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Colin Hinson
In the village of Blunham, Bedfordshire.

GENERAL PURPOSE COMMUNICATIONS RECEIVER

MODEL AR-88.LF

INSTRUCTIONS

Manufactured by

RCA Victor Company, Limited

Montreal, Canada

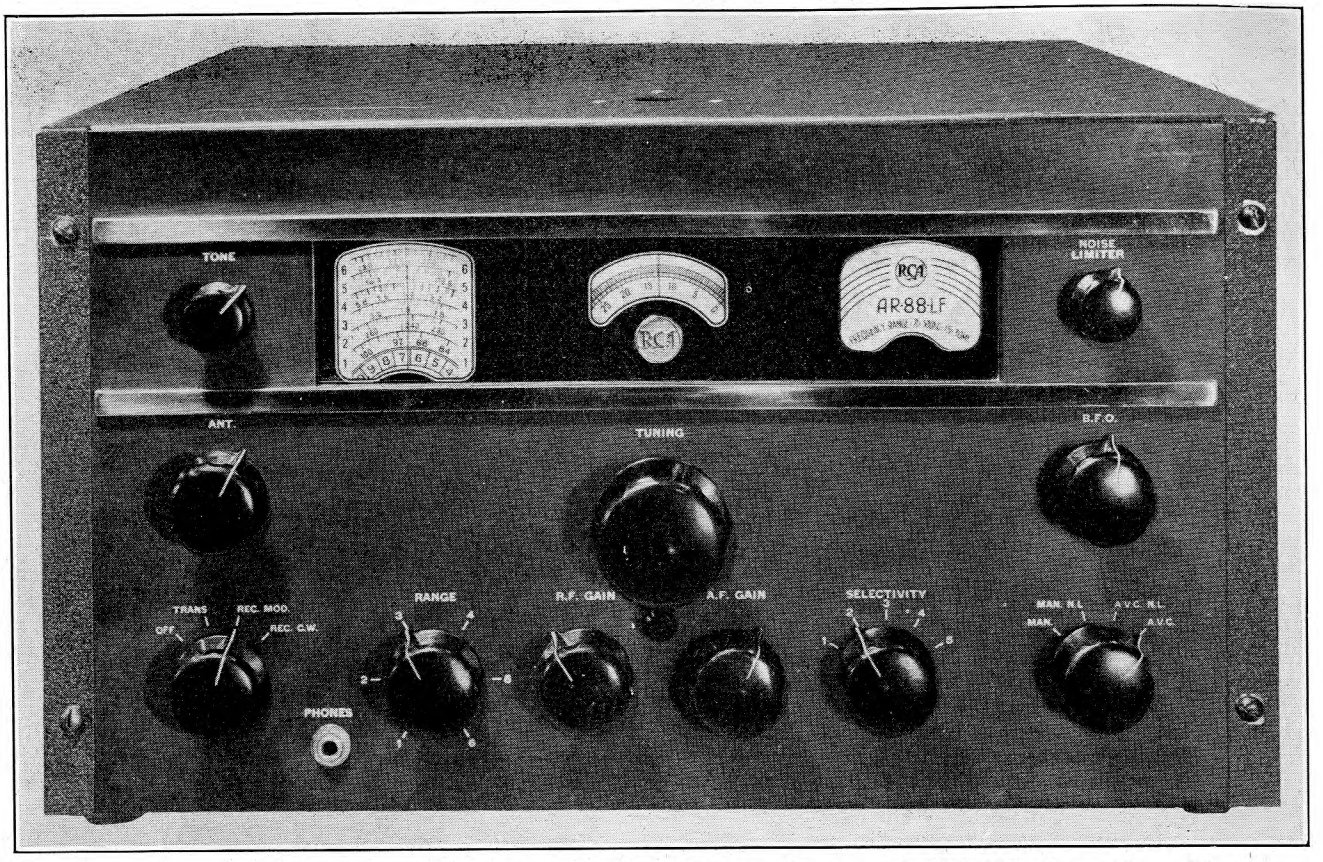

Figure 1.—General Purpose Communication Receiver—Front View.

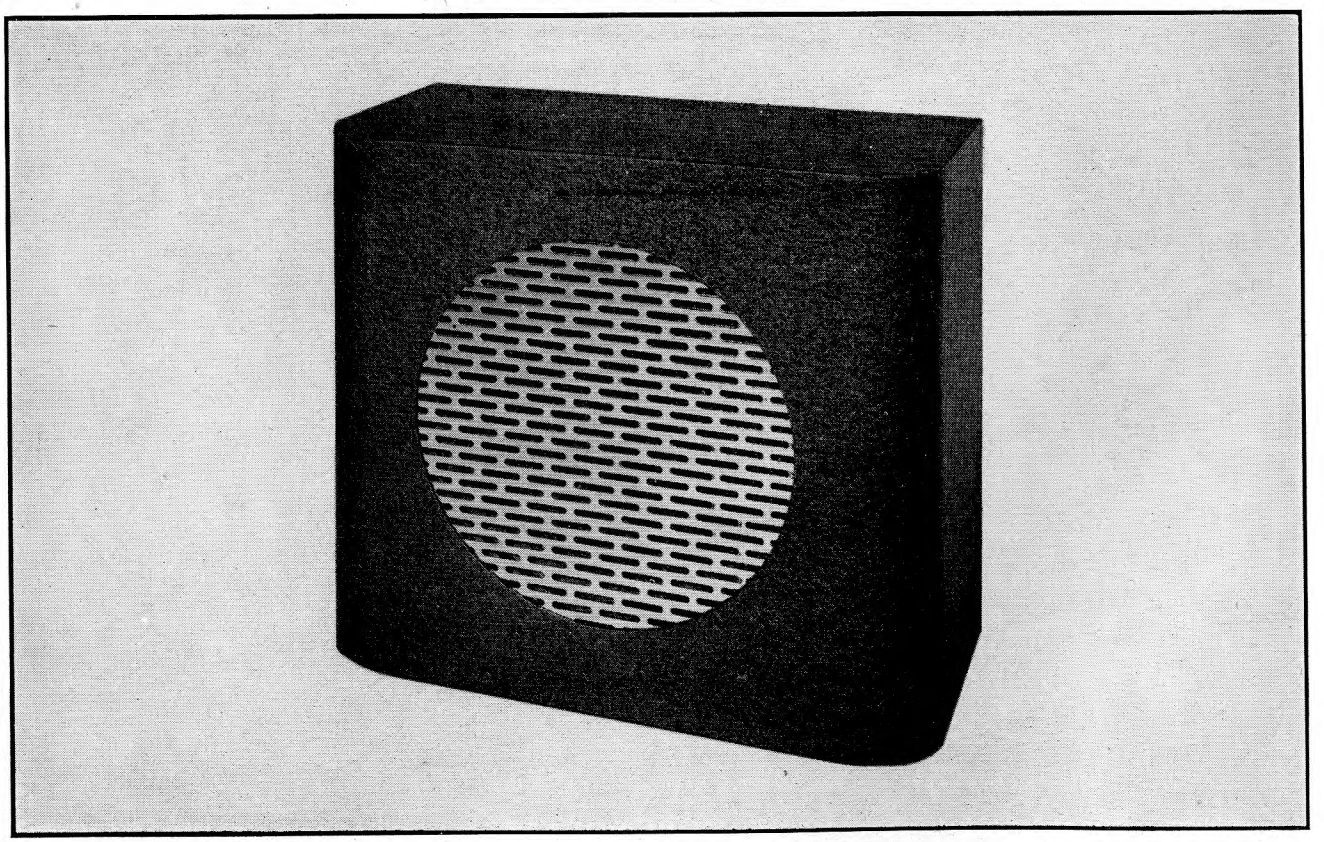

Figure 2.—General Purpose Communications Receiver—Loudspeaker.

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TABLES

ILLUSTRATIONS

*These illustrations are folded in.

ERRATA

Page 6 Paragraph 2.14 MI should read 22215. Page 7 paragraph 4.2 MI should read 22215.
Page 12 Figure 4 C-96.C-97.C-98 Electrolytic condenser should read Oil Filled.
Page 18 Table No. V C-96.C-97.C-98 Dry Electrolytic should read Oil Filled.

GENERAL PURPOSE COMMUNICATIONS RECEIVER

INSTRUCTIONS

1. GENERAL

1.1 This receiver has been designed for general purpose communication. It is designed to withstand severe climatic and line voltage variations without appreciable impairment in performance.

1.2 The following features have been incorporated into the design of this unit.

(a) Mechanical Band Spread, with Single Control for ease of tuning a previously logged station.

(b) Automatic Noise Limiter which automatically limits interference to a percentage of modulation.

(c) Noise Limiter Switch for switching Noise Limiter on or off.

(d) Continuously variable High Frequency Tone Control.

(e) Panel Antenna Trimmer for circuit alignment.

(f) Variable selectivity, with expansion of the normal selectivity characteristic for standby, and a crystal filter for ultra sharp selectivity when required. The crystal filter circuit is adjusted at the factory to give selectivity characteristics as shown in Figure 12.

(g) Temperature compensated oscillator circuits on all bands.

(h) Regulation of the anode voltage of the oscillator, giving good oscillator stability through normal variations in line voltage.

(i) Four-ganged Condenser giving high image ratio, and very low oscillator radiation on all bands.

(j) Special screening devices have been built around the gang condenser, the master oscillator section, and the r.f. amplifier section in order to minimize oscillator radiation on all bands.

(k) Tuning lock for service under extreme conditions of vibration.

1.3 **Frequency Range:—**

Band 1	73	to	205 KC
Band 2	195	to	550 KC
Band 3	1480	to	4400 KC
Band 4	4250	to	12150 KC
Band 5	11900	to	19500 KC
Band 6	19000	to	30500 KC

1.4 **Sensitivity:**—Better than 15 microvolts for 20 db signal to noise ratio, for MCW (A-2) reception and better than 5 microvolts for CW (A-1) reception (see table No. 1).

1.5 **Radiation:**—Less than 40 micro-microwatts of power radiated, as dissipated in resistance connected from Antenna input terminal to ground. Value of resistance is such as to cause maximum power to be radiated (see Section 3 below).

1.6 **Output Power:**—(Maximum undistorted)—2.5 Watts when loudspeaker used. When low impedance headphones are used, maximum output fed to the phones is 100 milliwatts approximately.

1.7 **Power Supply Requirements:** — 115 or 230 volts, 25/60 cycle, 100 Watts or 6 volts D.C., 12 amps when external power supply MI-22215 is used. (Note—external power supply MI-22215 is only supplied when specially ordered.)

1.8 **Output Load:**— This receiver has provision in the output circuit to take loads of 2.5 ohms, 20 ohms, and also low impedance headphones.

1.9 **Mechanical Specifications:**—Overall Dimensions —19¼ inches wide x 11 inches high x 19¼ inches deep. Weight — 100 Pounds (unpacked).

2. TECHNICAL DETAILS

2.1 **Circuit Details and Features:**—The schematic diagram of this receiver is shown in Figure 11. It consists of two stages of R.F. amplification, first detector, first heterodyne oscillator; three of I.F. amplification, second detector and A.V.C., noise limiter, second heterodyne oscillator; A.F. amplifier stage, output power stage, and power supply system.

2.2 **Input Coupling:**—The antenna coupling system is designed to provide optimum coupling from a 200 ohm transmission line, but equivalent performance is realized with a straight line antenna (see Section 4.4) with a conventional lead-in wire. The first tuned circuit is provided with a trimmer condenser adjustable from the front panel. This insures the proper tuning of this circuit with any antenna system.

For all bands, conventional antenna and ground connections may also be used.

The antenna terminal board is provided with three terminals (see Figures 3 and 7), two of which may be joined together with a link. When a single wire antenna is used, the link should be closed and the antenna connected to "A". If a ground is used, it should be connected to "G".

If a transmission line or balanced input is used, the link should be opened and the line connected to terminal "A" and the center terminal. Protection against damage due to high voltages across the antenna coil primaries is provided by a gas gap protector (Type 991 Valve). This protector will break down with an applied potential of approximately 50 Volts R.M.S.

2.3 **R.F. Amplifier:**—The R-F Amplifier is designed to provide ample selectivity ahead of the first detector for minimizing cross modulation and blocking effects from strong interfering signals and for obtaining a high degree of image signal suppression. The amplification is adjusted to provide optimum signal-to-noise ratio by making noise contributions of circuits following the first valve negligible in comparison with the noise contributed by the first R-F grid circuit; that is, each tuned circuit in the receiver contributes some noise voltage, but by making the gain of the first valve as high as practicable, the noise contributed by succeeding circuits is unimportant.

2.4 **Band Spread:**—The mechanical band spread with single control knob enables the operator to tune quickly to a previously logged station. The log scale on the main dial and the separate vernier dial provide for exact logging and tuning.

2.5 **First Heterodyne Oscillator:**—The first heterodyne oscillator is aligned to track with the R-F Amplifier at 735 kc higher than the signal frequency, thus producing a 735 kc intermediate frequency in the first detector plate circuit which is amplified further in the I-F stages. The oscillator voltage is regulated by the Type VR-150 regulator valve to provide maximum frequency stability under conditions of variations in power supply voltage.

2.6 **Intermediate Frequency Crystal Filter:**—The first detector plate circuit is tuned to the intermediate frequency and a balanced link circuit is used to couple the first detector plate and first I-F grid circuits. A 735 kc crystal is connected in one arm of the link circuit by the selectivity switch and a neutralizing capacitor is connected in the other. The impendance of the coils in the link circuit are designed so that the crystal selectivity characteristic is not impractically sharp. The band width at two times resonant input may be adjusted to 550 cycles, 2000 cycles, 4,000 cycles, 8000 cycles, or 16,000 cycles. For this adjustment see "Operation".

2.7 **Intermediate Frequency Amplifier:** — Three stages of I-F amplification are used; Type 6SG7 valves are used in all stages and a Type 6H6 valve is used for AVC and second detector. The first I-F transformer has its primary and secondary tuned, and is coupled through the crystal filter link. The second and third I-F transformers are composed of four tuned circuits each. These circuits are varied in coupling by the selectivity switch. The fourth I-F Transformer has two tuned circuits.

The third I-F stage is not connected to the AVC nor to the manual volume control so that a good AVC characteristic with little overload distortion is obtained. This also permits the CW oscillator to be coupled to the grid circuit of this stage,

2.8 **Second Heterodyne Oscillator:** — The second heterodyne (CW) oscillator is a triode Type 6J5 valve which is electrostatically coupled to the final I-F stage. A panel control is provided by means of which the frequency of the heterodyne oscillator and resultant audio beat note may be varied.

Particular care has been taken in the design of the circuit constants to minimize oscillator harmonics.

2.9 **Automatic Volume Control:**—The AVC voltage is obtained from the second detector, a Type 6H6 valve. A variable delay is obtained depending on the setting of the R-F gain control.

The second heterodyne (CW) oscillator excitation voltage is just lower than the AVC diode bias voltage so that it does not decrease the sensitivity of the receiver.

2.10 **Manual Volume Control:**—Two manual volume controls are provided: an audio gain control which is employed when the AVC is in use, to obtain the desired output level, and an R-F gain control.

2.11 **Noise Limiter:**—The noise limiter circuit utilizes a Type 6H6 valve and limits the noise interference to 100% modulation and to continuously lower percentages down to any modulation whatsoever, determined by the setting of the noise limiter control.

A noise limiter switch in conjunction with AVC provides for use of the noise limiter on CW or on modulated reception when interference is present.

2.12 **Output Valve:** — The Type 6V6GT/G output valve is resistance coupled from the A-F amplifier, a Type 6SJ7 valve, and operates into an output transformer which has taps for matching into a 2.5 ohm load, or headphones. Terminals are provided on the rear apron for each of these load impedances. The output from the 2.5 ohm tap is fed directly to the 2.5 ohm output terminal, while the output from the 20 ohm tap is fed to the 20 ohm output terminal and also to a jack mounted on the panel. With the phone plug inserted into the jack, the phones are across the 20 ohm output and a load resistor, R-56, provides correct matching for the valve and reduces output supplied to the headphones.

3.3 **Oscillator Stability:—**

(a) Oscillator frequency stable within 0.001% for line voltage variation of ± 5%.

(b) Oscillator frequency stable within 0.003% for temperature change of 1°C.

(c) Oscillator frequency stable within 0.001% for total variation of both the audio and R.F. gain controls.

(d) Resetting of range switch from either direction does not vary the frequency of the oscillator on any band more than 1 kc.

3.4 **Dial Resetability**—better than 2 kc. when the dial is reset from either direction, at any frequency.

3.5 **Dial Calibration:**—Calibration of the dial is accurate to within 0.5%.

3.6 **AVC Characteristics:**—The AVC circuit holds the audio output level to 15 db when the MCW (A-2) input is varied between 10 and 100,000 microvolts at any frequency, with any modulation percentage from 10 to 90, and with any modulation frequency from 300 to 4000 cycles. (See Figure 14.)

4. INSTALLATION

4.1 **Power Supply:**—The power supply circuit is integral with the receiver. Determine line voltage and frequency and check with the rating of the receiver. The power transformer primary may be connected for either 115 or 230 volts 25/60 cycle by means of the toggle switch on the rear apron. This toggle switch is protected by a protector plate. To alter the connection of the primary, remove the protector plate, throw the switch, and replace the protector plate, with the reverse face out.

4.2 **For Battery or Other Supply Operation:**—For connections see Schematic Diagram Figure 11. It is only necessary to remove the plug from the socket on the rear of the receiver, and connect the batteries to the proper terminals as indicated by the schematic diagram. A battery cable terminating in an octal male plug is necessary for this purpose.

If the Vibrator Power Unit MI-22216 is used, remove the plug from the socket on the rear of the receiver, and plug in the cable from the Vibrator Power Unit. Connect the 6 volts D.C. input to the power unit with heavy, low resistance leads. See Section 7. for more detailed information concerning the Power Unit.

4.3 **Valves:**—Inspect the chassis before applying power to see that all valves are firmly seated in their respective sockets.

4.4 **Antenna:**—The input impedance at the antenna terminals is designed to match a 100 to 200 ohm transmission line or a straight wire capacity type antenna.

For general use it is recommended that a straight wire antenna between 25 and 50 feet long be used for bands 3 to 6 inclusive, and a wire of 200 feet or more for bands 1 and 2.

4.5 **Speaker:**—Terminals for connection of a loudspeaker are indicated in Figures 3 and 7. The output transformer is designed to match a p.m. dynamic speaker having 2.5 ohms impedance.

4.6 **Headphones:**—A jack is provided on the left of the front panel for plugging in a pair of headphones. If additional phones are required, they may be connected to the 20 ohm output terminals on the rear apron of the receiver. Phones having an impedance in the range of 100 to 600 ohms should be used.

4.7 **Mounting:**—The instrument may be placed on a table or mounted on a rack. For rack mounting loosen the panel mounting screws and remove the front panel and chassis complete from the cabinet. Then mount on rack by means of the slots at the sides of the panel.

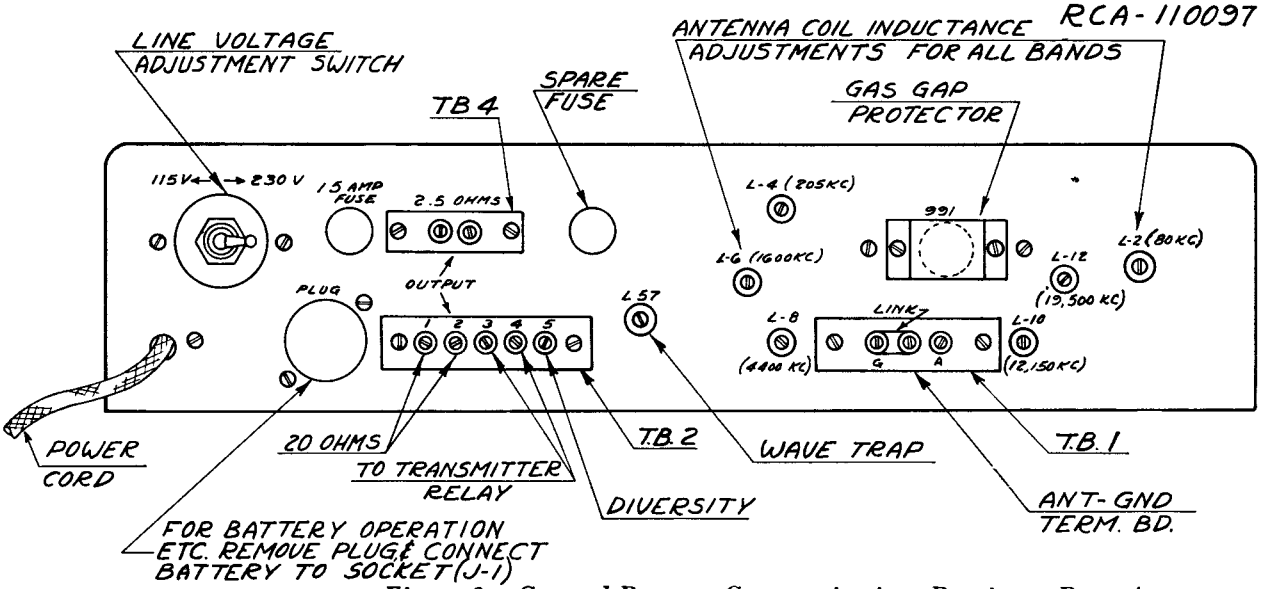

Figure 3.—General Purpose Communications Receiver—Rear Apron

5. OPERATION

5.1 Before attemping to operate the receiver, the information contained in this section should be thoroughly understood by the operator. The symbols on panel used to designate the various controls as shown in Figure 1, should be learned with respect to function, as described herein.

5.2 **The Antenna Trimmer:**—The center knob on the left is the Antenna Trimmer. Before tuning on any frequency range, it should be adjusted for maximum performance on the band. This control may be adjusted by tuning for maximum background noise.

Occasionally it is desired to test a signal that seems out of place, to see whether or not it is a fundamental signal or an "image". When doing this, if the maximum signal point coincides with the point of maximum background noise, the signal is a fundamental. If the control does not affect the signal strength, or if it is a maximum at some other point, it is an "image".

5.3 **The Main Tuning Dial** is on the left and consists of a disc with seven scales, one for each of the six bands and a log scale. The two low frequency bands are calibrated in kilocycles and the other four bands in megacycles.

5.4 **The Vernier Tuning Dial** is in the center and has a scale with arbitrary calibrations for exact tuning and log records of particular communication stations. It is used in conjunction with the log scale on the main tuning dial to give additional figures for logging.

5.5 **Power-Transmit-Receiver Switch:** — This is a four-position switch. Starting from fully counterclockwise these positions are:

1. Power off.
2. Transmit position which gives energized tube filaments, open plate circuits, and shorted terminals (for transmitter relay) on the speaker terminal board on the back of the chassis. (3. & 4. on T.B.-2.). Connect relay to these two terminals for transmitter operation. (See Figure 3.)
3. Normal reception.
4. CW reception — Beat frequency oscillator switched on.

5.6 **Selectivity Switch:** — This is a five-position switch and the band widths and control of selectivity are illustrated in the curves of Figure 12. The five positions are:

1. I-F band width for High Fidelity, modulated reception, — for "Stand-by" use.
2. I-F band width for normal modulated reception.
3. Crystal Filter in — for CW telegraph or sharp modulated signal reception.
4. Crystal Filter in — for sharper CW telegraph reception.
5. Crystal Filter in — for sharpest CW telegraph reception.

5.7 **Noise Limiter—AVC Switch:**—This is a four-position switch and starting from the fully counterclockwise position these are:

1. AVC and NL out — Manual gain only — for CW — no interference.
2. NL on, AVC out — Manual gain — for CW with interference.
3. NL and AVC on — for Modulated Reception with interference.
4. AVC on, NL out — for Modulated Reception — no interference.

5.8 **R-F Gain Control:**—This continuously variable sensitivity control is for use in conjunction with the audio gain (Volume) control for all manual gain operation. With AVC on, it should as a rule be set to its fully clockwise position or may be turned to eliminate interference. For reception of strong CW signals, it must be retarded somewhat.

5.9 **Noise Limiter Control:**—This control sets the instrument for operation at the required percentage value of Noise Limitation. The fully clockwise position limits the noise interference to 100% modulation. As the knob is turned counterclockwise, the noise interference is limited to continuously lower percentages of modulation so that in the fully counterclockwise position the Noise Limiter is operative on any modulation whatsoever. Normally, the fully clockwise position will be used, but under extreme conditions of interference a balance point should be found for maximum intelligibility of signal with best modulation and least noise.

5.10 **Tone Control:**—This is a continuously variable control for reducing HF response. In the fully clockwise position the full tone is obtained and as turned counterclockwise, high tones are lessened. Set it to suit the particular tonal conditions for the signal being received.

5.11 **Beat Frequency Oscillator Control:**—This control is normally used for CW code signals. It should be adjusted to give the desired audio pitch after the signal has been accurately tuned.

5.12 **Tuning:**—For functions of controls see the foregoing paragraphs.

1. Turn receiver on and set the Power-Transmit-Receive Switch for the required type of operation.
2. Set Range Switch for band required.
3. Set Antenna Trimmer for maximum background noise.

4. Set Selectivity Switch for the required operating conditions — See Selectivity Curves — Figure 12.
5. Set Noise Limiter—AVC Switch for the required operating conditions.
6. Set R-F Gain Control fully clockwise.
7. Set Audio Gain Control about halfway.
8. Tune in the station.
9. Reset Audio Gain Control to give desired volume.
10. Reset Selectivity and Sensitivity (R-F Gain) Controls and Noise Limiter Control in accordance with requirements due to interference, station transmission, and other conditions.
11. Set Tone Control for preferred tone.
12. On CW (A-1) operation set Power-Transmit-Receive Switch to "Rec. CW" (position 4) and set BFO Control to give desired pitch. When a strong CW signal is being received, it is necessary to retard the R.F. Gain Control to reduce the volume.
13. If the receiver is subject to vibration, the tuning may be locked by turning clockwise the knurled screw directly beneath the tuning knob. Turning the screw moderately tight will lock the tuning.

5.13 **Diversity Reception:** — Provision is made to operate two or three of these receivers together for "diversity" reception. For this type of reception the A.V.C. circuits of the receivers are tied together. The receivers are operated on separate antennas, and the receiver receiving the strongest signal, thus generating the greatest A.V.C. voltage, dominates the other receivers. If the separate antennas are faced to the incoming signal at different angles, the good reception with minimum fading results.

Refer to Figure 3: Connect together the terminals, marked "Diversity" of the receivers, and equip each receiver with a separate antenna. Tune each receiver to the same station as explained in Section 5.12 above.

6. MAINTENANCE

6.1 This receiver should maintain its correct factory adjustments over a reasonably long period of time. Causes of trouble and the probable sequency of their development are outlined in the following paragraphs:

6.2 **Valves:**—A noticeable decrease in the sensitivity of the receiver usually indicates worn out valves. If the sensitivity is low, remove and check the valves in a reliable valve tester or substitute new valves one at a time. See Schematic Diagram, Figure 11. Valve socket voltages are given in Table II.

TABLE No. II
VALVE SOCKET VOLTAGES

Valve	Symbol	Plate Volt.	Screen Volt.	Cathode Volt.
Type 6SG7 1st R-F Amplifier	1	235	150	0
Type 6SG7 2nd R-F Amplifier	2	235	150	0
Type 6J5 Oscillator	3	110	—	0
Type 6SA7 1st Detector	4	235	50	2
Type 6SG7 1st I-F Amplifier	5	235	150	7
Type 6SG7 2nd I-F Amplifier	6	235	150	1.3
Type 6SG7 3rd I-F Amplifier	7	235	150	3.1
Type 6H6 2nd Det. & AVC.	8	—	—	—
Type 6H6 Noise Limiter	9	—	—	—
Type 6SJ7 1st Audio Amplifier	10	83	34	0
Type 6V6GT/G Power output	11	256	240	0
Type 6J5 B.F.O.	12	40	—	0
Type VR-150 Voltage Regulator	13	150	—	0
Type 5Y3GT/G Rectifier	14	—	—	300

NOTE—These voltages all measured to chassis. Measured with a 1000 ohm per volt meter. Variations of ± 20% may be expected due to resistance tolerances, etc.

6.3 **Range Switch:**—A switch may operate defectively on certain positions after long periods of inoperation. Usually rotating the switch back and forth several times will clean the contacts and operation will become normal.
A bad range-switch contact is likely to cause a change in the sensitivity of the receiver, or the frequency of a received signal, as the switch is moved back and forth slightly in a certain frequency band position. A further check is to turn the switch off and on at one particular frequency band several times and note the apparent sensitivity of the receiver each time the switch comes into position. The sensitivity should be the same each time and may be adequaely judged for this test by listening to the receiver background noise.

6.4 **Circuit Alignment:**

WARNING:—The Circuit Alignment of this receiver has been done very carefully at the factory, and realignment should not be attempted unless it has been definitely ascertained that the Circuits are out of alignment. It should be attempted only by skilled personnel. It must be performed in a test laboratory where proper test equipment is available. All adjustments must be done very carefully and the exact procedure as outlined below must be followed.

6.4-1 **Alignment Tools:**—Special tools for alignment of R-F and I-F circuits are provided. They are mounted in fuse clips on either side of the gang condenser cover, and are available after removing the large R-F unit cover. The shorter one of the two is for adjustment of all R-F and I-F coils, and the longer one is for adjustment of the plunger type trimmers. One end of this tool is for turning the lock nut on the trimmers and the other end has a hook for engaging in the hole in the end of the plungers. After adjustment, the lock nut should be securely tightened.

6.4-2 **I-F Alignment:**—The intermediate frequency is 735 kc. The only satisfactory method of I-F alignment is by means of a sweep oscillator and cathode ray oscillograph. The I.F. circuits must be aligned at exactly 735 kc, and the frequency of the sweep oscillator carrier must be checked against a 735 kc. crystal oscillator. Make connections as in Table III (a), and follow the sequence as in Table III (b).

TABLE No. III (a)

I.F. ALIGNMENT CONNECTIONS

Oscillograph Connections	Vertical "HI" to Terminal C on last I-F Transformer (L-47, L-48), Vertical "LO" to chassis.
Dummy Antenna	Insert in series with generator output, 0.01 mfd.
Connection of Generator Output Lead	See Chart below.
Connection of Generator Ground Lead	To Chassis.
Position of Range Switch	Band No. 1
Position of Power-Transmit-Receive Switch	Position 3 (Rec. Mod.)
Position of R-F Gain Control	Fully clockwise.
Position of Selectivity Switch	Position 2.
Position of Noise Limiter and AVC Switch	Position 4 (AVC).

TABLE No. III (b)

I.F. ALIGNMENT ADJUSTMENTS

(Alignment Frequency is 735 Kc)

Steps	Generator Connections	Slug Adjustments (See Fig. 4)	Trimmer Function
1	6SG7 - 3rd I-F Grid	L-47, L-48	4th I-F Transformer
2	6SG7 - 2nd I-F Grid	L-41, L-42, L-43, L-44	3rd I-F Transformer
3	6SG7 - 1st I-F Grid	L-35, L-36, L-37, L-38	2nd I-F Transformer
4	6SA7 - 1st Det. Grid	L-32, L-33	1st I-F Transformer

6.4-3 Align each transformer to give a symmetrical flat-topped curve on the oscillograph. Before performing step 4 above, set crystal phasing control C-75 at approximately one-half of its maximum capacity. This is approximately its final setting and changing it appreciably will slightly detune the first I-F transformer.
With Selectivity Switch in Position 2 the I-F band width is normal without over-

coupling in the transformers. With Selectivity Switch in Position 1, the second and third I-F Transformers are expanded and over-coupled. It is well in going through tht alignment steps outlined above to check the I-F curves on the oscillograph screen with switch in Position 1 to see that the curves expand symmetrically.

6.4-4 **Adjustment of Crystal Phasing Control:**— This adjustment is best made by means of a signal generator and a high resistance sensitive DC voltmeter. Place Selectivity Switch in Position 3. Connect the generator to the grid of the 6SA7 first det., and the Voltmeter to Terminal C on last I-F transformer (L-47, L-48). Tune the generator to about 7 k.c. off I-F resonance and adjust the crystal phasing control C-75 for minimum response. If C-75 is adjusted much from its position as in Section 6.4-3, check alignment of first I.F. transformer.

6.4-5 **Adjustment of Crystal Load Circuit:**— Make connections as listed in Table III (a).

(a) Place Selectivity switch in Position 3. Rock the signal generator frequency back and forth across the I-F resonant frequency and adjust the crystal load circuit trimmer L-34 or symmetrical round-top curve.

(b) Place the Selectivity switch in Position 4, Rock the signal generator frequency and adjust trimmer C-81 for symmetrical curve.

(c) Place the Selectivity switch in Position 5. Adjust trimmer C-80 rocking the signal generator as for (a) and (b) above.

The above three adjustments are very critical and must be made carefully to obtain symmetrical curves.

6.4-6 **Adjustment of Wave Trap:**—A wave trap is connected across the No. 3 band, first R.F. primary to increase the rejection of I-F signal frequencies. With the range switch on Position 3, apply a modulated I-F signal to the antenna and ground terminals. Adjust the wave trap trimmer L-57 (See Fig. 3) for minimum output. The wave trap should be adjusted before the final R-F alignment on No. 3 band, or the R.F. coil alignment may be affected.

6.4-7 **R-F Alignment:**— A signal generator covering a range from 70 to 550 kc and 1.5 to 30 megacycles, and an output voltmeter, are required. It is desirable to connect a speaker across the output terminals. The output voltmeter should then be connected across the speaker voice coil. The output impedance is 2.5 ohms. Remove the cover from over the R-F unit by loosening the four knurled screws and lifting off.

Refer to Figures 3 and 4. Make connections as per Table IV (a). Align the R.F. circuits carefully, following the procedure as indicated in Table IV (b). Always align for maximum output. A correctly aligned receiver should have performance equivalent to that described in Section 3. Replace cover after alignment is completed.

6.4-8 **Adjustment of Beat Frequency Oscillator:**—Tune in a signal either R-F or I-F to exact resonance with Power-Transmit-Receive Switch at "Rec. Mod" (Fig. 1.). Turn on beat frequency oscillator by turning switch to "Rec. CW". If zero beat does not fall within the range of the BFO control, adjust BFO Trimmer L-22 (see Fig. 4) until zero beat occurs at the mid-point setting of the BFO control.

6.5 **Mechanical Construction:**—

6.5-1 The receiver has been designed to be very rugged so that it will stand up under severe conditions of use, and yet have all parts available for easy replacement. All component parts such as transformers, chokes, filter and by-pass capacitors, etc., are mounted with screws and nuts rather than with rivets. All wiring other than that involving high frequency circuits is made up in the form of a laced cable so that no loose leads are left floating which might cause damage or change capacity to various portions of the circuit. The tuning condenser is mounted so as to be rigid with respect to the tuning unit, and yet is flexible with respect to the chassis. This prevents distortion of the chassis from having any appreciable effect on the stability of the oscillator.

6.5-2 The R-F unit which consists of the tuning condenser, tuning unit, range switch, and all of the R-F and oscillator coils and trimmers, is mounted on a separate base which bolts to the main base. The various coils and trimmers on this base may be easily replaced by means of a single nut which screws on the individual mounting bushings. However if a major repair is to

(Continued on page 14)

TABLE No. IV (a)

R.F. ALIGNMENT CONNECTIONS

Output Meter Connections	Across speaker voice coil
Dummy Antenna	See Table IV (b) below
Generator Modulation	30% at 400 cycles
Position of Tone Control	Fully clockwise
Position of Antenna Trimmer	See Table IV (b) below
Position of Power-Transmit-Receive Switch	Position 3 (Rec. Mod.)
Position of Range Switch	See Table IV (b) below
Position of R-F Gain Control	Retard to reduce noise
Position of Audio Gain Control	Fully clockwise
Position of Noise Limiter and AVC Switch	Position 1 (Manual)
Position of Selectivity Switch	Position 2

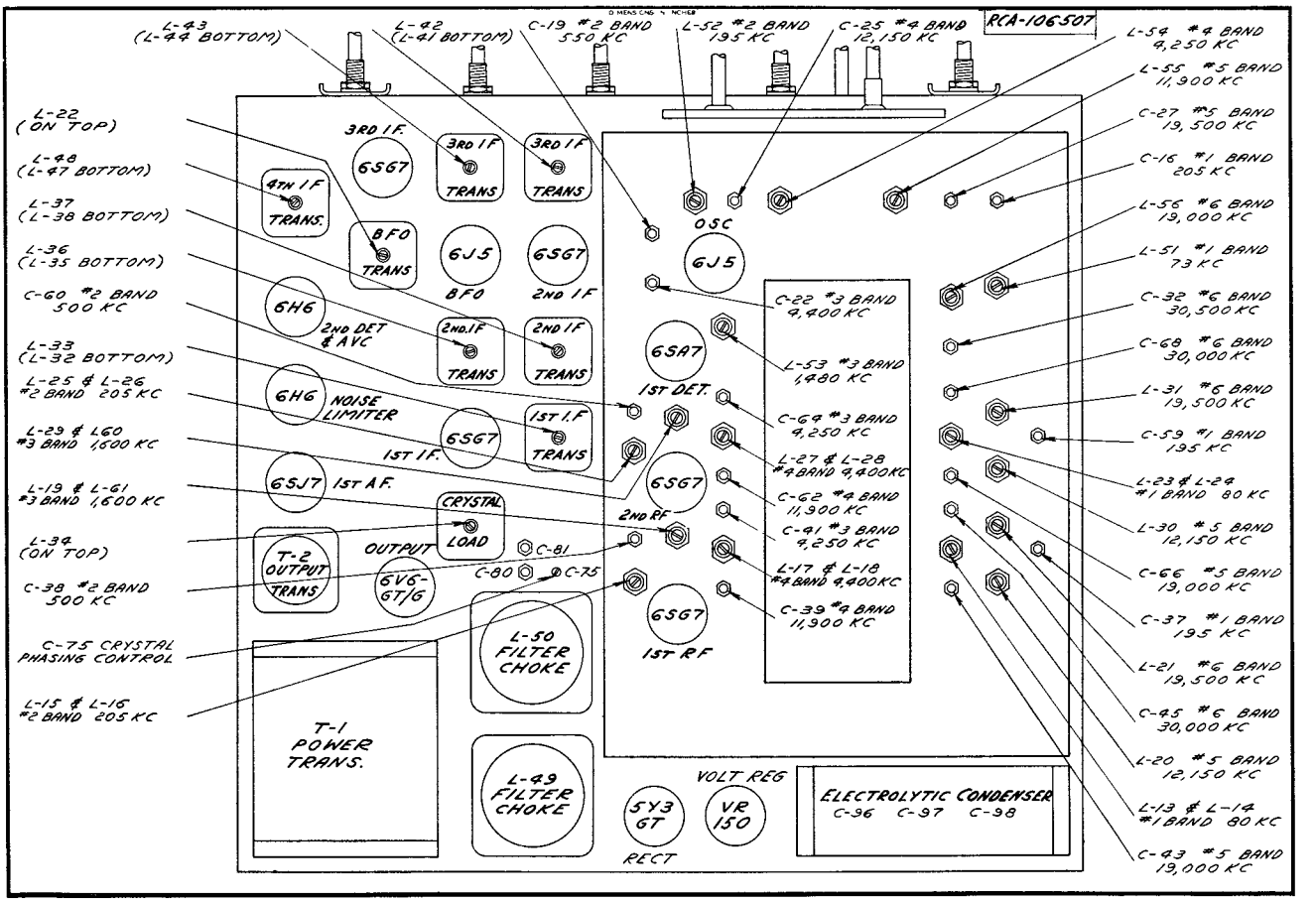

Figure 4.—General Purpose Communications Receiver—Alignment Layout.

TABLE No. IV (b)

R.F. ALIGNMENT ADJUSTMENTS

Operation No.	Range Switch Position	Position of Dial, and Generator Frequency	Dummy Antenna	Position of Antenna Trimmer	Trimmer Adjustments for Max. Peak Output (See Figures 3 and 4)	Trimmer Function
1	1	74	700 mmf	—	L-51	Low end osc.
2	1	200	700 mmf	—	C-16	High end osc.
3	Repeat 1 and 2 until end frequencies are as indicated.					
4	1	195	700 mmf	Max. output	C-37, C-59	1st & 2nd R-F
5	1	80	700 mmf	Untouched	L-2, L-14, L-24	Ant. & 1st and
6	Repeat 4 and 5 until circuits remain in alignment over the band.					2nd R/F
7	2	200	700 mmf	—	L-52	Low end osc.
8	2	545	700 mmf	—	C-19	High end osc.
9	Repeat 7 and 8 until end frequencies are as indicated.					
10	2	500	700 mmf	Max. output	C-38, C-60	1st & 2nd R-F
11	2	205	700 mmf	Untouched	L-4, L-16, L-26	Ant. & 1st and
12	Repeat 10 and 11 until circuits remain in alignment over the band.					2nd R-F.
13	3	1,500	200 ohms	—	L-53	Low end osc.
14	3	4,350	200 ohms	—	C-22	High end osc.
15	Repeat 13 and 14 until end frequencies are as indicated.					
16	3	4,250	200 ohms	Max. output	C-41, C-64	1st & 2nd R-F
17	3	1,600	200 ohms	Untouched	L-6, L-19, L-29	Ant. & 1st and
18	Repeat 16 and 17 until circuits remain in alignment over the band.					2nd R-F.
19	4	4,300	200 ohms	—	L-54	Low end osc.
20	4	12,100	200 ohms	—	C-25	High end osc.
21	Repeat 19 and 20 until end frequencies are as indicated.					
22	4	11,900	200 ohms	Max. output	C-39, C-62	1st & 2nd R-F
23	4	4,400	200 ohms	Untouched	L-8, L-18, L-28	Ant. & 1st and
24	Repeat 22 and 23 until circuits remain in alignment over the band.					2nd R-F.
*25	5	12,000	200 ohms	—	L-55	Low-end osc.
26	5	19,400	200 ohms	—	C-27	High end osc.
27	Repeat 25 and 26 until end frequencies are as indicated.					
28	5	19,000	200 ohms	Max. output	C-43, C-66	1st & 2nd R-F
29	5	12,150	200 ohms	Untouched	L-10, L-20, L-30	Ant. & 1st and
30	Repeat 28 and 29 until circuits remain in alignment over the band.					2nd R-F.
*31	6	19,100	200 ohms	—	L-56	Low end osc.
32	6	30,400	200 ohms	—	C-32	High end osc.
33	Repeat 31 and 32 until end frequencies are as indicated.					
34	6	30,000	200 ohms	Max. output	C-45, C-68	1st & 2nd R-F
35	6	19,500	200 ohms	Untouched	L-12, L-21, L-31	Ant. & 1st and
36	Repeat 34 and 35 until circuits remain in alignment over the band.					2nd R-F.

*NOTE: On all coils, except Nos. 5 and 6 band oscillator coils (L-55, and L-56) turning the core clockwise increases the inductance. On the above two mentioned coils, turning the core clockwise decreases the inductance.

On all bands the oscillator tracks above the signal frequency.

If more than one peak is obtainable on oscillator use the higher frequency peak.

6.5 Mechanical Construction *(Continued from page 11)*

be made such as replacement of the range switch, it is necessary first to remove the complete R-F unit from the receiver. To do this the following procedure should be observed:

(a) Remove the chassis and panel from the cabinet by removing the four panel mounting screws and sliding the chassis forward out of the cabinet.

(b) Remove the knobs by means of the small wrench held in the spring clip on the right hand side of the chassis. This wrench fits the set screws in all knobs except the main tuning knob. For this knob use an ordinary small screw driver.

(c) Remove the panel by removing the eight nuts with which it is held to the support brackets.

(d) Remove the large cover from the top of the R-F unit, by removing the four knurled nuts with which it is supported.

(e) Remove the small cover from the tuning condenser, by removing the eight knurled nuts with which it is supported.

(f) Remove the dial light sockets where they are clipped on to the tuning unit.

(g) Remove the antenna trimmer shaft extension by loosening set screw in coupling with same wrench as used above for knobs.

(h) Remove support bracket from flywheel tuning shaft.

(i) Remove main dial, vernier dial, and flywheel by loosening set screws with same wrench as used for knobs.

(j) Disconnect the eight leads which connect the R-F unit to the main base. These leads are as follows:—

(i) Two on the antenna terminal board (blue and black).

(ii) One on number 7 pin of the 6V6GT/G output valve (brown).

(iii) One on terminal E of the crystal load circuit (yellow).

(iv) One on terminal E of the first I-F Transformer (red).

(v) One on terminal F of the first I-F Transformer (blue).

(vi) One on pin 6 of the second I-F valve (green).

(vii) One on pin 7 of the second I-F valve (brown).

In addition, the by-pass condenser which grounds to the R-F unit near the second I-F valve must be disconnected.

(k) Remove eleven screws which hold R-F unit to main base. Three of these are on under side of chassis along the front edge. The other eight are removed from the top.

(l) The R-F unit may now be removed from the bottom by lifting up first the rear of the R-F unit and sliding it back out of the opening. After the unit has been repaired it may be reassembled by following the above procedure in reverse order.

7. VIBRATOR POWER SUPPLY UNIT

MI-22215

(6-Volt Storage-Battery Operation)

(Note: This item supplied only when specifically ordered)

7.1 **General**

7.1-1 The MI-22215 identifies the equipment furnished with the power supply unit and consists of the following items:

1—Vibrator Power Supply, complete with vibrator and Type-OZ4A rectifier valve.

1—Power Cable, approximately 8 feet long, equipped with power switch, fuse holder and fuse, terminals for connecting to the vibrator power supply unit, and terminating in a plug for connecting to the associated receiver.

7.1-2 **Electrical Characteristics:—**

Output	300 volts, 90 ma.
Battery Voltage	6 to 8 volts
Total current drain (operating AR-88-LF.) receiver	12 amperes
Fuse Rating	20 amperes

7.1-3 Valve Complement 1 Type OZ4A

7.1-4 **Mechanical Specifications:—**

Dimensions:—

Height	6½ inches
Width	5 inches
Depth	5½ inches
Weight (net)	7 pounds

7.2 **Technical Details:** — The MI-22215 vibrator power supply unit is primarily designed for the purpose of adapting the General Purpose Communication Receiver (Model AR-88LF) to 6-volt battery operation. Four rubber feet are provided for resting the unit on a table or shelf. If preferred, these feet may be removed to expose threaded studs by which the unit may be bolted permanently in position.

NOTE—The power supply unit must be mounted with the vibrator in an approximately vertical position.

Direct current at high potential is obtained by means of a non-synchronous vibrator used in conjunction with a step-up transformer. Rectification is obtained by the use of a Type OZ4A rectifier valve. This power unit has been designed and tested to operate under a wide variety of climatic conditions.

7.3 **Installation**

7.3-1 **Connecting the power cable to the vibrator power supply unit.** In order to connect the power cable to the vibrator power supply unit, first remove the terminal board cover from the power unit by removing the two self-tapping screws in the cover. About four feet from the end of the cable to which the two large battery clips are attached, a group of four wires, each about four inches long and equipped with a spade terminal, extends from the cable. These leads should be connected to the power unit terminal board — the brown lead to the terminal marked "A—HOT", the yellow lead to "B—" and the red lead to "B+." Replace the terminal board cover with the three leads extending from the open end of the cover, connecting the black lead under one of the screws which hold the cover.

7.3-2 **Mounting the Switch.** Fasten the switch to bracket on the top of the transformer can, or to any place convenient to the Power Supply.

7.3-3 **Connecting the Power Cable to the Receiver.** Remove the plug from the socket on the rear apron of the receiver. Insert the plug, on the end of the vibrator power supply cable, into this socket.

7.3-4 **Adjustments.** A four-position rotary switch on the rear of the chassis is used to adjust the vibrator output voltage to compensate for variations in the battery voltage. The positions on this switch are numbered from "1" to "4" inclusive. The position in which the switch rotor is placed is indicated by the direction in which the screw-driver slot in the rotor shaft is pointing. For proper selection of the switch position, consult the following table:

Switch Position	'A' Battery Voltage
4	6.0 to 6.5 Volts
3	6.5 to 7.0 Volts
2	7.0 to 7.5 Volts
1	7.5 to 8.5 Volts

7.3-5 **Connecting the Power Cable to the Storage Battery.** Turn the power switch in the power cable to the "OFF" position. These are two battery clips connected to one end of the power cable, each clip serving to terminate a pair of wires. On one clip, both wires are black while on the other clip one wire is green and the second is brown. Connect the clip with the two black wires securely to the negative (—) terminal of the storage battery. Be sure to make good contact at this point. Connect the clip with the green and brown wires

securely to the positive (+) terminal of the battery. The receiver is now ready for operation from the power supply unit.

NOTE: Since the power line cord supplied with the receiver is completely out of the circuit when the vibrator power supply is used, this cord should be wound up and placed inside of the receiver case in the space between the chassis and the case wall.

7.4 **Operation:—** The switch on the power cable must be used for turning the receiver on and off, the power switch on the receiver being automatically cut out of the circuit when the vibrator power supply unit is used. To prevent impairment of normal operation, the following precautionary measures should be observed:

(a) Never remove the rectifier valve while the power supply unit is in operation. Serious damage to circuit elements, or even to the vibrator itself, may result under these conditions.

(b) Never disconnect any leads on the power cable unless the power switch is turned off. Never tighten any terminal screws unless the power is definitely off. Should it become necessary to tighten any or all of the screws on the vibrator power unit terminal board, always first remove the battery clips from the battery. **THIS is extremely important, since failure to follow this rule will invariably result in serious damage to the vibrator power unit itself.**

7.5 **Maintenance:**—A schematic diagram of the vibrator power supply unit is shown in Figure 5. The diagram symbol of each part is repeated in the parts list to facilitate identification by means of cross reference. Service generally consists of replacing the vibrator which may have deteriorated through prolonged usage. If excessive output hum should occur during operation, the cause may be a filter-circuit breakdown, such as leaky or short-circuit filter capacitors. When servicing the power supply unit, disconnect it from its source of voltage supply and, using an ohmmeter, check through for continuity.

Capacitors should be tested by first removing one side from the adjacent connections so that the capacitor under test is not connected in the circuit.

The power supply unit is protected by a 20-ampere fuse which in the event of failure should be replaced by one of identical rating.

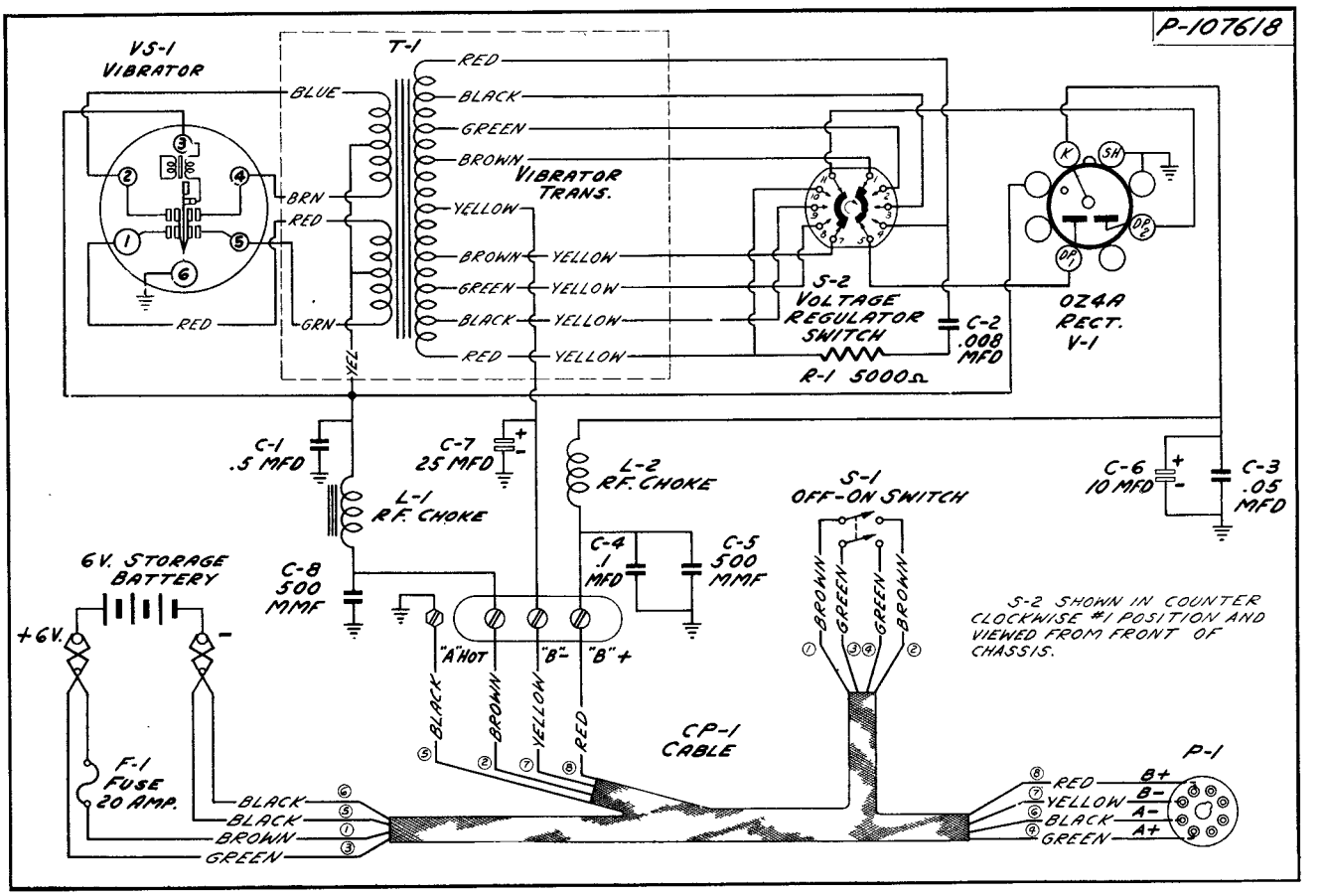

Figure 5.—Vibrator Power Supply — MI-22215 — Schematic Diagram.

TABLE NUMBER V

PARTS LIST

GENERAL PURPOSE COMMUNICATION RECEIVER

Schematic Reference	Nomenclature	DESCRIPTION	RCA Victor Mfg. No.	Qty. of Naval Spares	R.C.A.F. Ref. No.
A-1	Crystal	735 KC Crystal & Case	MI-19454-2	1	10X/735
C-1	Condenser	4700 mmfd. ± 10%, 500V, (mica)	102899-507	3	10C/8102
C-2	Condenser	3-25 mmfd., 5 Plate Antenna Trimmer	253132-2	1	10C/8121
*C-3	Condenser	10-410 mmfd.			
C-4	Condenser	220 mmfd. ± 10%, 500V, Temp. Coeff. — .00075 mmf./mmf./°C	90581-341	2	10C/8086
C-5	Condenser	Same as C-4			
*C-6	Condenser	8-88 mmfd.			
C-9	Condenser	10 mmfd. ± 10%. 500V, Temp. Coeff. — .00075 mmf./mmf./°C	90581-309	1	10C/8087
C-11	Condenser	Same as C-1			
C-12	Condenser	56 mmfd. ± 10%, 500V, Temp. Coeff. — .00075 mmf./mmf./°C (inc. in L-57)	90581-327		
C-13	Condenser	Same as C-4			
C-14	Condenser	Same as C-4			
C-15	Condenser	47 mmfd. ± 5%, 500V, Temp. Coeff. — .00015 mmf./mmf./°C	90577-225	1	10C/8093
C-16	Condenser	Air trimmer 2-20 mmfd.	95534-502	2	10C/8118
C-17	Condenser	68 mmfd. ± 5%, 500V, (mica)	720538-39	1	10C/8111
C-18	Condenser	39 mmfd. ± 5%, 500V, Temp. Coeff. — .00012 mmf./mmf./°C	90574-223	1	10C/8092
C-19	Condenser	Air trimmer 2-12 mmfd.	95534-503	1	10C/8119
C-20	Condenser	240 mmfd. ± 5%, 500V, (mica)	720538-32	1	10C/8105
C-21	Condenser	15 mmfd. ± 5%, 500V, Temp. Coeff. — .00047 mmf./mmf./°C	90580-213	1	10C/8094
C-22	Condenser	Air Trimmer — Same as C-19			
C-23	Condenser	1000 mmfd. ± 5%, 375V, (mica)	721133-4	1	10C/8114
C-24	Condenser	2500 mmfd. ± 5%, 500V, (mica)	721133-24	1	10C/8116
C-25	Condenser	Air Trimmer — Same as C-19			
C-26	Condenser	Same as C-21			
C-27	Condenser	Air Trimmer 2-25 mmfd.	95534-501	2	10C/8120
C-28	Condenser	3000 mmfd. ± 5%, 500V, (mica)	721133-12	1	10C/8115
C-29	Condenser	30 mmfd. ± 5%, 500V, Temp. Coeff. — .00047 mmf./mmf./°C	90580-220	1	10C/8099
C-30	Condenser	3900 mmfd. ± 5%, 500V, (mica)	720538-46	1	10C/8112
C-31	Condenser	39 mmfd. ± 5%, 500V, Temp. Coeff. — .00047 mmf./mmf./°C	90580-223	1	10C/8098
C-32	Condenser	Air Trimmer — Same as C-27			
C-33	Condenser	Same as C-1			
C-34	Condenser	Same as C-4			
*C-35	Condenser	10-370 mmfd.			
C-36	Condenser	1500 mmfd. ± 20%, 600V, (mica)	98041-1	1	10C/8100
C-37	Condenser	Air Trimmer — Same as C-16			
C-38	Condenser	Air Trimmer — Same as C-16			
C-39	Condenser	Air Trimmer — Same as C-16			
*C-40	Condenser	8-128 mmfd.			
C-41	Condenser	Air Trimmer — Same as C-16			
C-43	Condenser	Air Trimmer — Same as C-27			
C-44	Condenser	6.8 mmfd. ± 10%, 500V, Temp. Coeff. — .00075 mmf./mmf./°C	90581-305	1	10C/8088
C-45	Condenser	Air Trimmer — Same as C-27			
C-46	Condenser	Same as C-21			
C-47	Condenser	Same as C-1			
C-48	Condenser	.05 mfd., 400V, (oil filled) (C-48, C-109, C-110, in one assembly)	98034-1		10C/8083
*C-49	Condenser	8-128 mmfd.			
*C-50	Condenser	10-370 mmfd.			
C-51	Condenser	Same as C-1			
C-52	Condenser	Same as C-1			
C-53	Condenser	Same as C-44			
C-54	Condenser	Same as C-1			
C-55	Condenser	390 mmfd. ± 5%, 500V, (mica) (included in T-3)	86079-505		
C-56	Condenser	.01 mfd., 400V, (oil filled) (C-56, C-76, C-93, in one assembly)	98034-4	1	10C/8084
C-57	Condenser	Same as C-4			
C-58	Condenser	Same as C-36			
C-59	Condenser	Air Trimmer — Same as C-16			
C-60	Condenser	Air Trimmer — Same as C-16			
C-61	Condenser	Same as C-9			
C-62	Condenser	Air Trimmer — Same as C-16			
C-63	Condenser	Same as C-1			
C-64	Condenser	Air Trimmer — Same as C-16			
C-66	Condenser	Air Trimmer — Same as C-27			
C-67	Condenser	22 mmfd. ± 10%, 500V, Temp. Coeff. — .00075 mmf./mmf./°C	90581-317	1	10C/8090
C-68	Condenser	Air Trimmer — Same as C-27			
C-69	Condenser	Same as C-46			
*C-70	Condenser	8-128 mmfd.			
C-71	Condenser	0.1 mfd., 400V, (oil filled) (C-71, C-95, C-102, in one assembly)	98034-2	1	10C/8085
C-72	Condenser	Same as C-55 (included in T-3)			
C-73	Condenser	100 mmfd. ± 5%, 500V, (included in T-4) (mica)	86034-522		
C-75	Condenser	3-15 mmfd. Crystal Phasing Trimmer	253132-6	1	10C/8123
C-76	Condenser	.01 mfd., 400V, (see C-56)			

TABLE NUMBER V — PARTS LIST (Continued)

Schematic Reference	Nomenclature	DESCRIPTION	RCA Victor Mfg. No.	Qty. of Naval Spares	R.C.A.F. Ref. No.
*C-77	Condenser	10-370 mmfd.			
C-78	Condenser	Same as C-55 (included in T-5)			
C-79	Condenser	0.1 mfd., 400V, (oil filled) (C-79, C-84, C-92, in one assembly)	98034-2		10C/8085
C-80	Condenser	Air Trimmer — Same as C-16			
C-81	Condenser	Air Trimmer — Same as C-16			
C-82	Condenser	56 mmfd. ± 5%, 500V, (mica) (included in T-10)	86034-517		
C-83	Condenser	Same as C-1			
C-84	Condenser	0.1 mfd., 400V, (See C-79)			
C-85	Condenser	330 mmfd. ± 20%, 500V, (mica) (included in T-10)	86034-524		
C-86	Condenser	3-15 mmfd. B.F.Osc. Panel Trimmer	253132-7	1	10C/8124
C-87	Condenser	1500 mmfd. ± 10%, 500V, (mica) (included in T-10)	86034-548		
C-88	Condenser	Same as C-82 (included in T-10)			
C-89	Condenser	Same as C-55 (included in T-5)			
C-90	Condenser	Same as C-55 (included in T-6)			
C-91	Condenser	Same as C-55 (included in T-6)			
C-92	Condenser	0.1 mfd., 400V, (See C-79)			
C-93	Condenser	0.1 mfd., 400V, (See C-56)			
C-94	Condenser	Same as C-55 (included in T-7)			
C-95	Condenser	0.1 mfd., 400V, (See C-71)			
C-96	Condenser	4 mfd., + 20% — 10%, Dry Electrolytic (C-96,C-97,C-98 in one assembly)	72026-515	1	10C/8081
C-97	Condenser	4 mfd., + 20% — 10%, Dry Electrolytic (See C-96)			
C-98	Condenser	4 mfd., + 20% — 10%, Dry Electrolytic (See C-96)			
C-99	Condenser	.25 mfd., 400V, (oil filled) (C-99, C-112, C-113, in one assembly)	98034-3	1	10C/8082
C-100	Condenser	Same as C-55 (included in T-7)			
C-101	Condenser	Same as C-55 (included in T-8)			
C-102	Condenser	0.1 mfd., 400V, (See C-71)			
C-103	Condenser	.05 mfd., 400V, (oil filled) (C-103, C-106, C-107, in one assembly	98034-1	1	10C/8083
C-104	Condenser	Same as C-55 (included in T-8)			
C-105	Condenser	560 mmfd. ± 10%, 500V, (mica)	100404-528	1	10C/8101
C-106	Condenser	.05 mfd., 400V, (See C-103)			
C-107	Condenser	.05 mfd., 400V, (See C-103)			
C-108	Condenser	Same as C-73 (included in T-9)			
C-109	Condenser	.05 mfd., 400V, (See C-48)			
C-110	Condenser	.05 mfd., 400V, (See C-48)			
C-111	Condenser	2700 mmfd. ±.10%, 500V, (mica)	102899-508	1	10C/8103
C-112	Condenser	.25 mfd., 400V, (See C-99)			
C-113	Condenser	.25 mfd., 400V, (See C-99)			
C-114	Condenser	Same as C-73 (included in T-9)			
C-115	Condenser	180 mmfd. ± 5%, 500V, (mica) (included in T-9)	86034-513		
C-116	Condenser	Same as C-111			
C-117	Condenser	Same as C-1			
C-118	Condenser	Same as C-1			
C-119	Condenser	.003 mfd. ± 10%, 1000V, (oil filled)	251248-3	1	10C/8117
C-121	Condenser	Same as C-1			
C-122	Condenser	Same as C-1			
C-123	Condenser	Same as C-4			
C-124	Condenser	150 mmfd. ± 10%, 500V, Temp. Coeff. — .00075 mmf./mmf./°C	90581-337	1	10C/8091
C-125	Condenser	650 mmfd. ± 10%, 300V, (mica)	720592-13	1	10C/8113
C-126	Condenser	Same as C-125			
C-127	Condenser	Same as C-20			
C-128	Condenser	285 mmfd. ± 5%, 500V, (mica)	720538-31	1	10C/8104
C-129	Condenser	Same as C-9			
C-130	Condenser	Same as C-105			
* NOTE:		C-3, C-6, C-35, C-40, C-44, C-50, C-70, C-77, all parts of Variable Condenser Assembly	92444-502		10C/8122
F-1	Fuse	1.5 amp. 3 A G. in AC Line	55544-2	8	5C/1705
J-1	Socket	Connections for battery operations	421395-509	2	10H/8168
J-2	Jack	Jack, phone	98965-3		10H/8185
L-1	Coil	Antenna Prim. 73-205 KC (L-1 & L-2 on same coil form)	253674-506		10C/8142
L-2	Coil	Antenna Sec. 73-205 KC (See L-1)			
L-3	Coil	Antenna Prim. 195-550 KC (L-3 & L-4 on same coil form)	253674-507		10C/8143
L-4	Coil	Antenna Sec. 195-550 KC (See L-3)			
L-5	Coil	Antenna Prim. 1480-4400 KC (L-5 & L-6 on same coil form)	95521-501		10C/8144
L-6	Coil	Antenna Sec. 1480-4400 KC (See L-5)			
L-7	Coil	Antenna Prim. 4250-12150 KC (L-7 & L-8 on same coil form)	95521-502		10C/8145
L-8	Coil	Antenna Sec. 4250-12150 KC (See L-7)			
L-9	Coil	Antenna Prim. 11900-19500 KC (L-9 & L-10 on same coil form)	95521-503		10C/8146
L-10	Coil	Antenna Sec. 11900-19500 KC (See L-9)			
L-11	Coil	Antenna Prim. 19000-30500 KC (L-11 & L-12 on same coil form)	253671-505		10C/8147
L-12	Coil	Antenna Sec. 19000-30500 KC (See L-11)			
L-13	Coil	1st R.F. Prim. 73-205 KC (L-13 & L-14 on same coil form)	253674-501		10C/8148
L-14	Coil	1st R.F. Sec. 73-205 KC (See L-13)			
L-15	Coil	1st R.F. Prim. 195-550 KC (L-15 & L-16 on same coil form)	253674-502		10C/8149
L-16	Coil	1st R.F. Sec. 195-550 KC (See L-15)			

TABLE NUMBER V — PARTS LIST (Continued)

Schematic Reference	Nomenclature	DESCRIPTION	RCA Victor Mfg. No.	Qty. of Naval Spares	R.C.A.F. Ref. No.
L-17	Coil	1st R.F. Prim. 4250-12150 KC (L-17 & L-18 on same coil form)	253674-508		10C/8150
L-18	Coil	1st R.F. Sec. 4250-12150 KC (See L-17)			
L-19	Coil	1st R.F. Sec. 1480-4480 KC (L-19 & L-61 on same coil form)	95520-503		10C/8151
L-20	Coil	1st R.F. Coil 11900-19500 KC	253671-501		10C/8152
L-21	Coil	1st R.F. Coil 19000-30500 KC	253671-502		10C/8153
L-22	Coil	B.F. Osc. Coil (See T-10)			
L-23	Coil	2nd R.F. Prim. 73-205 KC (L-23 & L-24 on same coil form)	253674-501		10C/8148
L-24	Coil	2nd R.F. Sec. 73-205 KC (See L-23)			
L-25	Coil	2nd R.F. Prim. 195-550 KC (L-25 & L-26 on same coil form)	253674-502		10C/8149
L-26	Coil	2nd R.F. Sec. 195-550 KC (See L-25)			
L-27	Coil	2nd R.F. Prim. 4250-12150 KC (L-27 & L-28 on same coil form)	253674-508		10C/8150
L-28	Coil	2nd R.F. Sec. 4250-12150 KC (See L-27)			
L-29	Coil	2nd R.F. Sec. 1480-4400 KC (L-28 & L-60 on same coil form)	95520-503		10C/8151
L-30	Coil	2nd R.F. Coil 11900-19500 KC	253671-501		10C/8152
L-31	Coil	2nd R.F. Coil 19000-30500 KC	253671-502		10C/8153
L-32	Coil	I.F. Trans. Prim. (See T-3)			
L-33	Coil	I.F. Trans. Sec. (See T-3)			
L-34	Coil	Crystal Selectivity Coil (See T-4)			
L-35	Coil	I.F. Trans. Prim. (See T-5)			
L-36	Coil	I.F. Trans. Sec. (See T-5)			
L-37	Coil	I.F. Trans. Prim. (See T-6)			
L-38	Coil	I.F. Trans. Sec. (See T-6)			
L-39	Coil	Variable Selectivity Coil (See T-5)			
L-40	Coil	Variable Selectivity Coil (See T-6)			
L-41	Coil	I.F. Trans. Prim. (See T-7)			
L-42	Coil	I.F. Trans. Sec. (See T-7)			
L-43	Coil	I.F. Trans. Prim. (See T-8)			
L-44	Coil	I.F. Trans. Sec. (See T-8)			
L-45	Coil	Variable Selectivity Coil (See T-7)			
L-46	Coil	Variable Selectivity Coil (See T-8)			
L-47	Coil	I.F. Trans. Prim. (See T-9)			
L-48	Coil	I.F. Trans. Sec. (See T-9)			
L-49	Coil	Filter Choke	901433-501	1	10C/8154
L-50	Coil	Filter Choke — Same as L-49			
L-51	Coil	Oscillator 73-205 KC	253674-503		10C/8155
L-52	Coil	Oscillator 195-550 KC	253674-504		10C/8156
L-53	Coil	Oscillator 1480-4400 KC	95520-506		10C/8157
L-54	Coil	Oscillator 4250-12150 KC	253674-505		10C/8158
L-55	Coil	Oscillator 11900-19500 KC	253671-503		10C/8159
L-56	Coil	Oscillator 19000-30500 KC	253671-504		10C/8160
L-57	Coil	I.F. Wave Trap (includes C-12)	253481-502	1	10C/8161
L-60	Coil	2nd R.F. Prim. 1480-4400 KC (See L-29)			
L-61	Coil	1st R.F. Prim. 1480-4400 KC (See L-19)			
P-1	Plug	AC Power Plug & Cord	811638-1		
P-2	Plug	in J-1 for normal AC operation	99895-501	1	10H/8184
R-1	Resistor	33,000 ohms ± 10% ½ W.	850981-80	1	10C/8134
R-2	Resistor	2.2 meg. ± 20% ½ W.	850981-33	1	10C/8131
R-3	Resistor	1,000 ohms ± 10% ½ W.	82283-62	2	10C/1673
R-4	Resistor	100,000 ohms ± 10% ½ W.	82283-86	1	10C/3281
R-5	Resistor	1.0 meg. ± 20% ½ W.	82283-31	1	10C/5750
R-6	Resistor	Same as R-1			
R-7	Resistor	330 ohms ± 10% ½ W.	82283-56	1	10C/7729
R-9	Resistor	Same as R-4			
R-10	Resistor	Same as R-3			
R-11	Resistor	10,000 ohms ± 10% ½ W.	82283-74	1	10C/1675
R-12	Resistor	Same as R-3			
R-13	Resistor	560 ohms ± 10% ½ W.	850981-59	1	10C/7259
R-14	Resistor	Same as R-4			
R-15	Resistor	22,000 ohms ± 10% ½ W. (included in T-3)	82283-78		
R-16	Resistor	Same as R-3			
R-17	Resistor	Same as R-7			
R-19	Resistor	Same as R-1			
R-20	Resistor	100 ohms ± 10% ½ W.	82283-50	1	10C/3260
R-22	Resistor	Same as R-3			
R-23	Resistor	560,000 ohms ± 10% ½ W.	82283-95	2	10C/6688
R-24	Resistor	120,000 ohms ± 10% ½ W. (included in T-10)	82283-87		
R-25	Resistor	47 ohms ± 10% ½ W.	82283-46	1	10C/7747
R-26	Resistor	Same as R-3			
R-27	Resistor	Same as R-23			
R-28	Resistor	Same as R-24 (included in T-10)			
R-29	Resistor	47,000 ohms ± 10% ½ W. (included in T-10)	82283-82		
R-30	Resistor	2,700 ohms ± 10% 4 W.	90497-3	1	10C/8128
R-31	Resistor	Same as R-3			
R-32	Resistor	390 ohms ± 10% ½ W.	850981-57	1	10C/7282

TABLE NUMBER V — PARTS LIST *(Continued)*

Schematic Reference	Nomenclature	DESCRIPTION	RCA Victor Mfg. No.	Qty. of Naval Spares	R.C.A.F. Ref. No.
R-33	Resistor	Same as R-2			
R-34	Resistor	Same as R-3			
R-35	Resistor	680,000 ohms ± 10% ½ W.	850981-96	1	10C/8137
R-36	Resistor	Same as R-2			
R-37	Resistor	1.0 meg. ± 20% ½ W.	850981-31	1	10C/1651
R-38	Resistor	1.5 meg. ± 10% ½ W.	850981-100	1	10C/1921
R-39	Resistor	Same as R-20			
R-40	Resistor	270,000 ohms ± 10% ½ W.	850981-91	1	10C/8136
R-41	Resistor	100,000 ohms ± 10% ½ W.	850981-86	1	10C/8135
R-42	Resistor	390,000 ohms ± 10% ½ W.	82283-93	1	10C/8027
R-43	Resistor	100 ohms ± 10% 4 W.	90497-1	1	10C/8127
R-44	Resistor	150 ohms ± 10% 4 W.	90497-6	1	10C/8129
R-45	Resistor	15 ohms ± 10% ½ W.	867970-340	1	10C/8138
R-46	Potentiometer	66,000 ohms R.F. Gain Control	251402-2	1	10C/8139
R-47	Resistor	Same as R-2			
R-48	Potentiometer	Same as R-46 (Noise Limiter Control)			
R-49	Resistor	Same as R-1			
R-50	Resistor	Same as R-23			
R-51	Potentiometer	2. meg. Audio Gain Control	251402-3	1	10C/8140
R-52	Potentiometer	1 meg. Tone Control	251402-1	1	10C/8141
R-53	Resistor	330,000 ohms ± 10% ½ W.	82283-92	1	10C/8126
R-54	Resistor	2,700 ohms ± 10% ½ W.	850981-67	1	10C/8132
R-55	Resistor	6,800 ohms ± 10% ½ W.	850981-72	1	10C/8133
R-56	Resistor	39 ohms ± 10% 4 W.	90497-7	1	10C/8130
R-58	Resistor	5,600 ohms ± 10% ½ W.	82283-71	1	10C/8125
R-60	Resistor	Same as R-58.			
R-61	Resistor	Same as R-25			
R-62	Resistor	Same as R-25.			
R-63	Resistor	Same as R-23			
R-64	Resistor	Same as R-23			
R-65	Resistor	Same as R-23			
R-66	Resistor	Same as R-54.			
R-67	Resistor	Same as R-54			
S-1	Switch	Range Sw. Wafer Oscillator Ccts. (S-1 & S-2 on same wafer)			
S-2	Switch	Range Sw. Wafer Oscillator Ccts. (See S-1)			
S-3	Switch	Range Sw. Wafer Oscillator Ccts. (S-3 & S-4 on same wafer)			
S-4	Switch	Range Sw. Wafer Oscillator Ccts. (See S-3)			
S-5	Switch	Range Sw. Wafer 2nd R.F. Ccts. (S-5 & S-6 on same wafer)			
S-6	Switch	Range Sw. Wafer 2nd R.F. Ccts. (See S-5)			
S-7	Switch	Range Sw. Wafer 2nd R.F. Ccts. (S-7 & S-8 on same wafer)			
S-8	Switch	Range Sw. Wafer 2nd R.F. Ccts. (See S-7)			
S-9	Switch	Range Sw. Wafer 1st R.F. Ccts. (S-9 & 10 on same wafer)			
S-10	Switch	Range Sw. Wafer 1st R.F. Ccts. (See S-9)			
S-11	Switch	Range Sw. Wafer 1st R.F. Ccts. (S-11 & 12 on same wafer)			
S-12	Switch	Range Sw. Wafer 1st R.F. Ccts. (See S-11)			
S-13	Switch	Range Sw. Wafer Antenna Ccts. (S-13 & S-14 on same wafer)			
S-14	Switch	Range Sw. Wafer Antenna Ccts. (See S-13)			
S-15	Switch	Range Sw. Wafer Antenna Ccts. (S-15 & S-16 on same wafer)			
S-16	Switch	Range Sw. Wafer Antenna Ccts. (See S-15)			
		NOTE: S-1 to S-16 included all on one assembly	253660-1		10F/8167
S-17	Switch	Crystal Sw. Wafer (S-17 & S-18 on same wafer)			
S-18	Switch	Crystal Sw. Wafer (See S-17)			
S-19	Switch	Crystal Sw. Wafer (S-19 & S-20 on same wafer)			
S-20	Switch	Crystal Sw. Wafer (See S-19)			
		NOTE: S-17-18-19-20 all on same assembly	253134-1		10F/8165
S-21	Switch	A.V.C. — N.L. Switch Wafer (S-21 & S-22 on same wafer)	253099-1		10F/8166
S-22	Switch	A.V.C. — N.L. Switch Wafer (See S-21)			
S-23	Switch	Off-Trans.-B.F.O. Switch Wafer (includes S-24)	253098-1	1	10F/8163
S-24	Switch	On/Off Toggle Sw. (See S-23)			
S-25	Switch	D.P. D.T. Line voltage Switch	252657-1	1	10F/8164
T-1	Transformer	Power. 115/230 V. 25-60 cycle	901602-501	1	10A/8173
T-2	Transformer	Output. 2.5 ohms & 20 ohms	901611-501	1	10A/8174
T-3	Transformer	1st I.F. (includes L-32, L-33, C-55, C-72, R-15) 735 KC	255401-501	1	10A/8175
T-4	Transformer	I.F. Crystal Load (includes L-34 & C-73) 735 KC	255401-505	1	10A/8176
T-5	Transformer	2nd I.F. (Includes L-35, L-36, L-39, C-78, C-89) 735 KC	255401-503		
T-6	Transformer	2nd I.F. (Includes L-37, L-38, L-40, C-90, C-91) 735 KC	255401-503		
T-7	Transformer	3rd I.F. (Includes L-41, L-42, L-45, C-94, C-100) 735 KC	255401-503	1	10A/8177
T-8	Transformer	3rd I.F. (Includes L-43, L-44, L-45, C-101, C-104) 735 KC	255401-503		
T-9	Transformer	4th I.F. (Includes L-47, L-48, C-108, C-114, C-115) 735 KC	255401-502	1	10A/8178
T-10	Transformer	B.F. O. (Inc. L-22, C-82, C-85, C-87, C-88, R-24, R-28, R-29) 735 KC	255401-504	1	10A/8179
TB-1	Term. Bd.	Antenna & Ground. 3 term.	253669-2		
TB-2	Term. Bd.	5 Term.	253669-1		
TB-4	Term. Bd.	Output for external spk. 2 term.	253669-3		
V-1	Valve	1st R.F. Amplifier	6SG7		

TABLE NUMBER V — PARTS LIST *(Continued)*

Schematic Reference	Nomenclature	DESCRIPTION	RCA Victor Mfg. No.	Qty. of Naval Spares	R.C.A.F. Ref. No.
V-2	Valve	2nd R.F. Amplifier	6SG7		
V-3	Valve	Master Oscillator	6J5		
V-4	Valve	1st Detector, Converter	6SA7	6	
V-5	Valve	1st I.F. Amplifier	6SG7		
V-6	Valve	2nd I.F. Amplifier	6SG7	12	10E/8188
V-7	Valve	3rd I.F. Amplifier	6SG7		
V-8	Valve	2nd Detector & A.V.C.	6H6		
V-9	Valve	Noise Limiter	6H6	8	
V-10	Valve	1st A.F. Amplifier	6SJ7	6	
V-11	Valve	Output	6V6GT/G	6	
V-12	Valve	B.F. Oscillator	6J5	8	
V-13	Valve	Voltage Regulator	VR-150	6	10E/4298
V-14	Valve	Rectifier	5Y3GT/G	6	
V-16	Valve	Gas Gap Protector	991	4	10E/6827
X-1	Socket	Tube socket for V-1	421395-507	1	10H/8169
X-2	Socket	Tube socket for V-2 Same as X-1			
X-3	Socket	Tube socket for V-3	421395-508	1	10H/8170
X-4	Socket	Tube socket for V-4 Same as X-3			
X-5	Socket	Tube socket for V-5 Same as J-1			
X-6	Socket	Tube socket for V-6 Same as J-1			
X-7	Socket	Tube socket for V-7 Same as X-1			
X-8	Socket	Tube socket for V-8 Same as X-1			
X-9	Socket	Tube socket for V-9 Same as X-3			
X-10	Socket	Tube socket for V-10 Same as J-1			
X-11	Socket	Tube socket for V-11 Same as X-1			
X-12	Socket	Tube socket for V-12	421395-510	1	10H/8171
X-13	Socket	Tube socket for V-13 Same as J-1			
X-14	Socket	Tube socket for V-14 Same as J-1			
X-16	Socket	Tube socket for V-16	837884-2	1	10H/8172
		Board, Resistor	98958-1		
		Board, Terminal assembly 2 Way	81641-23		
		Board, Terminal assembly 1 Way	81641-32		
		Board, Terminal assembly 1 Way vertical	81641-57		
		Bracket assembly (for tuning shaft)	99819-501		
		Coupling	98950-1		
		Coupling	99630-1		
		Caps — Shield Can.	99840-1		
		Dial Assembly	98947-503		10A/8187
		Fuse Holder	844027-2		5C/1304
		Knob (Large)	712336-503		10A/8180
		Knob (Medium)	712336-505		10A/8181
MISCELLANEOUS		Knob (Small)	712336-507		10A/8182
		Lamp — Pilot ¼ Amp. 6V	61114-15	12	5L/777
		Screw — Knurled Thumb	252664-1		
		Screw — Thumb	99610-9		
		Screw — Set #8-32 for small knob	844365-12		
		Screw — Set #8-32 for medium knob	844365-13		
		Screw — Set #10-32 for large knob	59101-6		
		Socket Pilot Lamp (complete)	98983-501		
		Tool — Air Trimmer Adj.	81059-501		10D/8189
		Tool — I.F. Adj.	86183-501		10D/8186
		Tool — Set Screw Wrench	828505-12		
		Tuning Unit	92417-1		
		Vernier Assembly	98947-502		10A/8183

TABLE NUMBER VI — PARTS LIST — Vibrator Power Supply Unit (MI-22215)

C-1	Condenser	0.5 mfd., ± 10%, 120 volts	114125-5		
C-2	Condenser	.008 mfd., ± 10%, 2000 volts	114125-6		
C-3	Condenser	.05 mfd., ± 10%, 600 volts	114125-7		
C-4	Condenser	0.1 mfd., ± 10%, 600 volts	114125-8		
C-5	Condenser	500 mmfd., ± 10%, 600 volts (mica)	114125-9		
C-6	Condenser	Electrolytic, 10 mfd., 450 volts	114125-10		
C-7	Condenser	Electrolytic, 25 mfd., 40 volts	114125-11		
C-8	Condenser	Same as C-5			
CP-1	Cable	Power Cable, includes P-1, S-1	107617-501		
F-1	Fuse	Type 3 AG, 20 Amperes	55544-10		
L-1	Coil	Filter Choke (iron core)	98567-1		
L-2	Coil	Filter Choke	114125-2		
P-1	Plug	8 prong octal plug (on CP-1)	413691-8		
R-1	Resistor	5,000 ohms, ± 10%, 1/4 Watt	114125-4		
S-1	Switch	ON-OFF Switch, D.P.S.T. (on CP-1)	845786-3		
S-2	Switch	Voltage Tap Switch—Water type	114125-3		
T-1	Transformer	Vibrator Transformer	114125-1		
TB-1	Terminal Board	Voltage Terminal Board, 3 term.	114125-14		
V-1	Valve	Rectifier	OZ4A		
VS-1	Vibrator	Dual Contact Vibrator	110112-1		
X-1	Socket	Octal Socket for V-1	114125-13		
X-2	Socket	6-Pin Socket for VS-1	114125-12		

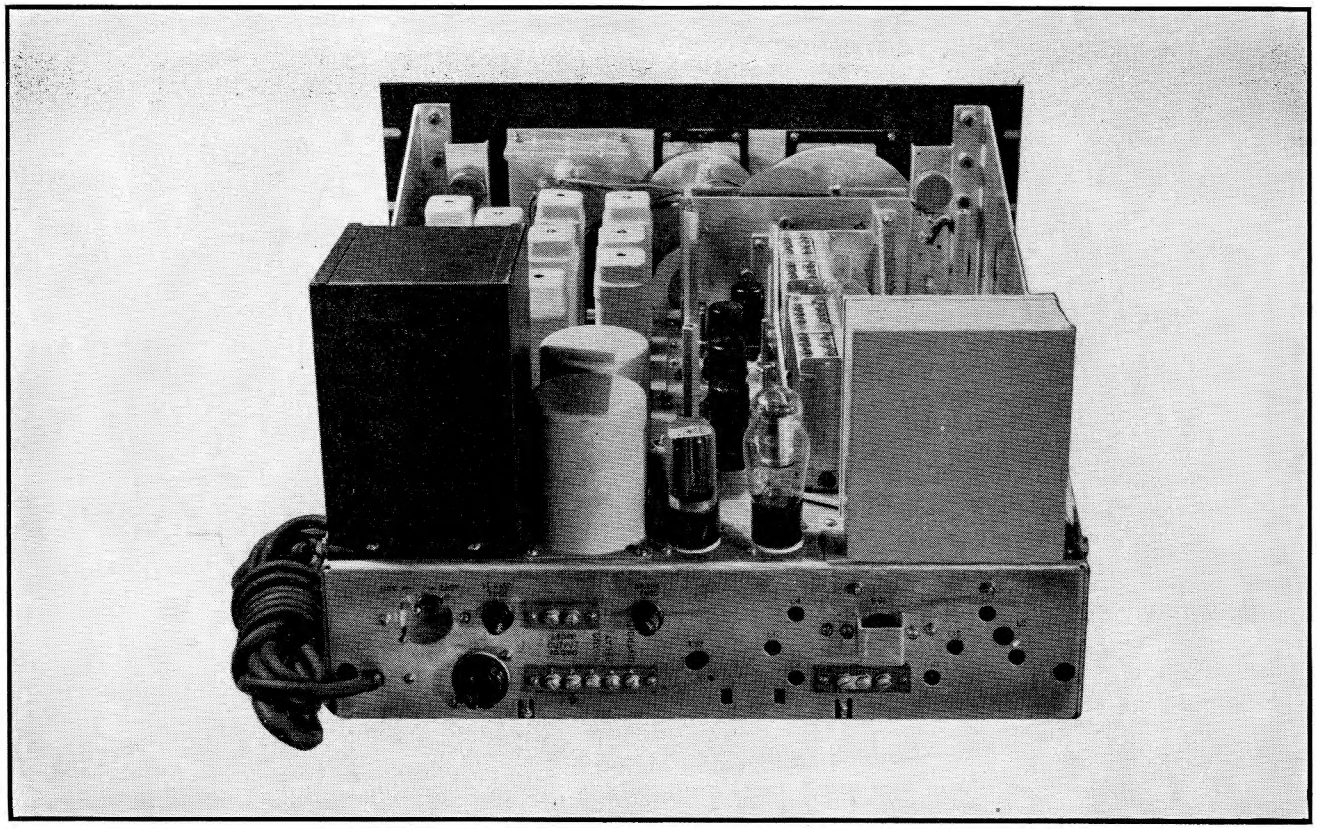

Figure 6.—General Purpose Communications Receiver—Rear View

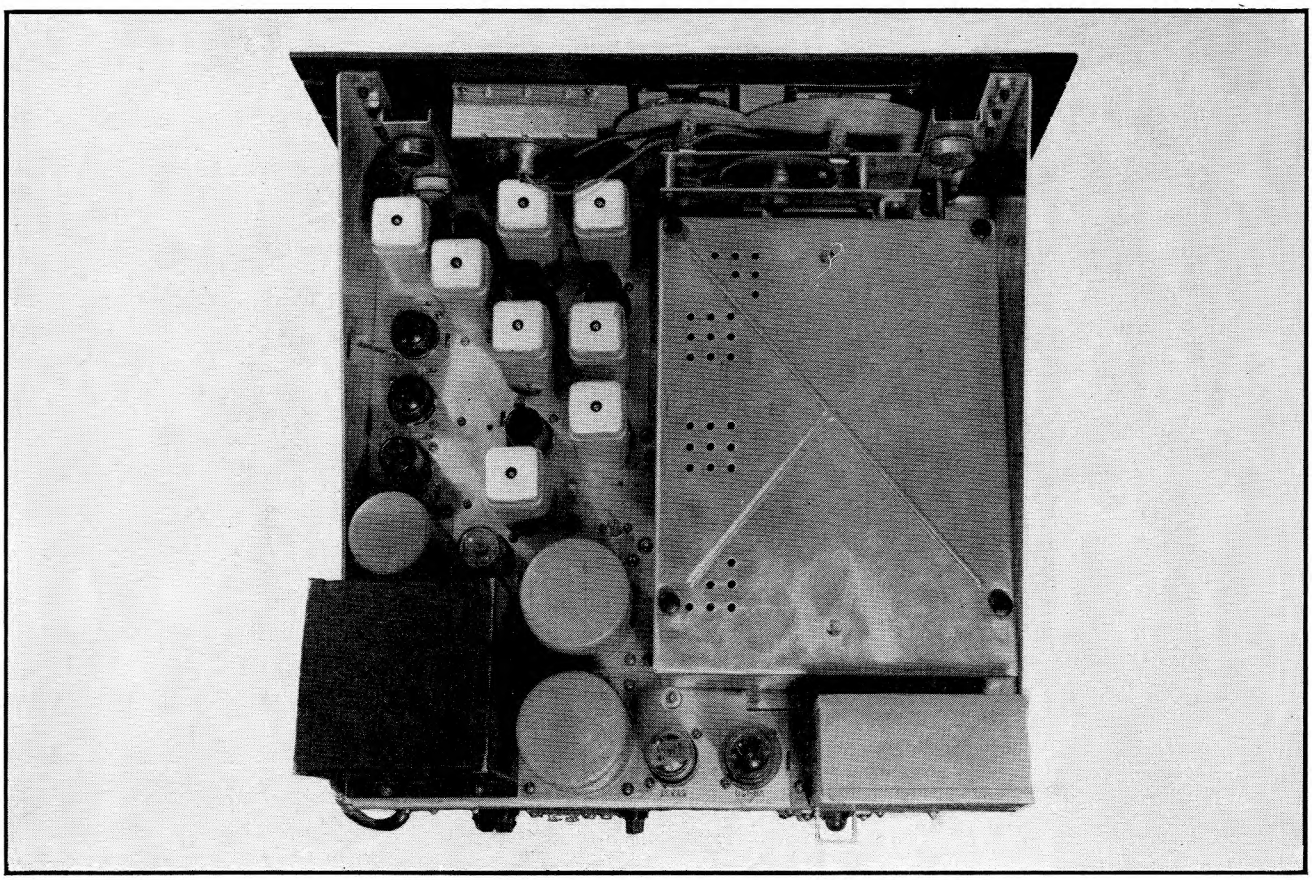

Figure 7.—General Purpose Communications Receiver—Top View

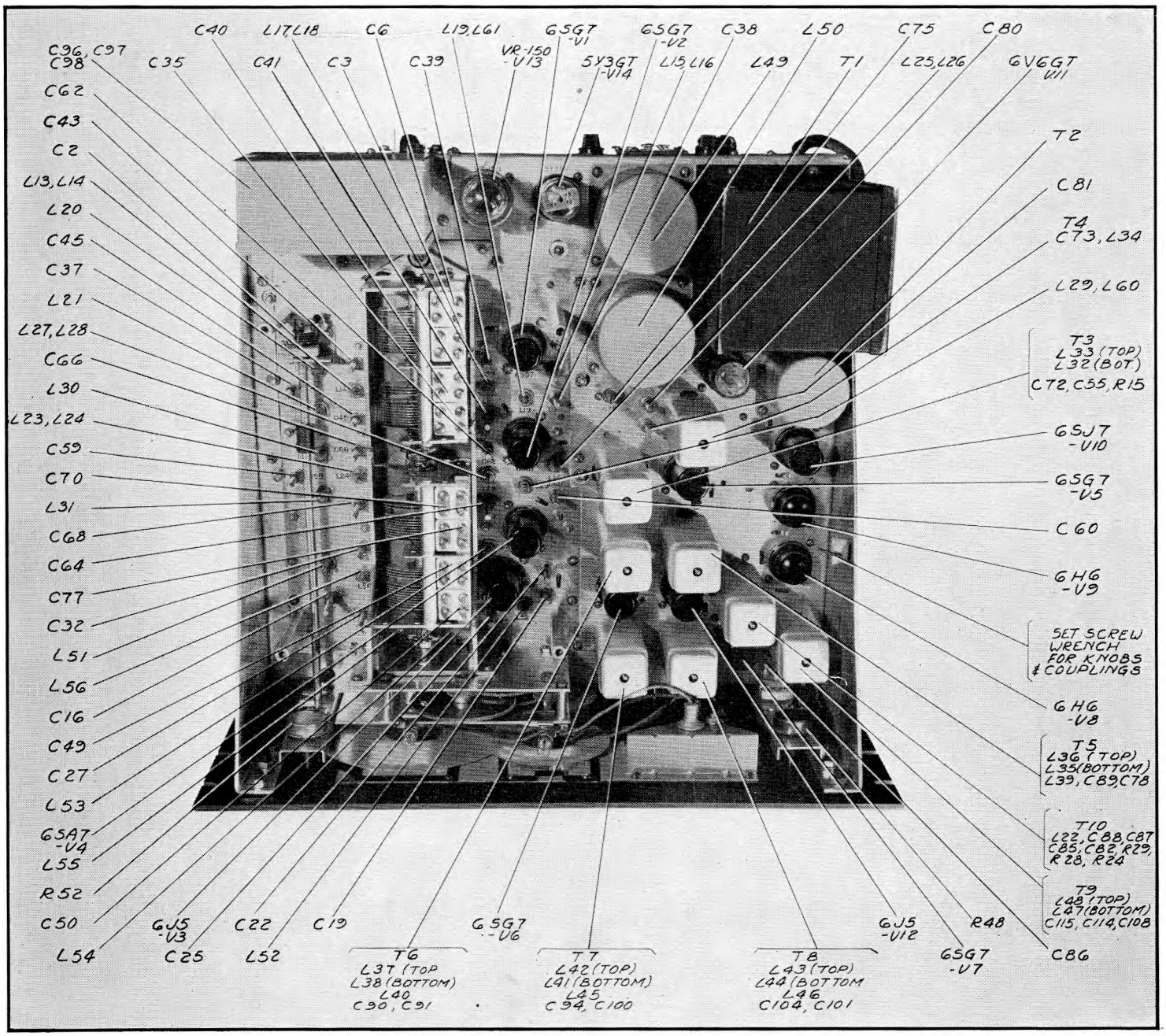

Figure 8.—General Purpose Communications Receiver—Top View—Covers Removed.

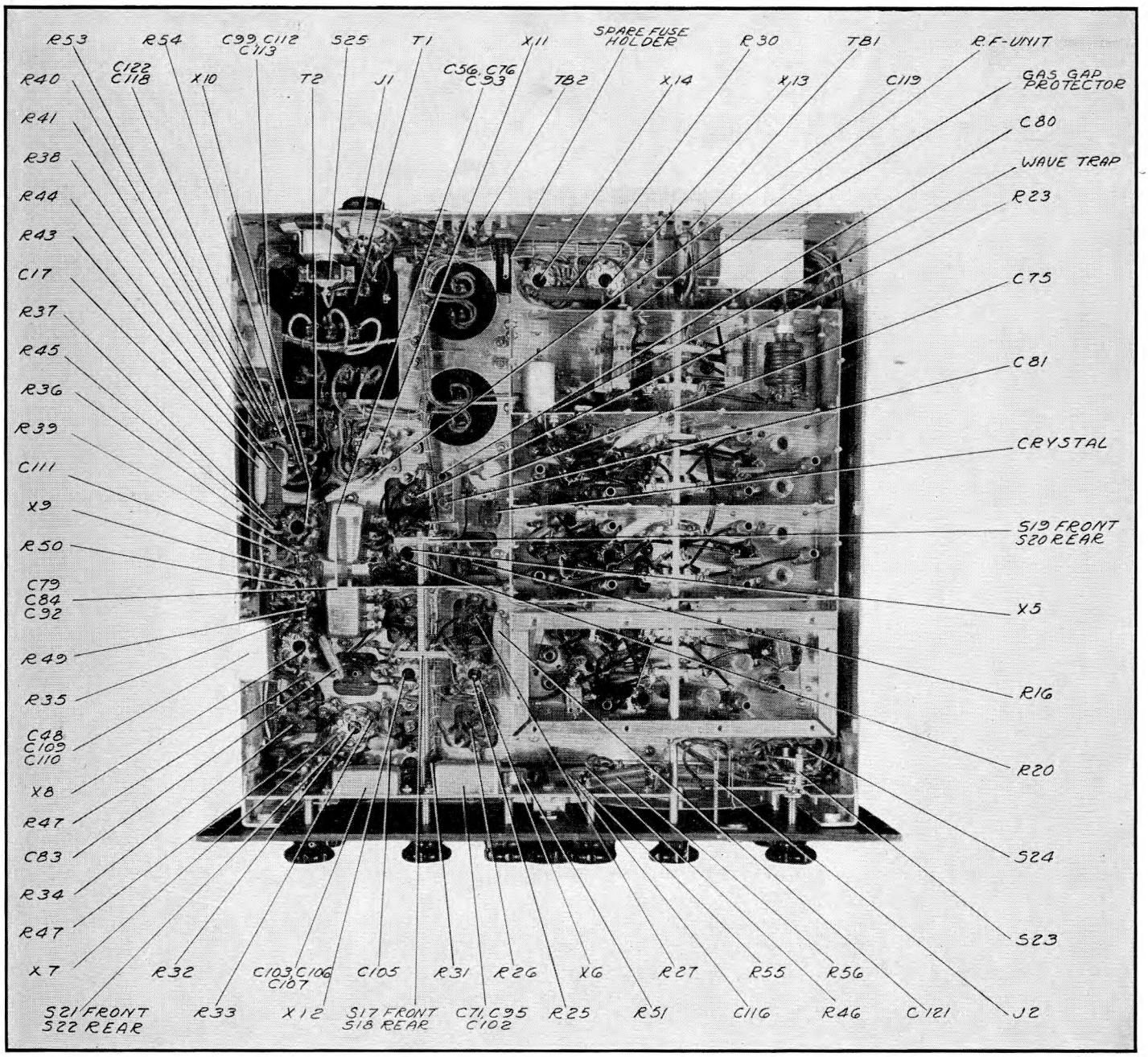

Figure 9.—General Purpose Communications Receiver—Bottom View—Covers Removed.

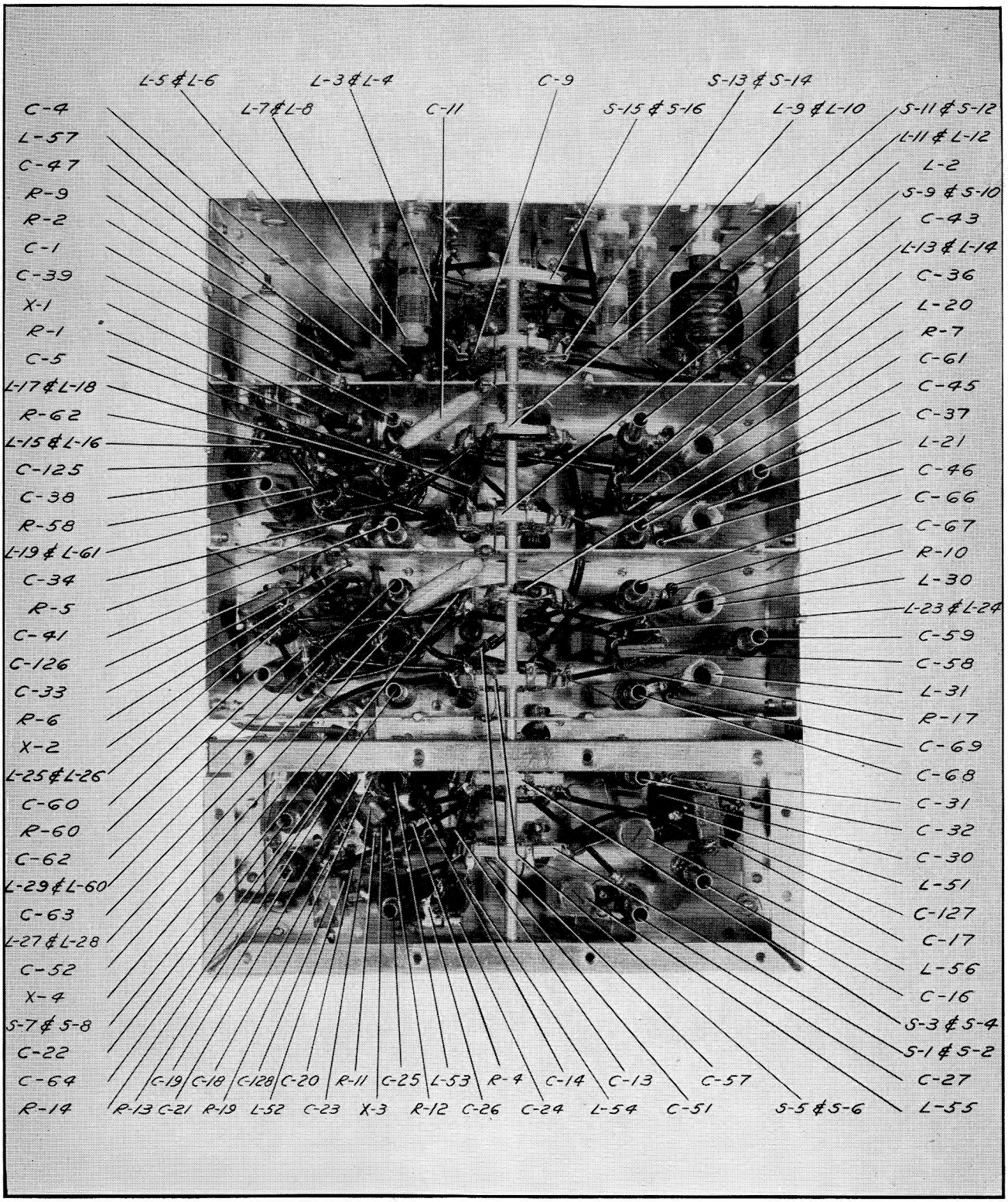

Figure 10.—General Purpose Communications Receiver—R.F. Unit.

W-87072

RANGE SWITCH (S1 TO S16 INCL.) SHOWN IN MAX. COUNTER/CW POSITION (BAND 1) AS VIEWED FROM FRONT OR KNOB END OF SWITCH.

BAND	RANGE
1	73-205 KC
2	195-550 KC
3	148-4.4 MC
4	4.25-12.15 MC
5	11.9-19.5 MC
6	19.0-30.5 MC

BAND 1
RANGE SWITCH SHOWN IN POSITION 1 (.75 TO 200 KC)
SELECTIVITY SWITCH (S17, 18, 19, 20) SHOWN IN POSITION 1 (BROAD)
AVC-NOISE LIMITER SWITCH (S21, S22) SHOWN IN MANUAL POSITION WITHOUT NOISE LIMITER
OFF-TRANSM-REC SWITCH (S23, S24) SHOWN IN "OFF" POSITION.

CAPACITORS C1 11, 33, 47, 51, 52, 54, 63, 83, 118, 121, 122 MAY BE .01 MFD (PT #86091-511) EXCEPT THAT FOR C118, 122 A SINGLE .01 MFD SHOULD BE USED.
C117 MAY BE .006 MFD (PT #86091-509)
C111, 116, 119 MAY BE .003 MFD (PT #8609I-507).

SOCKET (J1) CONNECTIONS FOR BATTERY OPERATION
-"B" TO PIN #6
+"B" (250V) TO PIN #7
-"A" TO PIN #5
+"A" (6V) TO PIN #4

NOTE - ALL CAPACITOR VALUES GIVEN IN MMF AND ALL RESISTOR VALUES GIVEN IN OHMS UNLESS OTHERWISE SPECIFIED. TUBE SOCKETS ARE DESIGNATED BY SYMBOL X FOR CORRESPONDING TUBE V NUMBER

TB2 TERMS
1 & 2 - FOR EXTRA PAIR OF PHONES
3, 4 - TRANSM RELAY
5 - DIVERSITY

TB4 TERMS
1 & 2 - EXTERNAL SPEAKER 2.5Ω IMPED

NOTE:- USE PHONES WITH 600Ω OR LESS IMPED.

Figure 11.—General Purpose Communications Receiver — Schematic Diagram.

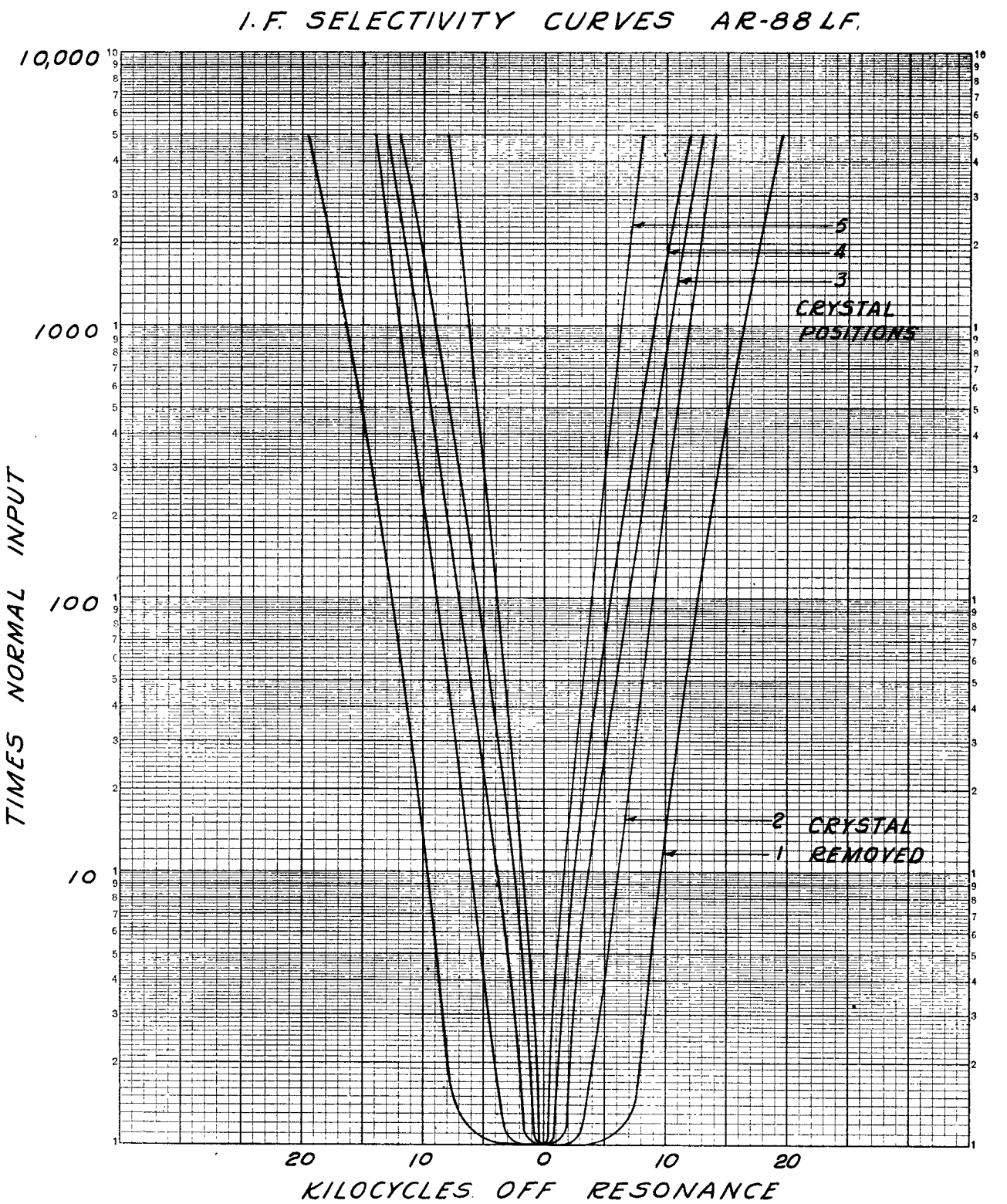

Figure 12.—General Purpose Communications Receiver—Selectivity Characteristics.

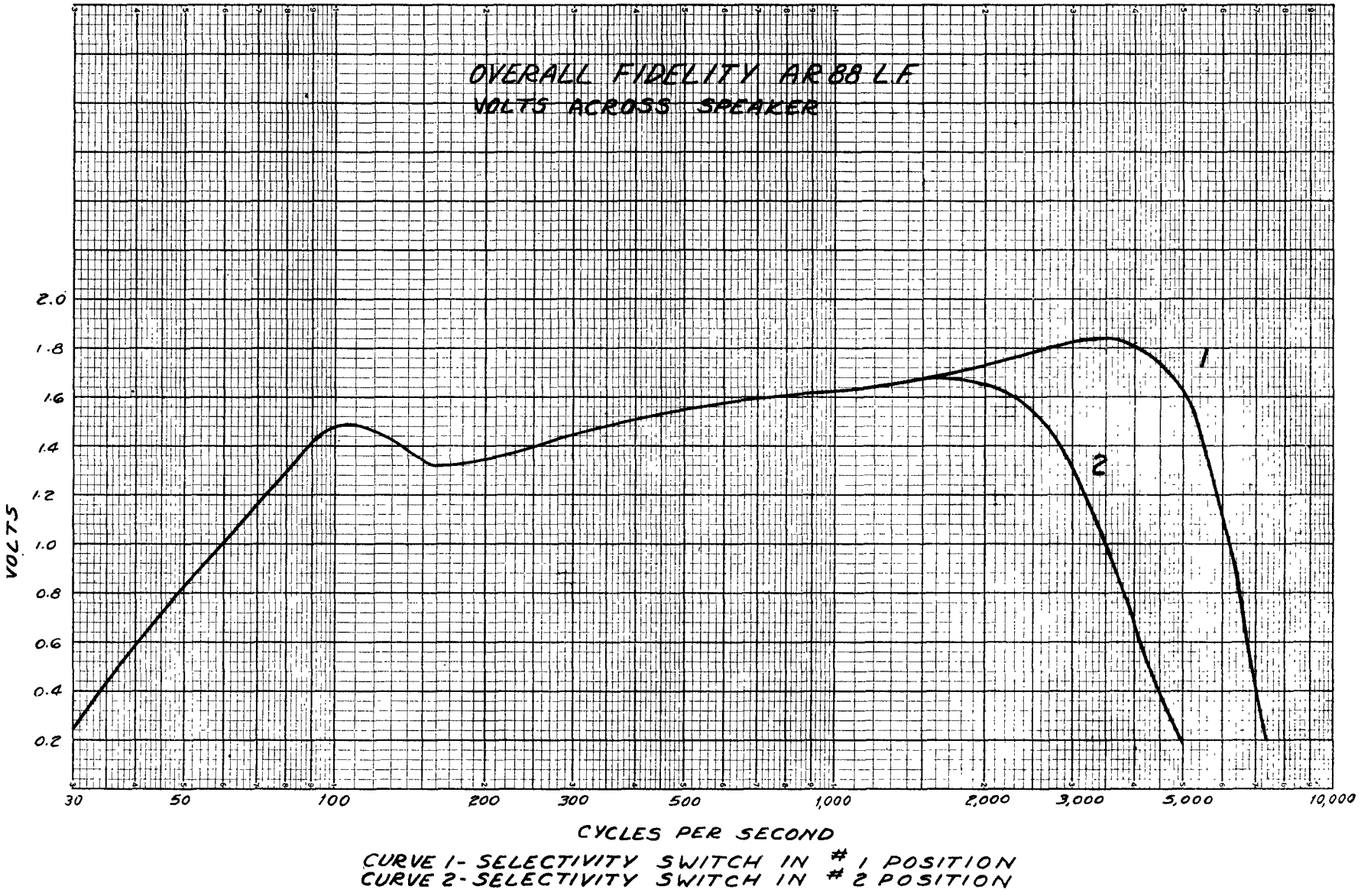

Figure 13.—General Purpose Communications Receiver—Fidelity Characteristics.

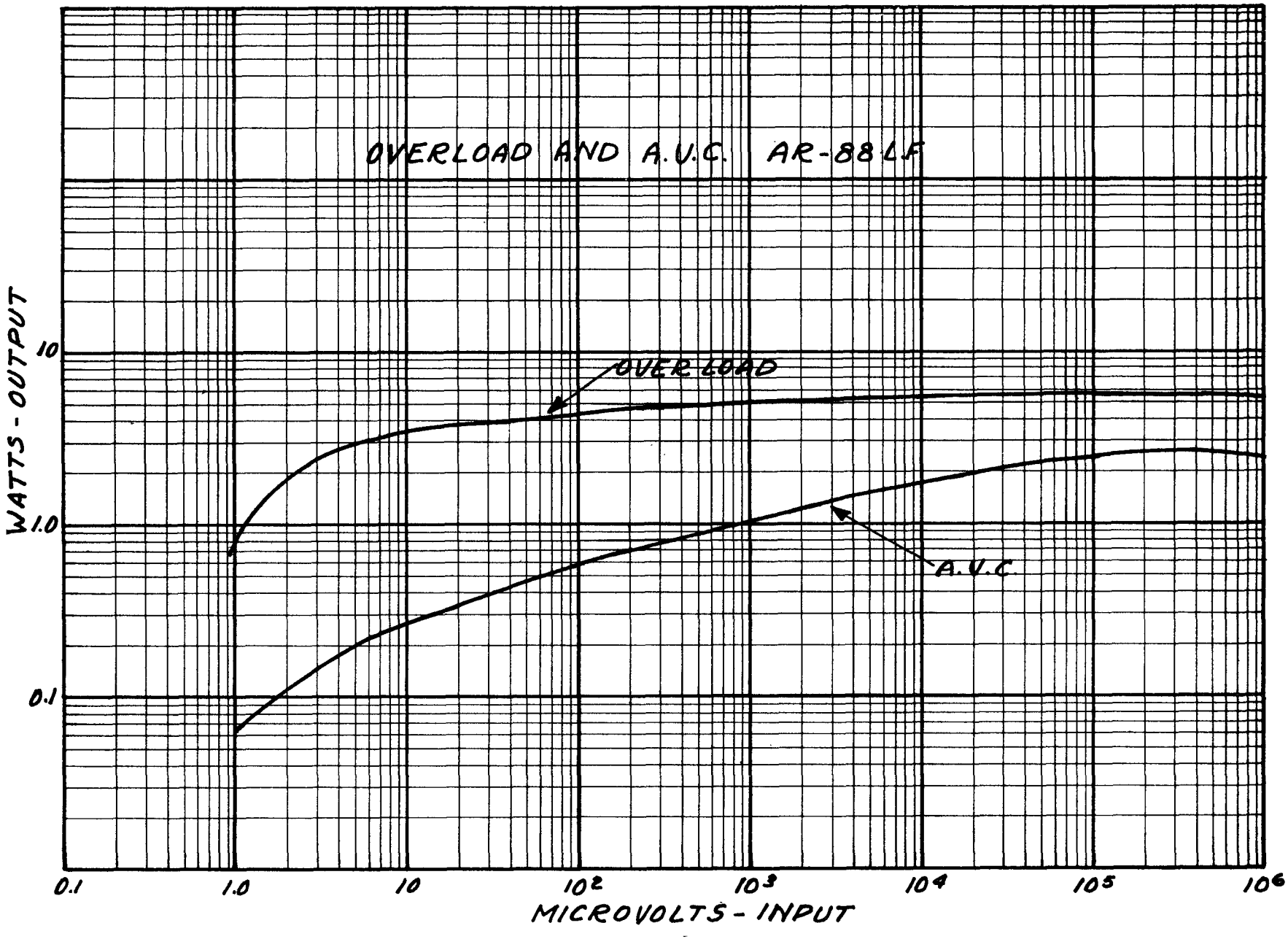

Figure 14.—General Purpose Communications Receiver—Overload A.V.C. Characteristics.