COLLINS

instruction book

55G - 1/1F
Low-Frequency Tuner

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

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<td>One adapter plug *</td>
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<td>3</td>
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<td>10-32 x 1/2 inch screws</td>
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<td>*4</td>
<td>12-24 x 5/8 inch screws</td>
<td>348-0008-000</td>
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* 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 4Ω SPEAKER jack and 51S-1 4Ω jack.
b. Connect one interconnecting cable between 55G-1 OUTPUT jack J13 and 51S-1 jack J1.

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.
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 4Ω SPEAKER jack and 51S-1 4Ω 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 368-0188-00). 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.
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 515-1, and a power supply. A 4-ohm loudspeaker for the 515-1 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](image1)

![B. 600-2000kHz Input Circuit](image2)

*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 flathead 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.](image)
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 is being used with the 55G-1 and 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 requirements .......... 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.
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<th>SYMBOL</th>
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### VENDOR'S CODE AND NAME INDEX

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| 00534  | Vector Cable Co.  
Div. of Schlumberger Technology Corp.  
5516 Lawndale Ave.  
Houston, TX 77023  | 76493  | Miller, J.W. Co.  
5915 S. Main St.  
Los Angeles, CA 90003  |
| 02660  | Amphenol Corp.  
2301 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  |
| 58289  | Syprague Electric Co.  
North Adams, MA 01247  | 83894  | TRW Electronic Components Div.  
Watseka, IL 60970  |
| 71400  | Bussmann Mfg.  
Div. of McGraw-Edison Co.  
2336 W. University St.  
S. Louis, MO 63017  | 86194  | Cleveland Electronics, Inc.  
1974 E. 61st St.  
Cleveland, OH 44103  |
| 71590  | Globe-Union, Inc.  
Centralab Div.  
F.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  |
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.

   PI: WIRING FOR 115VAC OPERATION
   PI: WIRING FOR 230VAC OPERATION
   PI: WIRING FOR 28VDC OPERATION

   JUMPER

   TO 115V RECEPTACLE
   TO 230V RECEPTACLE

   WHT  BLK  GRD  HOT  SEE  28V  NOTE  DC

5. 1/50 AMP FUSE USED FOR 230 VAC OPERATION.

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