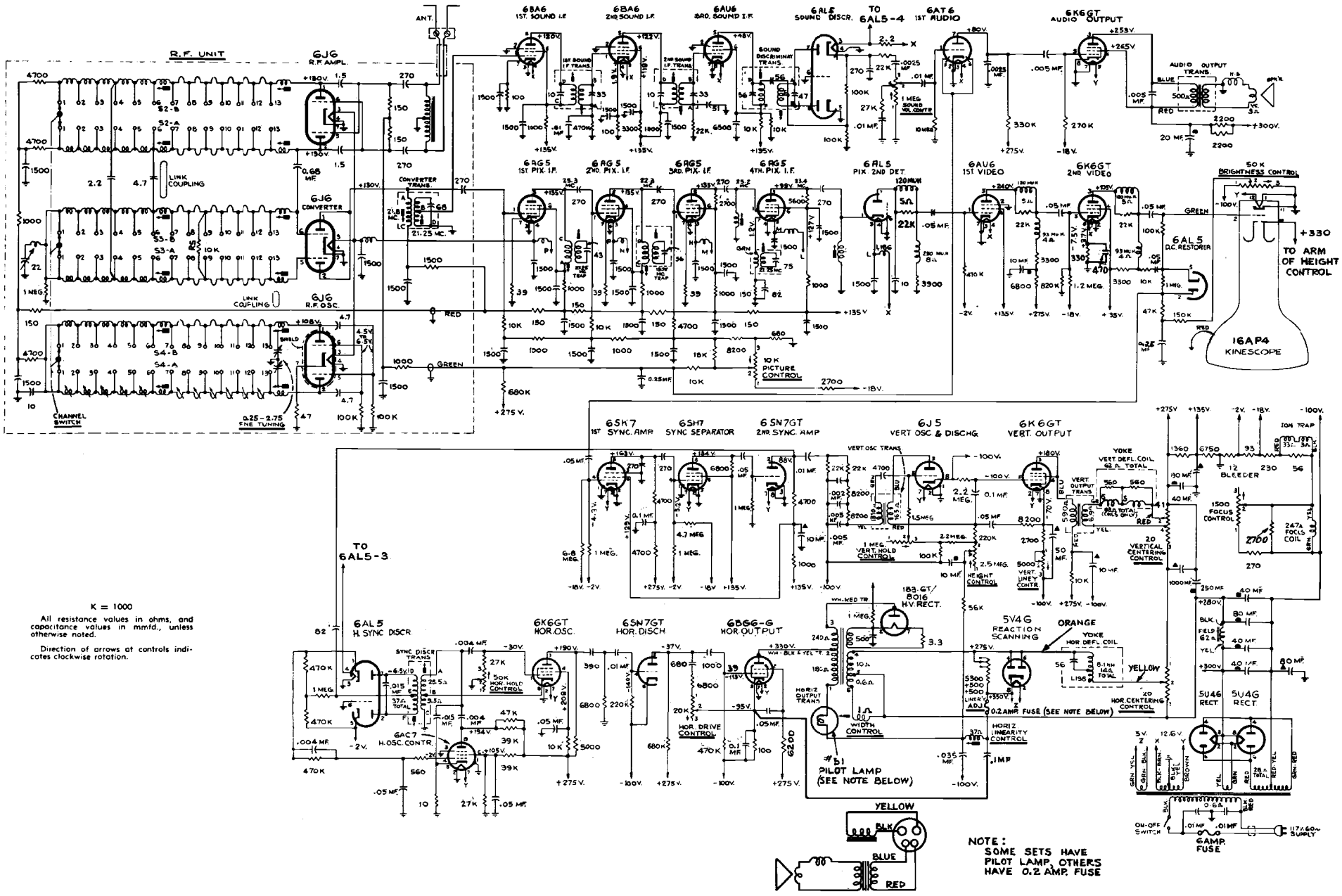
MODEL CT-101



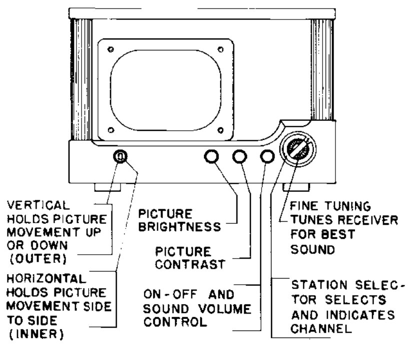
K = 1000

All resistance values in ohms, and capacitance values in mmfd., unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

NOTE: SOME SETS HAVE PILOT LAMP, OTHERS HAVE 0.2 AMP. FUSE

MODELS CT102, CT103, CT104



OPERATING INSTRUCTIONS

Tuning:
The following adjustments are necessary when turning the receiver on.
1. Turn ON-OFF VOLUME control slightly clockwise to switch receiver on. Then turn ½ turn clockwise for SOUND VOLUME.
2. Set the STATION SELECTOR so that the desired channel number is seen in the window.
3. Allow 15 to 20 seconds for the tubes to warm up.
4. Turn CONTRAST control fully counterclockwise.
5. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a faint glow just appears on the screen.
6. Turn CONTRAST control clockwise until a glow or a pattern appears on the screen.
7. If the desired channel is broadcasting, music or speech should now be heard and the FINE TUNING control should be reset for best sound quality. Adjust VOLUME control for desired amount of sound.
8. Adjust the VERTICAL hold control until the pattern stops moving up or down.
9. Adjust the HORIZONTAL hold control until a picture is obtained and centered from side to side.
10. Adjust the CONTRAST control so that the picture is clear on the screen.

To Change From One Channel to Another:
11. Turn the STATION SELECTOR so that the desired channel number is seen in the window.
12. It may be necessary to repeat steps 7 and 10 when switching from one channel to another.
13. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step 7 is generally sufficient.
14. If the position of the controls has been changed, it may be necessary to repeat steps 1 through 10.
Note: If any difficulty is experienced with steps 8 or 9, turn the CONTRAST control ¼ turn counterclockwise and repeat adjustments 8 and/or 9.

Installation:
The complete installation of your DE WALD television receiver and the television antenna must be made by a qualified Television Service Technician. A correctly designed antenna, properly installed, is essential for good picture and sound reception. Only an antenna, which is designated to match the receiver circuits, should be used. Reception up to and sometimes beyond the line of sight to the transmitter antenna may be obtained if local interference conditions permit. It is recommended that a combination low frequency and high frequency antenna with separate lead-ins be used when installing this receiver in poor reception areas. It is further advised that a double pole, double throw switch be used for switching either the high or low frequency antenna to the receiver input.

Replacement of Kinescope:
For models CT-102, CT-103. Remove all control knobs, masonite back of cabinet, five mounting screws under cabinet and connecting plug from speaker. The chassis can now be removed from the cabinet. To replace the kinescope, remove the socket, ion trap and disconnect the second anode cap connector. Loosen and remove the wing nuts which hold the tube strap. The tube may be withdrawn from the yoke and focus coil. When installing the new kinescope do not force it into the yoke or focus coil if they are not properly aligned. The tube must be installed so that the second anode contact is approximately on top and the two small flags, in the kinescope gun structure near the base of the tube, are in a horizontal position. Replace the top tube mounting strap and the ion trap and kinescope socket. Slide the chassis back into the cabinet, replace the five chassis mounting screws firmly into the chassis feet, replace the speaker connecting plug, push on the second anode cap connector and push on all control knobs. CAUTION: FAILURE TO CONNECT THE SPEAKER TO THE CHASSIS BEFORE TURNING THE RECEIVER ON MAY RESULT IN SERIOUS DAMAGE TO THE FIRST TWO FILTER CONDENSERS AND 5U4 RECTIFIER.
For Model CT-104 the procedure for replacement of the kinescope is as follows: Remove the front panel by unscrewing rosettes. Remove the kinescope socket from the kinescope. Slide off the ion trap. The tube may now be withdrawn from the yoke and focus coil. To replace/install the new kinescope, reverse the procedure.

Ion Trap Adjustment:
This television receiver is equipped with a special permanent magnet ion trap. To install this trap, slide on kinescope with the heavy magnet toward the base of the tube and in line with the tube flags. If a single permanent magnet ion trap is used, slide the trap on the kinescope tube with the manufacturer's name or arrow facing toward the front of the tube. Starting from this position, adjust the ion trap by moving it forward or backward at the same time rotating it around the neck of the kinescope tube for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap for maximum raster brilliance. The final touches should be made with the brightness control at the maximum position with good line focus maintainable.

Focus Coil Adjustments:
Turn the centering controls to mid position. 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 adjustment wing nuts and rotate the coil about its vertical and horizontal axes until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the focus coil in this position.

Deflection Yoke Adjustment:
If the lines of the raster are not horizontal or "squared" with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

Placement:
The location in the room for your television receiver should be given careful consideration. Choose the location:
A - Where no bright light will fall directly on the picture (some illumination in the room is desirable).
B - To give easy access for operation and comfortable viewing.
C - To permit convenient connection to the antenna.
D - Convenient to an A-C electrical outlet of the proper voltage and frequency.
E - To allow adequate ventilation.

CAUTION: The receiver is provided with adequate ventilation apertures, under, in back of, and on the sides of the cabinet. THESE APERTURES SHOULD NOT BE ALLOWED TO BE COVERED OR VENTILATION IMPEDED IN ANY WAY.
Note: Always keep the rear of this television receiver at least 6 inches away from the wall to allow for proper ventilation.

Replacement of Fuse:
This receiver is provided with a pigtail Glass Tube Fuse on the left bottom side of the chassis. This is a protective fuse for the H.V. Transformer. If it blows out, replace the 6BG6G tube. Use a 0.2 amp. - 250 volt pigtail fuse when replacement is necessary.

Power Supply:
This receiver is designed to operate on 105-125 volts, A-C, 60 cycle power only. If plugged into an incorrect power supply, damage to the receiver may result. If in doubt about your power supply, call your power company.

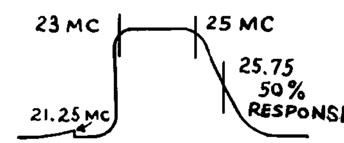
High Voltage Check:
If there is no raster on the kinescope tube after the ion trap has been adjusted, the high voltage may easily be checked by holding the handle of a well insulated screwdriver on the top cap of the 1B3 tube. The screwdriver should draw approximately a ¼" spark from this cap. If a spark is present and still no high voltage at the anode lead, replace the 1 meg. Filter Resistor underneath the 1B3 socket.

Tube Data:
The following is the complement of tubes and rectifiers on this television receiver:
TUBES: 6AG5 (3), 6AL5 (3), 6AU6 (1), 6K6GT (1), 6BA6 (1), 6AT6 (1), 6SN7GT (2), 6BG6G (1), 12AU7 (2), 5V4G (1), 6J6 (3), and Kinescope. If Turret tuner is used: 6J5 (1), and 6AG5 (1).
RECTIFIERS: 1B3GT/8016 (1), 5U4G (1).

ALIGNMENT PROCEDURE

To Adjust Sound I.F.'s:
1. Set the signal generator to 21.25 Mc and connect lead to grid of the second sound I.F. tube 6AU6, prong 1.
2. Bring out bottom slug of discriminator transformer.
3. Set VTVM or amplified detector.
4. Connect the hot side of the VTVM in series with a one megohm resistor to junction of the diode resistors (100K ohm each). Connection can be made by fashioning a hook on the one meg resistor lead and making connection to the transformer lug "C". Connect low side of VTVM to chassis.
5. Adjust top slug (primary coil) of the discriminator for maximum output on VTVM.
6. Remove VTVM lead from junction point of 100K ohm resistors and connect VTVM lead to junction of the volume control high side and 0.0025 MFD condenser coming from sound discriminator tube 6AL5 prong 1. This junction is a double cinch.
7. Adjust the bottom slug (secondary coil) of the discriminator transformer for zero voltage output. It will be found that it is possible to procure a positive or negative voltage on the VTVM depending upon this adjustment. Obviously, to pass from a positive to negative voltage, the voltage must go through zero. The bottom slug should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point then will be called discriminator zero output.
8. Remove VTVM lead and connect lead in series with a 33K ohm resistor to the second sound I.F. grid return terminal, "A". Adjust Contrast Control to give -3 volt bias on tuner bias lead (junction 82K and 6.8 Meg). Remove signal generator lead from the grid of the second sound I.F. tube and connect to: RCA TUNER: either side of the 10K ohm resistor located under the tuner shield. STANDARD COIL TUNER: shield of 6J6 tube, after having loosened shield just enough to prevent it from making contact with chassis. G.I. TUNER: first front section of center variable. Peak the top and bottom slugs of the first sound I.F. transformer T-1 for maximum output on VTVM.
9. Peak the top slug of the converter transformer for maximum output on VTVM.
10. When using an oscilloscope and a wide band oscillator for calibrating sound I.F., connect the sweep generator to the grid (Pin 1) of the 2nd sound I.F. tube 6AU6. Connect the oscilloscope high side (in series with a 1 Meg resistor) to the point indicated under 6 above and the ground terminal to chassis. Adjust top slug of discriminator (primary) to produce maximum amplitude and bottom slug (secondary) to produce the correct center point and best linearity on the response curve. This curve should be "S" shaped.
11. Connect sweep generator to point indicated in 8 and set tuner bias as shown. Connect oscilloscope high side (in series with a 40K ohm resistor) to terminal A of sound I.F. transformer (low side of secondary), and the ground terminal to chassis. Adjust sound transformer primary and secondary, and converter sound trap, to produce maximum amplitude at 21.25 Mc.

To Adjust Pix I.F.'s:
1. Adjust the Contrast Control so that there is a voltage of -3 volts on the I.F. bias bus (junction 10K and 12K resistors and grid returns of 1st and 2nd pix I.F. tubes).
2. Set channel switch to channel 9.
3. Connect the VTVM across the 2nd pix detector load resistor of 4,700 ohm. Cold end to go to chassis and hot end to junction of peaking coil L-4 and 4,700 ohm load resistor.
4. Connect signal generator lead (hot side) to grid of 1st pix I.F. tube 6AG5 prong 1. Connect cold side of signal generator to chassis.
5. Set signal generator to 24.6 Mc and peak detector I.F. (L-3) for maximum output on VTVM.
6. Set signal generator to 21.25 Mc and peak cathode trap (T-4) for minimum output on VTVM.
7. Set signal generator to 26 Mc and peak second I.F. coil (L-2) for maximum output on VTVM.
8. Set signal generator to 23.1 Mc and peak 1st I.F. coil (L-1) for maximum output on VTVM.
9. Remove generator lead from the grid of the 1st pix I.F. tube and connect to: RCA TUNER: either side of the 10K ohm resistor located under shield. STANDARD COIL TUNER: shield of 6J6 tube, after having loosened shield just enough to prevent it from making contact with chassis. G.I. TUNER: first front section of center variable.
10. Adjust Contrast Control so that there is a voltage of -3 volts on the tuner bias lead (1st audio tube 6AT6 prongs 5 and 6).
11. Set signal generator to 22.9 Mc and peak converter I.F. coil bottom slug for maximum output on VTVM.
12. When using an oscilloscope and a wide band oscillator for calibrating and checking band width of the I.F.'s, connect sweep generator to the point indicated under 9. Connect the oscilloscope high side (in series with a 40K ohm resistor) to the junction of Peaking coil L-4 and the 4,700 ohm resistor, and the ground terminal to the chassis. Follow steps 1 and 2. Align the Pix I.F.'s and Cathode Trap to produce a response curve similar to the one shown.



TYPICAL OVERALL RESPONSE CURVE OF PICTURE I.F.'S

TUBE SOCKET VOLTAGE READINGS

Pin Numbers and Voltage

TUBE	POSITION	1	2	3	4	5	6	7	8	REMARKS
5U4-G	Rectifier				270 AC to Gd.		380 AC to CT		280	Pin 2 to 8, 4.8 AC.
6AG5	1st Pix. IF	-3	0.3	6.2 AC	0	145	145	0.3		Contrast control fully clockwise.
6AG5	2nd Pix. IF	-1.15	0.4	6.2 AC	0	140	140	0.4		Contrast control fully clockwise.
6AG5	3rd Pix. IF	0	1.6	0	6.2 AC	95	140	1.6		Contrast control fully clockwise.
6AL5	2nd Detector	0	0	0	6.2 AC	0	0	-.5		Contrast control fully clockwise.
6SN7-GT If 12AU7	Video Amplifier is used for Vid.Amp	-100 90	85 -100	-100 -100	-.5 6.2 AC	145 6.2 AC	0 135	6.2 AC -1	0 0	Contrast control fully clockwise. Contrast control fully clockwise. Pin 9, zero volts
6BA6	1st Sound IF	0	0	0	6.2 AC	130	130	1.5		Contrast control fully clockwise.
6AU6	2nd Sound IF	-.5	0	0	6.2 AC	145	95	0		Contrast control fully clockwise.
6AL5	Sound Discr.	0	0			0	0	0		Pin 3 to 4, 5V AC. Contrast control fully clockwise.
6AT6	1st Audio	0	0	0	6.2 AC	-.75	-.75	65		Contrast control fully clockwise.
6K6-GT	Audio Output	6.2 AC	6.2 AC	130	200	-5.5	-16 Bus	0	0	Contrast control fully clockwise.
12AU7	Sync. Sep. & Amp.	135	0	7	6.2 AC	6.2 AC	6.5	0	1.2	Pin 9, zero volts.
6SN7-GT	Vert Osc. & Output	-115	50	-100	-95	190	-90	6.2 AC	0	V-Hold fully ccw, V-Lin fully cw, Height fully cw.
6BG6-G	Horiz. Output	0	6.2 AC	-95	0	-105	0	0	150	
6AL5	Horiz. Phase Det.	0	0	6.2 AC	0	1.3	0	-.9		
6SN7-GT	Horiz.Osc. & Disch.	-.85	85	9	0	220	9	6.2 AC	0	H-Hold fully ccw.
5V4-G	Damper				260		260		350	Pin 2 to 8, 4.8 AC.
10BP4	Kinescope	Pin 1-12 6.3 AC	Pin 2 90	Pin 10 300	Pin 11 B'ness. cw-35, ccw-210.				Pin 12 145	
#3032A	Metal Clad Resistor	High Side 225: Tap 150.								
#3033A	Metal Clad Resistor	High Side, -100; 1st Tap, -20; 2nd Tap, -16. 3rd Tap, -4.								

WAVE FORMS

PLATE OF HORIZONTAL DISCH. TUBE

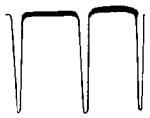
6SN7GT - PIN 2 60V. P-P

GRID OF HORIZONTAL OUTPUT TUBE

6BG6G - PIN 5 40V. P-P

TERMINAL NO 1 OF HIGH VOLTAGE FLYBACK TRANSFORMER & GROUND

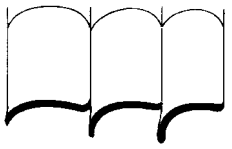
35 V. P-P



VOLTAGE ACROSS HORIZONTAL DEFLECTION COILS

DAMPER 5V4G - PINS 4&6 APPROX. 1100 V. P-P

NOTE: ALL MEASUREMENTS MADE WITH THE LOW SIDE OF OSCILLOSCOPE CONNECTED TO CHASSIS

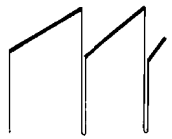


OUTPUT OF SYNC. SEPARATOR VERTICAL

12AU7 SYNC. AMP. - PIN 1 10V. P-P

OUTPUT OF SYNC. SEPARATOR HORIZONTAL

12AU7 SYNC. AMP. - PIN 1 10V. P-P



INPUT TO VERTICAL OUTPUT TUBE

RED LEAD OF VERTICAL OSC. TRANSFORMER 50V. P-P

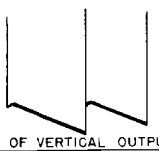
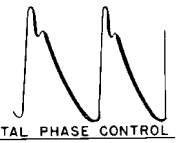


PLATE OF VERTICAL OUTPUT TUBE

6SN7GT - PIN 5 750 V. P-P

HORIZONTAL PHASE DETECTOR

6AL5 - PIN 5 4V. P-P

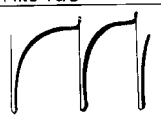


HORIZONTAL PHASE CONTROL VOLTAGE

6AL5 - PINS 1&2 6V. P-P

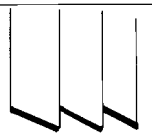
OUTPUT OF INTERGRATING NETWORK - VERTICAL VERTICAL OSC. TRANS. YELLOW LEAD

25V. P-P

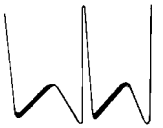


GRID OF VERTICAL OSC. TUBE

6SN7GT - PIN 1 140V. P-P



VOLTAGE ACROSS VERTICAL DEFLECTION COILS VERTICAL OUTPUT TRANS. GREEN LEAD 75V. P-P



HORIZONTAL PHASE DETECTOR

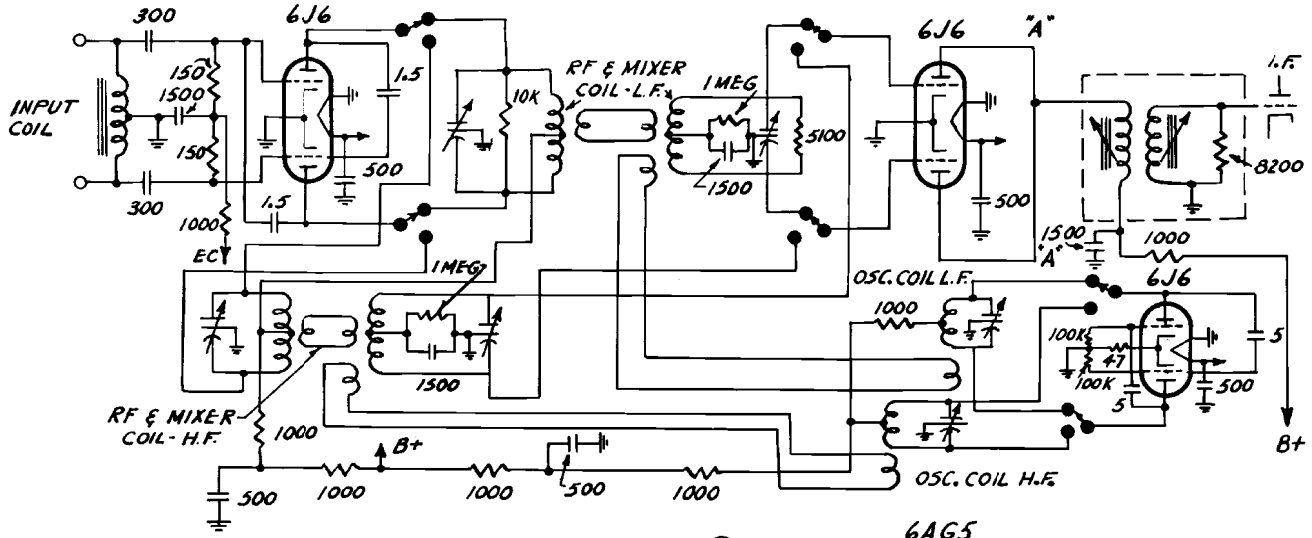
6AL5 - PIN 7 3V. P-P

HORIZONTAL OSC.

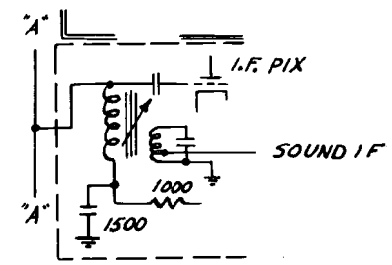
CATHODE OF 6SN7GT - PINS 3 & 6 10V. P-P

HORIZONTAL OSC.

PLATE OF 6SN7GT - PIN 5 30V. P-P

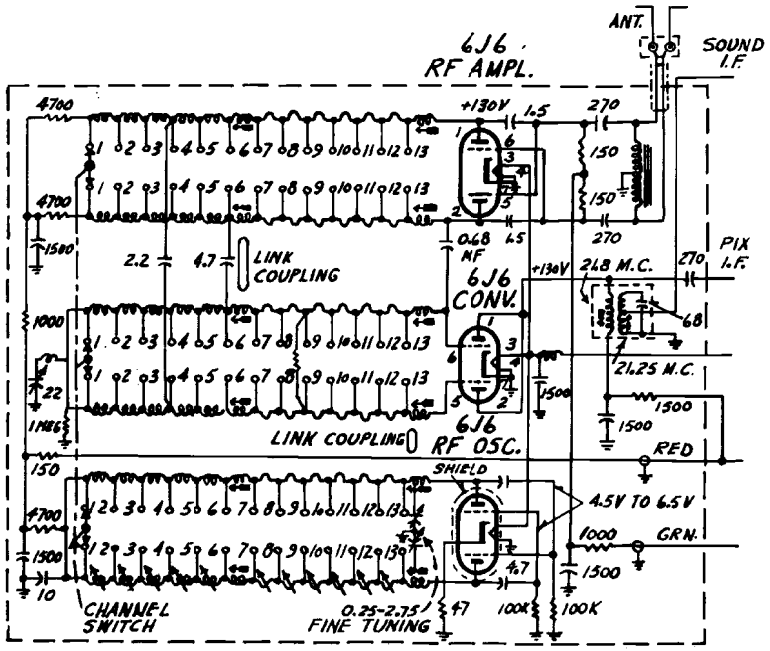


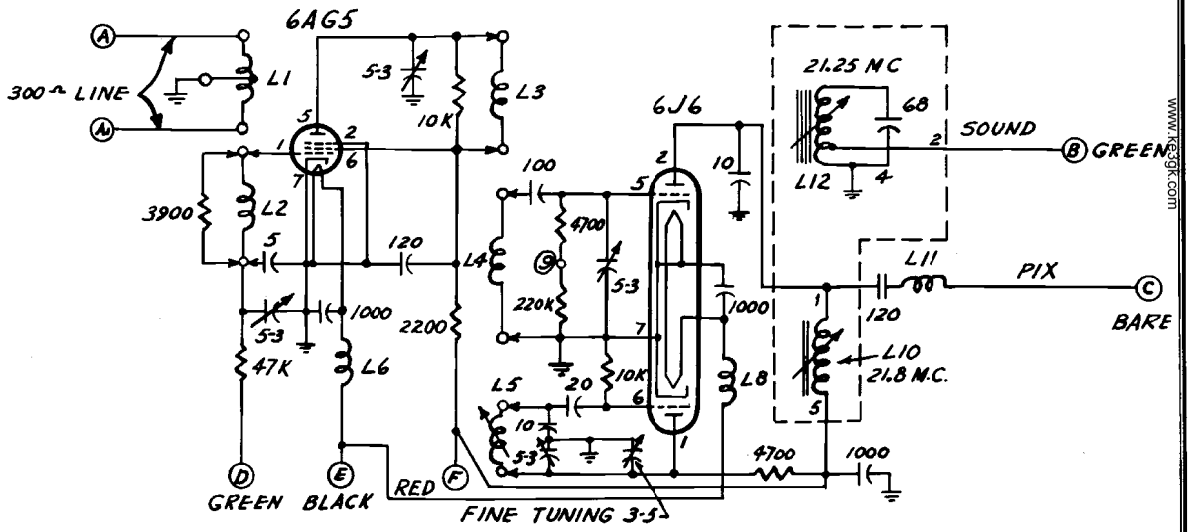
13 CHANNEL SWITCH TYPE TUNER



ALTERNATE CIRCUIT

12 CHANNEL, VARIABLE CONDENSER TYPE TUNER





12 CHANNEL, TURRET TYPE TUNER