# MODELS 10TZ1, 10TZ3, 10TZ4, 12TZ1, 12TZ3, 12TZ4, 12TZ6, 15TZ6

**HIGH VOLTAGE WARNING**

OPERATION OF THIS RECEIVER WITH INTERLOCKED BACK COVER REMOVED INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THIS RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT.

(A) SETTING UP THE RECEIVER

1. Remove the two decorative screws, holding the top cabinet strip in place retaining the glass front assembly.
2. Remove the glass front assembly.
3. Remove the three slotted head P.K. screws retaining the back in place and release with interlocked line cord.
4. Remove the two hex head P.K. screws, retaining the line cord at the top center of the back. Remove line cord for use in service operations.
5. Remove the carton containing the Tele-Zoom remote control unit and beam bender if used.
6. Remove the four copper plated shipping screws from the bottom of the cabinet
7. Remove the six "Service Adjustment" plug buttons located at the front of the cabinet.
8. Install the push-on knobs to the respective controls.
9. Remove the Picture tube retaining band held in place by the two wing screws.
10. Check all the other tubes to be sure they are in place and firmly seated in their sockets.
11. Loosen the two Picture tube cushion hood adjustment wing nuts and slide the cushion hood toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.
12. From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wing nuts and raise, lower or rotate the focus coil until the correct alignment is obtained. Tighten the wing nuts with the coil in position.

(B) PICTURE TUBE INSTALLATION

**PICTURE TUBE HANDLING PRECAUTION - Extreme care should be used in handling the picture tube. The Picture tube bulb encloses a high vacuum and, due to its large surface area is subjected to considerable air pressure.**

**The front of the Picture tube, particularly that part of the r m of the viewing surface, must not be struck, scratched, or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into the deflecting yoke or its socket, check and remove the cause of the trouble. Do not under any circumstances force the tube. Keep the carton for possible future shipping use.**

1. Insert the neck of the tube through the deflection yoke and focus coil until the base protrudes about two inches beyond the focus coil. Keep the second anode recessed metal well contact toward the top. The front of the tube should now rest on the three rubber support cushions at the front of the chassis.
2. Orient the Beam Bender Flags located in the neck about 1-1/2 inches from the end of the socket horizontal with the chassis. (Does not apply to 12" direct view tube).
3. Replace the Picture tube retaining band and secure with the two wing screws provided.
4. Slide the Beam Bender over the neck of the tube with the arrow pointing toward the front of the tube in line with the H.V. connector.
5. Connect the Picture tube socket to the tube base.
6. Wipe the Picture tube screen surface and glass front assembly safety glass of all dust and finger marks with a soft cloth moistened with "Windex" or other cleaning agent.
7. From the rear of the cabinet slip the Picture tube cushion hood firmly up against the flare of the tube and tighten the adjustment wing screws.
8. Slide the deflection yoke as far forward as possible.
9. Connect the high voltage lead to the recessed tube contact.
10. Connect the Tele-Zoom remote control leads to terminals "A" and "G" on the antenna terminal strip.
11. Insert the line cord plug into the socket at the top of the cabinet and connect to a suitable outlet of the proper voltage and frequency.
12. Connect the antenna to the antenna terminals.
13. Turn the ON-OFF volume knob clockwise to the ON position. Turn SELECTOR SWITCH TO "TELEV" position.
14. Press the Tele-Zoom button so that the normal rectangular picture appears on the face of the tube.
15. Advance the BRIGHTNESS control fully clockwise and contrast control counter-clockwise (minimum contrast).

(C) BEAM BENDER ADJUSTMENT. (For 10" 10BP4 or 12QP4 Direct View Tube)

1. The Beam Bender should be positioned approximately over the picture tube flags (about 1-1/2 inches from the socket).
2. Starting from this position adjust the Beam Bender by moving it forward or backward at the same time rotating it slightly around the neck of the tube until the brightest raster appears on the screen.
3. Reduce the BRIGHTNESS control setting until the raster is slightly above average brilliance.
4. Adjust the FOCUS control with a thin blade screwdriver, located at the front of the cabinet as shown on the "SERVICE ADJUSTMENT" diagram) until the line structure of the raster is clearly visible.
5. Readjust the Beam Bender for maximum raster brilliance. The final adjustment should be made with the BRIGHTNESS control at the maximum position with which good line focus can be maintained and left in that position.

(D) FOCUS COIL ADJUSTMENTS

1. Turn the VERTICAL and HORIZONTAL centering controls to mid position. Refer to the "SERVICE ADJUSTMENT" diagram at the rear of the masonite back for location of these controls.
2. If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the Focus coil wing nuts and rotate the coil about its HORIZONTAL and VERTICAL axis until the entire raster is visible, approximately centered and with no shadowed corners. The Focus coil should be kept as close to the rear of the deflection coil for optimum range of the focus control.
3. Tighten the focus coil adjustment wing nuts with the coil in this position.
4. Readjust the FOCUS control for clearest line structure on the raster.

(E) DEFLECTION YOKE ADJUSTMENT

1. If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained.
2. Tighten the yoke adjustment wing screw.

BEFORE PROCEEDING WITH THE PICTURE "SERVICE ADJUSTMENTS" FOR A NORMAL RECTANGULAR OR TELE-ZOOM PICTURE A BRIEF DESCRIPTION OF TELE-ZOOM OPERATION IS DESCRIBED BELOW.

The Garod "Tele-Zoom" is so arranged that at the will of the viewer, a normal picture is obtained, which is essentially a rectangle with an aspect ratio of 4 to 3, on the circular face of the picture tube; or the picture may be expanded uniformly to cover the entire screen area of the picture tube.

When increasing the picture size both horizontally and vertically while maintaining the proper aspect ratio 4 to 3 it is obvious that parts of the picture will necessarily fall past the edge of the tube and will be lost.

The picture is expanded or reduced to normal size by depressing a push buttor in a small plastic housing, connected to the television receiver rear terminal strip, by a 20 foot length of flexible cord. This push button switch is of the push-push type, that is the first push will close the circuit, and the next will open it. No indication is required since the picture size is its own indication.

Control is obtained thru this switch, which actuates a relay excited from the 6 volt filament supply. Thus, should the cord break or become detached, no shock or fire hazard is encountered; the relay will simply open, leaving the picture in the expanded position.

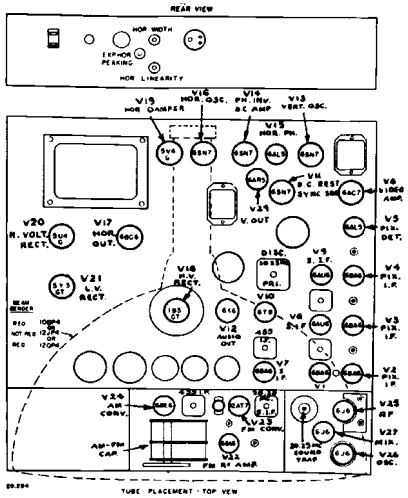
(F) PICTURE "SERVICE ADJUSTMENTS"

(a) NORMAL RECTANGULAR PICTURE (Refer to the diagram at rear of masonite back cover for location of controls).

1. In order to make further adjustments it wi l be necessary to obtain a test pattern picture.
2. Tune in a station as described under paragraph (A) pages two and three of the condensed operating instructions.
3. Adjust the normal VERTICAL size and normal VERTICAL LINEARITY controls until the test pattern is vertically symmetrical from top to bottom. Adjustment of either control will require readjustment of the other.
4. Adjust VERTICAL CENTERING control to cente the picture in the circular mask opening.
5. Adjust normal HORIZONTAL PEAKING control for a symetrical pattern so that the outer circle of the test pattern appears round.
6. Adjust the normal HORIZONTAL LINEARITY brass slotted screw located at the rear of the chassis for centrel alignment of the inner circles of the test pattern.
7. Adjust the normal WIDTH control at rear of the chassis until the four corners of the picture reach the circular mask opening.
8. Readjust the normal HORIZONTAL peaking control for best symmetry.
9. Adjust the HORIZONTAL CENTERING control to center the picture horizontally.
0. Repeat adjustment 3 above to obtain 4:3 aspect ratio of test pattern.

(b) TELE - ZOOM ADJUSTMENTS (Expanded Picture)

1. Remove the glass front assembly to allow access to the two expanded Vertical Service Adjustment controls.
2. Press the button on the remote control box so that the test pattern is expanded on the face of the picture tube.
3. Adjust the EXP. VERTICAL SIZE and EXP. VERTICAL LINEARITY controls until the outer circle of the test pattern fills the entire tube face vertically. Adjustment of either control will require readjustment of the other.
4. Readjust the VERTICAL CENTERING control to center the test pattern or the face of the tube vertically.
5. Adjust the EXP. HORIZONTAL PEAKING control at the rear of the chassis so that the outer circle of the test pattern appears round and fills the face of the tube horizontally.
6. Readjust the focus control if necessary.
7. Replace the glass front assembly, cabinet strip and decorative screws.




| CIRCUIT ALIGNED | STEP | SELECTOR SWITCH | CHANNEL | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQ. | CONNECT VTVM | ADJUST | METER INDICATION | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| TV SOUND | 1 | FOLLOW PROCEDURE FOR FM-IF & DISCRIMINATOR ADJUSTMENT, STEPS 2,3, & 4 AS SHOWN ON AM-FM ALIGNMENT CHART. | | | | | | | USE IDENTICAL SIGNAL GEN. FREQ AS IN STEPS 2,3,&4 OF FM IF ALIGNMENT. VISUAL CHECK DESIRABLE FOR "TOUCH-UP" OF BAND-PASS CIRCUIT. (SEE FIG. 1) |
| TV IF | 2 | TV | 8 | ACROSS CENTER TAP OF MIX. GRID COILS & GND. (R150) | 22.8 MC | ACROSS 4.7K LOAD RES. (R39) | T5 | MAX. DEFL. | |
| | 3 | " | " | " | 22.1 MC | " | T4 | " | |
| | 4 | " | " | " | 24.2 MC | " | T3 | " | |
| | 5 | " | " | " | 24.9 MC | " | T2 | " | |
| | 6 | " | " | " | 21.75 MC | " | T1 (BOT) | " | |
| | 7 | " | " | " | 20.25 MC | " | T1 (TOP) | MIN. DEFL. | |

TV RF ALIGNMENT

| DUMMY ANTENNA | STEP | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQUENCY (10 MC SWEEP) | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| ONE 150 Ω CARBON RESISTOR IN SERIES WITH EACH LEAD. | 8 | ANTENNA TERMINALS | 213 MC | 211.25 MC & 215.75 MC | 13 | VERT. AMPLIFIER ACROSS CENTER TAP OF MIX GRID COILS & GND. (ACROSS R150 & C152). | C15, C16 C20, C21 (SEE FIG. 2) | ADJUST FOR RESPONSE APPROX. AS SHOWN BELOW, WITH MARKERS MORE THAN 70% OF PEAK AMPLITUDE. KEEP THE RF AND MIXER TRIMMER PAIRS IN APPROX. THE SAME RELATIVE POSITION. |
| " | 9 | " | 177 MC | 175.25 MC & 179.75 MC | 7 | " | L103, L104 | ADJUST RINGS FOR WAVE-FORM AS SHOWN BELOW. |
| " | 10 | " | 183 MC | 181.25 MC & 185.75 MC | 8 | " | | CHECK RESPONSE ON ALL CHANNELS. SLIGHT ADJUSTMENT OF C13, C16, C20 OR C21 MAY BE REQUIRED TO OBTAIN OPTIMUM RESPONSE ON ALL CHANNELS. |
| " | 11 | " | 189 MC | 187.25 MC & 191.75 MC | 9 | " | | |
| " | 12 | " | 195 MC | 193.25 MC & 197.75 MC | 10 | " | | |
| " | 13 | " | 201 MC | 199.25 MC & 203.75 MC | 11 | " | | |
| " | 14 | " | 207 MC | 205.25 MC & 209.75 MC | 12 | " | | |
| " | 15 | " | 85 MC | 83.25 MC & 87.75 MC | 6 | " | C13, C14 C18, C19 | ADJUST FOR RESPONSE APPROX. AS SHOWN BELOW. |
| " | 16 | " | 79 MC | 77.25 MC & 81.75 MC | 5 | " | | CHECK RESPONSE ON ALL CHANNELS. SLIGHT ADJUSTMENT OF C13, C14, C18, OR C19 MAY BE REQUIRED TO OBTAIN OPTIMUM RESPONSE ON ALL CHANNELS. |
| " | 17 | " | 69 MC | 67.25 MC & 71.75 MC | 4 | " | | |
| " | 18 | " | 63 MC | 61.25 MC & 65.75 MC | 3 | " | | |
| " | 19 | " | 57 MC | 55.25 MC & 59.75 MC | 2 | " | | |

TV OSC. ALIGNMENT

| DUMMY ANTENNA | STEP | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM DC PROBE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| SAME AS ABOVE | 20 | ANTENNA TERMINALS | 215.75 MC | 13 | ACROSS 56.0Ω 1.W. GRID (PIN 1) & GND. | L102 | ADJUST FOR MAXIMUM DEFLECTION |
| " | 21 | " | 87.75 MC | 6 | " | L101 | " |
| " | 22 | CHECK TO SEE THAT ALL OTHER CHANNELS ARE RECEIVED WELL WITHIN THE LIMITS OF THE FINE TUNING CONTROL. IF NOT, SOME COMPROMISE MAY BE MADE BY ADJUSTING L102 FOR HIGH CHANNELS AND L101 FOR LOW CHANNELS. | | | | | |

RECOMMENDED RESPONSE CURVES

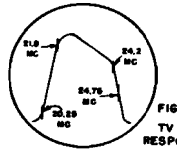



FIG. 1 TV IF RESPONSE

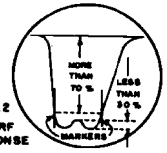
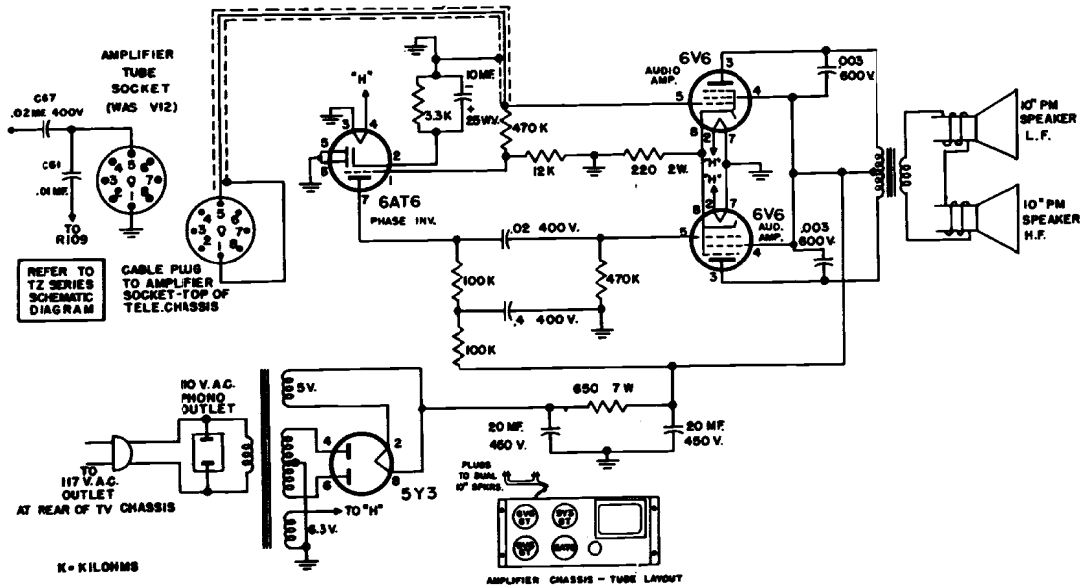


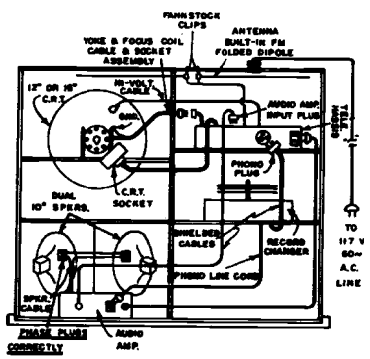

FIG. 2 TV RF RESPONSE

## AM-FM RECEIVER ALIGNMENT CHART SERIES 10TZ, 12TZ, & 15TZ TELEVISION RECEIVERS

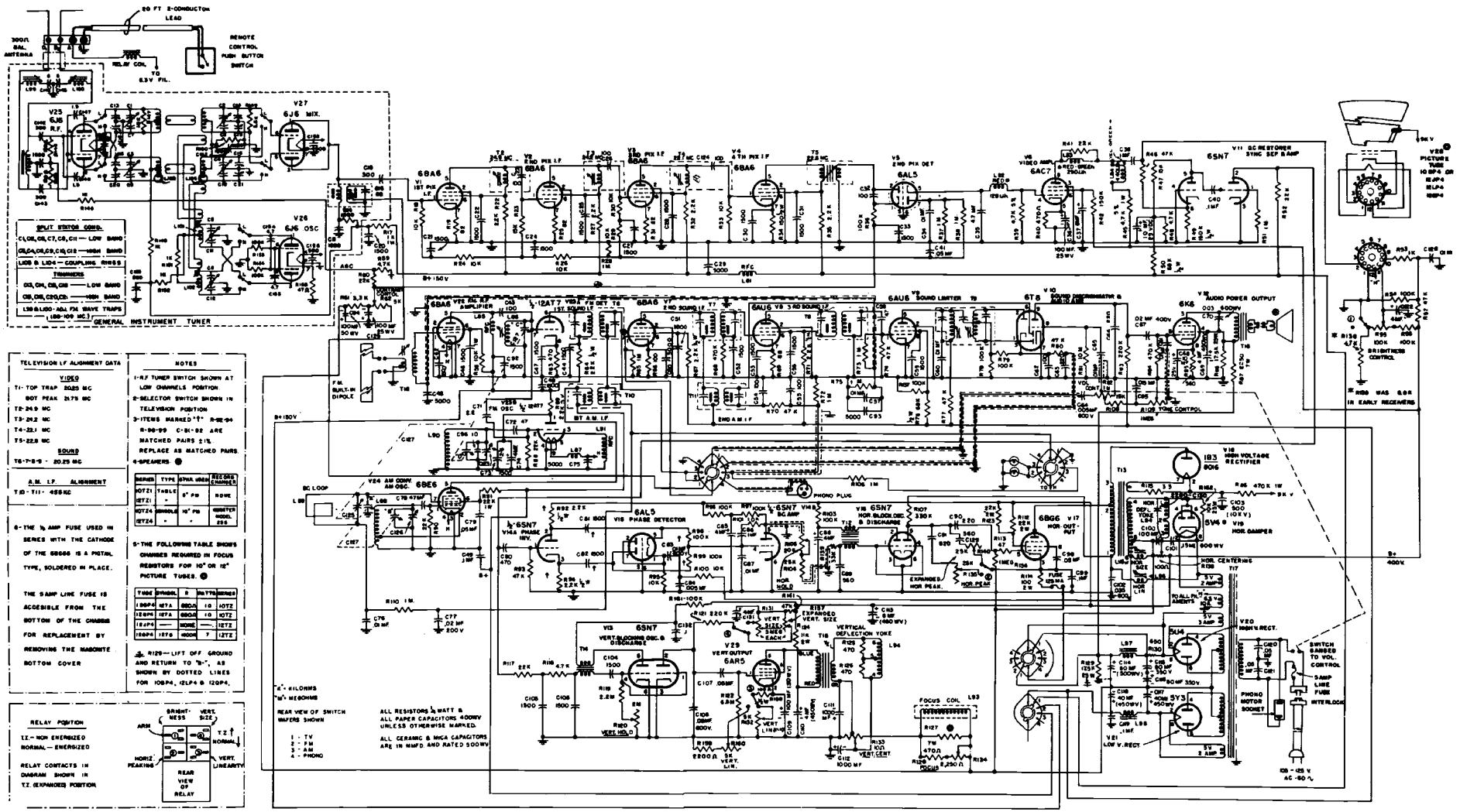
| CIRCUIT ALIGNED | STEP | SELECTOR SWITCH POS. | R'C'V'R DIAL SET TO | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTIONS | METER TYPE | METER CONNECTIONS | COMPONENT ADJUSTED | METER INDICATION | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| BC I.F. | 1 | BC | 1650 KC | 455 KC 30% MOD. | THRU .1 MFD TO 6BE6 GRID PIN #1 | A C OUTPUT | ACROSS VOICE COIL | TOP AND BOTTOM OF T-10, T11 | MAXIMUM DEFLECTION | |
| FM I.F. | 2 | FM | 108.5 MC | 20.25 MC. UN MOD. | THRU .01 MFD. TO GRID OF 12AT7 (PIN #7) | D C VTVM | FROM LIMITER GRID, PIN 1 OF 6AU6 AND GROUND. | TOP AND BOTTOM OF T6, T7, T8 | " | |
| FM DISC. | 3 | " | " | " | " | " | FROM DISC. CATHODE, PIN 3 OF 6T8 AND GROUND. | TOP OF T9 | MAX. DEFLECTION OF EITHER POLARITY | |
| | 4 | " | " | " | " | " | " | BOTTOM OF T9 | 0. VOLTS | ADJUST FOR ZERO BETWEEN PLUS AND MINUS PEAKS |
| BC OSC | 5 | BC | 1650 KC | 1650 KC 30% MOD. | COUPLED TO R'C'VR LOOP BY 2 OR 3 TURNS | AC OUTPUT | ACROSS VOICE COIL | C-126 | MAXIMUM DEFLECTION | |
| BC RF | 6 | " | 1500KC | 1500 KC 30% MOD. | " | " | " | C-125 | " | |
| FM OSC | 7 | FM | 108.5 MC | 108.5 MC UN MOD. | THRU BALANCED 300 Ω DUMMY ANT. TO F.M. ANT & GND. | DC VTVM | FROM LIMITER GRID PIN 1 OF 6AU6 AND GROUND. | C-123 2-6 MMF. TRIMMER ADJACENT TO TUNING GANG | MAXIMUM DEFLECTION | |
| | 8 | " | 87.5 MC. | 87.5 MC. UNMOD. | " | " | " | OSC. COIL CORE L90 | " | REPEAT STEPS 7 & 8 AS NECESSARY |
| FM R.F. | 9 | " | 95 MC. | 95 MC UNMOD. | " | " | " | RF COIL CORE L 86 | " | |
| | 10 | " | " | " | " | " | " | ANT. TRANS. CORE T-18 | " | |




CIRCUIT SCHEMATIC DIAGRAM - AMPLIFIER UNIT




CONSOLE REAR VIEW SHOWING CONNECTION OF UNITS



SERIES

10TZ1 10" TABLE
10TZ3 10" CONSOLETTE
12TZ1 12" TABLE
12TZ3 12" CONSOLETTE
10TZ4 10" CONSOLE
12TZ4 12" CONSOLE
12TZ6 12" DELUXE CONSOLE } WITH AUDIO
15TZ6 15" DELUXE CONSOLE } AMPLIFIER

CIRCUIT SCHEMATIC DIAGRAM

**HIGH VOLTAGE WARNING**

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(A) SETTING UP THE RECEIVER

1. Remove the two decorative screws, holding the top cabinet strip in place retaining the glass front assembly.
2. Remove the glass front assembly.
3. Remove the three slotted head P.K. screws retaining the back in place and release with interlocked line cord.
4. Remove the two hex head P.K. screws, retaining the line cord at the top center of the back. Remove line cord for use in service operations.
5. Remove the carton containing the Tele-Zoom remote control unit.
6. Remove the four copper plated shipping screws from the bottom of the cabinet.
7. Remove the two "Service Adjustment" plug buttons located at the front of the cabinet.
8. Install the push-on knobs to the respective controls.
9. Loosen the Picture tube retaining band held in place by the two wing screws.
10. Check all the other tubes to be sure they are in place and firmly seated in their sockets.
11. Loosen the two Picture tube cushion hood adjustment wing nuts and slide the cushion hood toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.
12. From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wing nuts and raise, lower or rotate the focus coil until the correct alignment is obtained. Tighten the wing nuts with the coil in position.

(B) PICTURE TUBE INSTALLATION

**PICTURE TUBE HANDLING PRECAUTION - Extreme care should be used in handling the picture tube. The Picture tube bulb encloses a high vacuum and, due to its large surface area is subjected to considerable air pressure.**

**The front of the Picture tube, particularly that part of the rim of the viewing surface, must not be struck, scratched, or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into the deflecting yoke or its socket, check and remove the cause of the trouble. Do not under any circumstances force the tube. Keep the carton for possible future shipping use.**

1. Insert the neck of the tube through the deflection yoke and focus coil until the base protrudes about two inches beyond the focus coil. Keep the second anode recessed metal well contact toward the top. The front of the tube should now rest on the two rubber support cushions at the front of the chassis.
2. Replace the Picture tube retaining band and secure with the two wing screws provided.
3. Connect the Picture tube socket to the tube base.
4. Wipe the Picture tube screen surface and glass front assembly safety glass of all dust and finger marks with a soft cloth moistened with "Windex" or other cleaning agent.
5. From the rear of the cabinet slip the Picture tube cushion hood firmly up against the flare of the tube and tighten the adjustment wing screws.
6. Slide the deflection yoke as far forward as possible.
7. Connect the high voltage lead to the recessed tube contact.
8. Connect the Tele-Zoom remote control leads to terminals "A" and "G" on the antenna terminal strip.
9. Insert the line cord plug into the socket at the top of the cabinet and connect to a suitble outlet of the proper voltage and frequency.
10. Connect the antenna to the antenna terminals.
11. Turn the ON-OFF Volume knob clockwise to the ON position. Turn SELECTOR SWITCH TO "TELEV" position.
12. Press the Tele-Zoom button so that the normal rectangular picture appears on the face of the tube.
13. Advance the BRIGHTNESS control fully clockwise and contrast control counterclockwise (minimum contrast).

(C) FOCUS COIL ADJUSTMENTS

1. Turn the VERTICAL and HORIZONTAL centering controls to mid position. Refer to the "SERVICE ADJUSTMENT" diagram at the rear of the masonite back for location of these controls.
2. If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil wing nuts and rotate the coil about its HORIZONTAL and VERTICAL axis until the entire raster is visible, approximately centered and with no shadowed corners. The Focus coil should be kept as close to the rear of the deflection coil for optimum range of the focus control.
3. Tighten the focus coil adjustment wing nuts with the coil in this position.
4. Readjust the FOCUS control for clearest line structure on the raster.

(D) DEFLECTION YOKE ADJUSTMENT

1. If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained.
2. Tighten the yoke adjustment wing screw.

BEFORE PROCEEDING WITH THE PICTURE "SERVICE ADJUSTMENTS" FOR A NORMAL RECTANGULAR OR TELE-ZOOM PICTURE A BRIEF DESCRIPTION OF TELE-ZOOM OPERATION IS DESCRIBED BELOW.

The Garod "Tele-Zoom" is so arranged that at the will of the viewer, a normal picture is obtained, which is essentially a rectangle with an aspect ratio of 4 to 3, on the circular face of the picture tube; or the picture may be expanded uniformly to cover the entire screen area of the picture tube.

When increasing the picture size both horizontally and vertically while maintaining the proper aspect ratio 4 to 3 it is obvious that parts of the picture will necessarily fall past the edge of the tube and will be lost.

The picture is expanded or reduced to normal size by depressing a push button in a small plastic housing, connected to the television receiver rear terminal strip, by a 20 foot length of flexible cord. This push button switch is of the push-push type, that is the first push will close the circuit, and the next will open it. No indication is required since the picture size is its own indication.

Control is obtained thru this switch, which actuates a relay excited from the 6 volt filament supply. Thus, should the cord break or become detached, no shock or fire hazard is encountered; the relay will simply open, leaving the picture in the expanded position.

(E) PICTURE "SERVICE ADJUSTMENTS"

(a) NORMAL RECTANGULAR PICTURE (Refer to the diagram at rear of masonite back cover for location of controls).

1. In order to make further adjustments it will be necessary to obtain a test pattern picture.
2. Tune in a station as described under paragraph (A) pages two and three of the condensed operating instructions.
3. Adjust the normal VERTICAL size and normal VERTICAL LINEARITY controls until the test pattern is vertically symmetrical from top to bottom. Adjustment of either control will require readjustment of the other.
4. Adjust VERTICAL CENTERING control to center the picture in the circular mask opening.
5. Adjust normal HORIZONTAL PEAKING control for a symmetrical pattern so that the outer circle of the test pattern appears round.
6. Adjust the normal HORIZONTAL LINEARITY brass slotted screw located at the rear of the chassis for central alignment of the inner circles of the test pattern.
7. Adjust the normal WIDTH control at rear of the chassis until the four corners of the picture reach the circular mask opening.
8. Readjust the normal HORIZONTAL peaking control for best symmetry.
9. Adjust the HORIZONTAL CENTERING control to center the picture horizontally.
10. Repeat adjustment 3 above to obtain 4:3 aspect ratio of test pattern.

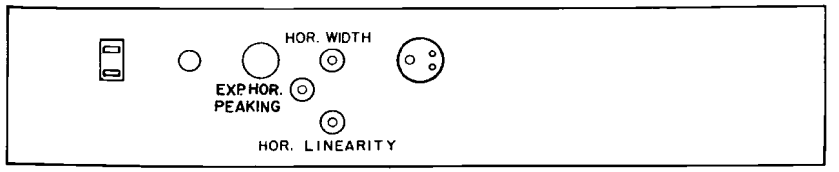
(b) TELE - ZOOM ADJUSTMENTS (Expanded Picture)

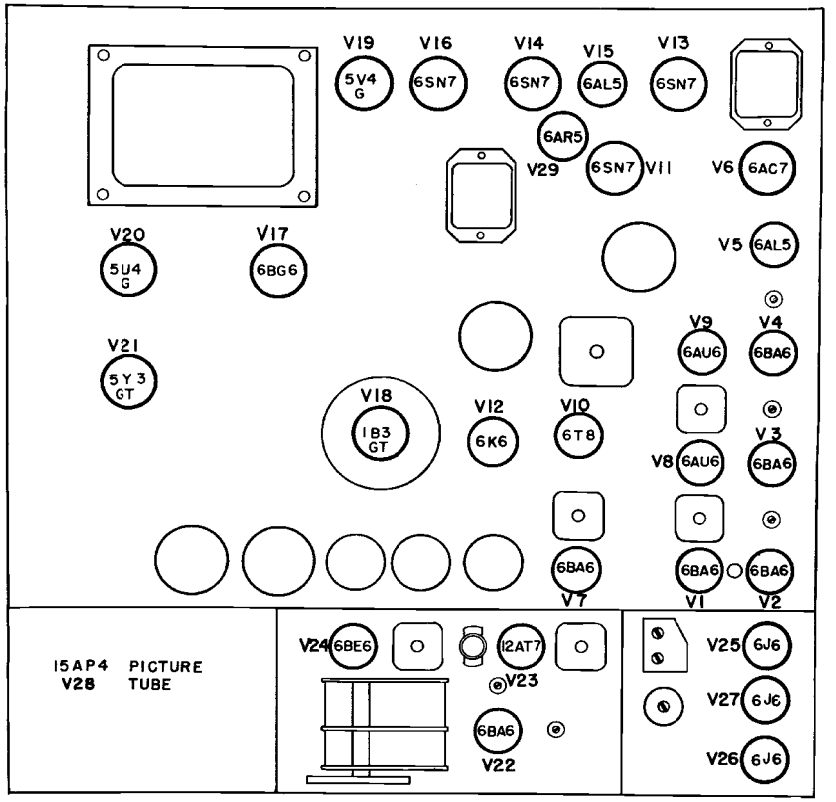
1. Press the button on the remote control box so that the test pattern is expanded on the face of the picture tube.
2. Adjust the EXP. VERTICAL SIZE and EXP. VERTICAL LINEARITY controls until the outer circle of the test pattern fills the entire tube face vertically. Adjustment of either control will require readjustment of the other.
3. Readjust the VERTICAL CENTERING control to center the test pattern on the face of the tube vertically.
4. Adjust the EXP. HORIZONTAL PEAKING control at the rear of the chassis so that the outer circle of the test pattern appears round and fills the face of the tube horizontally.
5. Adjust the AUTO. BRIGHTNESS control if necessary so that the brightness appears the same intensity for normal or expanded picture.
6. Readjust the focus control if necessary.
7. Replace the glass front assembly, cabinet strip and decorative screws.
8. Replace the back cover and line cord assembly.

F-M ANTENNA

The built-in 300 ohm dipole antenna for F-M reception should be suitable for most locations. However in remote areas an external dipole antenna may necessary. The external dipole 300 ohm lead-in should be connected to the two "fahnstock clips" at the top of the cabinet.

REAR VIEW




TUBE PLACEMENT - TOP VIEW

| CIRCUIT ALIGNED | STEP | SELECTOR SWITCH | CHANNEL | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQ. | CONNECT VTVM | ADJUST | METER INDICATION | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| TV SOUND | 1 | FOLLOW PROCEDURE FOR FM-IF & DISCRIMINATOR ADJUSTMENT, STEPS 2,3, & 4 AS SHOWN ON AM-FM ALIGNMENT CHART. | | | | | | | USE IDENTICAL SIGNAL GEN. FREQ AS IN STEPS 2,3,&4 OF FM IF ALIGNMENT.<br><br>VISUAL CHECK DESIRABLE FOR "TOUCH-UP" OF BAND-PASS CIRCUIT. (SEE FIG. 1) |
| TV IF | 2 | TV | 8 | ACROSS CENTER TAP OF MIX. GRID COILS & GND. (R150) | 22.8 MC | ACROSS 4.7K LOAD RES. (R39) | T5 | MAX. DEFL. | |
| | 3 | " | " | " | 22.1 MC | " | T4 | " | |
| | 4 | " | " | " | 24.2 MC | " | T3 | " | |
| | 5 | " | " | " | 24.9 MC | " | T2 | " | |
| | 6 | " | " | " | 21.75 MC | " | T1 (BOT.) | " | |
| | 7 | " | " | " | 20.25 MC | " | T1 (TOP) | MIN. DEFL. | |

## TV RF ALIGNMENT

| DUMMY ANTENNA | STEP | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQUENCY (10 MC SWEEP) | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| ONE 150 Ω CARBON RESISTOR IN SERIES WITH EACH LEAD. | 8 | ANTENNA TERMINALS | 213 MC | 211.25 MC & 215.75 MC | 13 | VERT. AMPLIFIER ACROSS CENTER TAP OF MIX. GRID COILS & GND. (ACROSS R150 & C152). | C15, C16 C20, C21 (SEE FIG.2) | ADJUST FOR RESPONSE APPROX. AS SHOWN BELOW, WITH MARKERS MORE THAN 70% OF PEAK AMPLITUDE. KEEP THE RF AND MIXER TRIMMER PAIRS IN APPROX. THE SAME RELATIVE POSITION. |
| " | 9 | " | 177 MC | 175.25 MC & 179.75 MC | 7 | " | L103, L104 | ADJUST RINGS FOR WAVE-FORM AS SHOWN BELOW. |
| " | 10 | " | 183 MC | 181.25 MC & 185.75 MC | 8 | " | | CHECK RESPONSE ON ALL CHANNELS. SLIGHT ADJUSTMENT OF C15, C16, C20 OR C21 MAY BE REQUIRED TO OBTAIN OPTIMUM RESPONSE ON ALL CHANNELS. |
| " | 11 | " | 189 MC | 187.25 MC & 191.75 MC | 9 | " | | |
| " | 12 | " | 195 MC | 193.25 MC & 197.75 MC | 10 | " | | |
| " | 13 | " | 201 MC | 199.25 MC & 203.75 MC | 11 | " | | |
| " | 14 | " | 207 MC | 205.25 MC & 209.75 MC | 12 | " | | |
| " | 15 | " | 85 MC | 83.25 MC & 87.75 MC | 6 | " | C13, C14 C18, C19 | ADJUST FOR RESPONSE APPROX. AS SHOWN BELOW. |
| " | 16 | " | 79 MC | 77.25 MC & 81.75 MC | 5 | " | | CHECK RESPONSE ON ALL CHANNELS. SLIGHT ADJUSTMENT OF C13, C14, C18, OR C19 MAY BE REQUIRED TO OBTAIN OPTIMUM RESPONSE ON ALL CHANNELS. |
| " | 17 | " | 69 MC | 67.25 MC & 71.75 MC | 4 | " | | |
| " | 18 | " | 63 MC | 61.25 MC & 65.75 MC | 3 | " | | |
| " | 19 | " | 57 MC | 55.25 MC & 59.75 MC | 2 | " | | |

## TV OSC. ALIGNMENT

| DUMMY ANTENNA | STEP | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM DC PROBE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| SAME AS ABOVE | 20 | ANTENNA TERMINALS | 215.75 MC | 13 | ACROSS 6AU6 LIM. GRID (PIN 1) & GND. | L102 | ADJUST FOR MAXIMUM DEFLECTION. |
| " | 21 | " | 67.75 MC | 6 | " | L101 | " |
| " | 22 | CHECK TO SEE THAT ALL OTHER CHANNELS ARE RECEIVED WELL WITHIN THE LIMITS OF THE FINE TUNING CONTROL. IF NOT, SOME COMPRIMISE MAY BE MADE BY ADJUSTING L102 FOR HIGH CHANNELS AND L101 FOR LOW CHANNELS. | | | | | |

## AM-FM RECEIVER ALIGNMENT CHART

| CIRCUIT ALIGNED | STEP | SELECTOR SWITCH POS. | R'C'V'R DIAL SET TO | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTIONS | METER TYPE | METER CONNECTIONS | COMPONENT ADJUSTED | METER INDICATION | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|
| BC I.F. | 1 | BC | 1650 KC | 455 KC 30% MOD. | THRU .1MFD TO 6BE6 GRID PIN #1 | A C OUTPUT | ACROSS VOICE COIL | TOP AND BOTTOM OF T10, T11 | MAXIMUM DEFLECTION | |
| FM I.F. | 2 | FM | 108.5 MC | 20.25 MC UN MOD. | THRU .01MFD TO GRID OF 12AT7 (PIN #7) | D C VTVM | FROM LIMITER GRID, PIN 1 OF 6AU6 AND GROUND. | TOP AND BOTTOM OF T6, T7, T8 | " | |
| FM DISC. | 3 | " | " | " | " | " | FROM DISC. CATHODE, PIN 3 OF 6T8 AND GROUND. | TOP OF T9 | MAX. DEFLECTION OF EITHER POLARITY | |
| | 4 | " | " | " | " | " | " | BOTTOM OF T9 | 0 VOLTS | ADJUST FOR ZERO BETWEEN PLUS AND MINUS PEAKS |
| BC OSC | 5 | BC | 1650 KC | 1650 KC 30% MOD. | COUPLED TO R'C'VR LOOP BY 2 OR 3 TURNS | AC OUTPUT | ACROSS VOICE COIL | C-126 | MAXIMUM DEFLECTION | |
| BC RF | 6 | " | 1500 KC | 1500 KC 30% MOD. | " | " | " | C-125 | " | |
| FM OSC | 7 | FM | 108.5 MC | 108.5 MC UN MOD. | THRU BALANCED 300 Ω DUMMY ANT. TO FM ANT & GND. | D C VTVM | FROM LIMITER GRID PIN 1 OF 6AU6 AND GROUND. | C-123 2-6 MMF TRIMMER ADJ. ACENT TO TUNING GANG | MAXIMUM DEFLECTION | |
| | 8 | " | 87.5 MC | 87.5 MC. UNMOD. | " | " | " | OSC. COIL CORE L90 | " | REPEAT STEPS 7 & 8 AS NECESSARY |
| FM R.F. | 9 | " | 95 MC. | 95 MC UNMOD. | " | " | " | RF COIL CORE L86 | " | |
| | 10 | " | " | " | " | " | " | ANT. TRANS. CORE T-18 | " | |

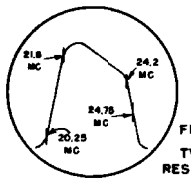



FIG. 1 TV IF RESPONSE

RECOMMENDED RESPONSE CURVES

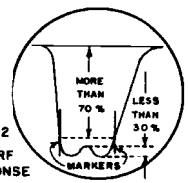
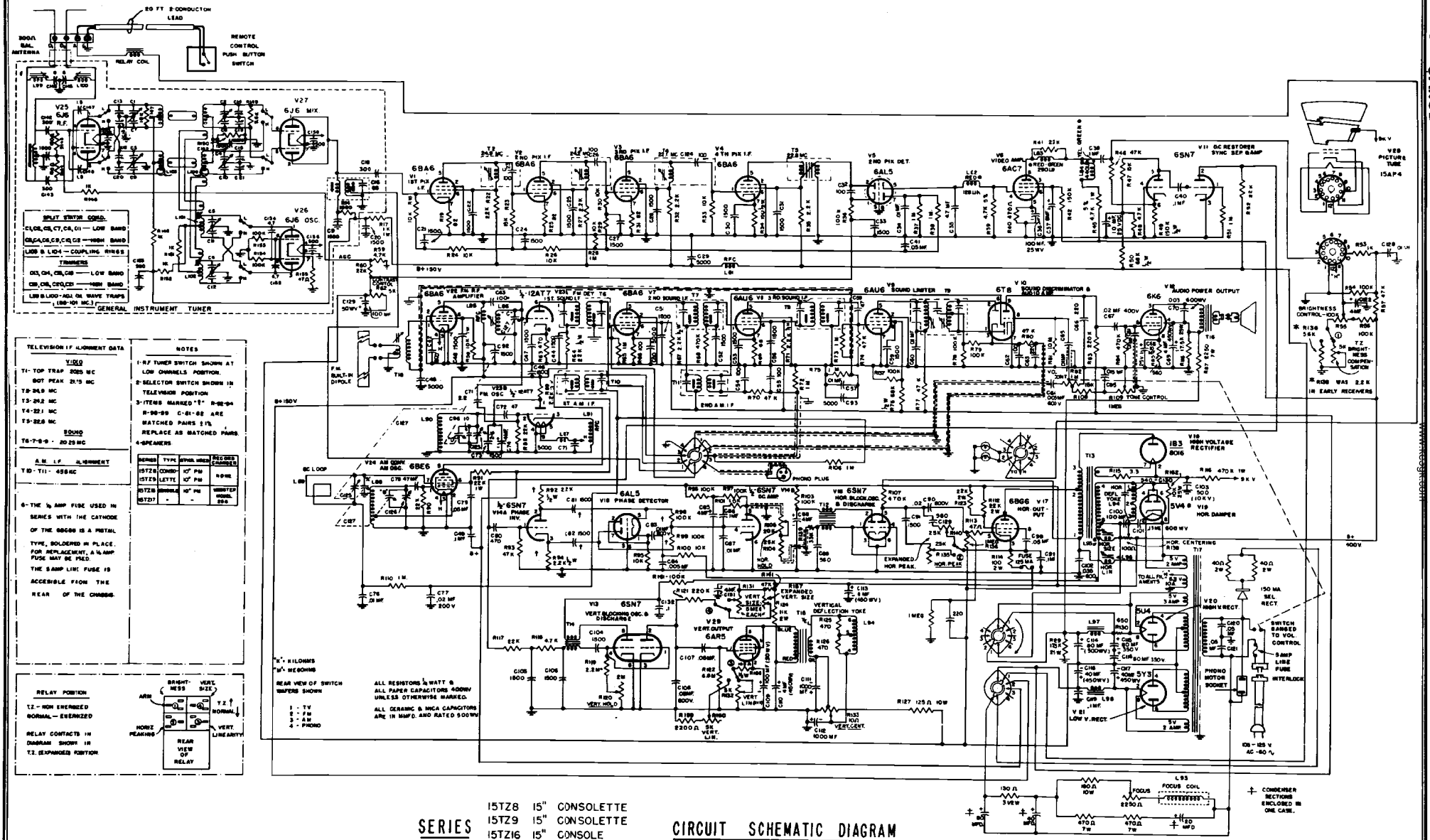



FIG. 2 TV RF RESPONSE




SERIES

| | | |
|---|---|---|
| 15TZ8 | 15" | CONSOLETTE |
| 15TZ9 | 15" | CONSOLETTE |
| 15TZ16 | 15" | CONSOLE |
| 15TZ17 | 15" | CONSOLE |

CIRCUIT SCHEMATIC DIAGRAM

| CIRCUIT ALIGNED | STEP | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQ. | CONNECT D.C. V.T.V.M | ADJUST | REMARKS |
|---|---|---|---|---|---|---|
| | 1 | TUNE RECEIVER TO QUIET PORTION OF TV HIGH BAND (CHANNEL 8) | | | | |
| T V I.F. | 2 | THRU 1500 MF. COND. TO CENTER TAP OF MIXER GRID COILS & GROUND (ACROSS R5 & C27) | 24.55 MC. | ACROSS VIDEO DIODE LOAD - HIGH SIDE TO JUNCTION OF L5, L6 & R104, - LOW SIDE TO GROUND. | T4 | ADJUST FOR MAXIMUM DEFLECTION ON V.T.V.M. |
| | 3 | " | 21.6 MC. | " " " | T3 | " " " |
| | 4 | " | 24.55 MC. | " " " | T2 | " " " |
| | 5 | " | 21.6 MC | " " " | T1 BOTTOM | " " " VISUAL CHECK-UP DESIRABLE FOR TOUCH-UP OF BANDPASS CIRCUIT. SEE FIG. 1 FOR RESPONSE. |
| SOUND TAKE-OFF | 6 | THRU 1500 MMFD. COND. ACROSS DIODE LOAD - HIGH SIDE TO JUNCTION OF L5, L6 & R104 - LOW SIDE TO GROUND | 4.5 MC. | NEGATIVE LEAD TO JUNCTION OF R22 & R23 (LOCATED AT 6T8 RATIO DET.) POSITIVE LEAD TO EITHER SIDE OF C41 4 MF. CONDENSER. | T5 TOP T5 BOT. T6 BOT. | ADJUST FOR MAXIMUM DEFLECTION ON V.T.V.M. |
| RATIO DETECTOR | 7 | " | 4.5 MC. | NEGATIVE LEAD TO JUNCTION OF R22 & R23 (LOCATED AT 6T8 RATIO DET.) POSITIVE LEAD TO JUNCTION OF C43, C45 & R24 (OUTPUT OF DEEMPHASIS NETWORK) | T6 TOP | ADJUST FOR ZERO OUTPUT ON V.T.V.M. BETWEEN A PLUS AND A MINUS PEAK. |

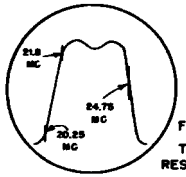



FIG. 1 TV IF RESPONSE

RECOMMENDED RESPONSE CURVES

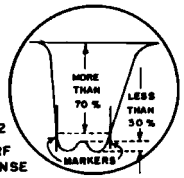
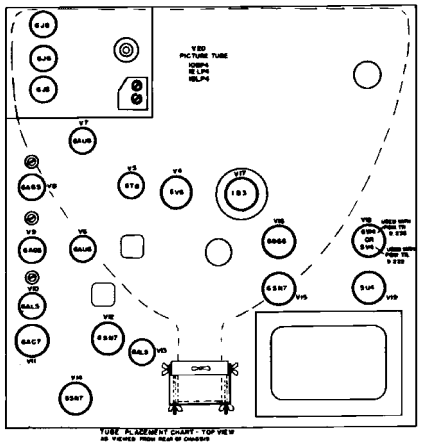
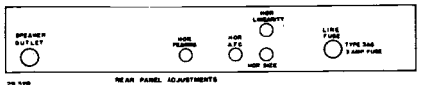



FIG. 2 TV RF RESPONSE



TUBE PLACEMENT CHART - TOP VIEW




REAR PANEL ADJUSTMENTS

## TV RF ALIGNMENT

| DUMMY ANTENNA | STEP | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQUENCY (10 MC SWEEP) | MARKER GENERATOR FREQUENCY | CHANNEL | CONNECT SCOPE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|---|
| ONE 150 Ω CARBON RESISTOR IN SERIES WITH EACH LEAD. | 8 | ANTENNA TERMINALS | 213 MC | 211.25 MC & 215.75 MC | 13 | VERT. AMPLIFIER ACROSS CENTER TAP OF MIX. GRID COILS & GND. (ACROSS R5 & C27). | C11, C20 C13, C22 (SEE FIG. 2) | ADJUST FOR RESPONSE APPROX. AS SHOWN BELOW, WITH MARKERS MORE THAN 70% OF PEAK AMPLITUDE. KEEP THE RF AND MIXER TRIMMER PAIRS IN APPROX. THE SAME RELATIVE POSITION. |
| " | 9 | " | 177 MC | 175.25 MC & 179.75 MC | 7 | " | L1 & L2 | ADJUST RINGS FOR WAVE-FORM AS SHOWN BELOW. |
| " | 10 | " | 183 MC | 181.25 MC & 185.75 MC | 8 | " | | CHECK RESPONSE ON ALL CHANNELS. SLIGHT ADJUSTMENT OF C11, C20, C13, OR C22 MAY BE REQUIRED TO OBTAIN OPTIMUM RESPONSE ON ALL CHANNELS. |
| " | 11 | " | 189 MC | 187.25 MC & 191.75 MC | 9 | " | | |
| " | 12 | " | 195 MC | 193.25 MC & 197.75 MC | 10 | " | | |
| " | 13 | " | 201 MC | 199.25 MC & 203.75 MC | 11 | " | | |
| " | 14 | " | 207 MC | 205.25 MC & 209.75 MC | 12 | " | | |
| " | 15 | " | 85 MC | 83.25 MC & 87.75 MC | 6 | " | C7, C16 C9, C18 | ADJUST FOR RESPONSE APPROX. AS SHOWN BELOW. |
| " | 16 | " | 79 MC | 77.25 MC & 81.75 MC | 5 | " | | CHECK RESPONSE ON ALL CHANNELS. SLIGHT ADJUSTMENT OF C7, C16, C9, OR C18 MAY BE REQUIRED TO OBTAIN OPTIMUM RESPONSE ON ALL CHANNELS. |
| " | 17 | " | 69 MC | 67.25 MC & 71.75 MC | 4 | " | | |
| " | 18 | " | 63 MC | 61.25 MC & 65.75 MC | 3 | " | | |
| " | 19 | " | 57 MC | 55.25 MC & 59.75 MC | 2 | " | | |

## TV OSC. ALIGNMENT

| DUMMY ANTENNA | STEP | SIGNAL GENERATOR CONNECTIONS | SIGNAL GENERATOR FREQUENCY | CHANNEL | CONNECT VTVM DC PROBE | ADJUST | REMARKS |
|---|---|---|---|---|---|---|---|
| SAME AS ABOVE | 20 | ANTENNA TERMINALS | 215.75 MC | 13 | ACROSS 6AU6 LIM. GRID (PIN 1) & GND. | L4 | ADJUST FOR MAXIMUM DEFLECTION. |
| " | 21 | " | 87.75 MC | 6 | " | L3 | " " " |
| " | 22 | CHECK TO SEE THAT ALL OTHER CHANNELS ARE RECEIVED WELL WITHIN THE LIMITS OF THE FINE TUNING CONTROL. IF NOT, SOME COMPRIMISE MAY BE MADE BY ADJUSTING L4 FOR HIGH CHANNELS AND L3 FOR LOW CHANNELS. | | | | | |

ELECTRICAL SPECIFICATIONS
Line Voltage ..... 105-125V.A.C.
Frequency ..... 60 cycles
Wattage ..... 175 watts

ANTENNA REQUIREMENTS
Type ..... Folded Dipole or Equiv.
Impedance ..... 300 ohms

TUBE COMPLEMENT (Total: 19 plus Picture Tube)
(V1) R.F. Amplifier ..... 6J6
(V2) Converter ..... 6J6
(V3) Oscillator ..... 6J6
(V4) Audio Output ..... 6V6
(V5) Ratio Detector & Audio Amp ..... 6T8
(V6) Ratio Detector Driver ..... 6AU6
(V7) 1st Video I.F. ..... 6AU6
(V8) 2nd Video I.F. ..... 6AG5
(V9) 3rd Video I.F. ..... 6AG5
(V10) Video Det. - A.G.C. ..... 6AL5
(V11) Video Amplifier ..... 6AC7
(V12) D.C. Rest., Clip., Sync. Sep. ..... 6SN7
(V13) Hor. Phase Detector ..... 6AL5
(V14) Vert. Sweep Osc. & Output ..... 6SN7
(V15) Hor. Sweep Osc. ..... 6SN7
(V16) Hor. Sweep Output ..... 6BG6G
(V17) High Voltage Rectifier ..... 1B3GT
(V18) Hor. Damper ..... 6W4 or 5V4
(V19) Power Rectifier ..... 5U4G
(V20) Picture Tube ..... See Diagram

MODELS 1042G, 1043G, 1546G, 1547G, 1244G, 1245G, 1548G, 1549G