor. Set sweep to 44Mc, markers as required	Same as Step #1	1st I.F. transformer (T-101) - 2nd I.F. transformer (T-102)	Proper 42.25Mc marker placement. See curve #2. Proper 45.75Mc marker placement. See curve #2. NOTE: Mixer plate coil (L-1) may cause suck-out in I.F. response. Detune transformer if desired.
3.	To mixer T. P. (M) thru .001mf capacitor. Set sweep to 44Mc, markers as required.	Same as Step #1	47.25Mc trap (L-101A bottom core)	Minimum response at proper trap frequency. See curve #3. NOTE: Temporary removal of bias and an increase of generator output may be required to see trap clearly.
4.	Same as Step #3	Same as Step #1	Mixer plate coil (L-1 on tuner) and 1st I.F. grid coil (L-101B - top core)	To obtain curve #4. The mixer coil affects the center peak and the grid coil affects the low side peak. Tune coils simultaneously for proper tuning and band-width consistent with maximum gain. If necessary, the 1st and 2nd I.F. transformers can be touched-up to obtain proper response as shown in curve #4. NOTE: The 41.25Mc marker must fall at the 90% level of this response curve or higher as shown in curve #4. If necessary, the 42.25Mc marker placement may deviate slightly to properly place the 41.25Mc marker.

SOUND ALIGNMENT (STATION SIGNAL METHOD)

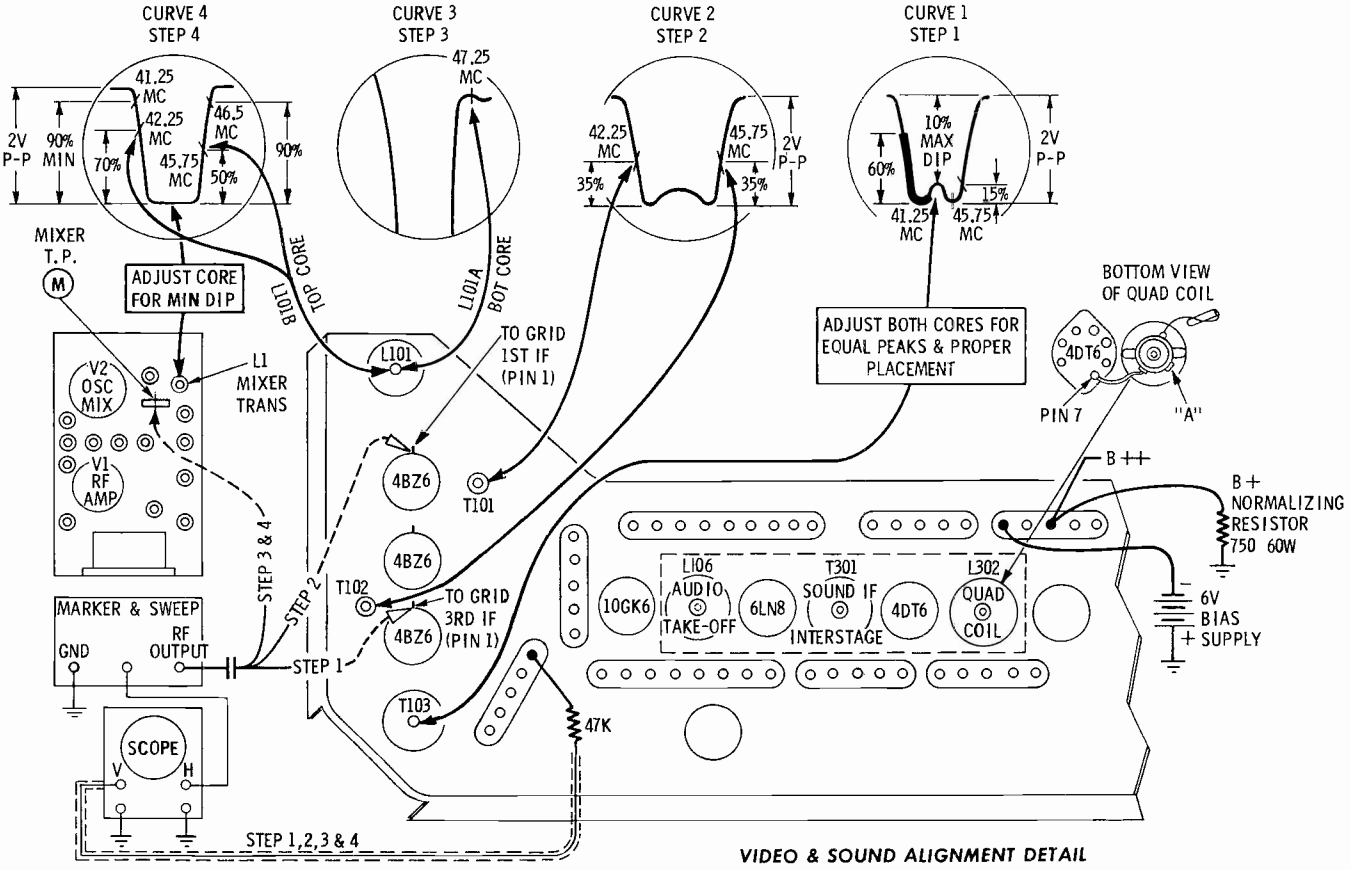
The sound system used in this receiver consists of an audio I.F. amplifier stage, a quadrature grid detector and an output stage. Since this type of sound system is extremely sensitive, relatively small input signal voltage will cause grid current to flow in both the I.F. amplifier and the detector stages. Grid current through the tuned coils will load them down making the adjustment extremely broad and alignment impossible. For this reason, it is necessary to use a very weak signal when aligning the driver and the detector input coils. Actually, the signal should be well down into the noise level for proper tuning action.

Preliminary Steps

1. Tune in a strong TV station.

2. Adjust all controls for normal picture and sound.

3. Refer to "Video I.F. & Mixer Alignment Detail" for coil and test point locations.



VIDEO & SOUND ALIGNMENT DETAIL

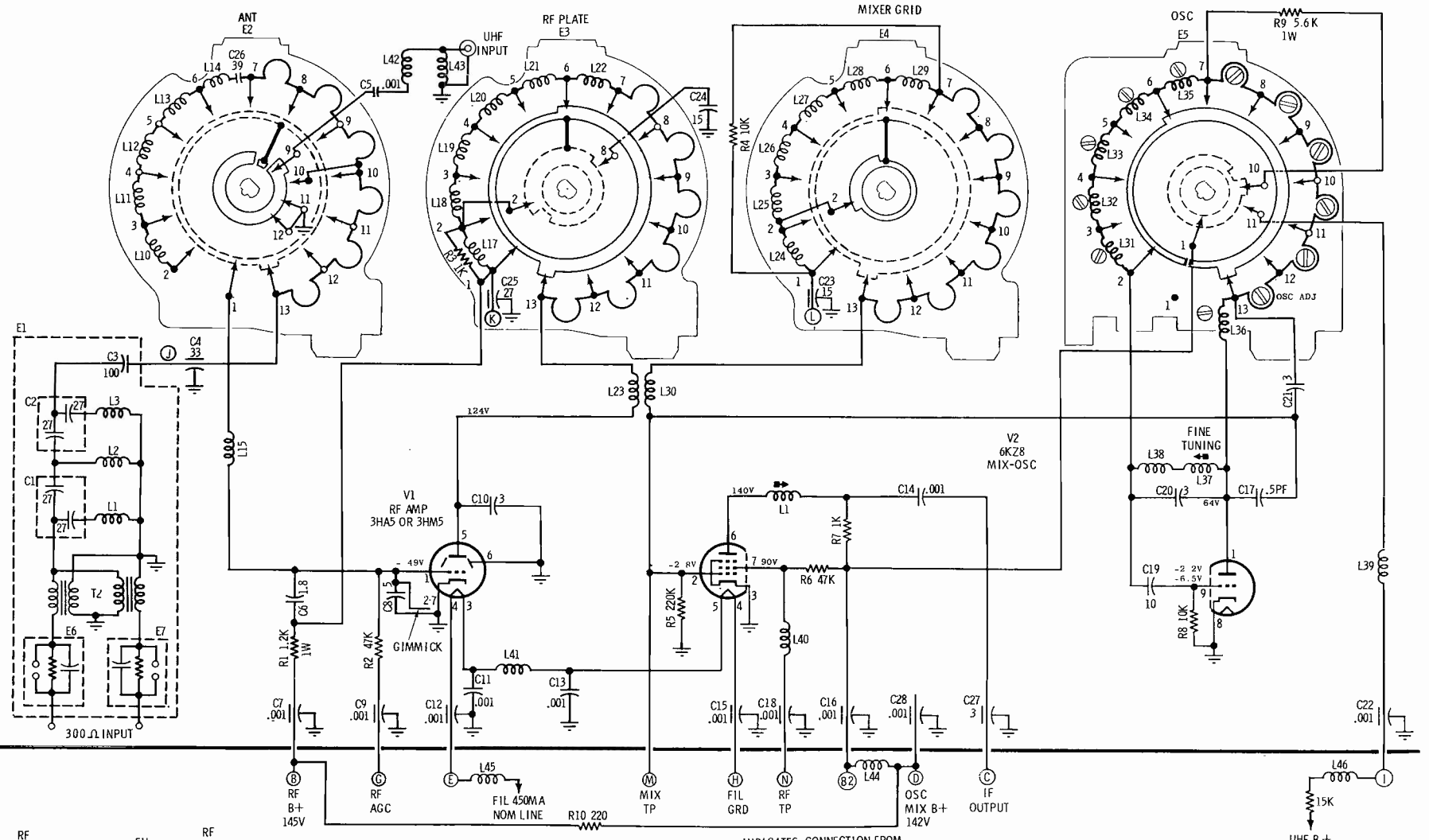
SOUND ALIGNMENT PROCEDURE

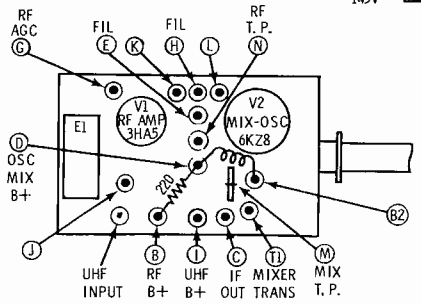
STEP	STATION	INDICATOR	ADJUST	ADJUST FOR AND/OR REMARKS
1.	Strong signal	VTVM to point (A) on quad. coil L-302. (See schematic diagram.)	L-302 (quad. coil)	Maximum deflection (coarse adjustment) of two possible maximum tuning points, use that giving largest voltage reading.*
2.	"	Listening test.	"	Maximum sound with minimum distortion (fine adjustment).
3.	Weak signal	"	T-301 (inter-stage coil)	Maximum sound with minimum distortion (maintain hiss level).**
4.	"	"	L-106 (take-off coil)	Maximum sound with minimum distortion.

If sound is not clear at this point, repeat the above procedure as necessary.

*The purpose of the top pre-set core is to enable the adjustable core to make the tuning range required while reducing the physical length. If the pre-set core should be misadjusted by previous service work, merely re-set near top end of coil and tune for maximum.

**The signal must be weakened considerably either by disconnecting one side of the antenna lead or connecting low value resistors across the antenna terminals until a pronounced hiss appears in the sound. The hiss level must be maintained for proper alignment.





NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, VALUES LESS THAN ONE IN MF; ALL OTHERS IN PF

VOLTAGES - SEE CHASSIS SCHEMATIC DIAGRAM FOR VOLTAGE NOTES.

T. P. = TEST POINT

● INDICATES CONNECTION FROM FRONT TO REAR SW TERMINALS

○ INDICATES NO CONNECTION FROM FRONT TO REAR SW TERMINALS.

TUNER WAFERS SHOWN VIEWED FROM FRONT

DOTTED ROTOR IS REAR ROTOR.

CHANNEL SELECTOR SHOWN IN CHANNEL 13 POSITION.

SCHEMATIC DIAGRAM - VHF TUNER TT-393Y

Tuner TT-393Y used in MOTOROLA Chassis ++TS-596

PHILCO

The model-chassis cross reference charts below will tell you what chassis material is needed for any particular model. All chassis types and corresponding reference to pages for such material are listed directly below.

Chassis 15J25 very similar to 15J27, follow material on pages 73-77;
Chassis 15J27 diagrams, service material, alignment, see pages 73-77;
Chassis 16J27 service material on pages 78-81, alignment facts on 73-74;
Chassis 16JT26,A, diagram, service data, alignment, see pages 85-90;
Chassis 16N35 service material on pages 82-85, alignment data on 73-74.

1966 "P" LINE TELEVISION MODEL CHASSIS CROSS REFERENCE

MODEL CHASSIS CROSS REFERENCE

MODEL	CHASSIS	VHF TUNER	UHF TUNER
PORTABLE MODELS			
P3309TN	15J27	TT-162 76-13579-1	TT-150C 76-13439-3
P3310TN	15J27	TT-162 76-13579-1	TT-150C 76-13439-3
P3310XBE	16J27	TT-162A 76-13579-6	TT-152A 76-13872-1
P3312GY, WH	16J27	TT-162A 76-13579-6	TT-152A 76-13872-1
P3314GY, WH	16J27	TT-162A 76-13579-6	TT-152A 76-13872-1
P3390BK	16J27	TT-162A 76-13579-6	TT-152A 76-13872-1
COMPACT MODELS			
P3540TN	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3542BR, WH	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3544MA, WA	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3552BE	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3554WA	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3555WH	16JT26A	TT-201A 76-13851-3	TT-152 76-13827-1
P3556MA, WA	16JT26A	TT-201A 76-13851-3	TT-152 76-13827-1
P3594WA	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3609BK, IV	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3616WA	15J25	TT-163 76-13579-2	TT-155X 76-13588-6
P3620MA, WA	16JT26A	TT-201A 76-13851-3	TT-152 76-13827-1
P3902BE	16JT26	TT-201B 76-13851-4	TT-152 76-13827-1
P3904WA, MA	16JT26	TT-201B 76-13851-4	TT-152 76-13827-1
P3906WA	16JT26	TT-201B 76-13851-4	TT-152 76-13827-1

MODEL	CHASSIS	VHF TUNER	UHF TUNER
TABLE & CONSOLE MODELS			
P4320BK	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4322MB, WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4324MB, WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4540MB, WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4542MB, WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4544WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4546CH, MA, WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4548PC, WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4550WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4552CH, MA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1
P4734WA	16N35	TT-163A 76-13579-5	TT-152 76-13827-1

General information applicable to all chassis is on pages 70 through 72.

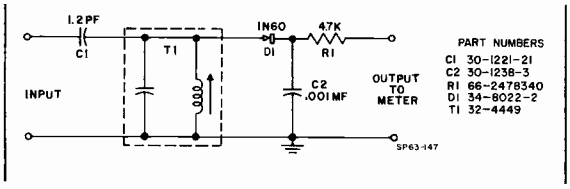
SPOT DECAY SWITCH S2 (15J25 & 15J27)

When switch S2 is in open position (set turned off) it instantaneously removes external bias from the CRT cathode and prevents spot decay. Switch S2 is part of the volume control.
(Service Hint) - Should the brightness control become ineffective, check switch S2.

GENERAL INFORMATION

4.5MC DETECTOR JIG

It is important that the jig be properly aligned to give proper results. Connect detector jig to an accurate source of 4.5MC signal and pad transformer (T1) for maximum D-C voltage output. Signal generator can be calibrated by zero beating with sound I-F developed from station signal.



TUNER OSCILLATOR ALIGNMENT

This procedure uses the traps of the video I-F channel; thus, proper oscillator adjustment is dependent upon an accurately aligned I-F strip.

1. Connect A-M generator to antenna input terminals (no matching network required). Use 30% modulated signal.
2. Connect oscilloscope to the video detector output lug.
3. Tuners using fine tuning control:

Set the fine tuning control in the middle of its range, then proceed with the padding of each channel oscillator adjustment for minimum scope indication (See chart below).

STEP	AM GEN. FREQ.	TUNER POSITION	VIDEO CARRIER FREQ. (MC)	SOUND CARRIER FREQ. (MC)
1	209.75MC	Channel 13	211.25	215.75
2	203.75MC	Channel 12	205.25	209.75
3	197.75MC	Channel 11	199.25	203.75
4	191.75MC	Channel 10	193.25	197.75
5	185.75MC	Channel 9	187.25	191.75
6	179.75MC	Channel 8	181.25	185.75
7	173.75MC	Channel 7	175.25	179.75
8	81.75MC	Channel 6	83.25	87.75
9	75.75MC	Channel 5	77.25	81.75
10	65.75MC	Channel 4	67.25	71.75
11	59.75MC	Channel 3	61.25	65.75
12	53.75MC	Channel 2	55.25	59.75

TUNER OSCILLATOR ALIGNMENT FOR PRESET FINE TUNING

The oscillator frequency for the various channels is controlled by the position of the gear-headed tuning screws in coils L2T thru L13T inclusive. The position of these screws is in turn controlled by the fine tuning shaft and its associated preset mechanism. The range is ordinarily ample to cover tube replacement. However, if it should become impossible to tune any of the high channels to the correct frequency, coil L37T may be adjusted as follows:

1. Set the tuner to channel 13 or the highest available channel (air signal).
2. Turn the fine tuning control so as to set the gear-headed screw to the mechanical center of its travel.
3. Adjust L37T with an insulated tool to obtain a correctly tuned picture.
4. The remaining high channels may be set correctly by means of the fine tuning control.
5. L37T will have only a small effect on low channel oscillator frequencies.

If an accurately calibrated AM generator is available, the following procedure which depends on a properly aligned I-F strip may be used:

1. Connect AM generator to antenna input terminals. Use 30% modulated signal.
2. Connect oscilloscope to the video detector output lug.
3. Set the tuner to channel 13 and the generator to 209.75MC. Adjust generator level for some convenient scope indication with a scope sensitivity of at least 0.5V p/p.
4. Turn the fine tuning control so as to set the gear-headed tuning screw to the mechanical center of its travel.
5. Adjust L37T with an insulated tool for minimum scope output.
6. The remaining channels may be set correctly by means of the fine tuning control using the frequencies indicated in the table below and adjusting for minimum scope output.

TUNER POSITION	AM GEN. FREQUENCY
Channel 13	209.75 MC
Channel 12	203.75 MC
Channel 11	197.75 MC
Channel 10	191.75 MC
Channel 9	185.75 MC
Channel 8	179.75 MC
Channel 7	173.75 MC
Channel 6	81.75 MC
Channel 5	75.75 MC
Channel 4	65.75 MC
Channel 3	59.75 MC
Channel 2	53.75 MC

CHECKING THE HORIZONTAL PHASE COMPARER SELENIUM (D1)

When servicing television receivers where the dual selenium diode is suspected, a fast and efficient method of checking them is this:

A 20,000 ohm/volt meter is employed. On the 10K scale, the forward resistance (meter connected in the same polarity as the diode) should be a maximum of 6000 ohms. The ratio of the forward resistances of the two diodes should be less than 2 to 1. On the 100K scale, the back resistance (meter connected in reverse polarity to the diode) should be a minimum of 2 megohms. The center of the phase comparer is the common negative.

HORIZONTAL OSCILLATOR ADJUSTMENT

Allow set to warm up. Tune in a picture.

1. Short out horizontal ringing and by placing jumper from pin #1 to pin #3 of coil.
2. Adjust horizontal hold control to correct horizontal line frequency (to stop picture); it will not be stable. On models with auxiliary horizontal control (16N35), set horizontal hold control to center of its range and adjust aux. horizontal control to correct line frequency.
3. Remove shorting jumper and adjust ringing coil for stable picture

NOISE CONTROL SETUP

The noise control adjusts the bias of the noise inverter stage for optimum performance at all signal levels. The procedure for adjustment is as follows:

1. Adjustment should be made on weak signal.
2. Adjust fine tuning control until slight sound beat appears in picture.
3. Adjust noise control (clockwise) until the picture appears watery or shifts sideways. This condition is due to the noise inverter stage clipping sync.
4. Back off noise control (counterclockwise) until picture appears stable, then rotate approximately 30° in same direction for additional safety.

COLD CHECK

1. Remove A-C plug from wall outlet and place a jumper between the two plug prongs. Turn receiver A-C switch "on".

2. Connect one lead from an ohmmeter to the jumpered A-C plug and touch the other ohmmeter lead to the exposed metal parts of the cabinet and trim (including antenna). Limits which the reading should fall are between 1.5 meg and 3.5 meg.

HOT CHECK

1. Connect receiver to A-C outlet and turn set "on".

2. Connect a 1500 ohm, 10 watt, resistor across the terminals of a 1000 ohm/volt A-C voltmeter. Connect one lead of the meter to earth ground and touch the other lead to the exposed metal parts of the cabinet and trim (including the antenna). The voltage measured (on the 2.5V scale) should not exceed 0.4V RMS. Start check with meter on higher range to protect meter against overload.

3. If the "polarized plug" has been defeated in any way, such as by an adaptor plug for homes without polarized wiring, then reverse the A-C plug in the wall socket and check voltage reading again. NOTE: There shouldn't be any reading if the "polarized" plug has not been defeated, as the "polarized" plug automatically connects the metal parts of the receiver to earth ground thereby further eliminating any hazard.

16JT26 TRANSISTOR IF CIRCUIT DESCRIPTION

The new 40 mc transistorized if system in the 16JT26 chassis is operated by its own +12-volt power supply. This voltage originates from a winding on the H.O.T. and is rectified by a conventional half-wave rectifier circuit. The +150-volt power supply for vacuum tubes is developed through a conventional half-wave rectifier circuit previously used.

The if system consists of three NPN type, high frequency transistor stages and a conventional 2nd detector diode.

The signal, which is developed from a three-transistor VHF tuner, is link-coupled through the same type of vif trap module used with a tube if circuit. The panel consists of two adjacent sound traps (L17 and L20) and an absorption-type accompanying sound trap (L18). The if signal is inductively-coupled stagger-tuned through the if system.

Neutralization is required for high frequency transistors and is accomplished by tapping the 1st, 2nd and 3rd if coils, L14, L11 and L5. The signal in the tapped portion of the if coils is returned to the +12-volt line.

The signal developed in the tapped portion is out of phase with the signal in the collector circuit, and is fed back to the base of the 1st if through capacitor C39, the base of the 2nd if through C26, and the base of the 3rd if through C10. This out-of-phase signal will cancel any feedback from collector to base within the transistor. This helps to increase the power gain while maintaining stability.

Damping resistors R73, R52A and R30A are placed across the 1st base pole, 1st if transformer and 2nd if transformer respectively. This lowers the "Q" of the coils to attain a broader bandpass for fringe reception.

A small value capacitor (C34) in the 1st if transformer is used for tuning. The 2nd if transformer is tuned by its own distributed capacity. Capacitor C11, in the 3rd if, and capacitor C1, in the secondary of L5, are used to tune their respective stages.

AGC is applied from a transistor AGC amplifier and is fed to the base of the 2nd if, (Q4) through coil L13. The AGC is then

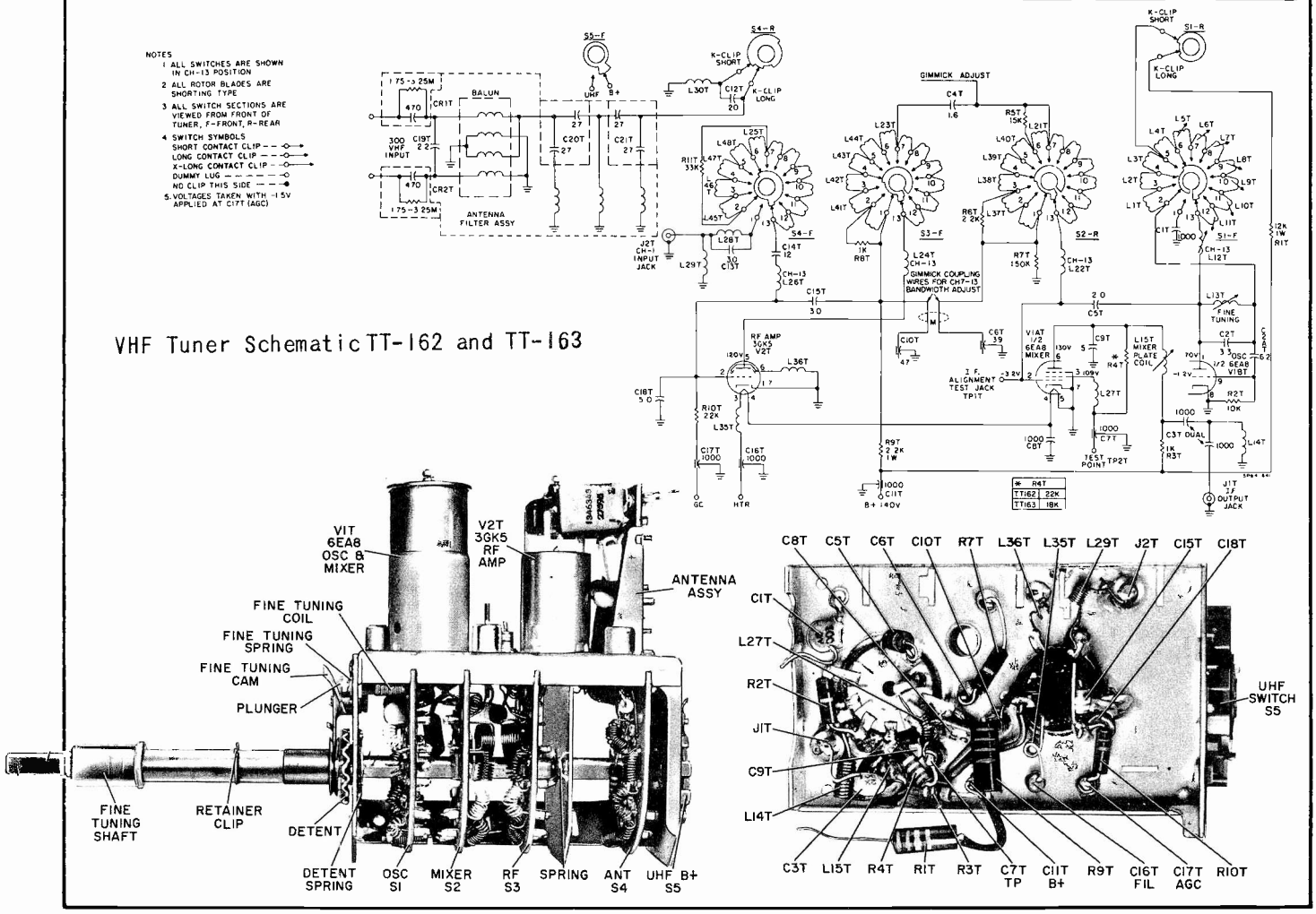
applied to the 1st if stage through the emitter of Q4 and a divider network (R43 and R44) which is tapped and is fed to the base of the 1st if through resistor R53.

The 1.5 pf capacitor (C5A), wired between the base and emitter of the 3rd vif transistor, is used to prevent spurious oscillations at ultra-high frequencies.

16JT26 CHASSIS TRANSISTOR A.G.C. SYSTEM

AGC voltage for the video if system and tuner is obtained from a keyed AGC system which uses transistor Q2 (TV17) as the AGC gate and an emitter follower transistor (Q3 TV18). Composite video from the plate circuit of the video amplifier is fed to the base of Q2 while a gating pulse, obtained from a winding on the horizontal output transformer, is applied to the collector. The sync pulse polarity applied to the base of Q2 is positive. Therefore the AGC gate transistor can conduct in proportion to the amplitude of the sync pulse tips if the gating pulse occurs at the same time as the sync. Because the amplitude of the gate pulse is constant (approximately 40 volts peak to peak), the amplitude of the sync pulse will determine the amount of conduction in the gate transistor. The amplitude of the signal developed across the emitter load resistor is proportional to the emitter current. This signal is coupled, rectified, and filtered to provide a positive voltage for the base of the emitter follower and controls the amount of emitter current in this stage. This current flows through a resistor network developing a voltage which is positive with respect to chassis and whose amplitude is proportional to the emitter current. This positive voltage is used to control the gain of the receiver, and is fed to the 1st video if stage and the tuner. A Zener diode (D5) provides a delay in tuner AGC voltage. Since conduction cannot occur in the AGC gate transistor unless the sync pulse and the gating pulse occur at the same time, noise disturbances that occur between sync pulse intervals cannot affect the AGC voltages.

The contrast control is in the plate of the video output tube and controls the gain of the stage.



PHILCO Alignment Data for Chassis 15J25, 15J27, 16J27, 16N35

CHASSIS ALIGNMENT 15J25 15J27 16J27 & 16N35
VIDEO I-F AM AND SWEEP ALIGNMENT PROCEDURE

Preliminary Information

The following video I-F alignment procedure is based upon a tuner with proper bandpass alignment connected to the TV chassis.

1. Allow set to warm up 10 minutes minimum.
2. Apply -15VDC bias to AGC TP lug (M12).
3. Connect scope thru a 15K resistor to 2nd detector TP lug (M28). Calibrate scope for 2V p/p for 100% deflection.
4. Connect AM and marker signal generator thru a .0015 mf capacitor to TP1T (on tuner) I-F test jack.
5. Connect sweep generator through a 72 ohm to 300 ohm matching network to antenna terminals.
6. Preset core adjustments
   a. L13 and L15, six turns out from flush core position
   b. L14, L16 and L18 fully engaged
   c. L19, two turns out from flush core position

AM ALIGNMENT CHART

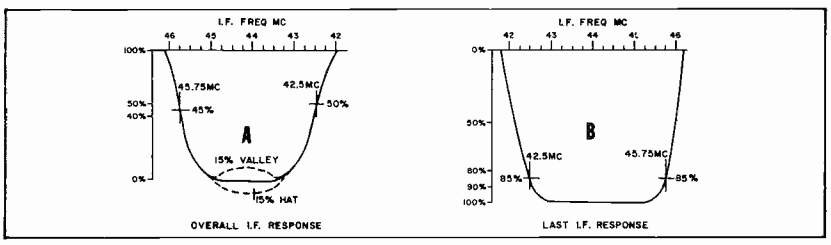
STEP	AM MOD. 400 AT 30%	ADJUST	REMARKS
1	43.5MC	L11 - FOR MAX.	ADJUST FOR FIRST PEAK DOWN FROM FLUSH CORE POSITION
2	42.75MC	L15T (ON TUNER) - FOR MAX.	
3	45.25MC	L15 - FOR MAX.	
4	41.25MC	L14 - FOR MIN.	BIAS MAY BE LOWERED TO PRODUCE SUFFICIENT SCOPE AMPLITUDE
5	47.25MC 47.25MC	L13 - FOR MIN. L16 - FOR MIN.	BE SURE TO ADJUST L13 FIRST, THEN L16. BIAS MAY BE LOWERED TO PRODUCE SUFFICIENT SCOPE AMPLITUDE
6	REPEAT STEP 5 UNTIL NO FURTHER IMPROVEMENT IS OBTAINED.		

CAUTION: REMOVE AM GENERATOR FROM TP1T BEFORE PROCEEDING WITH SWEEP ALIGNMENT.
NOTE: TO PROPERLY POSITION FINE TUNING FOR SWEEP ALIGNMENT, SET TUNER TO CHANNEL 4 AND INJECT 65.75MC, 30% MODULATED AT ANTENNA TERMINALS. ADJUST FINE TUNING CONTROL FOR MINIMUM SCOPE INDICATION. DO NOT TOUCH FINE TUNING OR CHANNEL SELECTOR FOR BALANCE OF ALIGNMENT.

SWEEP ALIGNMENT CHART

1. Repeat Steps 1, 2, 3 and 5 in preliminary information.
2. Inject low impedance 40MC sweep to lug (M35A). Make sure sweep is not in overload. Marker level should be such that output level is not affected.
3. To obtain response curve (Figure B)
   a. Adjust L19 for marker positions
   b. Adjust L18 to rock response curve
   c. Remove RF sweep before proceeding with 40MC sweep adjustment
4. Remove 40MC sweep.
   CAUTION: Do not attempt to adjust L18 or L19 after they have been 40MC sweep aligned.
5. To obtain response curve (Figure A), proceed with Steps 7 and 8.

STEP	SWEEP GEN. APPROX. 8 MC SWEEP WIDTH	MARKER GEN. UNMOD. R-F	ADJUST	REMARKS
7	44MC	42.5MC	L15T (TUNER I-F COIL)	ADJUST L15T TO PLACE 42.5MC MARKER BETWEEN INDICATED LIMITS ON SOUND SIDE OF CURVE (FIG. A). ADJUST SWEEP GEN. LEVEL TO LIMIT SCOPE TO 2V P/P DEFLECTION. KEEP RESPONSE LEVEL WITH L11.
8	44MC	45.75MC	L15	ADJUST L15 TO PLACE 45.75MC MARKER BETWEEN INDICATED LIMITS ON VIDEO SIDE OF CURVE (FIG. A). KEEP RESPONSE LEVEL WITH L11.



PHILCO Alignment Information for certain sets, continued

CHASSIS ALIGNMENT 15J25 15J27 16J27 & 16N35

4.5MC TRAP, SOUND TAKE-OFF AND INTERSTAGE ALIGNMENT

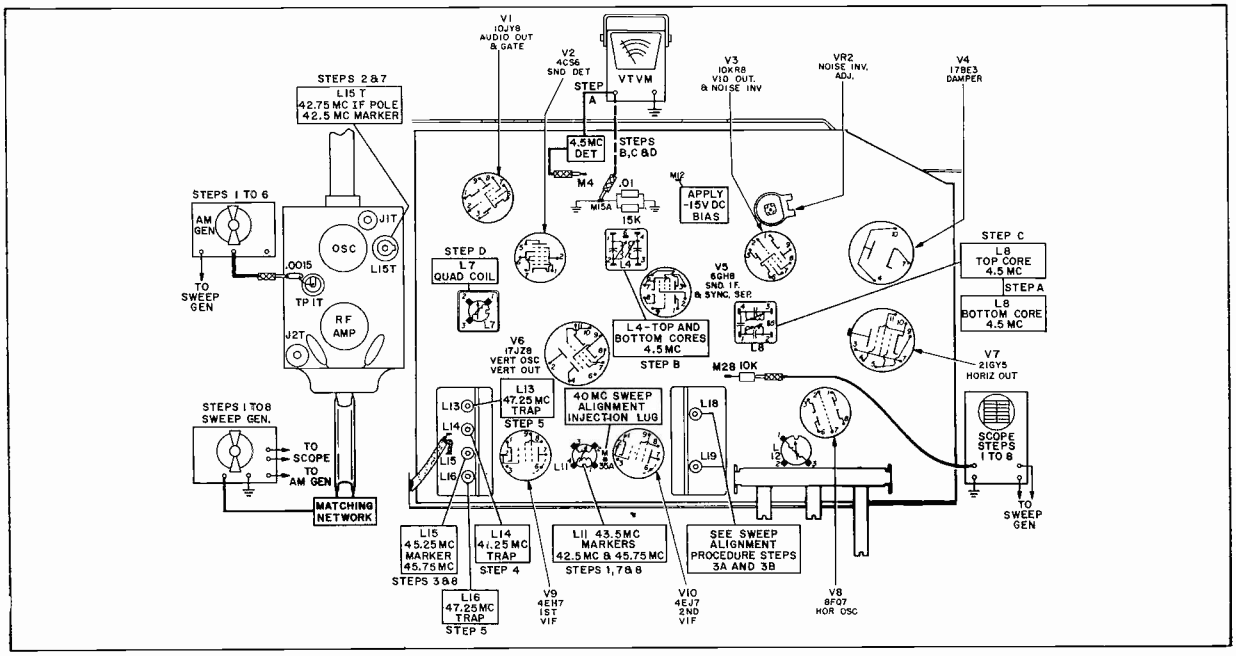
Preliminary:

1. Set contrast control to maximum
2. Set volume control to minimum
3. Apply -15 bias to lug M12

Equipment:

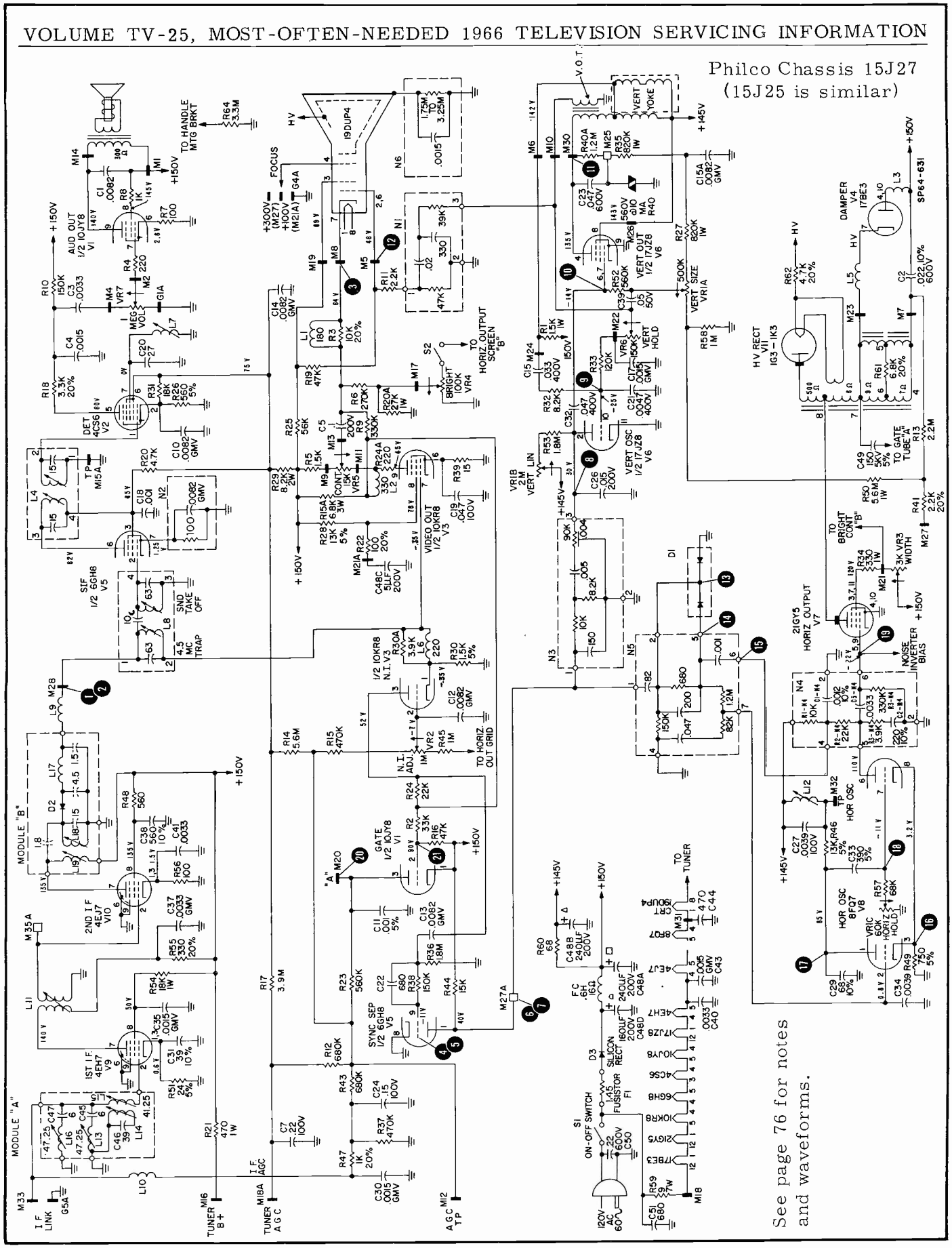
1. V.T.V.M.
2. AM Generator
3. RC Network (15K resistor and .01 mfd in parallel)
4. 4.5MC Detector Probe

STEP	SIGNAL INPUT THROUGH 1500Ω RESISTOR TO LUG M28	OUTPUT	ADJUST	REMARKS
A	4.5MC AM OR STATION SIGNAL	CONNECT 4.5MC DETECTOR PROBE TO LUG M4. CONNECT VTVM TO 4.5MC PROBE. SET METER TO 2.5V RANGE.	L8 (BOTTOM CORE) FOR MINIMUM OUTPUT INDICATION ON VTVM.	INCREASE SIGNAL INPUT TO GIVE 1/4 SCALE DEFLECTION AT NULL POINT (THIS STEP FOR 4.5MC TRAP ADJ. ONLY).
B	4.5MC AM OR STATION SIGNAL	REMOVE GROUND CONNECTION FROM LUG M15A. CONNECT RC NETWORK FROM M15A TO GROUND. PLACE VTVM ACROSS NETWORK. INPUT SHOULD BE ADJUSTED TO KEEP OUTPUT BETWEEN .1V AND .2V.	L4 (TOP & BOTTOM CORES) FOR MAXIMUM INDICATION ON VTVM.	RC NETWORK CONSISTS OF A 15K RESISTOR AND A .01 MFD CAPACITOR IN PARALLEL.
C	4.5MC AM OR STATION SIGNAL	SAME AS STEP B	L8 (TOP CORE) FOR MAXIMUM INDICATION ON VTVM.	
D	USE STATION SIGNAL	REMOVE RC NETWORK AND REPLACE GROUND TO LUG M15A	QUAD COIL L7 FOR MAXIMUM SOUND OUTPUT.	THE CORRECT PEAK WILL BE THE SECOND ONE WHEN TURNING CORE INTO COIL.



Equipment Setup & Alignment Points

Philco Chassis 15J27
(15J25 is similar)



See page 76 for notes and waveforms.

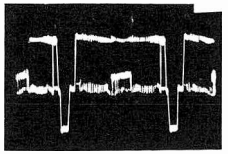
RESISTANCE CHART

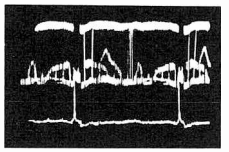
TUBE	USE	1	2	3	4	5	6	7	8	9	10	11	12
V1 10JY8	Aud. Out. & Gate	12KΩ	36KΩ	1.5MΩ	FIL.	FIL.	100Ω	260Ω	12KΩ	12KΩ			
V2 4CS6	Snd. Det.	6Ω	500Ω	FIL.	FIL.	200KΩ	12KΩ	3.5Ω					
V3 10KR8	Video Out. & N.I.	120Ω	900KΩ	35KΩ	FIL.	FIL.	15	100Ω	25KΩ	12KΩ			
V4 17BE3	Damper	FIL.	INF.	INF.	12KΩ	INF.	INF.	9MΩ	INF.	INF.	12KΩ	INF.	FIL.
V5 6GH8	Snd. I-F & Sync Sep.	12KΩ	2Ω	12KΩ	FIL.	FIL.	12KΩ	450Ω	GND.	1.9MΩ			
V6 17JZ8	Vert. Osc. & Vert. Out.	FIL.	3.8MΩ	INF.	12KΩ	INF.	1.8MΩ	1.8MΩ	12KΩ	GND.	200KΩ	GND.	FIL.
V7 21GY5	Hor. Out.	FIL.	INF.	12K	GND.	300KΩ	12KΩ	12KΩ	12KΩ	300KΩ	GND.	12KΩ	FIL.
V8 8FQ7	Horz. Out.	25KΩ	1.8MΩ	700Ω	FIL.	FIL.	45KΩ	95KΩ	700Ω	GND.			
V9 4EH7	1st Video I-F	24Ω	420KΩ	24Ω	FIL.	FIL.	GND.	12KΩ	20KΩ	GND.			
V10 4EJ7	2nd Video I-F	100Ω	0Ω	100Ω	FIL.	FIL.	GND.	12KΩ	12KΩ	GND.			

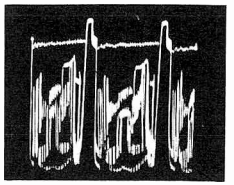
PANEL LUG CONNECTIONS

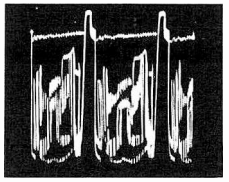
M1 LEAD TO A.O.T. (RED) AND LEAD TO C48A
M2 LEAD TO VR7 C.T. (GREEN)
M4 LEAD TO VR7 ARM (BLUE)
M5 LEAD TO CRT. PIN 2, 6
M6 LEAD TO M24 AND (WHITE/GREEN) LEAD TO YOKE
M7 LEAD (WHITE/BROWN) TO YOKE
M8 LEAD TO CRT. PIN 7
M9 LEAD TO VR5 ARM
M10 LEAD TO VR6 C.T.
M11 LEAD TO VR5 ARM
M12 AGC T.P.
M13 LEAD TO VR5 C.T.
M14 LEAD TO A.O.T. (BLUE)
M15 LEAD TO M22A AND LEAD TO VR3 ARM
M15A LEAD TO GROUND, T.P.
M16 LEAD TO TUNER B+ FEED THRU
M17 LEAD TO VR4 C.T.
M18 LEAD TO B1-1
M18A LEAD TO TUNER AGC FEEDTHRU
M19 LEAD TO CRT PIN 3
M20 LEAD (WHITE/BLUE) TO YOKE
M21 LEAD TO VR3 ARM AND PIN 4 OF S2
M21A LEAD TO C48C AND FOCUS LEAD
M22 LEAD TO VR6 ARM
M22A LEAD TO M15 AND LEAD TO M29
M23 LEAD TO PIN 7 OF H.O.T.
M24 LEAD TO M6 AND GREEN LEAD TO V.O.T.
M25 RESISTOR R40A
M26 LEAD TO C48B AND LEAD TO M35
M27 N/C
M27A N/C
M28 N/C 2ND DET. T.P.
M29 LEAD TO M22A AND LEAD TO C48A
M30 LEAD (BLUE) TO V.O.T.
M31 LEAD TO CRT PIN 1
M32 TEST POINT, HORZ. OSC.
M33 I.F LINK CABLE
M35 LEAD TO M26 AND (WHITE/ORANGE) LEAD TO YOKE
M35A TEST POINT

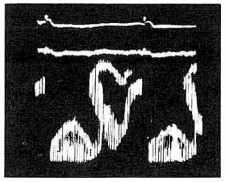
OSCILLOSCOPE WAVEFORM PATTERNS

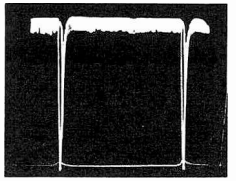

1 2.5 volts p/p, 15,750 cps (max. contrast)

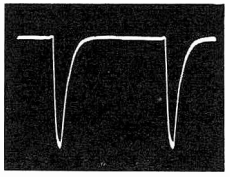

2 2.5 volts p/p, 60 cps (max. contrast)

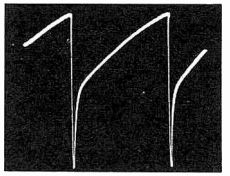

3 75 volts p/p, 15,750 cps (max. contrast)

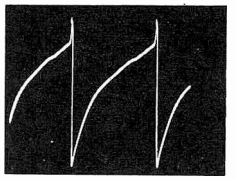

4 60 volts p/p, 15,750 cps

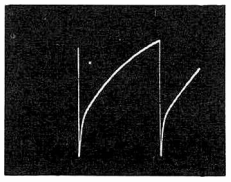

5 60 volts p/p, 60 cps

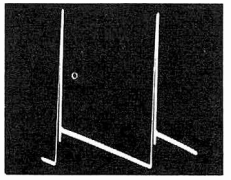

6 40 volts p/p, 60 cps

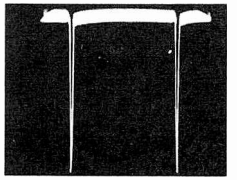

7 40 volts p/p, 15,750 cps

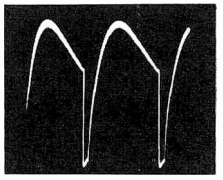

8 36 volts p/p, 60 cps

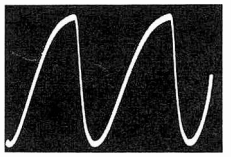

9 70 volts p/p, 60 cps

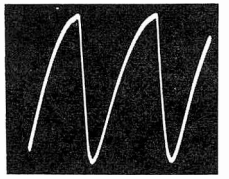

10 38 volts p/p, 60 cps

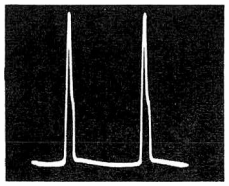

11 1100 volts p/p, total, 120 volts p/p sawtooth, 60 cps

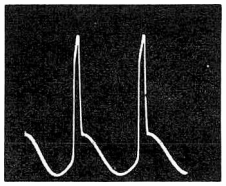

12 35 volts p/p, 60 cps

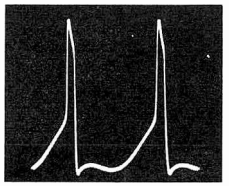

13 7 volts p/p, 15,750 cps

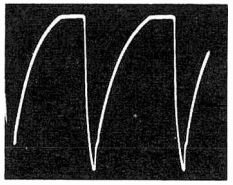

14 10 volts p/p, 15,750 cps

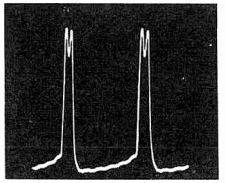

15 15 volts p/p, 15,750 cps

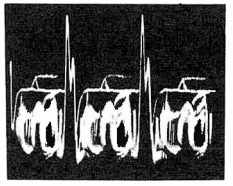

16 8 volts p/p, 15,750 cps


17 33 volts p/p, 15,750 cps

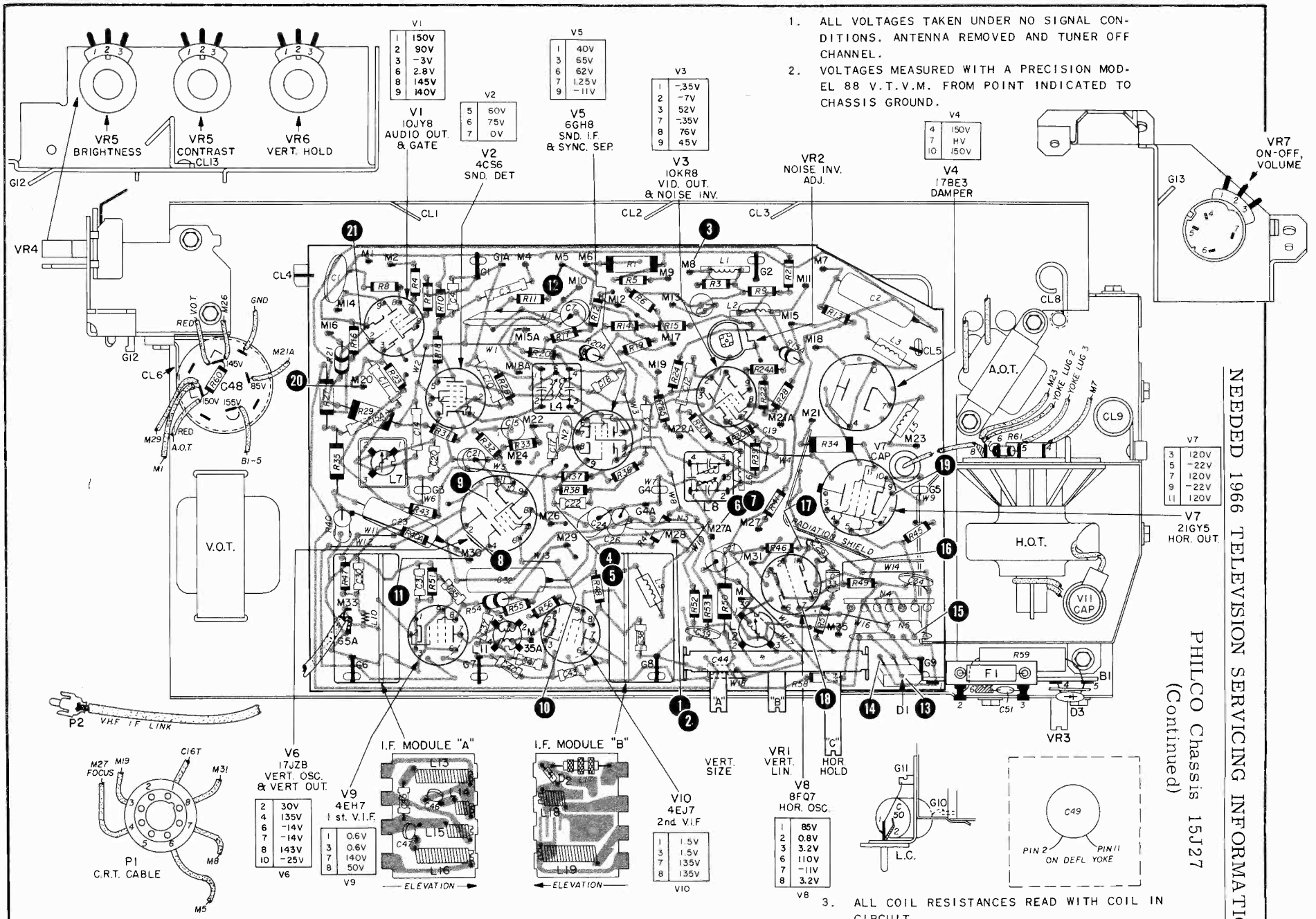

18 25 volts p/p, 15,750 cps


19 90 volts p/p, 15,750 cps


20 360 volts p/p, 15,750 cps


21 33 volts p/p, 15,750 cps

These waveforms were taken with the receiver adjusted for an approximate peak-to-peak output of 2.5 volts at the video detector. Voltage readings taken with raster just filling screen and all controls set for normal picture viewing except photos 1, 2 and 3 where contrast was set for maximum.



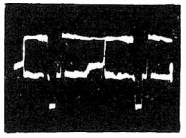
PHILCO Chassis 15J27

NEEDED 1966 TELEVISION SERVICING INFORMATION

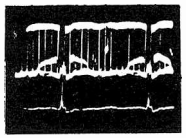
PHILCO Chassis 15J27 (Continued)

OSCILLOSCOPE WAVEFORMS

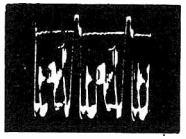
These waveforms were taken with the receiver adjusted for an approximate output of 2.5V p/p at the video detector. Voltage readings taken with raster just filling screen and all controls set for normal picture viewing except for photos 1, 2 and 3 where contrast was at maximum. The voltages given are approximate peak-to-peak values. The frequencies shown are those of the waveforms...not the sweep rate of the oscilloscope. All readings taken with Model ES-550B Precision Oscilloscope.



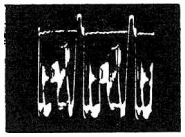
1 2.5 Volts p/p, 15,750 cps (max contrast)



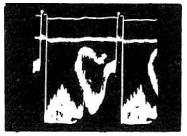
2 2.5 Volts p/p, 60 cps (max contrast)



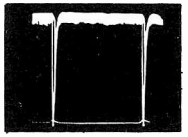
3 110 Volts p/p, 15,750 cps (max contrast)



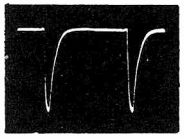
4 70 Volts p/p, 15,750 cps



5 70 Volts p/p, 60 cps

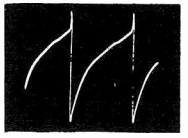


6 50 Volts p/p, 60 cps

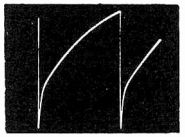


7 50 Volts p/p, 15,750 cps

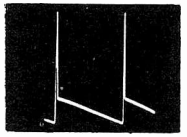
8 40 Volts p/p, 60 cps



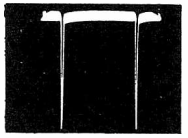
9 80 Volts p/p, 60 cps



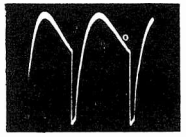
10 40 Volts p/p, 60 cps



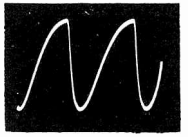
11 1300 Volts p/p total, 120 Volts p/p, sawtooth, 60 cps



12 60 Volts p/p, 60 cps

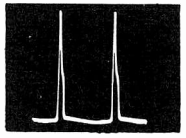


13 8 Volts p/p, 15,750 cps

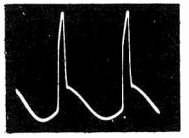


14 11 Volts p/p, 15,750 cps

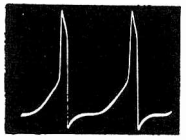
15 15 Volts p/p, 15,750 cps



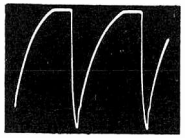
16 9 Volts p/p, 15,750 cps



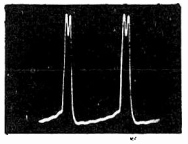
17 34 Volts p/p, 15,750 cps



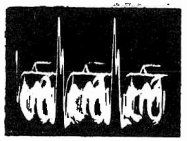
18 29 Volts p/p, 15,750 cps



19 100 Volts p/p, 15,750 cps



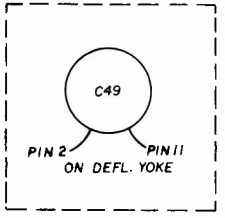
20 440 Volts p/p, 15,750 cps

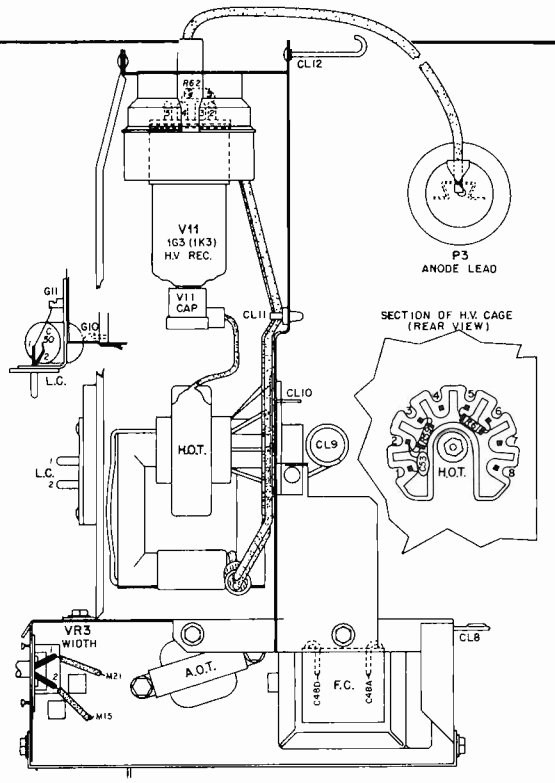


21 70 Volts p/p, 15,750 cps

16J27 PANEL LUG CONNECTIONS

FROM	TO
M1	A.O.T. & C48A
M2	VR7-#2
M4	VR7-#1
M5	CRT #2, #6
M6	M24 & YOKE #4
M7	YOKE #7 & H.O.T. #4
M8	CRT #5
M9	VR5-#1
M10	VR6-#2 & V.O.T.
M11	VR5-#3
M12	AGC T.P.
M12A	H.O.T. #2
M13	VR5-#2
M14	A.O.T.
M15	M22A & VR3-2
M15A	E (GND) SND T.P.
M16	C11T TUNER B+
M17	VR4-#2
M18	B1-4
M18A	C17T TUNER AGC
M19	CRT-#3
M20	YOKE #11 (C49)
M21	VR3-1 & VR4-1
M21A	C48C & FOCUS
M22	VR6-1
M22A	M15 & M29
M23	H.O.T. #7
M24	M6 & V.O.T.
M26	C48A & YOKE #6
M27	FOCUS
M28	2ND DETECTOR T.P.
M29	M22A & C48A
M30	V.O.T. & R40A
M31	CRT-#1
M32	HOR. OSC. T.P.
M33	J1T (TUNER IF)
M35	CHASSIS GND
M35A	IF T.P.

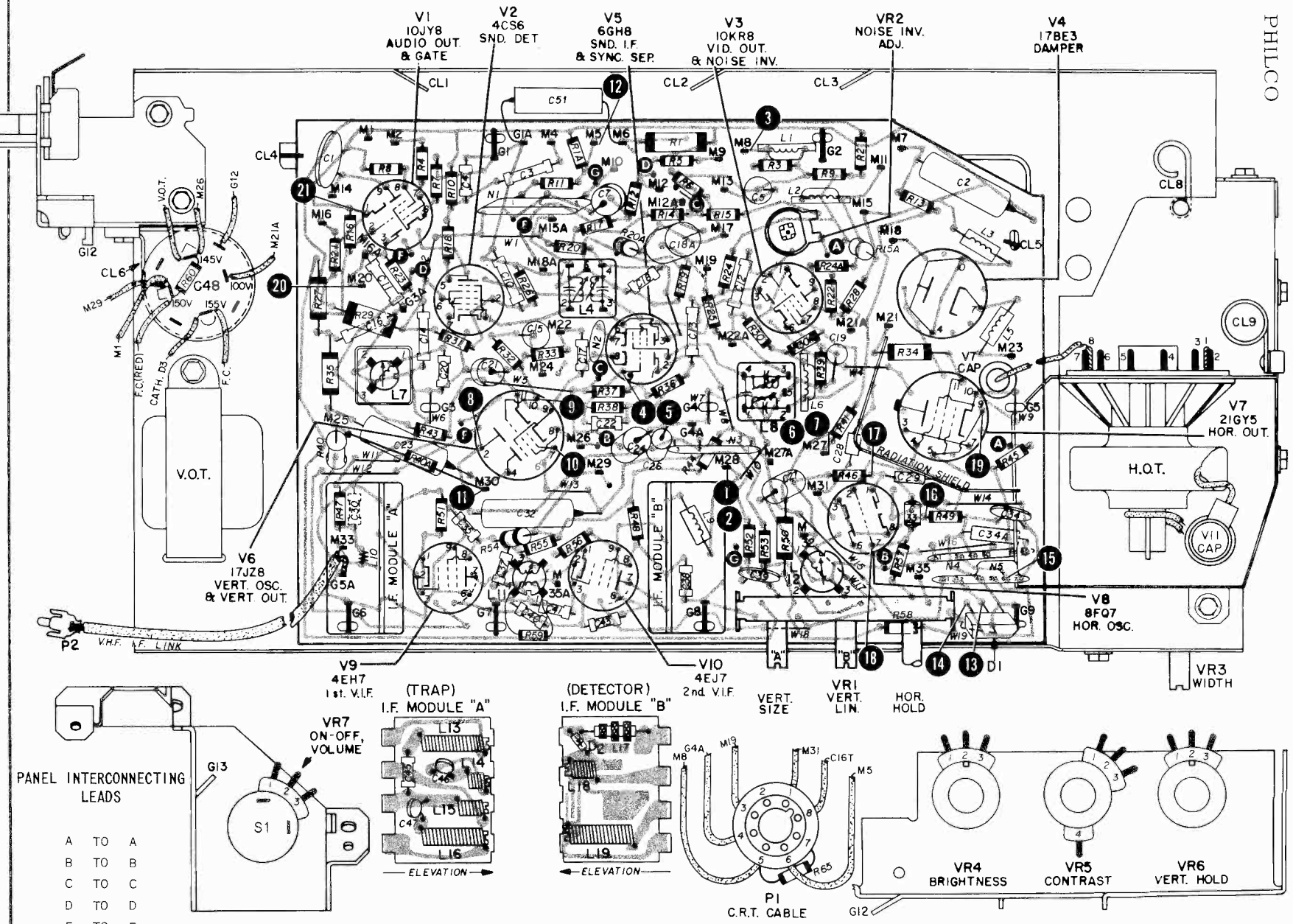




16J27 VOLTAGE AND RESISTANCE CHART

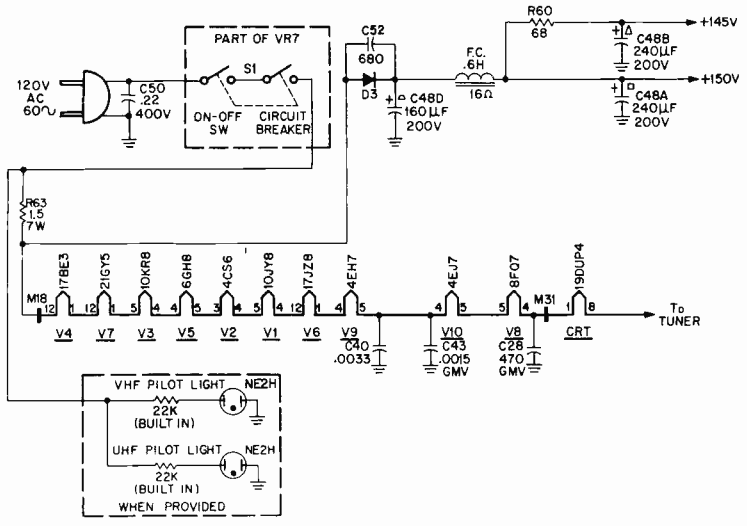
TUBE	USE	PIN NUMBERS 1	2	3	4	5	6	7	8	9	10	11	12
V1 10JY8	Aud. Out. & Gate	150V 12KΩ	83V 36KΩ	-3V 1.3MΩ	FIL	FIL	2.8V 100Ω	0V 260Ω	148V 12KΩ	145V 12KΩ			
V2 4CS6	Sound Detector	0V 6Ω	3.5V 500Ω	FIL	FIL	80V 200KΩ	75V 12KΩ	0V 3.5Ω					
V3 10KR8	Video Out. & M.I.	-.05 300Ω	-7.5 900KΩ	68V 35KΩ	FIL	FIL	.5V 15Ω	0V 300Ω	65V 25KΩ	54V 12KΩ			
V4 17BE3	Damper	FIL	INF	INF	150V 12KΩ	INF	INF	HV 9MΩ	INF	INF	150V 12KΩ	INF	FIL
V5 6GH8	Snd. IF & Sync Sync Sep.	58V 12KΩ	0V 2Ω	60V 12KΩ	FIL	FIL	58V 12KΩ	1V 270Ω	GND	-1.3V 1.9MΩ			

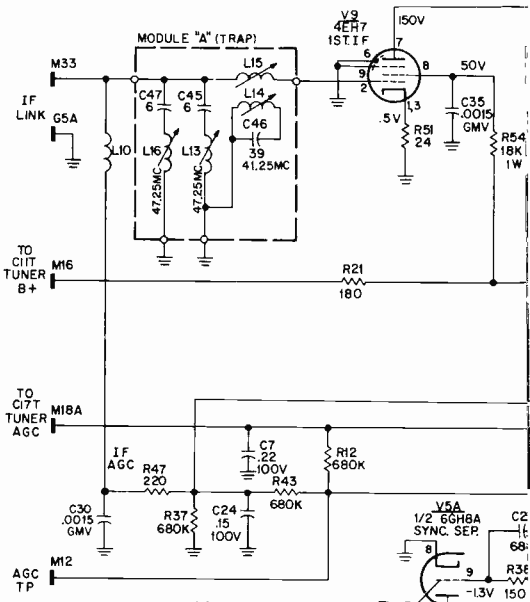
TUBE	USE	PIN NUMBERS 1	2	3	4	5	6	7	8	9	10	11	12
V6 17JZ8	Vert. Osc. & Output	FIL	21V 3.8MΩ	INF	145V 12KΩ	INF	-17V 1.8MΩ	-17V 1.8MΩ	150V 12KΩ	GND	-21V 200KΩ	GND	FIL
V7 21GY5	Horiz. Output	FIL	INF	120V 12KΩ	0V GND	-20V 300KΩ	120V 12KΩ	120V 12KΩ	120V 12KΩ	-20V 300KΩ	0V GND	120V 12KΩ	FIL
V8 8FQ7	Horiz. Osc.	100V 25KΩ	.1V 2.2MΩ	3.2V 750Ω	FIL	FIL	120V 45KΩ	-9.4V 95KΩ	3.2V 750Ω	GND			
V9 4EH7	1st Vid. IF	.5V 24Ω	0V 420KΩ	.5V 24Ω	FIL	FIL	GND	150V 12KΩ	50V 20KΩ	GND			
V10 4EJ7	2nd Vid. IF	1.6V 100Ω	0V 0Ω	1.6V 100Ω	FIL	FIL	GND	150V 12KΩ	145V 12KΩ	GND			



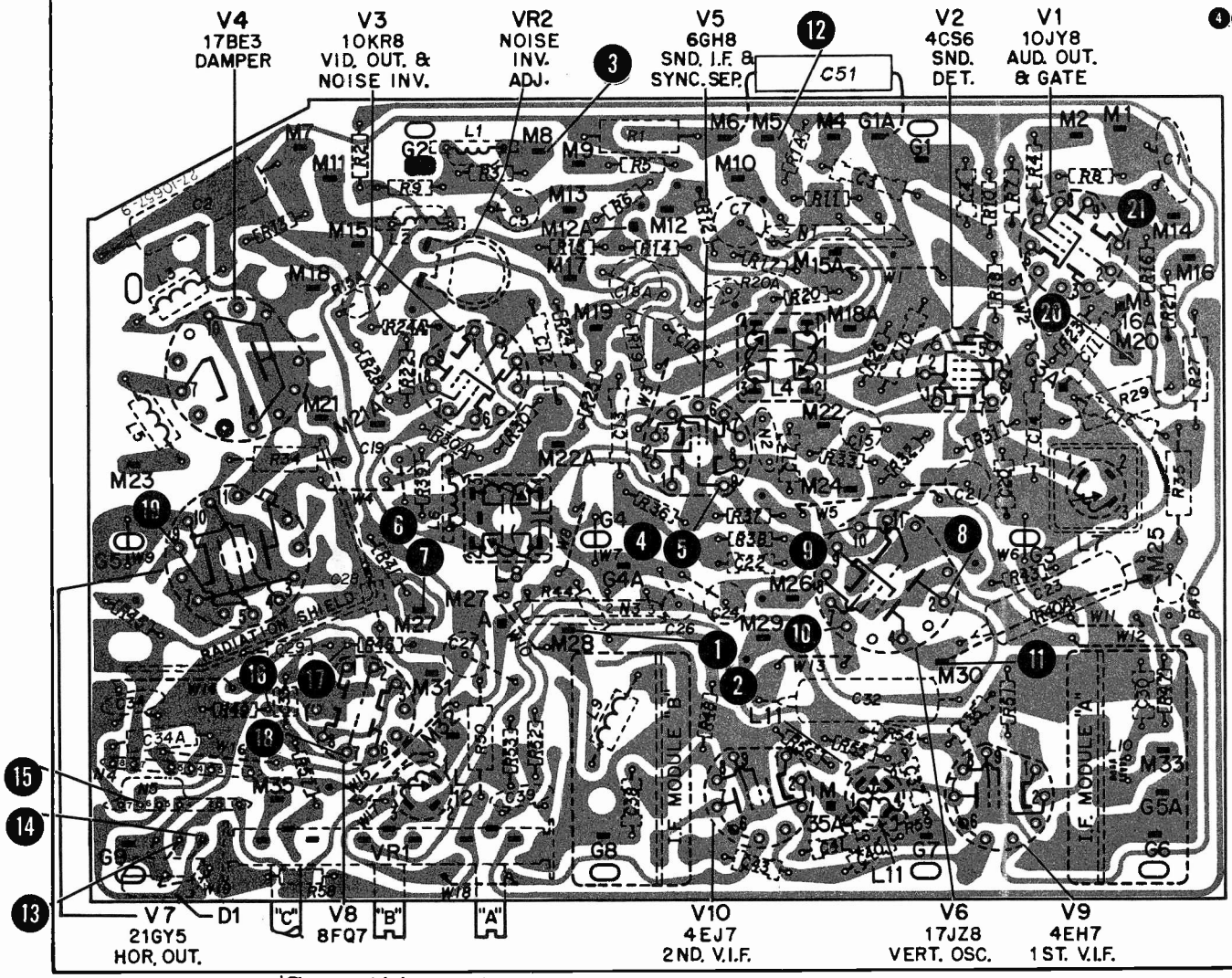
PHILCO Chassis 16J27 Servicing Information, Continued

PHILCO Chassis 16J27 Servicing Information, Continued

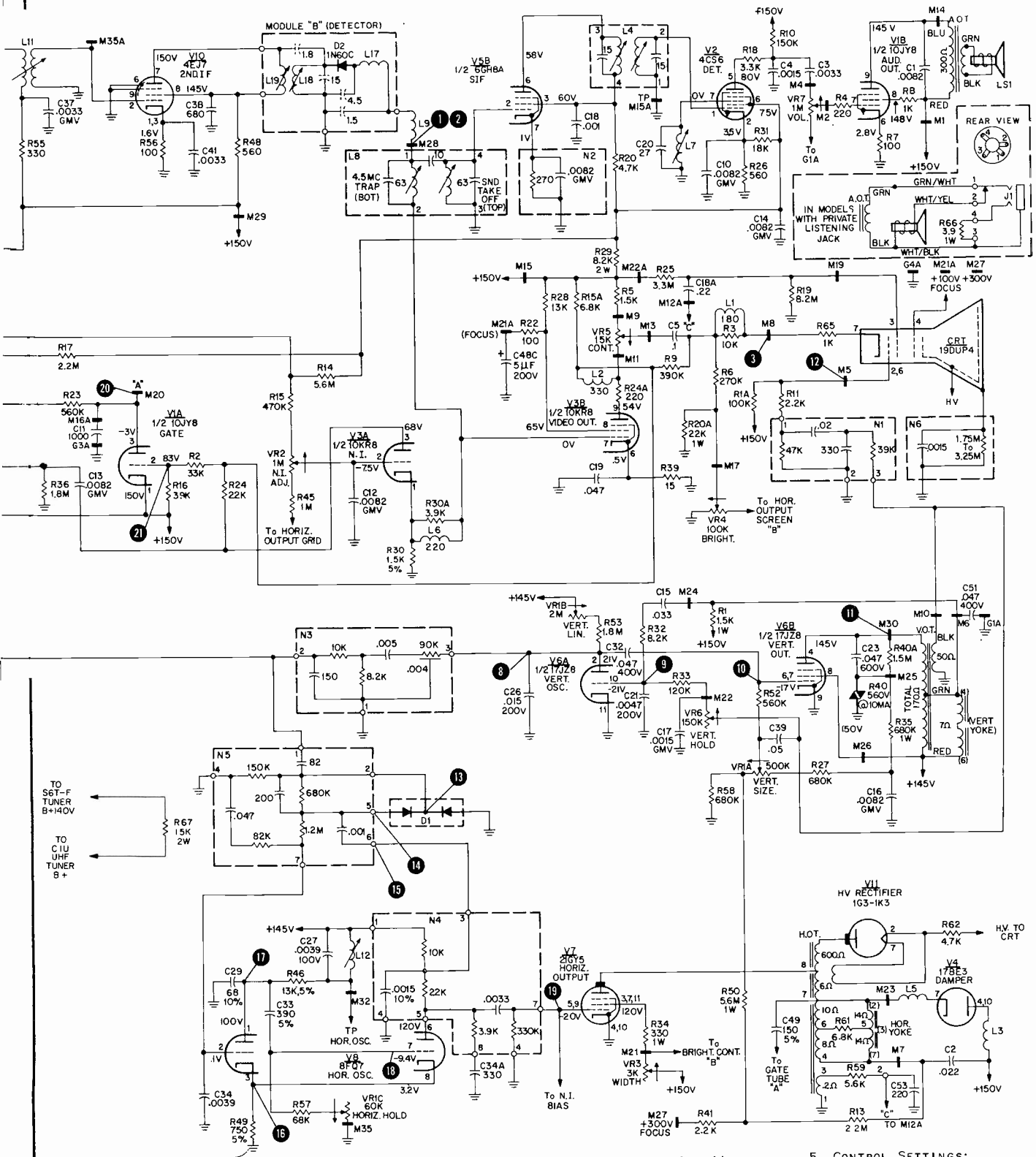




16J27 Bottom View Perma Circuit Panel Component Layout

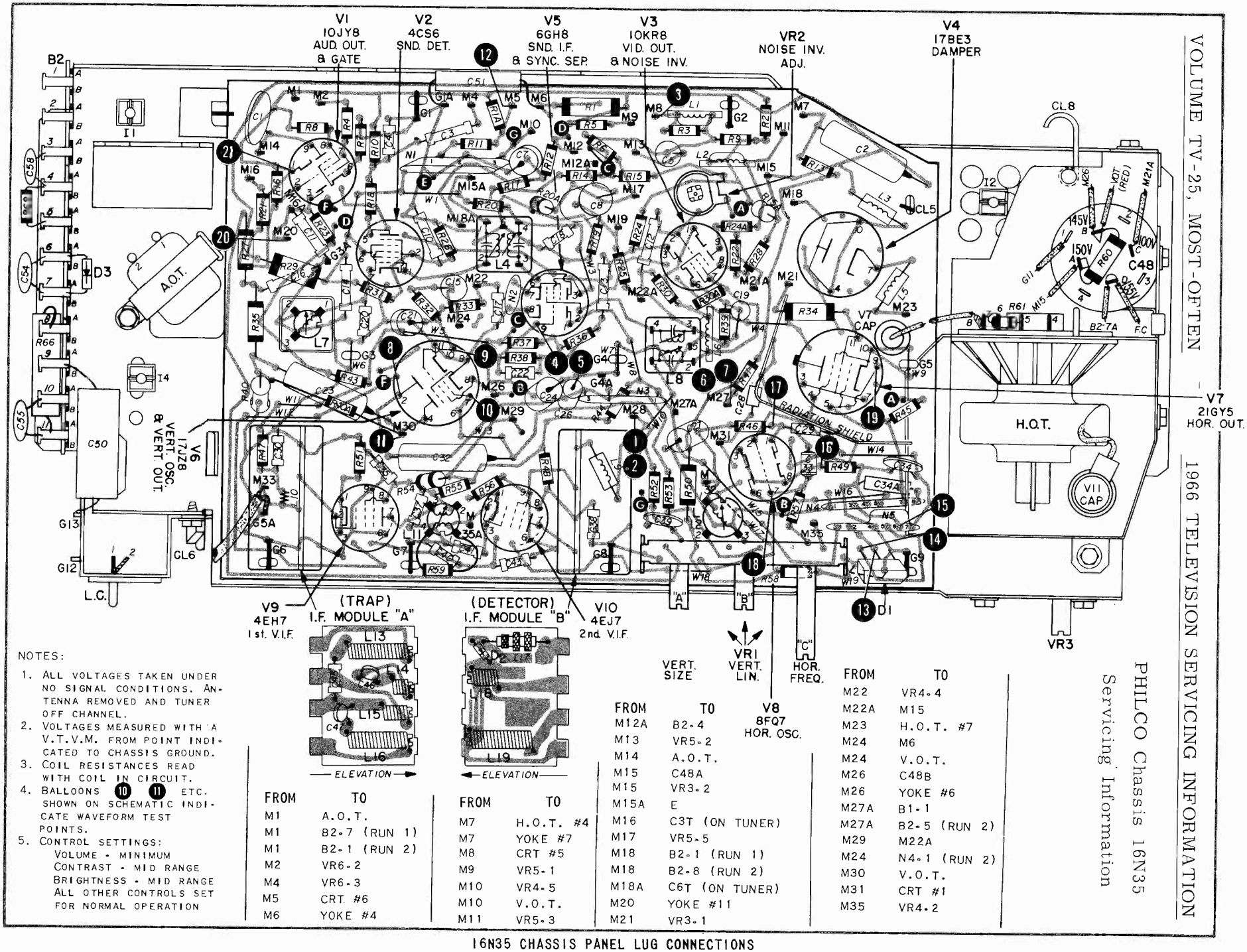


PHILCO Chassis 16J27 Schematic Diagram, Continued



NOTES:

1. ALL VOLTAGES TAKEN UNDER NO SIGNAL CONDITIONS. ANTENNA REMOVED AND TUNER OFF CHANNEL.
2. VOLTAGES MEASURED WITH A V.T.V.M. FROM POINT INDICATED TO CHASSIS GROUND.
3. COIL RESISTANCES READ WITH COIL IN CIRCUIT.
4. BALLOONS 10 11 ETC.. SHOWN ON SCHEMATIC INDICATE WAVEFORM TEST POINTS.
5. CONTROL SETTINGS:
   VOLUME - MINIMUM
   CONTRAST - MID-RANGE
   BRIGHTNESS - MID-RANGE
   ALL OTHER CONTROLS SET FOR NORMAL OPERATION



NOTES:

1. ALL VOLTAGES TAKEN UNDER NO SIGNAL CONDITIONS. ANTENNA REMOVED AND TUNER OFF CHANNEL.
2. VOLTAGES MEASURED WITH A V.T.V.M. FROM POINT INDICATED TO CHASSIS GROUND.
3. COIL RESISTANCES READ WITH COIL IN CIRCUIT.
4. BALLOONS (10) (11) ETC. SHOWN ON SCHEMATIC INDICATE WAVEFORM TEST POINTS.
5. CONTROL SETTINGS:
   VOLUME - MINIMUM
   CONTRAST - MID RANGE
   BRIGHTNESS - MID RANGE
   ALL OTHER CONTROLS SET FOR NORMAL OPERATION

FROM	TO
M1	A.O.T.
M1	B2-7 (RUN 1)
M1	B2-1 (RUN 2)
M2	VR6-2
M4	VR6-3
M5	CRT #6
M6	YOKE #4

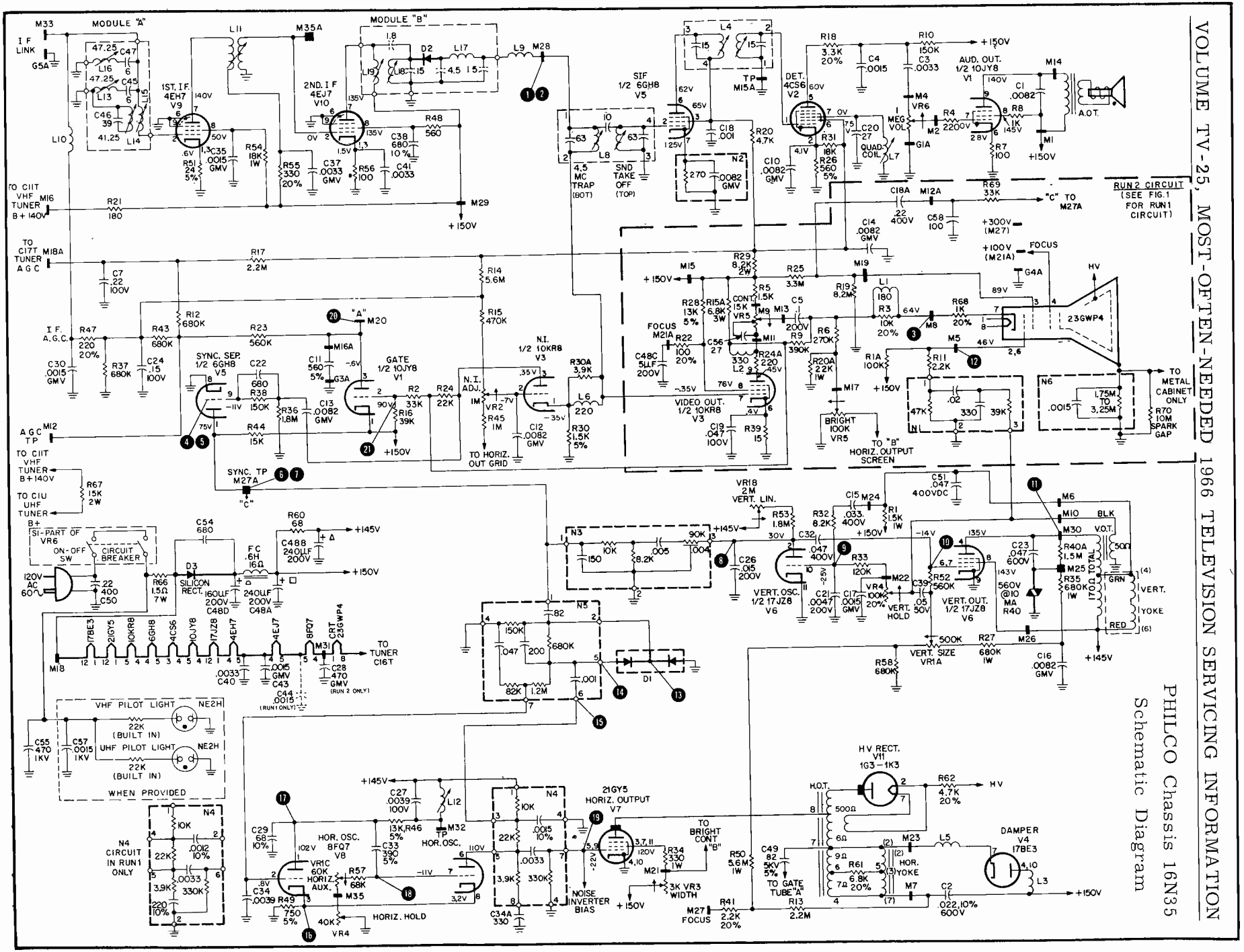
FROM	TO
M7	H.O.T. #4
M7	YOKE #7
M8	CRT #5
M9	VR5-1
M10	VR4-5
M10	V.O.T.
M11	VR5-3

FROM	TO
M12A	B2-4
M13	VR5-2
M14	A.O.T.
M15	C48A
M15	VR3-2
M15A	E
M16	C3T (ON TUNER)
M17	VR5-5
M18	B2-1 (RUN 1)
M18	B2-8 (RUN 2)
M18A	C6T (ON TUNER)
M20	YOKE #11
M21	VR3-1

FROM	TO
M22	VR4-4
M22A	M15
M23	H.O.T. #7
M24	M6
M24	V.O.T.
M26	C48B
M26	YOKE #6
M27A	B1-1
M27A	B2-5 (RUN 2)
M29	M22A
M24	N4-1 (RUN 2)
M30	V.O.T.
M31	CRT #1
M35	VR4-2

PHILCO Chassis 16N35
Servicing Information

16N35 CHASSIS PANEL LUG CONNECTIONS



PHILCO Chassis 16N35
Schematic Diagram

16N35 VOLTAGE AND RESISTANCE CHART

PHILCO

TUBE	1	2	3	4	5	6	7	8	9	10	11
V1 10JY8	150V 12KΩ	90V 36KΩ	-.6 1.5MΩ	FIL	FIL	2.8V 100Ω	0V 260Ω	145V 12KΩ	140V 12KΩ		
V2 4CS6	0V 6Ω	4.1V 500Ω	FIL	FIL	60V 150KΩ	70V 12KΩ	0V 3.5Ω				
V3 10KR8	-.35V 120Ω	-7V 900KΩ	.35V 35KΩ	FIL	FIL	.4V 15Ω	-.35V 100Ω	76V 25KΩ	45V 12KΩ		
V4 17BE3	FIL	INF	INF	INF	150V 12KΩ	INF	HV 9MΩ	INF	INF	150V 12KΩ	INF
V5 6GH8	75V 12KΩ	0V 2Ω	65V 12KΩ	FIL	FIL	62V 12KΩ	1.25V 270Ω	GND	-11V 1.9MΩ		
V6 17JZ8	FIL	30V 3.8MΩ		135V 12K		-14V 1.8M	-14V 1.8M	143V 12K	GND	-25V 200K	GND
V7 21GY5	FIL		120V 12KΩ	GND	-22V 300K	120V 12KΩ	120V 12KΩ	120V 12KΩ	-22V 300KΩ	GND	120V 12KΩ
V8 8FQ7	102V 25KΩ	.8V 1.8MΩ	3.2V 750Ω	FIL	FIL	100V 45KΩ	-11V 95KΩ	3.2V 750Ω	GND		
V9 4EH7	.6V 27Ω	0V 420KΩ	.6V 27Ω	FIL	FIL	GND	140V 12KΩ	50V 20KΩ	GND		
V10 4EJ7	1.5V 100Ω	0V 0Ω	1.5V 10DΩ	FIL	FIL	GND	135V 12KΩ	135V 12KΩ	GND		

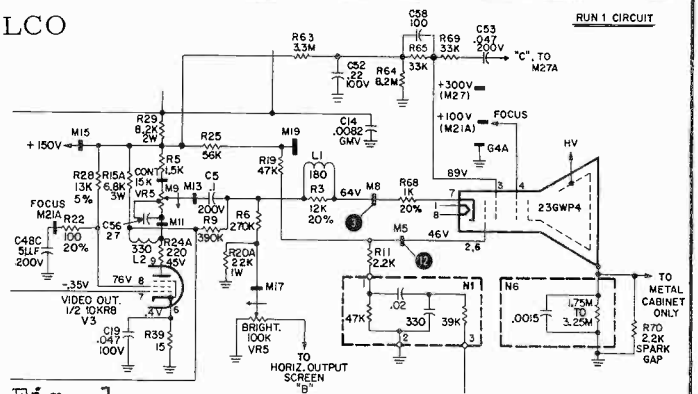
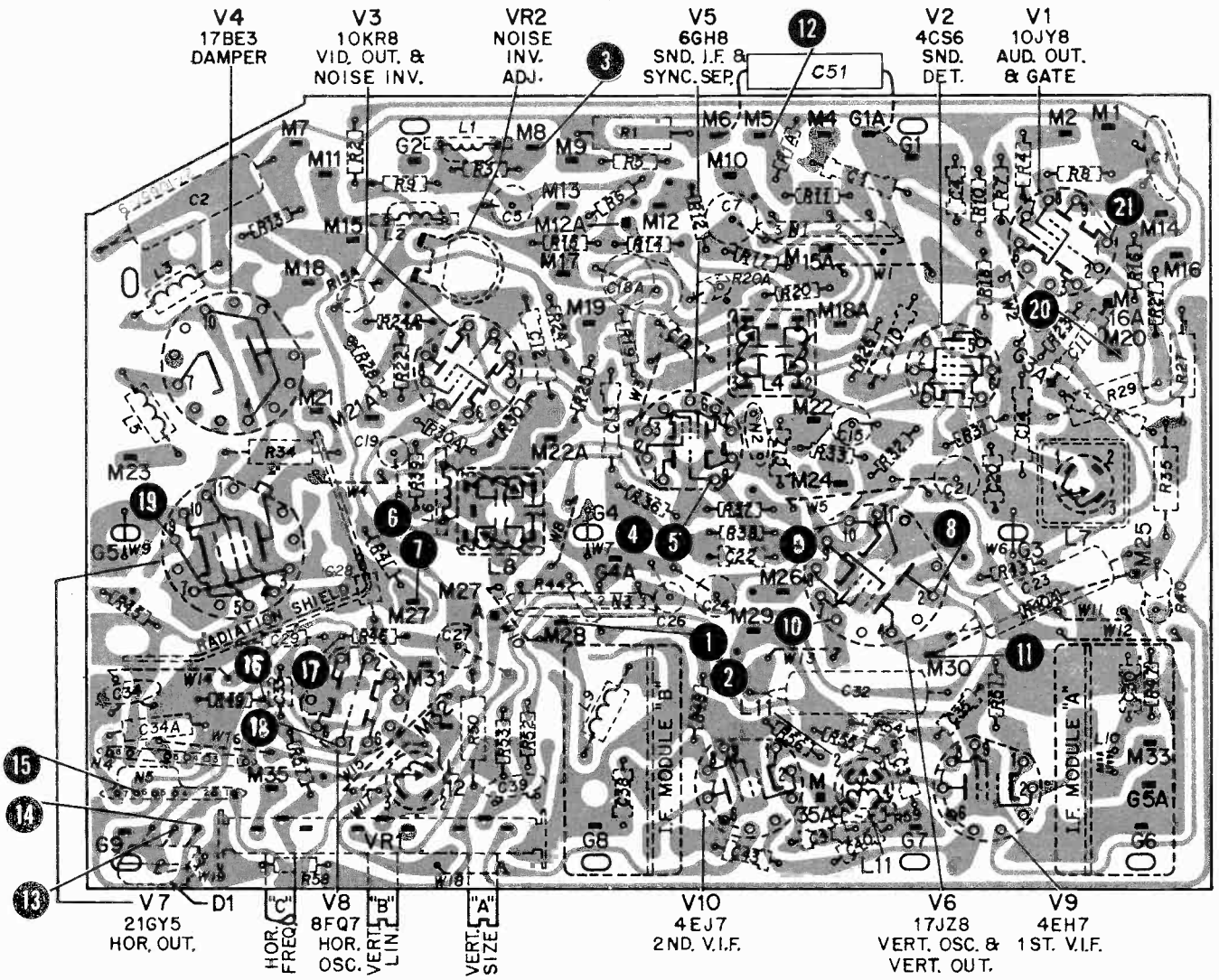


Fig. 1

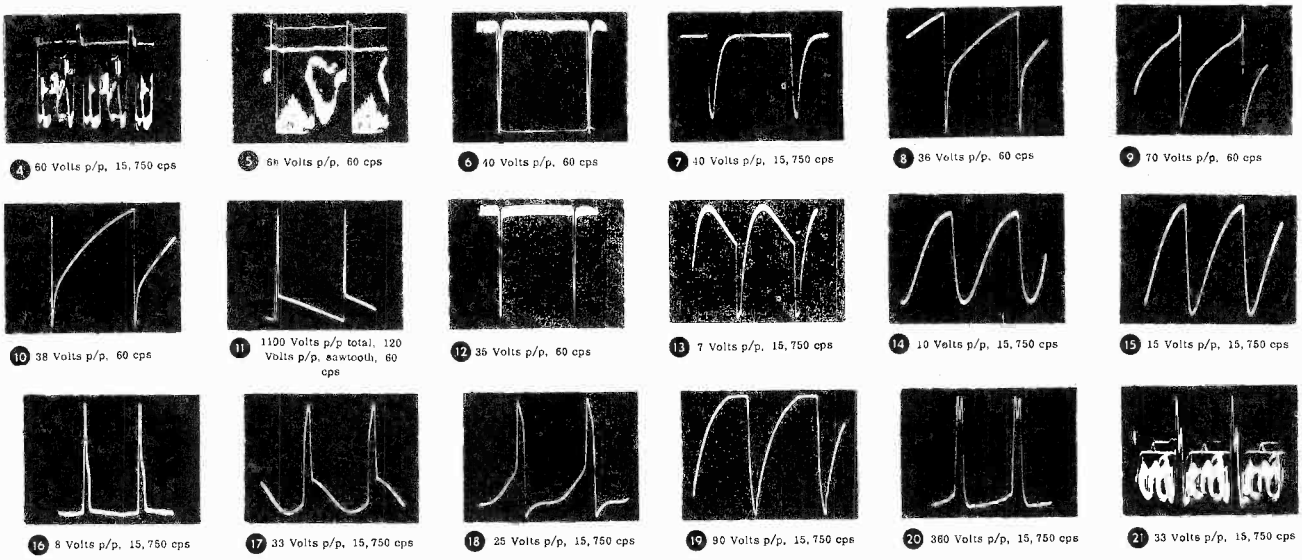
OSCILLOSCOPE WAVEFORMS

1. 2.5 Volts p/p, 15,750 cps (max contrast)
2. 2.5 Volts p/p, 60 cps (max contrast)
3. 75 Volts p/p, 15,750 cps (max contrast)

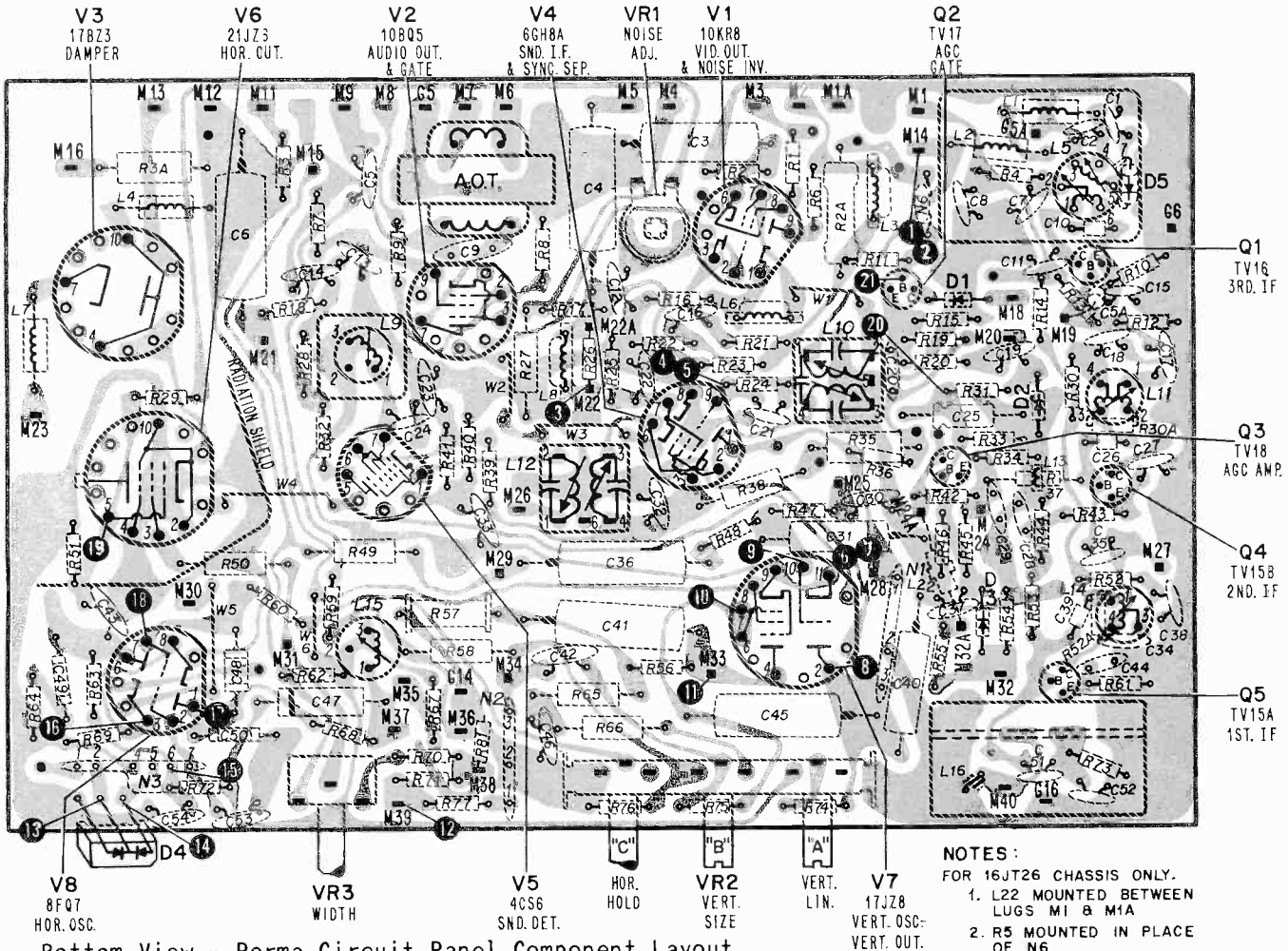


16N35 Run 2 Bottom View Perma Circuit Panel Component Layout

PHILCO Chassis 16N35 Waveforms with reference to diagram on pages 88-89



PHILCO Chassis 16JT26,A, Perma Circuit Panel



Bottom View - Perma Circuit Panel Component Layout

PHILCO Chassis 16JT26, 16JT26A, Alignment Information

VIDEO IF AM AND SWEEP ALIGNMENT PROCEDURE

PRELIMINARY INFORMATION

It is recommended that this Video IF alignment procedure be done with the chassis disconnected from the 120V AC line and an external +12 volts DC supply be used to power the Tuner and IF section. This alignment is based upon a tuner with the proper bandpass alignment connected to the chassis.

> CAUTION:
> To do this alignment with the chassis connected to the 120V AC source the following steps must be taken before proceeding:-
> a. Disconnect the AGC GATE winding leads from lugs M18 & M20.
> b. Connect chassis to 120V AC through an Isolation transformer.

A. Connect external +12 volts DC supply to lug M1A (16JT26) M32A (16JT26A) (omit this step when using 120V AC connected to chassis).
B. Connect variable external IF bias +4.5 to +6.5 volts DC to lug M24.
C. Connect external Tuner bias +2.0 volts DC to lug M32.
D. Connect scope through 10K resistor to lug M14, set scope gain for 2.0 volts p/p deflection.
E. Allow receiver to warm up 5 minutes minimum.
F. Set IF bias at lug M24 for +6.0 volts.
G. Inject low impedance 40MC sweep to lug M19 (3rd IF base) through network (see figure 1). Make sure sweep is not in overload. Marker level should be such that output level is not affected.
H. Preset core adjustments:-
   a. L11 & L18 fully engaged (flush with top of coil).
   b. L17, L19 and L20 set 8 to 9 turns out from flush core position.

I-F SWEEP ALIGNMENT CHART

STEP	SWEEP GEN. APPROX. 8MC SWEEP WIDTH	MARKER GEN. UN-MOD. R-F	ADJUST	REMARKS
1	44MC	42.5MC & 45.75MC	L5 BOT.	ADJUST TO PLACE 42.5MC MARKER AND 45.75MC MARKER BETWEEN INDICATED LIMITS SHOWN IN FIGURE B.
2	44MC	42.5MC & 45.75MC	L5 TOP	ADJUST BY ROCKING CURVE TO PLACE 42.5MC MARKER AND 45.75MC MARKER BETWEEN INDICATED LIMITS SHOWN IN FIGURE B.

CAUTION: DO NOT ATTEMPT TO ADJUST L5 TOP AND BOTTOM CORES AFTER THEY HAVE BEEN 40MC SWEEP ALIGNED.

J. Remove 40MC sweep.
K. Connect AM and Marker Generator to J2T (UHF input on tuner), set VHF tuner to UHF (ch. 1) position.
L. Reset IF bias for +5.0 volts.

AM ALIGNMENT CHART

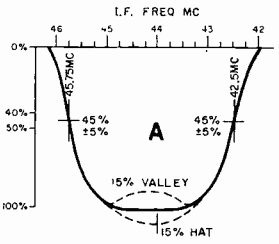
STEP	AM MOD. 400 AT 30%	ADJUST	REMARKS
3	44.0MC 44.0MC	L11 - FOR MAX. L14 - FOR MAX.	ADJUST FOR FIRST PEAK DOWN FROM FLUSH CORE POSITION. ADJUST TO FIRST PEAK DOWN.
4	43.0MC	L1T (ON TUNER) - FOR MAX.	
5	45.25MC	L19 - FOR MAX.	
6	41.25MC	L18 - FOR MIN. (TURN CCW)	BIAS MAY BE LOWERED TO PRODUCE SUFFICIENT SCOPE AMPLITUDE.
7	47.25MC 47.25MC	L20 - FOR MIN. L17 - FOR MIN.	BE SURE TO ADJUST L20 FIRST, THEN L17 BIAS MAY BE LOWERED TO PRODUCE SUFFICIENT SCOPE AMPLITUDE.
8	REPEAT STEP 5 UNTIL NO FURTHER IMPROVEMENT IS OBTAINED.		

CAUTION: REMOVE AM GENERATOR FROM J2T BEFORE PROCEEDING WITH SWEEP ALIGNMENT.
NOTE: TO PROPERLY POSITION FINE TUNING FOR SWEEP ALIGNMENT, SET TUNER TO CHANNEL 4 AND INJECT 65.75MC, 30% MODULATED AT ANTENNA TERMINALS. ADJUST FINE TUNING CONTROL FOR MINIMUM SCOPE INDICATION. DO NOT TOUCH FINE TUNING OR CHANNEL SELECTOR FOR BALANCE OF ALIGNMENT.

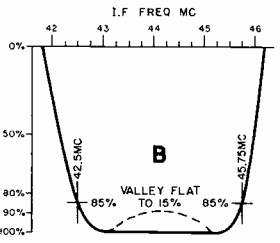
M. Connect sweep generator through 72 to 300 ohms matching network to antenna terminals.
N. Reset IF bias to get 2.0 volts p/p deflection on scope.

R-F SWEEP ALIGNMENT CHART

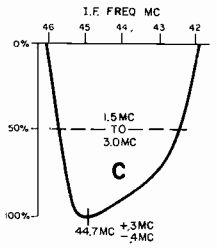
STEP	SWEEP GEN. APPROX. 8MC SWEEP WIDTH	MARKER GEN. UNMOD. R-F	ADJUST	REMARKS
9	44MC	42.5MC	L1T (TUNER I-F COIL)	ADJUST L1T TO PLACE 42.5MC MARKER BETWEEN INDICATED LIMITS ON SOUND SIDE OF CURVE (FIG. A). ADJUST SWEEP GEN. LEVEL TO LIMIT SCOPE TO 2v P/P DEFLECTION. KEEP RESPONSE LEVEL WITH L14.
10	44MC	45.75MC	L19	ADJUST L19 TO PLACE 45.75MC MARKER BETWEEN INDICATED LIMITS ON VIDEO SIDE OF CURVE (FIG. A). KEEP RESPONSE LEVEL WITH L14
11	OBTAIN FRINGE CURVE AS FOLLOWS: A. REDUCE IF BIAS TO +3V DC; TUNER BIAS TO +1.5V DC B. LOWER SWEEP INPUT TO MAINTAIN 2v P/P SCOPE DEFLECTION ADJUST HIGH FREQ. SIDE OF CURVE BY ADJUSTING L14 FOR WAVEFORM "C"			
12	TOUCH UP 47.25MC TRAPS AS FOLLOWS: A. REPEAT AM ALIGNMENT STEPS 7 & 8, MINIMIZE L20 AND A SLIGHT TOUCH OF L17 MAY BE REQUIRED TO ACHIEVE FURTHER NULLING.			



OVERALL I.F. RESPONSE



LAST I.F. RESPONSE



OVERALL IF RESPONSE (FRINGE)

IF Response Curves & Fringe Curve

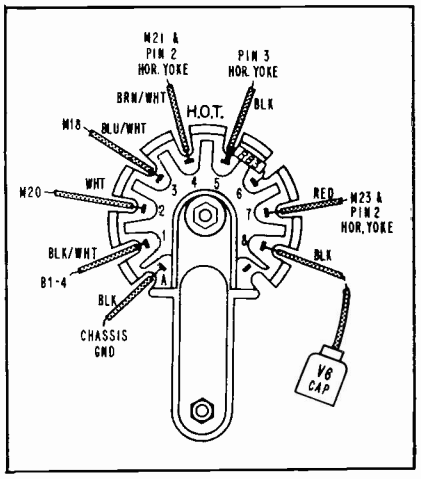
PHILCO Chassis 16JT26,A, Alignment Information, Continued

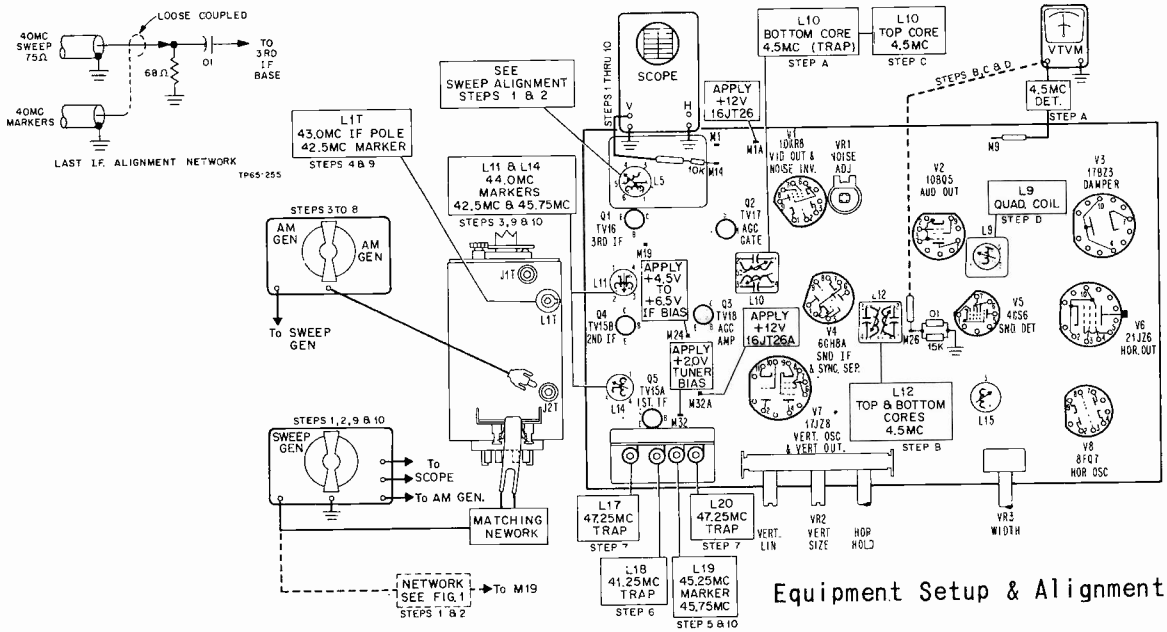
4.5 MC TRAP, SOUND TAKEOFF AND INTERSTAGE ALIGNMENT

Preliminary:
1. Connect receiver for normal AC operation through an isolation transformer.
2. Set contrast control to maximum.
3. Set volume control to minimum with power switch "ON".
4. Connect +5.0 volts DC to lug M24 (IF bias).

Equipment:
1. V.T.V.M.
2. AM Generator.
3. RC Network (15K resistor and .01 mf cap. in parallel).
4. 4.5 MC Detector Probe,

STEP	SIGNAL INPUT THROUGH 1500Ω RESISTOR TO LUG M14	OUTPUT	ADJUST	REMARKS
A	4.5MC AM OR STATION SIGNAL	CONNECT 4.5MC DETECTOR PROBE TO LUG M9. CONNECT VTVM TO 4.5MC PROBE. SET METER TO 2.5V RANGE.	L10 (BOTTOM CORE) FOR MINIMUM OUTPUT INDICATION ON VTVM.	INCREASE SIGNAL INPUT TO GIVE 1/4 SCALE DEFLECTION AT NULL POINT (THIS STEP FOR 4.5MC TRAP ADJ. ONLY).
B	4.5MC AM OR STATION SIGNAL	REMOVE GROUND CONNECTION FROM LUG M26. CONNECT RC NETWORK FROM M26 TO GROUND. PLACE VTVM ACROSS NETWORK. INPUT SHOULD BE ADJUSTED TO KEEP OUTPUT BETWEEN .1V AND .2V.	L12 (TOP & BOTTOM CORES) FOR MAXIMUM INDICATION ON VTVM.	RC NETWORK CONSISTS OF A 15K RESISTOR AND A .01 MFD CAPACITOR IN PARALLEL.
C	4.5MC AM OR STATION SIGNAL	SAME AS STEP B	L10 (TOP CORE) FOR MAXIMUM INDICATION ON VTVM.	
D	USE STATION SIGNAL	REMOVE RC NETWORK AND REPLACE GROUND TO LUG M26.	QUAD COIL L9 FOR MAXIMUM SOUND OUTPUT.	THE CORRECT PEAK WILL BE THE SECOND ONE WHEN TURNING CORE INTO COIL.



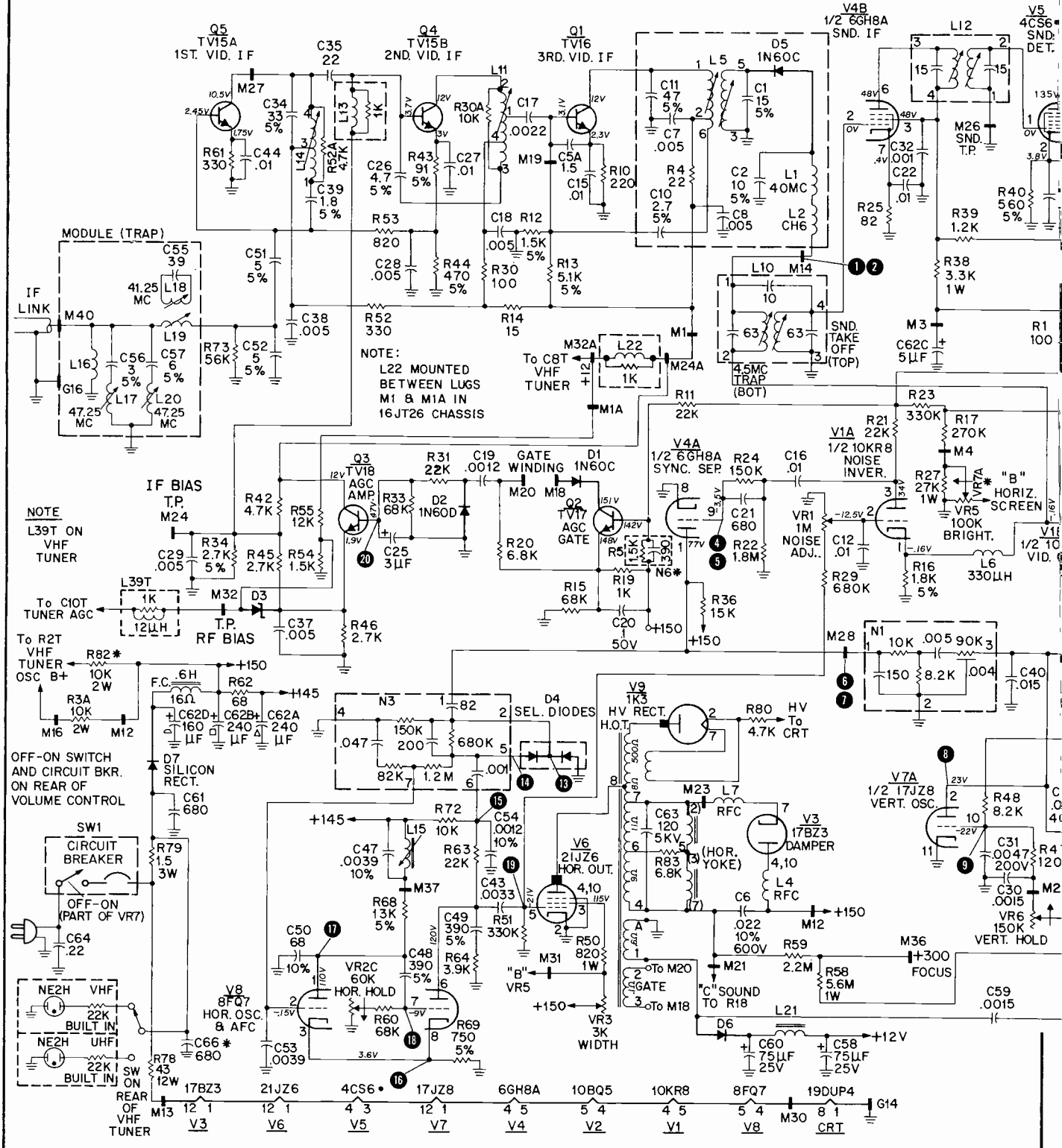


Equipment Setup & Alignment Points

SERVICE PRECAUTIONS FOR 16JT26 & 16JT26A

1. With chassis removed from cabinet, power the chassis thru an isolation transformer.
2. When servicing transistor circuits, the use of an external +12V power supply is recommended. Set should be unplugged when using external supply.
3. Keep all metallic objects (such as screwdrivers) away from transistor circuits while set is on.
4. When using a scope, use a direct probe with an isolation capacitor at the probe end, about 1000PF to 1500PF.
5. Use only direct replacement transistors.
6. Never connect test equipment directly to transistor elements, only to associated components or lugs.
7. Care should be taken when checking voltages; do not short 12 volt supply to any portion of the 150 volt supply.
8. Try to maintain same transistor lead lengths should replacement be required.
9. Do not measure voltages between transistor elements.
10. Do not make resistance measurements while set is operating.

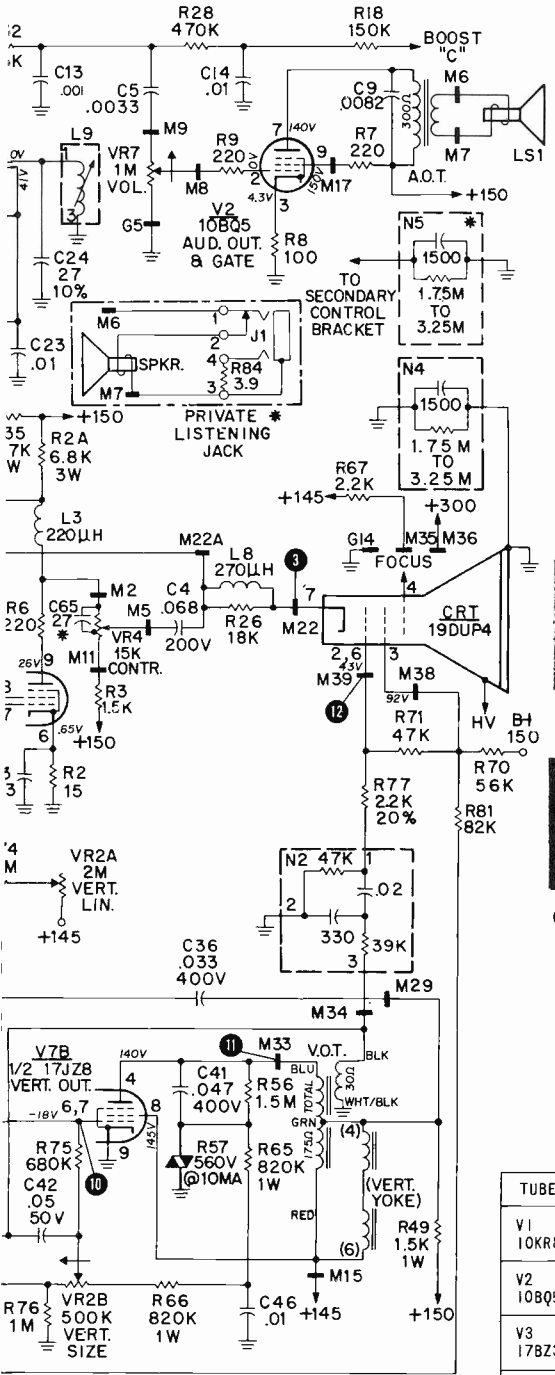
PHILCO Chassis 16JT26, 16JT26A, Schematic Diagram



✱USED IN 16JT26A ONLY

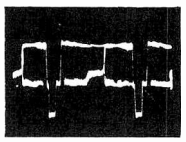
NOTES:
1. ALL VOLTAGES TAKEN UNDER NO SIGNAL CONDITIONS. ANTENNA REMOVED AND TUNER OFF CHANNEL.
2. VOLTAGES MEASURED WITH A V.T.V.M. FROM POINT INDICATED TO CHASSIS GROUND.
3. COIL RESISTANCES READ WITH COIL IN CIRCUIT.
4. BALLOONS ⑩ ⑪ ETC. SHOWN ON SCHEMATIC INDICATE WAVEFORM TEST POINTS.
5. CONTROL SETTINGS: VOLUME - MINIMUM CONTRAST - MID RANGE

PHILCO Chassis 16JT26, A, Continued

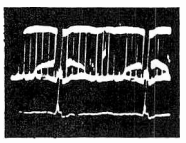


OSCILLOSCOPE WAVEFORMS

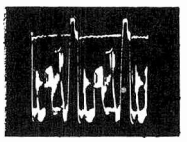
These waveforms were taken with the receiver adjusted for an approximate output of 2.5V p/p at the video detector. Voltage readings taken with raster just filling screen and all controls set for normal picture viewing except for photos 1, 2 and 3 where contrast was at maximum. The voltages given are approximate peak-to-peak values. The frequencies shown are those of the waveforms... not the sweep rate of the oscilloscope. All readings taken with Model ES-550B Precision Oscilloscope.



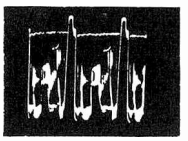
1 3 Volts p/p, 15,750 cps



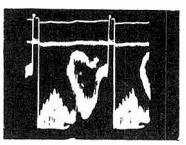
2 3 Volts p/p, 60 cps



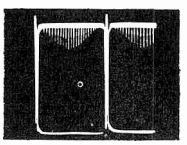
3 110 Volts p/p, 15,750 cps



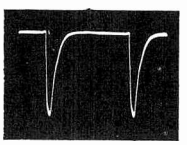
4 100 Volts p/p, 15,750 cps



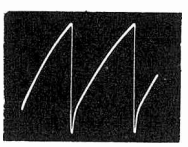
5 100 Volts p/p, 60 cps



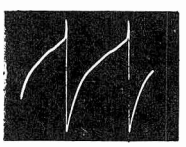
6 50 Volts p/p, 60 cps



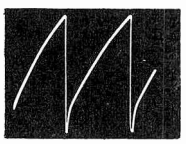
7 50 Volts p/p, 15,750 cps



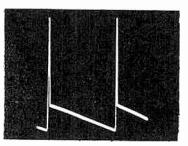
8 40 Volts p/p, 60 cps



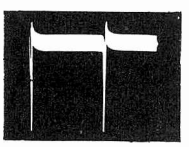
9 70 Volts p/p, 60 cps



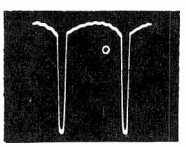
10 40 Volts p/p, 60 cps



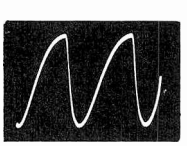
11 1300 Volts p/p total, 130 Volts p/p sawtooth, 60 cps



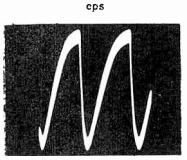
12 70 Volts p/p, 60 cps



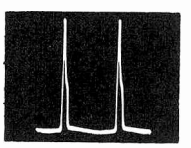
13 13 Volts p/p, 15,750 cps



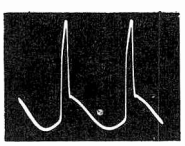
14 11 Volts p/p, 15,750 cps



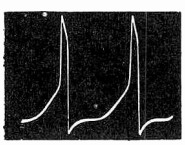
15 15 Volts p/p, 15,750 cps



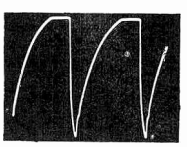
16 10 Volts p/p, 15,750 cps



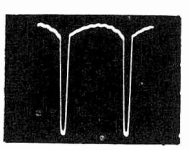
17 38 Volts p/p, 15,750 cps



18 29 Volts p/p, 15,750 cps



19 100 Volts p/p, 15,750 cps



20 7 Volts p/p, 15,750 cps

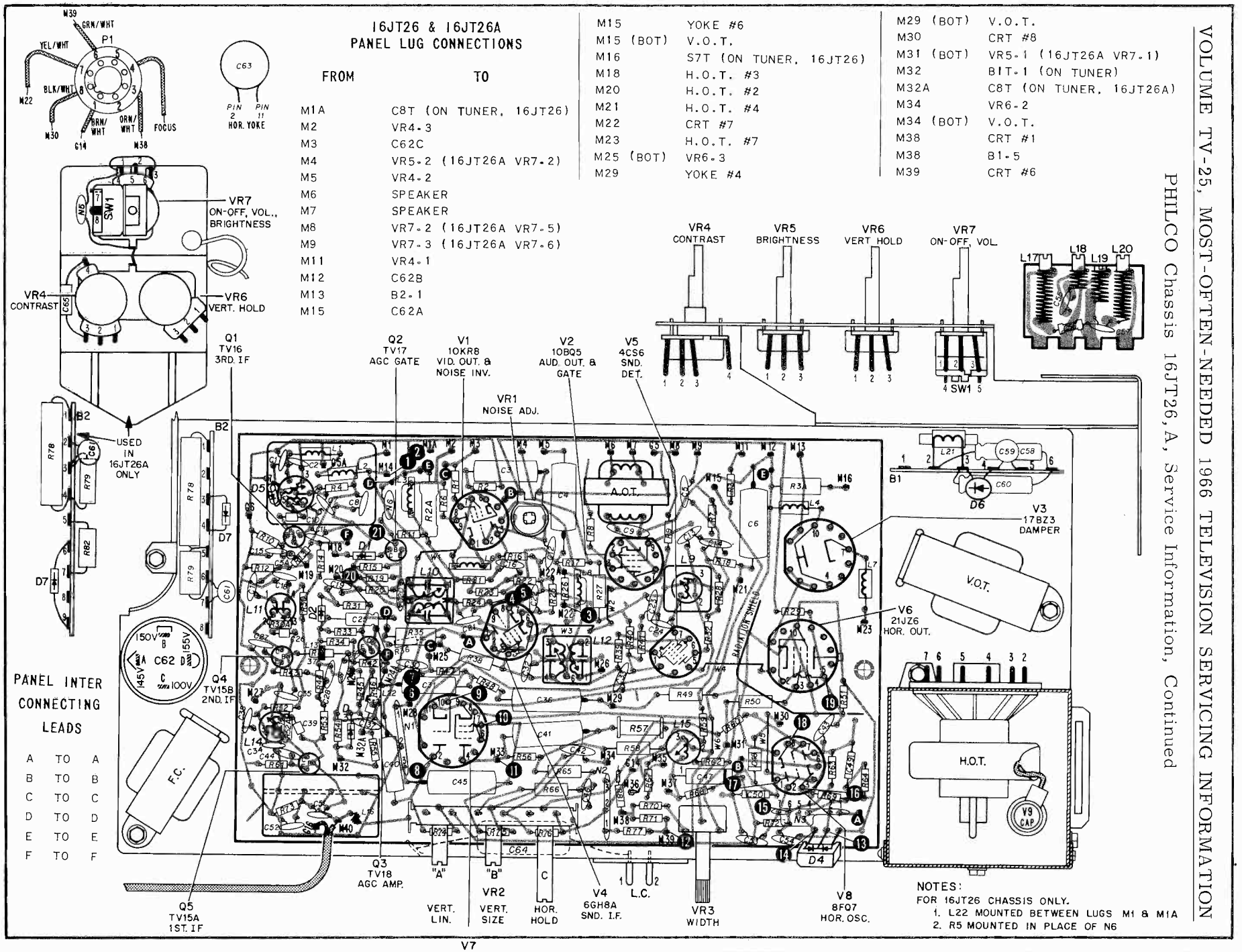
16JT26 VOLTAGE AND RESISTANCE CHART

TUBE	USE	1	2	3	4	5	6	7	8	9	10	11	12
V1 10KR8	Video Output & Noise Inv.	-.16V *1.1KΩ	-12.5V .5MΩ	34V 30KΩ	FIL	FIL	.65V 15Ω	-.16V *1.1KΩ	90V 10K	26V 12KΩ			
V2 10BQ5	Audio Output & Gate	NC	0V 280Ω	4.3V 100Ω	FIL	FIL	NC	140V 10KΩ	NC	150V 10KΩ			
V3 17BZ3	Damper	FIL	18KΩ	18KΩ	150V 9KΩ	NC	NC	520V 8.2MΩ	NC	NC	150V 9KΩ	18KΩ	FIL
V4 6GH8A	Snd. IF & Sync Sep.	77V 11KΩ	0V 2.5Ω	48V 10KΩ	FIL	FIL	48V 10KΩ	.4V 82Ω	0V GND	-3.5V 1.8MΩ			
V5 4CS6	Sound Det.	0V 5.5Ω	3.8V 560Ω	FIL	FIL	135V 9MΩ	41V 10KΩ	0V 4Ω					
V6 21JZ6	Horiz. Out.	FIL	0V GND	115V 12KΩ	0V GND	-21V 310KΩ	NC	NC	NC	-21V 310KΩ	0V GND	NC	FIL
V7 12JZ8	Vert. Osc. & Output	FIL	23V 3MΩ	NC	150V 10KΩ	NC	-18V 1.6MΩ	-18V 1.6MΩ	45V 10KΩ	0V GND	-22V 200KΩ	0V GND	FIL
V8 8FQ7	Horiz. Osc.	110V 22KΩ	-.15V 2MΩ	3.6V 750Ω	FIL	FIL	120V 41KΩ	-9V 80KΩ	3.6V 750Ω	0V GND			

*WITH POSITIVE LEAD OF VTVM AT GROUND

16JT26 TRANSISTOR VOLTAGE CHART

TRANSISTOR		USE	C	B	E
Q1	TV16	3rd Video IF	12V	3.1V	2.3V
Q2	TV17	AGC Gate	151V	142V	148V
Q3	TV18	AGC Amp	12V	.47V	1.9V
Q4	TV15B	2nd Video IF	12V	3.7V	3.0V
Q5	TV15A	1st Video IF	10.5V	2.45V	1.75V


16JT26 & 16JT26A
PANEL LUG CONNECTIONS
FROM TO
M1A C8T (ON TUNER, 16JT26)
M2 VR4-3
M3 C62C
M4 VR5-2 (16JT26A VR7-2)
M5 VR4-2
M6 SPEAKER
M7 SPEAKER
M8 VR7-2 (16JT26A VR7-5)
M9 VR7-3 (16JT26A VR7-6)
M11 VR4-1
M12 C62B
M13 B2-1
M15 C62A
M15 YOKE #6
M15 (BOT) V.O.T.
M16 S7T (ON TUNER, 16JT26)
M18 H.O.T. #3
M20 H.O.T. #2
M21 H.O.T. #4
M22 CRT #7
M23 H.O.T. #7
M25 (BOT) VR6-3
M29 YOKE #4
M29 (BOT) V.O.T.
M30 CRT #8
M31 (BOT) VR5-1 (16JT26A VR7-1)
M32 BIT-1 (ON TUNER)
M32A C8T (ON TUNER, 16JT26A)
M34 VR6-2
M34 (BOT) V.O.T.
M38 CRT #1
M38 B1-5
M39 CRT #6
P1
M39 GRN/WHT
YEL/WHT
BLK/WHT
M22
M30
BRN/WHT
G14
ORN/WHT
M38
FOCUS
C63
PIN 2 HOR. YOKE
PIN 11
SW1
M5
VR7 ON-OFF, VOL., BRIGHTNESS
VR4 CONTRAST
C65
VR6 VERT. HOLD
VR4 CONTRAST
VR5 BRIGHTNESS
VR6 VERT HOLD
VR7 ON-OFF, VOL.
4 SW1 5
L17
L18
L19
L20
Q1 TV16 3RD. IF
Q2 TV17 AGC GATE
V1 10KR8 VID. OUT. & NOISE INV.
V2 10BQ5 AUD. OUT. & GATE
V5 4CS6 SND. DET.
VR1 NOISE ADJ.
B2
USED IN 16JT26A ONLY
R78
R79
R82
C61
D7
D5
D1
D2
D4
D6
A.O.T.
V.O.T.
H.O.T.
V3 17BZ3 DAMPER
V6 21JZ6 HOR. OUT.
B1
L21
C59
C58
C60
150V
145V
C62
155V
100V
PANEL INTER CONNECTING LEADS
A TO A
B TO B
C TO C
D TO D
E TO E
F TO F
Q4 TV15B 2ND. IF
F.C.
Q3 TV18 AGC AMP.
Q5 TV15A 1ST. IF
"A" VERT. LIN.
"B" VERT. SIZE
VR2
C HOR. HOLD
V4 6GH8A SND. I.F.
L.C.
VR3 WIDTH
V8 8FQ7 HOR. OSC.
V7
V9 CAP
NOTES:
FOR 16JT26 CHASSIS ONLY.
1. L22 MOUNTED BETWEEN LUGS M1 & M1A
2. R5 MOUNTED IN PLACE OF N6

RCA VICTOR

Chassis KCS 136M Series

MODEL AND CHASSIS CROSS REFERENCE

MODEL	CHASSIS	VHF/UHF TUNER
BG-249E, M, W, Y	KCS136MA	KRK124C/120RB
BG-249MR, WR	KCS136MB	KRK124D/120RB
CG-281M, W, Y	KCS136MJ	KRK124A/120JAB
CG-287M, W, Y	KCS136MA	KRK124C/120RB
CG-299W	KCS136MA	KRK124C/120RB
CG-305L	KCS136MA	KRK124C/120RB
CG-317M, W, Y	KCS136MA	KRK124C/120RB
CG-323C, F, Y	KCS136MA	KRK124C/120RB
CG-329M, W	KCS136MA	KRK124C/120RB
CG-351W	KCS136MA	KRK124C/120RB
CG-353M, W	KCS136MA	KRK124C/120RB
CG-359M, W	KCS136MA	KRK124C/120RB
CG-365W	KCS136MA	KRK124C/120RB
CG-371L	KCS136MA	KRK124C/120RB
CG-377C, F, Y	KCS136MA	KRK124C/120RB
CG-383S	KCS136MA	KRK124C/120RB

Service data and diagrams on pages 91-94. For alignment see such material in TV-23, Early 1965 TV, pages 125-126.

CENTERING

If the picture does not fill the screen, it may be necessary to center the picture with the 2 disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity, and width, as they are all interdependent.

HEIGHT AND VERTICAL LINEARITY

If the blanking bar changed size while moving down, alternately adjust the height and vertical linearity controls for best vertical proportions. Final vertical size should allow the raster to overscan the mask about 5/8 inch at top and bottom with normal (120 volts) line voltage.

WIDTH

The width adjustment is made with L101. With normal line voltage, the raster should overscan the mask about 5/8 inch on each side. The raster should fill the mask at 108 volts.

HORIZONTAL OSCILLATOR ADJUSTMENT

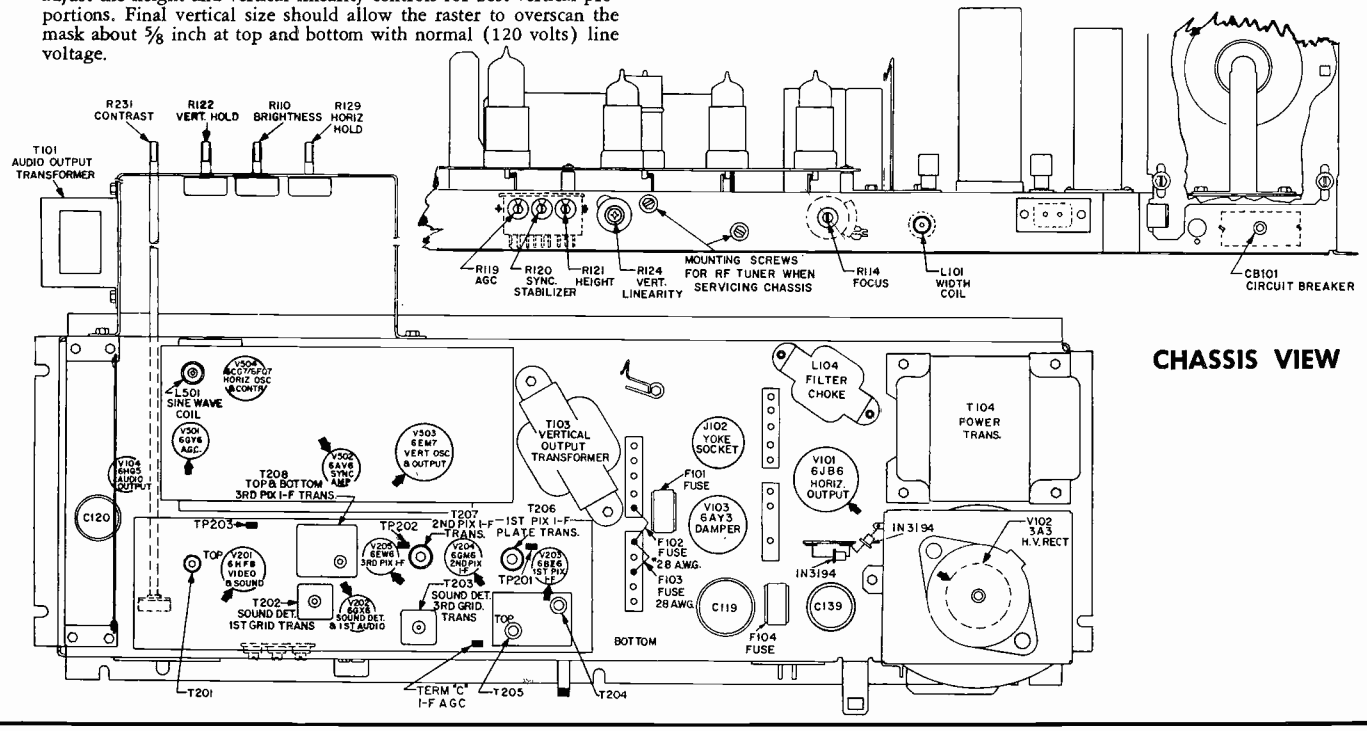
The horizontal sine wave coil is adjusted by temporarily attaching a short jumper across the coil (L501A) and another jumper from Pin 1 of V502 to ground. Carefully adjust the horizontal hold for least sideways drift of the picture and remove the coil jumper. Again stop the sideways drift (if any) by adjusting the sine wave coil slug with a nonmetallic tool. Remove all jumpers. See Zone A-1, PW500 drawing on page 4, for location of L501.

AGC AND SYNC STABILIZER

Turn the sync stabilizer control completely counterclockwise and adjust AGC while tuned to a strong, local station. Turn the control clockwise until picture begins to distort, and then counterclockwise slightly below the point where the distortion is eliminated. Quickly switch off channel and back. If the picture distorts and bends or does not reappear immediately, rotate the AGC control counterclockwise and recheck by switching off channel and back again.

Advance the noise stabilizer control fully clockwise and rotate the horizontal hold control counterclockwise until horizontal sync is lost. Then slowly sync the picture again. If the picture hangs up, or bends before locking in, retard the noise stabilizer control until symptom is eliminated.

NOTE: Adjust AGC before noise stabilizer.



CHASSIS VIEW

RCA Victor Chassis KCS-136M Series Schematic Diagram

RESISTANCE VALUES IN OHMS K=1000

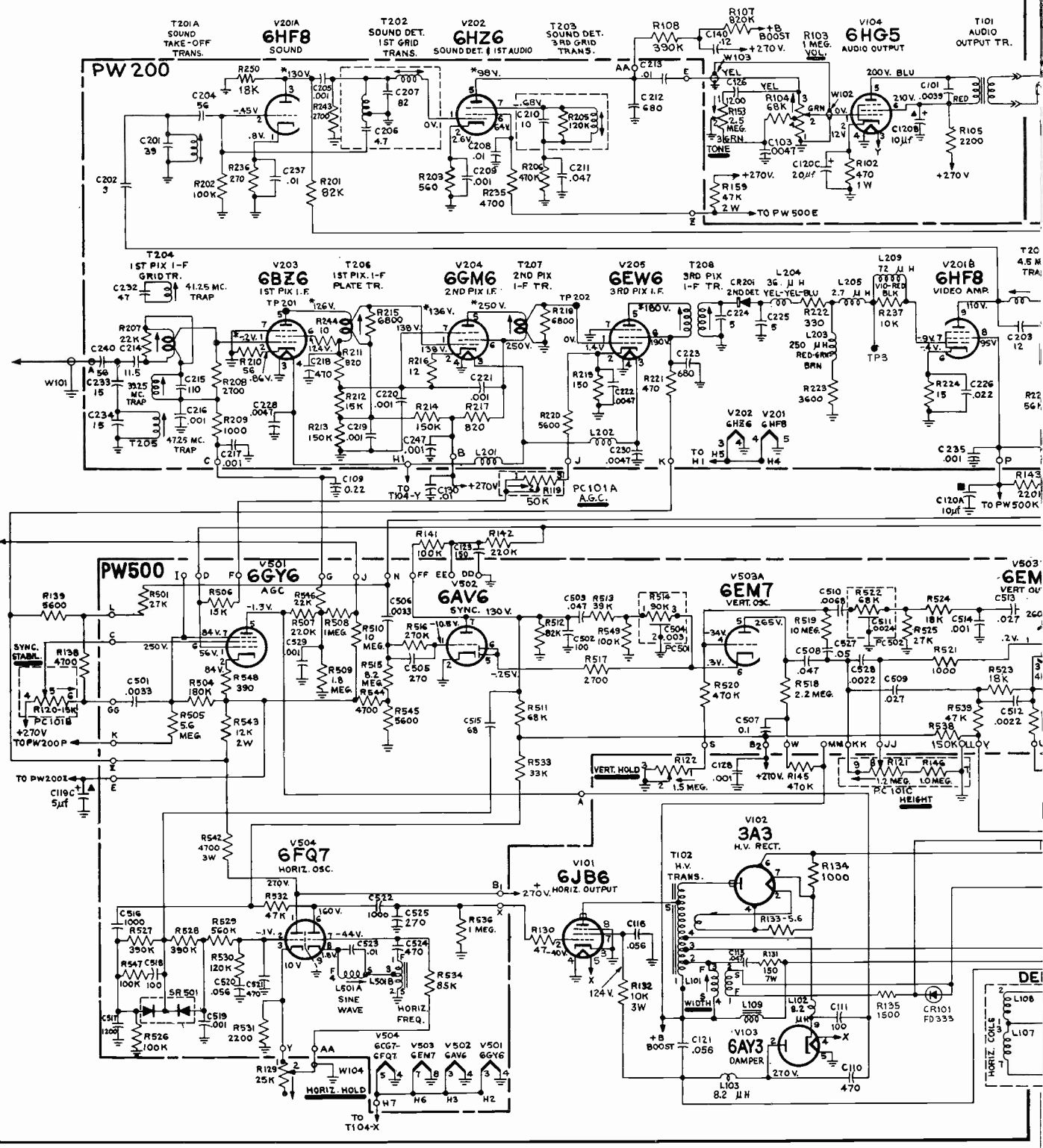
CAPACITANCE VALUES LESS THAN 1 IN μf, 1 AND ABOVE IN μμf UNLESS OTHERWISE INDICATED.

DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.

VOLTAGES MEASURED WITH 'VOLTOHMYST' AND WITH NO SIGNAL INPUT; AND SHOULD HOLD WITHIN ±20% WITH 120 VOLT A.C. SUPPLY.

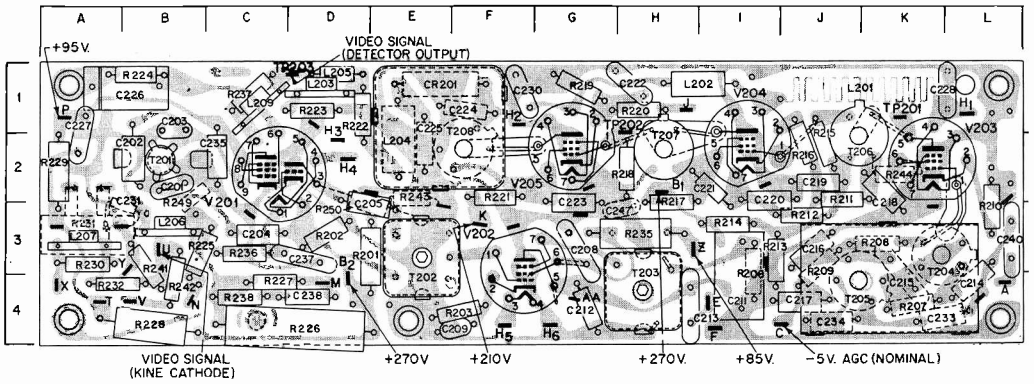
*VOLTAGES MEASURED WITH 1 MEG. 1/2 WATT RESISTOR IN SERIES WITH METER PROBE.

SCHEMATIC DIAGRAM FOR KCS136M CHASSIS

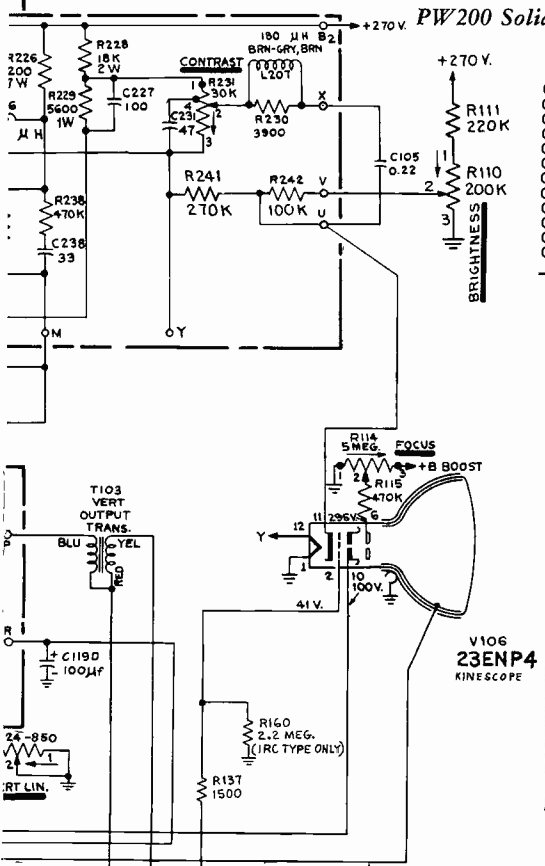


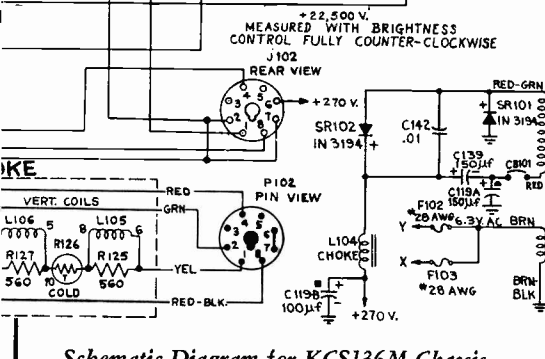
RCA Victor Chassis KCS-136M Series Service Material, Continued

PW200 SOLID COPPER CIRCUIT ASSEMBLY



PW200 Solid Copper Circuit Assembly—Phantom View



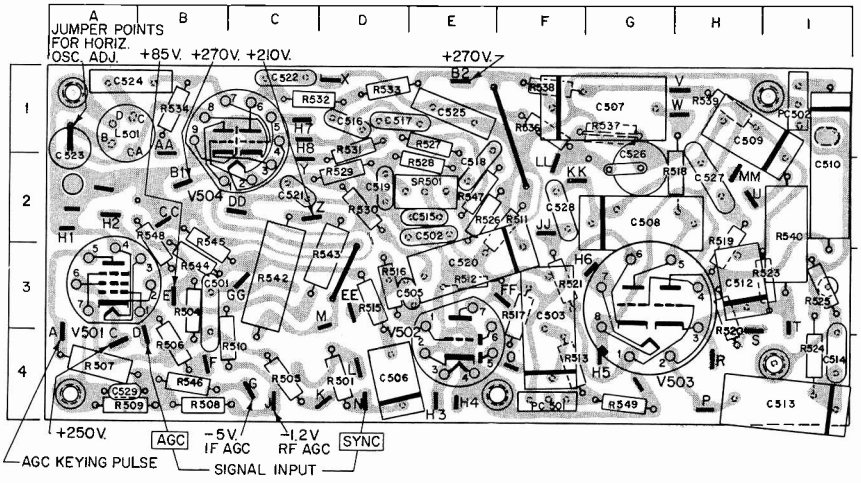


Schematic Diagram for KCS136M Chassis

PW200 COMPONENT LOCATION GUIDE

C201 ..... 2B	C216 ..... 3J	C228 ..... 1L	L201 ..... 1J	R206 ..... 3I	R218 ..... 2H	R232 ..... 4A	R249 ..... 2B
C202 ..... 2B	C217 ..... 4J	C230 ..... 1F	L202 ..... 1I	R207 ..... 4K	R219 ..... 1G	R235 ..... 3H	T201 ..... 2B
C203 ..... 1B	C218 ..... 2K	C231 ..... 3B	L203 ..... 1D	R208 ..... 3K	R220 ..... 1H	R236 ..... 3C	T202 ..... 3E
C204 ..... 3C	C219 ..... 2J	C233 ..... 4L	L204 ..... 2E	R209 ..... 3J	R221 ..... 2F	R237 ..... 1C	T203 ..... 4H
C205 ..... 2D	C220 ..... 2I	C234 ..... 4J	L205 ..... 1D	R210 ..... 3L	R222 ..... 1D	R238 ..... 4C	T204 ..... 3K
C208 ..... 3G	C221 ..... 2H	C235 ..... 2C	L206 ..... 3B	R211 ..... 2J	R223 ..... 1D	R241 ..... 3B	T205 ..... 4K
C209 ..... 4F	C222 ..... 1H	C237 ..... 3D	L207 ..... 3A	R212 ..... 3J	R224 ..... 1B	R242 ..... 4B	T206 ..... 2K
C211 ..... 4I	C223 ..... 2G	C238 ..... 4D	L209 ..... 1C	R213 ..... 3I	R225 ..... 3B	R243 ..... 2E	T207 ..... 2H
C212 ..... 4G	C224 ..... 1F	C240 ..... 3L		R214 ..... 3I	R226 ..... 4D	R244 ..... 2K	T208 ..... 2F
C213 ..... 4H	C225 ..... 2E	C247 ..... 3H	R201 ..... 3E	R215 ..... 2J	R227 ..... 4C	R249 ..... 2B	
C214 ..... 4L	C226 ..... 1B		R202 ..... 3D	R216 ..... 2J	R228 ..... 4B		
C215 ..... 4K	C227 ..... 1A	CR201 .... 1E	R203 ..... 4F	R217 ..... 3H	R229 ..... 2A		

PW500 SOLID COPPER CIRCUIT ASSEMBLY



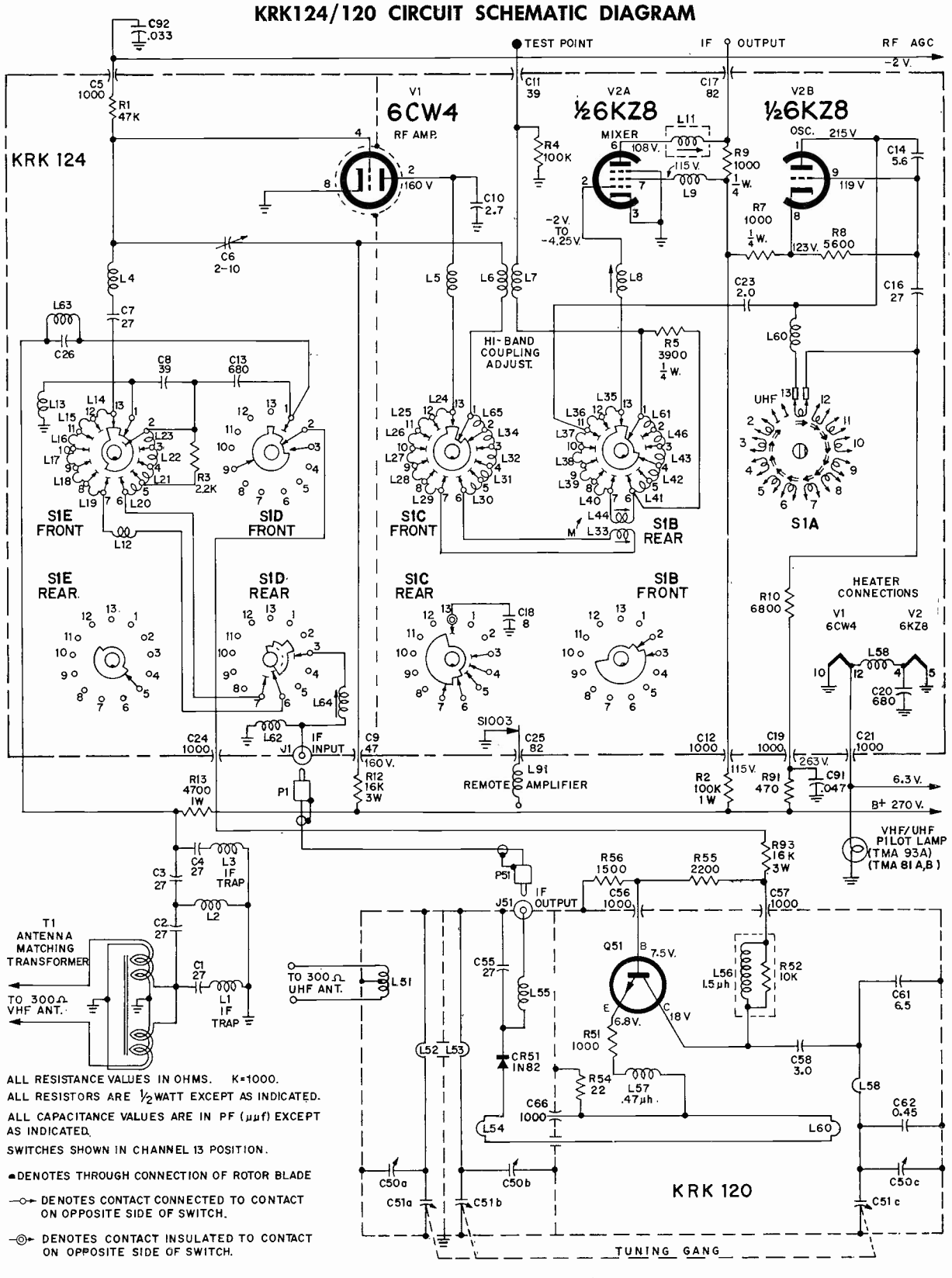
PW500 Solid Copper Circuit Assembly—Phantom View

PW500 COMPONENT LOCATION GUIDE

C501 ..... 3B	C523 ..... 1A	R510 ..... 4C	R532 ..... 1C	SR501 .... 2E
C502 ..... 2E	C524 ..... 1A	R511 ..... 2F	R533 ..... 1D	
C503 ..... 3F	C525 ..... 1E	R512 ..... 3E	R534 ..... 1B	
C505 ..... 3D	C526 ..... 2G	R513 ..... 4F	R536 ..... 1F	
C506 ..... 4D	C527 ..... 2H	R515 ..... 3D	R537 ..... 1G	
C507 ..... 1G	C528 ..... 2F	R516 ..... 3D	R538 ..... 1F	
C508 ..... 2G	C529 ..... 4A	R517 ..... 3F	R539 ..... 1H	
C509 ..... 1H		R518 ..... 2H	R540 ..... 2I	
C510 ..... 2I	L501 ..... 1A	R519 ..... 2H	R542 ..... 3C	
C512 ..... 3H		R520 ..... 3H	R543 ..... 3D	
C513 ..... 4I	PC501 .... 4F	R521 ..... 3F	R544 ..... 3B	
C514 ..... 4I	PC502 ..... 1I	R523 ..... 3I	R545 ..... 2B	
C515 ..... 2E		R524 ..... 4I	R546 ..... 4B	
C516 ..... 1D	R501 ..... 4D	R525 ..... 3I	R547 ..... 2E	
C517 ..... 1D	R504 ..... 3B	R526 ..... 2E	R548 ..... 2B	
C518 ..... 2E	R505 ..... 4C	R527 ..... 1E	R549 ..... 4G	
C519 ..... 2D	R506 ..... 4B	R528 ..... 2E		
C520 ..... 3E	R507 ..... 4A	R529 ..... 2D		
C521 ..... 2C	R508 ..... 4B	R530 ..... 2D		
C522 ..... 1C	R509 ..... 4A	R531 ..... 1D		

RCA Victor Chassis KCS-136M Series Tuner Information

KRK124/120 CIRCUIT SCHEMATIC DIAGRAM



KRK124/120 Tuner Schematic Diagram

RCA VICTOR

Chassis KCS 144E

Models AG-083J, N, Y, and AG-089E, W, Y

(Service data on pages 95-98; for alignment see TV-23, Early 1965 TV, pages 124-126)

CHASSIS REMOVAL

The knobs must be removed from the brightness control, volume control, VHF tuner shaft, and the UHF tuner shaft in order to remove the chassis.

To disassemble the instrument, disconnect the VHF and UHF antennas. Remove six screws from receiver back (two at top and two at bottom), the screw at the AC power cord, and the screw just below the antenna input terminals, then remove the receiver back. Remove four hex-head nuts from tuner mounting assembly and remove assembly. Remove four hex-head fasteners (two at top and two at bottom of chassis). Disconnect the yoke plug and the two speaker pin plugs at speaker. Remove chassis partially and disconnect the second anode lead.

WIDTH

The width adjustment is made with L101. The picture may be adjusted to fill the mask with a line voltage of 108 volts, and with normal line voltage, the raster should overscan the mask about 5/8 inch on each side. "Normal" line voltage is 120 volts.

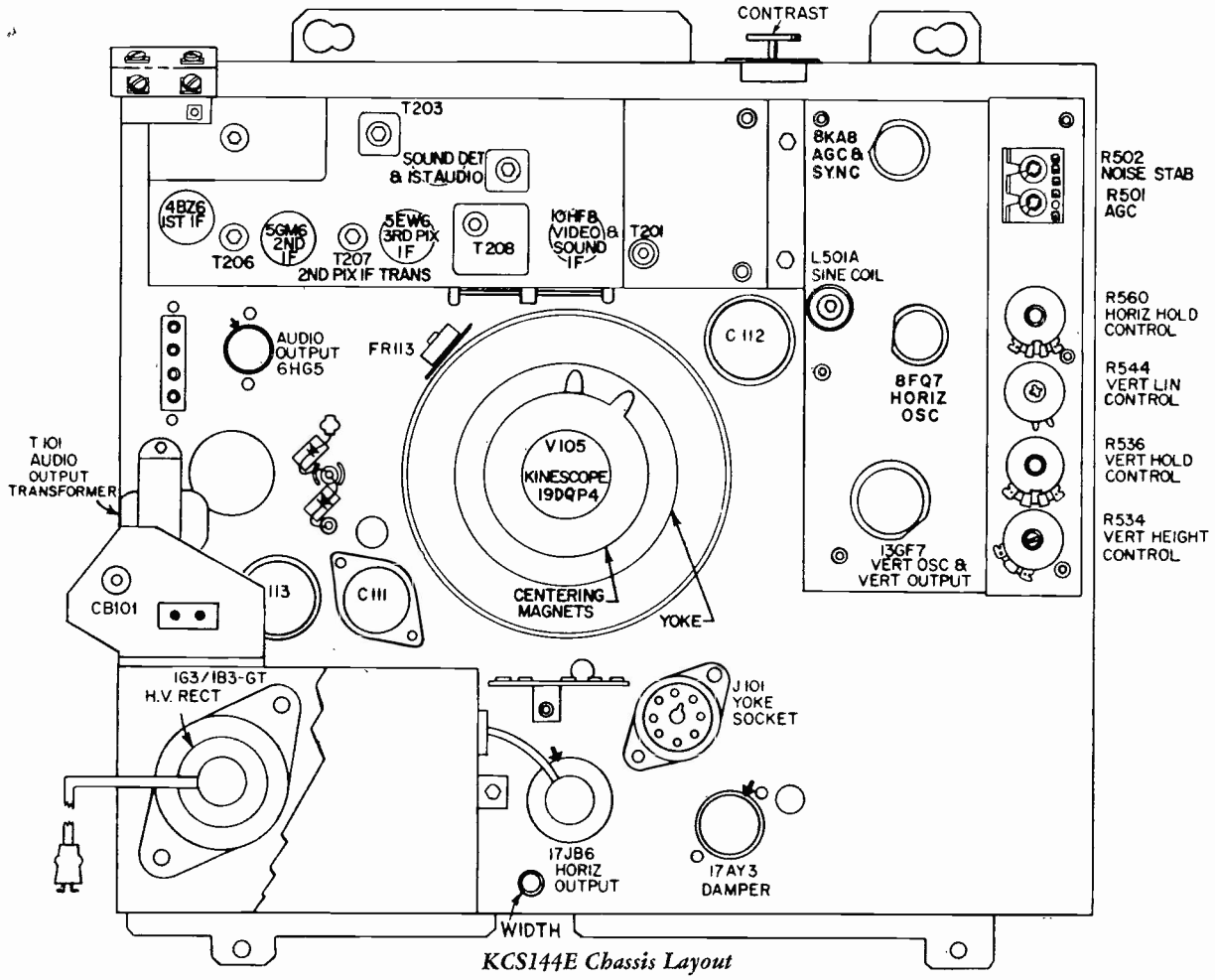
AGC CONTROL ADJUSTMENT

Perform the following routine test: Adjust the receiver and antenna to obtain the best picture from a strong, local station. Quickly switch off channel and back, and if the picture distorts and bends, or does not reappear immediately, rotate the AGC control (R501) counterclockwise and then clockwise until picture bend occurs. Then slowly retard control until the bend is gone. The noise stabilizer control should be turned counterclockwise to the end of rotation before adjusting AGC.

NOISE STABILIZER CONTROL

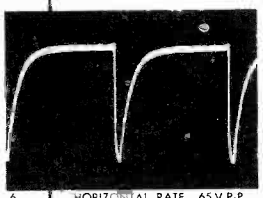
If the picture hangs up or bends before locking in, retard the noise stabilizer control (R502) until this symptom is eliminated.

NOTE: Adjust AGC before noise stabilizer.

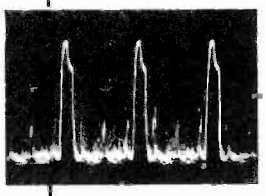


KCS144E Chassis Layout

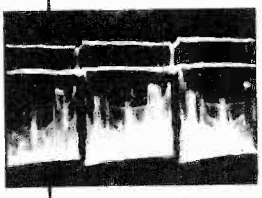
RCA Victor Chassis KCS-144E Service Information, Continued



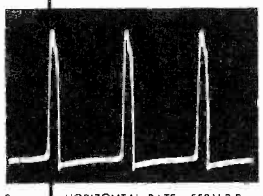
6 HORIZONTAL RATE 65 V P-P
SYNC. AMPLIFIER PLATE
V501B PIN 1



7 HORIZONTAL RATE 47 V P-P
AGC GRID
TERM. "D" PW300

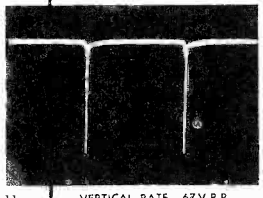


8 VERTICAL RATE 47 V P-P
AGC GRID
TERM. "D" PW300

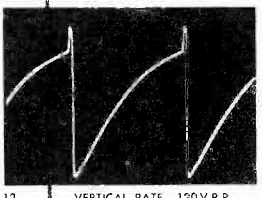


9 HORIZONTAL RATE 550 V P-P
AGC PLATE
TERM. "A" PW300

10 HORIZONTAL RATE 160 V P-P
HORIZONTAL OUTPUT GRID
V101 PIN 6

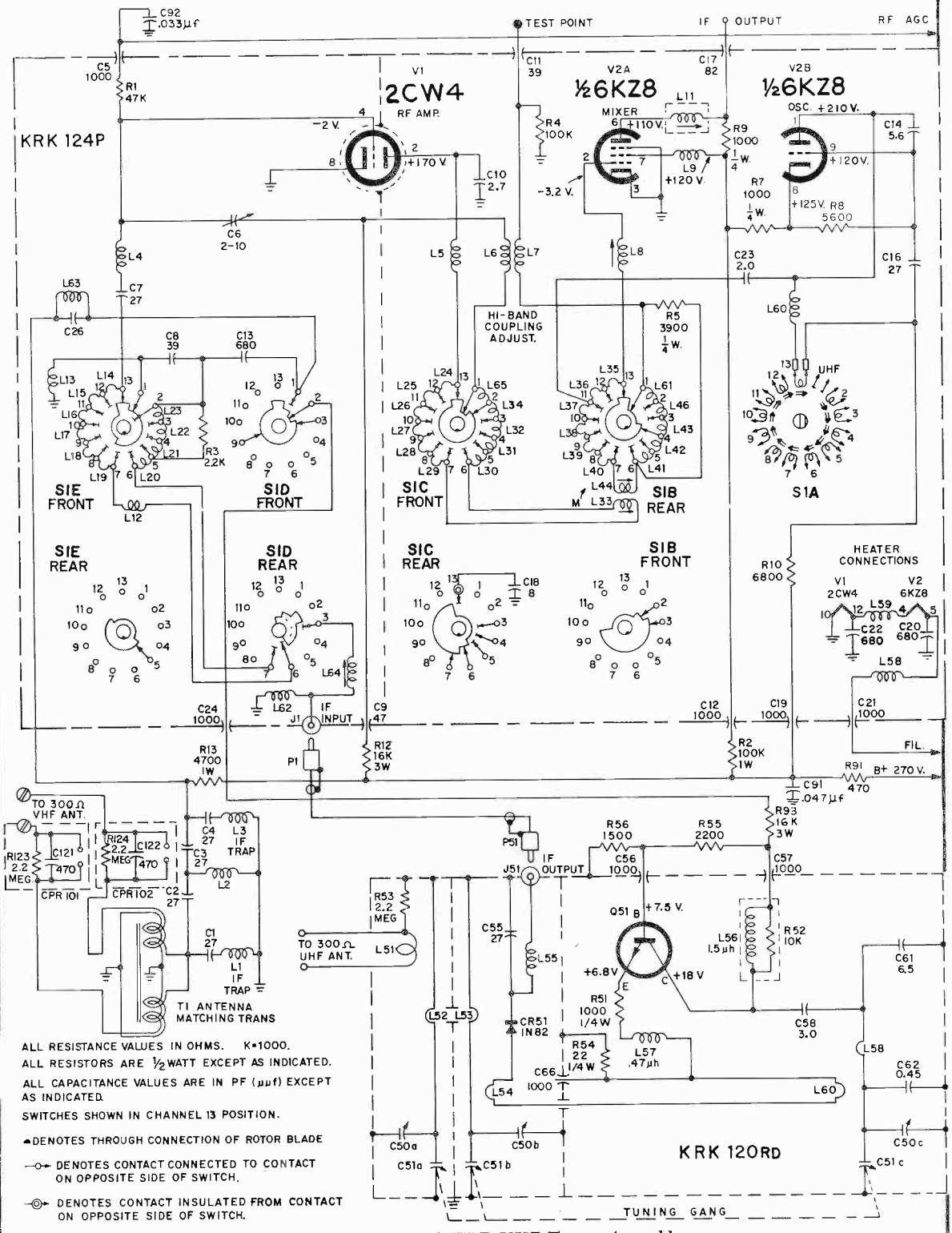


11 VERTICAL RATE 67 V P-P
KINESCOPE GRID
V105 PIN 2



12 VERTICAL RATE 120 V P-P
VERTICAL OSC. GRID
V502B PIN 9

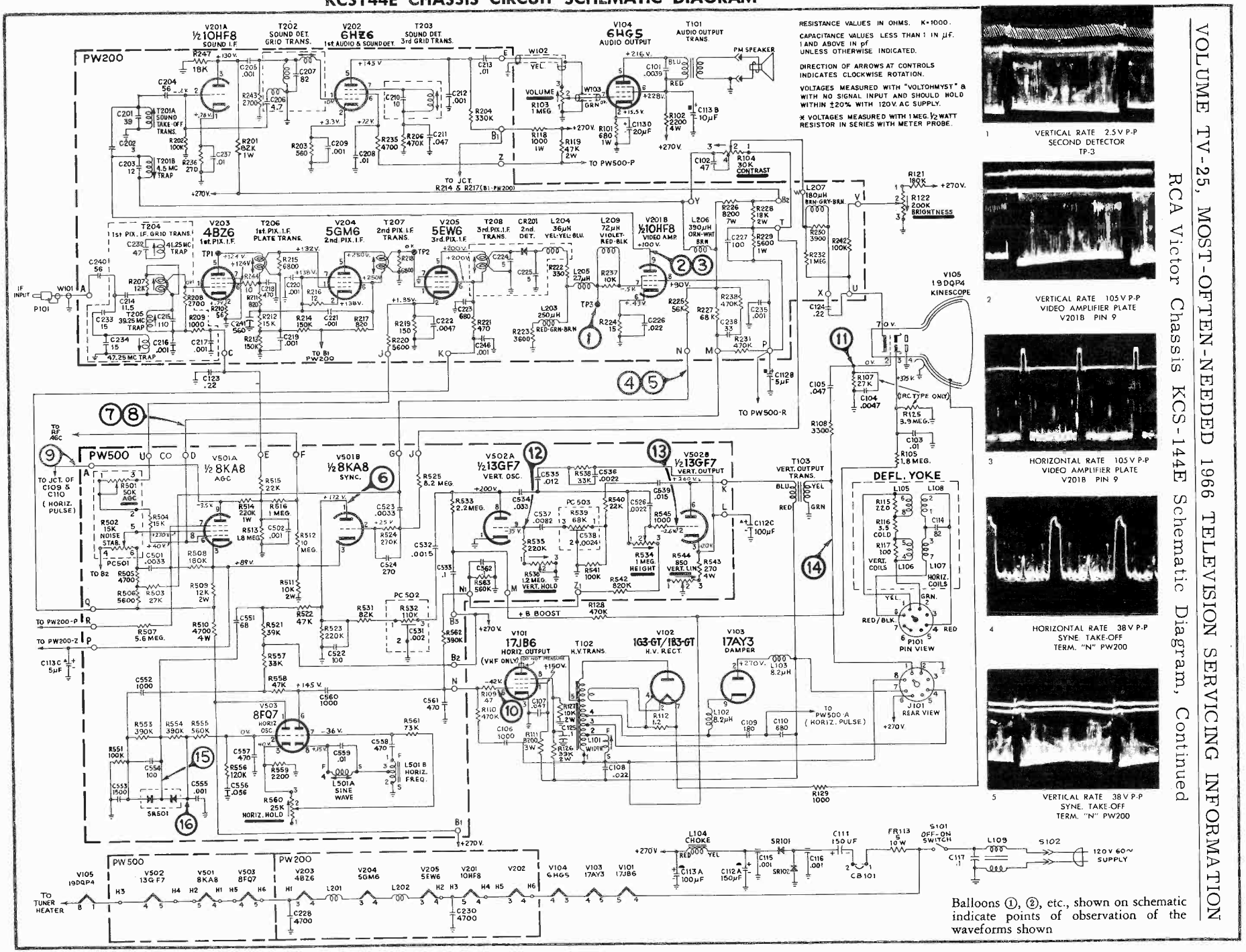
CIRCUIT SCHEMATIC DIAGRAM FOR KRK124P/KRK120RD VHF/UHF TUNER



ALL RESISTANCE VALUES IN OHMS. K=1000.
ALL RESISTORS ARE ½ WATT EXCEPT AS INDICATED.
ALL CAPACITANCE VALUES ARE IN PF (μμf) EXCEPT AS INDICATED.
SWITCHES SHOWN IN CHANNEL 13 POSITION.
▲DENOTES THROUGH CONNECTION OF ROTOR BLADE
—o— DENOTES CONTACT CONNECTED TO CONTACT ON OPPOSITE SIDE OF SWITCH.
—◎— DENOTES CONTACT INSULATED FROM CONTACT ON OPPOSITE SIDE OF SWITCH.

Circuit Schematic Diagram of VHF/UHF Tuner Assembly KRK124P/KRK120RD with TMA82A

KCS144E CHASSIS CIRCUIT SCHEMATIC DIAGRAM



1 VERTICAL RATE 2.5 V P-P
SECOND DETECTOR
TP-3

2 VERTICAL RATE 105 V P-P
VIDEO AMPLIFIER PLATE
V201B PIN 9

3 HORIZONTAL RATE 105 V P-P
VIDEO AMPLIFIER PLATE
V201B PIN 9

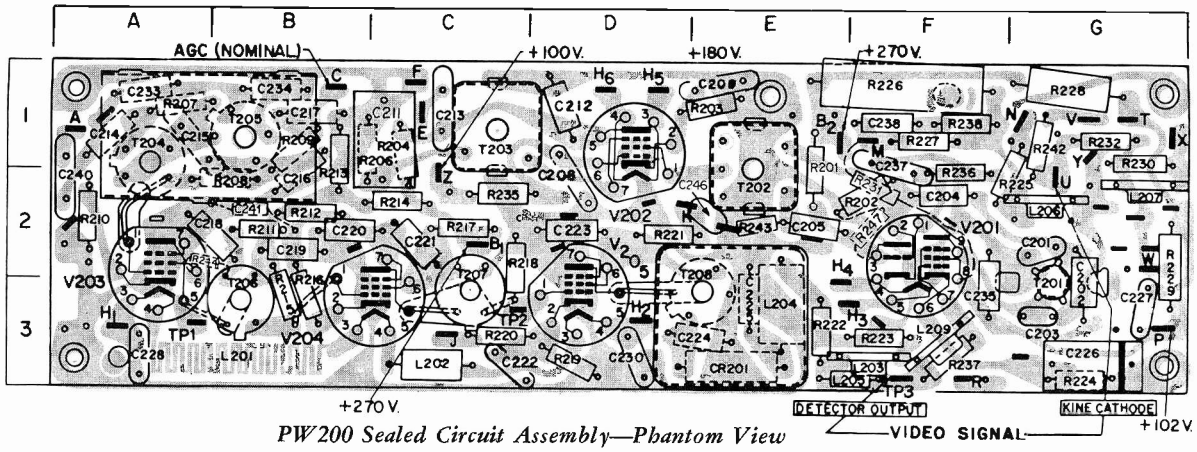
4 HORIZONTAL RATE 38 V P-P
SYNE TAKE-OFF
TERM. "N" PW200

5 VERTICAL RATE 38 V P-P
SYNE. TAKE-OFF
TERM. "N" PW200

Balloons ①, ②, etc., shown on schematic indicate points of observation of the waveforms shown

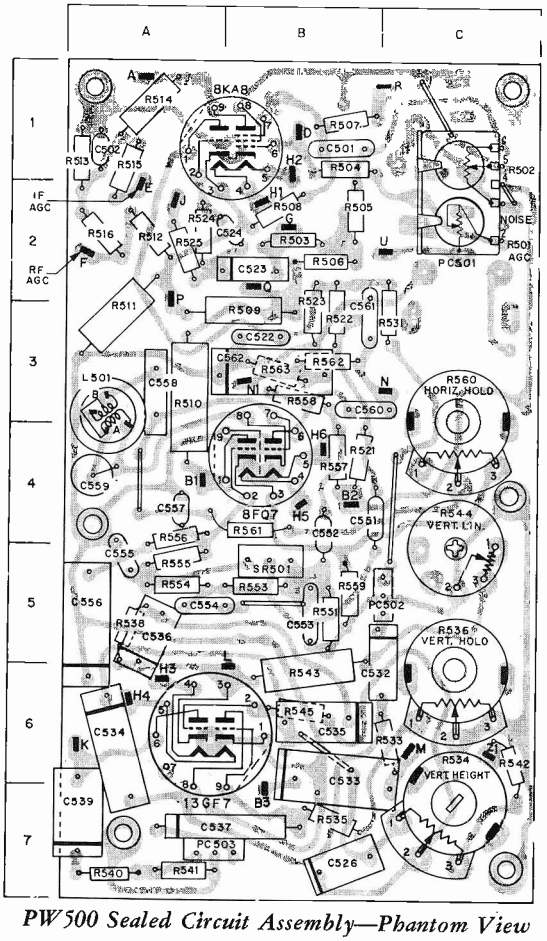
RCA Victor Chassis KCS-144E Service Information, Continued

PW200 SEALED CIRCUIT ASSEMBLY—PHANTOM VIEW



PW200 Sealed Circuit Assembly—Phantom View

PW500 SEALED CIRCUIT ASSEMBLY—



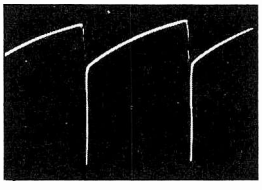
PW500 Sealed Circuit Assembly—Phantom View

C501	1B	R509	3B
C502	1A	R510	3A
C522	3B	R511	3A
C523	2B	R512	2A
C524	2B	R513	1A
C526	7B	R514	1A
C532	5C	R515	1A
C533	6B	R516	2A
C534	6A	R521	4B
C535	6B	R522	3B
C536	5A	R523	3B
C537	7B	R524	2A
C539	7A	R525	2A
C551	4B	R531	3C
C552	4B	R533	6C
C553	5B	R534	6C
C554	5A	R535	7B
C555	5A	R536	5C
C556	5A	R538	5A
C557	4A	R540	7A
C558	3A	R541	7A
C559	4A	R542	6C
C560	3B	R543	6B
C561	3B	R544	4C
C562	3B	R545	6B
		R551	5B
L501	3A	R553	5B
		R554	5A
		R555	5A
PC501	2C	R556	4A
PC502	5C	R557	4B
PC503	7A	R558	3B
		R559	5B
R501	2C	R560	3C
R502	1C	R561	4B
R503	2B	R562	3B
R504	1B	R563	3B
R505	2B		
R506	2B	SR501	5B
R507	1B		
R508	2B	PW200	

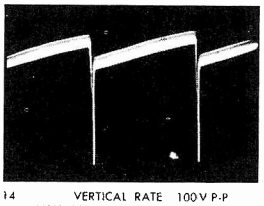
PW500 LOCATION GUIDE

C201	2G	R203	1E
C202	2G	R204	1C
C203	3G	R206	1C
C204	2F	R207	1A
C205	2E	R208	2B
C208	2D	R209	1B
C209	1E	R210	2A
C211	1C	R211	2B
C212	1D	R212	2B
C213	1C	R213	2B
C214	1A	R214	2C
C215	1A	R215	3B
C216	2B	R216	3B
C217	1B	R217	2C
C218	2B	R218	2D
C219	2B	R219	3D
C220	2A	R220	3C
C221	3C	R221	2D
C223	3E	R222	3E
C224	3E	R223	3F
C225	3E	R224	3G
C226	3G	R225	2G
C227	3G	R226	1F
C228	3A	R227	1F
C230	3D	R228	1G
C233	1A	R229	2G
C234	1B	R230	1G
C235	3F	R231	2F
C237	1F	R232	1G
C238	1F	R235	2C
C240	2A	R236	1F
*C241	2B	R237	3F
C246	2E	R238	1F
CR201	3E	R242	1G
		R243	2G
L201	3B	*R244	2B
L202	3C	*R247	1E
L203	3F		
L204	3E	T201	2G
L205	3E	T202	2E
L206	2G	T203	1C
L207	2G	T204	1A
L209	3F	T205	1B
		T206	3B
		T207	3C
R201	1E	T208	3E
R202	2F	*Under Board	

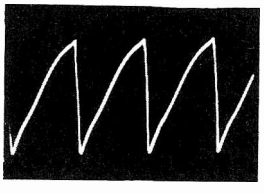
PW200 LOCATION GUIDE



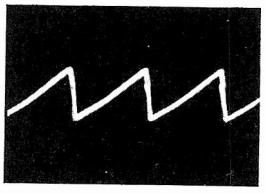
13 VERTICAL RATE 275V P-P
VERTICAL OUTPUT GRID
V502B PIN 2



14 VERTICAL RATE 100V P-P
VERTICAL OUTPUT TRANSFORMER SEC
J101 PIN 1 (YOKE SOCKET)



15 HORIZONTAL RATE 9V P-P
CATHODE JUNCTION SR501



16 HORIZONTAL RATE 1V P-P
ANODE SR501

CHASSIS WAVEFORMS

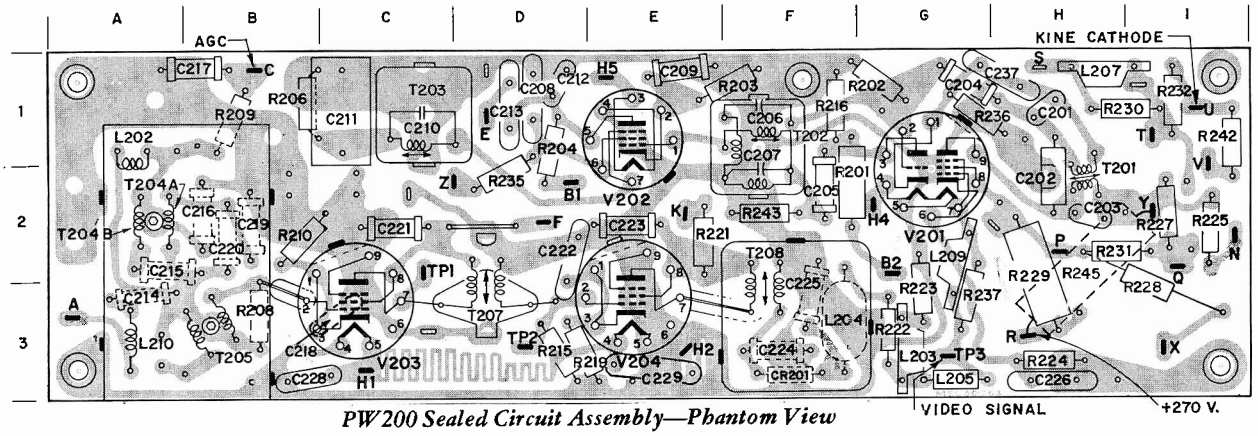
RCA VICTOR

Chassis KCS 148N

MODELS AG-127B, E

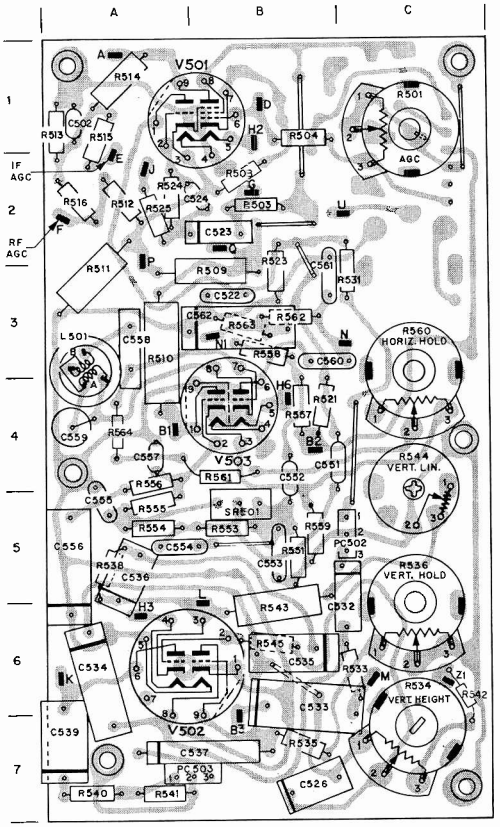
(Service data on pages 99-102; for alignment see TV-23, Early 1965 TV, pages 134-136.)

PW200 SEALED CIRCUIT ASSEMBLY—PHANTOM VIEW



PW200 Sealed Circuit Assembly—Phantom View

PW500 SEALED CIRCUIT ASSEMBLY



PW500 Sealed Circuit Assembly—Phantom View

PW500 LOCATION GUIDE

C502	1A	R513	1A
C522	3B	R514	1A
C523	3B	R515	1A
C524	2B	R516	2A
C526	7B	R521	4B
C532	6C	R523	2B
C533	6B	R524	2A
C534	6A	R525	2A
C535	6B	R531	3C
C536	2A	R533	6C
C537	7A	R534	6C
C539	7A	R535	7B
C551	4B	R536	5C
C552	4B	R538	5A
C553	5B	R540	7A
C554	5A	R541	7A
R555	5A	R542	6C
R556	5A	R543	6B
C557	4A	R544	4C
C558	3A	R545	6B
C559	4A	R551	5B
C560	3B	R553	5B
C561	3B	R554	5A
C562	3B	R555	5A
		R556	4A
L501	3A	R557	4B
PC502	5C	R558	3B
PC503	7B	R559	5B
R501	1C	R560	3C
R503	2B	R561	4B
R504	1B	R562	3B
R508	2B	R563	3B
R509	3B	R564	4A
R510	3A		
R511	3A	SR501	5B
R512	2A		

PW200 LOCATION GUIDE

C201	1H	L210	3A
C202	2H	R201	2F
C203	2H	R202	1G
C204	1G	R203	1F
C205	2F	R204	1D
C206	1F	R206	1B
C207	2F	R208	3B
C208	1D	R209	1B
C209	1E	R210	2B
C210	1C	R215	3D
C211	1C	R216	1F
C212	1D	R219	3D
C213	1D	R221	2E
C214	3A	R222	3G
C215	2A	R223	3G
C216	2B	R224	3H
C217	1B	R225	2I
*C218	3C	R227	2I
C219	2B	R228	2H
C220	2B	R229	2H
C221	2C	R230	1H
C222	2D	R231	2H
C223	2E	R232	1I
C224	3F	R235	2D
C225	3F	R236	1G
C226	3H	R237	3G
C228	3B	R242	1I
C229	3E	R243	2F
C237	1H	*R245	2H
CR201	3F	T201	2H
L202	1A	T202	1F
L203	3G	T203	1C
L204	3F	T204	2A
L205	3G	T205	3B
L207	1H	T207	3D
L209	2G	T208	2F
*Under Board			

SERVICE ADJUSTMENTS

ANTENNA INPUT

The single screw at the bottom of the receiver antenna terminal board is connected through a 75 ohm cable to the input terminals of the VHF tuner. When the monopole antenna is used, it connects (brown lead with spade lug) directly to the screw terminal.

When an external antenna with 300 ohm lead is connected to the VHF antenna input terminals, disconnect the brown lead (VHF monopole) and connect the white lead coming from between the two VHF terminals to the bottom screw terminal.

The UHF antenna input terminals connect directly to the 300 ohm input of the UHF tuner. Disconnect the UHF loop antenna before connecting an external antenna.

AGC CONTROL ADJUSTMENT

Perform the following, routine test: Adjust the receiver and antenna to obtain the best picture from a strong, local station. Quickly switch off channel and back, and if the picture distorts and bends, or does not reappear at once, rotate the agc control (R501) counterclockwise and then clockwise until slight picture bend occurs. Then slowly retard the control until the bend is gone. Check again by switching off and on strong signal.

HORIZONTAL OSCILLATOR

The horizontal sine wave coil is adjusted by temporarily attaching a short jumper across the coil (L501A) and another jumper from Pin 2 of the 6LC8 to ground. Carefully adjust the horizontal hold for least sideways drift of the picture and remove the coil jumper. Again stop the sideways drift (if any) by adjusting the sine wave coil slug with nonmetallic tool. Remove all jumpers.

CENTERING

If the picture does not fill the screen, it may be necessary to center the picture with the 2 disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity, and width, as they are all interdependent.

TESTING PICTURE PROPORTIONS

Rotate the vertical hold control to roll picture slowly downward and study the blanking bar. If it is not level, or if the bar varies in thickness as it moves down the screen, make adjustments as prescribed in the next two paragraphs.

DEFLECTION YOKE

If the picture is tilted, loosen the yoke clamp screw and rotate the yoke to level the picture. Retighten the yoke clamp.

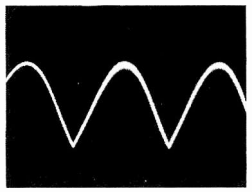
HEIGHT AND VERTICAL LINEARITY

If the blanking bar changed size while moving down, alternately adjust the height and vertical linearity controls for best vertical proportions. Final vertical size should allow the raster to overlap the mask about 5/8 inch at top and bottom with normal (120 volts) line voltage.

WIDTH

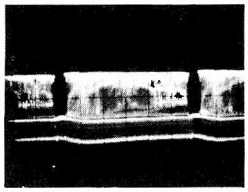
The width adjustment is made with L101. The picture may be adjusted to fill the mask with a line voltage of 108 volts; and with normal line voltage, the raster should overscan the mask about 5/8 inch on each side. "Normal" line voltage is 120 volts.

KCS148N CHASSIS WAVEFORMS

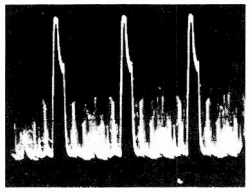


1 VERT. RATE 3.5 V P-P
TERM B1-PW500
270V B+ BUS

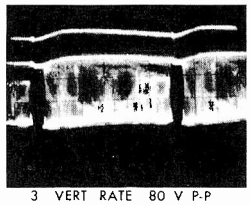
7 HORIZ RATE 65 V P-P
V501B PIN 1
SYNC AMPLIFIER PLATE



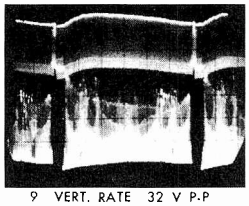
2 VERT. RATE 1.5 V P-P
2ND DETECTOR
TP3



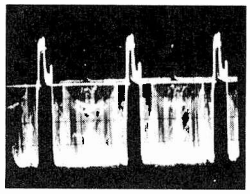
8 HORIZ. RATE 32 V P-P
TERM D PW500
AGC GRID



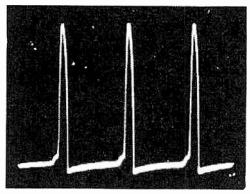
3 VERT RATE 80 V P-P
V201B PIN 9
VIDEO AMPLIFIER PLATE



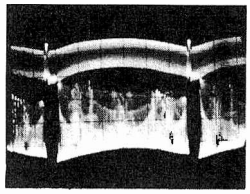
9 VERT. RATE 32 V P-P
TERM. D PW500
AGC GRID



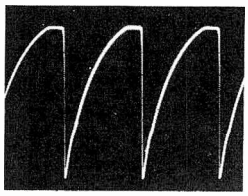
4 HORIZ RATE 80 V P-P
V201-B PIN 9
VIDEO AMPLIFIER PLATE



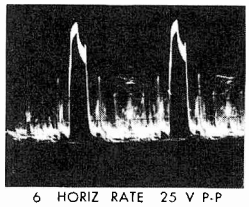
10 HORIZ. RATE 650 V P-P
TERM A PW500
AGC PLATE



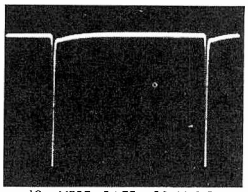
5 VERT RATE 25 V P-P
TERM N PW200
SYNC TAKE-OFF



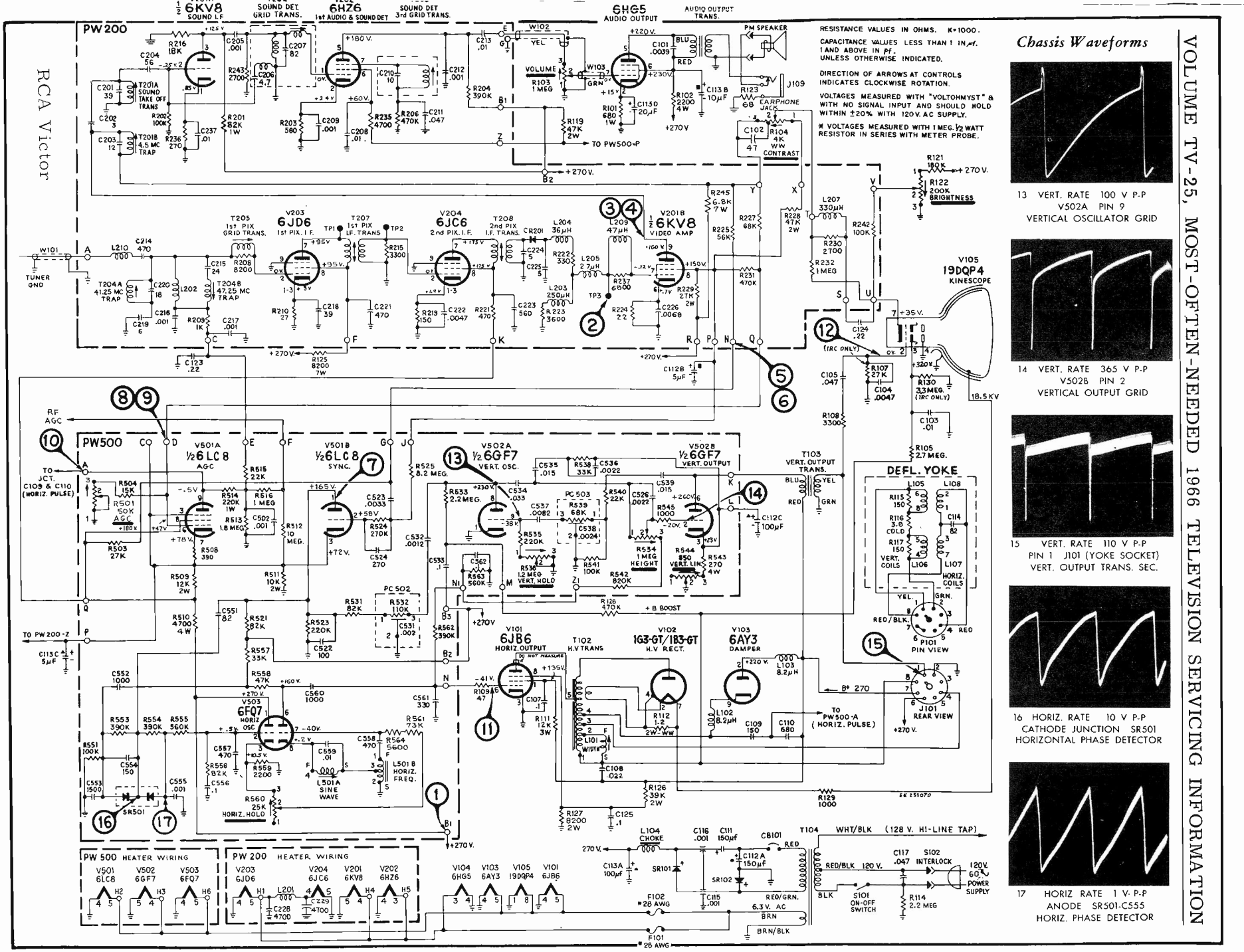
11 HORIZ. RATE 165 V P-P
V101 PIN 6
HORIZONTAL OUTPUT GRID



6 HORIZ RATE 25 V P-P
TERM. N PW200
SYNC TAKE-OFF



12 VERT. RATE 80 V P-P
PIN 2 V105
KINESCOPE GRID



Chassis Waveforms

13 VERT. RATE 100 V P-P
V502A PIN 9
VERTICAL OSCILLATOR GRID

14 VERT. RATE 365 V P-P
V502B PIN 2
VERTICAL OUTPUT GRID

15 VERT. RATE 110 V P-P
PIN 1 J101 (YOKE SOCKET)
VERT. OUTPUT TRANS. SEC.

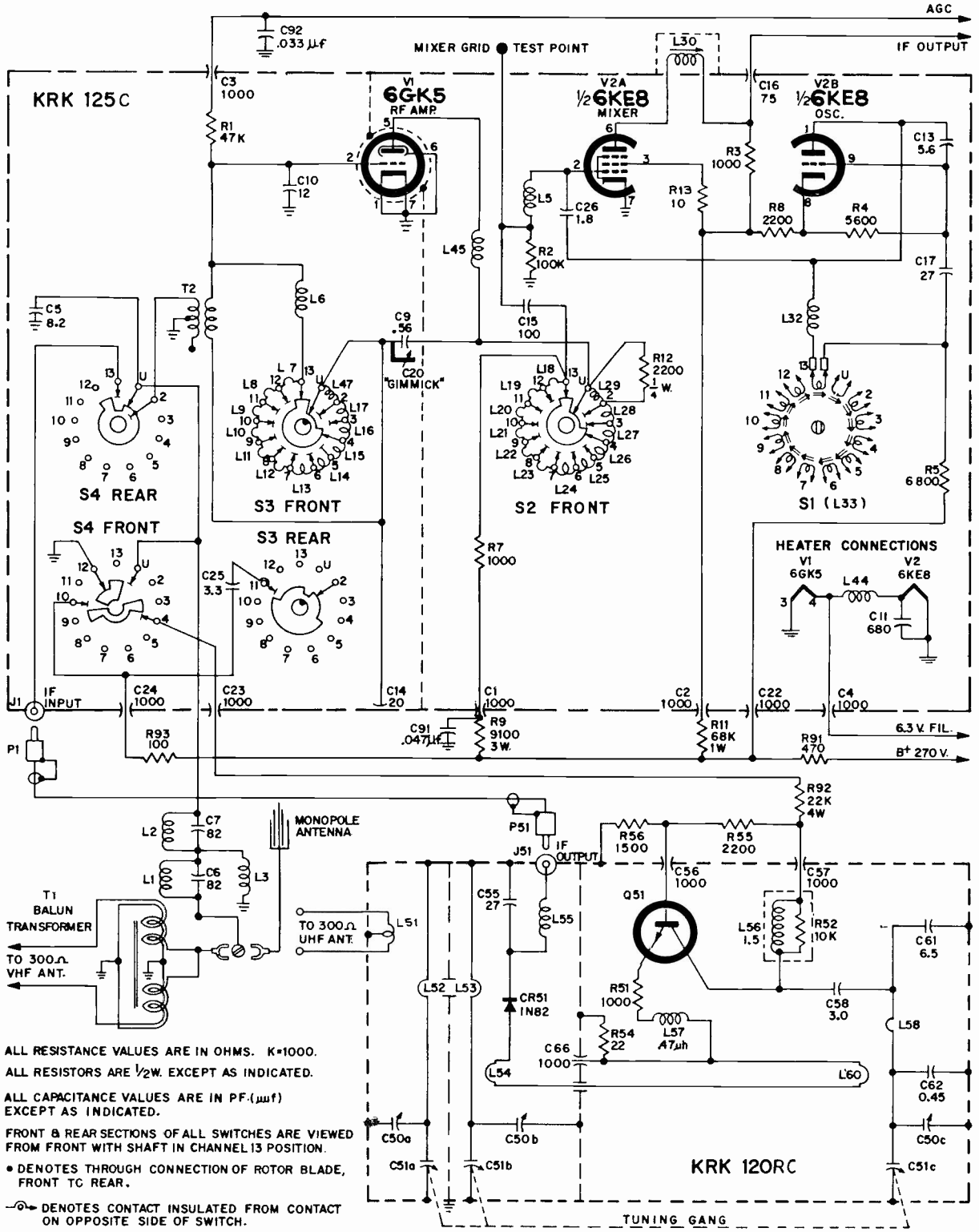
16 HORIZ. RATE 10 V P-P
CATHODE JUNCTION SR501
HORIZONTAL PHASE DETECTOR

17 HORIZ RATE 1 V. P-P
ANODE SR501-C555
HORIZ. PHASE DETECTOR

CIRCUIT SCHEMATIC DIAGRAM FOR KCS148N CHASSIS

RCA Victor Chassis KCS-148N Tuner Diagram

CIRCUIT SCHEMATIC DIAGRAM FOR KRK125C/KRK120RC VHF/UHF TUNER



ALL RESISTANCE VALUES ARE IN OHMS. K=1000.

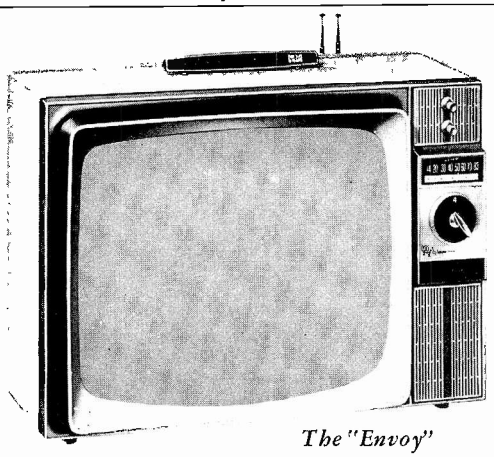
ALL RESISTORS ARE ½W. EXCEPT AS INDICATED.

ALL CAPACITANCE VALUES ARE IN PF.(µµf) EXCEPT AS INDICATED.

FRONT & REAR SECTIONS OF ALL SWITCHES ARE VIEWED FROM FRONT WITH SHAFT IN CHANNEL 13 POSITION.

• DENOTES THROUGH CONNECTION OF ROTOR BLADE, FRONT TO REAR.

—o— DENOTES CONTACT INSULATED FROM CONTACT ON OPPOSITE SIDE OF SWITCH.



The "Envoy"

RCA VICTOR

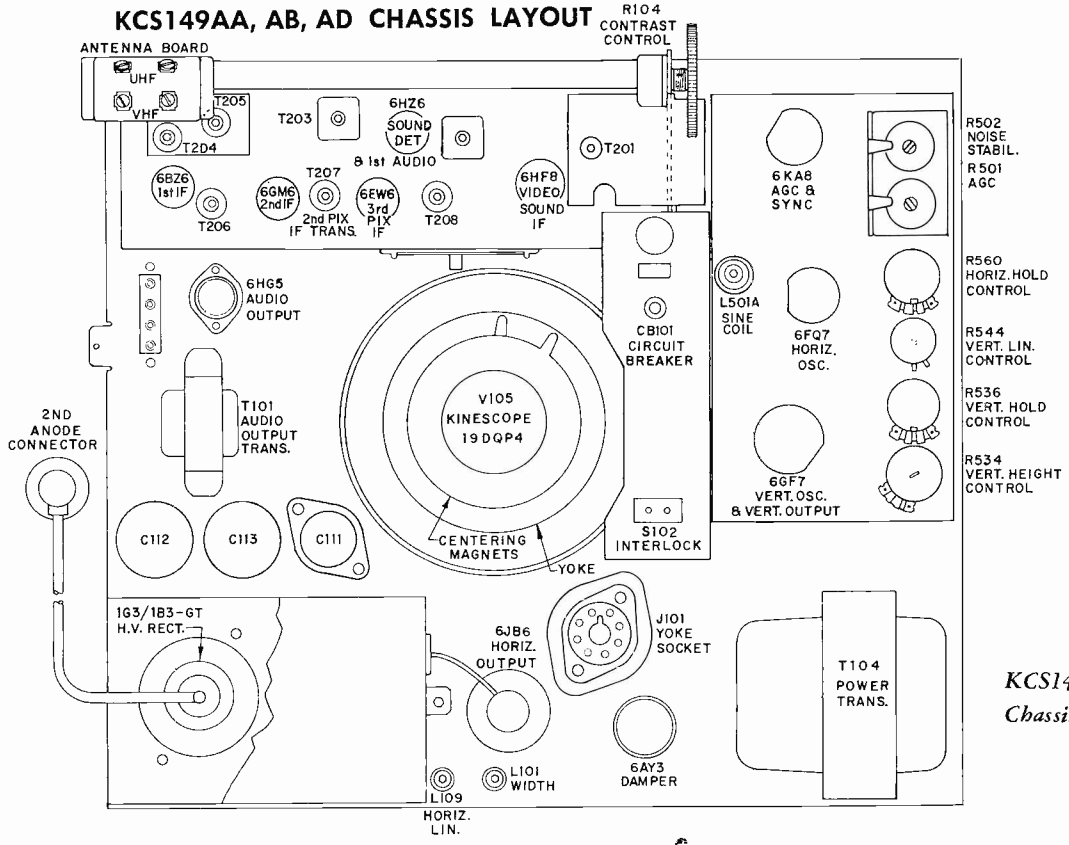
Chassis
KCS 149 AA, AB, AD

(Service data on pages 103-106; for alignment information see such material in TV-23, Early 1965 TV Manual, pages 124-126.)

MODEL AND CHASSIS CROSS REFERENCE

Model	Name	Chassis	TMA	Tuners	Kinescope	Antennas VHF/UHF
AG-143E, W, Y	*"FASHIONETTE"*	KCS149AD	105A	KRK124K/120RC	19DQP4	Dipole/Ring
AG-159B, E	*"STYLIST"*	KCS149AA	81A	KRK124K/120RE	19DQP4	Dipole/Ring
AG-167G, U, W	*"ENVOY"*	KCS149AA	81A	KRK124K/120RE	19DQP4	Dipole/Ring
AG-167GR, UR, WR	*"ENVOY"*	KCS149AB	81B	KRK124M/120RE	19DQP4	Dipole/Ring

KCS149AA, AB, AD CHASSIS LAYOUT



KCS149AA, AB, AD Chassis Layout

CENTERING

Both horizontal and vertical centering are accomplished at once by rotating the two disc magnets mounted behind the yoke cover. The discs can be rotated separately or together depending on the degree of adjustment necessary. Perform this adjustment along with vertical linearity, height, and width, as they are all interdependent.

HORIZONTAL OSCILLATOR ADJUSTMENT

The horizontal sine wave coil is adjusted by temporarily attaching a short jumper across the coil (L501A) and another jumper from Pin 2 of V501 to ground. Carefully adjust the horizontal hold for least sideways drift of the picture and remove the coil jumper. Again stop the sideways drift (if any) by adjusting the sine wave coil slug with nonmetallic tool. Remove all jumpers.

RCA Victor Chassis KCS-149AA, AB, AD, Service Information, Continued

HORIZONTAL LINEARITY AND WIDTH ADJUSTMENTS

Horizontal linearity and width should be adjusted in conjunction to obtain optimum linearity and proper width. Begin by presetting the width coil two turns in from the extreme counterclockwise position. With the picture properly centered, adjust the horizontal linearity control for best horizontal proportions and then complete the adjustment with the width coil as follows:

The picture may be adjusted to fill the mask with adjusted line voltage of 108 volts, and with normal line voltage, the raster should scan the mask about 5/8" on each side. "Normal" line voltage is 120 volts.

The width coil (L101) and the horizontal linearity coil (L109) are identified on the chassis drawing.

AGC CONTROL ADJUSTMENT

Perform the following routine test: Adjust the receiver and antenna to obtain the best picture from a strong, local station. Quickly switch off channel and back, and if the picture distorts and bends, or does not reappear immediately, rotate the AGC control R501, counterclockwise and then clockwise until picture bend occurs. Then slowly retard control until the bend is gone. The noise stabilizer control should be turned counterclockwise to the end of rotation before adjusting AGC.

NOISE STABILIZER CONTROL ADJUSTMENT

Advance the noise stabilizer control (R502) fully clockwise and rotate the horizontal hold control (R560) counterclockwise until horizontal sync is lost. Then slowly sync the picture again. If the picture hangs up, or bends before locking in, retard the noise stabilizer control until this symptom is eliminated.

NOTE: Adjust AGC before noise stabilizer.

CHASSIS REMOVAL

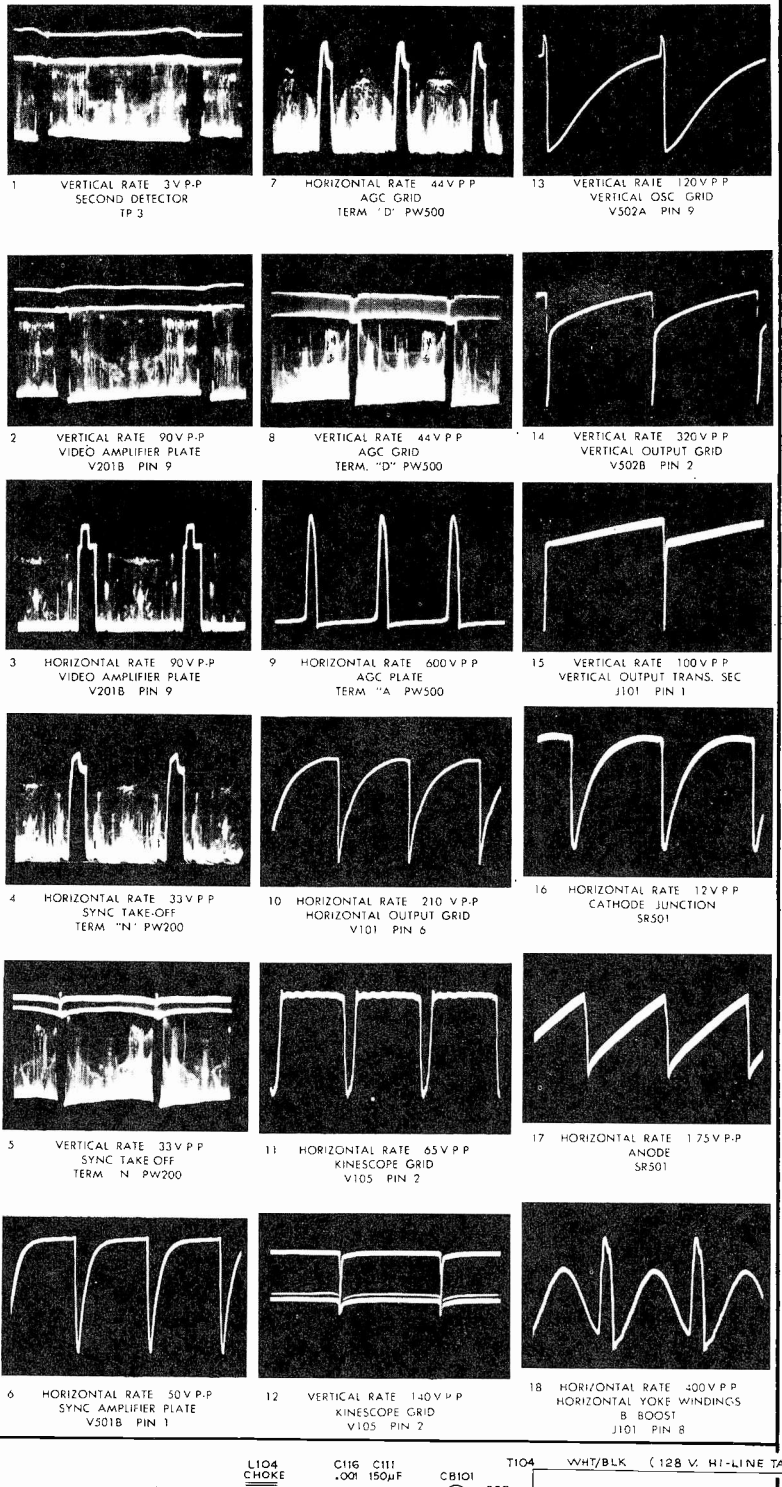
The knobs must be removed from the Brightness control, Volume control, and the combination UHF/VHF tuner shaft before removing the chassis.

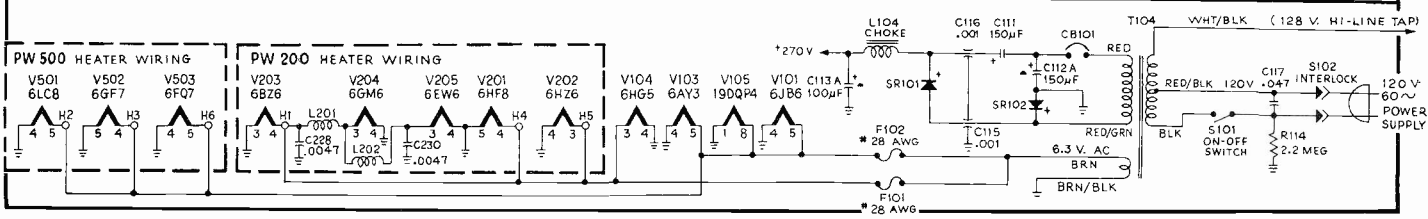
To disassemble the instrument, remove the six screws securing the back cover (two at top, two at bottom, one just above the AC power cord input, and one just below the VHF antenna input terminals). Disconnect VHF and UHF antennas and remove back cover. Remove four nuts from tuner mounting assembly and remove assembly. (On remote control models, unplug cable leading to remote control amplifier before removing tuner assembly.) Remove four hex-head chassis bolts (two at top of chassis and two under cabinet). Disconnect the yoke plug and the two speaker pin-plugs at the speaker. Partially remove the chassis and disconnect the second anode lead.

A threaded stud is provided at the left edge of the chassis and may be used to mount the tuner assembly to the chassis. For convenient servicing and for safety in transporting the chassis, it is recommended that this service position for the tuner assembly be utilized.

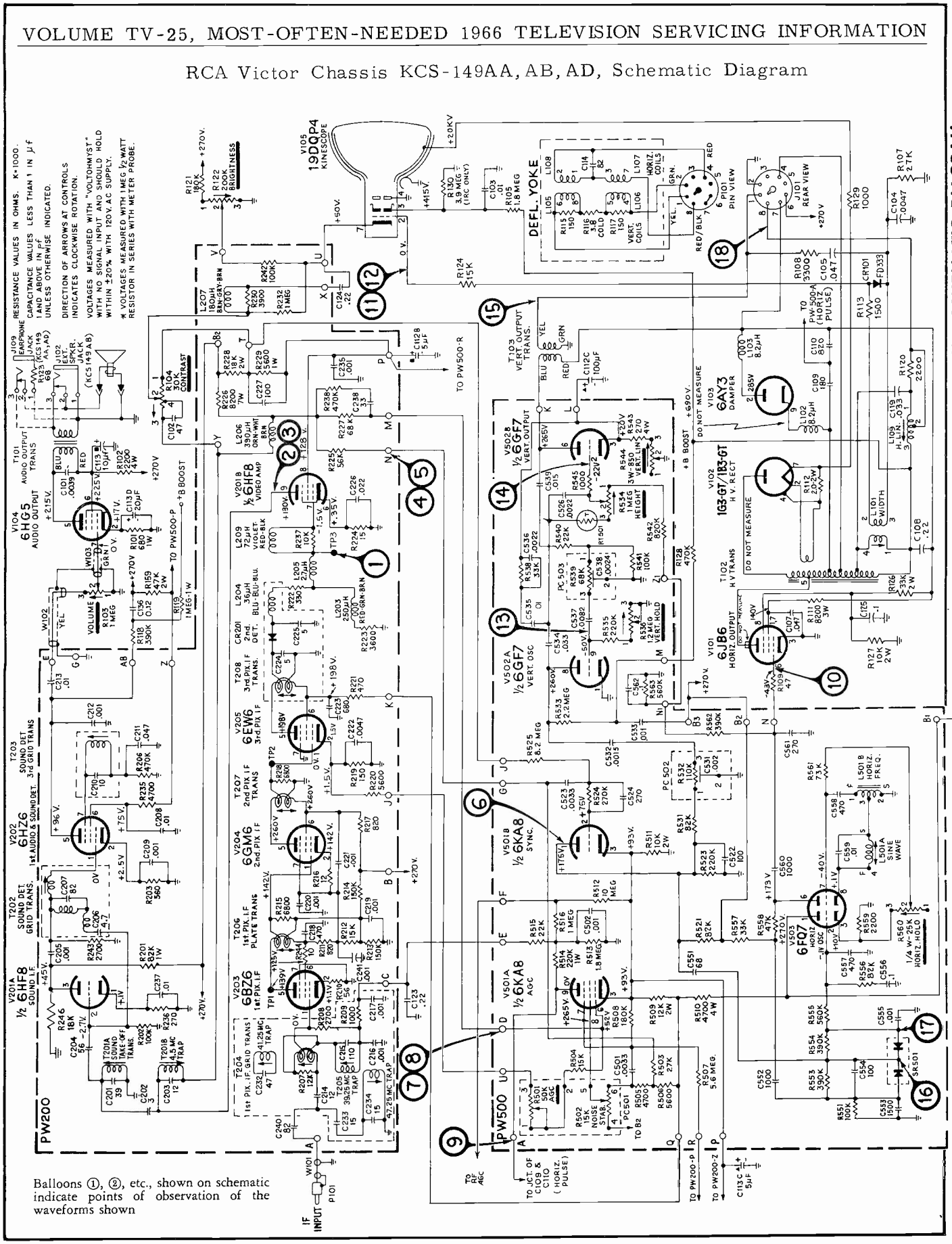
On remote control models, the remote control amplifier is mounted on the lower left side of the cabinet just behind the speaker. To remove the amplifier, remove four screws located under the cabinet. Unplug the transducer cable and the cable leading to the tuner assembly (unless previously unplugged) and lift the amplifier out.

KCS149AA, AB, AD CHASSIS WAVEFORMS





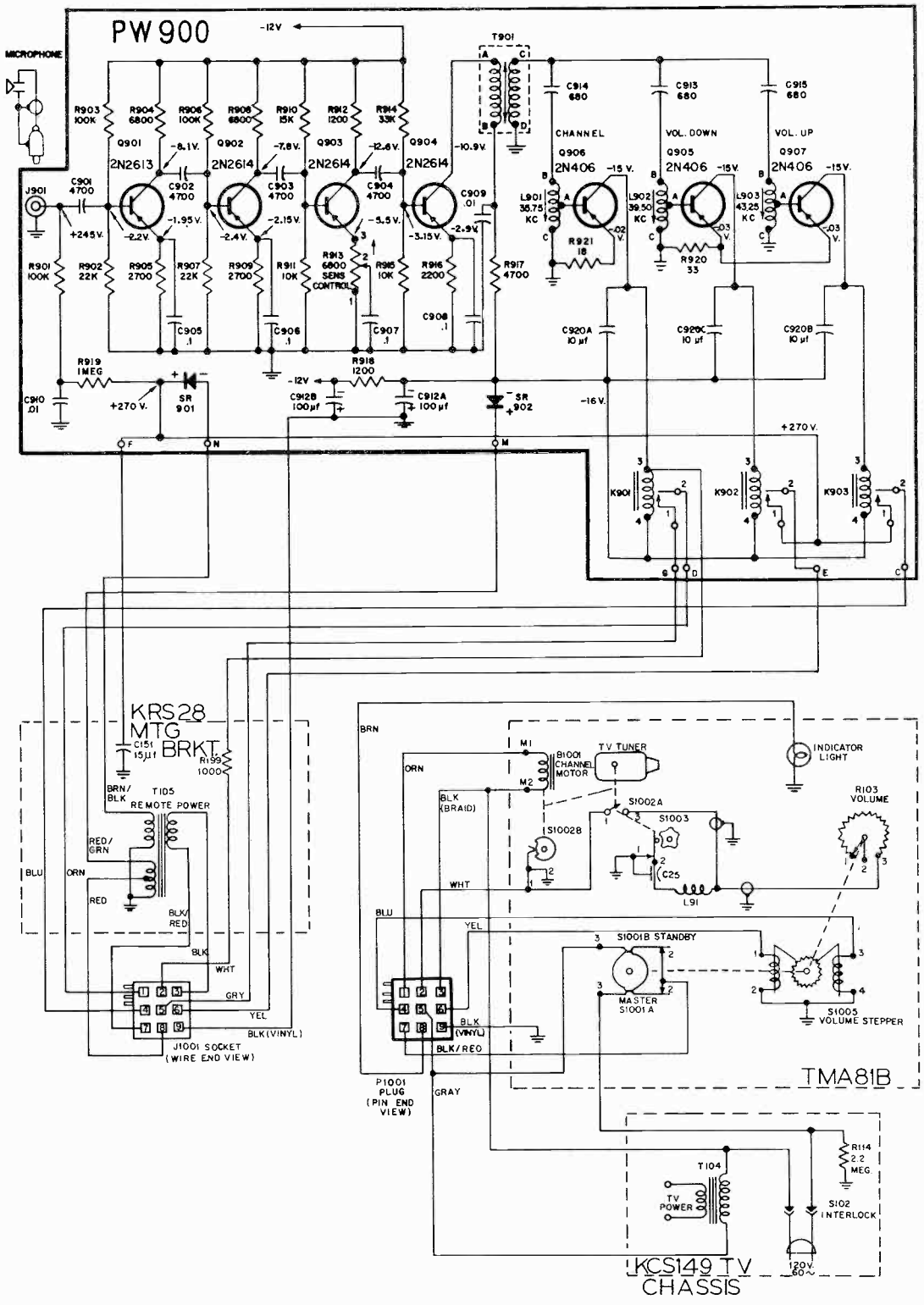
RCA Victor Chassis KCS-149AA, AB, AD, Schematic Diagram



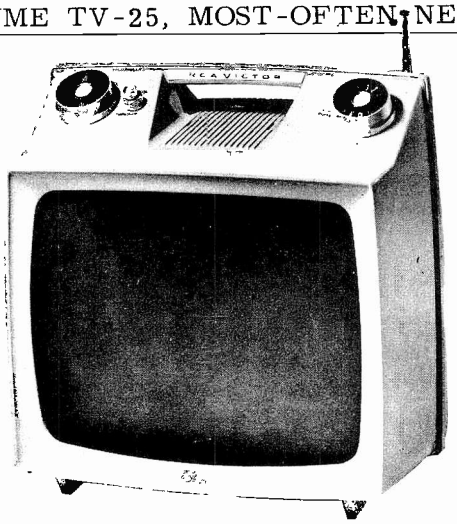
Balloons ①, ②, etc., shown on schematic indicate points of observation of the waveforms shown

RCA Victor Chassis KCS-149 Series Remote Control Diagram

CIRCUIT SCHEMATIC DIAGRAM FOR KRS28A REMOTE CONTROL AMPLIFIER



Circuit Schematic Diagram of Remote Control Amplifier KRS28A



RCA VICTOR

KCS153 Chassis

Model AG-005J, using Chassis KCS-153A
Models AG-013E,N,Y, Chassis KCS-153B

(Service material on pages 107 through 114)

INSTRUMENT DISASSEMBLY

The back cover is secured with six screws, two at the top, two on the bottom and one each at the VHF antenna terminal board and the AC power receptacle. The UHF antenna lead disconnects at the tuner input terminal posts.

All control knobs on the control panel should be taken off before the chassis is removed.

The chassis is held in place by two 3/8" nuts at the top, two 1/4" hex-head screws at the bottom, and a 1/4" hex-head screw on each side. Disconnect the speaker at the chassis plug then disconnect the Kinescope socket. Move out the chassis to disconnect the yoke plug and the second anode lead.

The Kinescope is held in position by a retaining strap which is under tension from a spring. The retaining strap is, in turn, secured to the mask by brackets at each corner. To remove the Kinescope, force the wire over the shoulders of one of the brackets. After the retaining wire is free of the brackets, lift the Kinescope from the cabinet.

WIDTH AND LINEARITY ADJUSTMENTS

Set AC input line voltage at 108 v.

Adjust Contrast and Brightness for a minimum visible picture.

Adjust Width Coil L107 (Lower right side of auxiliary outboard chassis) to give full scan +1/4" −0".

Adjust the Vertical Linearity Control R554 for best linearity at the top of the picture. Then adjust the Height Control R525 to give +1/8" to −3/8" overscan at the top and bottom of the picture.

Horizontal adjustments should be made before aligning vertical.

HORIZONTAL ADJUSTMENTS

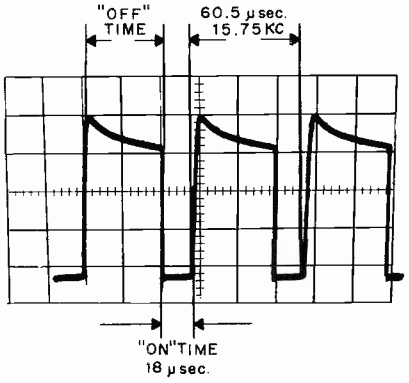
IMPORTANT: Adjustment of the bottom core of L101B, the Horizontal Stabilizer coil, is not a normal service adjustment. If for any reason the coil is misadjusted, serious horizontal misalignment and/or damage to the horizontal circuit could result. See "Horizontal Stabilizer Coil Adjustment."

Horizontal Oscillator Adjustment:

1. Turn Receiver power off.
2. Remove sync by connecting a jumper from the collector of Q502 (Zone 1E PW Board) to ground.
3. Turn Horizontal Hold control R580 full clockwise.
4. Connect a jumper between terminals AU (Zone 4E) and AT (Zone 3D). Turn AC Power on.
5. Adjust Hold control for least sideway drift of the picture.
6. Turn the set off, then remove jumper from Terminal AT and AU.
7. Turn the set on, then adjust L101A (Top core) until the picture sides are vertical and there is no sideways drift. Remove short from Q502-C.

HORIZONTAL STABILIZER COIL ADJUSTMENT

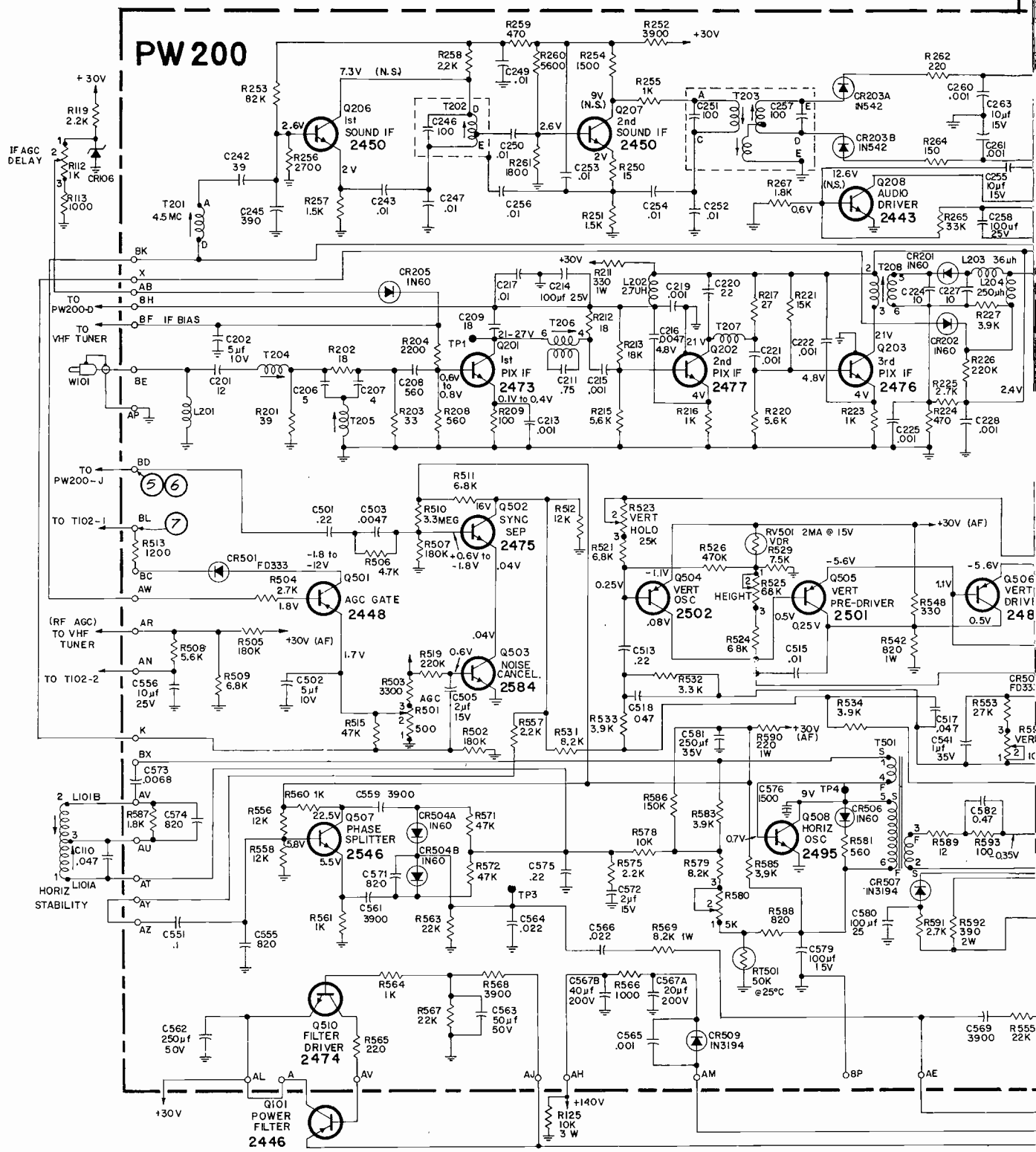
The action of the Horizontal Blocking Oscillator (Q508) is controlled by the Horizontal Stabilizer coil L101. Ringing coil L101A (Top core) controls oscillator off time, while transistor conduction is controlled by ringing coil L101B (Bottom core). For proper oscillator action Q508 should conduct for approximately 18 μsec and be cut off for the remainder of the Horizontal cycle. See wave form below.



If it should become necessary to adjust L101B proceed as follows:

1. Turn Receiver power off.
2. Remove sync by connecting a jumper from Q502-C to ground.
3. Connect Oscilloscope probe to TP4 (Zone 3E).
4. Turn Horizontal Hold control, R508 fully clockwise.
5. Short out Ringing coil L101A by connecting a jumper between terminals AT (Zone 3D) and AU (Zone 4E). Turn AC power on (120VAC).
6. Adjust Hold control R508 for least sideway drift of picture.
7. Adjust L101B (Bottom core) for a pulse width of 18 μsec (See figure "B"). Transistor conduction (Bottom trace) should be approximately half the cut-off time.
8. Turn set off, then remove jumper from terminals AT and AU.
9. Turn set on, then adjust L101A (Top core) to lock in picture Horizontally.
10. Remove jumper from Q502-C.

RCA Victor Chassis KCS-153A,B, Schematic Diagram



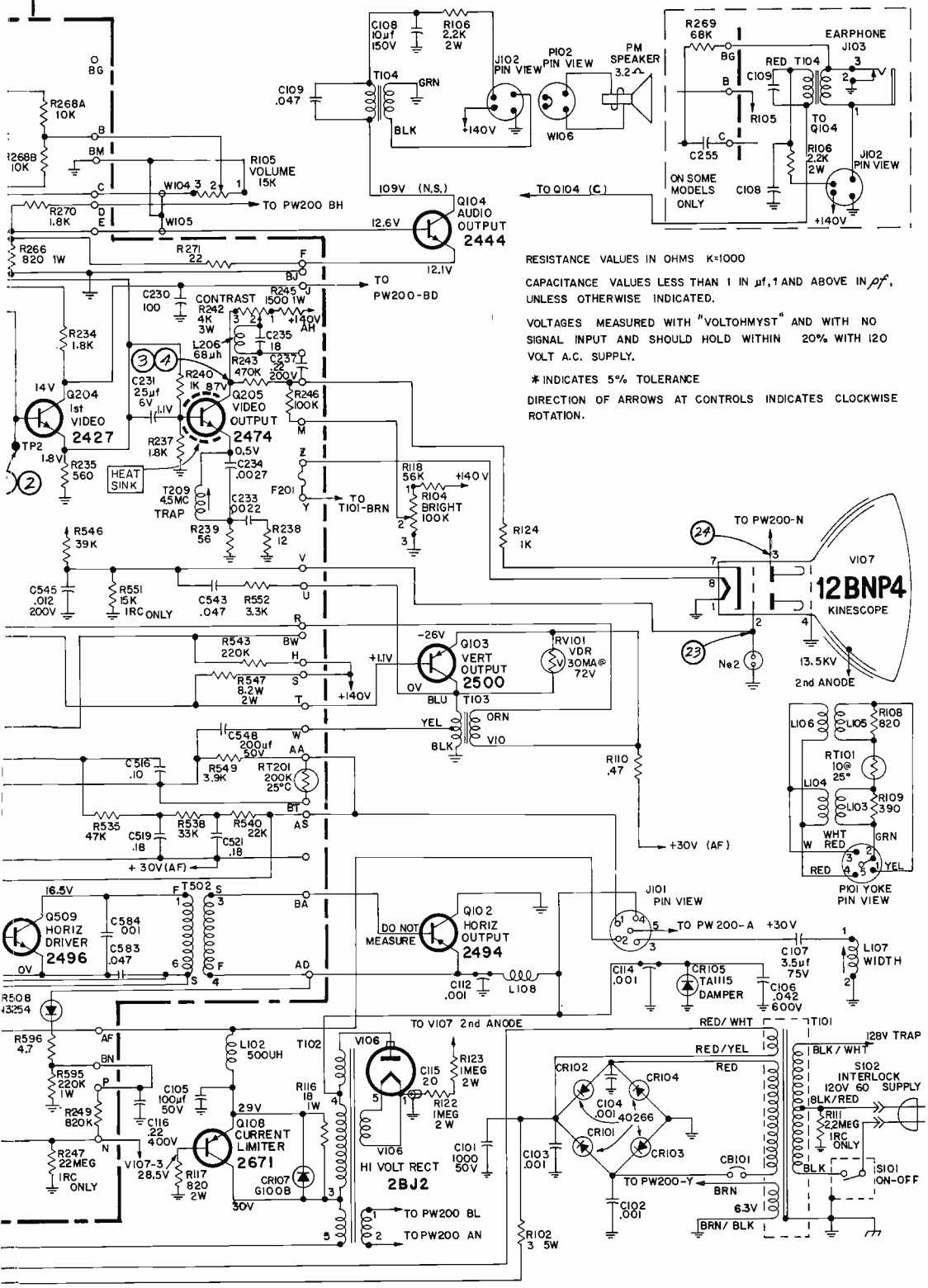
CENTERING

If the picture is not positioned correctly on the screen, it may be necessary to center the picture with the two disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity, and width, as they are all interdependent.

DEFLECTION YOKE

If the picture is tilted, loosen the yoke clamp screw and rotate the yoke to level the picture. Retighten the yoke clamp.

RCA Victor Chassis KCS-153A, B, Schematic Diagram, Continued



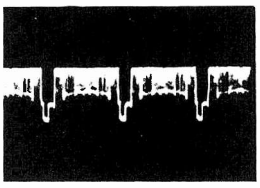
RESISTANCE VALUES IN OHMS K=1000

CAPACITANCE VALUES LESS THAN 1 IN µf, 1 AND ABOVE IN µµf, UNLESS OTHERWISE INDICATED.

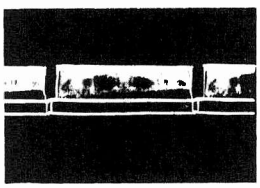
VOLTAGES MEASURED WITH "VOLTOHMYST" AND WITH NO SIGNAL INPUT AND SHOULD HOLD WITHIN 20% WITH 120 VOLT A.C. SUPPLY.

* INDICATES 5% TOLERANCE

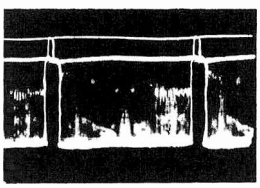
DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.



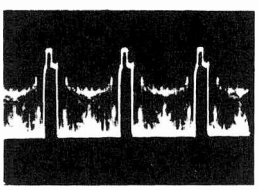
1 HORIZONTAL RATE 1.0V P-P
TP-2
1ST VIDEO AMPLIFIER



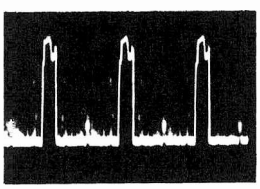
2 VERTICAL RATE 1.0V P-P
TP-2
1ST VIDEO AMPLIFIER



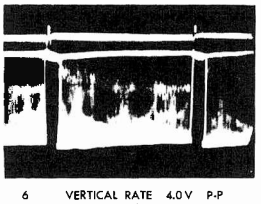
3 VERTICAL RATE 70V P-P
Q205—COLLECTOR
VIDEO OUTPUT



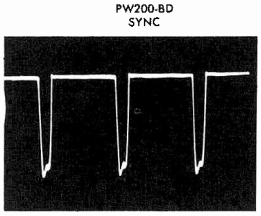
4 HORIZONTAL RATE 70V P-P
Q205—COLLECTOR
VIDEO OUTPUT



5 HORIZONTAL RATE 4.0V P-P
PW200-BD
SYNC



6 VERTICAL RATE 4.0V P-P
PW200-BD
SYNC



7 HORIZONTAL RATE 30V P-P
PW200-BL
AGC

KCS153 CHASSIS CIRCUIT SCHEMATIC DIAGRAM

RCA Victor Chassis KCS-153A, B, Alignment Information

PICTURE I-F ALIGNMENT—KCS153 CHASSIS

TEST EQUIPMENT CONNECTIONS:

BIAS.....Adjust AGC delay potentiometer R112 for +2.95 volts at PW200 —AB. Connect a bias source to AGC Test point (C10) on tuner and set R-F bias at +1.0 volt.

OSCILLOSCOPE.....Connect in series with 180 ohm Detector (Fig. 4) to 1st I-F Test Point TP1. Sensitivity at 50 mv full scale deflection.

MARKER GENERATOR.....Couple loosely to sweep cables or chassis to obtain proper size markers.

SWEEP GENERATOR.....Connect to tuner mixer test point TP1. Use 40-50 mc I-F Sweep.

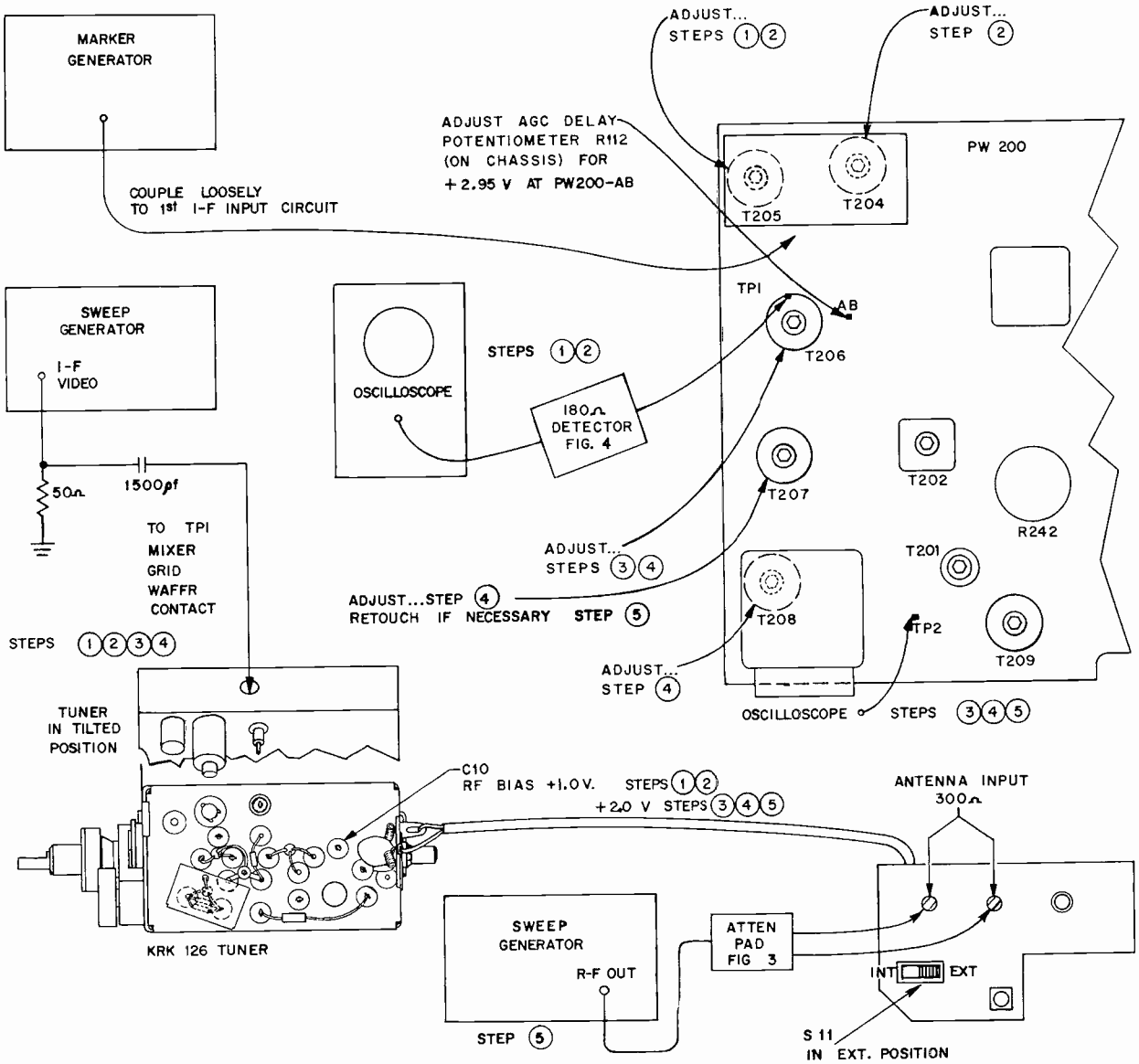
VTVM.....To check supply and bias voltages as indicated.

MISCELLANEOUS.....Refer to illustration for adjustment, location and observation points.

PICTURE I-F SWEEP ALIGNMENT

	STEP	SWEEP GENERATOR	MARKER GENERATOR	ADJUST	REMARKS
1	Tune adjacent sound trap	40-50 mc I-F	47.25 mc	T205	Adjust T205 for minimum at 47.25 mc.
2	Adjust mixer output and 1st I-F input coils	40-50 mc I-F	41.25 mc 45.75 mc 47.25 mc	T204 T1	Adjust T204 (frequency) and T1 (Tilt) for symmetrical curve and response "A". Retouch T205 if necessary for rejection at 47.25 mc.
	Remove detector probe from I-F TP1. Connect oscilloscope to 2nd detector, TP-2. Adjust scope sensitivity for 2 volts full scale deflection. Increase R-F bias (C10) to +2 V.				
3	Adjust sound trap for minimum	40-50 mc I-F	41.25 mc	Top coil of T206	Adjust top coil of T206 for minimum at 41.25 mc.
4	Tune I-F transformers for maximum	40-50 mc I-F	41.25 mc 42.5 mc 44.50 mc 45.0 mc 45.75 mc	T208 T207 T206 (Bot. Core)	Adjust T208, T207, and bottom core of T206 in that order for maximum at 44.50 mc. Check response and limits as in Figure "B".
	Remove I-F output from tuner TP1 (mixer) and couple channel 4 sweep through sweep attenuator pad (Fig. 3) to antenna terminals. Set R-F bias at +2 V (C10) and the antenna switch S11 in the external position. Switch tuner to channel 4 and adjust fine tuning for correct oscillator setting.				
5	Check R-F I-F overall	Channel 4	45.75 mc 42.5 mc 41.25 mc	T207	R-F I-F response should be within limits shown in figure "C". If necessary retouch T207 for proper response. Switch through all VHF channels (13-2) to insure that overall response stays within limits at all channel position.

RCA Victor Chassis KCS-153A,B, Alignment Information, Continued



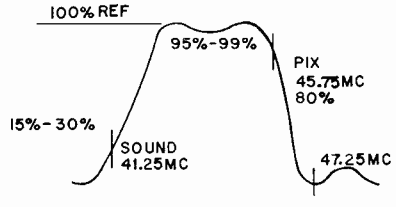


FIGURE A

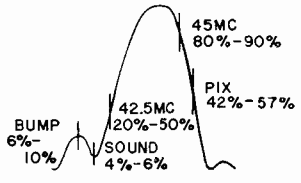


FIGURE B

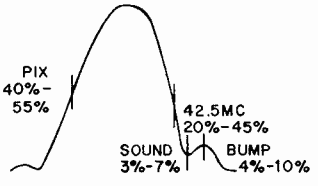
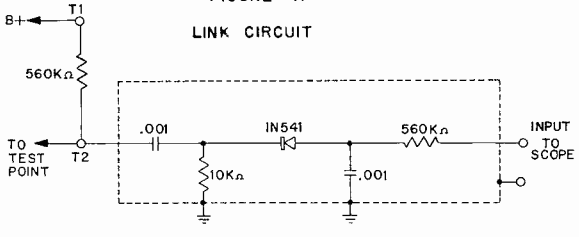


FIGURE C



LINK CIRCUIT

OVERALL I-F RESPONSE

OVERALL R-F, I-F RESPONSE

Figure 2—Sound Detector Test Block

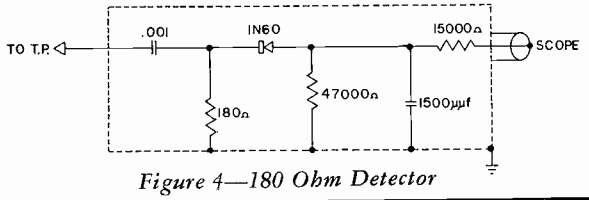
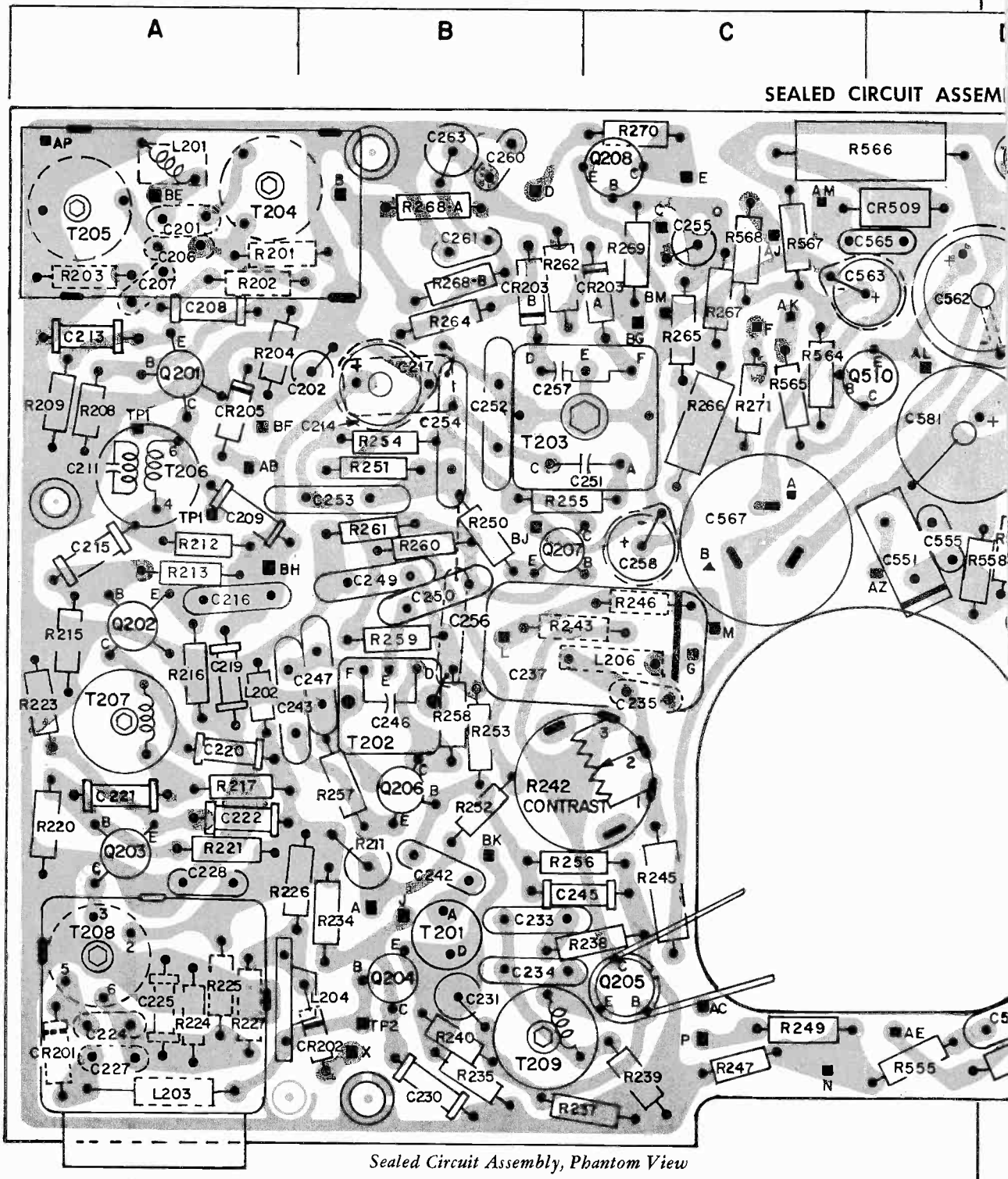


Figure 4—180 Ohm Detector

RCA Victor Chassis KCS-153A, B, Service Information, Continued



Sealed Circuit Assembly, Phantom View

AGC AND BIAS DELAY ADJUSTMENT

Tune receiver to local station, a high channel (7-13) if possible.

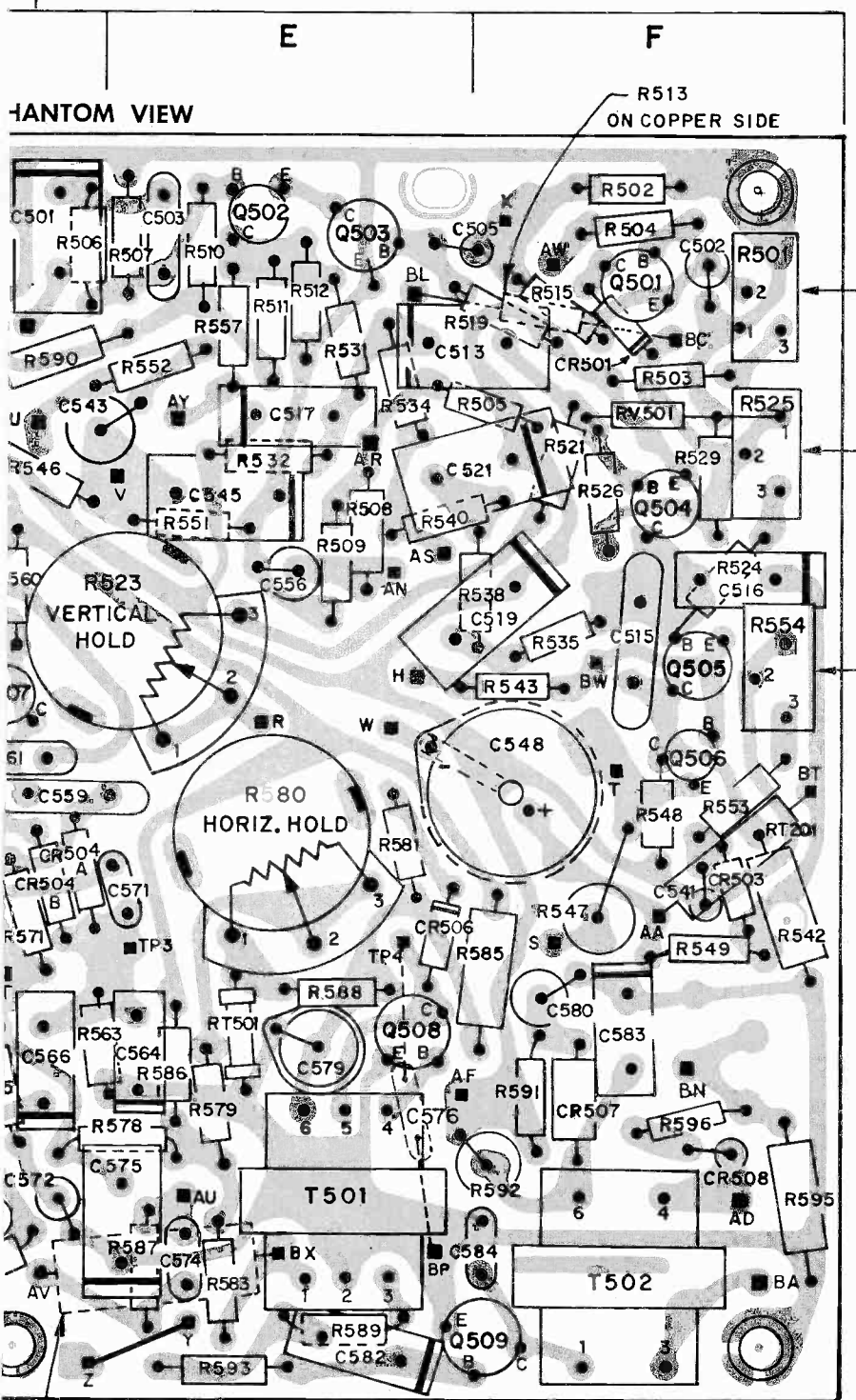
Adjust R112, Bias Delay control for 3.4 volts at terminal AB, (Zone 2A-PW200).

Using a low capacity probe, connect the oscilloscope to Q205 Collector (Video output).

Advance AGC control R501 until sync just begins to compress. Sync compression should not exceed 10 per cent.

Adjust the Bias Delay control R112 until noise (Snow) begins to appear as observed on the kinescope. Then carefully back off R112 until the snow in the picture just disappears.

RCA Victor Chassis KCS-153A, B, Service Information, Continued



COMPONENT LOCATION GUIDE

Q503	1E	R201	1A	C201	1A	C215	2A	C228	3A
Q504	2F	R202	1A	C202	2B	C216	2A	C230	4B
Q505	2F	R203	1A	C206	1A	C217	2B	C231	4B
Q506	2F	R204	1A	C207	1A	C219	3A	C233	4B
Q507	2D	R208	2A	C208	1A	C220	3A	C234	4B
Q508	3E	R209	2A	C209	2A	C221	3A	C235	3C
Q509	4E	R211	3B	C211	2A	C222	3A	C237	3B
Q510	2D	R212	2A	C213	1A	C224	4A	C242	3B
		R213	2A	C214	2B	C225	4A	C243	3A
		R215	3A			C227	4A	C245	4B
		R216	3A					C246	3B
		R217	3A					C247	3B
		R220	3A						
		R221	3A						
		R223	3A						
		R224	4A						
		R225	4A						
		R226	4A						
		R227	4A						
		R234	4B						
		R235	4B						
		R237	4C						
		R238	4C						
		R239	4C						
		R240	4B						
		R242	3B						
		R243	2B						
		R245	3C						
		R246	2C						
		R247	4C						
		R249	4C						
		R250	2B						
		R251	2B						
		R252	3B						
		R253	3B						
		R254	2B						
		R255	2B						
		R256	3B						
		R257	3B						
		R258	3B						
		R259	3B						
		R260	2B						
		R261	2B						
		R262	1B						
		R264	1B						
		R265	1C						
		R266	2C						
		R267	1C						
		R268A	1B						
		R268B	1B						
		R269	1C						
		R270	1C						
		R271	2C						
		R501	1F						
		R502	1F						
		R503	1F						
		R504	1F						
		R505	1F						
		R506	1D						
		R507	1E						
		R508	2E						
		R509	2E						
		R510	1E						
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		R529	2F						
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		R540	2E						
		R541	2E						
		R543	1D						
		R548	2E						
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		R551	2E						
		R552	1E						
		R553	3F						
		R554	2F						
		R555	4D						
		R556	2D						
		R557	1E						
		R558	2D						
		R560	2D						
		R561	2D						
		R563	3D						
		R564	1C						

CR507	4F	L201	1A	Q201	2A	C505	1F	C249	2B
CR508	4F	L202	3A	Q202	3A	C513	1E	C250	2B
CR509	1D	L203	4A	Q203	3A	C515	2F	C251	2C
		L204	4B	Q204	4B	C516	2F	C252	2B
		L206	3C	Q205	4C	C517	1E	C253	2B
				Q206	3B	C519	2F	C254	2B
				Q207	2B	C521	2E	C255	1C
				Q208	1C	C541	3F	C256	2B
				Q501	1F	C543	1D	C257	2B
				Q502	1E	C545	2E	C258	2C
						C548	2F	C260	1B
						C551	2D	C261	1B
						C555	2D		
						C556	2E		
						C559	3D		
						C561	2D		
						C562	1D		
						C563	1D		
						C564	3E		
						C565	1D		
						C566	3D		
						C567A	2C		
						C567B			
						C569	4D		
						C571	3E		
						C572	4D		
						C573	4D		
						C574	4E		
						C575	4E		
						C576	5E		
						C579	3E		
						C580	3F		
						C581	2D		
						C582	4E		
						C583	3F		
						C584	4E		
						CR201	4A		
						CR202	4B		
						CR203A	1C		

C263	1B	R565	2C	T201	4B	A	2C	AM	1C
C501	1D	R566	1D	T202	3B	A	4B	AN	2E
C502	1F	R567	1C	T203	2B	AA	3F	AP	1A
C503	1E	R568	1C	T204	1A	AB	2A	AR	2E
CR203B	1B	R569	4D	T205	1A	AC	4C	AS	2E
CR205	2A	R571	3D	T206	2A	AD	4F	AT	3D
CR501	1F	R572	3D	T207	3A	AE	4D	AU	4E
CR503	3F	R575	3D	T208	4A	AF	4F	AV	4D
CR504A	3D	R578	4E	T209	4B	AH	1D	AW	1F
CR504B	3D	R579	4E	T501	4E	AJ	1C	AU	1E
CR506	3E	R580	3E	T502	1F	AK	1C	AZ	2D
		R581	3E			AL	1D	B	1B
		R583	4E	RT201	3F	AM	1C	BA	4F
		R585	3E	RT501	3E	AN	2E	BC	1F
		R586	3E			AP	1A	BD	1D
		R587	4E	RV501	1F	AR	2E	BE	1A
		R588	3E			AS	2E	BF	2A
		R589	4E			AT	3D	BG	1C
		R590	1D			AU	4E	BH	2A
		R591	4F			AV	4D	BJ	2B
		R592	4F			AW	1F	BK	3B
		R593	4F			AU	1E	BL	1E
		R595	4F			AZ	2D	BM	1C
		R596	4F			B	1B	BN	3F
						BA	4F	BP	4E
						BC	1F	BT	3F
						BD	1D	BW	2F
						BE	1A	BX	4E
						BF	2A	C	1C
						BG	1C	D	1B
						BH	2A	E	1C
						BJ	2B	F	1C
						BK	3B	G	3C
						BL	1E	H	2E
						BM	1C	J	4B
						BN	3F	K	1F
						BP	4E	L	3B
						BT	3F	M	3C
						BW	2F	N	4C
						BX	4E	P	4C
						C	1C	R	2E
						D	1B	S	3F
						E	1C	T	3F
						F	1C	TP1	2A
						G	3C	TP2	4B
						H	2E	TP3	3E
						J	4B	TP4	3E
						K	1F	U	1D
						L	3B	V	2E
						M	3C	W	2E
						N	4C	X	4B
						P	4C	Y	4E
						R	2E	Z	4E
						S	3F		
						T	3F		
						TP1	2A		
						TP2	4B		
						TP3	3E		
						TP4	3E		
						U	1D		
						V	2E		
						W	2E		
						X	4B		
						Y	4E		
						Z	4E		

RCA Victor Chassis KCS-153A,B, Alignment Information, Continued

SOUND I-F ALIGNMENT—KCS153 CHASSIS

SOUND I-F, RATIO DETECTOR, AND 4.5 MC. TRAP ADJUSTMENT

TEST EQUIPMENT CONNECTIONS:

BIAS.....During 4.5 mc trap adjustment, bias picture I-F by grounding PW200-BF.

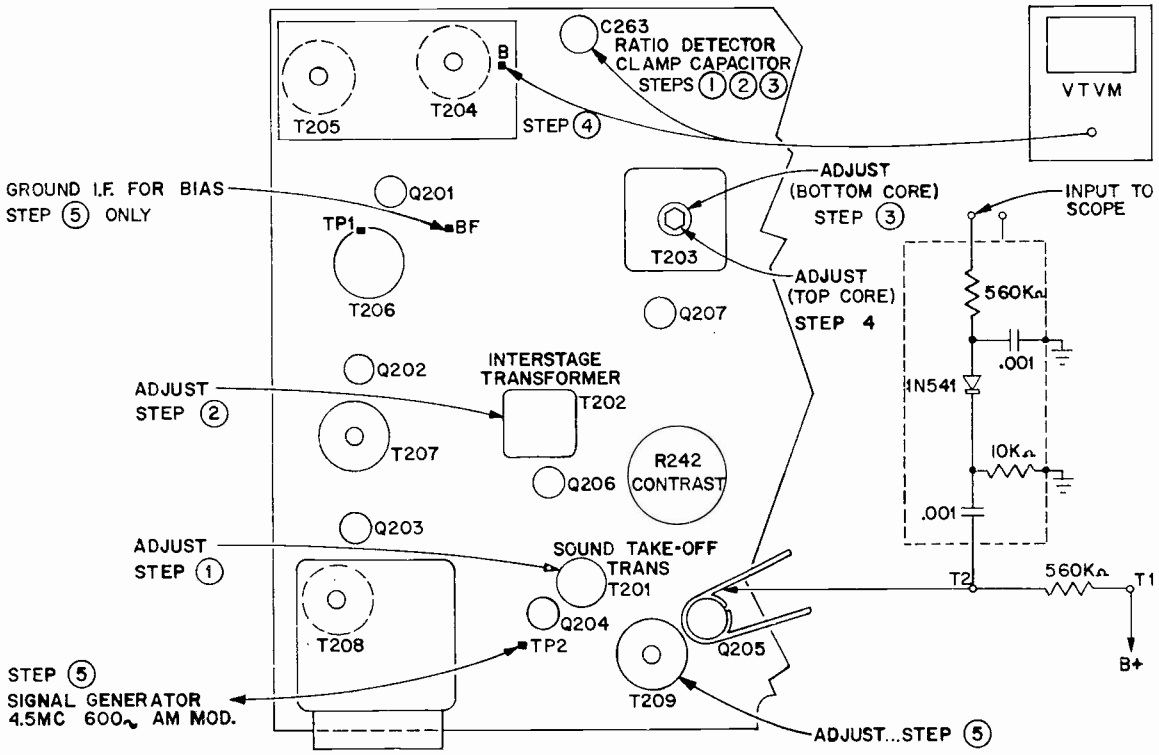
OSCILLOSCOPE.....During 4.5 mc trap adjustment connect in series with Sound Detector Test Block (Fig. 2) to heat sink or collector lead of Q205 (Video Output).

MARKER GENERATOR.....Connect to test point TP2 on PW200 during 4.5 mc trap alignment.

VTVM.....Connect to either side of C263 (Ratio Detector clamp capacitor) during Sound I-F alignment.

GENERAL.....Picture I-F must be aligned before Sound. Tune to a local TV station.

	STEP	SIGNAL GENERATOR	ADJUST	REMARKS
1	Adjust Sound Take-Off Transformer	Not Used	T201	Adjust fine tuning until the reading begins to decrease. This places Sound I-F below limiting level. Adjust T201 for maximum.
2	Adjust Inter-Stage Transformer	Not Used	T202	Adjust fine tuning until the reading begins to decrease. Adjust T202 interstage transformer for maximum.
3	Adjust Ratio Detector Transformer	Not Used	T203 (Bottom Core)	Adjust T203 (Bottom Core) Ratio detector transformer for maximum.
	Connect VTVM to Terminal PW200-B (audio output of ratio detector). Advance Volume Control to approximately half of rotation.			
4	Adjust for crossover	Not Used	T203 (Top Core)	Adjust T203 (Top Core) secondary for OVDC. (Crossover)
	Ground terminal PW200-BF to bias off picture I-F. Apply 4.5 mc signal modulated with 600 cycle AM to PW200-TP2. Connect oscilloscope through Sound Detector test block (Fig. 2) to heat sink or collector of Q205 Video output transistor.			
5	Adjust 4.5 mc trap	4.5 mc with 600 cycle AM modulation	T209	Adjust T209 for minimum 600 cycle output on oscilloscope.



RCA VICTOR

Chassis KCS 154A, B

Models AG-185J, AG-189W, WR, Y, YR

(Service data on pages 115-120; for alignment information see such material in TV-23, Early 1965 TV manual, pages 124-126)

SERVICE CONTROL LOCATIONS

The Tuner control knobs, the Brightness control, and the combined Volume/On-off switch are located on the top, tilted control and speaker panel.

The contrast control is located on the back cover as are the horizontal and vertical hold controls.

The vertical height, vertical linearity, AGC, and noise stabilizer controls are screwdriver adjustable through holes provided in the rear cover.

CENTERING

If the picture is not positioned correctly on the screen, it may be necessary to center the picture with the two disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity, and width, as they are all interdependent.

DEFLECTION YOKE

If the picture is tilted, loosen the yoke clamp screw and rotate the yoke to level the picture. Retighten the yoke clamp.

TESTING PICTURE PROPORTIONS

Rotate the vertical hold control to roll picture slowly downward and study the blanking bar. If it is not level, or if the bar varies in thickness as it moves down the screen, make adjustments as prescribed in the next two paragraphs.

HEIGHT AND VERTICAL LINEARITY

If the blanking bar changed size while moving down, alternately adjust the height and vertical linearity controls until the condition is corrected. Final vertical size should allow the raster to overlap the mask about 5/8 inch at top and bottom.

WIDTH

The width adjustment is made with L101. The picture may be adjusted to fill the mask with a line voltage of 108 volts, and with normal line voltage, the raster should overscan the mask about 5/8 inch on each side. "Normal" line voltage is 120 volts.

AGC CONTROL ADJUSTMENT

Perform the following routine test: Adjust the receiver and antenna to obtain the best picture from a strong, local station. Quickly switch off channel and back, and if the picture distorts and bends, or does not reappear immediately, rotate the AGC control (R501) counterclockwise and then clockwise until picture bend occurs. Then slowly retard control until the bend is gone. The noise stabilizer control should be turned counterclockwise to the end of rotation before adjusting AGC.

NOISE STABILIZER CONTROL

If the picture hangs up or bends before locking in, retard the noise stabilizer control (R502) until this symptom is eliminated.

NOTE: Adjust AGC before noise stabilizer.

HORIZONTAL OSCILLATOR ADJUSTMENT

Turn the horizontal hold control (R560) clockwise until the picture falls out of sync, then slowly counterclockwise. The number of diagonal black bars sloping downward to the left will be gradually reduced, and when only 1 to 3 bars are obtained, slight additional counterclockwise rotation of the control should pull the picture into sync. The picture should remain in sync for approximately one-half turn of additional counterclockwise rotation. Continue counterclockwise rotation until the picture again falls out of sync, then rotate the control slowly clockwise. The number of diagonal black bars sloping downward to the right will be gradually reduced, and when only 1 to 3 bars are obtained, slight additional clockwise rotation should pull the picture into sync.

If above conditions are not obtained, adjustment of the sine wave coil may be required (L501A on PW500 deflection board). Attach short jumpers across C559 (zone 4A PW 500 L501A) and from pin 2 of V501 to ground. Adjust horizontal hold control to obtain picture with sides vertical (picture may drift slowly). Momentarily remove and re-attach L501A jumper while adjusting and unshorting of the coil causes no more than a slight sideways shift of the picture. Remove all jumpers.

KINESCOPE CLEANING

The television instruments covered in this data feature a kinescope with a permanently reinforced face plate requiring no additional safety glass. Therefore, the face of the kinescope may be cleaned without the need for disassembly.

INSTRUMENT DISASSEMBLY

The Tuner Control knobs, the Brightness knob and the Volume Control knob must be removed in order to take out the chassis.

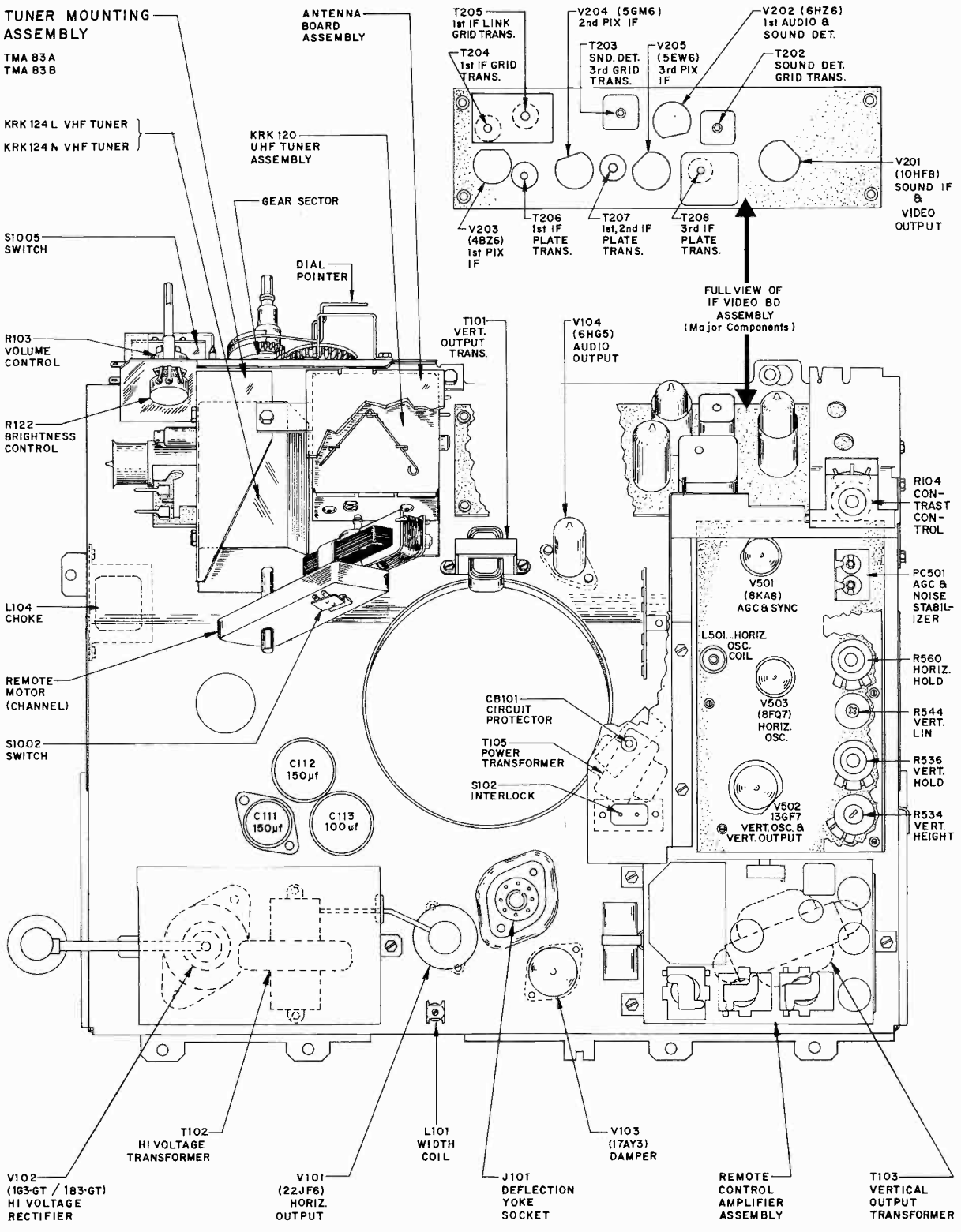
The back cover is secured by three screws each top and bottom, as well as a screw at both the AC input receptacle and the antenna terminal board.

The chassis and the tuner mounting assembly are removed as a unit. Remove the five hex head screws that secure the chassis to the cabinet, two each at top and bottom and one at the side near the tuners. Disconnect the yoke plug, the kinescope socket, and the two leads at the speaker. Tilt the chassis out from the bottom and lift out far enough to disconnect the second anode and grounding spring. (Short the second anode button to chassis ground to reduce the shock hazard.)

To remove kinescope, lay cabinet on its face, then loosen the compression bolt and lift the retaining wire over the mounting brackets. Lift the kinescope out of the cabinet by grasping it at the corners close to the faceplate. Protective goggles should be worn while handling the picture tube.

RCA Victor Chassis KCS-154A, B, Service Information, Continued

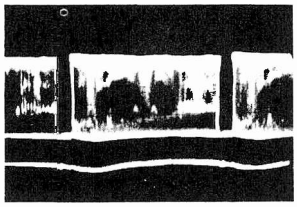
KCS154 CHASSIS LAYOUT



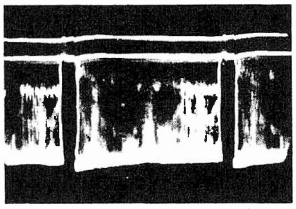
KCS154 Chassis Layout

RCA Victor Chassis KCS-154A,B, Service Information, Continued

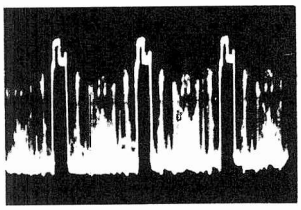
KCS154 CHASSIS VOLTAGE WAVEFORMS



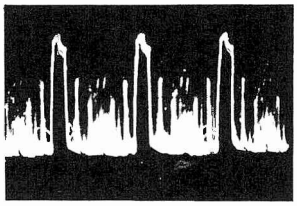
1 VERTICAL RATE 4.0 V P-P
SECOND DETECTOR TP-3



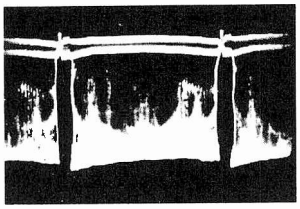
2 VERTICAL RATE 130 V P-P
V201B PIN 9
VIDEO AMPLIFIER PLATE



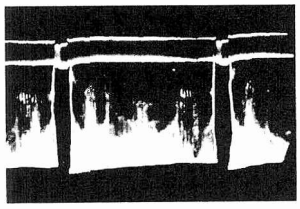
3 HORIZONTAL RATE 130 V P-P
V201B PIN 9
VIDEO AMPLIFIER PLATE



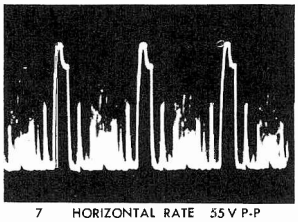
4 HORIZONTAL RATE 50 V P-P
PW200-N
SYNC TAKE-OFF



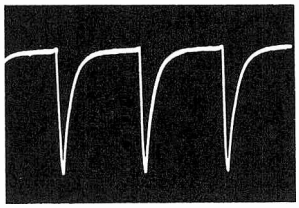
5 VERTICAL RATE 50 V P-P
PW200-N
SYNC TAKE-OFF



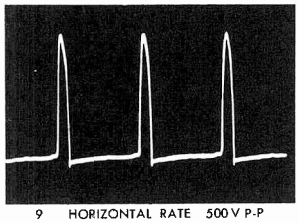
6 VERTICAL RATE 55 V P-P
V501A-6
AGC GRID



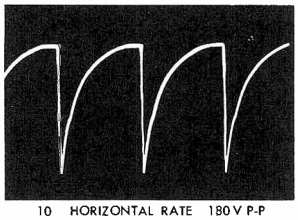
7 HORIZONTAL RATE 55 V P-P
V501A-6
AGC GRID



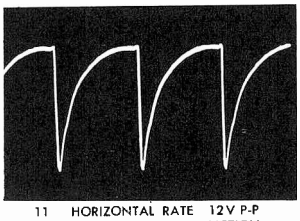
8 HORIZONTAL RATE 60 V P-P
V501B-1
SYNC PLATE



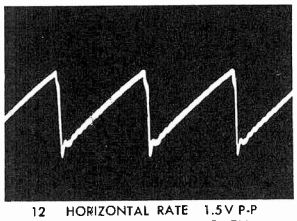
9 HORIZONTAL RATE 500 V P-P
V501A-9
AGC PLATE



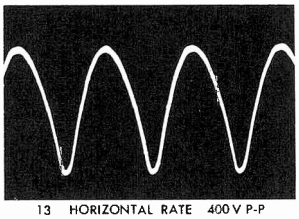
10 HORIZONTAL RATE 180 V P-P
V101-6
HORIZONTAL OUTPUT GRID



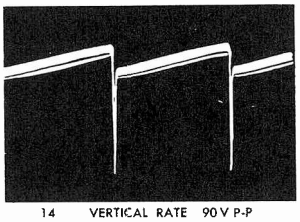
11 HORIZONTAL RATE 12 V P-P
SR501 CATHODE JUNCTION
HORIZONTAL PHASE DETECTOR



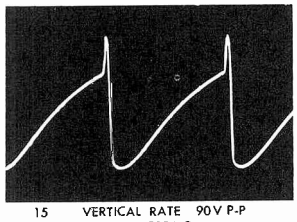
12 HORIZONTAL RATE 1.5 V P-P
SR501 ANODE JUNCTION
HORIZONTAL PHASE DETECTOR



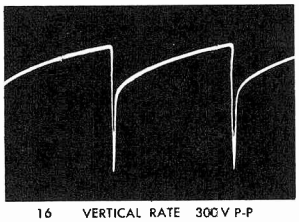
13 HORIZONTAL RATE 400 V P-P
J101-8
+BB



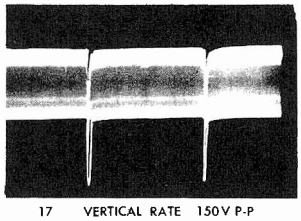
14 VERTICAL RATE 90 V P-P
J101-1
VERTICAL BLANKING PULSE



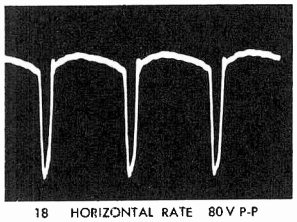
15 VERTICAL RATE 90 V P-P
V502A-9
VERTICAL OSCILLATOR GRID



16 VERTICAL RATE 300 V P-P
V502B-2
VERTICAL OUTPUT GRID



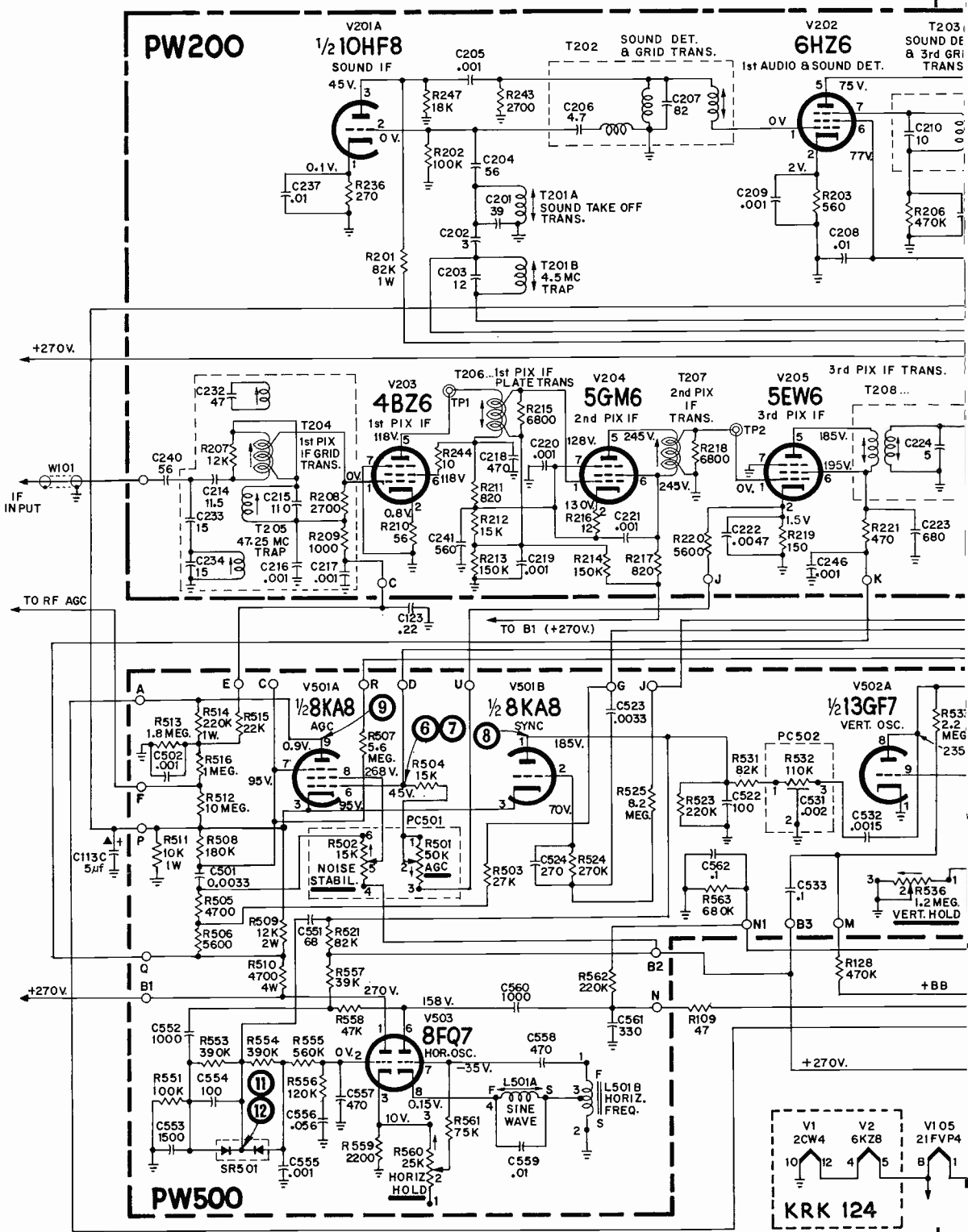
17 VERTICAL RATE 150 V P-P
V105-2
KINESCOPE GRID
(VERTICAL BLANKING)



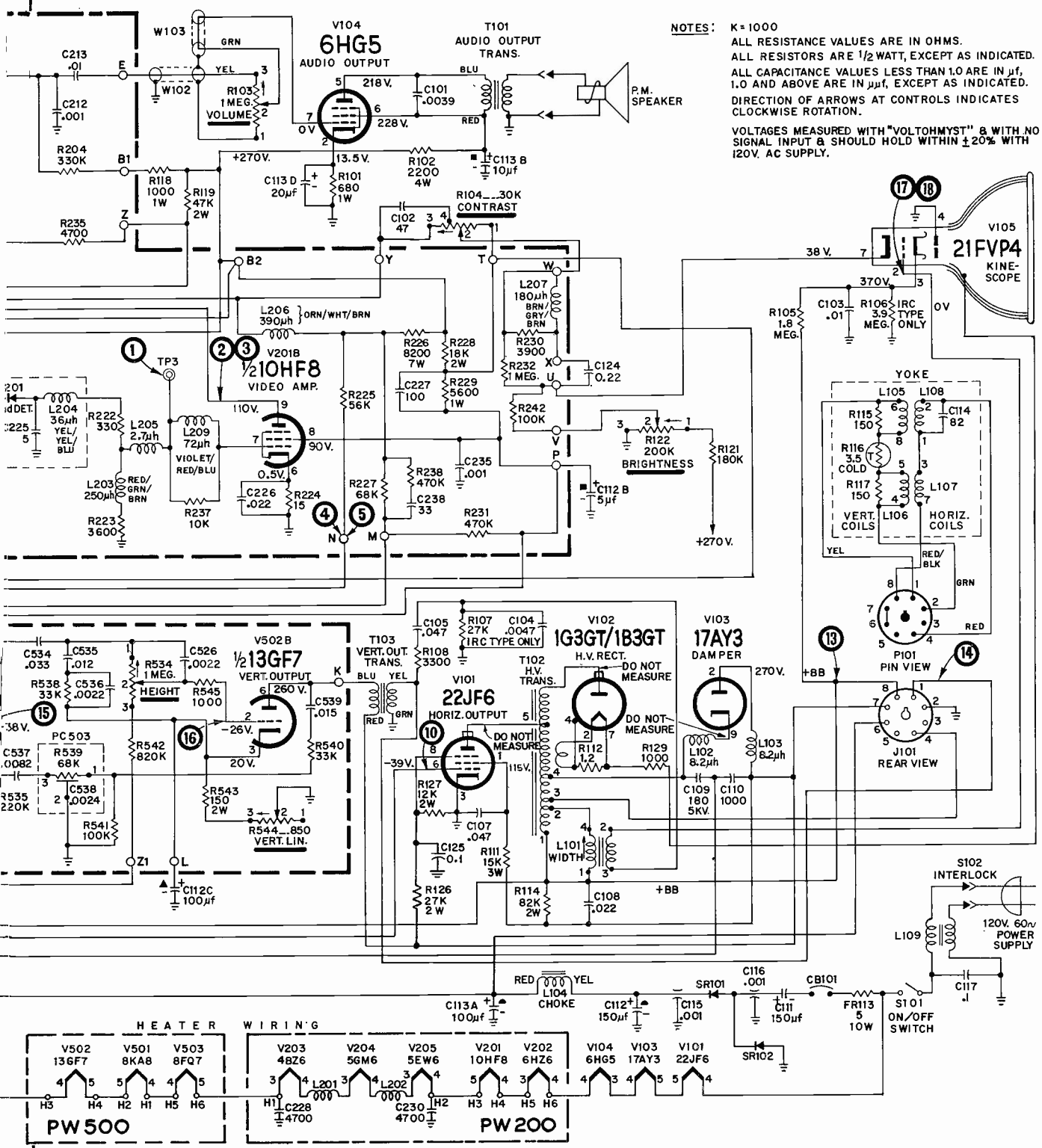
18 HORIZONTAL RATE 80 V P-P
V105-2
KINESCOPE GRID
(HORIZONTAL BLANKING)

KCS154 Chassis Voltage Waveforms

RCA Victor Chassis KCS-154A,B, Schematic Diagram



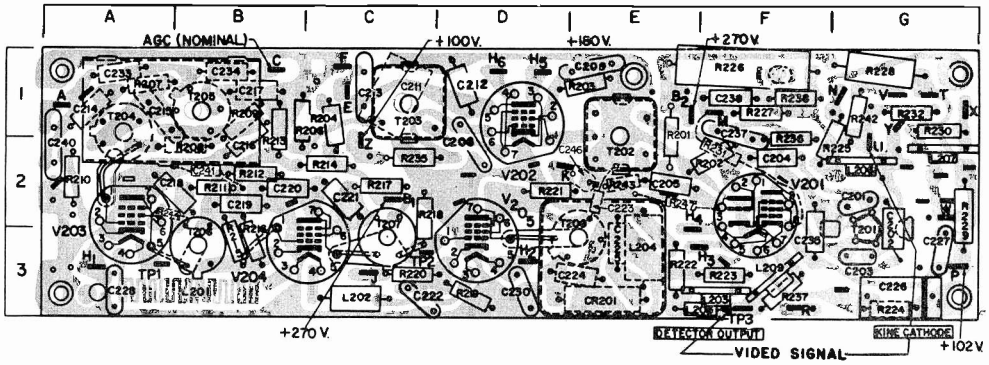
RCA Victor Chassis KCS-154A,B, Schematic Diagram, Continued



KCS154 CIRCUIT SCHEMATIC DIAGRAM

RCA Victor Chassis KCS-154A,B, Service Information, Continued

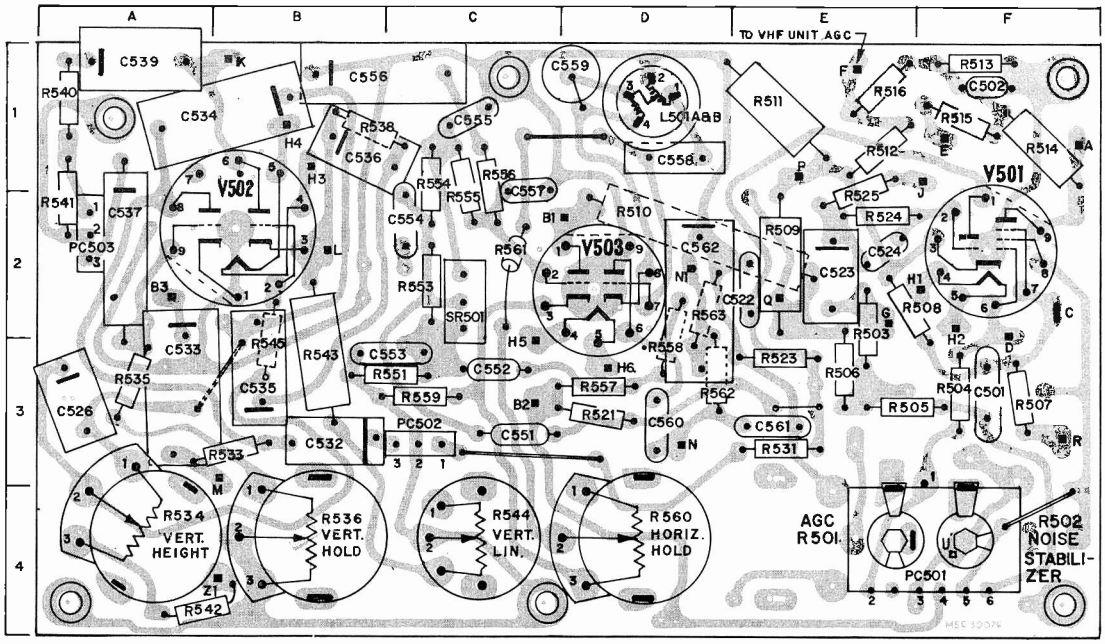
PW200 SEALED CIRCUIT ASSEMBLY



PW200 LOCATION GUIDE

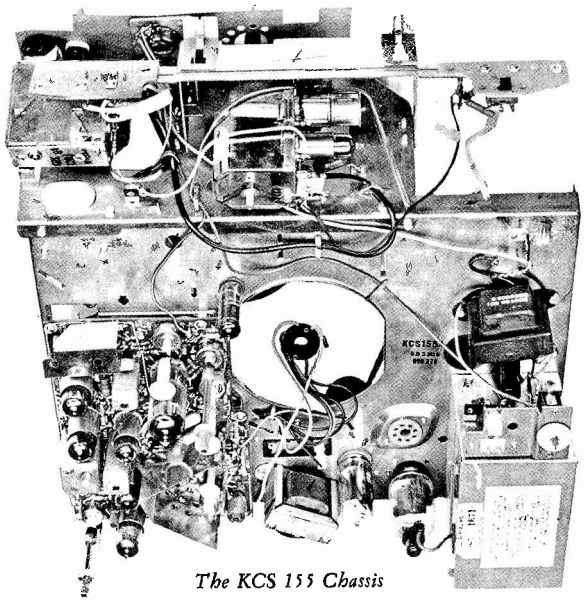
C201	2G	C217	1B	C233	1A	L205	3E	R211	2B	R224	3G	R242	1G	B1	2C	N	1G
C202	2G	C218	2A	C234	1B	L206	2G	R212	2B	R225	2G	R243	2E	B2	1E	P	3G
C203	3G	C219	2B	C235	3F	L207	2G	R213	2B	R226	1F	R244	2A	C	1B	R	3F
C204	2F	C220	2B	C237	1F	L209	3F	R214	2C	R227	1F	R247	2E	E	1C	T	1G
C205	2E	C221	2C	C238	1F	R201	1E	R215	3B	R228	1G	T201	2G	F	1C	TP1	3A
C208	2D	C222	3C	C240	2A	R202	2F	R216	2B	R229	2G	T202	2E	H1	3A	TP2	3C
C209	1E	C223	2E	C241	2B	R203	1E	R217	2C	R230	1G	T203	1C	H2	3D	TP3	3F
C211	1C	C224	3E	C246	2E	R204	1C	R218	2C	R231	2F	T204	1A	H3	3F	U	2F
C212	1D	C225	3E	CR201	3E	R206	1C	R219	3D	R232	1G	T205	1B	H4	2E	V	1G
C213	1C	C226	3G	L201	3B	R207	1A	R220	3C	R235	2C	T206	3B	H5	1D	W	2F
C214	1A	C227	3G	L202	3C	R208	2B	R221	2D	R236	1F	T207	2C	H6	1D	X	2F
C215	1A	C228	3A	L203	3F	R209	1B	R222	3E	R237	3F	T208	2E	K	2E	Y	1G
C216	2B	C230	3D	L204	3E	R210	2A	R223	3F	R238	1F	A	1A	M	1F	Z	2C

PW500 SEALED CIRCUIT ASSEMBLY



PW500 LOCATION GUIDE

C501	3F	C537	2A	C560	3D	R505	3E	R516	1E	R540	1A	R557	3D	B3	2A	H6	3D
C502	1F	C539	1A	C561	3E	R506	3E	R521	3D	R541	2A	R558	3D	C	2F	J	1F
C522	2E	C551	3C	C562	2D	R507	3F	R523	3E	R542	4A	R559	3C	D	2F	K	1B
C523	2E	C552	3C	L501A&B	1D	R508	2E	R524	2E	R543	3B	R560	4D	E	1F	L	2B
C524	2E	C553	3C	PC501	4F	R509	2E	R525	1E	R544	4C	R561	2C	F	1E	M	3B
C526	3A	C554	2C	PC502	3C	R510	2D	R531	3E	R545	3B	R562	3D	G	2E	N	3D
C532	3B	C555	1B	PC503	2A	R511	1E	R533	3B	R551	3C	R563	2D	H1	2E	N1	2D
C533	3A	C556	1B	R501	4E	R512	1E	R534	4A	R553	2C	SR501	2C	H2	2F	P	1E
C534	1A	C557	1C	R502	4F	R513	1F	R535	2C	R554	1C	A	1F	H3	1B	Q	2E
C535	3B	C558	1D	R503	2E	R514	1F	R536	1C	R555	2C	B1	2C	H4	1B	R	3F
C536	2A	C559	1D	R504	3F	R515	1F	R538	1B	R556	1C	B2	3C	H5	2C	Z1	4B



The KCS 155 Chassis

RCA VICTOR

Chassis KCS155

Models AG-050E, J, & AG-065E, H, Y
(Service material on pages 121-126. For picture alignment see TV-24, Additional 1965 TV manual, pages 110-111)

INSTRUMENT DISASSEMBLY

The knobs must be removed from the brightness control, the volume control, the VHF tuning shaft in order to remove the chassis.

To disassemble the instrument remove the seven screws that secure the back cover. Two each are at top and bottom, one above the AC receptacle and one screw is at each of the separate UHF and VHF antenna terminal boards.

The chassis and the tuner mounting assembly are removed as a unit. Remove the four hex head screws at the top and bottom of the chassis. Disconnect the yoke plug, kinescope socket and the two speaker pin plugs at the speaker. Move out the chassis and then disconnect the grounding spring and the second anode lead.

The kinescope is held in place by a retainer wire which is under tension from a heavy coil spring and is secured in four places by "S" shaped mounting brackets. To remove the kinescope, use a wide blade screw driver, or similar tool, and lift the retainer wire from one of the brackets by twisting the tool in the slot provided for this purpose. After the retaining wire is removed, lift the kinescope from the mask. To replace kinescope reverse the procedure. Secure retaining wire in the fourth bracket by engaging the tool in the bracket slot and lifting the retaining wire over the shoulders of the bracket.

CENTERING

If the picture is not positioned correctly on the screen, it may be necessary to center the picture with the two disc magnets mounted behind the yoke cover. Both horizontal and vertical centering are accomplished at once by rotating the discs together or separately. Perform this adjustment along with vertical height, vertical linearity, and width, as they are all interdependent.

HORIZONTAL SINE WAVE ADJUSTMENT

Remove sync by shorting Terminal "AE" (Zone A-6, PW200) to chassis ground. Short sine wave coil L207 by connecting a jumper wire between TP4 and Terminal "W" (Both in Zone F-6, PW200).

Adjust horizontal hold control until picture sides are vertical. Remove short from sine wave coil (TP-4 and Terminal "W"), then adjust L207 sine wave coil so that the picture remains stationary with sides vertical. Remove short from sync (Terminal "AE").

From CCW direction of horizontal hold control, pull in from out of sync condition should be from 1 to 3 bars. From the CW direction from 1 to 8 bars. There should be no loss of raster on either extreme of control rotation.

SPOT OPTIMIZER MAGNET ADJUSTMENT

The spot optimizer magnet adjustment need be made only when a new kinescope is installed or the magnet has been moved.

To adjust the spot optimizer magnet:

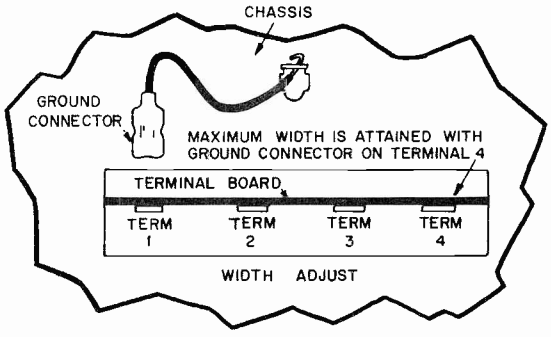
Use a cross hatch or dot pattern and set brightness so that only cross hatch lines or dots are visible on the raster.

While observing the pattern in the center portion of the screen, adjust the spot optimizer magnet for a symmetrical halo. Greatest effect of the magnet will be observed in the upper center section of the kinescope face.

If a dot-bar generator is not available the magnet may be adjusted as follows:

Turn the channel selector to a non-operating channel which displays the greatest amount of noise or "snow". While observing the snowy raster, adjust the spot optimizer for greatest detail in the center line portion of the screen.

WIDTH AND LINEARITY ADJUSTMENTS



Width Terminal Board

Adjust the Vertical Height and Linearity controls for an approximately symmetrical raster.

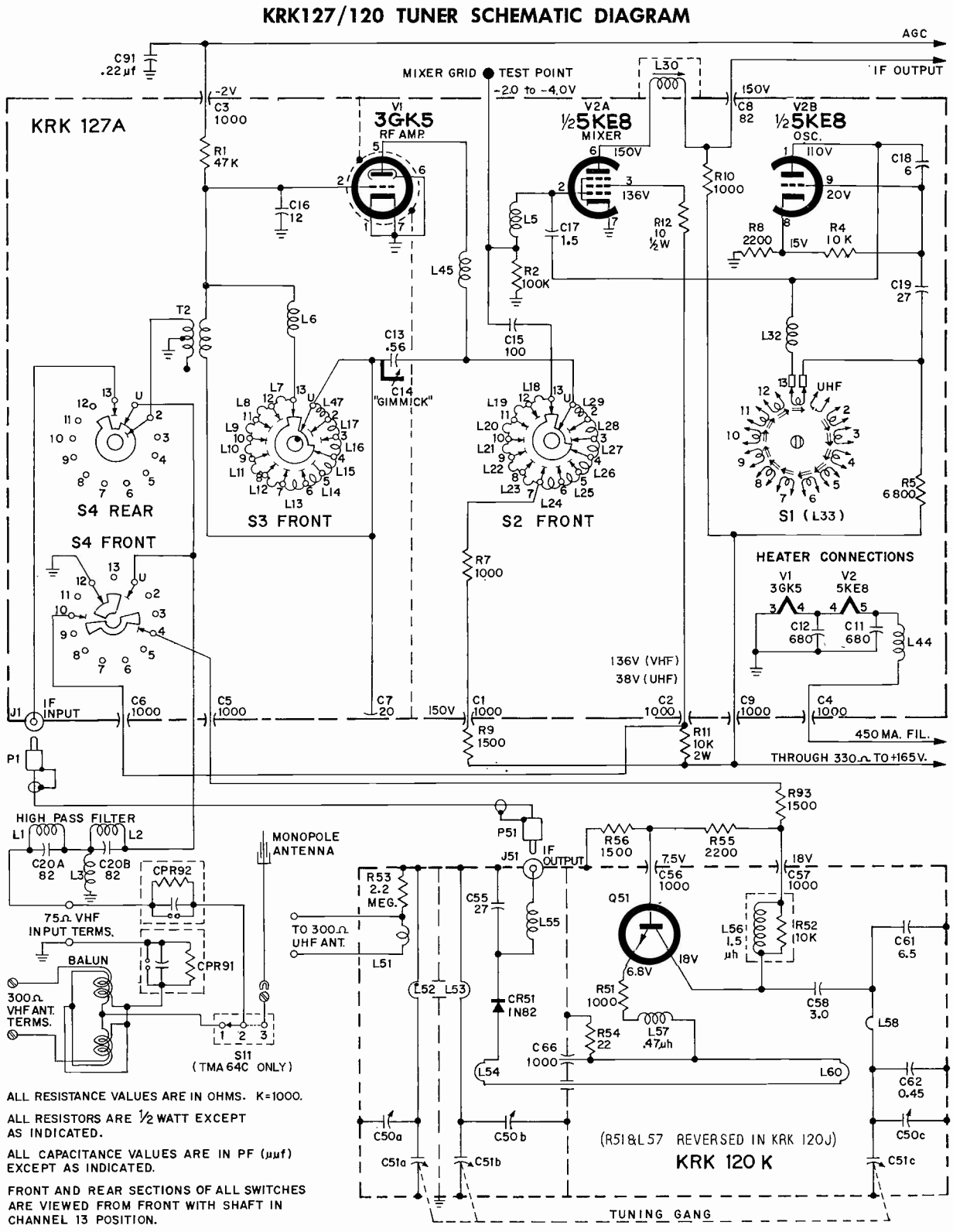
Note: Width adjustments are most accurate when made with low line, 108 VAC, supply voltage.

Set both Brightness and Contrast controls at maximum. (Fully clockwise.) Connect the ground lug to the terminal that allows the raster to just fill the screen horizontally +0, −⅛". (See illustration above.) Turn centering magnets together and individually to center the raster.

Turn contrast control to minimum, then center the raster vertically. After the Vertical Height and Linearity adjustments are completed at 108 VAC supply voltage, the raster should fill the screen +0, −¼" at the top and bottom.

If the vertical height and linearity controls are properly set the raster will fill the screen the proper amount at normal 120 VAC supply voltage, and the blanking bar will not change in width as the picture is rolled vertically.

RCA Victor Chassis KCS-155 Tuner Diagram



ALL RESISTANCE VALUES ARE IN OHMS. K=1000.

ALL RESISTORS ARE ½ WATT EXCEPT AS INDICATED.

ALL CAPACITANCE VALUES ARE IN PF (μμf) EXCEPT AS INDICATED.

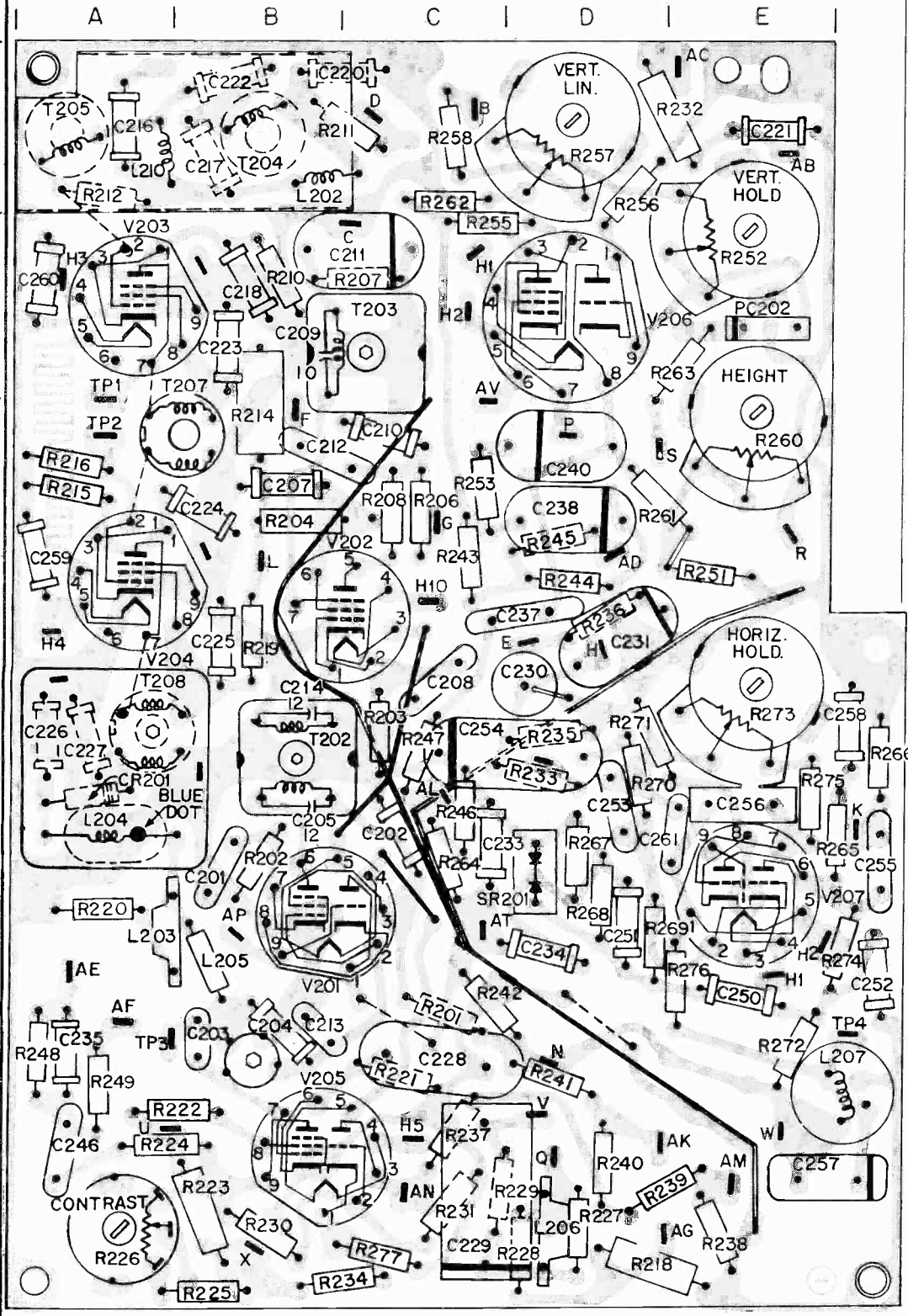
FRONT AND REAR SECTIONS OF ALL SWITCHES ARE VIEWED FROM FRONT WITH SHAFT IN CHANNEL 13 POSITION.

VOLTAGES TAKEN AT -2.0V RF BIAS WITH NO SIGNAL PRESENT
UHF VOLTAGES ARE PRESENT ONLY WHEN VHF TUNER IS IN THE UHF POSITION.

KRK127/120 Tuner Schematic Diagram

RCA Victor Chassis KCS-155 Service Information, Continued

PW200 BOARD



PW200 Board—Component Side

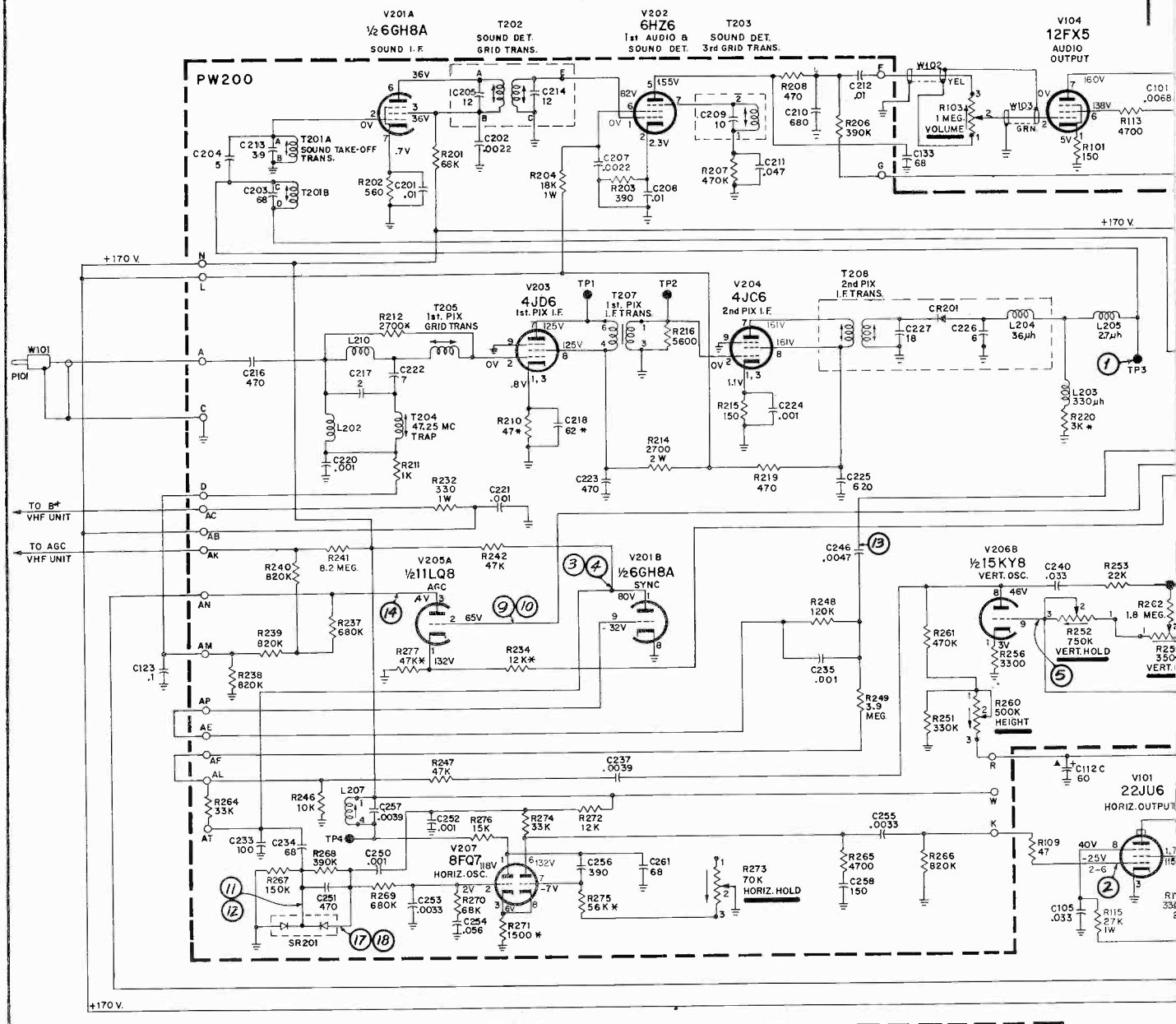
COMPONENT LOCATION GUIDE

C201	5B	R219	4B
C202	5C	R220	5A
C203	6B	R221	6C
C204	6B	R222	6B
C205	5B	R223	7B
C207	3B	R224	7A
C208	4C	R225	7B
C209	2B	R226	7A
C210	3C	R227	7D
C212	3B	R228	7D
C213	6B	R229	7D
C214	4B	R230	7B
C216	1A	R231	7C
C217	1B	R232	1E
C218	2B	R233	4D
C220	1B	R234	7C
C221	1E	R236	4D
C222	1B	R237	7C
C223	2B	R238	7E
C224	3B	R239	7D
C225	4B	R240	7D
C226	4A	R241	6D
C227	4A	R242	6C
C228	6C	R243	3C
C229	7C	R244	3D
C230	4D	R245	3D
C231	4D	R246	5C
C233	5C	R247	4C
C234	5D	R248	6A
C235	6A	R249	6A
C237	4D	R251	3E
C238	3D	R252	2E
C240	3D	R253	3C
C246	7A	R255	2C
C250	6E	R256	1D
C251	5D	R257	1C
C252	6F	R258	1C
C253	5D	R260	3E
C254	4C	R261	3D
C255	5F	R262	1C
C256	5E	R263	2E
C257	7E	R264	5C
C258	4F	R265	5F
C259	3A	R266	4F
C260	2A	R267	5D
C261	5D	R268	5D
		R269	5D
CR201	5A	R270	5D
		R271	4D
L202	1B	R272	6E
L203	5A	R273	4E
L204	5A	R274	6F
L205	6B	R275	5E
L206	7D	R276	6E
L207	6F	R277	7C
L210	1A		
		SR201	5D
PC202	2E		
		T202	4B
R201	6C	T203	2C
R202	5B	T204	1B
R203	4C	T205	1A
R204	3B	T207	2B
R206	3C	T208	4A
R208	3C		
R210	2B	V201	6B
R211	1B	V202	3C
R212	1A	V203	2A
R214	3B	V204	4A
R215	3A	V205	6B
R216	3A	V206	2E
R218	7D	V207	5F

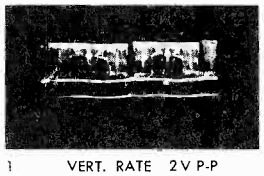
TEST POINT LOCATION

AT	5C	H1	6E
AB	1E	H2	2C
AC	1E	H2	5F
AD	3D	H3	2A
AE	6A	H4	4A
AF	6A	H5	7C
AG	7D	H10	3C
AK	7D	K	5F
AL	5C	L	3B
AM	7E	N	6C
AN	7C	Q	7D
AP	5B	P	3D
AV	2C	R	3E
B	1C	S	3D
C	2C	TP1	2A
D	1C	TP2	3A
E	4D	TP3	6A
F	3B	TP4	6F
G	3C	U	6A
H	4D	V	6D
H1	2C	W	7E
		X	7B

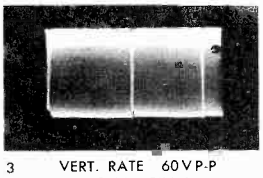
RCA Victor Chassis KCS-155 Schematic Diagram, Continued



Waveforms

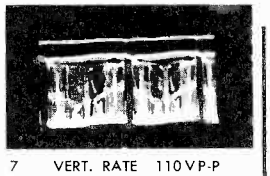


1 VERT. RATE 2 V P-P
SECOND DETECTOR
TP-3



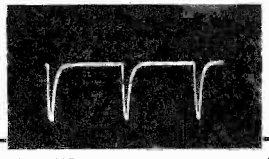
3 VERT. RATE 60 V P-P
V201B PIN 1
SYNC PLATE

5 VERT. RATE 180 V P-P
V206B PIN 9
VERTICAL OSCILLATOR GRID

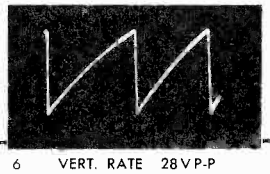


7 VERT. RATE 110 V P-P
V205B PIN 9
VIDEO AMPLIFIER PLATE

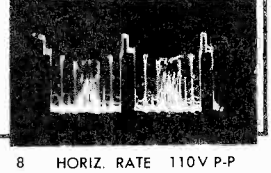
2 HORIZ. RATE 130 V P-P
V101 PINS 2 & 6
HORIZONTAL OUTPUT GRID



4 HORIZ. RATE 60 V P-P
V201B PIN 1
SYNC PLATE



6 VERT. RATE 28 V P-P
V206A PIN 2
VERTICAL OUTPUT GRID

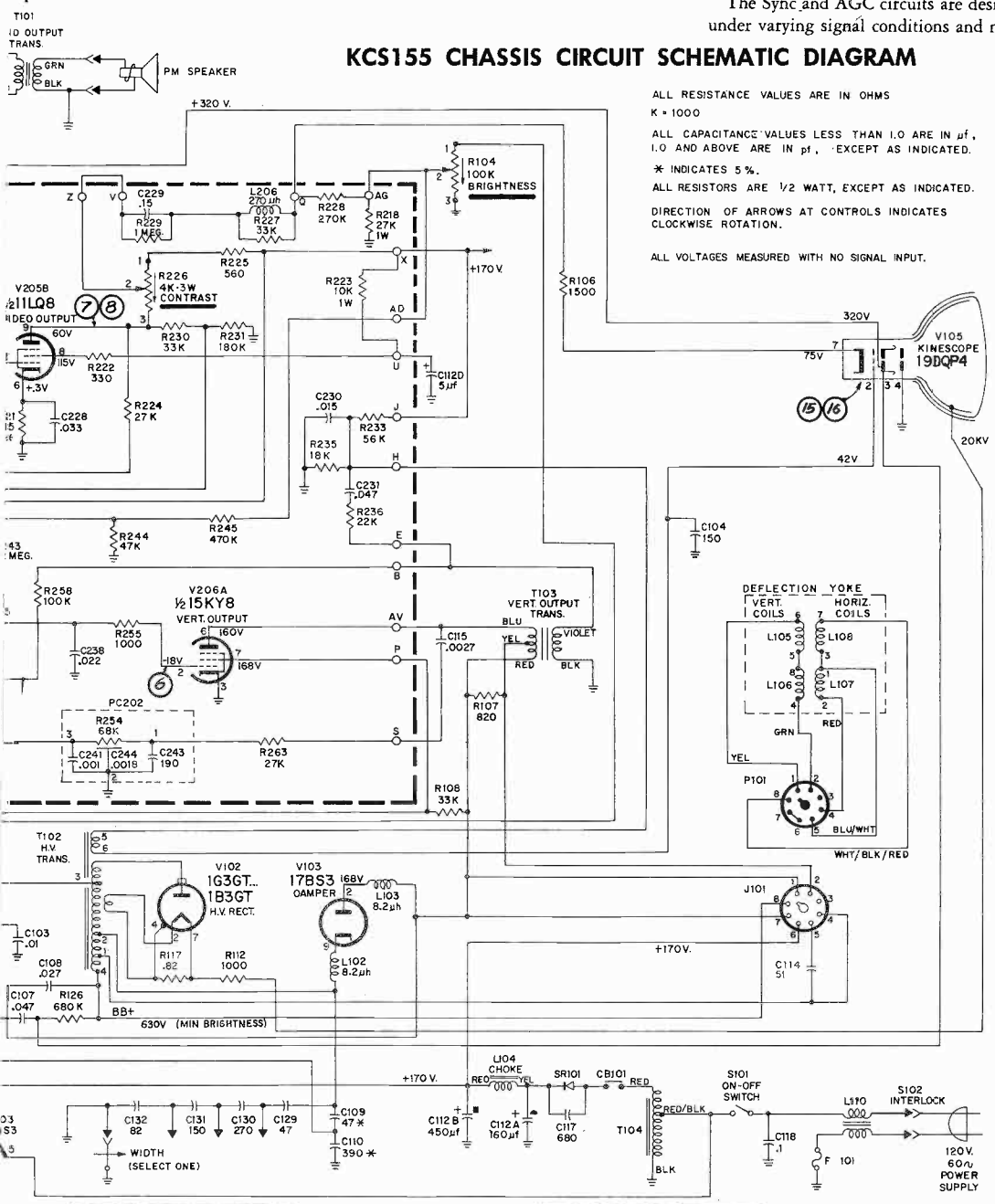


8 HORIZ. RATE 110 V P-P
V205B PIN 9
VIDEO AMPLIFIER PLATE

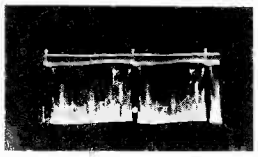
RCA Victor Chassis KCS-155 Schematic Diagram, Continued

The Sync and AGC circuits are designed for optimum performance under varying signal conditions and no controls are provided.

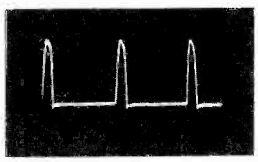
KCS155 CHASSIS CIRCUIT SCHEMATIC DIAGRAM



WAVEFORMS

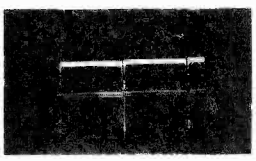


13 VERT. RATE 110 V P-P
R224 & C246 JUNCTION
(ZONE 7A PW200 BOARD)

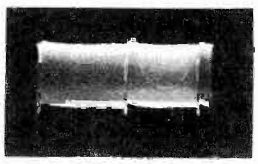


14 HORIZ. RATE 420 V P-P
V205A PIN 3
AGC PLATE

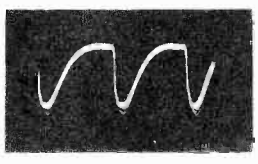
15 HORIZ. RATE 40 V P-P
V105 PIN 2
KINESCOPE GRID



16 VERT. RATE 80 V P-P
V105 PIN 2
KINESCOPE GRID

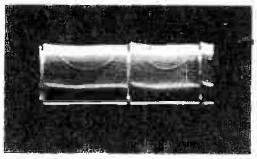


17 VERT. RATE 15 V P-P
SR201 ANODE
HORIZONTAL PHASE DETECTOR

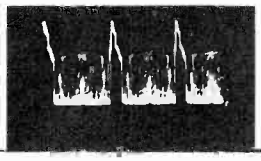


18 HORIZ. RATE 15 V P-P
SR201 ANODE
HORIZONTAL PHASE DETECTOR

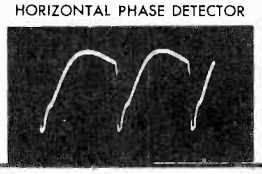
9 VERT. RATE 110 V P-P
V205A PIN 2
AGC GRID



11 VERT. RATE 12 V P-P
SR201 CATHODE JUNCTION
HORIZONTAL PHASE DETECTOR



10 HORIZ. RATE 110 V P-P
V205A PIN 2
AGC GRID



12 HORIZ. RATE 12 V P-P
SR201 CATHODE JUNCTION
HORIZONTAL PHASE DETECTOR

RCA Victor Chassis KCS-155 Alignment Information, Continued

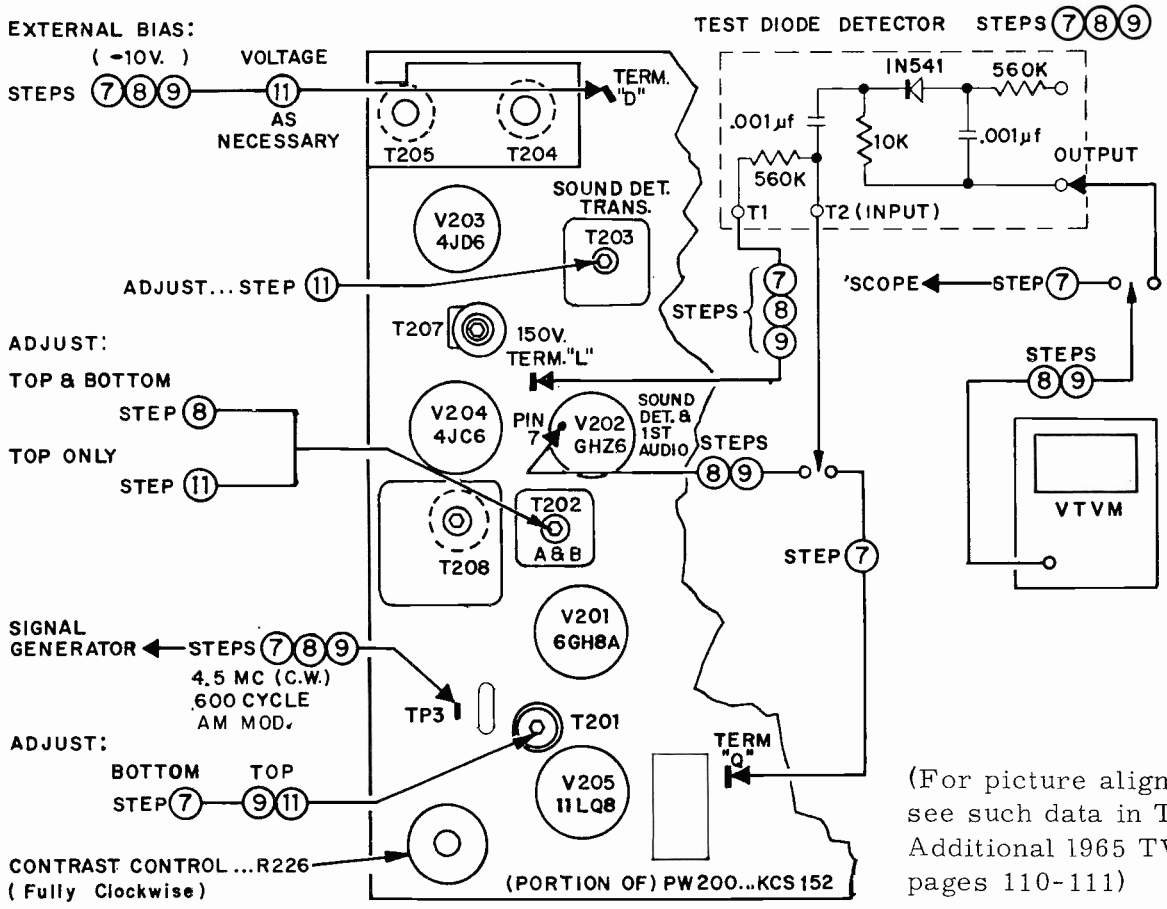
SOUND I-F ALIGNMENT OF KCS152 AND KCS155 CHASSIS

SOUND I-F, SOUND DETECTOR AND 4.5 MC. TRAP ALIGNMENT

TEST EQUIPMENT CONNECTIONS:

GENERAL.....Connect test diode detector lead, T2 input, to pin 7 of V202, T1 to 150 volts (Term L)—Contrast control, C226, fully clockwise. Picture I-F must be aligned before sound.
BIAS SUPPLY.....Apply —10 volts to the I-F AGC bus at terminal "D" on PW200.
OSCILLOSCOPE.....Connect to kinescope cathode lead through diode detector.
SIGNAL GENERATOR.....Connect to TP3 on PW200.
VTVM.....Connect to output of diode detector shown. Set meter for negative voltage readings.

	STEP	SIGNAL GENERATOR	ADJUST	REMARKS
7	Adjust 4.5 mc. trap	4.5 mc. 600 cycle. AM mod.	T201B (bottom)	Adjust for minimum 600 cps. indication on oscilloscope. The core should penetrate the coil from the board side when finally adjusted.
8	Adjust detector grid transformer	4.5 mc.	T202A & B	Adjust for maximum negative DC on meter. Set generator for 0.5 to 1.0 volts when peaked. T201A top core and T202A core should penetrate the coil from top of can and T202B should penetrate coil from board side when finally peaked.
9	Adjust sound take-off transformer	4.5 mc.	T201A (top)	
	NOTE: DO NOT READJUST T202B (BOTTOM) AFTER TRANSFORMER PEAKED IN STEPS 8 & 9.			
10	Disconnect the diode test detector. Turn off signal generator and tune in strongest signal in area, adjusting volume control for normal volume (approx. ¼ turn from C.C.W.). Turn core of T203 flush with top of coil form. Bias IF until hiss can be heard in sound.			
11	Adjust sound detector transformer	Not Used	T203	Turn core clockwise to 2nd peak, adjusting for maximum volume and least hiss in sound. If necessary, retouch T201A & T202A top cores only.



(For picture alignment see such data in TV-24, Additional 1965 TV, pages 110-111)

SEARS, ROEBUCK and CO.

Silvertone

CHASSIS NOS. **456.61606 456.61607 528.61606 528.61607 529.61606 529.61607**

Models 6120, 6121, 6124, 6125, 6126

DEFLECTION YOKE AND CENTERING RING

Follow this procedure in adjusting the Deflection Yoke and Centering Rings

1. Turn the receiver on and disconnect the antenna.
2. The deflection yoke is held on the neck of the picture tube by a clamp device. Loosen the clamp, by unscrewing the screw on the clamp, and carefully move the yoke as far forward as possible on the neck of the picture tube. Rotate the yoke until the top and bottom edges of the raster are squared with the chassis. Tighten the screw.

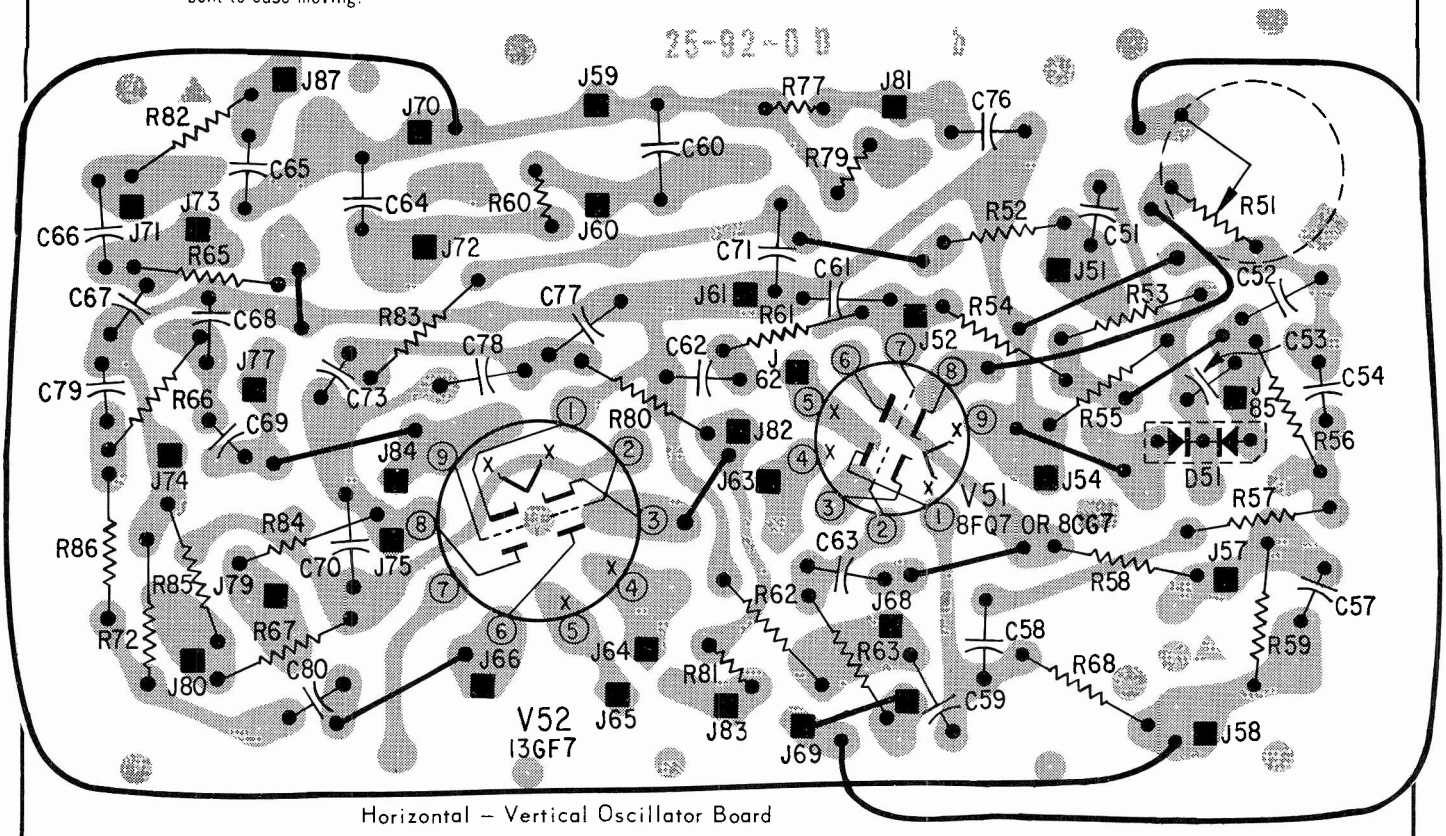
NOTE: A width Device is located between the Deflection Yoke and the neck of the picture tube. This must be adjusted before the Yoke clamp is tightened.

3. Center the raster horizontally and vertically, and eliminate shaded corners by simultaneoulsy, but independently, rotating the centering rings until the best effect is obtained.
4. Turn the brightness control to the point giving normal picture brillance. Maintain brightness at this level during the follosing adjustments. Center the contrast control.

WIDTH DEVICE ADJUSTMENT

The Width Device is a piece of metallic foil attached to a sheet of plastic; it forms a half circle around the top half of the picture tube neck. (During all adjustments, the Width Device must remain centered on the top half of the picture tube neck.) Be sure that the Width Device is pulled as far toward the base of the picture as possible. The Width Device should be left in this position unless further adjustment is necessary. For further adjustment, follow steps given below:

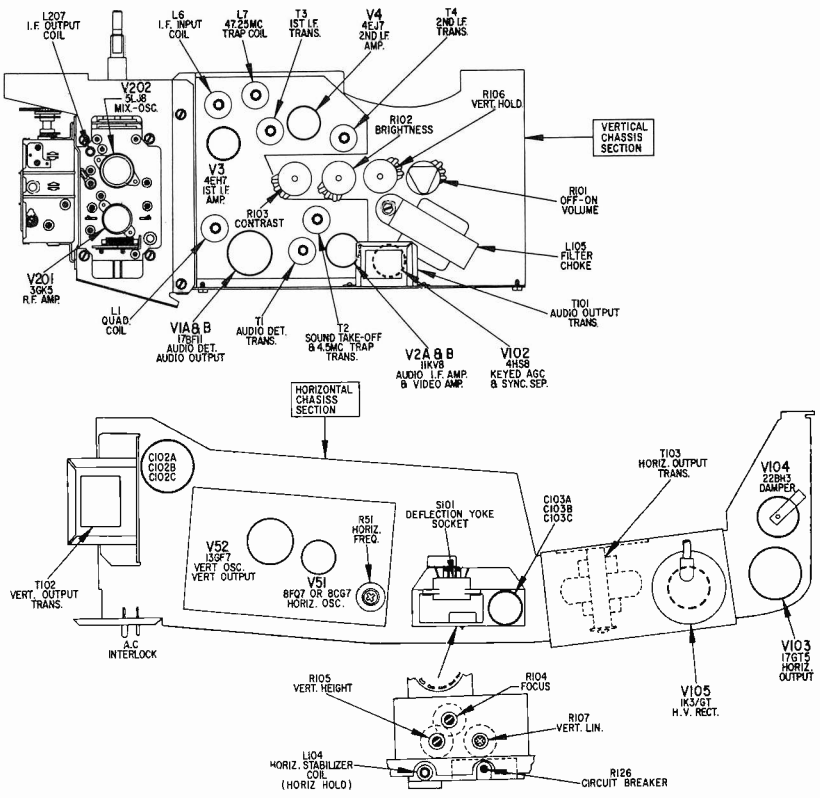
1. Loosen the screw on clamp which secures the Deflection Yoke to the picture tube.
2. During the following adjustment hold the Deflection Yoke in position and do not disturb the relative position between the Deflection Yoke and the picture tube. Slide the Width Device forward or backward until the picture has proper width. The plastic corners can be bent to ease moving.



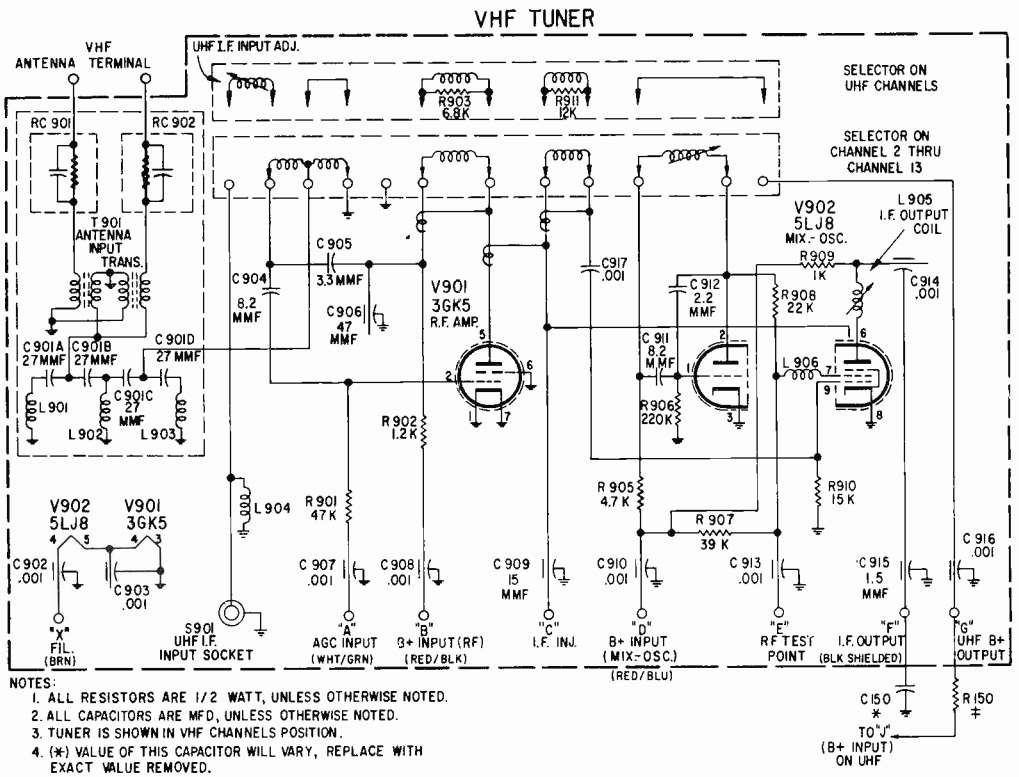
Horizontal – Vertical Oscillator Board

WIRE JUMPER UNDER V51 TUBE SOCKET BETWEEN PIN NO. 3 & PIN NO. 8, NOT SHOWN.

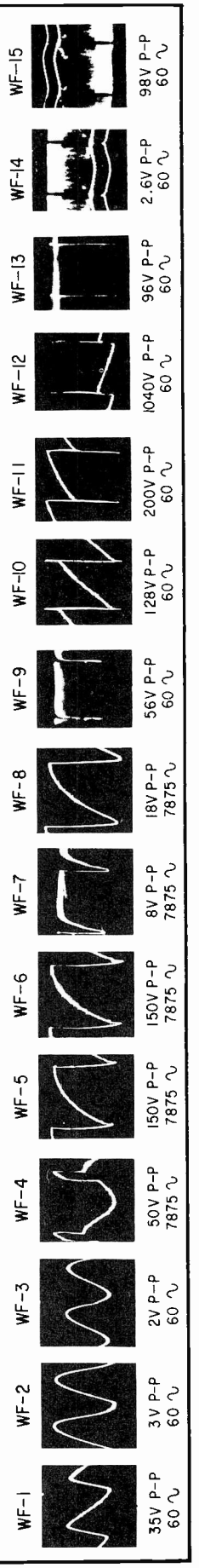
SEARS Chassis 456.61606/7, 528.61606/7, 529.61606/7, Continued

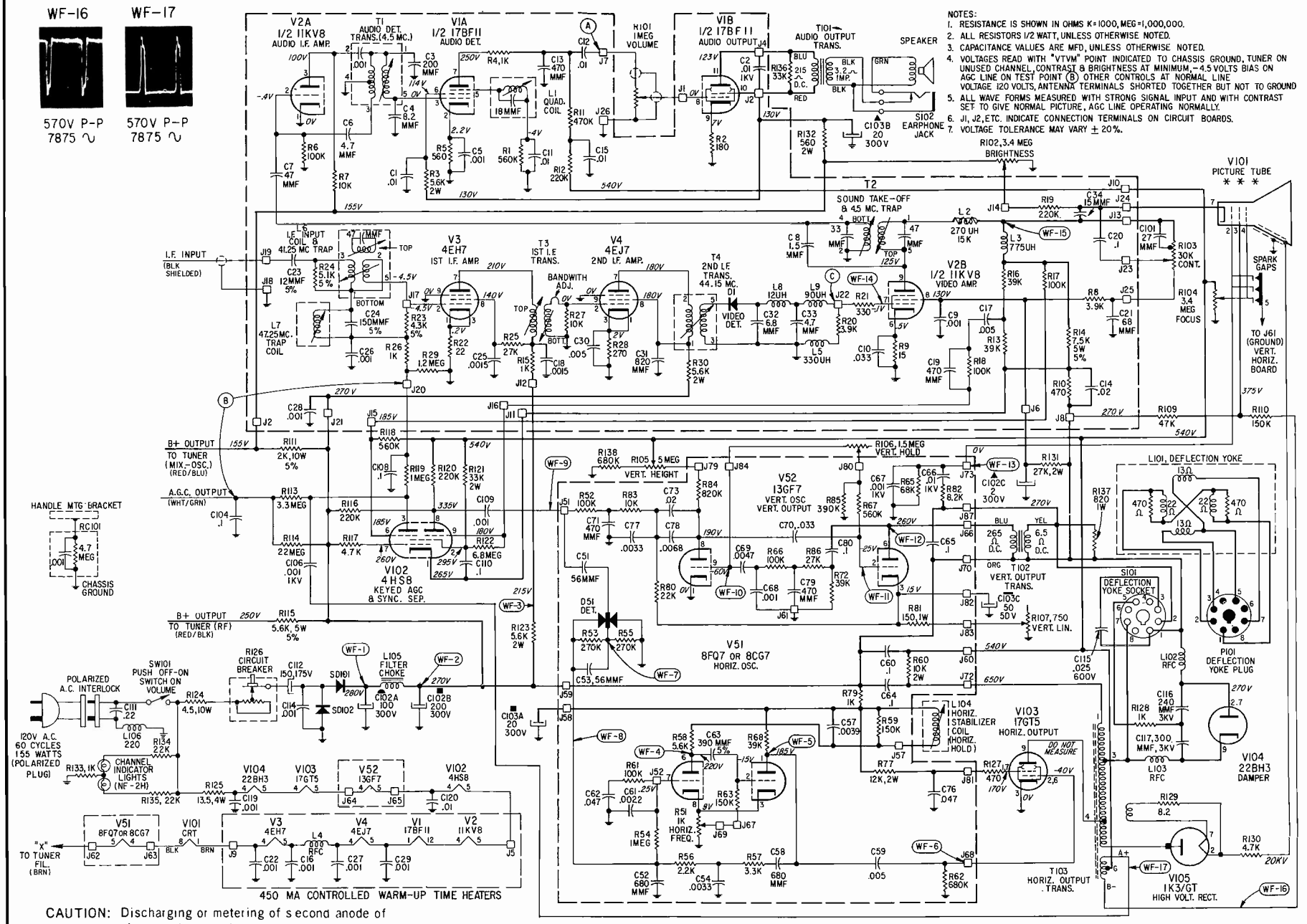


Tube View of Chassis

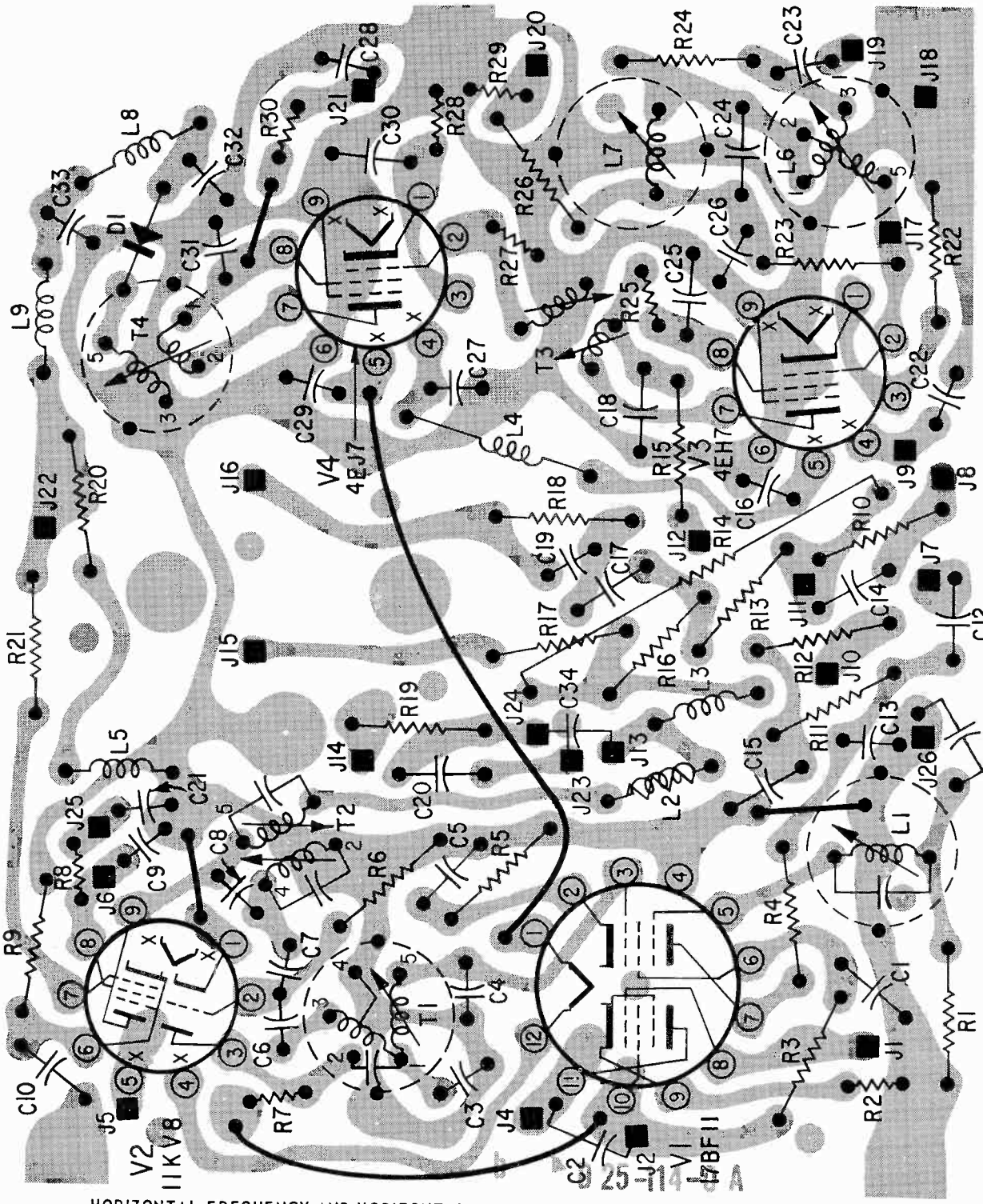


NOTES:
1. ALL RESISTORS ARE 1/2 WATT, UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS ARE MFD, UNLESS OTHERWISE NOTED.
3. TUNER IS SHOWN IN VHF CHANNELS POSITION.
4. (*) VALUE OF THIS CAPACITOR WILL VARY, REPLACE WITH EXACT VALUE REMOVED.




WF-16
570V P-P
7875 ∿
WF-17
570V P-P
7875 ∿
NOTES:
1. RESISTANCE IS SHOWN IN OHMS K=1000, MEG=1,000,000.
2. ALL RESISTORS 1/2 WATT, UNLESS OTHERWISE NOTED.
3. CAPACITANCE VALUES ARE MFD, UNLESS OTHERWISE NOTED.
4. VOLTAGES READ WITH "VTVM" POINT INDICATED TO CHASSIS GROUND, TUNER ON UNUSED CHANNEL, CONTRAST & BRIGHTNESS AT MINIMUM, -4.5 VOLTS BIAS ON AGC LINE ON TEST POINT (B) OTHER CONTROLS AT NORMAL LINE VOLTAGE 120 VOLTS, ANTENNA TERMINALS SHORTED TOGETHER BUT NOT TO GROUND
5. ALL WAVE FORMS MEASURED WITH STRONG SIGNAL INPUT AND WITH CONTRAST SET TO GIVE NORMAL PICTURE, AGC LINE OPERATING NORMALLY.
6. J1, J2, ETC. INDICATE CONNECTION TERMINALS ON CIRCUIT BOARDS.
7. VOLTAGE TOLERANCE MAY VARY ± 20%.
V2A 1/2 11KV8 AUDIO I.F. AMP.
T1 AUDIO DET. TRANS. (4.5 MC.)
V1A 1/2 17BF11 AUDIO DET.
R101 1MEG VOLUME
V1B 1/2 17BF11 AUDIO OUTPUT
T101 AUDIO OUTPUT TRANS.
SPEAKER
S102 EARPHONE JACK
C103B 20 300V
R102, 3.4 MEG BRIGHTNESS
V101 PICTURE TUBE * * *
T2
SOUND TAKE-OFF & 4.5 MC. TRAP
V3 4EH7 1ST I.F. AMP.
T3 1ST I.F. TRANS.
V4 4EJ7 2ND I.F. AMP.
T4 2ND I.F. TRANS. 44.15 MC.
V2B 1/2 11KV8 VIDEO AMP.
I.F. INPUT (BLK SHIELDED)
L7 47.25 MC. TRAP COIL
V102 4HS8 KEYED AGC & SYNC. SEP.
V52 13GF7 VERT. OSC VERT. OUTPUT
T102 VERT. OUTPUT TRANS.
V51 8FQ7 OR 8CG7 HORIZ. OSC.
V103 17GT5 HORIZ. OUTPUT
T103 HORIZ. OUTPUT TRANS.
V104 22BH3 DAMPER
V105 1K3/GT HIGH VOLT. RECT.
L101, DEFLECTION YOKE
P101 DEFLECTION YOKE PLUG
S101 DEFLECTION YOKE SOCKET
SPARK GAPS
TO J61 (GROUND) VERT. HORIZ. BOARD
B+ OUTPUT TO TUNER (MIX.-OSC.) (RED/BLU)
A.G.C. OUTPUT (WHT/GRN)
B+ OUTPUT TO TUNER (RF) (RED/BLK)
HANDLE MTG. BRACKET
CHASSIS GROUND
POLARIZED A.C. INTERLOCK
SW101 PUSH OFF-ON SWITCH ON VOLUME
120V A.C. 60 CYCLES 155 WATTS (POLARIZED PLUG)
CHANNEL INDICATOR LIGHTS (NF-2H)
"X" TO TUNER FIL. (BRN)
450 MA CONTROLLED WARM-UP TIME HEATERS
CAUTION: Discharging or metering of second anode of picture tube must be to main chassis only
SEARS Chassis 456.61606/7, 528.61606/7, 529.61606/7, Schematic Diagram
*** 19" Picture Tube - 19DQP4 or 19DWP4

SEARS Chassis 456.61606/7, 528.61606/7, 529.61606/7, Continued



NOTES:
1. WIRING DIAGRAM IS SHOWN FROM CIRCUIT SIDE OF BOARD.
2. SOLID LINES INDICATE WIRE JUMPERS.

HORIZONTAL FREQUENCY AND HORIZONTAL STABILIZER CONTROL ADJUSTMENT

1. Tune set to an active channel.
2. Short out L104 (Horizontal Stabilizer Coil) by connecting a jumper across J57 and J58.
3. Turn variable Horizontal Frequency control (R51) completely counter-clockwise.
4. Advance R51 SLOWLY clockwise until picture just locks in.
5. Remove jumper from horizontal stabilizer coil.
6. Lock in picture by adjusting the Horizontal Hold Control.

SEARS, ROEBUCK and CO.

Chassis 562.10110 and 562.10111, used in Models 6103 and 6104

TELEVISION ADJUSTMENTS

FOCUS ADJUSTMENT

Focus adjustment terminal strip is located on the side of H.V. cage. Connect the red lead to one of the three terminals which provides the best focus.

AGC

Turn channel selector to a station having sufficient signal strength and turn Contrast control (R133) about midway, turn AGC control to point giving maximum contrast and causing picture to become unstable, then turn control slightly back (about 5°–10°).

DEFLECTION YOKE, CENTERING RING

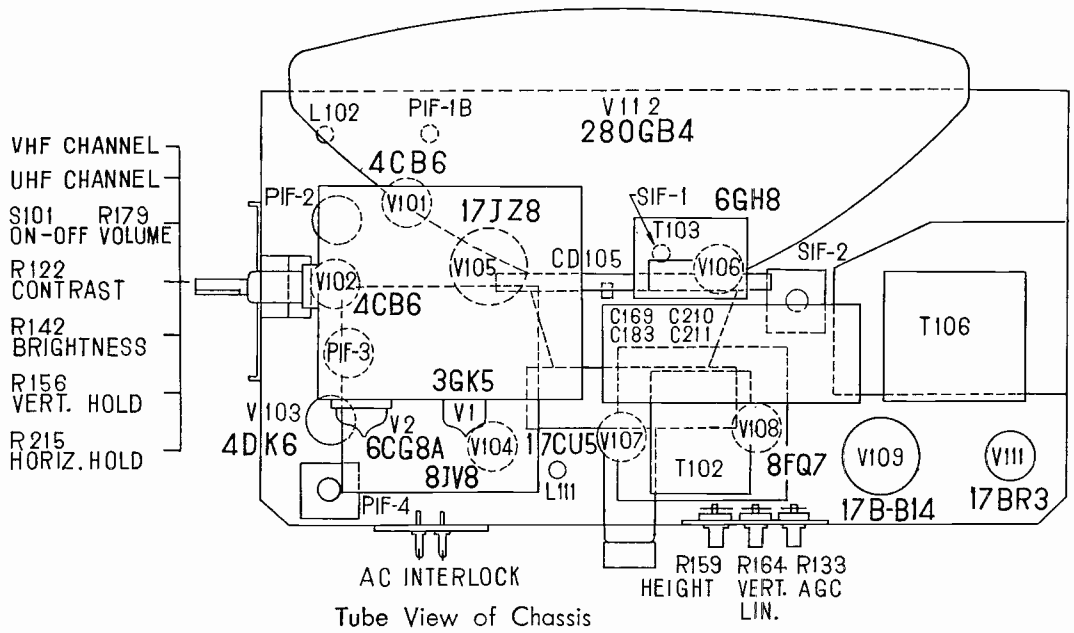
Follow this procedure in adjusting the Deflection Yoke, Centering Rings.

1. Turn the receiver on and disconnect the antenna.
2. The deflection yoke is held on neck of the picture tube by a clamp device.
   Loosen the clamp, by unscrewing the screw on the clamp, and carefully move the yoke as far forward as possible on the neck of the picture tube.
   Rotate the yoke until the top and bottom edges of the raster are squared with the chassis. Tighten the screw.
3. Center the raster horizontally and vertically, and eliminate shaded corners by simultaneously, but independently, rotating the centering rings until the best effect is obtained.

WIDTH ADJUSTMENT

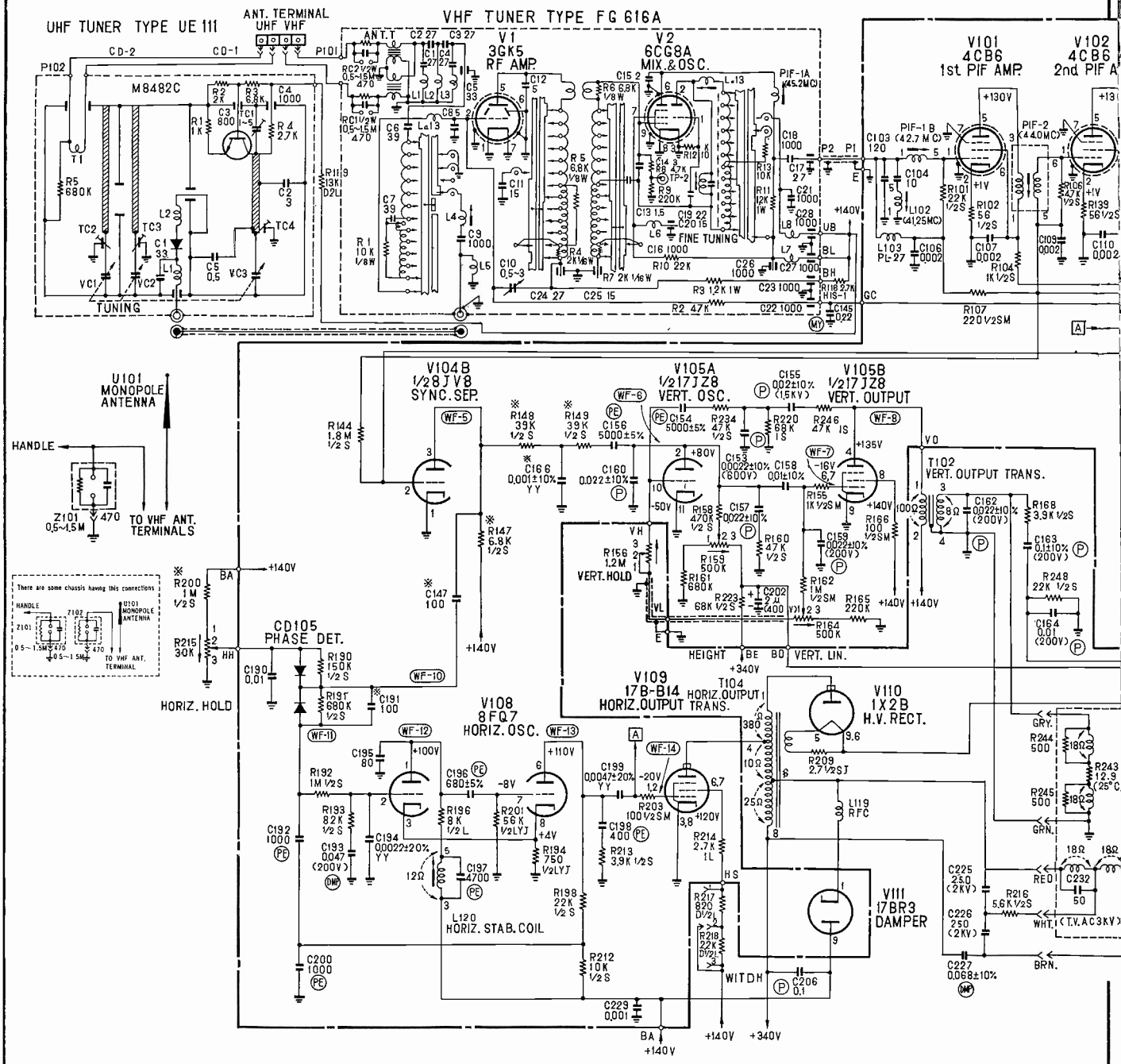
Width adjustment terminal strip is located on the top of the vertical output transformer.

When picture is too wide, connect the red lead to position "1" of the terminal strip. If picture is found too narrow, connect the red lead to position "3".



Tube View of Chassis

SEARS Chassis 562.10110, 562.10111, Schematic Diagram



(※) In chassis No. 562.10110, value of these parts is changed as follows.

C147, C191	60mmfd.
C166	0.0022 ±10%mfd.
R147	56K ½S
R148	68K ½S
R149	56K ½S

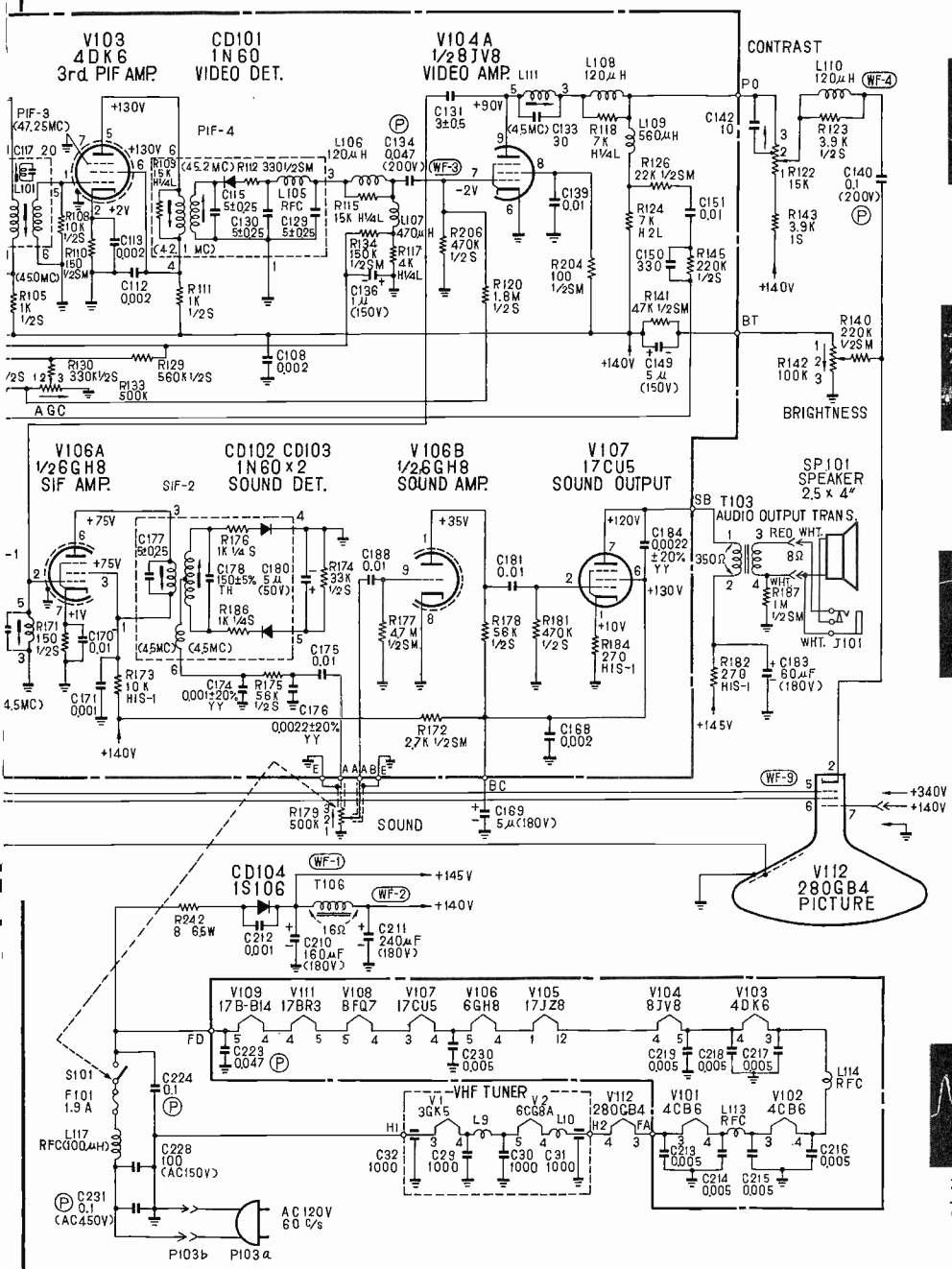
NOTES:

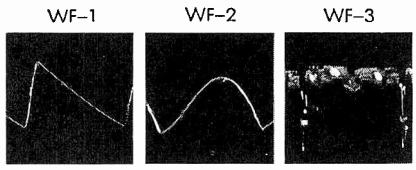
1. All resistance values in ohms K=1,000, M=1000,000.
2. Type of resistors.

Rating \ Type	Carbon film	High frequency carbon film	Carbon composition	Dippped carbon film	Carbon film (Special Type)
¼W	No Indication	H	—	—	—
½W	½ L	H ½ L	½ S	D ½ L	—
1W	1 L	H 1 L	—	D 1 L	HIS-1
2W	2 L	H 2 L	—	D 2 L	—

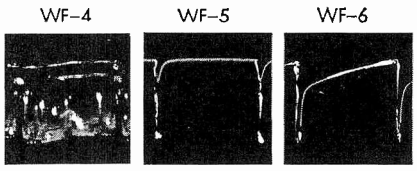
CHASSIS NOS. 562.10110 562.10111

SEARS Chassis 562.10110, 562.10111, Schematic Diagram, Continued

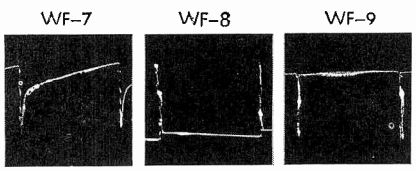




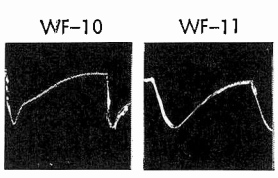
19V P-P 60~ | 1V P-P 60~ | 3V P-P 60~



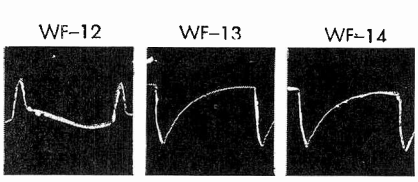
65V P-P 60~ | 95V P-P 60~ | 130V P-P 60~



50V P-P 60~ | 1100V P-P 60~ | 110V P-P 60~



8V P-P 15750~ | 12V P-P 15750~



30V P-P 15750~ | 90V P-P 15750~ | 90V P-P 15750~

3. All resistors ±10% unless otherwise noted.
   YJ: ±5% (for carbon film),
   M: ±20%
   SJ: ±5% (for carbon composition)

4. Types of capacitors.
   Ⓟ: Paper ⊣+⊢: Electrolytics Ⓟⓔ: Polyethylene
   Ⓜ: Dipped mylar paper Ⓜⓨ: Mylar
   All capacitors not designated as above are Ceramic capacitors.

5. Unless otherwise noted in schematic, all capacitors values less than 1 are expressed in mfd. and the values more than 1 are in mmfd.

6. Four section electrolytic capacitors.
   C211 (240mfd.) C210 (160mfd.) C183 (60mfd.)
   C169 (5mfd.)

7. Voltage reading taken with "VTVM" from point indicated to chassis ground, tuner on unused channel, contrast at maximum, AGC at maximum clockwise, other control at normal, line voltage 120 volts.

8. All wave forms measured with strong signal input, contrast set to give normal picture and AGC line operating normally.

9. Voltage readings may vary ±20%.
   CAUTION: Discharge or metering of second anode of picture tube must be to main chassis only.

SEARS Chassis 562.10110, 562.10111, Service Information, Continued

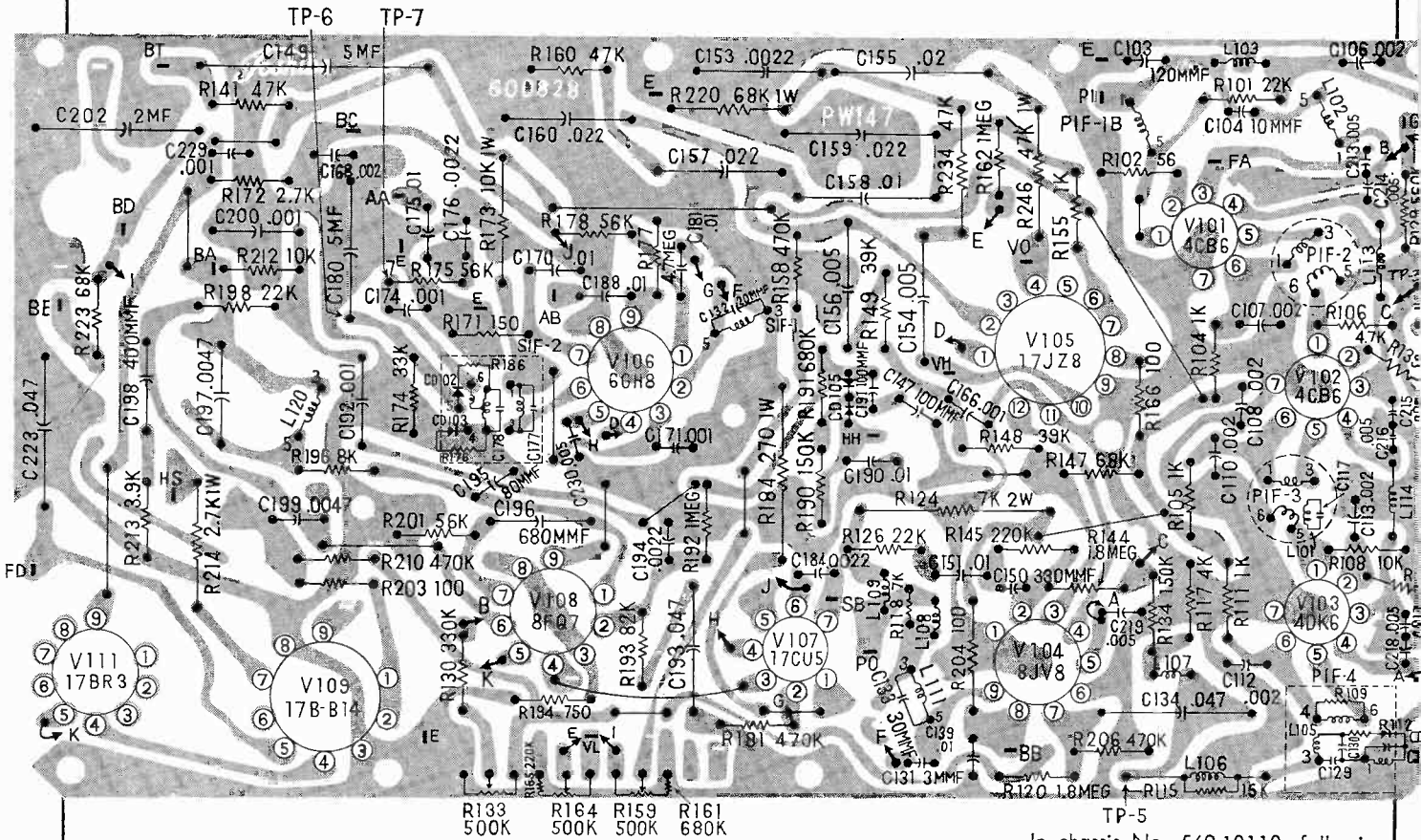
HORIZONTAL FREQUENCY AND HORIZONTAL STABILIZER CONTROL ADJUSTMENT (SHOP)

1. Tune set to an active channel.
2. Connect a high impedance voltmeter to Pin 2, V108.
3. Turn Horizontal Hold control R215 about midway and adjust Horizontal Stabilizer coil (L120) to synchronize picture, and to obtain voltmeter reading of +2.3 volts.
4. Remove voltmeter.
5. Make sure that at the both extreme position of Horizontal Hold control the picture goes out of synchronization when the channel selector switched to other channel momentarily, then back to original position.

TUNER ADJUSTMENT

If the range of the fine tuning control is not adequate to tune in a clear picture on one or more channels, the oscillator cores requires adjustment.

1. Set the fine tuning control to the center of its range.
2. Adjust oscillator core with non-metallic aligner to obtain best picture condition starting from higher channel down. Do not press oscillator core too hard during this adjustment work.



Wiring Diagram, Printed Circuits PW147

NOTES :

1. WIRING DIAGRAM IS SHOWN FROM CIRCUIT SIDE OF BOARD.
2. SOLID LINES INDICATE WIRE JUMPERS.
3. HEAVY ARROWS A, B, ..., K, INDICATE WIRE JUMPER CONNECTIONS. ARROW "A" CONNECTS TO THE OTHER ARROW "A", "B" CONNECTS TO "B", AND SO ON

In chassis No. 562.10110, following changes have been made.

C147, C191	60mmfd.
C166	0.0022±10%mfd.
R147	56K ½S
R148	68K ½S
R149	56K ½S

SONY TV5-305UW

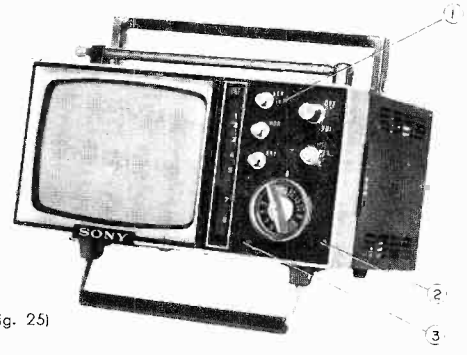
METHOD OF DISASSEMBLING THE SET

To Remove the Front Control Panel (Fig. 25)

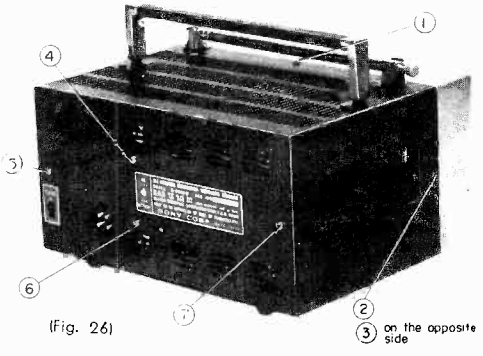
1. Pull all Control Knobs straight out. The Fine Tuning Knob may be somewhat difficult to remove . . . use force.
2. Remove three black screws 1, 2 and 3. The Front Control Panel can now be removed. See Fig. 25.

To Remove the Back Cabinet Cover (Fig. 26)

1. Remove the three small screws 1, 2 and 3 on the top side, on the left side and on the right side of the Cabinet respectively. See Fig. 26.
2. Remove the four screws 4, 5, 6 and 7 on the back side of the Cabinet. See Fig. 26.
3. Pull up the Telescopic Antenna from the Telescopic Antenna Catch. The Back Cabinet Cover can now be removed by pulling straight back.



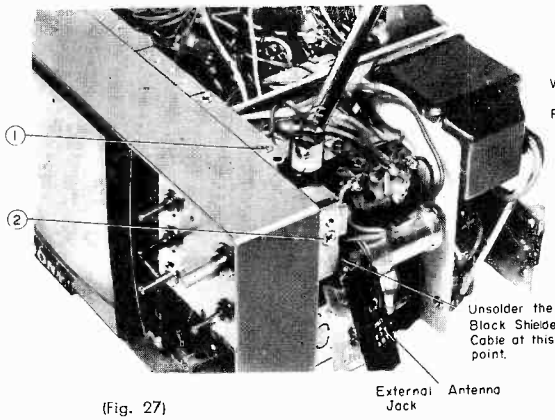
(Fig. 25)



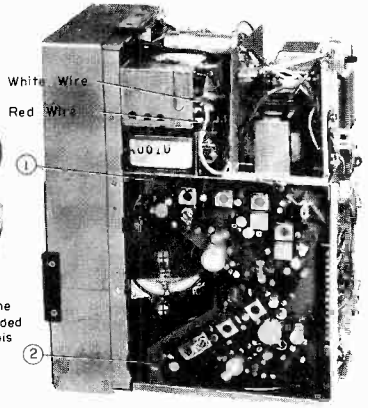
(Fig. 26)

To Remove the Telescopic Antenna (Fig. 27)

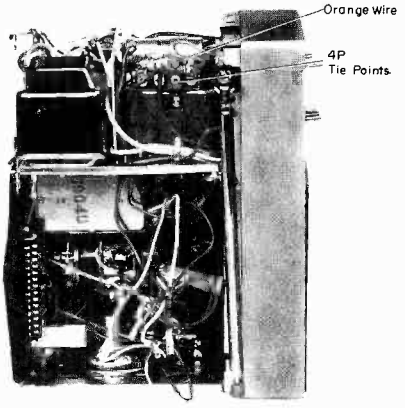
1. Remove the Back Cabinet Cover.
2. Disengage the External Antenna Jack from the Cabinet by pulling straight back.
3. Unsolder the short Shielded Cable at the upper terminals of the External Antenna Jack.
4. Remove the two screws 1 and 2. The Telescopic Antenna can now be detached. See Fig. 27.



(Fig. 27)



(Fig. 28)

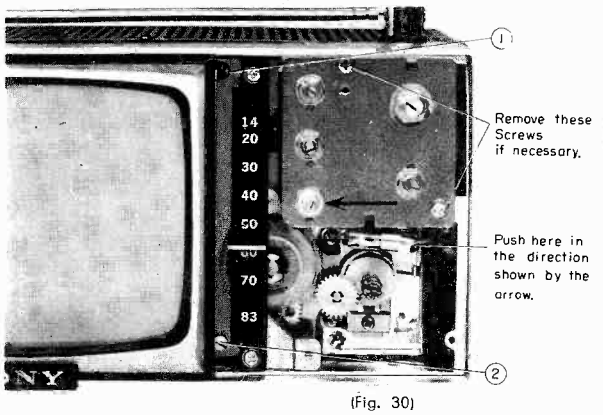


(Fig. 29)

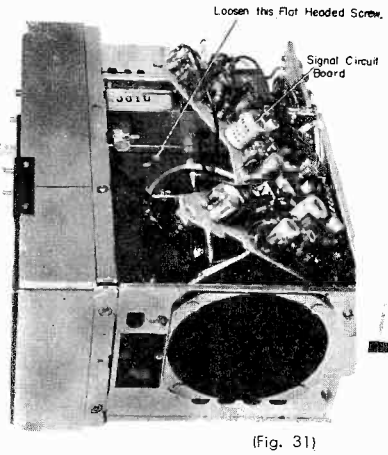
To Remove the Tuner Block (Fig. 28, 29, 30, 31)

1. Remove the Back Cabinet Cover.
2. Unsolder the two wires, the white one for AGC signal input and the red one for the power supply to the VHF Tuner, at the terminals on the bottom of the Set. See Fig. 28.
3. Unsolder the Orange wire for the power supply to the UHF Tuner, at the 4P Tie-points. See Fig. 29.
4. Unsolder the Black Shielded Cable at the lower terminals of the External Antenna Jack.

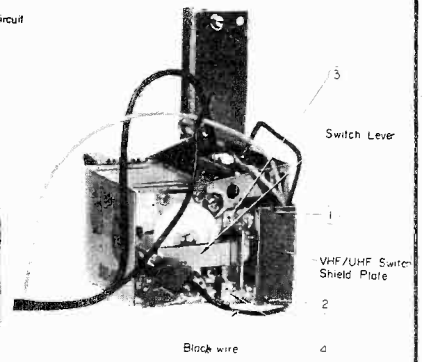
SONY Model TV5-305UW Disassembly Instructions, Continued



(Fig. 30)

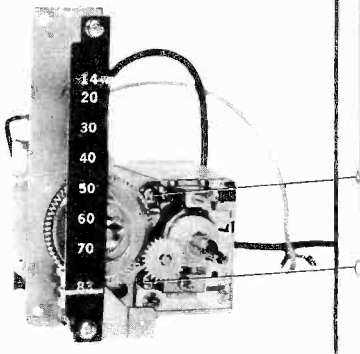


(Fig. 31)



(Fig. 32)

5. Push out the Neon Lamp from the Neon Lamp Holder to the Left. See Fig. 30.
6. Remove the two screws 1 and 2 in Fig. 28 and lift the front end of the Signal Circuit Board. The Circuit Board will swing around the axis of the Multi-jack.
7. Loosen the Flat Headed Screw located on the partition plate. It is not necessary to remove this screw. See Fig. 31.
8. Remove the two screws 1 and 2 in Fig. 30.
9. Pull the Tuner Block straight toward the front and then move to the right. The Tuner Block can be taken out from the Cabinet.



(Fig. 33)

To Separate the VHF Tuner from the Tuner Block (Fig. 32, 33)

1. Remove the two screws 1 and 2 to detach the VHF/UHF Switch Shield Plate. See Fig. 32.
2. Unsolder the Black wire at the terminal of the VHF/UHF Switch.
3. Remove the two screws 3 and 4 in Fig. 32.
4. Remove the two screws 1 and 2 in Fig. 33.

To Remove the Potentiometers for Vertical Hold, Horizontal Hold, Brightness Control, Volume Control and Contrast Control (PIX), follow the procedure explained below. (Fig. 34)

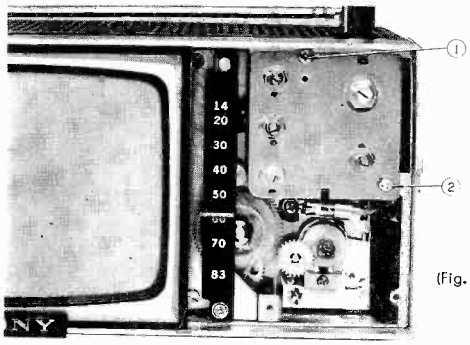
1. Remove the Front Control Panel.
2. Remove the two screws 1 and 2. See Fig. 34.

The Holding Plate for Potentiometer can now be detached from the chassis.

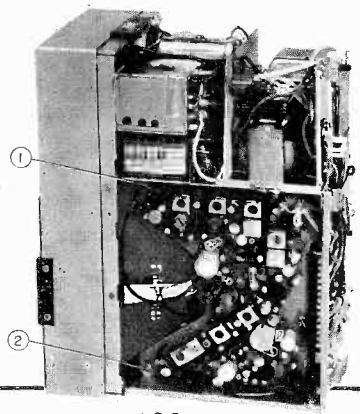
To Remove the Signal Circuit Board (Fig. 35)

1. Remove the Back Cabinet Cover.
2. Place the Set up side down. Be careful not to spoil the Telescopic Antenna.
3. Pull the two Shielded Cable, one is black and the other is gray, off from the Circuit Board.
4. Remove the two screws 1 and 2. See Fig. 35.
5. Lift the front side end of the Circuit Board. The Circuit Board will swing around the axis of the Multi-jack.

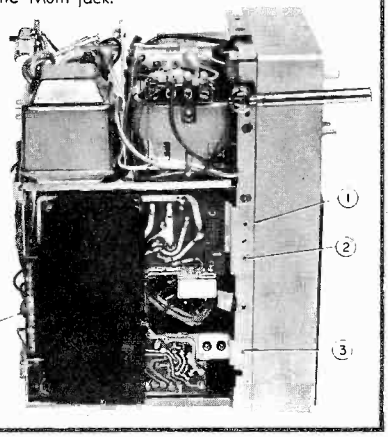
The Circuit Board can now be removed as a unit by pulling away from the Multi-jack.



(Fig. 34)



(Fig. 35)



(Fig. 36)

SONY Model TV5-305UW Disassembly Instructions, Continued

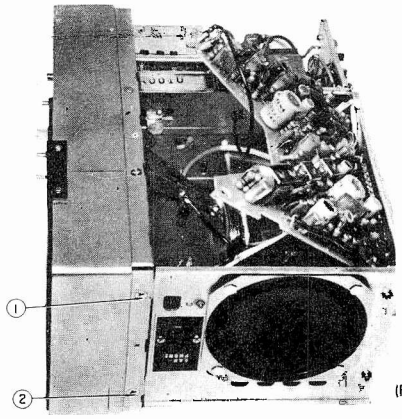
To Remove the Deflection Circuit Board (Fig. 36)

1. Remove the Back Cabinet Cover.
2. Remove the three screws 1, 2 and 3 and lift the front side end of the Circuit Board. The Circuit Board will swing around the axis of the Multi-jack. See Fig. 36.
3. Pull out the eight wires, Green, Blue, Orange, Brown, Black, White and two Yellow ones, from the pins on the Circuit Board. Be careful not to confuse the corresponding pins for the two Yellow wires in assembling.
4. The Circuit Board can now be removed as a unit by pulling away from the Multi-jack.

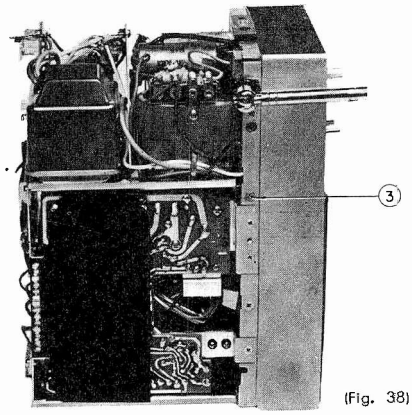
To Remove the Chassis (Fig. 37, 38, 39, 40)

1. Pull out all the Control Knobs.
2. Remove the Front Control Panel.
3. Remove the two securing screws for Potentiometer Holding Plate.
4. Pull out the Socket and the Anode Connector from the Picture Tube.
5. Unsolder the Black wire for Grounding at Picture Tube Holder.
6. Remove the Telescopic Antenna from the Cabinet.
7. Remove the four Chassis holding screws 1 and 2 in Fig. 37, 3 in Fig. 38 and 4 in Fig. 39.

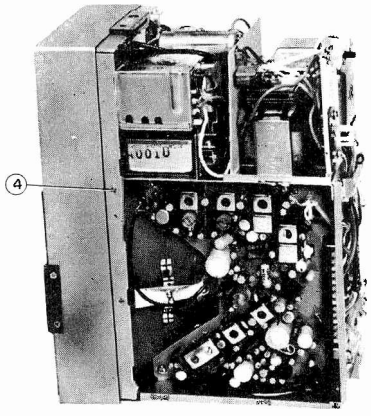
The Chassis and the Front Cabinet Frame can now be separated by pulling away each other. Be careful not to break the lead wires connecting the Deflection Yoke on the Picture Tube and the High Voltage Block in the Chassis.



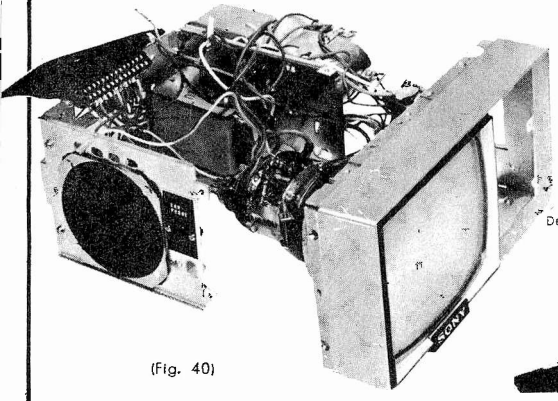
(Fig. 37)



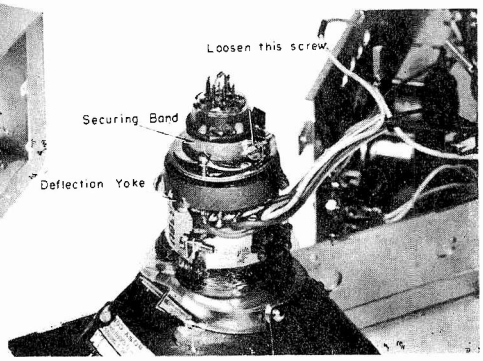
(Fig. 38)



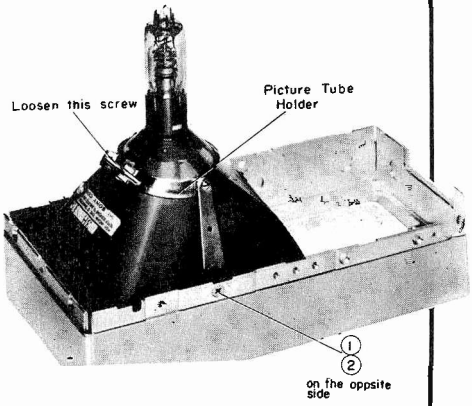
(Fig. 39)



(Fig. 40)



(Fig. 41)



(Fig. 42)

To Remove the Picture Tube (Fig. 41, 42)

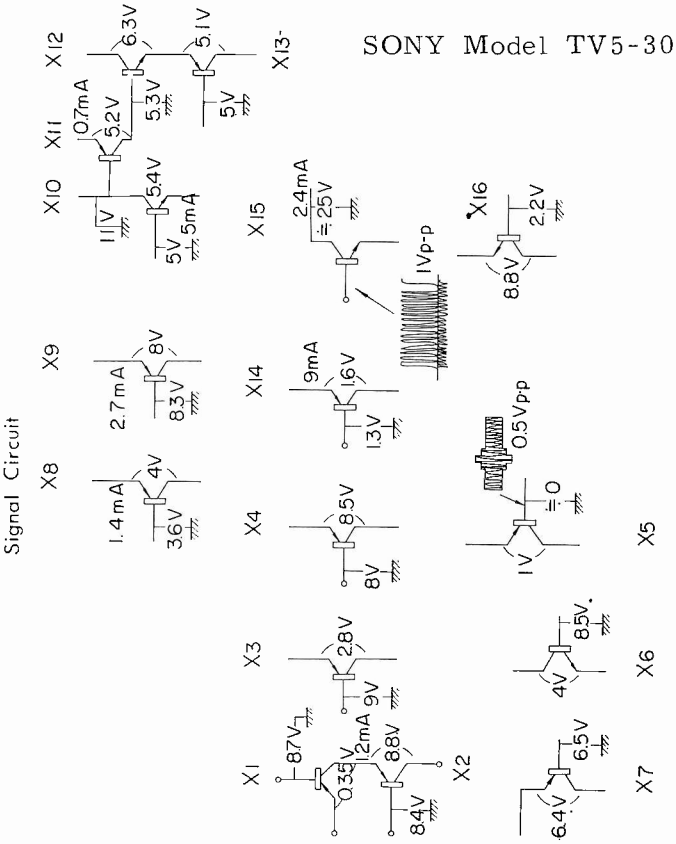
1. Separate the Chassis and the Front Cabinet Frame.
2. Remove the Deflection Yoke from the Picture Tube by loosening the screw on the Securing Band. See Fig. 41.
3. Loosen the Securing Screw for Picture Tube Holder.
4. Remove the two screws for Picture Tube Holder. See Fig. 42.

The Picture Tube can now be removed from the Front Cabinet Frame.

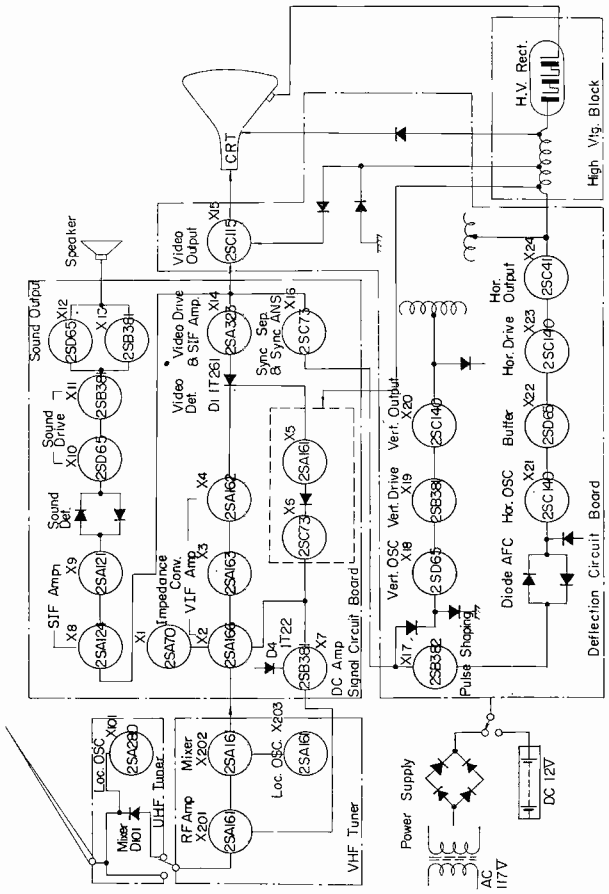
SONY Model TV5-305UW Service Information, Continued

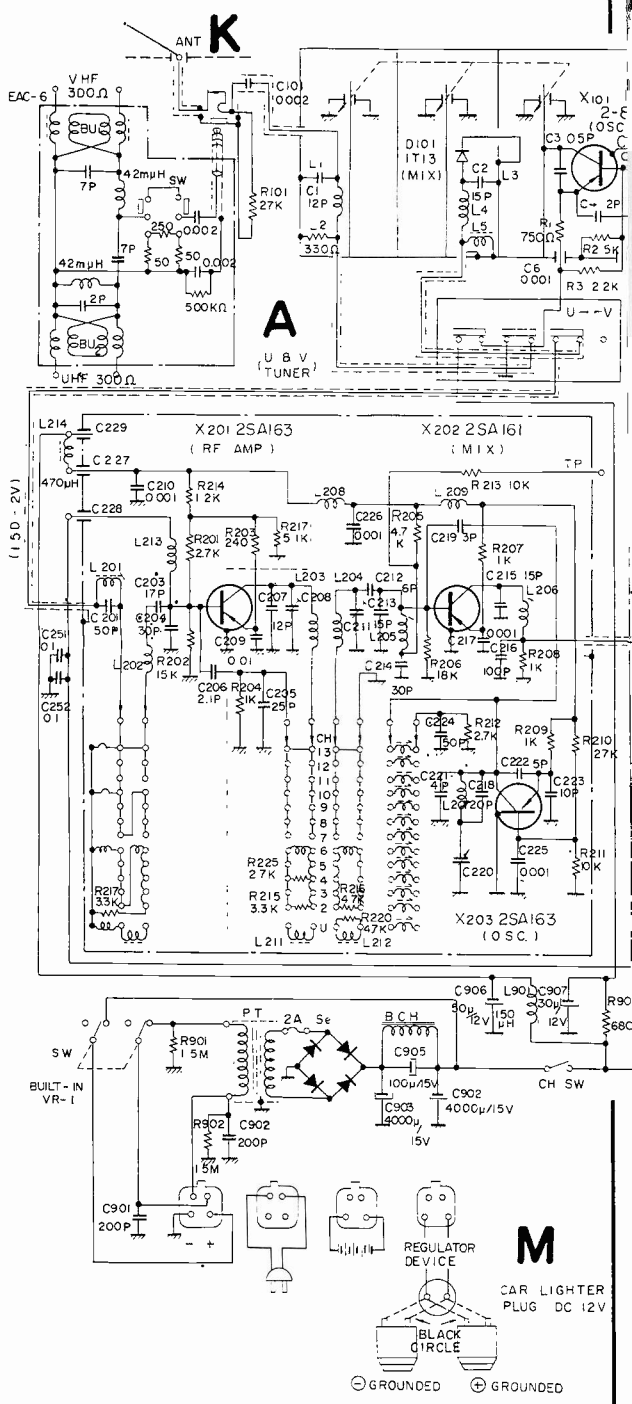
Voltage and Current Distribution Chart

Signal Circuit

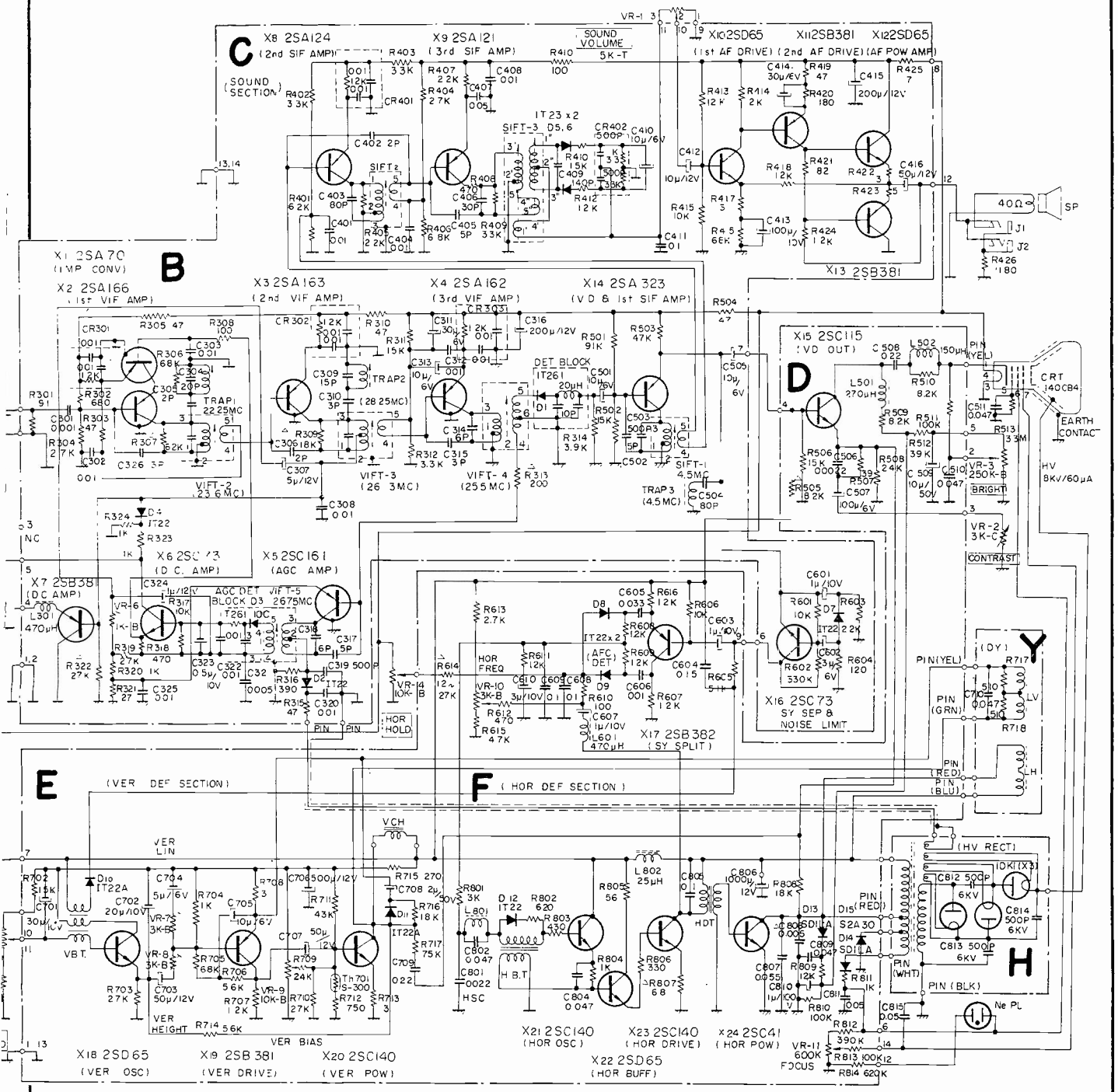


Block Diagram

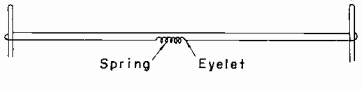


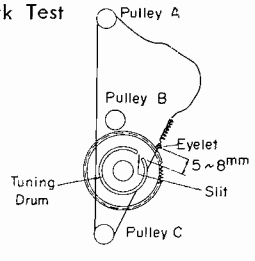


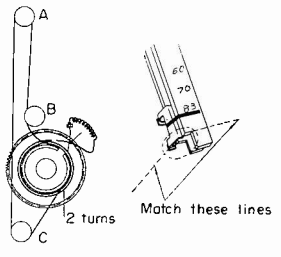
SONY Model TV5-305UW Schematic Diagram, Continued



Never Attempt to Check the high Voltage (8 KV) Circuit by Spark Test







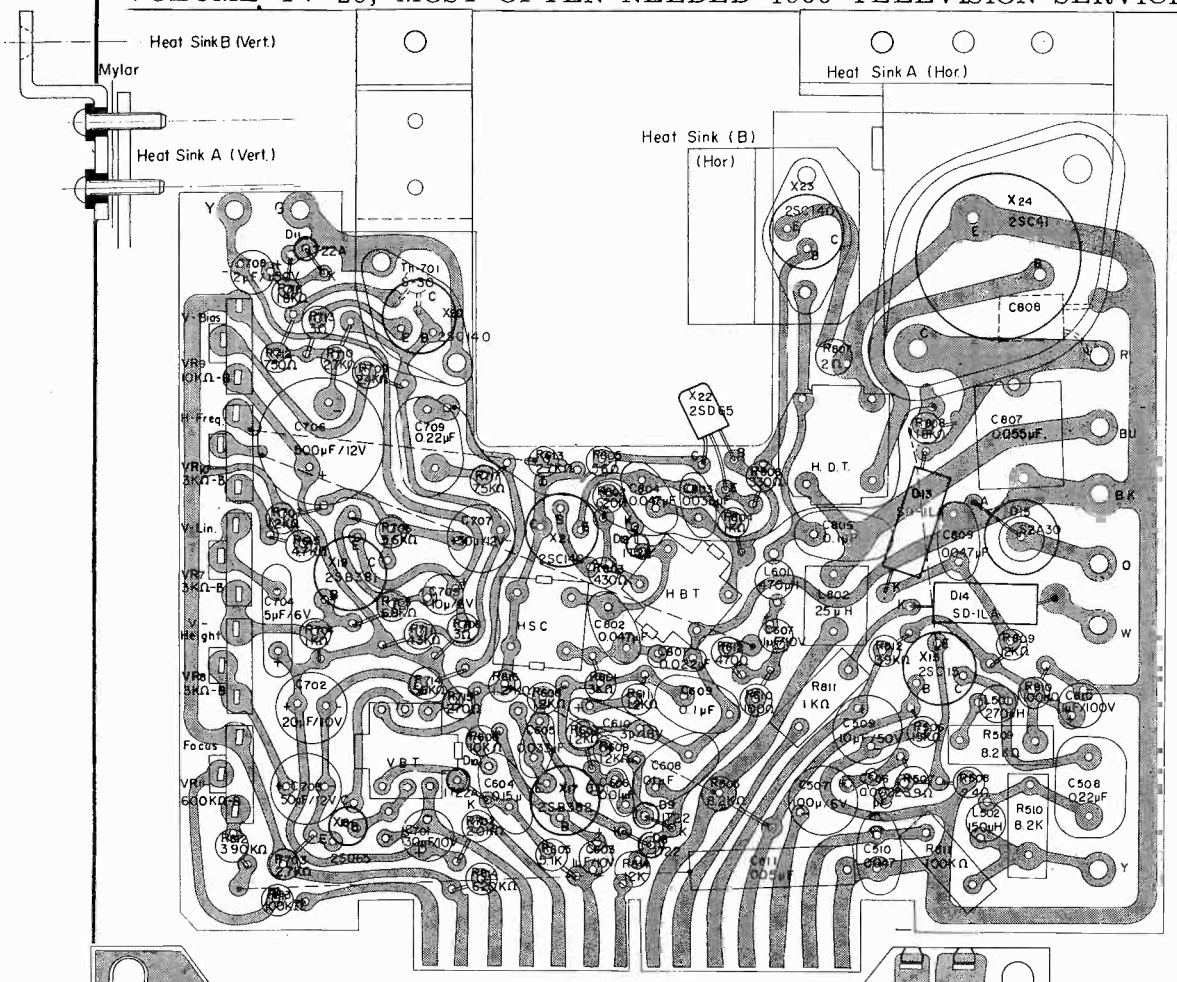
SONY

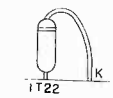
Model TV5-305UW

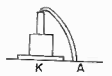
(Continued)

Mounting Diagram

Deflection Circuit Board





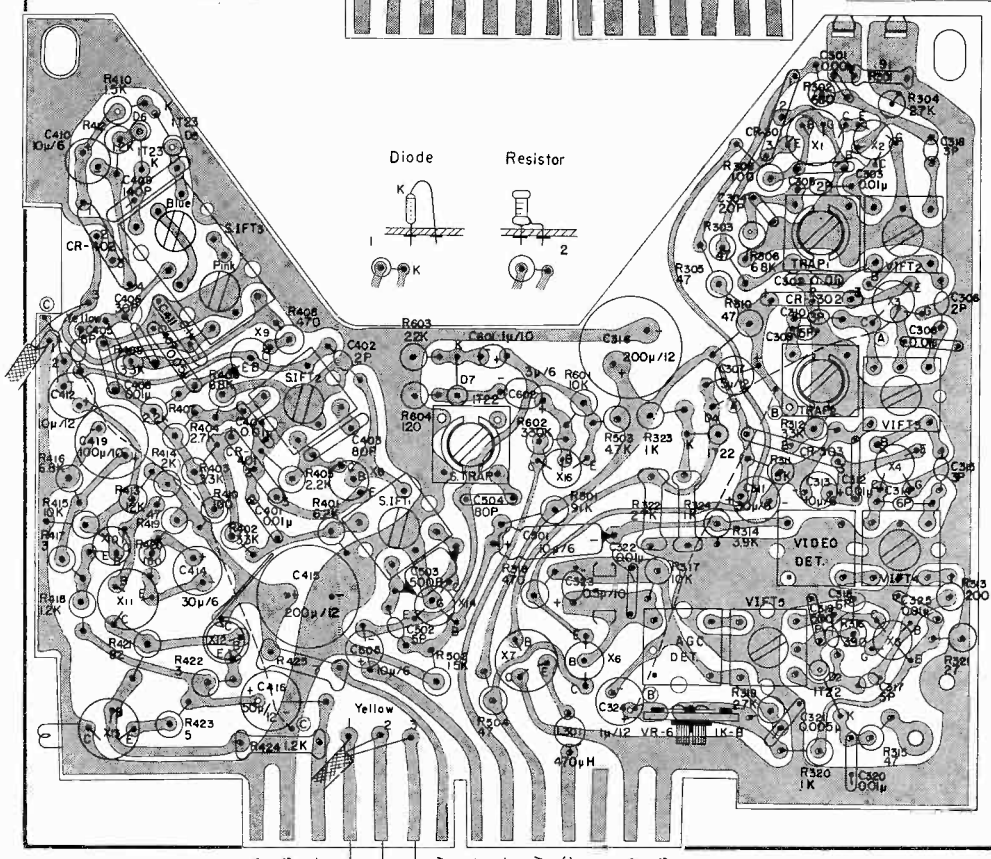


Jumper Wire ;

PVC Wires (Black) (Printed Side)

PVC Wires (Yellow) (Mounted Side)

Th701 and C808 are mounted on the printed Side



Mounting Diagram

Signal Circuit Board

SHARP ELECTRONICS CORPORATION

Sharp MODEL 12TP-8

1. Deflection Yoke Adjustment

a) Switch on the receiver and disconnect the antenna.

b) The deflection yoke is fastened to the neck of the cathode ray tube by a clamp. Now, loosen the said clamp and carefully move the yoke on the said neck as frontward as possible. If the lines of the raster are neither horizontal nor square with the picture mask, turn the deflection yoke until the lines become horizontal. As soon as so adjusted, tighten the clamp behind the deflection yoke.

2. Centering Adjustment:

Center the raster horizontally as well as vertically and eliminate shaded corners simultaneously but independently, rotating the centering rings until adjusted as required.

3. Focus Adjustment:

For the clearest picture from the center to the edge of screen, connect the blue lead of blue from the socket of cathode ray tube socket to the focus terminal of 1, 2 or 3.

4. Vertical Size and Linearity Adjustment:

Adjust the vertical size and vertical linearity for the best overall linearity with a desired picture size. After this adjustment, a slight readjustment of the centering rings may be necessary.

5. Horizontal Size Adjustment:

a) Set the brightness control to the normal operating position.

b) Adjust the horizontal size coil (TL-983) to fill the mask with a line voltage of 108V. With the normal line voltage of 120V, the raster should overscan the mask about ½ inch on each side.

6. AGC. Adjustment:

a) Turn the channel selector to the strongest station in the area and adjust the fine tuning control to correct the tuning point.

b) Turn the contrast and brightness controls to their maximum.

c) Turn round the AGC clockwise until the picture "bends" or "jumps" sideway.

d) Reverse the turning of AGC counterclockwise until the picture becomes stabilized horizontally and vertically.

e) Reduce the contrast and brightness to a normal setting and turn the fine tuning control to correct the tuning point, so that the best picture may be observed.

7. H-Hold Adjustment:

a) Turn the H-Hold in the receiving condition of some channel and check up the lateral displacement of the picture as far as it does not get out of shape.

b) Fix the picture in the center of displacement amplitude with aid of the H-Hold.

c) Check up that the picture does not get out of shape when the channel be switched.

SHARP Model 12TP-8 Alignment Information, Continued

1. Adjustment of Picture IF.

a) Instruments:

i) Sweep generator which sweeps the frequencies of 40–50 MC

ii) Oscilloscope

iii) Marker generator

iv) Bias source with the range ef about 0–5V.

b) Preparation.

i) The central frequency of the sweep generator should be adjusted to about 47 MC and the sweep width to about ±5 MC.

ii) The frequency of the marker generator should be adjusted to 45.75 MC and the output lead wire loosely coupled to the output of sweep generator.

iii) Bias source is adjusted to–2.5V and should charged to the AGC terminal of the tuner.

iv) The output of the sweep generator must be connected to TP–3 (See Schematic Diagram).

v) The resistor of 1kΩ is inserted between the input terminal of the oscilloscope and T.P. 4. (See Schematic Diagram)

vi) Set channel selector to Ch. 10.

c) Adjustment

i) Adjust upper and lower cores of TL–52 to produce on the oscilloscope the wavaform such as shown in Fig. 8. The output of the sweep generator should be adjusted to produce about 2–3 Vpp. It is convenient to adjust them simultaneously with two drivers in case of which, upper one will be changed the position of the peak, and lower one will be changed the slope of it.

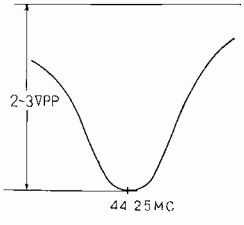


Figure8

ii) Disconnect the output of the sweep generator from TP–3 and connect to TP–2 through DC stopper condenser. Adjust the dust core of 2TIF–468 to obtain the wave form shown in Fig. 9.

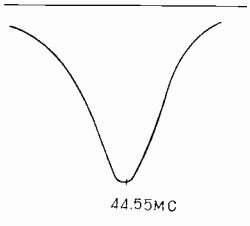


Figure 9

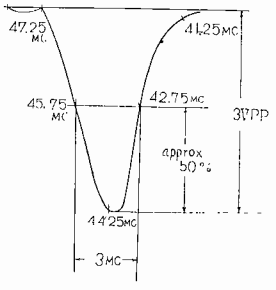


Figure 10

iii) Disconnect the output of sweep generator from TP–2 and connect to TP–1 of the tuner as shown in Fig. 11. Adjust 2TIF–467, 2TIF–470 and 2TIF–471 to obtain the waveform as shown in Fig. 10 in case of which the output of sweep generator should be adjusted to produce about 3 Vpp. Re-adjust, when the wave form will not be obtaind.

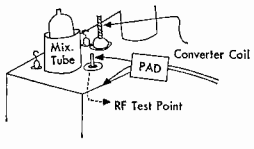


Figure 11

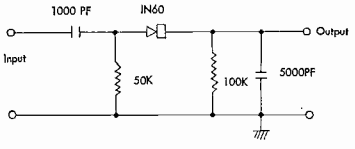


Figure 12

SHARP Model 12TP-8 Alignment Information, Continued

2. Adjustment of Sound IF

The sound system used in this receiver consists of a sound IF amplifier stage, a quadrature grid detector and an output stage. Since this type of sound system is extremely sensitive, adjustment should be done strictly and carefully.

a) Tune the receiver to the strong signal station and adjust the quadrature coil (TIF–542) to produce the maximum sound without buzz and distortion.

b) Tune the receiver to the weak signal station or reduce the strong signal with attenuater and adjust the interestage coil (2TIF–469) to produce maximum sound with minimum bazz.

c) Adjust the sound take-off coil (2TIF–437) to produce maximum sound.

3. Adjustment of 4.5MC Sound trap

a) Instruments

1) Sweep generator which sweeps the frequencies of 0–5MC.

2) Oscilloscope

3) Marker generator which generates the frequency of 4.5MC.

b) Preparation and Adjustment

1) The connection between the sweep generator and marker generator should be arranged like PIF adjustment, except for the frequency which should be 4.5MC.

2) Connect the output of the sweep generator to Pin 11 of V5 (15 BD11) and insert the detector shown in Fig. 13 between the oscilloscope and the cathode of CRT.

3) Arrange the contrast control to its maximum, and adjust 2TIF–437 with its lower cores and the marker frequency should be set to 4.5MC as shown in Fig. 14 in case of which, the waveform roughly shows the video characteristics.

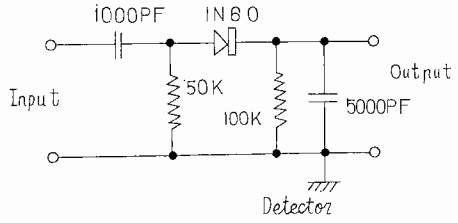


Figure 13 Detector

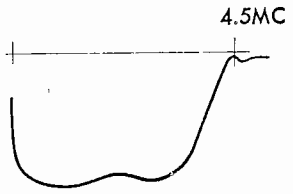


Figure 14

4. Adjustment of H-AUX and Horizontal Ringing Coil

a) Set H-Hold control about the center of all revolving degree.

b) Connect 0.5μF condenser between 15BD11 pin 4 and the chassis to eliminate the synchronizing signal output.

c) Short-circuit both ends of TL-23, TP-7 and TP-8.

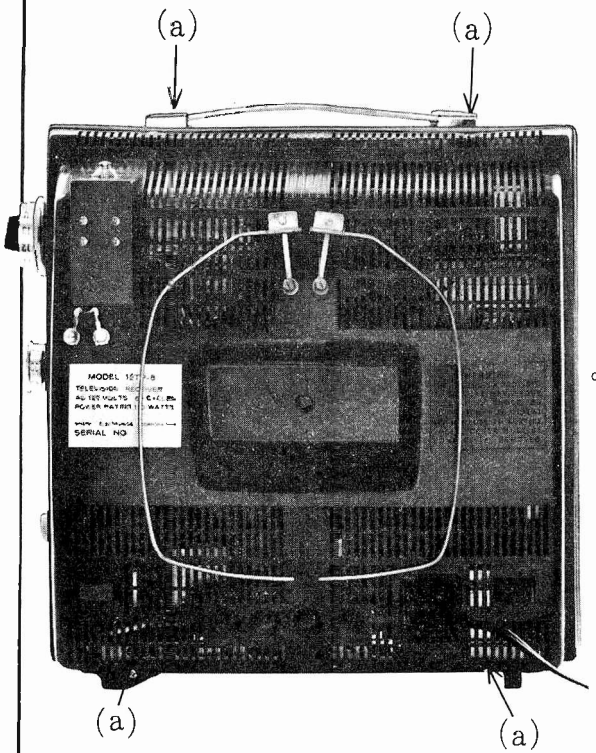
d) Tuner under H-AUX control, condition, reception where the picture is in the most stabilizing condition, although it moves right and left.

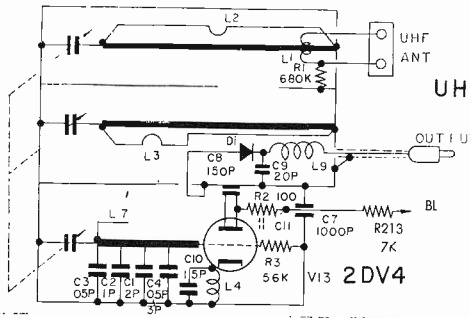
e) Open the short of horizontal ringing coil (TL–23) and adjust its core to produce the same condition as in d.)

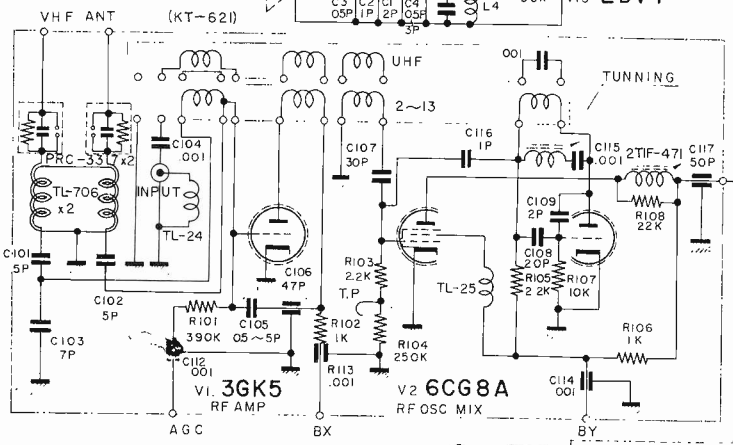
f) Remove 0.5μF condenser between 15BD11 pin 4 and the chassis.

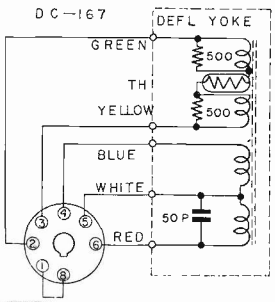
SHARP Model 12TP-8 Service Information, Continued

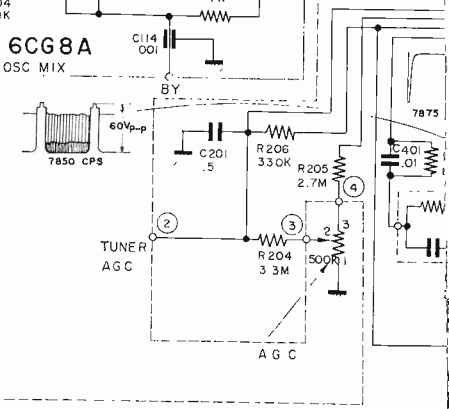
For removal of back cover and chassis remove screws and items indicated by letters (a) and (d) through (h) in the illustrations below.

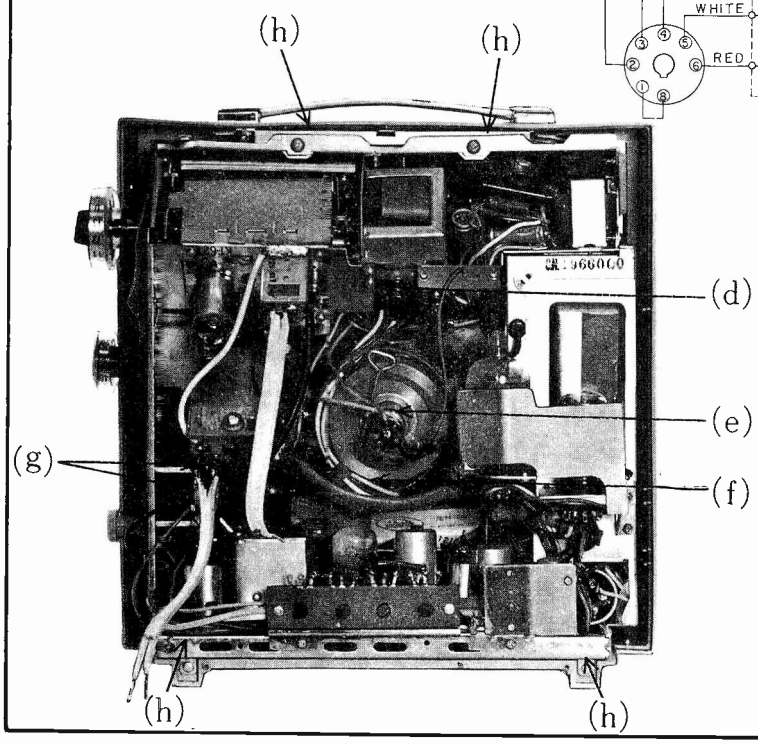


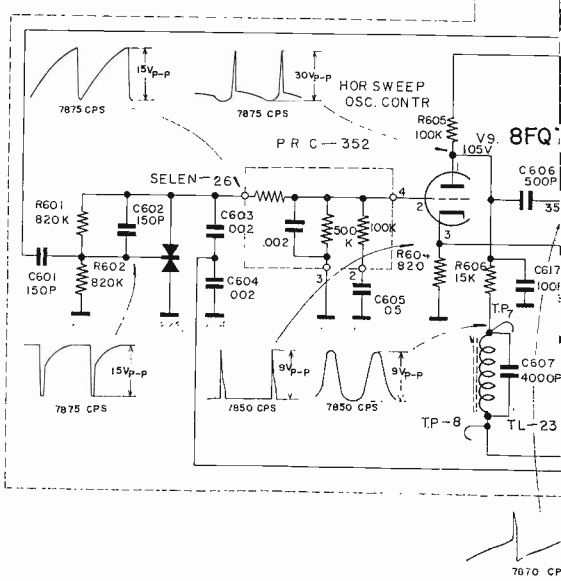




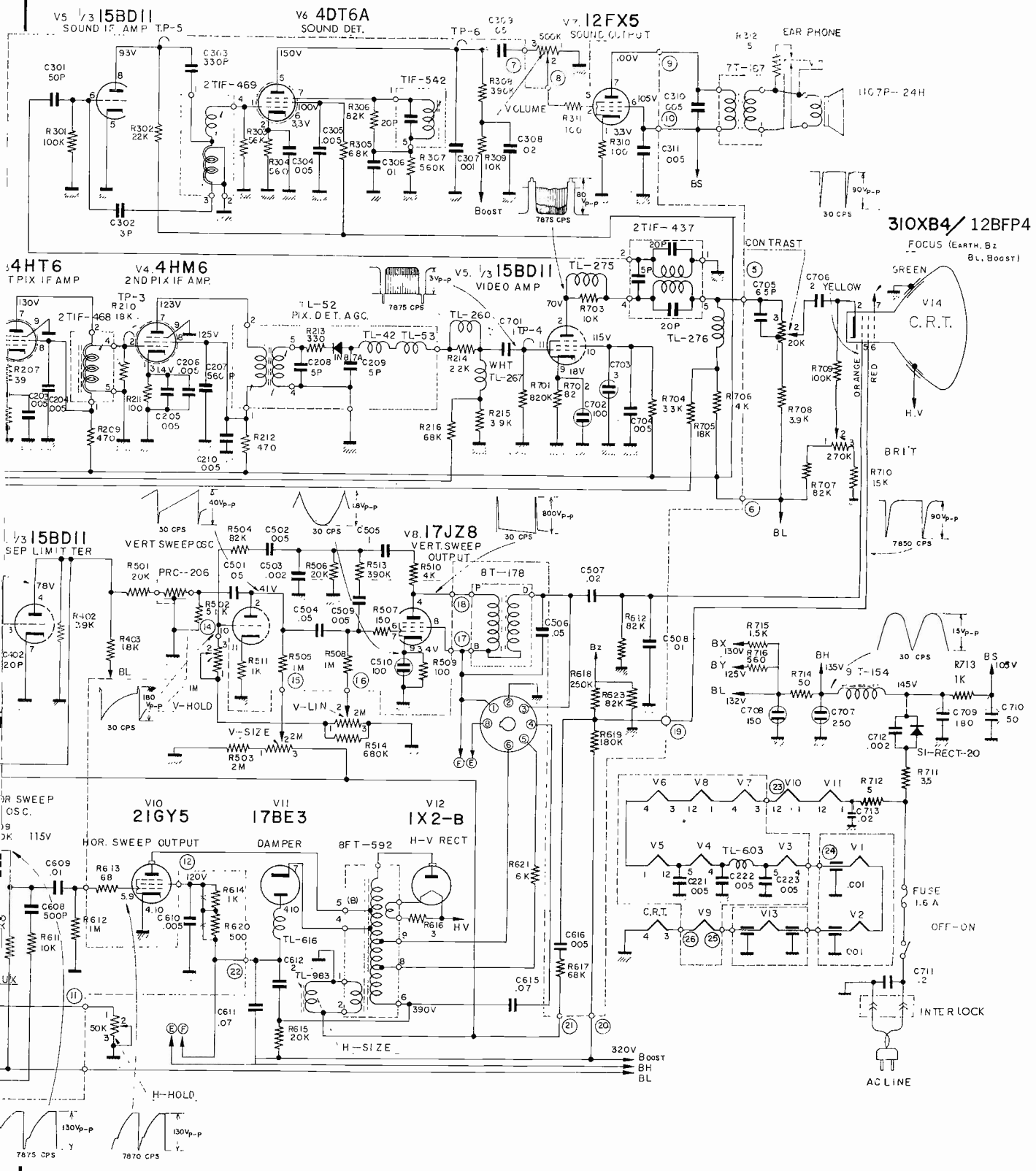






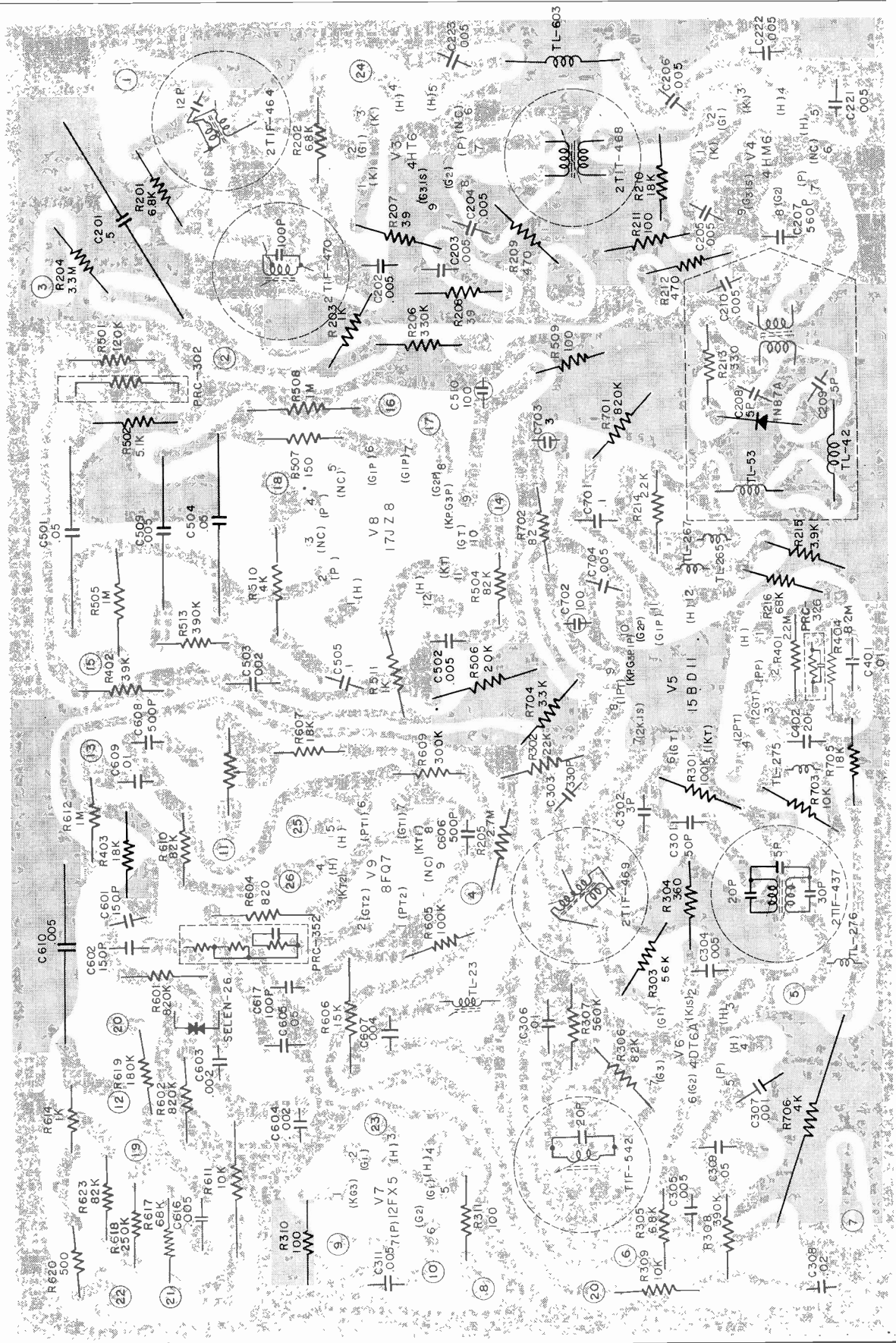


SHARP Model 12TP-8 Schematic Diagram, Continued



SHARP Model 12TP-8, Continued

PRINTED CIRCUIT BOARD



SYLVANIA

Chassis B04-1, -2, Models 23L163, 23L164, 23L165, 23L166, 23L167, 23T106-1

CENTERING ADJUSTMENT

1. Position deflection yoke as far forward as possible on the neck (against the flare) of the picture tube.
2. Rotate centering adjustment rings (located on yoke cover) individually or together, until picture is centered. Turn brightness control to a low level and check that no corner cutting exists in the picture.

HORIZONTAL AFC ADJUSTMENT

Before performing the following procedure, check AGC adjustment as described under controls.

1. Set channel selector to strongest channel in area and adjust fine tuning control to correct tuning point.
2. Adjust vertical height, vertical linearity and width control for normal picture.
3. Adjust L400 Horizontal Stabilizing coil for 10 volt AC with hot lead of probe at horizontal test point (D), ground lead to chassis, keeping picture locked in with R414 Horizontal hold control as adjustment is being made.
4. Short pin 2 of V6 (6JT8) to ground and adjust R414 until the picture becomes as stable as possible.
5. Remove short from V6, rotate channel selector to a position on which no signal is received; then return to the original station. The picture should immediately fall into sync. If not, repeat steps 3, 4 and 5.

HORIZONTAL LINEARITY

Before attempting to adjust Horizontal Linearity coil L406 make certain all other controls are adjusted for normal picture viewing. Using a test pattern, preferably a circle, rotate core of L406 until it is all the way out. Then slowly turn core inward until the right hand side of test pattern (as viewed from the front) is pulled out to its maximum. When maximum is reached, reverse rotation of the core very slightly until both sides of the circle are linear. Final adjustment of the Vertical Height, Vertical Linearity and width controls may become necessary after adjusting L406.

CHASSIS REMOVAL

1. Disconnect AC power cord and antenna connections. Remove interlock cover.
2. Disconnect the following plug and socket connections:
   A. Yoke - at chassis.
   B. Tuner cluster - at chassis.
   C. Halo-Light (on some models) - at chassis.
   D. Picture tube cable - at picture tube.
   E. High voltage lead - at picture tube.
   F. IF input - at chassis.
   G. Speaker leads - at speaker.
3. Remove screw securing braided cable grounding tuner assembly to main chassis.
4. Remove chassis mounting screw.
5. Slide chassis to the left until clear of slots and then to the rear until clear of cabinet. NOTE: Lower front control knobs will automatically disconnect while chassis is being removed.

NOTE: To remove yoke loosen screw on deflection yoke retaining ring. Slide yoke back on neck of picture tube until clear from tube.

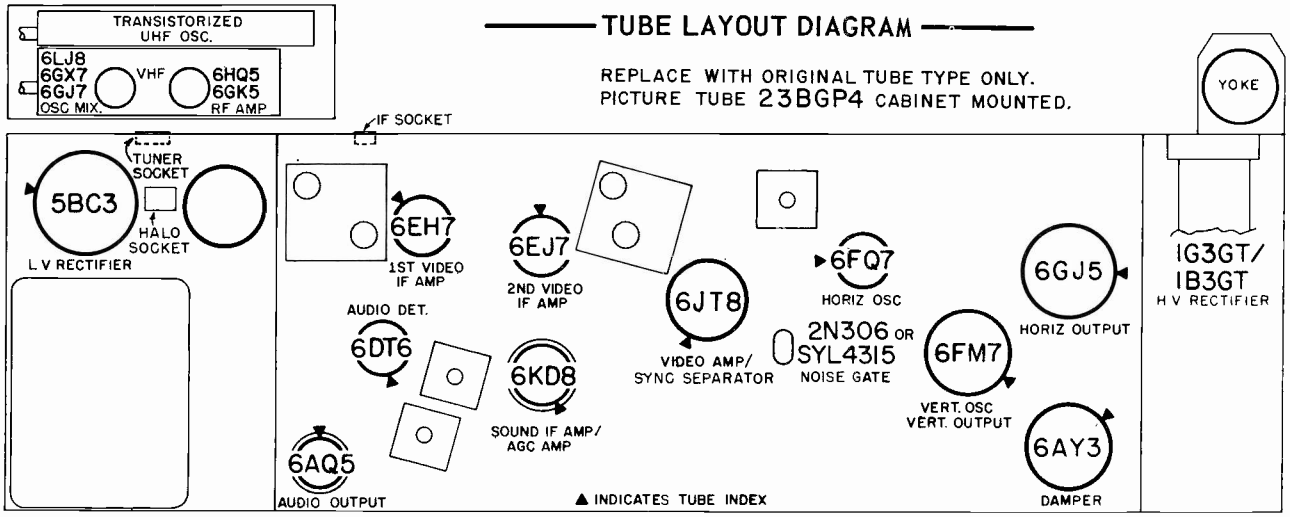
6. Remove tuner cluster knobs by pulling straight outward.
7. Remove screws securing antenna board to cabinet.
8. Remove tuner mounting screws securing tuner cluster to cabinet.
9. Lift tuner cluster upward slightly and then back. Remove tuner cluster.
10. To replace chassis, reverse the above procedure, engaging front controls by pressing ends of shaft assemblies over control shafts. Reconnect all plug and socket connections.

PICTURE TUBE REMOVAL

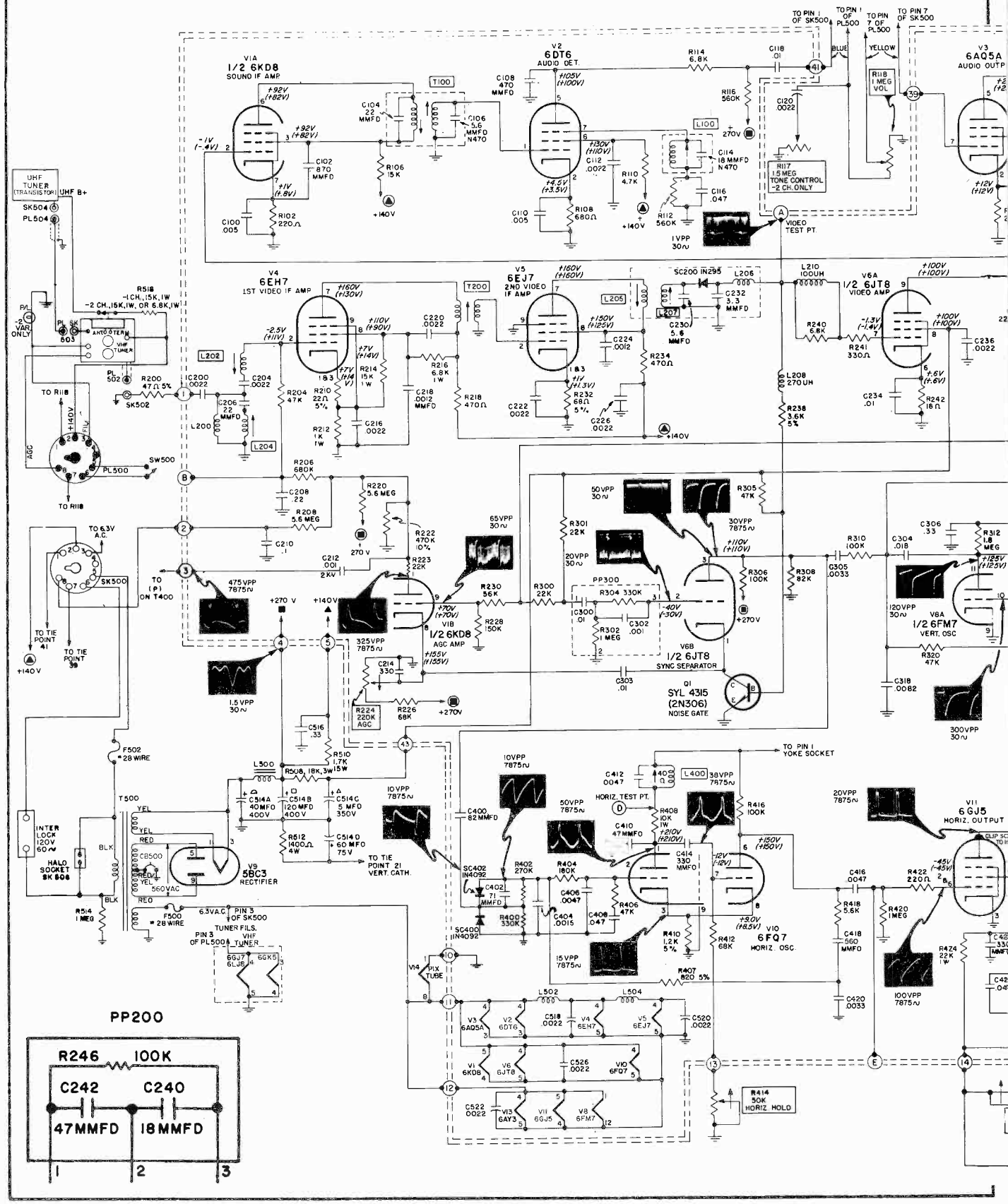
1. Remove chassis and tuner assembly as outlined under "Chassis Removal" procedure.
2. Lay cabinet face down on a soft material so as not to scratch or mar the face of the picture tube or finish on cabinet.
3. Remove the four brackets and screws securing picture tube to cabinet.
4. USING GOGGLES AND GLOVES, reach under face of tube and lift from cabinet, DO NOT GRASP NECK OF PICTURE TUBE AT ANY TIME.
5. To install picture tube, reverse the preceding steps.

TUBE LAYOUT DIAGRAM

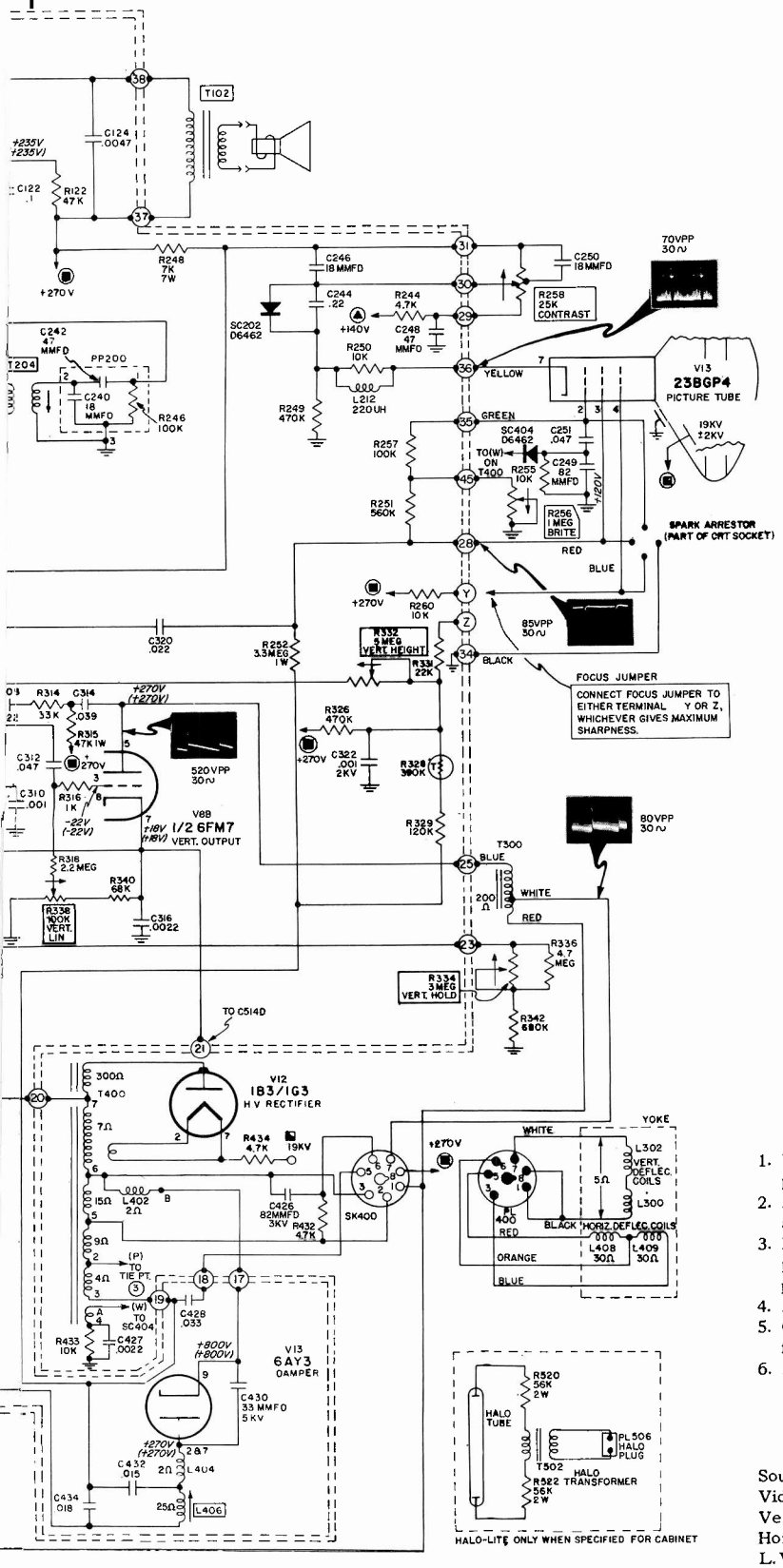
REPLACE WITH ORIGINAL TUBE TYPE ONLY.
PICTURE TUBE 23BGP4 CABINET MOUNTED.



SYLVANIA Chassis B04-1, -2, Schematic Diagram



SYLVANIA Chassis B04-1, -2, Schematic Diagram, Continued



VOLTAGE MEASUREMENT CONDITIONS UNLESS OTHERWISE SPECIFIED.

1. Voltages measured to chassis using VTVM.
2. AC power source 120 volt 60 cycle line.
3. Voltage readings in brackets taken with no input; channel selector set to a free channel, antenna disconnected, antenna terminals shorted together and grounded to chassis.
4. Voltage readings not in brackets taken with a strong signal input; tuner set to a strong local station developing approximately -7 volt on AGC Buss. NOTE: AGC VOLTAGE AT TEST POINT (B) WILL VARY FROM -7 VOLT ON A VERY STRONG SIGNAL TO A +20 VOLT ON A VERY WEAK SIGNAL.
5. Contrast control set to maximum. Brightness control set to minimum.
6. Voltage values shown are average readings. Variations may be observed due to normal production tolerances.

SPECIAL VOLTAGE MEASUREMENT CONDITIONS

(S) Picture tube anode voltage measured with VTVM high voltage probe at line voltage of 120 volts under conditions of normal signal, no brightness and correct scan size.

▲ High peak voltage of short duration may damage meter used for this measurement.

WAVEFORM MEASUREMENT CONDITIONS

1. Channel selector set to strong channel.
2. Contrast control set for signal of 70 volt peak to peak at yellow lead of picture tube.
3. Waveforms measured with respect to chassis using a wide band oscilloscope. (Other type oscilloscopes may alter waveform shapes or amplitudes.)
4. The terms 30∿ or 7875∿ refer to scope frequency used.

GENERAL SCHEMATIC NOTES

1. Voltage sources are indicated by encircled symbols, corresponding symbols without circles indicate voltage tie points.
2. Average resistances of coils and transformers are shown and are measured with component connected in circuit.
3. Encircled numbers on edge of printed circuit indicate tie points, corresponding with those shown on parts layout of printed board.
4. All capacitors are in microfarads unless otherwise specified.
5. Coils, transformers, plugs and sockets are shown as viewed from the bottom.
6. Arrows on controls indicate direction of clockwise rotation.

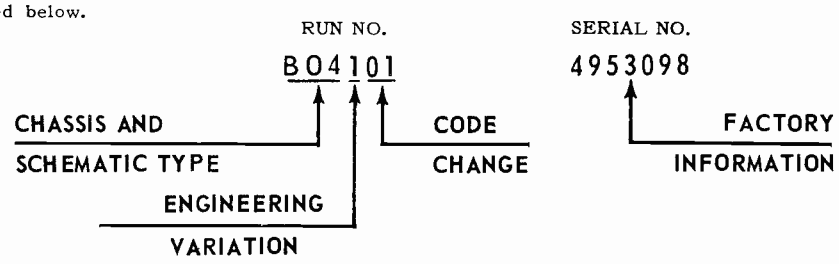
PARTS CODING

Sound Section	100-199
Video Section	200-299
Vert. and Sync Section	300-399
Horiz. and H.V. Section	400-499
L.V. Supply, Fil., Misc.	500-599

SYLVANIA Chassis B04-1, -2, Service Information, Continued

CHASSIS IDENTIFICATION

Chassis Identification consists of two blocks of numbers. In all correspondence relating to a specific model, both blocks of numbers, plus the model number should be given. To associate a chassis with its proper schematic refer to the number breakdown described below.



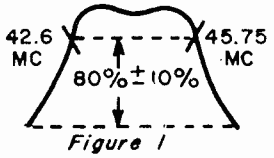
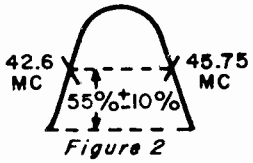
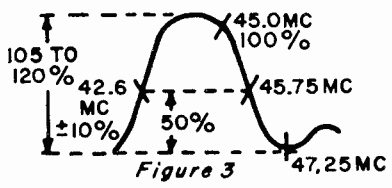
ALIGNMENT PROCEDURE

VIDEO IF, SOUND IF AND 4.5 MC TRAP ALIGNMENT PROCEDURES

PRELIMINARY INSTRUCTIONS

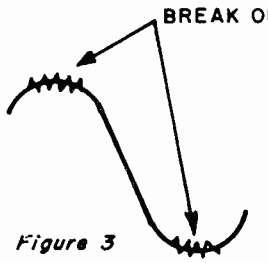
1. Line voltage should be maintained at 120 volts.
2. Keep marker generator coupling at a minimum to avoid distortion of the response curve.
3. Do not use tubular capacitors for coupling sweep into receiver. Disc ceramics are best.
4. For best results, solder the sweep generator ground to chassis, do not use clips.
5. Sweep generator "hot" lead must make good electrical contact at all points given under TEST EQUIPMENT HOOK-UP.
6. Adjust sweep generator output for maximum peak-to-peak response curve on the scope.
7. Receiver and test equipment should warm up for approximately 15 minutes before alignment.

—VIDEO IF ALIGNMENT—

STEP	ALIGNMENT SET - UP NOTES	TEST EQUIPMENT HOOK - UP	ADJUST
1	Set VHF tuner to a free channel that does not disturb the response curve. Short point (B) to ground and connect a -10V DC source to tie point (2) Connect - 30 volt DC source (-) terminal to pin 2 of V11 (+) terminal to chassis.	SWEEP GENERATOR - Through a .002 MFD capacitor to pin 2 of V5. Set generator to 43.5 MC with 10 MC sweep. SIGNAL GENERATOR - Loosely coupled as a marker to sweep generator lead. OSCILLOSCOPE - Through a 10K resistor connected to test point (A)	L205 and L207 so that the 42.6 MC marker and the 45.75 MC marker are of equal amplitude. See Figure 1.  *Figure 1* L205 Positions marker amplitude. L207 Adjusts for tilt.
2	Same as Step 1.  *Figure 2*	SWEEP GENERATOR - Through a .002 MFD capacitor to IF test point on tuner. Set generator to 43.5 MC with 10 MC sweep. SIGNAL GENERATOR - Same as Step 1. OSCILLOSCOPE - Same as Step 1.	T200 so that both the 42.6 MC and 45.75 MC markers are of equal amplitude and at 55% of response curve. See Figure 2.
3	Same as Step 1.  *Figure 3*	SWEEP GENERATOR - Same as Step 2. SIGNAL GENERATOR - Same as Step 1. OSCILLOSCOPE - Same as Step 1.	L204 for maximum dip at 47.25 MC TUNER MIXER COIL - To position 45.75 MC marker at 50% of response curve while 45 MC marker is maintained at 100%. L202 To obtain response as shown in Figure 3. Top of response curve should be smooth and rounded and should rise from 105% to 120%.

SYLVANIA Chassis B04-1, -2, Alignment Information, Continued

—4.5 MC TRAP AND SOUND IF ALIGNMENT—

STEP	ALIGNMENT SET - UP NOTES	TEST EQUIPMENT HOOK - UP	ADJUST
1	Set contrast control to maximum. Connect - 30 volts DC source (-) terminal to test point (B) and pin 2 of V11 (+) terminal to chassis.	SIGNAL GENERATOR - Through a 0047 MFD capacitor to test point (A) Set signal generator to 4.5 MC, preferably crystal calibrated or controlled, with at least 100 millivolts output. VTVM - Through detector network shown in Figure 1, to cathode of picture tube - tie point (36)	Separate cores of [T204] then Adjust top core of [T204] for minimum reading on meter.
2	Same as Step 1.	SIGNAL GENERATOR - Same as Step 1. VTVM - Through detector network shown in Figure 2. to pin 7 of 6DT6	[T100] Bottom core [T100] Top core [T204] Bottom core For maximum meter reading using weakest possible signal.
3	Same as Step 1.  *Figure 3*	SIGNAL GENERATOR - Same as Step 1. OSCILLOSCOPE - Through .0047 MFD capacitor to tie point (41)	With core of [L100] at the top of coil form, rotate core inward (clockwise). (NOTE: Coil has two (2) peaks of resonance). Tune through the first peak and adjust the core for maximum amplitude on the second peak. Decrease signal strength until break out occurs, then readjust top core of [T100] until break out occurs simultaneously on both peaks. See Figure 3.
4	Remove all test equipment leads etc. Connect antenna and check receiver on a strong local station.		

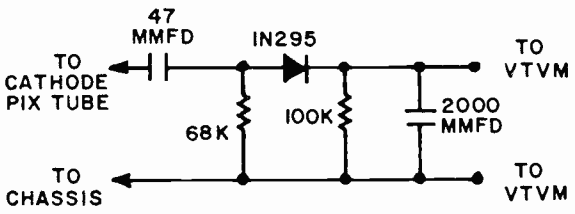


Figure 1

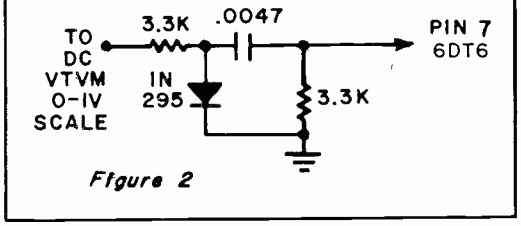


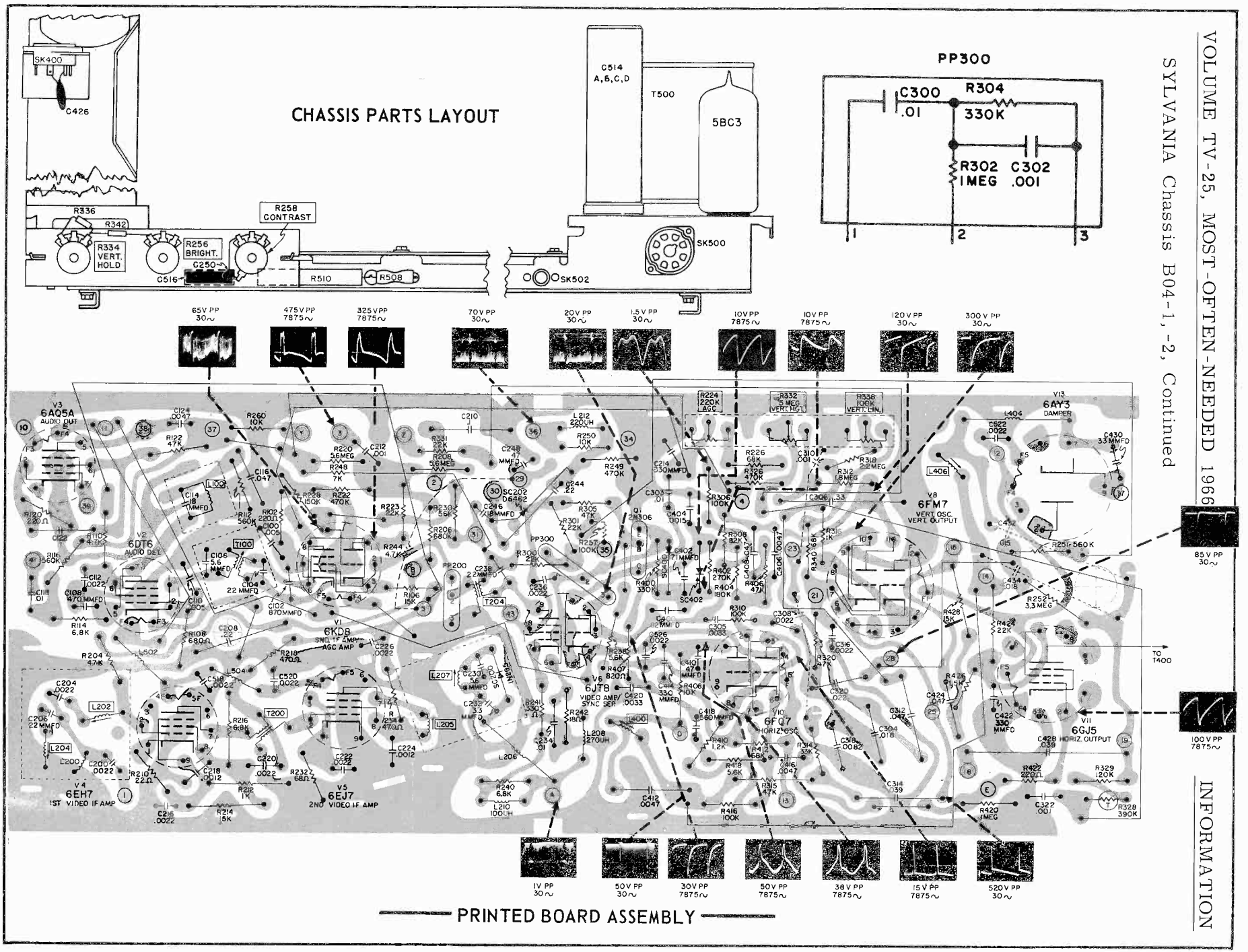
Figure 2

ALTERNATE SOUND ALIGNMENT USING TRANSMITTED SIGNAL

Tune in strongest available channel and adjust for best picture. Turn AGC control clockwise until picture begins to distort and adjust [L100] for best sound and minimum buzz. Use tuning point where core is closest to chassis board.

Turn AGC counterclockwise until sound gets weak and noisy. Adjust [T100] top and bottom core and [T204] bottom core for loudest and clearest sound and minimum hiss.

SYLVANIA Chassis B04-1, -2, Continued



SYLVANIA

CHASSIS B05-1, -2, -3, MODELS 19P38-1, 19P39-1, 19P41-1, 19P42

(Service data on pages 153-156. For alignment see material on pages 150-151)

CHASSIS REMOVAL

1. Disconnect AC power cord and antenna connections.
2. Remove screws securing backcover to cabinet. Remove backcover.
3. Remove the two (2) screws securing chassis to cabinet.
4. Remove the one (1) screw securing wire braid to chassis.
5. Slide chassis to the rear until clear of cabinet. Lead lengths permit removal of chassis from cabinet with components connected in circuit. If complete disassembly becomes necessary disconnect the following plug and socket connections:
   A. Picture tube socket - at picture tube.
   B. High voltage lead - at picture tube.
   C. Yoke - at chassis.
   D. IF input - at chassis.
   E. Tuner cluster - at chassis.
   F. Speaker leads - at speaker.
6. Remove chassis.

TUNER CLUSTER REMOVAL

1. Disconnect AC power cord and antenna connections. Remove backcover.
2. Remove VHF, UHF channel selector, VHF fine tune and Volume/On/Off knobs by pulling straight out.
3. Remove screws securing tuners to cabinet.
4. Remove tuners.

ADJUSTMENTS

FOCUS

With contrast and brightness at normal settings connect focus jumper to either tie point Y or Z whichever gives maximum sharpness and clarity of fine detail in center and edges of picture.

CENTERING ADJUSTMENT

1. Position deflection yoke as far forward as possible on the neck (against the flare) of the picture tube.
2. Rotate centering adjustment rings (located on yoke cover) individually or together, until picture is centered. Turn brightness control to a low level and check that no corner cutting exists in the picture.

HORIZONTAL AFC ADJUSTMENT

Before performing the following procedure, check AGC adjustment as described under controls.

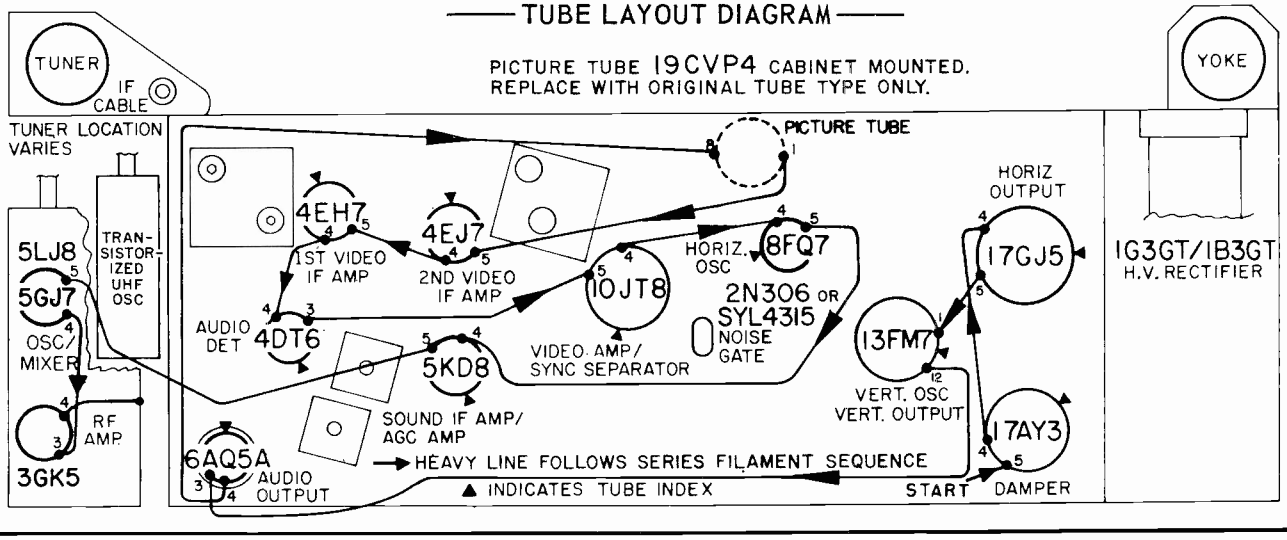
1. Set channel selector to strongest channel in area and adjust fine tuning control to correct tuning point.
2. Adjust vertical height, vertical linearity and width control for normal picture.
3. Adjust [L400] Horizontal Stabilizing coil for 10 volt AC with hot lead of probe at horizontal test point Ⓓ, ground lead to chassis, keeping picture locked in with [R414]. Horizontal hold control as adjustment is being made.
4. Short pin 2 of V6 (10JT8) to ground and adjust [R414] until the picture becomes as stable as possible.
5. Remove short from V6, rotate channel selector to a position on which no signal is received; then return to the original station. The picture should immediately fall into sync. If not, repeat steps 3, 4 and 5.

HORIZONTAL LINEARITY

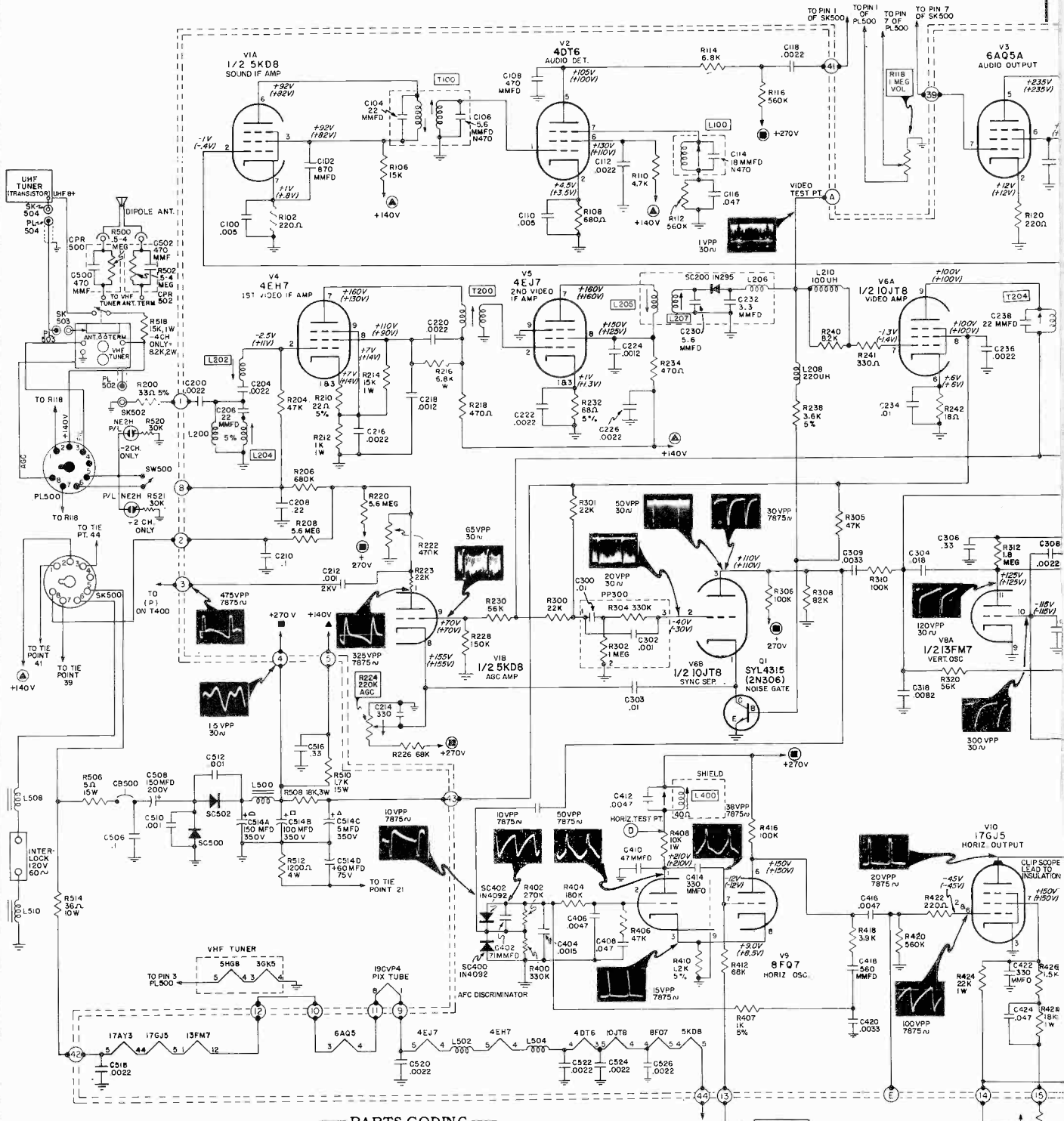
Before attempting to adjust Horizontal Linearity coil [L406], make certain all other controls are adjusted for normal picture viewing. Using a test pattern, preferably a circle, rotate core of [L406] until it is all the way out. Then slowly turn core inward until the right hand side of test pattern (as viewed from the front) is pulled out to its maximum. When maximum is reached, reverse rotation of the core very slightly until both sides of the circle are linear. Final adjustment of the Vertical Height, Vertical Linearity and width controls may become necessary after adjusting [L406].

TUBE LAYOUT DIAGRAM

PICTURE TUBE 19CVP4 CABINET MOUNTED.
REPLACE WITH ORIGINAL TUBE TYPE ONLY.



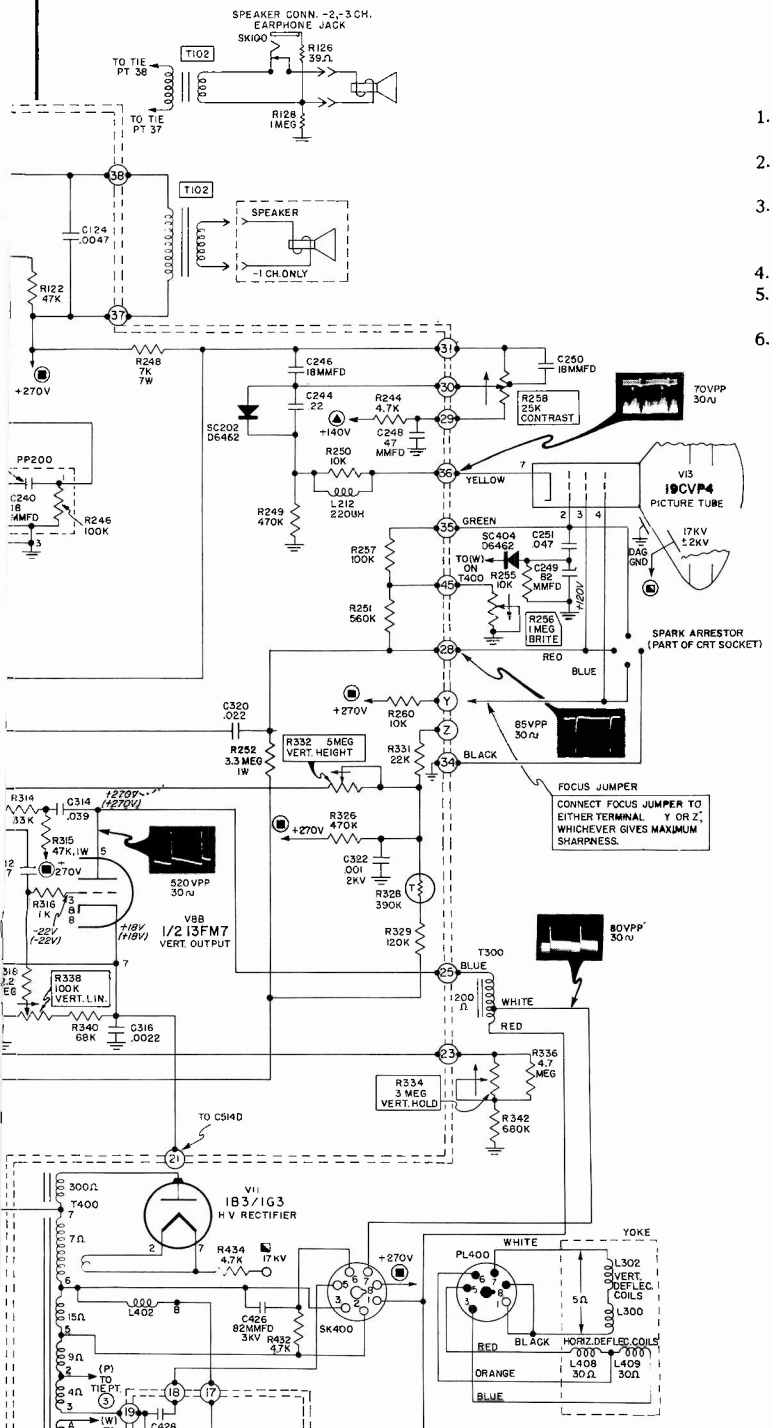
SYLVANIA Chassis B05-1, -2, -3, Schematic Diagram



PARTS CODING

Sound Section	100-199
Video Section	200-299
Vert. and Sync Section	300-399
Horiz. and H.V. Section	400-499
L.V. Supply, Fil., Misc.	500-599

SYLVANIA Chassis B05-1, -2, -3, Schematic Diagram, Continued



GENERAL SCHEMATIC NOTES

1. Voltage sources are indicated by encircled symbols, corresponding symbols without circles indicate voltage tie points.
2. Average resistances of coils and transformers are shown and are measured with component connected in circuit.
3. Encircled numbers on edge of printed circuit indicate tie points, corresponding with those shown on parts layout of printed board.
4. All capacitors are in microfarads unless otherwise specified.
5. Coils, transformers, plugs and sockets are shown as viewed from the bottom.
6. Arrows on controls indicate direction of clockwise rotation.

— IMPORTANT —

READ THESE INSTRUCTIONS CAREFULLY AND OBSERVE THE CONDITIONS NOTED WHEN TAKING VOLTAGE READINGS OR OBSERVING WAVEFORMS.

PICTURE TUBE HIGH VOLTAGE ANODE MAY HAVE A POTENTIAL OF 18,000 VOLTS.
OBSERVE ALL HIGH VOLTAGE PRECAUTIONS WHEN SERVICING THE CHASSIS. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COVER REMOVED. USE SAFETY GOGGLES AND GLOVES WHEN HANDLING THE PICTURE TUBE.

VOLTAGE MEASUREMENT CONDITIONS UNLESS OTHERWISE SPECIFIED.

1. Voltages measured to chassis using VTVM.
2. AC power source 120 volt 60 cycle line.
3. Voltage readings in brackets taken with no input; channel selector set to a free channel, antenna disconnected, antenna terminals shorted together and grounded to chassis.
4. Voltage readings not in brackets taken with a strong signal input; tuner set to a strong local station developing approximately -7 volt on AGC Buss. NOTE: AGC VOLTAGE AT TEST POINT (B) WILL VARY FROM -7 VOLT ON A VERY STRONG SIGNAL TO A +20 VOLT ON A VERY WEAK SIGNAL.
5. Contrast control set to maximum. Brightness control set to minimum.
6. Voltage values shown are average readings. Variations may be observed due to normal production tolerances.

WAVEFORM MEASUREMENT CONDITIONS

1. Channel selector set to strong channel.
2. Contrast control set for signal of 70 volt peak to peak at yellow lead of picture tube.
3. Waveforms measured with respect to chassis using a wide band oscilloscope. (Other type oscilloscopes may alter waveform shapes or amplitudes.)
4. The terms 30Ω or 7875Ω refer to scope frequency used.

SPECIAL VOLTAGE MEASUREMENT CONDITIONS

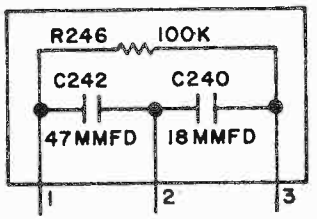
(B) Picture tube anode voltage measured with VTVM high voltage probe at line voltage of 120 volts under conditions of normal signal, no brightness and correct scan size.

▲ High peak voltage of short duration may damage meter used for this measurement.

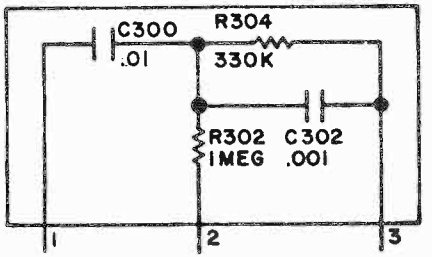
HORIZONTAL LINEARITY

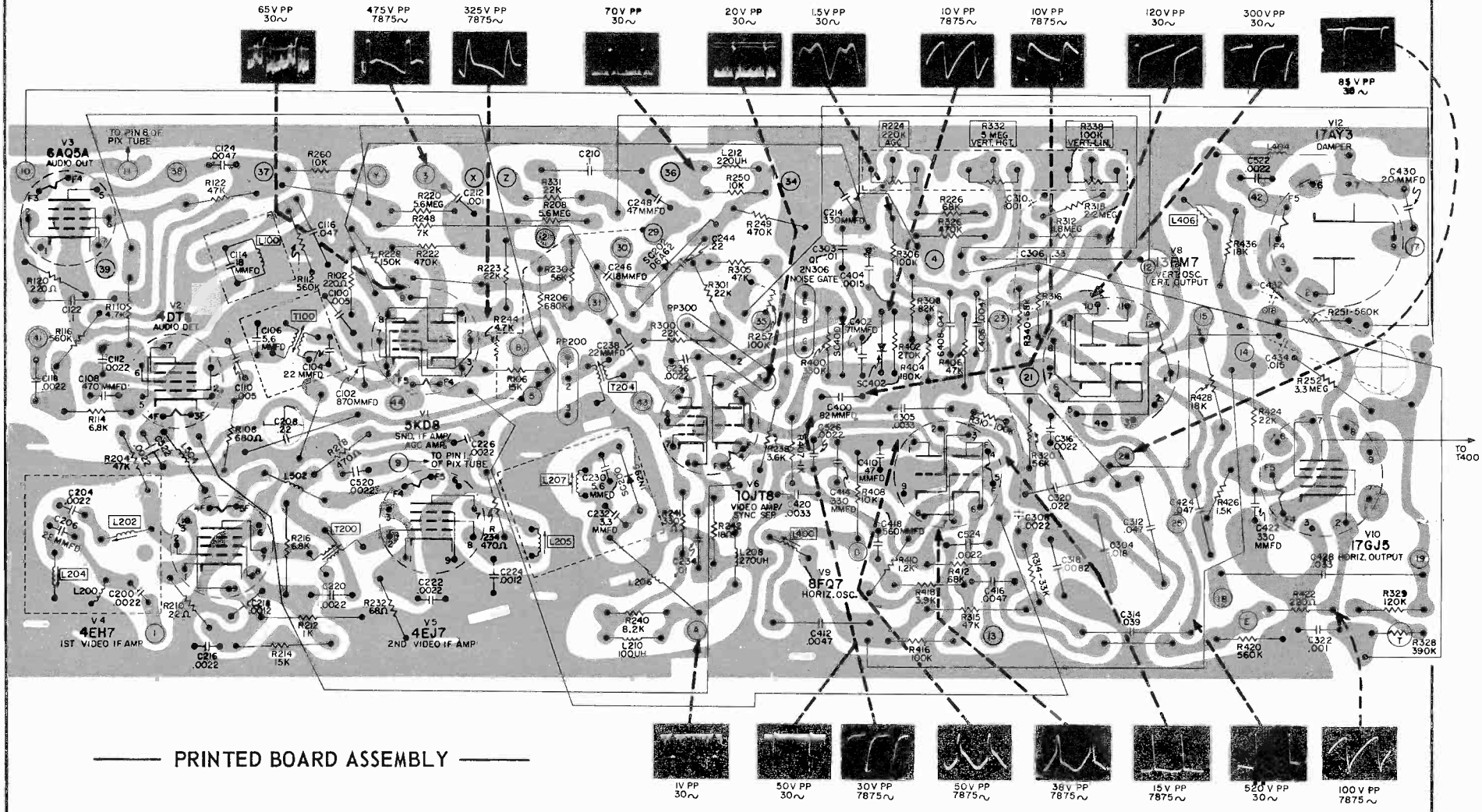
Before attempting to adjust Horizontal Linearity coil [L406], make certain all other controls are adjusted for normal picture viewing. Using a test pattern, preferably a circle, rotate core of [L406] until it is all the way out. Then slowly turn core inward until the right hand side of test pattern (as viewed from the front) is pulled out to its maximum. When maximum is reached, reverse rotation of the core very slightly until both sides of the circle are linear. Final adjustment of the Vertical Height, Vertical Linearity and width controls may become necessary after adjusting [L406].

PP200



PP300





PRINTED BOARD ASSEMBLY

Westinghouse

MODEL AND CHASSIS CHART

MODEL	CHASSIS	TUNERS	FEATURES	CRT
H-P3051 H-P3052	V-2484-1	VHF 470V159H01 UHF 472V046H02		19FEP4 114°
H-P3061 H-P3062	V-2484-2	VHF 470V160H01 UHF 472V049H01	Instant On	19FEP4 114°
H-P3056 H-P3057	V-2484-4	VHF 470V163D02 UHF 472V053D01		19FEP4 114°
H-T3620	V-2484-11	VHF 470V162D02 UHF 472V053D01		23EZP4 94°
H-K3628 H-K3629 H-K3790 H-K3793 H-K3940 H-K3941	V-2482-12	VHF 470V162D02 UHF 472V053D01	Instant On	23EZP4 94°

CHASSIS REMOVAL – 19" PORTABLES

The speaker and CRT remain in the cabinet.

1. Remove the control knobs.
2. Remove the back cover. The horizontal hold knob remains on the back cover. The antenna terminal board stays with the chassis.
3. Unsolder the speaker leads at the output transformer.
4. Remove the CRT socket, loosen the yoke and remove the width insert. The yoke is removed with the chassis.
5. Discharge and disconnect the anode lead at the CRT.
6. Remove the screws holding the chassis and upper and lower control panel to the cabinet.
7. Remove the chassis.
8. When replacing the back cover be sure the horizontal hold extension shaft engages the knob in the back cover.

CHASSIS REMOVAL – 19" TRENDSETTER

The speaker and CRT remain in the cabinet.

1. Remove the control knobs. The VHF dial remains with the chassis on some models.
2. Remove the back cover. The horizontal hold knob remains with the back cover.
3. Remove the screws holding the antenna terminal board to the cabinet.
4. Unsolder the speaker leads at the transformer.
5. Remove the CRT socket, loosen the yoke and remove the width insert. The yoke is removed with the chassis.
6. Discharge and disconnect the anode lead at the CRT.
7. Remove the screws holding the chassis and upper and lower control panel to the cabinet.
8. Remove the chassis. Note that the center chassis screw at the bottom connects the isolation capristor between the chassis and cabinet.
9. When replacing the back cover be sure the horizontal hold extension shaft engages the knob in the back cover.

CHASSIS REMOVAL – 23" TABLE AND CONSOLES

The speaker and CRT remain in the cabinet.

1. Remove the fully exposed front knobs. The VHF dial remains with the chassis on some models.
2. Remove the back cover. The horizontal hold knob remains with the back cover.
3. Remove the screws holding the antenna terminal board to the cabinet.
4. Unhook the dag spring at the chassis end.
5. Unsolder the speaker leads at the transformer.
6. Remove the CRT socket, loosen the yoke and remove the width insert. The yoke is removed with the chassis.
7. Discharge and disconnect the anode lead at the CRT.
8. Remove the tuner and control panel assembly by removing the screws holding it to the cabinet mounting brackets.
9. Remove the screws holding the chassis to the cabinet.
10. Remove the chassis.
11. When replacing the back cover be sure the horizontal hold extension shaft engages the knob in the back cover.

HORIZONTAL RANGE AND HOLD ADJUSTMENT

1. Short out Horizontal Hold coil L401 with a jumper connected across 'G' – 'H'.
2. With the meter zero set at center scale, connect a VTVM (1.5V range) across 'F' and B–.
3. Tune the receiver to a station of normal signal strength and adjust Horizontal Range control R413 to lock the picture into sync. Then adjust R413 for –0.25 volts on the VTVM.
4. Remove the jumper across 'G' & 'H', and adjust Horizontal Hold control L401 to lock the picture into sync.
5. Adjust L401 for –0.25 volts on the VTVM, and disconnect the VTVM.
6. Verify the horizontal sync adjustment by switching channels.

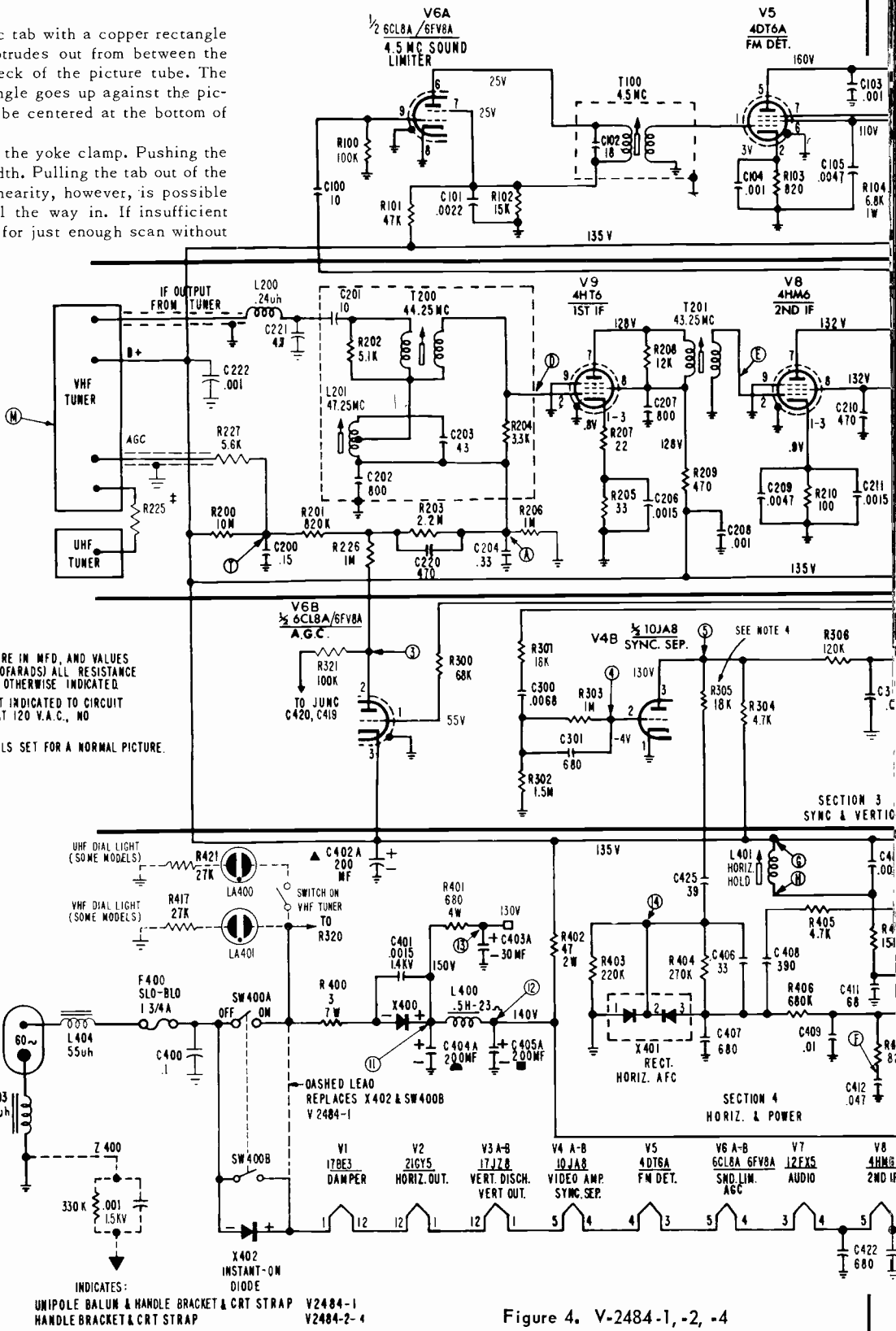
(Service material continued on pages 158 through 164)

WESTINGHOUSE Chassis V-2484+ Service Information, Continued

WIDTH ADJUSTMENT

This adjustment is a plastic tab with a copper rectangle bonded on to one side. It protrudes out from between the yoke and the bottom of the neck of the picture tube. The shiny side of the copper rectangle goes up against the picture tube. The rectangle must be centered at the bottom of the CRT neck.

To adjust the width, loosen the yoke clamp. Pushing the tab into the yoke decreases width. Pulling the tab out of the yoke increases width. Best linearity, however, is possible with the width tab pushed all the way in. If insufficient width occurs, pull out the tab for just enough scan without causing poor linearity.



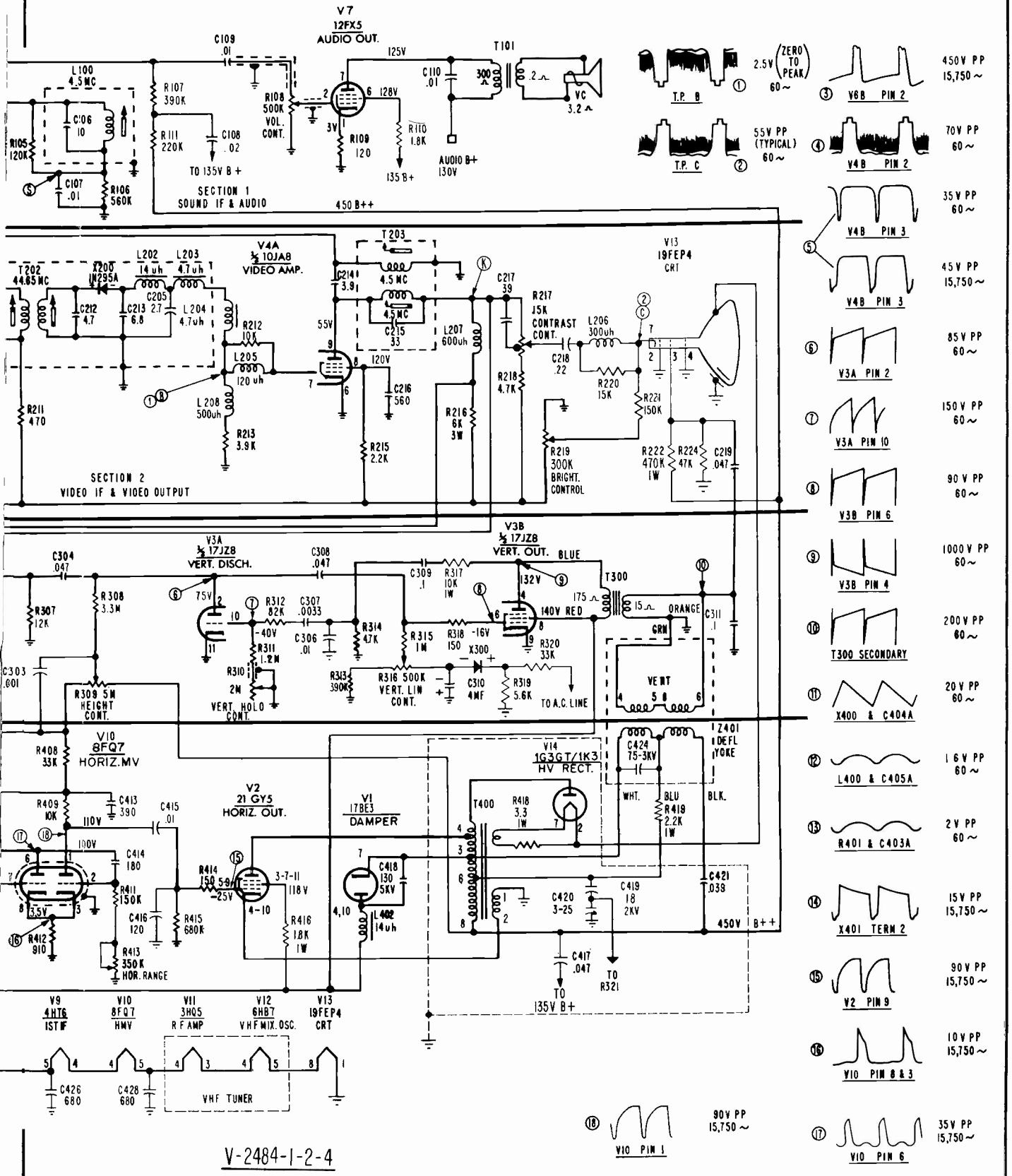
NOTES:

1. ALL CAPACITOR VALUES LESS THAN 1 ARE IN MFD, AND VALUES GREATER THAN 1 ARE IN PF (MICROMICROFARADS) ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE INDICATED.
2. DC VOLTAGES ARE MEASURED FROM POINT INDICATED TO CIRCUIT GROUND WITH A VTVM. LINE VOLTAGE AT 120 V.A.C., NO SIGNAL APPLIED.
3. WAVEFORMS WERE TAKEN WITH CONTROLS SET FOR A NORMAL PICTURE.
4. NOT IN ALL PRODUCTION

‡ 5. FOR UHF TUNER-R225
472V046H02-8.2K-2W
472V049H01-8.2K-2W

Figure 4. V-2484-1, -2, -4

WESTINGHOUSE Chassis V-2484-1, -2, -4, Schematic Diagram, Continued



V-2484-1-2-4

WESTINGHOUSE Chassis V-2484+ Service Information, Continued

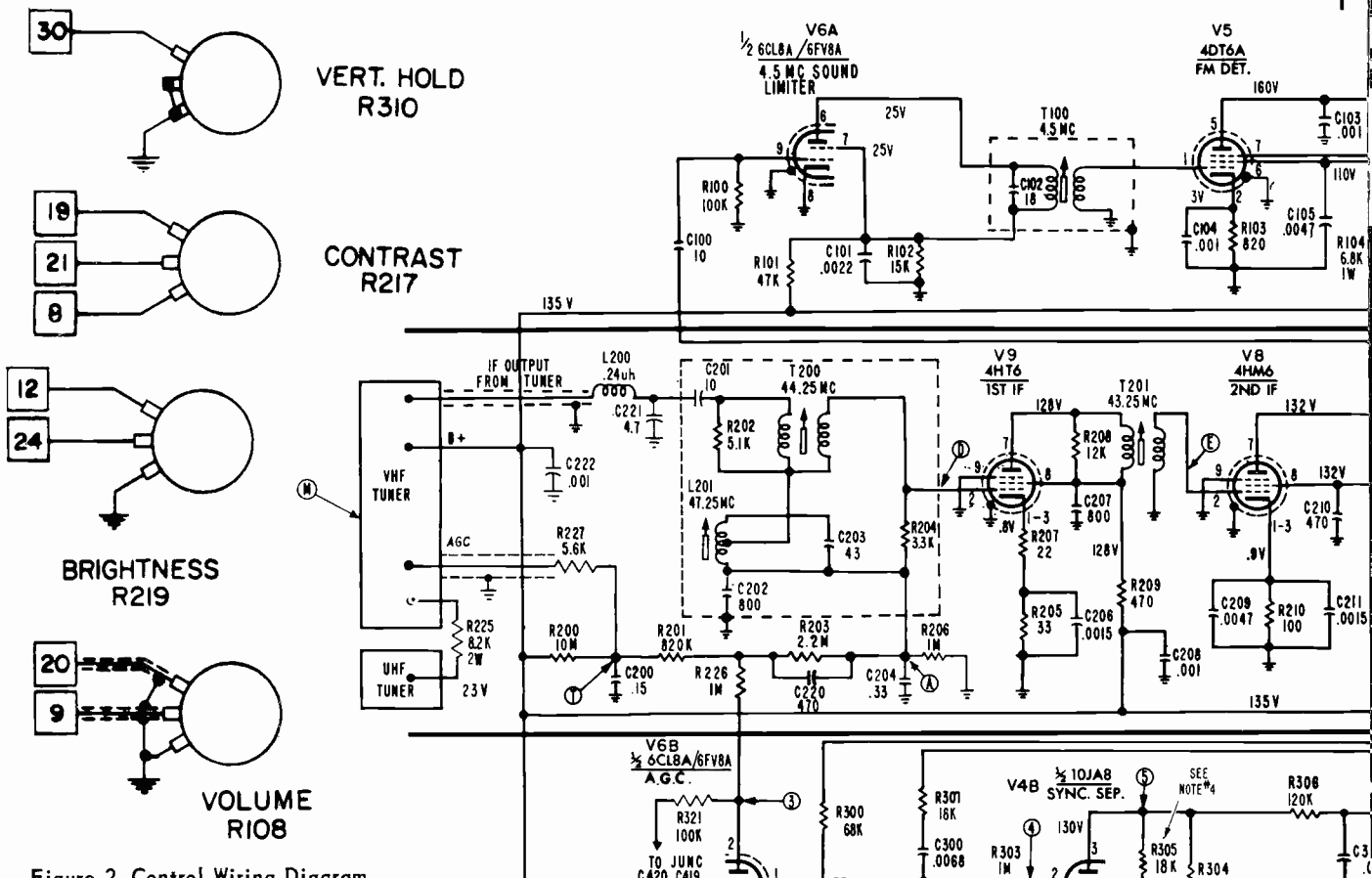


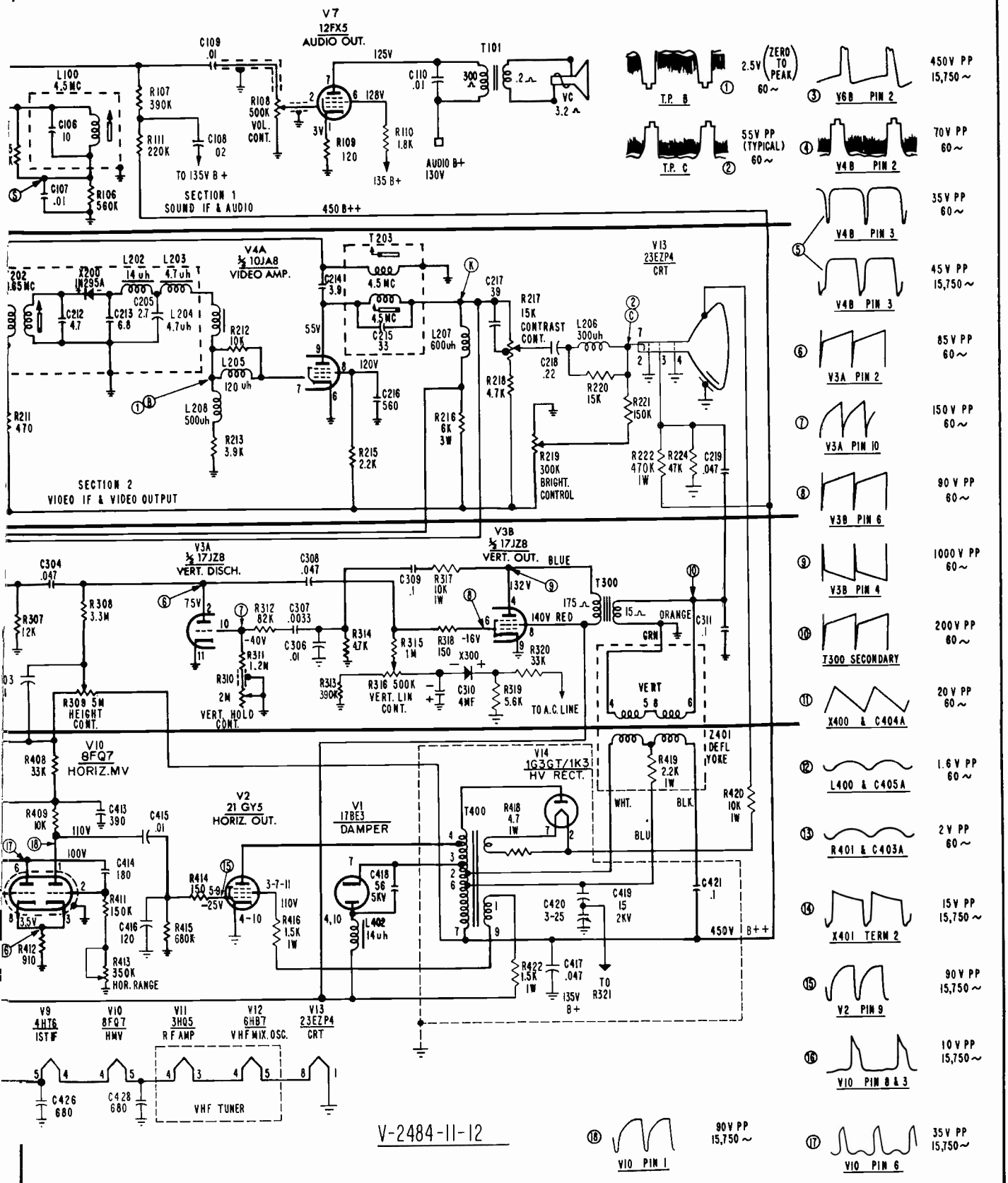
Figure 2. Control Wiring Diagram

NOTES:

1. ALL CAPACITOR VALUES LESS THAN 1 ARE IN MFD, AND VALUES GREATER THAN 1 ARE IN PF.(MICROMICROFARADS) ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE INDICATED.
2. DC VOLTAGES ARE MEASURED FROM POINT INDICATED TO CIRCUIT GROUND WITH A VTVM. LINE VOLTAGE AT 120 V.A.C., NO SIGNAL APPLIED.
3. WAVEFORMS WERE TAKEN WITH CONTROLS SET FOR A NORMAL PICTURE.
4. NOT IN ALL PRODUCTION

Figure 5. V-2484-11,-12

WESTINGHOUSE Chassis V-2484-11, -12, Schematic Diagram, Continued



WESTINGHOUSE Chassis V-2484+ Alignment Information, Continued

SOUND ALIGNMENT

EQUIPMENT: VTVM

PROCEDURE:

1. Select the strongest station available (preferably with test pattern and test tone) and adjust the FINE TUNING for best reception. Adjust the VOLUME control so that the station sound is audible.
2. Adjust the quad coil (L100) for maximum sound from the speaker.
3. Disconnect the antenna. Use a jumper wire to short TP Ⓑ to B–.
4. Connect the VTVM to TP Ⓢ.
5. Adjust interstage transformer T100 for maximum negative voltage on the VTVM.
6. Remove the jumper wire used to Short TP Ⓑ to B–.
7. Place the antenna input close to the antenna terminals so that the signal is loosely coupled to the receiver and the picture is barely visible. A pronounced noisiness (hiss) should accompany the sound.
8. Adjust the limiter input coil (T203 top slug) for maximum negative voltage on the VTVM. If the VTVM indicates a broad response while making this adjustment, the receiver input signal is too strong. When the signal coupling described in step 7 is at the necessary low point, no limiting takes place and the VTVM will indicate a sharp response to the limiter input coil adjustment.

4.5 MC TRAP ALIGNMENT

Disconnect the antenna and turn contrast control to maximum clockwise. Inject a 4.5 MC CW signal through a .001mf capacitor to TP Ⓑ. Connect a .001mf capacitor to a demodulation probe tip. Connect the other end of the probe to a VTVM and the capacitor to TP Ⓒ. Set the VTVM to 1.5-2V DC range. Turn the set on and allow ten minutes for warmup. Then adjust T203 bottom slug for minimum on the VTVM.

IF ALIGNMENT

EQUIPMENT

1. ***Sweep Generator*** with a 10 MC wide sweep at center frequencies from 10 MC to 90 MC and 170 MC to 216 MC.
2. ***CW (Marker) Generator*** which accurately produces the IF and RF frequencies from 4.5 MC to 216 MC.
3. ***Oscilloscope*** with good low frequency response characteristics.
4. ***VTVM.***
5. ***Bias Supply*** of –2.0 volts and –3 volts.
6. ***Standard Alignment Tool*** with a 3/32" hexagonal tip (long enough to reach bottom slugs).

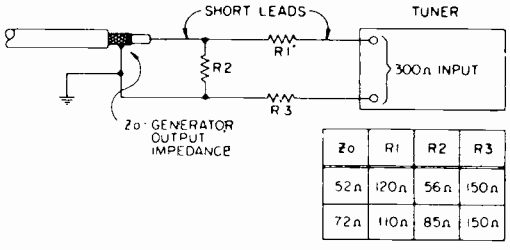
TERMINATION AND ADJUSTMENT OF EQUIPMENT

These instructions on termination and adjustment of equipment will apply throughout the IF Alignment procedure. All test equipment cables and leads should be as short and direct as possible.

Oscilloscope and VTVM – Use a low-capacitance direct probe terminated with the decoupling network shown in Figure 8. Keep the oscilloscope calibrated for 2 volts peak to peak (P-P). Use a VTVM range suitable for measuring –1.5 volts.

Generators – Except where otherwise noted, all signal generating equipment should be terminated as shown in Figure 7. Connect the signal cable ground near the ground of the stage where the signal is injected.

Adjust the CW generator output so that: (1) When the VTVM is being used its reading remains near the –1 volt point. (2) When the oscilloscope is being used, the marker frequencies do not distort the response curve.



Zo	R1	R2	R3
52Ω	120Ω	56Ω	150Ω
72Ω	110Ω	85Ω	150Ω

Figure 6 – Impedance Matching Network.

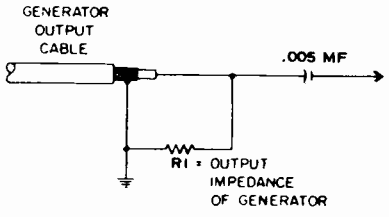


Figure 7 – Generator Cable Termination.

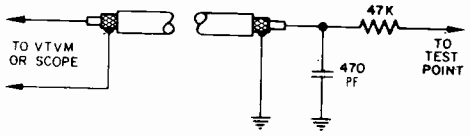


Figure 8 – VHF Decoupling Network

WESTINGHOUSE Chassis V-2484+ Alignment Information, Continued

IF ALIGNMENT

Step	*Test Equipment and Connection*	*Adjustment*
1.	−3V bias to TP Ⓐ and −2.0V bias to TP Ⓣ. Short antenna terminals. Channel selector to channel 10. Connect jumper from Pin 2 of V6B to B− to disable the AGC pulse.	
2.	Oscilloscope and VTVM to TP Ⓑ. IF sweep generator with CW marker to TP Ⓔ. a. 44.65 MC. b. 45.75 MC.	a. T202 primary (top slug): Maximum amplitude on VTVM. T202 secondary (bottom slug): Rocking symmetrical response at 44.65 MC. b. Place 45.75 MC marker at 70% of peak response (see Figure 9) for waveshape and marker placement.
3.	CW generator to TP Ⓓ. a. 43.25 MC.	a. T201: Maximum amplitude on VTVM.
4.	CW generator to TP Ⓜ. a. 44.25 MC. b. 44.25 MC. c. 47.25 MC. It may be necessary to increase generator output and/or decrease bias.	a. Tuner mixer output coil: Maximum on VTVM. b. T200: Maximum on VTVM. c. L201: Minimum on VTVM.
5.	Connect sweep generator to TP Ⓜ at 44.25 MC. Couple CW generator with marker at 44.25 MC to sweep generator cable. Keep marker amplitude low to avoid distorting response. Adjust scope for 2V PP.	Mixer output coil for maximum amplitude. T200 for "rocking symmetrical response with waveshape and markers" as shown in Figure 11.
6.	CW generator to TP Ⓜ at 47.25 MC.	Repeat step 4c.
7.	Oscilloscope, 2V PP. Sweep generator thru impedance matching network (see Figure 6) to antenna terminals. Set pix marker at 211.25 MC, channel 13. Inject 45.75 MC marker into IF section by connecting CW output cable to outer shield of IF link cable.	Fine tuning to center of range Channel selector to channel 13. Oscillator slug setting: Picture carrier should fall at 45.75 MC (± 300 KC) marker on scope. (See Figure 12).
8.	Repeat step 7 for all channels in descending order.	

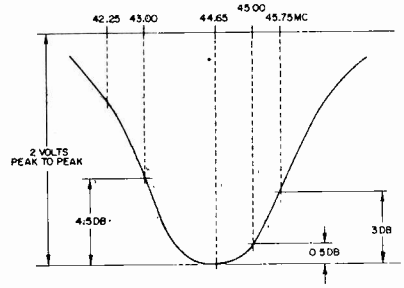


Figure 9 – Typical IF response, 2nd IF Amp Grid to 2nd Det.

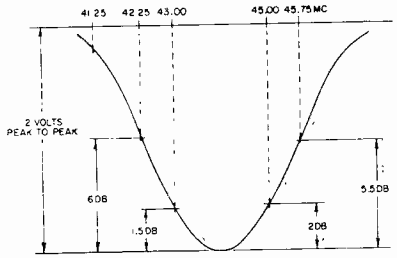


Figure 10 – Typical IF response, 1st IF Amp Grid to 2nd Det.

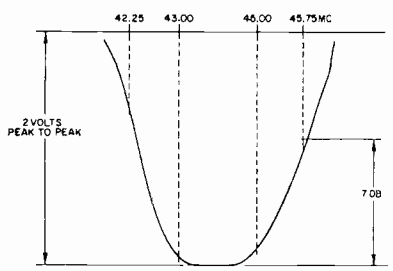


Figure 11 – Typical IF response, Mixer Amp Grid to 2nd Det.

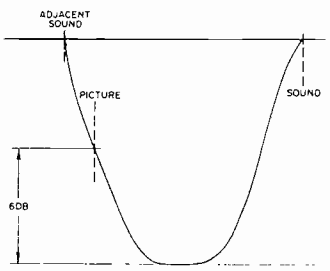


Figure 12 – Typical RF-IF response.

WESTINGHOUSE Chassis V-2484+ Service Information, Continued

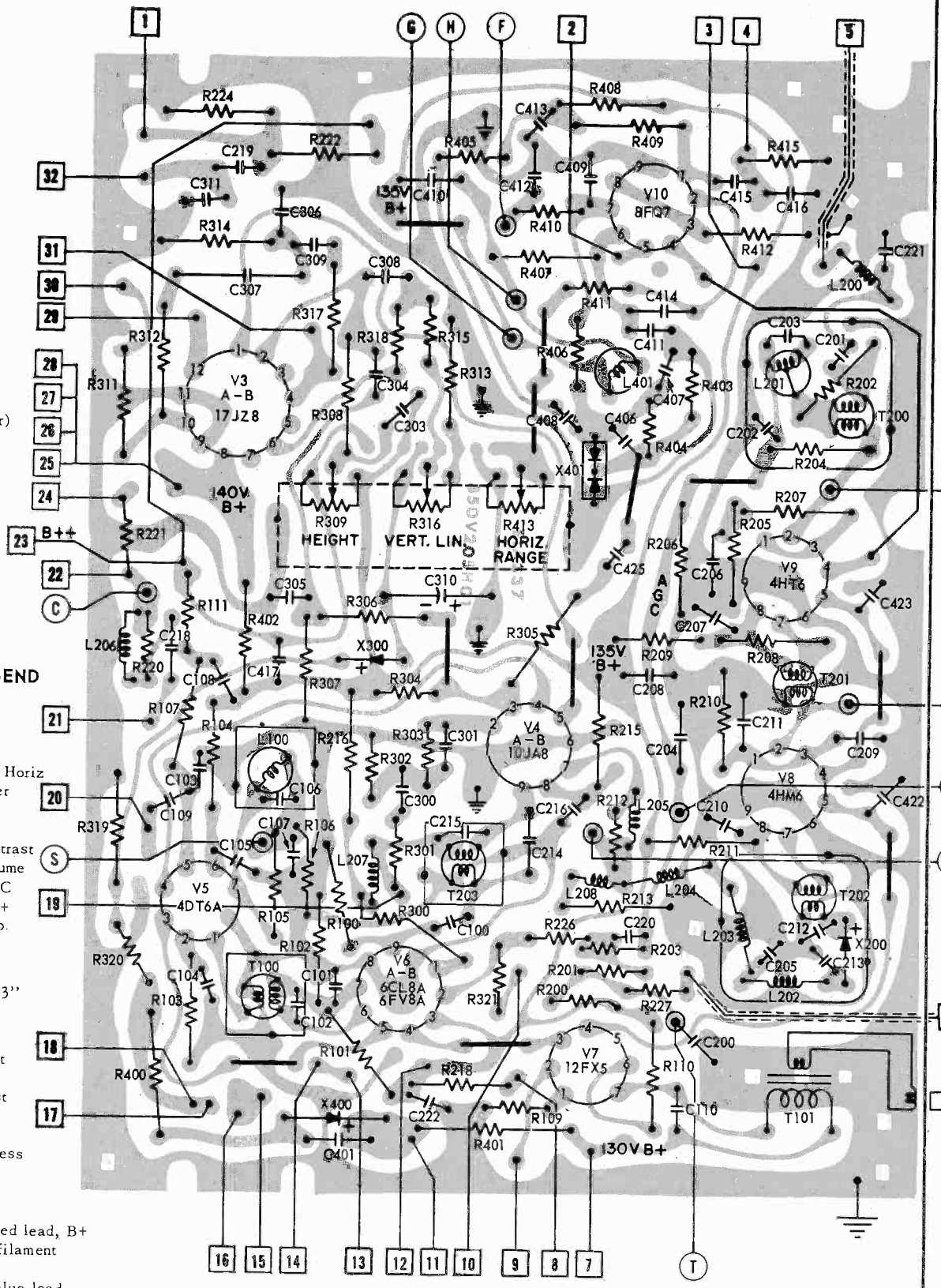
TEST POINTS

A AGC for IF
B Video detector
C CRT cathode
D 1st IF input
E 2nd IF grid
F Horizontal MV
G Horiz adj coil
H Horiz adj coil
M Mixer grid (Tuner)
S Quad coil
T AGC for tuner

PC BOARD LEGEND

1. Pin #3 of CRT
2. Tuner filament
3. 135 B+ to tuner
4. Pin #2 of 21GY5, Horiz
5. IF input from tuner
6. Tuner AGC
7. C403A, 130V, B+
8. R217 bottom, Contrast
9. Arm of R108, Volume
10. C420 & C419, AGC
11. L400 & L404A, B+
12. C402A & R219 top
13. AC tie point
14. AC tie point
15. Pin #8 of CRT
16. Tuner filament
17. SW400
18. Pin #1 of 17BE3
19. R217 top, Contrast
20. R108 top, Volume
21. R217 arm, Contrast
22. Pin #7 of CRT
23. Boost B+, 450V
24. R219 arm, Brightness
25. R416, B+
26. L402, B+
27. C405A, B+
28. T300, vert trans, red lead, B+
29. Pin #1 of 21GY5, filament
30. R310, Vert Hold
31. T300, vert trans, blue lead
32. T300, vert trans, orange lead, sec.

23"



Bottom view of PC board. Top components are shown in solid outline. Tube pin numbering is for bottom of socket.

Westinghouse

MODEL AND CHASSIS CHART

MODEL	CHASSIS	TUNER	FEATURES	CRT
H-K4250 H-K4251 H-K4252 H-K4253	V-2485-11	470V162D01 (VHF) 472V053D01 (UHF)	Memory Fine Tuning Instant-On Illuminated Dial Steel Guard CRT	23EZP4 94°

CHASSIS REMOVAL

1. Remove front control knobs.
2. Remove back cover.
3. Remove antenna board retaining screws.
4. Remove four control panel retaining screws. For ease of handling and servicing, hang the control panel bracket by inserting the two studs extending from its side into the slots on the PC board side support bracket.
5. Disconnect speaker wires at the audio output transformer.
6. Disconnect CRT dag spring, CRT high voltage connection, CRT socket cap and loosen yoke clamp.
7. Remove retaining screws from chassis top support brackets.
8. Remove retaining screws from chassis bottom support brackets.
9. Carefully remove the chassis. The CRT is cabinet mounted and is removed separately.

CRT REMOVAL

1. Remove chassis. (See Chassis removal)
2. Lay cabinet face down on a soft cloth.
3. Remove four corner retaining screws.
4. Carefully remove the CRT. The strap around the CRT and the four mounting ears are part of the 23EZP4 CRT and cannot be removed. The replacement CRT is equipped with the strap and four mounting ears as part of the CRT.

VHF/UHF DIAL REMOVAL AND REPLACEMENT

1. Remove the chassis. (See chassis removal.)
2. Remove the two screws retaining the VHF dial to the tuner hub and gear assembly.
3. Remove retaining ring.
4. Loosen the set screw and remove the tuner hub and gear assembly from the tuner shaft.
5. Remove the UHF dial knob.

For replacement reverse the above procedure.

Caution should be taken so that the hub and gear assembly does not bind with the fine tuning drive gear.

PC BOARD ACCESSIBILITY

To provide access to the underside of the PC board while the set is operating:

1. Remove the chassis.
2. Turn the chassis around.
3. Connect the CRT socket, yoke, and high-voltage lead (use a jumper). A test speaker may be connected to the audio output transformer.

WARNING: To operate the set partially disassembled, connect a jumper from the aquadag CRT coating to chassis ground. Be careful that the high-voltage anode lead does not short or arc to the frame.

When servicing sets that have a Steel-Guard CRT, connect a jumper from the metal band to chassis ground.

CENTERING

The centering rings, located at the rear of the deflection yoke, should be rotated to center the raster.

DEFLECTION YOKE

The deflection yoke should be as far forward as possible (touching the bell of the CRT). Rotation of the deflection yoke is used to level the raster.

HORIZONTAL HOLD ADJUSTMENT COIL, L403

1. Connect a jumper between TP Ⓖ and TP Ⓗ to short out coil L403.
2. Calibrate a VTVM to 0V center scale on the 1.5V range. Connect the meter to measure DC voltage between TP Ⓕ and circuit ground.
3. Tune the receiver to a station of normal signal strength. Adjust the Horizontal Range Control. R410A (part of the Quadruple Control Assembly, located at the top right of the chassis) to lock the picture into horizontal sync. Then adjust R410A for zero volts on the VTVM.
4. Remove the jumper across L403.
5. Tune L403 to lock the picture into horizontal sync. Adjust the core to the first position that will lock the picture into horizontal sync as the core is moved from the top of the coil form toward the PC board. Then adjust L403 for zero volts on the VTVM.

WIDTH AND HEIGHT

The Width and Height controls are part of the Quadruple Control Assembly, located at the top right of the chassis (see Figure 5).

VERTICAL LINEARITY

The Vertical Linearity control is mounted on the chassis above the yoke (see Figure 5). This control has a screwdriver adjustment slot at the back.

AGC LEVEL CONTROL

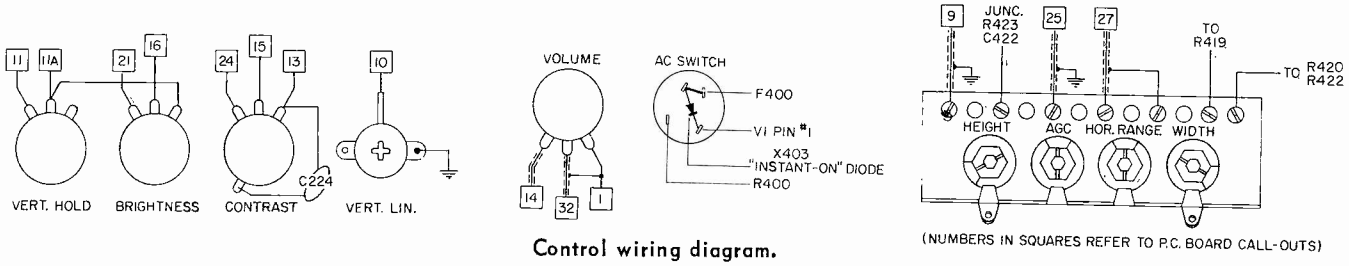
This adjustment is factory set. Normally, no adjustment will be needed in the field.

Should adjustment be necessary, select the channel with the strongest signal. Turn the control (part of the Quadruple Control Assembly) clockwise until a slight bend appears at the top of the picture. Then turn the control slowly counterclockwise about ¼ turn past the point at which the bend disappears.

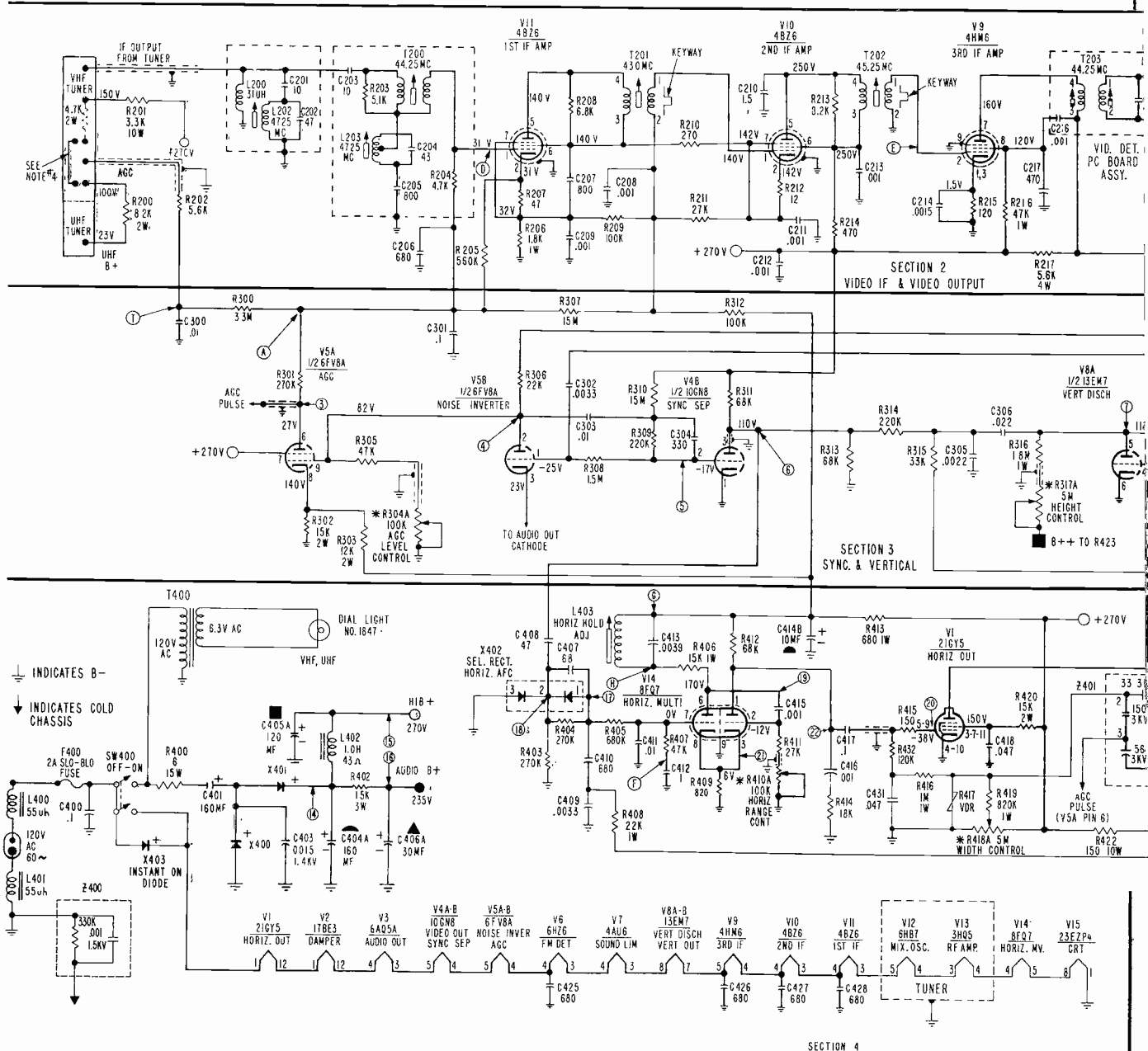
DIAL LAMP REPLACEMENT

1. Remove the back cover.
2. Disconnect the dial light clip from the control panel. Replace defective lamp with a No. 1847 lamp.

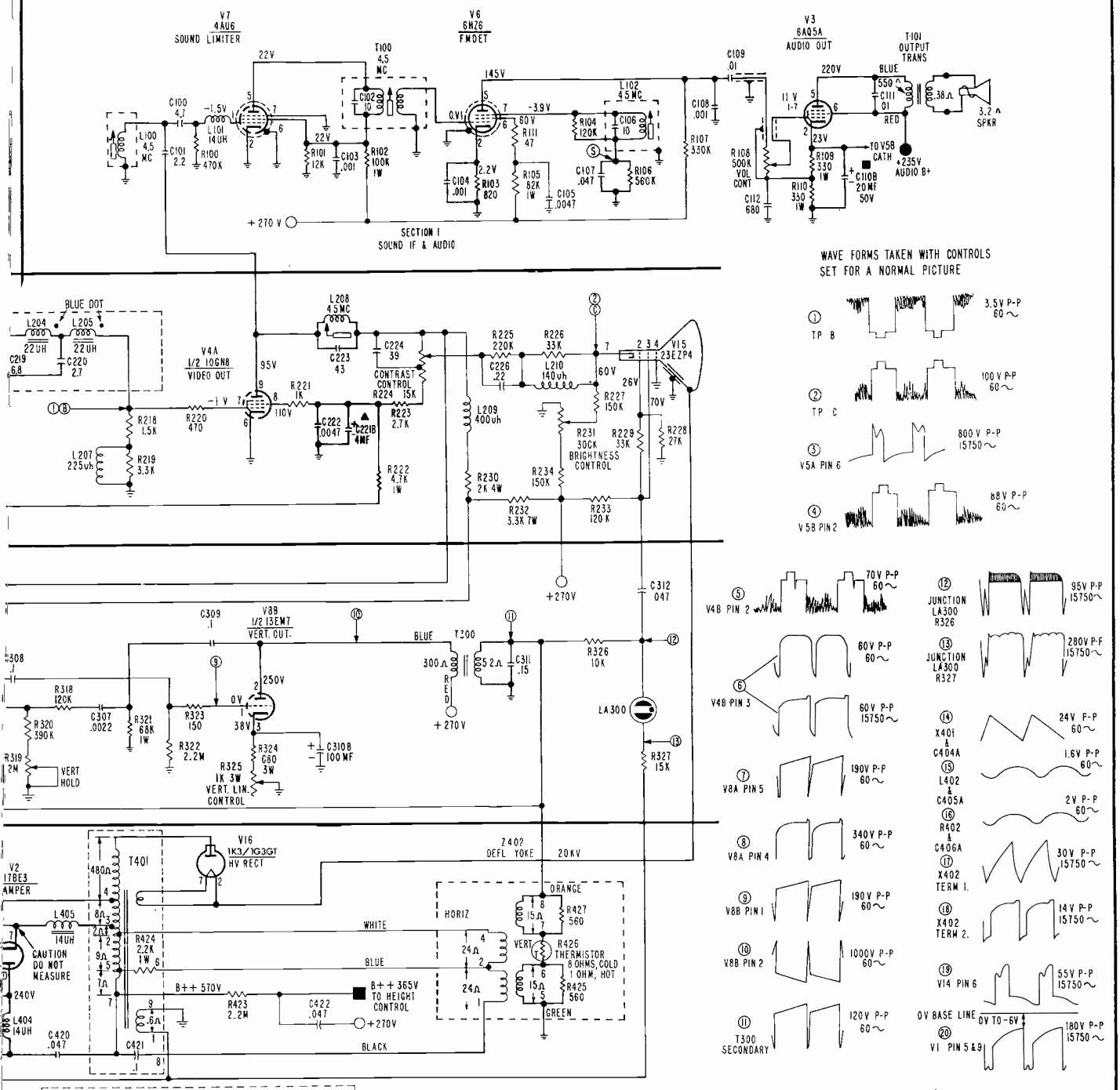
WESTINGHOUSE Chassis V-2485-11 Schematic Diagram



Control wiring diagram.
All views seen from the rear.



WESTINGHOUSE Chassis V-2485-11 Schematic Diagram, Continued



WAVE FORMS TAKEN WITH CONTROLS SET FOR A NORMAL PICTURE

NOTES:

1. ALL CAPACITANCE VALUES LESS THAN 1 ARE IN MF AND VALUES GREATER THAN 1 ARE IN PF WHILE ALL RESISTANCE VALUES ARE IN OHMS, 1/2 WATT UNLESS OTHERWISE INDICATED
2. DC VOLTAGES MEASURED FROM B-WITH A VTVM, NO SIGNAL APPLIED, LINE VOLTAGE AT 120 VAC
3. WAVEFORMS WERE TAKEN WITH CONTROLS SET FOR NORMAL PICTURE
4. MAKES CONTACT ON CHAN #1
5. CIRCLED NUMBERS REFER TO WAVE FORMS.

* PART OF QUADRUPLE CONTROL ASSY.

WESTINGHOUSE Chassis V-2485-11 Alignment Information

SOUND ALIGNMENT

EQUIPMENT: VTVM

PROCEDURE:

1. Select the strongest station available (preferably with test pattern and test tone) and adjust the FINE TUNING for best reception. Adjust the VOLUME control so that the station sound is audible.
2. Adjust the quad coil (L102) for maximum sound from the speaker.
3. Disconnect the antenna. Use a jumper wire to short TP Ⓑ to B−.
4. Connect the VTVM to TP Ⓢ.
5. Adjust interstage transformer T100 for maximum negative voltage on the VTVM.
6. Remove the jumper wire used to short TP Ⓑ to B−.
7. Place the antenna input close to the antenna terminals so that the signal is loosely coupled to the receiver and the picture is barely visible. A pronounced noisiness (hiss) should accompany the sound.
8. Adjust the limiter input coil (L100) for maximum negative voltage on the VTVM. If the VTVM indicates a broad response while making this adjustment, the receiver input signal is too strong. When the signal coupling described in step 7 is at the necessary low point, no limiting takes place and the VTVM will indicate a sharp response to the limiter input coil adjustment.

4.5 MC TRAP ALIGNMENT

1. Disconnect the antenna.
2. Turn contrast control to maximum (clockwise).
3. Inject a 4.5 MC CW signal to TP B through a .001 mf capacitor.
4. Connect a .001 mf capacitor to the tip of a demodulator probe.
5. Connect the demodulator probe to a VTVM and the capacitor to TP C.
6. Set the VTVM to 1.5-2 volt DC range.
7. Turn on set and allow for a ten minute warmup.
8. Adjust L208 for minimun on the VTVM.

IF ALIGNMENT

EQUIPMENT

1. **Sweep Generator** with a 10 MC wide sweep at center frequencies from 10 MC to 90 MC and 170 MC to 216 MC.
2. **CW (Marker) Generator** which accurately produces the IF and RF frequencies from 4.5 MC to 216 MC.
3. **Oscilloscope** with good low frequency response characteristics.
4. **VTVM**
5. **Bias Supply** of −2.5 volts.
6. **Standard Alignment Tool** with a 3/32" hexagonal tip. (long enough to reach bottom slugs)

TERMINATION AND ADJUSTMENT OF EQUIPMENT

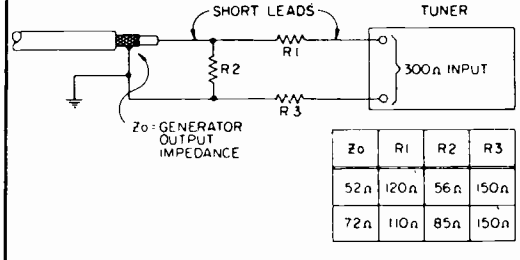
These instructions on termination and adjustment of equipment will apply throughout the IF Alignment procedure.

All test equipment cables and leads should be as short and direct as possible.

Oscilloscope and VTVM – Use a low-capacitance direct probe terminated with the decoupling network shown in Figure 8. Keep the oscilloscope calibrated for 2 volts peak to peak (P-P). Use a VTVM range suitable for measuring −1.5 volts.

Generators – Except where otherwise noted, all signal generating equipment should be terminated as shown in Figure 7. Connect the signal cable ground near the ground of the stage where the signal is injected.

Adjust the CW generator output so that: (1) When the VTVM is being used its reading remains near the −1 volt point. (2) When the oscilloscope is being used the marker frequencies do not distort the response curve.



Zo	R1	R2	R3
52Ω	120Ω	56Ω	150Ω
72Ω	110Ω	85Ω	150Ω

Figure 6 – Impedance Matching Network

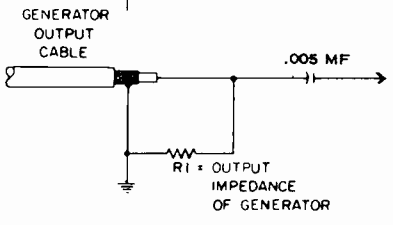


Figure 7 – Generator Cable Termination

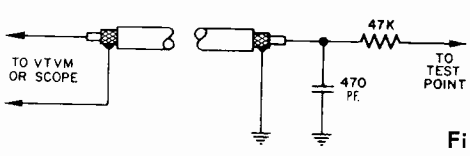


Figure 8 – Decoupling Network

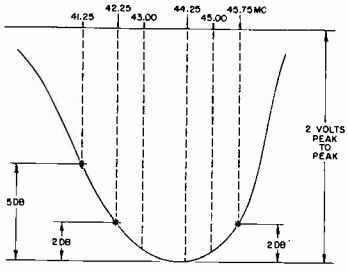


Figure 9 – Typical IF response, 3rd IF Amp grid to 2nd Det.

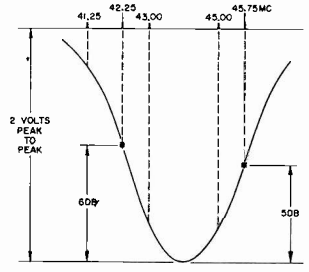


Figure 10 – Typical IF response, 1st IF Amp grid to 2nd Det.

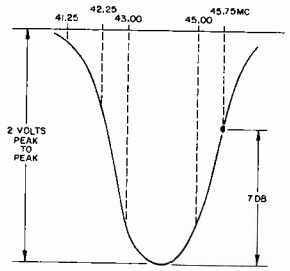


Figure 11 – Typical IF response, Mixer Amp grid to 2nd Det.

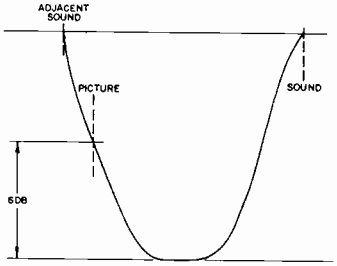


Figure 12 – Typical RF-IF response.

WESTINGHOUSE Chassis V-2485-11 Alignment Information, Continued

ALLOW A TEN-MINUTE WARMUP BEFORE BEGINNING ALIGNMENT.

STEP	TEST EQUIPMENT AND CONNECTION	ADJUSTMENT
1.	Jumper from B– to TP (A), –2.5v to TP (T)	Channel selector to channel 10
2.	Oscilloscope and VTVM to TP (B) IF sweep generator with CW Marker at 44.25 MC to TP (E)	Short antenna terminals. T203 primary (bottom slug): Maximum amplitude T203 secondary (top slug): Rocking symmetrical response (see Figure 9).
3.	CW generator to TP (D) at: a. 45.25 MC b. 43.00 MC	 T202: Maximum amplitude T201: Maximum amplitude
4.	IF sweep generator at 44.25 MC to TP (D). Couple CW marker generator to sweep generator cable. Keep marker amplitude at minimum to avoid distorting response.	T201, T202, T203: Slight retouching may be necessary to obtain response curve with correctly placed markers as shown in Figure 10. Use T203 (top slug) to flatten peak of curve, T201 to adjust low frequency slope and T202 to adjust high frequency slope.
5.	CW generator to TP (M) (see Figure 5): a. 44.25 MC b. 44.25 MC c. 47.25 MC } It may be necessary to increase generator d. 47.25 MC } output and/or remove the ground from TP(A).	 Tuner mixer output coil: Maximum on VTVM T200: Maximum on VTVM L202: Minimum on VTVM L203: Minimum on VTVM
6.	Connect IF sweep generator to TP (M) at 44.25 MC (see Figure 5). Couple CW generator with marker at 44.25 MC to IF sweep generator cable. Keep marker amplitude low to avoid distorting response.	Adjust mixer output coil and T200 for a "rocking" symmetrical response at approximately 44.25 MC with maximum amplitude and markers as shown in Figure 11.
7.	CW generator to TP (M) at 47.25 MC	L203: Minimum amplitude (see Step 5d).
8.	IF sweep generator to TP (M) at 44.25 MC (see Figure 5).	Wave shape as shown in Figure 11.
9.	RF sweep generator thru impedance matching network (See Figure 6) to antenna terminals. Set pix marker at 193.25 MC Channel 10. Inject 45.75 MC marker into IF section by connecting CW output cable to outer insulation of IF link cable.	Fine tuning screws to approximate center of range. Channel selector to Channel 10. If necessary, adjust oscillator trimmer C18 to bring channels in range with F.T. screws at approximate center of range. Oscillator slug setting: Picture carrier should fall at 45.75 MC (±300KC) marker on scope. (See Figure 12).
10.	Repeat step 9 for all channels using corresponding channel markers.	

470V162D01

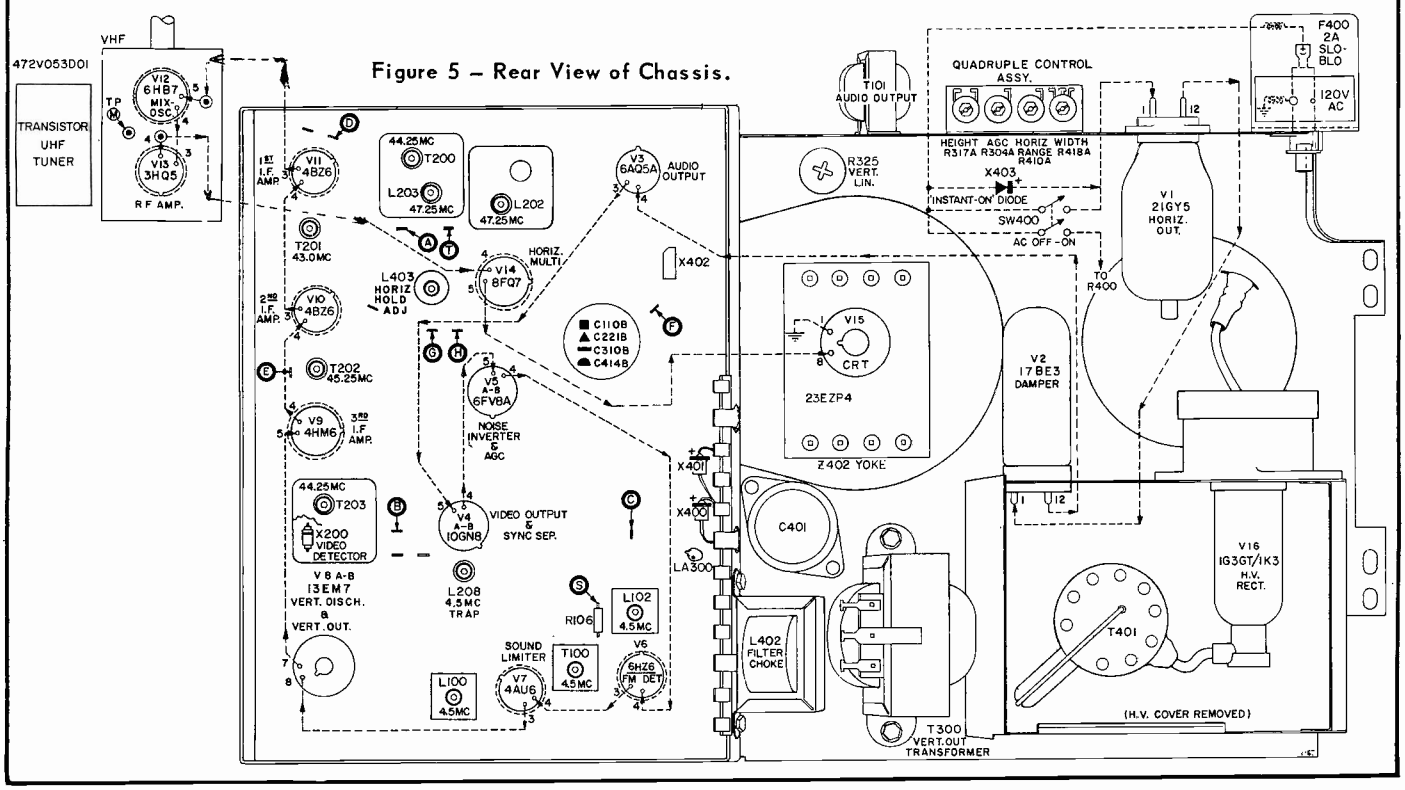
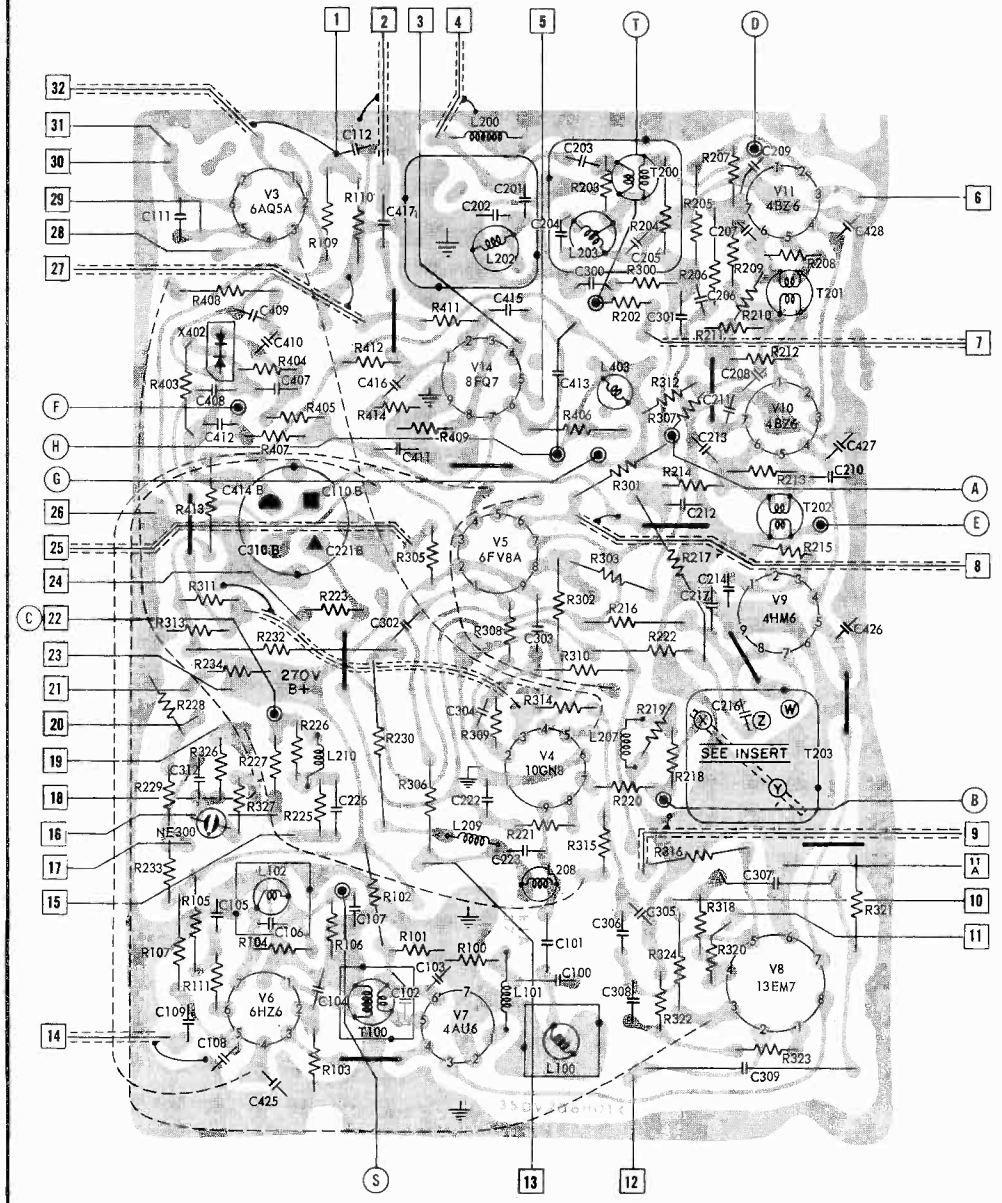


Figure 5 – Rear View of Chassis.



Bottom view of PC board, showing top components in solid outline. Tube pin numbering is for bottom of socket.

PC BOARD LEGEND

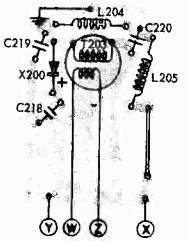
1. Volume control, low side
2. VI pin 2, and R415
3. Tuner filament
4. IF input
5. CRT pin 8
6. Tuner filament
7. Tuner AGC
8. Z401 pin 3
9. Height control, high side
10. Vertical Linearity control, high side
11. Vertical Hold control, high side

11A. Vertical Hold control, arm

12. T300, blue wire
13. Contrast control, high side
14. Volume control, high side
15. Contrast control, arm
16. Brightness control, arm
17. CRT pin 3
18. T401 lug 1
19. Junction T300 secondary, C311, and yoke orange wire
20. CRT pin 2
21. Brightness control, high side
22. CRT pin 7
23. Tuner B+ terminal board, to R201
24. Contrast control, low side
25. AGC Level control (R304A), high side
26. CRT pins 1 and 4 (two wires)
27. Horizontal Range control (R410A), high side
28. V2 pin 12
29. T101, blue wire
30. T101, red wire
31. Junction R402 and C406A
32. Volume control, arm

TEST POINTS

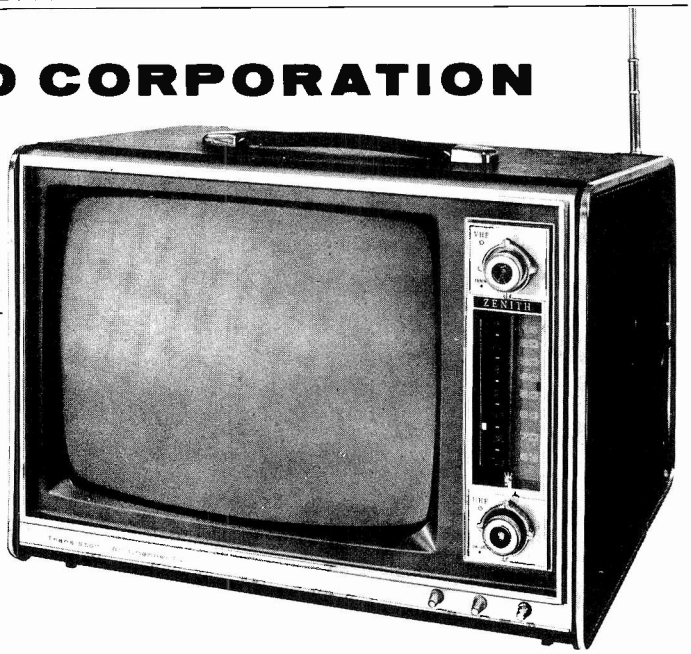
A. AGC for IF
B. Video detector
C. CRT cathode
D. 1st IF grid
E. 3rd IF grid
F. Horiz MV
G. Horiz Hold adjust coil
H. Horiz Hold adjust coil
M. Mixer Grid (on tuner)
S. Quad coil
T. AGC for tuner



Bottom view of video detector PC board. Circled letters refer to connecting points on PC Board.

ZENITH RADIO CORPORATION

ZENITH



TRANSISTOR TV CHASSIS 1M30T20

MODEL ROYAL 1290L,Y

The TV models using the 1M30T20 chassis are 12 inch completely transistorized (except for the picture tube) personal type portables. The picture tube is the rimbond type, 12 inch (diagonal) size, having 74 square inches of viewing area. The tube has a 12 volt heater and the second anode voltage is 12,000.

The receiver can be operated from a 120 volt 60 cycle AC line, or from any suitable 12 volt D.C. source. A 12 volt battery-pack (optional at extra cost) is available in a choice of two matching colors, the B129L or B129Y. It is easily attached to the bottom of the TV cabinet. Two special re-chargeable batteries (Zenith Part No. Z600) are supplied with the unit. The pack contains a charger unit consisting of three transistors, two diodes and the associated regulator circuitry. The current for the charger unit is supplied by the TV chassis. The batteries are automatically charged when the receiver is plugged into a 120 volts 60 cycle AC line and the Off/On switch is in the Off position.

To operate the receiver on battery-pack, or an external 12 volt DC source, the AC line cord plug must be inserted into the two slots provided at the rear of the chassis, next to the battery-pack socket.

The receiver is fully protected against overloads. Two fuses and a circuit breaker are provided. The breaker is in series with the AC line. One fuse (2 AMP) is inserted in the internal 12 volt DC power supply line and the other fuse (2 AMP) is inserted in the power supply line for the external battery.

CAUTION: Never replace the 2-ampere fuses with one even slightly higher in value. If a fuse any larger than 2 amps is installed, it will not provide adequate protection and damage to transistors or circuit components can result.

This receiver has a top carrying handle, a monopole VHF antenna, four IF stages and a four inch speaker. An earphone jack is located near the speaker for private listening.

WARNING: TO PREVENT DAMAGE TO TRANSISTORS.

1. NEVER REMOVE OR INSERT TRANSISTORS INTO SOCKETS WITH THE POWER ON.

2. DO NOT SOLDER OR MAKE CIRCUIT REPAIRS OF ANY KIND WITH THE POWER ON.

3. DO NOT APPLY ANY POSITIVE VOLTAGE OR MORE THAN 16 VOLTS NEGATIVE TO THE CHASSIS CIRCUITS OR THE DC INPUT POWER CIRCUIT.

4. NEVER SHORT HV ANODE LEAD TO CHASSIS OR GROUND.

5. NEVER SHORT THE COLLECTOR TO THE EMITTER OR TO THE BASE OF ANY TRANSISTOR; OR ANY ELECTRODE TO CHASSIS GROUND, WHILE THE POWER IS ON. EVEN MEASURING VOLTAGES FROM ONE ELECTRODE TO ANOTHER IS NOT RECOMMENDED.

When servicing transistor circuits such as measuring voltages, signal tracing, use of oscilloscope, signal generator and the like, take special care to prevent the application of excess voltages from test equipment. This is especially true when using an ohmmeter. Some ohmmeters can apply voltages to the circuit that are far in excess of the rated voltages of the transistors and diodes or even certain components such as electrolytic capacitors etc. ALWAYS WATCH OUT FOR POSSIBLE TRANSIENT VOLTAGE PEAKS WHEN USING TEST EQUIPMENT OF ANY KIND ON TRANSISTOR RECEIVERS.

The use of the oscilloscope for signal tracing and for other service purposes, as well as for alignment, is highly recommended.

When soldering the leads of a transistor, or when soldering at or near the transistor socket, use a pair of long nose pliers pinched around the lead or lug to be soldered to act as a heat sink. It is advisable to remove a plug-in transistor when soldering close by.

ZENITH Chassis 1M30T20 Service Information, Continued

CABINET REMOVAL

Disconnect the antenna leads, remove the four screws at the back (two near top and two near bottom) and then the two chassis retaining screws on the bottom. The entire cabinet then can be pulled away from the chassis leaving the front escutcheon attached.

PICTURE TUBE REMOVAL

The picture tube is a Rimbond type and is attached to the front cabinet section (the escutcheon). The picture tube and escutcheon are removed together from the front of the chassis.

Remove the tube socket, then disconnect the HV anode lead and the four yoke leads. Remove the tuning and volume control knobs but do not attempt to remove the secondary control knobs. Remove only the four chassis-to-escutcheon mounting screws (two at the top corners and two from the bottom of chassis). The escutcheon and attached picture tube are then removable together.

UHF TUNER REMOVAL

1. Disconnect the UHF-IF cable plug, antenna leads and red (B minus) lead from top of tuner. Remove tuner ground strap from the slanted front chassis apron. (The anchor screw is located near the curved side of the picture tube but is accessible if a 1/4 inch socket wrench with a long extension is used).

2. Remove the four screws (C) mounting the tuner and attached bracket to the upright. The complete assembly of the UHF tuner and gear assembly including the UHF dial, volume control, ON/OFF switch and shaft now can be rotated outward and downward. See the illustration (Figure 2.)

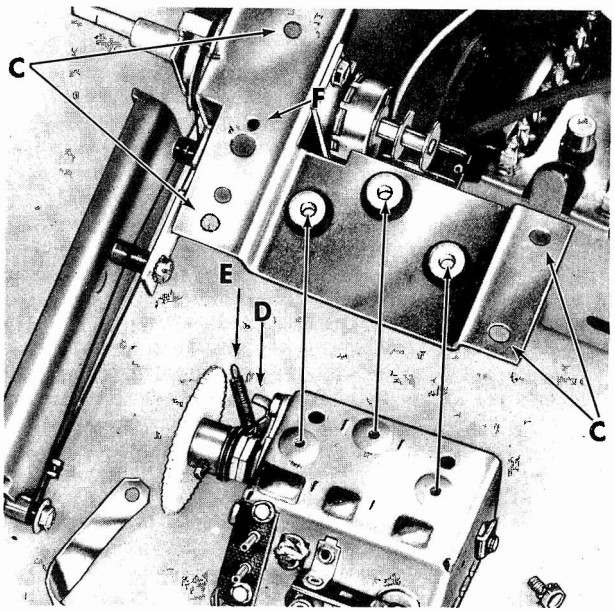


Fig. 2 View Of UHF Tuner Shown Removed From Chassis.

3. The UHF tuner is then removable from the attached four-hole bracket after first disconnecting the coiled spring (E) connecting the black-metal lever arm (D) to the bracket.

4. When replacing tuner onto the gear assembly and bracket, make certain the tuning gear assembly is set fully to the left (Chan. 83 on UHF dial) and the tuner shaft is set fully to the right for proper dial alignment. The lever (D) on the tuner shaft is positioned downward and outward. The small coiled spring (E) is then attached from the lever arm (D) to the small hole (F) in the bracket.

5. The UHF tuner, gear assembly and bracket can now be remounted to the chassis upright bracket.

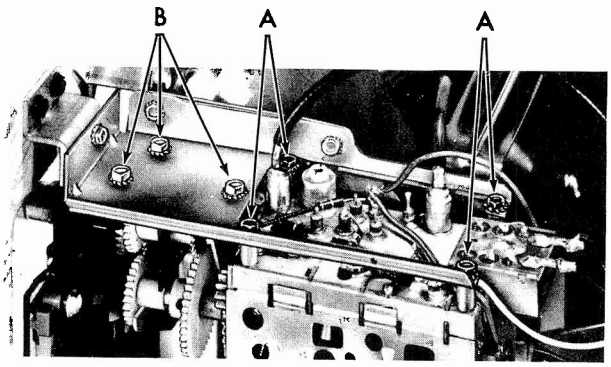


Fig. 3 View Of VHF Tuner Shown Mounted On Chassis.

VHF TUNER REMOVAL

1. Disconnect the UHF and IF cable plugs from top of tuner and the red (B minus) lead at the UHF tuner. Unsolder both leads of the small 5MFD capacitor (top of tuner) connected from the AGC terminal to ground. Also remove the yellow (AGC) and the red (B minus) leads.

2. Remove only the four screws (A) holding the tuner to the large bracket. DO NOT REMOVE THE THREE SCREWS (B) IN LARGE BRACKET IN FRONT OF TUNER OR A MISALIGNMENT OF THE VHF TUNING GEAR ASSEMBLY MAY RESULT.

3. Push tuner slightly forward to disengage both gears; then lift tuner straight out and away from chassis.

NOTE: The small 5 MFD capacitor (connected from the AGC terminal to ground) is a part of the chassis circuit and is not supplied with a replacement VHF tuner.

WIDTH

The WIDTH coil is located at the right-side from rear of chassis, near the top of the HV cage. The coil is accessible only after removing the cabinet. The adjustment is made from the rear of the coil by sliding the shaft back or forth to obtain the desired width. There is no horizontal linearity adjustment.

THE AGC CONTROL

Tune in the strongest signal available and turn the AGC control until the picture distorts and a buzz is heard. Then turn control back to the position where the picture is not distorted and a minimum of buzz is heard.

ZENITH Chassis 1M30T20 Service Information, Continued

CHANNEL OSCILLATOR FINE TUNING

Each channel can be adjusted individually with the receiver Fine Tuning knob. Several turns of the knob in either direction are permissible, if required for proper channel adjustment.

FOCUS

The Focus is adjustable by connecting the focus lead to any one of three terminals; plus 125, negative 220, and ground.

PIX CENTERING AND TILT

The centering assembly is permanently mounted at the rear of the deflection yoke and consists of two magnetic rings rotated by means of tabs. To center the picture, rotate each tab separately or both together until the picture is centered.

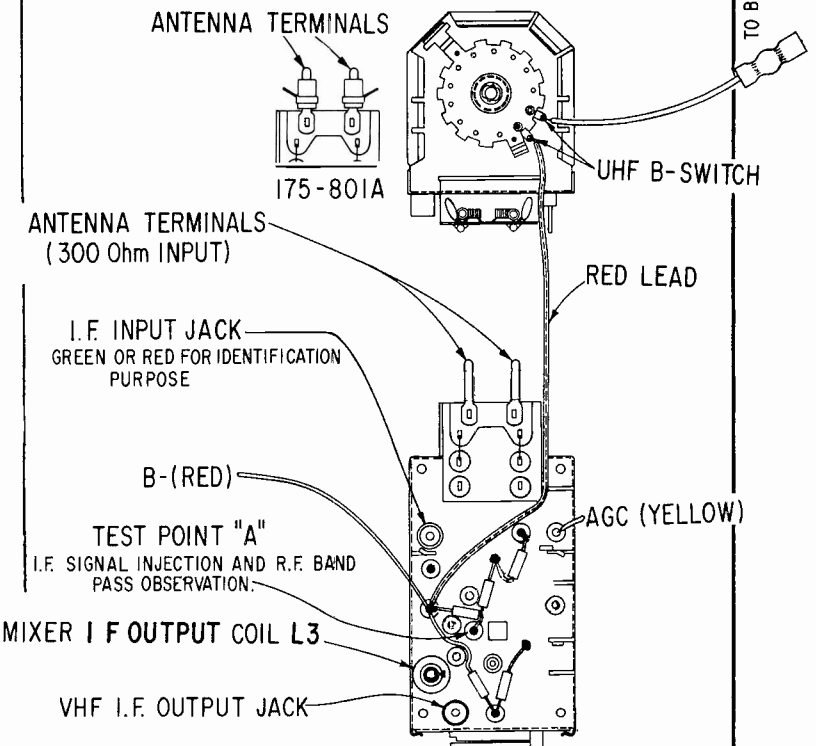
The yoke is held onto the neck of the picture tube by means of a clamp. To adjust picture tilt, it is necessary to loosen the yoke clamp screw.

If occasional noise pulses or strong interferences cause the picture to lose sync or break up, turn the NOISE GATE control to the left until the picture breaks up on the strongest signal; then turn control back just to the position where the picture returns to normal again. The normal setting of this control is -2.5V to -3V on the anode of the diode X3.

The HORIZONTAL HOLD control is located at the rear; lower-right hand side from rear of chassis. To adjust the horizontal frequency, turn the shaft to a position for horizontal lock-in while switching channels.

VERTICAL BIAS CONTROL

The Vertical Bias control, R94, normally will not need adjustment unless the Vertical Output transistor, TR22, is replaced. The particular setting of R94 determines the emitter voltage of TR22. The correct setting for R94 is obtained when approximately .6 volts is measured at the emitter of the Vertical Output transistor. This .6 volt reading, however, must be consistent with good vertical linearity. The emitter of TR22 is located at Test Point "F".



ITEM NO.	PART NUMBER	DESCRIPTION	
C1	22-5217	330 PF ± 10% DISC.	500V
C2	22-5181	4.5 PF ± .25 PF DISC.	500V
C3	22-5138	3.6 PF ± .25 PF DISC.	500V
C4	22-3987	1000 PF F.T. GMV.	500V
C5	22-4652	0.27 PF ± 10% GIMMICK (175-803A)	500V
C5	22-5142	0.24 PF ± 10% GIMMICK (175-801A, 175-802A)	500V
C6	22-3987	1000 PF F.T. GMV	500V
C7	22-5218	6.2 PF ± .25 PF DISC.	500V
C8	22-5219	1.3 PF ± 10% GIMMICK	500V
C9	22-5220	22 PF ± 2% F.T.	500V
C10	22-5222	10 PF ± 2% F.T.	500V
C11	22-5144	33 PF ± 2% F.T.	500V
C12	22-5221	6.8 PF ± .25 PF DISC.	500V
C13	22-2468	2.2 PF ± 5% GIMMICK	500V
C14	22-3987	1000 PF F.T. GMV.	500V
C15	22-3987	1000 PF F.T. GMV.	500V
C16	22-5224	1.5 PF ± 5% TUBULAR	500V
C17	22-5099	39 PF ± 5% F.T.	500V
C18	22-4653	4.5 PF ± .25 PF DISC.	500V
C19	22-5228	10 PF ± .25 PF DISC.	500V
C20	22-5148	20 PF ± 2% DISC NPO	500V
C21	22-3987	1000 PF F.T. GMV.	500V
C22	22-5225	9 PF ± .25 PF DISC.	500V
C23	22-3987	1000 PF F.T. GMV.	500V
T1	S-71390	ANTENNA FILTER ASSM. (175-803A)	
T1	S-68317	ANTENNA FILTER ASSM. (175-801A, 175-802A)	
T2	S-68316	ANTENNA TRANSFORMER	
L1	20-1374	D.C. CRYSTAL RETURN COIL	
L2	S-68285	R.F. CHOKE	
L3	S-68234	R.F. OUTPUT COIL	
L4	S-68265	R.F. CHOKE	
L5	S-97733	OSCILLATOR COIL & SCREW ASSY.	
A1	105-89	RC ISOLATION UNIT	
A2	105-89	(USED ON 175-801A ONLY)	
S1A	S-71581	SW. SECTION #1 (OSC. STATOR)	
S1B	S-68588	SW. SECTION #1 WIRING ASSY. (OSC. ROTOR)	
S2	S-71373	SW. SECTION #2 WIRING ASSY. (CONVERTER)	
S3	S-71374	SW. SECTION #3 WIRING ASSY. (R.F.)	
S4	85-879	SW. SECTION #4 (UHF I.F.)	
S5	S-71375	SW. SECTION #5 WIRING ASSY. (ANTENNA)	
S6	85-898	SW. SECTION #6 (UHF B-)	

NOTES:

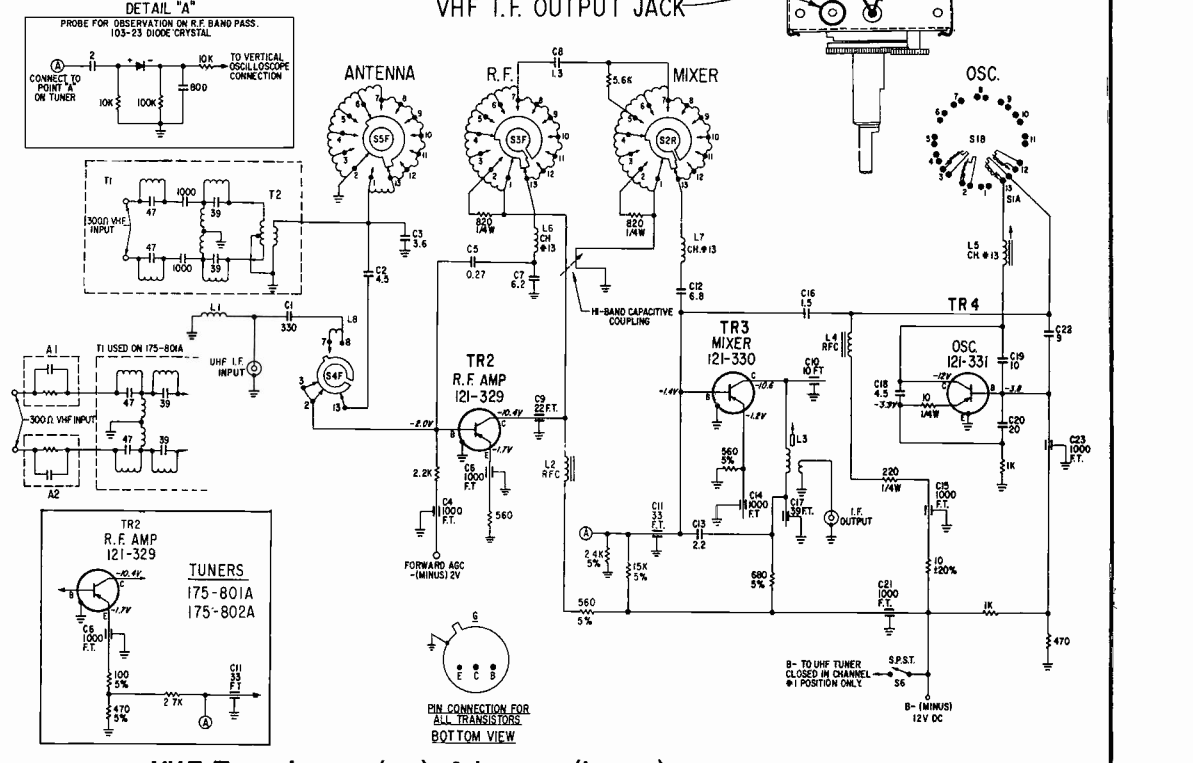
GMV DENOTES GUARANTEED MINIMUM VALUE.
ALL ROTOR BLADES ARE SHORTING TYPE.
ALL CAPACITORS ARE IN PICOFARADS(MMF).
ALL RESISTORS ARE HALF WATT 10% UNLESS INDICATED.
ALL SWITCH SECTIONS VIEWED FROM FRONT OF TUNER AND IN CHANNEL 13 POSITION.

VOLTAGES MEASURED WITH NO SIGNAL ; CHANNEL SELECTOR ON CHANNEL 13, USING VTVM WITH 10K ISOLATION RESISTOR. (LEAD ON TIP END MUST BE SHORT; ONE HALF INCH OR LESS.

TEST POINT (A) IS THE IF SIGNAL INPUT AND BAND-PASS OBSERVATION POINT. (SEE INSET DETAIL A IN THE TUNER SCHEMATIC.

PRECAUTIONS TO PREVENT DAMAGE TO TRANSISTORS.

1. NEVER APPLY POSITIVE VOLTAGE TO TUNER INPUT.
2. NEVER SHORT EMITTER OR COLLECTOR TO GROUND WITH THE POWER TURNED ON.



VHF Tuner Layout (top) Schematic (bottom)

ZENITH Chassis 1M30T20 Alignment Information, Continued

ALIGNMENT

PLEASE READ AND STUDY ALL INFORMATION AND PROCEDURES GIVEN UNDER ALIGNMENT BEFORE STARTING ANY ALIGNMENT OF THE TRANSISTOR TV RECEIVER.

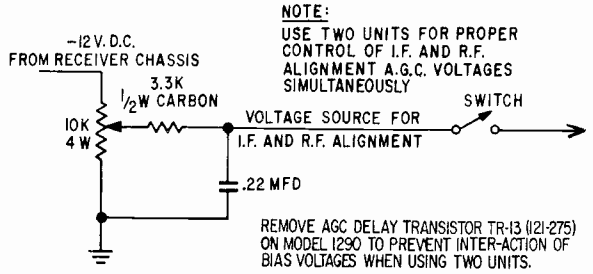
GENERAL

The IF stages of this receiver are not stagger tuned, thus making the alignment procedure somewhat different from the usual vacuum tube receiver. During the alignment, the AGC circuit must be disabled and an external bias voltage from a low impedance source applied at particular points and at certain voltages as specified under each alignment procedure. Too much or too little bias voltage in a transistor receiver can result in large changes in gain and lead to improper results.

A low impedance bias supply must be used to align a transistor receiver. Many high impedance supplies can be set for an output of 40 volts or more. Such voltages could (1) quickly damage the transistors and certain components. (2) The low impedance of the transistor circuits could cause the voltage to drop below the required value.

To test any bias supply for impedance, connect a 10K ohms resistor across the output when set at maximum voltage. A high-Z supply will drop down near zero volts. A low-Z supply will still show at least 7 to 10 volts.

Dry cell batteries make an ideal low-Z type power supply but as such cannot be adjusted over a continuous range of voltages. To construct a bias supply using batteries, or the TV set power supply, refer to suggested circuit diagram.



Schematic Of Low Impedance Bias Supply

Always allow a few minutes for the test equipment to warm up before starting the alignment. Use a non-metallic alignment tool for adjusting the transformer ferrite cores. Use alignment tool, Zenith Part No. 68-30 for IF alignment and Part No. 68-26 for sound alignment.

The signal Generator must be isolated from the circuits by the use of a standard network consisting of a series capacitor (100 Pf to 470 Pf) shunted by a 56 ohm, 1/2 watt resistor. The shielded (ground) lead must be grounded directly to chassis nearby. DO NOT USE LEADS. The high-side lead of the Oscilloscope also must be isolated from the circuits by the use of a 10K to 50K ohms series resistor.

It is very important for alignment purposes, that the collector voltage of the Video Output transistor to set at the amount specified under each alignment procedure. The collector voltage of this transistor is determined by the particular setting of the Video Bias control (R66) with no signal.

A correct check and setting of the Video Bias control can be made by measuring the collector voltage ONLY when the AGC control is set fully to the left (counter-clockwise) to cut off the lst and 2nd IF stages. The collector of the Video Output transistor TR19, is accessible from the top of the chassis through the small hole in the center of the finned heat sink attached to this transistor. For normal picture operation and also for IF alignment, the collector of the Video Output transistor must be +3 volts. For sound alignment the collector voltage must be +30 volts.

The 4th IF transformer has been split into two separate parts. The transformer T12 is the primary and T13 is the secondary. Both windings are link coupled. For alignment purposes, it is necessary to remove the large shield over these transformers, but be sure to replace shield after alignment is completed.

The Sound Take-off transformer (T14) and the Ratio Detector transformer (T2) can be aligned using an accurate 4.5MC CW signal and a VTVM. For the sound take-off transformer, an RF probe must be used with the VTVM. For a more accurate alignment of the Ratio Detector transformer, the use of a sweep genenator, with a 400KC FM modulated signal and an oscilloscope is recommended.

For all alignment procedures, set the Contrast control to maximum; the Volume control to minimum, and the Channel Selector between channels.

IF ALIGNMENT

STEP 1. ALIGN 4TH IF DUAL TRANSFORMERS. Turn AGC control fully to the right (cw). Connect Signal Generator to Test Point "G" (base of the 4th IF transistor, TR17). Set generator to 44MC with 6MC sweep. Connect calibrated oscilloscope to Test Point "C" (base of Video Output transistor, TR19) through a 10,000 ohm isolation resistor. Connect the shielded (ground) lead to chassis nearby.

Connect negative bias lead of low impedance bias supply, Zenith Part No. 950-179, or equivalent, to Test Point E1 ; positive lead to chassis. Set bias for -7 volts at Test Point "E" to cut off preceeding IF stages during the 4th IF alignment.

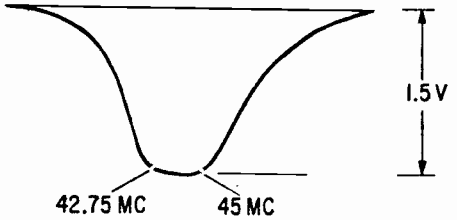


FIG. 4 4th IF Response Curve

Alternately adjust T12 and T13 (4th IF dual transformers) for maximum amplitude and symmetry with 42.75MC and 45MC markers as shown in Fig. 4. It is very important here to keep signal generator output low for no more than 1.5 volts peak-to-peak response curve on the calibrated oscilloscope.

IMPORTANT: Do not readjust T12 or T13 at any time after Step 1. is completed or when aligning the circuits in Steps 2. and 3.

ZENITH Chassis 1M30T20 Alignment Information, Continued

STEP 2. PREADJUST TRAP COILS T5, T6 AND T7. Connect generator to Test Point "A" on the VHF tuner. Reduce external bias voltage to -5 volts and adjust generator output to get 1.5 volts deflection on the calibrated oscilloscope.

Adjust trap coils T5 at 47.25MC; T6 at 41.25MC and T7 at 39.75MC for a minimum response on the oscilloscope and positioned as shown in Fig. 5.

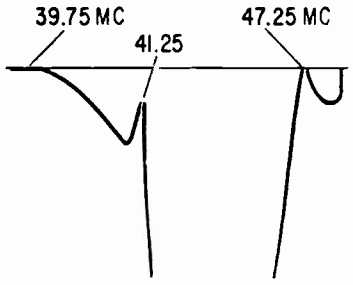


FIG. 5 Expanded View Showing the 47.25 MC Marker Frequency.

Increase the output of the generator ten times to provide an extended view of the 47.25MC marker to make it easier to obtain the required minimum response of this trap frequency.

STEP 3. OVERALL IF ALIGNMENT.
Reduce generator output ten times (to original setting). Same set-up as in Step 2. Adjust generator to maintain 1.5 volts peak-to-peak. First, adjust the IF input coil (T8); mixer output coil (L3 in VHF tuner) and 3rd IF coil (T11) for maximum response, symmetry of pattern and position of markers as shown in Fig. 6. Adjust bias for -2.5 volts and adjust generator to obtain 1.5 volts peak-to-peak on the calibrated oscilloscope. Adjust 1st IF coil T9, and 2nd IF coil T10 and any of the previous adjustments, if required, for maximum response, symmetry of pattern and position of markers as shown in Fig. 6. This does not include the 4th IF transformers T12 and T13 which are not to be readjusted after Step 1.

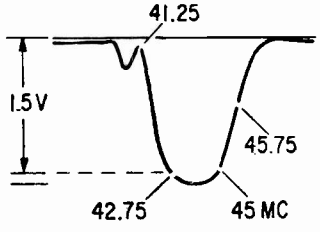


FIG. 6 Overall IF Response Curve.

IMPORTANT: After completing alignment, go back and check adjustment of the 47.25MC trap coil T5.

SOUND ALIGNMENT

STEP 1. ALIGN SOUND TAKE-OFF TRANSFORMER. Turn AGC control (R110) fully to left. Adjust bias control (R66) for 30 volts reading on collector of video output transistor TR19.

The collector of transistor TR19 is accessible from the top of the chassis through the small hole in the center of the finned heat-sink device mounted on top of the transistor.

Connect VTVM (low range scale) with RF probe to Test Point "D" (cathode of picture tube) ground lead to chassis. Inject 4.5MC (cw) signal at Test Point "C" (base of Video Output transistor, TR19). Adjust top and bottom cores of transformer T14 for minimum reading on VTVM.

STEP 2. ALIGN RATIO DETECTOR TRANSFORMER.
METHOD A. Ratio Detector alignment using a 4.5MC cw. signal and the VTVM (or oscilloscope) as an output meter.

Inject 4.5MC cw. signal at Test Point "C" (base of Video Output transistor TR19). Connect VTVM (low range DC scale) to Test Point "J". Adjust top and bottom cores of ratio detector transformer (T2) for maximum response; then adjust top core for zero response.

METHOD B. Ratio Detector alignment using a 4.5MC, FM signal (400KC deviation) and oscilloscope.

Connect oscilloscope from test point "J" to chassis nearby. Connect sweep generator from Test Point "C" to chassis nearby. Set sweep generator to 4.5MC; 400KC deviation.

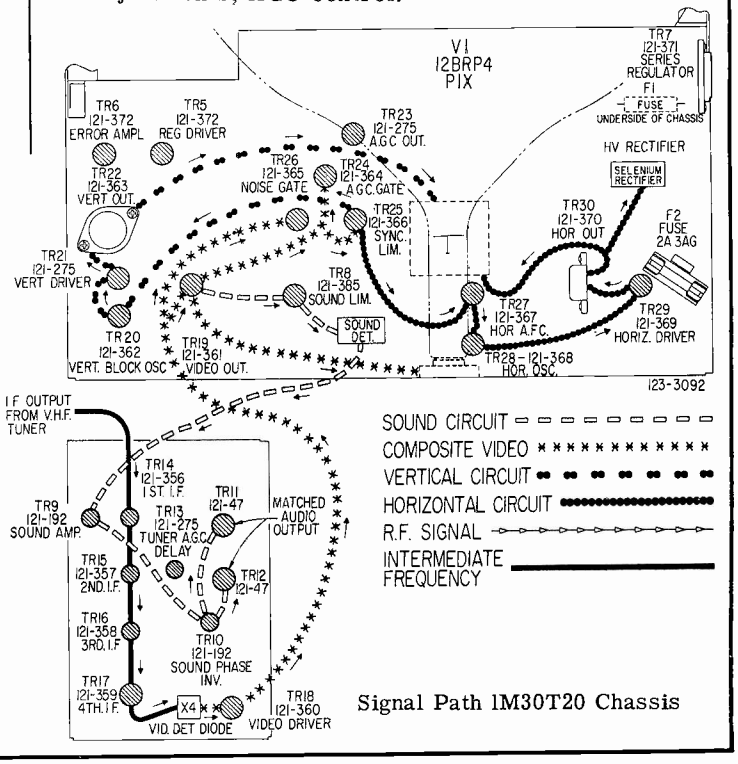
Adjust top core of transformer (T2) for 4.5MC marker to appear near zero (slightly off the center of "S" curve. Adjust bottom core for maximum amplitude of both peaks in the response curve.

Readjust top core for 4.5MC marker to appear at exact zero (center of "S" curve). Readjust top and bottom cores alternately for maximum gain and symmetry with 4.5MC marker at center of "S" curve.

After the sound alignment is completed, reset first the Video Bias control for +3 volts on collector of TR19 and then the AGC control for normal TV operation.

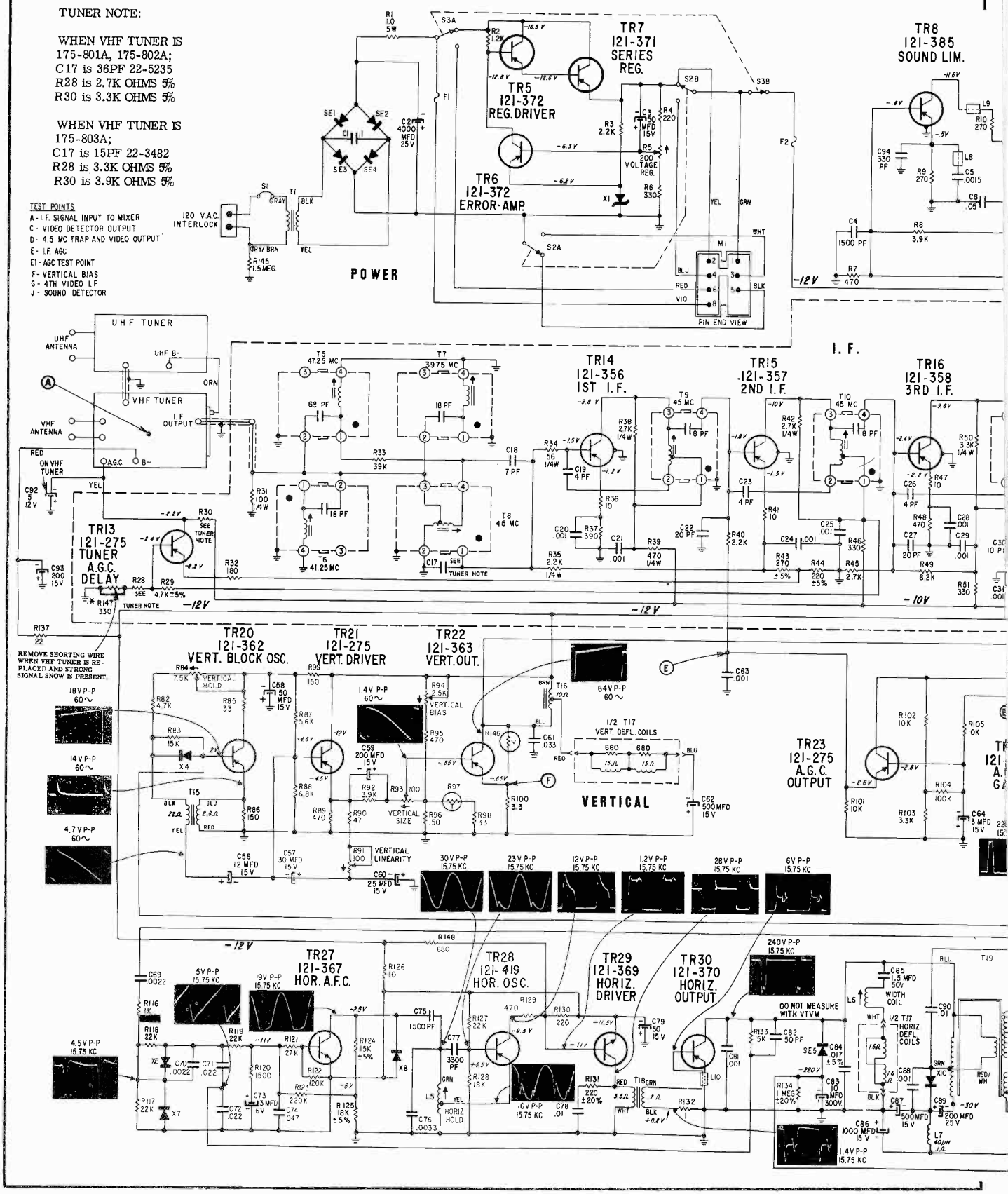
The Bias control (R66) must be reset for +3 volts reading on collector of Video Output transistor (TR19) when the AGC control is fully to the left.

The AGC control then is reset as instructed under Adjustments, AGC control.

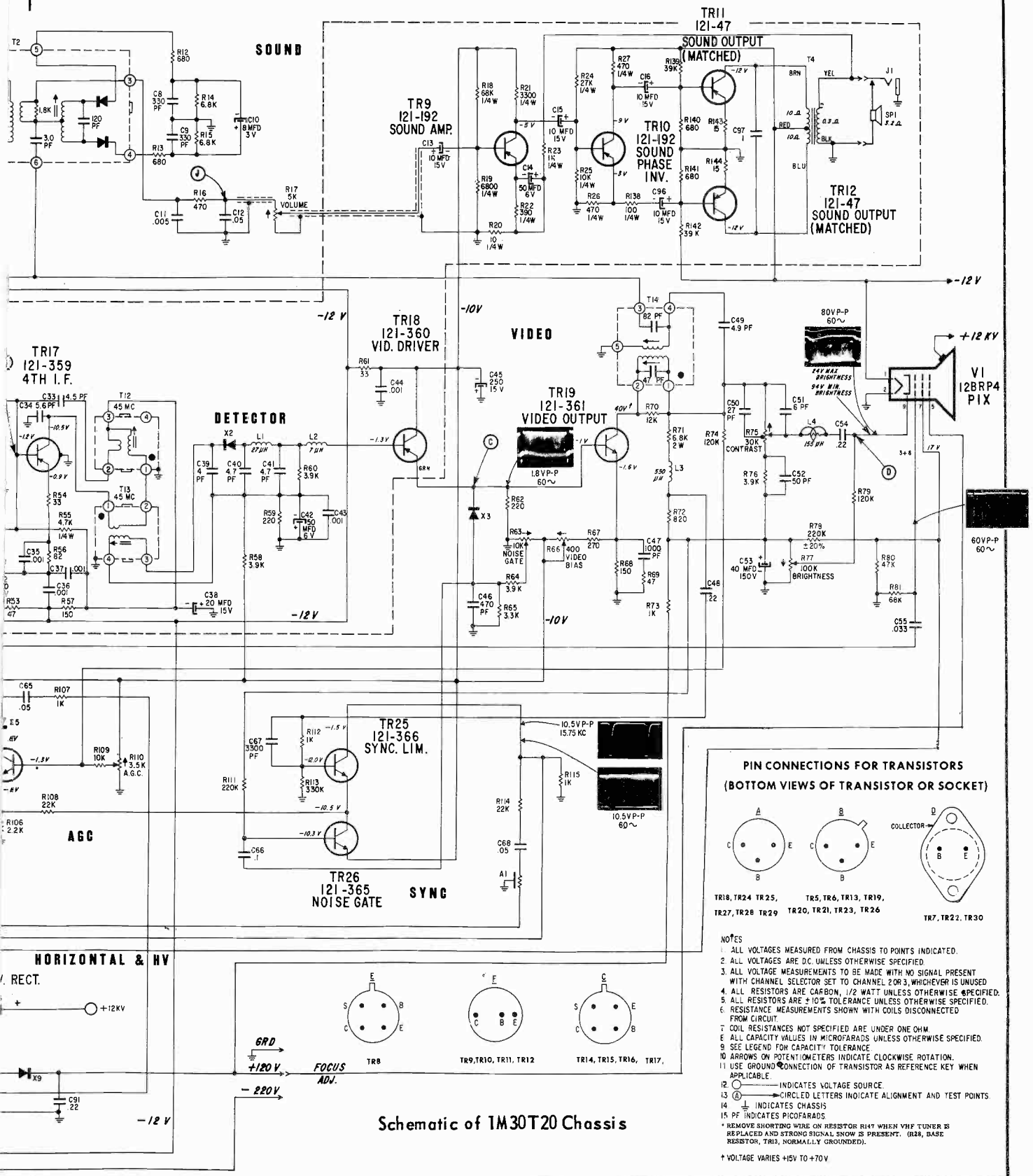


Signal Path 1M30T20 Chassis

ZENITH Chassis 1M30T20 Schematic Diagram



ZENITH Chassis 1M30T20 Schematic Diagram, Continued



PIN CONNECTIONS FOR TRANSISTORS
(BOTTOM VIEWS OF TRANSISTOR OR SOCKET)

TR18, TR24 TR25, TR27, TR28 TR29 — TR5, TR6, TR13, TR19, TR20, TR21, TR23, TR26 — TR7, TR22, TR30

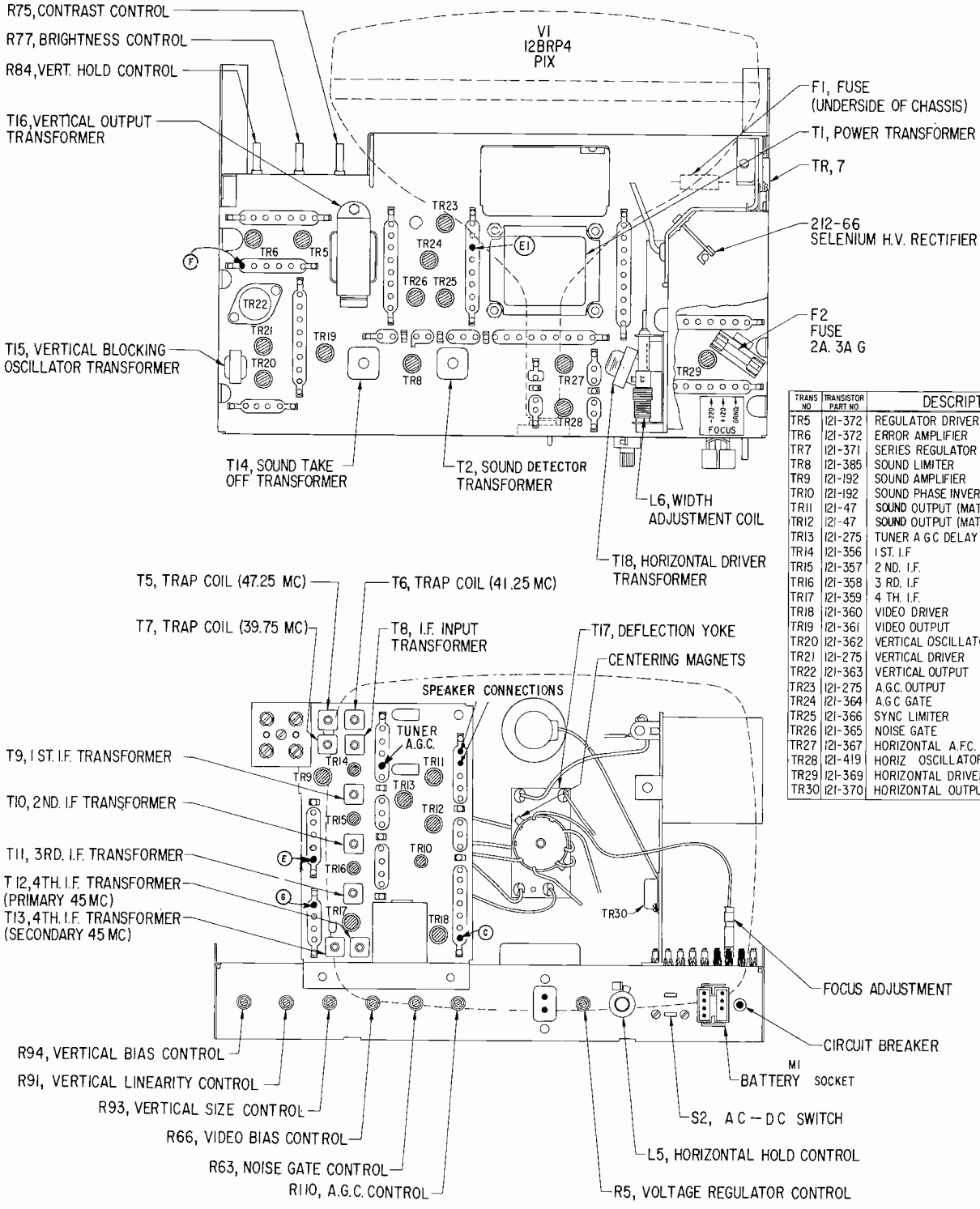
TR8 — TR9, TR10, TR11, TR12 — TR14, TR15, TR16, TR17

NOTES
1. ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED.
2. ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
3. ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT WITH CHANNEL SELECTOR SET TO CHANNEL 2 OR 3, WHICHEVER IS UNUSED
4. ALL RESISTORS ARE CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
5. ALL RESISTORS ARE ±10% TOLERANCE UNLESS OTHERWISE SPECIFIED.
6. RESISTANCE MEASUREMENTS SHOWN WITH COILS DISCONNECTED FROM CIRCUIT.
7. COIL RESISTANCES NOT SPECIFIED ARE UNDER ONE OHM.
8. ALL CAPACITY VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
9. SEE LEGEND FOR CAPACITY TOLERANCE.
10. ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.
11. USE GROUND CONNECTION OF TRANSISTOR AS REFERENCE KEY WHEN APPLICABLE.
12. ○ INDICATES VOLTAGE SOURCE.
13. Ⓐ CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS.
14. ⏚ INDICATES CHASSIS.
15. PF INDICATES PICOFARADS.

* REMOVE SHORTING WIRE ON RESISTOR R147 WHEN VHF TUNER IS REPLACED AND STRONG SIGNAL SNOW IS PRESENT. (R28, BASE RESISTOR, TR13, NORMALLY GROUNDED).

† VOLTAGE VARIES +15V TO +70V.

ZENITH Chassis 1M30T20 Service Information, Continued



TRANS NO	TRANSISTOR PART NO	DESCRIPTION
TR5	121-372	REGULATOR DRIVER
TR6	121-372	ERROR AMPLIFIER
TR7	121-371	SERIES REGULATOR
TR8	121-385	SOUND LIMITER
TR9	121-192	SOUND AMPLIFIER
TRI0	121-192	SOUND PHASE INVERTER
TRI1	121-47	SOUND OUTPUT (MATCHED)
TRI2	121-47	SOUND OUTPUT (MATCHED)
TRI3	121-275	TUNER A G C DELAY
TRI4	121-356	I ST. I.F
TRI5	121-357	2 ND. I.F.
TRI6	121-358	3 RD. I.F
TRI7	121-359	4 TH. I.F.
TRI8	121-360	VIDEO DRIVER
TRI9	121-361	VIDEO OUTPUT
TR20	121-362	VERTICAL OSCILLATOR
TR21	121-275	VERTICAL DRIVER
TR22	121-363	VERTICAL OUTPUT
TR23	121-275	A.G.C. OUTPUT
TR24	121-364	A.G.C GATE
TR25	121-366	SYNC LIMITER
TR26	121-365	NOISE GATE
TR27	121-367	HORIZONTAL A.F.C.
TR28	121-419	HORIZ OSCILLATOR
TR29	121-369	HORIZONTAL DRIVER
TR30	121-370	HORIZONTAL OUTPUT

Layout of 1M30T20 chassis showing the Transistors, Controls, Alignment and test point locations

ZENITH RADIO CORPORATION

ZENITH

MODELS WITH CHASSIS 14N26, 14N29, 14N32 AND 14N34

MODEL AND CHASSIS INFORMATION

1966 MODELS WITH "N" CHASSIS

MODEL	TYPE	CHASSIS	VHF TUNER	SPACE COMMAND	PICTURE TUBE
N2000CA,CVA	Portable	14N29	DeLuxe Video		19EZP4
N2001LA,LVA	Portable	14N29	DeLuxe Video		19EZP4
N2002WA,WVA	Portable	14N29	DeLuxe Video		19EZP4
N2180L,LV	Portable	14N26	DeLuxe Video		21FXP4
N2185X,XV	Portable	14N26	Super G.V.G.		21FXP4
N2190H,HV,W,WV	Portable	14N26	Super G.V.G.		21FXP4
N2205Ll,LVl	Portable	14N34	Super G.V.G.	300	19EZP4
N2270W	Portable	14N26	DeLuxe Video	300	21FXP4
T1978L5A,X5A	Portable	14N29	DeLuxe Video		19EZP4
T1982G5A,L5A	Portable	14N32	DeLuxe Video		19EZP4

FOCUS

14N26, 14N34 chassis:
Screwdriver adjustment, rear of chassis.

ALL OTHER chassis:
Adjusted by means of a three position tap.

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS

A screwdriver adjustment at the rear of the chassis is used to adjust width and the sleeve on the neck of the picture tube is used to adjust linearity.

The sleeve is installed with the slot to the left when facing the rear of set. The initial width and linearity adjustment is made by turning the width control to its maximum counterclockwise position and sliding the sleeve to optimize linearity. The width control is then advanced to obtain correct width.

AGC ADJUSTMENT

Tune in a strong TV signal and slowly turn the AGC control until a point is reached where the picture distorts and buzz is heard in the sound. The control should then be backed down from this position and set at a point comfortably below the level of intercarrier buzz, picture distortion and improper sync.

CAUTION: Misadjustment of the AGC control can result in a washed-out picture, distorted picture, buzz in the sound or complete loss of picture and sound.

AFC ADJUSTMENT

The horizontal hold control is equipped with a stop which limits knob rotation to approximately 270 degrees. To adjust the AFC, remove the knob and turn the shaft to a position where it is virtually impossible to disrupt horizontal synchronization when switching from channel to channel. After adjustment, install the knob with its pointer centered between the stops.

CENTERING ADJUSTMENT

The centering assembly is built into the yoke housing. This assembly is made of two magnetic rings which can be rotated by means of tabs. Centering is accomplished by gradually rotating each tab separately and/or rotating both tabs simultaneously until the picture is centered.

CORRECTOR MAGNET ADJUSTMENT

Two corrector magnets are used in all 23 inch models to obtain straight, sharply focused sweep lines across the face of the picture tube. The magnets are mounted on the deflection coil support bracket. Adjustment is made by bending the flexible arms sideways and up and down. Correct adjustment has been made at the factory and readjustment should not be required unless the brackets have been accidentally bent out of position. If this occurs, proceed as follows:

1. With the vertical and horizontal size controls, reduce the size of the picture to a point where the four corners and sides are visible. (In some receivers it is not possible to reduce the picture sufficiently to see all sides and it may be necessary to shift the picture with the centering control to view one side at a time.)

2. Bend the corrector magnet arms until the corners become right angles and the top of the raster is parallel with the bottom and the left side is parallel with the right side. After adjustment, the picture should be restored to normal size.

NOTE: Misadjustment of the corrector magnets may cause pincushioning, barreling, keystoning, poor linearity, etc.

ZENITH Chassis 14N26, 14N29, 14N32, 14N34, Alignment Information

ALIGNMENT

SOUND ALIGNMENT

Proper alignment of the 4.5 Mc intercarrier sound channel can only be made if the signal to the receiver antenna terminals is reduced to a level below the limiting point of the Gated Beam Sound Detector. This level can be easily identified by the "hiss" that accompanies the sound. Various methods may be used to reduce the signal level, however, a step attenuator is recommended for most satisfactory results. Alignment is made as follows:

1. Connect the step attenuator between the antenna and the receiver antenna terminals.

2. Tune in a TV signal. Adjust the step attenuator until the signal is attenuated to a level where a "hiss" is heard with the audio.

3. Adjust the sound take-off coil (top and bottom cores), intercarrier transformer, quadrature coil and buzz control for the best quality sound and minimum buzz. It must be remembered that any of these adjustments may cause the "hiss" to disappear and further reduction of the signal will be necessary to prevent the "hiss" from disappearing during alignment.

IF ALIGNMENT

A suitable VHF and UHF sweep generator in conjunction with an accurate marker must be used for IF and tuner alignment work. It is extremely important to terminate the output cable properly and to check for a reactive attenuator. If the attenuator is reactive or if the output cable is improperly terminated, correct alignment cannot be made since the degree of attenuation may change the shape as well as the amplitude of the response curve. The attenuator should only vary the amplitude and not the shape of the response curve.

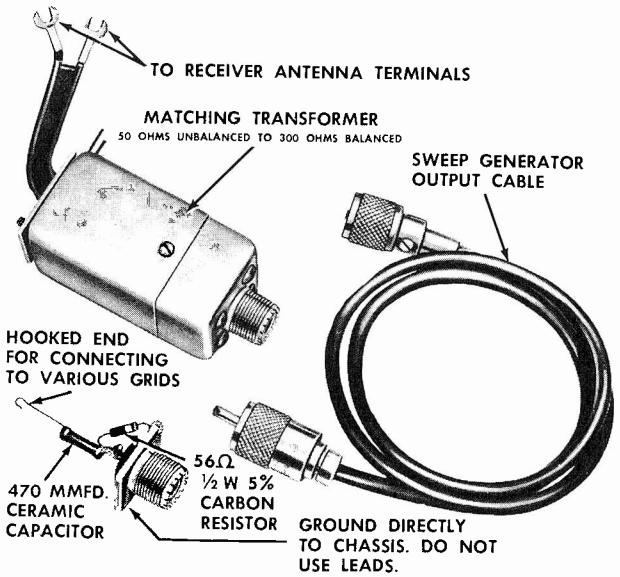


Fig. 1. Alignment Fixtures for IF-RF

VIDEO IF ALIGNMENT 14N26 CHASSIS

Refer to the appropriate schematic diagram, tube and trimmer layout.

1. (a) On the 700 series tuners; slowly turn the channel selector until it rests between channels 12 and 13. This will prevent an erroneous response.
   (b) On the 640 and 750 series; turn the selector until it rests on channel 13.
   (c) On the 500 series; turn the selector until it rests between any two channels.

2. Connect an oscilloscope through a 10,000 ohm isolation resistor to terminal "C" (detector). Connect the ground lead to chassis. In the 14M28Z chassis, the control should be set at mid range, all others at extreme counter-clockwise position.

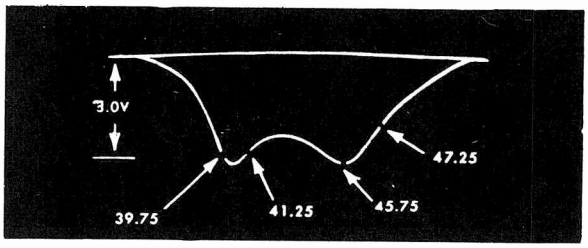


Fig. 2. 4th IF Response

3. Feed the sweep generator through a special terminating network as shown in Fig. 1. to Point "G" (Grid of the 3rd IF). Adjust generator to obtain a response similar to Fig. 2. with a detector output of 3 volts peak to peak. Do not exceed this level during any of the adjustments.

4. Set the marker generator to 45.75 Mc and alternately adjust the top and bottom cores of the 4th IF for maximum gain and symmetry with the 45.75 Mc marker positioned as shown in Fig. 2. The two peaks must be equal in height and the high frequency peak at 45.75 Mc. If the correct response cannot be obtained, check the position of the cores to see that they are not butted. The cores should be entering their respective windings from the opposite ends of the coils.

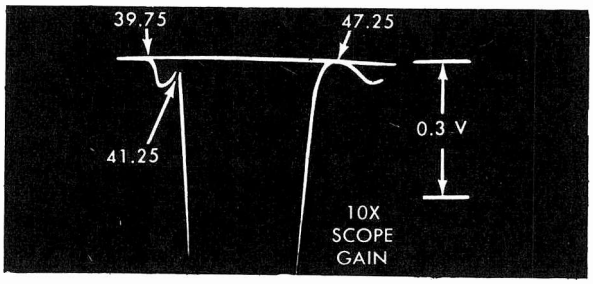


Fig. 3. Expanded View of Traps

5. Connect the sweep generator to terminal "A" (converter grid). Connect terminal "F" to chassis and connect a jumper between terminal "E" and chassis. Adjust the sweep to obtain a 3V. P.P. response similar to Fig. 5. Switch oscilloscope to 10X gain to "blow up" the traps (Fig 3).

6. Refer to Fig.3. and adjust the 39.75 Mc and the 41.25 Mc traps for minimum marker amplitude. Disconnect the jumper between "E" and chassis. Connect this jumper between "E" and the junction of the 22 (68 in the 14M28Z chassis) and 1800 ohm resistors in the cathode of the first IF. This provides an additional "blow up" of the 47.25 Mc traps (Fig. 4). Adjust the 47.25 Mc traps (the 15M22 chassis has two 47.25 Mc traps and the others have one) for minimum marker amplitude.

ZENITH Chassis 14N26, 14N29, 14N32, 14N34, Alignment, Continued

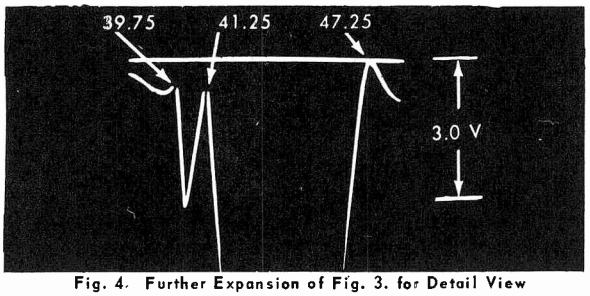


Fig. 4. Further Expansion of Fig. 3. for Detail View of the 39.75 and 47.35 Mc Traps.

7. Disconnect the jumper between "E" and the 22 and 1800 ohm cathode resistors. Connect this jumper between "E" and chassis. Adjust sweep generator for 3 volts peak to peak output at the second detector. Alternately, adjust the 2nd, 3rd, 1st IF and the converter plate coil until an overall response similar to Fig. 5.

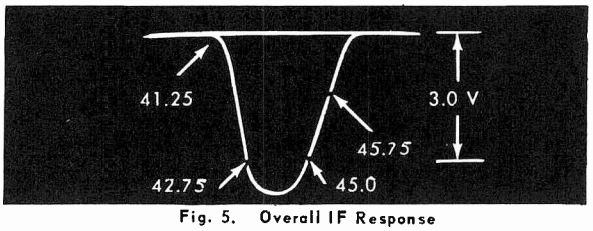


Fig. 5. Overall IF Response

VIDEO IF ALIGNMENT
14N29, 14N32 AND 14N34 CHASSIS

1. Slowly turn the channel selector until the tuner rotor is made to rest between two channels. This will prevent an erroneous response.

2. Connect an oscilloscope through a 10,000 ohm isolation resistor to terminal "C" (detector). Connect the ground lead to chassis. Set the peak picture control to mid-range.

3. Feed the sweep generator through a special terminating network as shown in Fig. 1. to Point "G" (Pin 1 of the 3rd IF). Adjust generator to obtain a response similar to Fig. 7. Do not exceed the 3 volt peak to peak detector output during any of the following adjustments.

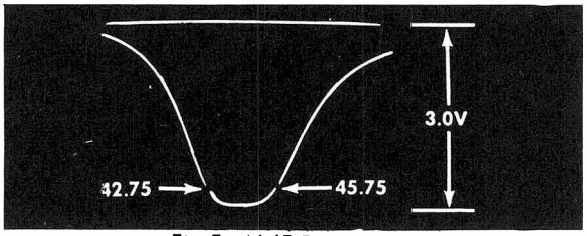


Fig. 7. 4th IF Response

4. Set the marker generator to 45.75 Mc and alternately adjust the top and bottom cores of the 4th IF for maximum gain and symmetry with the 45.75 Mc and the 42.75 Mc markers positioned as shown in Fig. 7. If the correct response cannot be obtained, check the cores to see that they are not butted but are entering their respective windings from the opposite ends of the coil.

5. Connect the sweep generator to terminal "A" converter grid (Refer to appropriate tuner tube and trimmer layout). Connect terminal "F" to chassis and connect a jumper between terminal "E" and the bottom end of the 68 ohm resistor in the cathode of the first IF. This provides a "blow up" of the 47.25 Mc trap (Fig. 8). Adjust the 47.25 Mc trap for minimum marker amplitude.

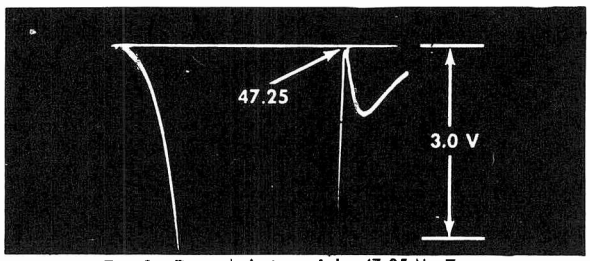


Fig. 8. Expanded view of the 47.25 Mc Trap

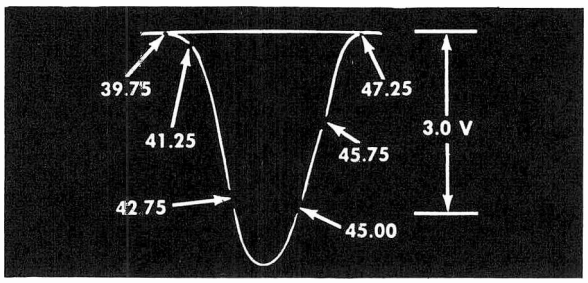
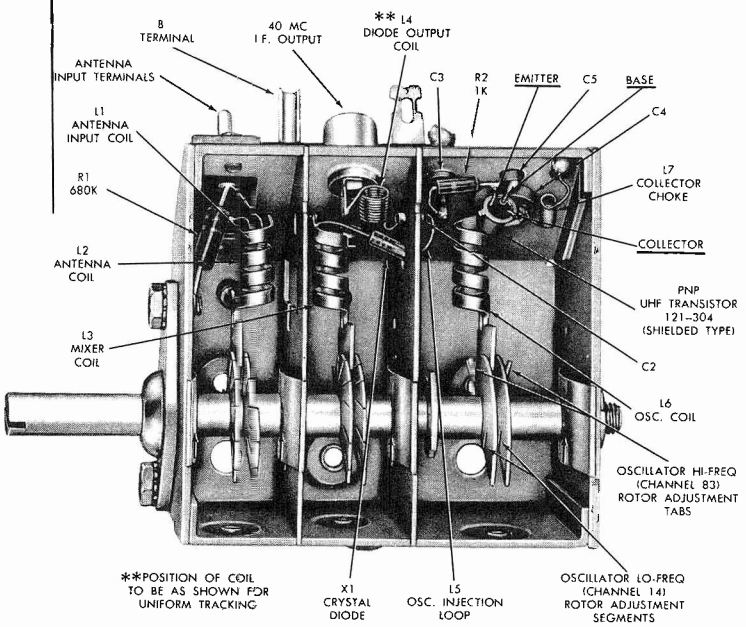


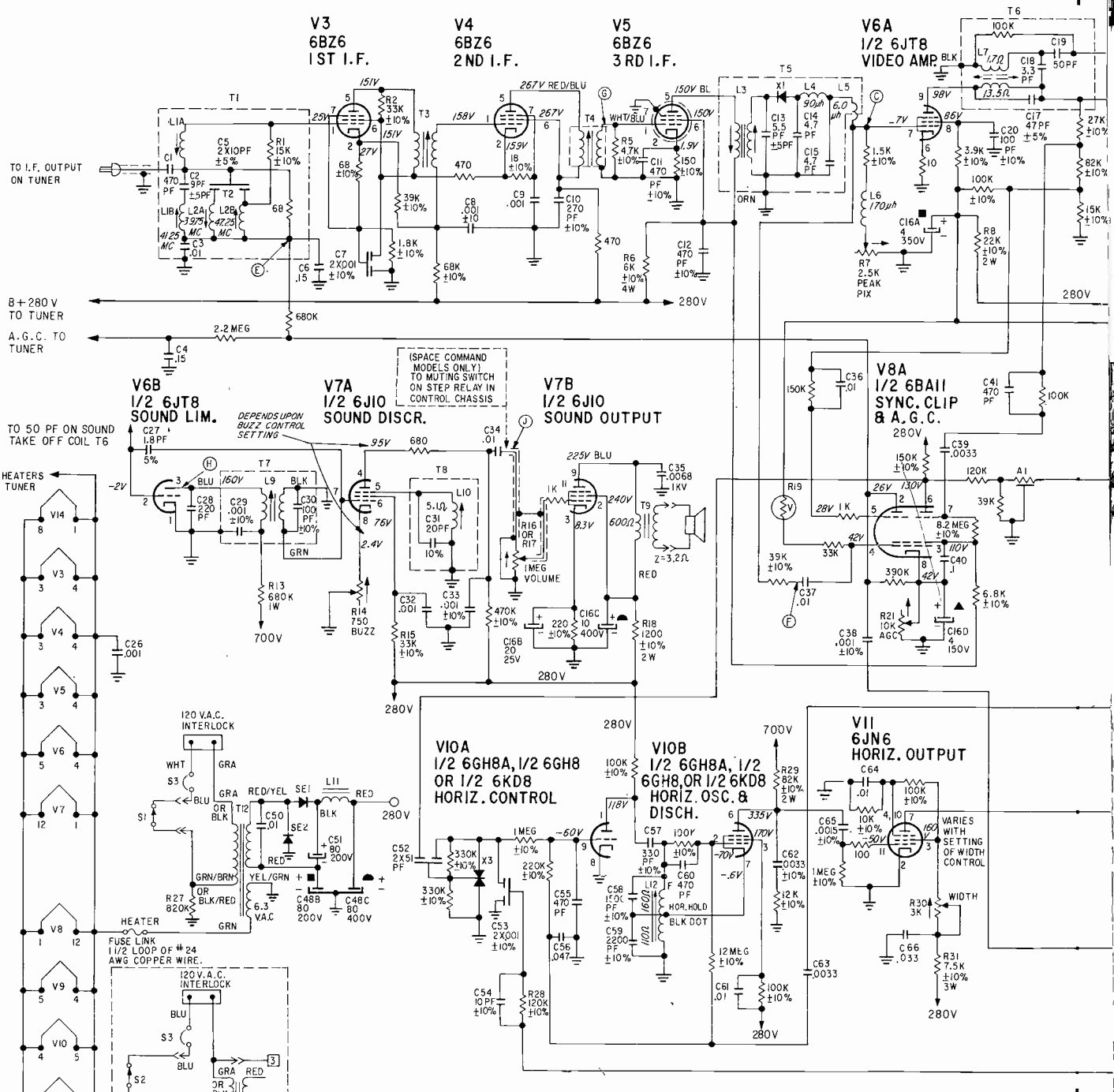
Fig. 9. Overall IF Response

6. Disconnect the jumper between "E" and the bottom end of the 68 ohm cathode resistor. Connect this jumper between "E" and the chassis. Adjust sweep generator for 3 volts peak to peak output at the second detector. Alternately, adjust the 2nd, 3rd, 1st IF and the converter plate coil until an overall response similar to Fig. 9. is obtained. It will be found that the 2nd IF affects the low side (42.75 Mc) and the 3rd IF the high side of the response. Remove jumpers after alignment.



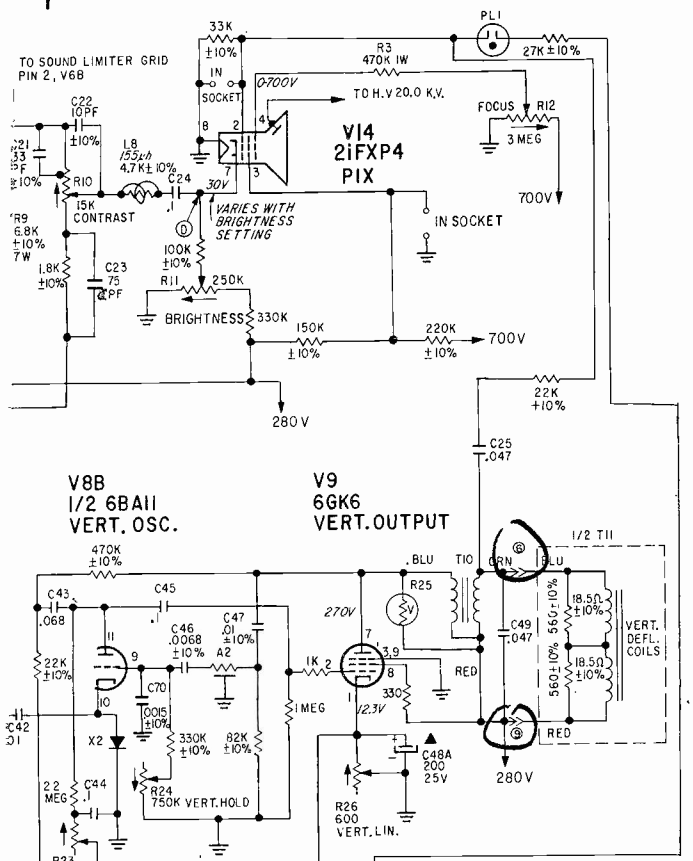
UHF Tuners 175-34A,B,F,J

ZENITH Chassis 14N26 Schematic Diagram



Schematic of the 14N26 chassis.

ZENITH Chassis 14N26 Schematic Diagram, Continued



NOTES.

ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED.

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE.

ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT. NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED.

ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

ALL CAPACITOR CAPACITY TOLERANCE ± 20% UNLESS OTHERWISE SPECIFIED.

ALL RESISTORS ARE ± 20% TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.

RESISTANCE MEASUREMENTS SHOWN WITH COIL DISCONNECTED FROM CIRCUIT.

COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM.

ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.

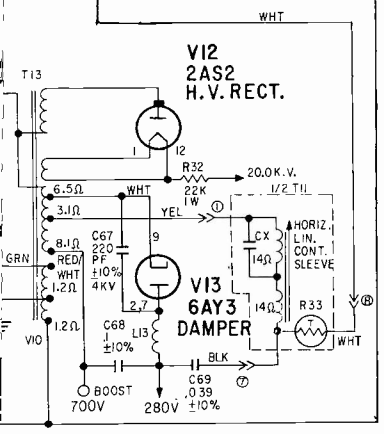
CHASSIS — INDICATES VOLTAGE SOURCE.

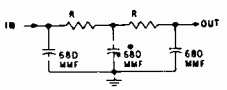
PICTURE TUBE 2ND ANODE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC KILOVOLTMETER WITH BRIGHTNESS AND CONTRAST CONTROLS FULL COUNTER-CLOCKWISE

CX= CAPACITOR VALUE SELECTED FOR MINIMUM YOKE RINGING. VARIES WITH A RANGE OF 47 PF TO 72 PF (3 K V., ± 10%). WHEN NECESSARY, REPLACE WITH EXACT VALUE FOUND IN YOKE.

CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS WHERE APPLICABLE.

C - DETECTOR OUTPUT
D - VIDEO OUTPUT
E - I.F. AGC
F - GROUNDED FOR I.F. ALIGNMENT
G - 3RD I.F. GRID
H - SOUND LIMITER PLATE
J - SOUND OUTPUT
P - SOUND DISC GRID



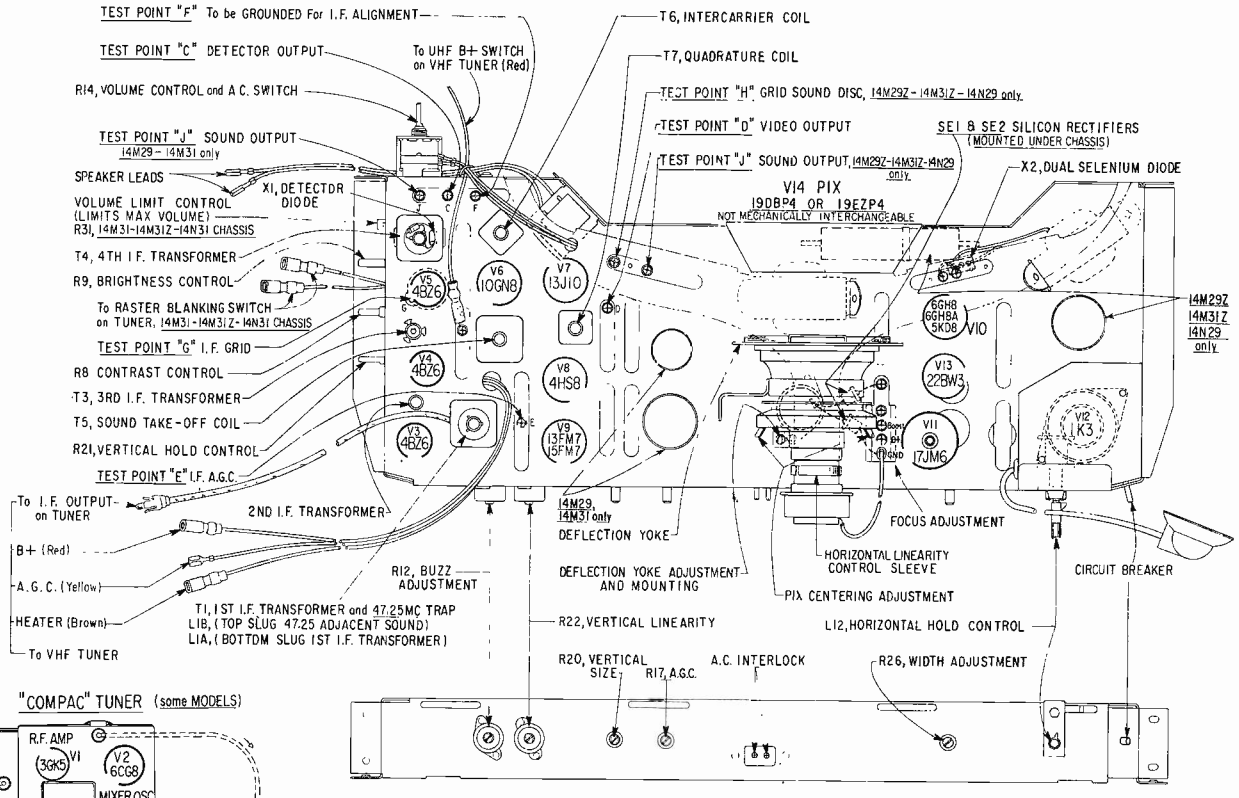


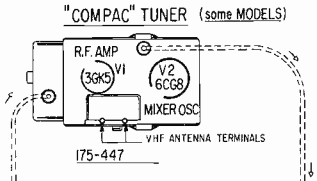
EQUIVALENT CIRCUIT A-1 and A-2 INTEGRATORS

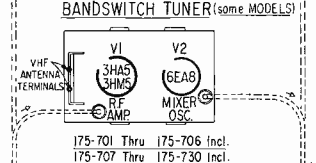
87-7 R is 68K
87-8 R is 82K

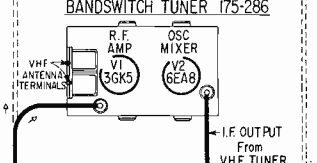
Parts Layout of the 14N26 chassis (top)

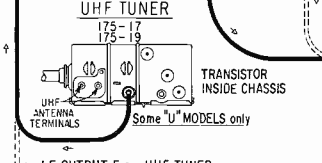
ZENITH Chassis 14N29 Service Information, Continued

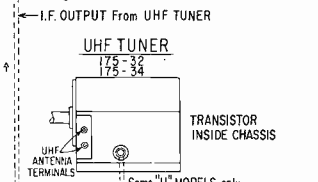






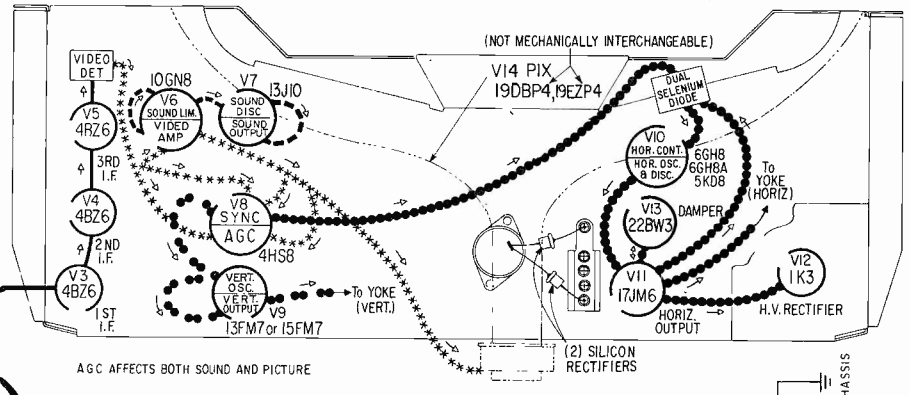






NOTE: REPLACE TUNER TUBE ONLY WITH TUBE TYPE ORIGINALLY SUPPLIED BY ZENITH, AND STAMPED ON TUNER CHASSIS

Parts Layout of the 14N29 chassis (top). Signal path diagram (bottom)

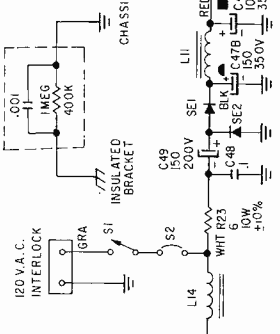


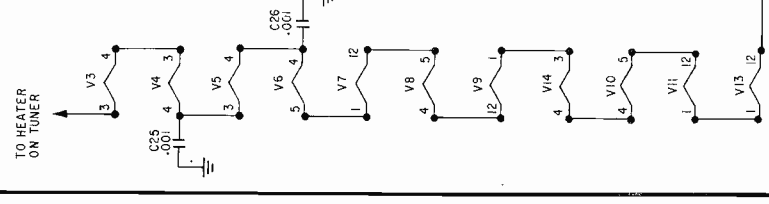
SOUND CIRCUIT
COMPOSITE VIDEO
VERTICAL CIRCUIT
HORIZONTAL CIRCUIT
INTERMEDIATE FREQUENCY

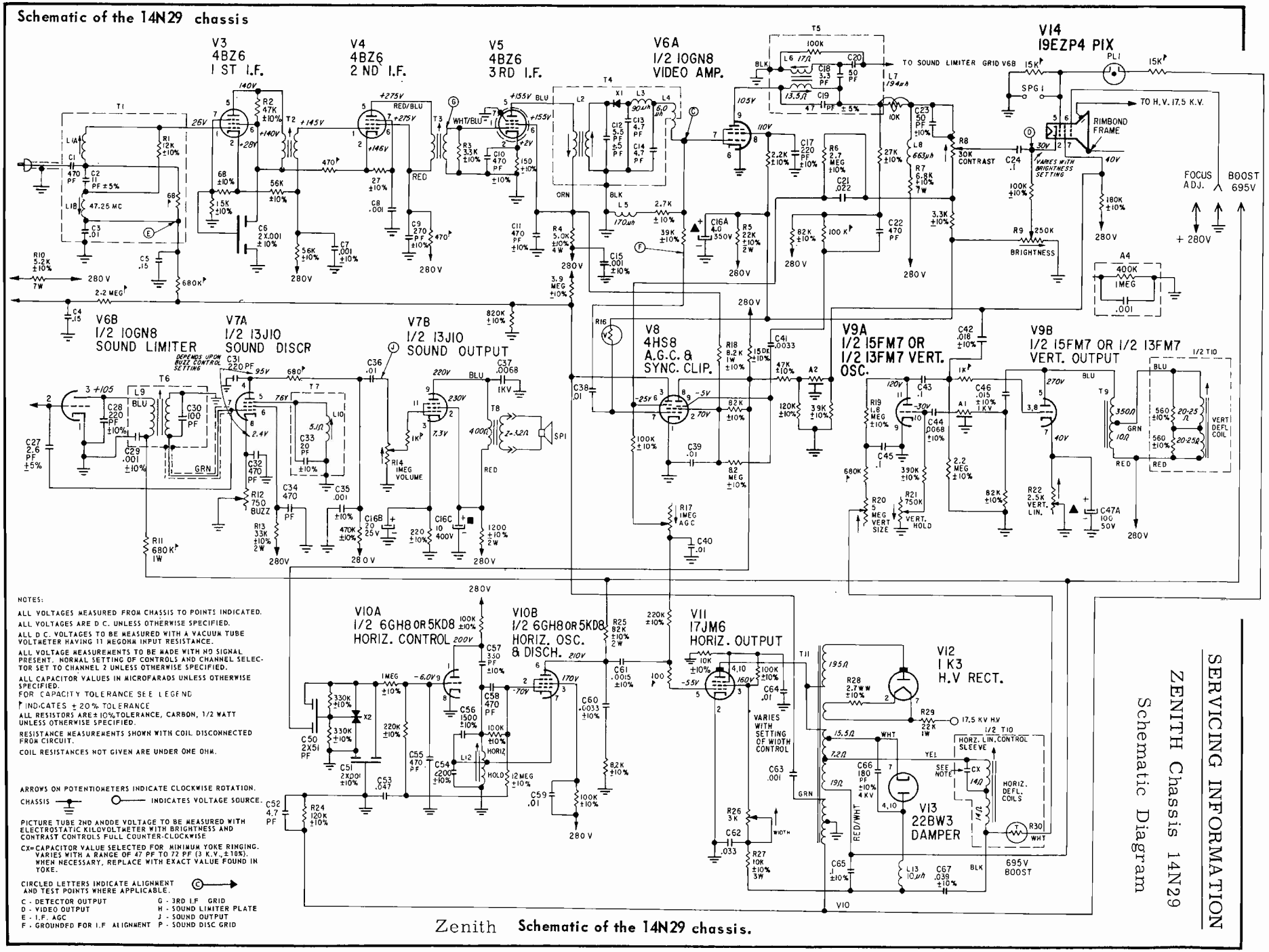
TUBE POSITIONING GUIDE

EQUIVALENT CIRCUIT A-1 and A-2 INTEGRATORS

87-7 R is 68K
87-8 R is 82K







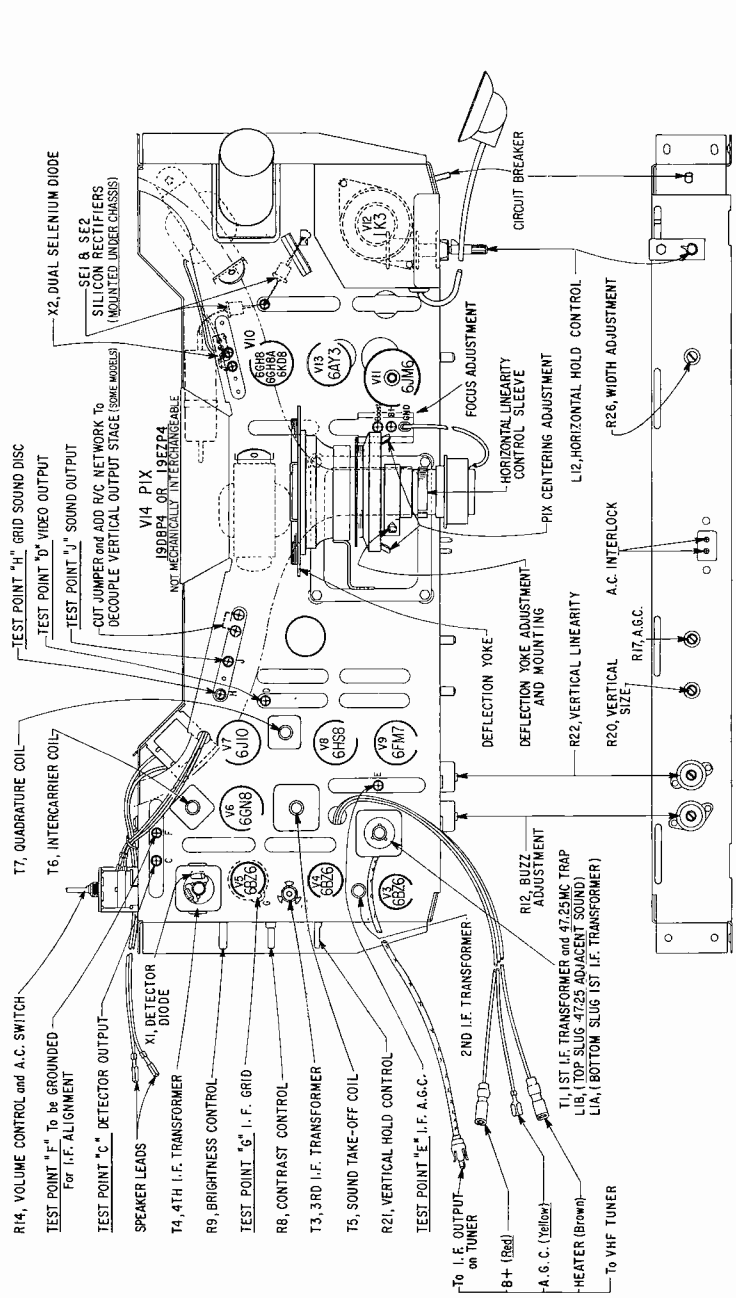
Zenith **Schematic of the 14N29 chassis.**

SERVICING INFORMATION

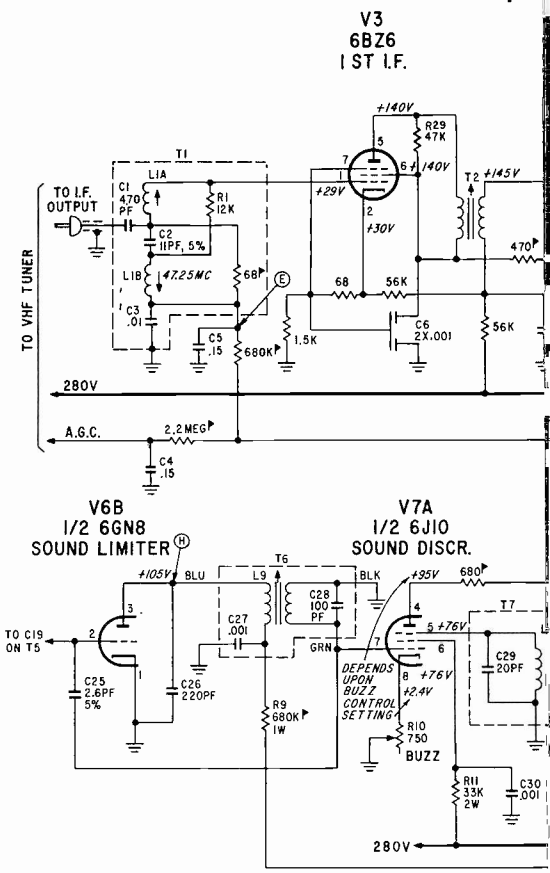
ZENITH Chassis 14N29

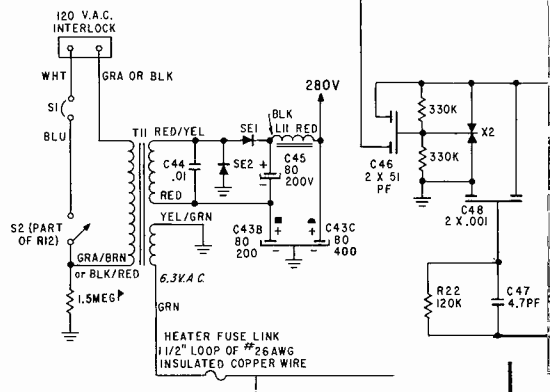
Schematic Diagram

ZENITH Chassis 14N32 Service Information, Continued

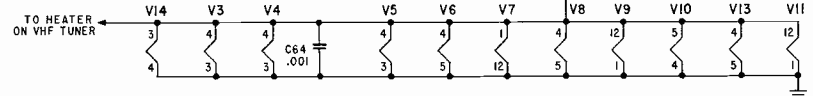


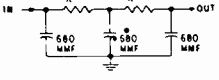
Parts Layout of the 14N32 chassis (top)





T1	S-65135	1ST I.F. & TRAP COIL ASSEMBLY
T2	S-65172	2ND I.F. TRANSFORMER ASSEMBLY
T3	S-57624	3RD I.F. TRANSFORMER ASSEMBLY
T4	S-57625	4TH I.F. TRANSFORMER ASSEMBLY
T5	S-65131	SOUND TAKE-OFF COIL ASSEMBLY
T6	S-67031	INTERCARRIER COIL ASSEMBLY
T7	S-45831	QUADRATURE COIL ASSEMBLY
T8	95-2185	AUDIO OUTPUT TRANSFORMER
T9	95-2186	VERTICAL OUTPUT TRANSFORMER
T10	95-2290	YOKE
T11	95-2311	POWER TRANSFORMER
T12	S-71286	HORIZONTAL SWEEP TRANSFORMER
PL1	100-251	NEON BULB (NE2H)
X1	103-23	DIODE CRYSTAL
X2	103-20	DUAL SELENIUM DIODE
A1	87-7	INTEGRATOR
A2	87-8	INTEGRATOR
SE1	212-60	SILICON RECTIFIER
SE2	212-27	SILICON RECTIFIER
S1	85-763	CIRCUIT BREAKER
S2		PART OF R14 VOLUME CONTROL
SP1		SPEAKER (SHOWN ON CABINET PARTS LIST)
SPG1		PART OF CRT SOCKET



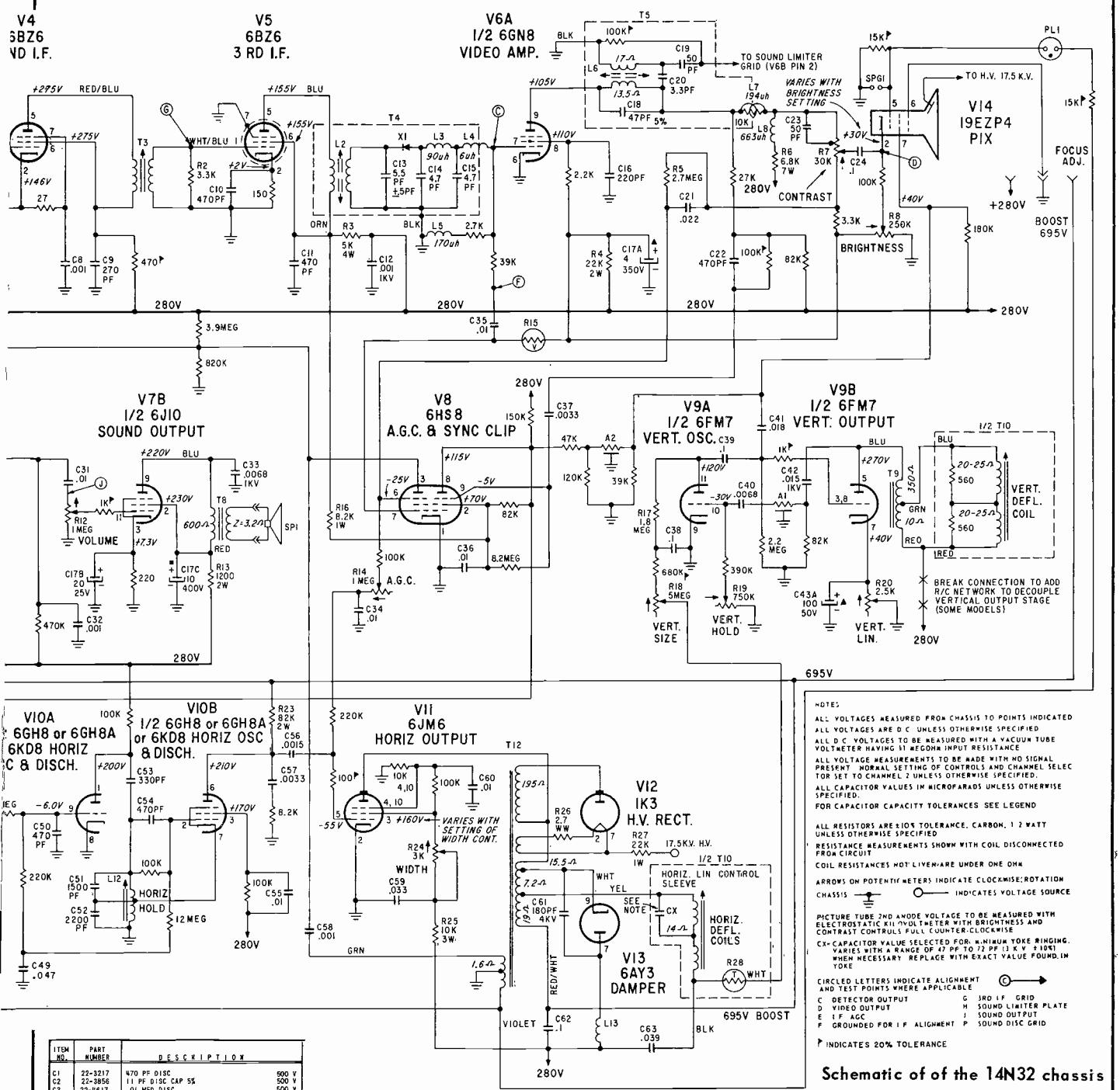


87-7 R is 68K
87-8 R is 82K

EQUIVALENT CIRCUIT
A-1 and A-2 INTEGRATORS

Schematic of the 14N32 chassis.

ZENITH Chassis 14N32 Schematic Diagram, Continued



NOTES

ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED

ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE

ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT. NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED.

ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

FOR CAPACITOR CAPACITY TOLERANCES SEE LEGEND

ALL RESISTORS ARE ±10% TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED

RESISTANCE MEASUREMENTS SHOWN WITH COIL DISCONNECTED FROM CIRCUIT

COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM

ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION

CHASSIS — INDICATES VOLTAGE SOURCE

PICTURE TUBE 2ND ANODE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC KILOVOLTMETER WITH BRIGHTNESS AND CONTRAST CONTROLS FULL COUNTER-CLOCKWISE

CX- CAPACITOR VALUE SELECTED FOR MINIMUM YOKE RINGING. VARIES WITH A RANGE OF 47 PF TO 72 PF (3 K.V. RATING) WHEN NECESSARY REPLACE WITH EXACT VALUE FOUND IN YOKE

CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS WHERE APPLICABLE

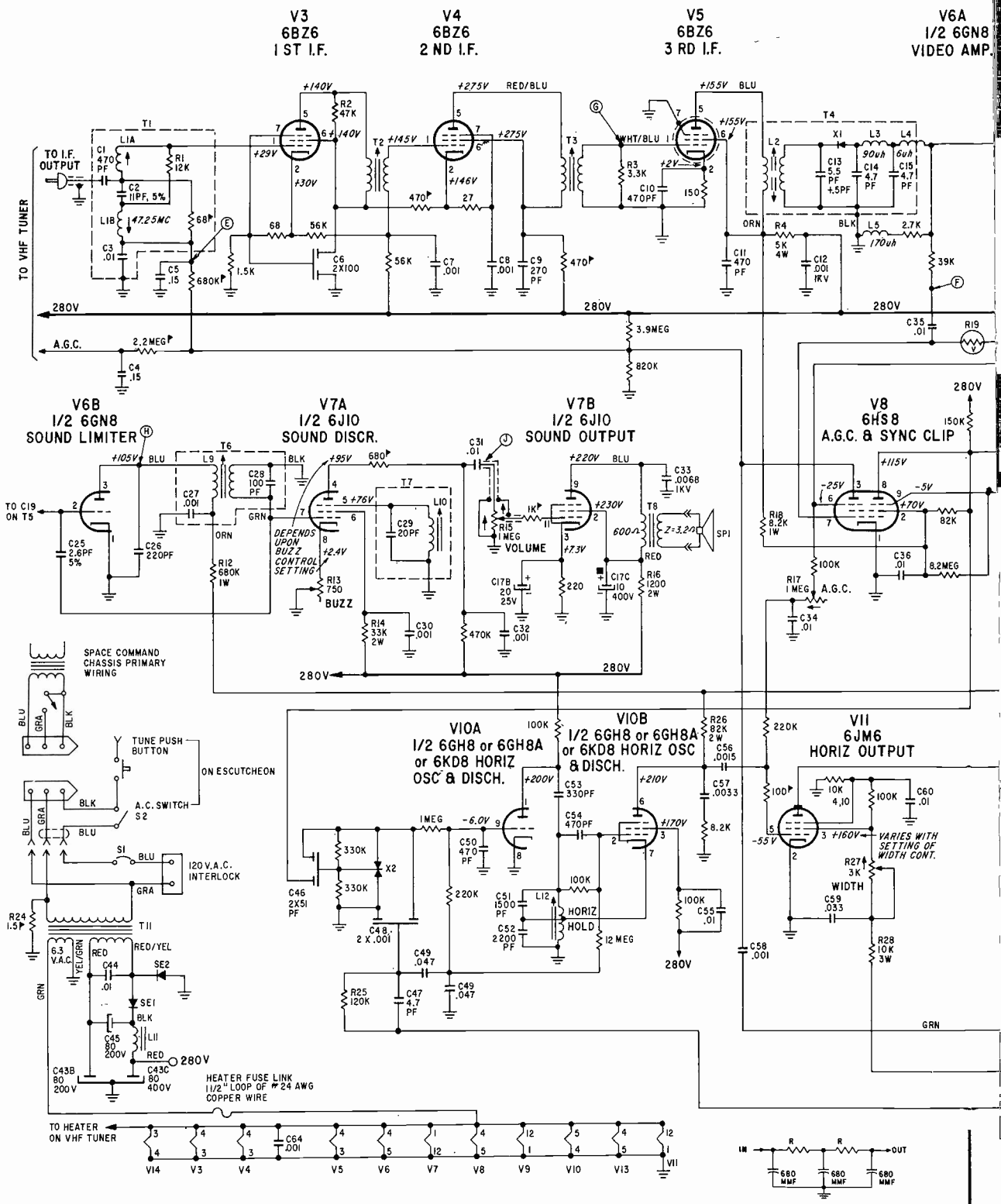
C	DETECTOR OUTPUT	G	3RD I.F. GRID
D	VIDEO OUTPUT	H	SOUND LIMITER PLATE
E	I.F. AGC	J	SOUND OUTPUT
F	GROUNDED FOR I.F. ALIGNMENT	P	SOUND DISC GRID

▶ INDICATES 20% TOLERANCE

Schematic of of the 14N32 chassis

ITEM NO.	PART NUMBER	DESCRIPTION	
C1	22-3217	470 PF DISC	500 V
C2	22-3856	11 PF DISC CAP 5%	500 V
C3	22-4617	.01 MFD DISC	500 V
C4	22-5107	.15 MFD MOLDED	100 V
C5	22-5107	.15 MFD MOLDED	100 V
C6	22-21	2 X .001 MFD DISC 10%	500 V
C7	22-17	.001 MFD DISC 10%	1 KV
C8	22-7	.001 MFD DISC	500 V
C9	22-3140	270 PF DISC 10%	500 V
C10	22-16	470 PF DISC 10%	500 V
C11	22-3363	470 PF DISC 10%	500 V
C12	22-17	.001 MFD DISC 10%	1 KV
C13	22-3221	5.5 PF DISC ± .5 PF	500 V
C14	22-1516	4.7 PF GIMMICK	500 V
C15	22-1516	4.7 PF GIMMICK	500 V
C16	22-2	220 PF DISC	500 V
C17A		4 MFD ELECTROLYTIC	350 V
C17B	22-2744	20 MFD ELECTROLYTIC	25 V
C17C		10 MFD ELECTROLYTIC	400 V
C18	22-2467	47 PF DISC 5%	500 V
C19	22-3515	50 PF DISC	500 V
C20	22-2343	3.3 PF GIMMICK	500 V
C21	22-3884	.022 MFD MOLDED	400 V
C22	22-6	470 PF DISC	1 KV
C23	22-2460	50 PF GIMMICK	500 V
C24	22-3239	.1 MFD MOLDED	400 V
C25	22-3483	2.6 PF GIMMICK 5%	500 V
C26	22-2926	220 PF 10%	500 V
C27	22-3748	001 MFD DISC 10%	1 KV
C28	22-5106	100 PF MICA 10%	500 V
C29	22-3139	20 PF DISC 10%	500 V
C30	22-7	.001 MFD DISC	500 V
C31	22-4617	.01 MFD DISC	500 V
C32	22-17	.001 MFD DISC 10%	1 KV
C33	22-5021	.0068 MFD DISC 10%	1 KV
C34	22-4617	.01 MFD DISC	500 V
C35	22-4617	.01 MFD DISC	500 V
C36	22-4617	.01 MFD DISC	500 V
C37	22-11	.0033 MFD DISC	500 V
C38	22-3577	.1 MFD MOLDED 20%	600 V
C39	22-3239	.1 MFD MOLDED	400 V
C40	22-3756	.0068 MFD MOLDED 10%	200 V
C41	22-3714	.018 MFD MOLDED 10%	400 V
C42	22-3040	.015 MFD MOLDED 10%	1 KV
C43A	22-3872	100 MFD ELECTROLYTIC	50 V
C43B		80 MFD ELECTROLYTIC	200 V
C43C		80 MFD ELECTROLYTIC	400 V
C44	22-4617	.01 MFD DISC	500 V
C45	22-3965	80 MFD ELECTROLYTIC	200 V
C46	22-25	2 X .01 MFD DISC	500 V
C47	22-1516	4.7 PF GIMMICK	500 V
C48	22-21	2 X .001 MFD DISC 10%	500 V
C49	22-3627	.047 MFD MOLDED 20%	100 V
C50	22-6	470 PF DISC	1 KV
C51	22-3916	1500 PF 10%	300 V
C52	22-3960	2200 PF 10%	400 V
C53	22-2627	330 PF MICA 10%	500 V
C54	22-3938	470 PF DISC	500 V
C55	22-4617	.01 MFD DISC	500 V
C56	22-12	.0015 MFD DISC 10%	500 V
C57	22-13	.0033 MFD DISC 10%	500 V
C58	22-7	.001 MFD DISC	500 V
C59	22-3758	.033 MFD MOLDED	400 V
C60	22-4617	.01 MFD DISC	500 V
C61	22-3388	180 PF DISC	4 KV
C62	22-3178	.1 MFD MOLDED 10%	600 V
C63	22-3905	.039 MFD MOLDED 10%	600 V
C64	22-7	.001 MFD DISC	500 V
R1	63-2845	12K OHM A.B. ONLY 10%	1/2 W
R2	63-5384	3.3K OHM A.B. ONLY 10%	1/2 W
R3	63-5038	5K OHM 10%	4 W
R4	63-5728	22K OHM 10%	2 W
R5	63-5240	2.7 MEGOHM A.B. ONLY 10%	1/2 W
R6	63-5338	6.8K OHM 10%	7 W
R7	63-4997	30K OHM CONTRAST CONTROL	
R8	63-5380	250K OHM BRIGHTNESS CONTROL	
R9	63-6188	680K OHM 20%	1 W
R10	63-3284	750 OHM BUZZ CONTROL	
R11	63-5733	33K OHM 10%	2 W
R12	63-6389	1 MEGOHM VOLUME CONTROL (A.C. SWITCH)	
R13	63-5441	1.2K OHM 10%	2 W
R14	63-4831	1 MEGOHM A.G.C. CONTROL	
R15	63-5314	VOLTAGE DEPENDENT RESISTOR	
R16	63-6108	8.2K OHM 10%	1 W
R17	63-4905	1.8 MEGOHM 10% A.B. ONLY	1/2 W
R18	63-5032	5 MEGOHM VERTICAL SIZE CONTROL	
R19	63-5379	750K VERTICAL HOLD CONTROL	
R20	63-4815	2.5K OHM VERTICAL LINEARITY CONTROL	
R22	63-5315	120K OHM I.P.C. ONLY	1/2 W
R23	63-5750	82K OHM 10%	2 W
R24	63-5031	3K WIDTH CONTROL	
R25	63-4097	10K OHM 10%	3 W
R26	63-3631	2.7 OHM W.W.	1/2 W
R27	63-6125	22K OHM 20%	1 W
R28	IN YOKE	THERMAL RESISTOR SUPPLIED WITH YOKE	
R29	63-2672	47K 0.61 ± 10% A.B. ONLY	1/2 W
L1A	S-57621	1ST I.F. & TRAP COIL WINDING ASSEMBLY	
L1B			
L2	S-55140	4TH I.F. COIL WINDING ASSEMBLY	
L3	20-2013	DETECTOR SERIES PEAKING COIL	
L4	20-2004	CHOKE COIL	
L5	20-2014	DETECTOR SHUNT PEAKING COIL	
L6	S-54785	SOUND TAKE OFF COIL WINDING ASSEMBLY	
L7	20-2512	VIDEO SERIES PEAKING COIL	
L8	20-2017	VIDEO SHUNT PEAKING COIL	
L9	S-56705	INTERCARRIER COIL WINDING ASSEMBLY	
L10	S-45229	QUADRATURE COIL WINDING ASSEMBLY	
L11	95-1805	FILTER CHOKE	
L12	S-56876	HORIZ. OSC. COIL WINDING ASSEMBLY	
L13	20-2005	SPOOK CHOKE COIL	

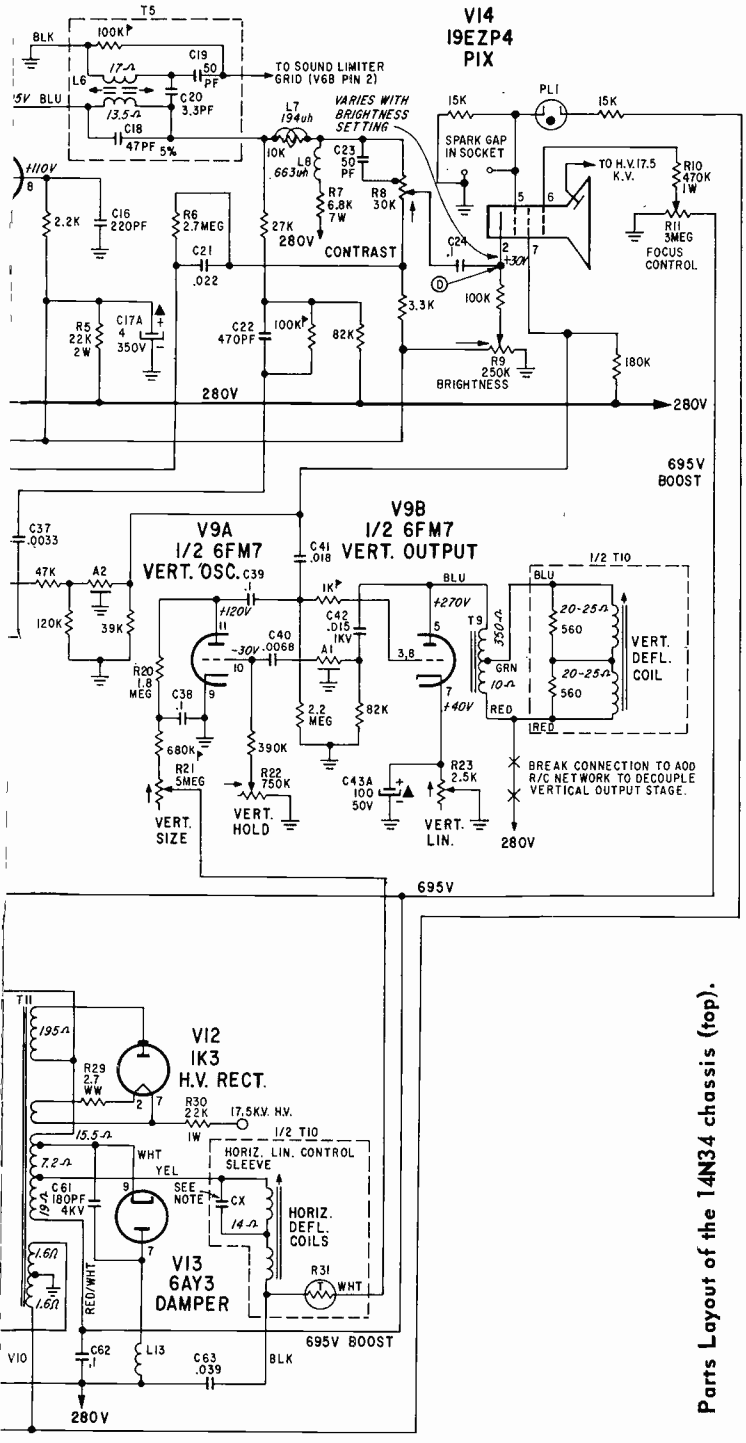
ZENITH Chassis 14N34 Schematic Diagram



Schematic of the 14N34 chassis.

87-7 R is 68K
87-8 R is 82K

ZENITH Chassis 14N34 Schematic Diagram, Continued



Schematic of the 14N34 chassis.

NOTES:

ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED.

ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.

ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE.

ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT. NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED.

ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
FOR CAPACITOR CAPACITY TOLERANCES SEE LEGEND

ALL RESISTORS ARE ±10% TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.

RESISTANCE MEASUREMENTS SHOWN WITH COIL DISCONNECTED FROM CIRCUIT.

COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM.

▶ INDICATES ± 20% TOLERANCE

ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.

CHASSIS ⏚ ○— INDICATES VOLTAGE SOURCE.

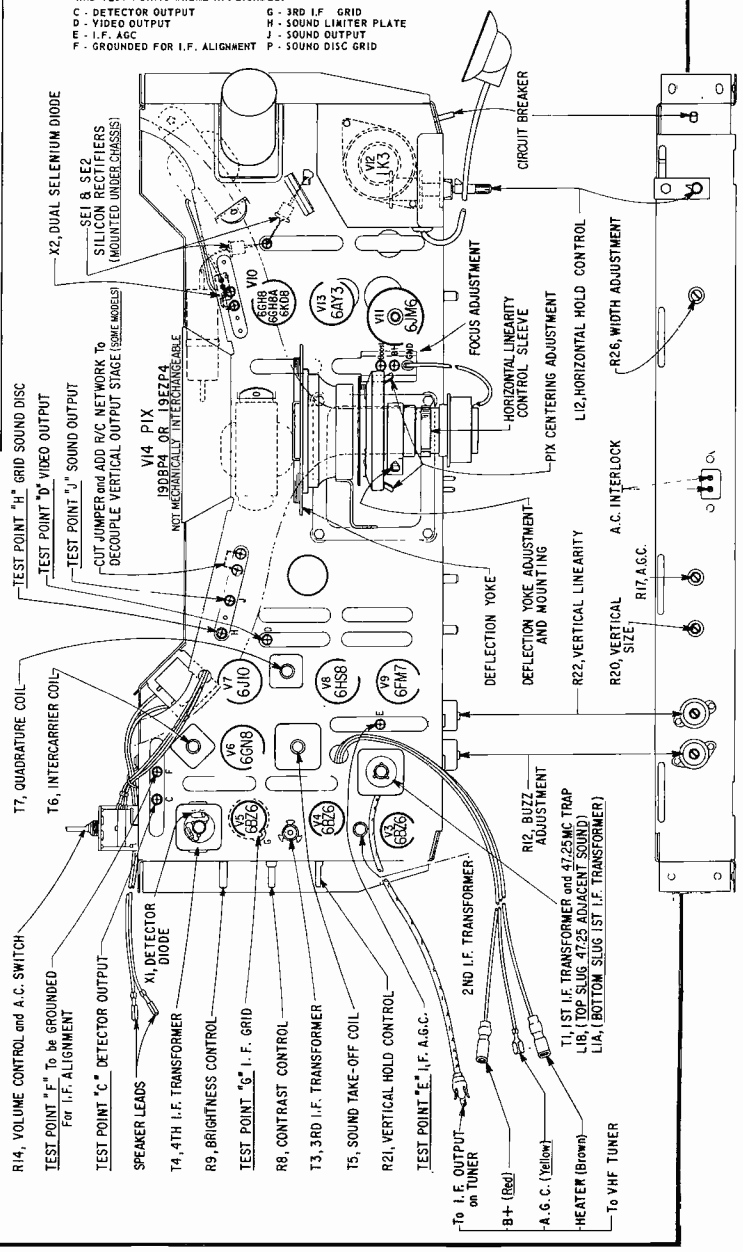
PICTURE TUBE 2ND ANODE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC KILOVOLTMETER WITH BRIGHTNESS AND CONTRAST CONTROLS FULL COUNTER-CLOCKWISE

CX=CAPACITOR VALUE SELECTED FOR MINIMUM YOKE RINGING. VARIES WITH A RANGE OF 47 PF TO 72 PF (3 K.V.,± 10%). WHEN NECESSARY, REPLACE WITH EXACT VALUE FOUND IN YOKE.

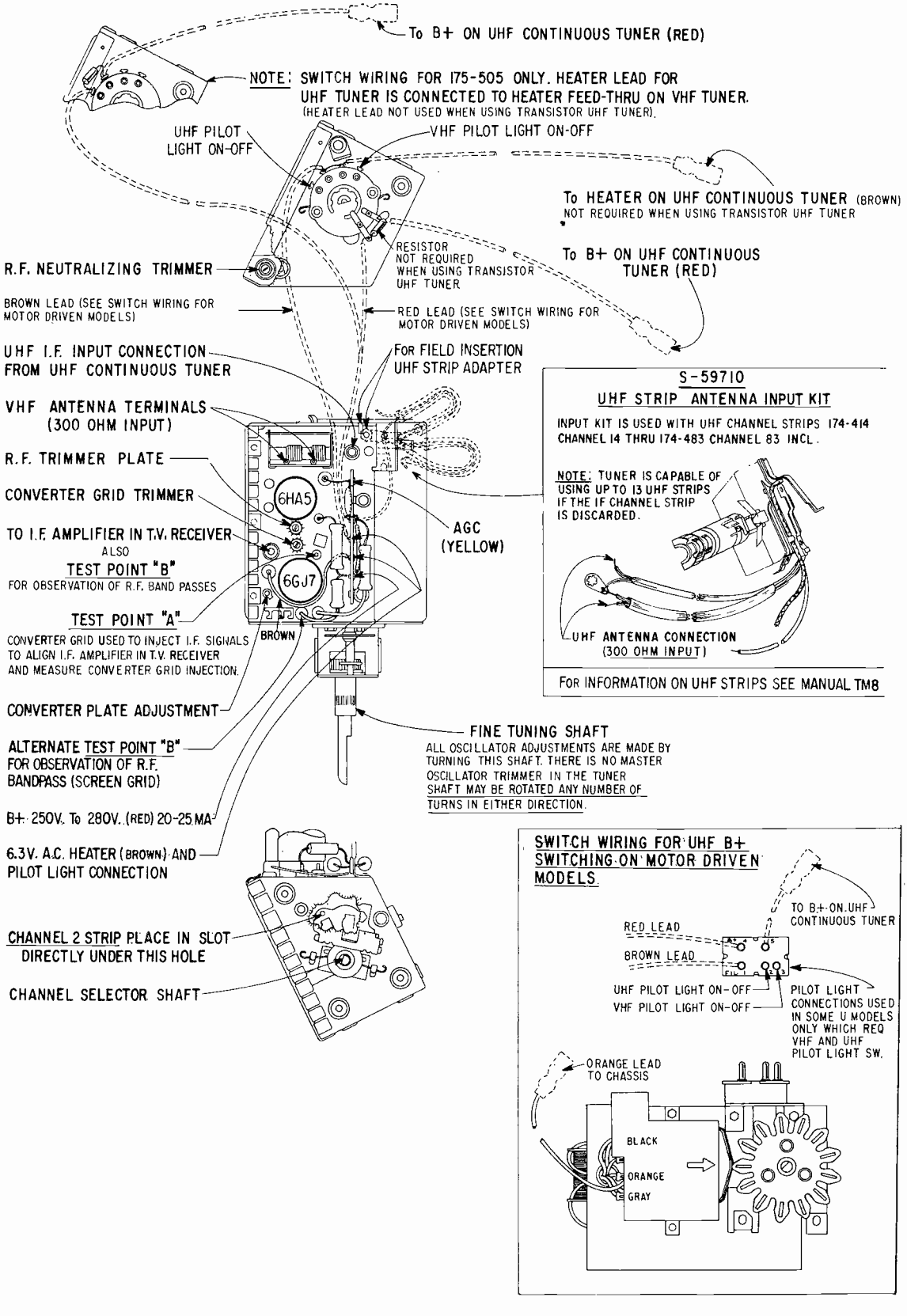
CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS WHERE APPLICABLE. ⓒ→

C - DETECTOR OUTPUT
D - VIDEO OUTPUT
E - I.F. AGC.
F - GROUNDED FOR I.F. ALIGNMENT
G - 3RD I.F GRID
H - SOUND LIMITER PLATE
J - SOUND OUTPUT
P - SOUND DISC GRID

Parts Layout of the 14N34 chassis (top).



ZENITH Tuner used in Chassis 14N26 and 14N34



Representative Layout for Super Gold Video Guard Turret Tuner.

INDEX

Under each manufacturer's name, at left there are listed that make chassis and models in numerical order. The corresponding page number at right of each listing refers to the first page of the section dealing with such material.

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This manual is made up of factory prepared service material. Editorial changes and selections were made to conform with the objectives of this manual. Our sincere thanks and appreciation is extended to every manufacturer whose products are covered by the material in this manual and who aided us in the preparation of this book.

M. N. Beitman, Chief Editor of the Engineering Staff, Supreme Publications.