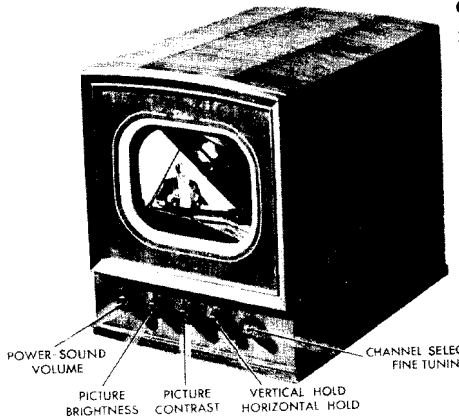


GENERAL

PICTURE AREA . . . . . 54 square inches

TUBES . . . . . Twenty-one plus two rectifiers

SPEAKER . . . . . 6-1/2 inch E.M. (3.2 Ohm V.C.)

ANTENNA . . . . . Provision for external antenna using 300-ohm transmission line

TUNING . . . . . Rotary channel selector switch Plus manual trimming adjustment.

TUNING RANGE . . . . . Twelve pre-set channels

Channel No.	Frequency (mc)	Channel No.	Frequency (mc)
2	54-60	8	180-186
3	60-66	9	186-192
4	66-72	10	192-198
5	76-82	11	198-204
6	82-88	12	204-210
7	174-180	13	210-216

INTERMEDIATE FREQUENCY
Picture carrier . . . . . 26.25 mc
Sound carrier . . . . . 21.75 mc
Intercarrier sound system . 4.5 mc

POWER SUPPLY . . . . . 105-125 V. 60 cycles AC

POWER CONSUMPTION . . . . 230 Watts

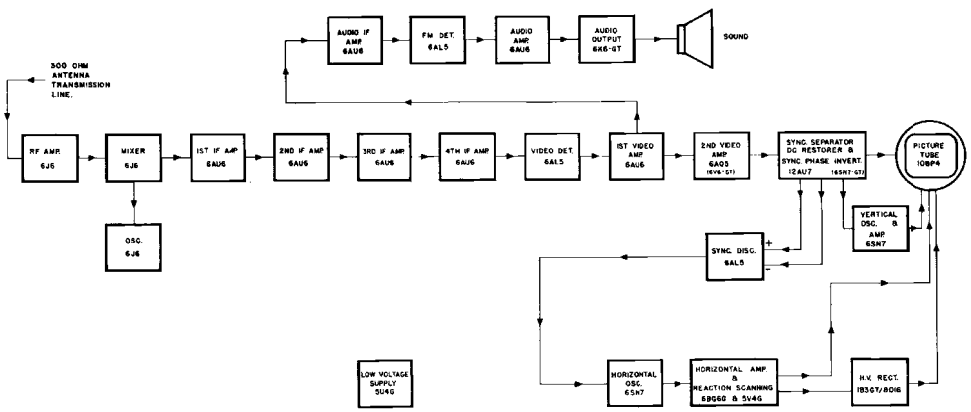


Fig. 1. Functional block diagram

CARE OF THE KINESCOPE WINDOW

The window in front of the picture tube is made of safety glass, hence it may be cleaned by any of the conventional window cleaning processes. Abrasive or strong solvent type cleaning solutions that may scratch the glass or damage the cabinet finish, however, should be avoided.

HIGH VOLTAGE WARNING

Operation of the receiver chassis outside of the cabine involves a shock hazard. An interlock in the line cord disconnects the power when the back cover is removed. The HIGH VOLTAGE supply, while of low current capacity, operates at a 9,000 volt potential. Exercise all normal HIGH VOLTAGE precautions while working with this equipment.

KINESCOPE HANDLING PRECAUTIONS

The kinescope housing provides adequate protection against possible tube implosure while in the cabinet. Do not expose the kinescope or handle it in any way without providing personal protection in the form of shatterproof goggles and heavy gloves. The kinescope should be handled by qualified personnel only.

The kinescope envelope encloses a high vacuum and with the large surface area of glass involved, the stresses set up, particularly at the front rim of the tube, are considerable. An abnormal handling stress, accidental blow at a highly stressed surface, or even a scratch on the surface of the tube could cause it to implode or collapse with destructive violence.

NON-OPERATING CONTROL ADJUSTMENTS

The "non-operating" or screw-driver adjustments normally will require an occasional minor adjustment if any circuit work or tube changing is required. A test pattern, generated either locally in the shop or obtained from a television station is recommended for best results. Normal picture contrast and brightness should be maintained during the following adjustments for best results.

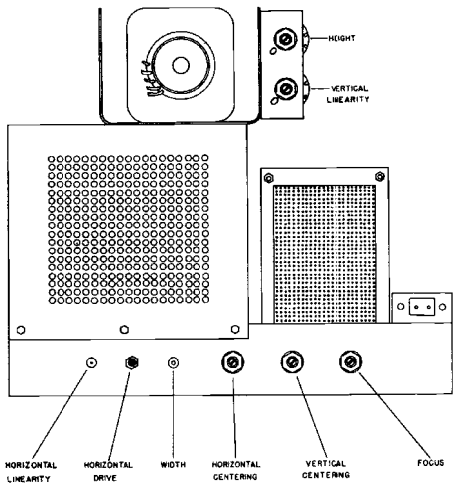


Fig. 2 Rear chassis view, location of non-operating controls

HORIZONTAL-OSC.,-DRIVE,-LINEARITY, -CENTERING AND WIDTH ADJUSTMENTS

1. Advance the HORIZONTAL DRIVE control (clockwise) as far as possible without causing crowding of the right hand side of the test pattern or producing picture instability. Insufficient horizontal drive will cause the raster to fall short of filling the mask horizontally. Should the HORIZONTAL HOLD control fail to hold the test pattern in the normal manner, set the HORIZONTAL HOLD control in the middle of its range and adjust the HORIZONTAL OSC screw for horizontal sync. (See Fig. 11 for location.)

HORIZONTAL DRIVE CONTROL MISADJUSTMENT

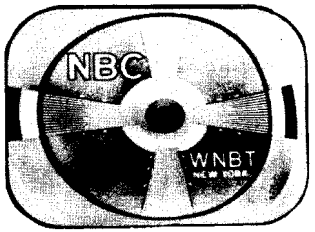


Figure 3.

WIDTH CONTROL MISADJUSTMENT

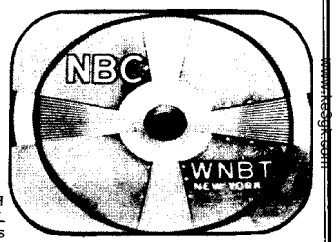


Figure 4.

2. Set the WIDTH and HORIZONTAL CENTERING controls so that the test pattern fits and centers in the horizontal dimension of the kinescope mask.

HORIZONTAL CENTERING CONTROL MISADJUSTMENT

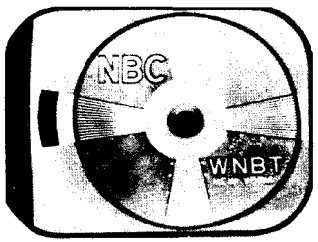


Figure 5.

3. Set the HORIZONTAL LINEARITY control so that the test pattern is symmetrical from left to right. A slight readjustment of the HORIZONTAL DRIVE control may be necessary when making tnis adjustment.

HORIZONTAL LINEARITY CONTROL MISADJUSTMENT

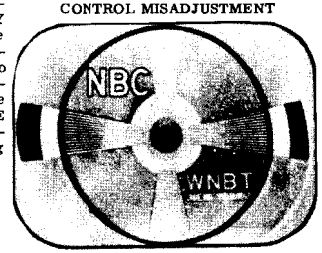


Figure 6.

VERTICAL-CENTERING,-LINEARITY, AND HEIGHT ADJUSTMENTS

HEIGHT CONTROL MISADJUSTMENT

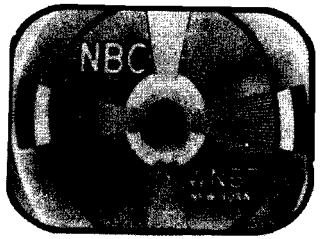


Figure 7

1. Set the HEIGHT and VERTICAL CENTERING controls so that the test pattern fits and centers in the vertical dimension of the kinescope mask.

VERTICAL CENTERING CONTROL MISADJUSTMENT

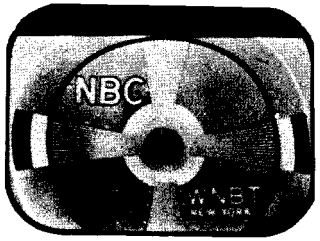


Figure 8.

VERTICAL LINEARITY CONTROL MISADJUSTMENT

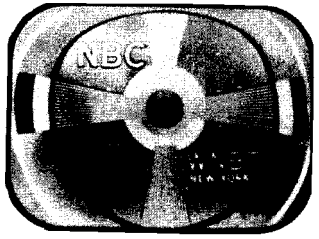


Figure 9

2. Set the VERTICAL LINEARITY control for a symmetrical test pattern in the vertical dimension. A slight readjustment of the HEIGHT and VERTICAL CENTERING controls may be required when making this adjustment.

NOTE - The sequence of "non-operating" control adjustments outlined above is suggested as a convenient method of approach and not an arbitrary procedure. Variations of the procedure is permitted to obtain the final result.

DISMANTLING FOR KINESCOPE REPLACEMENT OR ALIGNMENT ADJUSTMENTS

1. Remove the five front panel control knobs by pulling them straight from their shafts. The two dual control knobs must be removed in two pieces, removing the center unit first.
2. Remove the back cover. Note that the line cord and half of the interlock connector will come along with the back cover.
3. Disconnect and remove the speaker to provide clearance for the kinescope tube mounting.
4. Release the two chassis units by removing the eight mounting screws at the base of the cabinet and pull the chassis clear of the cabinet. The kinescope tube is now accessible for replacement or adjustment.
5. Reconnect the interlock connector for power while making the non-operating control adjustments or alignment adjustments on the bench.

REMOVING THE KINESCOPE TUBE

Refer to the warning KINESCOPE HANDLING PRECAUTIONS. Follow the dismantling instructions above to expose the tube and proceed as follows:

1. Disconnect the tube socket connector at the base of the tube and the high voltage anode lead. (Snap on connector).
2. Remove the ION TRAP slipping it from the neck of the tube passed the tube socket.
3. Loosen the steel band at the front rim of the tube and slip the tube with the rubber boot out through the steel band.

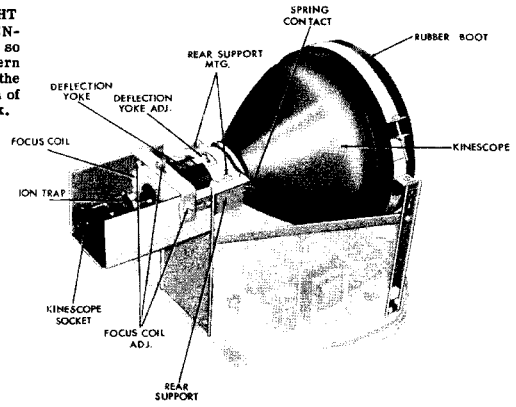


Fig. 10. Kinescope mounting detail

INSTALLING THE KINESCOPE TUBE

1. Slip the rubber boot over the front rim of the kinescope tube so that when the raster area is properly positioned the anode contact is at the top and slightly to the right of center as viewed from the screen of the tube.
2. Slip the tube through the front rim (socket first) and on through the REAR SUPPORT, DEFLECTION YOKE and FOCUS COIL. Orient the raster area and seat the tube firmly against the REAR SUPPORT. If the tube fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube. Check the distance from the front face of the RUBBER BOOT to the front edge of the metal clamp. The distance is approx. 1-1/16 inches to properly seat the boot against the cabinet. If this dimension is off; loosen the two REAR SUPPORT MTG. screws, position the tube correctly and fasten the front rim firmly about the RUBBER BOOT.
3. The REAR SUPPORT must seat firmly against the flare of the tube and be securely anchored in place by the two REAR SUPPORT MTG. screws. Check the two SPRING CONTACTS grounding the outer coating of the kinescope tube. A high potential is developed in the outer coating of the tube if these contacts are faulty.
4. The DEFLECTION YOKE must seat firmly against the flare of the tube. Check by loosening the single DEFLECTION YOKE ADJ. screw and pushing the DEFLECTION YOKE housing forward as far as it will go. Take up on the mounting screw temporarily to hold the coil in place.
5. Slip the ION TRAP over the neck of the tube. If it is the ring type, the arrow points toward the front of the tube; if it is of the clamp type, the blue coded clamp is toward the front.
6. Connect the tube socket and anode connector to the kinescope and turn on the receiver.
7. After allowing a few minutes for warmup, turn up the brightness control and set the ION TRAP for maximum raster brilliance, backing off the brightness control adjustment as the maximum point is approached. The ION TRAP must be rotated about the axis of the tube as well as shifted along the neck of the tube to obtain the proper setting. The arrow on the ring type ion trap will generally point at the HV anode connector when properly positioned as far as rotation is concerned, hence a rough setting may be obtained immediately with this type of trap.

With the BRIGHTNESS control set for slightly above average brilliance and the CONTRAST control full counterclockwise, adjust the FOCUS control until the line structure of the raster is clearly visible and readjust the ION TRAP for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

8. Set the HORIZONTAL and VERTICAL CENTERING controls at 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 ADJ. screws and rotate the coil about its vertical and horizontal axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the adjustments with the coil in this position.
9. If the lines of the raster are not horizontal or square with the picture mask loosen the DEFLECTION YOKE ADJ. screw and rotate the DEFLECTION YOKE until this condition is obtained. Tighten the adjustment.
10. Follow the procedure under NON-OPERATING CONTROL ADJUSTMENTS and make any minor adjustments of the FOCUS COIL or DEFLECTION YOKE necessary to obtain the desired results. A slightly better average focus may be obtained by sliding the FOCUS COIL back and forth along the kinescope neck while adjusting the FOCUS control and watching the test pattern. The final adjustment of the focus coil should leave the raster approximately centered.

MEASUREMENTS OF H.V.POTENTIAL ON KINESCOPE ANODE

The second anode potential will be approx. 9,000 V. on a receiver that is functioning properly. Since the high potential for the kinescope anode is obtained from the horizontal output transformer, the "non-operating" control adjustments outlined above must be made or be known to be in proper adjustment before the H.V. measurement will have any meaning. Improper operation of the horizontal sweep circuit or circuit faults in the high voltage filter will generally account for an abnormal anode potential. If the anode potential is low, check the HORIZONTAL DRIVE adjustment outlined above.

CAUTION HIGH VOLTAGE

Do not use hand held flexible test leads when making the following measurement. Keep the hands clear of the circuit during measurement. A 9,000 V. potential exists in this circuit. Exercise all normal high voltage precautions.

1. Connect a 50-megohm resistor string in series with a 200 microampere meter. Connect the free meter terminal to the chassis and the high side of the resistor string to the anode cap of the kinescope. The connection to the anode cap may be made with a fine wire slipped under the connector. Make up the resistor string with 10-megohm one or two watt resistors to provide a safety factor for voltage breakdown. If 10-megohm resistors are used, a total of five will be required to obtain the 50 megohms. Make the setup self-supporting and allow adequate clearance between the resistor string and chassis parts to prevent high voltage breakdown.
2. Turn on the receiver and set the BRIGHTNESS and CONTRAST controls at minimum. The microammeter will read approx. 180 microamperes or 9,000 V. at the kinescope anode. The anode potential is measured in this manner (CONTRAST and BRIGHTNESS control at minimum; meter current approx. 200 microamperes) to simulate the kinescope load on the high voltage power supply.

ALIGNMENT PROCEDURE

Note - The following alignment adjustments do not require the use of the kinescope tube. It is recommended that the tube be removed if extensive alignment adjustments are to be made.

CAUTION - Removal of the kinescope tube exposes the HIGH VOLTAGE anode connector contact. Keep this lead and contact clear of personnel servicing equipment and grounded objects on the service bench. Exercise all normal high voltage precautions working with the exposed units. See Figures 14 and 16 for high voltage points on the power supply chassis.

EQUIPMENT REQUIRED

Signal generator covering 4 mc to 30 mc
Signal generator covering 40 mc to 215 mc
Electronic voltmeter
Two 150-ohm carbon resistors
One .01 mfd. 600 V. tubular paper condenser.

F-M SOUND CHANNEL I-F ALIGNMENT

1. Connect the low frequency signal generator output between the control grid (pin 1) of the 6AU6 1st VIDEO AMP. tube (V-9) and chassis ground.
2. Connect the electronic voltmeter between pin 7 of the 6AL5 FM DET. tube (V-16) and chassis ground.
3. With the signal generator (unmodulated) set at 4.5 mc, set the 4.5 MC LIMITER GRID ADJ. and FM DET. PRI. ADJ. (See Fig. 11) for maximum d-c voltage as measured by the electronic voltmeter. Adjust the limiter grid coil (L-14) before adjusting the f-m detector transformer (T-1) primary. Use just enough signal generator output to obtain approximately one volt at the electronic voltmeter.
4. Connect the electronic voltmeter across the 1000 mmf condenser (C-17) at the output of the f-m detector stage and adjust the FM DET. SEC. ADJ. of the f-m detector transformer (T-1) for the null.
5. Shift the frequency of the signal generator either side of 4.5 mc and touch up the FM DET. PRI. ADJ. for approximately equal peaks. Use just enough signal generator output to obtain one volt peaks for the best results.

I-F AMPLIFIER ALIGNMENT

1. Connect the electronic voltmeter across the 5600-ohm resistor (R-57) in the plate circuit of the 6AL5 VIDEO DET. tube (V-8). This resistor is located on the terminal strip between the 6AL5 VIDEO DET. tube (V-8) and the 6AU6 1st VIDEO AMP tube (V-9).
2. Connect the high side of the low frequency signal generator to the center tap of the H.F. mixer coil (L-5) through a 1200 mmf condenser for isolation. Connect the generator ground to the tuning unit frame near coil (L-5). (See Fig. 11).
3. Set the channel selector at channel 2.
4. Set the signal generator output (unmodulated) to develop two volts at the electronic voltmeter and adjust the five i-f amplifier coils, according to the following chart, for maximum d-c voltage as measured by the electronic voltmeter. Readjust the signal generator output as required to maintain the two-volt potential at the electronic voltmeter.

IF AMPLIFIER ALIGNMENT CHART

Signal Generator Frequency (No Modulation)	Adjustment (Refer to Fig. 11)	Stage Adjusted
22.8 mc	22.8 MC IF ADJ.	Mixer
25.8 mc	25.8 MC IF ADJ.	1st IF amp
23.8 mc	23.8 MC IF ADJ.	2nd IF amp
25.2 mc	25.2 MC IF ADJ.	3rd IF amp
26.3 mc	26.3 MC IF ADJ.	Video detector

5. Check the i-f amplifier frequency response by tuning the signal generator from 21 mc through 26.25 mc and observing the change in d-c voltage at the electronic voltmeter. If the signal generator output is set for an electronic voltmeter reading of 1.5 volts at the peak i-f amplifier response, the d-c voltage should not drop below one volt between the two peaks normally obtained with this i-f amplifier. If the response is unsatisfactory, repeat the procedure or try slight modifications of the recommended settings to obtain the desired response. Avoid resonating the coils with the iron core at the bottom end of the coil form. (Adjustment screw near limit of its travel.) Check the two carrier i-f responses, 21.75 mc and 26.25 mc. The 21.75 mc response will be approximately 20 db below the peak response (Approx. 0.15 volt) and the 26.25 mc response will fall approximately 6 db below the peak (Approx. 0.4 volt). Refer to Fig. 12.

The average i-f amplifier sensitivity when feeding the signal generator output through the receiver as described above will run approx. 250 to 1500 microvolts for the one volt d-c peak measured at the 5800-ohm resistor (R-57). (Receiver's oscillator operating on channel 2.)

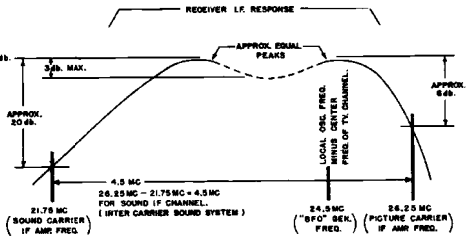


Fig. 12. IF amplifier response

STATION CHANNEL ALIGNMENT

1. Due to the broad frequency response of the i-f amplifier, it is necessary to use a 24.5 mc signal generator or oscillator (unmodulated) as a beat frequency oscillator (BFO) in order to locate the center frequency of the i-f amplifier response for the correct local oscillator adjustment. The "BFO" generator should be loosely coupled by means of a wire from the generator output placed in close proximity to the 6AL5 VIDEO DET. tube (V-8).

2. Connect the high frequency signal generator output to the receiver's antenna transmission line through the two 150-ohm carbon resistors, one connected in each conductor of the transmission line.

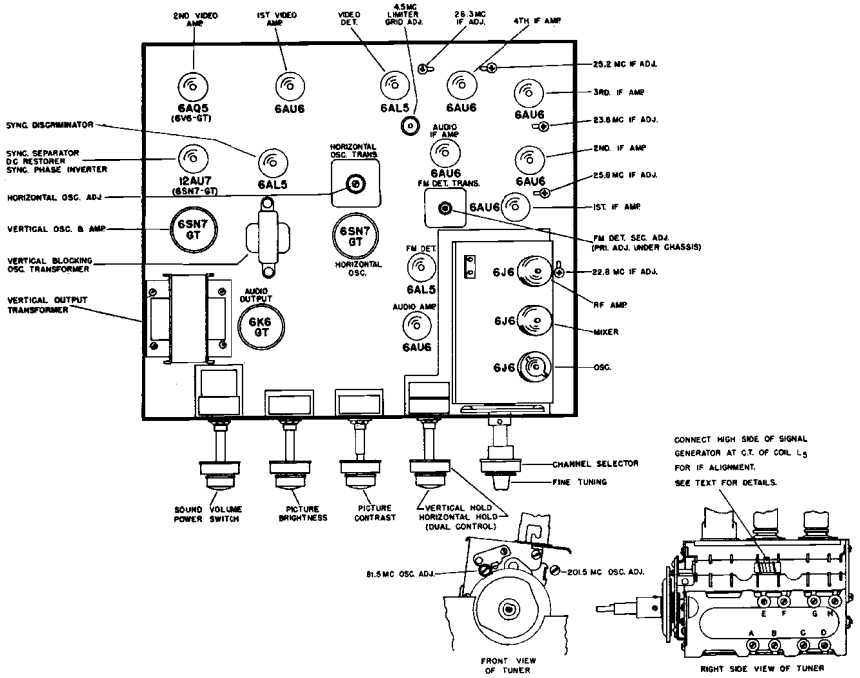


Fig. 11. Top view, alignment points

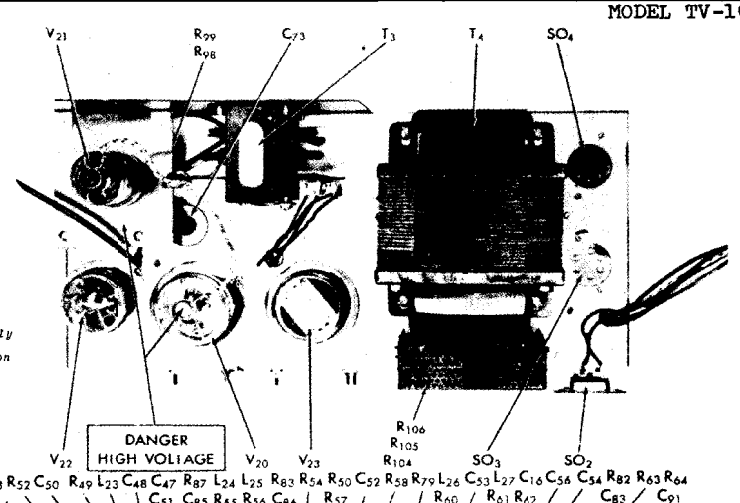


Fig. 14. Top view, power supply chassis, component location

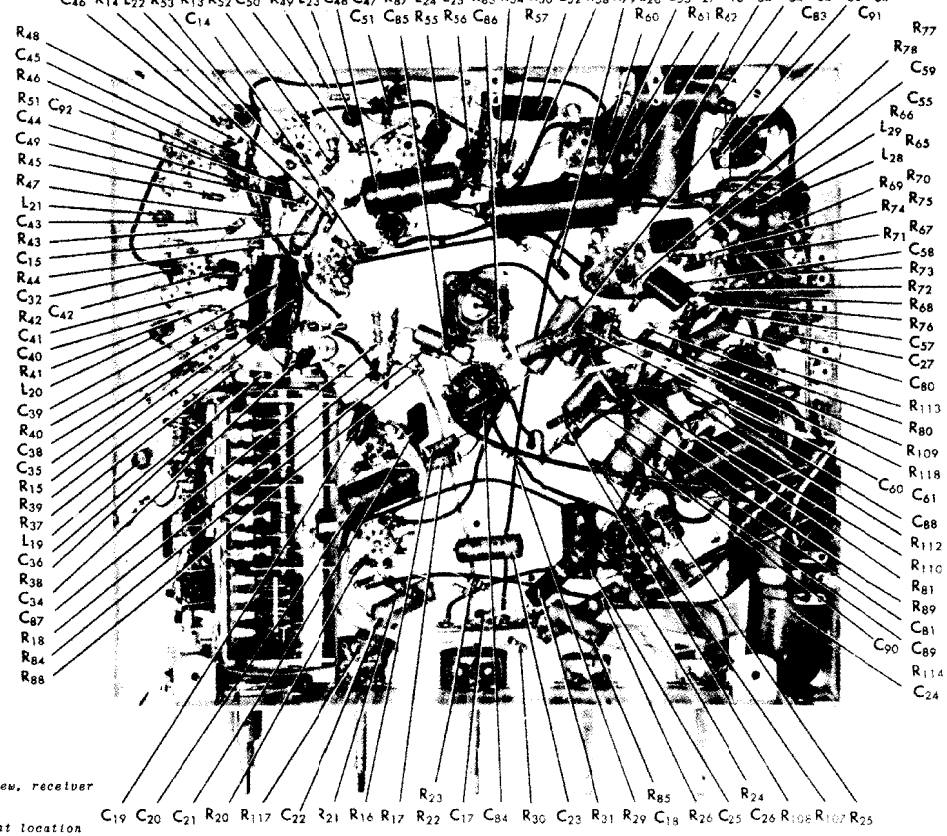


Fig. 15. Bottom view, receiver chassis, component location

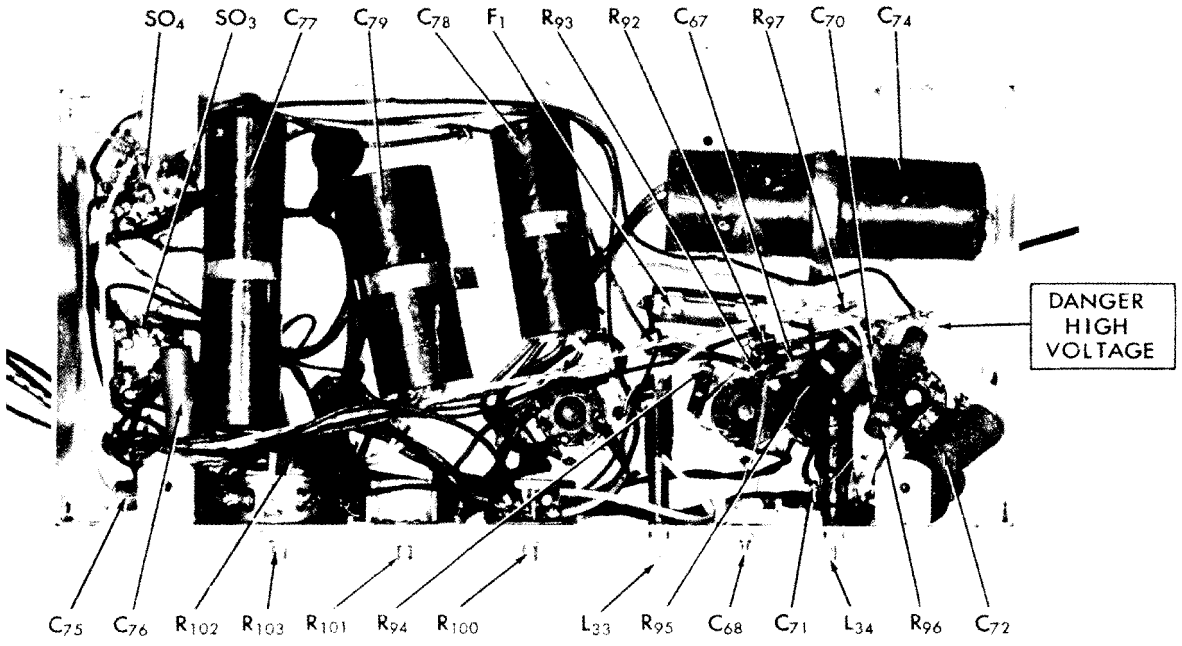


Fig. 16. Bottom view, power supply chassis, component location

3. Clip on an .01 mfd condenser between pin 2 of the 10BP4 kinescope (V-19) and pin 1 of the 6AU6 AUDIO AMP tube (V-17). The connection at pin 2 of the kinescope can be made at the terminal strip under the chassis provided for the socket leads of this tube.

4. Set the "BFO" generator at 24.5 mc (No modulation).

5. Set the FINE TUNING control in the center of its range.

6. Set the channel selector at channel number 2, the high frequency signal generator at 57 mc. and adjust the 81.5 mc OSC. ADJ. screw for a rough audio beat note, using the speaker as a detector.

7. Set the channel selector at channel number 7, the high frequency signal generator at 177 mc. and adjust the 201.5 MC OSC. ADJ. screw for a rough audio beat note.

8. Disconnect the .01 mfd condenser and connect the electronic voltmeter across the 5600-ohm resistor (R-57) in the plate circuit of the 6AL5 VIDEO DET tube (V-8) as for i-f amplifier alignment.

*9. Set the channel selector at channel 6, the high frequency signal generator at 85 mc and adjust trimmers A,B,C and D for maximum voltage as measured by the electronic voltmeter. Use just enough signal generator output to obtain approx. one volt at the electronic voltmeter. Note that trimmers A and B and trimmers C and D must be adjusted simultaneously since the mixer and amplifier tubes are operating in push-pull circuits.

*10. Set the channel selector at channel 13, the high frequency signal generator at 213 mc. and adjust trimmers E,F,G, and H for maximum voltage following the same procedure used in step 9. This completes the alignment of the tuning unit.

The overall sensitivity for the receiver will run approximately 200 microvolts for one volt DC at resistor R-57 when measured in the above manner.

*Step 9 and 10 are not ordinarily required. Adjustment of the trimmers should be undertaken only if the resonant circuits in the tuner have been serviced.

CARRIER vs IF FREQUENCY CHART

Channel No.	Channel Freq. (mc)	Picture Carrier Freq. (mc)	Sound Carrier Freq. (mc)	Receiver Osc. Freq. (mc)	Picture IF Freq. (mc)	Sound IF Freq. (mc)	Picture IF less Sound IF (mc)
2	54-60	55.25	59.75	81.5	26.25	21.75	4.5
3	60-66	61.25	65.75	87.5	26.25	21.75	4.5
4	66-72	67.25	71.75	93.5	26.25	21.75	4.5
5	76-82	77.25	81.75	103.5	26.25	21.75	4.5
6	82-88	83.25	87.75	109.5	26.25	21.75	4.5
7	174-180	175.25	179.75	201.5	26.25	21.75	4.5
8	180-186	181.25	185.75	207.5	26.25	21.75	4.5
9	186-192	187.25	191.75	213.5	26.25	21.75	4.5
10	192-198	193.25	197.75	219.5	26.25	21.75	4.5
11	198-204	199.25	203.75	225.5	26.25	21.75	4.5
12	204-210	205.25	209.75	231.5	26.25	21.75	4.5
13	210-216	211.25	215.75	237.5	26.25	21.75	4.5

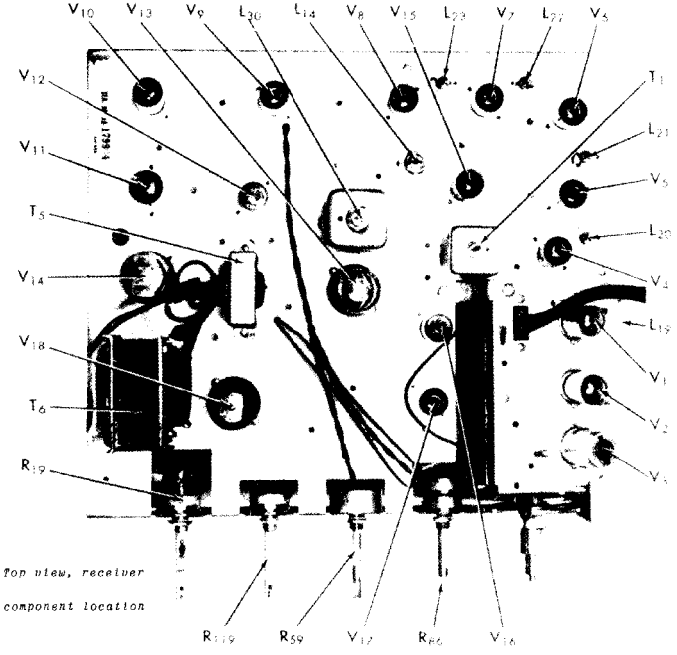


Fig. 13. Top view, receiver chassis, component location

MODEL TV-101

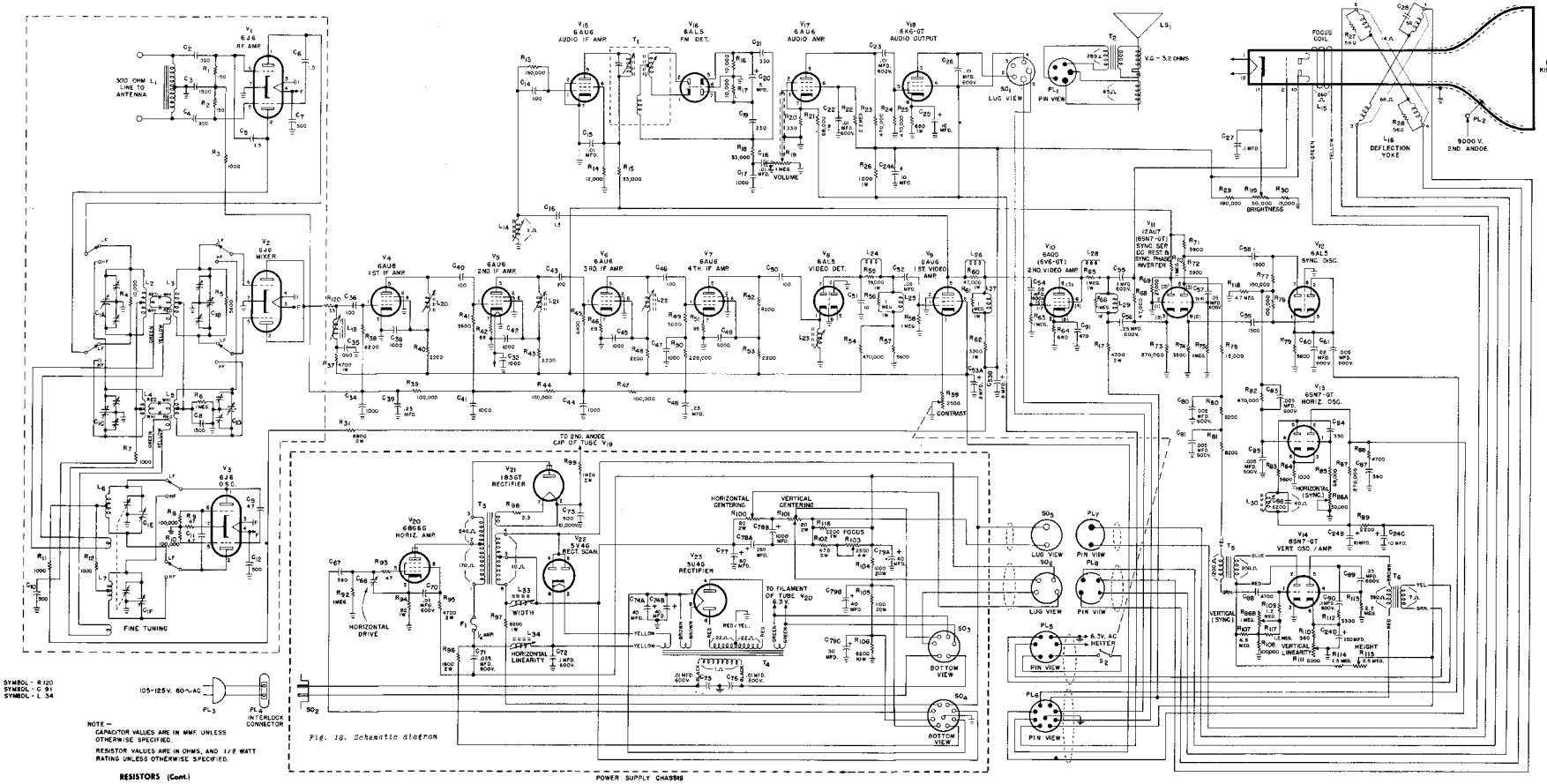


Fig. 18. Schematic diagram

LAST R SYMBOL - R120
LAST C SYMBOL - C 91
LAST L SYMBOL - L 34

105-125 V. 60~AC

PL-3

PL-4 INTERLOCK CONNECTOR

NOTE—
CAPACITOR VALUES ARE IN MMF UNLESS OTHERWISE SPECIFIED.

RESISTOR VALUES ARE IN OHMS, AND 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.

RESISTORS (Cont.)

R-86	25B786	1219259	50,000/1 megohms, HORIZONTAL/VERTICAL control (Dual)
R-93	RC20AE472K	A472	4700 ohms 1/2 watt, carbon
R-94	RC20AE470K	A470	47 ohms 1/2 watt, carbon
R-95	RC20AE820K	B820	82 ohms 1 watt, carbon
R-96	RC40AE182K	C182	1800 ohms 2 watts, carbon
R-97	RC20AE622K	B622	6200 ohms 1 watt, carbon
R-98	RC20AE033M	1214564	3.3 ohms 1/2 watt, carbon
R-99	RC30AE105K	B105	1 megohm 2 watts, carbon
R-100	25B707	1219246	20 ohms 2 watts, HORIZONTAL CENTERING control
R-101	25B706	1219245	20 ohms 2 watts, VERTICAL CENTERING control
R-102	RC40AE471K	C471	470 ohms 2 watts, carbon
R-103	25B708	1219247	2500 ohms 4 watts, FOCUS control
R-104	24BH103D	1219283	1000 ohms 20 watts, WW
R-105	24BH112D	1219215	1100 ohms 20 watts, WW
R-106	24BH82JE	1219216	8200 ohms 10 watts, WW
R-107	RC20AE685M	A685	6.8 megohms 1/2 watt, carbon
R-108,117	RC20AE155K	A125	1.2 megohm 1/2 watt, carbon
R-111	25B769	1219249	5000 ohms, VERTICAL LINEARITY control
R-112	RC20AE332K	A332	3300 ohms 1/2 watt, carbon
R-114	RC20AE155K	A155	1.5 megohms 1/2 watt, carbon
R-115	25B788	1219248	2.5 megohms, HEIGHT control
R-116	RC30AE222K	B222	2200 ohms 1 watt, carbon
R-118	RC20AE475M	A475	4.7 megohms 1/2 watt, carbon
R-119	25B764	1219243	50,000 ohms, BRIGHTNESS control
R-120	RC20AE330M	A330	33 ohms 1/2 watt, carbon

TUBES AND RECTIFIER COMPLEMENT

V-1,2,3	90X6J6	5254	Type 6J6: RF amp.; mixer; and osc.
V-4,5,6,7,9, 15,17	90X6AU8	5260	Type 6AU8: 1st, 2nd, 3rd, 4th IF amp; 1st video amp; audio IF amp; and audio amp.
V-8,12,16	90X6AL5	5251	Type 6AL5: video det., FM det; and sync. disc.
+V-10	90X6AQ5	5268	Type 6AQ5: 2nd video amp.
*V-11	90X12AU7	5328	Type 12AU7: sync. separator, DC restorer & sync. phase inverter
V-13,14	90X6SN7GT	5258	Type 6SN7GT: horizontal osc; and vertical osc. & amp.
V-18	90X6K6GT	5196	Type 6K6GT: audio output
V-19	90X10BP4	5531	Type 10BP4: kinescope
V-20	90X6BQ6G	5289	Type 6BQ6G: horizontal amp.
V-21	90X1B3GT	5056	Type 1B3GT: high voltage rectifier
V-22	90X5V4G	5118	Type 5V4G: rection scanning
V-23	90X5U4G	5117	Type 5U4G: low voltage rectifier

+ Some sets will use a type 6V6GT----90X6V6GT----5241
* Some sets will use a type 6SN7GT----90X6SN7GT---5258

MISCELLANEOUS ELECTRICAL PARTS

	1C740	1219299	Tuning unit assembly complete
LS-1	85C079	1219300	Speaker assembly (Includes plug PL-1)
PL-1			Plug, speaker (Part of speaker assembly)
PL-2	10A300	1219258	Plug, 10BP4 anode
PL-3	87B1668	1219258	Line cord and plug PL-4
PL-5	10A296	1219230	Plug, 6 prong (Power)
PL-6	10A299	1219299	Plug, 5 prong (Power)
PL-7	10A301	1219331	Shell, plug (Used on PL-5 and PL-6)
PL-8	10A302	1219232	Plug, 2 prong (Focus coil)
	10A305	1219220	Plug, 4 prong (Deflection yoke)
	8B309	1219257	Shell, plug (Used on PL-7 and PL-8)
SO-5	10A295	1219227	Socket, kinescope
SO-8	10A296	1219226	Socket, 2 pin (Focus coil)
	10A294	1219218	Socket, 4 pin (Deflection yoke)
F-1	39A334	446657	Shell, socket (Used on SO-5 and SO-6) Fuse, 1/4 amp. type 3AG

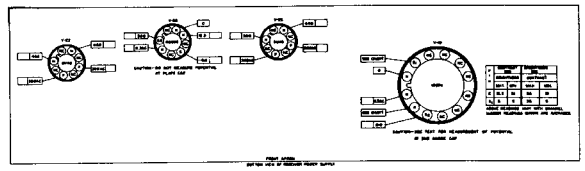
MECHANICAL PARTS

CHASSIS PARTS

SO-1	10A319	1219238	Socket, 5 pin (Speaker)
SO-2	10A286	1218889	Socket, a-c power
SO-3	6A313	1219234	Socket, 6 pin (Power)
SO-4	6A313	1219235	Socket, 9 pin (Power)
	6B396	1218380	Socket, octal (Tube)
	6A398	1219232	Socket, miniature (Tube)
	6A311	1219233	Socket, miniature, 9 pin (Tube V-11)
	6A177	1219221	Socket, octal (Tube V-21)
	6A287	1219140	Receptacle, fuse
	16K130	1219280	Rubber boot, kinescope mtg.
	76D406	1219278	Clamp, kinescope mounting
	87C389	1219275	Bracket, kinescope clamp support
	67B845	1219261	Bracket, rear kinescope support
	67A863	1219271	Bracket, VERT. LINEARITY and HEIGHT control mtg.
	67C870	1219282	Rear support (Deflection yoke housing)
	67B858	1219274	Bracket, focus coil
	67C869	1219275	Bracket, brace
	10A134	1219269	Insert, rubber (Focus coil)
	21B363	1219259	Ion trap
	8B823	1219273	Plate bakelite (Tube V-21 mtg.)

CABINET PARTS

7E079	1219281	Escutcheon, kinescope tube
22C322	1219276	Glass, safety
78A607	1219272	Clip, glass
18A126	1219270	Spacer, rubber
15B146-1	1219251	Knob, VERTICAL (Front section)
15B147-1	1219252	Knob, HORIZONTAL (Rear section)
15B148-1	1219253	Knob, VOLUME, BRIGHTNESS and CONTRAST
18A029	1219268	Foot, rubber
66F488	1219283	Cabinet
8C834	1219279	Cabinet, back
15B153	1219255	Knob, FINE TUNING
15B151-2	1219254	Knob, CHANNEL SELECTOR



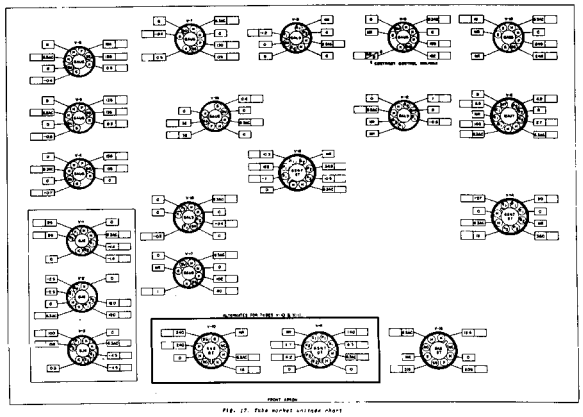
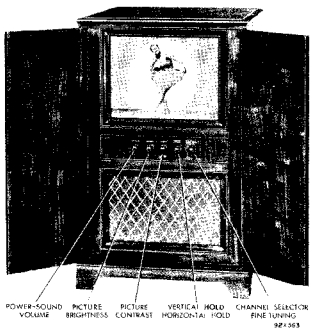


Fig. 17. Tube socket voltage chart

SERVICE PARTS LIST

Illustration No.	Production Part No.	Service Part No.	Description
			ELECTRICAL PARTS
			COILS AND TRANSFORMERS
L-1			Coil, antenna (Part of tuner ass'y.)
L-2			Coil, LF, antenna stage (Part of tuner ass'y.)
L-3			Coil, LF, mixer stage (Part of tuner ass'y.)
L-4			Coil, HF, antenna stage (Part of tuner ass'y.)
L-5			Coil, HF, mixer stage (Part of tuner ass'y.)
L-6			Coil, LF, oscillator stage (Part of tuner ass'y.)
L-7			Coil, HF, oscillator stage (Part of tuner ass'y.)
L-14	51B1037	1216852	Coil, 4.5 mc, sound trap
L-15	51B1085	1219239	Coil, focus
L-16	53B140	1219280	Deflection yoke
L-19,20,21, 22,23	50A372-1	1219233	Coil, i-f amplifier
L-24	51A1079	1219234	Coil, video peaking
L-25	51A1080	1219235	Coil, video peaking
L-26	51A1087	1219236	Coil, video peaking
L-27,29	51A1082	1219238	Coil, video peaking
L-28	51A1086	1219237	Coil, video peaking
L-30	50B411	1219263	Coil, horizontal sweeposc.
L-33	51B1072	1219241	Coil, WIDTH control
L-34	51B1071	1219240	Coil, HORIZONTAL LINEARITY control
T-1	50B406	1219084	Transformer, ratio detector
T-2			Transformer, audio output (Part of speaker assy.)
T-3	55C113	1219266	Transformer, horizontal output
T-4	52C170	1219265	Transformer, power
T-5	55B115	1219264	Transformer, vertical oscillator
T-6	55C114	1219267	Transformer, vertical output
			CONDENSERS
C-1			Tuning condenser ass'y. (Part of tuner ass'y.)
C-2,4,19, 21	47B20331K5	1218950	330 mmf, 500 V., ceramic
C-3,8	47B20152K5	1219298	1500 mmf, 500 V., ceramic
C-5,6,16	47A160-3	1218897	1.5 mmf, 500 V., bakelite
C-7,10,12	47B20501K5	1219296	500 mmf, 500 V., ceramic
C-9,11	47A160-8	1218408	4.7 mmf, 500 V., bakelite
C-14,38,40, 43,46,50	47B20101K5	1218949	100 mmf 500 V., ceramic
C-15,18	46AU105J	E103	.01 mfd. 200 V., tubular
C-17,32,34, 35,38,41, 42,44,45, 47,92	47B20A109N5	1219297	1000 mmf. 500 V., ceramic
C-20	45A109	J051	5 mfd, 50 V., electrolytic
C-22,23,26, 70	46AZ103Z	E103	.01 mfd. 400 V., tubular
C-24	45B135	1219210	10-10-10 mfd. 450 V.; 150 mfd, 50 V., electrolytic
C-25	45A121	J100	10 mfd, 25 V., tubular
C-27	46AU1047	E104	.1 mfd, 200 V., tubular
C-28	CM30A560K	G560	56 mmf, 500 V., mica
C-39,48	46AZ254Z	E254	.25 mfd, 200 V., tubular
C-49	47A168	1219295	5000 mmf, 450 V., ceramic
C-51	47A160-11	1218898	10 mmf, 500 V., bakelite
C-52	46AU503J	E503	.05 mfd, 200 V., tubular
C-53	45B139	1219214	6-8 mfd, 300 V., electrolytic
C-54,57	46AY503J	E503	.05 mfd, 600 V., tubular
C-55,72,90	46AY104J	E104	.1 mfd, 600 V., tubular
C-58,89	46AX254Z	E254	.25 mfd, 600 V., tubular
C-58,59	CM30A152K	G152	1500 mmf, 500 V., mica
C-60	46AY203J	E203	.02 mfd, 600 V., tubular
C-61,81,83, 85	46AZ502Z	E502	.005 mfd, 600 V., tubular
C-67	47B20391K5	1218951	390 mmf, 500 V., ceramic
C-68	44A361	1219207	Trimmer, HORIZONTAL DRIVE adjustment
C-71	46AY353J	E353	.035 mfd, 600 V., tubular
C-73	47A178	1219208	500 mmf, 10,000 V., ceramic
C-74	45B137	1219212	40-40 mfd, 450 V., electrolytic
C-75,76	46BR10316	1219217	.01 mfd, 600 V., molded paper
C-77	45B138	1219211	80 mfd, 450 V., electrolytic
C-78	45B134	1219209	250 mfd, 10 V.; 1000 mfd, 6 V., electrolytic
C-79	45B138	1219213	40 mfd, 150 V.; 40 mfd, 350 V.; 30 mfd., 250 V.; electrolytic
C-80	46AZ202J	E202	.002 mfd, 600 V., tubular
C-84	CM20A331K	G331	330 mmf, 500 V., mica
C-86	CM39C683J	G683	6800 mmf, 500 V., mica
C-87	CM20A391M	G391	390 mmf, 500 V., mica
C-88	CM35A472K	G472	4700 mmf, 500 V., mica
C-91	CM20A471M	G471	470 mmf, 500 V., mica
			RESISTORS
R-1,2	RC20AE151K	A151	150 ohms 1/2 watt, carbon
R-3,7,11, 12,84	RC20AE102K	A102	1000 ohms 1/2 watt, carbon
R-4,16,17	RC20AE103K	A103	10,000 ohms 1/2 watt, carbon
R-5,41,49, 57,79,83	RC20AE562K	A562	5600 ohms 1/2 watt, carbon
R-6,58,62, 70,75,92	RC20AE105K	A105	1 megohm 1/2 watt, carbon
R-8,10	RC20AE104K	A104	100,000 ohms 1/2 watt, carbon
R-13	RC20AE154K	A154	150,000 ohms 1/2 watt, carbon
R-14	RC20AE123K	A123	12,000 ohms 1/2 watt, carbon
R-15,18	RC20AE333K	A333	33,000 ohms 1/2 watt, carbon
R-19	25A785	1219244	1 megohm, VOLUME control
R-20	RC20AE331K	A331	330 ohms 1/2 watt, carbon
R-21	RC30AE683K	B683	68,000 ohms 1 watt, carbon
R-22,113	RC20AE225M	A225	2.2 megohms 1/2 watt, carbon
R-23,24, 54,82	RC20AE474K	A474	470,000 ohms 1/2 watt, carbon
R-25	RC30AE681K	B681	680 ohms 1 watt, carbon
R-26	RC30AE102K	B102	1000 ohms 1 watt, carbon
R-27,28, 110	RC20AE561K	A561	560 ohms 1/2 watt, carbon
R-29	RC20AE184K	A184	180,000 ohms 1/2 watt, carbon
R-30,76	RC20AE153K	A153	15,000 ohms 1/2 watt, carbon
R-31	RC40AE682K	C682	6800 ohms 2 watts, carbon
R-37	RC30AE472K	B472	4700 ohms 1 watt carbon
R-38,45, 52,80, 81	RC20AE822K	A822	8200 ohms 1/2 watt, carbon
R-39,44, 47,77, 78,108	RC20AE104K	A104	100,000 ohms 1/2 watt, carbon
R-40,43, 48,53, 89	RC20AE222K	A222	2200 ohms 1/2 watt, carbon
R-42,46, 51	RC20AE680K	A680	68 ohms 1/2 watt, carbon
R-50	RC20AE224K	A224	220,000 ohms 1/2 watt, carbon
R-55			39,000 ohms 1 watt, carbon, (Part of coil L24)
R-56,61, 85,86			1 megohm 1 watt, carbon (Part of coils L25, 27, 28 and 29)
R-59	25B783	1219242	2500 ohms, CONTRAST control
R-60			47,000 ohms 1 watt, carbon (Part of coil L26)
R-62	RC30AE332K	B332	3300 ohms 1 watt, carbon
R-64	RC20AE681K	A681	680 ohms 1/2 watt, carbon
R-67,95	RC40AE472K	C472	4700 ohms 2 watts, carbon
R-68	RC20AE473K	A473	47,000 ohms 1/2 watt, carbon
R-69	RC20AE273K	A273	27,000 ohms 1/2 watt, carbon
R-71,72,74	RC20AE392K	A392	3900 ohms 1/2 watt, carbon
R-73,87	RC20AE274K	A274	270,000 ohms 1/2 watt, carbon
R-76	RC20AE153K	A153	15,000 ohms 1/2 watt, carbon
R-85	RC20AE683K	A683	68,000 ohms 1/2 watt, carbon



GENERAL

PICTURE AREA ..... 192 square inches

TUBES ..... Twenty-three plus four rectifiers

SPEAKER ..... 8-inch E.M. (3.2 ohm V.C.) Field resistance - 65 ohms

ANTENNA ..... Provision for external antenna using 300-ohm transmission line

TUNING ..... Rotary channel selector switch plus manual trimming adjustment

TUNING RANGE ..... Twelve pre-set channels

Channel No	Frequency (mc)	Channel No.	Frequency (mc)
2	54-60	8	180-186
3	60-66	9	186-192
4	66-72	10	192-198
5	76-82	11	198-204
6	82-88	12	204-210
7	174-180	13	210-216

INTERMEDIATE FREQUENCY
- Picture carrier ..... 26.25 mc
- Sound Carrier ..... 21.75 mc
- Intercarrier sound system.. 4.5 mc

POWER SUPPLY ..... 105-125 V. 60 cycles AC

POWER CONSUMPTION ..... 250 Watts

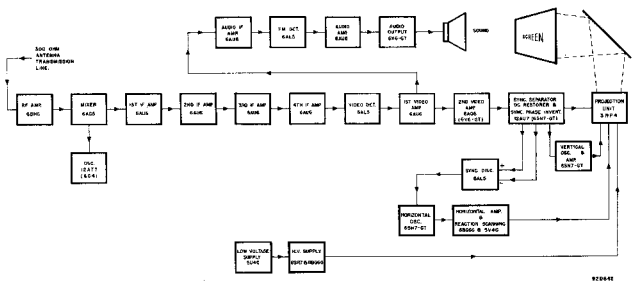


Fig. 1. Functional block diagram

* Note - Alignment frequencies. For complete list of intermediate frequencies, see I-F FREQUENCY CHART

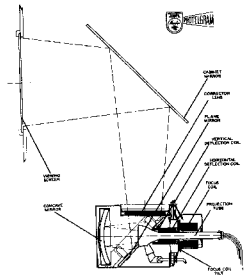


Fig. 2. The projection system

CARE OF THE OPTICAL SYSTEM

The optical components of a projection type of television receiver must remain free of dust and film to retain the original picture brilliance. The components of this optical system that will require occasional cleaning are the viewing screen, diagonal mirror, and top face of the projection unit window.

Loose dust may be safely removed with a camel hair brush. The diagonal mirror and viewing screen may be cleared of film by any normal glass cleaning procedure provided abrasives are avoided. Cleaning with absorbent cotton and a clean, soft cloth is satisfactory. Avoid the use of cleaning powders, abrasive soaps and similar abrasives. Freshly laundered soft cloths should be used to avoid abrading the surface of the optical system. Use water or other cleaning liquids sparingly on the window of the projection unit to avoid getting the moisture inside the unit.

The optical components inside the projection unit are well protected, hence rarely require cleaning. Where it is essential to clean an optical surface inside the projection unit, the side plate may be removed to gain access to the optical surfaces. See Fig. 21.

Loose dust may be removed with a jet of clean dry air and a camel hair brush. Film on the optical surfaces may be removed with lens tissue and commercial cleaning solutions prepared especially for optical surfaces. These are available at most photographic supply houses. When cleaning the optical components inside the housing also include the face of the projection tube. The face of the tube is an optical surface and must be cleaned with the same care given the concave mirror and diagonal mirror.

CAUTION - Do not loosen or remove the mounting or adjustment screws of the optical system inside the projection unit or remove the corrector lens or change its adjustment in any way. There is no simple way of adjusting this part of the optical system without special equipment.

HIGH VOLTAGE WARNING

Projection television receivers require an unusually high anode voltage on the projection tube. For this reason a reduced hazard pulse-type high voltage power source is used in this receiver. Nevertheless, extreme care should be exercised while working on this unit. Do not operate the receiver without the protective covers, they were placed there for your protection. The high-voltage points encountered in the servicing of this equipment will be found inside the perforated housings and below the chassis of the projection unit power supply and receiver power supply units. The anode lead of the projection tube is shielded with a grounded graphite coating to keep the rubber casing from becoming charged and assuming the same potential as the copper wire, however it is well to avoid direct contact with the lead while making adjustments.

PROJECTION TUBE HANDLING PRECAUTIONS

The projection tube housing provides adequate protection against possible tube implosure and soft X-Ray radiation, while in the projection unit. Do not expose the projection tube or handle it in any way without providing personal protection in the form of shatterproof goggles and heavy gloves. The projection tube should be handled by qualified personnel only.

The projection tube envelope encloses a high vacuum and with the large surface area of glass involved, the stresses set up, particularly at the front rim of the tube, are considerable. An abnormal handling stress, accidental blow at a highly stressed surface, or even a scratch on the surface of the tube could cause it to implode or collapse with destructive violence. Soft X-Rays generated by this tube, while in operation, are well absorbed by the housing. Without this shielding, free radiation will result, prolonged exposure to which could prove harmful to personnel.

INSTALLATION CHECKS AND ADJUSTMENTS

Although the receiver has been tested and adjusted at the factory, the "non-operating" controls may require final readjustment at the time of installation. This check should be undertaken by a competent television technician since the operation involves adjustments inside the cabinet. If a normal picture is obtained without these adjustments, the following procedure may be disregarded.

WARNING

Set the CONTRAST and BRIGHTNESS controls at minimum (counter-clockwise) before turning on the receiver. Allow about a minute for warm-up and then slowly advance the controls. If a spot or line appears instead of the full raster, immediately turn off the receiver. Because of the intense light generated at the face of the picture tube for projection purposes, any unusual concentration of light (Line or spot on the tube face) will burn the coating and permanently affect the quality of the picture.

For the same reason it is unwise to project a steady test pattern for long periods of time or pull tubes from the receiver chassis which may disable the sweep circuits.

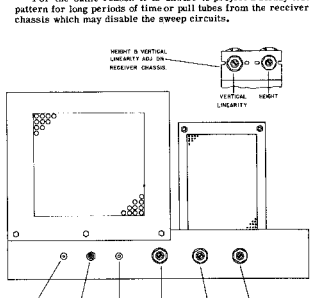


Fig. 3. Rear chassis view, "non-operating" controls