

RCA AR-8506-B

INSTRUCTION BOOK

MODEL AR-8506-B

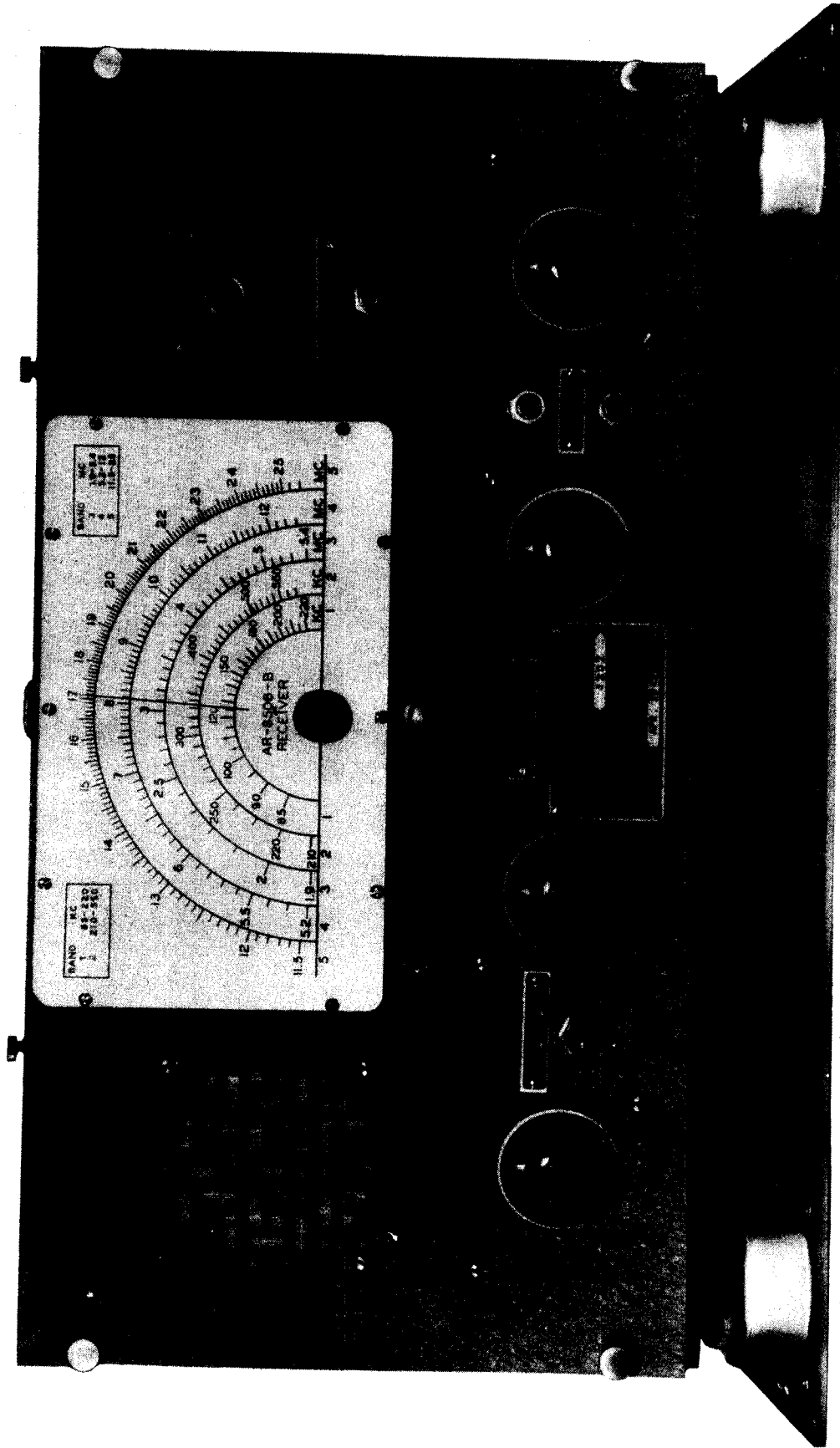
INTERMEDIATE AND HIGH FREQUENCY
RECEIVER

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MODEL AR-8506-B
INTERMEDIATE AND HIGH FREQUENCY
RECEIVER

I N D E X

MODEL AR-8506-B RECEIVER

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GENERAL

The model AR-8506-B is a five band intermediate and high frequency radio receiver designed for service aboard ships or in land stations. This receiver was approved on February 6th, 1943 by the Federal Communications Commission for compliance with Subsection 8.130(b) as capable of being used and operated on board ships of the United States within the limitations regarding the radiation of energy imposed by subsection 8.130(b).

DESIGN CHARACTERISTICS

Ten (10) tube superheterodyne circuit, low radiation, for compliance with F. C. C. subsection 8.130(b) which limits radiation to 400 micro-microwatts.

Triple stage 1700 K.C. intermediate frequency amplifier.

Direct line operation from 115 or 230 volts D.C. or A.C. power supply, without the use of external rotary converter or vibrator units.

Loud speaker built in as integral part of receiver front panel.

Dual jacks for telephone receivers (low or high impedance phones may be used).

High image rejection ratio.

Full vision tuning dial, calibrated in kilocycles and megacycles, entire frequency calibration visible at all times.

Electrical band spread tuning control for "sweeping" the tuning over a narrow range with a fixed setting of the main tuning control.

Main tuning control with 30 to 1 gear drive.

Voltage regulated oscillator tube to minimize variations in oscillator frequency with variations in ship's power supply.

Audio frequency and radio frequency gain controls.

Panel controlled "Off-On" switches for loud speaker, A.V.C., and B.F.O.

Receiver cabinet cover is hinged for convenient access to tubes.

Receiver is also designed for installation without cabinet, directly in frame D (Radiomarine ET-8023 high frequency transmitter and AR-8506-B receiver, all as a self-contained single unit for shipboard installations).

Five position band switch which provides selection of any one of the following frequency bands:

<u>Band</u>	<u>Frequency Range</u>
1	85 - 220 K.C.
2	210 - 550 K.C.
3	1.9 - 5.4 M.C.
4	5.2 - 12 M.C.
5	11.5 - 25 M.C.

VACUUM TUBES

The receiver uses ten standard octal base tubes as follows:

- 6SG7 - R. F. Amplifier
- 6SG7 - Mixer
- 6J5 - High Frequency Oscillator
- 6SG7 - First I. F. Amplifier
- 6SG7 - Second I. F. Amplifier
- 6SG7 - Third I. F. Amplifier
- 6SQ7 - Detector-A.V.C.-First Audio
- 25L6GT/G - Audio Output
- 25Z6 - Rectifier
- 6J5 - B.F.O.

In addition, a G-10 one watt Neon regulator tube is used to provide a regulated voltage source for the high frequency oscillator. This tube has a standard double contact bayonet candelabra base.

POWER SUPPLY

The receiver may be operated directly from 115 volts A.C. or D.C. without requiring any additional conversion apparatus. Power consumption is approximately 45 watts from a 115 volt A.C. or D.C. line. For operation from 230 volts A.C. or D.C., a Radiomarine type RM-9 external resistor unit (325 ohms, 75 watts) is required in series with the supply line. Total power consumption for 230 volt operation is approximately 90 watts.

PERFORMANCE DATA

SENSITIVITY: For a 30 percent modulated signal at any of the frequencies within the tuning range of the receiver and with a General Radio 418-G Dummy Antenna, or equivalent, a 35 microvolt maximum (average per band not to exceed 30 microvolt) input signal will produce a 6 milliwatt output into a resistive load of 10,000 ohms. This modulated wave sensitivity is measured with an incoming carrier modulated at 400 cycles and with the input adjusted for a signal (plus noise) - to-noise power ratio of 100 to 1.

For an unmodulated signal at any of the frequencies within the tuning range of the receiver and with the same dummy antenna as specified above, a 25 microvolt maximum (average per band not to exceed 20 microvolt) or less incoming signal will produce a 6 milliwatt output into the same load as specified above with a signal (plus noise) - to-noise power ratio of 100 to 1. Carrier to be removed when measuring noise output.

SELECTIVITY: With the signal (plus noise) - to-noise ratio, dummy antenna and load adjusted as described above, the selectivity for any modulated signal within the range of the receiver is within the following limits (receiver adjusted for maximum selectivity):

<u>Ratio of Input Voltage Off Resonance to Voltage at Resonance.</u>	<u>Total Maximum Band Width in Kilocycles</u>
10 (20 DB)	12
100 (40 DB)	18
1000 (60 DB)	25

IMAGE REJECTION RATIO: Image rejection ratio of the AR-8506-B is as follows:

<u>Band</u>	<u>Frequency</u>	<u>Image Rejection Ratio</u>
1	150 K. C.	25,000
2	300 K. C.	15,000
3	3 M. C.	8,000
4	8 M. C.	2,000
5	18 M. C.	600
5	24 M. C.	300

AUDIO OUTPUT: 750 milliwatts maximum "undistorted" output. 2 Watts maximum output.

RANGE OF SENSITIVITY CONTROLS: Operation of the R. F. and A. F. gain controls will provide at least 80 DB of attenuation with input signals up to a maximum of 500,000 microvolts.

FRONT PANEL CONTROLS

The front panel accommodates the following:

- Main Tuning Knob and Tuning Scale calibrated in Kilocycles and Megacycles.
- Band Spread Tuning Control
- Band Switch (five position)
- R. F. Gain Control including Power On-Off Switch *
- A. F. Gain Control
- Loudspeaker
- Speaker On-Off Switch
- Phone Jacks (two)
- Panel Type Fuse
- A.V.C. On-Off Switch
- B.F.O. On-Off Switch
- Line Fuse

*Some receivers use separate "Power On-Off Switch" on front panel.

MECHANICAL DESIGN

Careful attention has been given to the mechanical design of this receiver in order that the best possible results may be obtained in overall performance, operation and maintenance. The resulting design, furthermore, has been given due consideration in regard to rapid production technique. This has resulted in the development of a separate "R. F. unit assembly" and a separate "Oscillator-Mixer Assembly". These units are comprised of the band switch sections, tube sockets, R. F. coils and trimmers and by-pass condensers. Each unit is completely enclosed in its own shield box, which, when removed, exposes all wiring and components for examination and repair. Ceramic type trimmers are used throughout, and all coils are thoroughly treated against exposure to severe conditions of temperature and humidity. The main tuning condenser has ceramic insulation, and a special double stator construction permits improved performance at the higher frequencies. By-pass condensers are oil or wax impregnated. The main electrolytic filter capacitors, 40/40 mfd., are of the plug-in type with a standard octal base, permitting easy replacement. Filter reactors and the audio output transformer are cased and impregnated for marine conditions. A heavy plated steel chassis, and plated steel front panel and cabinet are used. The line power is brought into the chassis through a male receptacle which is recessed into the back wall of the chassis. A female "lock" type plug is furnished and the power wires attached to this.

The overall dimensions and weight of the receiver are shown on drawing KS-175. Access to tubes and other component units on the upper side of the chassis is obtained through a hinged door at the top of the receiver cabinet.

RECEIVER CIRCUITS
(Drawing T-1198)

The receiver uses a superheterodyne circuit having one stage of R. F. Amplification using a 6SG7 tube. A three gang tuning condenser tunes the "R. F.", "Mixer", and "Oscillator" circuits simultaneously. The band switch selects the coils desired and short circuits all other unused coils to eliminate "dead spots".

A type 6J5 tube is employed in a Hartley oscillator circuit which operates with the plate at R. F. ground potential. The plate voltage of this tube is regulated and kept within very close limits, even for extreme line voltage variations, by means of the voltage regulator tube. On the high frequency bands, the oscillator circuit contains "temperature stabilized" condensers which have a negative temperature coefficient. These condensers compensate for the normal expected expansion of the other controlling components in such a way as to eliminate "drift" with large variations in temperature. As a result, the oscillator frequency and dial tuning will remain substantially fixed after a short initial warm-up period.

The 6J5 oscillator tube operates 1700 K.C. above the signal frequency on bands 1, 2, 3 and 4, and 1700 K.C. below the signal frequency on band 5. The oscillator output is mixed by the 6SG7 mixer tube.

The output from the last I. F. transformer is rectified by the diode elements of the 6SQ7 tube; and the audio component, after passing through A. F. gain control, is further amplified by the triode portion of this same tube and thence fed to the 25 L6GT/G audio power amplifier feeding the loud speaker and headphones. A.V.C. voltage from the diode circuit is fed back to the preceding R. F., and the first two I. F. amplifiers when the A.V.C. switch is in the "On" position. The R. F. gain control regulates the amplification of the R. F., first I. F. and second I. F. amplifier tubes. A beat frequency oscillator consisting of a type 6J5 tube in conjunction with the B.F.O. transformer provides a suitable beat note for CW reception.

The 25Z6 rectifier tube rectifies the incoming power when an A. C. supply is connected and furnishes D. C. for the receiver plate supply. When the power supply is D. C., this tube merely conducts the plate supply voltage. The plate supply voltage is thoroughly filtered by iron core reactors and 40 mfd. filter capacitors for both A. C. and D. C. operation.

The heaters (filaments) of all tubes are connected in series, requiring a total of approximately 100 volts, the remaining 15 volts, from the 115 volt supply, being dropped through a metal clad resistor. The audio output impedance of the receiver is 4 ohms for the loud speaker circuit and 500 ohms for the headphone jacks. Either low or high impedance headphones may be used.

INSTALLATION

Power Supply Connections: Refer to T-1198. Power supply should be connected through the type RM-8 line filter unit as shown. The type RM-9 resistor unit (325 ohms, 75 watts) is only required if the power supply is 230 volts A.C. or D.C.

Caution: Check to determine if any permanent ground connection exists on the power supply line. This is important in the case of a three wire 115/230 volt power source where the neutral may have a permanent ground. In such cases, the RM-8 filter unit must be connected so that the "grounded" side of the line is negative. This places the RM-8 across the "high" side of the line for 115 volt D.C. input (RM-9 not required). In the case of a two wire 115 volt D.C. line which has the usual ship's "ground detector lamp system", each side of the line will measure 57 volts to ground and no special precautions are necessary other than maintaining correct polarity. With a two wire 230 volt line the RM-9 resistor unit must be connected in the positive side of the line and no grounds should exist on the positive side.

Connect the load side of the RM-8 filter unit to the receiver by means of the shielded power cord and polarized locking type connector which is furnished with the RM-8. For A.C. power supply, try reversing the "polarity" of the two leads to the line terminals of the RM-8 to obtain the lowest hum level.

Antenna-Ground Connections: The AR-8506-B is designed for use with a doublet antenna. The transmission line from the doublet should connect to terminals marked A₁ and A₂ which are located near the rear of the chassis. The band switch automatically connects the doublet as a "T" antenna to ground on positions 1 and 2 (low frequency bands), and as a normal doublet on bands 3, 4, and 5, in order to provide the best overall operation on all frequencies.

A good low resistance ground connection should be made, using 1/2" copper strip, or equal, to the ground stud at the rear of the receiver cabinet and to the metal box enclosing the RM-8 Line Filter Unit. The shielded braid connection on the receiver power cord is connected to the metal box of the RM-8 Unit.

OPERATION

Close switch on RM-8 Line Filter Unit. *Turn on receiver power switch by rotating R. F. gain control to the right (clockwise). Turn loud speaker Off-On switch to "On" position and plug in low or high impedance phones if phone reception is desired. After tubes have warmed up, advance R.F. and A.F. gain controls until signal or noise is received.

*Some receivers have separate "Power On-Off Switch", not ganged to R.F. Gain Control and this switch should be used to apply power to receiver.

When tuning in a signal, it must be remembered that the dial calibration is correct when the band spread control pointer is set at its zero (center) position. This effect will be more noticeable near the upper end of each frequency band.

When standing by to receive signals, it is recommended that the A.V.C. switch be left in the "On" position, the R. F. gain adjusted clockwise to a fairly high level, as determined by the prevailing noise level, and the A. F. gain adjusted to produce a moderate noise output level. With these control settings, strong incoming signals will be received without "block", and at the same time, fairly weak signals, only slightly above the prevailing noise level, will also be readily received.

A greater degree of A.V.C. control is available when the R. F. gain control is most fully advanced, and a much lesser degree is available when operating with the R. F. gain control in a less sensitive setting. It is also true, however, that if the R. F. gain control is advanced too far "into the noise", a poor signal to noise ratio will be obtained resulting in the signals standing out less clearly above the background static. Practice in operating the receiver and observing these two effects will help in estimating the approximate control settings which will offer the best compromise and will result in the most satisfactory reception.

When receiving A-1 (CW) transmissions, turn on the beat frequency oscillator (B.F.O.) switch and adjust band spread tuning condenser for a suitable beat note. A.V.C. may be either on or off for CW reception. It will be found that when the CW signals are very strong, a louder beat note may be obtained by reducing the R. F. control setting and increasing the A. F. gain correspondingly.

The various frequency bands may be selected by means of the five position band selector switch on the front panel.

When the receiver is operated from an A. C. line, one side of which may be grounded, the "hum" level of the receiver may be high or low depending upon the "polarity" of the connections to the RM-8 line filter unit. Try reversing the connections of the A. C. power line to the RM-8 to insure lowest "hum" level. Line polarity cannot be reversed with the power supply connector at the rear of receiver chassis, as this connector is polarized and may be inserted in one position only.

Warning: This receiver has been carefully aligned at the factory with precision instruments, and operators are cautioned not to disturb any of the trimmer adjustments on the chassis or on the R. F. and I. F. transformer cans.

Important: When AR-8506-B receiver is installed, it should be noted that band #2 covers the normal intermediate ship frequencies so that any frequency between 210 and 550 K.C. may be received. Therefore, AR-8506-B may be used for monitoring in this frequency band in lieu of the ship's regular low and intermediate frequency receiver (such as AR-8503 and AR-8510). This practice will result in a considerable increase in life of the "B" batteries usually used with the ship's low and intermediate frequency receiver. It will also be apparent that bands #1 and #2 in AR-8506-B provide "duplicate facilities" whenever reception between 85 and 550 K.C. is required, in the event that the ship's normal low and intermediate frequency receiver is being used on other frequencies, or is out of order.

MAINTENANCE

Standard receiver spares comprise a complete set of tubes, 18 one amp glass fuses and a #20942 plug-in filter condenser. In emergency, receiver will operate with only one filter condenser if plugged in left hand socket behind loud speaker.

If receiver sensitivity appears lower than normal, change tubes, one tube at a time, using spare tubes, to locate any weak or defective tube. Make sure tubes are placed in sockets according to tube type numbers stamped near each socket.

If receiver appears to be "dead", check front panel fuse and the two similar fuses in RM-8 filter unit. Since all heaters are connected in series, burnout of any one heater or removal of any one tube will prevent receiver from operating. The G-10 Neon regulator tube, which also serves as a pilot light, receives its voltage from the receiver plus B supply. This regulator tube will not glow until the rectifier tube has warmed up and a few seconds delay is normal when receiver is first turned on.

By referring to diagram T-1198 and the circuit voltage values shown on this diagram, a high resistance multirange D.C. voltmeter (1000 ohms per volt) may be used to check socket voltages, component parts and general operation if receiver performance is below normal. By disconnecting the power supply and using an ohmmeter, resistors and coils may be checked for continuity, and condensers for shorts or leakage.

When checking voltages, component parts, etc., special care should be taken not to accidentally disturb any of the trimmer adjustments. Never alter any of the trimmer adjustments in an attempt to "improve" receiver performance, unless the receiver is to be realigned as detailed in this book.

1 - The instructions given below should be followed in cases where various grounds exist on the shipboard power supply circuit, and where the various capacitors listed may have failed after long continued use.

2 - Capacitor C-143, 40/40 mfd., Aerovox #29042: When the positive side of the line is grounded, external to the receiver, a reversed polarity of about 15 volts appears across pins 5 and 7 on this capacitor. This causes no particular harm and the receiver will operate, although ultimately the 40 mfd. section connected to pins 5 and 7 will lose its capacity and act as a high D. C. resistance. Every effort should be made to remove the positive ship ground.

3 - Capacitors C-146 and C-147, .01 mfd., Industrial Condenser Company PT-135: If either of these capacitors is short circuited and if the negative ship's line is grounded, receiver will not operate. A shorted C-146 will extinguish the heaters between the 6J5 oscillator tube and the remaining tubes near the negative grounded ship's line. A shorted C-147 will extinguish the 6SG7 R. F. Amplifier tube, and on later production sets also the 6SQ7 second detector. Obviously the remaining tubes in the receiver will receive excessive heater voltage under the above conditions. On ships where there is a midpoint ground (ground detector lamps used) shorted C-146 or C-147 will extinguish one of the ground detector lamps, will give higher heater voltage on the mixer and R. F. tubes, and will lower the heater voltage on the I. F. tubes. Receiver will still operate, but obviously the shorted capacitor should be removed and replaced.

4 - Capacitors C-157 and C-158, .01 mfd., Industrial Condenser Company PT-135: If either of these capacitors are shorted and negative ship's line is grounded, and receiver chassis grounded, the 25 volt tubes (rectifier and A. F.) will probably burn out. Likewise, if positive line is grounded, the 25 volt heaters will be extinguished and the remaining tubes burn out or receive excessive heater voltage. With midpoint ship's ground, receiver will still operate. In all cases the obvious remedy is to replace shorted C-157 or C-158.

5 - Measurements to check correct heater voltage on all tube sockets, with chassis grounded and with existing conditions of ship grounds, will disclose the shorted heater by-pass capacitors described above. In addition, with the power line completely disconnected from receiver, ohm-meter measurements may be made and should show no D. C. grounds from any of the heaters to chassis.

6 - Capacitor C-120, .01 mfd., Industrial Condenser Company PT-135, 6J5 Oscillator Plate By-Pass: If this capacitor is shorted and negative ship's line is grounded, resistor R-125, 2500 ohms, in the 6J5 oscillator plate circuit will be overloaded and may be damaged. Receiver will also be inoperative. With positive ship's line grounded, receiver may operate, but V-111 voltage regulator tube will probably fail. With midpoint grounded, set will not operate and V-111 will be extinguished. Remedy in all cases is to replace C-120.

*AR-8506-B receivers, in cabinets, and with shorted by-pass capacitors, will often be found to operate if ship's ground is removed from the cabinet. Cabinet and chassis are then insulated through the rubber shock mounts. This procedure should be followed only in an emergency when there is not time to replace defective capacitors. Where the receiver is mounted in a frame such as in 4U or ET-8023-D1, receiver chassis cannot be freed from ground, and defective capacitors must be replaced.

* The information in paragraphs 2 to 6 inclusive, page 9, is predicated on a ship ground connection to the receiver cabinet or chassis. This ground should normally be maintained and any defective capacitors replaced where necessary, as outlined in paragraph above.

CIRCUIT ALIGNMENT

The alignment procedure specified below must not be attempted unless an accurately calibrated test oscillator, or signal generator, and an output A.C. voltmeter are available.

I.F. Circuit Alignment: If it is merely desired to check the "peaking" of the I.F. system, and it is known that none of the trimmers are seriously out of alignment, (such as might occur through replacement of defective transformers, etc.) this may be done most conveniently by coupling a strong 1700 K.C. modulated signal to either terminal A₁ or A₂ and with the band switch turned to band #1 or band #2. An output voltmeter may be connected across the loud speaker terminals or across the phones. A.F. and R.F. gain controls should be well advanced and enough signal fed in to give a clear output indication above the noise level. The A.V.C. should be turned off, and it should be ascertained that the receiver is not "blocked" by too strong an input signal. Adjust both trimmers on all I.F. transformers labelled 1700 K.C. for maximum output. In order to align the I.F. wave trap, it is necessary to connect the test oscillator to terminal A₁ and to ground terminal A₂. The frequency switch must be turned to bands #3, #4 or #5. Adjust the iron core for minimum output. Turn on the B.F.O. and adjust the beat note as necessary by turning the knob on top of the B.F.O. transformer at the rear of the chassis.

If major repairs or replacements have been made to the I.F. system, it may not be possible to feed a strong enough signal to the antenna terminal to obtain an output indication, and it is advisable to feed in a signal directly to the I. F. grid before replacing the set in its cabinet.

R.F. Circuit Alignment: Be sure that the main tuning pointer coincides with the horizontal line on the scale when the gang condenser is closed (maximum C.C.W. rotation). If necessary, reset pointer. Set band spread control pointer to its 0 (center) position, (band spread condenser one-half open). Refer to photographs for location of R. F. trimmers beneath the chassis. It is necessary to remove the receiver from its cabinet when making any R. F. trimming adjustments. When the receiver is operated in this manner, a connection from chassis to ground should be made.

Refer to the R. F. Alignment Chart on the following page for details as to Antenna Connections, Test Frequencies, Trimmer and Iron Core Adjustments, etc.

When "peaking" the trimmers, two peaks will be obtained since the condensers are free to rotate 360 degrees. Either peak may be used.

Since the I. F. frequency is high and the trimmer range is restricted, it is not possible to incorrectly align the receiver to the "Image" frequency, even on the highest frequency range.

R. F. ALIGNMENT CHART

Step	Connect Test Osc. to	Tune Test Osc. to..	Turn Receiver Dial to	Adjust the follow- ing for Max.Output
1	A ₁ thru 400 ohms or I.R.E. STD. Dummy Antenna. Ground A ₂	24.0 Mc	24 Mc-Band 5	C-114 Osc. C-110 RF (Rock Gang) C-106 Ant.
2	Same as Step 1	12.0 Mc	12.0 Mc-Band 5	Core Adj. Z-112
3	Repeat Step 1			
4	Same as Step 1	12.0 Mc	12.0 Mc-Band 4	C-113 Osc. C-109 RF C-105 Ant.
5	Same as Step 1	5.5 Mc	5.5 Mc-Band 4	Core Adj. Z-111
6	Repeat Step 4			
7	Same as Step 1	5.0 Mc	5.0 Mc-Band 3	C-112 Osc. C-108 RF C-104 Ant.
8	Same as Step 1	2.0 Mc	2.0 Mc-Band 3	Core Adj. Z-110
9	Repeat Step 7			
10	A ₁ thru 200 mmfd or I.R.E. STD. Dummy Antenna. <u>Do not Ground A₂</u>	500 Kc	500 Kc-Band 2	C-111 Osc. C-107 RF C-103 Ant.
11	Same as Step 10	220 Kc	220 Kc-Band 2	Core Adj. Z-109
12	Repeat Steps 10 and 11 several times if necessary until "interlocking" is negligible.			
13	Same as Step 10	200 Kc	200 Kc-Band 1	C-164 Osc. C-163 RF C-162 Ant.
14	Same as Step 10	85 Kc	85 Kc-Band 1	Core Adj. Z-121
15	Repeat Steps 13 and 14 several times if necessary until "interlocking" is negligible.			

NOTES:

- 1 - All R. F. trimmer adjustments are beneath the chassis.
- 2 - All Oscillator iron core adjustments are above the chassis.
- 3 - Check pointer zero setting. Pointer should coincide with horizontal line at low frequency end of dial.
- 4 - Set "Band Spread" pointer to zero (mid-scale) position before proceeding with alignment.

PARTS LIST
MODEL AR-8506-B
RADIO RECEIVER

REFERENCE DRAWING: T-1198 - Circuit Diagram

Symbol Desig.	Function	Rating
<u>CABINETS, PANELS, ETC.</u>		
A-101	Receiver Cabinet	Welded Steel, plated and painted RMCA drawing TS-321
<u>CAPACITORS</u>		
C-101	Main Tuning Capacitor	Variable Air, 3 Gang, Double Stator Radio Cond. Co. - RMCA dwg K-77 3 X 218 mmfd & 3 X 187 mmfd.
C-102	Band Spread Capacitor	Variable Air, 1-3.5 mmfd, Chardwell, Type A-6274 - RMCA dwg K-192
C-103	Trimmer Capacitor	3-12 mmfd, ceramic, Erie TS2A-NPO
C-104	Trimmer Capacitor	SAME AS C-103
C-105	Trimmer Capacitor	SAME AS C-103
C-106	Trimmer Capacitor	SAME AS C-103
C-107	Trimmer Capacitor	SAME AS C-103
C-108	Trimmer Capacitor	SAME AS C-103
C-109	Trimmer Capacitor	SAME AS C-103
C-110	Trimmer Capacitor	SAME AS C-103
C-111	Trimmer Capacitor	SAME AS C-103
C-112	Trimmer Capacitor	SAME AS C-103
C-113	Trimmer Capacitor	SAME AS C-103
C-114	Trimmer Capacitor	SAME AS C-103
C-115	Padder Capacitor	<u>C e r a m i c</u> , 55 mmfd, 500 V, Erie Type W750 L. p/m 1 mmfd.
C-116	Padder Capacitor	Silver Mica, 450 mmfd, 500 V, Sangamo KR-1345, p/m 2%
C-117	Padder Capacitor	Silver Mica, 700 mmfd, 500 V, Sangamo KR-1370, p/m 2%
C-118	Padder Capacitor	Silver Mica, 1500 mmfd, 500 V, Teleradio 22-F-2, p/m 2%
C-119	By-Pass Capacitor	Paper Tubular, .1 mfd, 600 V, p/m 20%, Industrial Cond. Co. PT-139
C-120	By-Pass Capacitor	Paper Tubular, .01 mfd, 600 V, p/m 20% Industrial Cond. Co. PT-135
C-121	By-Pass Capacitor	SAME AS C-120
C-122	Osc. Grid Capacitor	Silver Mica, 100 mmfd, 500 V, Sangamo Cm-20C 101J, p/m 5%
C-123	R.F. Grid Capacitor	SAME AS C-122
C-124	By-Pass Capacitor	SAME AS C-120
C-125	By-Pass Capacitor	SAME AS C-120
C-126	R.F. Coup. Capacitor	SAME AS C-122
C-127	By-Pass Capacitor	SAME AS C-120
C-128	By-Pass Capacitor	SAME AS C-120
C-129	By-Pass Capacitor	3 X .1 mfd, oil filled paper, 400 V, Indust. Cond. Co. 6-BAT-111, p/m 20%
C-130	By-Pass Capacitor	SAME AS C-120

PARTS LIST
MODEL AR-8506-B
RADIO RECEIVER

REFERENCE DRAWING:: T-1198 - Circuit Diagram

Symbol Desig.	Function	Rating
<u>CAPACITORS (Cont'd)</u>		
C-131	By-Pass Capacitor	SAME AS C-129
C-132	By-Pass Capacitor	SAME AS C-129
C-133	By-Pass Capacitor	SAME AS C-120
C-134	Diode Filter Capacitor	SAME AS C-122
C-135	Diode Filter Capacitor	SAME AS C-122
C-136	A.F. Coup. Capacitor	Paper Tubular, .001 mfd, 1000 V, Indust. Cond. Co. PT-103, p/m 20%
C-137	A.F. Coup. Capacitor	SAME AS C-136
C-138	A.F. Plate Capacitor	SAME AS C-136
C-139	A.F. Coup. Capacitor	Oil Filled Paper, .1 mfd, 200 V, Fast Z-282, p/m 20%
C-140	Filter Capacitor	Tubular Dry Electrolytic, 25 mfd, 50 V, Aerovox EDJ-3250
C-141	A.F. Plate Capacitor	Paper Tubular, .005 mfd, 600 V, Indust. Cond. Co. PT-105, p/m 20%
C-142	Filter Capacitor	Dual 40 mfd, 150 V, Plug in type Dry Electrolytic, Metal Can, Aerovox #29042
C-143	Filter Capacitor	SAME AS C-142
C-144	OMITTED	- - - - -
C-145	Padder Capacitor	Ceramic, .5 mmfd, Temp. Coeff. -.00075 mmfd/mmfd/Deg. C, plus or minus 15%. Centralab Part 4421-A.
C-146	By-Pass Capacitor	SAME AS C-120
C-147	By-Pass Capacitor	SAME AS C-120
C-148	By-Pass Capacitor	SAME AS C-120
C-149	By-Pass Capacitor	SAME AS C-120
C-150	Padder Capacitor	<u>C e r a m i c</u> , 10 mmfd, 500 V, Erie Type NPO K, p/m .5 mmfd.
C-151	Padder Capacitor	SAME AS C-118
C-152	Padder Capacitor	SAME AS C-145
C-153	Padder Capacitor	SAME AS C-145
C-154	Padder Capacitor	SAME AS C-145
C-155	By-Pass Capacitor	SAME AS C-120
C-156	By-Pass Capacitor	SAME AS C-120
C-157	By-Pass Capacitor	SAME AS C-120
C-158	By-Pass Capacitor	SAME AS C-120
C-159	Padder Capacitor	SAME AS C-115
C-160	OMITTED	- - - - -
C-161	Padder Capacitor	<u>C e r a m i c</u> , 35 mmfd, 500 V, Erie, Type N750 K, p/m 1 mmfd.
C-162	Trimmer Capacitor	SAME AS C-103
C-163	Trimmer Capacitor	SAME AS C-103
C-164	Trimmer Capacitor	SAME AS C-103

FUSES

F-101	Line Fuse	1 Amp, 250 V, Glass, Littlefuse Type 3-AG
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PARTS LIST
MODEL AR-8506-B
RADIO RECEIVER

REFERENCE DRAWING: T-1198 - Circuit Diagram

Symbol Desig.	Function	Rating
<u>JACKS</u>		
J-101	Power Jack	Male, Locking Type, Polarized, Hubbell #7467
J-102	Phone Jack	Maxley Junior Jack #702-A, Mallory SAME AS J-102
J-103	Phone Jack	
<u>R. F. & A. F. REACTORS</u>		
L-101	Filter Choke	5 Hy, 100 ohms, 100 m.a., Kenyon S-15056 or Super Elec. SE-15056
-102	Filter Choke	SAME AS L-101
L-103	R. F. Choke	2.5 MH 50 Ohms, 125 m.a. R-100 National or Super Elec.
<u>LOUD SPEAKER</u>		
LS-101	Loud Speaker	3" P.M. Dynamic, 5 ohm coil, Cinaudigraph 30-0M-9A
<u>RESISTORS *</u>		
R-101	R.F. Grid Resistor	1 Megohm, 1/2 W, Carbon, Erie
R-102	R.F. Cathode Resistor	250 Ohms, 1/2 W, Carbon, Erie
R-103	R.F. Plate Resistor	1,000 ohms, 1/2 W, Carbon, Erie
R-104	Mixer Grid Resistor	SAME AS R-101
R-105	Mixer Cathode Resistor	500 ohms, 1/2 W, Carbon, Erie
R-106	Osc. Grid Resistor	100,000 ohms, 1/2 W, Carbon, Erie
R-107	Mixer Plate Resistor	SAME AS R-103
R-108	1st I.F. Grid Resistor	SAME AS R-106
R-109	1st I.F. Cath. Resistor	SAME AS R-103
R-110	1st I.F. Plate Resistor	SAME AS R-103
111	R.F. Gain Control	10,000 ohms, 2 W, wire wound, Clarostat type P-185, RMCA dwgK220 "V" taper, DPST switch to open at counterclockwise end.
(See Note 2 on page 18 regarding R.F. Gain Control & Switch)		
R-112	2nd I.F. Grid Resistor	SAME AS R-106
R-113	2nd I.F. Cath. Resistor	SAME AS R-103
R-114	2nd I.F. Plate Resistor	SAME AS R-103
R-115	3rd I.F. Cath. Resistor	SAME AS R-105
R-116	A.V.C. Filter Resistor	2 Megohms, 1/2 W, Carbon, Erie
R-117	3rd I.F. Plate Resistor	SAME AS R-103
R-118	Diode Filter Resistor	50,000 ohms, 1/2 W, Carbon, Erie
R-119	Diode Load Resistor	250,000 ohms, 1/2 W, Carbon, Erie
R-120	A.F. Gain Control	1 Megohm, C Taper, IRC VG-8823
R-121	1st A.F. Grid Resistor	10 Megohms, 1/2 W, Carbon, Erie

* RESISTOR TOLERANCES: R-120 and R-128 plus or minus 20%
All other resistors plus or minus 10%

PARTS LIST
MODEL AR-8506-B
RADIO RECEIVER

REFERENCE DRAWING: T-1198 - Circuit Diagram

<u>Symbol</u> <u>Desig.</u>	<u>Function</u>	<u>Rating</u>
<u>RESISTORS (Cont'd)</u>		
R-122	1st A.F. Plate Resistor	150,000 ohms, 1/2 W, Carbon, Erie
R-123	2nd A.F. Grid Resistor	SAME AS R-119
R-124	B.F.O. Plate Resistor	500,000 ohms, 1/2 W, Carbon, Erie
R-125	Osc. Plate Resistor	2,500 ohms, 1/2 W, Carbon, Erie
R-126	2nd A.F. Filter Resistor	SAME AS R-106
R-127	Heater Resistor	50 ohms, 10 W, wire wound, Glarostat type MR
R-128	Output Resistor	5 ohms, 2 W, wire wound, IRC BW-2
R-129	Bleeder Resistor	SAME AS R-118
R-130	Antenna Resistor	10 ohms, 1/2 W, Carbon, Erie
<u>SWITCHES</u>		
S-101	Band Switch, Ant. Sect.	2 Wafer, 5 pos., bakelite, Oak Mfg. Co., RMCA dwg K-216
S-102	Band Switch, M.O. Sect.	4 Wafer, 5 pos., bakelite, Oak Mfg. Co., RMCA dwg K-215
S-103	B.F.O. On-Off Switch	SPST, Toggle, H & H #20992
S-104	A.V.C. On-Off Switch	SPDT, Toggle, H & H #21350
S-105	Loud Speaker On-Off Sw.	SAME AS S-104
S-106	Power Switch	(A part of R.F. Gain Control R-111)
(See Note 2 on Page 18)		
<u>TRANSFORMERS</u>		
T-101	Output Transformer	25L6 Tube to 500 and 4 ohms, Kenyon S-17586 or Super Elec. SE-17586
<u>VACUUM TUBES</u>		
V-101	R. F. Amplifier Tube	RCA 6SG7
V-102	Mixer Tube	RCA 6SG7
V-103	Oscillator Tube	RCA 6J5
V-104	1st I.F. Amplifier Tube	RCA 6SG7
V-105	2nd I.F. Amplifier Tube	RCA 6SG7
V-106	3rd I.F. Amplifier Tube	RCA 6SG7
V-107	Det., A.V.C., 1st A.F. Tube	RCA 6SQ7
V-108	Audio Output Tube	RCA 25L6GT/G
V-109	Beat Freq. Osc. Tube	RCA 6J5
V-110	Rectifier Tube	RCA 25Z6
V-111	Voltage Regulator	1 W Neon D.C. Candelabra Base, G-10Bult
<u>SOCKETS</u>		
X-101	R.F. Amp. Tube Socket	Ucinite #115078
X-102	Mixer Tube Socket	SAME AS X-101
X-103	Osc. Tube Socket	SAME AS X-101
X-104	1st I.F. Amp. Tube Socket	SAME AS X-101
X-105	2nd I.F. Amp. Tube Socket	SAME AS X-101

PARTS LIST
MODEL AR-8506-B
RADIO RECEIVER

REFERENCE DRAWING: T-1198 - Circuit Diagram

Symbol Desig.	Function	Rating
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SOCKETS (Cont'd)

X-106	3rd I.F. Amp. Tube Socket	SAME AS X-101
X-107	Det., A.V.C. 1st I.F. Socket	SAME AS X-101
X-108	Audio Output Tube Socket	SAME AS X-101
X-109	Beat Freq. Osc. Tube Socket	SAME AS X-101
X-110	Rectifier Tube Socket	SAME AS X-101
X-111	Voltage Regulator Socket	Ediswan #23, F.W.Morse Co.
X-112	Filter Cond.(C-142) Socket	SAME AS X-101
X-113	Filter Cond.(C-143) Socket	SAME AS X-101

R. F. AND I. F. TRANSFORMERS

Z-101	Band 2, Ant. Coil	Prim. 10 M.H. - Sec. 1.29 M.H. Super Elec. or Delta - T-1199-A2
Z-102	Band 3, Ant. Coil	Prim. 50 u.h. - Sec. 16.6 u.h. Super Elec. or Delta - T-1199-A3
Z-103	Band 4, Ant. Coil	Prim. 1.5 u.h. - Sec. 3.63 u.h. Super Elec. or Delta - T-1199-A4
Z-104	Band 5, Ant. Coil	Prim. 0.23 u.h. - Sec. 0.82 u.h. Super Elec. or Delta - T-1199-A5
Z-105	Band 2, R. F. Coil	Prim. 12.0 u.h. - Sec. 1.35 M.H. Super Elec. or Delta - T-1199-B2
Z-106	Band 3, R. F. Coil	Prim. 500 u.h. - Sec. 16.1 u.h. Super Elec. or Delta - T-1199-B3
Z-107	Band 4, R. F. Coil	Prim. 100 u.h. - Sec. 3.66 u.h. Super Elec. or Delta - T-1199-B4
Z-108	Band 5, R. F. Coil	Prim. 50 u.h. - Sec. 0.84 u.h. Super Elec. or Delta - T-1199-B5
Z-109	Band 2, Osc. Coil	65 u.h. tapped 12-1/4 turns from bot. Super Elec. or Delta - T-1199-C2
Z-110	Band 3, Osc. Coil	7.37 m.h. tapped 2-1/4 turns from bot. Super Elec. or Delta - T-1199-C3
Z-111	Band 4, Osc. Coil	2.38 u.h. tapped 1-1/4 turns from bot. Super Elec. or Delta - T-1199-C4
Z-112	Band 5, Osc. Coil	0.97 m.h. tapped 1-1/4 turns from bot. Super Elec. or Delta - T-1199-C5
Z-113	1st I.F. Transf.(1700 KC)	Prim. 76 u.h. Sec. 76 uh tap @ 8 u.h. Sickles Co. #12568
Z-114	2nd I.F. Transf.(1700 KC)	SAME AS Z-113
Z-115	3rd I.F. Transf.(1700 KC)	SAME AS Z-113
Z-116	Diode Transf. (1700 KC)	Prim & Sec. ea. 76 u.h. No tap Sickles Co. #12569
Z-117	B.F.O. Transf.(1700 KC)	50 u.h. tapped 4.7 u.h. from bottom Sickles Co. #12600
Z-118	I.F. Wave Trap	Series Connected, Adjust.Core Type RCAM #33033

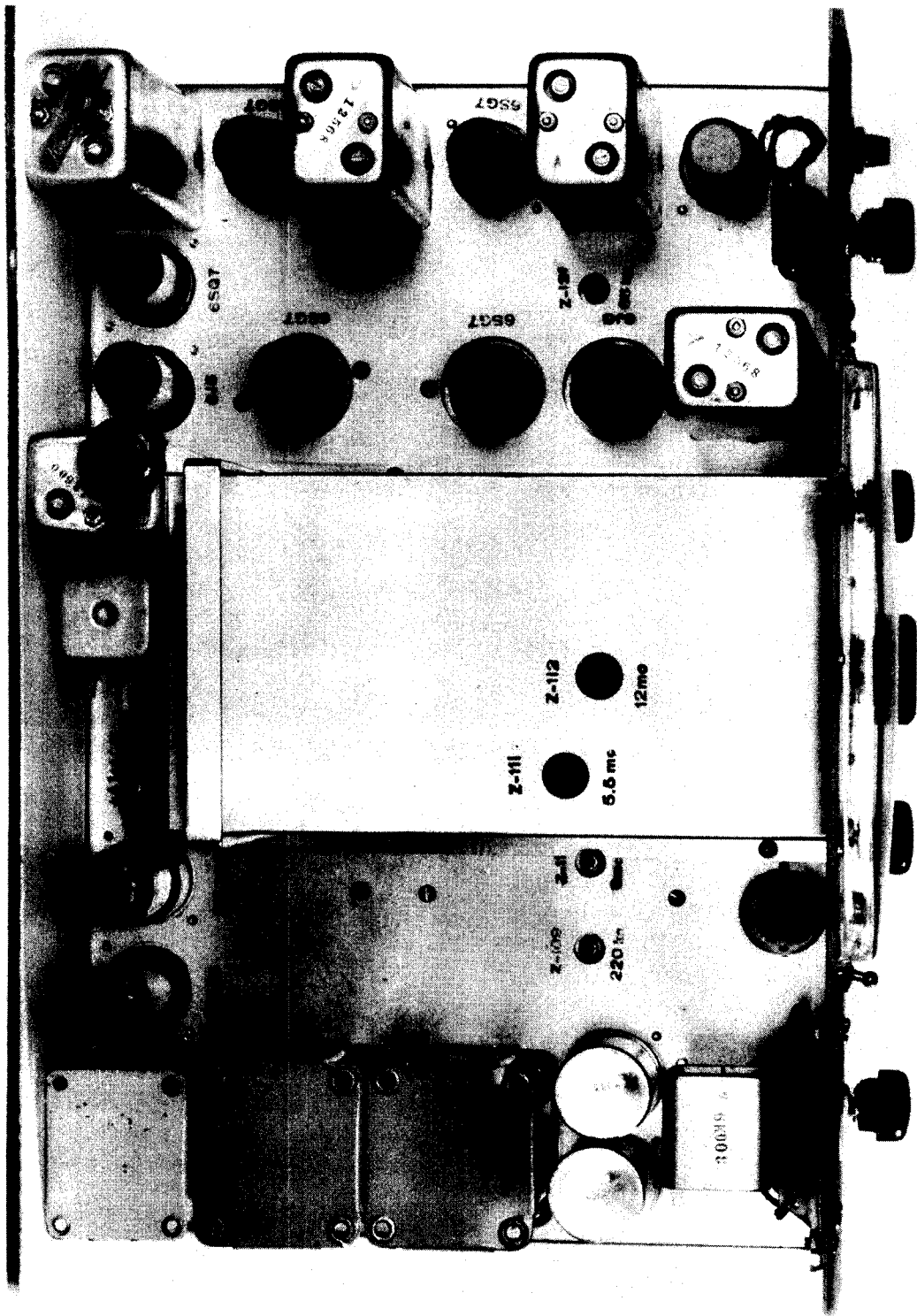
PARTS LIST
MODEL AR-8506-B
RADIO RECEIVER

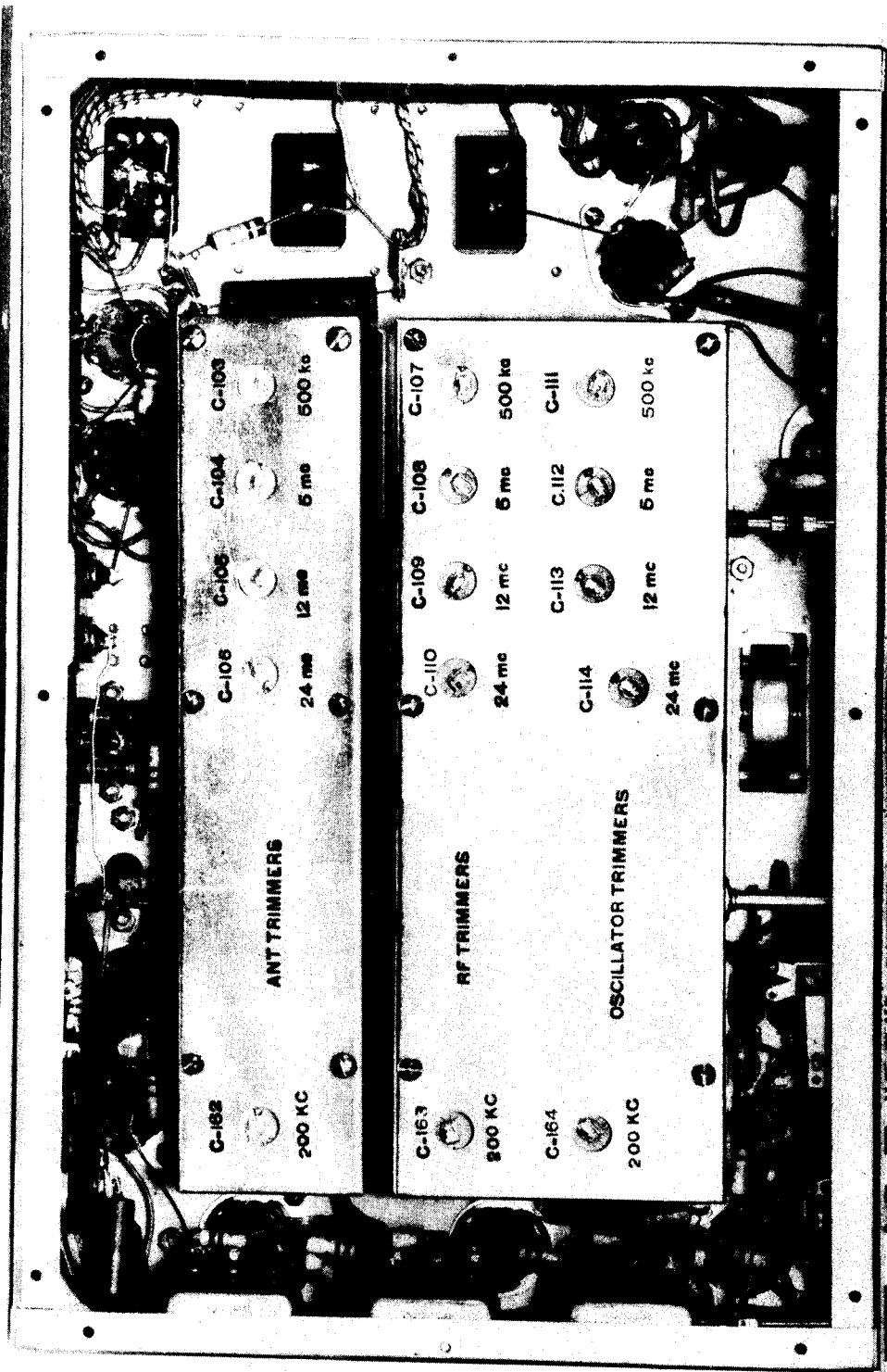
REFERENCE DRAWING: T-1198 - Circuit Diagram

<u>Symbol</u> <u>Desig.</u>	<u>Function</u>	<u>Rating</u>
<u>R. F. AND I. F. TRANSFORMERS (Cont'd)</u>		
Z-119	Band 1, Ant. Coil	Prim. 50 M.H. - Sec. 8.93 M.H. Super Elec. or Delta - T-1199-A1
Z-120	Band 1, R. F. Coil	Prim. 210 u.h. - Sec. 9.17 u.h. Super Elec. or Delta - T-1199-B1
Z-121	Band 1, Osc. Coil	65 u.h. tapped 12-1/4 turns from bot. Super Elec. or Delta - T-1199-C1
<u>TYPE RM-8 - LINE FILTER UNIT</u>		
A-201	Line Filter Box	6" X 6" X 3" Welded Steel Box with hinged top cover #14 U.S.S. RMCA drawing TS-195
C-201	Filter Condenser	3 X .1 mfd, 400 V, Oil filled paper Aerovox AX-1007
F-201	Line Fuse	1 A, 250 V, Glass, Littlefuse 3-AG
F-202	Line Fuse	SAME AS F-201
L-201	R.F. Choke	2 M.H., 1.3 ohms, 2 pies #20 AWG Delta - X-917-4
L-202	R. F. Choke	SAME AS L-201
P-201	Line Power Plug	Female, Polarized, locking type Hubbell #7464
S-201	Power Switch	DPST, 115 V, 20 Amp, Bryant Elec. 3982
W-201	Line Power Cable	3 Ft. Long, 2 conductor shielded rubber covered. Birnbach #772.

NOTE 1: "p/m" means plus or minus for tolerances.

NOTE 2: R. F. Gain Control and S-106 Power Switch: On some receivers a separate R. F. Gain Control and a separate Power Switch (not ganged together) are used. In such cases the R. F. Gain Control, R-111, is Allen Bradley, 10,000 ohms, type J-1765-CR. The Power Switch, S-106, is H and H Cat. #80600 double-pole, single-throw..





C-102

200 KC

ANT TRIMMERS

C-106

24 mc

C-105

12 mc

C-104

5 mc

C-103

500 kc

C-107

200 KC

RF TRIMMERS

C-110

24 mc

C-109

12 mc

C-108

5 mc

C-107

500 kc

C-164

200 KC

OSCILLATOR TRIMMERS

C-114

24 mc

C-113

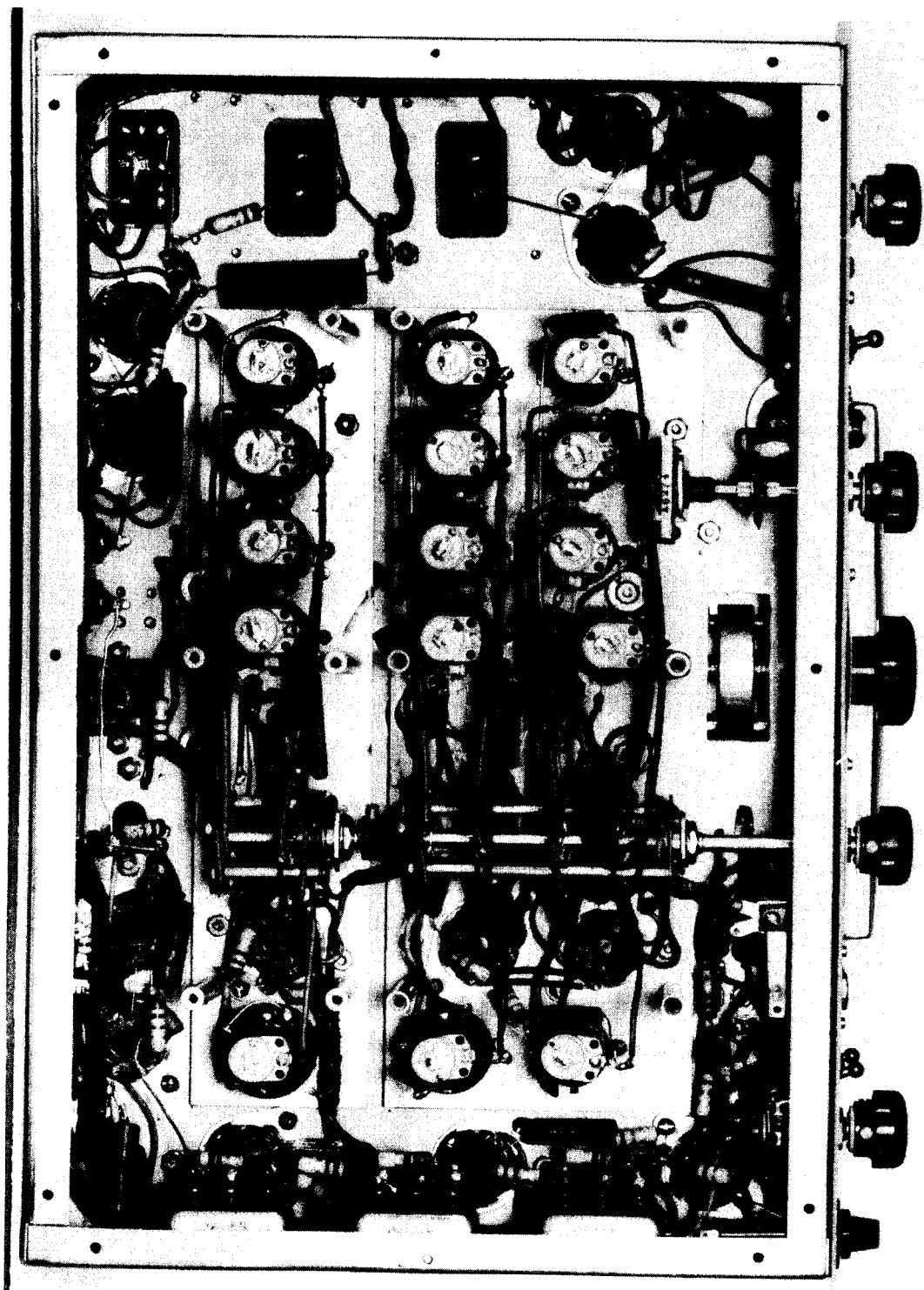
12 mc

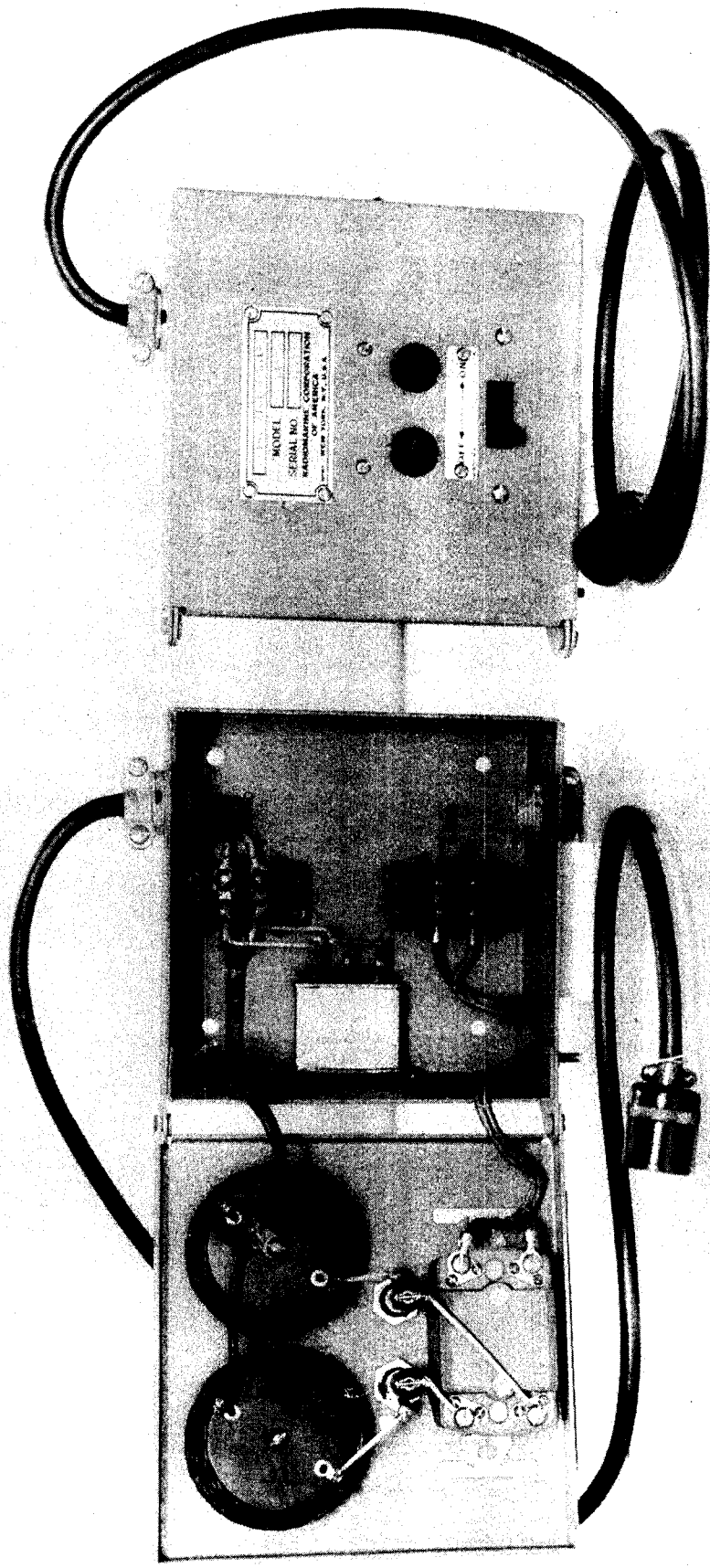
C-112

5 mc

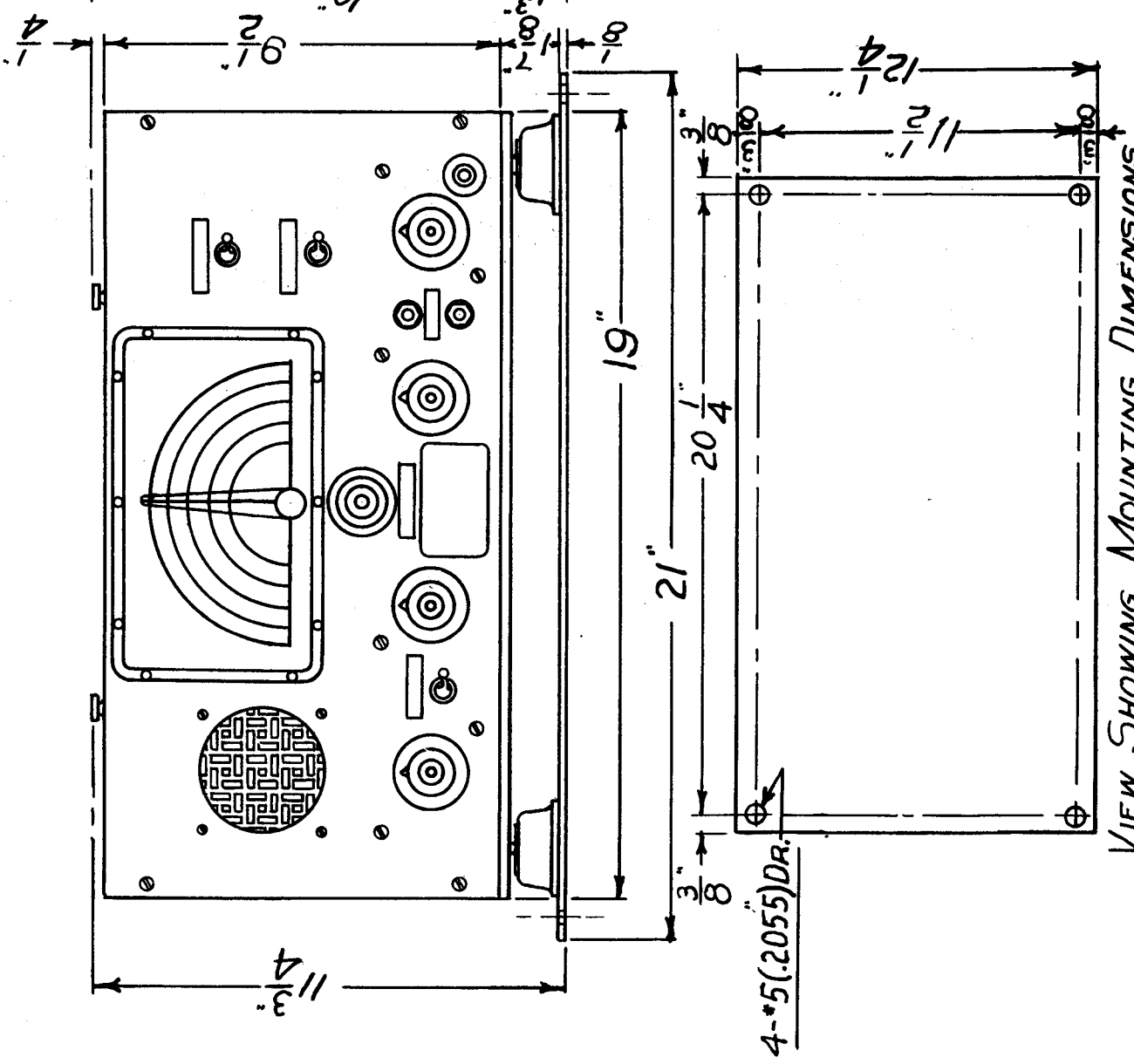
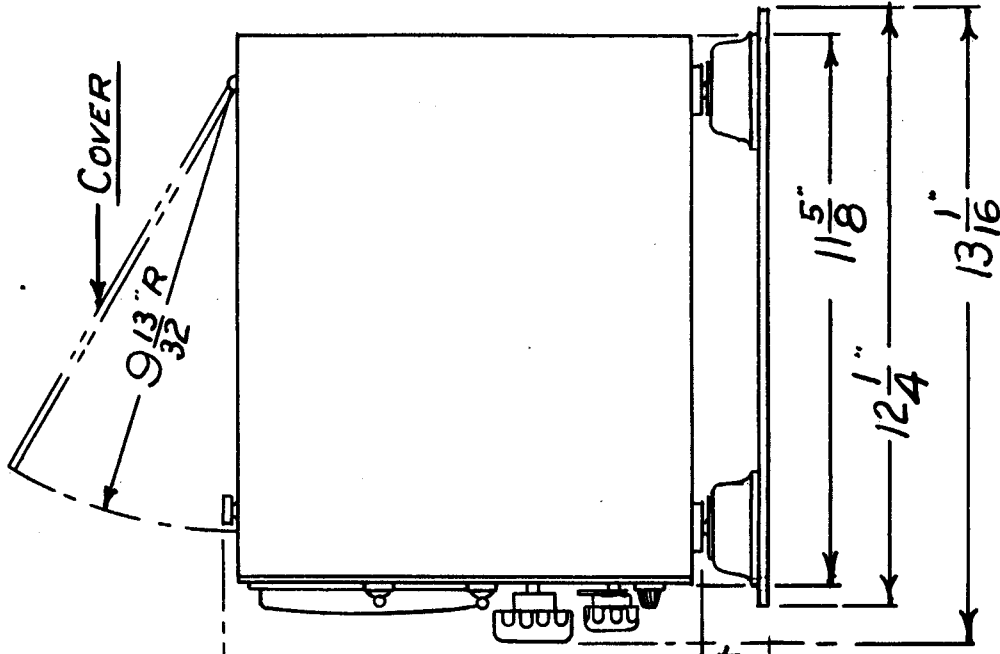
C-111

500 kc





MODEL RM-8 - LINE FILTER UNIT

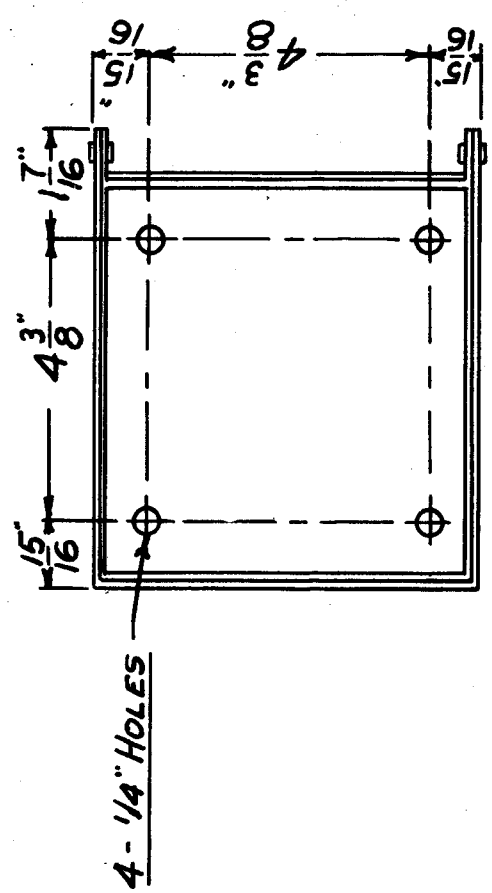
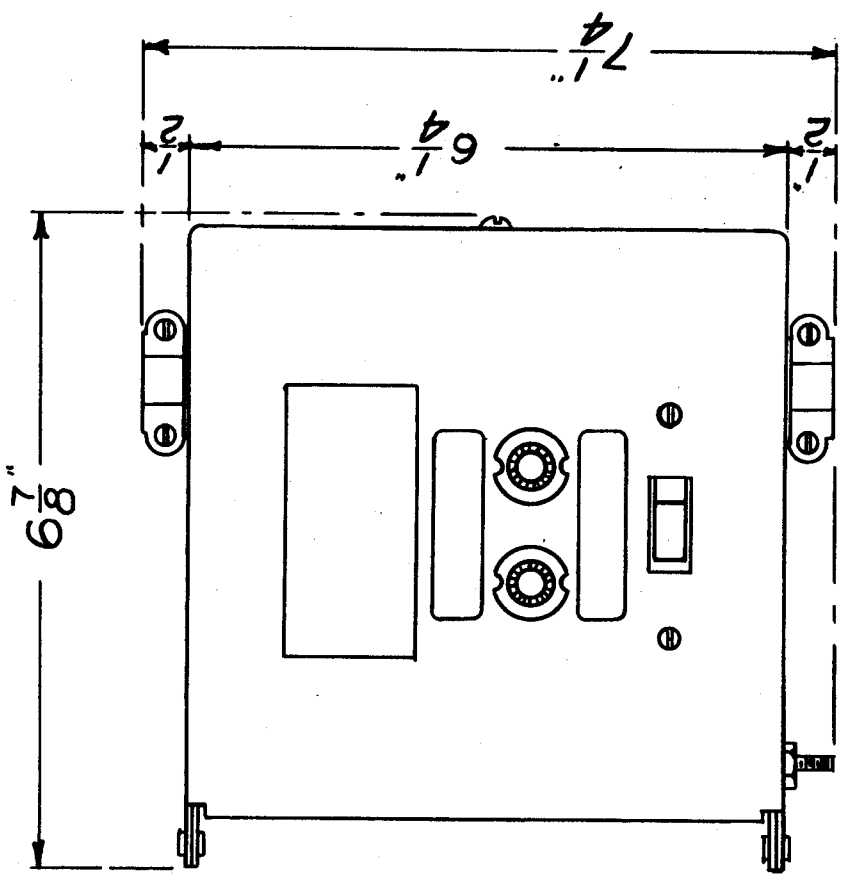
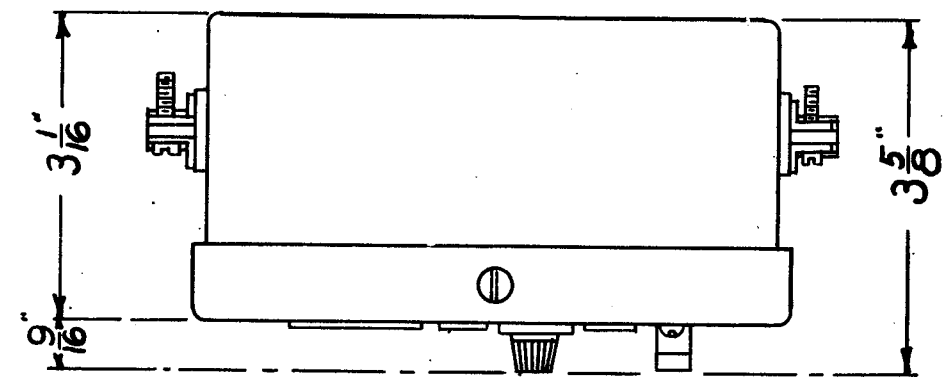


VIEW SHOWING MOUNTING DIMENSIONS

WEIGHT-63 LBS.

OUTLINE	
AR-8506-B RECEIVER	
RADIOMARINE CORP. OF AMERICA	
ENG. DEPT.	S. PROSAR
NEW YORK, N. Y.	Sub. No. 23
KS:175	
Date 10-9-42	

SUB #3 4-16-43 SR
SUB #2 3-5-43 SR
SUB #1 1-14-43 SR

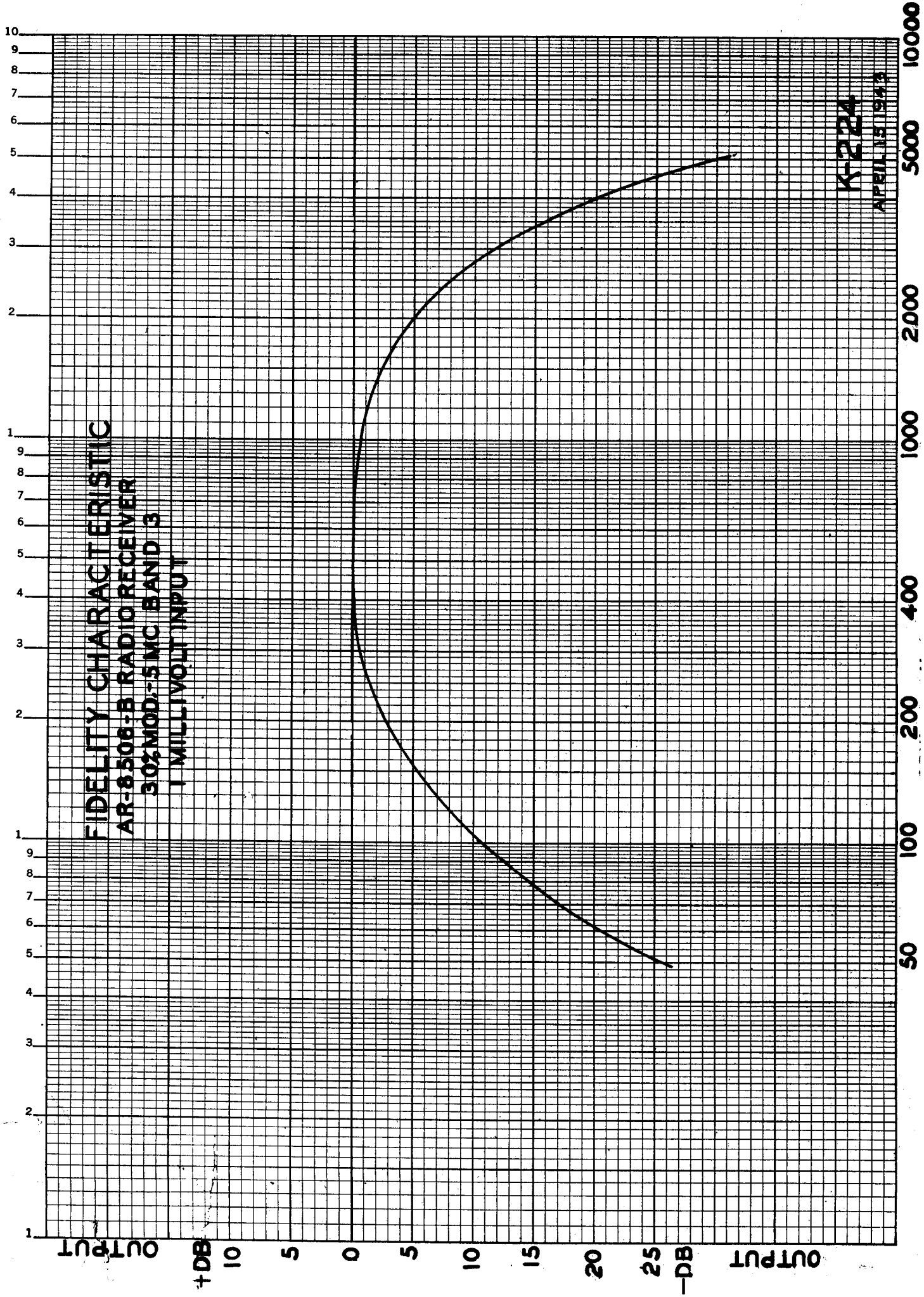


WEIGHT - 5 LBS.

RM-8	
LINE FILTER UNIT OUTLINE	
RADIOMARINE CORP. OF AMERICA	
ENG. DEPT.	S. PROSAK
KS-194	

MTG. DIMENSIONS ON REAR OF CABINET

FIDELITY CHARACTERISTIC
AR-8506-B RADIO RECEIVER
30% MOD., 5 MC BAND 3
1 MILLIVOLT INPUT



K-2224
APRIL 15 1943

0000

SELECTIVITY CHARACTERISTIC MODEL AR-8506-B RADIO RECEIVER

200KC

200KC

2000KC
AND
HIGHER

2000KC
AND
HIGHER

1000

RATIO: INPUT VOLTAGE OFF RESONANCE
INPUT VOLTAGE AT RESONANCE

100

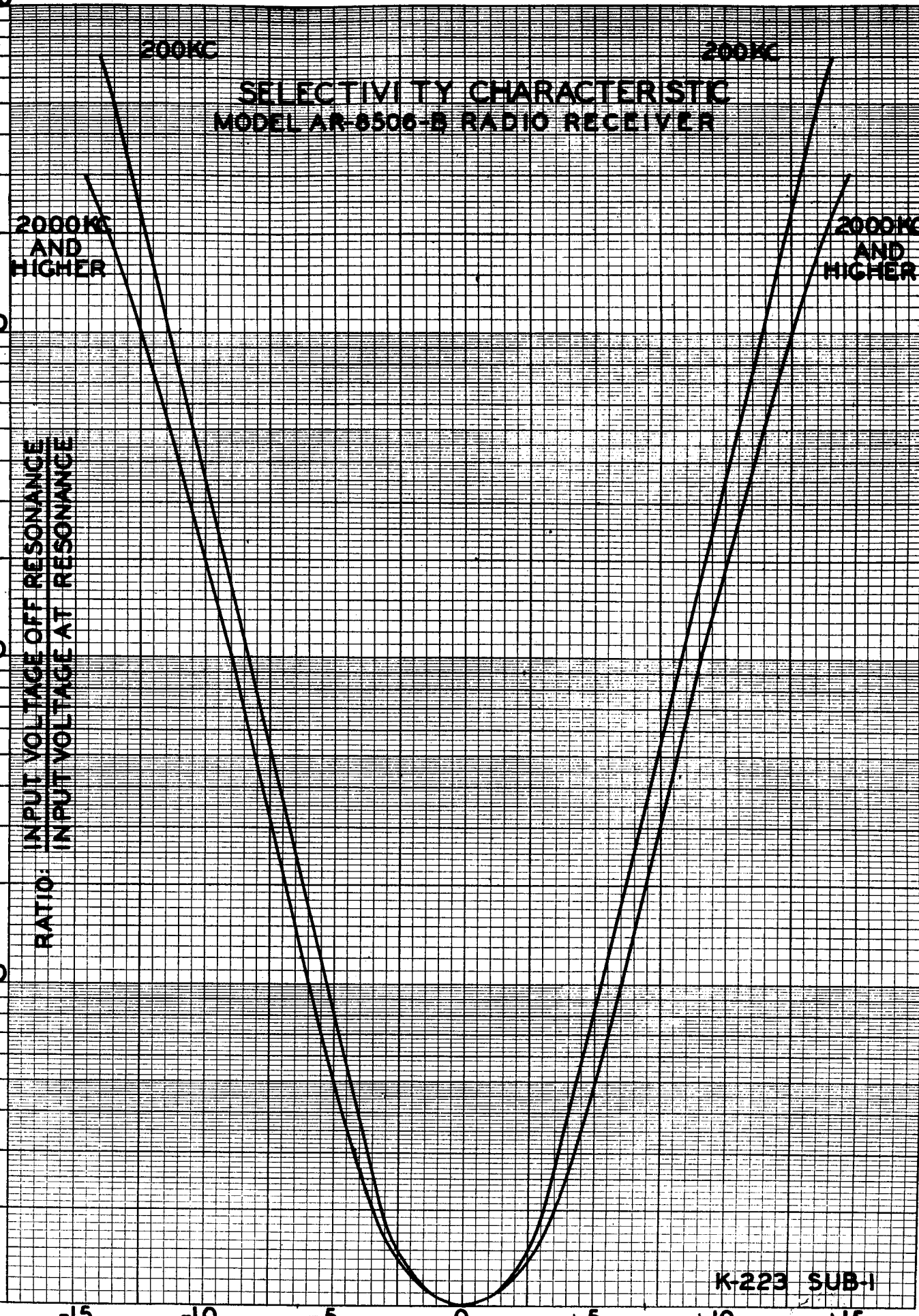
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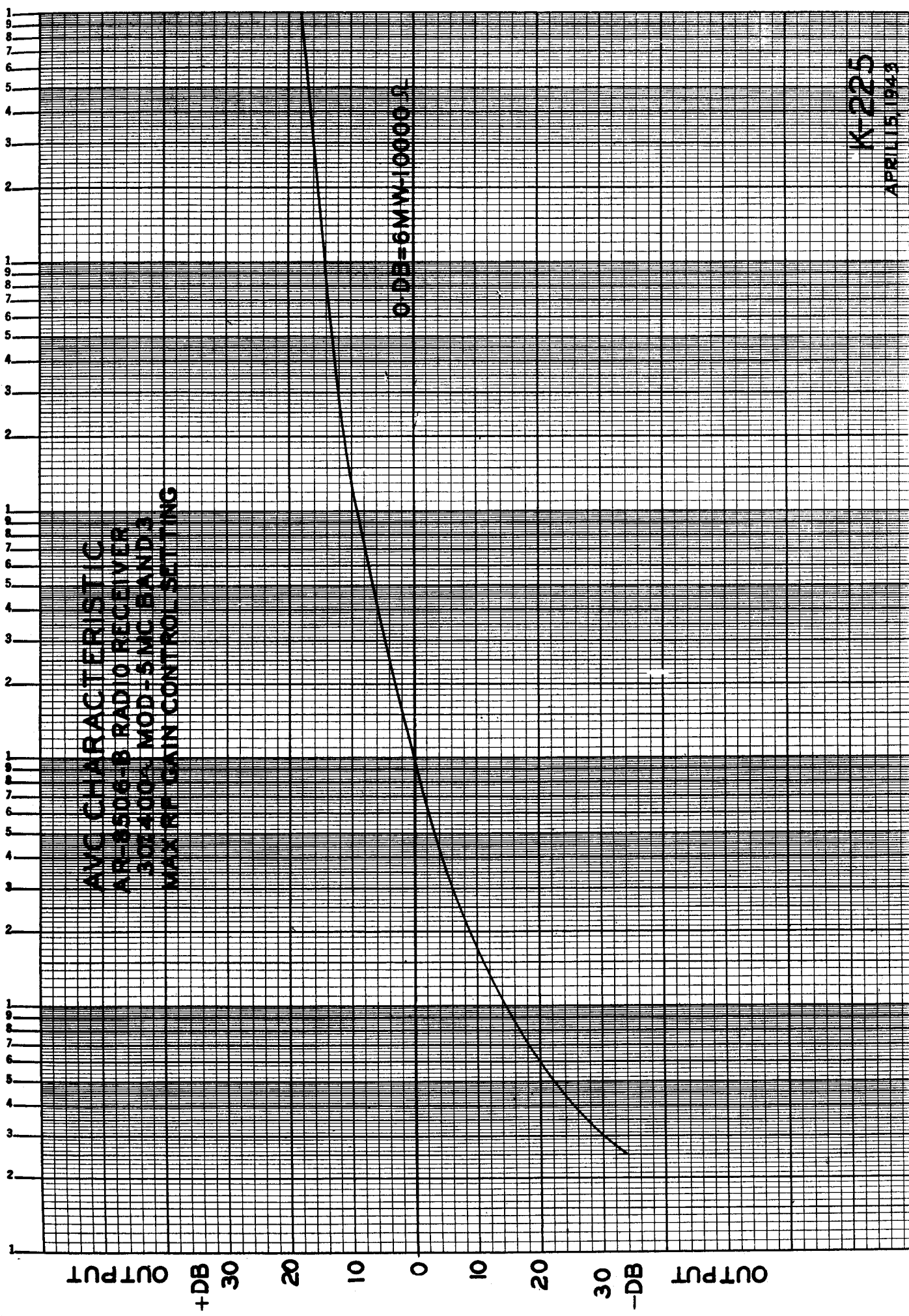
K-223 SUB-1

-15 -10 -5 0 +5 +10 +15

KILOCYCLES OFF RESONANCE

JULY 8 1943





AVC CHARACTERISTIC
 AR-8506-B RADIO RECEIVER
 3024000 MOD-5 MC BAND 1
 MAX RF GAIN CONTROL SETTING

0 DB = 6 MW-10000 Ω

K-225
 APRIL 15, 1943

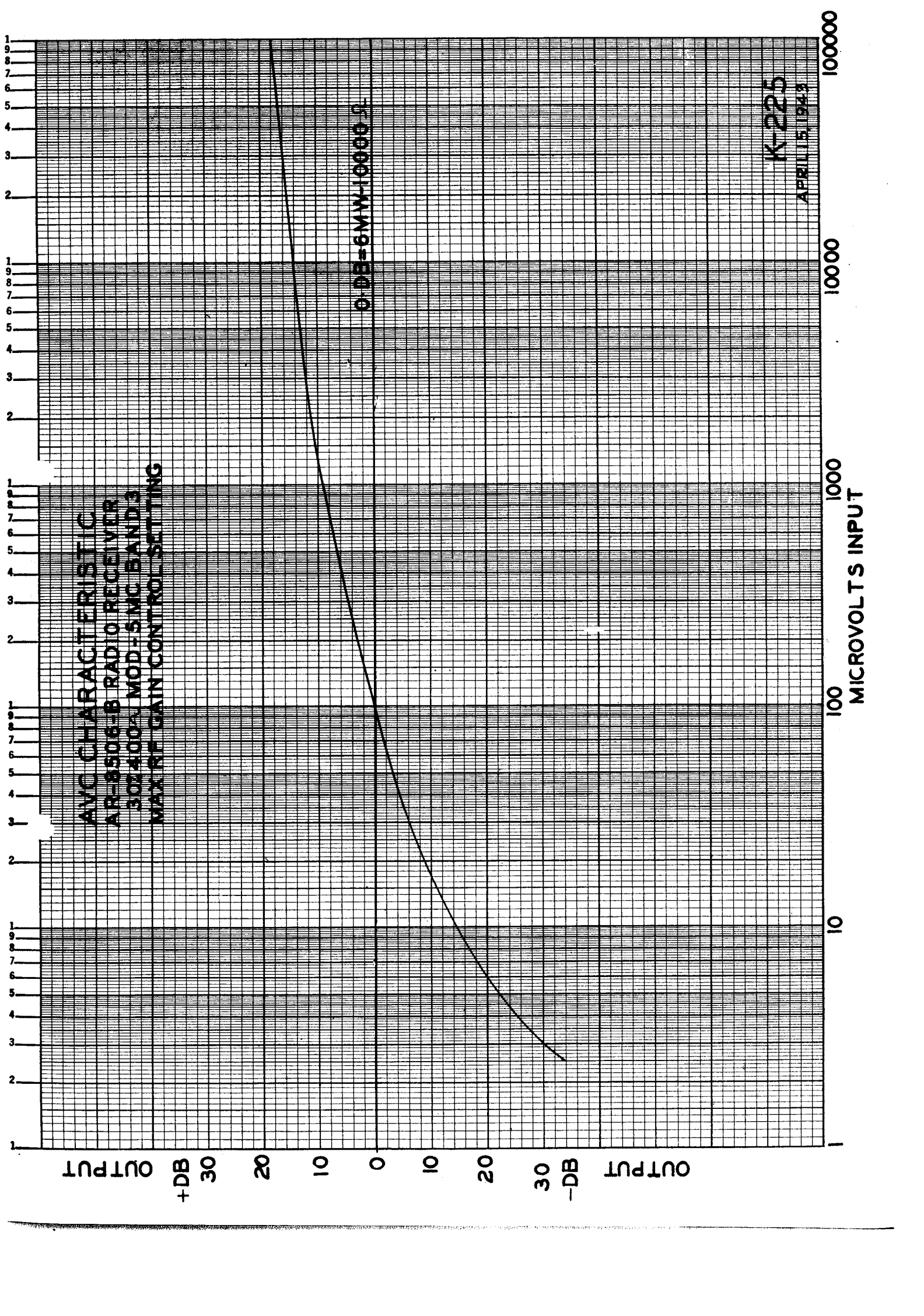
OUTPUT
+DB
30
20
10
0
10
20
30
-DB

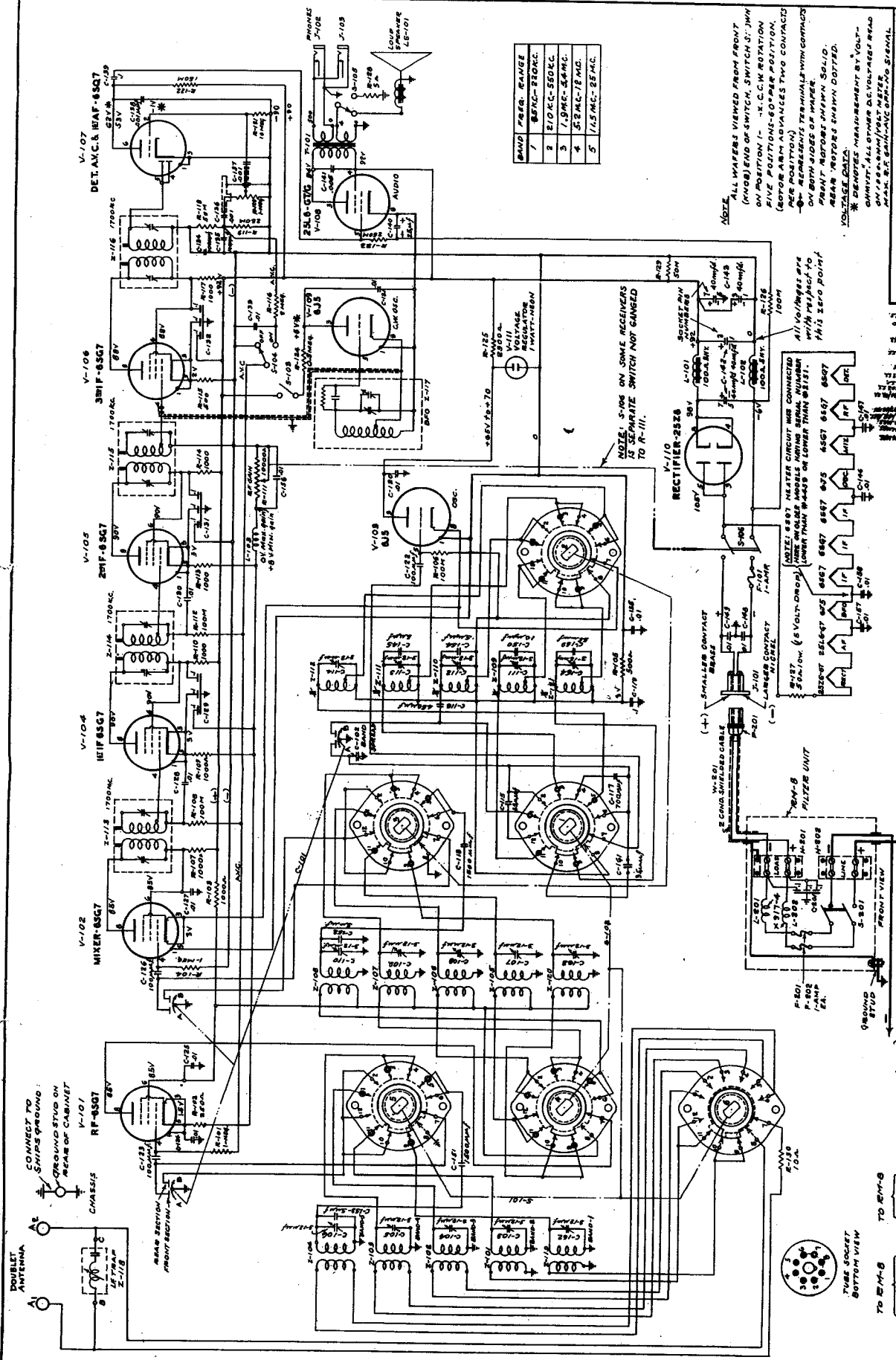
AVC CHARACTERISTIC
AR-8506-B RADIO RECEIVER
302400 MOD-5 MC BAND 3
MAX RF GAIN CONTROL SETTING

0 DB = 6 MW - 10000 R

K-225
APRIL 15, 1943

10
100
1000
10000
100000
MICROVOLTS INPUT





AR-8506-B RADIO RECEIVER
RADIOMARINE CORP. OF AMERICA
ENGINEERING DEPT.
NEW YORK

Sub. / 5
T-1198
 Date 1/28/42

BAND	FRQ. RANGE
1	850 KC - 230 KC.
2	2.0 MC - 5.50 MC.
3	1.0 MC - 5.0 MC.
4	0.5 MC - 1.8 MC.
5	1.5 MC - 2.5 MC.

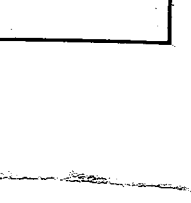
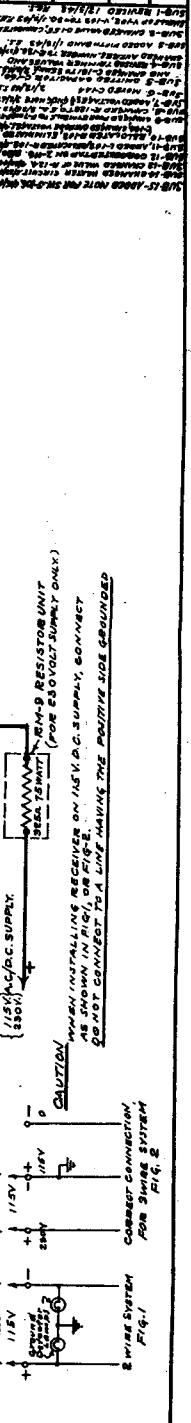
NOTE:
 ALL WAPERS VIEWED FROM FRONT (KNOB END OF SWITCH, SWITCH S; JMW ON POSITION I - C.C.W. ROTATION FIVE POSITIONS-50 PER POSITION. (BEFORE ARM ADVANCES TWO CONTACTS - 50 PER POSITION). (FOR POSITIVE CONTACTS ON BOTH SIDES OF WAPER, FRONT ROTORS SHOWN SOLID, REAR ROTORS SHOWN DOTTED).
VOLTAGE DATA:
 * DENOTES MEASUREMENT BY VOLT-SHUNTS; ALL OTHER D.C. VOLTAGE READ BY 1.5 OHM PERCENT METER.
 # BY 2.5 OHM PERCENT METER.
 - BY 2.5 OHM PERCENT METER.

NOTE: S-WOGS ON SOME RECEIVERS IS SEPARATE SWITCH NOT CONNECTED TO R-III.

All 100Mega are with respect to this zero point.

NOTE: 6507 HEATER CIRCUT HAS CONNECTED WITH WAPERS HAVING SERIAL NUMBER LOWER THAN WAPERS ON LOWER THAN 5817.

FIG. 1-AR-8506-B RADIO RECEIVER
 DETAIL OF POWER SUPPLY AND
 FILAMENT SYSTEM (SEE FIG. 2)
 DETAIL OF VOLTAGE REGULATOR
 AND 50VOLT SUPPLY UNIT
 DETAIL OF AF AMPLIFIER
 DETAIL OF TUNING EYE
 DETAIL OF VOLUME CONTROL
 DETAIL OF TONE CONTROL



WHEN INSTALLING RECEIVER ON 115V. D.C. SUPPLY, CONNECT AS SHOWN IN FIG. 1 OR FIG. 2. SHOULD CONNECT TO A LINE HAVING THE POSITIVE SIDE GROUNDED.
CAUTION
 CORRECT CONNECTION FOR 50V SUPPLY FIG. 2