

INSTALLATION INSTRUCTIONS

RECEIVER HANDLING PRECAUTION

The Receiver weighs approximately 90 pounds and the base should always be picked up from under the bottom of the cabinet since lifting by the top would tend to pull the receiver apart.
The receiver is shipped with all tubes in their sockets except the 12L4 Kinescope. The Kinescope is shipped in a special carton and should not be unpacked until ready for installation.

SETTING UP THE RECEIVER

Remove the top of the receiver cabinet. Remove front panel. Install the front panel control knobs. Make sure that all tubes are in place and firmly seated in their sockets. Loosen the two kinescope cushion adjustment wing screws and slide the cushion towards the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of chassis and tighten.

From the front of the cabinet, look through the deflection coils at the alignment of the focus coil with the yoke. If the focus coil is loose, loosen the front focus coil adjustment wingnuts and raise, lower or rotate the coil. Picture Frame Holding Screws

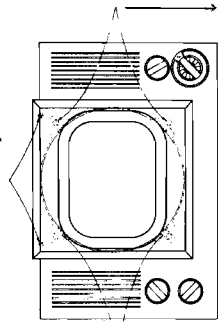


Fig. 2 Tube Mounting Feet

until such an alignment is obtained. Tighten the wingnuts with the coil in this position.
Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 2 for location of the slides, their adjustment screws and front panel screws.

INSTALLATION OF KINESCOPE

The Kinescope second anode contact is recessed metal well in the side of the bulb. The tube must be installed so that this contact is properly aligned with the deflection coil. The contact is generally secured by the position of the ion trap flags. Looking at the second cylinder from the base inside the glass neck, it is provided with two small metal flags. The Kinescope must be installed so that when looking down on the chassis, the two flags will be seen in a horizontal plane. Insert the neck of the Kinescope through the deflection and focus coils until the base of the tube protrudes approximately two inches beyond the coils. Investigate and adjust the tube until the deflection yoke is properly aligned and the cause of the trouble. Do not force the tube. Slip the ion trap on the neck of the Kinescope with the large magnet toward the base of the tube. Connect the Kinescope socket to the tube base. Insert the Kinescope as far forward of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet. Adjust the four centering slides until the face of the Kinescope is in the center of the cabinet opening. Tighten the Kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with "Windex" or similar cleaning agent.

Install the cabinet front. Slip the Kinescope as far forward as possible. Slide the Kinescope cushion firmly up against the flange of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. Connect the high voltage lead to the Kinescope second anode. Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counter-clockwise.

I—STATION SELECTOR
Selects and indicates channel.

O—FINE TUNING
Tunes receiver for best sound.

O—PICTURE
Varies picture contrast, light or dark.

I—OFF-ON SOUND
Turns set on and off and adjusts sound volume.

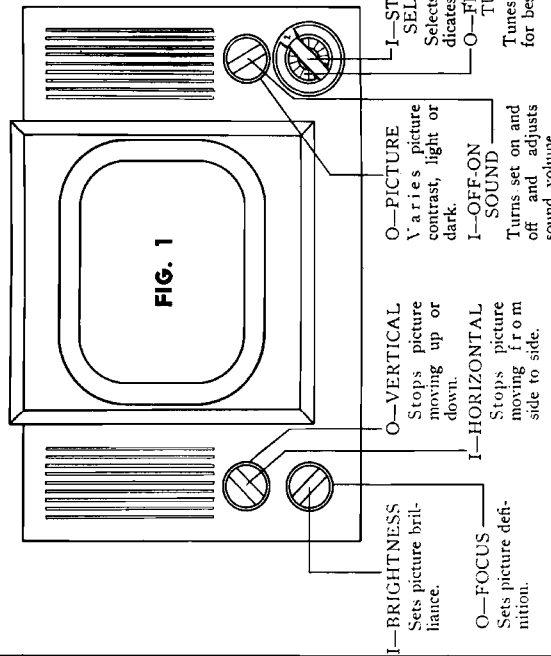
O—VERTICAL
Stops picture moving up or down.

I—HORIZONTAL
Stops picture moving from side to side.

I—BRIGHTNESS
Sets picture brilliance.

O—FOCUS
Sets picture definition.

Explanation of Controls



ELECTRICAL AND MECHANICAL SPECIFICATIONS

11" x 8 1/4"

Picture Size
R-F Frequency Ranges

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

Fine Tuning Range

Plus and minus approximately 300 kc on channel 1, and plus and minus approximately 750 kc on channel 13.

Power Supply Rating 117 volts, 60 cycles, 320 watts Re-ceiver Antenna Input Impedance—300 ohms balanced

Tube Complement

Tube Used	Function
516	R-F Amplifier
516	R-F Oscillator
516	Converter
6BA6	1st. Sound I-F Amplifier
6BA6	2nd. Sound I-F Amplifier
6AU6	3rd. Sound I-F Amplifier
6AU6	Sound Discriminator
6AT8	1st. Audio Amplifier
6K6GT	Audio Output
6AG5	1st. Picture I-F Amplifier
6AG5	2nd. Picture I-F Amplifier
6AG5	3rd. Picture I-F Amplifier
6AG5	4th. Picture I-F Amplifier
6AL5	Picture 2nd. Detector and D-C Restorer
6AU6	1st. Video Amplifier
6K6GT	2nd. Video Amplifier
6SK7	1st. Sync Amplifier
6SH7	Sync Separator
6SN7GT	2nd Sync Amplifier and Horizontal Discharge
6J5	Vertical Sweep Oscillator and Discharge
6K6GT	Vertical Sweep Output
6AL5	Horizontal Sync Discriminator
6K6GT	Horizontal Sweep Oscillator
6AC7	Horizontal Sweep Control
6BG6G	Horizontal Sweep Output
5V4G	Horizontal Reaction Rectifier
1B3GT/8018	High Voltage Rectifier
5U4G	Power Supply Rectifier (2 tubes)
12L14	Kinescope

Picture I-F Frequencies

Picture Carrier Frequency	25.75 Mc.
Adjacent Channel Sound Trap	27.25 Mc.
Accompanying Sound Trap	21.25 Mc.
Adjacent Channel Picture Carrier Trap	15.75 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 Mc.
Sound Discriminator Band Width (between peaks)	350 Kc.
VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 lines
HORIZONTAL SCANNING FREQUENCY	15,750 cps
VERTICAL SCANNING FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front panel)
Channel Selector } Dual Control Knobs
Fine Tuning }
Picture }
Sound Volume and On-Off Switch } Dual Control Knobs
Picture Horizontal Hold }
Picture Vertical Hold } Dual Control Knobs
Brightness }
Focus }

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Vertical Centering	rear chassis adjustment
Vertical Centering	rear chassis adjustment
Width	rear chassis adjustment
Height	rear chassis adjustment
Horizontal Linearity	top chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis adjustment
Horizontal Oscillator Frequency	rear chassis adjustment
Horizontal Oscillator Phase	bottom chassis adjustment
Focus Coil	top chassis wing nut adjustment
Ion Trap	top chassis wing nut adjustment
Deflection Coil	top chassis wing screw adjustment

ADJUSTMENTS

RECEIVER OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the receiver "ON" and advance the SOUND VOL. UME control to approximately mid-position.
2. Set the STATION SELECTOR to the desired channel.
3. Turn the PICTURE control fully counterclockwise.
4. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen, then counterclockwise until the glow just disappears.
5. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.
6. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.
7. Adjust the VERTICAL hold control until the pattern stops vertical movement.
8. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and due to its large surface area, is subjected to considerable air pressure. For these reasons, Kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the Kinescope bulb — particularly that part at 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 clip smoothly into its socket, or deflection yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on Kinescope Installations. All Kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep this carton for possible future use.

ADJUSTMENTS OTHER THAN R.F. & I.F.

These adjustments should be made in the cabinet, however trial adjustments should be made first to insure all are working. If readjustment is necessary, the chassis must be removed from the cabinet. However, if the only adjustments that are necessary to be made, such as ion trap, deflection yoke, focus coil placement, or adjusting controls available from the back, the chassis need not be removed.

FOCUS COIL ADJUSTMENTS

Turn the centering controls R181 and R211 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 axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the 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.

ION TRAP ADJUSTMENT (Beam Bender)

The ion trap consists of two magnetized rings on a metal frame. It is installed on the neck of the kinescope with the larger magnet toward the tube base with the arrow on top. With the set turned on and the brightness control advanced, move the set forward or backward and at the same time rotate it for the brightest raster. Adjust the focus control until the line structure of the raster is clearly visible. Final adjustment is made by reducing the brightness control so that only a faint glow is evident, and further placement of the trap for maximum illumination. The tension of the spring is sufficient to hold the trap in place.

If difficulty is experienced in obtaining a raster, the atirgap of each ring should be examined for metal filings, as magnets of this order attract them and no picture can be had if the poles are connected.

PICTURE ADJUSTMENTS

It will now be necessary to obtain a test pattern picture in order to make further adjustments. See step 2 through page 3. Turn the horizontal hold control to the extreme counterclockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by turning the picture control fully counter-clockwise and then returning it to the operating position. Normally the picture will pull into sync. Turn the horizontal hold control to the extreme clockwise position. The picture should remain in sync. Momentarily pull into sync. Again, the picture should normally pull into sync. If the receiver does not pull into sync, check the above checks and the picture is normal and stable. Check the horizontal deflection coil alignment. Skip "Alignment of Horizontal Oscillator" and proceed with "FOCUS adjustments."

ADJUSTMENT OF HORIZONTAL OSC.

In the above check, the receiver failed to hold sync. with the hold control, at either extreme or failed to pull into sync. after the hold control was released. To correct this condition, the following steps should be taken. After making these retouching adjustments, the transmitter fault checks the above checks or if the horizontal oscillator is completely out of adjustment then make the adjustments under "Alignment of Horizontal Oscillator" in "Alignment Procedure Manual."

SLIGHT RETOUCHING ADJUSTMENTS

Turn on a Television Station and adjust the fine tuning control for best sound quality. Sync the picture, and adjust the picture control for slightly less than normal contrast. Turn the horizontal hold control to the extreme position in which the oscillator fails to hold or to pull in. Momentarily remove

the signal. Turn the T108 frequency adjustment on the chassis rear apron until the oscillator pulls into sync. Check hold and pull-in for the other extreme position of the hold control.

FOCUS

A slightly better than 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.

HEIGHT AND VERTICAL LINEARITY

ADJUSTMENTS

Adjust the height control (R169 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R178 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH AND HORIZONTAL LINEARITY

ADJUSTMENTS

Turn the horizontal drive (R187 on rear apron) clockwise as far as possible, without causing crowding of the right edge to the picture. This position provides maximum high voltage to the Kinescope second anode. Adjust the width control (L195 on rear chassis) until the picture just fills the mask horizontally. Adjust the horizontal linearity control L201 until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust horizontal centering to align the picture with the mask.

If repeated adjustments of drive width and linearity fail to give proper linearity, it may be necessary to move the top of R209, which is located in the high voltage compartment. Adjustments of drive, width and linearity, must then be repeated. Check to see that all cushions, yoke, focus coil, thumb screws are tight. Replace the cabinet top.

VIDEO PEAKING LINK

A video peaking link is provided (See Fig. 4) to permit changing the video response. If the pictures from the majority of stations look better with the link closed, (2.3 position) then the link should be placed in that position. However, if transients are produced on high contrast pictures then the link should be left open (1.2 position).

ANTENNA TRAP

In some instances interference may be encountered from FM stations that are on the image frequency of a television station. In other instances, interference between two television stations may be observed.

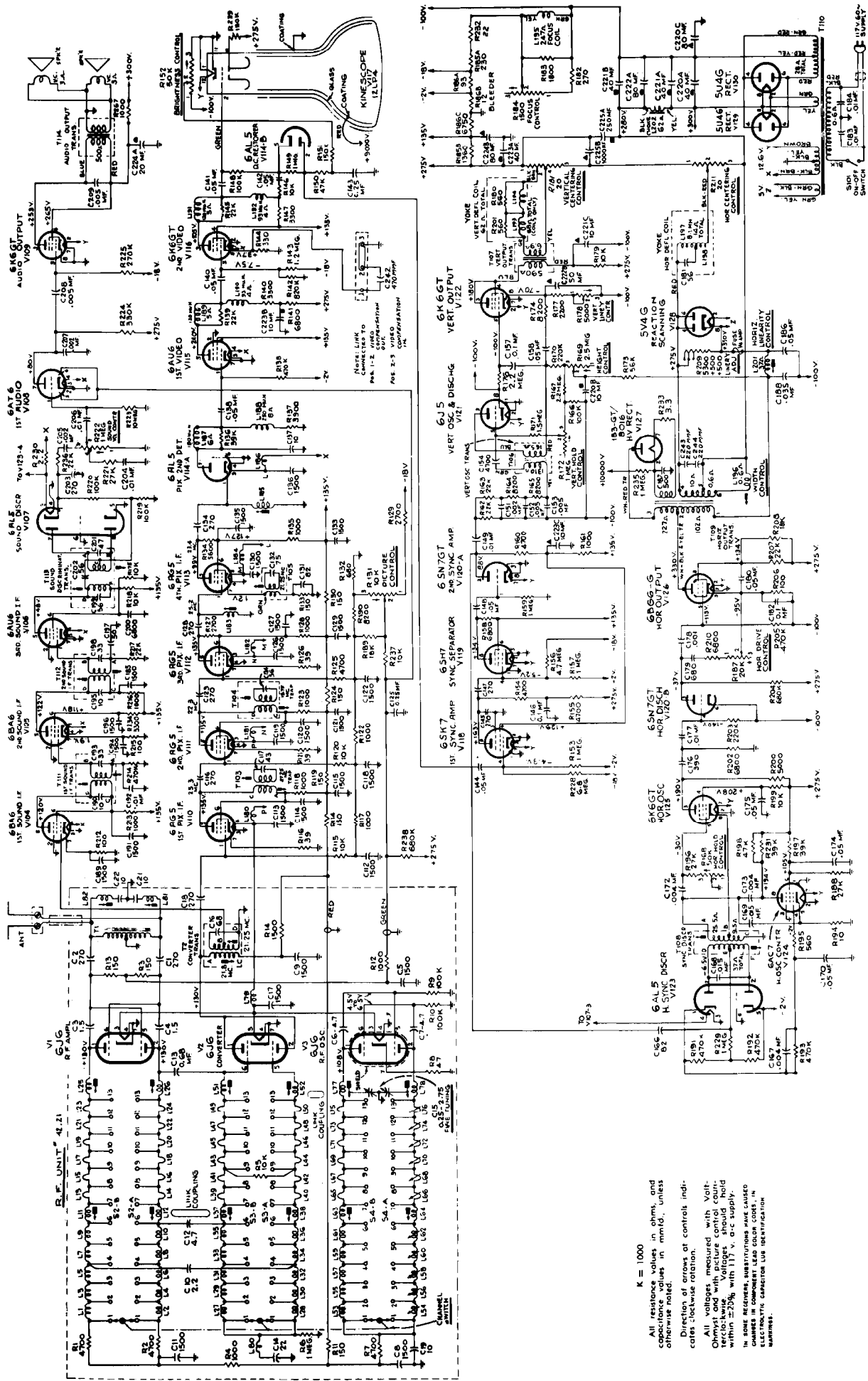
Assume that two television stations in a city are operating on channels 6 and 10. When the receiver is tuned to channel 6, a small amount of the oscillator voltage (109 mc.) is present on the r-f amplifier grid. This 109 mc. voltage beats with the channel 10 picture carrier, and produces an 84.25 mc. signal. This signal falls within the channel 6 range and interferes with the reception of channel 6. A similar case occurs between channels 5 and 7.

A series resonant trap across the r-f amplifier grid circuit will remove the oscillator voltages from the grids and will eliminate this type of interference. In production, this trap is adjusted to reject the channel 6:10 interference. However, in the field, it may be necessary to make adjustments on or to readjust the trap for channel 5:7 or FM image interference. To adjust the trap in the field, tune in the station on which the trap is observed. Tune both cores of the trap for minimum interference in the picture. Keep both cores approximately the same by visual inspection. Then, turn one core 1/2 turn from the original position and repeat the second core 1/2 turn from the original position and repeat the second for maximum rejection. Repeat this process until the best rejection is obtained.

NOTE: For Alignment of R.F. & I.F. Picture and Sound, see "Alignment Procedure Manual."

MODELS 930, 9140

CIRCUIT SCHEMATIC DIAGRAM



K = 1000

All resistance values in ohms, and
capacitor values in mmd., unless
otherwise noted.

Direction of arrows at controls indi-
cates clockwise rotation.

All voltages measured with Volt-
Ohm-millivoltmeter. Voltages should hold
within $\pm 25\%$ with 117 v. a-c supply.

IN SOME RECEIVERS, SUBSTITUTIONS HAVE CAUSED
CHANGES IN COMPONENT LEAD COLOR CODES. IN
SUCH CASES, THE GARNETIOR LUG IDENTIFICATION
MARKERS.

MODEL S 930, 940

REPLACEMENT PARTS LIST

Description	Schematic No.	Fada Part No.	Description	Schematic No.	Fada Part No.
Capacitors Tubular Paper			Power X-Former		
.001 400 V	C-178	12.34	Vertical Deflection X-Former	T110	42.12
.002 600 V	C-151, 205, 207	12.2	Vertical Blocking Osc. X-Former	T107	42.14-1
.004 400 V	C167, 172, 173	12.35	Output X-Former	T106	42.15-1
.005 400 V	C152, 153, 208, 209	12.19	R. F. Unit	None	42.21
.01 400 V	C149, 177, 192, 204, 206	12.6	Choke	L202	42.28
.015 400 V	C-168, 169	12.36	Controls:		
.035 1000 V	C188	12.53	Focus & Brightness (Dual)	R152, 184	52.49
.05 400 V	C138, 144, 148, 158, 170	12.12	Horiz. & Vert. Hold (Dual)	R168, R172	52.21
.05 1000 V	C186	12.55	Contrast & Sound Volume (Dual)	R131, 222	52.22
.05 600 V	C140, 141, 142, 174, 175, 180	12.38	Horizontal Drive	R205	52.23
.1 400 V	C146	12.15	Height	R169	52.24
.1 200 V	C157, 162	12.14	Vertical Linearity	R178	52.25
.25 400 W.V.	C125, 143	12.17	Vertical Centering	R181	52.26
Capacitors Tobe Molded			Horizontal Centering	R211	52.52
01 400 V 20%	C183, 184	12.22	Miscellaneous Parts:		
Ceramic Capacitors			Hi Voltage Cap & Lead	None	82.7
10 mmf + - 20%	C137	17.33	Wing Nut #8-32	None	87.199
50 mmf + - 10%	C197	17.18	Wing Screw #8-32 x 1/2"	None	87.200
1500 mmf + - 20%	C112, 113, 114, 115, 118, 119	17.45	Fiber Washer	None	92.124
	120, 121, 122, 126, 127, 129,		Rubber Cushion	None	92.154
	130, 133, 135, 136, 185, 189,		Escutcheon Spring	None	92.114
	191, 194, 196		Escutcheon Plate	None	92.122
	C230	17.35	Soldering Clip	None	92.121
6800 mmf + - 20%, 350 V			Rubber Grommet	None	92.143
High Voltage Capacitor			Line Cord Mate Plug	None	92.115
500 mmf 10,000 Volt	C187	17.41	Insulator Plate—H.V. Shield Cover	None	92.118
Slot & Thread Type			Insulator Plate—H.V. Shield	None	92.119
Mica Capacitor			Safety Glass (Cabinet)	None	92.289
56 mmf + - 5%	C181	17.36	Felt Feet (Cabinet)	None	92.304
82 mmf + - 10%, 1000 V	C131, 166	17.37	Support—H.V. Socket Assy'	None	92.159
220 mmf + - 10%	C243, 244	17.97	Support—H.V. Socket Assy'	None	92.160
270 mmf + - 10%	C116, 123, 128, 134, 145, 147, 203, 18	17.38	Plate—H.V. Socket Assy'	None	92.161
390 mmf + - 10%	C176	17.96	Plate—H.V. Socket Assy'	None	92.162
470 mmf + - 10%	C292	17.39	Cabinet	None	97.241
680 mmf + - 10%	C179	17.40	Knob Springs	None	92.183
4700 mmf + - 10%	C154	17.40	Knob Springs	None	92.185
Capacitors Electrolytics			Instruction Manual	None	102.271
40 mf 450 W.V.	C220 A	22.22	Left Decal	None	102.163
40 mf 450 W.V.	C220 B		FADA Decal	None	102.164
80 mf 150 W.V.	C220 C		Right Decal	None	102.169
			Speakers (2)	None	107.36
40 mf 450 W.V.	C221 A	22.23	Bkrt. for Cabinet Cover	None	92.165
40 mf 450 W.V.	C221 B		Bkrt. for Cabinet Cover	None	92.166
10 mf 450 W.V.	C221 C		5300 - 500 - 500 ohm 50 W. Res. & Mig. Hdwe.	R209	117.19
80 mf 450 W.V.	C222 A	22.24	1360-230 50 W. Res. & Mig. Hdwe.	R185A, R185B	117.20
50 mf 30 W.V.	C222 B		5 K 10 W. Resistor	R200	117.18
40 mf 450 W.V.	C223 A	22.25	1 K 5 W. Resistor	R267	117.27
10 mf 350 W.V.	C223 C		Fuse Holder	None	122.21
			Fuse 1/4 Amp. (T 3AG)	None	122.22
20 mf 450 W.V.	C224 A	22.26	Knob—Station Selector	None	142.40
80 mf 350 W.V.	C224 B		Knob—Fine Tuning	None	142.41
			Knob—Outside Shaft (3)	None	142.42
250 mf. 10 W.V.	C225 A	22.27	Knob—Inside Shaft (3)	None	142.43
1000 mf 6 W.V.	C225 B		Antenna Terminal Strip	None	152.27
Fixed Resistors			Link Connector Strip	None	152.28
3.3 ohm 10% 1 Watt	R230	32.61	R.F. Shaft Support Assy	None	157.7
2.2 ohm 10% 1/2 Watt	R233	32.62			
10 ohm 5% 1/2 Watt	R194	32.63			
39 ohm 10% 1/2 Watt	R116, 121, 126	32.63			
22 ohm 10% 2 Watt	R232	32.62			
100 ohm 10% 1 Watt	R206	32.53			
100 ohm 10% 1/2 Watt	R212, 215	32.2			
			Width Control Coil	L196	37.105
			Horiz. Deflection Output X-Former	T109	42.45