0284-058-8000

UNCLASSIFIED

NAVSHIPS 900,353

INSTRUCTION BOOK

for

NAVY MODELS

RBL, RBL-1, RBL-2

RADIO RECEIVING EQUIPMENTS

NOTE: Ignore all markings of "RESTRICTED" on this publication. It has been downgraded to UNCLASSIFIED.

NATIONAL COMPANY, INC.

MALDEN, MASSACHUSETTS, U.S.A.

NAVY DEPARTMENT BUREAU OF SHIPS

Contract Nos-91471 for RBL
Nxs-456 for RBL-1
Nxs-4683 for RBL-2

Approved 30 October 1945

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT

ADDRESS NAVY DEPARTMENT,
BUREAU OF SHIPS

Section 993-100
REFER TO FILE NO.

NAVY DEPARTMENT
BUREAU OF SHIPS
WASHINGTON 25, D. C.

28 September 1945

1. NAVSHIPS 900,353 is the instruction book for Radio Receiving Equipments, Navy Models RBL/RBL-1/2. It is in effect upon receipt.

2. NAVSHIPS 900,353 is a RESTRICTED non-registered publication and shall be handled, transported, and safeguarded in accordance with U.S. Naval Regulations. When superseded by a later edition, this publication shall be destroyed.

3. Any person known to be in the service of the United States and persons of undoubted loyalty and discretion who are cooperating in Government work may have access to this publication. However, information contained herein shall not be communicated to the public or to the press.

4. This document contains information affecting the National defense of the United States within the meaning of the Espionage Act, 50 U.S.C., 31 and 32, as amended. Its transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law. (ART. 76 U.S.N. REGS-1920).

5. Extracts from this publication may be made to facilitate the preparation of other Navy instruction books and handbooks.

6. Copies of this publication should be obtained from the nearest Electronics Officer.

E. L. COCHRANE
Chief of Bureau

FROM BUREAU OF SHIPS, NAVY DEPARTMENT, WASHINGTON 25, D. C.

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF PHOTOGRAPHS AND DRAWINGS

CONTRACTUAL GUARANTEE

The equipment including all parts and spare parts, except vacuum tubes, batteries, rubber and material normally consumed in operation, is guaranteed for a period of one year from the date of delivery of the equipment to and acceptance by the Government with the understanding that all such items found to be defective as to material, workmanship or manufacture will be repaired or replaced, f.o.b. any point within the continental limits of the United States designated by the Government; without delay and no expense to the Government; provided that such guarantee will not obligate the Contractor to make repair or replacement of any such defective items unless the defect appears within the aforementioned period and the Contractor is notified thereof in writing within a reasonable time and the defect is not the result of normal expected shelf life deterioration.

To the extent the equipment, including all parts and spare parts, as defined above, is of the Contractor's design or is of a design selected by the Contractor, it is also guaranteed, subject to the foregoing conditions, against defects in design with the understanding that if ten per cent (10%) or more of any such said item, but not less than two of any such item, of the total quantity comprising such item furnished under the contract, are found to be defective as to design, such item will be conclusively presumed to be of defective design and subject to one hundred per cent (100%) correction or replacement by a suitably redesigned item.

All such defective items will be subject to ultimate return to the Contractor. In view of the fact that normal activities of the Naval Service may result in the use of equipment in such remote portions of the world or under such conditions as to preclude the return of the defective items for repair or replacement without jeopardizing the integrity of Naval Communications, the exigencies of the Service, therefore, may necessitate expeditious repair of such items in order to prevent extended interruption of communications. In such cases the return of the defective items for examination by the Contractor prior to repair or replacement will not be mandatory. The report of a responsible authority, including details of the conditions surrounding the failure, will be acceptable as a basis for affecting expeditious adjustment under the provisions of the contractual guarantee.

The above one year period will not include any portion of time the equipment fails to perform satisfactorily due to any such defects, and any items repaired or replaced by the Contractor will be guaranteed anew under this provision.

REPORT OF FAILURE

Report of failure of any part of this equipment, during its service life, shall be made to the Bureau of Ships in accordance with current instruction. The report shall cover all details of the failure and give the date of installation of the equipment. For procedure in reporting failures see Chapter 67 of the "Bureau of Ships Manual," or superseding instructions.

INSTALLATION RECORD

Contract Number NOs-91471	*Date of Contract* 8 September 1941
NXs-456	10 March 1942
NXs-4683	30 April 1942

Serial Number of Equipment.....
Date of acceptance by the Navy.....
Date of Delivery to contract designation.....
Date of completion of installation.....
Date placed in service.....

REPLACEMENT MATERIAL

All requests or requisitions for replacement material should include complete descriptive data covering the part desired, in the following form:

1. Name of part desired.
2. Federal Stock Number (if assigned).
3. Navy Type Number (if assigned) (including *prefix* and *suffix* as applicable.)
4. Commercial designation.
5. Model designation (including *suffix*) of equipment in which used.

6. Navy Type Designation (including *prefix* and *suffix* where applicable) of major unit in which part is used.
7. Contract, purchase order, requisition, etc., under which the equipment was procured.
8. Circuit symbol designation of part.
9. (a) Navy Drawing and/or specification number (include part or group number)
   (b) Manufacturer's drawing or specification's number. (Include part or group number.)
10. Rating or other descriptive data.

DESTRUCTION OF
ABANDONED MATERIEL IN THE COMBAT ZONE

In case it should become necessary to prevent the capture of this equipment, and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED, OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper or wood.
4. Grenades and shots from available firearms.
5. Burying all debris, or disposing of it in streams or other bodies of water, where possible and when time permits.

Procedure:

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch and instrument boards.
3. Destroy all controls, switches, relays, connections and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil and water cooling system in gas engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING

SAFETY AND WARNING NOTICES

THIS EQUIPMENT EMPLOYS VOLTAGES WHICH ARE DANGEROUS AND MAY BE FATAL IF CONTACTED BY OPERATING PERSONNEL. EXTREME CAUTION SHOULD BE EXERCISED WHEN WORKING WITH THE EQUIPMENT.

THE ATTENTION OF OFFICERS AND OPERATING PERSONNEL IS DIRECTED TO CHAPTER 67 OF BUREAU OF SHIPS MANUAL OR SUPERSEDING INSTRUCTIONS ON THE SUBJECT OF "RADIO-SAFETY PRECAUTIONS TO BE OBSERVED."

AN APPROVED POSTER ILLUSTRATING THE RULES FOR RESUSCITATION BY THE PRONE PRESSURE METHOD SHALL BE PROMINENTLY DISPLAYED IN EACH RADIO, RADAR OR SONAR ENCLOSURE. POSTERS MAY BE OBTAINED UPON REQUEST TO THE BUREAU OF MEDICINE AND SURGERY.

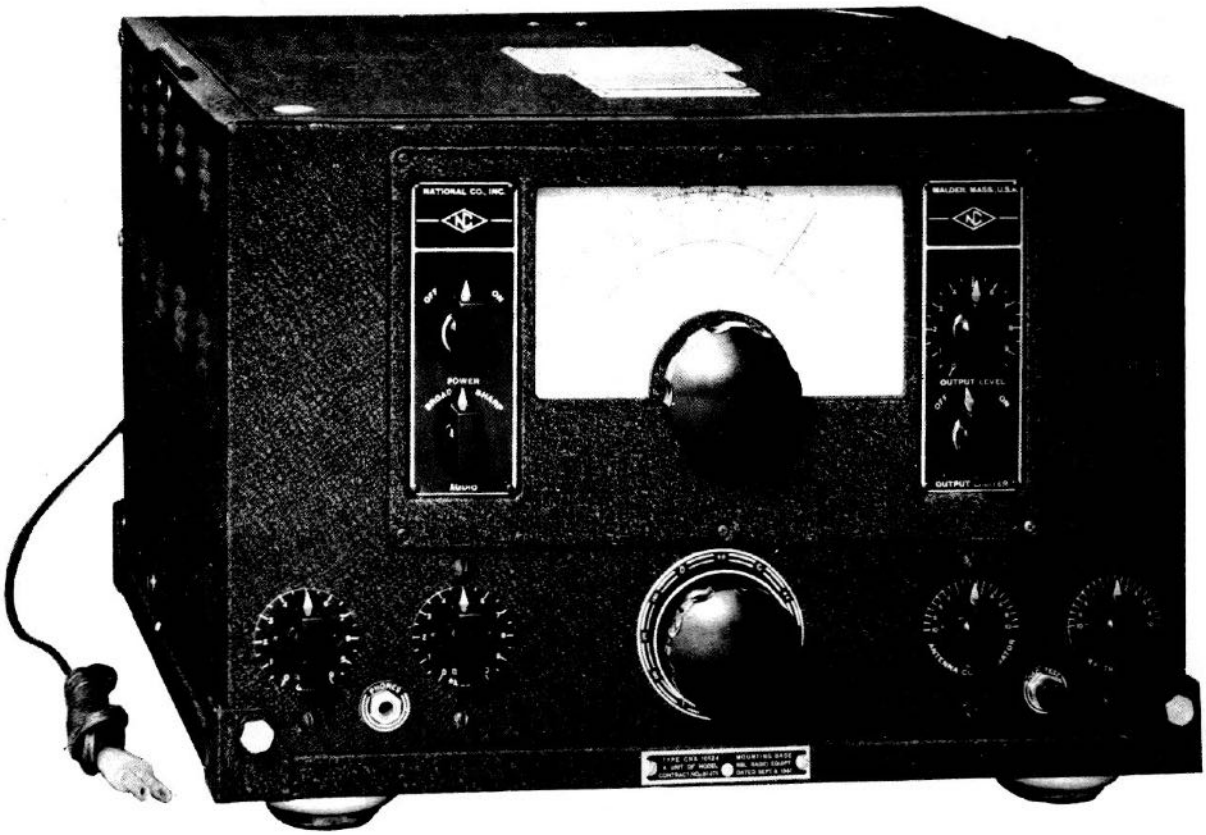


Figure 1-1 - Front Perspective View of RBL Equipment

SECTION I

GENERAL DESCRIPTION

1. GENERAL DESCRIPTION AND FUNCTION.

a. The Model RBL Radio Receiving Equipment utilizes a tuned radio frequency circuit for the reception of radio telephone (M.C.W.) and telegraph signals (C.W. or I.C.W.) over a frequency range of 15 to 600 kilocycles continuously tunable in six bands.

b. The receiver is provided with a shockproof mounting base making it suitable for table mounting. All controls necessary for operation are mounted on the front panel while plugs and terminals for external connections are located at the rear of the receiver.

c. The power supply required for operation of the receiver may be either 115 volts, 50-60 cycles for A.C. operation or a six-volt heater battery and a 135-volt B battery for emergency battery operation.

d. This instruction book is applicable to the models of the RBL series which includes only RBL, RBL-1, and RBL-2 Radio Receiving Equipments.

2. REFERENCE DATA.

a. NOMENCLATURE.

Equipment	Receiver Navy Type	Mounting Base Navy Type	Contract	Date
RBL	CNA-46161	CNA-10124	NOs-91471	8 September 1941
RBL-1	CNA-46161	CNA-10124	NXs-456	10 March 1942
RBL-2	CNA-46161	CNA-10124	NXs-4683	30 April 1942

b. CONTRACTOR. - National Company, Inc., Malden, Massachusetts.

c. COGNIZANT INSPECTOR. - INM, Boston, Massachusetts.

d. FREQUENCY RANGE. - 15 Kcs. to 600 Kcs. in six tuning bands.

e. TYPES OF RECEPTION. - C.W. or I.C.W. from 15 Kcs. to 600 Kcs.; M.C.W. from 200 Kcs. to 600 Kcs.

f. C.W. BEAT NOTE. - 750 c.p.s. by autodyne method.

g. RADIATION. - Less then 400 micro-microwatts.

h. OUTPUT IMPEDANCE. - 600 ohms.

i. POWER SOURCES.

(1) A.C. OPERATION: 115 volts, 60 cycles, one phase. CURRENT DRAIN: .4 A. at 115 volts.

(2) BATTERY OPERATION: 6-volt heater battery, 135-volt B battery. CURRENT DRAIN: 2.2 A. at 6 volts, 30 ma. at 135 volts.

j. SHIPPING CONTAINERS. - One crate per complete equipment. Weight, Receiver and Spare Parts, crated - 225 lbs. Cubic Volume, crated - 9.7 cu. ft.

k. VACUUM TUBES. - Three 6SK7, One 6SG7, One 6H6, One 6K6GT/G, One 5U4G.

3. EQUIPMENT SUPPLIED.

a. The following table lists the equipment comprising a complete receiving equipment and applies to either RBL, RBL-1 or RBL-2 Equipments. Batteries and cables are not supplied by the contractor. For quantities of Stock Spares see Parts List.

EQUIPMENT SUPPLIED

Quantity	Symbol Series	Name of Unit	Navy Type Desig.	Overall Dimensions A: Crated B: Uncrated Height	Width	Depth	Volume Cu. Ft. A: Crated B: Uncrated	Weight A: Crated B: Uncrated
1	101-199	RBL Radio Receiver	CNA-46161	A: 17-1/2"	x 42-1/2"	x 22-1/2"	A: 9.7	A: 225 lbs.
				B: 10-31/32"	x 17-3/16"	x 16-5/8"	B: 1.8	B: 75 lbs.
1	201-299	Mounting Base	CNA-10124	A: Crated with Receiver				
				B: 2-9/16"	x 17-17/32"	x 16-5/16"	B: .04	B: 5-1/2 lbs.
1		Equipment Spare Parts		A: Crated with Receiver				
				B: 6-1/2"	x 19"	x 10"	B: .7	B: 25 lbs.
*		Stock Spare Parts		A: 10-3/4"	x 23"	x 16"	A: 2.4	A: 82 lbs.
				B: 9-1/2"	x 19"	x 13"	B: 1.4	B: 67 lbs.

* Stock Spares furnished on the basis of one set per ten equipments.

4. DESCRIPTION OF MAJOR UNITS.

a. TYPE CNA-46161 RADIO RECEIVER. - The Type CNA-46161 Radio Receiver is a seven-tube, tuned radio frequency receiver covering a continuous frequency range of 15 to 600 kilocycles in six working bands. The receiver is enclosed within a single copper-plated steel cabinet, having a black wrinkle finish designed for top of table mounting. The chassis and other steel parts mounted on it are copper-plated and given a gray enamel finish. The circuit employed on all bands is shown in Figure 7-1, Schematic Wiring Diagram, and Figure 7-2, Coil-switch Diagram, and comprises two stages of radio frequency amplification, a regenerative detector, a resistance coupled first audio stage, audio filters arranged to permit a choice of two possible cut-off frequencies, an adjustable audio limiter, and a resistance coupled audio output stage. The audio output is available at a phone jack and at a terminal strip located at the rear of the receiver. A built-in A.C. power supply provides the proper filament and D.C. voltages required by the various circuits of the receiver. A power socket mounted on the rear of the receiver permits connections to be made to an emergency battery power supply.

b. FREQUENCY RANGE. - The frequency range of the receiver is covered in six working bands as follows:

Band A	15 - 25 Kilocycles
Band B	25 - 45 Kilocycles
Band C	45 - 80 Kilocycles
Band D	80 - 155 Kilocycles
Band E	155 - 310 Kilocycles
Band F	310 - 600 Kilocycles

c. TUNING DIAL. - The Type CNA-46161 Radio Receiver has a stationary dial scale calibrated in kilocycles to conform with the frequency coverage of the six bands. A moving pointer indicates the frequency setting. The dial is calibrated with the autodyne detector adjusted for zero beat against accurate C.W. signals. The band in use is indicated by a band indicator dial, which turns with the band selector knob. In addition to the frequency calibrated scales, an auxiliary numerical scale is employed which in conjunction with a vernier dial may be read to one division in one thousand when logging signals.

d. VACUUM TUBE COMPLEMENT. - The tubes employed in the Type CNA-46161 Radio Receiver are as follows:

Symbol	Navy Type	Function
V-101	-6SK7	First R.F. Amplifier
V-102	-6SK7	Second R.F. Amplifier
V-103	-6SK7	Regenerative Detector
V-104	-6SG7	First Audio Amplifier
V-105	-6H6	Audio Limiter
V-106	-6K6GT/G	Power Audio Amplifier
V-107	-5U4G	Rectifier

e. GENERAL CHARACTERISTICS. - The Type CNA-46161 Radio Receiver is designed primarily for the reception of pure C.W. and M.C.W. radio telegraph signals. The high R.F. and A.F. selectivity of the receiver results in improved signal-to-noise ratio for C.W. reception but due to sideband cutting and the resulting distortion, voice modulated reception is limited to the frequency range of 200 to 600 Kc.

f. FREQUENCY AND GAIN STABILITY.

(1) Voltage variations of plus or minus 10 per cent of the 115-volt power source result in a frequency shift of the 1000 c.p.s. autodyne beat note of less than 50 c.p.s. The variation in overall gain as a result of the voltage variation and frequency shift does not exceed three db.

(2) The frequency variation per degree Centigrade for variation of ambient temperature over a range of 0°C. to +50°C. (32°F. to 122°F.) is less than 50 c.p.s. The variation in overall gain under these temperature conditions does not exceed six db.

(3) Humidity changes up to a maximum relative humidity of 95 per cent at a constant temperature of 40°C. (104°F.) result in an oscillator frequency variation of less than one per cent and a variation in overall gain of not more than six db.

5. DESCRIPTION OF TYPE CNA-10124 MOUNTING BASE.

a. The Type CNA-10124 Mounting Base is a cradle or framework designed to support the CNA-46161 Radio Receiver and protect it from vibration or shock. The mounting base is fitted with four shock mounts which consist of rubber insulated bushings, the bushings serving to pass the mounting bolts for the base. Thumb screws at the front and rear corners of the base serve to secure the receiver to the base. The CNA-10124 Mounting Base is shown in Figures 7-8 and 7-9, and the mounting dimensions are given in Figure 7-14.

6. TECHNICAL SUMMARY.

a. FREQUENCY RANGE. - 15-600 Kilocycles.

b. TUNING BANDS. - Six bands as follows:

Band A	15 - 25 Kilocycles
Band B	25 - 45 Kilocycles
Band C	45 - 80 Kilocycles
Band D	80 - 155 Kilocycles
Band E	155 - 310 Kilocycles
Band F	310 - 600 Kilocycles

c. DIAL.

(1) FREQUENCY SCALE. - Fixed type with moving pointer; six scales calibrated in kilocycles.

(2) NUMERICAL SCALE: - 1000 divisions with vernier dial.

d. TYPE OF RECEPTION. - C.W. or I.C.W. from 15 Kcs. to 600 Kcs.: M.C.W. from 200 Kcs. to 600 Kcs.

e. POWER OUTPUT. - 300 milliwatts undistorted audio into a 600-ohm resistive load.

f. C.W. SENSITIVITY.

(1) SHARP. - 5 microvolts or less to give Standard Output of 6 milliwatts.

(2) BROAD. - R.F. input of 10 microvolts or less for a Standard Output of 6 milliwatts.

g. SELECTIVITY AT 6 DB. DOWN.

BAND	FREQ. (KC.)	BANDWIDTH (KC.)
F	460	4.5
E	220	2.5
D	120	1.5
C	65	1.0
B	40	1.0
A	20	0.6

h. AUDIO FIDELITY.

(1) SHARP. - 500 c.p.s. band pass at 20 db. down, peak response at 750 c.p.s.

(2) BROAD. - 3500 c.p.s. band pass at 20 db. down, peak response at 1100 c.p.s.

i. C.W. BEAT NOTE. - 750 c.p.s. by autodyne method.

j. RADIATION. - Less than 400 micro-microwatts.

k. LIMITER CHARACTERISTICS. - 300. mw. audio output with minimum limiter action. 1. mw. audio output with maximum limiter action.

l. FREQUENCY AND GAIN STABILITY.

Condition	Freq. Stability	Gain Variation
(1) Line Voltage Change 115 V. ±10%	50 c.p.s. Change in 1000 c.p.s. beat note	3 db.
(2) Temp. Change (0°C. to +50°C.) (32°F. to 122°F.)	50 c.p.s. Change in 1000 c.p.s. beat note	6 db.
(3) Humidity Change 30-95% at Temp. of +40°C. (104°F.)	Less than 1% Osc. Freq. Change	6 db.

m. LOW PASS FILTER IMPEDANCE. - Input/Output 50,000/50,000 Ohms.

n. HIGH PASS FILTER IMPEDANCE. - Input/Output 50,000/50,000 Ohms.

o. AUDIO OUTPUT IMPEDANCE. - 600 Ohms.

p. ANTENNA CHARACTERISTICS. - Antennas having capacities of 150 to 2000 mmf. may be used.

q. POWER SOURCES.

(1) A.C. OPERATION. - 115 Volts, 60 Cycles, one phase. Current Drain .4 A. at 115 Volts.

(2) BATTERY OPERATION. - Six-volt heater battery, 135-volt B Battery. Current Drain 2.2 A. at 6 Volts, 30 ma. at 135 Volts.

SECTION II

INSTALLATION

1. UNPACKING PROCEDURE.

a. The major units and spare parts of the Model RBL Equipment are packed in a single wooden crate. The recommended procedure to employ in unpacking the equipment is as follows:

STEP 1. Place the packing crate so that the identification stenciling is uppermost.

STEP 2. Remove the side or cover of the packing crate which is now uppermost. This cover is secured by nails and an ordinary nail puller or claw hammer may be employed.

STEP 3. Remove the receiver by carefully turning the crate upside down and lifting the crate off. The receiver is protected from scratching or marring by the cardboard carton in which it is enclosed.

STEP 4. Remove the receiver from the cardboard carton.

STEP 5. Release the spare parts container from the crate by removing the retaining cleats with a pry bar or claw hammer.

STEP 6. Remove the spare parts container from the crate.

STEP 7. Inspect the parts and controls of the receiver for any damage incurred during shipment.

STEP 8. The packing crate, cardboard carton and spare parts container should be saved if the equipment is to be repacked and reshipped.

2. PRELIMINARY TEST.

a. Before permanently mounting the CNA-46161 Radio Receiver, a preliminary test should be made after making external connections as shown in the interconnections diagram. A test oscillator or transmitter signals may be used to provide test signals. For this test, set the controls of the CNA-46161 Radio Receiver as follows:

Control Symbol	Control	Setting
S-102, S-103	POWER Switch	ON
S-106	AUDIO Switch	BROAD
R-134	R.F. Gain	10
S-105	OUTPUT LIMITER Switch	OFF
R-120	OUTPUT LEVEL	10
R-127	REGENERATION	Below Oscillation
C-104	ANT. COMPENSATOR	For Maximum Gain
C-109	R.F. TRIMMER	For Maximum Gain
S-107	BAND SELECTOR	To Desired Band
C-103	MAIN TUNING	To Signal Frequency

b. After the tubes have warmed up, background noise should be heard and M.C.W. signals from the test oscillator or transmitter may be tuned in. The operation of the receiver should be checked at the high and low ends of each of the six bands. For C.W. signals, advance REGENERATION control to point of oscillation. Check low-pass filter by switching AUDIO switch to SHARP, noise and high audio frequencies should be attenuated and C.W. signals should peak at about 750 cycles per second. Turn the OUTPUT LIMITER switch ON and retard OUTPUT LEVEL control toward 0, which should cause noise peaks to be held to the same audio level as any modulated signals being received. Repeat these tests with the receiver connected for battery operation. Typical performance data is shown in Figure 5-2.

3. MOUNTING.

a. The location of the CNA-46161 Radio Receiver should be selected so as to permit short antenna and power connections when this is practical. The Type CNA-10124 Mounting Base should be fastened to the operating table, allowing a minimum clearance of two and one-half inches at the rear to permit removal and replacement of fuses and plugs. Mounting centers and overall dimensions are shown in Figure 7-14. The receiver should be secured to the mounting base by means of the thumb screws provided on the front and rear corners of the mounting base.

4. EXTERNAL CONNECTIONS.

a. POWER CONNECTIONS.

(1) A.C. POWER CONNECTIONS. - For A.C. operation store the D.C. CABLE CONNECTOR plug P-102 in the DUMMY SOCKET J-102; connect the A.C. LINE PLUG P-101 to a 115-volt, 50-60 cycle A.C. power source; connect the A.C. SUPPLY CONNECTOR PLUG P-102 to the POWER SOCKET J-103. Plug P-103 in conjunction with jack J-103 completes the necessary circuits for A.C. operation.

(2) BATTERY POWER CONNECTIONS. - For D.C. operation store the A.C. SUPPLY CONNECTOR PLUG P-103 in the DUMMY SOCKET J-102, thus breaking A.C. connections, and connect the D.C. CABLE CONNECTOR PLUG P-102 to the POWER SOCKET J-103, which completes the necessary circuits for D.C. operation. Connect the battery cable to a six-volt D.C. source for the heater supply and a 135-volt D.C. source for the B supply. Battery connections are shown on the interconnection diagram.

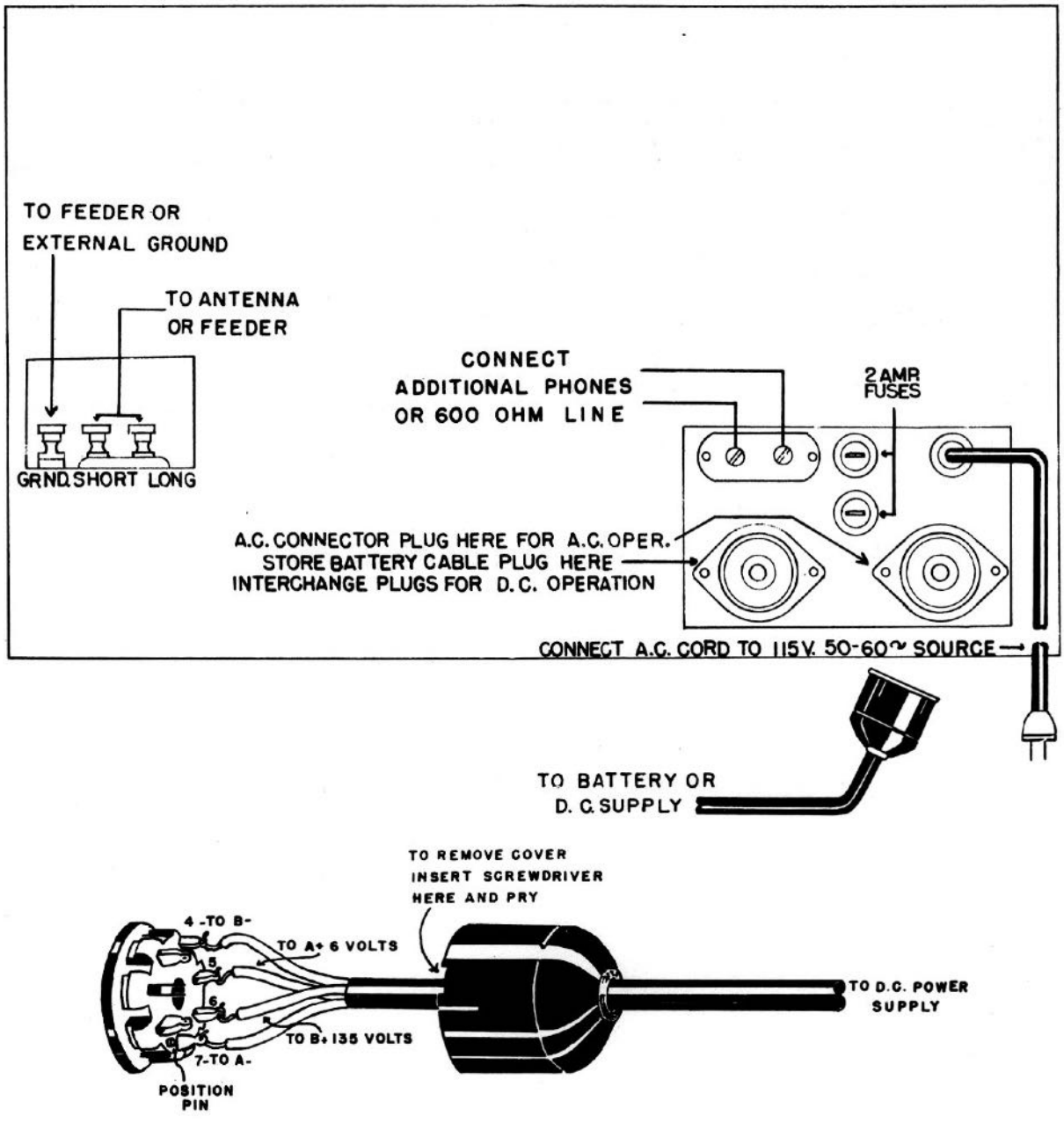


Figure 2-1 - External Interconnection Diagram

b. ANTENNA CONNECTIONS. - The antenna input circuit is arranged so as to be suitable for use with either a relatively high impedance unbalanced feed line or a simple antenna-ground combination.

The antenna input terminals are located at the left-hand side of the receiver chassis when viewed from the rear. These consist of insulated terminal board E-102 on which are mounted the long and short antenna posts; the right-hand terminal is for use with a long antenna; for short antennas the left-hand terminal should be used; to the left of E-102 is located the ground post E-103.

It is desirable to permanently ground the equipment by means of a ground connection between the ground post E-103, and a cold water pipe or other metal structure having a large surface in contact with moist earth or water.

When using an unbalanced transmission line, the ground side of the line should be connected to the ground post and the high side of the line to the long antenna post. In order to determine whether an antenna is electrically long or short, it should be connected to the short antenna terminal and checked by means of the ANTENNA COMPENSATOR. If the first R.F. stage cannot be resonated on all bands, the antenna should be tried on the long antenna terminal. Antenna length is not critical although at least fifty feet exclusive of lead-in should be used.

c. OUTPUT CONNECTIONS. - The secondary of the audio output transformer is terminated at the OUTPUT terminals E-101 located at the right-hand rear of the receiver. Connected in parallel with the OUTPUT terminals is headphone jack J-101 which is mounted on the front panel. An amplifier or other equipment may be connected to the OUTPUT terminal strip. The total impedance of the output load should be 600 ohms. Since the output transformer secondary is of the balanced type having a grounded center tap, no other ground connection should be made to either side of the audio line.

5. INSTALLATION ADJUSTMENTS.

a. When installation of the receiver is completed, the operation of the ANTENNA COMPENSATOR control should be checked. Connect the antenna to the short antenna post; if the first R.F. stage cannot be tuned to resonance with the ANTENNA COMPENSATOR control, the antenna should be tried on the long antenna terminal. It may be necessary to shorten a very long antenna in order to obtain resonance.

b. The mechanism used to turn the main tuning capacitor assembly may be made to turn more or less freely as desired by adjustment of the friction introduced into the mechanism. The desired adjustment of mechanism friction is made by proper placement of the main tuning knob on its shaft. The main tuning knob is secured to its shaft by means of set screws. Adjustment of these set screws allows the knob to be moved closer to the receiver and then secured on its shaft, thus increasing the mechanism friction and vice versa.

SECTION III

OPERATING INSTRUCTIONS FOR CNA-46161 RADIO RECEIVER

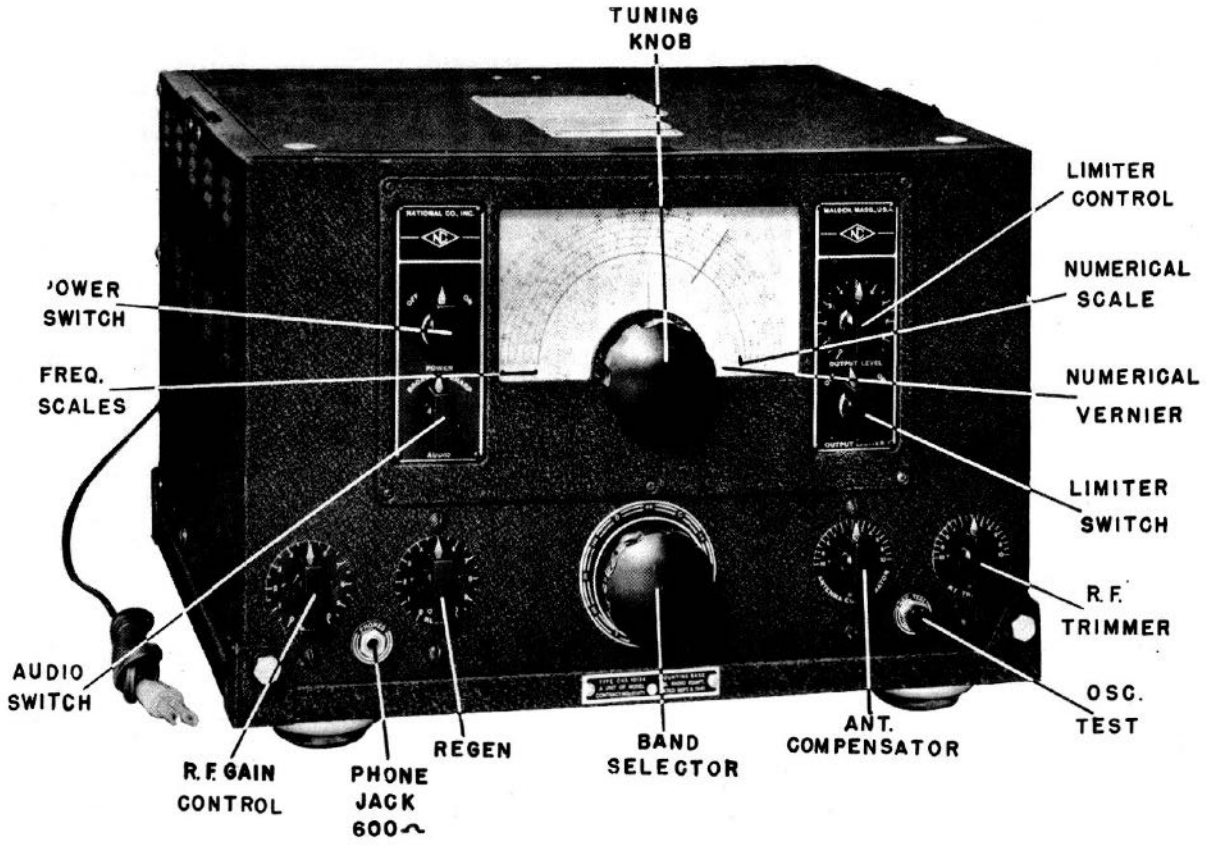


Figure 3-1 - Front Panel Controls - Type CNA-46161 Radio Receiver

Navy Type CNA-46161 Radio Receiver is a unit of RBL, RBL-1 and RBL-2 Equipments.

1. STARTING EQUIPMENT.

a. The controls used to start and operate the CNA-46161 Radio Receiver and settings normally used for M.C.W. reception are shown in the following table:

Control Symbol	Control	Setting
S-102	POWER Switch	ON
S-106	AUDIO Switch	BROAD
R-134	R.F. GAIN	10
S-105	OUTPUT LIMITER Switch	OFF
R-120	OUTPUT LEVEL	10
R-127	REGENERATION	Below Oscillation
C-104	ANT. COMPENSATOR	For Maximum Gain
C-109	R.F. TRIMMER	For Maximum Gain
S-107	BAND SELECTOR	To Desired Band
C-103	MAIN TUNING	To Signal Frequency

b. For C.W. signals advance REGENERATION control to point of oscillation; adjust tuning 750 c.p.s. higher than the signal, at which point the beat note provides maximum response (AUDIO switch at SHARP.) To turn off POWER turn POWER switch counterclockwise to OFF.

2. CONTROLS.

a. The functions of the various controls and their adjustment for efficient reception of C.W. or M.C.W. signals is described in the following paragraphs. All switches and controls (with the exception of the main tuning dial and the band selector knob) of the Type CNA-46161 Radio Receiver are identified by etched panel plates or dial scales. The symbol numbers in the following paragraphs of this Section refer to the Schematic Diagrams and to the Parts Lists.

(1) The POWER SWITCH (S-102) is located at the left-hand side of the receiver panel near the top. Turning this control to the maximum clockwise position completes the necessary supply circuits and places the receiver in operation.

(2) The main tuning dial is located at the center of the front panel of the receiver. The dial scale is calibrated in accordance with the frequency response of the six bands. In addition to the frequency calibrated scales, an auxiliary numerical scale is provided. Signals may be simultaneously logged on the zero to 1000 numerical scale which is direct reading within one division by means of the zero to 100 vernier dial and its fixed pointer.

(3) The band selector knob is located near the bottom of the front panel at the center. The knob must be rotated approximately one sixth of a turn to change from one band to an adjacent band. The band in use is indicated by the pointer attached to the band selector knob. A positive detent insures proper positioning of the band selector switch contacts.

(4) Directly beneath the power switch is located the AUDIO bandwidth control switch. In the sharp position the pass band is approximately 500 cycles wide at 20 db. down with the peak response occurring at 750 cycles per second. In the broad position the pass band is approximately 3500 cycles wide at 20 db. down with the peak response occurring at 1100 cycles per second.

(5) The REGENERATION control is located directly below the AUDIO bandwidth control. Clockwise rotation of this control increases the regeneration in detector circuit. The detector tube may be made to oscillate when the REGENERATION control is turned sufficiently in the clockwise direction thus providing a means for heterodyne detection of C.W. radio telegraph signals.

(6) The R.F. GAIN control is located to the left of the REGENERATION control. Clockwise rotation of this control increases the amplification of the two R.F. amplifier tubes V-101 and V-102.

(7) The ANTENNA COMPENSATOR control is located at the right of the band selector control. This control is used to compensate for antenna capacity, which tends to detune the first R.F. stage. It should be adjusted for maximum amplification.

(8) The R.F. TRIMMER control is located to the right of the ANTENNA COMPENSATOR. The function of this control is to compensate for unavoidable tracking errors in the second R.F. stage and should be adjusted for maximum amplification.

(9) The OSCILLATION TEST button is located between the ANTENNA COMPENSATOR and R. F. TRIMMER. In the absence of a received signal, this control is useful in determining whether or not the detector is oscillating. The detector slides in and out of oscillation so smoothly that it is often difficult to determine whether or not it is oscillating. If a click is heard in the headphones when the OSCILLATION TEST button is pressed and another click observed when it is released, this indicates that the detector is in the oscillating condition.

(10) The OUTPUT LIMITER control is located directly above the ANTENNA COMPENSATOR control. In the OFF position the limiter circuits are inoperative. In the ON position the limiter circuits are operative and limit all audio voltage peaks to a definite maximum value determined by the setting of the OUTPUT LEVEL control. The type of limiter employed limits both alternations of an audio frequency cycle to approximately the same peak value.

(11) The OUTPUT LEVEL control is located directly above the OUTPUT LIMITER control. Turning this control in a counterclockwise direction increases limiter action by decreasing the peak value of audio frequency voltages that appear in output of the limiter circuit. The limiter may thus be used to limit noise peaks or pulses which are greater than the maximum value that the limiter will pass, or in addition to this action it may also be used to provide a means of automatic volume control. Automatic volume control action is obtained by increasing the receiver gain and decreasing the output level by means of the limiter so that when the desired signal fades to the lowest usable level, the limiter still cuts off the desired signal peaks to a slight extent.

3. C.W. RECEPTION.

a. After the Model RBL Equipment is properly installed in accordance with Section II, it is put into operation by turning the POWER switch to the ON position. The AUDIO bandwidth switch should be at the SHARP position; the radio frequency GAIN control well advanced; the REGENERATION control advanced sufficiently to cause the detector to oscillate; the OUTPUT LIMITER control turned OFF; and the ANTENNA COMPENSATOR and R. F. TRIMMER adjusted for maximum receiver background noise. The receiver is now adjusted for the reception of C.W. signals and will tune to the approximate frequency indicated by the main tuning dial and band in use.

b. In order to obtain heterodyne detection and the desired resultant audio beat note, the REGENERATION control must be advanced sufficiently to cause the detector tube to oscillate. This condition may be checked by the OSCILLATION TEST button. (See Paragraph 2.a(9).) With the AUDIO bandwidth switch in the sharp position, the heterodyne beat note frequency should be approximately 750 cycles per second to insure that the beat note will pass through the audio band pass filter with minimum attenuation. This condition must be fulfilled by adjusting the main tuning dial to the high frequency side of the point where oscillations from the detector zero beat with the received signal. The ANTENNA COMPENSATOR and R.F. TRIMMER should then be adjusted for maximum signal. Should adjustment of the ANTENNA COMPENSATOR or R. F. TRIMMER cause any change in the frequency of the beat note produced, this change may be corrected by readjustment of the main tuning control.

c. The selectivity of the Type CNA-46161 Radio Receiver may be reduced by turning the AUDIO bandwidth control to the BROAD position. This makes the tuning less critical and the frequency of the heterodyne beat note may be any value between 700 to 2,500 cycles per second. Preliminary adjustment of the ANTENNA COMPENSATOR and R.F. TRIMMER should be made in accordance with Paragraph 3.b. The ANTENNA COMPENSATOR and R.F. TRIMMER will then be in correct adjustment when the AUDIO switch is turned from the SHARP to the BROAD position.

d. If the signal is partially obscured by static peaks or noise pulses of high intensity and short duration, the best signal-to-noise ratio will be obtained by turning the OUTPUT LIMITER control to the ON position and adjusting the OUTPUT LEVEL control. Automatic volume control action may be obtained at a sacrifice in audio quality by retarding the OUTPUT LEVEL control in a counterclockwise direction beyond the point where audio distortion is observed. (See Paragraph 2.a(11).)

4. M.C.W. RECEPTION.

a. Although primarily suited to C.W. reception, the Type CNA-46161 Receiver may be used for M.C.W. reception on frequencies between 200 and 600 Kc. Set controls as follows: POWER switch in the ON position, AUDIO bandwidth switch in the BROAD position, R.F. GAIN control well advanced, OUTPUT LIMITER switch OFF, and OUTPUT LEVEL control at 10. The REGENERATION control should be set just below the point where the detector starts to oscillate. Adjust ANTENNA COMPENSATOR and R.F. TRIMMER controls for maximum background noise. The receiver is now adjusted for M.C.W. reception.

b. The OUTPUT LEVEL control may be used in M.C.W. code reception as described in Paragraph 3.d. When receiving voice, the OUTPUT LEVEL control may be used to suppress undesired static peaks, but cannot be used to provide AVC action without excessive distortion.

5. EMERGENCY BATTERY OPERATION.

a. The operating instructions in the preceding paragraphs are also applicable when the receiver is powered by means of batteries. To conserve batteries shut power switch OFF between receiving schedules.

6. FAILURES DURING OPERATION.

a. Troubles or interruptions occurring during reception may often be corrected by checking the equipment as follows:

STEP 1. Check external connections and headphone cords.

STEP 2. Check fuses located at rear of receiver.

STEP 3. Check tubes; a tube which is not burned out will be quite warm and if operative should cause a click in headphones when momentarily removed from its socket.

SECTION IV

THEORY OF OPERATION

1. CIRCUIT DETAILS.

a. As shown in the schematic diagram, Figure 7-1 the Type CNA-46161 Radio Receiver comprises two R.F. stages and a regenerative detector stage, coupled by means of tuned impedances. Two sets of tapped inductors together with a three-gang tuning capacitor are used to cover the frequency range of 15 to 600 kilocycles. A bandswitch permits selection of any one of six bands and in addition selects coupling taps on the inductors so as to maintain satisfactory sensitivity and selectivity over the wide frequency range covered by the receiver. The tuned inductors are wound on ceramic forms and are protected against the effects of humidity by means of wax impregnation. Interaction between stages is prevented by copper shields around the inductors and by filters in common power supply leads. A detailed schematic diagram of the radio-frequency portion of the Type CNA-46161 Radio Receiver is shown in Figure 7-2; in this diagram the band switch is shown adjusted to connect the inductors for 15 to 25 kilocycle operation (Band A); to illustrate the theory of operation, it will be assumed that Band A is in use. Figure 4-1 illustrates the functions of the circuits comprising the receiver.

adjustment as is capacitor, C-109, in the second R.F. stage. The grid bias of both amplifier tubes V-101 and V-102 is adjusted by resistors R-133 and R-134. Resistor, R-133, is ganged to the main tuning capacitor, C-103, to compensate for the decrease in gain, due to decrease in L/C ratio, in tuning from the high frequency end to the low frequency end of each band. Resistor R-134 is a manual R.F. GAIN control mounted on the front panel. The R.F. voltage developed across capacitor, C-103A, is connected to the grid of first R.F. amplifier tube V-101. The plate circuit of V-101 is connected to the second R.F. inductor, L-112, by means of switch section, S-107G, and R.F. tube V-102. Capacitors C-120, C-125 and C-126 complete the R.F. circuits to ground for inductors L-112 and L-114 without grounding the direct current supplied to the plates of the R.E tubes.

b. SECOND R.F. STAGE. - The principles of operation of the second R.F. amplifier stage are similar to that described for the first R.F. stage.

c. DETECTOR CIRCUIT. - The R.F. voltage developed across capacitor, C-103C, is coupled to the grid of detector tube, V-103, by means of capacitor, C-127, which also functions as the detector grid con-

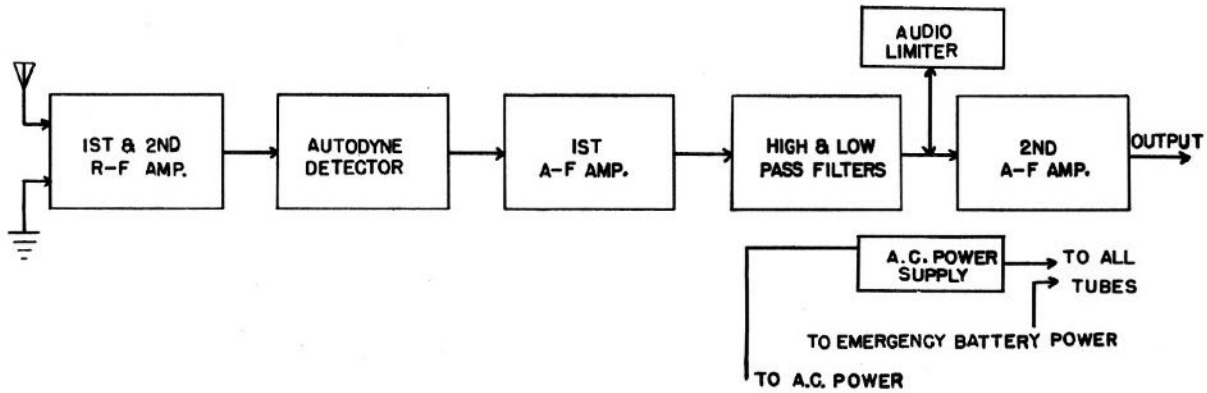


Figure 4-1 - Block Diagram of CNA-46161 Radio Receiver

2. PRINCIPLES OF OPERATION.

a. FIRST R.F. STAGE. - Signal input from the antenna is coupled to the R.F. inductor, L-110, through bandswitch section, S-107A, and capacitor C-102. When using the long antenna terminal, an additional capacitor, C-101 is connected in series with the antenna for loose coupling. Resistors R-136 and R-137 provide a leakage path for static charges which might otherwise break down the antenna coupling capacitors. Inductor, L-110, is tuned to the desired frequency by trimmer capacitor, C-104, and section, C-103A, of main tuning capacitor, C-103. These capacitors are selected by switch section S-107D. Trimmer capacitor, C-104, is located on the front panel for manual

denser. Resistor, R-106, serves as a detector grid leak. C.W. reception, as well as increased sensitivity and selectivity, are provided by connecting the detector in an electron-coupled regenerative circuit. The feedback current is taken from the cathode of V-103 and connected to the proper portion of L-114 by switch section, S-107K. Audio output is taken from the plate of V-103 without affecting the stability of the oscillatory circuit. Regeneration is controlled by potentiometer R-127 which adjusts the screen voltage of V-103.

d. SIMILARITIES BETWEEN TUNING BANDS. - The operation of the remaining radio-frequency bands is similar to the operation of Band A as explained in

the preceding paragraphs. In some band positions it is necessary to place additional capacity across unused portions of the inductors to prevent absorptive resonances from affecting the band in use. The R.F. selectivity of the receiver is shown in Figure 5-15.

e. AUDIO CIRCUITS. - The output of detector tube, V-103, is connected to the R.F. filter comprised of resistor, R-108, and capacitors C-130 and C-131 which removes R.F. components from the audio signal. The audio voltages appearing across plate load resistor, R-109, are coupled to first audio tube, V-104, by means of capacitor, C-133. The amplified audio appearing across plate load resistor, R-114, is coupled to the low-pass filter AF-101 by means of capacitor C-137. Low-pass filter AF-101 is designed to permit a choice of two possible cut-off frequencies at 800 or 3500 cycles per second which may be selected by audio switch S-106. High-pass filter AF-102 has a fixed cut-off frequency occurring at 800 cycles per second. With audio selectivity switch S-106 in the sharp position, the pass band of AF-101 and AF-102 combined is approximately 500 cycles wide at 20 db. down, with peak response occurring at 750 cycles per second. In the broad position the pass band is 3500 cycles wide at 20 db. down with the peak response at 1100 cycles per second. The audio characteristic with audio switch in the sharp position is such as to reduce noise and unwanted signal components as well as to increase the C.W. audio selectivity. The audio output of the low-pass filter is modified by the high-pass filter AF-102 so as to attenuate hum and other low frequency disturbances, since the high-pass filter has a cut-off frequency at 800 cycles per second; increasing attenuation taking place at frequencies lower than 800 cycles. The characteristics of the audio system are shown in Figure 5-16 Audio Fidelity.

f. OUTPUT LIMITER. - The output of high-pass filter AF-102 is connected directly to audio limiter tube V-105. The first section of this tube limits negative peaks of the audio cycle. The elements of the second section of V-105 are connected so as to limit positive peaks. Noise peaks are thus limited to the level of the desired signal. The limiting action is adjustable by means of potentiometer R-120 which varies the supply voltage applied to the plates of V-105. Limiting action takes place if signal or noise peaks tend to make the cathode of either diode more positive than its corresponding plate. Limiting action may be reduced to a minimum by means of switch S-105 which permits application of a higher positive voltage to the plates of V-105. With high R.F. sensitivity, limiter action serves to hold audio output at a constant level thus providing a useful form of automatic volume control. The output limiter characteristics are shown in Figure 5-18.

g. OUTPUT STAGE. - The audio output voltage of limiter tube V-105 appearing across resistor R-119, is connected to the grid of audio tube V-106 by means of capacitor C-157. The plate of V-106 is connected to the primary of output transformer T-102. The secondary of T-102 is of the balanced type having a grounded center tap; an electrostatic shield provides an R.F. screen between the primary and secondary. A 600-ohm load connected to the secondary of T-102 reflects the proper impedance into the plate circuit of output tube V-106.

h. POWER SUPPLY. - The power supply section of the Type CNA-46161 Radio Receiver is of the transformer-rectifier-filter type. Transformer T-101 supplies A.C. heater voltages as well as high A.C. voltage which is rectified by V-107. The output of V-107 is filtered by inductor L-108 and capacitors C-159, C-160 and C-161. Power socket J-103 provides a means for connecting an external battery power source when A.C. connector plug P-103 is removed and replaced with a similar plug wired to a suitable battery cable.

SECTION V

MAINTENANCE

1. MAINTENANCE TEST SCHEDULE FOR TYPE CNA-46161 RADIO RECEIVER.

NOTE

The attention of Maintenance personnel is invited to the requirements of Chapter 67 of the "Bureau of Ships Manual" of the latest issue.

a. The maintenance test schedule which follows will aid in reducing equipment failures or interruptions resulting from severe service conditions and normal deterioration of component parts:

(1) DAILY.

(a) Adjust controls for normal operation and check reception on Bands A through F.

(2) WEEKLY.

(a) Adjust controls for normal operation and check reception on Bands A through F.

(b) Check external connections for undue wear and for corrosion at terminals.

(3) MONTHLY.

(a) Repeat weekly test. Test vacuum tubes.

(b) Check for loose control knobs.

(4) QUARTERLY.

(a) Check dial calibration.

(b) Test socket voltages.

2. GENERAL TROUBLE LOCATION.

a. A thorough inspection of the receiver and its external connections should be made before any adjustments or repairs are attempted.

b. Failure of a vacuum tube in the receiver is the most likely cause of reduced sensitivity, intermittent operation, or complete failure of the equipment. In all cases of reduced sensitivity or noisy operation, all tubes should be checked, preferably by replacement with tubes of proven quality. The replacement tube should be selected with care to avoid changes in calibration and sensitivity. A poor connection in a tube can usually be found by lightly tapping the tube in question with the receiver adjusted for normal operation. A tube with shorted elements, or a shorted by-pass or filter capacitor, may seriously overload resistors of the associated circuits. Overloads may permanently damage a resistor and cause the surface of the resistor to be scorched, making the defective unit easy to locate by visual inspection. By-pass or filter capacitors which develop poor connections internally, or which become open-circuited, will in most cases cause decreased sensitivity, oscillation, or affect the normal characteristics of the equipment. The defective unit can be located by temporarily connecting a similar good capacitor in parallel with each capacitor that is under suspicion.

c. Intermittent or noisy operation of the receiver may be caused by loose connections in the wiring or external circuits. Noise may also be caused by solder or metallic particles which cause false connections and/or capacitive changes in R.F. circuits. Such faults are often difficult to find but can usually be located by lightly tapping each circuit element or component with a piece of insulating material. Faults may sometimes be located by observing some peculiar action of one of the controls. The Table of Socket Voltages and Cathode Currents, Figure 5-7, should be consulted when locating faults, and to aid in checking the effectiveness of repairs. Fuses F-101 and F-102 are connected in the A.C. supply circuit. These fuses protect the receiver from damage in the event of a high voltage surge on the A.C. supply line or if a short circuit occurs in the power supply or filament circuit of the receiver. A blown-out fuse may be easily replaced by unscrewing the fuse extractor posts located on the rear of the receiver.

NOTE

All tubes supplied with the equipment or as spares on the equipment contract shall be used in the equipment prior to employment of tubes from general stock.

3. LOCATION OF FAULTY CIRCUITS.

a. GENERAL. - If the receiver is weak or inoperative and the external connections and vacuum tubes are not at fault, a systematic procedure to employ is to adjust the receiver controls for normal operation and then, starting with the output stage, work toward the input stage of the receiver, checking each stage in turn by applying a suitable signal to the grid terminal which should result in a signal being heard in the headphones. If a signal source is lacking a test lead probe touched to the grid terminal should cause a click to be heard. By this means the inoperative circuit may be located and checked for defective components in accordance with the preceding data. The chart which follows lists troubles and indicates points to be checked, except alignment errors which are covered in Section 5-3.

b. VOLTAGE MEASUREMENT. - The table of Socket Voltages and Cathode Currents gives voltage and current readings which should be obtained if the receiver is functioning normally. Correct values of voltages for a normal receiver are also indicated on the schematic wiring diagram.

c. RESISTANCE AND CONTINUITY TESTS. - Disconnect the power cord and other external connections before making resistance or continuity tests within the receiver. When making resistance or continuity tests, the schematic wiring diagram should be

consulted to make certain that the component under test is not connected in parallel with some other circuit element thereby resulting in a false measurement. The Table of Inductor and Transformer Resistances, Figure 5-10, gives the actual D.C. resistance of all windings.

d. REPLACEMENT OF BANDSWITCH SECTIONS. - Provision has been made to permit removal of faulty switch sections when necessary. Often, however, it is possible to correct switch contact faults by first switching the rotor to an adjacent band and then bending the contact springs slightly to improve the contact tension. Figure 5-12 shows the band switch and procedure for removal of a section. In instances where it is necessary to replace a switch section, this replacement is most easily accomplished by the following procedure:

STEP 1. Loosen the set screws which fasten the shaft to the indent mechanism located near the front of the receiver. The shaft may now be slid rearward until free of the switch section to be removed.

STEP 2. Remove the two mounting screws which secure the switch section to the frame of the switch.

STEP 3. Unsolder the leads of the faulty switch and, if practicable, immediately resolder the new switch section. With short leads, this procedure may not be possible and in such cases due care should be taken to assure that proper connections are made.

STEP 4. Remount the switch section, replacing the spacer washers and lock washers, but leaving the mounting screws loose enough to permit aligning the switch section with the shaft.

STEP 5. Carefully replace the switch shaft, first ascertaining that the rotor blades of all switch sections are indexed alike. After tightening the shaft set screws, check the band switch at either end of its travel; the band selector dial should point to the corresponding band A or F position. The switch section mounting screws should be securely tightened after operation of the band switch has been checked.

4. TECHNICAL INFORMATION.

a. The curve labelled Frequency-Kilocycles Vs. Linear Dial Scale-Divisions, Figure 5-13, together with the curve for C.W. Sensitivity, Figure 5-14, provide data for definitely checking the Type CNA-46161 Radio Receiver to determine if repairs or realignment are necessary. These curves will also serve to show the efficiency of repair or realignment. The Selectivity, Fidelity, Resonant Overload, A.V.C., and Output Limiter Characteristics of Figures 5-15 to 5-18 inclusive are necessary where it is desirable to check the performance of the receiver regarding these characteristics.

Figure 5-1 - Trouble Location Chart

RECEIVER CONDITION OR FAULT	PROBABLE CAUSES BY REFERENCE NUMBERS
Weak or Inoperative	1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13
Noisy Reception	1, 2, 3, 8, 9, 10, 12, 15
Oscillation	2, 5, 6, 8
Hum	2, 3, 6, 7, 8, 12, 14, 15

REFERENCE NUMBER	PROBABLE CAUSES OF RECEIVER FAULTS
1	External connections incorrect or damaged.
2	Burned out or defective tubes.
3	Electrical leakage due to dust and/or humidity.
4	Burned out fuse.
5	Abnormal supply or socket voltages.
6	Abnormal resistor values.
7	Open filter capacitor.
8	Open or shorted by-pass capacitors.
9	Low insulation resistance of coupling capacitors.
10	Bandswitch contacts defective.
11	Open or damaged R.F. inductors.
12	False connections caused by loose solder or wire scrap.
13	Controls incorrectly adjusted.
14	Shorted filter choke.
15	Insulation failure and/or shorted turns in power transformer.

5. PERFORMANCE REQUIREMENTS.

a. SENSITIVITY CHECK.

(1) Equipment Required.

(a) Standard Signal Generator Navy Model LP Series or the equivalent.

(b) Dummy Antenna Navy Type 66017.

(c) 600-Ohm Resistor, 2 Watts.

(d) Output Meter Navy Type 22195.

b. METHOD.

(1) Connect the Signal Generator to SHORT ANT. through the dummy antenna. (See Figure 5-2.)

(2) Connect the 600-Ohm load resistor in parallel with the output terminals of the receiver.

(3) Connect the output meter across the 600-Ohm load resistor.

(4) Apply an unmodulated carrier from the signal generator to the receiver. The generator must be on the same frequency as the receiver.

(5) Set controls as in Table below.

FIGURE 5-2

Control Symbols	Control	Setting
S-102	POWER Switch	ON
S-106	AUDIO Switch	BROAD
R-134	R.F. GAIN	10
S-105	OUTPUT LIMITER SWITCH	OFF
R-120	OUTPUT LEVEL	10
R-127	REGENERATION	To Setting for Osc.
C-104	ANT. COMPENSATOR	Maximum Gain
C-109	R.F. TRIMMER	Maximum Gain
S-107	BAND SELECTOR	Correct Band
C-103	MAIN TUNING	Signal Frequency

(6) Adjust receiver to produce a 750-cycle beat note by tuning receiver to a higher frequency than that of the signal generator.

(7) Set the regeneration control for maximum output. Note the reading on the output meter which should be about 6 milliwatts.

(8) Turn the regeneration control towards maximum until output is 3 db. below that indicated in Step (7) above. MAINTAIN 750-CYCLE BEAT NOTE BY RETUNING IF NECESSARY.

(9) Adjust R.F. GAIN control for 60 microwatts of receiver output with signal generator OFF.

(10) Turn signal generator ON and increase generator output to produce 6 milliwatts receiver output with 750 beat note being maintained.

(11) Read the sensitivity of the receiver directly from the attenuator dial of the signal generator.

(12) Following Table indicated the noise and sensitivity of a typical receiver on bands F through A.

FIGURE 5-3

SENSITIVITY AND MAXIMUM NOISE

		SENSITIVITY -uV		MAXIMUM NOISE -uV	
BAND	FREQ. KC.	BROAD	SHARP	BROAD	SHARP
F	600	3.0	1.5	10M	2500
F	310	4.0	2.0	5M	2500
E	310	2.0	1.5	10M	2M
E	155	4.0	2.0	5M	2M
D	155	2.0	1.5	10M	1500
D	80	4.5	3.0	5M	2M
C	80	2.0	1.5	10M	5M
C	45	4.5	3.0	8M	5M
B	45	2.5	1.5	5M	2500
B	25	3.5	2.5	2500	2M
A	25	3.5	2.5	1500	1000
A	15	5.0	4.0	1500	1000

6. GENERAL ALIGNMENT DATA.

a. The following alignment data should be carefully studied before making any circuit adjustments. It is inadvisable to attempt alignment of the receiver unless suitable test equipment is available. Realignment of the CNA-46161 Radio Receiver is indicated if the frequency calibration is in error by more than plus or minus two per cent, or if the panel trimmers cannot be resonated throughout any band.

b. The complete alignment of any band of the Type CNA-46161 Radio Receiver may be divided into three steps:

STEP 1. Detector Alignment.

STEP 2. Second R.F. Amplifier Alignment.

STEP 3. First R.F. Amplifier Alignment.

c. Each band must be checked in the above order when complete alignment is necessary. In general, it is preferable to start with the alignment of the high frequency band and finish with the lowest frequency band. Alignment frequencies and trimmer adjustments by stages are shown in Figure 5-4.

d. REQUIRED TEST EQUIPMENT. - A Navy Model LP Series Signal generator is required together with associated equipment as listed below:

(1) Output Meter, Navy Type-22195 or the equivalent.

(2) Standard Dummy Antenna, Navy Type-66017 or the equivalent.

(3) Output Load Resistor, 600 ohms, 2 watts.

7. PREPARATION FOR ALIGNMENT.

a. Before proceeding with the alignment of the CNA-46161 Radio Receiver, the receiver must be removed from the mounting base and the bottom plate should then be removed. The various trimmer capacitors are mounted directly over the band switch. In order to adjust any of these capacitors it is necessary to loosen the lock nut located on the capacitor shaft bushing; this lock nut should, of course, be tightened again after adjustment has been made. An ordinary metal screw driver having a blade width of one-eighth inch is satisfactory for the trimmer adjustment. The trimmer capacitor positions are shown in Figure 5-6.

b. The receiver control should be adjusted for C.W. operation as explained in Section 3, Paragraph 3.a. Connect the signal generator through a dummy antenna to the short antenna terminals of the receiver as shown by the block diagram of Alignment Connections, Figure 5-5. An output meter having a resistive load of 600 ohms should be connected either to the phone jack output circuit or to the output terminal strip E-101.

c. Alignment adjustments should be made with an R.F. signal input of roughly five microvolts or as necessary to provide STANDARD OUTPUT level of six

Figure 5-4 - Alignment Frequencies and Trimmer Adjustments

Stage	Band	Alignment Freq. Kc.	Trimmer Capacitor Symbol	Adjustments
Detector Calibration	F	600 Kc.	C-113	Adjust trimmers to calibrate dial for zero beat at alignment frequency of each band.
	E	310 Kc.	C-113	
	D	155 Kc.	C-113	
	C	80 Kc.	C-114	
	B	45 Kc.	C-115	
	A	25 Kc.	C-116	
2nd R.F. Stage Alignment	F	600 Kc.	C-110	Adjust main tuning capacitor to high frequency side of alignment frequency to produce a beat note of 750 c.p.s.; with panel R.F. TRIMMER set at zero, adjust trimmer capacitors to obtain peak response at 750 c.p.s. beat note.
	E	310 Kc.	C-110	
	D	155 Kc.	C-110	
	C	80 Kc.	C-111	
	B	45 Kc.	C-112	
	A	25 Kc.	C-112	
1st R.F. Stage Alignment	F	600 Kc.	--	Adjust ANTENNA COMPENSATOR as required to resonate 1st R.F. stage on all bands.
	E	310 Kc.	--	
	D	155 Kc.	--	
	C	80 Kc.	--	
	B	45 Kc.	--	
	A	25 Kc.	--	

milliwatts into a 600-ohm output meter. Adjust input signal level as necessary to avoid overload of the R.F. circuits. R.F. overload is evidenced by broad tuning which prevents accurate adjustment of alignment capacitors.

(1) DETECTOR ALIGNMENT.

(a) Before aligning, check the position of the dial pointer with respect to the tuning capacitor; with the dial pointer set at zero on the linear scale, the tips of the rotor plates farthest from the hubs should line up with all stator tips.

(b) Errors in frequency calibration of the detector circuits occurring at the high frequency end of any band are corrected by adjustment of the proper trimmer capacitor. The detector must be in an oscillating condition for all alignment adjustments.

(c) With the receiver dial and the signal generator both adjusted to the alignment frequency of the band under test, apply a test signal of not more than five microvolts and adjust the detector trimmer capacitor to zero beat with the test signal. Trimmer capacitor C-113 serves to align the detector circuits of bands, F, E, and D; these bands should be checked before adjusting capacitor C-113. A compromise setting should be made if the detector alignment is not exactly the same for these bands. Trimmer capacitors C-114, C-115, and C-116 are provided to adjust the detector alignment of bands C, B, and A respectively and should also be adjusted for zero beat at the appropriate dial calibration and signal frequency.

(2) SECOND R.F. AMPLIFIER ALIGNMENT.

(a) Adjust the main tuning control of the receiver to the high frequency side of the test signal so that peak response occurs at an audio beat note of 750 cycles per second. (750 cycles higher than detector calibration for zero beat.) The beat note may be set to the correct value by turning the AUDIO switch to the SHARP position and tuning the receiver for maximum response. Set panel R.F. TRIMMER at zero and adjust second R.F. TRIMMER of band being aligned for maximum response, maintaining the beat note at 750 cycles per second. Trimmer capacitor C-110 serves to align the second R.F. circuits of bands F, E, and D while trimmer capacitor C-112 performs this function for bands B and A. A separate trimmer capacitor C-111 is used to align the second R.F. circuits of band C. A compromise setting should be made if the trimmer setting is not the same for those bands having a common trimmer capacitor.

(3) FIRST R.F. AMPLIFIER ALIGNMENT.

(a) The range of the ANTENNA COMPENSATOR is great enough to provide proper alignment of the first R.F. circuits of all bands without additional trimmer capacitors. In general, with good alignment it should only be necessary to set the ANTENNA COMPENSATOR for maximum amplification near the high frequency end of a band and have this setting remain fixed for other frequencies throughout the band. This test should be made with the receiver tuned higher than the signal to produce a 750-cycle beat note.

8. ALIGNMENT ERRORS.

a. Errors in alignment of the R.F. circuits or in frequency calibration of the detector circuits occurring from the middle to the low frequency end of the band may be corrected by bending the end rotor plates of the main tuning capacitor C-103 to adjust the capacity and obtain proper tracking or calibration. This adjustment can be made only when it is required by all or a majority of the bands, as bending the rotor plates affects all bands in a similar manner. To check the performance of the receiver after alignment adjustments have been made, refer to Section 5, Figure 5-3, Sensitivity and Maximum Noise or to the C.W. Sensitivity graph, Figure 5-14.

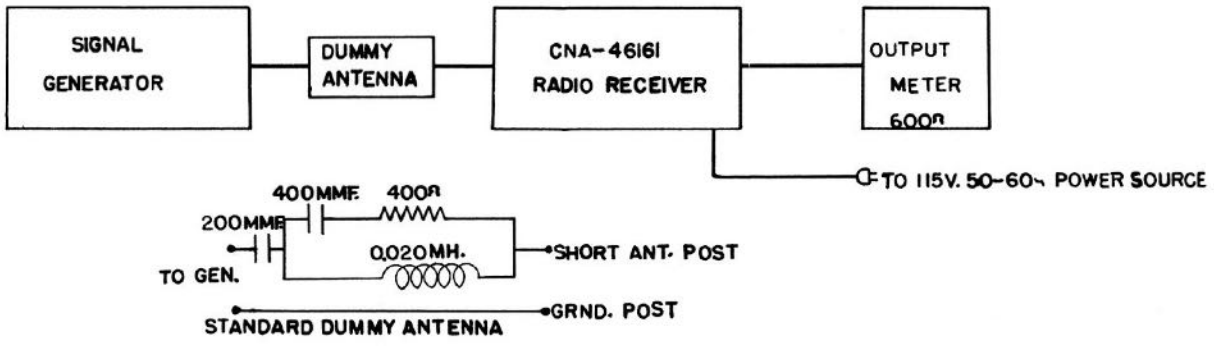


Figure 5-5 - Alignment Connections

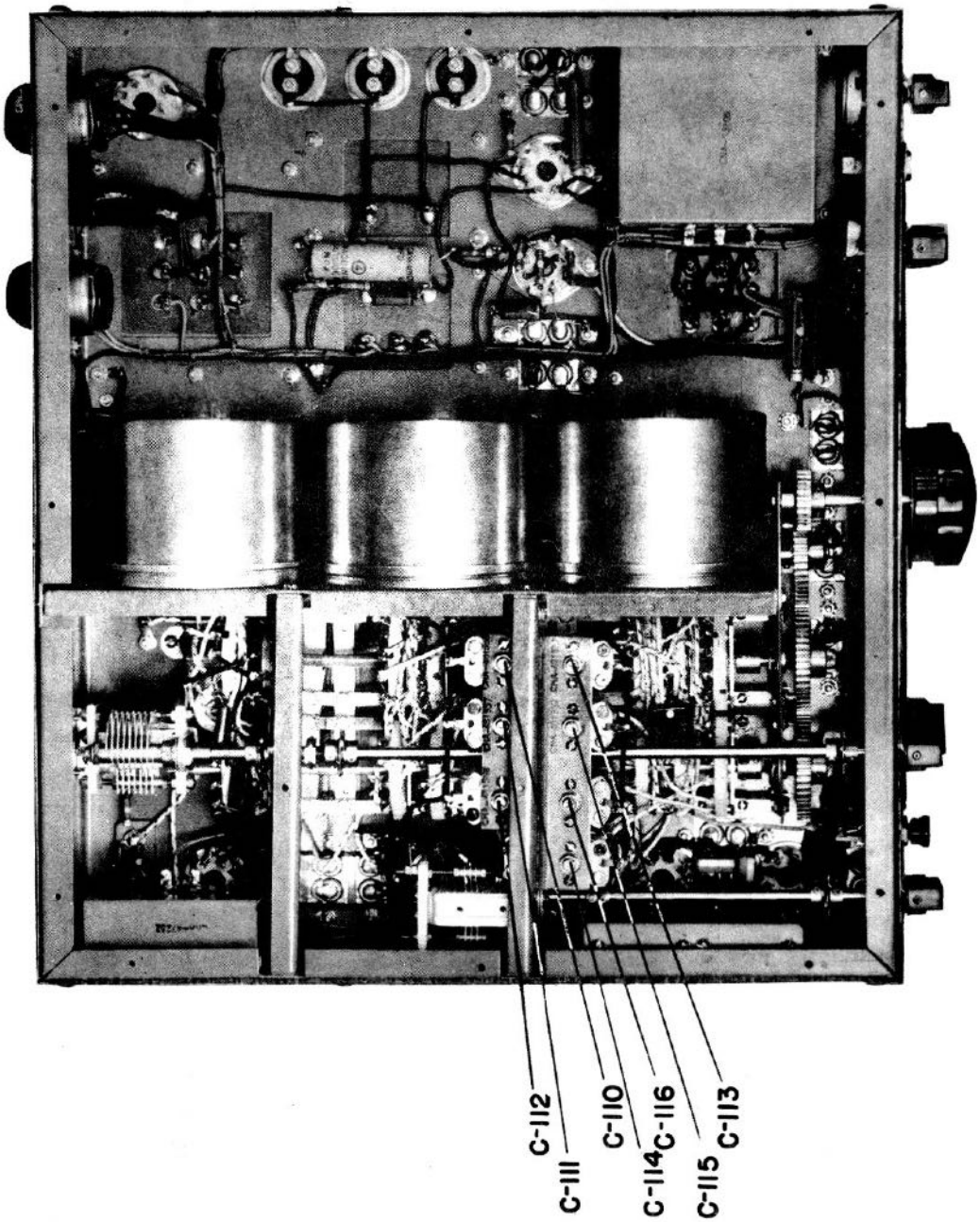


Figure 5-6 - Trimmer Capacitor Locations

Figure 5-7 - Tube Socket Voltages and Cathode Currents

Measure from Terminal to Chassis	Pin No.	Variable Symbol	Variable Setting	Voltage Variable at 0	Voltage Variable at 10	Current DC Ma. At 0	Current DC Ma. At 10
V-101 Grid	4	R-134		0	0	0	0
V-101 Cathode	5	R-134		59(100)	10.5(25)	0	2.25
V-101 Screen*	6	R-134		110(250)	100(250)	0	.45
V-101 Plate*	8	R-134		210(250)	188(250)	0	1.8
V-101 Suppressor	3	R-134		59(100)	10.5(25)	0	0
V-102 Grid	4	R-134		0	0	0	0
V-102 Cathode	5	R-134		59(100)	10.5(25)	0	2.15
V-102 Screen*	6	R-134		110(250)	100(250)	0	.45
V-102 Plate*	8	R-134		210(250)	185(250)	0	1.7
V-102 Suppressor	3	R-134		59(100)	10.5(25)	0	0
V-103 Grid	4			0	0(10)	0	0
V-103 Cathode	5			0	0	0	1.1
V-103 Screen*	6	R-127		0	37(50)	0	.3
V-103 Plate*	8			190(250)	100(250)	0	.8
V-103 Suppressor	3				0		0
V-104 Grid	4			0	0+	0	0+
V-104 Cathode	3-5			.7(1.0)			1.35
V-104 Screen*	6				31(50)		.35
V-104 Plate*	8				90(100)		1.0
V-104 Suppressor	3-5				.7(1.0)		0
V-105 Plate D2*	3	S-105	Off		55(100)		.15
V-105 Cathode D2*	4	S-105	Off		55(100)		.15
V-105 Plate D1*	5	S-105	Off		55(100)		.40
V-105 Cathode D1*	8	S-105	Off		55(100)		.40
V-106 Grid	5				0		0
V-106 Cathode	8				14(25)		28
V-106 Screen	4				205(250)		3
V-106 Plate	3				192(250)		25
V-107 Heater	2-8				218(250)		
V-105 Plate D2*	3	S-105 R-120	On	0	9.4(10)	0	.03
V-105 Cathode D2*	4	S-105 R-120	On	.4(1.0)	9.7(10)	0	.03

Figure 5-7 - Tube Socket Voltages and Cathode Currents

Measure from Terminal to Chassis	Pin No.	Variable -Symbol	Variable Setting	Voltage Variable at 0	Voltage Variable at 10	Current DC Ma. At 0	Current DC Ma. At 10
V-105 Plate D1*	5	S-105	On	-.25(1.0)	9.5(10)	0	.07
		R-120					
V-105 Cathode D1*	8	S-105	On	.4(1.0)	9.7(10)	0	.07
		R-120					
Filter Output (B+)					192		50

All measurements should be made with the equipment connected for normal operation as follows: R.F. Gain at 10, Regeneration at 0, Audio at Broad, Output Limiter at Off, Dial at High Frequency End of Band F, Output Level at 0 and Power Switch at On except when otherwise indicated in Figure 5-7. Voltage measurements are made with a 1,000 ohms per volt voltmeter except where indicated with an * in which case Voltage must be measured with a 20,000 ohms per volt voltmeter in order to obtain a useful reading. Numbers in parenthesis after voltage readings indicate the voltmeter range that should be used for each measurement. All readings will depend (in varying degree) upon the resistance of the meter and therefore upon the meter range that is used. These voltages should not be considered as operating voltages as in many cases the voltmeter loading renders circuits inoperative with resultant departure from true operating voltages.

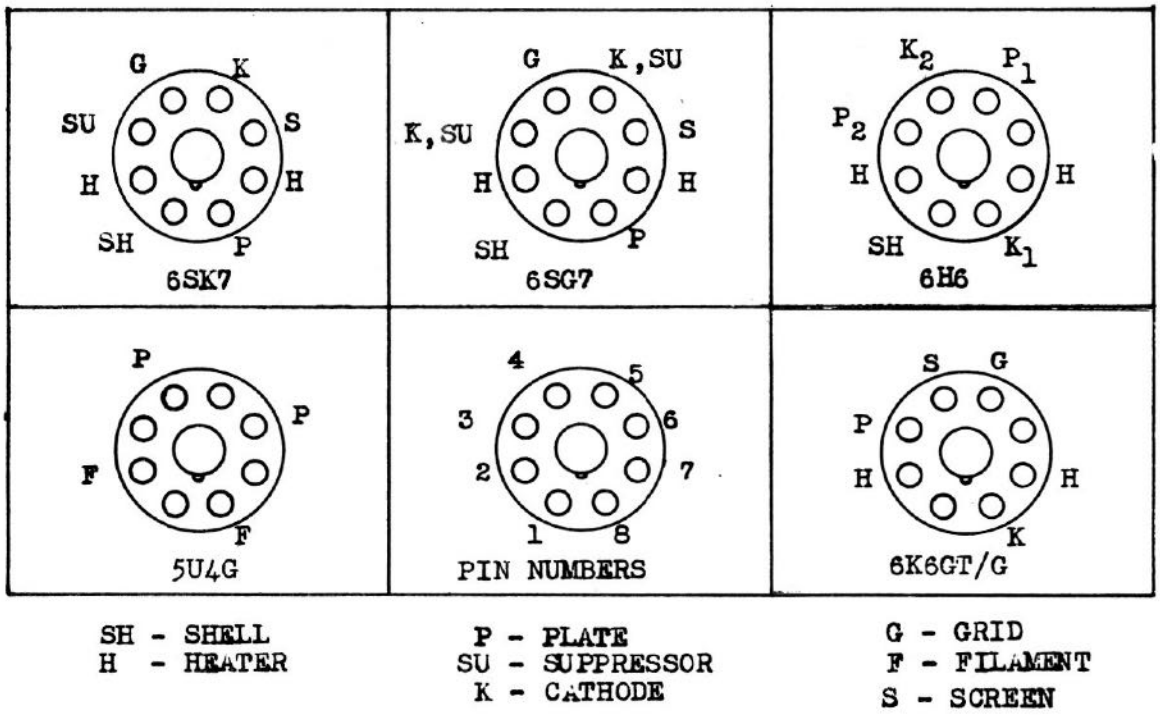


Figure 5-8 - Tube Base Diagrams

Figure 5-9 - Tube Socket to Chassis Resistance

TUBE	PIN 1	2	3	4	5	6	7	8
V-101	0	F	670	17-110*	670	19K	F	25K
V-102	0	F	670	5 meg.	670	19K	F	35K
V-103	0	F	0.3-5*	2.5 meg.	0.3-5*	31K	F	142K
V-104	0	F	500	.5 meg.	500	500 K	F	137K
V-105	0	F	300K	100K	130K	----	F	100K
V-106	-	F	17.4K	17K	.5 meg.	----	F	500
V-107	-	17.3K	----	250	----	250	--	17.3K

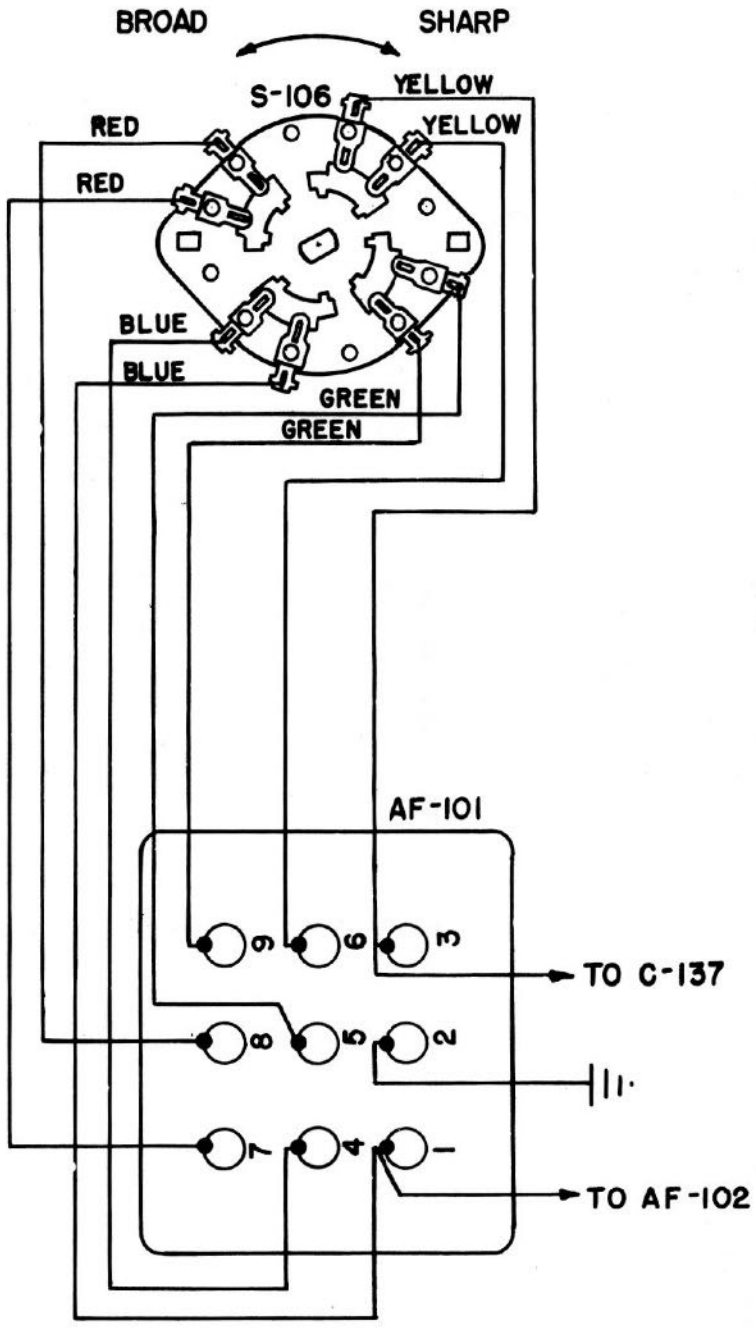
All measurements made with the receiver controls set as follows: R.F. GAIN at 10, REGENERATION at 10, OUTPUT LEVEL at 10, OUTPUT LIMITER ON, and tuning dial at 1000 on numerical scale; all external connections removed. F indicates heater terminals, * varies with band in use.

INDUCTOR AND TRANSFORMER RESISTANCES

SYMBOL DESIG.	NAME OF UNIT	TERMINAL OR LUG	DC RESISTANCE OHM ±10%	APPROXIMATE NUMBER OF TURNS	WIRE SIZE	INDUCTANCE 1000cps ±5%
AF-101	Low Pass Filter	1 - 3	800.	See L-102, L-103 and L-104		
AF-102	High Pass Filter		No continuity for D.C.	See Parts List for Details		
L-101	R.F. Filter Choke		470.	7500	34E	18H
L-102	Low Pass Filter Choke	3 - 5	200.	3600	31E	4.7H
L-103	Low Pass Filter Choke	5 - 8	400.	4600	33E	7.7H
L-104	Low Pass Filter Choke	1 - 8	200.	3600	31E	4.7H
L-108	B+ Filter Choke	1 - 3	300.	5000	31E	17H
L-109	1st R.F. Inductor 80-600 Kc.	1 - 3	17.	350	10-41EDS	*555 uh
		3 - 5	8.	160	10-41EDS	#2.30MH
		5 - 7	6.	120	10-41EDS	'8.50MH
L-110	1st R.F. Inductor 15-80 Kc.	1 - 3	110.	1500	10-41EDS	*25.5MH
		3 - 5	62.	910	10-41EDS	#81MH
		5 - 7	50.	810	10-41EDS	'265MH
L-111	2nd R.F. Inductor 80-600 Kc.	1 - 3	17.	350	10-41EDS	
		3 - 5	8.	160	10-41EDS	*555 uh
		5 - 7	6.	120	10-41EDS	#2.30MH
		5 - 6	2.2	50	10-41EDS	'8.50MH
L-112	2nd R.F. Inductor 15-80 Kc.	1 - 3	110.	1500	10-41EDS	
		3 - 5	62.	910	10-41EDS	*25.5MH
		5 - 7	50.	810	10-41EDS	#81MH
		1 - 2	25.	400	10-41EDS	'265MH
		3 - 4	13.	250	10-41EDS	
		5 - 6	8.	160	10-41EDS	
L-113	Det. Inductor 80-600 Kc.	1 - 3	17.	350	10-41EDS	
		3 - 5	8.	160	10-41EDS	
		5 - 7	6.	120	10-41EDS	*555 uh
		8 - 11	0.7	20	30ESS	#2.30MH
		9 - 11	0.5	15	30ESS	'8.50MH
		10 - 11	0.3	10	30ESS	
		1 - 2	2.	54	10-41EDS	
		3 - 4	2.	54	10-41EDS	
		5 - 6	2.	54	10-41EDS	
L-114	Det. Inductor 15-80 Kc.	1 - 3	115.	1525	10-41EDS	
		3 - 5	62.	925	10-41EDS	
		5 - 7	50.	830	10-41EDS	
		5 - 6	8.	200	10-41EDS	*24.5MH
		3 - 4	18.	325	10-41EDS	#75MH
		1 - 2	27.	525	10-41EDS	'218MH
		8 - 11	5.	120	30ESS	
		9 - 11	1.4	35	30ESS	
		10 - 11	.7	17	30ESS	
T-101	Power Transformer	1 - 4	10.	600	25E	
		7 - 9	500.	2350	35E	
		3 - 6	10.	600	25E	
		2 - 5	.09	28	16E	
T-102	Output Transformer	7 - 9	430.	5000	34E	
		1 - 3	22.	650	28E	

Measure inductance of r.f. inductors L-109 to L-114 at lugs 1 and 7; connect jumpers to lugs as indicated:
* 1 and 5
# 1 and 3
' no jumpers

Figure 5-10 - Inductor and Transformer Resistances



LOW PASS FILTER WIRING

Figure 5-11 - Low Pass Filter Wiring

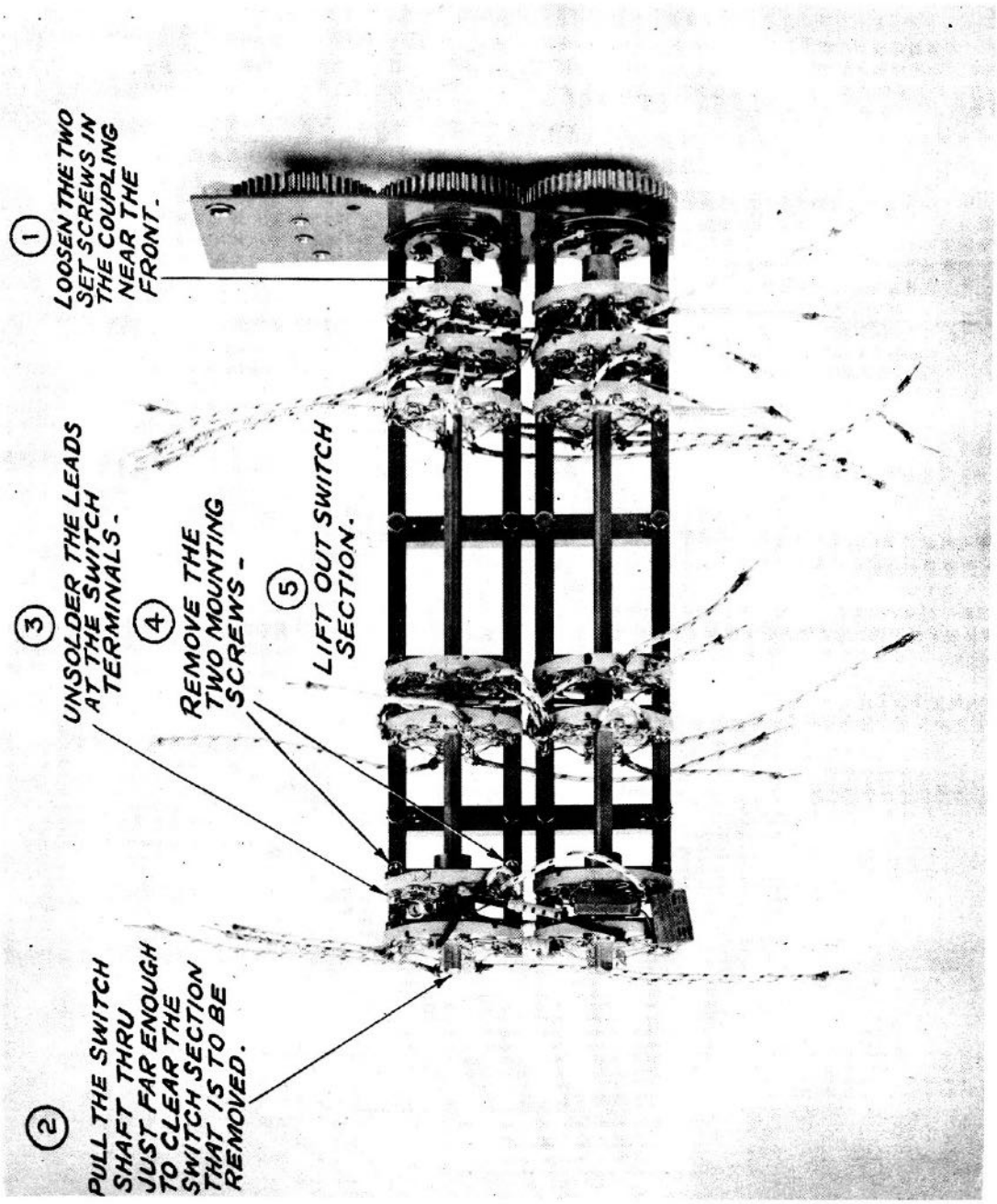


Figure 5-12 - Procedure for Removal of Band Switch Section

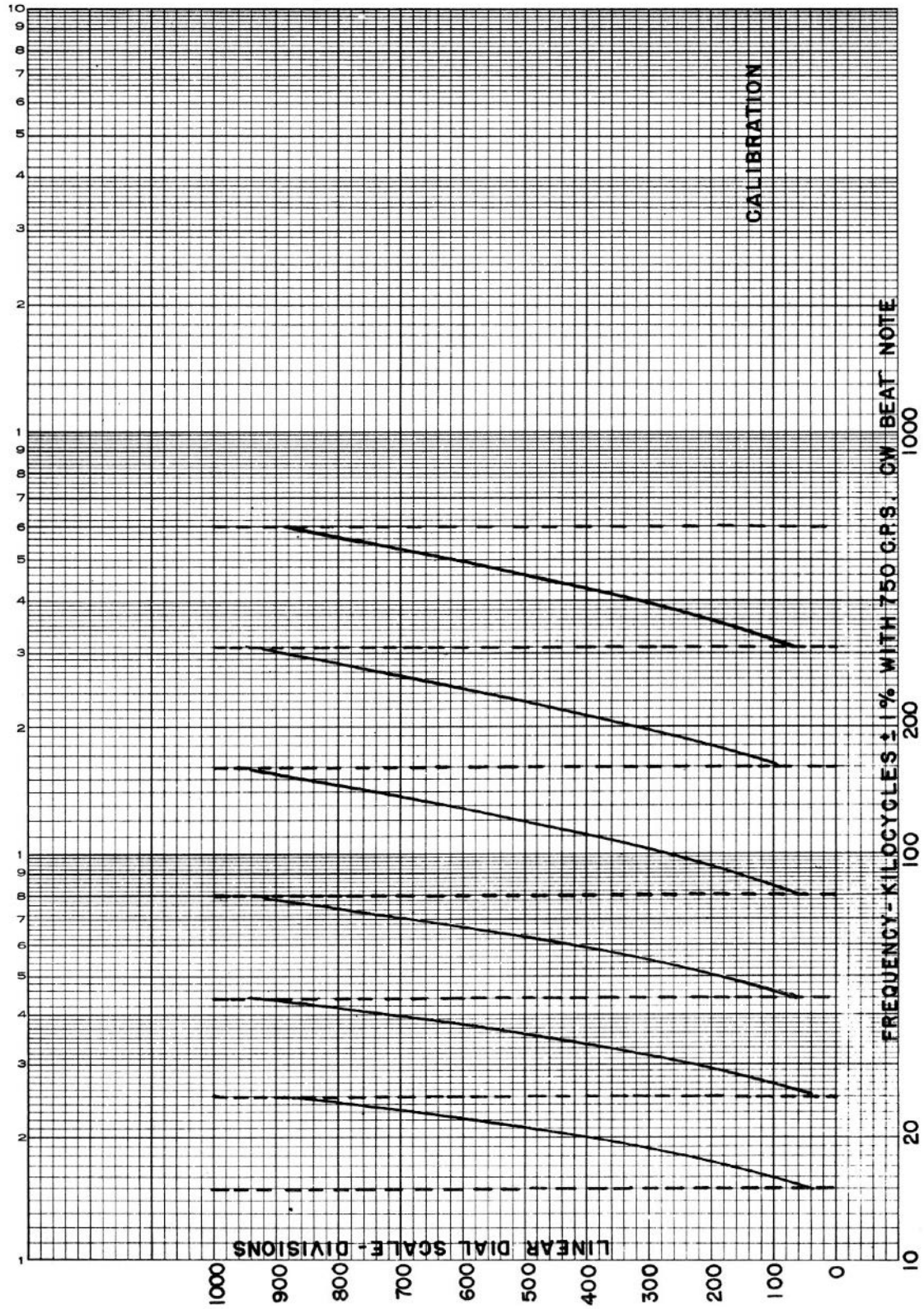


Figure 5-13 - Frequency-Kilocycles Vs. Linear Dial Scale Divisions

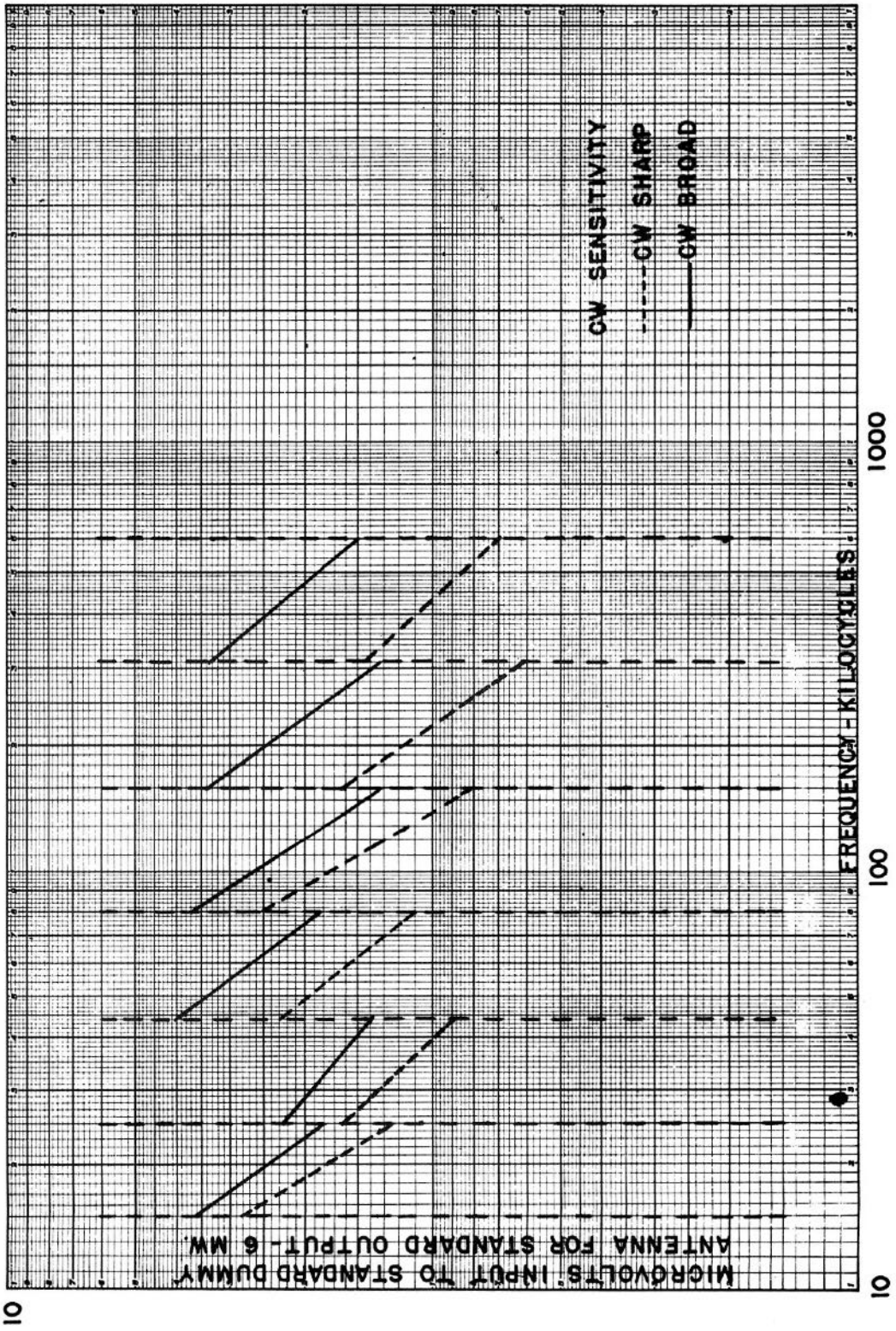


Figure 5-14 - C.W. Sensitivity Graph

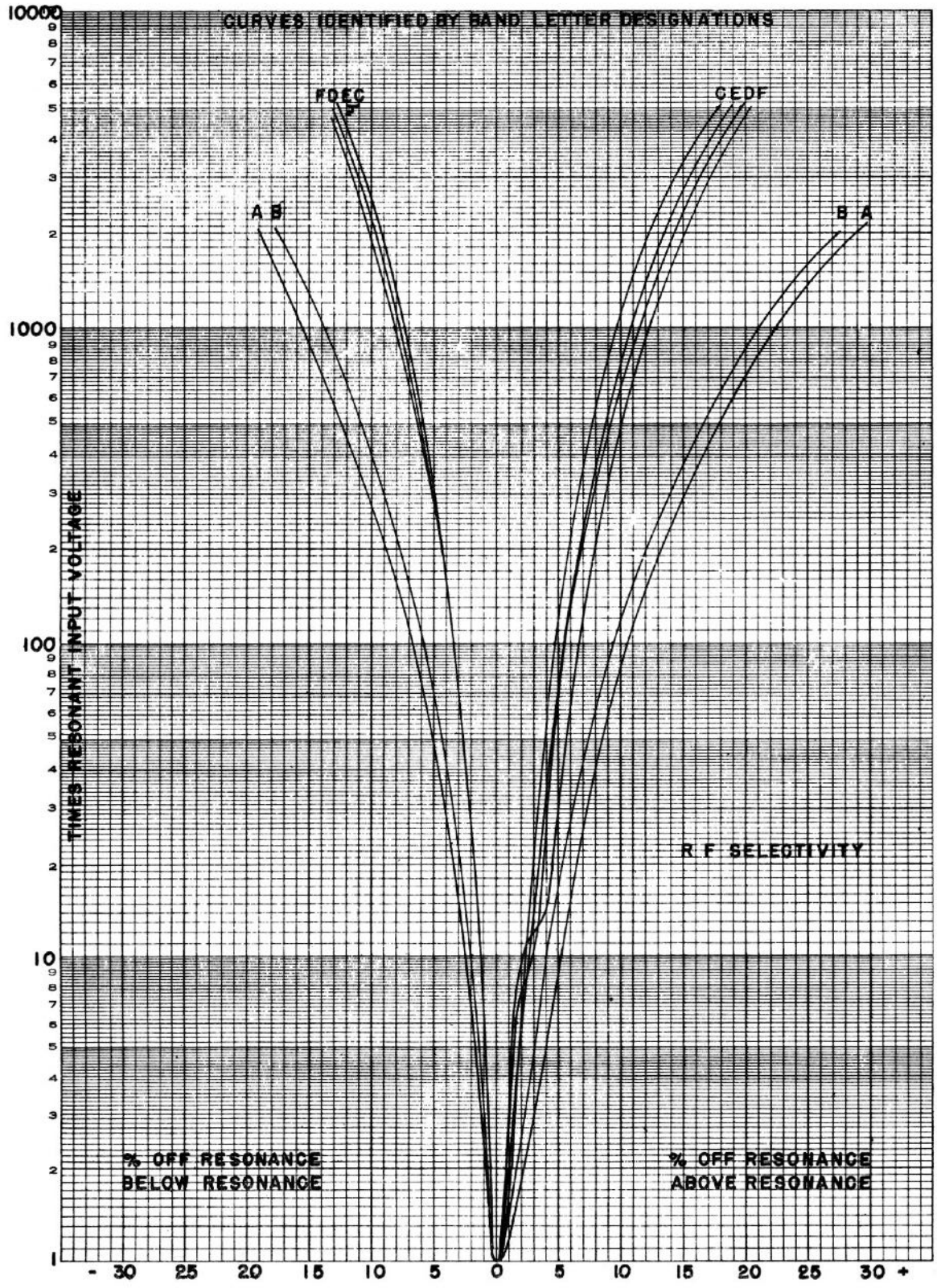


Figure 5-15 - Overall Selectivity Graph

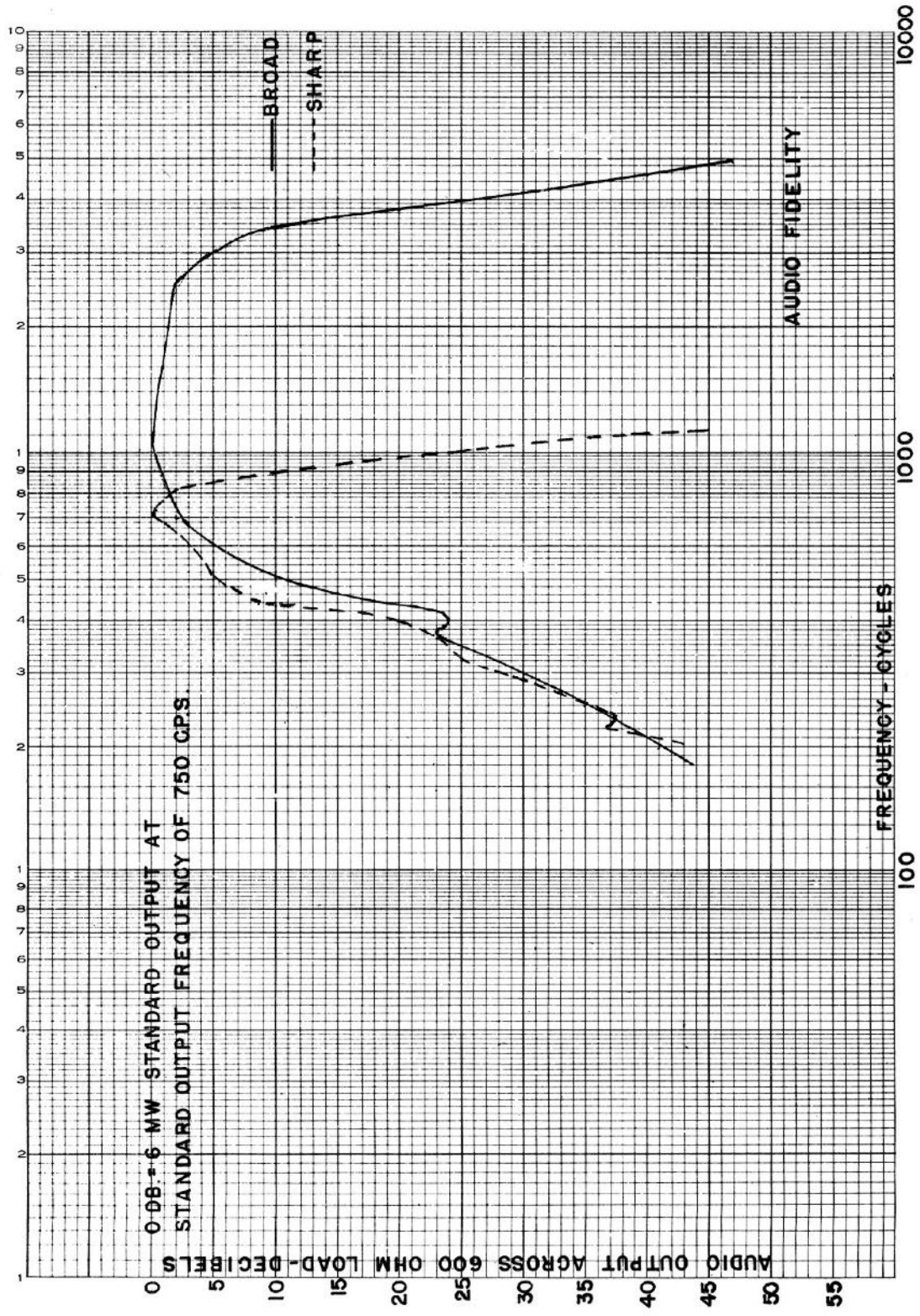


Figure 5-16 - Overall Audio Fidelity

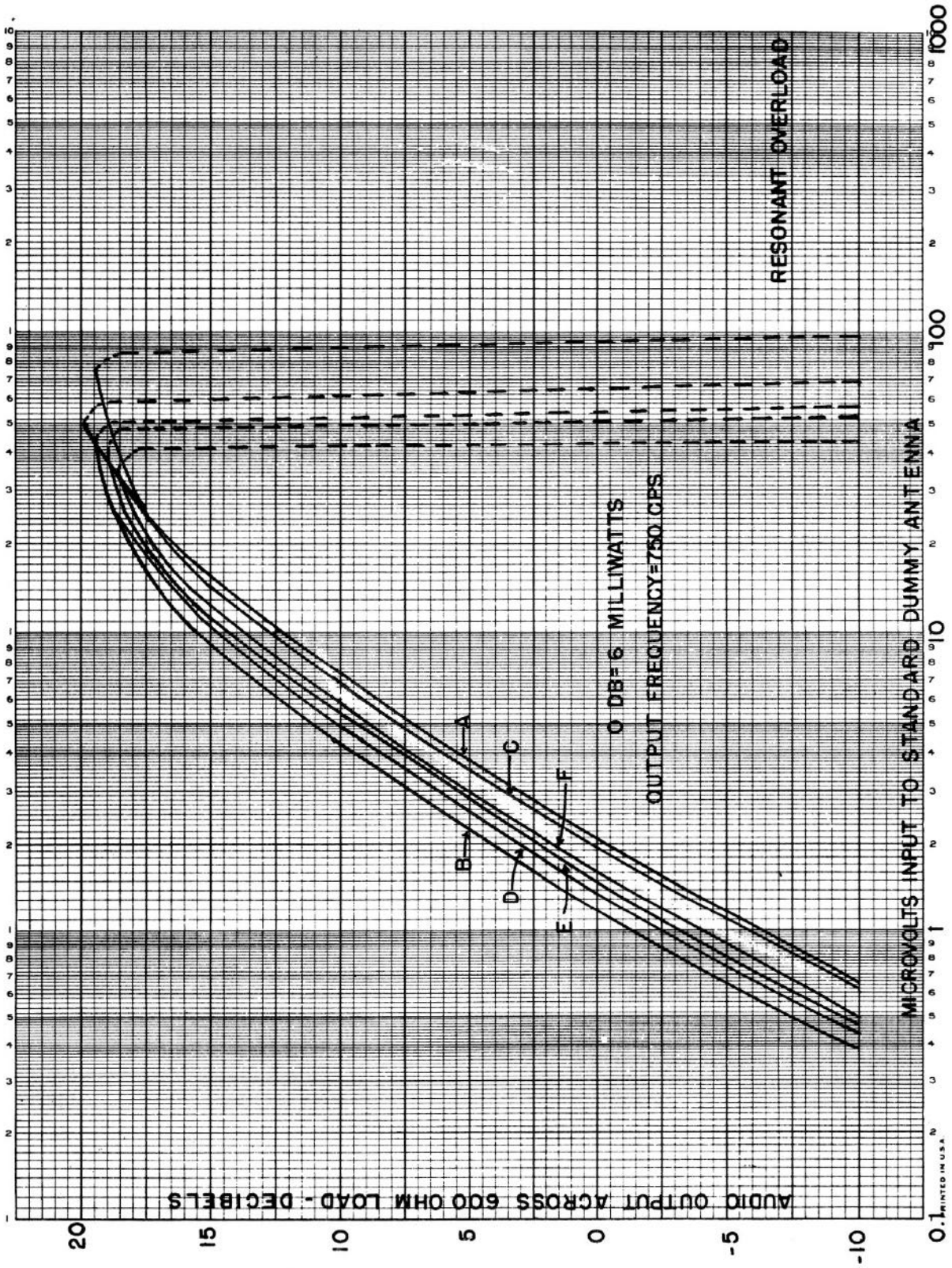


Figure 5-17 - Resonant Overload Characteristics

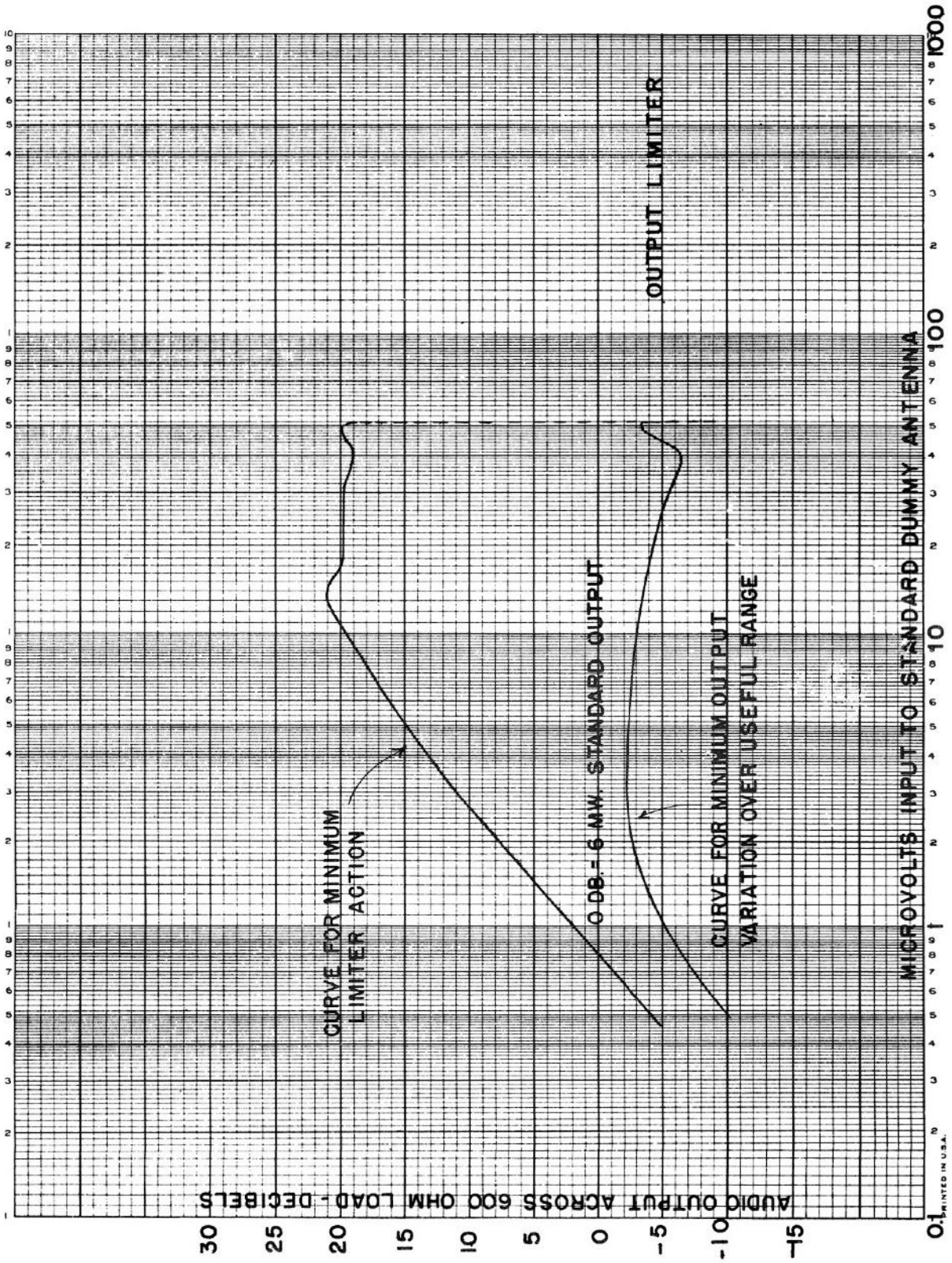


Figure 5-18 - Output Limiter Characteristics

TABLE I
LIST OF MAJOR UNITS
FOR MODEL RBL, RBL-1/2 RADIO RECEIVING EQUIPMENT

Quantity	Symbol Group	Navy Type Designation	Name	Assembly Drawing No.
1	101-199	CNA-46161	Radio Receiver	D-665
1	201-299	CNA-10124	Mounting Base	D-911

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NTD JAN or AWS	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			STRUCTURAL PARTS					
A-101	Main Dial Window	Window, Cellulose Acetate			1	B-513		B-513
			CAPACITORS					
C-101	Long Ant. Coupling	Mica: .0003 Mfd. ±10%, 500 V DC W	-481014-10	RE 48A 148C	14	1468	Wax Dip	D-774
C-101'	Long Ant. Coupling	Ceramic: .0003 Mfd. ±10%, 500 V DC W	CC35UJ301J#		10	810-385		D-825C-333
C-102	Short Ant. Coupling	Mica: .0008 Mfd. ±10%, 500 V DC W	-481428-10	RE 48A 143	14	1467	Wax Dip	D-775
C-103	Main Tuning	Var. Air: Three Section			1	SA-19-E		D-618
C-103A	1st R.F. Tuning	54-470 Mmf.						
C-103B	2nd R.F. Tuning	54-470 Mmf.						
C-103C	Detector Tuning	54-470 Mmf.						
*C-104	Antenna Compensator	Var. Air: 8-95 Mmf. 1000 V W	-481555		1	SA-19	SS-90	D-809
C-105	Ant. Coupling, Bands D,E,F	Mica: .000045 Mfd. ±5%, 500 V DC W	-481559-5	RE 48A 148	14	1468	Wax Dip	D-774
C-105'	Ant. Coupling, Bands D,E,F	Ceramic: .000045 Mfd. ±5%, 500 V DC W	-482499-5#		10	D		D-825D-416
C-106	Ant. Coupling, Band B	Mica: .001 Mfd. ±10%, 500 V DC W	-48983-10	RE 48AA 143D	14	1467	Wax Dip	D-775
C-107	Ant. Coupling, Band C	Mica: .00006 Mfd. ±5%, 500 V DC W	-481065-5	RE 48A 148C	14	1468	Wax Dip	D-774
C-107'	Ant. Coupling, Band C	Ceramic: .00006 Mfd. ±5%, 500 V DC W	CC35UJ620J#		10	C		D-825C-310
C-108	L-109 Trimmer, Bands D,E,F	Mica: .0001 Mfd. ±10%, 500 V DC W	-48674-10	RE 48A 148C	14	1468	Wax Dip	D-774
C-108'	L-109 Trimmer, Bands D,E,F	Ceramic: .0001 Mfd. ±10%, 500 V DC W	CC35CG101K#		10	C		D-825C-304
*C-109	R.F. Trimmer	Var. Air: 6-37 Mmf. 1000 V W	-481554		1	SA-19-A	SS-35	D-808
*C-110	L-111 Trimmer, Bands D,E,F	Var. Air: 5-55 Mmf. 500 V W	-481556		1	SA-11-F	USL-50	D-815
C-110'	L-111 Trimmer, Bands D,E,F	Var. Air: 5-55 Mmf. 500 V W	-481556		1	SA-435	PSL-50	D-810
*C-111	L-112 Trimmer, Band C	Var. Air: 6-75 Mmf. 500 V W	-481557		1	SA-11-G	USL-75	D-815
*C-111	L-112 Trimmer, Band C	Var. Air: 6-75 Mmf. 500 V W	-481557		1	SA-436	PSL-75	D-810
*C-112	L-112 Trimmer, Bands A,B	Var. Air: 8-100 Mmf. 500 V W	-481558		1	SA-11-H	USL-100	D-815

' May be used in place of part listed with corresponding symbol.
* For actual quantity of spares furnished refer to table IV.
# For replacement use.

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NTD JAN OR AWS	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		CAPACITORS (Continued)						
C-112'	L-112 Trimmer, Bands A,B	Var. Air: 8-100 Mmf. 500 V W	-481558		1	SA-437	PSL-100	D-810
*C-113	L-113 Trimmer, Bands D,E,F	Same as C-111	-481557		1	SA-11-G	USL-75	D-815
*C-114	L-114 Trimmer, Band C	Same as C-112	-481558		1	SA-11-H	USL-100	D-815
*C-115	L-114 Trimmer, Band B	Same as C-111	-481557		1	SA-11-G	USL-75	D-815
*C-116	L-114 Trimmer, Band A	Same as C-110	-481556		1	SA-11-F	USL-50	D-815
C-117	L-114 Anti-Resonance Band E	Mica: .0009 Mfd. ±10%, 500 V DC W	-481098-10	RE 48A 143F	14	1467	Wax Dip	D-775
*C-118	V-101 Cathode Bypass	Foil-Paper: .5 Mfd. ±10%, 600 V DC W	-481549-10	RE 48A 174	110	OM-650-B		D-744
*C-119	V-101 Screen Bypass	Same as C-118	-481549-10					
*C-120	V-101 Plate Filter	Foil-Paper: 1. Mfd. ±10%, 600 V DC W	-481550-10	RE 48A 174	110	OM-601-B		D-744
C-121	V-102 Grid Coupling	Mica: .0005 Mfd. ±10%, 500 V DC W	-48691-10	RE 48AA 143	14	1468	Wax Dip	D-774
C-121'	V-102 Grid Coupling	Ceramic: .0005 Mfd. ±10%, 500 V DC W	CC35UJ241J# (Use two)		10	Dual C		E-603-3
*C-122	V-102 Cathode Bypass	Same as C-118	-481549-10					
*C-123	V-102 Screen Bypass	Same as C-118	-481549-10					
C-124	V-102 Grid-Plate Shield	Same as C-106	-48983-10					
*C-125	V-102 Plate Filter	Same as C-120	-481550-10					
*C-126	V-102 Plate Filter	Foil-Paper: 1. Mfd. ±10%, 600 V DC W	-481551-10	RE 48A 147	110	OM-601		D-745
C-127	V-103 Grid Coupling	Mica: .0005 Mfd. ±10%, 500 V DC W	-48691-10					
C-127'	V-103 Grid Coupling	Same as C-121	CC35UJ241J# (Use two)					
*C-128	V-103 Screen Bypass	Same as C-120	-481550-10					
*C-129	V-103 Screen Filter	Same as C-120	-481550-10					
C-130	V-103 Plate R.F. Bypass	Same as C-106	-48983-10					
C-131	V-103 Plate R.F. Filter	Same as C-106	-48983-10					
*C-132	V-103 Plate Filter	Same as C-120	-481550-10					
C-133	V-104 Grid Coupling	Mica: .01 Mfd. ±10%, 300 V DC W	-48848-10	RE 48A 143A	14	1467	Wax Dip	D-775

' May be used in place of part listed with corresponding symbol. # For replacement use.
* For actual quantity of spares furnished refer to table IV.

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NTD JAN OR AWS	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		CAPACITORS (Continued)						
C-133'	V-104 Grid Coupling	Foil-Paper: .01 Mfd. ±10%, 300 V DC W	-481567		14	338T		E-369-42
*C-134	V-104 Cathode Bypass	Same as C-120	-481550-10					
*C-135	V-104 Screen Bypass	Same as C-120	-481550-10					
*C-136	V-104 Plate Filter	Same as C-126	-481551-10					
*C-137	V-104 to AF-101 Coupling	Same as C-118	-481549-10					
C-138	Part of AF-101	Mica: .00035 Mfd. ±10%, 500 V DC W	-48676-10	RE 48A 148C	14	1468	Wax Dip	D-774
C-138'	Part of AF-101	Ceramic: .00035 Mfd. ±10%, 500 V DC W	CC35UJ361J#		10	810		D-825C-330
C-139	Part of AF-101	Mica: .004 Mfd. ±10%, 300 V DC W	-48929-10	RE 48A 143F	14	1467	Wax Dip	D-775
C-139'	Part of AF-101	Foil-Paper: .004 Mfd. ±10%, 400 V DC W	CMR-482495-10		218	340		E-784-14
C-139'	Part of AF-101	Foil-Paper: .004 Mfd. ±10%, 400 V DC W	CMR-482234-10		218	339		E-783-6
C-140	Part of AF-101	Mica: .005 Mfd. ±10%, 300 V DC W	-481037-10	RE 48A 143	14	1467	Wax Dip	D-775
C-140'	Part of AF-101	Foil-Paper .005 Mfd. ±10%, 400 V DC W	CMR-482494-10		218	340		E-784-2
C-141	Part of AF-101	Same as C-133	-48848-10					
C-141'	Part of AF-101	Foil-Paper: .01 Mfd. ±10%, 300 V DC W	-484567#		14	338T		E-369-42
C-142	Part of AF-101	Same as C-117	-481098-10					
C-143	Part of AF-101	Same as C-117	-481098-10					
C-144	Part of AF-101	Same as C-139	-48929-10					
C-145	Part of AF-101	Same as C-133	-48848-10					
C-145'	Part of AF-101	Foil-Paper: .01 Mfd. ±10%, 300 V DC W	-481567		14	338T		E-369-42
C-146	Part of AF-101	Same as C-140	-481037-10	RE 48A 143	14	1467	Wax Dip	D-775
C-147	Part of AF-101	Same as C-138	-48676-10					
C-147'	Part of AF-101	Ceramic: .00035 Mfd. ±10%, 500 V DC W	CC35UJ361J#		10	810		D-825C-330
C-148	Part of AF-102	Same as C-140	-481037-10					
C-149	Part of AF-102	Mica: .006 Mfd. ±10%, 300 V DC W	-48847-10	RE 48A 143F	14	1467	Wax Dip	D-775
C-149'	Part of AF-102	Coil-Paper: .006 Mfd. ±10%, 400 V DC W	-481832-10#		218	340		E-784-4

' May be used in place of part listed with corresponding symbol.
* For actual quantity of spares furnished refer to table IV.
# For replacement use.

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NTD JAN OR AWS	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		CAPACITORS (Continued)						
C-150	Part of AF-102	Mica: .008 Mfd. ±10%, 300 V DC W	-481560-10	RE 48A 143	14	1467	Wax Dip	D-775
C-150'	Part of AF-102	Foil-Paper .008 Mfd. ±10%, 400 V DC W	-482256-10		218	340		E-784-6
C-151	Part of AF-102	Same as C-150	-481560-10					
C-152	Part of AF-102	Same as 140	-481037-10					
C-153	Part of AF-102	Same as C-149	-48847-10					
*C-154	V-105 Plate Filter	Foil-Paper: .1 Mfd. ±10%, 400 V DC W	-481073-10	RE 13A 488C	14	489		E-369
*C-155	V-105 Plate Filter	Same as C-118	-481549-10					
C-156	V-106 Output Bypass	Mica: .0025 Mfd. ±10%, 500 V DC W	-481089-10	RE 48A 143F	14	1467	Wax Dip	D-775
C-156'	V-106 Output Bypass	Foil-Paper .0025 Mfd. ±10%, 400 V DC W	-482493-10		218	340		E-784-10
C-157	V-105 to V-106 Coupling	Same as C-133	-48848-10					
C-157'	V-105 to V-106 Coupling	Foil-Paper: .01 Mfd. ±10%, 300 V DC W			14	338T		E-369-42
*C-158	V-106 Cathode Bypass	Foil-Paper: 1. Mfd. ±10%, 600 V DC W	-481550-10	RE 48A 174	110	OM-601-B		D-744
*C-159	Power Supply Filter	Foil-Paper: 4. Mfd. ±10%, 600 V DC W	-481080-10		13	P8213		E-333
*C-159'	Power Supply Filter	Foil-Paper: 4. Mfd. ±10%, 600 V DC W	-481080-10		12	TLAD-6040		E-333
*C-159'	Power Supply Filter	Foil-Paper: 4. Mfd. ±10%, 600 V DC W	-481080-10		110	NAT-104		E-333
*C-159'	Power Supply Filter	Foil-Paper: 4. Mfd. ±10%, 600 V DC W	-481080-10		14	610N2-4		E-333
*C-160	Power Supply Filter	Same as C-159	-481080-10					
*C-161	Power Supply Filter	Same as C-159	-481080-10					
*C-162	AC Line Bypass	Same as C-118	-481549-10					
*C-163	AC Line Bypass	Same as C-118						
C-164	L-114 Trimmer Band B	Mica: .00005 Mfd. ±10%, 500 V DC W	-48895-10	RE 48A 148C	14	1468	Wax Dip	D-774
C-164'	L-114 Trimmer Band B	Ceramic: .00005 Mfd. ±10%, 500 V DC W	-481635-10#		10	813		D-825D-417
C-165	L-114 Trimmer Band A	Same as C-108	-48674-10					
C-165'	L-114 Trimmer Band A	Ceramic: .0001 Mfd. ±10%, 500 V DC W	CC35CG101K		10	810		D-825C-324

' May be used in place of part listed with corresponding symbol.
* For actual quantity of spares furnished refer to table IV.
# For replacement use.

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NAVY TYPE NUMBER	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			CAPACITORS (Continued)					
C-166	Part of AF-101	Mica: .003 Mfd. ±10%, 500 V DC W	-481036-10	RE 48A 143F	14	1467	Wax Dip	D-775
C-166'	Part of AF-101	Foil-Paper .003 Mfd. ±10%, 400 V DC W	-482492-10		218	340		E-784-2
C-166'	Part of AF-101	Foil-Paper .003 Mfd. ±10%, 400 V DC W	-482491-10		218	339		E-783-4
C-167	Part of AF-101	Same as C-166	-481036-10					
*C-168	R.F. Gain Control Bypass	Same as C-154	-481073-10					
			MISCELLANEOUS ELECTRICAL PARTS					
E-101	Audio Output Terminals	Insulated Screw Terminals			8	1720	Marked Output	E-265-6
E-102	Antenna Terminals	Insulated Binding Posts			1	SA-26-C		D-672
E-103	Ground Terminal	Binding Post			1	SA-91-D		
			FUSES					
*F-101	AC Line Fuse	2 Amperes, Glass Enclosed			76	1042		F-135-4
*F-102	AC Line Fuse	Same as F-101						
			INDICATING DEVICES					
*I-101	Dial Lamp	6.3V., 15A. Bayonet Base			18	47		F-136-6
*I-102	Dial Lamp	Same as I-101						
			JACKS AND RECEPTACLES					
J-101	Phone Jack	Single Circuit		-49008-A	129	2A		D-777-1
J-102	Dummy Socket	Recessed Male, Small 7 Prong		-49201	128	61C?7S		D-769
J-103	Power Socket	Same as J-102		-49201				
			INDUCTORS					
*L-101	R.F. Filter Reactor	18 Henry ±20%, 470 Ohms ±10%, DC Res.		-47252	1	SA-31-D		D-781
L-102	Part of AF-101	4.7H. ±10%, 3600T., No. 31E, 200 Ohms ±10%			1	13131		
L-103	Part of AF-101	7.7H. ±10%, 4600T., No. 33E, 400 Ohms ±10%			1	14004		
L-104	Part of AF-101	Same as L-102						

' May be used in place of part listed with corresponding symbol.
* For actual quantity of spares furnished refer to table IV.

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NAVY TYPE NUMBER	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		INDUCTORS (Continued)						
L-105	Part of AF-102	18H. ±10%, 7500T., No. 34E, 470 Ohms ±10%			1	NCT10019		
L-106	Part of AF-102	10.8H ±10%, 7500T., No. 34E, 470 Ohms ±10%			1	NCT10019	Air Gap	
L-107	Part of AF-102	Same as L-105						
L-108	Power Supply Filter Reactor	17 Henry ±20%, 5000T No. 31E, 300 Ohms ±10% DC Res.	-30931		1	SA-31-E		D-782
L-109	1st R.F. Input Bands D,E and F	Four Windings on a Ceramic Spool	-47247		1	SA-55-H		D-785
L-110	1st R.F. Input Bands A,B, and C	Three Windings on a Ceramic Spool	-47250		1	SA-55-E		D-788
L-111	2nd R.F. Input Bands D,E, and F	Four Windings on a Ceramic Spool	-47248		1	SA-55-G		D-786
L-112	2nd R.F. Input Bands A,B and C	Three Windings on a Ceramic Spool	-47251		1	SA-55-D		D-789
L-113	Det. Input Bands D,E, and F	Five Windings on a Ceramic Spool	-47246		1	SA-55-F		D-784
L-114	Det. Input Bands A,B, and C	Five Windings on a Ceramic Spool	-47249		1	SA-55-C		D-787
		NAMEPLATES AND DIALS						
N-101	Equipment Nameplate	Etched Zinc			1	D-711	RBL Only	D-711
N-102	Receiver Nameplate	Etched Zinc			1	D-705	RBL Only	D-705
N-103	Acceptance Nameplate	Etched Zinc			1	D-457	RBL Only	D-457
N-101	Equipment Nameplate	Etched Zinc			1	D-712	RBL-1 Only	D-712
N-102	Receiver Nameplate	Etched Zinc			1	D-713	RBL-1 Only	D-713
N-103	Acceptance Nameplate	Etched Zinc			1	D-457	RBL-1 Only	D-457
N-101	Equipment Nameplate	Stamped Bakelite			1	D-714	RBL-2 Only	D-714
N-102	Receiver Nameplate	Stamped Bakelite			1	D-715	RBL-2 Only	D-715
N-103	Acceptance Nameplate	Stamped Bakelite			1	D-457A	RBL-2 Only	D-457A
N-104	Dial Scale	Etched Brass			1	D-581		D-581
N-105	Auxilliary Logging Dial	Etched Brass			1	D-611		D-611
N-106	R-134 Scale	Etched Zinc			1	D-678-1		D-678-1
N-107	J-101 Scale	Etched Zinc			1	D-689		D-689
N-108	R-127 Scale	Etched Zinc			1	D-678-2		D-678-2

See Technical Information Section for additional R.F. Coil data.

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NAVY TYPE NUMBER	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		NAMEPLATES AND DIALS (Continued)						
N-109	S-107 Scale	Etched Zinc			1	D-687		D-687
N-110	C-104 Scale	Etched Zinc			1	D-678A-3		D-678A-3
N-111	S-101 Scale	Etched Zinc			1	D-688		D-688
N-112	C-109 Scale	Etched Zinc			1	D-678A-4		D-678A-4
N-113	R-120, S-105 Scale	Etched Zinc			1	D-685-2		D-685-2
N-114	S-102, S-106 Scale	Etched Zinc			1	D-685-1		D-685-1
N-115	R-134 Knob	Molded Bakelite			1	SA-2-B		
N-116	R-127 Knob	Same as N-115						
N-117	S-107 Knob	Molded Bakelite			1	SA-2-C		
N-118	C-104 Knob	Same as N-115						
N-119	C-109 Knob	Same as N-115						
N-120	S-105 Knob	Same as N-115						
N-121	R-120 Knob	Same as N-115						
N-122	C-103 Knob	Same as N-117						
N-123	S-102 Knob	Same as N-115						
N-124	S-106 Knob	Same as N-115						
N-125	S-107 Pointer	Etched Zinc			1	D-686		D-686
N-126	S-101 Knob	Molded Bakelite						
		PLUGS						
P-101	A.C. Line Plug	Two Prong, Male			69	22		
P-102	D.C. Cable Connector Plug	Small Seven Prong, Female	-49202		128	PF7S		D-678
P-103	A.C. Supply Connector Plug	Same as P-102						
		RESISTORS						
*R-101	V-101 Cathode	350 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-102	V-101 Screen Filter	10000 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-103	V-102 Grid	5. Megohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-104	V-102 Cathode	Same as R-101	-63360-10					
*R-105	V-102 Screen Filter	Same as R-102	-63360-10					
*R-106	V-103 Grid	2.5 Megohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-107	V-103 Screen Filter	Same as R-102	-63360-10					
*R-108	V-103 Plate R.F. Filter	25000 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-109	V-103 Plate	70000 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-110	V-103 Plate Filter	Same as R-102	-63360-10					
*R-111	VV-104 Grid	.5 Megohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-112	V-104 Cathode	500 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-113	V-104 Screen Filter	Same as R-111	-63360-10					

*For actual quantity of Spares furnished refer to Table IV

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NAVY TYPE NUMBER	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		RESISTORS (Continued)						
*R-114	V-104 Plate	.1 Megohm ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-115	AF-101 Termination	Same as R-108	-63360-10					
*R-116	V-105 Input Plate	Same as R-114	-63360-10					
*R-117	V-105 Plate Filter	20000 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-118	V-105 Cathode	Same as R-114	-63360-10					
*R-119	V-105 Output Plate	.25 Megohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-120	Limiter Control	10000 Ohms, W.W. Var., 1.5 Watt	-631286	RE 13A 492	11	P58-10000V	G-60	D-771
*R-121	Voltage Divider	50000 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
*R-122	V-105 Plate Filter	Same as R-121	-63360-10					
*R-123	V-106 Grid	Same as R-111	-63360-10					
*R-124	V-106 Cathode	500 Ohms±10%, 2 Watt, Fixed	-63474-10	RE 13A 372G	10	316		D-791
*R-125	V-104 Plate Filter	Same as R-117	-63360-10					
*R-126	V-102, V-102 Plate Filter	10000 Ohms ±10%, 2 Watt, Fixed	-63474-10	RE 13A 372G	10	316		D-791
*R-127	Regeneration Control	25000 Ohms, W.W. Var., 1.5 Watt	-631287	RE 13A 492	11	P58-25000	I-4168-B	D-771
*R-128	V-103 Screen Filter	.1 Megohm ±10%, 2 Watt, Fixed	-63474-10	RE 13A 372G	10	316		D-791
*R-129	V-102 Plate Filter	Same as R-102	-63360-10					
*R-130	V-101 Plate Filter	Same as R-102	-63360-10					
*R-131	Voltage Divider	20000 Ohms ±10%, 2 Watt, Fixed	-63474-10	RE 13A 373G	10	316		D-791
*R-132	Voltage Divider	Same as R-131	-63474-10					
*R-133	Gain Compensation	750 Ohms, W.W. Var., 1.5 Watt	-631284	RE 13A 492	11	P58-750	D-595	D-595
*R-134	R.F. Gain Control	5000 Ohms, W.W. Var., 1.5 Watt	-631285	RE 13A 492	11	P58-5000	I-4168-A	D-771
*R-135	Voltage Divider	5000 Ohms ±10%, 2 Watt, Fixed	-63474-10	RE 13A 372G	10	316		D-791
*R-136	Long Ant. Static Drain	Same as R-111	-63360-10					
*R-137	Short Ant. Static Drain	Same as R-119	-63360-10					
*R-138	R.F. Gain Shunt	10000 Ohms ±10%, 1/2 Watt, Fixed	-63360-10	RE 13A 372G	10	310		D-770
		SWITCHES						
S-101	Oscillation Test Switch	Single Circuit Closing	-24047		5	2001		D-776
S-102	Power Supply Switch	Dual Switch Assembly			3	1570-NM		D-666
*S-102A	A.C. Line Switch	SPST Toggle, Slotted Handle	-24146		3	80993-C		D-772
*S-102B	Heater And B+ Switch	DPST Toggle, Slotted Handle	-24147		3	81009-P		D-773
S-103	Not Used							
S-104	Not Used							
S-105	Limiter Switch Assembly	Single Switch Assembly			3	81021-V		D-667
*S-105A	Limiter Switch	SPDT Toggle, Slotted Handle	-24148		3	81021-W		D-863

*For actual quantity of Spares furnished refer to Table IV

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NAVY TYPE NUMBER	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		SWITCHES (Continued)						
S-106	Audio Selectivity Switch	4PST Rotary, Ceramic			111	22744-HIC		D-807
S-107	Band Switch	14 Pole 6 Position Rotary			1	SA-66-A		D-659
S-107A	Band Switch Section	1 Pole 6 Position Ceramic Section			1	D-550		D-550
S-107B	Band Switch Section	Same as S-107A						
S-107C	Band Switch Section	Same as S-107A						
S-107D	Band Switch Section	Same as S-107A						
S-107E	Band Switch Section	Same as S-107A						
S-107F	Band Switch Section	Same as S-107A						
S-107G	Band Switch Section	Same as S-107A						
S-107H	Band Switch Section	Same as S-107A						
S-107J	Band Switch Section	Same as S-107A						
S-107K	Band Switch Section	Same as S-107A						
S-107L	Band Switch Section	Same as S-107A						
S-107M	Band Switch Section	Same as S-107A						
S-107N	Band Switch Section	Same as S-107A						
S-107P	Band Switch Section	Same as S-107A						
		TRANSFORMERS						
T-101	Power Transformer	115V., 50/60 Cycle, 1 Phase, 50 Watt	-30930		1	SA-31-G		D-778
	Primary:Terminals 1 And 4	600T, No. 25E, DC Res. 10 Ohms ±10%, 115 V., 0.5 Amp.						
	Heater Secondary: Terminals 3 And 6	35T, No. 16E, DC Res. .12 Ohms ±10%, 6.3V, 3. Amp.						
	Rectifier Secondary: Terminals 2 And 5	28T, No. 16E, DC Res. .09 Ohms ±10%, 5V., 3. Amp.						
	1/2 H.V. Secondary: Terminals 7 and 8	1175T, No. 35E, DC Res. 240 Ohms ±10%, 200V., .02 Amp.						
	1/2 H.V. Secondary: Terminals 8 And 9	1175T, No. 35E, DC Res. 260 Ohms ±10% 200 V., .02 Amp.						
*T-102	Audio Output Transformer	Impedance: 36000/600 Ohms	-30932		1	SA-31-H		D-783
	Primary: Terminals 7 And 9	5000T, No. 34E, DC Res. 430 Ohms ±10%						
	Secondary: Terminals 1 And 3	650T, No. 28E, DC Res. 22 Ohms ±10%						
	Terminal 2	Secondary Center Tap						

*For actual quantity of Spares furnished refer to Table IV

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NAVY TYPE NUMBER	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			VACUUM TUBES					
*V-101	1st R.F. Amplifier Tube	Super-Control Amplifier	-6SK7		17	6SK7		
*V-102	2nd R.F. Amplifier Tube	Same as V-101	-6SK7		17	6SK7		
*V-103	Regenerative Det. Tube	Same as V-101	-6SK7		17	6SK7		
*V-104	1st Audio Tube	Pentode Amplifier	-6SG7		17	6SG7		
*V-105	Limiter Tube	Twin Diode	-6H6		17	6H6		
*V-106	Audio Output Tube	Pentode Power Amplifier	-6K6GT/G		17	6K6GT/G		
*V-107	Rectifier	Rectifier	-5U4G		17	5U4G		
			INTERCONNECTING CABLES					
W-101	A.C. Line Cord	2 Wire, Rubber Covered			69	POSJ		
			SOCKETS					
*X-101	Socket For V-101	Octal Ceramic	°49373	RE 49AA 313	128	RSS-8M		D-806
*X-102	Socket For V-102	Same as X-101	°49373					
*X-103	Socket For V-103	Same as X-101	°49373					
*X-104	Socket For V-104	Same as X-101	°49373					
*X-105	Socket For V-105	Same as X-101	°49373					
*X-106	Socket For V-106	Same as X-101	°49373					
*X-107	Socket For V-107	Same as X-101	°49373					
X-108	Socket For I-101	Miniature Bayonet Socket			127	85UL		
X-109	Socket For I-102	Same as X-108						
X-110	Holder For F-101	Extractor Post			76	1075		D-887
X-111	Holder For F-102	Same as X-110						
			FILTERS					
AF-101	Low-Pass Filter	Three Section; Cut-Off At 800 Or 3500C/S By External Switch Impedance: 50000/50000 Ohms	-53108		1	SA-31-F		D-780
AF-102	High-Pass Filter	Three Section; Cut-Off At 800C/S, Impedance: 50000/50000 Ohms	-53109		1	SA-31-I		D-779
			STRUCTURAL PARTS					
A-201	Shock Mount	Rubber Shock Mount			125	200PH25		
A-202	Shock Mount	Same as A-201						
A-203	Shock Mount	Same as A-201						

°For replacement use.
*For actual quantity of Spares furnished refer to Table IV

TABLE II
PARTS LIST BY SYMBOL DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

SYMBOL DESIG.	FUNCTION	DESCRIPTION	NAVY TYPE NUMBER	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
		STRUCTURAL PARTS (Continued)						
A-204	Shock Mount	Same as A-201			125	200PH25		
		HARDWARE						
H-201	Receiver Mounting Screw	Screw, 1/2" Hex. Head, 12-24 Thd., 13/16" Long			1	D-759		D-759
H-202	Receiver Mounting Screw	Same as H-201						
H-203	Receiver Mounting Screw	Same as H-201						
H-204	Receiver Mounting Screw	Same as H-201						
		NAMEPLATES						
N-201	Mounting Base Nameplate	Etched Zinc			1	D-901	RBL Only	D-901
N-201	Mounting Base Nameplate	Etched Zinc			1	D-929	RBL-1 Only	D-929
N-201	Mounting Base Nameplate	Stamped Bakelite			1	D-930	RBL-2 Only	D-930

TABLE III
PARTS LIST BY NAVY TYPE DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENT

QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED
MISCELLANEOUS CLASS 10		
1		E-101
1		E-102
1		E-103
2		I-101, I-102
SWITCHES CLASS 24		
1	-24047	S-101
1	-24428	S-102
1	-24427	S-105
1		S-106
1		S-107
FUSES CLASS 28		
1		F-101
1		F-102
TRANSFORMERS AND REACTORS CLASS 30		
1	-30930	T-101
1	-20931	L-108
1	-30932	T-102
VACUUM TUBES CLASS 38		
3	-6SK7	V-101, V-102, V-103
1	-6SG7	V-104
1	-6H6	V-105
1	-6K6GT/G	V-106
1	-5U4G	V-107
R.F. TRANSFORMERS AND INDUCTORS		
1	-47252	L-101
1	-47247	L-109
1	-47250	L-110
1	-47248	L-111
1	-47251	L-112
1	-47246	L-113
1	-47249	L-114
CAPACITORS CLASS 48		
2	-48674	C-108, C-165
2	-48676	C-138, C-147
2	-48691	C-121, C-127
2	-48847	C-149, C-153
5	-48848	C-133, C-141, C-157
1	-48895	C-164
CAPACITORS (CONTINUED) CLASS 48		
2	-48929	C-139, C-144
4	-48983	C-106, C-124, C-130 C-131
1	-481014	C-101
2	-481036	C-166, C-167
3	-481037	C-140, C-146, C-148
1	-481065	C-107
2	-481073	C-154, C-168
3	-481080	C-159, C-160, C-161
3	-481098-10	C-117, C-142, C-143
1	-481428	C-102
8	-481549-10	C-118, C-119, C-122 C-123, C-137, C-155 C-162, C-163
8	-481550-10	C-120, C-125, C-128 C-129, C-132, C-134 C-135, C-158
2	-481551-10	C-126, C-136
1	-481554	C-109
1	-481555	C-104
2	-481556	C-110, C-116
3	-481557	C-111, C-113, C-115
1	-481558	C-112
1	-481559-5	C-105

TABLE III
PARTS LIST BY NAVY TYPE DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENT

QUANTITY	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED
CAPACITORS (CONTINUED) CLASS 48		
2	-481560-10	C-150, C-151
PLUGS, JACKS, AND SOCKETS CLASS 49		
1	-49009-A	J-101
2	-49201	J-102, J-103
1		P-101
2	-49202	F-102, P-103, X-101 X-102, X-103, X-104
7	-49373	X-105, X-106, X-107
2		X-108, X-109
2		X-110, X-111
FILTERS CLASS 53		
1	-53108	AF-101, L-102, L-103 L-104,
1	-53109	AF-102, L-105, L-106, L-107
RESISTORS CLASS 63		
2	-63360-10	R-101, R-104
6	-63360-10	R-102, R-105, R-107 R-110, R-129, R-130
1	-63360-10	R-103
1	-63360-10	R-106
RESISTORS CLASS 63		
2	-63360-10	R-108, R-115
1	-63360-10	R-109
4	-63360-10	R-111, R-113, R-123 R-136
1	-63360-10	R-112
3	-63360-10	R-114, R-116, R-118
2	-63360-10	R-117, R-125
2	-63360-10	R-119, R-137
1	-631286	R-120
2	-63474-10	R-124
1	-63474-10	R-126
1	-631287	R-127
1	-63474-10	
2	-63474-10	R-131, R-132
1	-631284	R-133
1	-631285	R-134
1	-63474-10	R-135
1	-63360-10	R-138

TABLE IV
SPARE PARTS LIST BY NAVY TYPE DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

QUANTITIES EQUIPMENT SPARE PARTS	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			MISCELLANEOUS (CLASS 10)					
2		I-101,I-102	6.3 V. .15A Bayonet Base Lamp		18	47		
28			Tube Socket Spring Contacts		128	E-769-1	For RSS8M	E-769-1
2			Spanner Wrench		1			SA-101-H
1			Set Screw Wrench		1	#6		F-131-2
1			Set Screw Wrench		1	#8		F-131-3
1			Spare Parts Box		1	D-890-5		D-890-5
2			Insulated Lugs, 1 Left		8	1510		D-947-1
2			Insulated Lugs, 1 Right		8	1513		D-947-2
2			Insulated Lugs, 1 Left, 1 Right		8	1520		D-947-4
2			Insulated Lugs, 2 Right		8	1525		D-947-7
2			Insulated Lugs, 2 Left		8	1529		D-947-6
			SWITCHES (CLASS 24)					
1	-24146	S-102A	SPST Slotted Handle 3A 125V		3	80993-C		D-772-1
1	-24147	S-102B	DPST Slotted Handle 3A 125V		3	81009-P		D-773-1
1	-24148	S-105A	SPDT Slotted Handle 3A 125V		3	81021-W		D-863-1
			FUSES (CLASS 28)					
2		F-101,F-102	Fuse, 2A., Glass Enclosed		76	1042		F-135-4
			A.F. TRANSFORMERS AND INDUCTORS (CLASS 30)					
1	-30932	T-102	Audio Output Transformer, Impedance: 36000/600 Ohms, Pri: Terms. 7-9 5000T, No. 34E, DC Res. 430 Ohms ±10%, Sec: Terms. 1-3 650T, No. 28E, DC Res. 22 Ohms ±10%, Term. 2 Sec. Center Tap		1	SA-31-H		D-783
			VACUUM TUBES (CLASS 38)					
1	-5U4G	V-107	Rectifier		17	5U4G		
1	-6H6	V-105	Dual Diode		17	6H6		
1	-6K6GT/G	V-106	Audio Output		17	6K6GT/G		
1	-6SG7	V-104	R.F. Pentode		17	6SG7		
3	-6SK7	V-101,V-102,V-103	Triple Grid Amplifier		17	6SK7		
			R.F. INDUCTORS (CLASS 47)					
1	-47252	L-101	18 Henry ±20%, DC Res. 470 Ohms ±10%		1	SA-31-D		D-781
			CAPACITORS (CLASS 48)					
1	-481073-10	C-154,C-168	Foil-Paper: .1 Mfd. 400 V DC W ±10%		14	489		E-369-16

TABLE IV
SPARE PARTS LIST BY NAVY TYPE DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

QUANTITIES EQUIPMENT SPARE PARTS	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			CAPACITORS (CLASS 48) (Continued)					
2	-481080-10	C-159,C-160,C-161	Foil-Paper: 4. Mfd. 600 V DC W ±10%		13	P8213		E-333
	-481080-10	C-159',C-160', C-161'	Foil-Paper: 4. Mfd. 600 V DC W ±10%		12	TLAD-6040		E-333
	-481080-10	C-159',C-160', C-161'	Foil-Paper: 4. Mfd. 600 V DC W ±10%		110	NAT-104		E-333
	-481080-10	C-159',C-160', C-161'	Foil-Paper: 4. Mfd. 600 V DC W ±10%		14	610N2-4		E-333
*4	-481549-10	C-118,C-119,C-122, C-123,C-137,C-155, C-162,C-163	Foil-Paper: .5 Mfd. 600 V DC W ±10%		110	OM-650-B		D-744
#4	-481550-10	C-120,C-125,C-128, C-129,C-132,C-134, C-135,C-158	Foil-Paper: 1. Mfd. 600 V DC W ±10%		110	OM-601-B		D-744
#1	-481551-10	C-126,C-136	Foil-Paper: 1. Mfd. 600 V DC W ±10%		110	OM-601		D-745
1	-481554	C-109	Var. Air: 6 to 37 Mmf. 1000V W		1	SA-19-A	SS-35	D-808
1	-481555	C-104	Var. Air: 8 to 95 Mmf. 1000V W		1	SA-19	SS-90	D-809
1	-481556	C-110,C-116	Var. Air: 5 to 55 Mmf. 500V W		1	SA-11-F	USL-50	D-815
	-481556	C-110',C-116'	Var. Air: 5 to 66 Mmf. 500V W		1	SA-435	PSL-50	D-810
2	-481557	C-111,C-113,C-115	Var. Air: 6 to 75 Mmf. 500V W		1	SA-11-G	USL-75	D-815
	-481557	C-111',C-113', C-115'	Var. Air: 6 to 75 Mmf. 500V W		1	SA-436	PSL-75	D-810
1	-481558	C-112,C-114	Var. Air: 8 to 100Mmf. 500V W		1	SA-11-H	USL-100	D-815
	-481558	C-112',C-114'	Var. Air: 8 to 100Mmf. 500V W		1	SA-437	PSL-100	D-810
			TUBE SOCKETS (CLASS 49)					
2	-49373	X-101 to X-107	Octal, Ceramic		128	RSS8M		D-806-1
			RESISTORS (CLASS 63)					
1	-63360-10	R-101,R-104	350 Ohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-112	500 Ohm, 1/2 Watt ±10%		10	310		D-770
3	-63360-10	R-102,R-105,R-107, R-110,R-129,R-130	10,000 Ohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-117,R-125	20,000 Ohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-108,R-115	25,000 Ohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-121,R-122	50,000 Ohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-109	70,000 Ohm, 1/2 Watt ±10%		10	310		D-770
2	-63360-10	R-114,R-116,R-118	.1 Megohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-119,R-137	.25 Megohm, 1/2 Watt ±10%		10	310		D-770

' May be used in place of part listed with corresponding symbol.
* MFR. TYPE OM-650-0, NAVY TYPE -481997 may be used in place of MFR. TYPE OM-650-B.
# MFR. TYPE OM-601-0, NAVY TYPE -481998 may be used in place of MFR. TYPE OM-601-B or OM-601.

TABLE IV
SPARE PARTS LIST BY NAVY TYPE DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

QUANTITIES EQUIPMENT SPARE PARTS	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			RESISTORS (CLASS 63) (Continued)					
2	-63360-10	R-111, R-113, R-123, R-136	.5 Megohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-106	2.5 Megohm, 1/2 Watt ±10%		10	310		D-770
1	-63360-10	R-103	5. Megohm, 1/2 Watt ±10%		10	310		D-770
1	-63474-10	R-124	500 Ohm, 2 Watt ±10%		10	316		D-791
1	-63474-10	R-126	10,000 Ohm, 2 Watt ±10%		10	316		D-791
1	-63474-10	R-131, R-132	20,000 Ohm, 2 Watt ±10%		10	316		D-791
1	-63474-10	R-135	5,000 Ohm, 2 Watt ±10%		10	316		D-791
1	-63474-10	R-128	.1 Megohm, 2 Watt ±10%		10	316		D-791
1	-631284	R-133	750 Ohm, W.W. Var., 1.5 Watt ±10%		11	P58-750		D-595
1	-631285	R-134	5,000 Ohm, W.W. Var., 1.5 Watt ±10%		11	P58-5000		D-771-1
1	-631286	R-120	10,000 Ohm, W.W. Var., 1.5 Watt ±10%		11	P58-10000V		D-771-3
1	-631287	R-127	25,000 Ohm, W.W. Var., 1.5 Watt ±10%		11	P58-25000		D-771-5

QUANTITIES STOCK SPARE PARTS	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			TRANSFORMERS AND REACTORS (CLASS 30)					
2	-30930	T-101	Power Transformer, 115 V., 50/60 Cycle, 1 Phase, 50 Watt, Pri: Terms. 1-4 600T, No. 25E, DC Res. 10 Ohms ±10%, 115 V., 0.5 Amp. Sec: Terms. 3-6 35T, No. 16E, DC Res. .12 Ohms ±10%, 6.3 V., 3 Amp. Sec: Terms. 2-5 28T, No. 16E, DC Res. .09 Ohms ±10%, 5 V., 3. Amp. 1/2 H.V.Sec: Terms. 7-8 1175T, No. 35E, DC Res. 240 Ohms ±10%, 200 V., .02 Amp. 1/2 H.V.Sec: Terms. 8-9 1175T, No. 35E, DC Res. 260 Ohms ±10%, 200 V., .02 Amp.		1	SA-31-G		D-778
2	-30931	L-108	Reactor, 17 H ±20%, Terms. 1-3 5000T, No. 31E, DC Res. 300 Ohms ±10%		1	SA-31-E		D-782
			R.F. INDUCTORS AND TRANSFORMERS (CLASS 47)					
1	-47246	L-113	Det. Coil, Bands D,E and F		1	SA-55-F		D-784
1	-47247	L-109	1st RF Coil, Bands D,E and F		1	SA-55-H		D-785

TABLE IV
SPARE PARTS LIST BY NAVY TYPE DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

QUANTITIES STOCK SPARE PARTS	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			R.F. INDUCTORS AND TRANSFORMERS (CLASS 47) (Continued)					
1	-47248	L-111	2nd RF Coil, Bands D,E and F		1	SA-55-G		D-786
1	-47249	L-114	Det. Coil, Bands A,B and C		1	SA-55-C		D-787
1	-47250	L-110	1st RF Coil, Bands A,B and C		1	SA-55-E		D-788
1	-47251	L-112	2nd RF Coil, Bands A,B and C		1	SA-55-D		D-789
			CAPACITORS (CLASS 48)					
1	-48674-10	C-108,C-165	Mica: .0001 Mfd. 500V DC W ±10%		14	1468		D-774
		C-108',C-165'	Ceramic: .0001 Mfd. 500V DC W ±10%		10	C		D-825C-304
1	-48676-10	C-138,C-147	Mica: .00035 Mfd. 500V DC W ±10%		14	1468		D-774-17
		C-138',C-147'	Ceramic: .00035 Mfd. 500V DC W ±10%		10	Dual C		D-603
1	-48691-10	C-121,C-127	Mica: .0005 Mfd. 500V DC W ±10%		14	1468		D-774-9
		C-121',C-127'	Ceramic: .0005 Mfd. 500V DC W ±10%		10	Dual C		E-603
1	-48847-10	C-149,C-153	Mica: .006 Mfd. 300V DC W ±10%		14	1467		D-775
		C-149',C-153'	Paper: .006 Mfd. 400V DC W ±10%		218	340		E-784-4
2	-48848-10	C-133,C-141,C-145, C-157	Mica: .01 Mfd. 300V DC W ±10%		14	1467		D-775
		C-133',C-141', C-145',C-157'	Paper: .01 Mfd. 400V DC W ±10%		218	340		E-784-8
1	-48895-10	C-164	Mica: .00005 Mfd. 500V DC W ±10%		14	1468		D-774
		C-164'	Ceramic: .00005 Mfd. 500V DC W ±10%		10	D		D-825D-417
1	-48929-10	C-139,C-144	Mica: .004 Mfd. 300V DC W ±10%		14	1467		D-775
		C-139',C-144'	Paper: .004 Mfd. 400V DC W ±10%		218	339		E-783-6
2	-48983-10	C-106,C-124,C-130, C-131	Mica: .001 Mfd. 500V DC W ±10%		14	1467		D-775
1	-481014-10	C-101	Mica: .0003 Mfd. 500V DC W ±10%		14	1468		D-774
		C-101'	Ceramic: .0003 Mfd. 500V DC W ±10%		10	C		D-825C-333
1	-481036-10	C-166,C-167	Mica: .003 Mfd. 500V DC W ±10%		14	1467		D-775
		C-166',C-167'	Paper: .003 Mfd. 400V DC W ±10%		218	339		E-783-4
2	-481037-10	C-140,C-146,C-148, C-152	Mica: .005 Mfd. 300V DC W ±10%		14	1467		D-775
		C-140',C-146', C-148',C-152'	Paper: .005 Mfd. 400V DC W ±10%		218	340		E-784-2
1	-481065-5	C-107	Mica: .00006 Mfd. 500V DC W ±5%		14	1468		D-774
		C-107'	Ceramic: .00006 Mfd. 500V DC W ±5%		10	C		D-825C-319
1	-481089-10	C-156	Mica: .0025 Mfd. 500V DC W ±10%		14	1467		D-775
		C-156'	Paper: .0025 Mfd. 400V DC W ±10%		218	339		E-784-10
2	-481098-10	C-117,C-142,C-143	Mica: .0009 Mfd. 500V DC W ±10%		14	1467		D-775
1	-481428-10	C-102	Mica: .0008 Mfd. 500V DC W ±10%		14	1467		D-775
1	-481559-5	C-105	Mica: .000045 Mfd. 500V DC W ±5%		14	1468		D-774
		C-105'	Ceramic: .000045 Mfd. 500V DC W ±5%		10	D		D-825D-416
1	-481560-10	C-150,C-151	Mica: .008 Mfd. 300V DC W ±10%		14	1467		D-775
		C-150',C-151'	Paper: .008 Mfd. 400V DC W ±10%		218	340		E-784-6

' May be used in place of part listed with corresponding symbol.

TABLE IV
SPARE PARTS LIST BY NAVY TYPE DESIGNATION
FOR MODELS RBL, RBL-1 AND RBL-2 RECEIVING EQUIPMENTS

QUANTITIES STOCK SPARE PARTS	NAVY TYPE NUMBER	ALL SYMBOL DESIGNATIONS INVOLVED	DESCRIPTION	NAVY DRAWING OR SPEC.	MFR.	MFR. DESIG.	SPECIAL TOLERANCE RATING OR MODIFICATION	NATIONAL CO DRAWING AND PART NUMBER
			AUDIO FILTERS (CLASS 53)					
2	-53108	AF-101	Three Section; Cut-off at 800 or 3500 C/S by External Switch Impedance: Terms. 3-2 Input 50,000 Ohms, Terms. 1-2 Output 50,000 Ohms		1	SA:31-F		D-790
2	-53109	AF-102	Three Section; Cut-off at 800 C/S, Impedance: Terms. 1-2 Input 50,000 Ohms, Terms. 3-2 Output 50,000 Ohms		1	SA:31-I		D-779

TABLE V

COLOR CODES

FOR MODEL RBL RECEIVING EQUIPMENT

COLOR CODE FOR CAPACITORS

Color	Figures	Multiply By	V DC W	Tolerance	Temperature Coefficient#
Black	0	1			Zero
Brown	1	10	100*	1%	-.00003
Red	2	100	200*	2%	-.00008
Orange	3	1,000	300*	3%	-.00015
Yellow	4	10,000	400*	4%	-.00022
Green	5	100,000	500*	5%	-.00033
Blue	6	1,000,000	600*	6%	-.00047
Violet	7	10,000,000	700*	7%	-.00075
Gray	8	100,000,000*	800*	8%	
White	9	1,000,000,000*	900*	9%	
Gold*		0.1*	1000*	5%	
Silver*		0.01*	2000*	10%	
No Color*			500*	20%	
Gray#		0.1			
White#		0.01		10%	

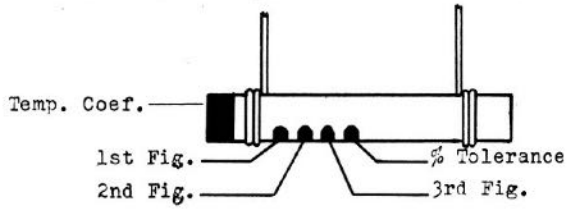
COLOR CODE FOR RESISTORS

Color	1st Figure	2nd Figure	Multiply By
Black		0	1
Brown	1	1	10
Red	2	2	100
Orange	3	3	1,000
Yellow	4	4	10,000
Green	5	5	100,000
Blue	6	6	1,000,000
Violet	7	7	
Gray	8	8	
White	9	9	

Resistive Tolerance Code

Gold -- 5% Silver -- 10% No Color -- 20%

*Mica Capacitors only
#Centralab Ceramic Capacitors only
Temperature coefficient is expressed in MMF/MMF/C°.
V DC W Of all Ceramic Capacitors is not indicated. See Parts List.



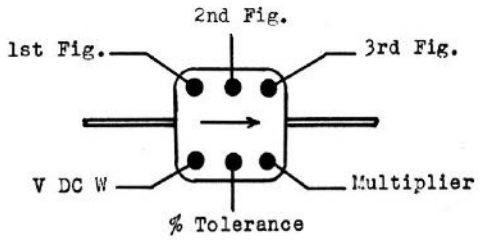


TABLE VI
LIST OF MANUFACTURERS
MODEL RBL,-1 AND -2 EQUIPMENTS

CODE NO.	MFR. PREFIX	NAME	ADDRESS
1	CNA	National Company, Inc.	Malden, Massachusetts
3	CHH	Arrow-Hart & Hegeman Co.	Hartford, Connecticut
5	CMA	P. R. Mallory & Co., Inc.	Indianapolis, Indiana
8	CMG	Cinch Manufacturing Co.	Chicago, Illinois
10	CBN	Central Radio Labs.	Milwaukee, Wisconsin
11	CMC	Clarostat Mfg. Co., Inc.	Brooklyn, New York
13	CSF	Sprague Products Co.	North Adams, Massachusetts
14	CAW	Aerovox Corporation	New Bedford, Massachusetts
17	CRC	RCA Manufacturing Co.	Harrison, New Jersey
18	CG	General Electric Co.	Cleveland, Ohio
69		Cornish Wire Company	New York, New York
76	CLF	Littelfuse Laboratories	Chicago, Illinois
110	CTD	Tobe Deutschmann Corp.	Canton, Massachusetts
111	COC	Oak Manufacturing Co.	Chicago, Illinois
127	CYA	Alden Products Company	Brockton, Massachusetts
128	CPH	American Phenolic Corp.	Chicago, Illinois
129	CRA	Utah Radio Products Co.	Chicago, Illinois
218	CMR	Micamold Radio Corp.	Brooklyn, New York
12	CD	Cornell-Dubilier Corp.	South Plainfield, New Jersey

TABLE OF TUBE SOCKET VOLTAGES & RESISTANCES

(MEASURE FROM TERMINAL TO CHASSIS)

TUBE	ELEMENT	PIN NO.	VOLTAGE (D.C.)	RESISTANCE (Ohms)
V-101	Grid	4	0	17 to 110
6SK7	Cathode	5	10.5	670
	Screen*	6	100	19K
	Plate*	8	188	25K
	Suppressor	3	10.5	670
V-102	Grid	4	0	5 meg.
6SK7	Cathode	5	10.5	670
	Screen*	6	100	19K
	Plate*	8	185	35K
	Suppressor	3	10.5	670
V-103	Grid	4	0	2.5 meg.
6SK7	Cathode	5	0	0.3-5
	Screen*	6	37	31K
	Plate*	8	100	142K
	Suppressor	3	0	0.3-5
V-104	Grid	4	0+	.5 meg.
6SG7	Cathode	3-5	0	500
	Screen*	6	31	500K
	Plate*	8	90	137K
	Suppressor	3-5	.7	500
V-105	Plate D-2*	3	9.4	300K
6H6	Cathode D-2*	4	9.7	100K
	Plate D-1*	5	9.5	130K
	Cathode D-1*	8	9.7	100K
V-106	Grid	5	0	.5 meg.
6K6GT/G	Cathode	8	14	500
	Screen	4	205	17K
	Plate	3	192	17.4K
V-107	Heater	2-8	218	17.3K
5U4G	Plate	4-6		250

Except as indicated by an asterisk*, all voltages apply to actual readings obtained when using a 1000-ohm-per-volt meter, whose maximum scale reading is not more than approximately three times the stipulated value.

An asterisk* indicates that measurement with a 20,000-ohm-per-volt meter is necessary for true indication.

All measurements should be made with the equipment connected for normal operation as follows:

R. F. Gain — 10
Regeneration — 10
Audio - Broad
Output Limiter - On
Dial - H. F. end of Band F
Output Level - 10
Power Switch - ON, except if making resistance measurements when it should be OFF.

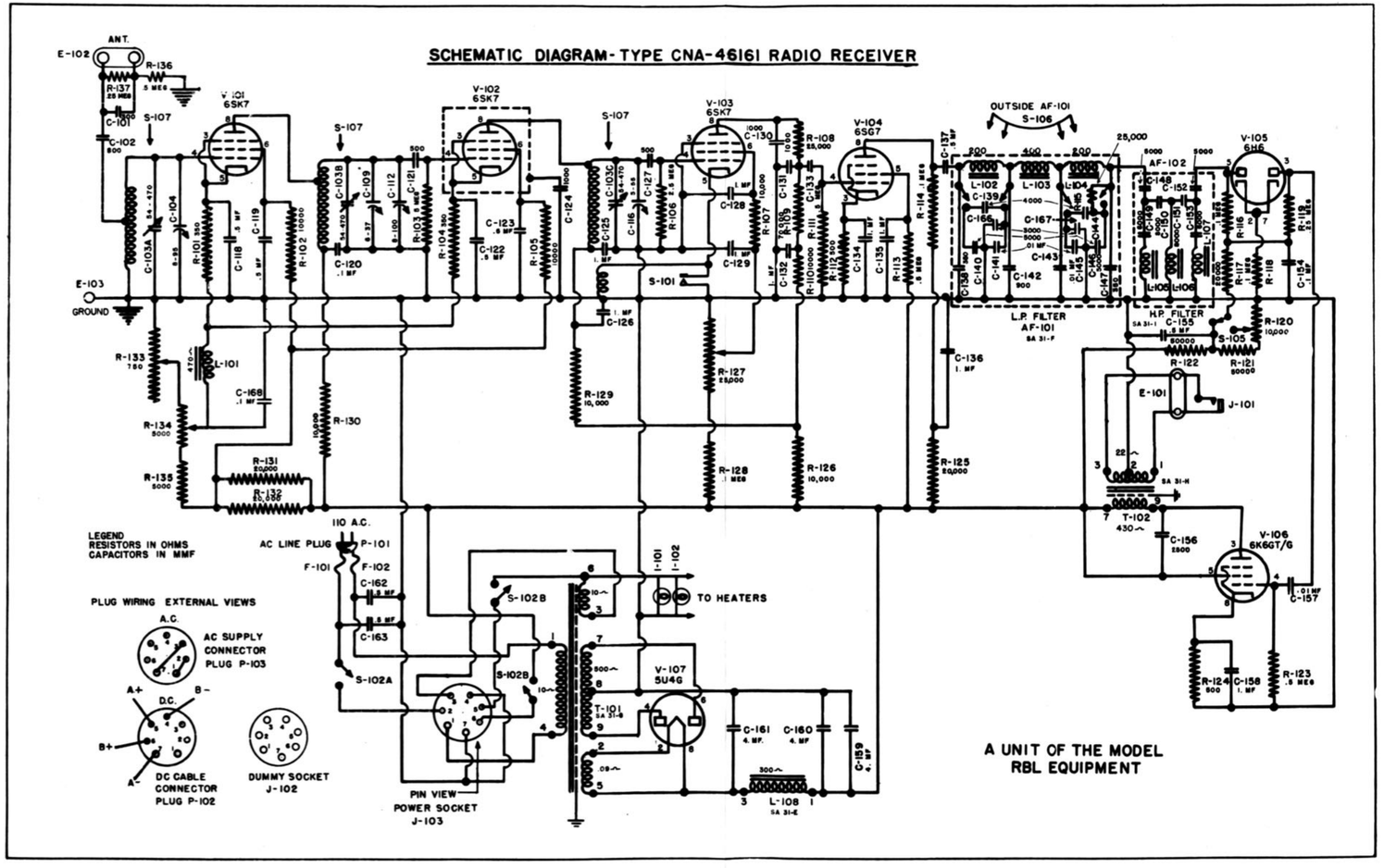


Fig. 7-1 Schematic Wiring Diagram of Type CNA-46161 Radio Receiver

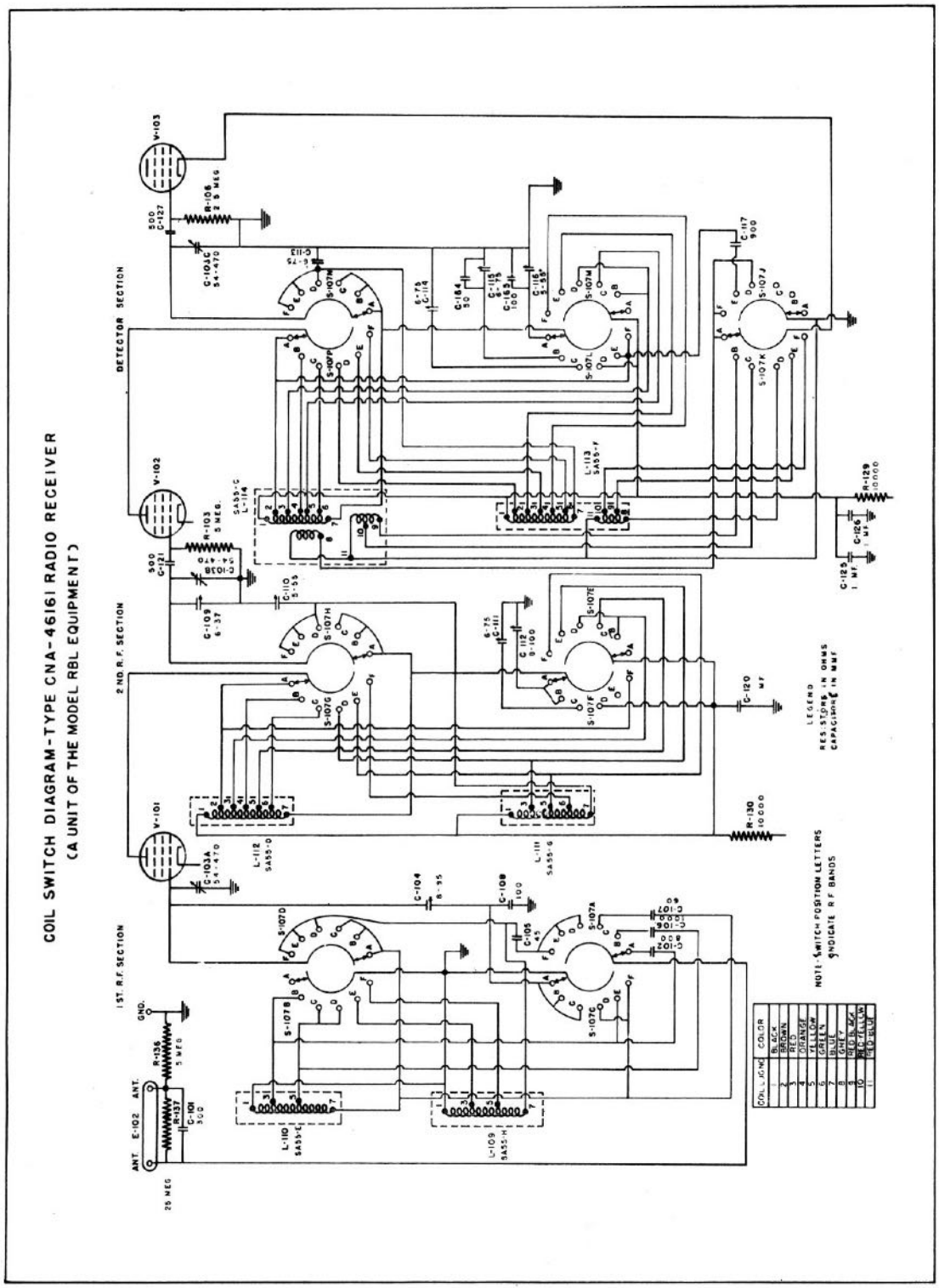


Fig. 7-2 Coil Switch Diagram - Type CNA-46161 Radio Receiver

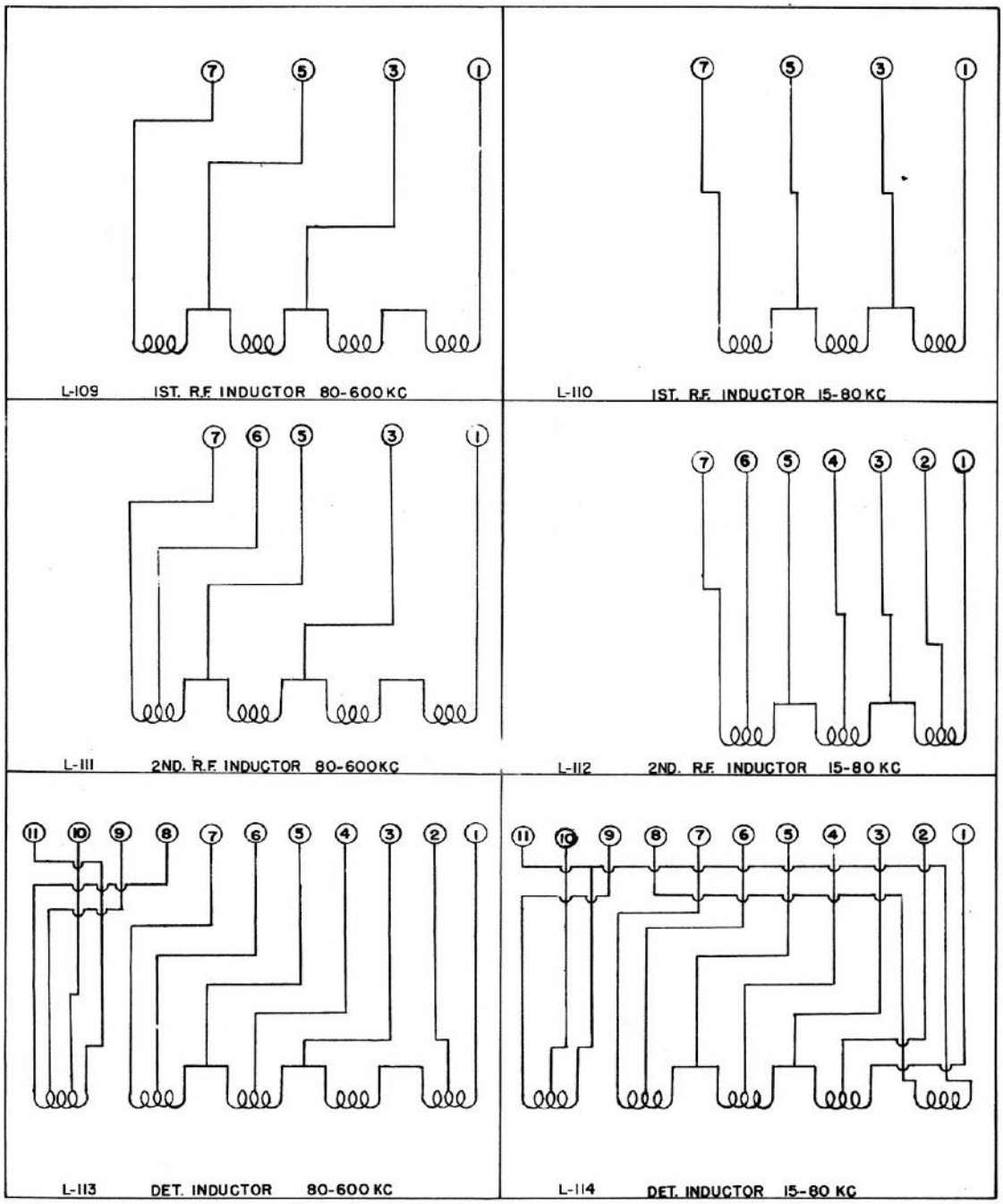


Fig. 7-3 R. F. Coil Schematic Diagrams

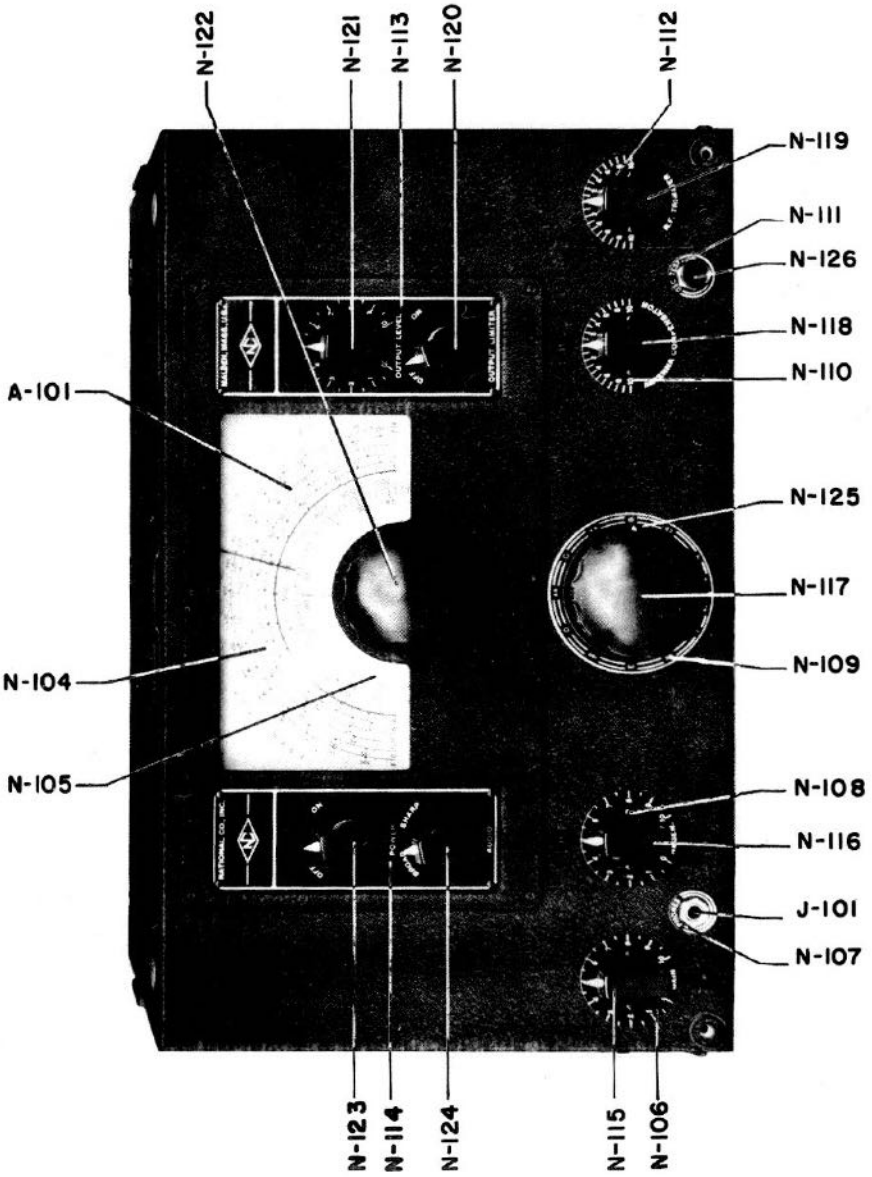


Fig. 7-4 Front View of Type CNA-46161 Radio Receiver

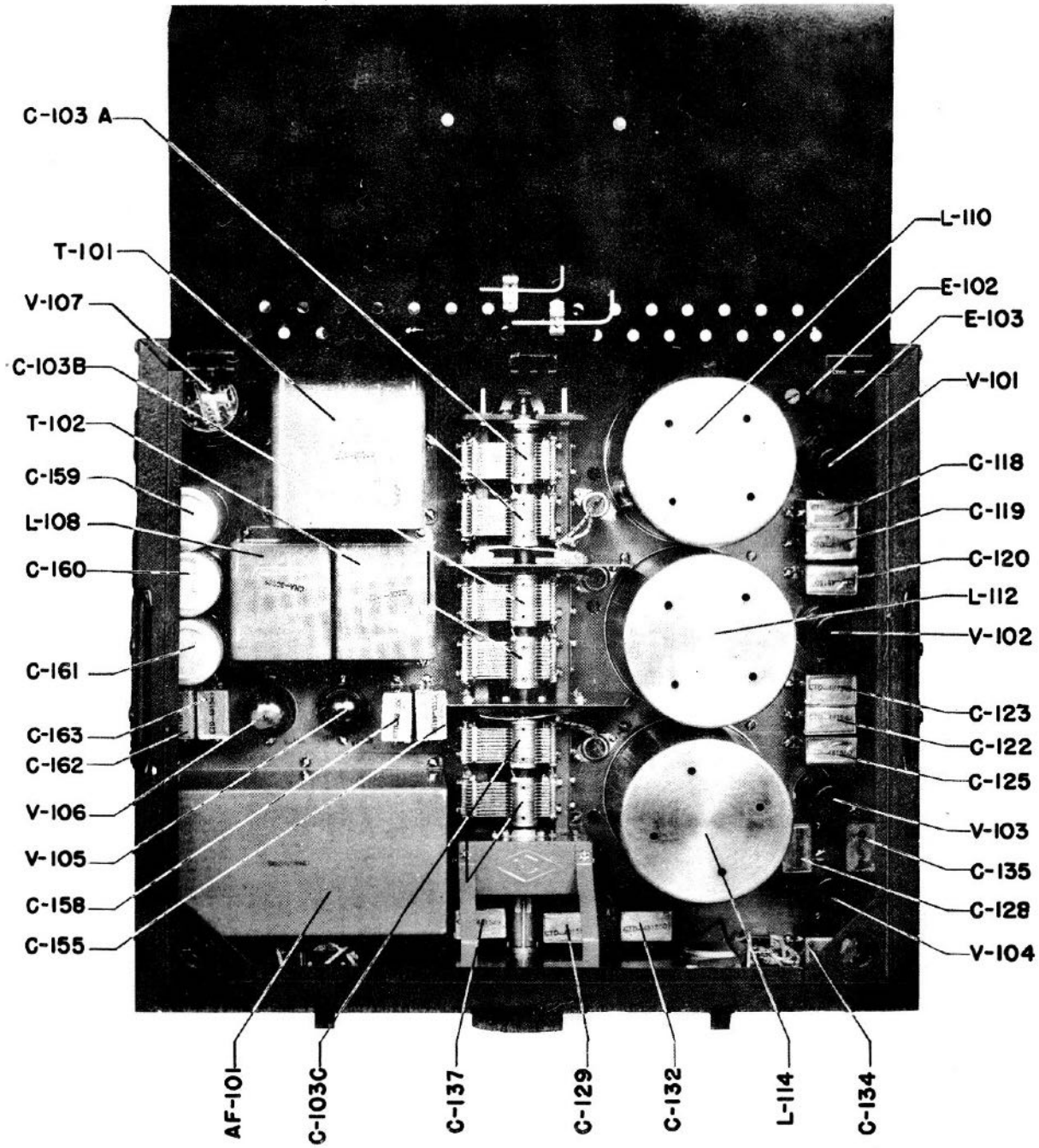


Fig. 7-5 Top View of Type CNA-46161 Radio Receiver

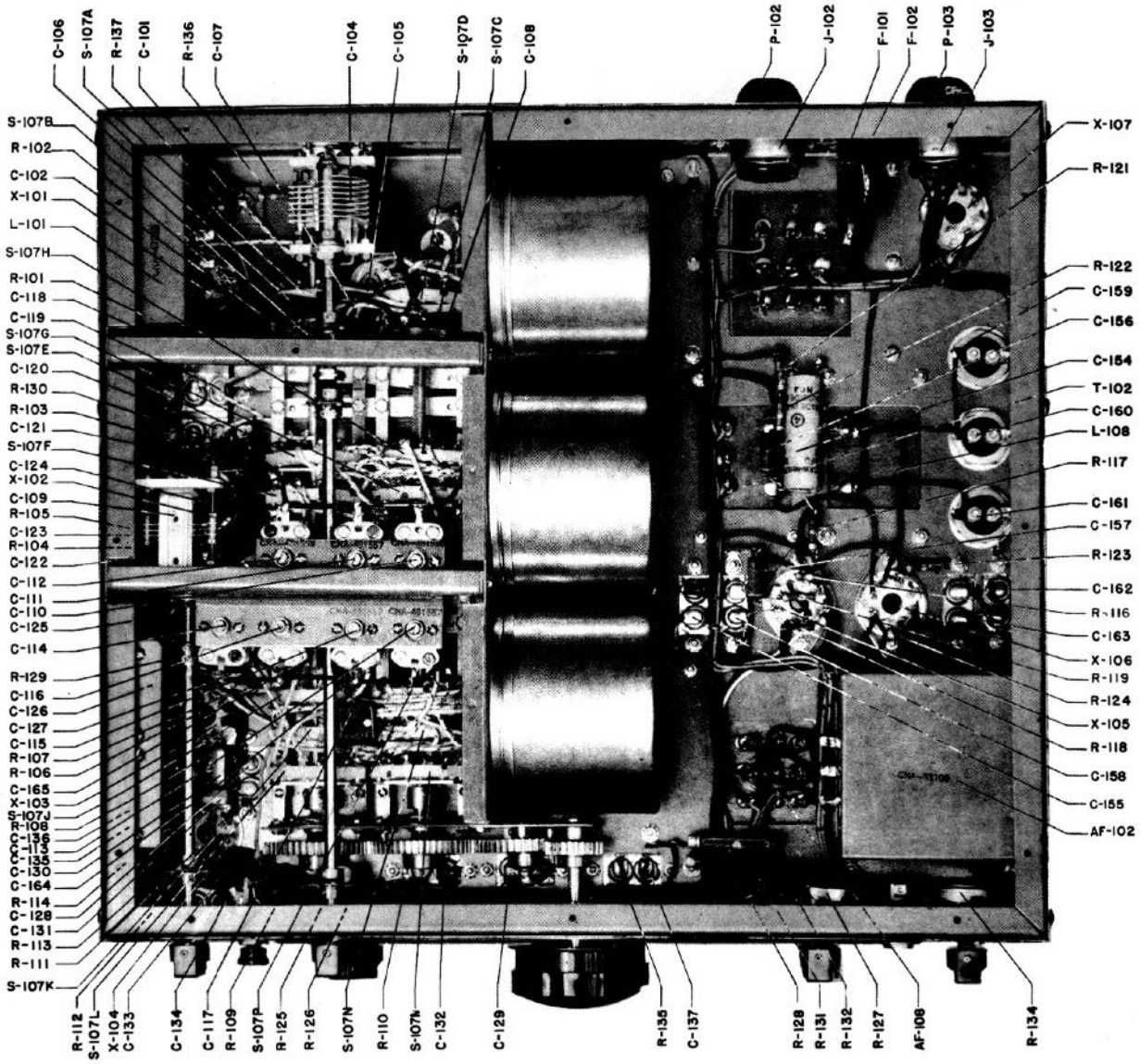


Fig. 7-6 Bottom View of Type CNA-46161 Radio Receiver

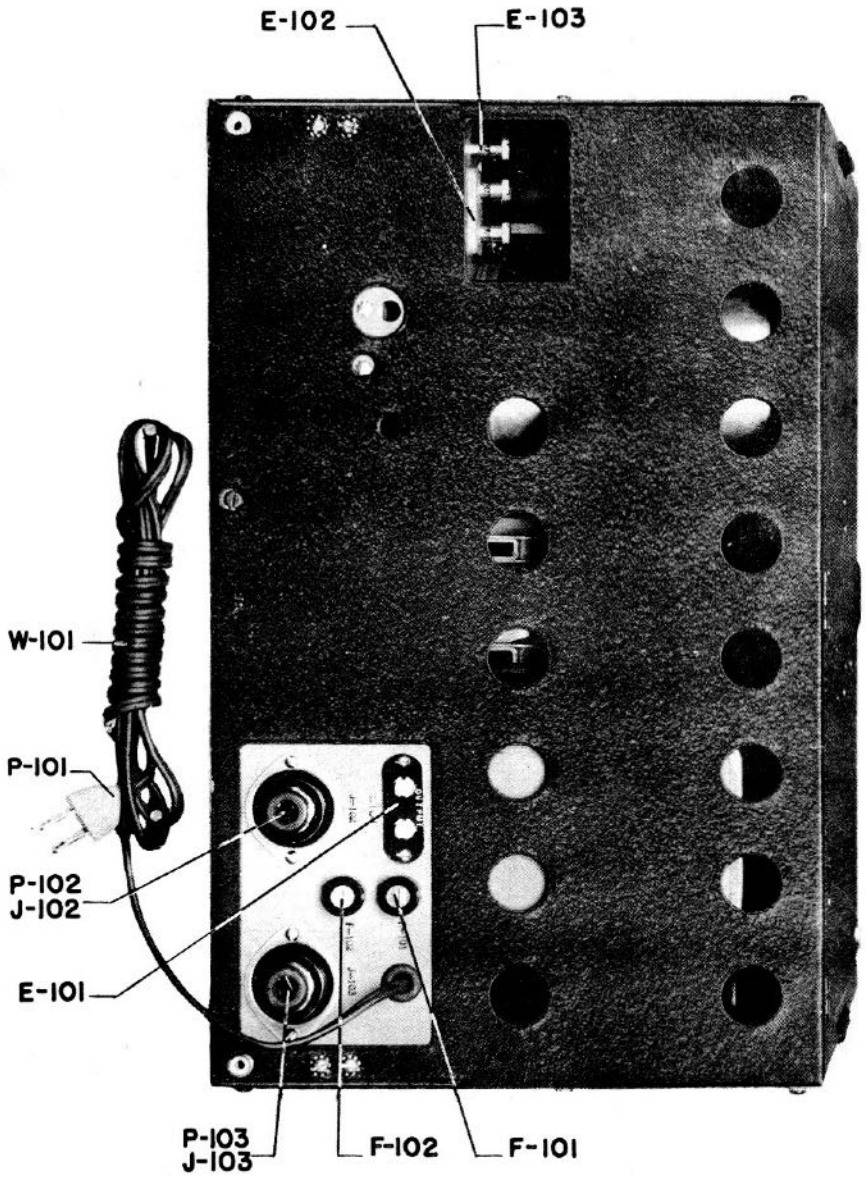


Fig. 7-7 Rear View of Type CNA-46161 Radio Receiver

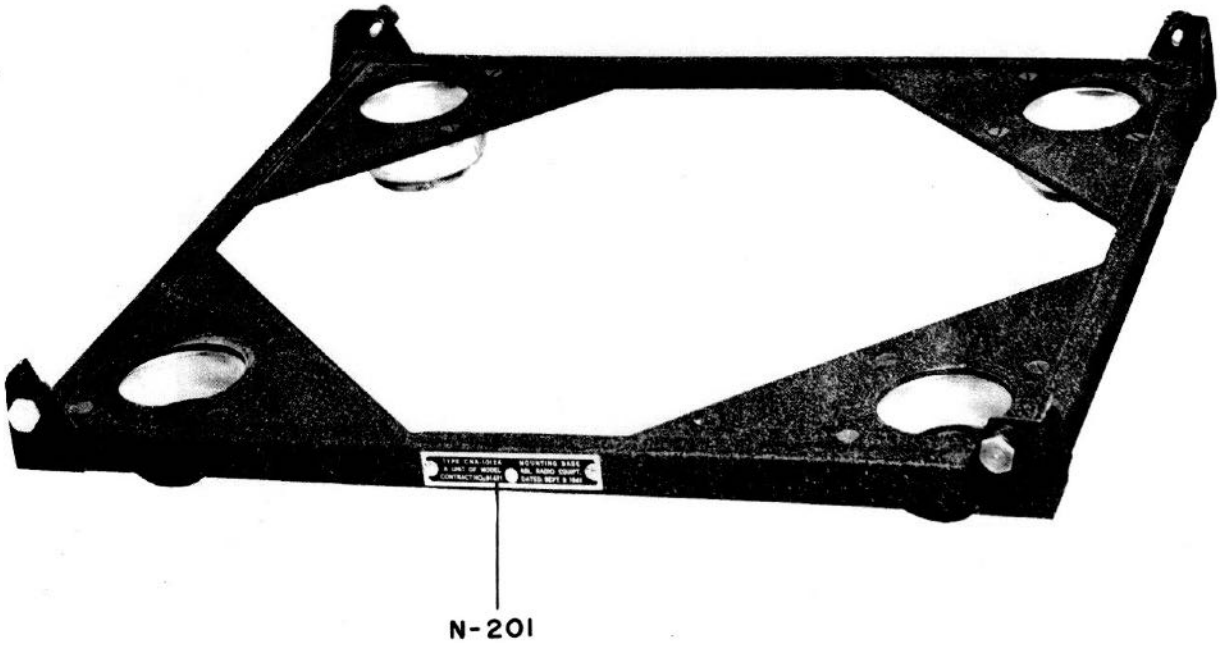


Fig. 7-8 Top View of Type CNA-10124 Mounting Base

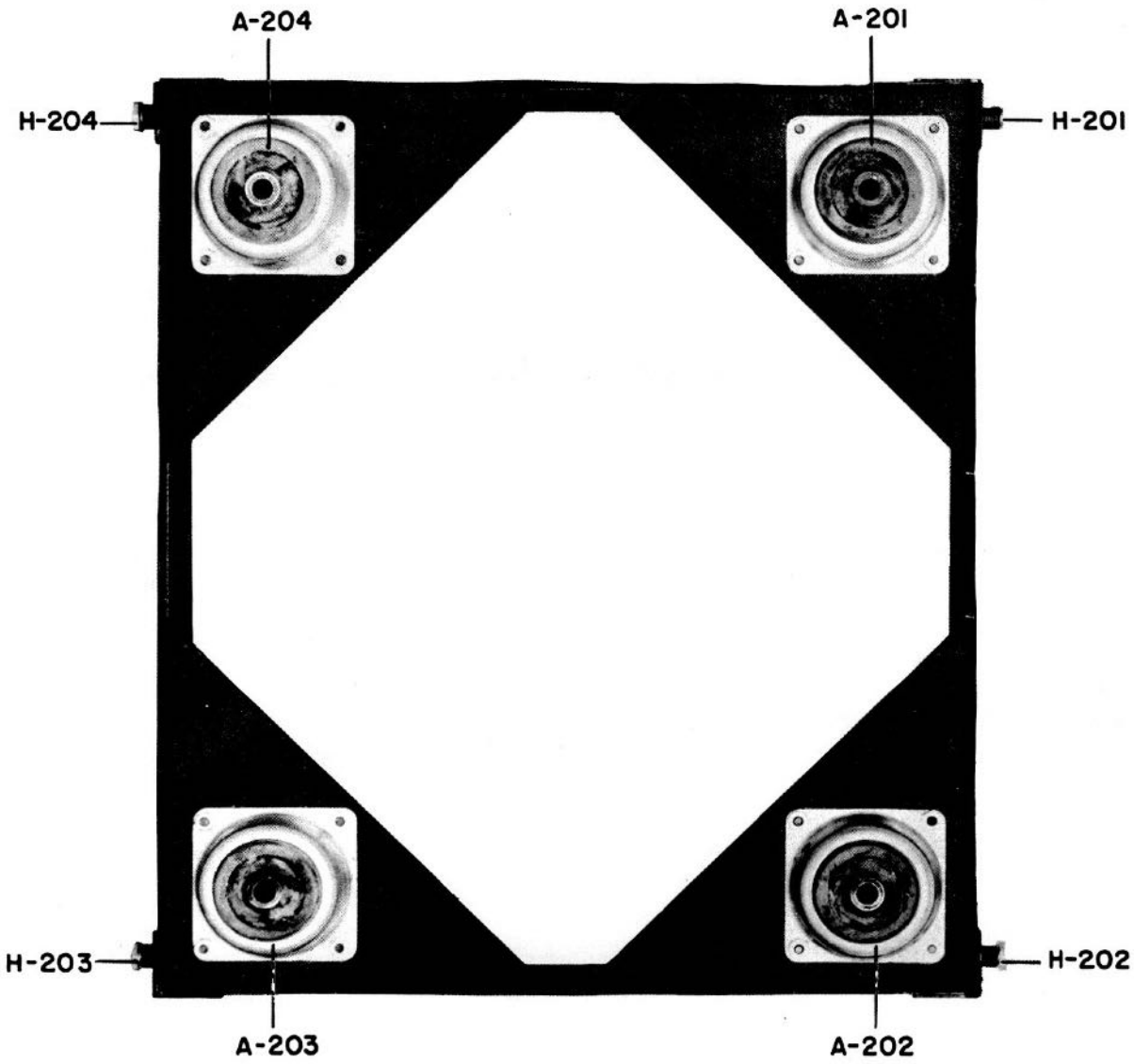


Fig. 7-9 Bottom View of Type CNA-10124 Mounting Base

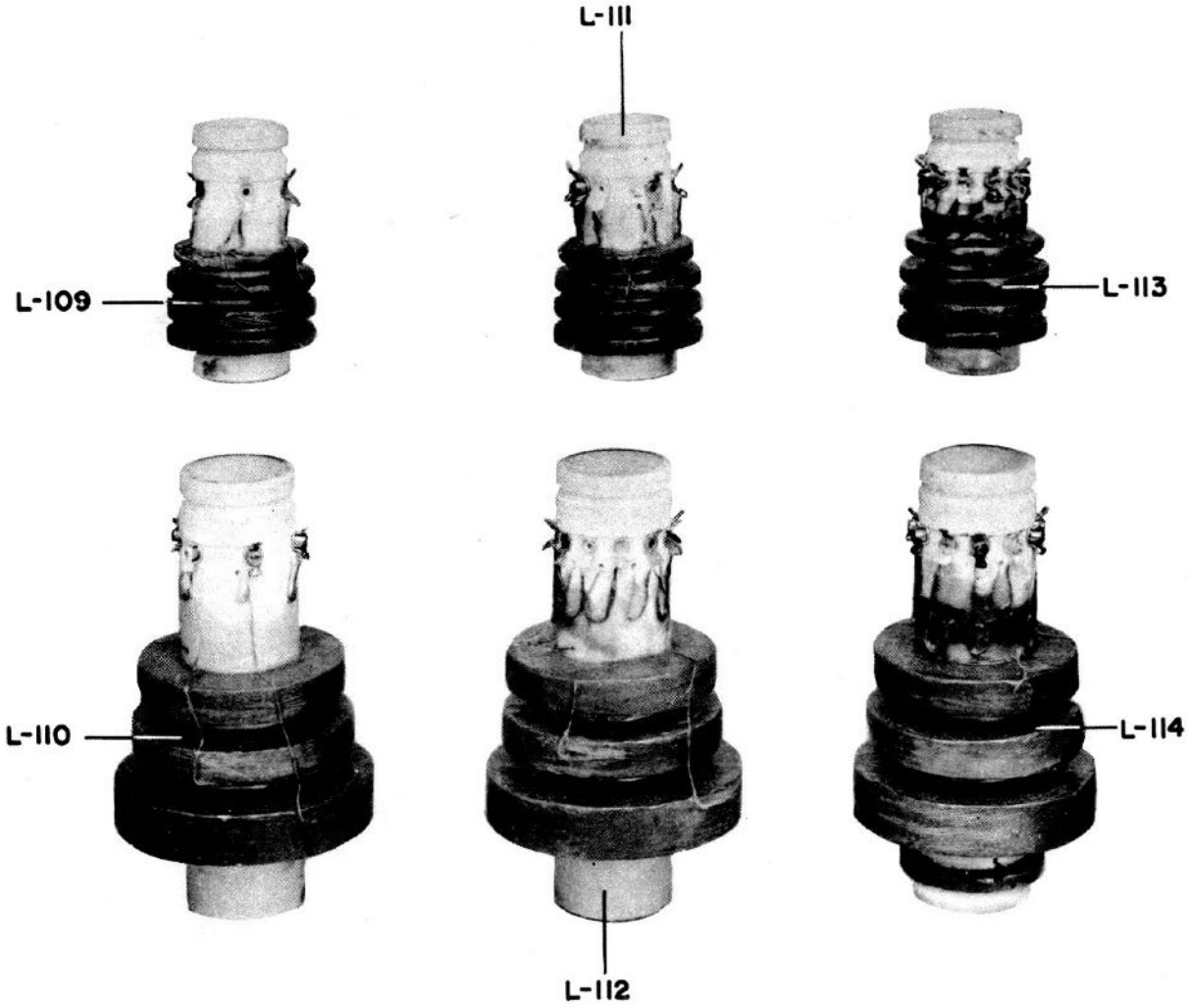


Fig. 7-10 Typical High Frequency and Low Frequency Coils

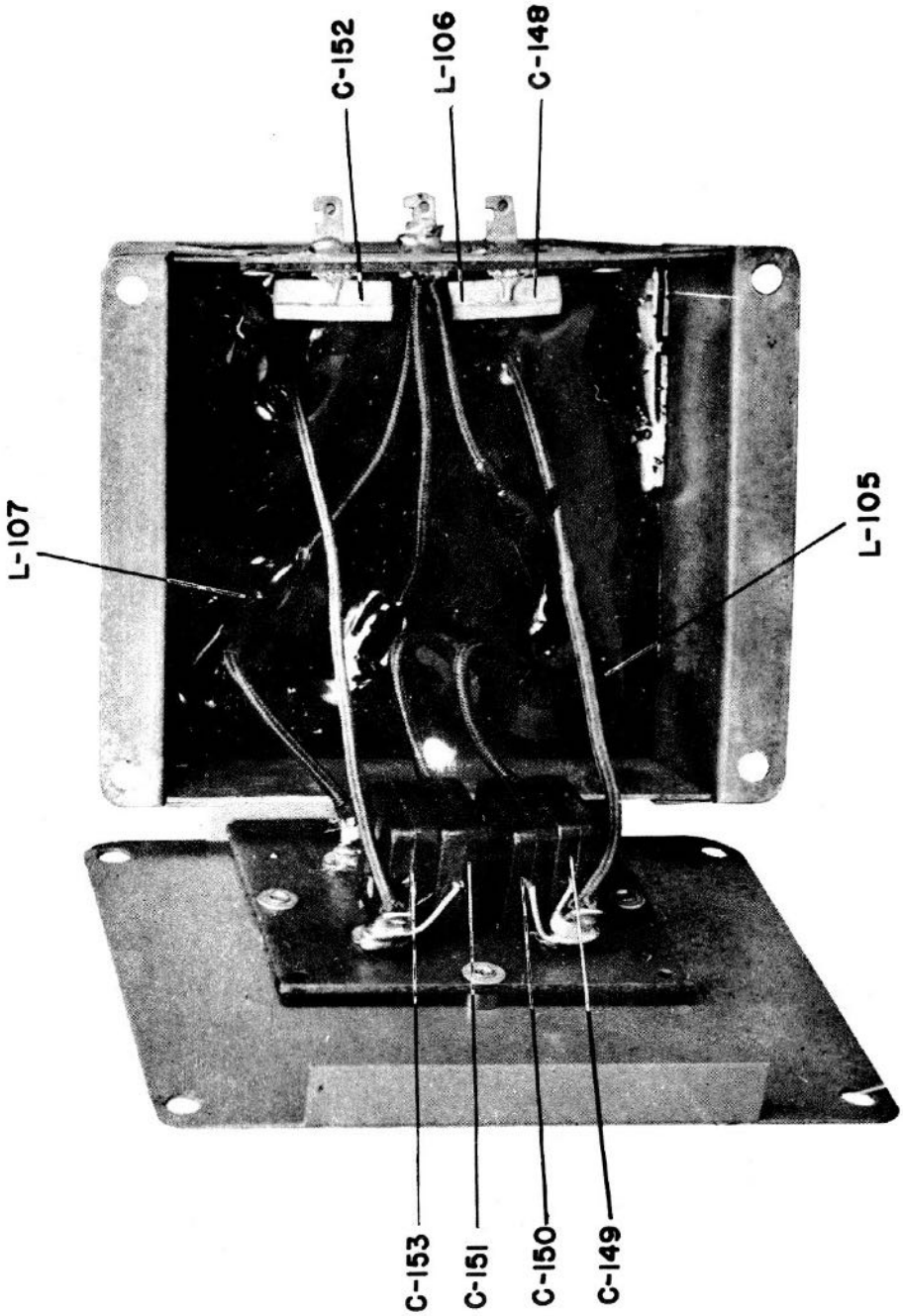


Fig. 7-11 Internal View of High Pass Filter

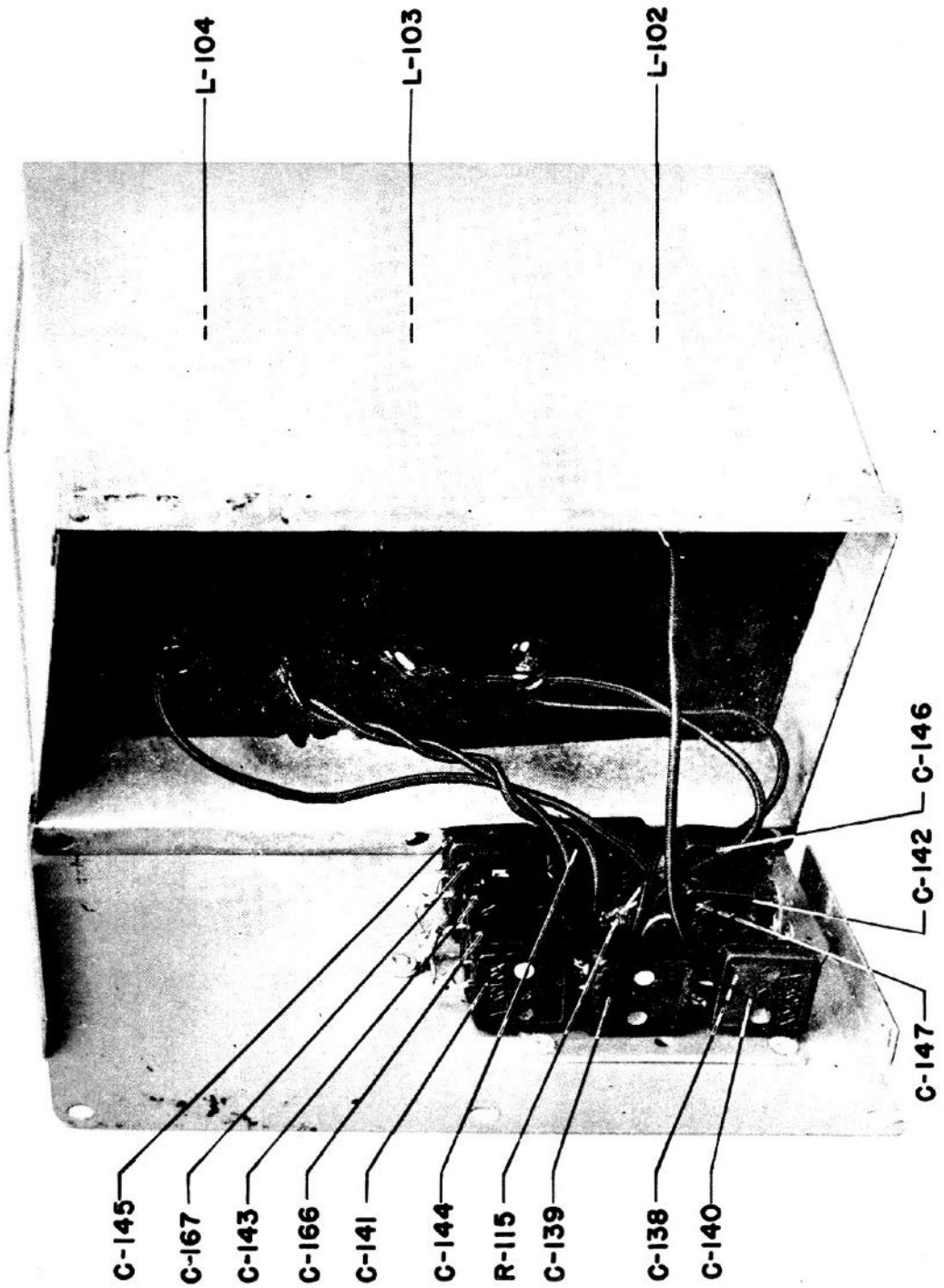


Fig. 7-12 Internal View of Low Pass Filter

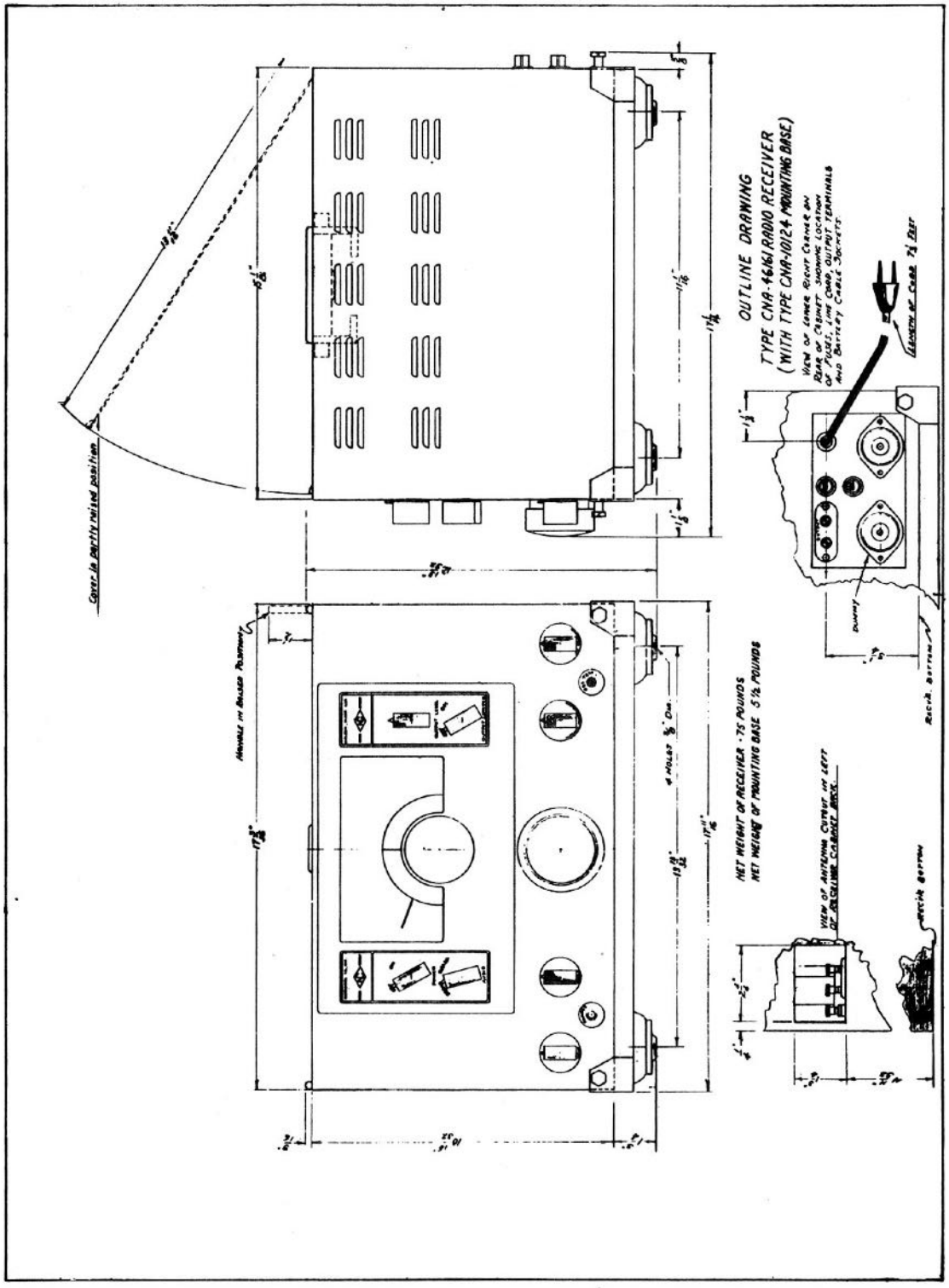


Fig. 7-13 Outline Drawing of Type CNA-46161 Radio Receiver

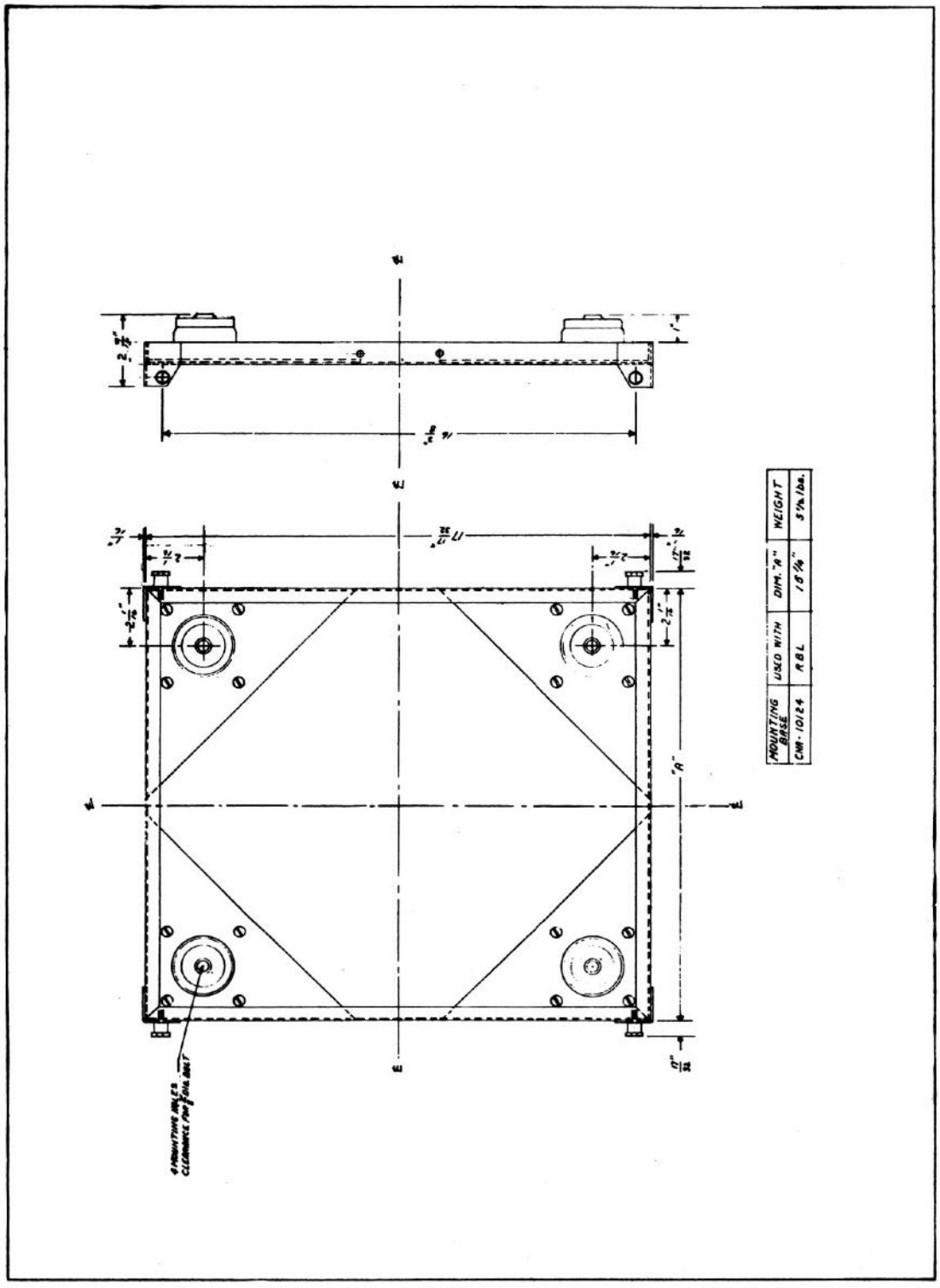


Fig. 7-14 Outline Drawing of Type CNA-10124 Mounting Base