

MAINTENANCE MANUAL

for the

Farnsworth

MODEL GV-260
TELEVISION RECEIVER



Price \$1.00

Issued by the Service Department

CAPEHART-FARNSWORTH CORPORATION

An IT&T Associate

FORT WAYNE, INDIANA

ELECTRICAL AND MECHANICAL SPECIFICATIONS

MODELS GV-260 TELEVISION RECEIVERS

SECTION 25

FREQUENCIES

Television any 8 of 13 channels
 Intermediate Frequency, Television 26.25 M. C.
 Intermediate Frequency, Sound 21.75 M. C.

TUBE COMPLEMENT

Function	Type	Type	Function
RF Amplifier	6BA6	6SJ7	Audio Amplifier
Local Oscillator	6J6	6V6	Audio Power Amplifier
Mixer	6AG5	6SN7	2nd and 3rd Sync. Amplifiers
1st IF (video and sound)	6AC7	6SN7	Horiz. Sync. Amplifier
2nd IF (video and sound)	6AC7	6K6	Sync. Oscillator
3rd IF (video)	6AC7	6AC7	Reactance Tube
Video Detector, Sync. Separator, A.G.C.	6H6	6AL5	Horiz. Sync. Discriminator
Video Amplifier	6AC7	6L6	Horizontal Oscillator
DC Reinsertor, Sync. Amp.	6SN7	6SN7	Vertical Oscillator
Viewing Tube	10FP4	6SN7	Vertical Amplifier
IF Amplifier (sound)	6AC7	8016 (2)	High Voltage Rectifiers
Discriminator (sound)	6H6	5U4 (2)	Low Voltage Rectifiers

ELECTRICAL REQUIREMENTS

VOLTAGE 105-120 VOLTS AT 60 CYCLES
 POWER 240 WATTS AT 115 VOLTS
 SIGNAL INPUT IMPEDANCE 300 OHMS

CABINET SPECIFICATIONS

Net Weight
With Viewing Tube

68 Pounds

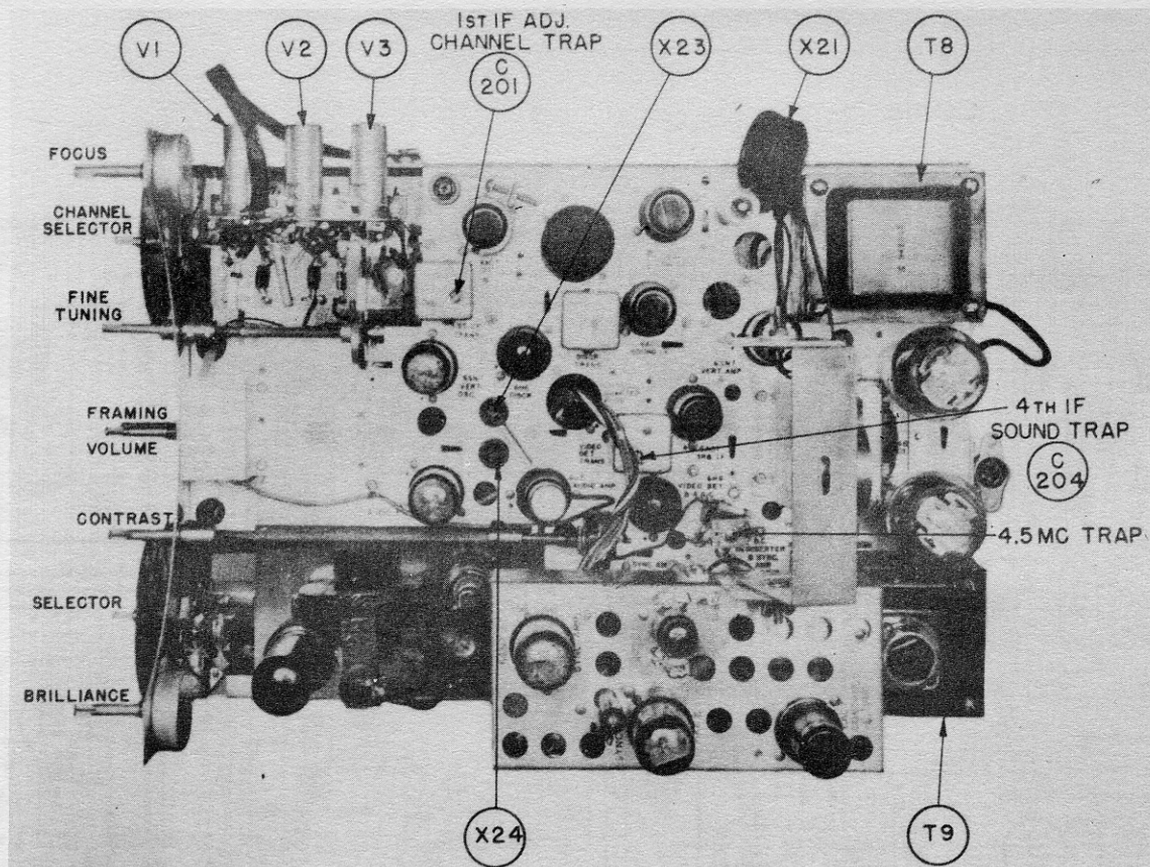
Cabinet Size

Height 17⁵/₈"
 Width 15⁷/₈"
 Length 21¹¹/₁₆"

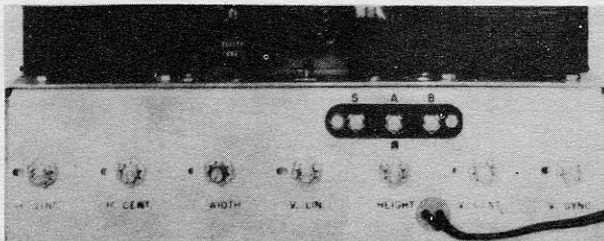
Shipping Weight
Less Viewing Tube

81 Pounds

TOP VIEW OF RECEIVER CHASSIS



ADJUSTING THE REAR-CHASSIS CONTROLS



29a Rear-chassis view showing controls

The rear-chassis controls of the receiver are shown in Fig. 29a. Those at the rear of the receiver are known as serviceman's controls and should never be tampered with by the layman. The two controls commanding close adjustment are the horizontal and the vertical sync. controls. Mal-adjustment may result in picture deterioration.

HORIZONTAL SYNC. CONTROL

There are two major lock-in points of this control. One will cause a vertical black bar in the center of the picture; the other, being the correct point, gives a clear picture. The two limits of proper setting of this control are: One limit gives unstable synchronization. Operation may be normal for a few minutes, then it will break synchronization. The other limit is a slight condition of fuzzi-

ness in the picture, particularly noticeable in the transmitted test pattern.

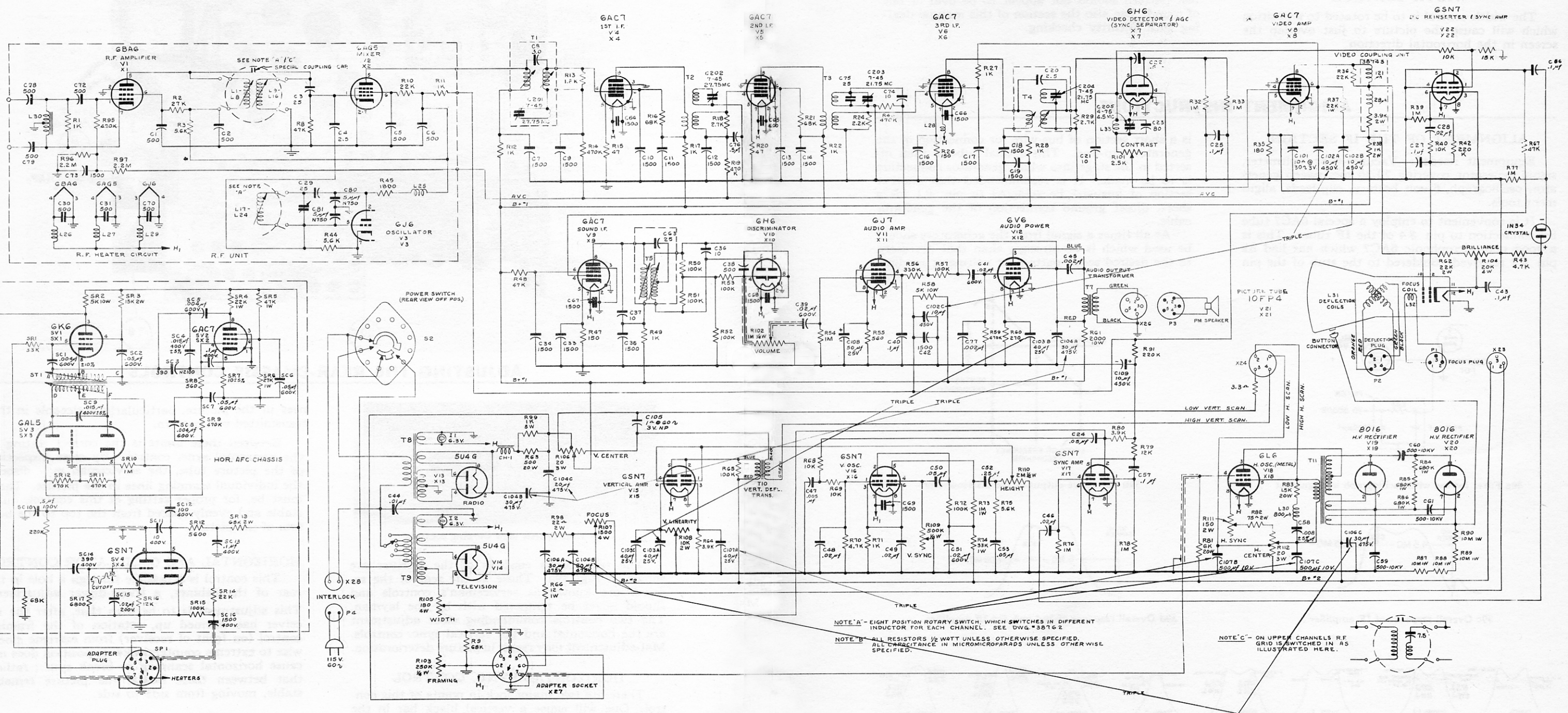
Between these limits is the correct setting of the horizontal sync. control. By close inspection of the picture tube, the serviceman may discern the individual scanning lines in the picture. These must be, for proper setting of this control, quite stable and evenly-spaced from the top to the bottom of the picture.

HORIZONTAL AFC OSCILLATOR CONTROL

This control is accessible through a hole in the rear of the cabinet, a screw-driver adjustment. This adjustment is to be such that, after the receiver has warmed up, rotation of the framing control (on front of receiver) from extreme clockwise to extreme counterclockwise position does not cause horizontal scanning to break sync.; rather, that between these limits, the picture remains stable, moving from side to side.

VERTICAL SYNC. CONTROL

The vertical sync. control does not necessitate as precise setting as does the horizontal control. It may be adjusted to the center of the portion of control rotation where vertical synchronization occurs.



NOTE 'A' - EIGHT POSITION ROTARY SWITCH, WHICH SWITCHES IN DIFFERENT INDUCTOR FOR EACH CHANNEL. SEE DWG. #38162
 NOTE 'B' - ALL RESISTORS 1/2 WATT UNLESS OTHERWISE SPECIFIED. ALL CAPACITANCE IN MICROMICROFARADS UNLESS OTHERWISE SPECIFIED.

NOTE 'C' - ON UPPER CHANNELS R.F. GRID IS SWITCHED IN AS ILLUSTRATED HERE.

HORIZONTAL AND VERTICAL CENTERING CONTROLS

The centering controls are used to locate the image in the center of the picture tube screen. Adjustment of the horizontal centering control may require slight readjustment of the horizontal synchronizing control.

WIDTH CONTROL

The width control is to be rotated to a position which will cause the picture to just overlap the screen in the horizontal direction.

HEIGHT AND VERTICAL LINEARITY CONTROLS

The action of these controls is somewhat interlocked. A transmitted test chart should be used when making adjustments. The controls should be so positioned that the screen is just filled in the vertical direction and the vertical linearity is correct. When the linearity is correct, a circle in the test pattern should not appear to be oval or out of round. See also the section of this manual dealing with linearity checking.

ALIGNMENT INSTRUCTIONS

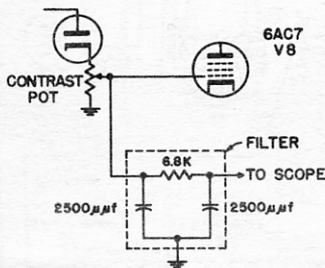
ALIGNMENT OF THE IF SECTION

Equipment needed: Vacuum-tube voltmeter, signal generator covering 20-30 mc, sweep generator, oscillograph, 6-volt battery, clip-leads, alignment tools.

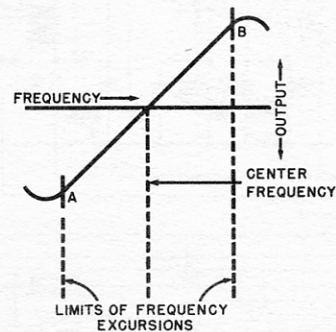
It is convenient to employ a special 6AC7 tube for connection to pin #4 of the IF tubes. This is a good non-microphonic 6AC7 which has had its pin #4 removed. Soldered to the stub of the pin

is a short section of bus-wire for connection of the generator clip-lead. This special tube is then inserted in the stage into which generator connection is to be made. It is recommended that another section of bus-wire be soldered to pin #1 for a short, direct ground connection of the generator cable.

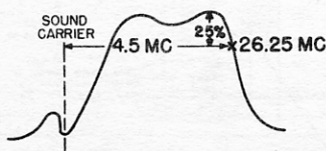
At all times a signal from the generators should be used which is no stronger than that necessary to the desired scope pattern or voltmeter reading.



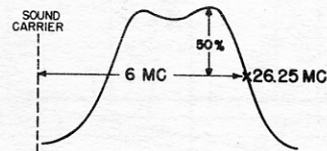
39a Filter for use with oscillograph in alignment



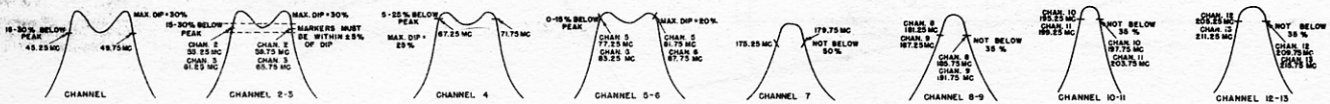
39b "S" curve-output of the discriminator



39c Overall response of IF amplifier



39d Overall response of 2nd and 3rd IF amplifier



39e Response of RF bands

The scope and voltmeter should be operated at high gain.

The receiver chassis must be well bonded to all instruments being used, all placed upon a metallic sheet or a metal-topped bench. All chassis and connecting leads must in operation be cold—touching with the hand should produce no change in the reproduced scope pattern or meter reading. If the hand does produce a change, evidently there is present an unstable condition which must be corrected by better grounding together of all chassis and instruments in use.

1. Remove Television 5U4G rectifier tube.
2. Remove Oscillator tube (6J6).
3. Connect filter as shown in Fig. 39a.
4. Apply sweep signal to pin 4 of sound IF amplifier. Set volume control to minimum. Connect scope to the "high" side of volume control. Tune discriminator for the pattern shown in Fig. 39b.
5. Set contrast control about mid range. Connect meter to filter shown in step 3. Connect 21.75 mc to second IF grid (pin 4).
6. Tune trap on third transformer for minimum output.
7. Connect sweep to second IF grid. Connect scope to filter. Tune fourth transformer trap out of pass band. Adjust slugs in fourth transformer until curve has equal peaks with 26.25 mc about 15% down.
8. Connect meter to contrast pot, through filter. Apply 21.75 mc signal. Adjust trap trimmers in third and fourth transformers for minimum output.
9. Repeat steps 7 and 8 for the pattern of Fig. 39c as obtained with the sweep generator and scope.
10. Connect a clip-lead from the junction of R13, R14 and C9 to ground the low side of T1. Apply negative six volts from a battery to T2. This is to the junction of R18, R19 and C12.
11. Connect sweep to mixer grid.
12. With scope at contrast pot, through filter, tune traps in first and second transformers outside pass band. Adjust first transformer slugs until peaks are equal and 26.25 mc is about 30% down.
13. Apply 27.75 mc signal to mixer grid. Connect voltmeter to contrast pot. Tune first transformer trap for minimum output.
14. Apply sweep to mixer grid. Connect scope to "high" side of volume control. Adjust second transformer trap for maximum symmetrical output. 21.75 mc marker should be at the center of the S curve.
15. Connect sweep to mixer grid. Connect scope to contrast pot through filter. Adjust first transformer for equal peaks with 26.25 mc 30% to 45% down as shown below.
16. Repeat 14, 15 and 16. The response pattern should be as in Fig. 39d.

ALIGNMENT OF THE RF SECTION

Equipment needed:

Sweep generator covering 44-216 mc, oscillograph, alignment tools, cement for staking slug adjustments.

1. Set local oscillator vernier (fine tuning) to the middle of its tuning range.

2. Connect modulated signal generator to antenna terminals. Set the generator to a frequency which is .25 mc lower than the high extremity of the channel being aligned. To align channel #4, for example, which extends from 66 to 72 mc, set the generator to 71.75 mc. Frequency limits of the television channels are:

Channel No.	Frequency, mc.	Sound carrier
1	44-50	49.75
2	54-60	59.75
3	60-66	65.75
4	66-72	71.75
5	76-82	81.75
6	82-88	87.75
7	174-180	179.75
8	180-186	185.75
9	186-192	191.75
10	192-198	197.75
11	198-204	203.75
12	204-210	209.75
13	210-216	215.75

Tune oscillator slug for maximum tone in the speaker. When slug has been properly set, cement in place with a drop of cement.

3. Align other oscillator coils in the same manner.

4. Apply sweep signal to the antenna terminals. If the sweep generator does not incorporate an internal marker, connect also the signal generator to antenna terminals as a marker source.

5. Connect the oscillograph to the screen-grid of the mixer tube, pin #6 of V2.

6. Align the RF transformer slugs of selector position No. 2. The coupling wires on top of the main panel of the oscillator be adjusted so that the markers (Fig. 39e) are down from the peaks by the same percentage as the dip between peaks. These coupling wires are two short sections of wire over which has been placed a length of spaghetti. Adjustment is by slightly spreading the wires at the point of entry into the spaghetti, or crimping closer together. This assembly is the condenser, shown on the schematic, which connects between the primary and secondary coils.

NOTE: It may be necessary to adjust the fine tuning condenser to remove a disturbance in the bandpass curve. The bandpass should approximate that of figure 39e, paying careful attention to limits.

7. Align position #1. The coupling loop mounted on the third switch wafer (counting from the front end) should be adjusted for proper bandpass.

8. Align other switch positions.

9. Since tuning of coils on one position may effect the tuning of adjacent coils, it may be necessary to go back over the curves and to make an readjustment necessary. Cement slugs in place with cement.

10. Remove scope and generators, replace 5U4G and picture tubes.

11. Check overall reception by observing a transmitted test pattern.

PARTS LIST, MODELS GV-260 RECEIVER

RESISTORS ARE ONE-HALF WATT UNLESS OTHERWISE SPECIFIED

Part No.	Description of Part	List Price	Part No.	Description of Part	List Price
25367	.008 plus-minus 5%	\$.25	77387	33K, 1 watt	.15
25370	500 mmf. 10,000 volt	2.20	77364	680K, 1 watt	.15
25379	100 mmf. (Tubular molded)	.20	77388	1M, 1 watt	.15
25389	500 mmf. (Tubular molded)	.20	77400	10M, 1 watt	.15
25273	1500 mmf. (Tubular molded)	.25	77363	20M, 1 watt	.15
25394	2.5 mmf. (Tubular molded)	.25	77425	75, 2 watt	.35
25383	10 mmf. (Tubular molded)	.30	77401	1K, 2 watt	.15
25391	7.5 mmf. (Tubular molded)	.20	77390	22K, 2 watt	.15
25392	25 mmf. (Tubular molded)	.20	77393	2K, 10 watt	1.85
25385	7-45 mmf. Ceramicon Variable	1.50	77391	5K, 10 watt	1.85
25378	.02 mf. 1000 volt	.30	77402	500, 20 watt	.85
25209	.01 mf.	.80	77404	1.5K, 20 watt	.85
25105	.05 mf. 400 volt	.25	77403	6K, 20 watt	.95
25103	.1 mf. 400 volt	.30	78126	150 Pot (Hor. Sync.)	.90
25352	.25 mf.	.40	78137	2.5K Pot (Contrast)	1.80
25118	.5 mf.	.55	78133	250K Pot (Tone)	.85
25354	10 ohm @ 30 C.P.S. 3 volt	1.45	78131	500K Pot (Vert. Sync.)	.75
25355	1 ohm @ 60 C.P.S.	3.05	78134	1M, Pot (Volume)	.85
25359	40-25 volt, 500-10 volt, 500-10 volt	2.70	78130	2M, Pot (Height)	.85
25357	10-10-10mf. 450 volt	2.20	94230	Power Transformer tapped	23.95
25358	30-20-30mf. 475 volt	3.55	94231	Power Transformer untapped	17.15
25356	40-40-40mf. 25 volt	1.55	L13655	High Voltage Transformer	23.00
77376	47 ohm Resistor	.15	94223	Vertical Deflection Transformer	7.55
77380	150	.15	94233	Filter Choke	3.80
77385	180	.15	94222	Output Transformer	2.30
77377	470	.15	L38739	1st IF Transformer	4.90
77414	560	.15	L38797	2nd IF Transformer	1.10
77372	1K	.15	L38742	3rd IF Transformer	1.10
77418	1.8 K 5%	.15	L38740	4th IF Transformer	4.15
77419	2.2 K 5%	.15	L38741	Discriminator Transformer	2.35
77420	2.7 K 5%	.15	38743	Video Coupling Unit	2.05
77443	3.3K	.15	L38735	Focus Coil	11.15
77373	3.9K	.15	L38734	Deflection Yoke	10.75
77383	4.7K	.15	81161	P.M. Speaker 6"	9.30
77365	5.6K	.15	80404	C.R.T. Socket Assembly	2.80
77371	10K	.15	38802	RF Choke (Osc. Plate)	.20
77369	22K	.15	59481	Knob	.15
77410	27K	.15	80397	High Voltage Snap Connector	.15
77378	33K	.15	62144	Rubber Ring (C.R. Tube)	.15
77379	47K	.15	38745	Linearity Coil	.40
77375	68K	.15	90230	Selector Switch	1.60
77366	100K	.15	80391	Mica Filled Octal Socket	.30
77386	220K	.15	80239	Molded Octal Socket	.15
77368	270K	.15	80390	Molded Miniature Socket, 3 prong	.25
77442	330K	.15	80389	Molded Miniature Socket, 4 prong	.25
77374	470K	.15	80424	Molded Miniature Socket, 5 prong	.30
77370	560K	.15	37276	Miniature Socket Retainer Ring	.10
77381	680K	.15	42186	Dial Lamp, 150 ma	.15
77367	1M	.15		Cathode Ray Tube	52.75
77382	2.2M	.15	13839	Syncadaptor Unit	39.75
77389	22K, 1 watt	.15			

COMPONENTS OF RF UNITS

Dwg. No.	Description	List Price	Dwg. No.	Description	List Price
80319	Socket Miniature	\$ 1.75	25394	Capacitor, 2.5 mmf.	.25
25389	Capacitor, 500 mmf.	.20	25324	Capacitor, 5 mmf.	.30
25381	Capacitor, 500 mmf.	.25	25273	Capacitor, 1500 mmf.	.25
25391	Capacitor, 7.5 mmf.	.20	25452	Capacitor, .34 mmf.	.15
25392	Capacitor, 25 mmf.	.20		Total Cost of RF Unit	\$78.25

COMPONENTS OF SYNC. ADAPTOR

Dwg. No.	Description	List Price	Dwg. No.	Description	List Price
77391	Resistor	\$.20	77458	Resistor	.30
77198	Resistor	.15	77455	Resistor	.15
77366	Resistor	.15	25103	Condenser	.30
77414	Resistor	.15	25453	Condenser	.30
77374	Resistor	.15	25421	Condenser	.20
77202	Resistor	.15	25445	Condenser	1.00
77367	Resistor	.15	25448	Condenser	.45
77445	Resistor	.15	25118	Condenser	.55
77148	Resistor	.15	25383	Condenser	.30
77365	Resistor	.15	25379	Condenser	.20
77454	Resistor	.15	25454	Condenser	.30
77389	Resistor	.15	25446	Condenser	.25
77456	Resistor	.15	38916	Transformer	4.55
77325	Resistor	.15	13839	Sync Adaptor	39.75