



instruction book

55G - 1 / 1F Low-Frequency Tuner

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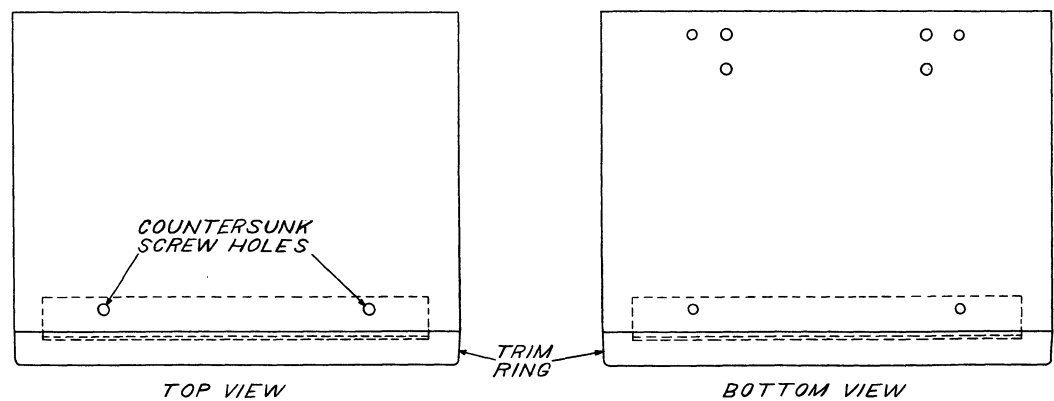


Figure 1-1. Top and Bottom Views of 55G-1 Cabinet.

section 1

installation

1.1 UNPACKING

Carefully lift the 55G-1/1F Low-Frequency Tuner out of the packing material. Examine the unit for visible damage. If the 55G-1/1F has been damaged in shipment, save the carton and packing material, and notify the transportation company. Look for the warranty card inside the unit. Check all controls and switches for freedom of movement. See that connecting

cables and required power cable (table 1-1) are present.

1.2 MOUNTING AND CABLING FOR 55G-1F

The 55G-1F is a 55G-1 mounted in a standard rack that is 19 inches wide. The mounting panel is 8-3/4 inches high, and it is secured to the mounting rack by four screws. Paragraphs 1.3.3 through 1.3.6 provide cabling instructions.

Table 1-1. Equipment Supplied With the 55G-1/1F Low-Frequency Tuner.

QUANTITY	DESCRIPTION	COLLINS PART NUMBER	FUNCTION
1	Power cord kit (one of the following is supplied with the 55G-1 as specified by the purchaser)		
	115V AC Power Cord Kit consisting of: One 115-volt ac power cord One adapter plug Two 1/16-ampere fuses	763-3939-001 547-2795-000 368-0138-000 264-4220-000	Connects dual primary windings of 55G-1 power transformer in parallel and connects 55G-1 to 115-volt ac source.
	230V AC Power Cord Kit consisting of: One 230-volt ac power cord Two 1/32-ampere fuses	763-3940-001 547-2674-001 264-4210-000	Connects dual primary windings of 55G-1 power transformer in series and connects 55G-1 to 230-volt ac source.
	28V DC Power Cord Kit consisting of: One 28-volt dc power cord Two 1/16-ampere fuses	763-3938-001 548-8245-000 264-4220-000	Bypasses 55G-1 ac power supply and connects 55G-1 to 28-volt dc source.
3	Interconnecting cables	426-5076-000	Connects 55G-1 tuner and speaker to 51S-1.
*4	Finishing washers	310-0086-000	Mounts 55G-1F to rack.
*4	Finishing washers	310-0092-000	Mounts 55G-1F to rack.
*4	10-32 x 1/2 inch screws	319-0165-000	Mounts 55G-1F to rack.
*4	12-24 x 5/8 inch screws	348-0008-000	Mounts 55G-1F to rack.

*Furnished with 55G-1F only.

1.3 MOUNTING AND CABLING FOR 55G-1

1.3.1 Table Mounting

No special mounting procedure is required when the 55G-1 is used with a 51S-1 on a table top.

1.3.2 Rack Mounting

To mount the 55G-1 in a 351R-2 Rack Mount, proceed as follows:

- a. Remove two knobs by pulling them off.
- b. Remove four screws holding front panel, two at top of panel and two at bottom. Lift panel from trim ring.
- c. Remove two rear feet. Remove two flat-head and two #6 screws on bottom of cabinet. Remove two countersunk screws on top of cabinet (figure 1-1). Tilt front panel and slide it through trim ring to remove chassis from cabinet. Next, remove front feet from cabinet.
- d. Carefully remove trim ring from cabinet. Install trim ring in 351R-2 panel from front so that two holes in top of trim ring line up with front pair of holes in bracket on back of 351R-2 panel.
- e. Place a #6 lockwasher and a #6 flat washer on each of two 6-32 x 5/8-inch screws, and install screws in holes in the 351R-2 panel bracket and the trim ring.
- f. Place a 6-32 hexnut on each screw and tighten.
- g. Place a #6 lockwasher and a #6 flat washer on each of two 6-32 x 5/8-inch screws, and, from bottom side of 351R-2, install a screw in each of two holes nearest 351R-2 panel. These screws should pass through bottom pair of holes in trim ring.
- h. Place a 6-32 hexnut on each of two screws and tighten.
- i. Slide 55G-1 chassis into cabinet without spacers normally used between chassis and cabinet. Using two countersunk holes nearest cabinet front on underside, secure chassis to cabinet with four screws removed in step b.
- j. Set 55G-1 into 351R-2, and carefully work equipment panel through trim ring. Leave panel positioned partway through trim ring.
- k. Position 55G-1 cabinet so that two holes in top front of cabinet line up with two holes left open in the 351R-2 panel bracket.
- l. Place a #6 lockwasher and a #6 flat washer on each of two 6-32 x 5/8-inch screws, and, from top, install screws in holes described in step k. Place a 6-32 hexnut on each screw and tighten.
- m. Install two 6-32 x 5/8-inch screws with one #6 lockwasher and one #6 flat washer through bottom of 351R-2 in elongated holes near 351R-2 panel. These screws are held by captive nuts in 55G-1 chassis. Tighten to a snug fit.
- n. Carefully replace front panel in trim ring.
- o. Replace and tighten four screws holding front panel in trim ring.
- p. Replace the knobs on the control shafts.

1.3.3 Temporary RF Connection

- a. Connect one interconnecting cable between the 55G-1 4 Ω SPEAKER jack and 51S-1 4 Ω jack.
- b. Connect one interconnecting cable between 55G-1 OUTPUT jack J13 and 51S-1 jack J1.
- c. Connect antenna to 55G-1 INPUT jack J14.

Note

When temporary rf connection is used between 55G-1/1F and 51S-1, 55G-1 KC BAND switch must be set to OFF before 51S-1 can be used to receive between 2 and 30 MHz.

1.3.4 Permanent RF Connection .

- a. Before the 55G-1/1F can be connected permanently to a 51S-1, an internal jumper between 51S-1 jacks J13 and J14 must be removed. Refer to the 51S-1 instruction book for instructions on removing the receiver from the cabinet, and for locations of jacks J13 and J14. The unwanted jumper is connected directly between center pins of jacks J13 and J14, and can be removed by cutting. Replace the 51S-1 in the cabinet.

Note

When the jumper between jacks J13 and J14 in the 51S-1 has been removed, the 51S-1 will not be able to operate without the 55G-1/1F between 200 and 2000 kHz unless an external jumper cable is connected between 51S-1 jacks J13 and J14.

- b. Connect one interconnecting cable between 55G-1 4 Ω SPEAKER jack and 51S-1 4 Ω jack (figure 1-2).
- c. Connect one interconnecting cable between 55G-1 OUTPUT jack J13 and 51S-1 input jack J13.
- d. Connect one interconnecting cable between 55G-1 INPUT jack J14 and 51S-1 output jack J14.
- e. When the permanent rf connection is used between the 55G-1 and the 51S-1, turning the 51S-1 MEGACYCLES selector to frequencies above 2 MHz will automatically bypass the 55G-1.

1.3.5 Alternate Permanent RF Connection

If a separate low-frequency antenna is used and the jumper between 51S-1 jacks J13 and J14 is not removed, connect the separate low-frequency antenna directly to 55G-1 INPUT jack J14. Make the other connections as directed in paragraph 1.3.4.

1.3.6 Power Connections

- a. 115-Volt AC Operation. Connect 115-volt ac power cord (CPN 547-2795-00) to 55G-1 and to 115-volt, 50- to 400-Hz source. If necessary, use a 3-wire to 2-wire adapter plug (CPN 368-0138-00). These parts are

supplied in a kit (CPN 763-3939-001). (Refer to table 1-1).

- b. 230-Volt AC Operation. Install 1/32-ampere fuse (CPN 264-4210-00) in holder F1, and connect 230-volt ac power cord (CPN 547-2674-001) to 55G-1 and to 230-volt, 50- to 400-Hz source. These parts are supplied in a kit (CPN 763-3940-001). (Refer to table 1-1.)
- c. 28-Volt DC Operation, Negative Ground. Connect 28-volt dc power cord (CPN 548-8245-00) to 55G-1 and to 28-volt dc source. This is supplied in a kit (CPN 763-3938-001). (Refer to table 1-1.)
- d. 28-Volt DC Operation, Positive Ground.

Caution

The 55G-1/1F is wired for negative ground operation and must be modified for positive ground operation.

For positive ground operation, jumpers must be changed on the terminal strip on the underside of the 55G-1 chassis. Refer to paragraph 4.1 for instructions on removing the chassis from the cabinet. When the chassis has been removed, reconnect the jumpers for positive ground operation as shown in figure 1-3. Replace the chassis in the cabinet. Be sure the spacer strips are replaced between the chassis and the cabinet, or the control shafts will not be centered in the front panel holes.

Connect 28-volt dc power cord (CPN 548-8245-00) to 55G-1 and to 28-volt dc source. This is supplied in a kit (CPN 763-3938-00). (Refer to table 1-1.)

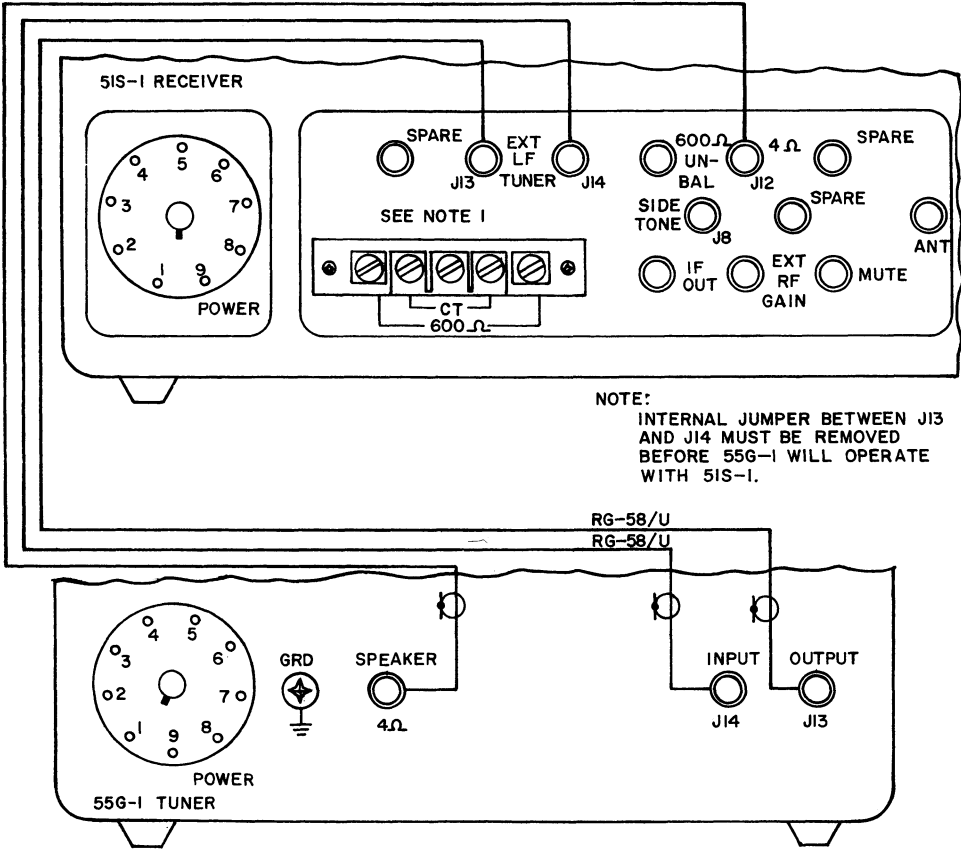


Figure 1-2. Connection of 55G-1 to 51S-1.

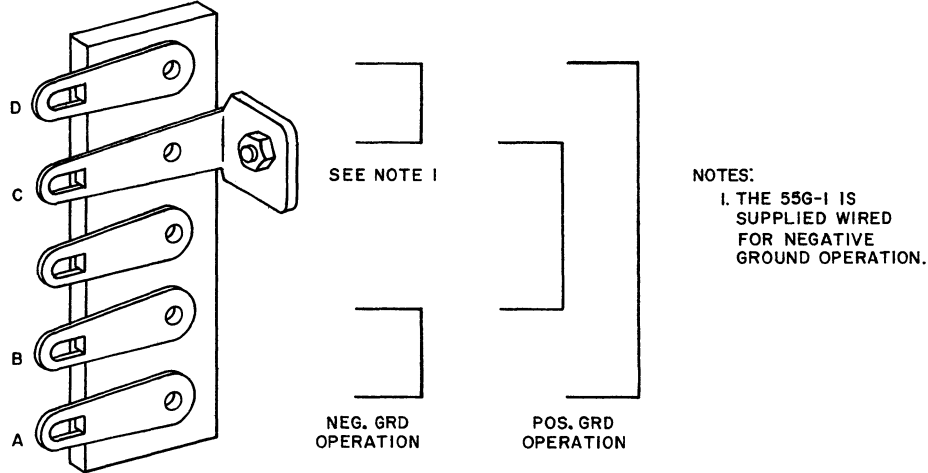


Figure 1-3. Jumper Connections for Negative or Positive Ground Operation of 55G-1.

section 2

operation

2.1 GENERAL

The KC BAND switch (figure 2-1) serves to control power to the 55G-1/1F and to select the desired frequency band. In the OFF position, power is disconnected from the 55G-1 internal power supply, and the antenna connection is made straight through the 55G-1.

In the 200 to 600 position, the 200- to 600-kHz band is selected, and in the 600 to 2000 position, the 600- to 2000-kHz band is selected. Signal peaking is done with the TUNING control, once the desired signal has been tuned in on the 51S-1 Receiver. When signals outside the frequency coverage of the 55G-1 are to be received, set the KC BAND switch to OFF.



Figure 2-1. Front View of 55G-1.

section 3

principles of operation

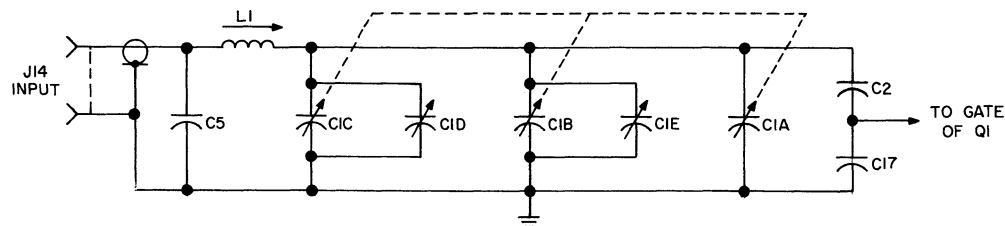
3.1 GENERAL

Figure 7-1 is a schematic diagram of the 55G-1/1F Low-Frequency Tuner. The 55G-1 consists of input tuned circuits, a field-effect transistor that provides gain and transforms the impedances of the tuned circuits to the 50-ohm output required for the 51S-1, and a power supply. A 4-ohm loudspeaker for the 51S-1 is also mounted in the 55G-1 cabinet.

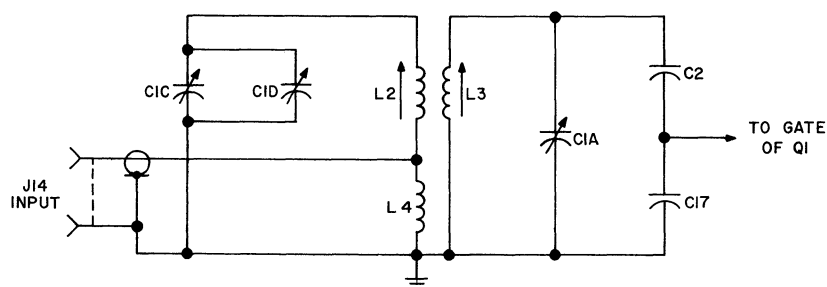
3.2 RF CIRCUITS

Two tuned input circuits are used, one for the 200- to 600-kHz band and one for the 600- to 2000-kHz band. Figure 3-1 is a simplified

schematic of the two input circuits. The 200- to 600-kHz input circuit is a pi network consisting of input capacitor C5; inductor L1; sections A, B, and C of variable capacitor C1; and voltage divider capacitors C2 and C17. The three sections of C1 are connected in parallel to obtain the large capacitance needed to tune this frequency range. Capacitors C2 and C17 couple field-effect transistor Q1 to the tuned circuit without reducing the tuned-circuit selectivity. For the 600- to 2000-kHz range, a tuned transformer (consisting of L2, L3, L4, and sections A and C of C1) provides the needed selectivity. Inductor L4 provides a 50-ohm input without tapping L2 directly. When aligned, the inductance of L2 plus L4 is the same as the inductance of L3. Section B



A. 200-600kHz INPUT CIRCUIT



B. 600-2000kHz INPUT CIRCUIT

TPO-2136-013

Figure 3-1. Simplified Schematic of 55G-1 Input Circuits.

of capacitor C1 is not used for this frequency range.

Field-effect transistor Q1 has a much higher input impedance than conventional transistors and transforms the high impedance of the tuned circuits to the required 50-ohm output impedance. It is operated as a source follower which is closely analogous to a vacuum-tube cathode follower.

3.3 POWER SUPPLY

The 55G-1 power supply has provision for three input voltages, 115 or 230 volts ac or

28 volts dc (figure 7-1). For 115-volt ac operation, the two primaries of power transformer T1 are connected in parallel and for 230-volt ac operation, they are connected in series. For 28-volt dc operation, the ac power supply is bypassed and dc power is applied directly through fuse F2, filter choke L6, and decoupling diode CR4. Resistor R5 and regulator diode CR3 reduce the 28-volt dc input to a regulated 12 volts. The 55G-1 is supplied wired for negative ground operation. For positive ground operation, jumpers must be changed as described in the installation section. The strapping for the various power inputs takes place through jumpers in the connectors of the various power cords used.

4.1 INITIAL TEST SETUP

Before aligning the 55G-1/1F, proceed as follows:

- a. Remove two rear feet. Remove two flat-head and two #6 screws on bottom of the of the 55G-1 cabinet. Remove two control knobs. The tuner can now be removed from the cabinet.
- b. Connect 55G-1 output to input of a 51S-1 known to be in good alignment.
- c. Connect an rf signal generator to 55G-1 input through a 10-to-1 voltage divider as shown in figure 4-1.
- d. Set KC BAND switch to OFF, and connect power cord to POWER connector on rear of 55G-1 and to power source.

Note

The 600- to 2000-kHz alignment must be done first. To obtain the proper TUNING control setting for alignment purposes, the chassis should be slipped back into the cabinet for shaft positioning with the front panel calibration marks.

4.2 600- TO 2000-kHz ALIGNMENT

- a. Set 55G-1 KC BAND switch to 600 to 2000 position and set TUNING control to 20.
- b. Tune rf signal generator and 51S-1 RF GAIN control to clockwise limit and set

RF - +10 DBM - 0 DBM switch to RF. Adjust rf signal generator output for a 51S-1 meter reading above zero but below midscale.

- c. Prepare a swamping tool by connecting a 0.01-microfarad capacitor in series with a 1000-ohm, 1/2-watt, carbon-composition resistor. Connect swamping tool across C1-C. Adjust coil L3 for maximum indication on 51S-1 meter.
- d. Tune rf signal generator and 51S-1 to 600 kHz. Adjust 55G-1 TUNING control for maximum indication on 51S-1 meter. Move swamping tool to C1-A and adjust coil L2 for maximum indication on 51S-1 meter (figure 4-2.)
- e. Tune rf signal generator and 51S-1 to 1950 kHz. Move swamping tool to C1-C and carefully adjust 55G-1 TUNING control for an exact maximum on 51S-1 meter. Move swamping tool to C1-A and adjust C1-D (C1-C trimmer) for maximum indication on 51S-1 meter.
- f. Repeat steps d and e.

4.3 200- TO 600-kHz ALIGNMENT

- a. Set 55G-1 KC BAND switch to the 200 to 600 position and set TUNING control to 2.
- b. Tune rf signal generator and 51S-1 to 200 kHz. Adjust coil L1 for maximum indication on 51S-1 meter.
- c. Tune rf signal generator and 51S-1 to 600 kHz. Set 55G-1 TUNING control to 6.

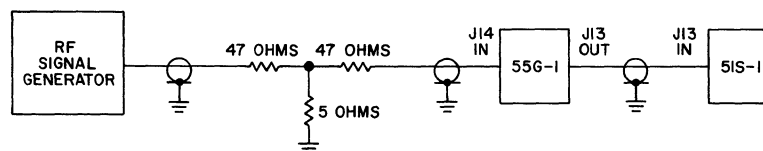


Figure 4-1. Connection of RF Signal Generator to 55G-1.

Adjust C1-E for maximum indication of 51S-1 meter.

d. Repeat steps a, b, and c.

e. Set KC BAND switch to OFF, disconnect power cord from power source and 55G-1,

and replace tuner in cabinet. Be sure spacers are in place under front and rear edges of tuner chassis. Replace feet and screws. This completes the alignment of the 55G-1.

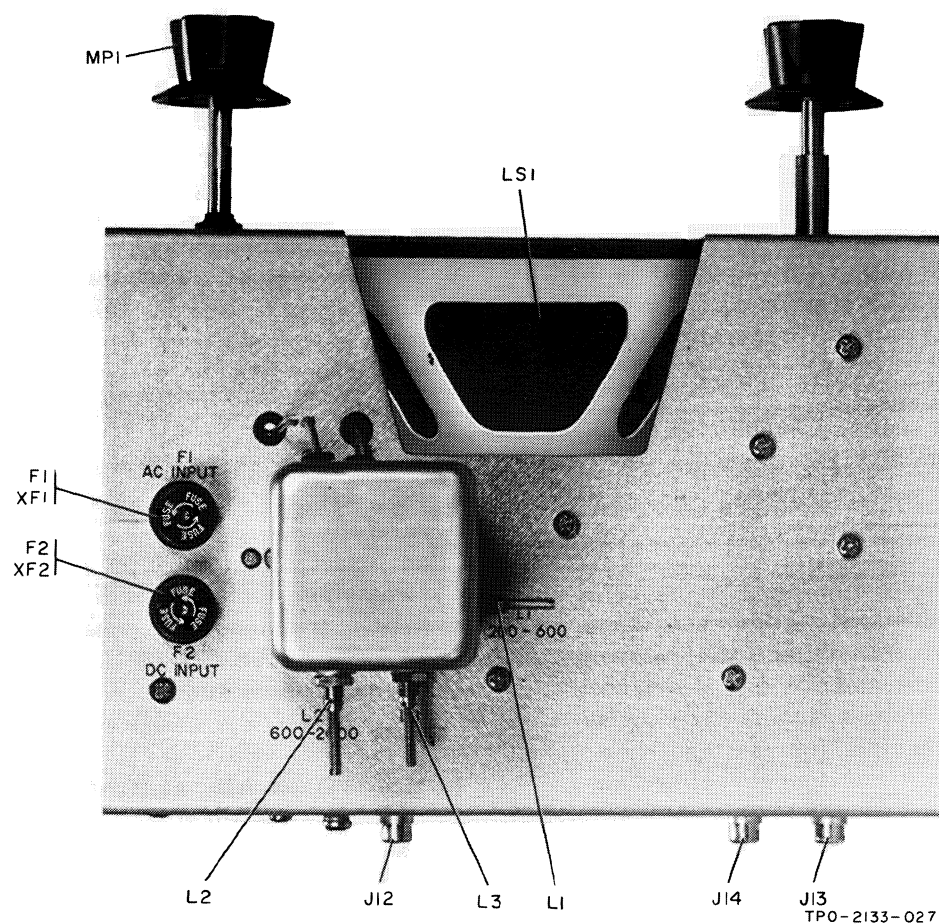


Figure 4-2. 55G-1 Component Identification (Sheet 1 of 2).

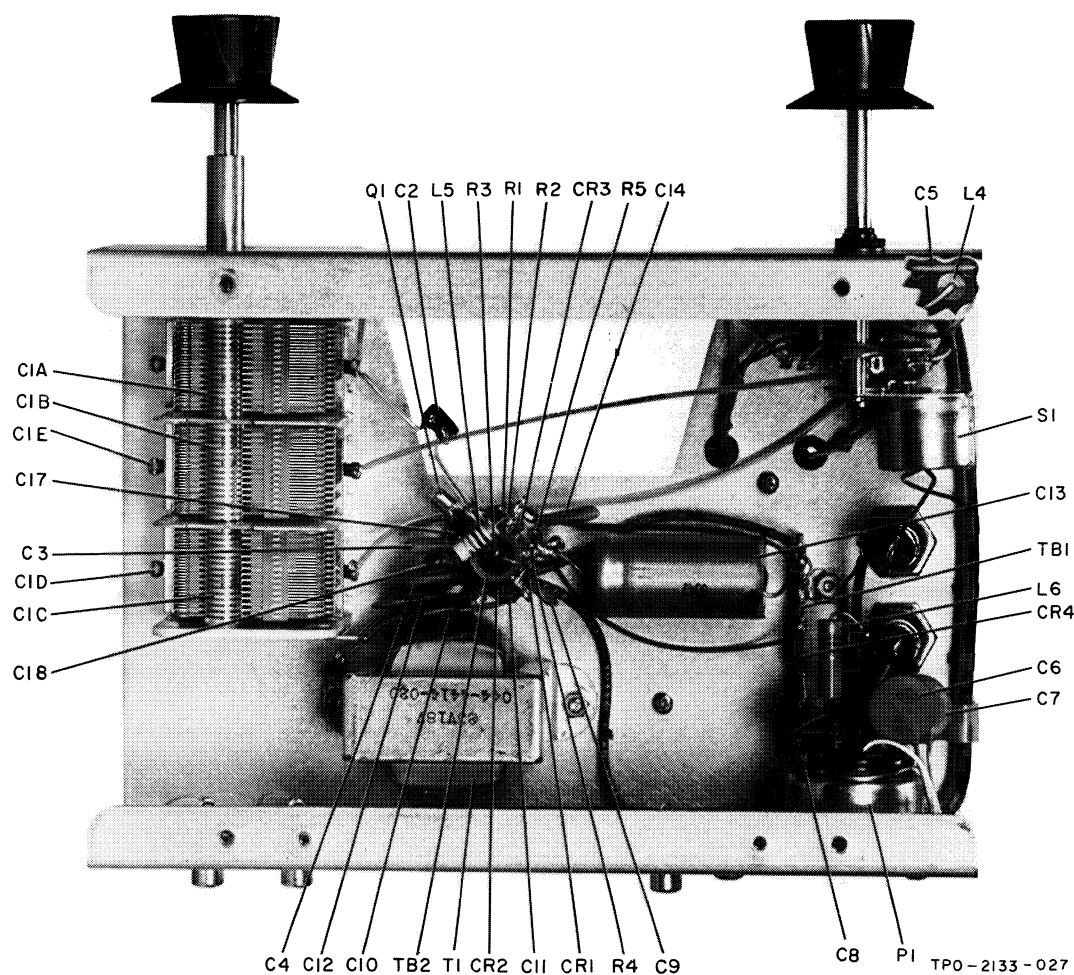


Figure 4-2. 55G-1 Component Identification (Sheet 2 of 2).

section 5

specifications

5.1 DESCRIPTION

The 55G-1/1F Low-Frequency Tuner is a manually operated tuner that is an accessory unit for the 51S-1 Receiver. It improves the sensitivity and input selectivity of the 51S-1 between 200 and 2000 kHz, and greatly reduces cross modulation and spurious responses caused by strong broadcast station signals. Besides the tuner, the 55G-1 cabinet also contains a 4-ohm loudspeaker for the 51S-1. Power for the 55G-1 is obtained from an internal power supply which operates from 115 or 230 volts ac at 50 to 400 Hz, or from 28 volts dc.

5.2 SPECIFICATIONS

Frequency
range 200 to 2000 kHz covered
in two bands; 200 to 600
kHz and 600 to 2000 kHz.

Tuning.....Manual from front panel.

Band selection...Front panel band switch
(OFF position bypasses
tuner).

Input and output
impedances 50 ohms, unbalanced.

Sensitivity.....The sensitivity values listed below are valid only if the 51S-1 being used with the 55G-1 meets the published sensitivity values.

Am 5 microvolts for not less than 10-dB signal-plus-noise to noise ratio.

Cw and ssb.....1 microvolt for not less than 10-dB signal-plus-noise to noise ratio carrier on to carrier off.

Power require-
ments.....115 or 230 volts, 50 to 400 Hz, or 28 volts dc at 1 watt.

Loudspeaker

Size 5 inches by 7 inches.

Impedance.....4 ohms.

Dimensions 7-3/4 inches high by 10 inches wide by 8 inches deep.

Weight.....6.5 pounds.

section 6

parts list

SYMBOL	DESCRIPTION	MANUFACTURER'S PART NUMBER	MFR CODE	COLLINS PART NUMBER
	55G-1 TUNER UNIT			522-3982-002
	55G-1F TUNER UNIT			777-1470-001
C1	CAPACITOR, VAR, 13.4 PF, 150 VDCW	25-3A	83894	921-0027-010
C2	CAPACITOR, FXD, 27 UF 5%, 500 VDCW	CM05E270J03		912-2774-000
C3, C4	CAPACITOR, FXD, 100,000 PF P80M20%, 50 VDCW	53 C41	56289	913-3886-000
C5	CAPACITOR, FXD, 10,000 PF 20%, 500 VDCW	36 C175A	56289	913-3013-000
C6, C7	CAPACITOR, FXD, 10,000 PF 20%, 1000 VDCW	DA 134-048CB	71590	913-3922-000
C8	CAPACITOR, FXD, 10,000 PF 20%, 500 VDCW	36 C175A	56289	912-3013-000
C9	CAPACITOR, FXD, 1000 PF 20%, 500 VDCW	40 C73A1	56289	913-3009-000
C10	CAPACITOR, FXD, 10,000 PF 20%, 500 VDCW	36 C175A	56289	913-3013-000
C11	CAPACITOR, FXD, 1000 PF 20%, 500 VDCW	40 C73A1	56289	913-3009-000
C12	CAPACITOR, FXD, 10,000 PF 20%, 500 VDCW	36 C175A	56289	913-3013-000
C13	CAPACITOR, FXD, 150 UF P100M10%, 50 VDCW	D27276	56289	183-1307-000
C14	CAPACITOR, FXD, 0.1 UF P80M20%, 50 VDCW	CK104	71590	913-3886-000
C15	NOT USED			
C16	NOT USED			
C17	CAPACITOR, FXD, 5 PF 10%, 500 VDCW	CM05C050K03		912-2751-000
C18	CAPACITOR, FXD, 390 PF 5%, 500 VDCW	CM05F391J03		912-2858-000
CR1, CR2	SEMICOND DEVICE	1N645		353-2607-000
CR3	SEMICOND DEVICE	1N963B		353-3085-000
CR4	SEMICOND DEVICE	1N645		353-2607-000
F1	FUSE	F02B250V1-16AS		264-4220-000
F2	FUSE	F02B250V1-16AS		264-4220-000
J1 THRU J14	NOT USED			
J12	JACK	3501FP	82389	360-0148-000
L1	COIL, RF, 370 UH	43A684CB1	76493	278-2081-130
L2, L3	COIL, RF, 138 UH	43A224CB1	76493	278-2081-100
L4	COIL, RF, 4.7 UH	240-1611-000	99800	240-1611-000
L5	COIL, RF, 1000 MH	2500-28	99800	240-2540-000
L6	COIL, RF, 5000 MH	2500-62	99800	240-2557-000
LS1	LOUDSPEAKER	X6496	86194	271-0215-000
MP1	KNOB ASSY	546-1296-003	13499	546-1296-003
MP2	KNOB ASSY	546-1296-003	13499	546-1296-003
MP3	BUMPER	747R	75543	200-5010-000
P1	CONNECTOR	86CP9-1003	02660	372-1951-000
Q1	TRANSISTOR	2N3823		352-0706-010
R1	RESISTOR, FXD, 820,000 OHMS 10%, 1/4 W	RC07GF824K		745-0854-000
R2	RESISTOR, FXD, 150 OHMS 10%, 1/4 W	RC07GF151K		745-0719-000
R3	RESISTOR, FXD, 470 OHMS 10%, 1/4 W	RC07GF471K		745-0737-000
R4	RESISTOR, FXD, 100 OHMS 10%, 1/4 W	RC07GF101K		745-0713-000
R5	RESISTOR, FXD, 1200 OHMS 10%, 1/2 W	RC20GF122K		745-1356-000
S1	SWITCH	255903K2AC	76854	259-2522-010
T1	TRANSFORMER	T57282	96256	662-0258-010
TB1	TERMINAL BOARD	5246A	71785	306-0839-000
TB2	TERMINAL BOARD	6H12	00534	306-0909-000
W1	CORD KIT, 28 VDC	763-3938-001	13499	763-3938-001

section 6
parts list

SYMBOL	DESCRIPTION	MANUFACTURER'S PART NUMBER	MFR CODE	COLLINS PART NUMBER
W1	CORD KIT, 115 VAC	763-3939-001	13499	763-3939-001
W1	CORD KIT, 230 VAC	763-3940-001	13499	763-3940-001
W2	CABLE ASSY	4C1336	82389	426-5076-000
XF1, XF2	FUSEHOLDER	HKPHJRZZ	71400	265-1019-000

VENDOR'S CODE AND NAME INDEX

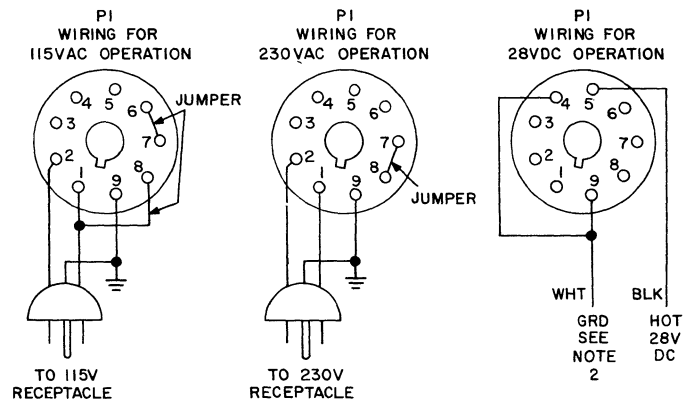
CODE	VENDOR'S NAME AND ADDRESS	CODE	VENDOR'S NAME AND ADDRESS
00534	Vector Cable Co. Div. of Schlumberger Technology Corp. 5616 Lawndale Ave. Houston, TX 77023	76493	Miller, J.W. Co. 5915 S. Main St. Los Angeles, CA 90003
02660	Amphenol Corp. 2801 S. 25th Ave. Broadview, IL 60153	76854	Oak Mfg. Co. Div. of Oak Electro/Netics Corp. S. Main Crystal Lake, IL 60014
13499	Collins Radio Co. 5225 C Ave. N.E. Cedar Rapids, IA 52406	82389	Switchcraft, Inc. 5527 N. Elston Ave. Chicago, IL 60630
56289	Sprague Electric Co. North Adams, MA 01247	83894	TRW Electronic Components Div. Watseka, IL 60970
71400	Bussmann Mfg. Div. of McGraw-Edison Co. 2536 W. University St. St. Louis, MO 63017	86194	Cleveland Electronics, Inc. 1974 E. 61st St. Cleveland, OH 44103
71590	Globe-Union, Inc. Centralab Div. P.O. Box 591 Milwaukee, WI 53201	96256	Thordarson-Meissner, Inc. Electronic Center Mt. Carmel, IL 62863
75543	Lavelle Rubber Co. 424 N. Wood Chicago, IL 60622	99800	Delevan Electronics Corp. 270 Quaker Rd. East Aurora, NY 14052

section 7

illustrations

NOTES:

1. UNLESS OTHERWISE INDICATED, ALL RESISTANCES ARE IN OHMS, CAPACITANCES ARE IN MICROFARADS AND INDUCTANCES ARE IN MICROHENRYS.
2. DC INPUT POWER CONNECTIONS ARE SHOWN FOR NEGATIVE GROUND. MATING POWER CONNECTOR IS SUPPLIED WITH THE WHITE WIRE AS INPUT GROUND AND THE BLACK WIRE AS THE HOT INPUT. FOR POSITIVE GROUND OPERATION CHANGE JUMPER WIRES: CONNECT POINT A TO POINT D AND POINT B TO POINT C.
3. ALL ROTARY TYPE SWITCHES ARE VIEWED FROM THE REAR, OR OPPOSITE THE DRIVEN END.
4. ROUND PIN ON PI 115VAC IS GROUND. IF MATING TYPE AC SOCKET NOT AVAILABLE, USE ADAPTER AND GROUND GREEN WIRE.



5 $\frac{1}{32}$ AMP FUSE USED FOR 230 VAC OPERATION.

Figure 7-1. Schematic Diagram of 55G-1.

