NAVSHIPS 92736

INSTRUCTION BOOK

for

RADIO RECEIVING SET

AN/FRR-32

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, NEW JERSEY, U. S. A.

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS

IB-39612

Contract: NObsr 57571

Approved by BuShips: 11 April 1956

LIST OF EFFECTIVE PAGES

PAGE NUMBERS	CHANGE IN EFFECT	PAGE NUMBERS	CHANGE IN EFFECT
Title page	Original	4-1 to 4-15, 4-16	Original
A to C	Original	5-1 to 5-11, 5-12	Original
i to xi	Original	6-1 to 6-15, 6-16	Original
1-0 to 1-13	Original	7-1 to 7-185, 7-186	Original
2-0 to 2-27	Original	8-1 to 8-130	Original
3-0 to 3-29, 3-30	Original	i-1 to i-20	Original

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

IN REPLY REFER TO
Code 993-100
11 April 1956

From: Chief, Bureau of Ships
To: All Activities Concerned with the Installation, Operation, and Maintenance of the Subject Equipment

Subj: Technical Manual for Radio Receiving Set AN/FRR-32 NAVSHIPS 92736

1. This is the technical manual for the subject equipment and is in effect upon receipt.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense publications.

4. Errors found in this manual (other than obvious typographical errors), which have not been corrected by means of Temporary Corrections or Permanent Changes, should be reported. Such report should include the complete title of the publication and the publication number (short title); identify the page and line or figure and location of the error; describe the error or indicate what change should be made; and be forwarded to the Electronics Publications Section of the Bureau of Ships.

5. All Navy requests for NAVSHIPS electronics publications should be directed to the nearest District Publications and Printing Office. When changes or revised books are distributed, notice will be included in the Electronics Information Bulletin, NAVSHIPS 900,022, and in the Index of Bureau of Ships General and Electronics Publications, NAVSHIPS 250-020.

A. G. MUMMA
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATA	SIGNATURE OF OFFICER MAKING CORRECTION

TABLE OF CONTENTS

SECTION 1 - GENERAL DESCRIPTION

SECTION 2 - THEORY OF OPERATION

TABLE OF CONTENTS (Continued)

SECTION 3 - INSTALLATION

TABLE OF CONTENTS (Continued)

SECTION 4 - OPERATION

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

SECTION 7 - CORRECTIVE MAINTENANCE

TABLE OF CONTENTS (Continued)

LIST OF ILLUSTRATIONS

SECTION 1 - GENERAL DESCRIPTION

SECTION 2 - THEORY OF OPERATION

SECTION 3 - INSTALLATION

SECTION 4 - OPERATION

SECTION 5 - OPERATOR'S MAINTENANCE

LIST OF ILLUSTRATIONS (Continued)

SECTION 6 - PREVENTIVE MAINTENANCE

SECTION 7 - CORRECTIVE MAINTENANCE

LIST OF ILLUSTRATIONS (Continued)

LIST OF TABLES

SECTION 1 - GENERAL DESCRIPTION

SECTION 2 - THEORY OF OPERATION

SECTION 3 - INSTALLATION

SECTION 4 - OPERATION

SECTION 5 - OPERATOR'S MAINTENANCE

SECTION 6 - PREVENTIVE MAINTENANCE

SECTION 7 - CORRECTIVE MAINTENANCE

LIST OF TABLES (Continued)

SECTION 8 - PARTS LISTS

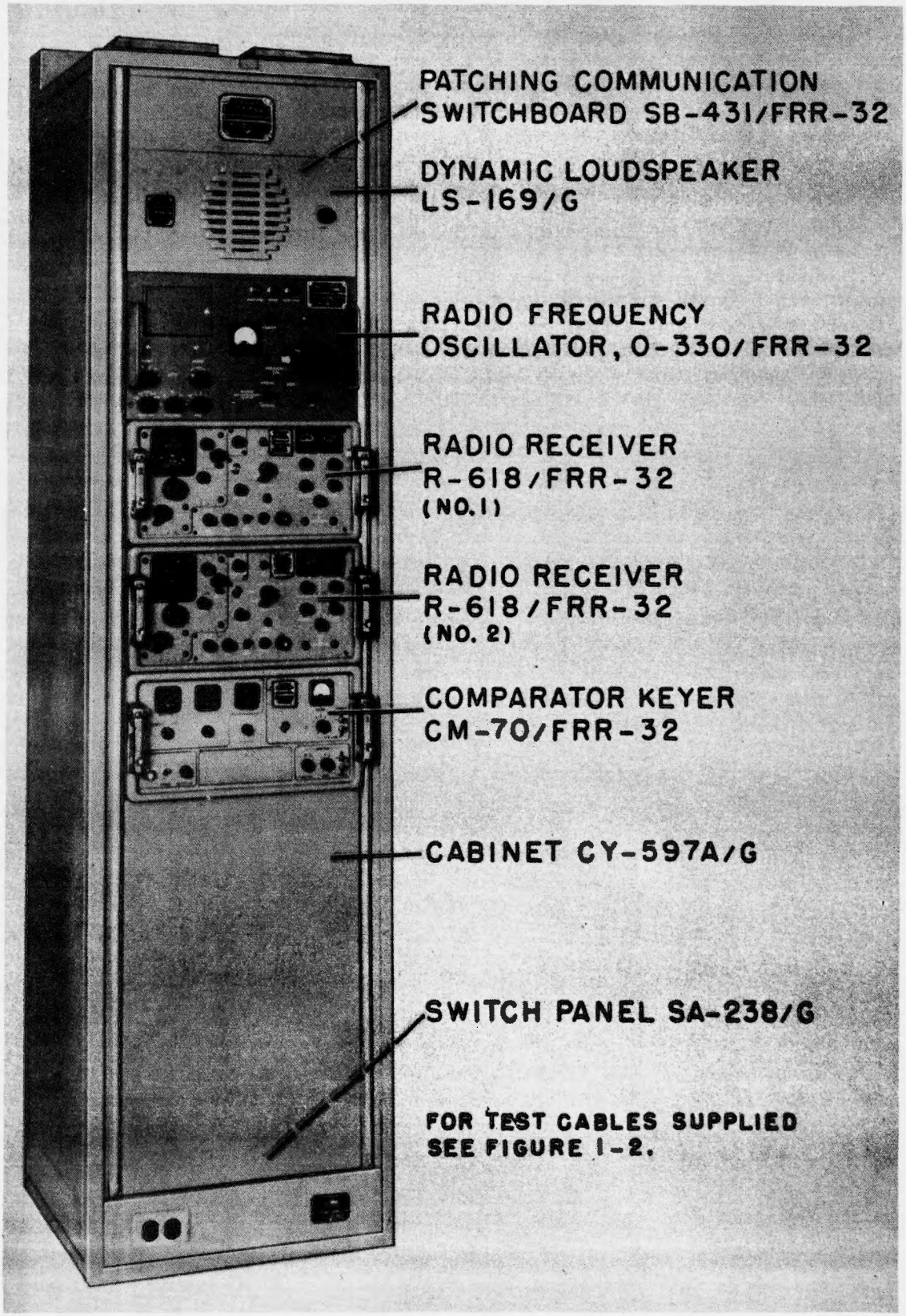


Figure 1-1. Radio Receiving Set AN/FRR-32

SECTION 1

GENERAL DESCRIPTION

1. SCOPE OF THIS BOOK.

This instruction book covers fixed station Radio Receiving Set AN/FRR-32 (see figures 1-1 and 1-2). Sections on theory, installation, operation, maintenance and parts lists are included. Refer to table 1-1 for the list of equipment supplied. Figure 1-1 shows the overall equipment and figure 1-2 shows the test cables provided.

2. PURPOSE AND BASIC PRINCIPLES.

a. RADIO RECEIVER R-618/FRR-32

Radio Receiving Set AN/FRR-32 is designed for fixed station operation. It includes two radio receivers, type R-618/FRR-32, which may be used either singly, or in diversity to eliminate the effect of fading. Fading, in this case, denotes the variations in signal strength over periods of several seconds down to only a few milliseconds or less. It must not be construed as applying to the slow hour to hour, day to night, day to day, or seasonal variations in signal strength.

The receivers are of high frequency type and will receive all signal frequencies from 2.0 to 32 megacycles. The frequency range is divided into five bands with continuous tuning throughout each band. The frequency range provided in each band is as follows:

BAND	FREQUENCY RANGE
1	2 to 4 mc
2	4 to 8 mc
3	8 to 16 mc
4	16 to 24 mc
5	24 to 32 mc

Receiver R-618/FRR-32 is capable of receiving four types of emission, namely, A1, A2, A3, and Frequency Shift F1. A2 reception is possible with the receiver RECEPTION control in A3 SHARP position and the AGC switch turned to OFF.

The basic receiver is a double superheterodyne with two stages of r-f amplification ahead of the first mixer and local oscillator. Accommodation is made for use with the external oscillator which can replace the local oscillator.

The output of the mixer is coupled to a first i-f amplifier (which is essentially a second converter). The first i-f amplifier converts the signal to a frequency of 200 kc.

This 200-kc signal is coupled to the input of a second i-f assembly, where it goes through three stages of amplification, and then is applied to a diode detector when the receiver is set to receive A3 signals, or to a mixer stage when the receiver is set to receive A1 or F1 signals. The mixer stage also receives a signal from a beat frequency oscillator, which heterodynes with the unmodulated 200-kc signal (A1 or F1) to produce an adjustable signal within the audio frequency range.

A manual adjustment, which controls the gain of the first two r-f amplifiers and of the first and second amplifiers of the second i-f assembly, is provided in the receiver. This adjustment is active when the receiver is set to receive A1 or A2 signals. A delayed AGC diode, located in the second i-f assembly, controls the gain of the same stages when the receiver is set to receive A3 or F1 signals if the AGC switch is in NORM position.

The output of the second i-f assembly (detector or mixer stage output) is coupled to the input of an audio assembly which provides three stages of amplification ahead of a beam power output stage. The beam power output stage feeds into an audio output transformer, which provides balanced line and unbalanced line (phone) outputs.

A noise peak limiter, located between the detector and first audio amplifier, limits noise pulses to a value corresponding to maximum modulation percentage during A2 and A3 reception. It is normally set to limit impulses to a level approximating 40 per cent modulation.

Two series limiters, located between the second and third audio amplifiers, limit positive and negative peaks. A silencer diode, located between the first and second audio amplifiers, eliminates background noises when the receiver is set to receive A3 signals.

Two meters are provided in the receiver. One, which is connected to the second i-f assembly, to determine when the set is tuned properly to an incoming signal. The other, connected to the audio output transformer, to indicate the power level (in db) of the audio output stage.

The tuning dial on the receiver provides two readings. One reading indicates the frequency to which the set is tuned and is displayed on a projection dial. The other is a numerical reading which is used for logging previously received stations. This reading is displayed on two movable scales.

A crystal calibrator is included by which the projection dial may be aligned to an exact frequency. This is done to compensate for tracking error. Frequency check points are provided at every 200-kc separation of the tuned frequency input.

An a-c operated power supply is included in each receiver to provide all of its filament and B+ operating voltages.

b. RADIO FREQUENCY OSCILLATOR O-330/FRR-32.

This oscillator is a precision, direct reading, variable frequency device, designed to provide high and medium frequency oscillator injection voltage for the control of one or more receivers or transmitter exciters with extremely high stability. A high frequency r-f output voltage (continuously variable over the range of 2 to 64 megacycles), a crystal controlled high frequency voltage covering the same range, and a crystal controlled beat frequency oscillator voltage plus a 3500-kc crystal control r-f output voltage for dual conversion superheterodynes are the different type voltages provided. Sufficient output is available from any one of the foregoing to control up to three receivers in diversity, or the usual requirement of transmitter exciters.

A highly stable variable frequency oscillator with an extremely accurate counter type dial is incorporated in this instrument. Master oscillator frequency determining elements are contained in a temperature stabilized oven, and these components are carefully selected for high stability operation.

The unit contains its own power supply circuit to supply the necessary power and filament voltages for operation.

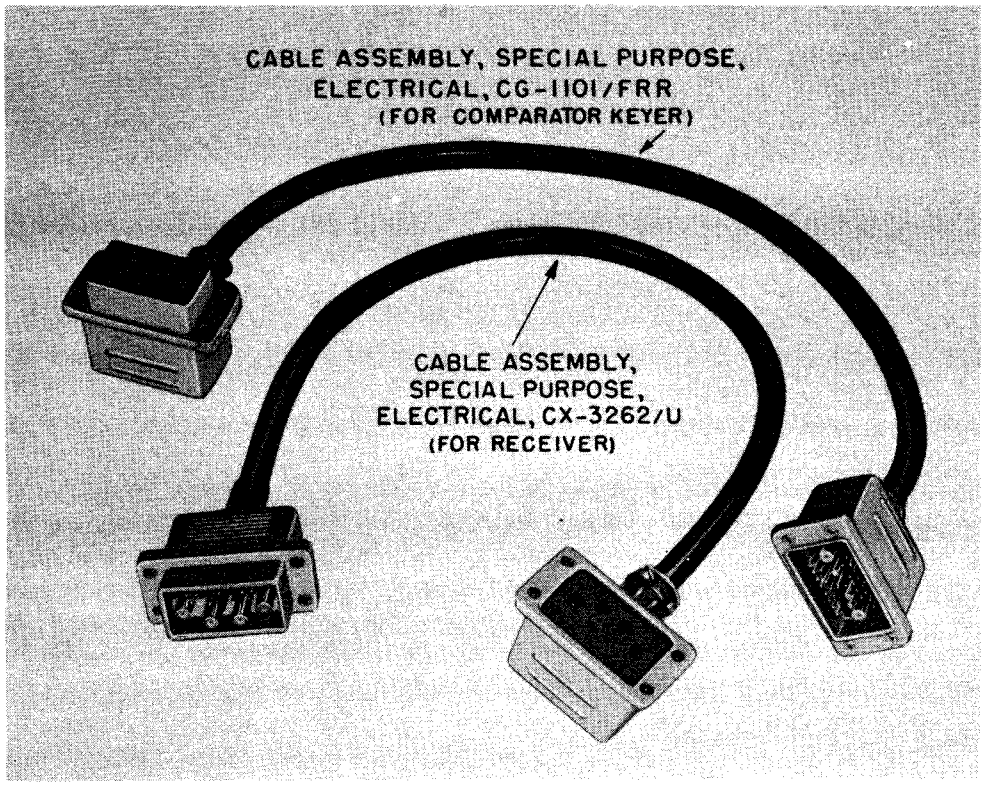


Figure 1-2. Test Cables for AN/FRR-32

c. COMPARATOR KEYER CM-70/FRR-32.

The Comparator Keyer CM-70/FRR-32 is used to combine the detector output of the two radio receivers when used in the diversity system. This unit is composed of four sub units, the comparator sub unit, the tone keyer sub unit, the monitor sub unit, and the power sub unit. It also includes controls and switching arrangements to permit the operation of one or the other receiver or the combination of the two receivers in diversity.

In the comparator sub unit both detector outputs are fed to a common load from which the useful signal is obtained. Since the automatic gain control voltage for both receivers is derived from this common load the receiver with the lower detector output is silenced and the receiver with the greater output predominates. Provision is made for the selection of the correct AGC time constant for reception of CW signals. Front panel meters indicate detector current for each receiver as well as the combined detector current.

During A2 and A3 reception the signal from the common load is fed to an impulse noise limiter. The signal is then fed from the cathode of the limiter through a level control to an amplifier. Next, the signal is sent to a silencer stage where all signals below a set amplitude may be blocked and only the stronger useful signals allowed to pass. The output of the silencer is amplified, then limited (for A2 reception only) and fed through another amplifier, and then to a power amplifier stage. The power amplifier stage is coupled to an output transformer that is tolerant of a wide range of loads. The windings of this transformer feed a center-tapped line, line phones, and a line to the monitor sub unit.

During F1 reception, the Comparator Keyer uses the common AGC voltage developed at the common load to silence the receiver with the lower detector output and allow the receiver with the greater detector output to predominate.

For A1 reception, the signal from the common load is sent out of the comparator sub unit to the tone keyer sub unit. There, the output from a tone oscillator is triggered and the tone pulses fed through a level potentiometer to the amplifier circuits of the comparator sub unit. During A1 reception the silencer circuit is rendered inoperative.

The tone keyer sub unit provides a selection of eight preset modulating frequencies or a position for the use of an external oscillator. The eight preset frequencies are 595, 765, 935, 1105, 1275, 1445, 1615, and 1785 cycles per second.

The monitor sub unit serves to monitor the audio frequency outputs or the intermediate frequency outputs of the two receivers of the diversity system or to monitor the output of the comparator sub unit. It also provides an output suitable for driving a speaker as well as headsets.

Switching arrangement is provided for the selection of the output to be monitored. When an intermediate frequency signal is to be monitored it is mixed with a 200-kc signal from a crystal controlled oscillator. The resultant difference frequency is fed from a pi filter through the audio stages the same as any other audio signal. The output level is controlled by a potentiometer mounted on the front panel.

All filament and d-c power for the sub units of the Comparator Keyer is provided by the power sub unit. A-c power is supplied from an external source.

d. DYNAMIC LOUDSPEAKER LS-169/G.

Dynamic Loudspeaker LS-169/G includes a six-inch permanent-magnet dynamic speaker, an output transformer and a variable attenuator.

e. SUMMARY.

The two component receivers used in Radio Receiving Set AN/FRR-32 are complete self-contained units and are capable of high quality reception when used individually. They are designed to give high standards of sensitivity, selectivity, stability, and reliability. They are capable of receiving A1, A2, A3 and Frequency Shift F1 emission over a frequency range of 2 to 32 megacycles. Together with the Radio Frequency Oscillator, the Comparator Keyer, and the Dynamic Loudspeaker they form a diversity system of reception which eliminates the possibility of fading and gives decidely better results than can be obtained with a single receiver.

The use of an external oscillator, for both receivers during diversity reception produces greater stability. In addition, any variation in oscillator conditions will affect both receivers in like manner. Hence tracking in both receivers should be the same.

The Comparator Keyer compares the two receiver detector outputs and electronically selects the receiver with the stronger output signal to operate in the overall system while suppressing the output of the other receiver. A keyer circuit serves to key a locally generated tone signal of constant frequency in accordance with the telegraph or facsimile keying of the incoming radio signal. The monitor sub unit provides facilities for monitoring either receiver audio or intermediate-frequency output or the diversity output.

Radio Receiving Set AN/FRR-32 has been designed so that it may be used with any type diversity reception.

3. DESCRIPTION OF UNITS.

a. RADIO RECEIVER R-618/FRR-32.

(1) GENERAL. - Each receiver is housed in a grey enamel metal case 8 3/4 inches

high, 17 1/4 inches wide, 18 1/2 inches deep, and weighs approximately 75 lbs. The case is designed to mount in a standard rack, 19 inches wide, by means of two metal flanges which extend from the sides. All operating controls and switches, OUTPUT meter and TUNING meter, phone jack connectors, and the tuning dial assembly are mounted on the front panel.

A special lever and lock system is provided to enable the receiver to be serviced while mounted in the rack. This lever mechanism is so designed that the receiver chassis may be pulled from its case and tilted to permit the attachment of assemblies and sub-assemblies.

(2) INPUT AND OUTPUT CONNECTIONS. - All input and output connections to the receiver are made through receptacles mounted on a filter assembly at the back of the receiver case. Mating plugs for those receptacles not already connected (PAN and ANT) are supplied as part of the Radio Receiving Set. Appropriate cable-to-plug connections must be fabricated in accordance with instructions given in Section 3 of this instruction book. Electrical connections between the filter assembly and the receiver chassis are made through a multi-connector plug mounted on the back of the filter assembly, and its corresponding socket mounted on the back of the receiver chassis. All connections are broken when the receiver is pulled out of the cabinet or case. Two sleeves on the back of the chassis engage guide pins on the back wall of the receiver case to insure that the multi-connector plug and socket line up when the receiver chassis is pushed into the cabinet or case.

Some of the connectors accommodate external equipment such as:

CONNECTOR	ASSOCIATED EQUIPMENT	
	NAME	TYPE OR EQUIVALENT
IF	Frequency Shift Converter	I-F type (200 kc)
*PAN	Panoramic Adapter	I-F type (1600 kc)
EXT OSC	Radio Frequency Oscillator	O-330/FRR-32
AUDIO	Frequency Shift Converter	Audio type (converter comparator group)
DET AGC	Diversity Operation	Identical receiver

* Not used in AN/FRR-32 equipment.

(3) ASSEMBLIES AND SUB-ASSEMBLIES. - These receivers are made up of assemblies and sub-assemblies, each of which is physically independent of the rest. The assemblies are held in position by captive screws and interconnection between assemblies and chassis wiring is accomplished through multiple circuit connectors. Circuits to the assemblies are disconnected when the assembly is lifted from the chassis. The time necessary to repair a receiver is lessened greatly by simply replacing a defective assembly with a spare one.

Individual sub-assemblies are mounted within each assembly. Some of these sub-assemblies contain a subminiature electron tube and circuitry for one stage. Others contain parts other than electron tubes, such as transformers, coils, filter networks, etc. All sub-assemblies are symbolized by "Z" numbers.

Sub-assemblies containing a subminiature electron tube are of the plug-in type, permitting quick and easy replacement.

Sub-assemblies containing parts other than an electron tube, require unsoldering of a few connections to effect replacement.

(4) CONTROLS. - All operating controls of the radio receiver are brought out to the front panel. The functional name of each, except for the band selector and tuning dial knob,. is marked on the panel near the control. The band selector has frequency markings corresponding to the limits of the band at each of its settings. Refer to Section 4 for illustrations and functions of the front panel controls.

(5) TUNING DIAL ASSEMBLY. - The tuning dial assembly tunes the r-f section of the receiver by turning a ganged variable capacitor when the tuning dial knob is turned. The band selector, also part of the tuning dial assembly, actuates switches in the r-f section of the receivers to select the appropriate tuned circuits for each band.

The frequency value to which the receiver is tuned is projected on a translucent dial screen located on the front panel of the dial assembly. A numerical indication of receiver tuning is displayed on a logging dial comprised of two movable scales, also located on the front panel of the dial assembly.

b. RADIO FREQUENCY OSCILLATOR O-330/FRR-32.

The Radio Frequency Oscillator is enclosed in a grey enamel metal case which measures 10 1/2 inches high, 19 inches wide, and 18 5/8 inches deep overall. It is rack mounted and is secured to the rack by eight mounting screws through slots on each side of the front panel.

The controls most often used are located on the front panel, while seldom used controls and fuses are located behind an access door on the upper left-center of the panel. All electron tubes and relays are readily accessible from the rear of the unit.

The direct reading calibration of the instrument enables the operator to set the output frequency to within 20 cycles per megacycle of any desired frequency within the range of the unit at any check point, and the unit is resettable to the same tolerance. A self-contained 100-kc temperature controlled crystal provides 50-kc check points for calibration of the Radio Frequency Oscillator. All assemblies are isolated with buffer amplifiers, where necessary, to prevent interaction. The output is controllable from approximately 0.1 to 2 watts.

The Radio Frequency Oscillator has its own self-contained power supply which provides all the filament and d-c power the unit requires. A-c power is supplied from an external source.

c. COMPARATOR KEYER CM-70/FRR-32.

(1) GENERAL. - The Comparator Keyer is housed in a grey enamel metal case similar to that of the receivers. The case is 8 23/32 inches high, 19 inches wide and 18 3/16 inches deep overall and is designed to mount in a standard 19-inch rack by means of two metal flanges which extend from the sides. Operating controls, switches, meters, and phone jack connectors are mounted on the front panel.

The lever mechanism provided, to facilitate test and service access, is identical to that used on the radio receivers.

(2) INPUT AND OUTPUT CONNECTIONS. - Again, like the receivers, input and output co..nections are made through receptacles mounted on a filter assembly at the back of its case. Electrical connections between the filter assembly and the Comparator Keyer chassis are made through a multi-connector plug mounted on the back of the filter assembly, and its corresponding socket mounted on the back of the Comparator Keyer chassis. All connections are broken when the chassis is pulled out of the case. Two guide pins on the back wall of

the case are used to insure that multi-conductor plug and socket line up when the Comparator Keyer chassis is pushed into the case.

(3) SUB UNITS. - The Comparator Keyer is made up of four sub units, namely, the comparator sub unit, the tone keyer sub unit, the monitor sub unit and the power sub unit. Each sub unit is physically independent of the others. The sub units are held in place by captive screws and are interconnected by multiple circuit connectors. Each sub unit is completely disconnected when it is lifted from the chassis.

(4) CONTROLS. - All operating controls are brought out to the front panel. The controls for the tone keyer sub unit are located behind the door in the lower center of the front panel. Those wafer switches which must be disengaged in order to remove the sub units have knobs with a pin attached that fits into a slot on the switch shaft. This arrangement allows the knob to be pulled out, so disengaging the pin from its slot and leaving the sub unit free for removal. During replacement this arrangement prevents the knob from being positioned incorrectly. Refer to Section 4 for illustrations and functions of the front panel controls.

d. DYNAMIC LOUDSPEAKER LS-169/G.

The components of Dynamic Loudspeaker LS-169/G (the speaker, output transformer, and an attenuator) are mounted on a grey enamel panel 8 3/4 inches high and 19 inches wide. The overall depth of the unit is 4 3/8 inches. The panel is designed to be mounted on a standard 19-inch rack by eight screws.

The loudspeaker is a round six-inch permanent-magnet dynamic type mounted in the center of the panel. The attenuator is mounted to the right of the speaker. All connections are made from the rear of the panel.

e. PATCHING COMMUNICATION SWITCHBOARD SB-431/FRR-32.

A connecting panel, Patching Communication Switchboard SB-431/FRR-32 is mounted inside the cabinet behind the loudspeaker panel. It is 10 1/2 inches high (with hinge open), 19 inches wide, and 1 1/16 inches deep overall. Its design, with a piano hinge, permits access to the rear for repair or connection changes without removing the unit from the rack.

There are 14 connectors, type AN-3102A-10SL-3P, mounted on it to provide connection facilities for external circuits.

f. CABINET CY-597A/G.

All of the units of Radio Receiving Set AN/FRR-32 are mounted in this cabinet which is 87 9/16 inches high, 22 3/8 inches wide, and 24 inches deep with the rear door closed. Each of the units, except the Dynamic Loudspeaker slides into the cabinet on side rails and is screw mounted to the frame. The speaker panel is mounted by screws only.

Connection to the external power source is made through Switch Panel SA-238/G at the bottom of the cabinet. Switch Panel SA-238/G at the bottom of the rear, inside, mounts the master power switch, two fuses, and a trouble lamp. A raceway on one side of the cabinet mounts five receptacles so that the enclosed units may be conveniently connected to the a-c source.

A covered channel at the top of the rear side provides a means for running cables into the cabinet from the top if necessary. When the rear door of the cabinet is closed, Radio Receiving Set AN/FRR-32 becomes a dustproof equipment.

4. REFERENCE DATA.

a. Nomenclature of equipment: Radio Receiving Set AN/FRR-32.

b. Contract number: NObsr-57571; Contract date: 21 June 1952.

c. Contractor: Radio Corporation of America, RCA Victor Division, Camden, New Jersey, U. S. A.

d. Cognizant Naval Inspector: Inspector of Naval Material, Camden, New Jersey.

e. Number of packages involved per complete shipment of equipment: 6

f. Total cubical content: Crated 69.3 cu ft; uncrated 27.4 cu ft.

g. Total weight: Crated 610 lbs; uncrated 510 lbs.

h. Frequency range: 2 to 32 megacycles.

i. Tuning bands and range of each band:

Band 1	2 to 4 mc
Band 2	4 to 8 mc
Band 3	8 to 16 mc
Band 4	16 to 24 mc
Band 5	24 to 32 mc

j. Type of frequency control: Crystal control or continuous tuning may be employed when using the Radio Frequency Oscillator and continuous L-C oscillator tuning when operating the receivers without the master oscillator.

k. Type of receivers: Dual-conversion superheterodyne.

l. Intermediate frequency: First intermediate frequency 1600 kc. Second intermediate frequency 200 kc.

m. Type of reception: A1, A2, A3, and F1.

n. Receiver output: 6 milliwatts into 600 ohms. (Zero db) Output through headphones and indicated on OUTPUT meter.

o. Power Supply: 105, 115, or 125 volts, 50 to 60 cycles, single phase ac.

p. Power factor for a-c operation: 90%.

q. Input impedance to antenna preamplifier: 73 ohms low impedance, 200 ohms high impedance.

r. Receiver sensitivity: (CW)

2 to 24 mc, 5 microvolts or better.
24 to 32 mc, 8 microvolts or better.

s. Silencer diode operates on A3 signals. Threshold control range 40 db.

t. Power required at 115 volts:

(1) Receiver No. 1 - 62.5 watts

(2) Receiver No. 2 - 62.5 watts

(3) Comparator Keyer - 80 watts

(4) R-F Oscillator - 295 watts

(5) Overall - 500 watts

TABLE 1-1. EQUIPMENT SUPPLIED

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	OVERALL DIMENSIONS (INCHES)			VOLUME (CU FT)	WEIGHT (POUNDS)
			HEIGHT	WIDTH	DEPTH		
1	Radio Receiving Set	AN/FRR-32	87 9/16	22 3/8	24	27.4	510
	Consisting of:						
2	Radio Receiver	R-618/FRR-32	8 3/4	19	18 1/2	1.8	78
1	Comparator Keyer	CM-70/FRR-32	8 23/32	19	18 3/16	1.8	55
1	Radio Frequency Oscillator	O-330/FRR-32	10 15/32	19	18 5/8	2.2	66
1	Dynamic Loudspeaker	LS-169/G	8 23/32	19	4 3/8	0.5	-
1	Patching Communication Switchboard	SB-431/FRR-32	10 1/2	19	1 1/16	0.2	-
1	Cabinet (includes Switch Panel SA-238/G mounted)	CY-597A/G	87 9/16	22 3/8	24	27.4	311*

* Includes Dynamic Lousdpeaker LS-169/G, Patching Communication Switchboard SB-431/FRR-32, and Switch Panel SA-238/G.

TABLE 1-2. EQUIPMENT AND PUBLICATIONS REQUIRED BUT NOT SUPPLIED

QUANTITY PER EQUIP-MENT	NAME OF UNIT	NAVY TYPE DESIGNATION	REQUIRED USE	REQUIRED CHARACTERISTICS
1	Antenna System			C/o antenna, multicouplers, switching and distribution system.
	Terminal Equipment			As necessary for the type of service to be provided.
	Power Source			105, 115 or 125 volts single phase 50-60 cycles.

TABLE 1-3. SHIPPING DATA

SHIP-PING BOX NO.	CONTENTS		OVERALL DIMENSIONS (INCHES)			VOL-UME (CU FT)	WEIGHT (POUNDS)
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	Cabinet with Dynamic Loudspeaker and Switch Panel	CY-597A/G LS-169/G SA-238/G	98	37	33	69.3	610
2	Comparator Keyer	CM-70/FRR-32	32	29	21	11.3	150
3	Radio Frequency Oscillator	O-330/FRR-32	32	29	21	11.3	165
4	Radio Receiver	R-618/FRR-32	32	29	21	11.3	175
5	Radio Receiver	R-618/FRR-32	32	29	21	11.3	175
6	Spare Parts		34	28	23	12.7	140

TABLE 1-4. BASIC SIMILARITIES IN RADIO RECEIVING SETS AN/FRR, AN/MRR, AND AN/SRR

MODEL	FREQUENCY COVERED	TYPES OF RECEPTION	POWER SOURCE	MECHANICAL DESIGN	REMARKS
AN/FRR-19	2 to 32 mc	A1, A2, A3, F1	105, 115 or 125 volts, 50-60 or 400 cycles ac	Metal case, rack mounted	Intended for shore station high-frequency FSK service. Uses crystal oscillator
AN/FRR-23	2 to 32 mc	A1, A2, A3, F1	105, 115 or 125 volts, 50-60 or 400 cycles ac	Metal case, rack mounted	Intended for high-frequency shore station communication service
AN/FRR-32	2 to 32 mc	A1, A2, A3, F1	105, 115 or 125 volts, 50-60 cycles ac	Metal case, rack mounted	Intended for high-frequency dual-diversity shore station communication service
AN/MRR-3	2 to 32 mc	A1, A2, A3, F1	* 24 volts dc 105, 115 or 125 volts, 50-60 or 400 cycles ac	Waterproof case, portable	Intended for high-frequency mobile or transportable service
AN/SRR-13	2 to 32 mc	A1, A2, A3, F1	105, 115 or 125 volts, 50-60 or 400 cycles ac	Metal case, table-top mounted	Intended for high-frequency shipboard communication service

* Separate power supply assembly supplied to accommodate 24 volts d-c source.

TABLE 1-5. BASIC SIMILARITIES IN DIVERSITY RECEIVING EQUIPMENT

MODEL	FREQUENCY COVERED	TYPES OF RECEPTION	NO. OF RECEIVERS USED	POWER SOURCE	MECHANICAL DESIGN	REMARKS
RBP	3 to 24 mc	A1, A2, A3	6 (2 groups of 3 each)	98-125 volts, 60 cycles ac 490 volt-amperes per group	Multi-bay cabinet racks, floor mounted	
RDM-1	535 kc to 32 mc	A1, A2, A3	3	100-117, 117, 135, 135-165, 190-230, 200-260 volts, 50-60 cycles ac, 350 watts	Cabinet rack, floor mounted	
AN/FRR-32	2 to 32 mc	A1, A2, A3, F1	2	105, 115 or 125 volts, 50-60 cycles ac	Cabinet rack, floor mounted	Intended for high-frequency dual-diversity shore station communication service

TABLE 1-6. ELECTRON TUBE COMPLEMENT

UNIT	NUMBER OF TUBES OF TYPE INDICATED																					Total No. of Tubes
	0A2	5V4G	6AQ5	6BE6	6C4	6X4W	12AU7	5636	5644	5647	5718	5719	5750	5751	5814	5840	5899	5902	6005	6074	6136	
Radio Receiving Set AN/FRR-32: Radio Receiver (No. 1)						2		3	1	6	7	2				1	5	1				28
Radio Receiver (No. 2)						2		3	1	6	7	2				1	5	1				28
Comparator Keyer						3							1	6	2				2	2	1	17
Radio Frequency Oscillator	1	1	5	1	3		3															14
Total Number of Each Type	1	1	5	1	3	7	3	6	2	12	14	4	1	6	2	2	10	2	2	2	1	87

SECTION 2

THEORY OF OPERATION

1. GENERAL DESCRIPTION.

The space diversity system of reception is based upon the fact that a high-frequency signal such as used for long-distance communication does not always fade simultaneously at two locations separated by even as little as several wave lengths. With two antennas, spaced approximately 1000 feet apart, the signal will seldom fade out on both at the same time. Thus, by feeding the signal from each antenna through a separate receiver and combining the two rectified outputs, a relatively constant output level can be maintained.

Throughout these instructions, the term "fading" is employed to denote variations in signal strength over periods of from several seconds down to only a few thousandths of a second or less, or frequencies of fading of from about one-tenth of a cycle per second up to hundreds of cycles per second. This restriction is made so that the term will not be construed as applying to the slow variations in signal strength taking place from hour to hour, day to night, day to day, and season to season.

It is generally agreed that fading is due to multi-path transmission; that is, the radio waves travel over two or more paths between the transmitting and receiving antennas. The difference in length of these paths causes the relative phases of the waves arriving over them to differ. These phase differences between the two or more waves, and variations in these differences, result in partial or complete addition or cancellation at a given instant at any point. The resulting difference or diversity of fading at the several receiving antennas is utilized in the manner already described to maintain a usable signal in spite of the fading.

If the differences in path length were such as to result in phase differences between the several waves of only a fraction of a cycle, or of several cycles at the carrier frequency, the space diversity system of reception would give practically perfect reception on telegraph, facsimile, or telephone services. Actually the difference in path length, amount in some cases to several thousandths of a second. This means that the signal arrives first over the shortest path, then perhaps a millisecond later over a second path. The effect of such multi-path transmission on a telegraphic character, or a pulse as used in facsimile, is shown in figure 2-1. It will be apparent that a high-speed signal can easily be ruined by such transmission conditions since the character recorded on the tape or on the facsimile recorder will be badly distorted. Telephone modulation also is badly distorted by multi-path transmission of this sort. Slow-speed telegraph signals, on the other hand, are not seriously bothered because the duration of each character is so great, compared to the difference in the time of transmission over the several paths, that the resulting elongation or shortening of the characters is negligible.

Experience has demonstrated that a two-unit space diversity system of reception gives decidedly better results than can be obtained with a single receiver. This is due primarily to the spaced antennas, and partly also to the method of combining the signals from these spaced antennas.

The two individual antennas comprising this diversity antenna system may be of any type. Where available space is very limited, the use of one horizontal doublet and one vertical doublet located quite close to each other will give a worth-while diversity effect. For best results, however, two horizontally polarized antennas of a type affording good directional characteristics should be employed. These are normally placed approximately one thousand feet apart. Spacing much less than this would result in less improvement due to the lesser

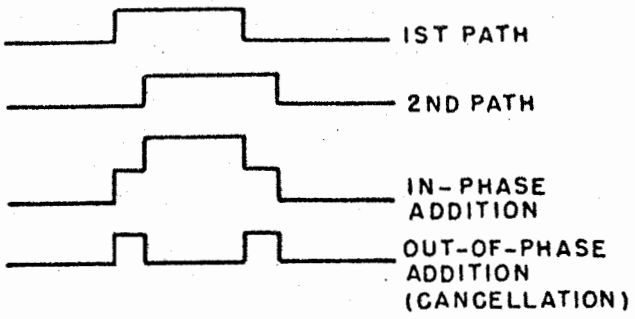


Figure 2-1. Phase Relations in Multi-path Reception

diversity of fading experienced at the less distantly spaced points. On the other hand, spacing much greater than the nominal one thousand feet, while offering some improvement is generally not warranted due to the increase in land area and loss in the necessarily longer transmission lines.

Antennas ordinarily used in the diversity system are not sharply tuned and the so-called optimum frequency is therefore merely the approximate mid-frequency of the band over which the antenna should be used. Where several sizes of antennas are available for the desired direction, the one whose nominal frequency rating is nearest the frequency of the desired signal will give the best results.

Radio Receiving Set AN/FRR-32 is discussed with reference to schematic diagram, figure 7-30, and the servicing block diagram, figure 7-29. Other diagrams will be referred to in the text, as required for an understanding of the functioning of the circuits.

These introductory paragraphs describe the circuits of each unit in this equipment first, then describe the signal channels through this equipment, from the radio-frequency input of the receiver to the final audio-frequency output during diversity reception or individual receiver operation. More detailed discussion of the individual stages of each unit is given in the subsequent paragraphs of this section.

a. RADIO RECEIVER R-618/FRR-32. - The general features and frequency coverage of the receivers used in this equipment were described in Section 1 of this instruction book and are not repeated here. Refer to block diagram, figure 7-29. Radio Receiving Set AN/FRR-32 uses two identical dual-conversion superheterodyne receivers. Each receiver consists of the stages listed below (each stage listed is followed by a reference to a later paragraph, in which the stage is described in greater detail):

STAGE	PARAGRAPH
Antenna Preamplifier	2a(2)
R-f Amplifier	2a(3)
Mixer	2a(4)
Local Oscillator	2a(5)
First I-f Assembly	2a(7)

STAGE	PARAGRAPH
Second I-f Assembly	2a(8)
Beat Frequency Oscillator	2a(9)
Audio Amplifier	2a(10)
Power Supply	2a(12)

Other features of the receivers are merely mentioned here, being described in detail in the paragraphs indicated:

Output Meter, paragraph 2a(11)
Filter Assembly, paragraph 2a(13)
Band Selector, paragraph 2a(15)
Reception Control, paragraph 2a(16)
Tuning Dial Assembly, paragraph 2a(17)
Crystal Controlled Calibrator, paragraph 2a(14)

Cathode-follower outputs are provided for operation of an external panoramic equipment and for an external i-f frequency shift converter. External detector and automatic gain control (AGC) line outputs are provided for diversity operation.

b. RADIO FREQUENCY OSCILLATOR O-330/FRR-32. - In the following discussion reference to the Radio Frequency Oscillator section of the block diagram shown in figure 7-29, will serve to show the signal path through this unit.

(1) THE HIGH FREQUENCY OSCILLATOR CHAIN. - The master oscillator, V301, is a highly stable frequency determining device. The resonant portion of the circuit is very lightly coupled to its associated electron tube element and this, in turn, is isolated from external influences by a cathode follower.

The oven is composed of an inner and outer shell, each of which is temperature controlled. The outer shell is maintained at a given temperature by a bimetallic temperature sensitive switch and heating elements. The inner shell heating elements are controlled by an accurate mercury thermostat. The design of the entire assembly is such that its heat inertia is high and its temperature is extremely stable.

A cathode follower output feeds a dual triode which may become a simple RC amplifier or a conventional Pierce oscillator with three crystal positions, depending upon the setting of switch S201. The next stage, an r-f amplifier, has a gain that is virtually uniform over the entire two-to-four-megacycle range. A series of four multipliers then multiply the fundamental frequency range continuously up to 64 megacycles.

(2) THE INTERMEDIATE FREQUENCY OSCILLATOR. - The intermediate frequency oscillator is a Pierce circuit with a permanently installed 3.5-megacycle crystal. A class C power amplifier follows, whose tank is link-coupled to the output jacks. This 3.5-mc signal is not used in the AN/FRR-32.

(3) THE BEAT FREQUENCY OSCILLATOR. - This stage is also a crystal oscillator but has two crystal positions. The output jacks in this case are capacitively-coupled to the tank through an output control. This BFO stage is not used in the AN/FRR-32.

(4) THE CALIBRATING CHAIN. - Contained within the oven enclosure is a highly stable 100-kc crystal oscillator, against which the master oscillator is calibrated. Both voltages are fed to a mixer, where the difference-frequency between one of the 100-kc harmonics and the master oscillator output is picked off. Audio amplifiers provide sufficient gain to drive a headset.

c. COMPARATOR KEYER CM-70/FRR-32. - A general description of this unit was given in Section 1 of this instruction book and is not repeated here. Refer to the functional block diagram, figure 7-29. The Comparator Keyer consists of the sub units listed below (each sub unit is followed by a reference to a later paragraph, in which its stages are described in greater detail):

SUB UNIT	PARAGRAPH
Comparator Sub Unit	2c(1)
Tone Keyer Sub Unit	2c(2)
Monitor Sub Unit	2c(3)
Power Sub Unit	2c(4)

d. DYNAMIC LOUDSPEAKER LS-169/G. - A brief description of this unit was given in Section 1. Refer to paragraph 2d for a more detailed description of its circuits.

2. CIRCUIT DESCRIPTION.

a. RECEIVER CIRCUITS. - The receivers used in this equipment are identical, therefore an analysis of each circuit of only one receiver will be given.

(1) HOW TO READ THE SCHEMATIC. - The schematic diagram of the receiver (figure 7-30) is divided into two sheets. Sheet 1 contains the antenna, r-f, mixer, oscillator, first i-f, and the crystal calibrator. Sheet 2 contains the second i-f, audio, beat frequency oscillator, power supply, and the filter assemblies. Front panel controls are also shown in sheet 2 of the schematic diagrams. Description of physical make-up of the assemblies and sub-assemblies is given in paragraph 3a(3) of Section 1.

(a) ASSEMBLIES. - On the schematic diagram each assembly is outlined by dashed lines; all parts contained within the dashed lines belong to the assembly.

(b) SUB-ASSEMBLIES. - The sub-assemblies contained in each assembly are outlined in dotted lines or in dot-dashed lines and are symbolized by "Z" numbers. All parts contained within these lines belong to that assembly. The dotted lines refer to plug-in units and the dot-dashed lines refer to plug-in boards.

(c) WAFER SWITCHES.

1. BAND SELECTOR SWITCHES. - The band switch wafers are all shown on sheet 1 of the schematic diagram. They are controlled by the five-position band selector located on the front of the tuning dial. The wafers are all linked mechanically and this is shown by dotted lines on the schematic diagrams. These switches are shown in band I position of the band selector.

To circuit-trace the schematic in the band II position of the band switch, rotate each arrow representing a switch arm, in all the wafer switches shown on sheet 1 of the schematic diagram, by one position in the direction of the arrow shown outside of each wafer switch. Proceed in the same way for any of five bands, rotating the switch by a number of positions corresponding to the desired band.

2. RECEPTION CONTROL. - The RECEPTION control switch wafers are shown on sheet 2 of the schematic diagram. They are controlled by the RECEPTION control located on the front panel of the receiver. The wafers are all linked mechanically. This is shown by dotted lines on the schematic diagram. This control is a six-position switch. The wafers are shown in the A1 BROAD position.

To circuit-trace the schematic in any of the other positions of the RECEPTION control, proceed as explained for the band switch in the preceding paragraph. A knob, labeled RECEPTION and shown with associated positions, is located on sheet 2 of the schematic diagram. This knob is shown mechanically linked to the reception control wafers. The wafers of the RECEPTION control therefore have seven possible positions on the schematic diagram (sheet 2). Only the last six of these positions are used (corresponding to A1 BROAD, A1 SHARP, A1 MEDIUM, A3 SHARP, A3 BROAD, and FSK reception, respectively). Note that in the seventh position, the switch arms of the wafers having three common segments make contact with the succeeding fixed segment.

(d) INPUT HI-LO, OUTPUT HI-LO. - In the antenna, r-f, and mixer stages, the leads designated as the OUTPUT HI connect the plate of that stage to the INPUT HI lead of the succeeding stage, whereas leads designated as OUTPUT LO connect the plate return of that stage to the INPUT LO lead of the succeeding stage. The leads designated as INPUT HI on the schematic diagram connect to the high side of the appropriate transformers as selected by the band selector, whereas the leads designated as INPUT LO connect to the low side of the appropriate transformer.

(2) ANTENNA PREAMPLIFIER. - Refer to sheet 1 of figure 7-30. The input circuit of the antenna preamplifier will accommodate a low- or high-impedance antenna. When link O3101 (see figure 3-11) is set in the high-impedance position, the full primary of one of five transformers T3101 through T3105 is connected across the input circuit. When link O3101 is connected in the low-impedance position a tap and one side of the primary on the appropriate transformer primary and secondary windings are selected by S3101A and S3101B, which are controlled by the band selector. A section of S3101B also shorts out unused secondaries of the transformers to prevent absorption of the signal on the band in use.

If at any time the two receivers are to be operated individually from a common antenna they should be isolated from each other by the setting of link O4002 located in the filter assembly (see sheet 2 of the schematic diagram).

Fixed capacitors, connected across the secondary of each transformer, together with the antenna section of the r-f tuning capacitor C2201E, and the ANT COMP capacitor C2206, resonate with the secondary coil to provide continuous tuning over the selected frequency band. The transformer secondaries can be adjusted by means of a screwdriver at points shown in figures 7-24 and 7-26. R-f voltages are taken off the high side of the appropriate secondary through a portion of S3101A and fed to the control grid (pin 1) of V3101, through a capacitor C3110 and resistor R3103.

R-f signals from the selected tuned circuit are amplified in V3101. The r-f section of the GAIN control R2201A (shown on sheet 2 of the schematic diagram) is connected in series with the filter coil L2201 (of the filter board E2203) and the cathode bias resistor, R3104, at terminal J3101F. A filter capacitor C2203 of the filter board is connected across the r-f section (A section) of a smoothing filter to reduce r-f currents in the GAIN control circuit. The r-f section of the GAIN control provides variable bias for controlling the gain through V3101 (and V3135, r-f amplifier as will be covered in a later paragraph). An alternate AGC bias voltage is applied to the control grid (pin 1) of V3101 through J3101D, to adjust the gain when the receiver is set to receive A3 or F1 signals unless the AGC switch S2203, is in OFF position.

Output from the antenna preamplifier V3101 is taken from plate (pin 5) and screen grid (pin 7) and is coupled to the r-f amplifier, V3135, through terminals J3101L and K, and J3135B and C.

(3) R-F AMPLIFIER. - Refer to figure 7-30. Output from the antenna preamplifier, V3101, is applied across the primary of one of five transformers T3135, T3136, T3137, T3138, or T3139 by the setting of a section of S3136A which is controlled by the band selector.

Each of these transformers T3135 through T3139 has a primary and secondary winding which is coupled to an associated coil L3135, L3136, L3137, L3138, or L3139. This arrangement provides for two parallel-resonant circuits at each band setting. The first of these circuits includes the secondary winding of one of five transformers, T3135 through T3139, associated fixed and trimmer capacitors, and section D of the ganged tuning capacitor C2201D. The second tuned circuit consists of one of the coils L3135 thru L3139, associated fixed and trimmer capacitors, and section C of the ganged tuning capacitor C2201C. The inductance and capacity of the trimmers of the first and second tuned circuits can be adjusted by a screwdriver at points shown in figures 7-24 and 7-26. The capacitance of sections C and D of the tuning capacitor are varied by the tuning knob on the front panel of the dial assembly, and provide continuous tuning through each band.

Signal is coupled from the appropriate secondary (first tuned circuit as selected by S3136A) to the associated coil (second tuned circuit), and from there it is coupled to the control grid, pin 1, of V3135 through S3135 and C3169. The use of two parallel-resonant circuits provides greater selectivity.

Sections of S3136B and S3135 short unused secondaries and associated coils to prevent absorption of signal on the band in use.

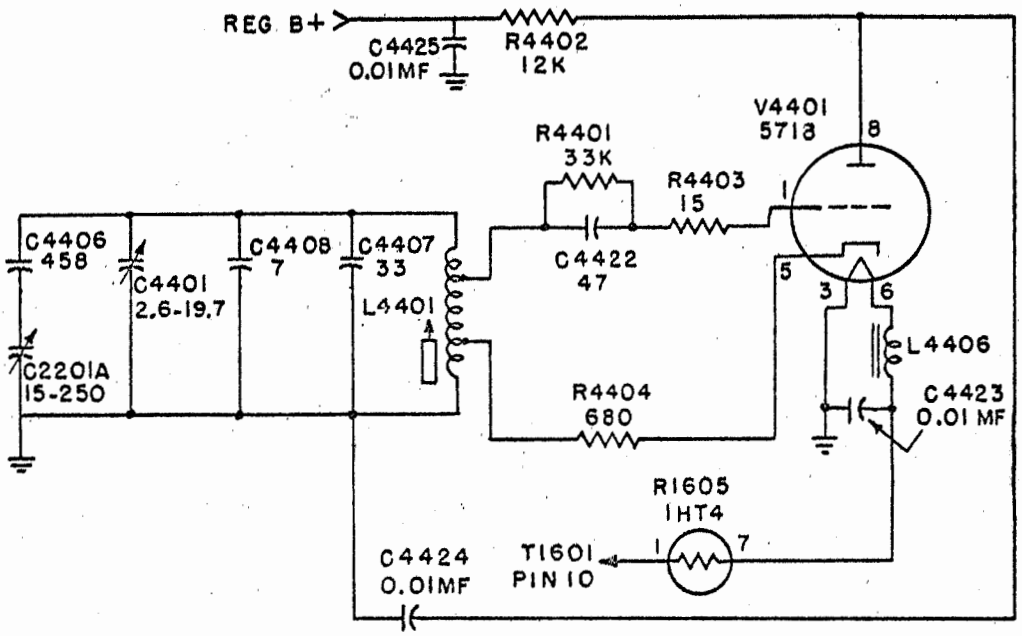
Signals are amplified in V3135, which operates as a conventional pentode amplifier. The cathode resistor, R3137, is connected to the r-f section of the GAIN control, R2201A (see figure 7-30, sheet 2), which varies the bias to control, also adjusts the gain of the antenna preamplifier, V3101. An AGC voltage, which is controlled by diode V1006 in the second i-f, and can be switched on or off by S2203 is applied to the control grid through resistors R3135 and R3136 (when S2203 is in the NORM position) to control the gain of the amplifier, V3135, when the reception control is set to receive A3 and F1 signals. The AGC system is discussed in paragraph 2a(8)(e) of this section.

Output of the r-f amplifier, V3135, is taken from the plate, pin 5, and screen grid, pin 7, and coupled to the input mixer, V551, through terminals J3135L and K to terminals J551B and C.

(4) MIXER. - Refer to figure 7-30. Input to the mixer, J551, is applied to the primary of T551, T552, T553, T554, or T555 by a section of S551B, the setting of which is controlled by the band selector. Capacitors C557, C560, C563, and C570 are shunted across the primaries of T551, T552, T553, and T555 respectively to load the primary circuit. This arrangement provides a constant input impedance throughout each band. No such capacitor is included in the primary of T554, as the stray capacitance in that circuit is sufficient to perform this function. The mixer section of the ganged tuning capacitor C2101B is shunted across the secondary of the selected transformer to adjust the transformer tuning to the desired frequency. Fixed capacitors and a trimmer, together with the mixer tuning capacitor, resonate with the secondary coils to provide continuous tuning over the selected band. Coils and trimmers in the mixer circuits are adjustable by means of a screwdriver at points shown in figures 7-24 and 7-26.

R-f signals are applied to the first grid, pin 1, of V551 from one side of the selected tuned circuit by the setting of S551A. Switch S551A shorts the secondary of unused transformers to prevent absorption of signals on the band in use.

The oscillator voltage is applied to grid 3 (pin 4) of V551 by way of link O4403, which is accessible directly beneath the cover of the oscillator and mixer boxes. Output from V551, is applied to the first i-f assembly through J551L and J901B. This output has a frequency of 1600 kilocycles on all five bands. The pentode V551 also feeds the mixer cathode follower, V552, which supplies a panoramic adapter on all bands. The PAN receptacle J4006 is at the back of the receiver.



NOTES:

1. UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES GIVEN IN OHMS (K=1000) AND CAPACITANCE VALUES IN MMF.
2. ABOVE CIRCUIT APPLIES TO BAND I. BASIC CIRCUIT SAME FOR OTHER BANDS EXCEPT COMPONENT VALUES WILL CHANGE.

Figure 2-2. Local Oscillator, Simplified Schematic

(5) LOCAL OSCILLATOR. - Refer to figure 2-2. The oscillator used in a Hartley circuit. The cathode and first grid, pin 1, of the oscillator tube V4401 are connected in the oscillatory circuit through contacts on S4401A, which is controlled by the band selector. The tuned circuit consists of coils L4401, L4402, L4403, L4404, or L4405 fixed and trimmer capacitors, and the oscillator section of the ganged tuning capacitor C2201A.

A tap of one of the coils L4401 to L4405 is connected to the control gird, pin 1, as selected by a portion of S4401A, through the grid leak network C4422 and R4401. Another tap of one of the coils, as selected by a section of S4401A, is connected to the cathode, pin 5. A section of S4401B shorts unused coils to prevent absorption of signal on the band in use.

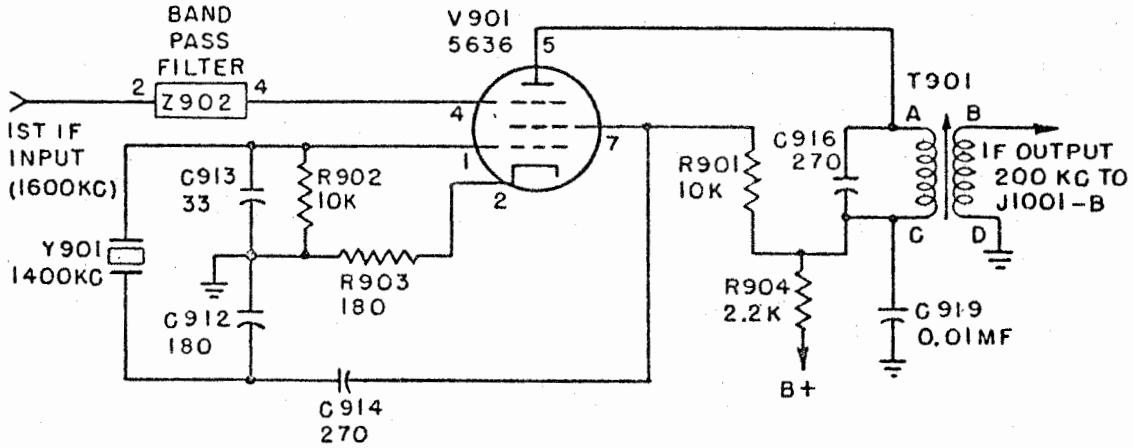
The plate, pin 8, is connected to the low side (ground) of the tuned circuit, through capacitor C4424. This arrangement along with the cathode tap mentioned previously, provides proper feedback to sustain oscillations.

The plate voltage of V4401 is regulated to insure stable output from the oscillator. In order to reduce hum on bands 4 and 5, one side of the heater is connected to the cathode through a section of S4401B. Choke L4406 and ballast resistor R1605, located in the power supply, are provided in the outer heater line to minimize heater current variations. The oscillator tracks 1600 kilocycles higher than the signal frequency on all five bands.

The OSC switch on the front panel, S2207, is a coaxial switch used to provide accommodation for the external oscillator. When turned to EXT position, S2207 operates the wafer switch S2206 (which removes regulated B+ from the oscillator tube, V4401) and connects the EXT OSC jack (J4008) to the suppressor grid (pin 4) of the mixer (V551) via the injection link O4403 and appropriate connectors as shown on the schematic diagram. Both of these links are shown in position for normal receiver operation employing the oscillator signal provided by the receiver.

(6) INTERMEDIATE FREQUENCIES. - In addition to the local oscillator, a second-conversion oscillator (V901) incorporated in the first i-f assembly is used to convert the signal to 200 kilocycles when the output from the mixer stages V551 is 1600 kilocycles. On all bands the first i-f frequency is 1600 kilocycles and the first i-f oscillator frequency is 1400 kilocycles.

(7) FIRST I-F ASSEMBLY. - See figure 2-3. The first intermediate frequency input, determined by the mixer output (V551), is 1600 kilocycles on all bands.



NOTE: UNLESS OTHERWISE INDICATED, ALL RESISTANCE VALUES ARE IN OHMS (K = 1000) AND ALL CAPACITANCE VALUES IN MMF.

Figure 2-3. First I-F, Simplified Schematic

The first i-f input signal goes through to a band-pass filter Z902 which passes signal frequencies within a band wide enough for intelligibility, while suppressing extraneous frequency components. After passing through Z902 the 1600-kilocycle signal is applied to the third grid (pin 4) of V901. This tube V901 also operates as a 1400-kilocycle crystal-controlled oscillator connected as a Pierce-type circuit, the tube elements involved being the cathode (pin 2), first grid (pin 1), and second grid (pin 7), and the feedback relations being obtained through capacitors C912, C913 and the interelectrode capacitance of the tube elements. The 1400-kc signal thus produced and the 1600-kc signal applied to the grid (pin 4) combine to produce a 200-kc signal in the plate (pin 5) circuit of V901 which is then fed to the primary tuned circuit of T901. The signal from the secondary of T901 goes through J902B to the second i-f input J1001B.

(8) SECOND I-F ASSEMBLY. - The second i-f assembly includes filter circuits Z1015A and Z1015B, and Z1016, three stages of amplification V1001, V1002, and V1003 at 200 kilocycles, a BFO mixer V1004, a diode detector V1005, an AGC delay diode V1006, and a cathode follower V1007 which is used to supply signals to a frequency shift converter or other accessory equipment. Link connections O1001, O1002, and O1003, on board E1001 are provided for connection with the companion receiver for dual diversity reception.

(a) FILTERS AND INPUT CIRCUIT. - The 200-kilocycle input to the second i-f assembly, appearing at J1001B, is filtered before it is applied to the first amplifier, V1001, The filter selected depends on the position of wafer switches S1001 and S1002 which are operated by the RECEPTION control. When this control is set at A1 SHARP or A1 MEDIUM signals are fed through the "sharp" filter Z1015A which provides a pass-band of approximately 1 kc centered about 200 kc. When the RECEPTION control is set at A1 BROAD, A3 SHARP or FSK, the "medium" filter, Z1015B, is used which provides a pass-band of approximately 3 kc centered about 200 kc and when set at A3 BROAD, the "broad" filter, Z1016, is used to provide a pass-band of approximately 8 kc centered about 200 kc.

(b) SECOND I-F AMPLIFIER STAGES. - The first two stages of amplification in the second i-f assembly, V1001 and V1002, are semi-remote cut-off pentodes which are coupled by the broadly tuned transformer circuit, Z1017. The alignment tuning of this circuit is adjusted by means of movable powdered iron cores in L1016 and T1015. The plate of V1002 is coupled through another broadly tuned transformer circuit, Z1018 (also provided with iron tuning slugs) to the third i-f amplifier, V1003. The B section of the GAIN control, R2201, is connected to the cathode bias resistors R1006, R1010 of the first two amplifiers, V1001 and V1002, to control the gain through these stages. The GAIN BAL control, R2202, variable by means of a screwdriver adjustment behind the hole in the front panel of these receivers, is also connected in series with cathode bias resistors of V1001 and V1002. The GAIN BAL control is used for matching the gain of the local receiver to the gain of the companion receiver when using diversity reception.

Output from V1003, feeds four circuits: (1) the TUNING meter M2201 through T1014; (2) the BFO mixer circuit which is active when the RECEPTION control is set at A1 or FSK; (3) the diode detector V1005 whose output voltage is fed through the audio amplifier when the reception control is set at A3. (4) the cathode follower V1007.

(c) TUNING METER. - The output of the third amplifier, V1003, is applied to a 200-kilocycle tuned circuit in Z1009 and rectified by a crystal rectifier CR1001 to actuate the movement of the TUNING meter, M2201, which is mounted on the front panel. When the desired signal is detuned, the rectified signal voltage applied to the TUNING meter is low, and the meter reads down scale. As the desired signal is tuned, the rectified voltage increases and the TUNING meter reads up scale. The HIGH-LOW switch, S2204, mounted below the TUNING meter on the front panel, attenuates the meter reading when the switch is in the LOW position by adding a series resistor, R2203. This resistor is removed when the switch is in the HIGH position.

(d) BFO-MIXER. - Output from the third i-f amplifier, V1003, is fed to the first grid of the BFO-mixer, pin 1 of V1004. Signals from the beat frequency oscillator V1301 are applied to the third grid, pin 4, of V1004 through capacitor C1306. (See paragraph 2a(9) of this section for BFO circuit description.) The 200-kilocycle i-f signal and the signal from the BFO are heterodyned in V1004 to produce a difference frequency in the audio range. This difference frequency component is fed to the audio amplifier V1102 through S1003, J1002N, J1101D, and S1101A, when the RECEPTION control is set at A1 BROAD, A1 SHARP. When this control is set at FSK, the signal goes to V1102 through S1003, J1002N, the center arm of the OUTPUT control, R2207, J1101J, and S1101A.

(e) DIODE DETECTOR AND DELAYED AGC. - See figure 2-4.

1. WITH COMPARATOR KEYER. - Signals at 200 kc from the plate of V1003 are also applied across the diode detector, V1005, through the broadly tuned transformer circuit Z1011. The detector output from V1005 is applied, through link O1002, connectors J1002E, J2214-2, and J4003A to the common load R801 or R810, in the Comparator Keyer.

LINKS	OPERATION: DIVERSITY: WITH COMPARATOR KEYER: BOTH RECEIVERS	DIVERSITY: WITHOUT COMPARATOR KEYER: LOCAL	DIVERSITY: WITHOUT COMPARATOR KEYER: COMPANION	SINGLE RECEIVER
O1001	OPEN	CLOSED	OPEN	CLOSED
O1002	CLOSED	CLOSED	CLOSED	OPEN
O1003	OPEN	CLOSED	OPEN	CLOSED

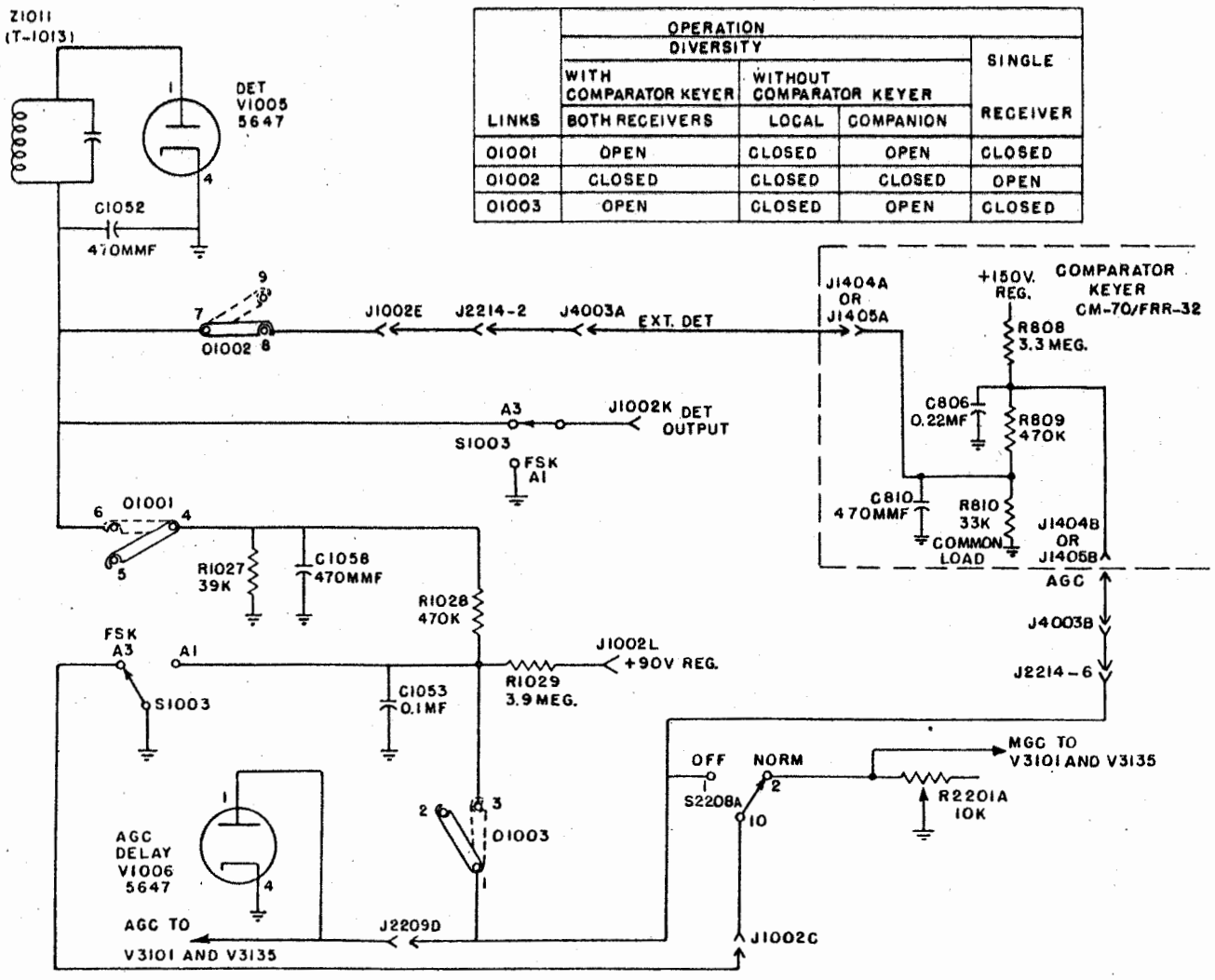


Figure 2-4. Detector and AGC, Simplified Schematic

When the AGC switch is in NORM position, the voltage developed across this common load in the Comparator Keyer is applied to the AGC delay diode, V1006, through J4003B, J2214-6, and J2209D. Delayed AGC is effective in all positions of reception.

The AGC switch is operative only in A3 or FSK position of the RECEPTION control. In either of these positions the operator may turn the AGC voltage on or off as he sees fit for best reception. During A1 reception, the AGC switch is inoperative but an AGC voltage is applied to the AGC delay diode, V1006, and the manual gain controls are operative.

In the OFF position the AGC voltage from the common load is sent through J1002C to S1003 where it is grounded when the RECEPTION control is set at A3 or FSK, and permitting manual control of the gain in the i-f section by GAIN potentiometer R2201. Similarly S1001 is disconnected from R2201B allowing MGC operation in the r-f section in positions A3 and FSK.

Capacitor C806 with resistor R809, or capacitor C803 with resistor R803, in the Comparator Keyer, filter the modulation components of the detected signal so that only the d-c component is applied to the AGC delay diode, V1006, when the AGC switch is in NORM position. This diode is normally conducting by reason of a positive voltage applied to its plate from the B+ regulated supply through R808 or R802. Therefore the AGC line to the r-f and second i-f amplifiers is held at a slightly positive potential until the d-c component of the signal developed across the common load R801 or R810 is sufficiently negative to stop V1006 from conducting. The voltage divider network composed of R808, R809 and R810 or R802, R803 and R801, (in the Comparator Keyer) is so designed that the point where the diode V1006 stops conducting is approximately minus 12 volts dc at the detector V1005. For stronger signals the AGC line becomes negative by the amount necessary to bias the r-f and second i-f amplifiers and reduce the gain in these stages.

2. SINGLE RECEIVER OPERATION. - Link O1001 is provided to permit the use of a diode load resistor in Receiver R618/FRR-32 in lieu of the one in Comparator Keyer CM-70/FRR-32 thus permitting complete interchangeability among the i-f amplifier sub units of other similar radio receivers such as R-501/FRR-21, R-502/FRR-22, and R-503/FRR-23. - When only one receiver is used, an audio voltage is developed across the diode load R1027 and is applied to the audio amplifier noise peak limiter V1001 when the RECEPTION control is set at A3. The noise peak limiter is discussed in paragraph 2a(10)(a) of this section.

That voltage developed across R1027 is applied to the AGC delay diode, V1006, when the RECEPTION control is in FSK or A3 position. Capacitor C1053 in conjunction with R1028 filter modulation from the detected signal so that only the d-c component is applied to V1006. As in the sub-paragraph above, the divider network composed of R1029, R1028 and R1027 is so designed that the point where the diode V1006 stops conducting is approximately 12 volts dc at the detector V1005. The remainder of the circuit operates as described in the preceding sub-paragraph.

3. DIVERSITY RECEPTION WITHOUT THE COMPARATOR KEYER. - Link O1001, O1002, and O1003 are provided in the diode detector and AGC circuits for applying a rectified signal voltage and an AGC voltage to the second or companion receiver. These links must be set as designated in the table in figure 2-4 for diversity operation without the Comparator Keyer. This facility is provided to maintain interchangeability among i-f amplifier sub units of other similar radio receivers as described in the preceding paragraph. When these links are so connected, the diode load resistor R1027 and the delayed AGC circuit of the local receiver are made common to the companion receiver through the DET AGC receptacle J4003 and suitable cabling. As in all diversity systems the gain of both receivers must be balanced. This is accomplished by regulating the amount of amplification on V1001 and V1002 of each receiver through adjustment of the DIVERSITY GAIN BAL control, R2202, through a recessed screwdriver adjustment on the front panel of the receiver.

(f) FREQUENCY SHIFT AND PANORAMIC OPERATION. - Intermediate-frequency output is supplied by the receiver to feed a frequency shift converter.

One output is provided by the second i-f cathode follower, V1007, which supplies signals at 200 kilocycles to a frequency shift converter through the coaxial receptacle, I. F. (J4005), on the back of the receiver. The output of the third amplifier, V1003 (pin 5), is coupled to the grid (pin 1) of V1007.

The second output, PAN receptacle J4006, is provided by the mixer cathode follower, V552, for use with a panoramic adapter. The mixer cathode follower circuits are further described in paragraph 2a(4) of this section.

In addition to the i-f outputs, a frequency shift converter of the audio type can also be supplied from the audio line of one receiver in single receiver operation or both audio lines when operating in diversity. Mark and space frequencies may be correctly set by adjustment of the beat frequency oscillator in the receiver or receivers, after the receiver or receivers have been tuned to the desired carrier frequency.

(9) BEAT FREQUENCY OSCILLATOR. - The BFO circuit provides a heterodyning signal to the BFO-mixer, V1004, for the second i-f to produce the desired beat note when the RECEPTION control is set for A1 and F1 reception. The beat frequency oscillator, V1301, is a Hartley circuit with adjustable capacitor, C1309, operated by the FREQ. VERNIER front panel control. This capacitor is paralleled by C1307 or C1308 which is a screwdriver trimmer adjustment (C1308 is active only in the FSK position of the RECEPTION control).

Output of the oscillator is electron-coupled to the plate, pin 5, of V1301. Beat frequency oscillator signals are fed, through J1301B, J2209A, to the third grid, pin 4, of the BFO-mixer, V1004, where they heterodyne with A1 or F1 received signals (coming from V1003) to produce a beat note in the audio range. Capacitor C1309, labeled as the FREQ. VERNIER on the front panel, changes the resonate frequency of Z1301 to provide a variation of 1500 cycles on either side of the center frequency which is zero cycle except in FSK position of the RECEPTION control. In this case, the beat note at the center (0) setting of the FREQ. VERNIER is 2550 cycles.

Plate and screen grid potentials to V1301 are removed through the setting of S1301 when the RECEPTION control is set at A3 or by the CAL switch, S2202, when the crystal calibrator is turned on.

(10) AUDIO AMPLIFIER.

(a) AUDIO INPUT CIRCUITS. - Input to the audio assembly is determined by the setting of S1101A which is controlled by the RECEPTION control. A simplified schematic of the audio input circuits is shown in figure 2-5. When the RECEPTION control is set at FSK, A1 BROAD, A1 SHARP, or A1 MEDIUM, output from the BFO-mixer, V1004, is applied directly to the first audio amplifier, V1102. But when the RECEPTION control is set at A3 SHARP, or A3 BROAD output from the diode detector, V1005, is applied to the first amplifier, V1102, through a noise peak limiter diode, V1101, which functions as follows:

The d-c component of the rectified signal from the diode detector circuit developed across the common load R810 (in Comparator Keyer CM-70/FRR-32) as described in paragraph 2a (8)(e) is applied to the plate of the noise peak limiter, V1101, by means of voltage divider R1102 and R1103.

A portion of the rectified signal voltage is applied to the cathode of the noise peak limiter, V1101, through R1104, R1105, and C1101. Under conditions of normal signal, the diode V1101 conducts and feeds the first audio amplifier, V1102, but when a noise pulse which exceeds normal modulation percentage is detected, it causes an instantaneous decrease in potential on

the plate of the noise limiter diode V1101. Voltage to the cathode, however, remains constant because of the filtering action of C1101 and R1104. Thus for a short time interval, the plate is more negative than the cathode, and during this time the diode acts as an open circuit. Therefore the output noise pulse is limited to a value corresponding to maximum normal modulation percentage as determined by the relative values of R1102 and R1103. In these receivers the noise limiter is set to limit impulses to a level corresponding to 40 per cent modulation.

The B section of OUTPUT control, R2207, is shunted across the grid circuit of V1102, when S1102A is set at FSK, A3 SHARP, or A3 BROAD, to provide a means of adjusting the signal level before it is applied to the first audio amplifier, V1102. This control is inoperative when S1101A is set at A1 BROAD, A1 SHARP, or A1 MEDIUM (in these positions the signal input is applied across the entire resistor, and the output is taken from the same point).

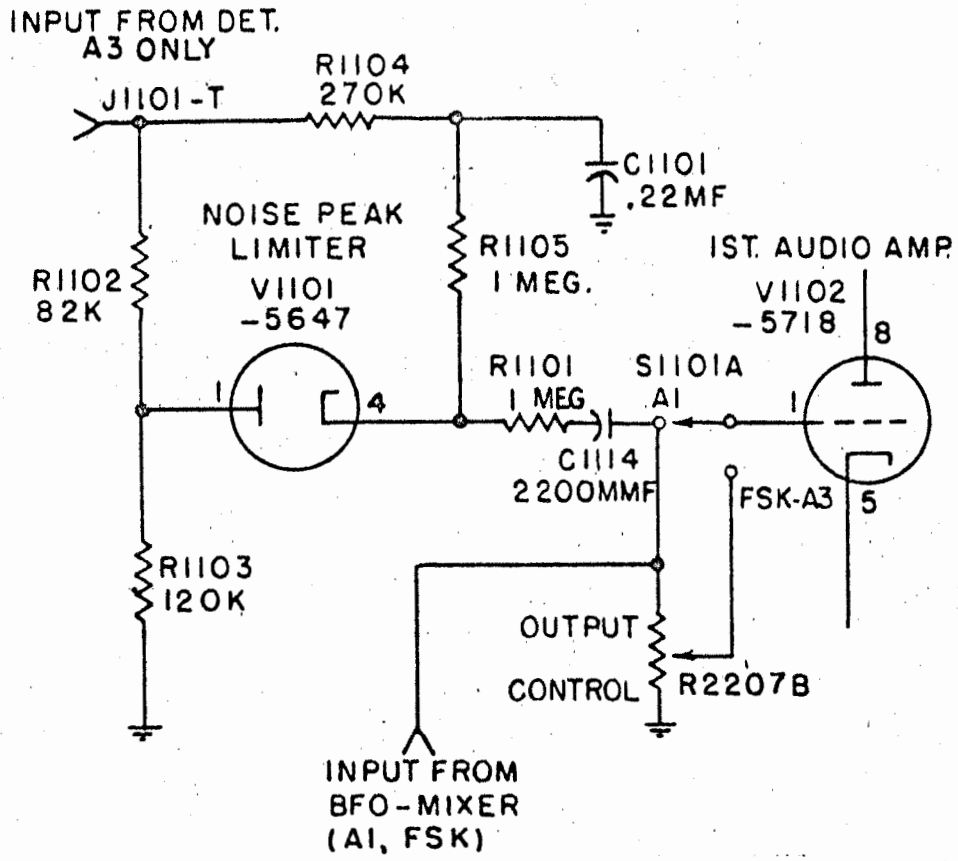


Figure 2-5. Noise Peak Limiter, Simplified Schematic

The normal characteristic of the audio amplifier provides broad selectivity, but a narrow frequency response is obtained when the RECEPTION control is set at A1 SHARP. In this position, S1101B channels the output of the first audio amplifier through a band-pass filter, Z1110, before the signal is applied to succeeding stages of the audio assembly. Filter Z1110 is bypassed in all other positions of S1101B.

(b) SILENCER CIRCUIT. - See figure 2-6. A silencer circuit, V1103 and V1104, is active in the audio assembly when the RECEPTION control is in the A3 SHARP or A3 BROAD position to prevent noise from being further amplified by succeeding stages in the absence of signals.

The silencer diode, V1103, is connected in series between the first and second audio amplifiers, V1102 and V1105. Plate potential of the diode is determined by the amount of plate current flow through the d-c amplifier, V1104. The cathode potential is determined by voltage divider R1115 and R1116. Grid voltage of the d-c amplifier (pin 1 of V1104), supplied by B+, is determined by the setting of the SILENCER potentiometer, R2206, which is mounted on the front panel of the receiver, and by the average d-c level of the detector output. This potentiometer is connected between B+ and ground, and thus provides an adjustable positive voltage.

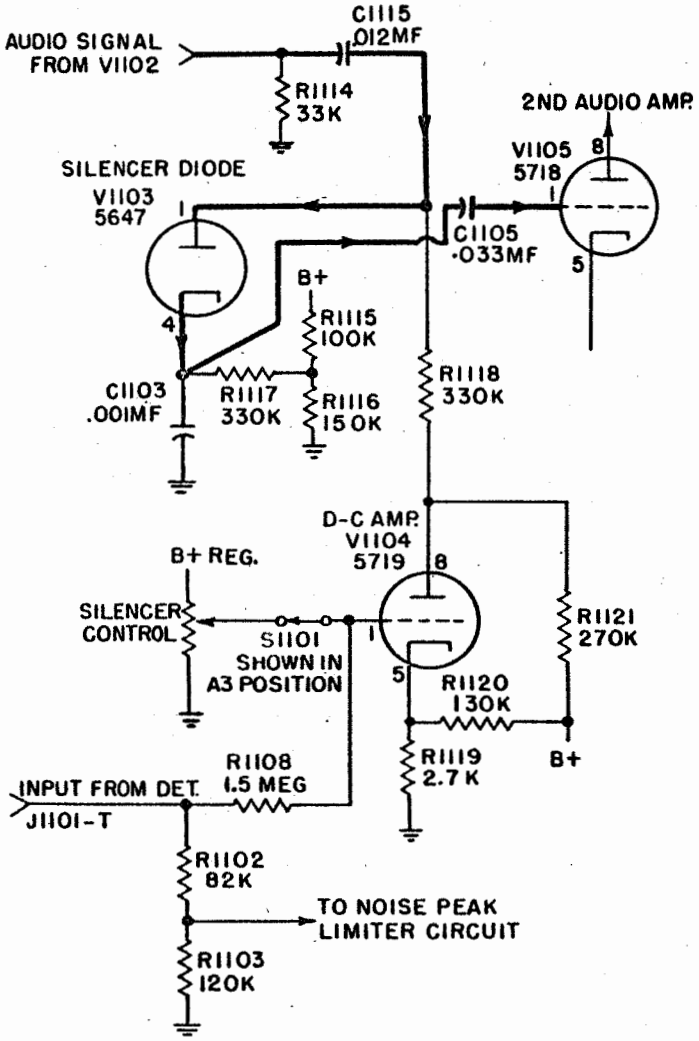


Figure 2-6. Silencer Circuit, Simplified Schematic

When the grid voltage of the d-c amplifier V1104 is positive, the voltage drop due to current through R1121 causes the plate of V1103 to become negative relative to the cathode, and V1103 cannot conduct. When the grid voltage of V1104 is reduced (as by the presence of a strong carrier) the current through R1121 decreases causing the plate of V1103 to become positive relative to the cathode, thus causing V1103 to conduct.

When the RECEPTION control is set to any other position but A3 SHARP or A3 BROAD, the SILENCER control is inoperative because switch S1101A returns the grid circuit of V1104 to ground instead of to the silencer control.

(c) SECOND AUDIO AMPLIFIER (V1105). - The output of the silencer diode, V1103, is taken from its cathode and coupled to the grid (pin 1) of the second audio amplifier, V1105, through C1105. The amplified output appears at the plate (pin 8) of V1105 and is applied to the cathode of the first diode limiter, V1106, through capacitor C1107.

(d) DIODE LIMITERS. - Two series diode limiters, V1106 and V1107, are combined to clip equally on positive and negative portions of the audio cycle, when S1101A on the RECEPTION control is set for A1. Plate potential on the limiters, and therefore, the level at which the tubes will become non-conductive, is set by the A section of the OUTPUT control, R2207. When the audio output from V1105 is applied to the limiter diodes (cathode of V1106), diode V1106 limits the positive portions of the input while V1107 limits the negative portions, and the OUTPUT control is adjustable to provide a range of 40 db. In those positions of the RECEPTION control where limiting is not used, A3 and FSK, the plate potential on the diodes is fixed by returning the plate to B+ through R1112 at such a value that the diodes remain conductive beyond the point that produces maximum power output from the output stage.

(e) AUDIO OUTPUT STAGES. - Signal voltages are taken from the cathode of the second limiter, V1107, and applied to the grid (pin 1) of the driver stage, V1108 through C1108. They are amplified and applied to the control grid (pin 1) of the beam power pentode, V1109 through C1109. A negative feed-back voltage is applied from the plate (pin 5) of V1109 to the cathode (pin 5) of V1108 via resistor R1134. The feedback is provided to maintain a nearly constant output voltage under changing load conditions, such as due to connecting two headphones in parallel or connecting various loads to the receiver audio output terminals.

The pentode, V1109, feeds the primary of output transformer T1101; and signals are taken from a balanced secondary winding to feed a 600-ohm line, and an unbalanced winding (with one side grounded) for phone jack connections.

The phone LEVEL control, R2208, regulates the output which is applied to the two PHONE jacks (J2215 and J2216) connected in parallel. The same audio signal that feeds the PHONE jacks also goes to the OUTPUT meter, through appropriate multiplier resistors as selected by the ADD DECIBEL switch, S2205. The OUTPUT meter is connected directly to the output winding to prevent the LEVEL control and phones from affecting the meter readings.

(11) OUTPUT METER. - The signal to the OUTPUT meter, M2202, is attenuated in four steps to permit the meter to indicate, in decibel, a wide range of output levels. Zero db of the meter circuit corresponds to a power level of six milliwatts into a 600-ohm load. Multiplier resistors provide the appropriate amount of attenuation. These multipliers are selected by the ADD DECIBEL switch, S2205, for the +20 db, +10 db, 0 db, and -10 db positions. There is no attenuation provided when the switch is in the -10 db position in order that the low output levels can be read. The -10 db position of the ADD DECIBEL switch is spring-loaded, and the switch will fall back to the 0 db position if the switch arm is not held in the -10 db position.

(12) POWER SUPPLY. - All voltages necessary for the operation of these receivers are provided by an a-c operated power supply. Taps on the primary of transformer T1601,

selected by an appropriate position of link O1601 on link board E1601, accommodate either a 105- 115- or 125-volt a-c source at frequencies of 50-60 cycles. Additionally, for operation at 400 cycles (single receiver reception or dual diversity reception without the external oscillator and the Comparator Keyer only), the other side of the primary circuit, which is normally connected to terminal No. 1 of the power transformer T1601, must be reconnected to terminal No. 6 in which case the line voltage taps function as above. The two-section POWER switch, S2201, which is mounted on the front panel, opens and closes both sides of the primary of T1601. Two fuses, F1601 and F1602, protect the circuit from overload.

Rectified current, developed by V1601 and V1602, is taken from the parallel connected cathodes and fed through a choke-input filter L1601A, L1601B, C1601 and C1602. Two outputs are supplied by the rectifier: 120 volts at terminal J1601C, and 95 volts regulated by V1603 at terminal J1601D. This is obtained by connecting V1603 to the midpoint of the filtering network via R1603. C1603 provides r-f filtering of the regulated output. A visual indication of the existence of B+ is given by the PILOT light, I2201, which is located on the front panel and glows when d-c voltage is present in the circuit. This pilot light (a neon bulb) is connected in series with a 100,000-ohm resistor and this series combination is connected across B+.

Two heater windings are provided on the secondary of T1601. One winding (terminals 8, 9) supplies heater voltage for the noise limiter diode, V1101. This is supplied at a reduced level (5.2 volts) so as to reduce hum due to the heater-cathode leakage in V1101. Potentiometer R1601 (a chassis control) adjusts the balance of this winding to further reduce hum when a 400-cycle primary source is employed. The second heater winding (terminals 10, 11, 12, 13, 14) has several taps on each side of its ground connection. Most of the heater voltages for all other vacuum tubes in the equipment are supplied from terminals 11 and 13. Terminal 12 is connected to ground. A ballast resistor, R1605, is connected in series between terminal 10 of the transformer and one of the oscillator-heater leads to regulate current to the oscillator-heater. (The other lead of the oscillator-heater is grounded.) A 6.3-volt a-c potential from terminal 14 of T1601 supplies the dial lights.

(13) FILTER ASSEMBLY. - Refer to figure 7-2. The filter assembly is located at the back of the receiver cabinet or case. It includes receptacles for input and output connections to the receiver, filters which reduce interference between the receiver and other equipment, and a relay which protects the receiver input stages. These receptacles, filters, and relay are described in the following sub-paragraphs.

(a) I-F CIRCUIT. - This circuit carries the cathode-follower output (200-kc) from V1007 through J1002B and the A2 lead of the multiple jack, J2214, the i-f filter, Z4001 to the I.F. jack, J4005. This filter rejects a signal in the frequency range from 400 kc to 400 mc to prevent interference between the receiver and any external equipment connected to the I.F. jack.

(b) PAN CIRCUIT. - This circuit carries the cathode-follower output (1600 kc) from V552 through J551F to the A3 lead of the multiple jack, J2214, and the pan filter, Z4004, to the PAN jack, J4006. This filter rejects signals in the frequency range from 1700 kc to 400 mc to prevent interference between the receiver circuits and the external circuits.

(c) ANT. CIRCUIT. - This circuit carries r-f signals from the external antenna through the ANT jack, J4007, the ANT relay, K4001, and the A4 lead of the multiple jack, J2214, to jack J3101B of the antenna assembly. The antenna relay is a current-operated thermal relay which opens the antenna lead to protect the receiver input circuits from overload, when a transmitter is operated in the immediate vicinity. Under overload conditions, the relay opens and closes rapidly to maintain an average current of 150 milliamperes or less.

(d) POWER CIRCUIT. - The circuit carries 115-volt (nominal) a-c current which powers the equipment, through the POWER jack, J4004, the power filter, Z4002, leads 7, 8,

and 10 of the multiple jack, the POWER switch, S2201, fuses F1601, F1602, to the power transformer T1601. The power filter rejects frequencies from 14 kc to 400 mc to prevent interference between the receiver and other circuits connected to the power line.

(e) AUDIO CIRCUIT. - This circuit carries the receiver audio output from transformer T1101 terminals 5 and 7 through J1101A, E, leads 4 and 9 of the multiple jack, J2214, the audio filter, Z4003, to the audio jacks, J4001 and J4002. The audio filter rejects frequencies from 100 kc to 400 mc.

(f) DET. AGC CIRCUIT. - This circuit includes no filter network. Terminal A of the DET. AGC jack J4003 carries the output of the detector tube V1005 through link O1002, jacks J1002E and lead 2 of the multiple jack J2214. Terminal B of the DET. AGC jack J4003 carries an AGC voltage to the AGC diode V1006 through J1002D, E2203-2, and lead 6 of the multiple jack J2214. At E2203-2 the AGC voltage is also applied to an AGC switch, S2203 (which is operative only when the RECEPTION control is set at A3 or FSK), permitting the operator to turn off the AGC voltage during A3 or F1 reception if he so chooses.

(g) EXT. OSC. - An input receptacle on the rear of the receiver, labeled EXT. OSC. (J4008) is provided to accommodate the external oscillator. It receives the output from one of the HFO jacks on the R-F Oscillator directly. This input is applied to the receiver when OSC switch S2207, on the receiver front panel, is in EXT. position.

(14) CRYSTAL CALIBRATOR. - Refer to figure 2-7. The crystal calibrator circuit provides accurate frequency check points for calibrating the main tuning dial. These check points occur at every 200 kilocycles. The circuit used is a cathode coupled multivibrator, V1201 and V1202, which is locked to 200 kilocycles by Y1201. One output, rich in harmonics of 200 kc, is taken from the plate of V1202 and applied to the grid pin 1 of the r-f amplifier V3135 through C1205, J1201C, J3135M, C3168, J3136K, and C3169. After passing through V3135 the signal is combined in the mixer, V551, with the signal from the local oscillator, V4401. The combination-frequency signal output of V551 then goes through jacks J901, J902 and associated networks, through switches S1001, S1002 and associated networks, then through V1001 to the input circuit of V1002.

The second output is taken from the common cathodes of V1201 and V1202, and is applied to V1002 of the second i-f assembly through C1207, J1201, J1002, and C1064. The combination of the two signals gives a beat note at every 200-kilocycle intervals throughout the tuning range of the receiver. The main tuning dial can thereby be calibrated independently of external signals if the CAL switch is turned to the ON position.

The CAL switch, S2202, is connected so that in the OFF position B+ voltage is not applied to the crystal calibrator. In the ON position, B+ voltage is applied to the calibrator, and is removed from the antenna preamplifier, V3101, and BFO, V1301. This prevents interference with the crystal calibrator from either externally applied signals or the BFO.

(15) BAND SELECTOR FUNCTIONING. - The band selector assembly consists of a gear and sliding bar which moves the five-position wafer switches in the antenna, r-f, mixer, and oscillator assemblies to connect appropriate circuits for the band of frequencies selected. The ranges of frequencies covered in each of the five bands are marked on the front panel around the band selector knob. The sliding bar, which extends along the ends of the antenna, r-f, mixer, and oscillator assemblies, is made to move in and out by gears and a rack which are driven when the shaft on the band selector is turned. Crank arms connected to the extended ends of the wafer switch shafts in each assembly, have pins which fit into slots in the sliding rack. Stops on the linkage prevent the band switch assembly from moving through more than five positions. Each wafer switch assembly is provided with a detenting mechanism to assure accurate positioning of the switch.

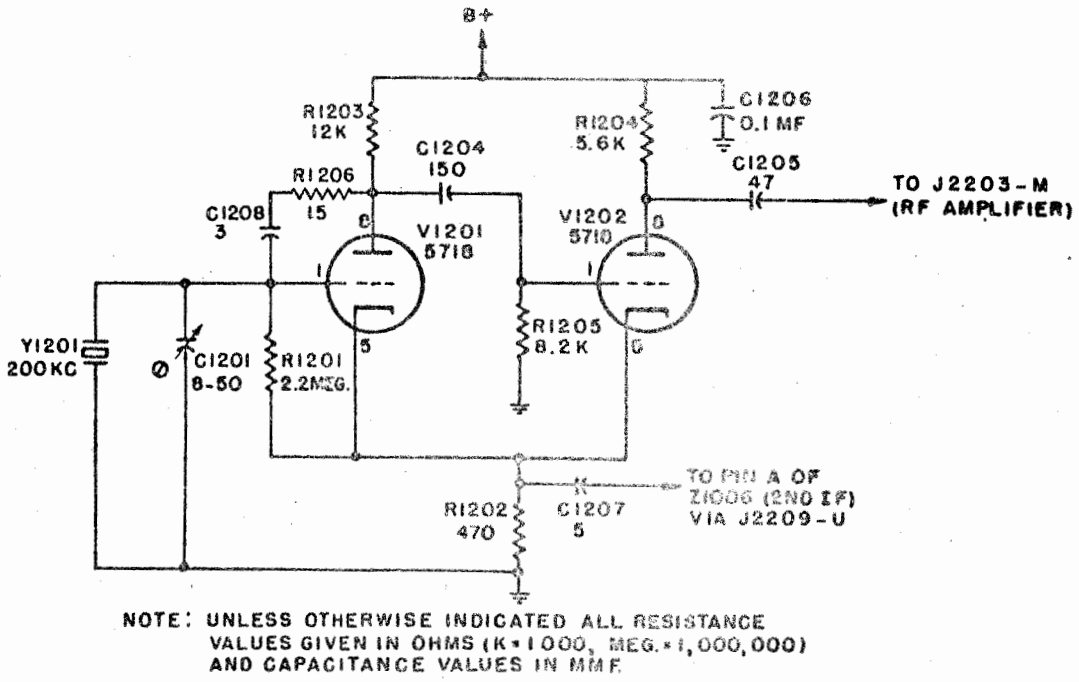


Figure 2-7. Crystal Calibrator, Simplified Schematic

TABLE 2-1. RECEPTION CONTROL EFFECTS

CONTROLLED CIRCUIT	CONTROL POSITION					
	A1 BROAD	A1 SHARP	A1 MEDIUM	A3 SHARP	A3 BROAD	FSK
I-F selectivity	Medium	Sharp	Sharp	Medium	Broad	Medium
A-F selectivity	Broad	Sharp	Broad	Broad	Broad	Broad
AGC	Off	Off	Off	On	On	On
Output Limiter	On	On	On	Off	Off	Off
R-F Gain Control	Active	Active	Active	Inactive	Inactive	Inactive
BFO	On	On	On	Off	Off	On*
Silencer circuit	Inactive	Inactive	Inactive	Active	Active	Inactive

* The beat note with FREQ. VERNIER control centered, and input frequency tuned to the i-f (maximum reading on TUNING meter) is 2550 cycles in this position, 0 cycle in all others.

(16) RECEPTION CONTROL FUNCTIONING. - The reception control operates in a manner similar to the band selector to actuate wafer switches in the second i-f, audio, and BFO assemblies and select proper circuits for optimum conditions of reception of one of the four classes of emission. Six positions of the control are used corresponding to A1 BROAD, A1 SHARP, A1 MEDIUM, A3 SHARP, A3 BROAD, and FSK. See table 2-1 for circuits which are affected by the RECEPTION control, and how they are affected.

(17) TUNING DIAL ASSEMBLY. - Refer to figures 7-18 through 7-21. The frequency to which the receiver is tuned appears projected on a translucent screen located at the upper left of the front panel. Calibration of the tuning dial is in megacycles.

The projection system consists of a glass disk on which the tuning range of the receiver is calibrated in five scales. A light source is mounted in a housing behind the tuning dial. A portion of one of the optical scales is projected through a system of lenses and onto a mirror which reflects the image of the scales back upon the translucent screen. The glass disk is rotated by gears as the tuning knob is turned. When the setting of the band selector is changed, the dial light and lens housing is moved up or down by a cam driven from the band selector gears to align the lens system with the corresponding frequency scale on the glass disk. A CAL. ADJUST knob and locking screw, located to the right of the tuning dial, provides a means of shifting the frequency scale on the translucent screen when recalibrating the receiver in conjunction with the crystal-controlled calibrator. This is done by a slight horizontal movement of the lens system.

The bayonet base lamps (dial lamps I3801 and I3802) are mounted in the dial light housing. Either lamps can be illuminated and moved into physical alignment with the lens system by the setting of the LAMP switch, S3801, located on the front of the dial assembly. The bulbs are accessible from the top of the receiver after the cover plate to the dial light housing has been removed. A lamp adjustment (O3826) is provided to locate the lamp filament in the optimum position.

The dial lamp also illuminates the logging dial by the means of an aperture in the side of the dial light housing. Brilliance of the dial light is controlled, from maximum to extinguished, by the setting of the DIM control (R3801). This control is located on the front of the dial assembly. The dial lamps are connected to the 6.3-volt winding of T1601 (terminal 14 to ground) through terminal 1 of the dial lights terminal board (E2201) and J1601V.

The logging dial assembly comprises two movable scales located below the translucent screen. An index marker "O" is located between the two movable scales. The movable scales are driven through reduction gears by the tuning knob so that the top scale, calibrated in hundreds from zero to one thousand, moves between two one-hundred markers while the bottom scale makes a complete rotation, from zero to one hundred in steps of one.

b. RADIO FREQUENCY OSCILLATOR CIRCUITS. - Refer to the schematic diagram shown in figure 7-32.

(1) HIGH FREQUENCY OSCILLATOR CHAIN. - V301, the master high-frequency oscillating tube, is connected in a Colpitts circuit to oscillate at frequencies between two and four megacycles as determined by the resonant circuit consisting of L301 and C301. Coupling between the resonant circuit and the grid, pin 6 of V301, is maintained constant with tuning by C302 which is ganged with the tuning capacitor. R320 provides tube bias and L302 is an r-f choke to ground. R301 provides the necessary decoupling action; C307 couples the plate of V301 to one end of the resonant circuit. C305 and C306 provide the necessary feedback phase relationship for oscillation. Twin-triode V302 performs the double function of a cathode follower output coupling stage for the variable oscillator, and as a crystal-controlled 100-kc oscillator. R302 is the cathode resistor across which the output is taken. R303 and C308 provide filtering action to keep the ac out of the power supply by bypassing it through C308 to the ground end of the cathode load resistor. The second half of V302 is connected

in a Pierce type crystal oscillator circuit in which C311 and C312 provide feedback with the necessary phase relationship for oscillation. C309 provides coupling from the plate, pin 6, to the resonant crystal Y301. The output from the second part of V302 is taken across R305. R306 supplies the necessary grid bias. Crystal Y301 resonates near 100 kc and may be accurately adjusted by means of capacitor C311. R304 is the plate load.

The cathode follower output feeds triode V202, which is used either as an amplifier or crystal oscillator. When S201 is set on VMO, V202 is an R-C amplifier, when S201 is set on 1, 2, or 3, the stage is a conventional Pierce oscillator having three crystal positions. Crystal Y202, Y203, or Y204 may be inserted into the circuit as operating conditions require. C210 in combination with tube interelectrode capacities provides feedback with the proper phase relation for oscillation. C210 is the crystal trimmer and R207 provides grid bias. C243 is a blocking condenser to prevent any dc from entering the crystal and couples the plate (pins 1 and 5) to the resonant crystal circuit. R208 is the load resistor while C211 and R209 provide decoupling action. This stage is capacitively coupled by C212 to the grid of V203.

V203 is a broadband r-f amplifier with peaking coil L202 in its plate circuit providing uniform gain over the two- to four-mc range. The output signal amplitude of this tube is controlled by the variable resistor R215, which changes the screen grid voltage. R214 and R217 are dropping resistors to provide correct voltage on the screen grids of V203 and V204. C215 and C216 are screen grid bypass capacitors. R213 and C213 provide decoupling action with R212 as the plate load resistor. R210 and R211 provide necessary bias for the grid and cathode respectively with C214 as the conventional cathode bypass to ground. C217 is the coupling capacitor between stages.

V204, V205, V206 and V207, used in conjunction with S202 are frequency multipliers of the second harmonic of each preceding stage. Band switch, S202 is a four-section, five-position, rotary type switch. The a section of the switch controls the screen voltage on the tubes V203 and V204. R216 and R233 are the dropping resistors involved. The b section of the switch connects coil L203 or L205, to be used for tuning the plate circuit of V204. L203 in series with C219, C220, and C225a is used for two to four megacycles and L205 with C219, C221, and C225a for four to eight megacycles. L206 with C222, C228, and C225b tune the plate circuit of V205 for 8 to 16 megacycles. L207 with C230, C231, and C225c tune the plate circuit of V206 for 16 to 32 megacycles. L208 with C234, C236, and C225d tune the plate circuit of V207 for 32 to 64 megacycles. R220, R221, R228, R230 and L204 are decoupling devices to prevent rf from flowing through the d-c power lines. The r-f output level is metered by the detector circuit built around CR202. C238 is a coupling capacitor. The dc obtained from rectified rf through crystal CR202 is filtered by R232 and C237 and fed to the meter through J201, P201, S107, P201, J201, J302 and P302. Section c of switch S202 connects plate voltage to each successive multiplier as each higher harmonic of the oscillator is required. The d section is the output selector to select harmonics of the high frequency oscillator from 2-4, 4-8, 8-16, 16-32, and 32 to 64 megacycles, from positions marked A-F respectively.

(2) THE INTERMEDIATE FREQUENCY OSCILLATOR. - (This portion of Oscillator O-330/FRR-32 is normally not used in Radio Receiving Set AN/FRR-32.) The first half of V201 is a Pierce crystal oscillator circuit. The crystal is set at 3.5 megacycles. C202, C203 and R203 provide a low band-pass filter to keep rf out of the power source, while C242 is the crystal coupling capacitor. The second half of V201 is a class C amplifier, whose tuned plate is link-coupled to the output jacks J205, J206 and J207. The tank circuit is tuned to 3.5 megacycles by L201 and C207. C206 couples the output circuit to the cathode, pin 8, of V201. Metering is accomplished in essentially the same manner as described in the high frequency oscillating circuit; a portion of the r-f output is coupled to rectifier CR201 through C208. This germanium diode and its associated filter network (R206, C209) produce a d-c level proportional to the r-f output voltage. This is fed to the front panel milliammeter so that output indication is available. Full scale deflection is approximately equivalent to 10 volts rms of r-f voltage.

(3) THE BEAT FREQUENCY OSCILLATOR. (This portion of Oscillator O-330/FRR-32 is normally not used in Radio Receiving Set AN/FRR-32). - V105 is a modified type of Pierce crystal oscillator and toggle switch S105 may throw either crystal Y101 or Y102 into the oscillator circuit. The plate tank circuit of V105 is tuned by variable inductor L102, C120, and C121. The voltage output, controlled by potentiometer R116, is fed to the output jacks J102, J103, and J104. The metering in this case is similar to that discussed in the preceding paragraph. A portion of the r-f output is coupled to CR102 through C118, and rectified dc is filtered by R115 and C117. Full-scale deflection of the meter is equivalent to 20 volts rms of r-f voltage.

(4) THE CALIBRATING CHAIN. - The voltage from the 100-kc calibrating oscillator and the high-frequency variable oscillator is fed to pins 1 and 7, respectively, of the pentagrid converter V103. The difference frequency is picked off by filter action of the capacitors C111, C112, and resistor R108. This is a low pass filter with a rising characteristic at very low frequencies. The audio signal is then amplified successively by the first and second halves of V104. Variable resistor R112 provides audio volume control, working in conjunction with rotary switch S104, which turns on and off the 100-kc oscillator. The front panel milliammeter is switched into the cathode circuit of the final amplifier, so that the zero beat may be seen by the swinging of the meter needle about the center dial reading. J105 is capacitively coupled to the plate of V104 through C116 to accommodate earphones so that the zero beat frequency may be picked up. The circuit built around CR101 containing C105, C102, and R102 is for metering the variable master oscillator output. A portion of the variable master oscillator output is coupled to rectifier CR101 through C106 and the d-c, filtered by R102 and C105, is fed through switch S107 to the front panel meter.

(5) THE POWER SUPPLY. - Transformer T101 supplies the necessary power and filament voltages for the Radio Frequency Oscillator. V101 is a full-wave vacuum rectifier with choke (L101) filter input. C101 and C104 provides low impedance paths to ground for any r-f current. R101 is used to limit the current passing through V102. This tube is a glow discharge regulator type whose output voltage is held constant and provides +150 volts at point B2.

(6) OVEN CONTROL. - The oven is the heart of the R-F Oscillator. It is composed of two sections, an inner and an outer oven which are thermostatically controlled to 70°C (158°F) and 60°C (140°F) respectively. The inner oven thermostat S302, set to open at 80°C (176°F), protects the unit in case of excessive temperatures, due to sticking or failure of the mercury thermostat, S301. Figure 2-8 illustrates the operation of the inner oven thermostat switch circuit.

In normal operation switch S301 is open and the contacts of relay K301 closed. When the temperature of the oven reaches 70°C (158°F), S301 closes, thus energizing the coil of relay K301, which in turn, opens the contacts (terminals 4 and 5) of the relay. In the event S301 should fail at 80°C (176°F), safety switch S301 will open, thus preventing further current from passing through the heating elements, R307 and R308.

The neon bulbs (INNER OVEN and OUTER OVEN) on the front panel give indication as to the normal operation of the inner and outer ovens. In normal operation, the OUTER OVEN pilot lamp should blink alternately "On" for approximately five seconds and "Off" for approximately 30 seconds, depending on the ambient temperature. The INNER OVEN pilot light should blink alternately "On" for approximately 90 seconds, and "Off" for approximately 90 seconds.

In the event switch S301 fails to operate, due to sticking, the inner oven will continue to heat until the temperature of the oven reaches 80°C (176°F), at which time, safety switch S302 will open. When the temperature reaches this point the INNER OVEN pilot lamp blinks erratically at short intervals, instead of the usual 90 seconds as in normal operation.

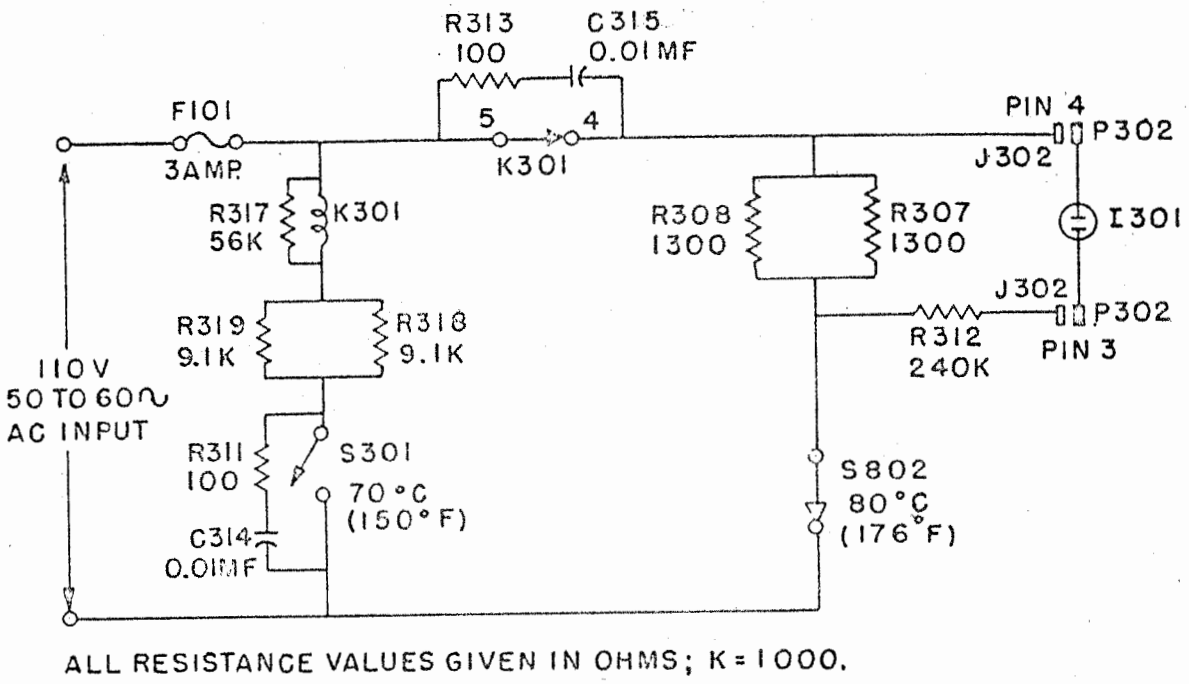


Figure 2-8. Inner Oven Heat Control, Simplified Schematic

c. COMPARATOR KEYER CIRCUITS.

The discussion of the Comparator Keyer circuits which follows is given with reference to the schematic diagram shown in figure 7-31 and the Comparator Keyer section of the overall block diagram of Radio Receiving Set AN/FRR-32 (figure 7-29).

(1) COMPARATOR SUB UNIT. - The input of the Comparator Keyer is the detector outputs of the two receivers which comes from pin A of connector J4003 of each receiver.

DIVERSITY RECEPTION. - It is assumed that both receivers have initially been adjusted for equal gain in the paragraphs which follow. Such adjustment is indicated by the equality of the detector-output currents as shown on meters M1502 and M1503.

The output from Receiver 1 (the top receiver) is fed through the filter sub unit of the Comparator Keyer, by pin A of J1404 and pin 22 of J1401, to milliammeter M1502, which indicates the detector current of Receiver No. 1. A germanium diode CR801, in series with the detector output, prevents reverse current from flowing through the meter after the signal has been returned to the comparator sub unit through pin F of J1505 and pin F of J801. From CR801 the signal goes to RECEIVER 1 DIVERSITY TUNE switch, S801, terminal 5.

The detector output of Receiver 2 (the bottom receiver) follows a similar path through pin A of J1405, pin 25 of J1401, milliammeter M1503, pin B of J1505, and CR802 to terminal 5 of S802.

With S801 and S802 in DIV position, the two outputs are joined after leaving pin 1 of S801 and pin 1 of S802. The combined detector output is fed through milliammeter M1504, which indicates the combined detector current, to a common load (resistor R810) from which the useful signal is obtained and the automatic gain control (AGC) voltage is derived.

The AGC bias voltage obtained is supplied to all of the antenna and r-f stages of both receivers. Since both receivers are adjusted initially to the same gain and are automatically controlled by the common AGC bias, they will have equal gain at any instant. The gain of each receiver, will, of course, rise and fall as the signals fade, with the result that the receiver which has the strongest incoming signal at any instant is supplying the major portion of the combined rectified output that flows through the input of the comparator sub unit. The receiver having the weaker incoming signal strength at this instant supplies less to the combined rectified output and the arrangement of the common load circuit for the detector output and AGC of the receivers gives still further reduction of the current contributed by the receiver with the weaker incoming signal strength. The net result is that, at any instant, the useful output signal is controlled or supplied almost entirely by the receiver having the highest input level.

It is this general scheme of combining after rectification that makes it possible to utilize fully the diversity of fading existing at the spaced antennas. If combination were attempted before rectification, either at the original carrier frequency or at an intermediate frequency, there would be both addition and cancellation due to phase differences. By combining rectified outputs, only addition is obtained.

An AGC TIME CONSTANT switch S803 is located under the front panel door and is used to simultaneously select the AGC time constant for both receivers. A choice of three values is provided; namely, slow, medium, and fast, such alternatives being necessary in facsimile and telegraph services to handle properly all types of fading, noise, echoes, and interference. Details of the AGC circuits and correct selection of values are treated under Section IV, Operation.

1. A2 AND A3 RECEPTION. - When the RECEPTION switch, S804 (on the front panel of the Comparator Keyer), is in the A2 or A3 position, the d-c component of the rectified signal (which is developed across the common load, R810) is applied to the plate and grid (tied together) of the impulse noise limiter V801A by means of voltage divider R811 and R812. A portion of the rectified signal voltage is applied to the cathode, pin 3, of V801A through R813, R814, and C811. Under conditions of normal signal, the diode V801A conducts and feeds amplifier V801B through S804B. When a noise pulse which exceeds normal modulation percentage is detected, it causes an instantaneous decrease in potential on the plate of the impulse noise limiter V801A. The voltage to the cathode, however, remains constant because of the filtering action of C811 and R813. Thus, for a short time interval, the plate is more negative than the cathode, and during this time V801A acts as an open circuit. Therefore the output noise pulse is limited to a value corresponding to a maximum normal modulation percentage as determined by the relative values of R811 and R812. The noise limiter, in this case, is set to limit impulses to a level corresponding to 40 per cent of modulation.

In A2 and A3 positions of S804, the signal is fed from the cathode of V801A through resistor R815 and capacitor C812 to the LEVEL potentiometer R1505B on the front panel. In position A3 of S804, the setting of this potentiometer determines the amplitude of signal fed to the grid of amplifier V801B. V801B amplifies the signal and feeds it from the plate, pin 6, to the plate of V802B, pin 6. Whether or not V802B passes the signal depends upon the action of V802A. In A2 and A3 positions of S804, the grid potential of V802A is determined largely by the setting of the silencer potentiometer R1504, on the front panel of the Comparator Keyer. This potentiometer is supplied with regulated +105 volts at its high end and, therefore, any fraction of +105 volts can be fed to the grid, pin 2 of V802A through R819. If the

SILENCER potentiometer is turned clockwise, the voltage on the grid of V802A increases in a positive direction which tends to make V802A conduct.

Grid voltage on V802A is also affected by the incoming signal level inasmuch as the grid is also fed from the common load through R818. C814 and R818 filter out the audio component of the signal, leaving only the d-c level changes caused by changes in signal level. When V802A conducts, the resulting drop across its plate load resistor R821 reduces the potential on the plate, pin 6, of V802B. If the voltage on the plate of V802B drops below potential of the cathode, V802B will block the signal. Therefore, R1504 can be adjusted to block all signals below a certain amplitude and allow only the stronger useful signals to pass through V802B. At any particular setting of R1504 the grid voltage on V802A will vary with the signal level from the common load, becoming less positive with stronger signals thereby allowing them to pass through V802B.

The signal feeds from the cathode, pin 8, of V802B through an R-C coupling (R827 and C816) to the grid, pin 2, of amplifier V803A. V803A is a conventional amplifier utilizing cathode degeneration. V803B and V804A act as limiters. In position A2 of S804, the limit level can be controlled by the AF LINE LEVEL potentiometer, R1505B, on the front panel, whereas in all other positions only very strong signals are limited. Regulated +105 volts is supplied to the high end of R1505B so that when it is rotated counterclockwise the voltage supplied to the plates of V803B and V804A, pin 6 and pin 1 respectively, is decreased. Limiting of the positive half of the signal fed to the cathode, pin 8, of V803B occurs when the cathode reaches the same potential as the plate. The negative half of the signal is limited when the plate of V804A becomes less positive than its cathode because the negative going half of the signal is on the plate.

From the cathode of the second half of the limiter V804A, the signal is fed through an R-C coupling (C819 and R837) pin 7, to the grid of V804B. V804B amplifies the signal and feeds the power amplifier V805 through coupling capacitor C820. Negative feedback is applied from the plate, pin 5, of V805 to the cathode of V804B through C821 and R840. This feedback helps to maintain low distortion and makes the output transformer T801 tolerant of a wide range of loads. T801 feeds a center tapped line through pins MM, HH, and LL of J801, which leads to the rear of the Comparator Keyer cabinet. An additional winding on the transformer feeds the LINE PHONES, on the front panel, and also the monitor sub unit through pins JJ and NN of J801.

2. A1 RECEPTION. - In A1 position of the RECEPTION switch, S804, the signal from the common load R810 is sent out of the comparator sub unit through pin E of J801 to the tone keyer sub unit. There the tone from the oscillator V601 is triggered and the tone pulses are fed back to the comparator sub unit through pin J of J801 to switch S804B, pin 7. A detailed description of the tone keyer sub unit circuit is given in paragraph c(2).

From the switch, the tone pulses are fed to the high side of the LEVEL potentiometer R1505A, located on the front panel of the Comparator Keyer. From the center arm of R1505A the tone pulses feed again through S804B to the grid, pin 7, of amplifier tube V801B. R1505A can be used to adjust the amplitude of the pulsed tone being fed through the comparator sub unit circuits. In A1 position the SILENCER potentiometer R1504 is made inoperative effectively grounding the grid, pin 2, of V802A through R819 by means of S804C.

3. F1 RECEPTION. - When the RECEPTION switch, S804, is in FSK position and F1 signals are being received from both receivers, the Comparator Keyer serves only to select the receiver with the stronger output and block the other receiver. The F1 signals enter the Comparator Keyer in like fashion to the A2 and A3 signals. The circuits of the Comparator Keyer are not affected because, after combination of the two input signals at common load, the only output is a d-c voltage since an F1 signal is composed of an unmodulated carrier.

(2) TONE KEYER SUB UNIT. - The circuits of the tone keyer sub unit are used only during A1 reception to add tone modulation to unmodulated CW.

When RECEPTION switch S804 (on the comparator sub unit) is in A1 position, negative d-c pulses from the common load R810 are supplied to the tone keyer unit through pin D of J601. At the same time, S804 (in A1 position) also closes the 235-volt B+ circuit applying B+ to the tone keyer oscillator V601, which is a two-stage cathode coupled type oscillator wherein the resonant plate tank circuit of one stage determines the frequency of oscillation. L601 with C619 and the R-C combination selected by S601C constitutes the resonant circuit.

Rotation of switch S601C selects the R-C part of the tank circuit. In this manner any one of eight frequencies can be selected by means of S601. The knob of the FREQ switch S601 is under the front panel door of the Comparator Keyer. The ninth position of this switch makes the oscillator inoperative by shorting the plate load. The eight preset frequencies provided are 595, 765, 935, 1105, 1275, 1445, 1615, and 1785 cycles per second. This ninth position allows for the use of an external oscillator to supply a modulating frequency other than those mentioned previously. The external oscillator would in this case be fed to J1410 at the rear of the cabinet and enter the tone keyer sub unit through J601, pins C and F. The external tone would then be applied to the circuit at the primary of transformer T601. Potentiometers for presetting the oscillator frequencies are accessible from the top of the tone keyer sub unit.

The output of oscillator V601, taken from plate pin 6, feeds through a network, made up of C621, C622, C623, R619, and R620, which serves to attenuate and equalize the amplitudes of the various frequencies to grid pin 7 of the cathode follower V602A.

The rectangular negative d-c pulses from pin D of J601 are applied to the grid, pin 2, of V602B. If these pulses are of sufficient amplitude, each pulse will cut off plate current, causing, in this case, plate pin 1 to rise to +105 volts for the duration of the pulse.

The cathode bias on V602B is controlled by the THRESHOLD potentiometer R1503. The setting of R1503 determines how large a pulse is required to cut off the tube. It would normally be adjusted so that the CW keying being received will trigger V602B, but weaker spurious pulses will fail to do so. The knob for R1503 is located behind the front panel door.

The output voltage of V602B from the plate pin 1 is coupled to the grids pins 2 and 7 of amplifier V603 through R623 and the secondary winding of transformer T601. Since the cathodes of V603 are supplied with +105 volts, V603 will conduct and amplify the signal on its grids for the duration of the pulse. When no pulse is being fed to the grid of V602B, V603 is biased at cut-off and cannot pass a signal. This biasing is due to the voltage drop across the plate load of V602B.

The signal that is being passed or blocked at this point is the tone originating from the tone keyer oscillator. Since the pulses on the grid of V602B are detected CW pulses from the common load in the comparator sub unit tone modulation has been added to the unmodulated CW.

A CAL KEY switch S1502 is also located behind the front panel door of the Comparator Keyer. It is included for amplitude and frequency adjustment of the tone oscillator. In CAL position +105 volts is supplied to the grids of V603 allowing the tube to pass the signal from the tone oscillator regardless of whether or not CW is being received. Tone pulses or continuous tone are fed from the plates of V603 through transformer T602 to the comparator sub unit by pin X of J601.

(3) MONITOR SUB UNIT. - The monitor sub unit is capable of monitoring the audio-frequency outputs and the intermediate-frequency outputs of the two receivers and the output

of the comparator sub unit. The setting of FUNCTION switch S701 determines which of the five outputs is to be monitored.

(a) MONITORING AUDIO FREQUENCY OUTPUTS. - Audio signals from connectors J4001 or J4002 and of Receiver 1 and Receiver 2 enter the Comparator Keyer through connectors J1408 and J1409 respectively on balanced lines. They are fed through J1401, J1507, J1504 and J701 to the primary of transformer T701 via switch S701B when the switch is in AF RCVR 1 or RCVR 2 position.

Audio signals from the comparator sub unit are fed from pin JJ of connector J801 and J1505 through pin F of J1504 and J701 to transformer T701 via switch S701B when the switch is in AF DIV position.

From the secondary of T701 audio feeds out of the monitor sub unit through S701A and C701 to the monitor LEVEL potentiometer R1502. R1502 enables the level of output to be controlled from the front panel. From R1502 the signal is returned to the grid, pin 2, of the amplifier tube V703. Then the signal is applied to the grid, pin 1, of the power amplifier tube V704 after passing through the R-C coupling composed of R713 and C711. Negative feedback from the plate, pin 5, of V704 to the cathode, pin 3, of V703 helps to maintain low distortion of the output. The output from the plate of V704 is fed to the primary winding of output transformer T702. The output of one secondary winding (winding 5 to 7) is fed to the loudspeaker through pins U and X of J701, pins 7 and 6 of J1507 and J1401, to pins A and B of J1411. The output of the other secondary (winding 3 to 4) is applied to the MONITOR PHONES jack, J1501 from pin M of J701.

(b) MONITORING INTERMEDIATE-FREQUENCY OUTPUTS. - Intermediate-frequency (i-f) signals are fed from either Receiver 1 or Receiver 2 according to the setting of S701. Receiver 1 i-f output passes through J1402 (or J1403) pin A2 of J1401 and J1507, then pin W of J1504 and J701 to FUNCTION switch S701. Receiver 2 i-f output passes through J1412 (or J1413) pin A1 of J1401 and J1507, then pin T of J1504 and J701 to S701.

The i-f signal which centers around 200 kc is fed from S701 through C702 to L701. This series C-L combination resonates at 200 kc and L701 is variable to allow precise adjustment to this frequency. From here the signal is applied to grid No. 3, pin 7, of the mixer tube V701. V702 the beat-frequency oscillator is crystal controlled by Y701 connected in a Pierce type crystal oscillator circuit in which C704 and C705 provide the feedback coupling for oscillation. Variable capacitor C707 serves to provide a means of slight frequency adjustment of the oscillator. The output of the oscillator, a 200-kc signal is taken from the plate, pin 5, and coupled through C703 to grid No. 1 of V701. The mixing of the signals from grid No. 1 and grid No. 3 in V701 produces an output, the difference frequency between the i-f signal and the 200-kc output from the BFO, which is taken from the plate and applied to a pi filter network. The network consisting of L702, C708, and C709 attenuate the higher frequencies. The difference-frequency output is now fed to S701A through C701 and then to the monitor LEVEL potentiometer, R1502. The signal is then returned through pin D of J701 to audio stages in the same manner as any other audio signal. See paragraph c(2)(a) above.

(4) POWER SUB UNIT. - All filament and d-c power for the sub units of the Comparator Keyer originate in the power sub unit. A-c power enters Comparator Keyer through J1406 passes through the power line filter Z1401, then pins 1 and 2 of J1401 and J1507 to the POWER (on-off) switch S1501. From S1501 power is sent to the power sub unit through pins N and S of J1506 and J401. The primaries of power transformers T401 and T402 are fused by two one-ampere fuses F401 and F402. Winding 5-6-7 of T401 feeds a full-wave rectifier V401, connected to supply a negative output voltage. Resistors R401 and R402, connected to the plates of V401, serve to equalize and limit the surge currents to the capacitor input filter. The input capacitor C401 is followed by additional R-C filtering to provide a well filtered B- voltage to the voltage regulator tube V404. V404 maintains a regulated

negative 105 volts for the THRESHOLD potentiometer R1503. The 105 volts is dropped to approximately -10 volts at the high side of R1503 by R409 and R410.

Winding 8-9-10 of T401 supplies ac to the plates of two rectifier tubes, V402 and V403, which are connected to supply a positive rectifier voltage. A choke input followed by a pi filter is used to attenuate the 120-cycle ripple. A paper capacitor C407 serves to supplement the final electrolytic capacitor of the filter by providing a low impedance path for higher frequencies which might appear from B+ to ground. This B+, approximately +235 volts dc, is used as the plate supply voltage for most circuits in the three sub units. Within the power supply it is the source voltage for the positive voltage regulator tube V405. Regulated +105 volts dc is supplied to the other sub units from the plate, pin 5, of V405

The secondaries of T402 supply 6.3 volts ac to the filaments of rectifier tubes in the power sub units and to the filaments of all tubes in the other three sub units. Filaments connected to winding 7-8 of T402 are raised to approximately +40 volts dc by means of the voltage divider, R411 and R412, which comes off the +235-volt d-c source. Potentiometer R403 connected across this winding (7-8 of T402) can be used to balance to a minimum the 60-cycle hum introduced into the low level stages from the filaments. The positive 40 volts dc and C406 also help reduce hum.

(5) COMPARATOR KEYER FILTER ASSEMBLY. - See figure 7-9. The Comparator-Keyer filter assembly is located at the back of the Comparator Keyer case. It includes receptacles for input and output connections to this unit and two filters (a power supply filter and an AF LINE filter) to reduce interference between this unit and others in the system. These receptacles and filters are described in the following sub-paragraphs.

(a) EXT TONE CIRCUIT. - This circuit carries the external tone input received from J1812 of the Patching Communication Switchboard through pins A and B of J1410 directly to pins 27 and 28 of J1401 respectively.

(b) RCVR 1 AUDIO CIRCUIT. - Receptacle J1408 of the Comparator Keyer receives the audio output of Receiver No. 1 on terminals A and B and carry it directly to terminals 19 and 18 of J1401.

(c) RCVR 1 DET. AGC CIRCUIT. - Terminal A of RCVR 1 DET AGC jack carries the received detector input from Receiver No. 1 directly to terminal 22 of J1401. Terminal B of J1404 receives the AGC voltage from the same receiver and carries it directly to terminal 23 of J1401.

(d) RCVR 1 IF CIRCUIT. - This circuit receives the Receiver No. 1 i-f output on either connector J1402 or J1403 and carries it directly to pin A2 of J1401.

(e) POWER CIRCUIT. - This circuit carries the 115-volt (nominal) a-c current, which powers the Comparator-Keyer, through PWR jack, J1406, and the power supply filter Z1401 to terminals 1, 2, 16 and 17 of J1401.

(f) AF LINE CIRCUIT. - The AF LINE output of the comparator sub unit is received on pins 5, 12, and 13 of J1401 and is carried through the AF LINE filter Z1402 to pins A, B, and C of J1407.

(g) RCVR 2 IF CIRCUIT. - Receiver No. 2 i-f circuit of the Comparator-Keyer filter assembly is identical to the Receiver No. 1 i-f circuit except the i-f input is received on J1412 or J1413 and is connected to pin A1 of J1401.

(h) RCVR 2 DET. AGC CIRCUIT. - Same as RCVR 1 DET AGC circuit except utilizes J1405 for input and pins 25 and 24 of J1401 for output to Comparator sub unit.

(i) RCVR 2 AUDIO CIRCUIT. - Same as RCVR 1 audio circuit, except J1409 is used for input and pins 20 and 21 of J1401 for output.

(j) SPEAKER CIRCUIT. - Output from monitor sub unit is received on pins 6 and 7 of J1401 and carried directly to pins A and B of J1411.

d. LOUDSPEAKER CIRCUIT. - The audio output from the monitor sub unit is fed from J1411 of the Comparator Keyer to pins C and D of connector J1701 on the loudspeaker panel. It is then applied through a 600-ohm variable attenuator, R1701, to the output transformer T1701 and coupled to the speaker LS1701. The attenuator circuit is so arranged that each end of the line is always matched to a 600-ohm load thus eliminating distortion through mismatched impedances and providing uniform attenuation.

SECTION 3

INSTALLATION

1. UNPACKING.

Radio Receiving Set AN/FRR-32 includes the equipment shown in figure 1-1 and listed in table 1-1. Shipping data is given in table 1-3.

CAUTION

THE EQUIPMENT IS SHIPPED WITH THE ELECTRON TUBES IN PLACE. AVOID EXTREME SHOCKS WHEN UNPACKING AND INSTALLING THE EQUIPMENT IN ORDER NOT TO DAMAGE ANY PART.

The following precautions should be observed:

Keep the crates containing the equipment in an upright position at all times.

Observe the weights marked on the crates and make certain that appropriate lifting and transporting gear is available to handle the units without subjecting them to shock or damage.

Remove at least three sides of the crates with a nail puller. Do not use a hammer or pinch bar for this purpose.

Inspect the equipment upon unpacking to be sure that no parts have been broken or damaged in transit.

Check the items removed against those listed in table 1-1.

2. INSTALLATION.

Radio Receiving Set AN/FRR-32 is intended for fixed station operation. It is to be floor mounted and powered from a 105-115 or 125-volt, 50-60 cycle a-c supply. The primary power distribution diagram is shown in figure 3-14.

a. LOCATION. - In choosing a locating site for the equipment, attention should be given to accessibility of the rack from the front and rear. See figure 3-15 for outline dimensions and floor plan. It is also important to consider the proximity of associated equipments, such as a frequency shift converter should such operation be desired. Direction of incoming antenna transmission lines and power supply facilities should not be overlooked.

After the locating site has been marked off, the cabinet should be set in place and secured by eight lag bolts (or other suitable means) through the eight mounting holes provided, two in each of the corner brackets at the bottom of the cabinet.

CAUTION

The equipment frame should be securely grounded to insure best performance and eliminate possibility of electric shock to personnel.

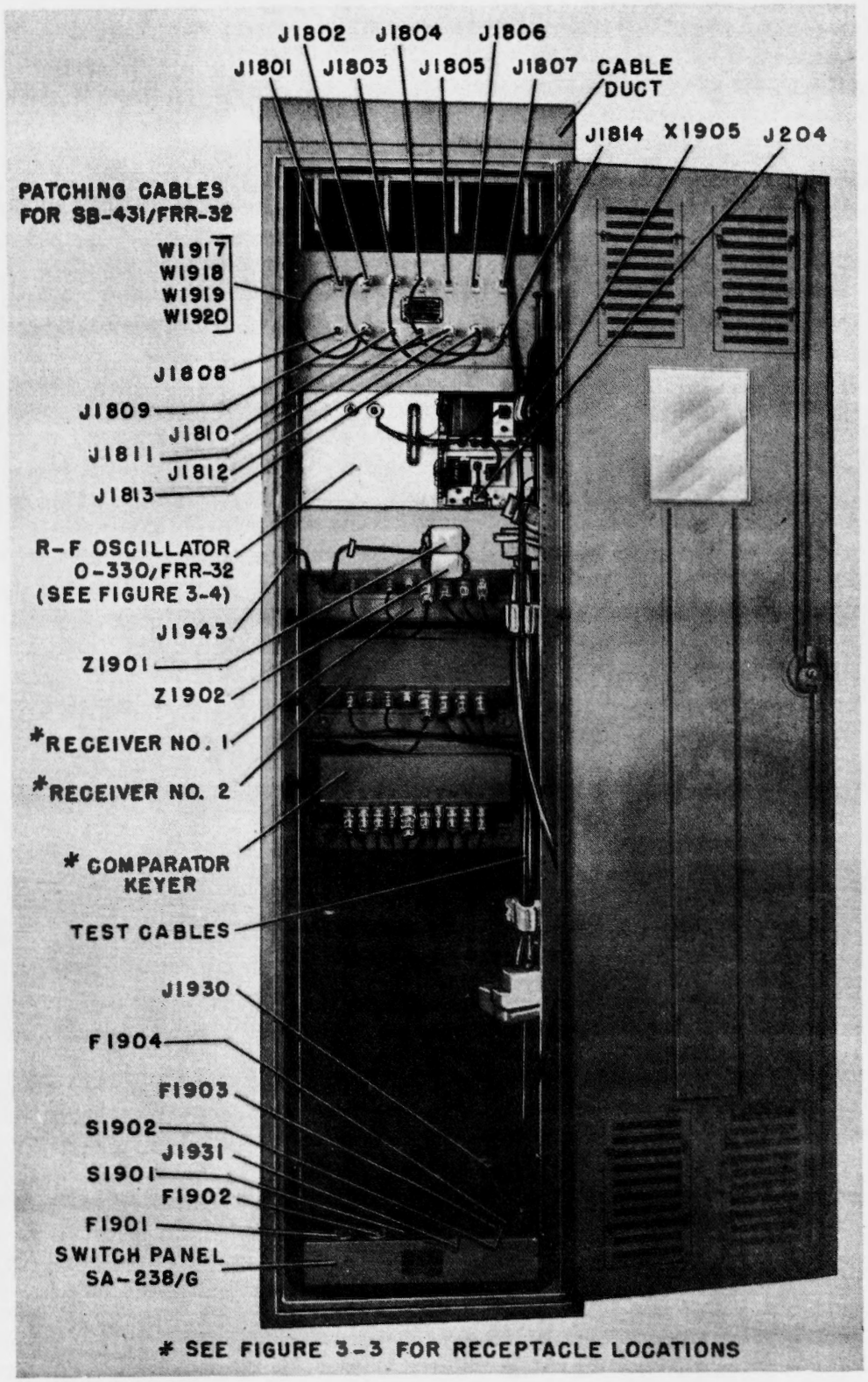


Figure 3-1. Rear View of Cabinet

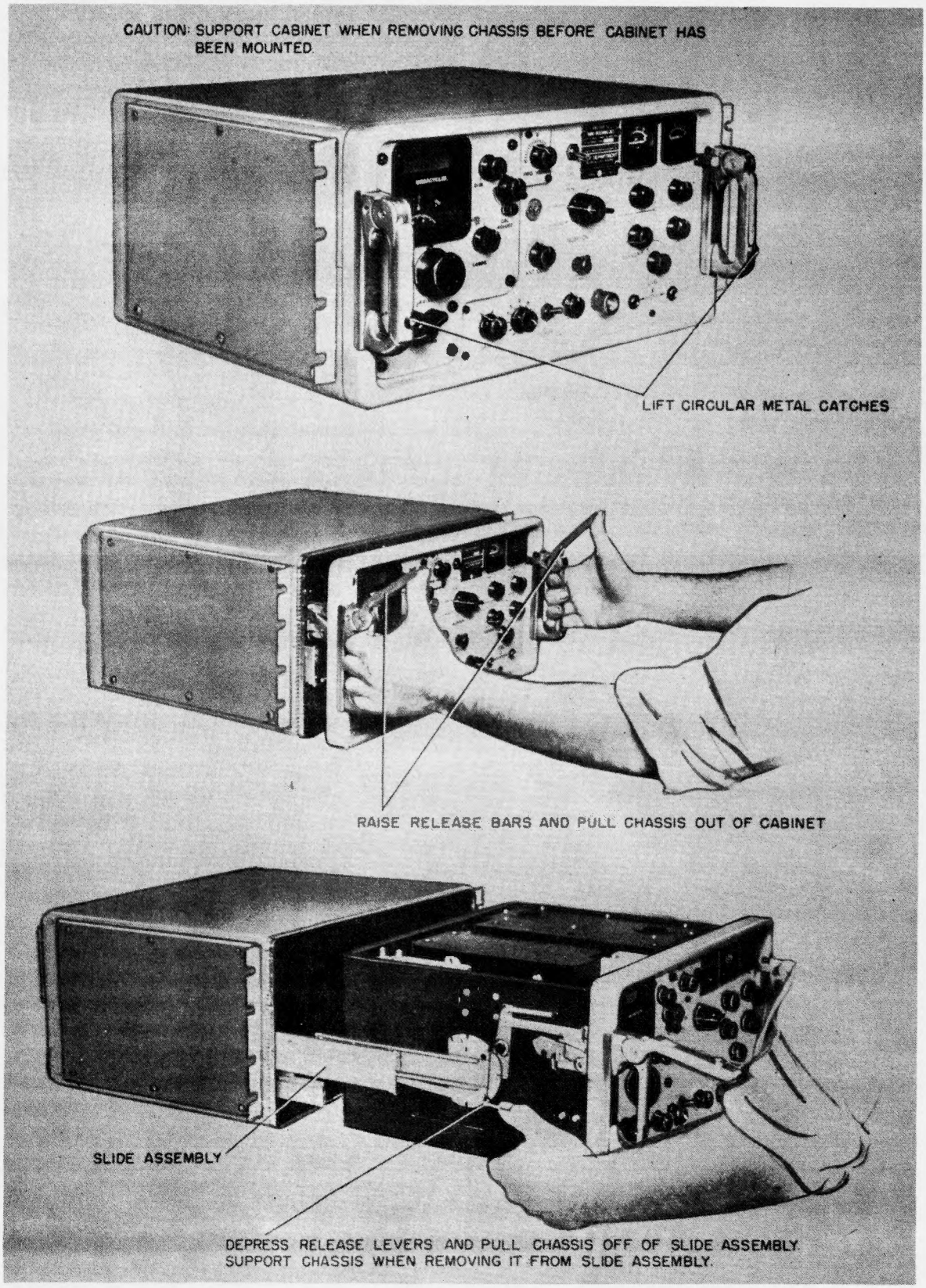


Figure 3-2. Removal of Chassis from Case

b. REMOVING UNITS FROM THE CABINET. - The individual units of this equipment are to be mounted in Cabinet CY-597A/G. In order to make repairs or adjustments, after installation, it may be necessary to remove one or all of the units from the cabinet. To do this it is necessary to disconnect all cables at the rear of each unit and then remove the mounting bolts, which are accessible after prying off the strip of molding from each side of the front of the cabinet, before sliding the unit from its place.

c. REMOVING CHASSIS FROM CASE. - The instructions given here are included in case it is necessary to remove a chassis from its case.

(1) RECEIVER OR COMPARATOR KEYER CHASSIS. - Refer to figure 3-2. Lift the circular metal catches located toward the bottom of the two handles at the sides of the front panel and raise the two release bars astride the handles as far as they will go, then slide the chassis out. Depress the two chassis release levers located on the sides of the chassis, and pull the chassis off the slide assembly.

(2) R-F OSCILLATOR CHASSIS. - The chassis of this unit is mounted on its front panel and the complete unit must be taken out of the cabinet in order to service it. It is necessary to disconnect the cables at the rear of the unit before removal from the cabinet.

The power supply of this unit is mounted on a sub-chassis which is located in the upper left-hand corner of the chassis behind the door on the front panel. It is held in place by four snap fasteners, two of which are located on the front panel and two located under the rear of the power supply chassis. These fasteners are loosened by simply half-turning the associated screws on the front panel (located beneath the door) and the two thumbscrews at the rear. The complete unit must be taken out of the cabinet in order to remove this sub-chassis.

d. REPLACING THE CHASSIS.

(1) RECEIVER OR COMPARATOR KEYER CHASSIS. - To replace either of these chassis into its case it is necessary to extend the two tracks mounted on the inside wall of the case to their full length, then lift the chassis into position so that the rails at the sides of the chassis engage the tracks in the case. Push the chassis on the slide assembly, until the locking mechanism clicks into place. Then depress the two release levers at the sides of the chassis and continue pushing the chassis into the case as far as it will go. Push the release bars, on the handles, back into position. They will supply the leverage needed to secure the chassis in the case. Make sure that the two round metal catches on the release bars are down so the bars stay in place.

(2) R-F OSCILLATOR CHASSIS.

(a) MAIN CHASSIS. - To replace this unit into the cabinet, first remove the two side moldings from the front of Cabinet CY-597A/G. Then set the chassis on its shelf and slide it into position. Secure with the eight mounting bolts and replace the moldings.

(b) POWER SUPPLY SUB-CHASSIS. - The R-F Oscillator chassis must be out of the cabinet in order to replace this sub-chassis. The sub-chassis should be lifted into position, from the rear of the main chassis, and then pushed into place. Then secure the sub-chassis by tightening the two captive thumbscrews at the rear and the two screws located beneath the door on the front panel.

e. CABLING.

(1) GENERAL. - A duct at the top of the cabinet provides access for the entrance of the antenna and/or power cables and cables from other associated equipments, such as a frequency shift converter, which might enter from overhead wiring. The opening at the bottom of

the cabinet provides access for cables which might enter from sub-floor wiring. Either method of entering cables to the equipment may be used at the discretion of the installing activity upon the approval of the Bureau of Ships.

Cables which must be fabricated, such as the antenna cables, should be run as direct as possible from their external connections to the unit intended avoiding sharp bends in the leads. Six inches of slack should be allowed at the equipment end of the cable so that the cable connectors can be attached to the receptacles without pulling or binding at the connection.

When cables enter by the overhead duct, they may be dropped through one or both holes at the top of the cabinet (one hole located at each end of the duct) and run down the side of the cabinet to their connections. After the cables are located satisfactorily, they should be secured by clamps. The clamps may be attached to the cross supports of the cabinet by number ten self-threading screws.

(2) CONNECTING THE POWER LINE. - The power cable from the 115-volt 50-60 cycle a-c source should run to the bottom of the cabinet and enter the Switch Panel SA-238/G through the elbow located on the left of the inner side. Allow at least eight inches of slack to permit the cover of the switch panel to be raised after connection.

Access to the inside of this unit is possible after removing the six screws which hold the top cover and lifting the top cover up and out. After the cable and elbow have been secured, connect one of the two conductors to the vacant contact screw on fuse F1901 and the other conductor to the vacant contact screw on fuse F1902. Paragraph 2f(5) describes the procedure for terminating these two conductors.

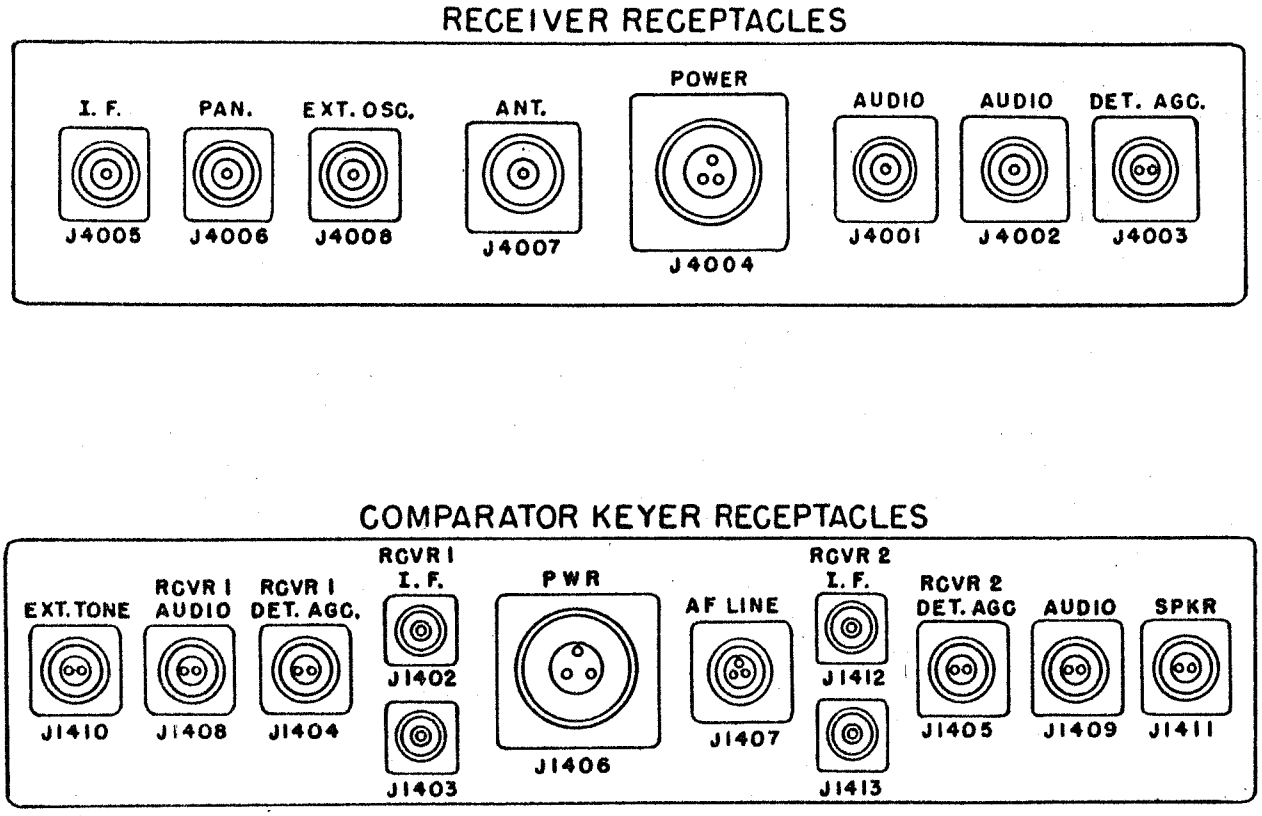


Figure 3-3. Receptacle Locations, Receiver and Comparator Keyer

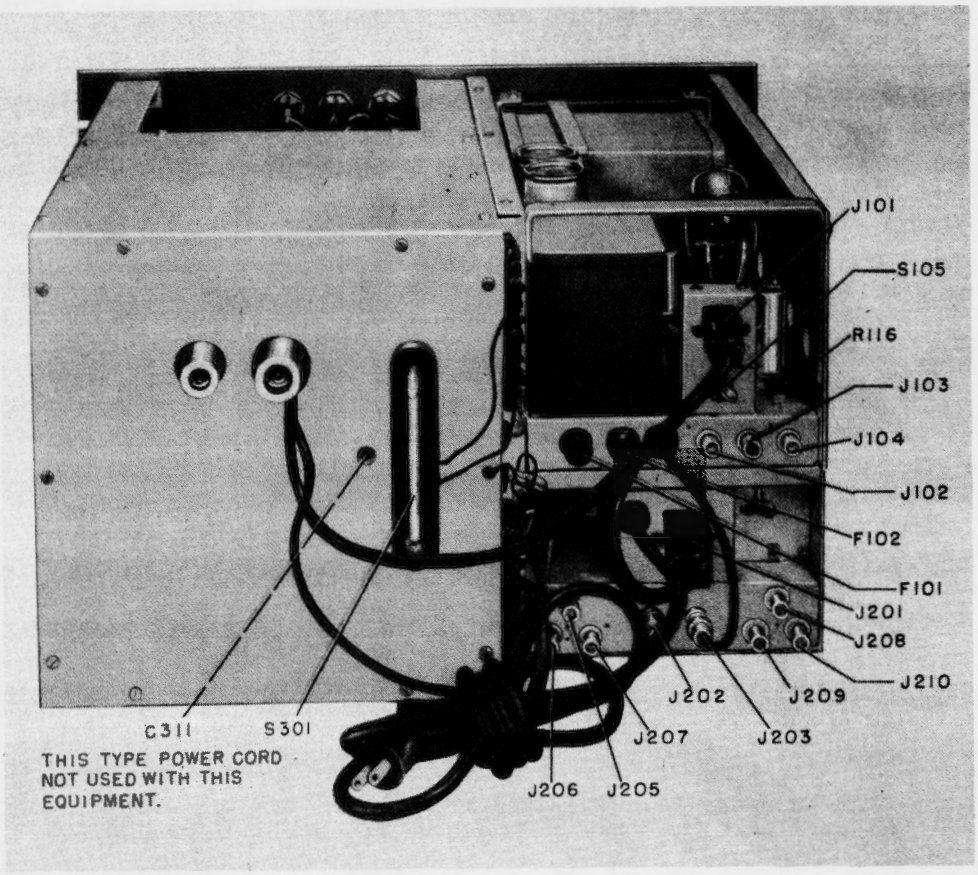


Figure 3-4. Receptacle Locations, R-F Oscillator

(3) PATCHING PANEL (SB-431/FRR-32) CONNECTIONS. - The cable connections given in the following paragraphs are described for single line outputs since Patching Communication Switchboard SB-431/FRR-32 is supplied with only four of its connectors wired in, namely:

AF LINE (J1811) from Comparator Keyer connector J1407
RCVR 1 AUDIO (J1813) from Receiver No. 1 connector J4002
RCVR 2 AUDIO (J1814) from Receiver No. 2 connector J4002
EXT TONE (J1812) to Comparator Keyer connector J1410

Four patching cables (W1917 through W1920) which are identical are also provided to permit interconnection at the Patching Communication Switchboard for multiple outputs or multiple external tone inputs. These patching cables are to be attached to any one of the spare connectors (J1801 through J1810) on the patching panel. The spare connectors must be wired in, in accordance with the requirements of the installation, before use.

f. CABLE FABRICATION. - Receptacles are provided at the rear of each unit. Those on each receiver are labeled IF, PAN, EXT. OSC., ANT, POWER, AUDIO, and DET. AGC. The receptacles on the back of the Comparator Keyer are labeled EXT TONE, RCVR 1 AUDIO, RCVR 1 DET. AGC, RCVR 1 IF, PWR AF LINE, RCVR 2 IF, RCVR 2 DET. AGC, RCVR 2 AUDIO, and SPKR. Figure 3-3 shows the locations of these receptacles. Figure 3-4 shows the locations of the receptacles at the rear of the R-F Oscillator.

The receptacles mounted on Patching Communication Switchboard SB-431/FRR-32 are all one type, AN3102A-10SL-3P. Only the four receptacles on the lower right of this unit are labeled and wired. They are labeled EXT TONE, AF LINE, RCVR 1 AUDIO and RCVR 2 AUDIO; refer to figure 3-1 for their locations and figure 3-3 for a complete interconnecting cable diagram of the equipment.

All interconnecting cables between the units of Radio Receiving Set AN/FRR-32 are supplied and already connected. The only cables necessary to be fabricated are the antenna cables, power cable, and connecting cables to associated equipments, if any are used. Mating connectors to receptacles for associated equipments are supplied attached to the respective receptacle. On those cables which connect the external equipment, the plug which mates with the receptacle of the external equipment will have to be attached to the other end of the cable. Instructions for fabricating the external cables are as follows:

(1) ANT (UG-21B/U PLUG). - Obtain a cable of required length with an outside diameter of approximately 3/8 inch and a characteristic impedance of 70 ohms, such as RG-12/U or equivalent, and attach the cable to the plug according to the instructions in figure 3-5. If armored cable is used, make certain that the rear connector nut grips the armor securely. Two antenna cables are needed in normal use of this equipment.

(2) I-F (UG-88/U PLUG). - A cable with a type UG-88/U plug on one end is needed when feeding a frequency shift converter of the i-f (200 kc) type. Select a cable of required length with an outside diameter of approximately 1/4 inch and a characteristic impedance of 50 ohms, such as RG-58/U or equivalent. Attach a cable to the plug according to the instructions given in figure 3-6.

(3) PAN (UG-88/U PLUG). - When a panoramic adapter is to be used, a cable with a type UG-88/U plug on one end is necessary. It should be fabricated using the same procedure outlined for fabrication of the I-F cable in the preceding sub-paragraph.

(4) SB-431/FRR-32 PLUGS (AN3106A-10SL-3S PLUG AND AN3057-4A CLAMP).

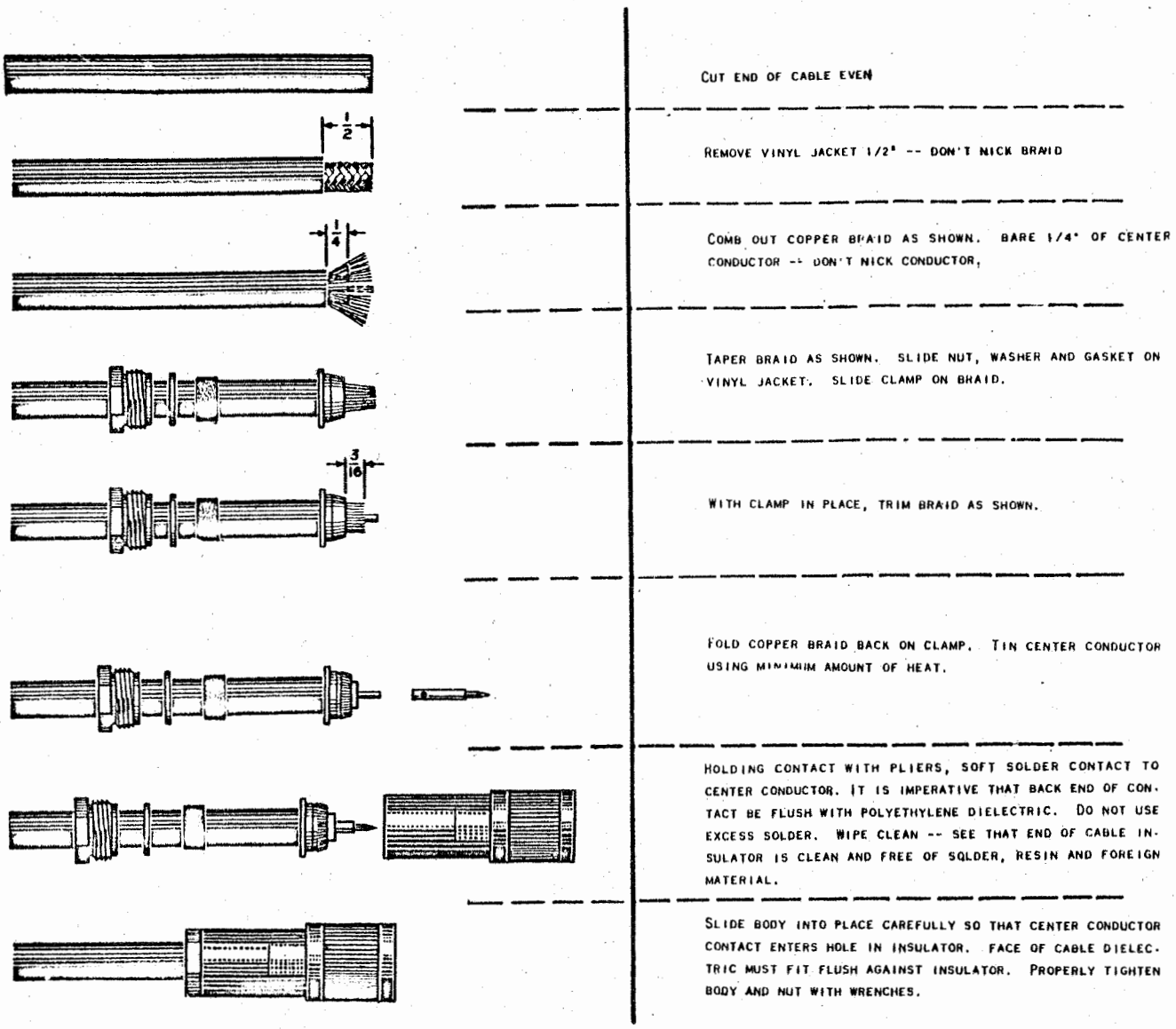
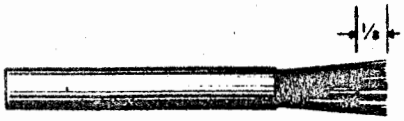


Figure 3-5. Cable Fabrication, UG-21B/U Plug

(a) RCVR 1 AUDIO, RCVR 2 AUDIO. - If an audio type frequency shift converter or other similar type external equipment is to be operated from the output of the Patching Communication Switchboard SB-431/FRR-32, one or more cables with a type AN3106A-10SL-3S plug on one end will be needed. The other end of these cables must be terminated with plugs which will mate with the input receptacles of the equipment being used. These cables should be of required length with an outside diameter of approximately 1/4 inch and a characteristic impedance of 76 ohms, such as type RG-108A/U or equivalent. Attach type AN3106A-10SL-3S plugs according to the instructions given in figure 3-7. If armored cable is used, make certain that the cable clamp grips the armor securely. See table 3-1 for contacts used.

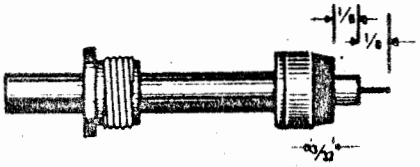
(b) AF LINE. - If the particular installation plan in use calls for a balanced line output from diversity reception, an AF Line cable is needed. Fabricate this cable in the same manner as described in a RCVR 1 AUDIO cable in the preceding sub-paragraph.

Trim jacket ¼" for RG-58/U, 5/16" for RG-59/U or 7/16" for RG-71/U.

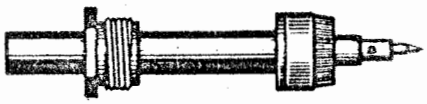


Fray shield and strip inner dielectric ⅛". Tin center conductor.

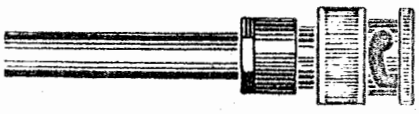
Taper braid and slide nut, washer, gasket and clamp over braid. Clamp is inserted so that its inner shoulder fits squarely against end of cable jacket.



With clamp in place, comb out braid, fold back smooth as shown and trim 3/32" from end.



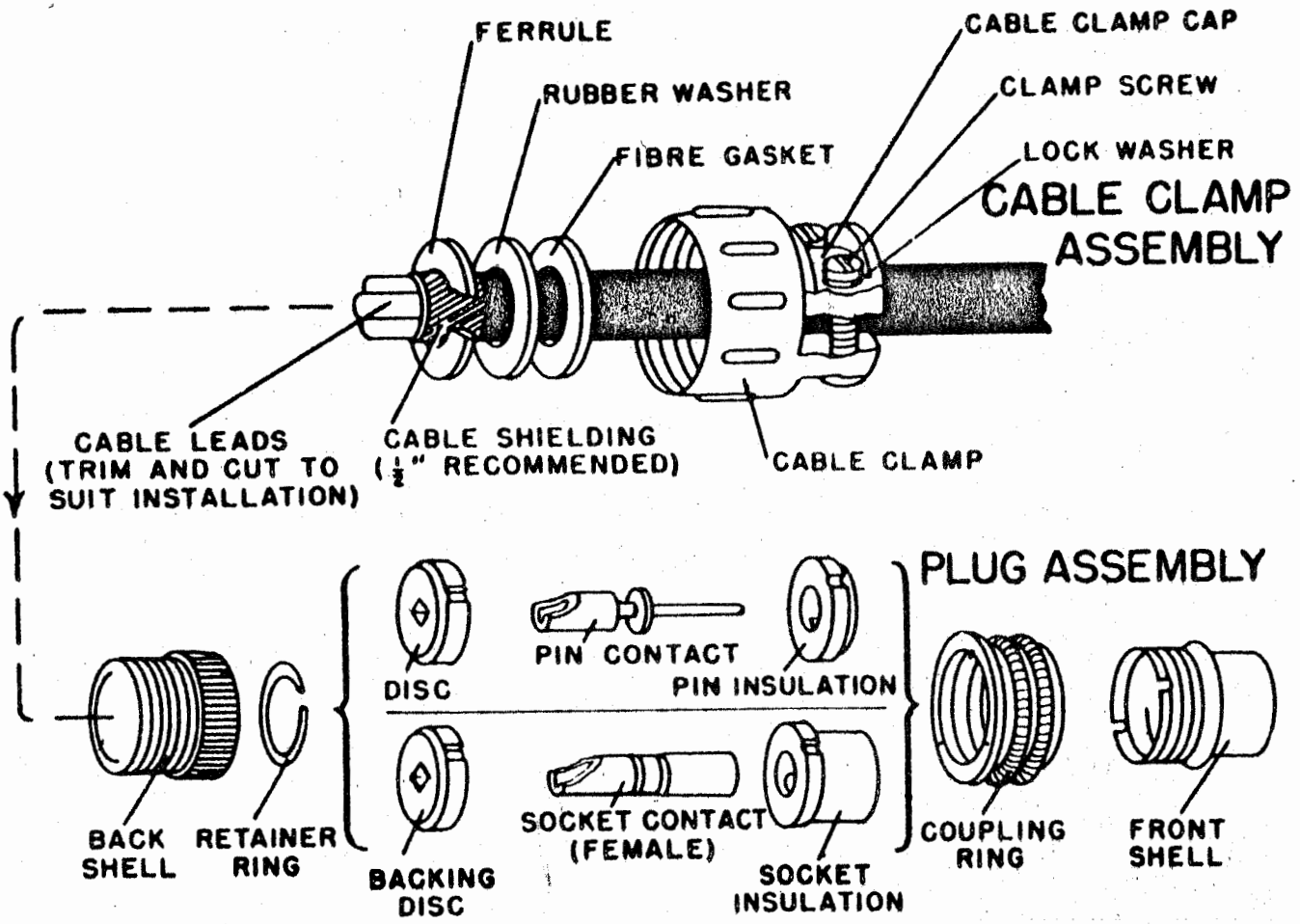
Slip contact in place, butt against dielectric and solder. Remove excess solder from outside of contact. Be sure cable dielectric is not heated excessively and swollen so as to prevent dielectric from entering into connector body.



Push assembly into body as far as it will go. Slide nut into body and screw in place with wrench until tight. For this operation, hold cable and shell rigid and rotate nut.

Figure 3-6. Cable Fabrication, UG-88/U Plug

(c) EXT TONE. - If a modulating frequency other than one of the eight provided by the Comparator Keyer is required by the particular installation, an EXT TONE cable is needed. Fabricate this cable in the same manner as described for a RCVR 1 AUDIO cable in sub-paragraph 4(a) above.



1. Unscrew cable clamp from plug, being careful not to lose ferrule, rubber washer, and fibre gasket.
2. Remove cable clamp cap by unfastening the two clamp screws.
3. Slip cable through cable clamp, fibre gasket, and rubber washer, the threaded portion of clamp being towards the end of cable.
4. Disassemble plug for soldering wires by unscrewing its back shell. Slip the cable through back shell and the plug coupling ring, which is freed when the back shell is removed.
5. Cut and strip cable and wires to suit. Pre-tin each wire. Cut back the shielding to within one-half inch of the outer covering.
6. Pre-tin braided shielding of cable.
7. Solder wires to plug contacts. Avoid excessive solder.
8. Reassemble plug. The cable shielding should show about one-quarter inch beyond the assembled plug.
9. Slip ferrule over cable so that shielding is on side that will be within connector housing. Solder shielding to ferrule, not permitting any solder to get near outer edge of ferrule as this causes a barrier between ferrule and rim of connector shell.
10. Push the cable in so that the ferrule is up against the connector shell rim, position the clamp rubber washer and fibre gasket, and then screw the cable clamp body onto the back shell of plug.
11. Reassemble the cable clamp cap with the two associated clamp screws and lock washers.

Figure 3-7. Cable Fabrication, AN-3106A Plugs

TABLE 3-1. CABLE CONNECTORS AND FUNCTIONS

SOURCE			CONNECTOR TYPE	CONTACTS USED	FUNCTION	DESTINATION		
	CONNECTOR						CONNECTOR	
UNIT	NAME	SYMBOL				UNIT	NAME	SYMBOL
RECEIVER No. 1 R-618/FRR-32		J4001	AN3106A-10SL-4S	A, B	Audio	Comparator Keyer	RCVR 1 AUDIO	J1408
	AUDIO	J4002	AN3106A-10SL-4S	A, B	Audio and F1 output	Patching Communication Switchboard	RCVR 1 AUDIO	J1813
	DET. AGC	J4003	AN3106A-10SL-4S	DET.-A and ground AGC-B and ground	Output for external DET. and AGC	Comparator Keyer	RCVR 1 DET AGC	J1404
	POWER	J4004	AN3106-16S-5S	B, C A-ground	Power input	Cabinet		
	IF	J4005	UG-88/U	Center and shell	I-F output	Comparator Keyer	RCVR 1 IF	J1402, J1403
	PAN	J4006	UG-88/U	Center and shell	Output to Panoramic Adapter	Not used in AN/FRR-32		
	EXT. OSC.	J4008	UG-88/U	Center and shell	EXT. OSC. Input	R-F Oscillator	HFO OUT	J209
	ANT	J4007	UG-21B/U	Center and shell	Antenna Input	Antenna		
RECEIVER No. 2 R-618/FRR-32		J4001	AN3106A-10SL-4S	A, B	Audio	Comparator Keyer	RCVR 2 AUDIO	J1409
	AUDIO	J4002	AN3106A-10SL-4S	A, B	Audio and F1 output	Patching Communication Switchboard	RCVR 2 AUDIO	J18
	DET. AGC	J4003	AN3106A-10SL-4S	DET.-A and ground AGC-B and ground	Output for External DET. and AGC	Comparator Keyer	RCVR 2 DET AGC	J1405
	POWER	J4004	AN3106-16S-5S	B, C A ground	Power input	Cabinet		
	IF	J4005	UG-88/U	Center and shell	I-F output	Comparator Keyer	RCVR 2 IF	J1412, J1413
	PAN	J4006	UG-88/U	Center and shell	Output to Panoramic Adapter	Not used in AN/FRR-32		
	EXT. OSC.	J4008	UG-88/U	Center and shell	EXT. OSC. input	R-F Oscillator	BFO OUT	J210
	ANT	J4007	UG-21B/U	Center and shell	Antenna input	Antenna		
COMPARATOR KEYER CM-70/FRR-32	EXT TONE	J1410	AN3102A-10SL-4S	A, B	External tone input	Patching Communication Switchboard	EXT TONE	J1812
	RCVR 1 AUDIO	J1408	AN3102A-10SL-4S	A, B	Receiver No. 1 audio input	Receiver No. 1	AUDIO	J4001
	RCVR 1 DET AGC	J1404	AN3102A-10SL-4S	DET.-A and ground DET.-B and ground	Receiver No. 1 DET. and AGC input	Receiver No. 1	DET AGC	J4003

TABLE 3-1. CABLE CONNECTIONS AND FUNCTIONS (Continued)

SOURCE			CONNECTOR TYPE	CONTACTS USED	FUNCTION	DESTINATION		
	CONNECTOR						CONNECTOR	
UNIT	NAME	SYMBOL				UNIT	NAME	SYMBOL
COMPARATOR KEYER CM-70/FRR-32	RCVR 1 IF	J1402, J1403	UG-88/U	Center and shell	Receiver No. 1 i-f input	Receiver No. 1	IF	J4005
	PWR	J1406	AN3102A-16SL-5S	B, C A-ground	Power input	Cabinet		
	AF LINE	J1407	AN3102A-10SL-3S	A, B	Diversity output (A1 and A3)	Patching Communication Switchboard	AF LINE	J18
	RCVR 2 IF	J1412, J1413	UG-88/U	Center and shell	Receiver No. 2 i-f input	Receiver No. 2	IF	J4005
	RCVR 2 DET AGC	J1405	AN3102A-10SL-4S	DET.-A and ground AGC-B and ground	Receiver No. 2 DET. and AGC input	Receiver No. 2	DET AGC	J4003
	RCVR 2 AUDIO	J1409	AN3102A-10SL-4S	A, B	Receiver No. 2 audio input	Receiver No. 2	AUDIO	J4001
	SPKR	J1411	AN3102A-10SL-4S	A, B	Comparator Keyer output	Loudspeaker		J1701
R-F OSCILLATOR O-330/FRR-32	HFO	J209	UG-604/U	Center and Shell	High frequency output	Receiver No. 1	EXT OSC	J4008
	OUT	J210	UG-604/U	Center and shell	High frequency output	Receiver No. 2	EXT OSC	J4008
PATCHING COMMUNICATION SWITCHBOARD SB-431/FRR-32		J1813	AN3102A-10SL-3S	A, B	Audio and F1 output	Receiver No. 1	AUDIO	J4002
		J1814	AN3102A-10SL-3S	A, B	Audio and F1 output	Receiver No. 2	AUDIO	J4002
		J1811	AN3102A-10SL-3S	A, B, C	Diversity output (A1 and A3)	Comparator Keyer	AF LINE	J1407
		J1812	AN3102A-10SL-3S	A, B	External tone input	Comparator Keyer	EXT TONE	J1410
DYNAMIC LOUDSPEAKER LS-169/G		J1701	AN3102A-14S-2S	A, B C, D not used	Comparator Keyer input	Comparator Keyer	SPKR	J1411

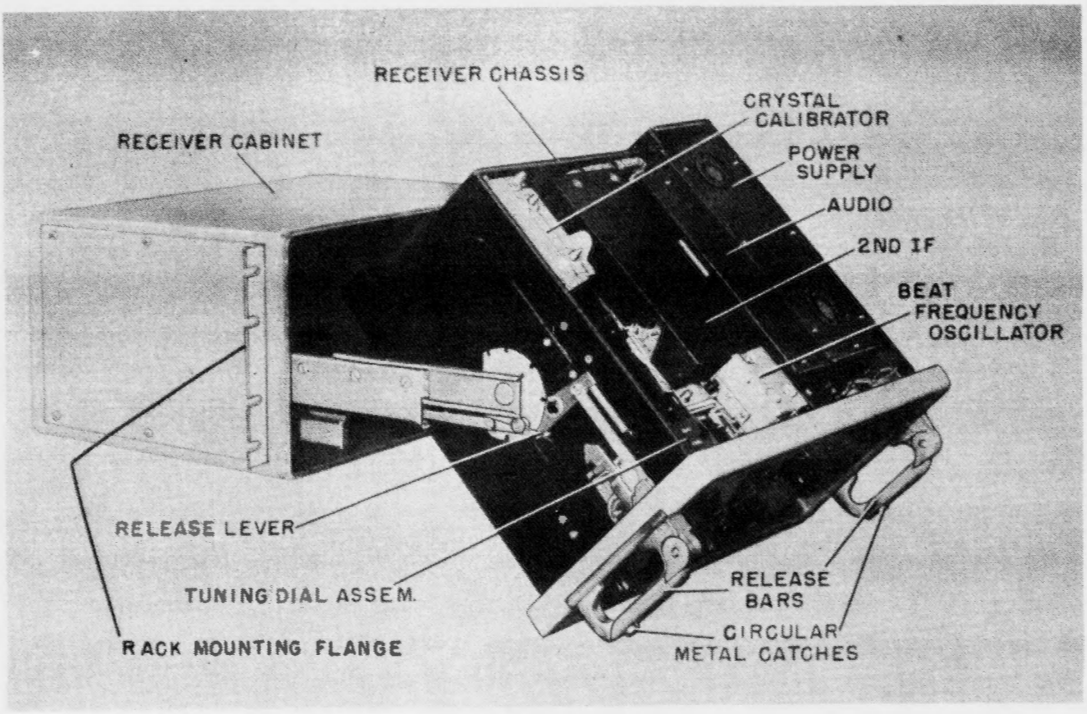


Figure 3-8. Chassis in Service Position, Top View

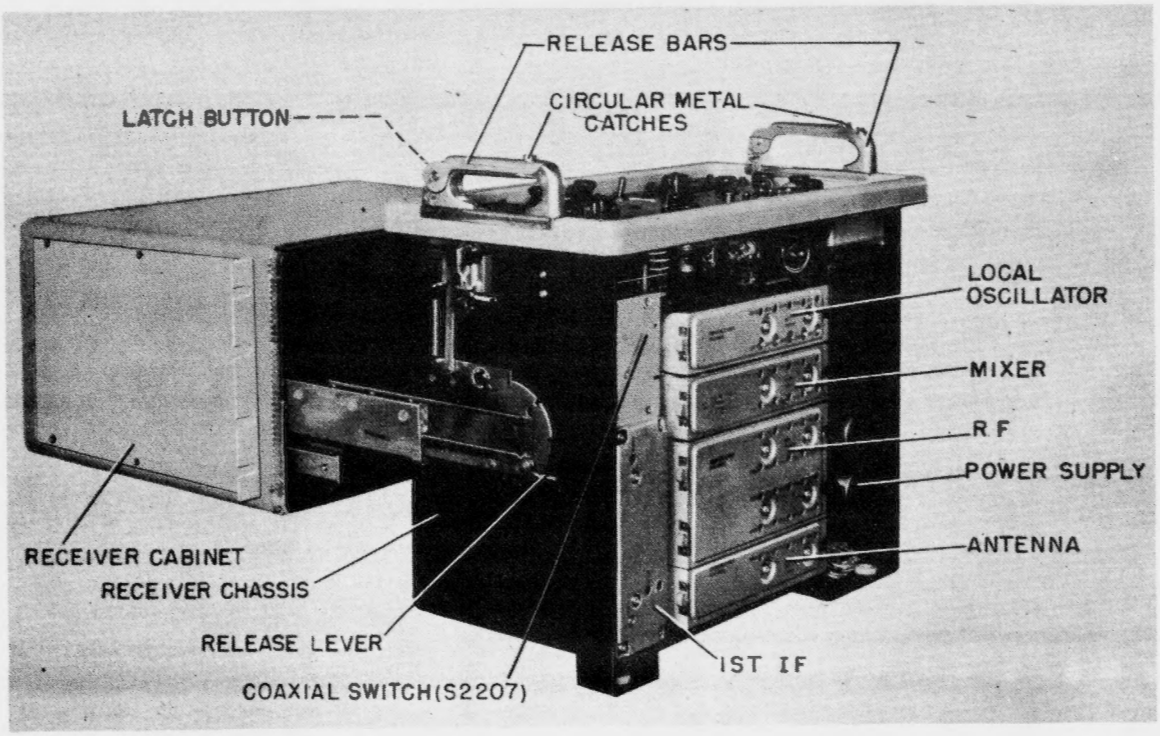


Figure 3-9. Chassis in Service Position, Bottom View

(5) TERMINATING THE INPUT POWER LINE. - The conductors of the power line should be terminated with eyelet or spade terminal lugs which have openings large enough to accommodate a number eight screw. Attach the terminal lugs as follows:

(a) Cut the cable jacket back approximately three inches. Be careful not to damage the insulation on the conductors.

(b) Remove enough insulation from the end of each conductor to suit the terminal lug used and pre-tin each wire.

(c) Position the wire on the lug in such a manner that the terminal lug clamp will go around the conductor insulation when closed and solder the wire to the terminal lug.

(d) Crimp the clamping ears.

g. EXTERNAL CONNECTIONS. - The intended application of the equipment will determine what cables are to be used and how they are to be connected. Connections should be made as described below.

(1) NORMAL INSTALLATION. - Since the design of this equipment is for diversity operation, normal use will require fabrication of two antenna cables, output cables as required, and connection of the power line. Fabrication of the antenna cables is described in paragraph 2f(1), termination of power line in paragraph 2f(5), and fabrication of the output cables in paragraph 2f(4).

Connect one antenna cable to the ANT receptacle of Receiver No. 1, the other to the ANT receptacle of Receiver No. 2, and the output cables to their associated connectors on the Patching Panel (SB-431/FRR).

Connect the power line as described in paragraph 2e(2).

(2) FREQUENCY SHIFT (F1) CONNECTIONS.

(a) AUDIO TYPE FREQUENCY SHIFT CONVERTERS. - Connect Radio Receiving Set AN/FRR-32 as described in paragraph 2g(1). Attach output cables - see paragraph 2f(4)(a) for method of fabrication - to the RCVR 1 and RCVR 2 AUDIO connectors, J1813 and J1814, on the Patching Communication Switchboard SB-431/FRR-32. Connect the other ends of the output cables to the audio input connections of the frequency shift converter.

(b) I-F TYPE FREQUENCY SHIFT CONVERTERS. - Connect Radio Receiving Set AN/FRR-32 as described in paragraph 2g(1). Attach i-f output cables - see paragraph 2f(2) for method of fabrication - to J1403 and J1413, located on the rear of the Comparator Keyer case. Terminate the other ends of the cables with connectors suitable for attachment to the input receptacles of the i-f frequency converter being used.

3. INITIAL ADJUSTMENTS.

a. RECEIVER NO. 1 (LOCAL). - Through the following procedures the receiver closest to the top of the equipment will be referred to as Receiver No. 1 or local receiver. Receiver No. 2 (the lower receiver) in this case will be considered the companion receiver. In actual operation, however, either receiver may be designated the local receiver and the other the companion receiver.

(1) SERVICING POSITION. - Extend the chassis of the receiver to the servicing position, as shown in figure 3-8 or 3-9, by lifting the circular metal catches located toward

the bottom of the two handles at the sides of the front panel, and raising the two release bars astride the handles as far as they will go. The chassis, thus released and pulled out of the cabinet, may be positioned 45 or 90 degrees up or down by depressing the two latch buttons next to the handles, so placing the chassis to the desired servicing position. Make certain that the positioning mechanism locks in place (horizontal, 45- or 90-degree positions) before letting go of the handles; then proceed with instructions in the sub-paragraph (2) and the remainder of the installation procedure.

(2) PRIMARY TAP SETTINGS. - Set the link O1601 on board E1601 in the power supply assembly to most nearly correspond to the anticipated line voltage. Link board E1601 is accessible from the top of the chassis after the cover plate on the power supply is removed. See figure 3-10. Taps on E1601 are labeled 105, 115, and 125. If the receiver is to be operated from a 400-cycle supply, unsolder and remove the lead connected to pin 1 of T1601 and connect it to pin 6.

NOTE

The receivers are the only units of this equipment which will operate from a 400-cycle supply.

(3) OUTPUT TRANSFORMER TAP SETTINGS. - Refer to the particular installation plan in use, and check whether it calls for a grounded or ungrounded secondary tap (pin 6) of the output transformer T1101. Then check T1101 of the receiver to see if it conforms with the installation plan. If it does not conform with the installation plan, remove or insert the grounding wire as necessary to meet the requirements of the installation plan (the ground wire of T1101, pin 6, should be connected between pins 6 and 4 of T1101). See figure 3-10 for location of T1101.

(4) MATCHING ANTENNA IMPEDANCE. - The receivers are shipped with the antenna assembly link, O3101, set to operate with a high-impedance antenna. To match the receiver input to a low-impedance antenna, place the receiver in the servicing positions with the bottom of the chassis accessible and set link O3101 to the LO position. Location of the link boards are shown in figure 3-11.

(5) COMMON ANTENNA CONNECTION. - This paragraph does not apply for diversity operation. The receivers of this equipment may be operated individually from a common antenna. Link O4002, mounted in the filter board on the rear wall of the receiver cabinet or case, must be set across terminals 1 and 3 as shown on sheet 2 of figure 7-30 for parallel antenna connection. Link O4002 is located directly behind the small black cover on the filter board which is accessible after the receiver chassis has been removed from its case.

(6) SECOND I-F LINK SETTINGS. - Three links on terminal board E1001 in the second i-f assembly of both receivers must be set as follows for the different type operations.

(a) NORMAL DIVERSITY RECEPTION. - Link O1002 must be set between terminals 7 and 8, link O1001 between terminals 4 and 5, and link O1003 between terminals 1 and 2 (see A of figure 3-12) in both receivers.

(b) DIVERSITY RECEPTION WITHOUT THE COMPARATOR KEYER. - NOTE: This is not a normal type of operation of Radio Receiving Set AN/FRR-32. The facility has been included to provide interchangeability of subassemblies with other similar receivers.

1. LOCAL RECEIVER. - Link O1002 must be set between terminals 7 and 8, link O1001 between terminals 4 and 6, and link O1003 between terminals 1 and 3 (see B of figure 3-12).

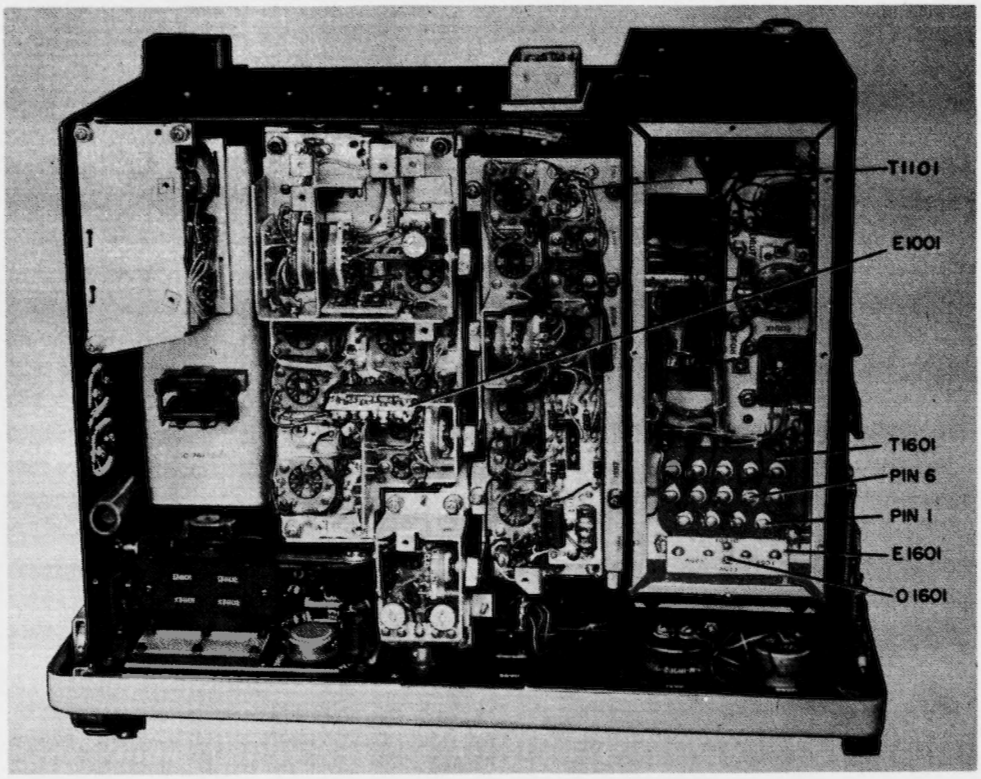


Figure 3-10. Receiver Initial Adjustment Component Locations, Top View

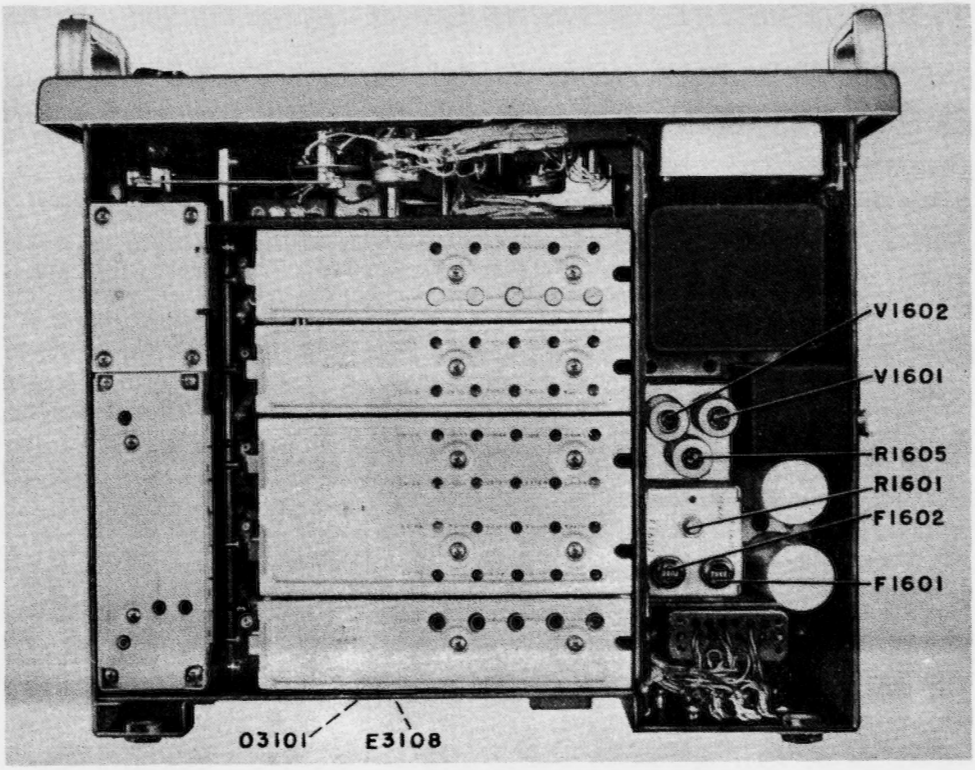
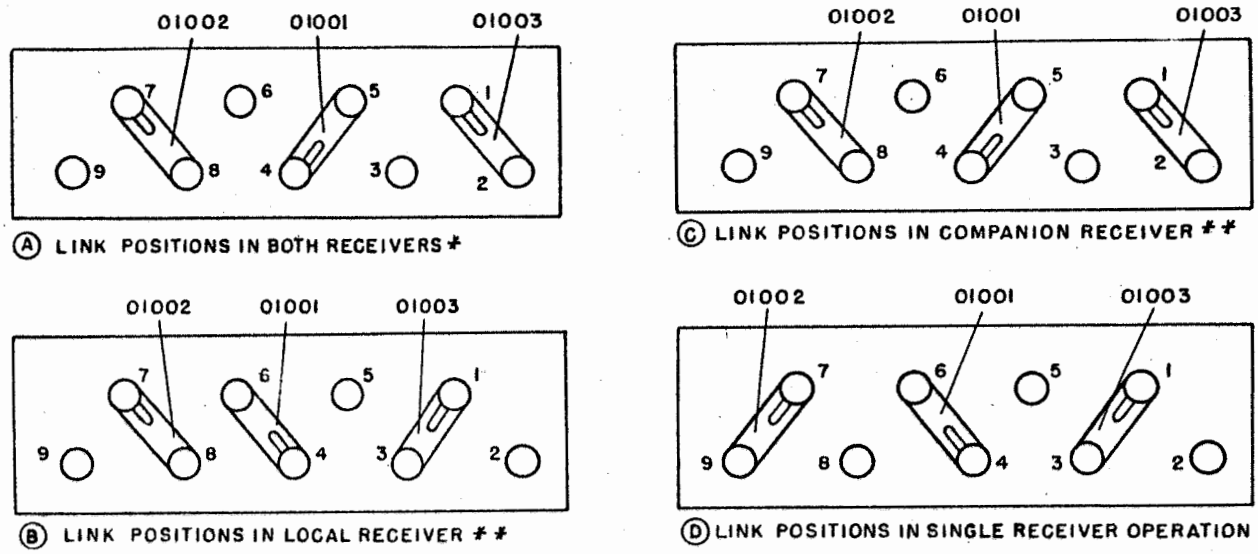


Figure 3-11. Receiver Initial Adjustment Component Locations, Bottom View



THE LINK BOARD IN THE R-618/FRR-32 IS LOCATED IN THE SECOND I-F ASSEMBLY. IT APPEARS AS SHOWN WHEN THE CHASSIS IS IN THE SERVICING POSITION SO THAT THE FRONT PANEL POINTS TOWARD THE DECK. THE COVER PLATE OVER THE ASSEMBLY MUST BE REMOVED.

* OPERATING WITH COMPARATOR KEYER.

** NOTE: POSITIONS B, C, AND D ARE NOT USED IN AN/FRR-32. THEY ARE SHOWN HERE FOR INFORMATION ONLY SINCE THIS SUBASSEMBLY IS COMPLETELY INTERCHANGEABLE WITH IDENTICAL SUBASSEMBLIES OF OTHER SIMILAR RECEIVERS.

Figure 3-12. Link Board E1001 Settings

2. COMPANION RECEIVER. - Link O1002 must be set between terminals 7 and 8, link O1001 between terminals 4 and 5, and link O1003 between terminals 1 and 2 (see C of figure 3-12).

b. RECEIVER NO. 2. - Initial adjustments of Receiver No. 2 are exactly the same as on Receiver No. 1.

c. COMPARATOR KEYER. - There is only one adjustment to be made on the Comparator Keyer before energizing the equipment. The taps on T401 and T402 in the power sub unit must be set to most nearly correspond to the anticipated line voltage. See figure 7-8 for location of these adjustment components.

d. R-F OSCILLATOR. - In order to insure high accuracy of the equipment during operation, it is recommended that the 100-kc crystal of the Radio Frequency Oscillator O-330/FRR-32 be checked and aligned, if necessary, at installation. Refer to sub-paragraph (1). Once satisfactory performance of the 100-kc crystal has been established the oscillator may be calibrated to the desired frequency of operation. See sub-paragraph (2). A complete description of the correct procedures for the use of this oscillator is given in paragraph 4c of Section 4.

NOTE

The Radio Frequency Oscillator O-330/FRR-32 requires an initial warm-up period of at least 48 HOURS of CONTINUOUS duty. Thereafter, the unit should NEVER to turned off unless detailed repairs are necessary.

(1) 100-KC CRYSTAL CHECK AND ALIGNMENT.

(a) Turn the power on to one of the receivers, allow at least a five-minute warm-up, set the RECEPTION switch to A1 BROAD and the OSC switch to INT.

(b) Tune the receiver in use to a standard frequency, such as station WWV (5000 kc). Adjust the tuning knob for maximum indication on the TUNING meter.

(c) Plug a headset into the PHONES jack of the receiver and adjust the FREQ. VERNIER control, on the front panel of the receiver for zero beat.

(d) Connect one end of a cable to the spare HFO receptacle at the rear of the Radio Frequency Oscillator O-330/FRR-32 and couple the other end of the cable to the ANT receptacle of the receiver being used.

(e) Set the BAND-MCS switch to 4-8 and the TUNING knob to 2.5, then tune the oscillator by hand or by use of the motor drive, until zero beat is obtained in the receiver.

(f) Plug a headset into the PHONES jack of the R-F Oscillator (located behind the door on the front panel).

NOTE

To calculate the correct dial reading, divide the desired frequency by 2 for the 4-8 mc band, by 4 for the 8-16 mc band, by 8 for the 16-32 mc band.

(g) Set the METER switch of the oscillator to ZERO BEAT and adjust C311 (through the rear oven cover) with an insulated screwdriver or alignment tool until a zero beat is heard in the phones or seen on the meter. The initial setting of C311 should not be changed until this process is repeated for rechecking and re-alignment.

(h) Check that both the TUNING meter on the receiver and the meter on the oscillator indicate a zero beat.

(i) Disconnect the cable attached in step (d).

(2) CALIBRATION TO THE DESIRED FREQUENCY. - This adjustment should be made only after the 100-kc crystal has been checked and aligned. The procedure for calibrating the Radio Frequency Oscillator O-330/FRR-32 is as follows:

(a) Make certain that the R-F Oscillator is turned on and has had the required warm-up.

(b) Turn the METER switch to ZERO BEAT and turn the VOLUME control fully clockwise.

(c) Plug a headset into the PHONES jack.

(d) Turn the BAND-MCS switch to the desired band and the XTAL switch to VMO position. Both switches are located on the front panel.

(e) Tune the R-F Oscillator to the nearest 50-kc point of the desired frequency on the FREQUENCY CPS dial.

NOTE

For diversity operation, set the FREQUENCY CPS dial to a reading equal to the sum of the intermediate frequency value of the receiver (1600 kc) plug the value of the desired signal frequency. To calculate the correct dial reading divide total by 2 for the 4-8 mc band, by 4 for the 8-16 mc band, etc. For accurate calibration and resettability, rotate the dial in the same direction (preferably from a lower dial reading to a high dial reading) to prevent any error due to backlash.

(f) Vary the CALIBRATE control until a zero beat indication is obtained in the headset and on the front panel milliammeter. The Radio Frequency Oscillator O-330/FRR-32 has now been properly calibrated for the dial region to be used and should be returned to the required frequency setting.

(g) Set the VOLUME control to the 100-KC OFF position, the METER switch to HFO, and the HFO switch to the ON position.

(h) Adjust the TUNING knob clockwise to a position, roughly approximating the master oscillator frequency dial, and vary the OUTPUT control until a reading is obtained on the front panel meter. The TUNING control will be properly set when the highest milliammeter reading is obtained.

e. OPERATING IN SERVICING POSITION.

CAUTION

Open the 115-volt a-c feeding into the equipment by setting the POWER switch, S1901, in OFF position. The POWER switch is located on Switch Panel SA-238/G at the bottom of the rear of the cabinet (see figure 3-1). All power should be removed from the unit to be checked before connecting a test cable assembly.

The two test cables mounted in the back of the cabinet are supplied to permit operation of a receiver or the Comparator Keyer while the unit is in servicing position. Test Cable Assembly Type CG-1101/SRR is to be used with either one of the receivers and Test Cable Assembly Type CX-3262/U is to be used with the Comparator Keyer. The receivers and the Comparator Keyer are of like construction; their chassis may be extended for test or maintenance operation (see figures 3-8 and 3-9). The Radio Frequency Oscillator is not of this construction.

After extending the receiver to be tested to the servicing position (see figure 3-8 and/or 3-9), connect a Test Cable Assembly Type CG-1101/SRR to receptacle J2214 (see figure 7-2) at the back of the receiver chassis. Then plug the connector at the other end of the test cable to the receptacle on the back wall of the receiver case. In a like manner the Comparator Keyer may be connected using Test Cable Assembly CX-3262/U. When the test cable is connected as described, all circuits of the unit connected are complete and the receiver or Comparator Keyer may be operated in this position for servicing.

f. ENERGIZING THE EQUIPMENT. - This equipment may be operated with any one or all of the major units (receivers and Comparator Keyer) in either the servicing position or the normal operating position with the chassis pushed into their cases and locked in place. Power to the equipment may be turned on by throwing the POWER switch S1901 (on Switch Panel SA-238/G) to ON. Then each unit may be turned on separately by throwing its POWER switch to ON position. Except for the R-F Oscillator the POWER switches are located on the front panel of each unit. The POWER switch on the R-F Oscillator is located on the front panel of the power supply sub-chassis found behind the door on the front panel of the R-F Oscillator. The equipment can now be operated in accordance with instructions given under SUMMARY OF OPERATION, paragraph 4 of Section 4.

g. REDUCING HUM IN COMPARATOR KEYER. - If objectionable hum is heard when operating normally, switch the RECEPTION control on the Comparator Keyer to A3, the MONITOR FUNCTION control to DIV, and the MONITOR LEVEL to half gain. With the upper MONITOR phone jack connected to the vertical input of an oscilloscope (OS-8/U or equal), adjust R403 for minimum hum as seen on the oscilloscope. R403 is located on the bottom of the power sub unit. See figure 7-8.

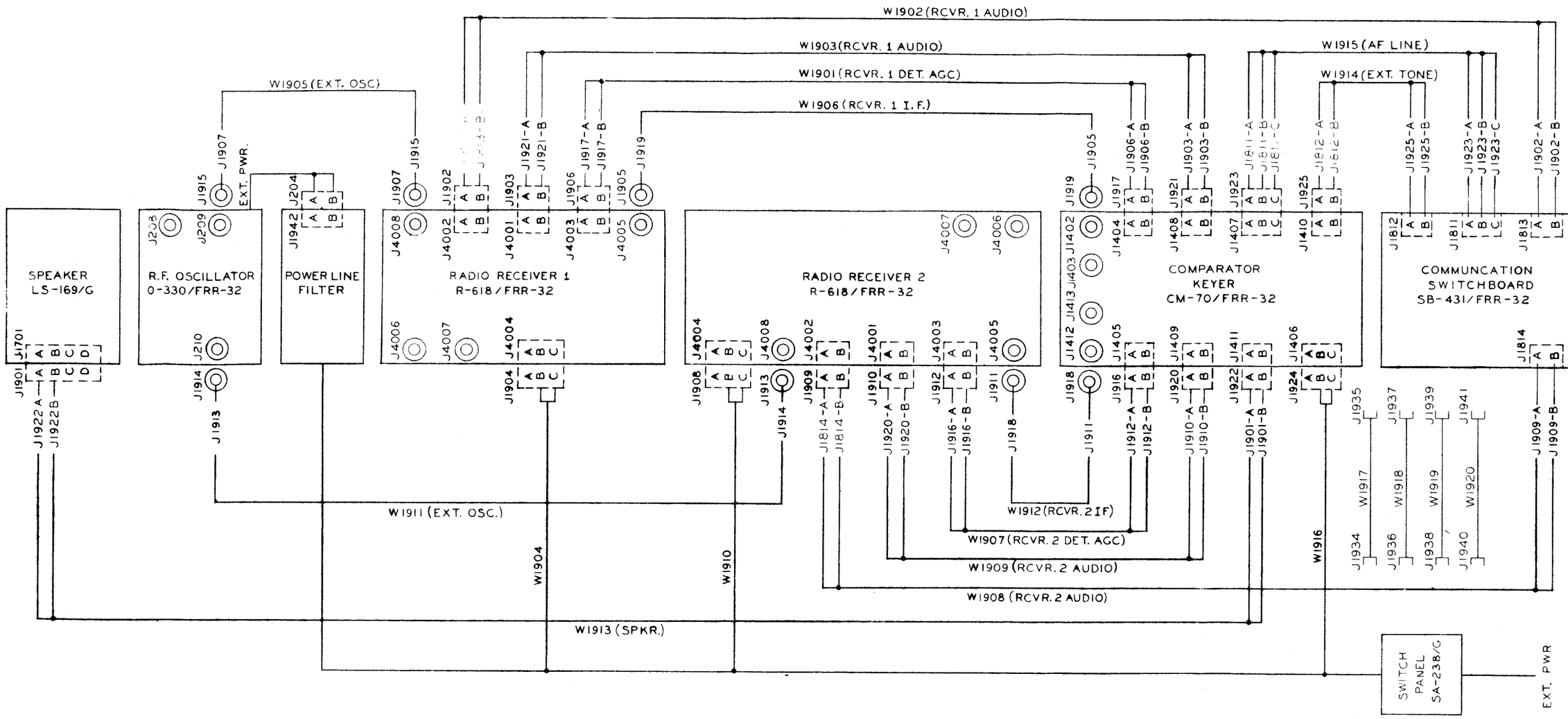
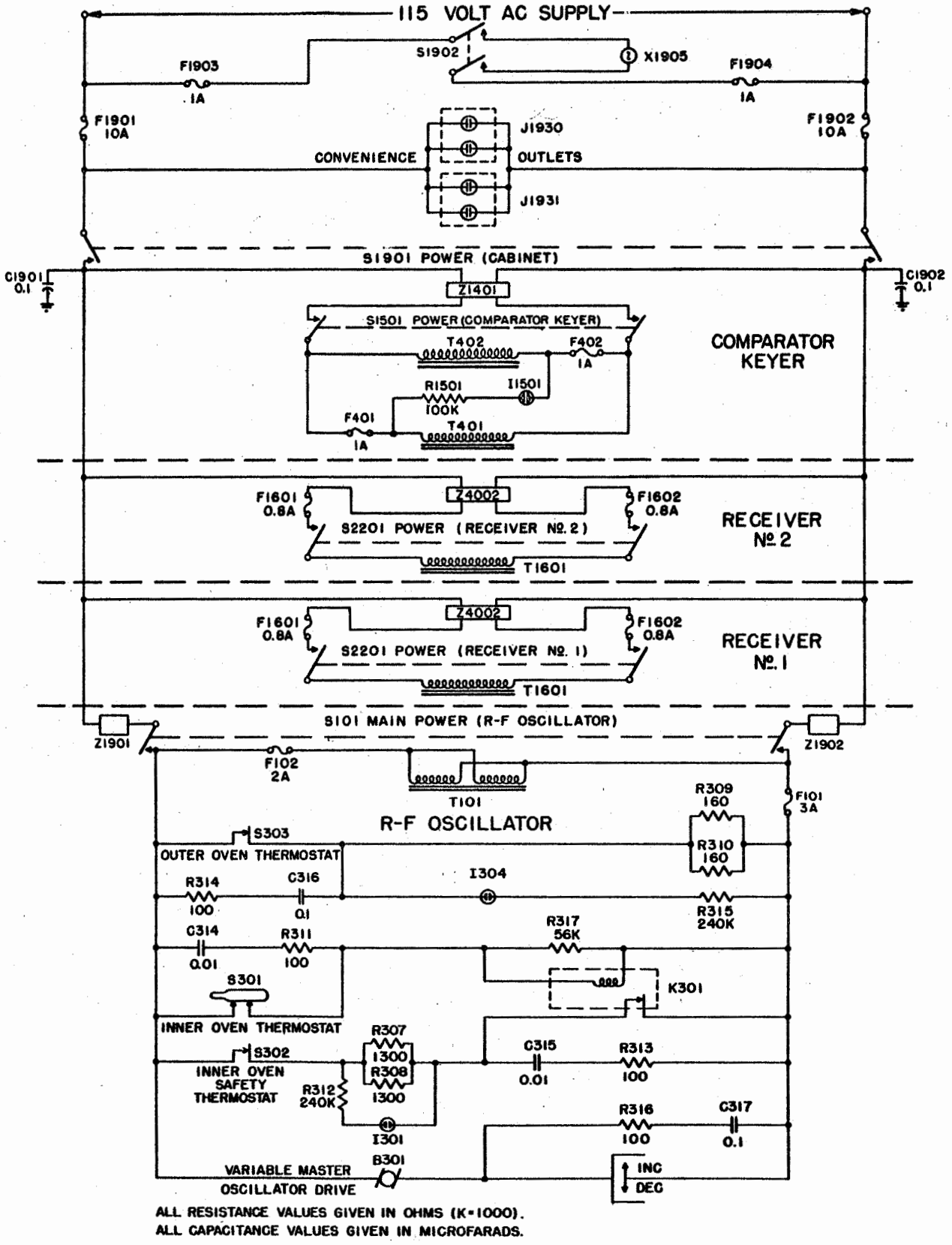


Figure 3-13. Interconnection Cabling Diagram



ALL RESISTANCE VALUES GIVEN IN OHMS (K=1000).
ALL CAPACITANCE VALUES GIVEN IN MICROFARADS.

Figure 3-14. Primary Power Distribution Diagram

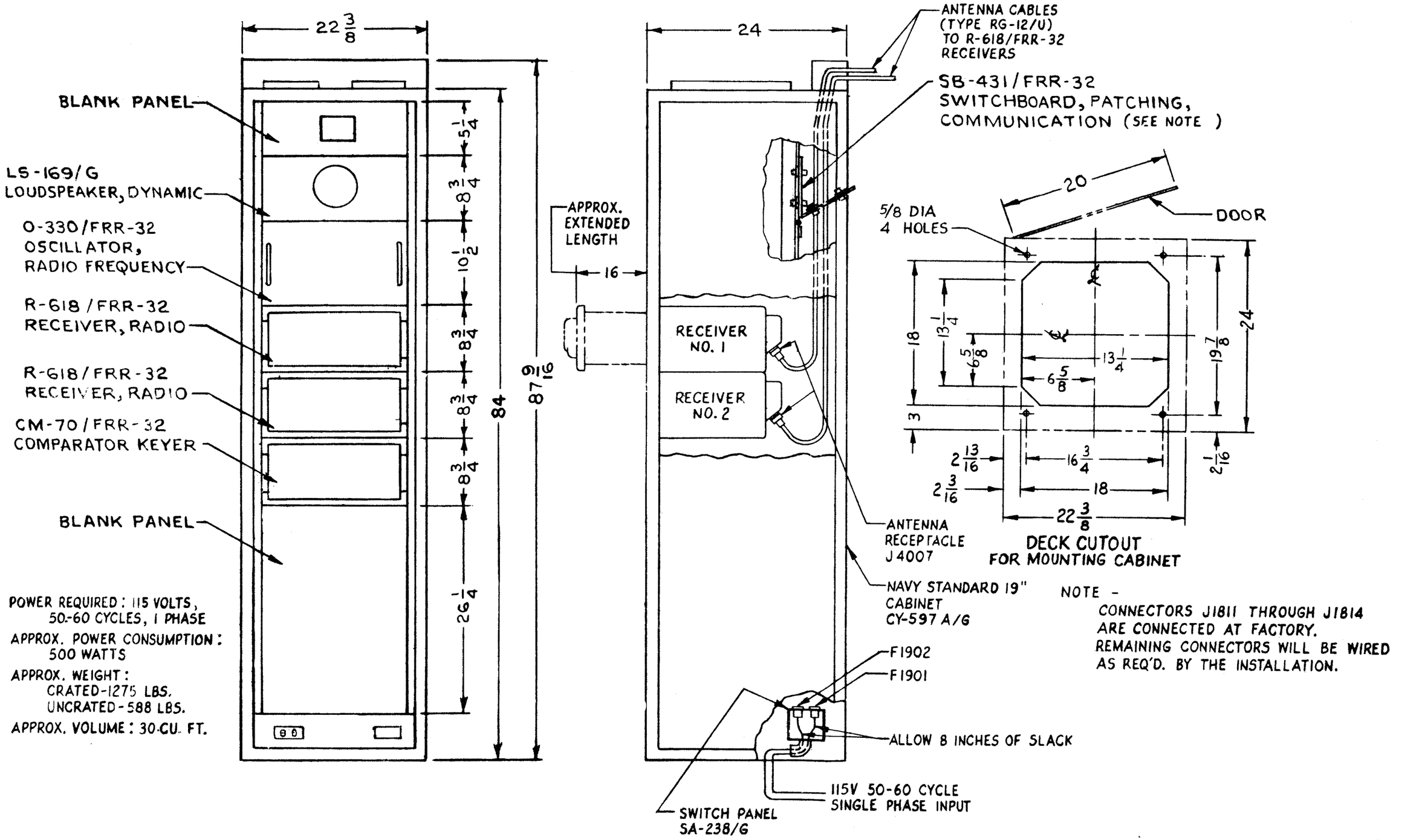


Figure 3-15. Installation Outline Drawing

SECTION 4

OPERATION

1. INTRODUCTION.

The radio receiving set described in this instruction book is a fixed station diversity receiving set. Its major units consist of two Radio Receivers R-618/FRR-32, a Comparator Keyer CM-70/FRR-32, and a Radio Frequency Oscillator O-330/FRR-32 used as the external oscillator.

Diversity reception, as employed by this equipment, is used to reduce fading (variations in signal strength over periods of several seconds down to only a few thousandths of a second or less) of high frequency signals, hence maintaining a relatively constant output level.

Each receiver has five bands with continuous tuning throughout each band and is capable of receiving unmodulated CW (A1) signals, amplitude modulated (A2 and A3) signals, and frequency shift (F1) signals. The receivers are designed to give maximum efficiency for the reception of those emissions encountered in the band of frequencies ranging from 2 to 32 megacycles.

An OSC switch incorporated in each receiver permits the use of its internal oscillator when in the INT position. If the equipment is used with this switch in the EXT position, the internal oscillator is cut out and the R-F Oscillator O-330/FRR-32 is substituted. When the equipment is set up in this manner, the receivers will only be capable of receiving on one frequency, as determined by the setting of the external oscillator, but insures greater frequency stability.

The Comparator Keyer CM-70/FRR-32 is used to compare the detector outputs of both receivers and electronically select the receiver with the stronger output signal to operate in the overall system while suppressing the output of the other receiver. In addition, it provides a keyer circuit to key a locally generated tone signal in accordance with the telegraph or facsimile keying of the incoming radio signal. It also provides facilities for monitoring the different outputs of the equipment.

2. OPERATING CONTROLS AND SWITCHES.

All operating controls and switches necessary for the operation of this equipment are mounted on the front panels of the various units, together with the meters to be used when tuning and reading output level. The functional name of each control and meter, except the band selector on the receivers, is marked on the panel near the particular control. The band selector has five frequency-marked positions. Refer to figure 4-1 for the location of operating controls and table 4-1 for description of their functions.

CAUTION

BEFORE OPERATING THE RECEIVING EQUIPMENT MAKE SURE THE RECEIVER CHASSIS AND THE COMPARATOR KEYER CHASSIS ARE FIRMLY IN THEIR CASES, OTHERWISE NO POWER WILL BE APPLIED TO THESE UNITS.

3. TUNING ADJUSTMENTS.

Tuning of the separate units of this equipment is accomplished by means of the controls on the front panels of the units as shown in figure 4-1. The functions of each control is described in table 4-1.

4. SUMMARY OF OPERATION.

a. STARTING THE EQUIPMENT. - When applying power to the equipment follow this procedure:

(1) Make sure the receiver and comparator keyer chassis are firmly in their cases.

(2) Turn the POWER switch, S1901 (see figure 3-1), located in the rear of the cabinet on Switch Panel SA-238/G, to ON.

(3) Turn the POWER switch of the R-F Oscillator (Control (7) in figure 4-1) to ON and allow 48 hours warm up.

(4) Turn the Power switches of the receivers to ON (see 24 in figure 4-1).

(5) Adjust dial illumination on both receivers by turning the DIM control. Turn DIM control fully counterclockwise to extinguish dial light. Should dial light fail, switch LAMPS knob to SPARE position and report the burned out light to a technician.

(6) Turn ADD DECIBELS switch of both receivers to the +20 position.

(7) Turn the OSC switch of both receivers to INT.

(8) Make sure the CAL switch on both receivers is at the OFF position.

(9) Turn the POWER switch on the Comparator Keyer to ON.

(10) Note that the PILOT lights on all four units are glowing except when the knurled ring around the light is turned clockwise.

(11) Two pairs of headsets can be operated from each receiver at the same time. They can be used to observe the output of the respective receiver only. Plug one or two pair of headsets into the jacks on the receiver marked PHONES.

Provisions are made on the Comparator Keyer for observing the AF LINE output or MONITOR output from that unit by headsets. One pair of headsets may be operated from each of these outputs.

It is recommended that low-impedance (600 ohms nominal) headsets be used, similar to Navy Type 49507. The associated LEVEL control regulates the volume through the respective headphones without affecting the audio line level indicated on the meter and connected to J4002.

In addition, the audio output from the Comparator Keyer is fed to the Dynamic Loudspeaker LS-169/G on the top of the cabinet. The LEVEL control on its front panel regulates the signal level through the loudspeaker.

b. TUNING A SIGNAL ON A RECEIVER. - Tune both receivers as described below. Make certain that the DIVERSITY TUNE switch (on the Comparator Keyer) of the receiver being tuned is set at TUNE position and the other DIVERSITY TUNE switch is set at DIVERSITY while tuning in a signal.

(1) Turn the GAIN and OUTPUT controls up (clockwise) until background noise is heard. Turn SILENCER knob fully counterclockwise. NOTE: the SILENCER control is effective only when the RECEPTION control is set at A3 SHARP or A3 BROAD.

(2) Select the appropriate band of frequencies using the band selector.

(3) Calibrate the receiver at the frequency check point nearest to the desired signal frequency. See paragraph 4h of this section for use of the crystal calibrator.

(4) Set the desired station's frequency under the hair line index on the projection screen by means of the tuning knob. Turn the ANT. COMP. control until signal is the loudest. This control will have the greatest effect at the high end of each frequency band. Tune for maximum signal as indicated on the TUNING meter. Use of the TUNING indicator is optional for CW signals (A1 positions of the RECEPTION control). See paragraph 4f for use of the TUNING meter.

NOTE: If station is not heard at this setting of the dial, rock the dial about this point a short distance to search for it.

When the desired station has been recorded previously on the logging dial, reset the two scales to the recorded figure. See paragraph 4g for use of the logging dial.

(5) Adjust the FREQ. VERNIER for the desired beat note. This control is inactive when the RECEPTION control is set in the A3 positions.

(6) From this point on the tuning procedure differs depending upon the position of the RECEPTION control, which is set to match the class of emission of the desired signal. Refer to paragraph 4e which describes the method of selecting emission types.

(7) It is important that the desired signal is tuned to maximum and when associated equipment is operated from the output of this equipment, that the desired output level is maintained. These indications are given on the meters of the receivers. Refer to paragraph 4f which describes the use of these meters.

c. TUNING THE R-F OSCILLATOR. - It is important to remember that for optimum performance, this unit must have had at least 48 hours warm-up before placing it into operation with other units of this equipment.

(1) Calibrate the R-F Oscillator to the desired frequency as described in paragraph 3d(2) of Section 3. Calculation of the correct dial reading for a desired frequency is described in paragraph 4i of this section.

(2) Make certain that the controls (located behind the door on the front panel) are set as follows:

METER switch to HFO
VOLUME control to 100 KC OFF
HFO switch to ON
IFO switch to OFF
BFO switch to OFF

(3) Make sure the BAND-MCS switch is set to the desired band of frequencies and that the XTAL switch is set to VMO position. Both of these switches are located on the front panel.

(4) Tune the R-F Oscillator to the desired frequency by setting the FREQUENCY-CPS (VMO) dial. The oscillator must be set 1600 kc above the frequency of the desired station. See paragraph 4i.

(5) Rotate the TUNING knob until the highest milliammeter reading is obtained on the meter on the front panel.

(6) Set the OSC switches on both receivers to EXT position.

(7) Retune the FREQUENCY-CPS dial of the R-F Oscillator for maximum signal as indicated on the TUNING meters of the receivers and lock in this position.

(8) Retune the TUNING control for maximum output on the front panel meter of the R-F oscillator.

(9) Adjust the OUTPUT (HFO) control for maximum output on the receiver.

d. TUNING THE COMPARATOR KEYER. - To obtain full benefits of the capabilities of the diversity receiving system, each individual receiver must be adjusted to deliver its full share of the combined output. This is one of the most important adjustments as a whole. Adjustment of gain should not be made until after each receiver has been individually adjusted and switched to a common load circuit. When this adjustment has been made correctly, the individual detector output meters on the Comparator Keyer front panel should be swinging equally, showing that each receiver is delivering its share of the output. Tuning the Comparator Keyer may be accomplished by the following procedure:

(1) Set Receiver 1 DIVERSITY TUNE switch to TUNE position: set Receiver 2 DIVERSITY TUNE switch to DIVERSITY position and note the output indicated on the Receiver 1 meter.

(2) Reverse the procedure of step (1) by setting Receiver 1 DIVERSITY TUNE switch to DIVERSITY position and the Receiver 2 DIVERSITY TUNE switch to TUNE position. Note the output indicated on Receiver 2 meter.

(3) Compare the two outputs indicated in step (1) and step (2). Readjust the GAIN controls of the receiver with the lower output until its output is equal to that of the companion receiver. If this is impossible reduce the gain of the receiver with the greater output until both outputs are equal.

(4) Set both DIVERSITY TUNE switches to DIVERSITY position.

(5) Turn the SILENCER knob fully counterclockwise. NOTE: This SILENCER control is effective only when the RECEPTION control of the Comparator Keyer is set at A2 or A3.

(6) Set the FUNCTION control to DIV position.

(7) Set the RECEPTION switch to the position corresponding to the setting of the RECEPTION controls on the receivers.

(8) Adjust the LEVEL controls to suit the prevailing conditions. If monitoring is to be done by the loudspeaker alone, turn the MONITOR LEVEL control fully clockwise and adjust the LEVEL control on the loudspeaker panel to the desired point. If monitoring is to be done by a headset, adjust the MONITOR LEVEL control for the desired output.

(9) Tuning procedure differs from this point depending on the position of the RECEPTION controls.

(a) If the RECEPTION controls are set in the A1 position, adjust the controls listed below located behind the front door on the Comparator Keyer front panel as follows:

1. Set FREQ switch to the desired modulating tone.

2. Adjust the THRESHOLD control to the lowest value that will permit keying of the tone oscillator by the incoming signal at the level of maximum fading.

3. Make certain that the CAL KEY switch is set at the KEY position.

(b) If the RECEPTION controls of the receivers are set in one of the A3 positions, or the FSK position and the RECEPTION control of the Comparator Keyer is set in the A2, A3, or FSK position set the controls listed below as follows:

1. Set the AGC switch of both receivers to NORM or OFF as desired for the best reception.

2. If the AGC switch is set to NORM select the proper AGC time constant thus: when the incoming signals are of high-speed traffic or dots or is a steady carrier of a phone signal turn the AGC TIME CONSTANT switch on the Comparator Keyer (located behind the front door on the front panel) to FAST position.

In the case of a signal which is being keyed rather slowly, it may be necessary to use the MEDIUM or SLOW position of this switch or even, as previously stated, turn the AGC switch on the receivers to OFF position.

e. SELECTING EMISSION TYPES. - Tuning procedure differs from this point depending on the position of the RECEPTION control, which is set to match the class of emission of the desired signal. The RECEPTION controls are set at:

(1) FSK. - When the receivers are supplying signals to a frequency shift converter of the i-f type (similar to Navy Model CV-57/URR), then tune the receivers to the desired frequency by means of the tuning knob and adjust the ANT. COMP. controls for maximum signal.

When the receivers are supplying audio signals to a frequency shift converter, similar to Navy Model CV-60/URR, tune the receiver to the desired frequency, then adjust the OUTPUT and FREQ. VERNIER controls as required for the operation of the frequency shift converter.

Refer to paragraph 4d for the settings of the controls of the Comparator Keyer.

(2) A1 BROAD. - When the receivers are used for reception of unmodulated CW signals, adjust the GAIN controls to the point of loudest signal and lowest background noise, then adjust OUTPUT controls to a comfortable listening point. Use the LEVEL control to regulate the gain in the headphones when used and adjust the FREQ. VERNIER for a convenient audio note.

(3) A1 MEDIUM. - Adjust controls as given for the A1 BROAD position. The A1 MEDIUM setting should be used to eliminate adjacent signals that crowd desired station's signals moderately. The A1 BROAD position should be used for reception of CW signals whenever possible.

(4) A1 SHARP. - Adjust controls as given for the A1 BROAD position. The A1 SHARP setting should be used to eliminate adjacent signals that crowd the desired station's signals excessively.

(5) A3 SHARP. - When the receivers are used to receive voice modulated signals, tune for maximum signal as indicated on the TUNING indicator. See paragraph 4f(1) for use of the TUNING indicator. Then adjust the OUTPUT controls to produce proper line output level. Use the LEVEL control to regulate volume in receiver headphones, if used. To eliminate background noise between intermittent transmissions, set the SILENCER control fully counter-clockwise; then turn the control clockwise until the background noise is eliminated when there is no signal, and with the desired signal remaining undistorted when transmission resumes. A2 (modulated CW) signals may be received when the RECEPTION control is in this position and the AGC switch turned to OFF. See paragraph 4d for the control settings on the Comparator Keyer.

f. USE OF RECEIVER METERS.

(1) As a station is tuned in, the TUNING indicator reads up scale. When TUNING indicator is below 1/4 scale on the LOW setting of the HIGH-LOW switch, hold switch in HIGH position and readjust tuning knob for an up-scale indication of the TUNING indicator (CAUTION: never hold HIGH-LOW switch in HIGH position when TUNING meter is at full scale).

(2) When reading output power, turn ADD DECIBELS switch from +20 to +10 and add 10 db to OUTPUT meter reading. (EXAMPLE: OUTPUT meter reads -3, signal power = -3 +10 or +7 db.) If OUTPUT meter reads on lower left-hand part of the scale, put ADD DECIBELS switch in 0 position and read OUTPUT meter directly. If OUTPUT meter still reads low, put ADD DECIBELS switch in -10 position. (EXAMPLE: OUTPUT meter reads +5, signal power = +5 -10 or -5 db.) The -10 db position of the ADD DECIBELS switch is spring-loaded, and the switch will return to 0 position if not held in the -10 db position. CAUTION: Return ADD DECIBELS switch to +20 db position when not measuring output level.

g. USE OF RECEIVER LOGGING SCALES. - Two movable scales and one fixed index, immediately below the projection dial, are used for logging the dial setting of received stations. There is no relationship between the projection dial and the logging dial. The logging dial provides a quick means of resetting the receiver to the point where a station has previously been received. Note also, that the logging dial is not affected by the CAL. ADJUST knob.

To use the logging dial, calibrate the projection dial (see paragraph 4b), and then tune the receiver to the desired station. To record the settings of the scales, use the index mark on the middle segment of the logging dial. EXAMPLE:

(1) The top scale reads between 200 and 300.

(2) The bottom scale reads 63.

(3) The setting of the logging dial is 263. By setting this figure (263) on the logging dial, when the band selector is set as before, a previously tuned receiver can be returned quickly. The logging dial should always be set approaching from the same direction - clockwise rotation of the tuning knob.

h. USE OF RECEIVER CRYSTAL CONTROLLED CALIBRATOR. - The crystal controlled calibrator provides frequency check points at regular intervals throughout the tuning ranges of the receivers so that the numerical setting of the projection dial can be adjusted to agree with the frequency of the received signals. These check points occur at every 200-kilocycle separations. Proceed as follows to calibrate the tuning dial:

(1) Turn the CAL switch to ON.

(2) Set the tuning dial at the nearest calibration marker on the projection dial. The calibration points are designated by an inverted V on the frequency scale. These markers are separated by 200 kc.

(3) Rock the tuning dial slightly on both sides of the frequency chosen, until a beat note is heard. Zero beat should occur at the calibrated marker chosen. If zero beat does not occur at this marker, adjust the tuning knob until zero beat is heard.

(4) Loosen the thumbscrew holding the CAL. ADJUST knob (turn counterclockwise), then turn the CAL. ADJUST knob until the nearest calibration marker is under the hair line on the projection screen. Tighten the thumbscrew over the CAL. ADJUST knob. NOTE: If beat note is not located within 1/3 of the distance between the calibration markers, or if the beat note cannot be brought to coincidence by use of the CAL. ADJUST knob, report the condition to a technician.

i. HOW TO CALCULATE CORRECT DIAL READING ON THE R-F OSCILLATOR. - In order to calculate the correct dial reading on the R-F Oscillator for use in this equipment, it must be remembered to add the i-f frequency (1600 kc) to the frequency of the station to be received to obtain the required output frequency; then divide the sum by 2 for the 4-8 mc band, by 4 for the 8-16 mc band, or by 8 for the 16-32 mc band to obtain the required dial setting.

FOR EXAMPLE:

EXAMPLE 1: If the signal frequency to be received is 2.5 mc (2500 kc), add 1600 kc to 2500 kc. The required output frequency is 1600 kc +2500 kc or 4100 kc. The BAND-MCS controls must therefore be set to the 4-8 mc band. Then 4100/2 = 2050 kc which is the required setting for the FREQUENCY CPS (VMO) dial.

EXAMPLE 2:

Desired frequency	12,256 kc
	12,256
	+ 1,600
Required output frequency	13,856 mc

Set BAND-MCS control to the 8-16 mc band.

$$\frac{13,856}{4} = 3464.000 \text{ kc.}$$

3464.000 kc is the required setting of the FREQUENCY CPS dial.

EXAMPLE 3:

Desired frequency	14,822 kc
	14,822
	+ 1,600
Required output frequency	16,422 kc

Set BAND-MCS control to 16-32 mc band.

$$\frac{16,422}{8} = 2052.750 \text{ kc}$$

2052.750 kc is the required setting of FREQUENCY CPS dial.

j. SHUTTING OFF THE EQUIPMENT. - If the equipment is to be put back into operation within 48 hours, simply throw the POWER switches on the Comparator Keyer and both receivers to OFF. If the equipment is to be out of service for an extended length of time, throw the POWER switches on all units using the POWER switch located on Switch Panel SA-238/G (located at the bottom rear of the cabinet) to OFF.

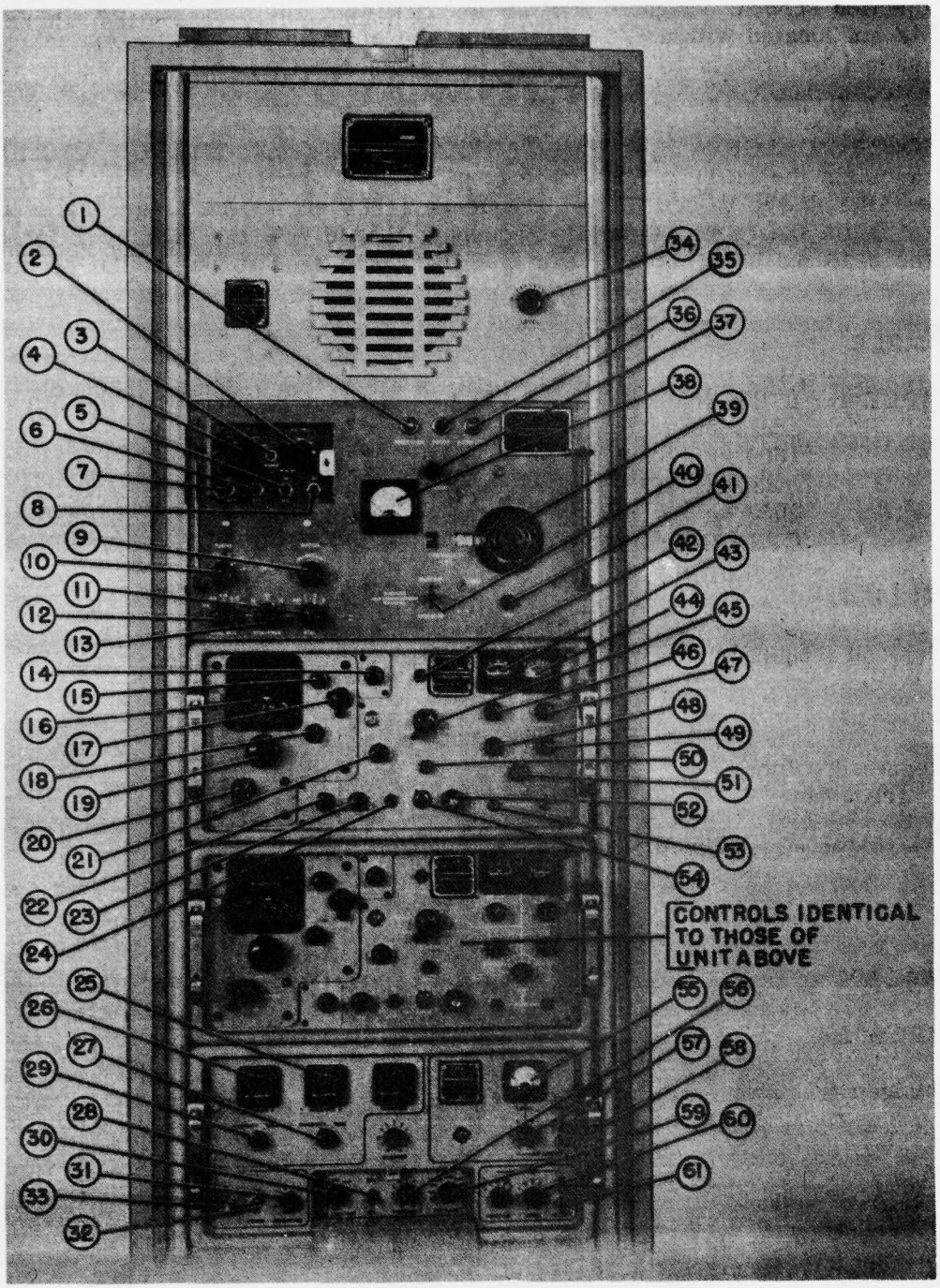


Figure 4-1. Front Panel Controls, Radio Receiving Set AN/FRR-32.

TABLE 4-1. OPERATING CONTROL FUNCTIONS

ILLUSTRATION REFERENCE*	CIRCUIT SYMBOL	CONTROL	FUNCTION
1	I301	INNER OVEN pilot	Inner oven indicator of the R-F Oscillator. Blinks alternately ON and OFF for approximately 90 seconds each when inner oven is operating properly.
2	R112 with S104	VOLUME - 100 KC OFF	R-F Oscillator audio volume control and 100-kc oscillator on-off switch.
3	J105	PHONES	Provides R-F Oscillator output to operate one set of headphones.
4	S107	METER switch	Selects the circuit in the R-F Oscillator whose output is to be observed on meter M301.
5	S102	IFO switch	Applies plate voltage to the i-f oscillator when in the ON position.
6	S103	HFO switch	Applies plate voltage to the high-frequency oscillator when in the ON position.
7	S101	POWER	Applies primary power to R-F Oscillator when in ON position.
8	S106	BFO switch	Applies plate voltage to the beat-frequency oscillator (of the R-F Oscillator) when in the ON position.
9	R215	OUTPUT (HFO)	Controls the output level of the high-frequency oscillator.
10	C225	TUNING (HFO)	Adjusts the high-frequency oscillator to the desired frequency.
11	S201	XTAL (HFO)	Selects proper crystal to control the high-frequency oscillator circuit.
12	S202	BAND-MCS (HFO)	Selects tuning range of the high-frequency oscillator in five bands.

*Refer to figure 4-1.

TABLE 4-1. OPERATING CONTROL FUNCTIONS (Continued)

ILLUSTRATION REFERENCE*	CIRCUIT SYMBOL	CONTROL	FUNCTION
13	C210	XTAL-FREQ (HFO)	Fine adjustment of the crystal frequency used in the high-frequency oscillator circuit.
14	C1309	FREQ. VERNIER	Varies pitch of beat note in the receiver when RECEPTION control is set in the A1 or FSK position.
15	R3801	DIM	Controls the intensity of the receiver dial light.
16		TUNING DIAL	Tuning dial of the receiver. Frequency setting is projected onto a translucent screen (upper part or projection dial). The linear scale (bottom part or logging dial) is used for logging stations.
17		CAL. ADJUST	Used to set projection dial of receiver, after desired check point frequency has been zeroed.
18	S3801	LAMPS switch	Connects spare dial light on receiver, should first one fail.
19		TUNING KNOB	Adjusts receiver to desired frequency.
20		BAND SELECTOR	Selects tuning range of receiver in five bands.
21	C2206	ANT. COMP.	Adjusts tuning of antenna preamplifier to compensate for variations in antenna.
22	S2207 with S2206	OSC switch	Selects internal or external oscillator for use in the equipment.
23	R2201	GAIN	Controls r-f gain in receiver. Inactive when RECEPTION control is in A3 or FSK positions.
24	S2201	POWER	Applies primary power to receiver when in ON position.

*Refer to figure 4-1.

TABLE 4-1. OPERATING CONTROL FUNCTIONS (Continued)

ILLUSTRATION REFERENCE*	CIRCUIT SYMBOL	CONTROL	FUNCTION
25	M1503	Meter (RECEIVER 2)	Indicates detector output current of Receiver No. 2.
26	M1502	Meter (RECEIVER 1)	Indicates detector output current of Receiver No. 1.
27	S802	DIVERSITY TUNE switch (RECEIVER 2)	Disconnects Receiver No. 2 from the common load for tuning the receiver when in the TUNE position.
28	S1502	CAL KEY switch	Permits continuous tone from tone oscillator of Comparator Keyer for amplitude and frequency adjustment of the tone oscillator, when in CAL position.
29	S801	DIVERSITY TUNE switch (RECEIVER 1)	Disconnects Receiver No. 1 from the common load for tuning the receiver when in TUNE position.
30	S803	AGC TIME CONSTANT	Simultaneously selects the AGC time constants for diversity reception. Reduces the effects of rapid fading when set in FAST position and attenuates noise during pauses in transmission when set in SLOW position.
31	S804	RECEPTION	A1 - Normal setting for unmodulated CW signals. Tone modulation is provided. A2 - Provides for reception of MCW signals. A3 - Provides for reception of voice modulated signals. FSK - Provides for reception F1 signals.
32	S1501	POWER	Applies primary power to the Comparator Keyer when in ON position.
33	I1501	Pilot	Glows when primary power is applied to the Comparator Keyer.

*Refer to figure 4-1.

TABLE 4-1. OPERATING CONTROL FUNCTIONS (Continued)

ILLUSTRATION REFERENCE*	CIRCUIT SYMBOL	CONTROL	FUNCTION
34	R1701	LEVEL	Controls volume from the loudspeaker.
35	I302	POWER pilot	Glows when primary power is applied to the R-F Oscillator.
36	I304	OUTER OVEN pilot	Outer oven indicator of the R-F Oscillator. Blinks alternately ON for approximately 5 seconds and OFF for approximately 30 seconds when outer oven is operating properly.
37	L301	CALIBRATE	Adjusts the frequency of the variable master oscillator tank circuit.
38	M301	Meter	Provides an output indication of the circuits in the R-F Oscillator.
39		FREQUENCY CPS (VMO)	Adjusts the variable master oscillator to the desired output frequency.
40	S304	INCREASE DECREASE (VMO) switch	Controls the variable master oscillator tuning motor-drive assembly. Motor is off when switch is in center position.
41		LOCK (VMO)	Locks the tuning drive of the variable master oscillator in its set position.
42	S2202	CAL switch	Provides frequency check points in the receiver when in ON position.
43	M2201	Tuning Meter	Meter reads up scale (toward right) when desired signal is tuned to maximum and down scale (toward left) when station is detuned. TUNING meter is used in conjunction with HIGH-LOW switch.
44	M2202	Output Meter	Reads output power level between -20 db and +25 db when used in conjunction with ADD

*Refer to figure 4-1.

TABLE 4-1. OPERATING CONTROL FUNCTIONS (Continued)

ILLUSTRATION REFERENCE*	CIRCUIT SYMBOL	CONTROL	FUNCTION
44 (continued)	M2202	Output Meter	DECIBEL switch. OUTPUT meter should be turned to +20 db position when not reading signal strength.
45		RECEPTION	A1 BROAD - Normal setting for unmodulated CW signals. A beat note is provided. A1 MEDIUM - Used to separate CW signals by moderately narrowing frequency response. A beat note is provided. A1 SHARP - Used to separate CW signals by greatly narrowing frequency response. A beat note is provided. A3 SHARP - Provides for reception of voice modulated signals. (Medium selectivity.) A2 (MCW) signals may be received with RECEPTION control in this position and the AGC switch turned to off. A3 BROAD - Provides for reception of voice modulated signals. FSK - Selects circuits for reception of F1 (frequency shift) signals when suitable converter is connected to a receiver. A beat note is provided.
46	S2204	HIGH-LOW switch	Normally in LOW position. When TUNING meter reads down scale in LOW position of switch, use HIGH position and tune receiver slightly for an up-scale reading on TUNING meter. HIGH positions of switch is spring-loaded and will return to LOW position when released.

*Refer to figure 4-1.

TABLE 4-1. OPERATING CONTROL FUNCTIONS (Continued)

ILLUSTRATION REFERENCE*	CIRCUIT SYMBOL	CONTROL	FUNCTION
47	S2205	ADD DECIBELS switch	Provides attenuation for OUTPUT meter circuit. +10 db position should be used to check strong signal output levels; 0 db is used to measure weak levels. ADD DECIBELS switch should be in +20 db position when not using OUTPUT meter.
48	R2206	SILENCER	Background noise in the receiver may be reduced when RECEPTION control is set in one of the A3 positions and a station is not transmitting.
49	R2207	OUTPUT control	Controls volume of audio amplifier of the receiver.
50	R2202	DIVERSITY GAIN BAL.	Recessed screwdriver adjustment used to match receiver gain with companion receiver. CAUTION: This control is preset and does not require adjustment by the operator.
51	R2208	LEVEL control	Controls volume through receiver PHONES jack.
52	I2201	Pilot	Glows when voltage is applied to receiver.
53	J2215 and J2216	PHONES	Provides receiver output to operate one or two sets of low-impedance headphones similar to Navy Type 49507.
54	S2203	AGC NORM-OFF	Switch operative in A3 or FSK positions of the RECEPTION control only; to be turned "on" or "off" for best reception. Permits manual control of gain in r-f and i-f sections of the receiver by the GAIN control.
55	M1501	Meter LEVEL (AF LINE)	Indicates the output current of the AF LINE.

*Refer to figure 4-1.

TABLE 4-1. OPERATING CONTROL FUNCTIONS (Continued)

ILLUSTRATION REFERENCE*	CIRCUIT SYMBOL	CONTROL	FUNCTION
56	R1503	THRESHOLD (Keyer)	Used to set the lower limit of the unmodulated CW pulse necessary to add tone modulation in the Comparator Keyer.
57	R1505	LEVEL (AF LINE) control	When the RECEPTION control of the Comparator Keyer is set in A2 position, this control adjusts the limit level of the A2 (MCW) signals. When the RECEPTION control is in the A1 position it controls the amplitude of the tone pulses fed through the Comparator Keyer circuits.
58	J1502 A and B	PHONES (AF LINE)	Provides Comparator Keyer AF LINE output to operate one or two sets of low-impedance headphones.
59	S601	FREQUENCY (KEYER) switch	Provides selection of eight frequencies for the tone keyer oscillator of the Comparator Keyer and permits the use of an external oscillator when other than one of the eight preset frequencies is desired when set in EXT TONE position.
60	R1505	LEVEL (MONITOR) control	Controls the audio output level from the Comparator Keyer.
61	J1501 A and B	PHONES (MONITOR)	Provides Comparator Keyer MONITOR output to operate one set of low impedance headphones.

*Refer to figure 4-1.

SECTION 5

OPERATOR'S MAINTENANCE

1. ROUTINE CHECKS.

The routine checks given in table 5-1, should be made by the operator to insure that Radio Receiving Set AN/FRR-32 performance is maintained at a high standard. When trouble is indicated which cannot be cleared up by using procedures described under Emergency Maintenance (paragraph 2 of this section), report the condition to the technician. These routine checks should be made each time the equipment is placed in operation, or daily if the equipment is in continuous service. See Section 3, paragraph 3a, for placing the receiver and/or Comparator Keyer in the servicing position.

In order to maintain high accuracy in operation, it is recommended that the 100-kc crystal (Y301) be checked and aligned at frequent intervals, not exceeding a period of over two weeks. See section 3, paragraph 3d(1).

2. EMERGENCY MAINTENANCE

NOTICE TO OPERATORS

OPERATORS SHALL NOT PERFORM ANY OF THE FOLLOWING EMERGENCY MAINTENANCE PROCEDURES WITHOUT PROPER AUTHORIZATIONS.

a. REPLACING FUSES.

WARNING

NEVER REPLACE A FUSE WITH ONE OF A HIGHER RATING UNLESS CONTINUED OPERATION OF THE EQUIPMENT IS MORE IMPORTANT THAN PROBABLE DAMAGE. IF A FUSE BURNS OUT IMMEDIATELY AFTER REPLACEMENT, DO NOT REPLACE IT A SECOND TIME UNTIL THE CAUSE HAS BEEN CORRECTED.

TABLE 5-1. ROUTINE CHECK CHART

WHAT TO CHECK	HOW TO CHECK	REMARKS
RADIO RECEIVER R-618/FRR-32		
Dial Light	With receiver ON, turn DIM control fully clockwise. If dial light does not light, turn LAMPS switch to SPARE position.	Check power input, replace fuses, replace lamp, if still does not light, report to technician.

TABLE 5-1. ROUTINE CHECK CHART (Continued)

WHAT TO CHECK	HOW TO CHECK	REMARKS
PILOT	With receiver ON, open light shutter of PILOT by turning knurled knob around light in a counterclockwise position.	PILOT is out, and receiver is inoperative. Check fuses and tubes in power supply. See paragraph 2d this section. Replace PILOT light if burned out.
TUNING meter	Tune a strong signal. TUNING meter should read up-scale on LOW position of HIGH-LOW switch. See paragraph 4f of section 4.	Failure of TUNING meter to read as described may indicate aging tubes in r-f and i-f stages. Report condition to technician.
OUTPUT meter	Read signal strength as indicated on the OUTPUT meter. See paragraph 4f(2) of Section 4.	Failure of meter to read on 0 db position of ADD DICIBEL switch may indicate aging tubes in audio amplifier or trouble in OUTPUT meter circuit. Report condition to technician.
BFO	With RECEPTION control set at FSK, or A1 position, CW signals should be heard.	If CW signals are not heard, report condition to technician.
COMPARATOR KEYER CM-70/FRR-32		
PILOT	With Comparator Keyer ON, open light shutter of PILOT by turning knurled knob around light in a counterclockwise position.	PILOT is out, and Comparator Keyer is inoperative. Check fuses and tubes in power sub unit. See paragraph 2d of this section. Replace PILOT light if burned out.
RECEIVER 1 DIVERSITY TUNE meter	Place RECEIVER 1 DIVERSITY TUNE switch in TUNE position. Tune a strong signal on Receiver No. 1. Meter should read up-scale.	Failure of meter to read up-scale may indicate aging tubes in r-f and i-f stages of Receiver No. 1 or one of the units disconnected. If units are securely in place report condition to technician.
RECEIVER 2 DIVERSITY TUNE meter	Place RECEIVER 2 DIVERSITY TUNE switch in TUNE position. Tune a strong signal on Receiver No. 2. Meter should read up-scale.	Treat as above except with Receiver No. 2.
COMBINED meter	Place both DIVERSITY TUNE switches in DIVERSITY position. Meter should read up-scale.	If units are securely in place and meter does not read up-scale, report condition to technician.

TABLE 5-1. ROUTINE CHECK CHART (Continued)

WHAT TO CHECK	HOW TO CHECK	REMARKS
LEVEL meter	Read AF Line signal strength.	Failure of meter to read may indicate aging tubes in comparator sub unit or trouble in the AF LINE circuit. Report condition to technician.
TONE OSCILLATOR	With RECEPTION control set at A1 and FREQUENCY control at any position except EXT, CW signals should be heard.	If CW signals are not heard, report condition to technician.
RADIO-FREQUENCY OSCILLATOR O-330/FRR-32		
POWER indicator light	With equipment ON, lamp should glow.	Lamp is out, and R-F Oscillator is inoperative. Check POWER fuse (see paragraph 2d of this section). Replace lamp if burned out. Report condition to technician if not corrected.
OUTER OVEN indicator light	Lamp should blink alternately "On" for approximately 5 seconds, and "Off" for 30 seconds.	Lamp is out. Check INNER OVEN light. Then check OVEN fuse. Replace lamp if burned out.
INNER OVEN indicator light	Lamp should blink "On" and "Off" alternately for approximately 90 seconds each.	Lamp is out. Check OVEN fuse. Replace lamp if burned out. If lamp blinks erratically at short intervals, in normal operation, S301 may have to be replaced. Report condition to technician.
METER	Turn meter switch to VMO position. Meter should read 0.9 ma approximately.	Meter does not indicate. Report condition to technician.

(1) SYMPTOMS OF FUSE FAILURE.

(a) CABINET CY-597A/G.

1. MAIN POWER FUSES. - PILOT lights on all units will be out. Complete equipment inoperative.

2. TROUBLE LAMP FUSES. - TROUBLE LAMP inoperative.

(b) RECEIVER. - Dial light and PILOT light will be out. Receiver will be inoperative.

(c) COMPARATOR KEYER. - PILOT will be out. Comparator Keyer will be inoperative.

(d) R-F OSCILLATOR.

1. POWER FUSE. - PILOT light and OVEN lights will be out. Oscillator will be inoperative.

2. OVEN FUSE. - INNER OVEN and OUTER OVEN lights will be out. Oscillator is operative but unstable.

(2) FUSE LOCATIONS.

(a) CABINET CY-597A/G. - There are two sets of fuses in this unit, the MAIN POWER fuses and the TROUBLE LAMP fuses. They are mounted on Switch Panel SA-238/G which is located at the bottom rear of the cabinet (see figure 5-1).

1. MAIN POWER FUSES. - There are two 10-ampere fuses mounted to the left on top of Switch Panel SA-238/G.

2. TROUBLE LAMP FUSES. - The two one-ampere fuses located to the top right of the Switch Panel are provided to protect the trouble light circuit (see figure 5-1).

(b) RECEIVER. - Each receiver has two 0.8-ampere slo-blo fuses used in its power supply. They are located toward the rear of the power supply chassis and are accessible from the bottom of the receiver main chassis (see figure 5-2).

(c) COMPARATOR KEYER. - Two 1-ampere fuses are mounted on the top, near the center, of the power sub unit and are accessible from the top of the Comparator Keyer chassis (see figure 5-3).

(d) R-F OSCILLATOR. - The POWER fuse (2 amperes) on the OVEN fuse (3 amperes) are mounted on the rear of the R-F Oscillator power supply. They are accessible from the rear of the equipment (see figure 5-1).

(3) FUSE REPLACEMENT. - There are two type fuses used in this equipment, cartridge fuses and plug fuses. The two main power fuses are plug fuses and screw-base mounted. All other fuses are cartridge type and mounted in fuseholders. Replacement procedures are described as follows:

(a) PLUG FUSES.

1. Unscrew (turning counterclockwise) defective fuse from screw base.

2. Screw in (turning clockwise) the new fuse.

(b) CARTRIDGE FUSES. - The R-F Oscillator fuses are available after opening the rear door of the cabinet. The Receiver fuses are accessible after pulling the receiver chassis out in servicing position with bottom toward front and the fuses on the Comparator Keyer are accessible after pulling its chassis out in servicing position with top toward the front.

1. Remove the defective fuse by turning the fuseholder cap in a counterclockwise direction until the cap is free from the holder.

2. Then pull the fuses from the cap and replace with a new fuse.

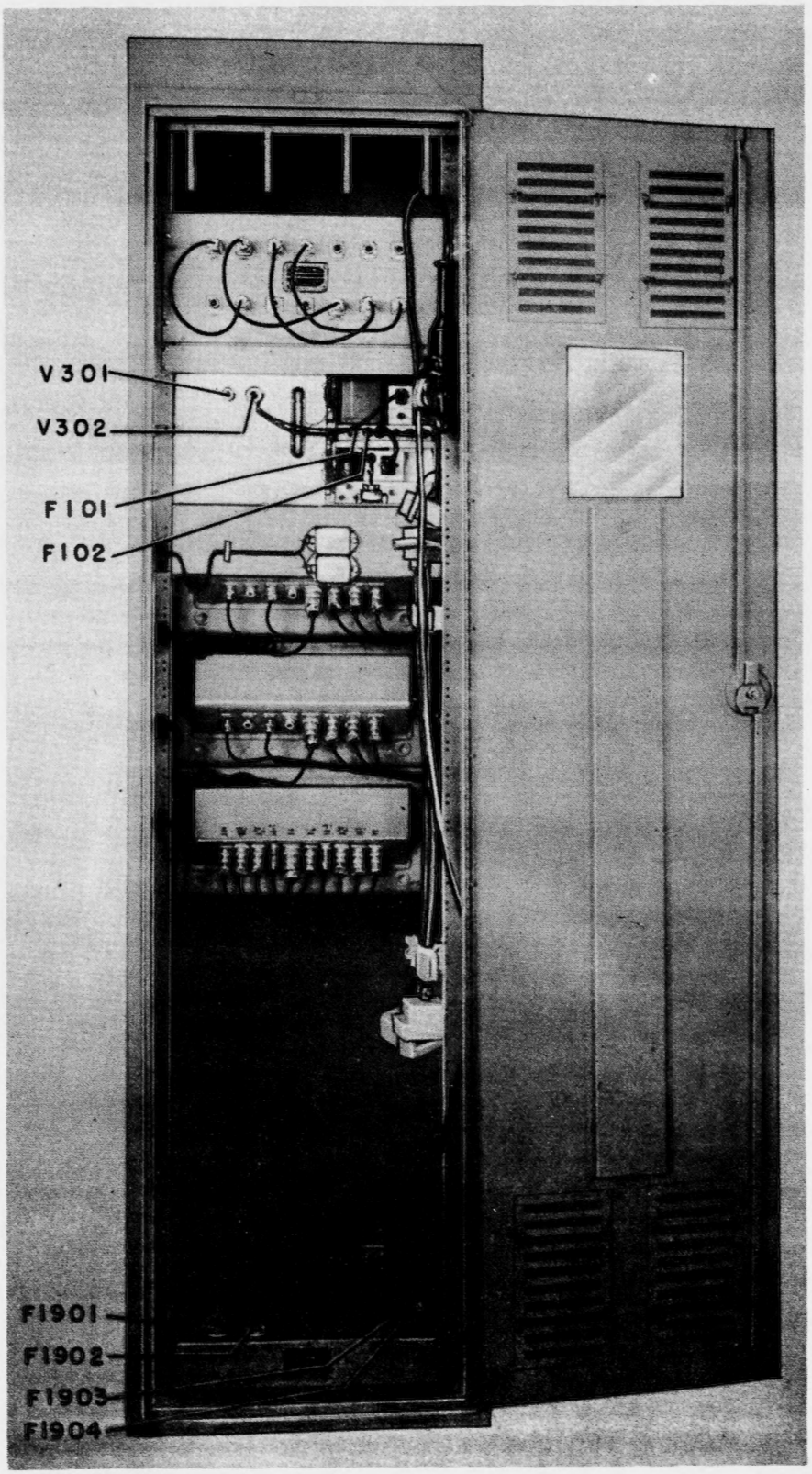


Figure 5-1. Tube and Fuse Locations, Rear View of Cabinet

3. Insert the cap with new fuse into the holder and secure by turning the cap in a clockwise direction until it is tight.

b. REPLACING ELECTRON TUBES. - The discussion on the replacement of electron tubes will be treated separately for units which differ in construction.

(1) TUBE CLAMPS. - Two types of tube clamps are used, the push-and-turn shield and the spring-wire clamp (used only on V101 of the R-F Oscillator). Remove and replace clamps as follows:

(a) PUSH-AND-TURN SHIELD. - Push shield downward, turn counterclockwise as far as it will go, and lift off. Replace tube, slide shield down overlooking pins as far as it will go, turn clockwise, and release.

(b) SPRING-WIRE CLAMP. - Push spring wire down and pull out tube, insert new tube and release spring wire.

(2) RECEIVER TUBE REPLACEMENT. - The location of the sub-miniature electron tubes used in these receivers does not permit the operator to check tube performance. However, the two high voltage rectifier tubes and ballast resistor used in the power supply can be checked by the operator.

(a) SYMPTOMS OF TUBE FAILURE. - If rectifier tubes in the power supply are faulty, the dial light will be lit, but the PILOT light will be out and the receiver inoperative.

(b) ELECTRON TUBE LOCATION. - The two high voltage rectifier tubes and ballast resistor are mounted on the power supply and are accessible from the bottom of the receiver main chassis (see figure 5-2).

(c) LOCATING AND REPLACING RECTIFIER TUBES AND BALLAST RESISTOR. - Slide the receiver chassis out of its case and connect test cable, type CG-1101/FRR, between the connector mounted at the rear of the receiver chassis, and the connector mounted on the filter assembly which is located on the back wall of the receiver case.

Turn the receivers to ON and allow about 30 seconds for the tubes to warm up. The rectifier tube or tubes (V1601 and V1602) in the power supply that fail to glow should be replaced, and the ballast resistor (R1605) should be replaced if it fails to glow with a dull red. Actual replacement may be accomplished as described in paragraph 2b(1)(a) of this section. TURN RECEIVER OFF BEFORE REPLACING ANY OF THESE TUBES. Refer to figure 5-2.

After the tube or tubes in the power supply have been checked, turn receiver off, remove the test cable, and replace the chassis in the case.

(d) DIAL LIGHT EXTINGUISHED. - If the dial light does not light in the NORM position of the NORM-SPARE switch, turn control to SPARE position and report condition to technician.

(e) PILOT LIGHT EXTINGUISHED. - If the PILOT light does not light when the receiver is operating normally and the shutter in the PILOT indicator is open (turned counterclockwise), turn the POWER switch to OFF and unscrew the PILOT cover (keep turning counterclockwise). Slide the receiver chassis out of its case and remove the rubber plunger from its position on the top left side of the chassis. The plunger has an opening on each end. Press the smaller of the openings against the PILOT bulb face until the proper gripping takes place; then press and twist the plunger to remove the bulb. To replace the PILOT bulb, press the smaller of the plunger openings against the PILOT bulb until the proper gripping takes place; then grasp the large opening end of the plunger and insert the PILOT bulb into its proper

receptacle, and press and twist the plunger to lock the bulb in position. Replace the PILOT cover. If it still does not light, report the condition to a technician.

(3) COMPARATOR KEYER TUBE REPLACEMENT. This unit uses push-and-turn shield type tube clamps. Actual replacement of tubes will be performed as described in paragraph 2b(1)(a). Location of a defective tube is described in the sub-paragraph which follows.

(a) LOCATING DEFECTIVE TUBE. - Defective tubes in the Comparator Keyer may be located as follows: Turn the POWER switch to OFF. Slide the chassis out of the case and connect test cable type CX-3262/U between the connector mounted on the rear of the chassis, and the connector mounted on the filter assembly which is mounted on the back wall of the Comparator Keyer case. Turn the POWER switch to ON and allow about 30 seconds warm-up time. Tubes which fail to glow and also feel cold when touched are defective. Refer to figure 5-3 for tube locations.

(b) COMPARATOR KEYER PILOT LIGHT EXTINGUISHED. - Refer to paragraph 2b(2)(e) for location and use of the lamp extractor (plunger). If the PILOT light on the Comparator Keyer does not light when the unit is operating normally, turn the POWER switch to OFF and unscrew the pilot cover (turning counterclockwise). Use the plunger to remove the defective PILOT lamp and to replace the new one. Replace the PILOT cover. Turn the power on. If it still does not light, report the condition to a technician.

(4) R-F OSCILLATOR TUBE REPLACEMENT. - The R-F Oscillator O-330/FRR-32 uses push-and-turn shield type tube clamps except on tube V101 which is secured by a spring-wire type clamp. Actual replacement of tubes will be performed as described in paragraph 2b(1)(a) or (b) as required. Location of a defective tube is described in the following sub-paragraph which follows.

(a) LOCATING DEFECTIVE TUBE. - Defective tubes in the R-F Oscillator may be located as follows: All tubes may be checked visually to see if they are lighted when power is applied or for warmth. The power supply chassis may be withdrawn from the oscillator case in a matter of seconds to permit access to the electron tubes of this unit. To remove the power supply chassis, slip the unit out of the case by simply half-turning its four snap fasteners, two of which are located on the front panel, and two of which are located under the rear of the power supply chassis. Disconnecting the power supply in this manner removes power from the oven and should not last for more than approximately five minutes, if good oven stability is to be maintained. Those tubes which fail to glow when power is applied or feel cold when touched very soon after disconnection are defective and should be replaced. When tubes are replaced, care should be taken to install tube shields. Refer to figures 5-1 and 5-4 for location of tubes in this unit.

(b) R-F OSCILLATOR PILOT OR OVEN LIGHT EXTINGUISHED. - Refer to paragraph 2b(2)(e) for location and use of the lamp extractor (plunger). If either the POWER light or one of the OVEN lights fails to light when the oscillator is operating normally, turn the POWER switch to OFF and unscrew the indicator light cover (turning counterclockwise). Use the plunger to remove the defective lamp and to replace the new one. Replace the indicator light cover. Turn the power ON. If the light still does not light, report the condition to a technician.

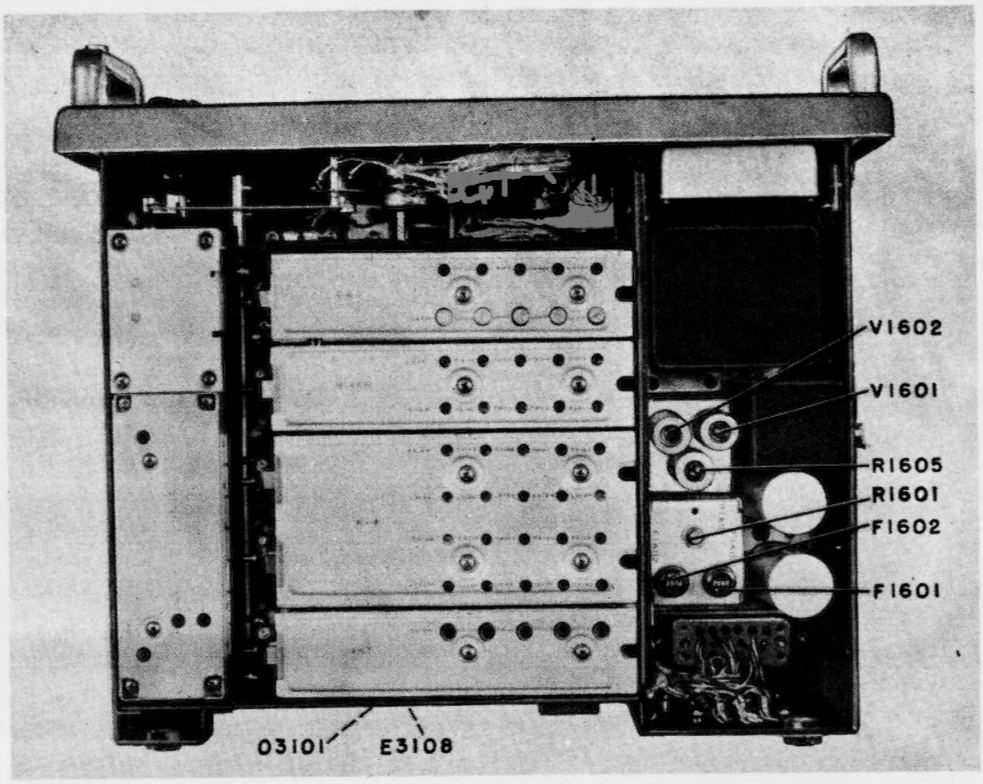


Figure 5-2. Receiver Tube and Fuse Locations

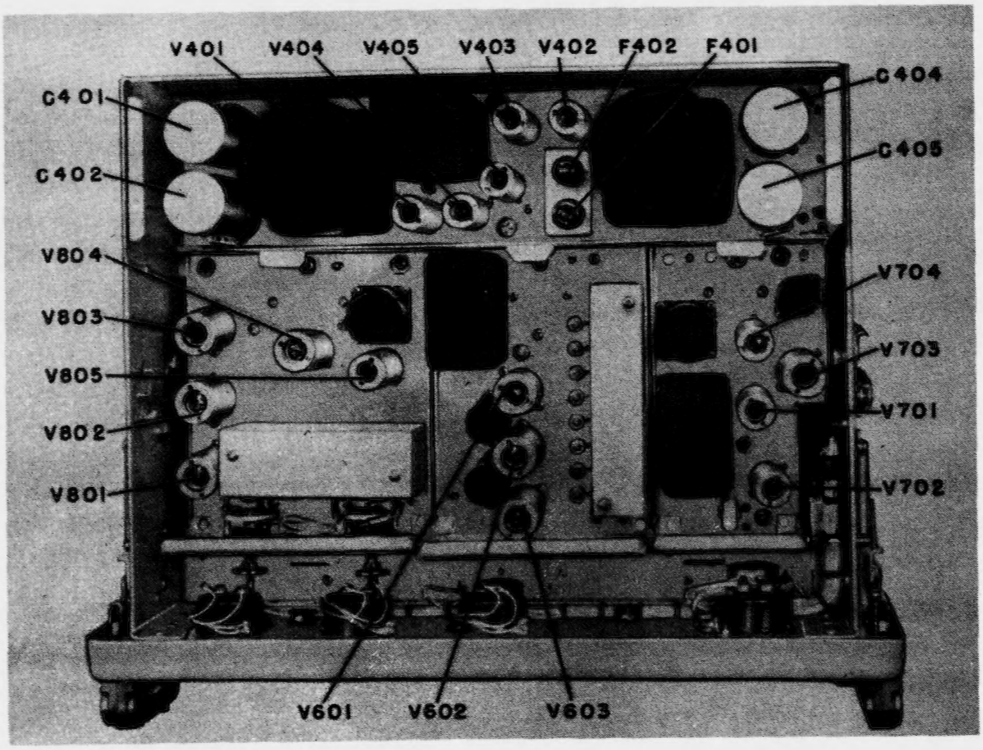
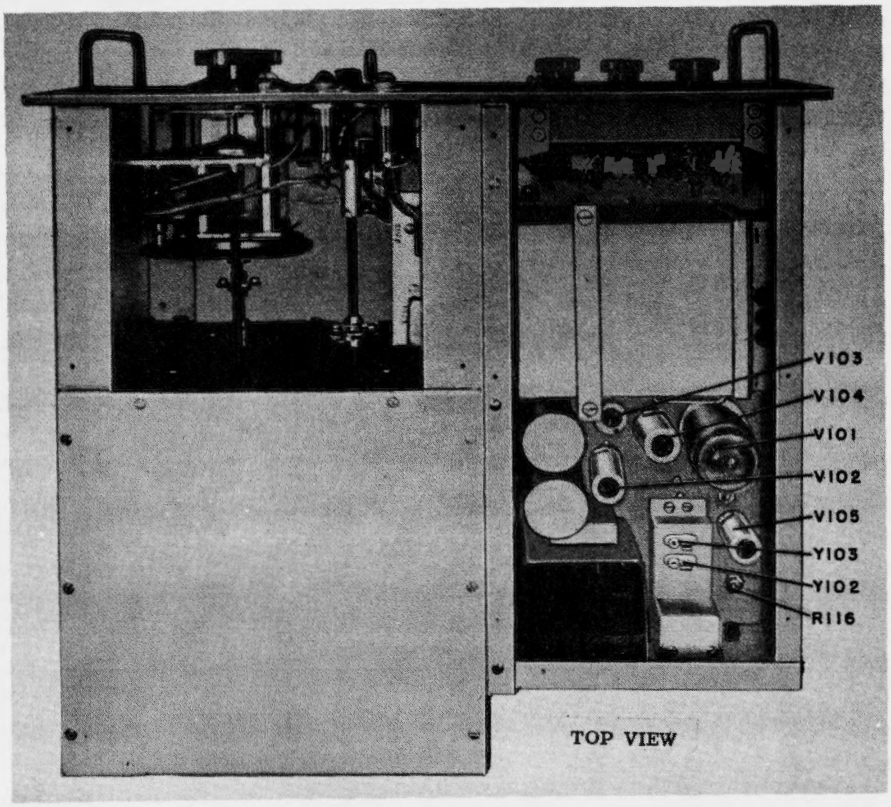


Figure 5-3. Comparator Keyer Tube and Fuse Locations



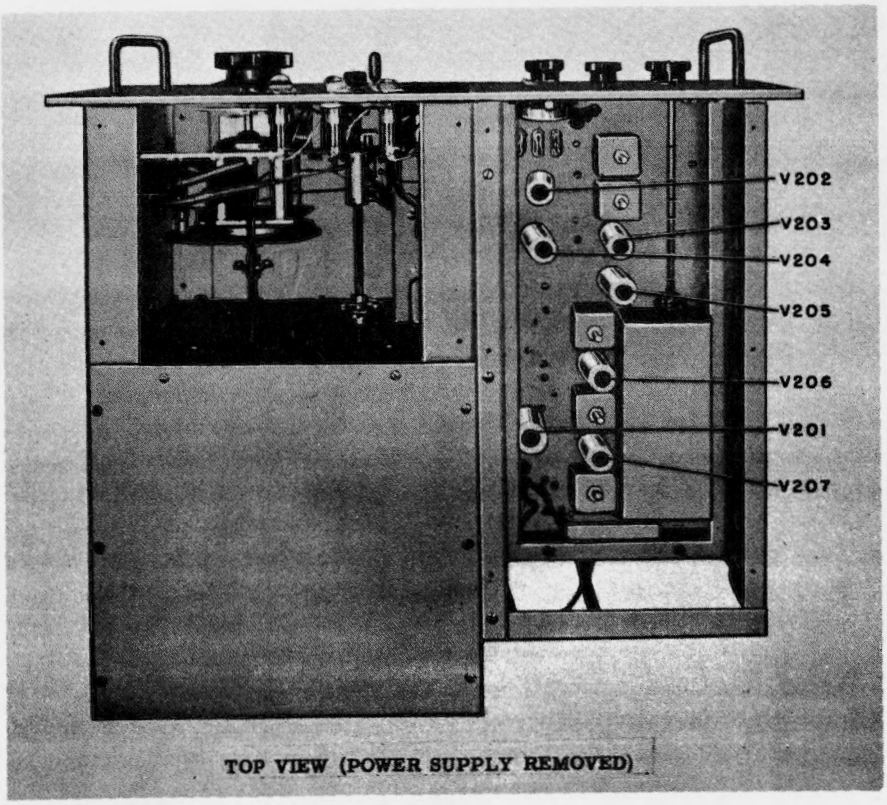


Figure 5-4. R-F Oscillator Tube Locations

SECTION 6

PREVENTIVE MAINTENANCE

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 OF THE "BUREAU OF SHIPS MANUAL," OF THE LATEST ISSUE.

1. ROUTINE MAINTENANCE CHECK CHART.

When the procedure given in table 6-1 is followed, potential mechanical and electrical failures can often be prevented by correcting the unit at fault before it causes interruption in equipment operation. Refer also to table 5-1 of Section 5, which gives procedures for checking overall equipment performance during operation.

2. SLIDE ASSEMBLY ADJUSTMENTS.

The slide assemblies referred to in the following paragraph are those on the Comparator Keyer and both receivers which enable these units to be extended from their case and placed in servicing position.

If the chassis scrapes against the inside wall of the case when it is pulled out to the service position, loosen the two retaining nuts that hold the tilting fulcrum (shown in figure 6-4) using a 5/8-inch open-end wrench. These nuts are located on the inside walls of the chassis. Adjust the tilting fulcrum on both walls of the chassis, as required until the chassis no longer scrapes the housing. When the correct adjustment is found, tighten the two retaining nuts and stake by spreading glyptal or equivalent varnish over each tilting fulcrum and onto the chassis wall to prevent the adjustment from slipping.

3. CHECKING RECEIVER SENSITIVITY.

Refer to figure 6-1 and connect an r-f signal generator, type AN/URM-25 or Model LP series, to the ANT receptacle (J4007) located at the rear of the receiver. Use the required accessories to simulate a standard RMA Dummy Antenna (such as supplied with RF Signal Generator Set AN/URM-25, use impedance adapter MX-1074/URM-25 and Antenna Simulator SM-35/URM-25. With the Model LP series, use Navy type 66017 dummy antenna). After the signal generator is connected as described above, perform the following checks given in steps a, b, c, and d on all five bands of each receiver and compare the results against those given in table 6-2. To perform these sensitivity checks, each receiver must be tested individually. On the receiver, link O3101 should be set in the high impedance position and the OSC switch set at EXT. The R-F Oscillator should be set to a frequency 1600 kc above the test frequency (see paragraph 3d(2) of Section 3) and the DIVERSITY TUNE switch of the receiver being checked (located on the Comparator Keyer) set to TUNE position and the other DIVERSITY TUNE switch set at DIVERSITY.

The information given in table 6-2 indicates typical sensitivity data for Radio Receiver R-618/FRR-32 as measured in the manner described below. Receivers that differ appreciably (by a factor of more than 2 or 3) from these values are probably out of alignment or have more serious difficulties.

TABLE 6-1. ROUTINE MAINTENANCE CHECK CHART

WHAT TO CHECK	HOW TO CHECK	REMARKS
WEEKLY		
100-KC Crystal Alignment	See paragraph 3d(1) of Section 3.	
MONTHLY		
Mounting	Inspect that the mounting bolts or screws are tight.	Tighten mounting bolts, screws and all external fasteners when loose.
QUARTERLY		
Cables	Inspect all connecting cables and plugs for wear and broken parts.	Replace cords that cause clicking sounds when shaken during operation.
Receiver Cleaning	Remove dust from chassis and assemblies using small blower. Remove excess lubricant from band selector and RECEPTION control racks, miter gears and dial gears.	After cleaning, lubricate according to instructions given in figures 6-3 through 6-6.
Cleaning of Other Units	Remove dust and dirt from the cabinet, the R-F Oscillator and the Comparator Keyer chassis, using a small blower, if necessary. Inspect the inside of these units for signs of dampness, molding, charring, and corrosion. Correct any defects found.	It is necessary to remove the R-F Oscillator from the cabinet to thoroughly clean it. Refer to paragraph 2c(2) of Section 2.
Chassis	Inspect for loose interstage connectors (multi-sockets) on chassis.	Tighten as required.
Receiver Plug-in Units and Comparator Keyer Sub Units	Check each plug-in unit and each sub unit for loose connections and appearance of components.	If components show signs of overheating apply corrective maintenance given in Section 7.
Slide Assembly	Remove and replace Comparator Keyer and both receiver chassis in the housing.	If chassis binds on rails, adjust the chassis tilting fulcrum according to directions in Section 6, paragraph 2. Apply lubrication as described in Section 6, paragraph 6.

TABLE 6-1. ROUTINE MAINTENANCE CHECK CHART (Continued)

WHAT TO CHECK	HOW TO CHECK	REMARKS
Receiver Band Selector	Inspect for loose crank pins that connect to switch shafts.	If one crank arm is loose, turn band switch knob to band where receiver noise is loudest, then tighten crank pin, exercising care that it is centered in the slot. If more than one crank pin is loose, line the wafers up according to procedure given in paragraph 6a(8) of Section 7.
Receiver RECEPTION Control	Inspect for loose crank pins that connect to switch shafts.	Line the wafer switches up according to procedure given in paragraph 6a(9) of Section 7.
Tubes	Test all tubes except the subminiature electron tubes of the receivers on a Navy Type TB-3/U series tube tester or equivalent.	Check each tube, one at a time, and replace it in the socket from which it was removed, if its measured characteristics are within the manufacturers' tolerance. Discard those tubes which are found to be below par.
SEMI-ANNUALLY		
R-F Oscillator Voltages	Check all d-c and a-c voltages as indicated in table 7-3 of Section 7.	Investigate any serious discrepancies.
Receiver Sensitivity	Check receiver sensitivity according to instructions in paragraph 3 of Section 6.	Alignment may be required. See paragraph 6a(9) of Section 7.
Receiver Dial Light Adjust	Check alignment of tuning dial and operation of dial light. Check the mirror assembly.	If alignment is required see paragraph 6a(6) of Section 7. If mirror is dirty clean it as per paragraph 7 of this section.
Tone Frequency Accuracy	Check accuracy of Comparator Keyer tone keyer oscillator (V601) frequency settings according to instructions in paragraph 4 of Section 6.	If alignment is required see paragraph 6b(2) of Section 7.
Spare Assemblies	Inspect for evidence of physical damage.	See paragraph 5 of Section 6.

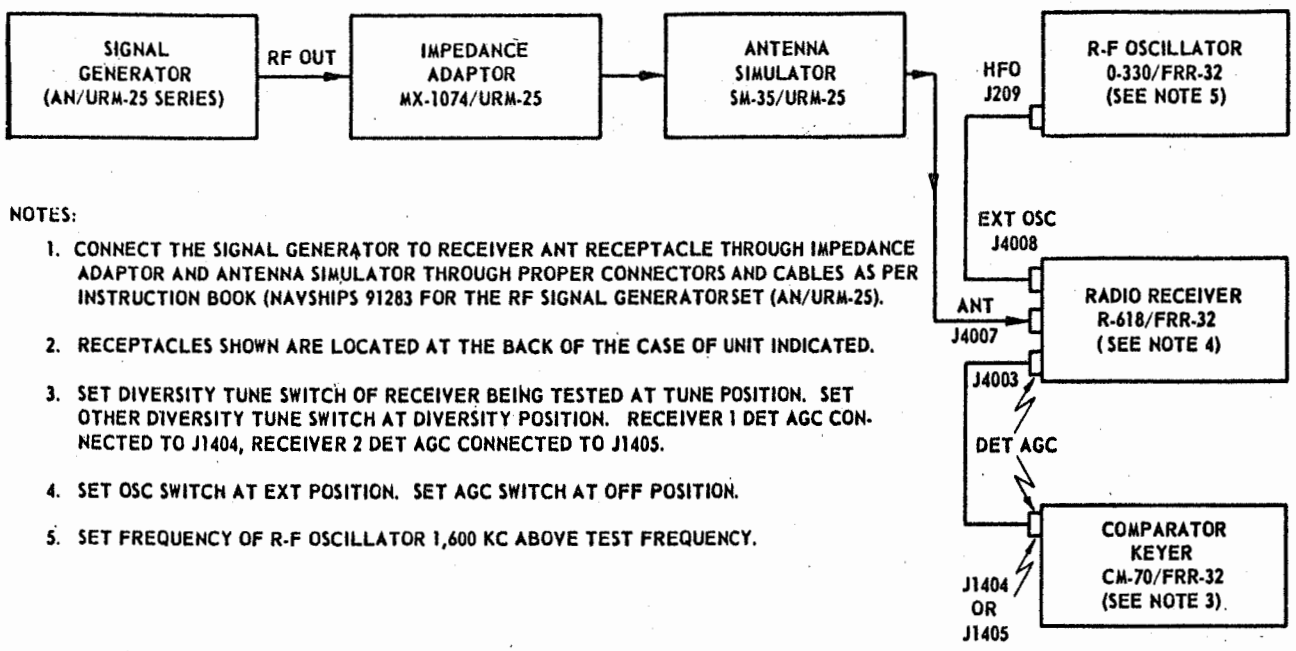


Figure 6-1. Test Set-up for Receiver Sensitivity Measurements

NOTE

Sensitivity measurements should be made with the receivers placed in their cabinet or case. Do not use the Test Cable Assembly CG-1101/FRR, since the input capacity introduced by this cable will cause erroneous readings.

a. A1 BROAD, A1 MEDIUM, A1 SHARP, AND FSK POSITIONS. - The procedure as described in the following steps is for checking the sensitivity of the receiver when A1 signals are being received. The check for FSK will be the same, except that the AGC switch, on the receiver, must be set in the OFF position.

(1) Set the RECEPTION control to A1 BROAD, the OUTPUT control to maximum and the tuning dial to the frequency specified in table 6-2.

(2) Disconnect the standard dummy antenna from the Signal Generator and connect a short across the input of the dummy antenna.

(3) With the ADD DB switch in the -10 db position, adjust the GAIN control for a noise level of -10 db as read on the OUTPUT meter. (This is a total of -20 db with respect to 6 milliwatts, or equivalent to an output level of 60 microwatts or 0.19 volt across 600 ohms.)

(4) Remove the short connected in step (2) and reconnect the dummy antenna to the signal generator.

(5) With the signal generator set for an unmodulated output, tune the signal generator for a maximum indication of the receiver TUNING meter.

(6) Set the RECEPTION control to A1 SHARP, and adjust the receiver FREQ. VERNIER to produce a beat note of 1000 cycles per second. A 1000 cps beat note will occur at the FREQ. VERNIER setting which produces maximum reading on the OUTPUT meter.

(7) Set the RECEPTION control to A1 BROAD.

(8) With the ADD DECIBELS switch in the 0 position, adjust the signal generator for 0 db reading on the receiver OUTPUT meter. (This is equivalent to an output level of 6 milliwatts or 1.9 volts across 600 ohms.)

(9) Under this condition, the signal generator output level is a measure of the receiver sensitivity. Check this sensitivity reading against the corresponding value given in table 6-2.

(10) Measure the sensitivity in the A1 MEDIUM, the A1 SHARP, and the FSK positions of the RECEPTION control. Substitute the appropriate RECEPTION control settings in steps (1) and (7) when performing these checks. Make certain the AGC switch is set at OFF position when measuring FSK sensitivity (with the RECEPTION control in FSK position, an audio beat note of 2550 cycles will be obtained with the FREQ. VERNIER set at 0). FSK measurements should be comparable to the values indicated for A1 BROAD in table 6-2.

b. A3 SHARP AND A3 BROAD POSITIONS.

(1) Set the RECEPTION control to A3 SHARP, the SILENCER control to minimum, the AGC switch at OFF position, and the tuning dial to the frequency specified in table 6-2.

(2) Set the signal generator for 30 per cent modulation at 1000 cps, and adjust the signal generator frequency for a maximum reading on the receiver TUNING meter.

(3) Switch the signal generator to an unmodulated output (leaving signal generator carrier level unchanged) and adjust the receiver OUTPUT control for a 0 db reading on the OUTPUT meter with the ADD DECIBELS switch in the -10 position. (This is equivalent to an output level of 600 microwatts or 0.6 volt across 600 ohms.)

(4) Switch the signal generator back to a modulated output and adjust the generator signal level for 0 db reading on the receiver OUTPUT meter with the ADD DECIBELS switch in the 0 position (this is equivalent to an output level of 6 milliwatts or 1.9 volts across 600 ohms).

(5) Repeat steps (2) and (3) until both conditions can be attained without further adjustment.

(6) With conditions of step (5) satisfied, the signal generator output level is a measure of the receiver sensitivity. Check this sensitivity reading against the corresponding value given in table 6-2.

(7) Set the RECEPTION control to A3 BROAD, and repeat steps (2) to (6).

4. CHECKING TONE FREQUENCY ACCURACY.

The accuracy of the output frequency of the tone keyer oscillator (V601) on the Comparator Keyer should be checked in each of the eight positions of the FREQUENCY switch. This may be accomplished by obtaining a stationary ellipse on an oscilloscope and reading the frequency indicated on the audio oscillator when feeding the AF LINE output of the Comparator Keyer to the vertical input terminals of the oscilloscope and the output of the audio oscillator to the horizontal input terminals of the oscilloscope. Refer to figure 6-2 for manner of connecting the test equipment. The procedure for checking tone frequency is described as follows:

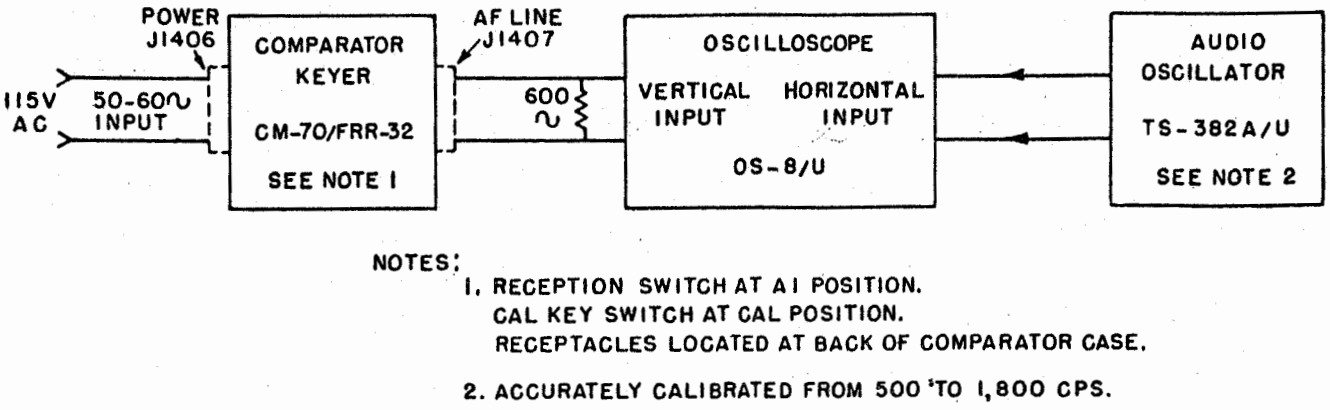


Figure 6-2. Test Set-up for Tone Frequency Accuracy

a. Connect the AF LINE output receptacle, J1407 (located at the rear of the Comparator Keyer), to the vertical input terminals of an oscilloscope (Navy Type OS-8/U or equivalent).

b. Connect a 600-ohm resistor across the vertical input terminals of the oscilloscope.

c. Connect the audio output terminals of the audio oscillator (Navy Type TS-382A/U or equal) to the horizontal input terminals of the oscilloscope.

d. Turn power on to Comparator Keyer, the oscilloscope, and the audio oscillator and allow at least 10 minutes warm-up.

e. Set the RECEPTION control of the Comparator Keyer to A1 position and the CAL KEY switch to CAL.

f. Set the FREQUENCY switch to 595 and adjust the audio oscillator until a stationary ellipse is seen on the oscilloscope. Note the frequency indicated on the audio oscillator. The frequency shown should be 595 cps ±10 cycles.

g. If the output frequency is not within tolerance adjust R601 (located on the top of the Comparator Keyer chassis, see figure 7-7) until the condition is corrected.

h. Repeat step f, checking each of the other seven positions of the FREQUENCY switch and adjust the potentiometer indicated below for frequency correction when necessary.

FREQUENCY switch position	Adjust potentiometer
765	R603
935	R605
1105	R607
1275	R609
1445	R611
1615	R613
1785	R615

TABLE 6-2. SENSITIVITY DATA RADIO RECEIVER R-618/FRR-32

BAND KC	FREQ. MC	SENSITIVITY (Microvolts)				
		A1 BROAD	A1 MEDIUM	A1 SHARP	A3 SHARP	A3 BROAD
1	2.0	2.9	1.9	1.0	2.6	3.8
	2.8	2.9	1.5	1.2	2.4	3.4
	4.0	3.2	1.9	1.1	3.2	4.4
2	4.0	4.2	2.5	1.4	3.6	5.6
	5.6	4.2	2.5	1.3	4.0	5.6
	8.0	4.4	2.6	1.4	3.4	5.2
3	8.0	4.4	2.6	1.3	3.6	4.8
	11.0	4.0	2.4	1.3	3.4	5.2
	16.0	4.7	2.9	1.6	4.3	5.5
4	16.0	4.8	2.9	1.8	5.1	6.0
	19.5	4.7	2.9	1.5	4.8	7.0
	24.0	5.1	3.0	1.8	4.6	6.2
5	24.0	5.6	3.3	1.9	5.0	7.3
	27.7	5.5	3.4	1.8	4.7	7.2
	32.0	5.6	3.5	1.9	5.0	7.5

5. SPARE ASSEMBLIES.

Spare assemblies should be stored in a locker or box that is free of excess moisture. Never stock the spare units on top of each other when unpacked.

6. LUBRICATION.

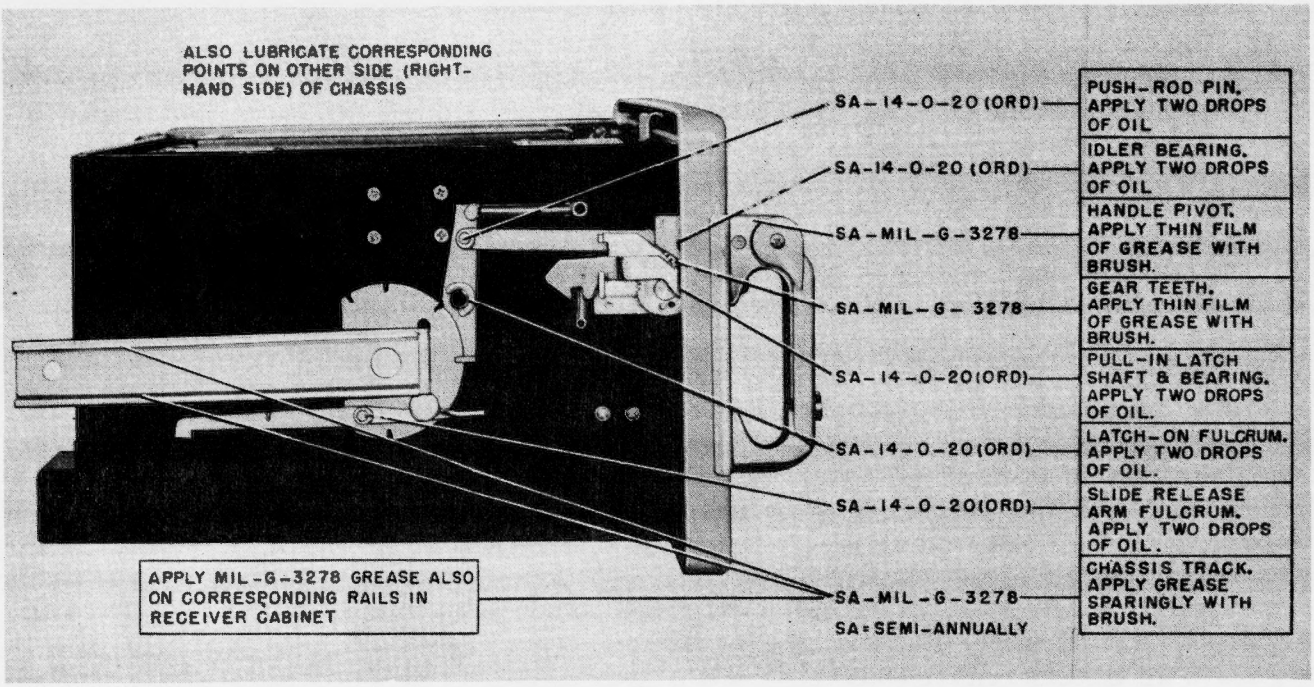
Lubricate the equipment at the time intervals and with the lubricants indicated in figures 6-3 to 6-6 inclusive. Caked or dirty lubricant should be removed with Dry Cleaning Solvent 140-F (5-gallon drum, stock number G51-S-9718-10).

7. CLEANING RECEIVER MIRROR.

Use a soft cloth with soap solution or alcohol and wipe the mirror softly. Lens cleaning tissues are not recommended because of their oil content.

NOTE

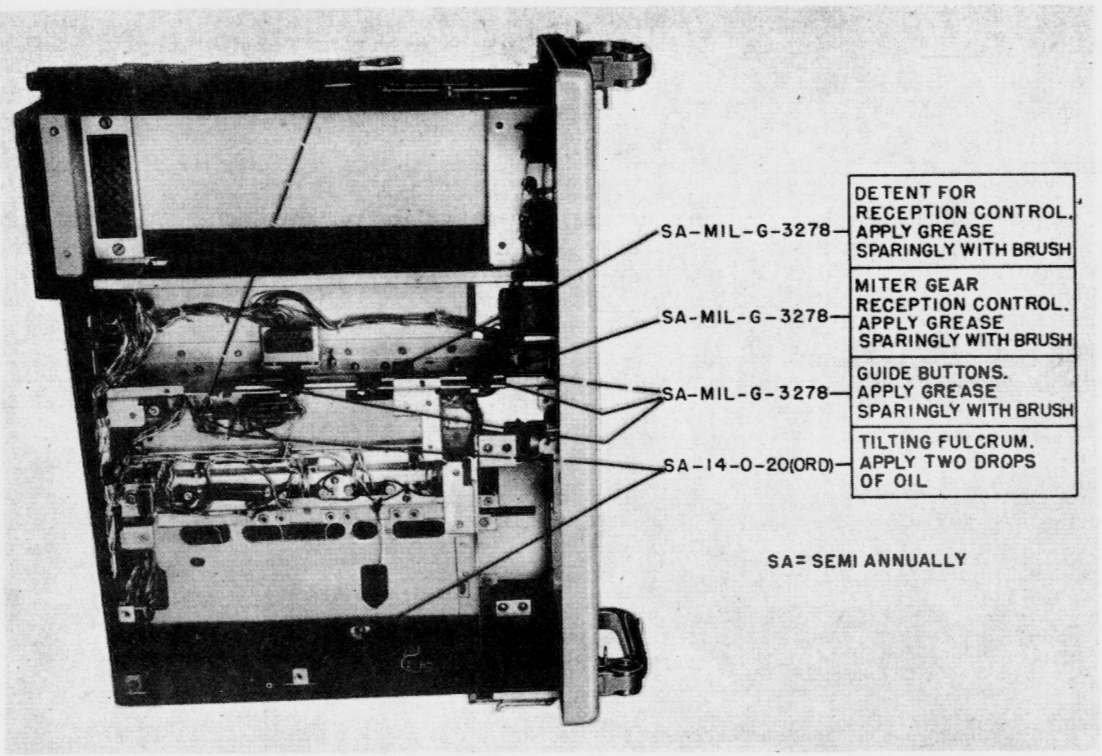
This is a "front surface" mirror and will be permanently damaged if cleaned by any other method.



Specification Number & Table	STANDARD NAVY STOCK NUMBER 8 ox.	1 lb.	5 lb.	25 lb.	1 Pint
MIL-G-3287* Grease, Aircraft & Instruments	W14-G-611-5, R14-G-984-500	W14-G-611-10, R14-G-982-20	R14-G-984-520	R14-G-984-540	
14-O-20 Oil, Lubricating Instrument (Synthetic)					W14-O-975-25

* Formerly AN-G-25.

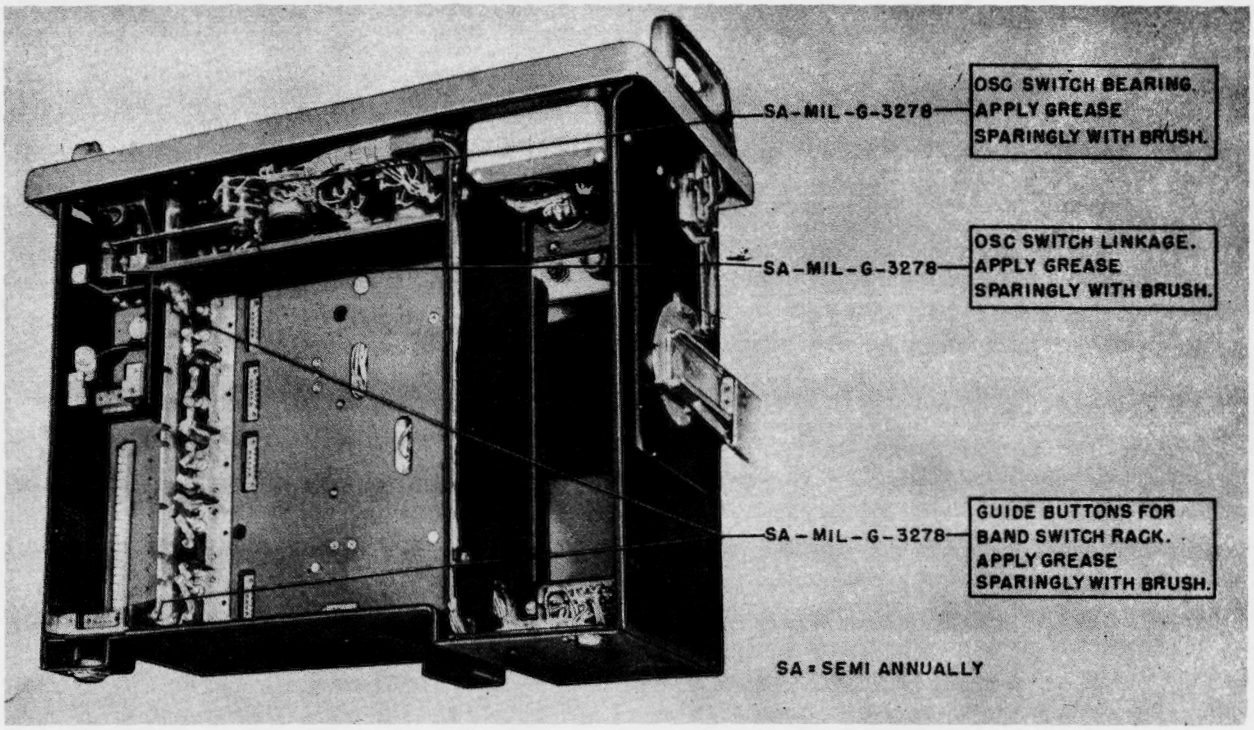
Figure 6-3. Lubrication Chart, Chassis Positioning Mechanism



Specification Number & Table	STANDARD NAVY STOCK NUMBER 8 oz	1 lb.	5 lb.	25 lb.	1 Pint
MIL-G-3278* Grease, Aircraft & Instruments	W14-G-611-5,	W14-G-611-10,	R14-G-984-520	R14-G-984-540	
	R14-G-984-500	R14-G-982-20			
14-O-20 Oil, Lubricating Instrument (Synthetic)					W14-O-975-25

* Formerly AN-G-25

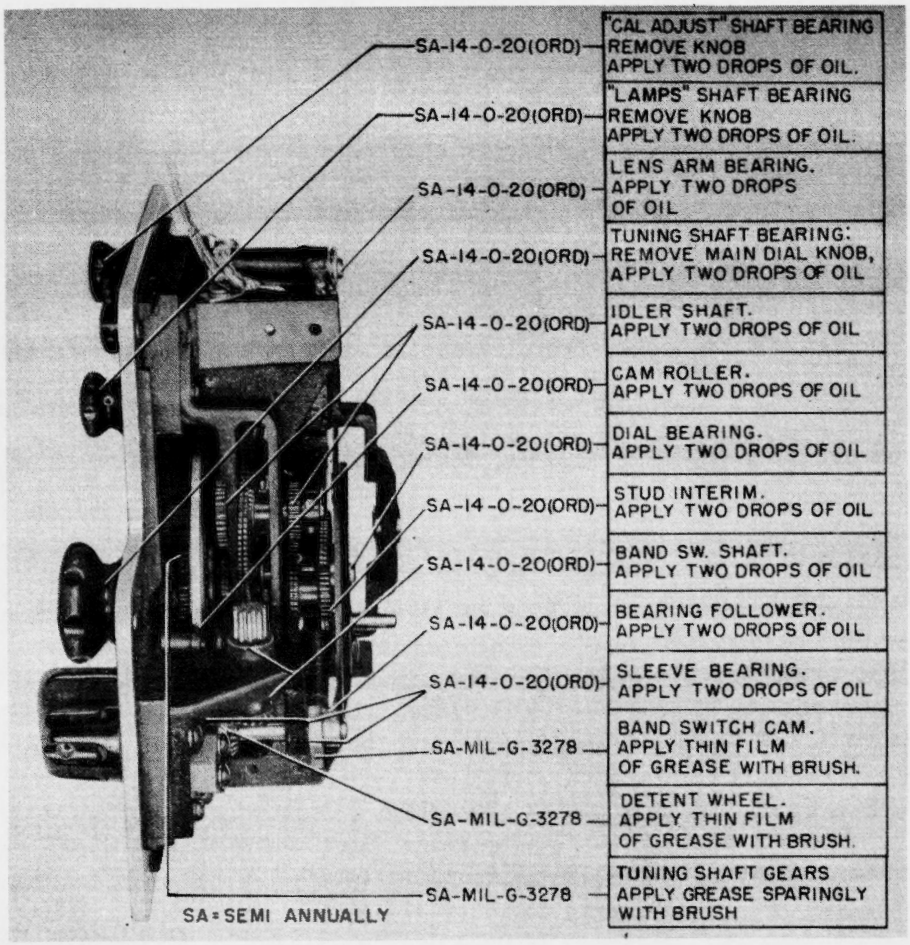
Figure 6-4. Lubrication Chart, Receiver Chassis Top View



Specification Number & Table	STANDARD NAVY STOCK NUMBER 8 oz.	1 lb.	5 lb.	25 lb.	1 Pint
MIL-G-3278* Grease, Aircraft & Instruments	W14-G-611-5,	W14-G-611-10,	R14-G-984-520	R14-G-984-540	
	R14-G-984-500	R14-G-982-20			

* Formerly AN-G-25.

Figure 6-5. Lubrication Chart, Receiver Chassis Bottom View



Specification Number & Table	STANDARD NAVY STOCK NUMBER 8 oz.	1 lb.	5 lb.	25 lb.	1 Pint
MIL-G-3278* Grease, Aircraft & Instruments	W14-G-611-5,	W14-G-611-10,	R14-G-984-520	R14-G-984-540	
	R14-G-984-500	R14-G-982-20			
14-O-20 Oil, Lubricating Instrument (Synthetic)					W14-O-975-25

* Formerly AN-G-25.

Figure 6-6. Lubrication Chart, Receiver Tuning Dial Assembly

SECTION 7

CORRECTIVE MAINTENANCE

WARNING

Voltages over 300 volts shall be measured as follows:

(1) De-energize the equipment. Ground terminals to be measured to discharge any capacitors connected to these terminals. See note (F).

(2) Connect meter to terminals to be measured using a range higher than the expected voltage.

(3) WITHOUT TOUCHING METER OR TEST LEADS, energize the equipment and read the meter.

(4) De-energize the equipment. Ground the terminals connected to the meter before disconnecting meter.

NOTES:

(A) MAKE SURE you are not GROUNDED whenever you are adjusting equipment or using measuring equipment.

(B) In general, USE ONE HAND only when servicing live equipment.

(C) If test meter must be held or adjusted while voltage is applied GROUND the case of the meter before starting measurement and DO NOT touch the live equipment or personnel working on live equipment while you are holding the meter. Some moving-vane type meters should not be grounded. These should not be held during measurements.

(D) DO NOT FORGET that high voltages MAY BE PRESENT across terminals that are normally low-voltage, due to equipment breakdown. Be careful even when measuring low voltages.

(E) DO NOT use test equipment known to be in poor condition.

FAILURE REPORTS

"Report each failure of the equipment, whether caused by a defective part, wear, improper operation, or an external cause. Use ELECTRONIC FAILURE REPORT form DD 787. Each pad of the forms includes full instructions for filling out the forms and forwarding them to the Bureau of Ships. However, the importance of providing complete information cannot be emphasized too much. Be sure that you include the model designation and serial number of the equipment (from the equipment nameplate), the type number of the major unit (from the major unit nameplate), and the type number and reference designation of the particular defective part (from the instruction book). Describe the cause of the failure completely, continuing on the back of the form if necessary. Do not substitute brevity for clarity. And remember - there are two sides to the failure report ---

"YOUR SIDE"

Every FAILURE REPORT is a boost for you:
1. It shows that you are doing your job.
2. It helps make your job easier.
3. It insures available replacements.
4. It gives you a chance to pass your knowledge to every man on the team.

"BUREAU SIDE"

The Bureau of Ships uses the information to:
1. Evaluate present equipment.
2. Improve future equipment.
3. Order replacements for stock.
4. Prepare field changes.
5. Publish maintenance data.

Always keep a supply of failure report forms on board. You can get them from the nearest District Publications and Printing Office."

(F) High-voltage high-capacity capacitors should be discharged with a grounding stick with approximately 10 ohms in series with the grounded line. Where neither terminal of a capacitor is grounded, short capacitor terminals to each other.

WARNING

THIS EQUIPMENT EMPLOYS VOLTAGES WHICH ARE DANGEROUS AND MAY BE FATAL IF CONTACTED. ALWAYS OBSERVE ALL SAFETY REGULATIONS AND PRECAUTIONS.

1. INTRODUCTION.

This section is written to help the technician in localizing trouble and in repairing and adjusting the equipment as necessary. It also contains reference data on electron tube characteristics, crystal characteristics, coil winding, and selectivity curves.

A list of test equipment required for trouble shooting and alignment of Radio Receiving Set AN/FRR-32 is given in table 7-1.

Follow the instructions given in paragraph 2 of Section 3 for removal of the individual chassis from the cabinet and their cases; and in sub-paragraph 3a(1) of Section 3, for placing a receiver or the Comparator Keyer chassis in the servicing position. Two test cable assemblies (Type CG-1101/FRR for use with a receiver and Type CX-3262/U for use with the Comparator Keyer), stored in the rear of the cabinet, are provided to permit operation of these units while in the servicing position. See paragraph 3a of Section 3 for method of connecting these cables.

TABLE 7-1. LIST OF TEST EQUIPMENT REQUIRED FOR TROUBLE SHOOTING AND ALIGNMENT

ITEM NO.	QUAN.	DESCRIPTION	NAVY DESIGNATION
1	1	Multimeter	AN/PSM-4 TS3352/U Series
2	1	Electronic Multimeter	ME-25/U Series
3	1	RF Signal Generator Set	AN/URM-25
	1	Impedance Adapter (Part of AN/URM-25)	MX-1074/URM-25
	1	Antenna Simulator (Part of AN/URM-25)	SM-35/URM-25
	1	Test Lead (Part of AN/URM-25)	CX-1363/U*
4	1	Audio Oscillator	TS-382A/U or higher, Navy Model LAJ Series
5	1	Heterodyne Frequency Meter	Navy Model LR Series
6	1	Oscilloscope	OS-8/U, Model OBL or OBT series
7	1	Tube Tester	TV-3/U Series

* Contains an isolating capacitor.

2. LOCALIZING TROUBLE.

Should trouble develop in the equipment the first step is to analyze the symptom to determine whether the trouble is internal or external; then, if the trouble is internal, the unit in which the fault exists must be determined. Familiarity with the servicing block diagram, figure 7-29, and reference to the trouble shooting chart, table 7-2 will be of assistance in making these decisions. From this point, the faulty circuit and component may be found by following

the procedures outlined in the following paragraphs. Each procedure makes reference to a portion of paragraph 3, Detailed Trouble Shooting, where information is given for a more thorough check of the equipment. The results indicated by these procedures are those to be expected if a unit is in good working order. This data has been compiled from like units in good working order under normal conditions.

When trouble occurs or when it is desired to make a systematic check of the equipment performance, visually inspect the chassis of the separate units; check for charred insulation, discoloration of parts, leakage of potting compound, or other indications of abnormal operation. If the parts appear normal and odor of burned insulation is not detected, proceed by checking each unit separately.

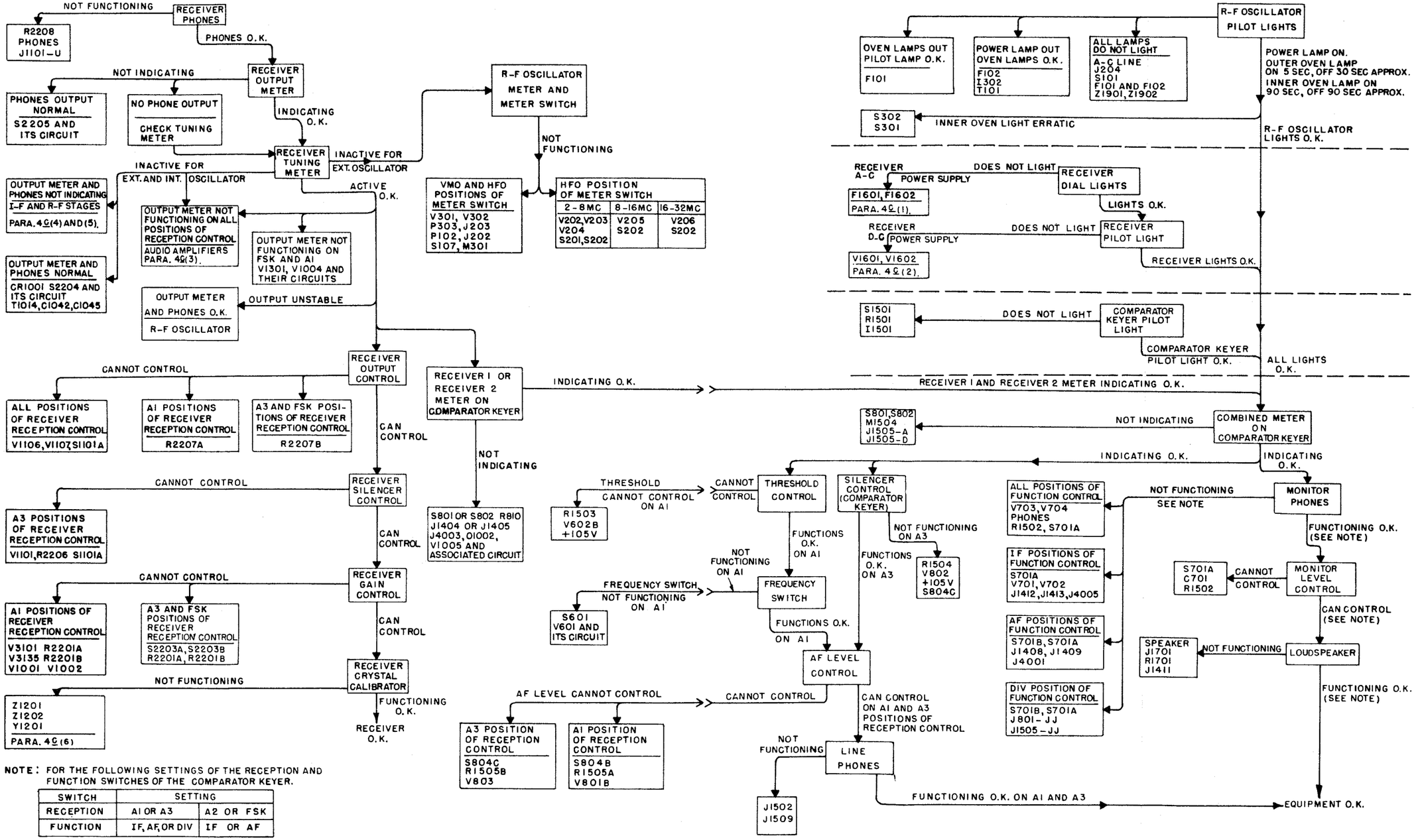
3. LOCATING FAULTY UNIT.

Since the Diversity Receiving Equipment AN/FRR-32 is made up of four major units which are completely independent of each other, maintenance problems are greatly simplified. Any impaired action can be rapidly traced to the faulty unit merely by checking the output of each unit individually. The suggested procedure is to start with the complete equipment in operation as a system and noting the pilot lights, see sub-paragraph a; then examine the outputs of each receiver with headphones for a rough check, see sub-paragraph b. After which, the output of each receiver should then be checked individually in the Comparator Keyer and fed singly, in all combinations, to the monitor sub unit, see sub-paragraph c. The final check is that of the Loudspeaker panel which should include operation of each receiver as a single unit and with both receivers operating in diversity, see sub-paragraph d. These steps will definitely allocate any trouble to the faulty component unit. After the unit at fault has been determined, the interconnecting cables should be checked for secure connections and open circuits or shorts.

a. PILOT LIGHTS. - Turn the main POWER switch on Switch Panel SA-238/G to ON. Also switch all POWER switches on the major units to ON. (NOTE: If the equipment is to be checked out with the R-F Oscillator, it must be remembered that to insure stable operation the R-F Oscillator must have an initial warm-up period of at least 48 hours of continuous duty. Otherwise, both OSC switches on the receivers must be set to the INT position and a warm-up period of at least 10 minutes allowed.) After power has been turned ON to all of the units, check to see if any of the pilot lights are glowing. If none of the pilot lights or tuning dials are lit, replace fuses F1901 and F1902 located on Switch Panel SA-238/G at the bottom of the rear of the cabinet. If the condition is not corrected, see paragraph 4a of this section.

(1) R-F OSCILLATOR LIGHTS. - Check that the POWER light is glowing; after required warm-up, check that the OUTER OVEN light is blinking ON for 5 seconds and OFF for 30 seconds approximately, and that the INNER OVEN light is blinking ON for 90 seconds and OFF for 90 seconds approximately. If these lights are glowing as described proceed to step b of this procedure. If none of these lamps are lit check the power input cable connection. If this does not correct the condition, replace fuses F101 and F102 located at the rear of the R-F Oscillator unit, as shown in figure 7-1. If the condition still exists see sub-paragraph 4b(1) of this section.

(a) POWER LIGHT. - If the POWER lamp is glowing, this indicates that the power input and the power transformer T101 are operating. If this is the case, proceed to sub-paragraph 2. If the POWER lamp is not glowing and the tube filaments of the R-F Oscillator are lit, replace the lamp if it is burned out. Should the lamp still fail to light refer to sub-paragraph 4b(1) of this section. If the POWER lamp is not glowing and the tube filaments are not lit and one or the other or both oven lamps are lit, replace fuse F102, located at the back of the R-F Oscillator. If this does not correct the trouble, see sub-paragraph 4b(1) of this section.



NOTE: FOR THE FOLLOWING SETTINGS OF THE RECEPTION AND FUNCTION SWITCHES OF THE COMPARATOR KEYER.

SWITCH	SETTING	
RECEPTION	AI OR A3	A2 OR FSK
FUNCTION	IF, AF, OR DIV	IF OR AF

TABLE 7-2. TROUBLE SHOOTING CHART

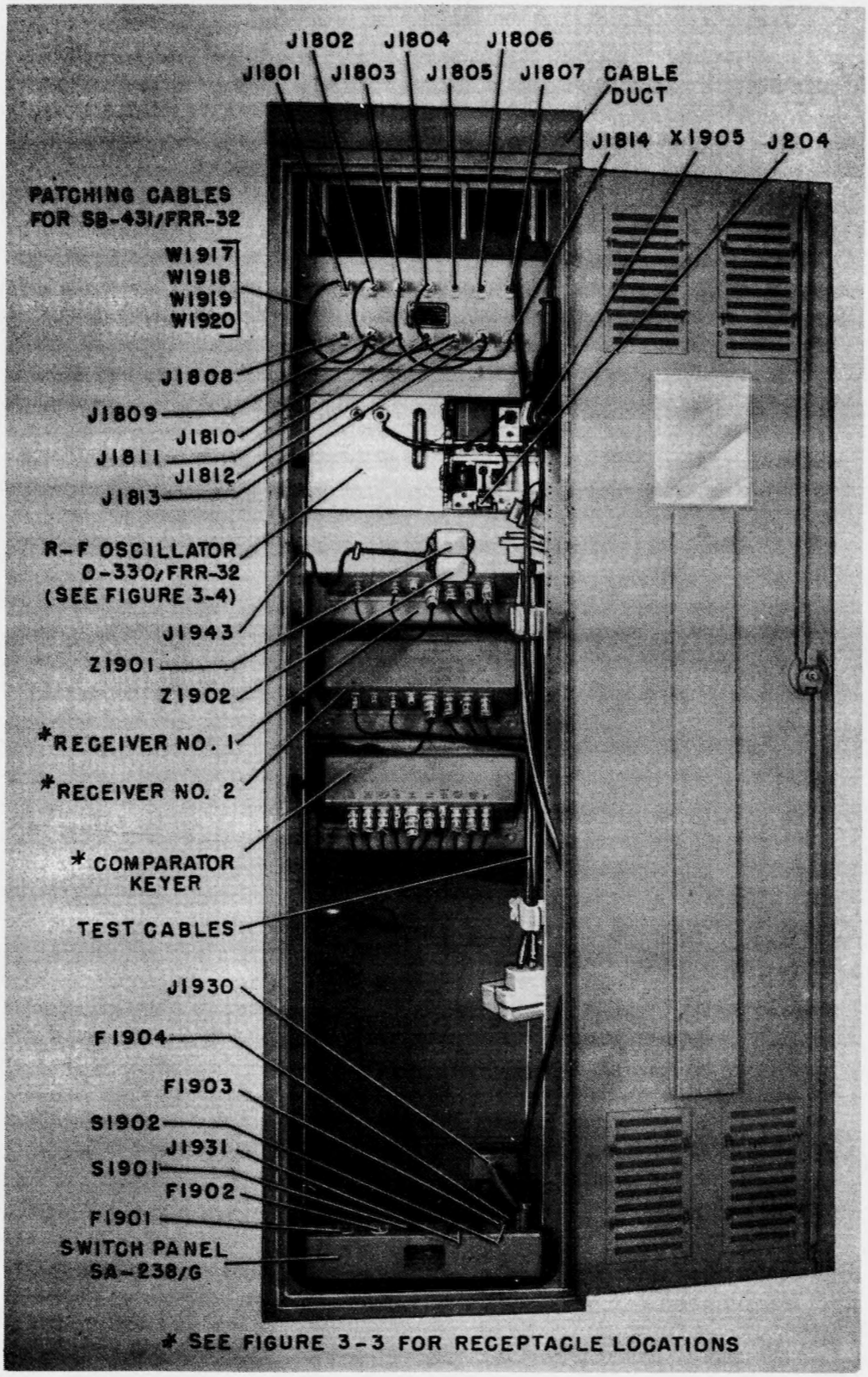


Figure 7-1. Cabinet, Rear View, Showing Component Location

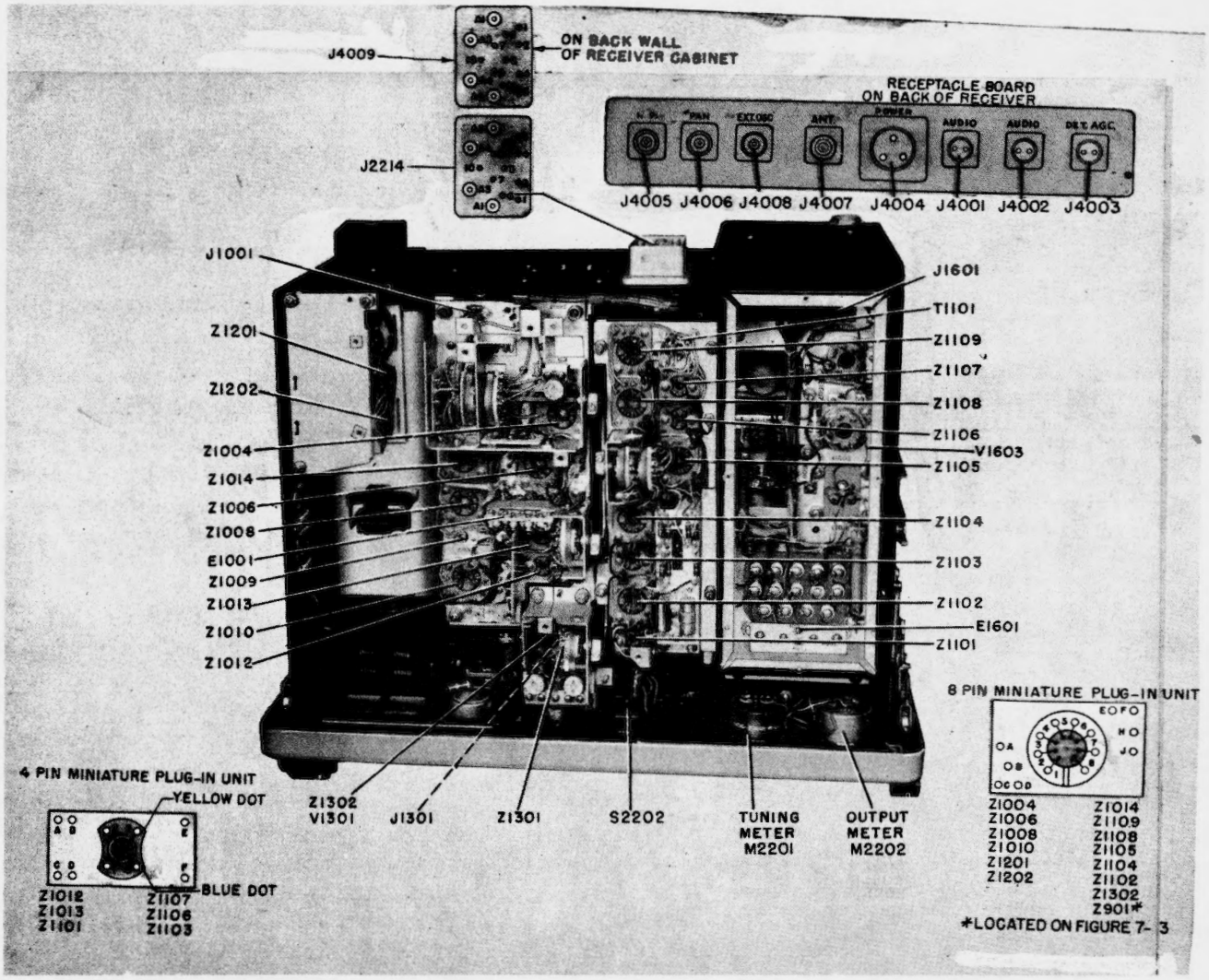


Figure 7-2. Receiver Stage Gain and Trouble Shooting Measurement Points, Top View

(b) OVEN LIGHTS. - In normal operation the oven lights of the R-F Oscillator should glow as described in sub-paragraph 3a(1), depending on the ambient temperature. If the POWER lamp is lit and the OVEN lamps do not light, replace fuse F101. Should the condition still exist, refer to sub-paragraph 4b(2). If one oven lamp is glowing O. K. and the other isn't glowing at all, replace the lamp if it is burned out. If the condition is not corrected refer to sub-paragraph 4b(2).

(2) RECEIVER LIGHTS. - Check the receiver pilot lights of both receivers as follows:

(a) DIAL LIGHTS AND FUSES. - Check that the dial light is glowing. If it is, this indicates that the receiver power input and the power transformer T1601 primary circuits are operating. In this case follow with step (b), which follows. If the dial light is not glowing, switch the LAMPS control to the SPARE position; if the dial light still does not glow, replace fuses F1601 and F1602 located on the bottom of the receiver power supply assembly, as shown in figure 7-3. If this does not correct the trouble, then see sub-paragraph 4c(1).

(b) PILOT LIGHT. - Check that the receiver pilot light is lit: if it is glowing, this will indicate that the receiver d-c power supply is operating. In this case, proceed to step (3) which follows. If the receiver pilot light is not glowing, replace it if it is burned out. If the light still fails to glow replace tubes V1601 and V1602, located in the receiver power supply assembly. If these measures do not correct the trouble, see sub-paragraph 4c(2).

(3) COMPARATOR KEYER PILOT LIGHT. - Check to see if the pilot light on the Comparator Keyer is glowing: if it is, this indicates that the a-c power is being supplied to the power sub unit of the Comparator Keyer. In this case proceed to step b of this procedure. If the pilot light is not glowing and the tube filaments of the Comparator Keyer are lit, replace the lamp. If the condition still exists or the unit is inoperative, see sub-paragraph 4d(1).

b. RECEIVER CHECKS. - The procedure given below quickly and systematically checks the functioning of the receiver by observation of the indicators that are built in the receiver. Two of these indicators (TUNING meter and OUTPUT meter) check the signal circuits, the other two (pilot light and dial light, which were checked in sub-paragraph 3a(2)) are related to the power circuits. After localizing the trouble to an assembly or system, this procedure refers to a portion of paragraph 4, Detailed Trouble Shooting, where information is given for a more thorough check of the receiver. In some cases, where use of the receiver indicators isolates the trouble to a limited section of the receiver, details for localizing trouble are contained right within that paragraph without referring to paragraph 4.

(1) RECEIVER PHONES AND OUTPUT METER. - After noting that all of the pilot lights of the equipment are glowing properly and still trouble exists, the output of each receiver should be examined separately. A rough check may be made by the use of a headset and noting the indications on the receiver OUTPUT meter, while attempting to tune in a signal. NOTE: If the R-F Oscillator is in operation at the time, make certain that it is tuned to a frequency 1600 kc above the frequency of the desired station. To make this check simply insert the headset into the PHONES jack of the receiver being tested and listen to the output. If both the OUTPUT meter and phones of each receiver, give indication of signal then each receiver is operating. If satisfactory reception is obtained from each receiver, proceed to step c of this procedure.

If there is no output or the output is unstable, it may be that the R-F Oscillator is at fault. A quick way to resolve this is to switch both receivers over to internal oscillator operation by setting their OSC switches at INT position and check each receiver output to see if the fault has cleared. Should the fault still remain and it is noted that one of the receivers must be checked more thoroughly, proceed to step (2) which follows.

If just one of the two, either OUTPUT meter or phones gives indication of signal then the trouble lies within the immediate circuits of the other. This trouble can be localized by taking resistance measurements of the faulty circuit. Refer to figure 7-30.

If the OUTPUT meter and phones do not give an indication of signal or if the receiver is operating but other associated devices such as the crystal calibrator or TUNING meter are not, continue on with step (2).

(2) TUNING METER. - Check the TUNING meter while attempting to tune a signal. If the TUNING meter gives an indication of signal, the receiver is operating from the antenna input to the output of the third amplifier (V1003) of the second i-f. If such is the case and previously the OUTPUT meter and phones were found to be inactive in step (1) above, then the trouble is localized to the audio assembly and associated external components and interconnecting lines. For further procedures in localizing this trouble see sub-paragraph 4c(3).

If no known trouble exists thus far, proceed to step (3) below.

If the TUNING meter gives an indication but there is no signal output as indicated by phones or the OUTPUT meter in the CW positions (A1 SHARP, A1 MEDIUM, A1 BROAD, and FSK) of the RECEPTION control, see step (7) below.

If the TUNING gives no indication of signal and the OUTPUT meter and phones give none, then trouble lies in the i-f or r-f systems (see sub-paragraph 4c(4) for further instructions).

(3) OUTPUT CONTROL. - Check the OUTPUT control. If the OUTPUT control is functioning properly, it should vary the output level of signal on the OUTPUT meter. If the OUTPUT control does perform this function, then go to step (4), which follows.

If the OUTPUT control does not perform this function on the A1 positions of the receiver RECEPTION control, then check the A section of the OUTPUT control (R2207) and its associated wiring.

If the OUTPUT control does not perform this function on the A3 and FSK positions of the receiver RECEPTION control, then check the B section of R2207 and its associated wiring.

(4) SILENCER CONTROL. - Check the receiver SILENCER control. This control is active only on the A3 positions of the receiver RECEPTION control. To check its operation, turn the control fully counterclockwise and tune in an A3 signal; then turn the SILENCER control clockwise and note whether background noises are eliminated or not. If they are, the control is functioning properly; proceed to step (5) which follows. If the control is not operating properly, check the noise peak limiter diode (V1101) and its associated circuit, the SILENCER control (R2206) and its wiring, and the portion of switch S1101A associated with the SILENCER control.

(5) GAIN CONTROL. - Check the GAIN control. This control is active on the A1 positions of the receiver RECEPTION control at all times. It is active on the A3 and FSK positions of the RECEPTION control only when the AGC switch is in the OFF position. When operating properly (under conditions stated) the GAIN control should vary the signal output as indicated by the TUNING meter, the OUTPUT meter, and phones. If signal output is varied, as described above, by operation of this control, proceed to step (6) which follows. If the GAIN control does not vary the output level to any degree, then trouble is probably in the immediate circuits of the control (R2201) itself. Check resistance and continuity of the A and B sections of this control and its interconnections until the fault is found. Refer to the receiver schematic diagram, figure 7-30, and to figures 7-2 and 7-3 for location of the interconnections.

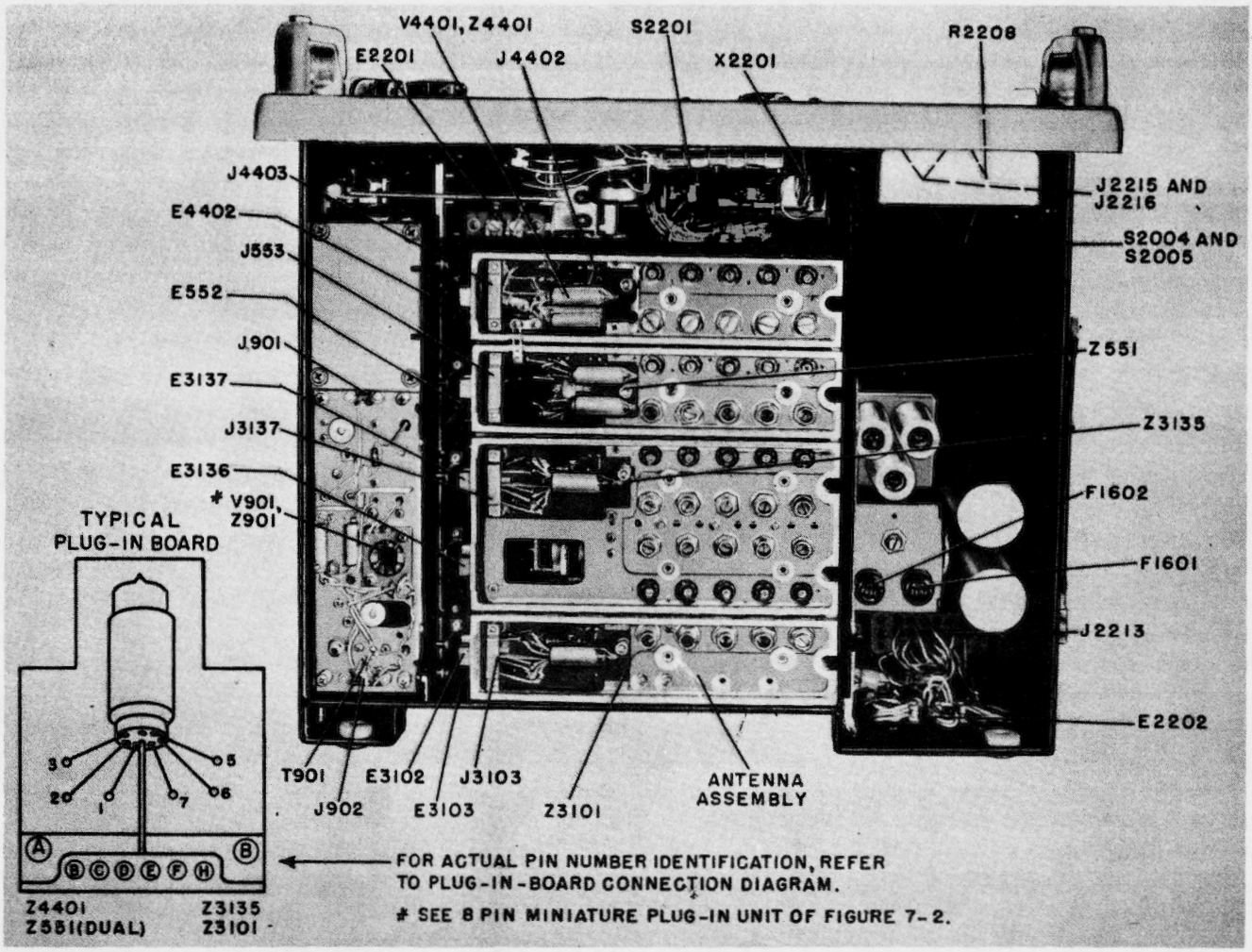


Figure 7-3. Receiver Stage Gain and Trouble Shooting Measurement Points, Bottom View

If the GAIN control varies the output to only a slight degree, then probably the fault lies in either the antenna and r-f section of the control (A section and associated circuit), or in the second i-f section of the control (B section and associated circuit). To localize this trouble to either of the above mentioned sections, check for a slight positive voltage, which should vary as the GAIN control is turned, on terminal 3 of both the A and B sections of the GAIN control. Check this voltage on all the applicable points as shown on the receiver schematic diagram, figure 7-30, until the faulty connection or part is found.

(6) CRYSTAL CALIBRATOR. - Turn the CAL switch to ON. Turn the tuning knob until a zero beat is obtained on the phones. Check this on all five bands and at several frequency check points through each band. Note the position of the tuning dial at zero beat. If the positions of the zero beat coincide with the frequency check points on the dial (inverted V on the frequency scale), or are capable of being brought to coincidence by the CAL ADJUST knob, then continue with step (7) which follows. If zero-beat indications are obtained, but their positions do not correspond to the frequency dial check points, then misalignment of the crystal calibrator oscillator or tuning dial is indicated.

The 95-volt regulated B+ supplies plate voltage to the oscillator. A changed value of this voltage could cause misalignment of this oscillator. Check the regulated B+ voltage between J4403F and ground. If it does not measure 95 volts dc, replace regulator tube V1603 in the receiver power supply. If this fails to give the required 95 volts at the above mentioned receptacle, check the voltage at all the connector pins through which the regulated B+ passes until the fault is found. Refer to figure 7-30 for the receiver schematic diagram and figures 7-2 and 7-3 for location of the associated connectors.

If the B+ voltage does measure 95 volts dc, then check the crystal calibrator frequency, see sub-paragraph 4c(6). Do not tamper with the crystal calibrator adjustment until it is made certain that this frequency is off. If the crystal calibrator frequency is correct, then check that the R-F Oscillator is set to the correct frequency (if it is being used). If the internal oscillator is being used, then align the oscillator section on only the band or bands where calibration cannot be obtained. See sub-paragraph 6a(9)(f) for receiver oscillator and r-f alignment.

If beat notes are not obtained on any position of the band selector and the receiver is otherwise operative, then trouble in the crystal calibrator assembly and interconnections is indicated. See sub-paragraph 4c(6) for localizing this trouble.

(7) FREQ. VERNIER (BFO). - Turn the receiver RECEPTION control to an A1 position and tune in a signal. If a signal can be heard and the audio note can be adjusted to 1000 cps (approx) by the FREQ. VERNIER control, proceed to step (8) which follows.

If a beat note can be heard but cannot be tuned properly, then see sub-paragraph 6a(9)(d) for alignment of the BFO.

If a beat note is not heard but a signal is indicated on the TUNING meter, then the fault most likely lies in the BFO assembly or in the BFO mixer stage (Z1010) of the second i-f. See sub-paragraph 4c(7) for further localization.

If a beat note is not heard on the phones or indicated on the TUNING meter, then the fault lies in the second i-f assembly or the BFO: see sub-paragraph 4c(4) or 4c(7) for further localization.

(8) WEAK OUTPUT. - If all of the receiver controls and meters function properly but the receiver in general appears to have a weak output, check the receiver sensitivity as described in Section 6. If the sensitivity is normal, the trouble lies in the antenna and its connecting line or if both receivers check below normal it may be that the equipment is in the area of weak signal reception.

If the sensitivity is low, take stage gain measurements starting from the audio output stage Z1109 and working back to the receiver input. Nominal stage gain measurements are given in table 7-5. If a stage gain is found to be low, replace the stage. If this fails to correct the trouble, then a fault in the interconnections between the stages is indicated. Check voltage and resistance measurements as given in table 7-8 to further localize this trouble. A low stage gain measurement in the r-f section, first i-f, or second i-f could indicate misalignment, see sub-paragraph 6a(9) for alignment of the receiver.

c. R-F OSCILLATOR CHECKS.

(1) VMO OUTPUT. - Turn METER switch to VMO position and notice the deflection of the needle on the milliammeter on the front panel. It should read approximately 0.9 milliampere. If it does proceed to step (2). If the output reading is low check tubes V301 and V302 in a reliable tube tester such as item 7 of table 7-1. Replace the tube if its measured characteristics are found to be below par. If the trouble is not cleared up, see sub-paragraph 4b (3)(a) of this section.

(2) HFO OUTPUT. - Once it is established that the VMO is operating properly, then any succeeding stage to the HFO may be checked or traced, stage by stage, to its fault. This may be accomplished as follows:

(a) Turn the METER switch to HFO position.

(b) Turn the BAND-MCS dial to the desired band.

(c) Note the deflection of the needle on the milliammeter on the front panel.

(d) If no indication is given, switch the BAND-MCS to each of the other band positions and note the output if any.

(e) If no output is noted in any positions of the BAND-MCS switch, it is a good indication of power supply failure, see sub-paragraph 4b(1)(b).

(f) If output is present for some bands but is missing for one or more bands see sub-paragraph 4b(4).

(3) IFO OUTPUT (NOTE: This output is not used in the AN/FRR-32). - The output of the IFO channel may be checked by placing the METER switch to the IFO position and observing the output reading on the front panel meter, if any. If there is no output, check tube V201 and replace, if necessary. If this does not clear up the fault, refer to sub-paragraph 4b(5) for further checks.

(4) BFO OUTPUT (NOTE: This output is not used in the AN/FRR-32). - The BFO output may be checked in the same manner as IFO output, except that the METER switch must be placed in the BFO position. Refer to the preceding sub-paragraph. If there is no output indication, check tube V105. If the tube checks O. K. or replacement does not correct the trouble, see sub-paragraph 4b(6) for further steps.

(5) THE CALIBRATING CHAIN. - The calibrating chain is composed of two circuits, the VMO output and the 100-kc oscillator. Check the VMO output as described in paragraph 3c(1) above. The 100-kc oscillator may be checked by connecting an oscilloscope, such as item 6 of table 7-1, to pin 1 of V103. Improper mixing action by V103 or faulty low pass filtering components may also contribute to trouble.

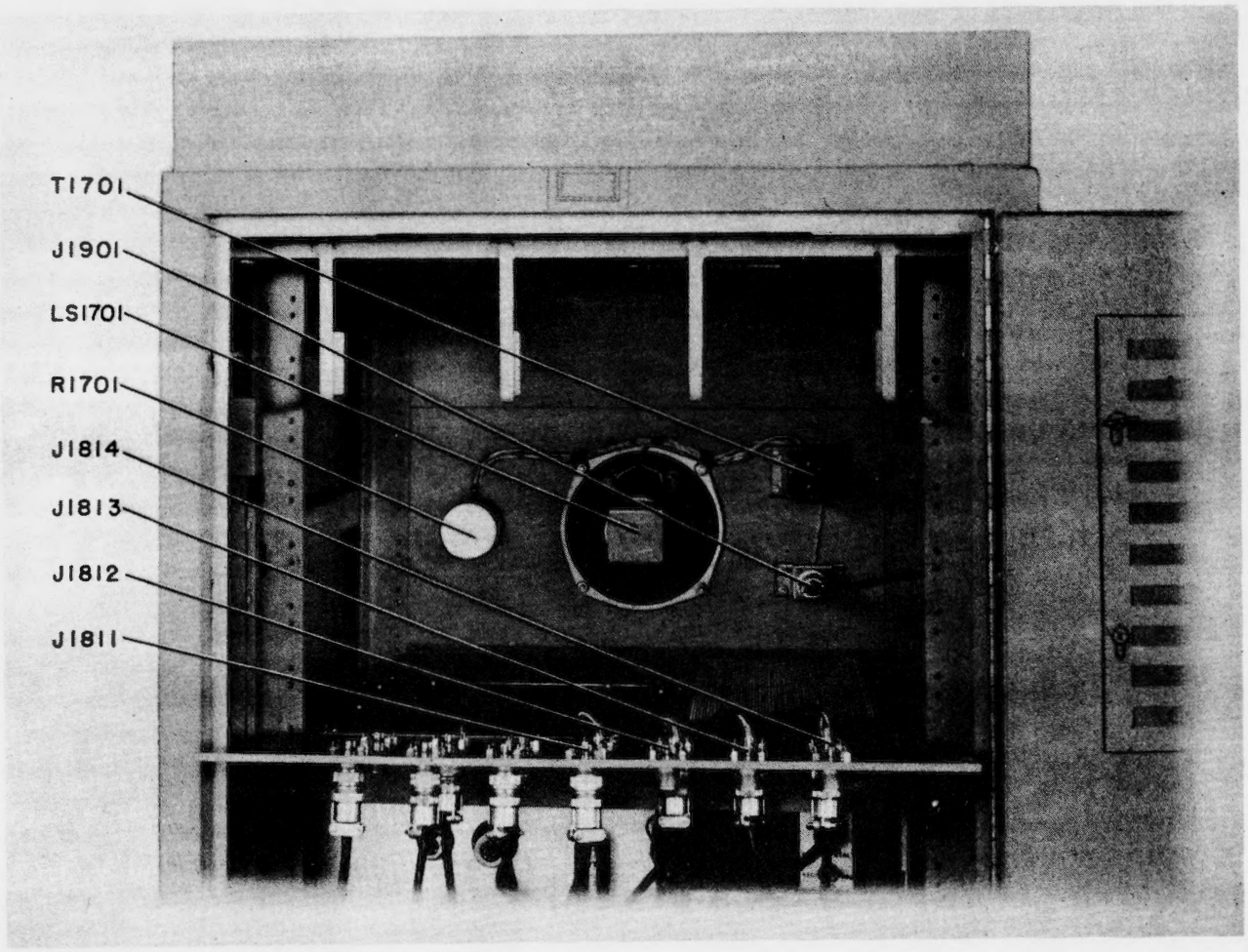


Figure 7-4. Loudspeaker Panel, Rear View

NOTE

The front panel milliammeter circuits have been adjusted so that the following relationships exist in each of the METER switch positions:

HFO position - meter reads 20 volts full scale
IFO position - meter reads 10 volts full scale
BFO position - meter reads 20 volts full scale
VMO position - meter reads 10 volts full scale

d. COMPARATOR KEYER CHECKS.

(1) AF LINE LEVEL METER AND LINE PHONES. - Check the AF LINE LEVEL meter and LINE PHONES while attempting to tune in an A1 or A3 signal. If the meter and phones both give indication of a signal, the AF LINE circuit is operating, but other circuits may not be. For further check continue on with step (2).

If just one of the two, either the meter or phones gives an indication of signal, then the trouble lies in the immediate circuit of the other. This trouble may be localized by taking resistance measurements of the faulty circuit. Refer to figure 7-31.

If neither the AF LINE LEVEL meter nor the LINE PHONES is operative, continue with step (2).

(2) MONITOR PHONES. - Insert the headphones into the MONITOR PHONES jack and check for the presence of a signal. If the signal is not audible, turn the MONITOR LEVEL potentiometer clockwise until the signal is heard. If the signal is heard, proceed to step (3). If the control is turned fully clockwise and no signal is heard, check to see if there is indication of a signal being received, on the COMBINED meter. Should the COMBINED meter show evidence of a signal, check for a signal at the loudspeaker. If after turning the speaker LEVEL control fully clockwise, no signal is heard, the trouble lies in the monitor sub unit or its connection to the Comparator sub unit. In which case the monitor sub unit will have to be checked more thoroughly. Refer to sub-paragraph 4d(3).

If a signal is heard at the loudspeaker and not at the MONITOR PHONES, resistance measurements check of the MONITOR PHONES circuit must be made. Refer to figure 7-31.

(3) COMBINED METER, RECEIVER 1 AND RECEIVER 2 METERS. - With either one or both receivers set for diversity operation, the COMBINED meter should indicate presence of a signal. If indication is given and no known trouble exists go on to step (4). If no indications are present, make certain that both DIVERSITY TUNE switches are in DIVERSITY position and that the FUNCTION switch is at DIV. Also check that connections of the interconnecting cables are tight. If the trouble still exists, turn the RECEIVER 1 DIVERSITY TUNE switch to TUNE and the FUNCTION switch to AF1. If a signal is being received RECEIVER 1 meter should give indication. If it does, the trouble lies in the circuit of the COMBINED meter and a resistance measurements check of this circuit is necessary. Refer to the Comparator section of figure 7-31.

If no signal is indicated, turn the RECEIVER 1 DIVERSITY TUNE switch to DIV, the RECEIVER 2 DIVERSITY TUNE switch to TUNE, and the FUNCTION switch to AF2. Check for presence of a signal on the RECEIVER 2 meter.

If a signal is present and Receiver 1 is known to be operating properly then the trouble lies in the RECEIVER 1 meter and/or the COMBINED meter circuit. This condition necessitates a resistance measurements check of these circuits (refer to figure 7-31).

If under all of the above conditions no signal is being received, further checks of the comparator sub unit's circuits must be made. Refer to sub-paragraph 4d(2).

(4) LEVEL CONTROLS.

(a) AF LINE LEVEL. - Check the AF LINE LEVEL potentiometer. If it is functioning properly, it should vary the output level of signal on the AF LINE LEVEL meter on the A1 and A3 positions of the RECEPTION control. If the control does perform this function, go to step (b) which follows.

If it does not perform this function, check R1505A and its associated wiring, switch S804B, and tube V801B.

(b) MONITOR LEVEL. - Check the MONITOR LEVEL potentiometer. If it is functioning properly, it should vary the output level to the MONITOR PHONES and to the LOUDSPEAKER. If the control does perform this function, go on to step (5).

If it does not perform this function, check R1502 and its associated wiring, switch S701A, and capacitor C701.

(5) SILENCER CONTROL. - Check the SILENCER control. This potentiometer is operative only in the A3 position of the RECEPTION control. To check its functioning, turn the control fully counterclockwise and tune in an A3 signal; then turn the SILENCER control clockwise and note whether the control eliminates the background noises or not. If it does, proceed to step (6). If not, check tube V802 and its associated components, +105 volts d-c supply to R1504 and to V802, switch S804C, R1504 and its associated wiring (refer to figure 7-31).

(6) THRESHOLD CONTROL. - The THRESHOLD control is active only when the RECEPTION control is in the A1 position. It is normally adjusted to a point where only the desired CW signals being received will trigger the tone oscillator and weaker spurious pulses will not. The THRESHOLD control is at maximum sensitivity when it is in the fully counterclockwise position. If it is noted that during reception of A1 signals, spurious noise pulses break through and key the tone oscillator, turn the THRESHOLD potentiometer clockwise until the reception is clear and distinct. If operation of the control is satisfactory, proceed to step (7). If the control fails to operate properly, check tube V602 and its associated components, +105 volts d-c supply to R1503 and V602B, and R1503 and its associated wiring (refer to figure 7-31).

(7) CAL-KEY SWITCH AND FREQUENCY CONTROL. - In CAL position, the CAL-KEY switch permits tone signals from the tone oscillator to be passed continuously for amplitude and frequency adjustment of the tone oscillator circuit. In the KEY position tone signals will only be permitted when CW (A1) pulses are received. The particular tone frequency is selected by varying the setting of the FREQUENCY switch. When this switch is set at EXT position, tone from an external oscillator may be used to modulate the CW signals, if other than one of the eight preset frequencies is desired.

To check these controls, tune in an A1 signal, place the CAL KEY switch in CAL position and the FREQUENCY control at any position other than EXT; a steady continuous tone should result. Then vary the setting of the FREQUENCY control through the other seven pre-set frequency positions; different tones should be produced. Now, place the CAL-KEY switch in KEY position and tones should only be produced during the intervals of the received cw pulses. If the CAL-KEY switch does not act as described check S1502 and its associated wiring. Should any individual tone frequencies fail to operate check switch S601, its associated wiring, and the individual frequency components (refer to the Tone Keyer section of figure 7-31).

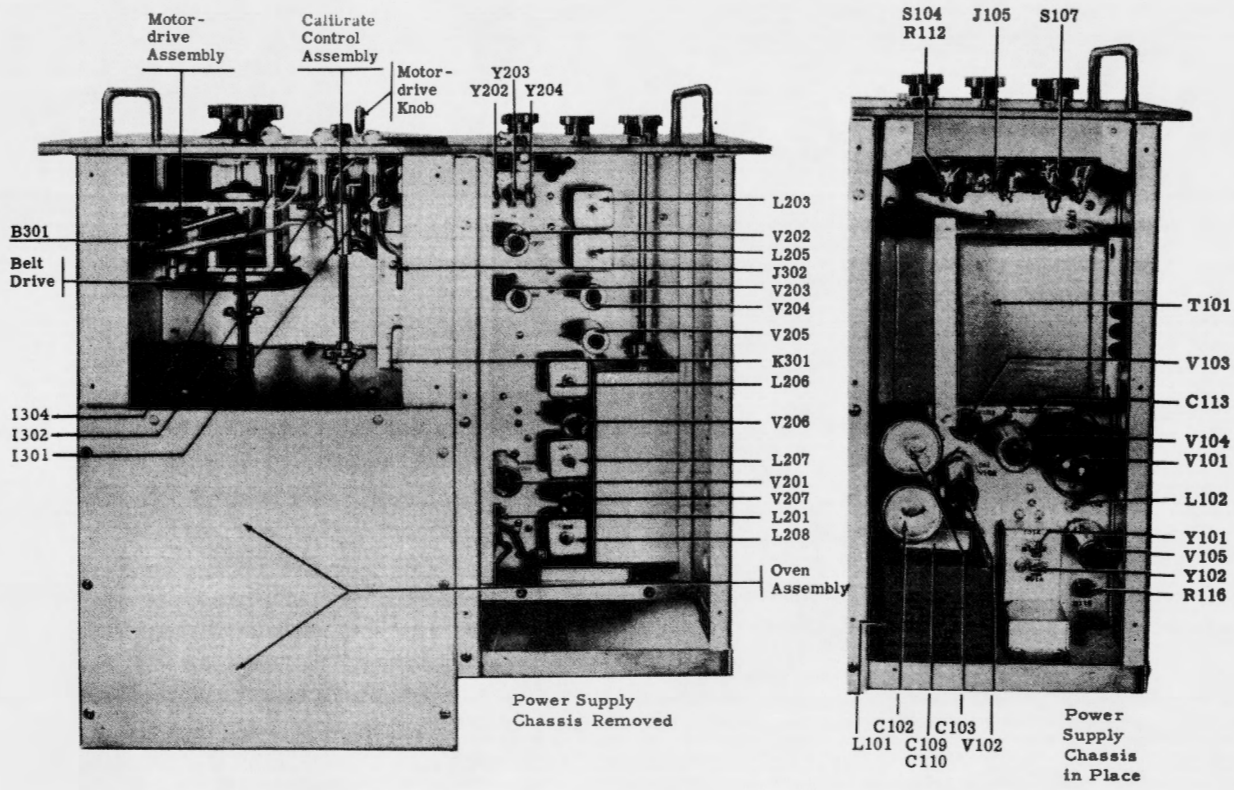


Figure 7-5. R-F Oscillator, Showing Component Location (Sheet 1)

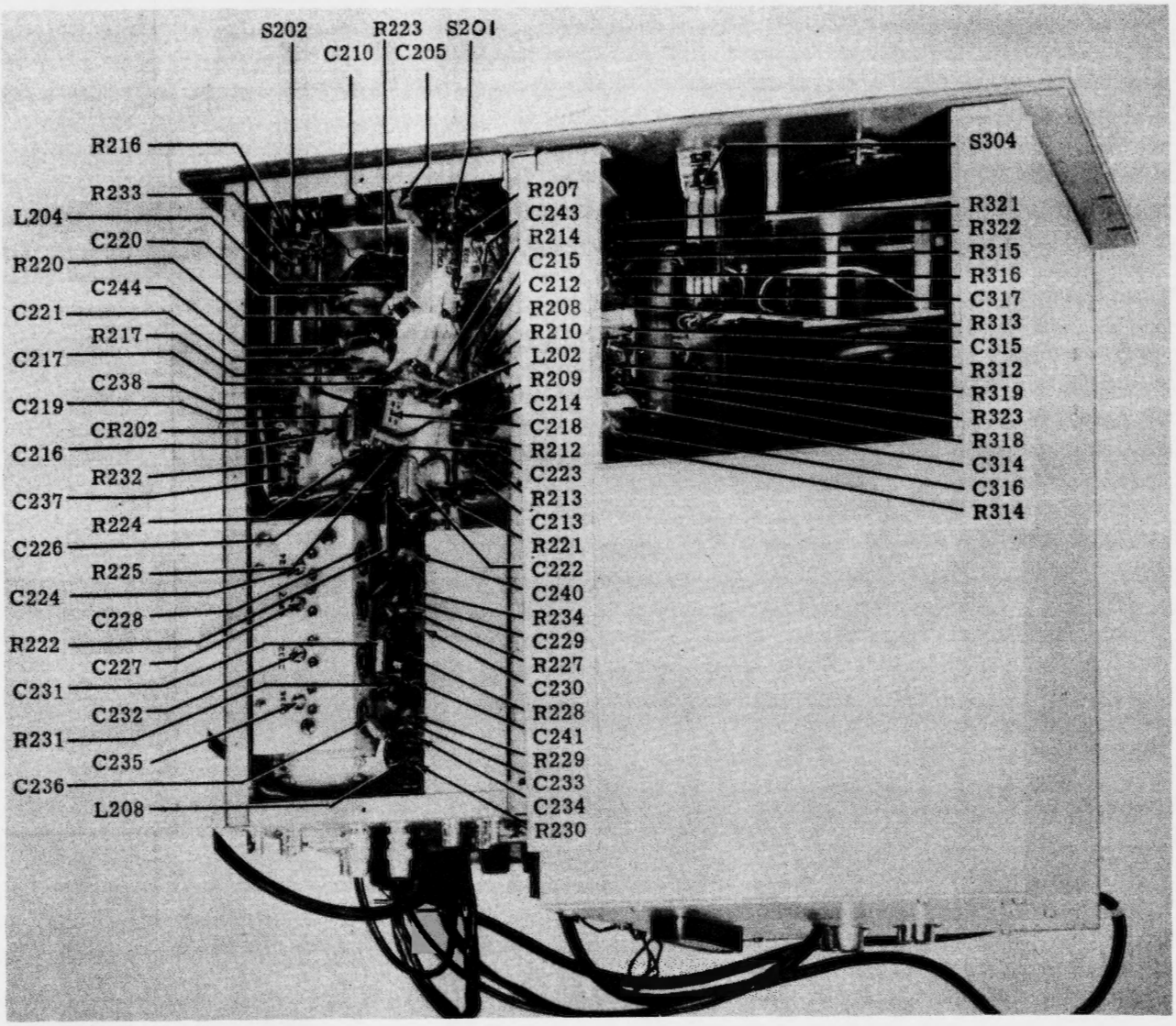


Figure 7-5. R-F Oscillator, Showing Component Location (Sheet 2)

4. DETAILED TROUBLE SHOOTING.

The following procedures constitute a detailed, systematic, and complete check on the functioning of the equipment. These procedures should be used after trouble has been localized by the procedures described in paragraph 3. Refer to the appropriate schematic diagram, component location illustrations, and connection (wiring) diagrams as required.

a. CABINET. - (None of the pilot lights or dial lights glowing and all POWER switches in ON position, as per paragraph 3a.) After fuses (F1901 and F1902) have been eliminated as a possible source of trouble, throw the trouble lamp switch, S1902, to ON. If the trouble lamp glows, a-c line voltage is present at the input to the cabinet and the trouble lies between the fuses and the input to the separate units. See step (2) below and follow the procedure described.

If the trouble lamp does not light, then there is trouble in the input a-c line to the cabinet. Follow the procedure described in step (1) which follows. Refer to figure 7-1 for location of parts in this procedure and to figure 7-33 for the schematic diagram.

(1) Remove the screws which hold the top cover of Switch Panel SA-238/G and pull the top cover up as far as the connecting leads will allow. Then check by use of a voltmeter, similar to item 1 of table 7-1, for presence of a-c line voltage between one terminal of F1901 and one terminal of F1902. If no reading is obtained make certain that both leads of the voltmeter are connected to the terminals of the fuses that are connected to the conductors of the input cable. If no reading is obtained at this point, there is trouble in the power cable which connects to the equipment or the a-c line voltage source. If a reading is obtained on the side of the fuses which are connected to the a-c input cable and not on the other, then either a fuse or its holder is at fault. Check the continuity of these parts and replace the one at fault.

(2) Since the trouble lamp lights, a-c line voltage is being applied to the equipment but is being interrupted before it gets to the various units. In this case the first step toward locating the trouble is to check for a-c line voltage at the convenience outlet J1903. If a-c line voltage is not present here, trouble lies in the wiring between F1901 or F1902 and S1901. If a-c line voltage is present, then the trouble lies in the main power switch, S1901, or the wiring to the receptacles on the raceway at the side of the rear of the cabinet, to which the power connectors of the various units are attached. In either case, remove the screws which hold the top cover of Switch Panel SA-238/G and pull the cover up as far as the connecting leads will permit. Check for presence of a-c line voltage between the contacts on both sides of S1901 (make certain that S1901 is in the ON position). If indication is given on the input side but not on the output side, replace the switch. If indication is given on both sides, turn the power off and make a continuity check of the wiring from the switch (S1901) to the output receptacles on the raceway.

b. R-F OSCILLATOR. - Careful observation while operating the controls of Radio Frequency Oscillator O-330/FRR-32 may sectionalize any faults to a particular stage or circuit. Some faults, such as burned out resistors, r-f arcing, and shorted transformers, can often be located by sight, smell, or hearing. A logical division of R-F Oscillator would indicate four main operating divisions and the power supply. The four divisions are the HFO chain, the IFO, the HFO, and the calibrating chain. In this equipment the divisions most used are the HFO chain and the HFO. The unit is so designed that every stage may be checked, thus facilitating trouble shooting. The procedure described in the following sub-paragraphs constitute a method of checking this unit with reference to the Trouble Shooting Chart, table 7-2, and the R-F Oscillator schematic diagram, figure 7-32.

(1) POWER SUPPLY.

(a) A-C POWER. - (POWER lamp, oven lamps, and tube filaments not glowing, as per paragraph 3a.) After fuses F101 and F102 have been eliminated as a source of trouble,

remove the R-F Oscillator power cord from the receptacle (which mates with J204, see figure 7-1) on the back of the R-F Oscillator filter assembly and check for presence of a-c line voltage at the receptacle. If voltage is not present at this point the trouble lies in the associated filter assembly or its connection or cable to receptacle J1943. In which case, remove the power input connector of the filter assembly and check for a-c line voltage at J1943. If no line voltage is present, make a check of the cabinet wiring as described in paragraph 4a. If line voltage is present at J1943, remove the power cord of the R-F Oscillator filter assembly and make a continuity check of the power cord, filters Z1901 and Z1902 and the leads to the receptacle which mates with J204. If the filters are not continuous, emergency operation may be accomplished by switching the receivers to local oscillator operation or by bypassing the filters with a jumper cable, otherwise replace the defective filter. To bypass Z1901 and Z1902 connect J204 to J1943 direct.

If a-c line voltage is present at the output receptacle of the R-F Oscillator filter assembly the trouble lies in the power input cable to the R-F Oscillator. In which case, remove the R-F Oscillator from the cabinet, then remove its power supply from the chassis (see paragraph 2c(2) of Section 3) and check the continuity of the power input cable and transformer T101, also the operation of switch S101.

(b) D-C POWER. - (POWER lamp and OVEN lamps glow properly but there is no reading on the milliammeter for any position of the METER switch.) Check the rectifier tube, V101 and the voltage regulator tube V102. If defective, replace. If this does not clear up the trouble, remove the R-F Oscillator chassis from the cabinet, then remove the power supply unit from the chassis and make voltage and resistance checks of the circuit about T101 and V101. Refer to table 7-3 for typical voltage measurements of a normally operating R-F Oscillator O-330/FRR-32. Figure 7-32 shows its schematic diagram.

(2) OVEN. - (POWER lamp lit and OVEN lamps out.) After fuse F101 and the OVEN indicator lamps have been eliminated as a source of trouble, remove the R-F Oscillator unit from the cabinet. Then, remove its power supply from the chassis and make continuity checks from S101 through F101, P101-4, J201-4, J302-5 and P302-5 to insure that all interconnections are being made. If this does not reveal a defect it will be necessary to make a complete circuit check. Refer to figure 7-32.

In the event that relay S301 is malfunctioning, the inner oven will continue to heat until safety switch S302 opens up at 80°C (176°F). At this temperature, the INNER OVEN lamp will blink erratically at shorter intervals than the usual 90 seconds as in normal operation. If such is the case, check the thermometer on switch S301 in the rear of the R-F Oscillator. See figure 7-1. Replace switch S701 if the thermometer reads well over 70°C (158°F).

(3) VMO CIRCUIT. - After tubes V301 and V302 are eliminated as a possible source of trouble, circuit components must be checked. This may be done by making voltage and resistance measurements from the tube socket pins to ground and comparing the results with the values given in table 7-3 and figure 7-32. The values shown in this table were taken from a normally operating R-F Oscillator. Note, especially, that R302 measures 1000 ohms resistance, since it is a critical resistor in this circuit.

(4) HFO CIRCUIT. - If, for example, the output frequency being checked is 20 mc and the milliammeter indicates a null reading at this frequency, there is trouble in the 16 to 32 mc stage. Therefore, the critical components of this stage (V206, L207 and C225C) must be checked as well as each preceding stage to the initial amplifier V202.

The preceding stages may be checked quickly by the following procedure.

(a) Turn the BAND-MCS switch to the 8-16 mc position and noting the output indicated on the milliammeter, if any.

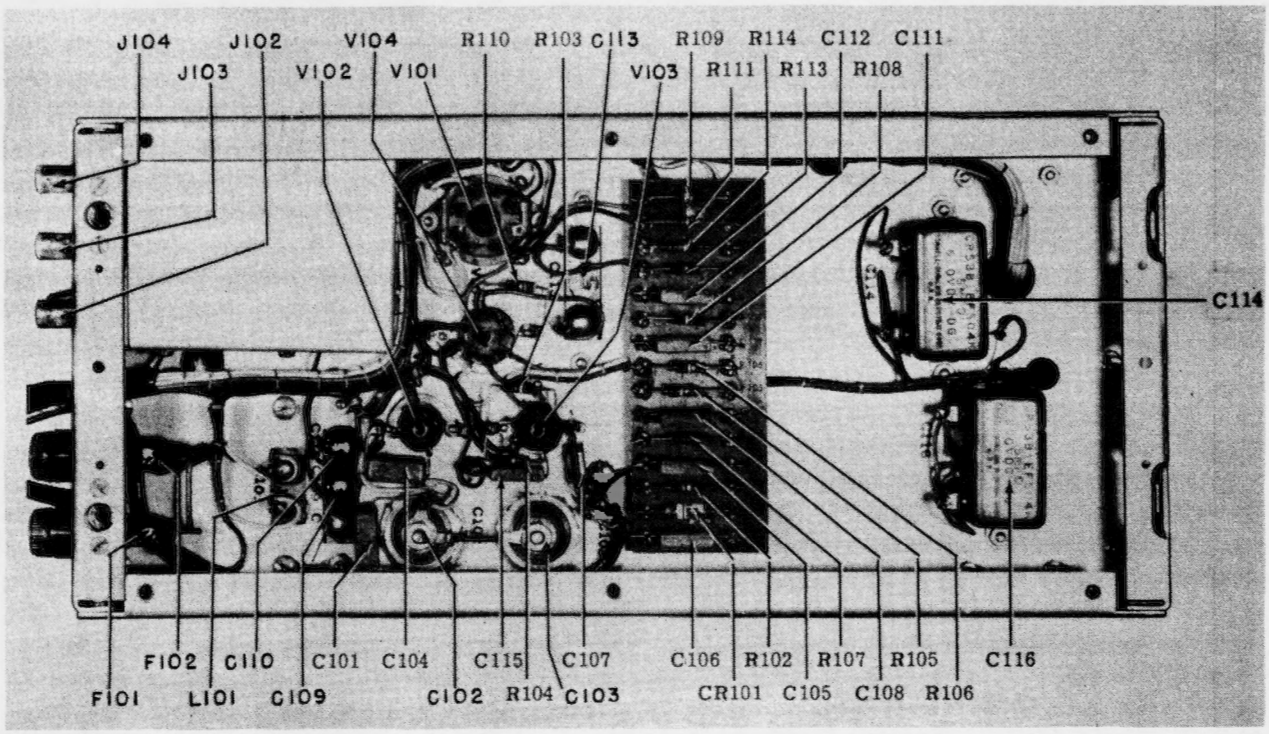


Figure 7-6. R-F Oscillator Power Supply, Bottom View

(b) If output is indicated, the trouble lies in the circuit about tube V206.

(c) If no output is shown, turn the BAND-MCS switch to the 4-8 mc position and check for output indication on the front panel meter.

(d) If output is indicated the trouble lies in the circuit about tube V205. The critical components of this circuit are V205, L206 and C225B.

(e) A similar check may be made for the circuits about the two amplifier output tubes V203 and V204, by switching the BAND-MCS dial to the 4-8 mc and the 2-4 mc positions and checking for output indication.

(5) IFO CIRCUIT. - After tube V201 has been eliminated as a source of trouble, it will be necessary to make voltage and resistance measurements of the circuit about the tube. Refer to table 7-3 and figure 7-32. The critical components of this circuit are C207, L201, Y201 and R205.

(6) BFO CIRCUIT. - After the BFO tube has been eliminated as a cause of trouble, make voltage and resistance measurements of its associated circuit. Refer to table 7-3 and figure 7-32. The critical components of this circuit are C120, L102, R117, R116, Y101 and Y102.

TABLE 7-3. R-F OSCILLATOR VOLTAGE MEASUREMENTS

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOL	PIN NUMBERS								
	1	2	3	4	5	6	7	8	9
V101	0	300	0	378*	0	378*	0	300	-
V102	147	0	0	0	147	0	Gnd	-	-
V103	-5.25	Gnd	6.3*	Gnd	155	9.6	-0.25	-	-
V104	45	-8.1	0	6.3*	6.3*	17	-0.82	Gnd	-
V105	138	0	6.3*	Gnd	*138	-7.2	Gnd	-	-
V201**	60	11	Gnd	Gnd	Gnd	120	11	Gnd	6.3*
V202**	90	NC	Gnd	6.3*	90	10	Gnd	-	-
V203**	11	6	Gnd	6.3*	95	110	11	-	-
V204**	30	14	Gnd	6.3*	270	260	30	-	-
V205**	30	12	Gnd	6.3*	250	170	30	-	-
V206**	20	13	Gnd	6.3*	275	175	20	-	-
V207**	35	13	Gnd	6.3*	265	225	35	-	-
V301	120	0	0	6.3*	120	3.3	0.13	-	-
V302	162	0.13	6.4	6.3*	6.3*	72	16	4.5	0

* A-c volts.

** Conditions for measurements indicated:

2 MC XTAL TUNING set at 2 mc
OUTPUT control set at maximum.
70-ohm load at r-f output.
70-ohm load at IFO output.

c. RECEIVER. - Refer to the receiver schematic diagram figure 7-30, to the receiver component location illustration figures 7-2 and 7-3, and the connection (wiring) diagrams.

Radio Receiver R-618/FRR-32 is composed of 12 assemblies; namely, antenna, r-f, mixer, oscillator, first i-f, second i-f, audio, BFO, crystal calibrator, power supply, tuning dial assembly, and filter assembly. Each of these assemblies can be removed and replaced by loosening a few captive screws; some assemblies require slight additional procedures. See sub-paragraph 5a(1).

If trouble has been isolated to a receiver, the next step is to establish in which assembly the fault exists. The faulty assembly can be replaced if a spare one is available, or repaired if there is no spare assembly.

Most of the receiver assemblies are divided into sub-assemblies, many of which plug into the assembly. Each plug-in sub-assembly contains a sub-miniature electron tube and associated parts.

Plug-in sub-assemblies are of two types, plug-in boards and plug-in units. The plug-in boards are located in the antenna, r-f, mixer, and oscillator assemblies; and the plug-in units are in the first i-f, second i-f, audio, BFO, and crystal calibrator assemblies. The power supply assembly uses conventional type tubes and does not contain sub-assemblies. The tuning dial and filter assemblies do not contain electron tubes.

(1) A-C POWER SUPPLY. - Receiver dial light not glowing, pilot light not glowing, as per sub-paragraph 3a(2). After fuses have been eliminated as a possible source of trouble, remove the test cable connector from the rear of the receiver chassis and check between pins 8 and 10 of the test cable connector for presence of a-c line voltage by use of a voltmeter similar to item 1 of table 7-1. If a-c line voltage is present at these points, the trouble lies either in the chassis interconnections, power switch S2201, or the power transformer (T1601) primary (pins 1, 2, 3, 4, or 6) or secondary filament circuits (pins 10 to 14). See step (b) for further procedures. If a-c line voltage is not present at these points, the trouble lies either in the filter assembly, the test cable (CG-1101/FRR), or the power cable connecting the receiver to the source of a-c power. See step (a) for further procedures.

(a) Check to see if there is line voltage supplying the receiver. If such is the case, remove the receiver from the cabinet, as described in Section 3 sub-paragraph 2c(1) and check for presence of line voltage at pins 8 and 10 of jack J2214, located at the back wall of the receiver cabinet, see figure 7-2. If line voltage is present at these points, then the trouble lies in the test cable assembly (CG-1101/FRR). Check the continuity of the cable to find which of the power leads (pin 8 or 10) is at fault, then correct trouble. If line voltage is not present at this point, then remove the plug from power input receptacle at the back of the receiver cabinet J4004, and check for presence of line voltage between pins B and C of the power cable. If line voltage is not present on the power cable, then the fault lies in the incoming line. Turn power off and check continuity of the power cable until trouble is found. If line voltage is present on the power cable, then the fault lies in the filter assembly. Remove the filter assembly and check continuity of Z4002 and associated leads. If the filter Z4002 is not continuous, emergency operating conditions can be met by bypassing this filter with jumper leads, otherwise replace the filter. To bypass the power line filter Z4002, connect J4004B to J7009-8 and J4004C to J4009-10.

(b) Check for presence of a-c line voltage between pins P and N of J2213.

If line voltage is present here, the trouble lies in the power transformer (T1601) primary (pins 1, 2, 3, 4, or 6) or secondary circuits (pins 10 to 14). Check the voltage at these points. If they are normal then check the filament lines, starting at pins V and ground of J2213 and checking voltage at each pin listed on the schematic diagram. Location of this connector is shown in figure 7-2.

If line voltage is not present at pins P and N of J2213 the trouble lies in the interconnecting lines between these points and the filter assembly. Check voltages at each of the connectors and terminals shown on the schematic diagram starting from P and N of J2213 until the fault is found. See figure 7-2 and location of these jacks and terminals.

(2) D-C POWER SUPPLY. - (Dial light glowing, pilot light not glowing.) After the pilot light lamp and the tubes V1601 and V1602 have been eliminated as a possible source of trouble as explained in sub-paragraph 3a(2), measure the d-c voltage between ground and terminal D of J2213.

(a) If voltage does exist at this point, the trouble is localized to the interconnecting lines. Start at terminal D and check voltage on the interconnecting lines at the successive terminals shown on the schematic diagram until the faulty connection is found.

(b) If voltage does not exist at this point, the trouble is in the power supply assembly. Check voltage and resistance of V1601 and V1602, the filter network, and transformer T1601 (refer to table 7-8).

(3) AUDIO. - (No phone output, OUTPUT meter not indicating, TUNING meter indicating when receiver is tuned as per sub-paragraph 3d(1).) Remove the cover from the audio assembly and take the stage gain measurements listed in table 7-5, part 1. If the audio system is not operating properly on just one or a few positions of the RECEPTION control, take only the measurements corresponding to that or those particular positions. Once an abnormal reading is found replace the plug-in unit associated with that stage. If this does not correct the trouble then the fault lies in the interconnecting lines between the plug-in unit and its external associated parts. Check voltage and resistance at the tube socket in that particular stage (normal values are given in table 7-8). If an abnormal voltage appears, check the assembly appropriate chassis interconnections which could logically cause the trouble. For example, if no voltage appears at the plate of a tube and this voltage should be 80 volts dc, it is obvious that the B+ lead is opened or shorted somewhere along the lines. Probable place for these to be shorted or opened is at any connectors or terminals through which they may pass. It then remains to check the voltage and/or resistance at each of these jacks or terminals until the cause is found. Refer to the schematic diagram and figures 7-2 and 7-3 for the location of these jacks and terminals.

(4) I-F AND R-F SYSTEMS. - (No phone output, no indication on OUTPUT meter or TUNING meter when receiver is tuned as per paragraph 3b.) The following procedure listed in paragraphs (a) to (b) constitutes a check on the operation of the second i-f assembly to eliminate or localize this as a possible cause of trouble. Remove the cover from the second i-f assembly and connect a signal generator such as item 3 of table 7-1 directly to J1001B (see figure 7-2 for location of this jack.) Set the OUTPUT, GAIN, and DIVERSITY GAIN BAL controls to maximum and the SILENCER control to minimum and proceed as follows:

(a) A1 SIGNALS.

1. Set the RECEPTION control to A1 BROAD.

2. Set the signal generator to have an unmodulated output at a frequency of 200 kc.

3. Adjust the BFO to produce a 1-kc beat note. See steps A and B of sub-paragraph 6a(9)(f)2.

4. Set the signal generator output level to obtain a 0 db reading on the OUTPUT meter.

5. Check the siganl generator output level. It should be 15 uv (±30%). Note this reading and go on to step (6) of this procedure.

6. Set the RECEPTION control to A1 SHARP.

7. Set the signal generator output level to obtain a 0 db reading on the OUTPUT meter.

8. Check the signal generator output level. It should be 15 uv (±30%). Note this reading and go on to sub-paragraph (b) of these procedures.

(b) A2 SIGNALS.

1. Set the RECEPTION control to A3 SHARP.

2. Set the signal generator to have an output frequency of 200 kc at 30% modulation with 1000 cps.

3. Set the signal generator output level to obtain a 0 db reading on the OUTPUT meter.

4. Check the signal generator output level. It should be 25 uv (±30%). Note this reading and proceed to paragraph (c) of these procedures.

(c) A3 SIGNALS.

1. Set the RECEPTION control to A3 SHARP.

2. Leaving the signal generator frequency and modulation as set up in paragraph (b), set the signal generator output level to obtain a 0 db reading on the OUTPUT meter.

3. Check the output level of the signal generator. It should be 25 uv (±30%). Note this reading and proceed to step (4).

4. Set the RECEPTION control to A3 BROAD.

5. Set the signal generator output level to obtain a 0 db reading on the OUTPUT meter.

6. Check the signal generator output level. It should be 38 uv (±30%). Note this reading and proceed with paragraph (d) of these procedures.

(d) F1 SIGNALS.

1. Set the RECEPTION control to FSK.

2. Set the signal generator to have an unmodulated output at a frequency of 200 kc.

3. Set the BFO to produce a 1-kc beat note. See steps A and B of sub-paragraph 6a(9)(f)2.

4. Set the signal generator output level to obtain a 0 db reading on the OUTPUT meter.

5. Check the signal generator output level. It should be 22 uv (±30%). Note this reading then go on to paragraph (e) of these procedures.

(e) CONCLUSION. - If the readings obtained in all of the above steps are normal, the second i-f is then eliminated as a possible cause of trouble. The trouble is now localized to the antenna, r-f, mixer, local oscillator, or first i-f assemblies and their interconnections. Replace the cover on the second i-f assembly, and see sub-paragraph (5) for further procedures.

If the readings obtained in the above steps (1) to (4) are abnormal, then take the stage gain measurements listed in table 7-3 for the second i-f. If the readings are abnormal on one or a few positions of the RECEPTION control, take only the stage gain measurements pertaining to these particular positions. Once a faulty reading is found, replace the plug-in unit associated with that stage. If this does not correct the trouble, then the fault lies in the interconnecting lines between that plug-in unit and its external associated components. Check voltage and resistance at the tube socket in that particular stage (normal values are given in table 7-8). If an abnormal voltage appears, trace the assembly and chassis interconnections which could logically cause the trouble. For example, if no voltage appears at the plate of a tube and this voltage should be 80 volts dc, it is obvious that the B+ lead is opened or shorted somewhere along the lines. Probable place for this to be shorted or opened is at jacks or terminals through which it may pass. It then remains to check the voltage and/or resistance at each of these jacks or terminals until the cause is found. Refer to the schematic diagram and figures 7-1 and 7-2 for the location of these jacks and terminals.

(5) R-F SYSTEM. - (No phone output, OUTPUT meter not indicating, TUNING meter not indicating when receiver is tuned on all positions of the RECEPTION control and the second i-f has been eliminated as the possible cause of trouble by procedures contained in paragraph 4c(4).) The procedure given in the following steps (a) to (g) is a method of localizing the trouble to the filter, antenna, r-f, mixer, oscillator or first i-f assemblies and their interconnecting lines.

(a) Connect a signal generator, such as item 3 of table 7-1, to the mixer terminal, E552, of the mixer assembly. These terminals protrude from the bottom of the assembly and are connected to the tuning capacitor through metal straps. The assembly cover will not have to be removed, but make certain to connect to the right terminal. See figure 7-3 for location of this terminal.

(b) Set the RECEPTION control to A1 SHARP and adjust the BFO for a beat note of 1 kc. See sub-paragraph 6a(9)(f)2, steps A and B for adjusting the BFO.

(c) Set the signal generator to have an unmodulated output at a frequency of 4.0 mc.

(d) Set the band selector to band 1. (The tuning dial to correspond to the signal generator frequency.)

(e) Set the signal generator output level to obtain a 0 db reading on the OUTPUT meter.

(f) Check the signal output level. This should be 120 uv. Note this reading and see step (g) for further procedures.

(g) If the signal generator output level required to produce 0 db on the output meter is within 30% of 120 uv, the trouble can then be assumed to lie in the filter, antenna or r-f assembly and the interconnections associated with these assemblies. If the signal generator output level required to produce 0 db on the output meter is not within 30% of 120 uv, the trouble can be assumed to lie in the mixer, oscillator, or first i-f assembly and the interconnections associated with these assemblies.

Measure the gain of the suspected stages. Once an abnormal stage gain measurement is found, replace the stage. If this does not correct the trouble then the fault lies in the interconnecting lines between that stage and its external associated components. Check voltage and

resistance at the tube socket in that particular stage; normal values are given in table 7-8. If an abnormal voltage appears, check the assembly and appropriate chassis interconnections which could logically cause the trouble. For example, if no voltage appears at the plate of a tube and this voltage should be 80 volts dc, it is obvious that the B+ lead is opened or shorted somewhere along the lines. Probable places for these to be shorted or opened are at any connectors through which it may pass. It then remains to check the voltage at each of these connectors until the cause is found. Refer to the schematic diagram and figures 7-2 and 7-3 for the location of these jacks and terminals.

(6) CRYSTAL CALIBRATOR. - (Receiver operates properly but crystal calibrator beat notes cannot be obtained when attempting to align the tuning dial as per sub-paragraph 3b(6).) The trouble lies either in the crystal calibrator stages (Z1201, Z1202), or in their associated interconnections and parts. Replace each of these stages. If this fails to correct the trouble, then the fault can be assumed to be in the interconnections and external parts associated with the stage. Replace the crystal Y1201. If this fails to restore operation, check voltage and resistance at the tube socket of the crystal calibrator stages; normal values are given in table 7-8. If an abnormal voltage appears, check the assembly and appropriate chassis interconnections which could logically cause the trouble. For example, if no voltage appears at the plate of a tube and this voltage should be 80 volts dc, it is obvious that the B+ lead is opened or shorted somewhere along the lines. Probable place for these to be shorted or opened is at any jacks or terminals through which it may pass. It then remains to check the voltage at each of these jacks or terminals until the cause is found. Refer to the schematic diagram and figures 7-2 and 7-3 for the location of these jacks and terminals.

(7) BFO. - (No phone output, OUTPUT meter not indicating, TUNING meter active when receiver is tuned on A1 BROAD, A1 SHARP, A1 MEDIUM and FSK positions of the RECEPTION control as per sub-paragraph 3c(7).) The first step is to localize the trouble to the BFO (V1301) or the BFO mixer (V1004) and their associated parts and interconnections. Follow the procedure given in steps (a) to (f) to accomplish this.

(a) Remove the BFO cover, and connect a signal generator similar to item 3 of table 7-1, directly to J1301B.

(b) Set the signal generator to have a 1.0-volt output level at 201 kc.

(c) Set the RECEPTION control to A1 SHARP.

(d) Tune in a signal as would be indicated on the TUNING meter.

(e) Check the OUTPUT meter and phones for presence of a 1-kc beat note.

(f) If a 1-kc beat note is obtained and is of appreciable amplitude, then trouble can be assumed to lie within the BFO stage (Z1302) and associated interconnections and parts. If a 1-kc beat note is not obtained or is weak, then trouble can be assumed to lie in the BFO mixer (Z1010) and its associated interconnections and parts.

Replace the plug-in unit associated with the suspected stage. If this does not correct the trouble, then the fault lies in the interconnecting lines between that stage and its external associated components. Check voltage and resistance at the tube socket in that particular stage; normal values are given in table 7-9. If an abnormal voltage appears, check the assembly and appropriate chassis interconnections which could logically cause the trouble. For example, if no voltage appears at the plate of a tube and this voltage should be 80 volts dc, it is obvious that the B+ lead is opened or shorted somewhere along the lines. Probable place for these lines to be shorted or opened is at any jacks or terminals through which it may pass. It then remains to check the voltage at each of these jacks or terminals until the cause is found. Refer to the schematic diagram and figures 7-2 and 7-3 for the location of these jacks and terminals.

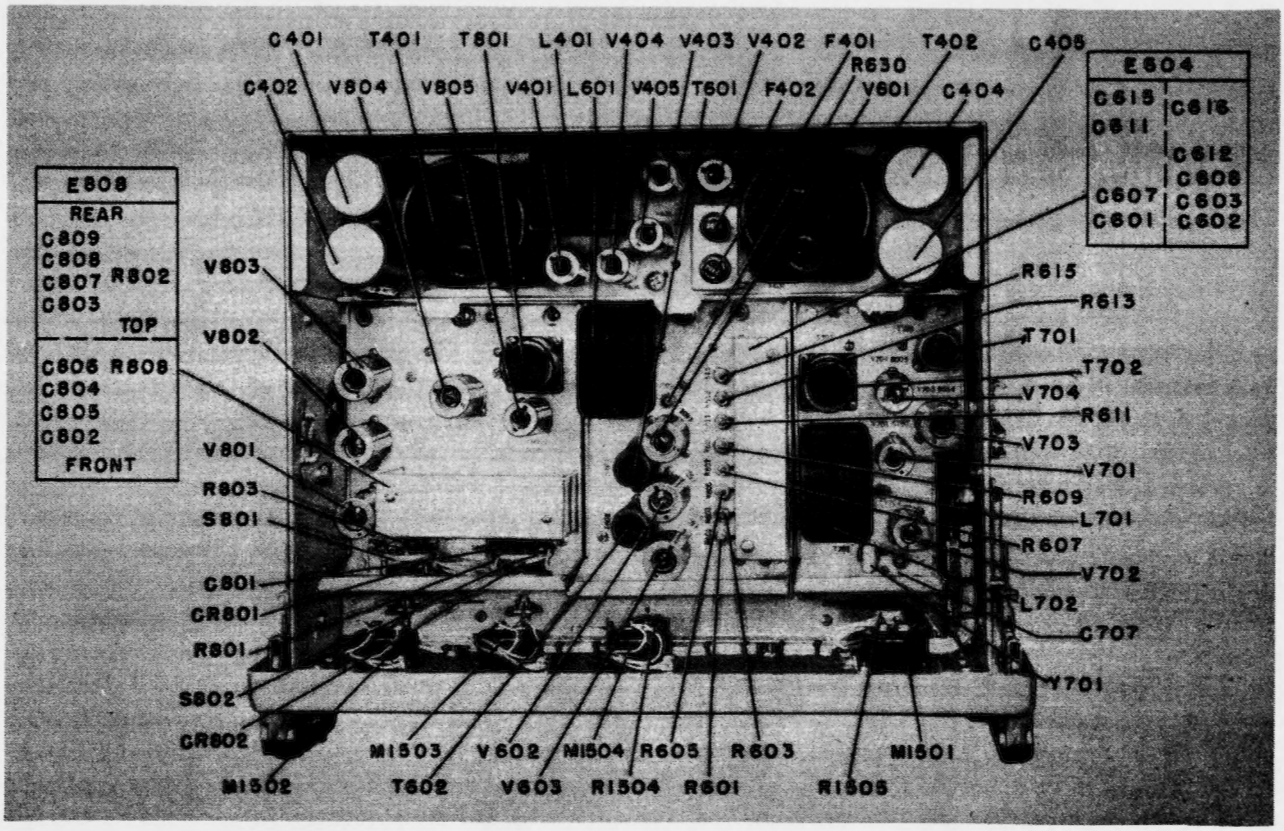


Figure 7-7. Comparator Keyer Component Location, Top View

(8) NOISE PEAK LIMITER, DIODE DETECTOR, AND TUNING INDICATOR. - (No phone output, erratic phone output, TUNING indicator does not register.) With the RECEPTION control at an A3 position, feed a 200-kilocycle signal from an r-f signal generator (similar to item 3 of table 7-1) through a 0.01-mf isolation capacitor (isolation accessory supplied with AN/URM-25) to V1003-5. Modulate the 200-kilocycle signal with a 1000-cycle tone at 30%, and adjust the signal generator output until the TUNING meter reads half scale on the HIGH position of the HIGH-LOW switch.

(a) If there is no other indication of output or if the output is erratic, check V1005 and V1101.

(b) When the TUNING indicator does not register, check voltage and resistance of V1003, and inspect Z1011 for a possible short. If Z1011 is replaced, the spare unit will have to be aligned at 200 kc. See sub-paragraph 6a(9)(b) of this section.

(c) If output is obtained but the TUNING meter does not register, check the TUNING indicator circuit, Z1009, and the HIGH-LOW switch circuit.

(9) CHECKING RECEIVER AGC CIRCUIT. - Refer to figure 2-4. The AGC circuit is active only when the RECEPTION is at A3 and the AGC switch is at NORM.

(a) Feed an r-f signal from a signal generator to the ANT receptacle of the receiver. Modulate the r-f signal with a 1000-cycle tone at 30 per cent.

(b) Tune the signal generator at any frequency within the tuning range of the receiver being checked, and resonate the receiver to this frequency. Set the RECEPTION control at A3 BROAD.

(c) Set the generator output to 10 uv, and adjust the OUTPUT control until the OUTPUT meter reads 0 db. The SILENCER must be off (fully counterclockwise).

(d) When the generator output is increased to 10,000 uv, the OUTPUT meter reading should not increase by more than 4 db.

d. COMPARATOR KEYER.

(1) POWER SUPPLY. - Pilot lamp not glowing and tube filaments lit indicates trouble in the pilot lamp circuit. Therefore, check for 115 volts ac between terminals 1 and 2 of I/X1501. If voltage is present, replace R1501, since the bulb was changed or found to be good in sub-paragraph 3a(3). If voltage is not present, make a continuity check of the leads for I/X1501 to F402 and F401 respectively.

If the unit is inoperative, check fuses F401 and F402, replace if necessary. If this does not clear up the trouble check the tubes in the power supply sub unit. If the condition still exists after eliminating tubes and fuses as a source of trouble, check for 115-volt a-c input to the unit between pins 1 and 2 of J1401 (located on the inside back of the Comparator Keyer case, see figure 7-9).

If no voltage is present and it is known that line voltage is being fed to the plug which feeds the Comparator Keyer, it will be necessary to check the continuity of the a-c input cord and filter Z1401. To do this, remove the connector of the Comparator Keyer power cord from the receptacle on the raceway of the cabinet and check continuity from its terminals through to pins 1 and 2 of J1401. If an open is detected, remove the Comparator Keyer case from the cabinet, then remove the cover plate off the filter assembly and check the continuity of Z1401 alone. Continuity should be read, between pins 1 and 4 and 3 and 6 of Z1401, if not, replace the power supply filter (Z1401) or for emergency operation, place jumper wires from pin 1 to 4 and from pin 3 to 6.

If voltage is present, the trouble lies in the unit itself and further checks will have to be made. Voltage checks of the unit may be made by placing the Comparator Keyer in servicing position and using Test Cable Assembly, CX-3262/U to connect the chassis to its case. When making voltage or resistance measurements, compare the results with the values given in table 7-4. Check for 115 volts ac at pins 2 and 4 of T401 and T402. If no voltage is present the trouble lies in switch S1501 or its interconnections through connectors J1506 pins S and N and J1507 pins 1 and 2. Resistance checks of the wiring about S1501 may be made with reference to figure 7-31.

If voltage is present at the primaries of both transformers, check the transformer secondaries for presence of plate and filament voltages. The voltage measurements should read as follows:

TRANSFORMER	TERMINAL TO CHASSIS	VOLTAGE
T401	5	250 v AC
	7	250 v AC
	8	330 v AC
	10	330 v AC
	9	0
	6	-275 v DC
T402	5-6*	6.3 v AC
	7-8*	6.3 v AC

* Measured between pins indicated.

If the a-c voltages are not present at secondaries of T401, make a resistance check of that transformer. Results may indicate that a secondary winding is open. If voltages are present, check continuity from T401 secondaries to plate of V401, V402 and V403. In plate leads of V401, R401 and R402 may be open.

If filament voltage is present at the secondaries of T402, pull out the individual sub units and check for filament voltage between terminals L and P of J1503, between terminals L and P of J1504, and between terminals KK and EE of J1505. If filament voltage is not present at these points, refer to the schematic diagram, figure 7-31, and the associated connection diagrams and check the wiring. If the voltages are present, replace the sub units.

With filament voltage present at all tubes, and the set still inoperative, proceed to check the +230-volt d-c line. This may be done by checking the voltages at L401. Pin 1 of L401 should measure 260 volts dc; pin 2, 245 volts dc; pin 3, 230 volts dc to ground. If voltages are not present, turn the power off to the unit and check the resistance of L401. If either section reads open, replace L401. If L401 is not open check wiring to pin 7 of V402 and V403. Refer to figure 7-31. Also check the voltages at the filter capacitors C404 and C405. Voltage measured at pin 5 of X410 (C404) should be +245 volts dc, and at pin 5 of X411 (C405) should be +230 volts dc. See figure 7-8 for location of components.

With 230 volts dc present at the above points, check the B+ line in each of the individual sub units. If voltage is not present, pull out the respective sub unit and check at the junction terminal. See the appropriate section of the Comparator Keyer schematic diagram for the

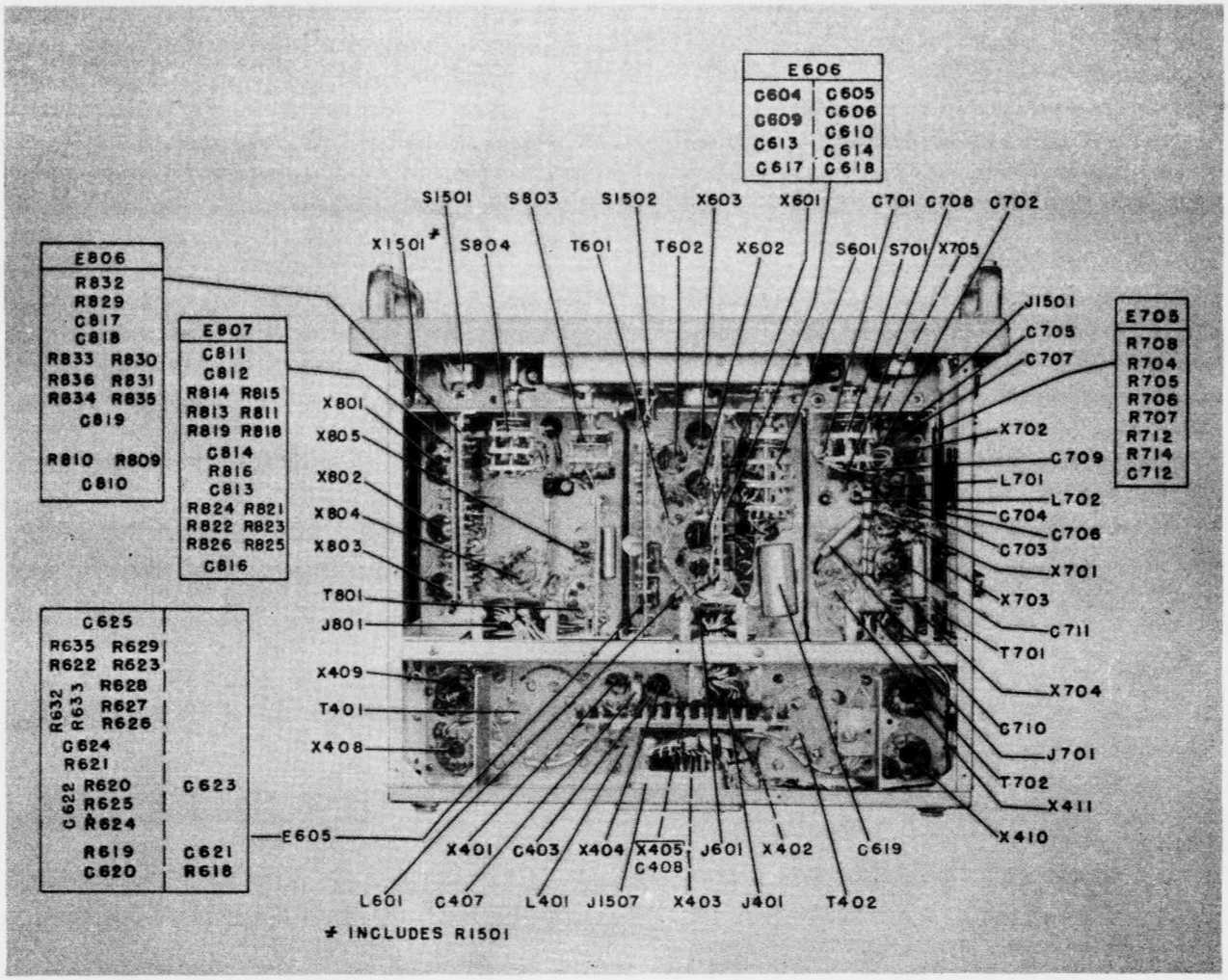


Figure 7-8. Comparator Keyer Component Location, Bottom View, Sheet 1

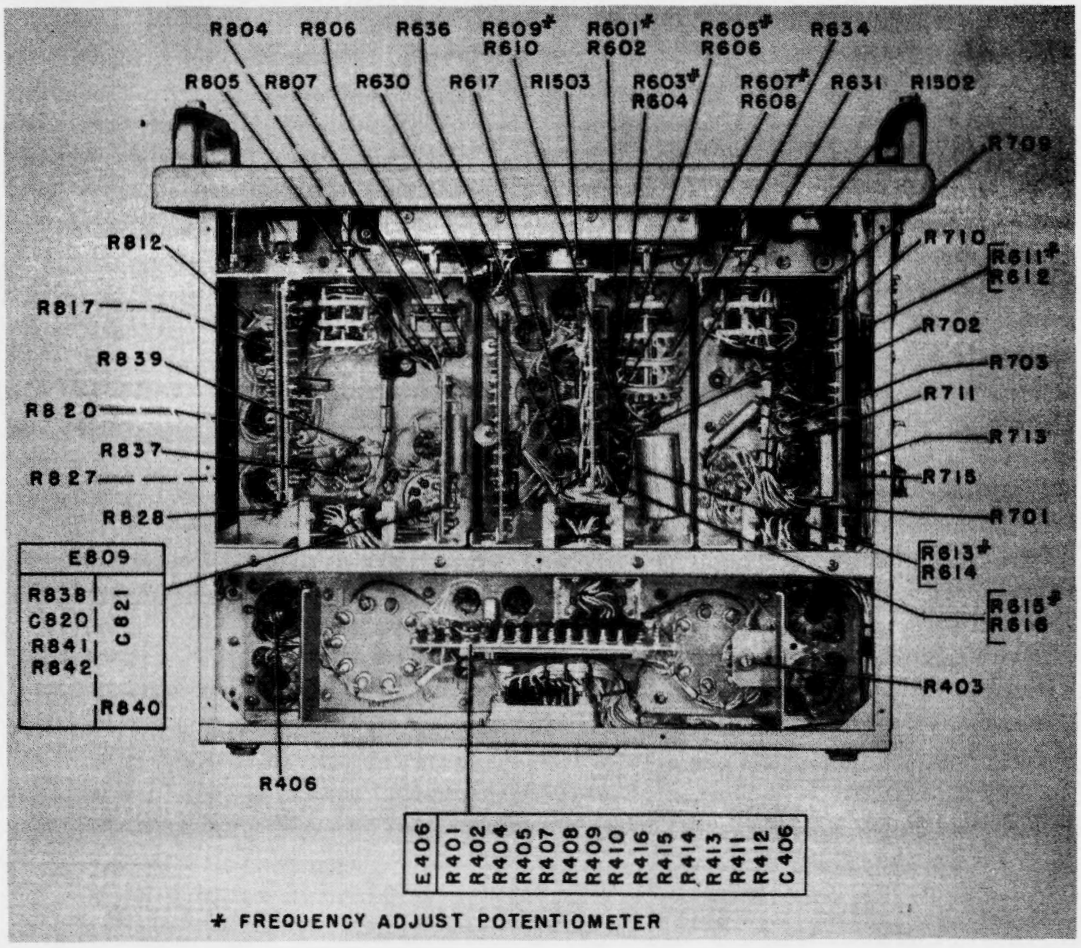


Figure 7-8. Comparator Keyer Component Location, Bottom View, Sheet 2

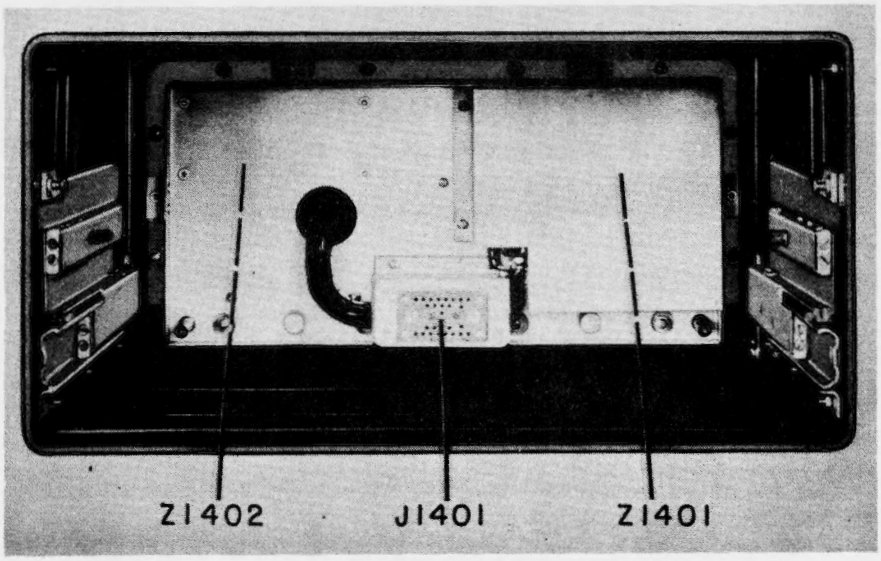


Figure 7-9. Comparator Keyer Case, Inside View

correct pin letter. If voltage is not present at the junction terminal, check the wiring from the junction terminal to E1503-1 (located on the rear face of brace).

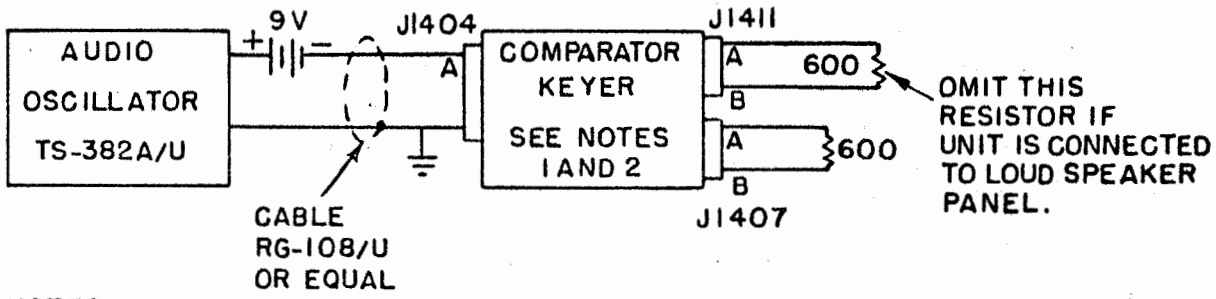
After checking the 230-volt d-c line, check the +105-volt d-c line. +150 volts dc should be measured from E1503-2 to ground. If it is not present here, take resistance measurement from pin 5 of V405 to pin 3 of L401 (should read approximately 100 K ohms). If reading does not correspond, check R413 through R416. If +105 volts dc is present at E1503-2, check the various sub units.

(2) COMPARATOR SUB UNIT. - After checking that the B+, +105 volts dc, and filament voltages are normal and yet trouble exists (no output at LINE PHONES with FUNCTION switch at DIV position; output present at speaker and MONITOR PHONES when FUNCTION switch is at AF1 or AF2 position), it will be necessary to check the signal path through the comparator sub unit. The procedure to make this check is as follows:

(a) Disconnect the cables at J1404 and J1405 (RCVR 1 and RCVR 2 DET. AGC), located on the back of the Comparator Keyer case.

(b) Refer to figure 7-10 and using Cable, type RG-108/U or equal, connect the output of an audio oscillator (similar to item 4 of table 7-1) through a 9-volt battery (used to replace the normal d-c reference level supplied by a receiver) to the A terminal of J1404 (RCVR 1 DET. AGC receptacle). Connect the ground terminal of the audio oscillator to the Comparator Keyer case and to a common ground.

(c) If the Comparator Keyer unit is disconnected from the loudspeaker panel, connect a 600-ohm resistor across the terminals of the SPKR receptacle J1411. Then connect another 600-ohm resistor across terminals A and B of the AF LINE receptacle J1407. Both receptacles are located on the back of the Comparator Keyer case.



NOTES:

1. TO CHECK COMPARATOR AND MONITOR SUB UNITS:
   RECEPTION SWITCH SET AT A3.
   AF LINE LEVEL CONTROL SET AT 10.
   TS-382A/U SET FOR 1,000 CYCLE OUTPUT. ADJUSTED TO GIVE 0.33 V AC RMS FROM V801-3 TO GROUND.
2. TO CHECK TONE KEYER SUB UNIT:
   RECEPTION SWITCH SET AT A1.
   FREQUENCY SWITCH SET AT ANY ONE OF THE 8 PRE-SET FREQUENCIES.
3. USE ELECTRONIC MULTIMETER ME-25/U TO MAKE OUTPUT MEASUREMENTS.
4. ALL RESISTANCE VALUES GIVEN IN OHMS.

Figure 7-10. Comparator Keyer AC Signal Voltage Test Set-up

(d) Supply 115 volts a-c power to the Comparator Keyer and the audio oscillator. Turn both units on and allow at least 10 minutes warm-up.

(e) Turn the RECEPTION switch of the Comparator Keyer to the A3 position and the AF LINE LEVEL control to 10.

(f) Adjust the audio oscillator for a 1000-cycle output signal.

(g) Connect the leads of an electronic multimeter (similar to item 2 of table 7-1) on pin 3 of V801 and ground. Adjust the output of the audio oscillator to a point where 0.33 volt rms is indicated on the multimeter.

(h) If no signal is present at V801-3, use the multimeter or an oscilloscope (similar to item 6 of table 7-1) to trace back from V801-1 or 2 through R811, S804A (terminals 9 and 11), the COMBINED METER, S801 and S802 (terminal 1) and at J1505-F for the first indication of the a-c signal. The component between the last point checked where no signal appears and the point where signal does appear is at fault.

(i) If presence of an a-c signal is indicated at V801-3, use the chart below as a guide and trace the signal through the comparator sub unit stage by stage. The fault will appear between the stage where the signal is not present and the test point last checked where the signal did appear.

TEST POINT	SIGNAL VOLTAGE *	TEST POINT	SIGNAL VOLTAGE *
V801-1, 2	0, 35	V803-8	0.83
V801-3	0.33	V804-7	0.77
V801-7	0+	V804-6	1.6
V801-6	0.35	V805-1, 7	1.6
V802-6, 7	0.36	V805-5	19
V802-8	0.35	T801-3	2.4
V803-2	0.35	T801 (pins 5 to 7)	2.9
V803-1	0.83		

* Approximate rms volts.

(j) Refer to figure 7-31 and table 7-4 to check the components of the faulty stage.

(3) MONITOR SUB UNIT. - If supply voltages are normal and a fault still exists (FUNCTION switch in DIV position, no signal at MONITOR PHONES or speaker and signal at LINE PHONES), it will be necessary to check the signal path through the monitor sub unit. The procedure to make this check is as follows:

(a) Set the Comparator Keyer up for test as described in sub-paragraphs (2)(a) through (g) above.

(b) Check for the indication of an a-c signal at pin 1 of T701. If no signal is present, trace back through S701B-6 and 3, J701-F, J1504-F, J1505-JJ, J801-JJ, and T801-3 for signs of the 1000-cycle signal. The component between the last point where no signal appears and the point where signal does appear is at fault.

(c) If signal is present at T701-1, use the chart which follows as a guide to trace the signal through the monitor sub unit stage by stage. The faulty component will appear between that point where the signal is not present and the last point checked where the signal did appear.

TEST POINT	SIGNAL VOLTAGE *	TEST POINT	SIGNAL VOLTAGE *
T701-1	2.4	V704-5	86
T701-4	1.7	V702-5	1
V703-2	0.95	T702-1	86
V703-1	5.3	T702-4	11.6
V704-1,7	5.3	T702 (pins 5 to 7)	13.5

* Approximate rms volts.

(d) Refer to figure 7-31 and table 7-4, check the components of the faulty stage.

(4) TONE KEYER SUB UNIT. - If tube voltages are normal and trouble still exists (signal through comparator and monitor sub units, FUNCTION switch at DIV position, RECEPTION switch at A1 position, and no frequency tone available in any of the eight preset frequency positions of the FREQUENCY control), it will be necessary to check the signal path through the tone keyer sub unit. The procedure for making this check is as follows:

(a) Refer to figure 7-10 and connect the Comparator Keyer unit up for test as shown and described in sub-paragraph (2)(a) through (g). In step (e) turn the RECEPTION switch to the A1 position instead of A3.

(b) Check the points listed in the following steps for evidence of a-c signal, using an electronic multimeter set on the appropriate a-c volt scale. The measurements listed were taken from the test point indicated to chassis ground.

(c) Check pin 6 of V601 for presence of signal. The signal voltage indicated should be approximately 20 volts rms. If the signal is not present, check back through S601C to the selected tank circuit referring to the tone keyer section of figure 7-31.

(d) If the signal voltage is present at V601-6, check the stages of the tone keyer sub unit for indication of a-c signal. Use the chart listed below as a guide for the appropriate test points to check stage by stage. The faulty component will appear between the point where the signal is not present and the test point where the signal last appeared. Refer to figure 7-31 to check the values of components.

TEST POINT	SIGNAL VOLTAGE *	TEST POINT	SIGNAL VOLTAGE *
V601-6	23	T601-3, 5	0.2
V601-2	20	V603-2, 7	0.2
V601-3, 8	10.8	V603-1, 6	0.46
V602-7	0.3	T602-1, 3	0.46
V602-8	0.2	T602-4, 5	0+
T601-1	0.1		

* Approximate rms volts.

TABLE 7-4. COMPARATOR KEYER VOLTAGE AND RESISTANCE MEASUREMENTS

VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

Conditions for taking Comparator Keyer voltage measurements:

115-volt a-c input supplied; all other units disconnected.
RECEPTION switch set at A1.
CAL KEY switch set at KEY.
THRESHOLD control set at 10.
FREQUENCY switch set at 1785.

TUBE SYMBOL	PIN NUMBERS								
	1	2	3	4	5	6	7	8	9
V401	245*	NC	3.15*	3.15*	NC	245*	0	-	-
V402	330*	NC	6.3*	6.3*	NC	330*	260	-	-
V403	330*	NC	6.3*	6.3*	NC	330*	260	-	-
V404	0	-105	NC	-105	0	NC	-105	-	-
V405	105	0	NC	0	105	NC	0	-	-
V601	133	-0.33	12.35	3.1*	3.1*	131	0	12.35	3.1*
V602	67	-4.9	-5	3.1*	3.1*	133	0	1.02	3.1*
V603	230	67	105	3.1*	3.1*	230	67	105	3.1*
V701	0	2	3.1*	3.1*	210	48	0	-	-
V702	-17.2	0	3.1*	3.1*	227	64	1.22	-	-
V703	142	0	2.7	3.1*	3.1*	NC	NC	NC	3.1*
V704	0	15	3.1*	3.1*	225	230	0	-	-
V801	0	0	0	3.1*	3.1*	180	0	1.5	3.1*
V802	92	0	2.55	3.1*	3.1*	77	77	77	3.1*
V803	220	0	1.8	3.1*	3.1*	11.7	11.7	11	3.1*
V804	11.7	11.7	11	3.1*	3.1*	135	0	2.4	3.1*
V805	0	15	3.1*	3.1*	225	230	0	-	-

* A-c volts.

TABLE 7-4. COMPARATOR KEYER VOLTAGE AND RESISTANCE MEASUREMENTS (Continued)

RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

Conditions for taking Comparator Keyer resistance measurements:

RECEPTION switch set at A1.
SILENCER control set at 0.
AF LINE LEVEL control set at 10.
MONITOR LEVEL control set at 10.
FUNCTION switches set at DIV.
CAL KEY switch set at CAL.
THRESHOLD control set at 0.

TUBE SYMBOL	PIN NUMBERS								
	1	2	3	4	5	6	7	8	9
V401	19K	NC	90K	90K	NC	19K	0	-	-
V402	160	NC	Inf	Inf	NC	160	72K	-	-
V403	160	NC	Inf	Inf	NC	160	72K	-	-
V404	0	9.5K	NC	9.5K	0	NC	9.5K	-	-
V405	62K	0	NC	0	62K	NC	0	-	-
V601	140K	500K	12K	90K	90K	140K	0	12K	90K
V602	72K	120K	0	90K	90K	140K	0	12K	90K
V603	80K	64K	87K	90K	90K	80K	65K	87K	90K
V701	100K	470	90K	90K	90K	120K	2.5	-	-
V702	1 meg	0	90K	90K	75K	560K	1K	-	-
V703	120K	500K	1.5K	90K	90K	NC	NC	NC	90K
V704	470K	470	90K	90K	72K	72K	470K	-	-
V801	120K	120K	1.5 meg	90K	90K	140K	90K	2.2K	90K
V802	300K	1.7 meg	6.8K	90K	90K	670K	670K	400K	90K
V803	80K	100K	2.2K	90K	90K	500K	500K	105K	90K
V804	500K	500K	105K	90K	90K	500K	1 meg	12K	90K
V805	470K	470	90K	90K	72K	72K	470K	-	-

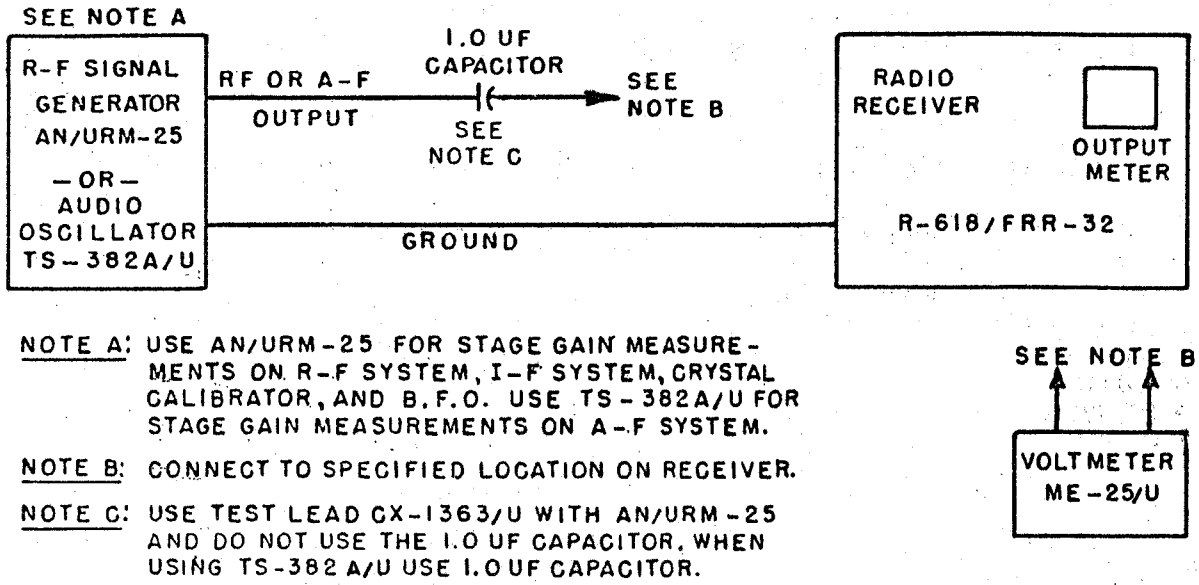


Figure 7-11. Test Set-up for Receiver Stage Gain Measurements

5. RECEIVER STAGE GAIN MEASUREMENTS.

Receiver stage gain measurements are listed in table 7-5. The measurements should be taken as called for in paragraph 3 or 4 of this section. If a measured stage gain does not agree to within approximately 30% of the value given in table 7-5, then replace the stage. If this fails to correct the trouble, then take voltage and resistance measurements of the stage and associated components to locate the trouble. To measure stage gain, refer to the appropriate portion of table 7-5 and to figure 7-11, which shows the test set-up, and proceed as follows:

a. Refer to figure 7-11 and connect a signal generator or audio oscillator as called for in table 7-1 to the point designated as input location on that table (location of points for test equipment connections or the receiver is shown in figures 7-2 and 7-3).

b. Set band selector tuning dial and RECEPTION control as specified in table 7-5.

c. Unless otherwise stated in table 7-5, set the OUTPUT GAIN, and DIVERSITY GAIN BAL controls to maximum, and the SILENCER control to minimum.

d. Set the signal generator to the frequency and output modulated or unmodulated as called for in table 7-5.

NOTE

When table 7-5 calls for an unmodulated signal generator output, with the BFO adjusted for a 1-kc beat note, refer to sub-paragraph 6a(9)(f)2, and use step (A) or (B) of that paragraph to adjust the BFO for a 1-kc beat note.

e. If the OUTPUT LOCATION, as called for in table 7-5, is designated by J-numbers, V-numbers, or Z-numbers connect a voltmeter, as called for in that table, to the specified location.

f. Set the signal generator output level to obtain the reading given as OUTPUT LEVEL in table 7-5. This reading is indicated on either the OUTPUT meter (OM on table 7-5) or on the voltmeter connected in step e.

g. Compare the signal generator r-f output level, as indicated on the signal generator, to the INPUT LEVEL value given in table 7-5. If these two values do not agree to within 30% then consider the stage faulty and replace.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS

PART 1: A-F System. (See figure 7-2 for test point locations.)
A1 BROAD, A1 MEDIUM, A3 and FSK reception.

UNIT	FREQUENCY CPS	INPUT		OUTPUT		REMARKS
		LOCATION	LEVEL VOLTS	LEVEL	LOCATION	
A-F	1000	Z1109-A	1.5	(0 db) 6 mw	OM (M2202)	
	1000	Z1108-A	0.6	(0 db) 6 mw	OM	
	1000	Z1107-E	0.6	(0 db) 6 mw	OM	
	1000	Z1106-E	0.6	(0 db) 6 mw	OM	
	1000	Z1105-A	0.05	(0 db) 6 mw	OM	
	1000	Z1103-F	0.05	(0 db) 6 mw	OM	
	1000	Z1104-H	0.055	(0 db) 6 mw	OM	
	1000	Z1102-J	0.25	(0 db) 6 mw	OM	
	1000	Z1102-A	0.017	(0 db) 6 mw	OM	
A1 SHARP reception. All stage measurements similar to A1 BROAD reception with following exceptions:						
A-F	1000	Z1102-J	0.2	(0 db) mw	OM	The frequency of the oscillator must be very accurate to take these measurements.
	1000	Z1102-A	0.016	(0 db) mw	OM	

NOTE: Use a 0.47-mf capacitor in series with an audio oscillator similar to item 4 of table 7-1.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

PART 2: I-F System. (See figure 7-2 for test point locations.)
A1, and FSK reception.
Input signal: 200 kc unmodulated with BFO frequency adjusted for 1-kc beat note.

UNIT	FREQUENCY KC	INPUT		OUTPUT		REMARKS
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION	
2nd I-F	1	Z1010-J	*0.4	(0 db) 6 mw	OM (M2202)	Use audio oscillator (item 4 of table 7-1).
	200	Z1014-A Z1010-A Z1008-J	*0.55	(0 db) 6 mw	OM	
	200	Z1008-A	43,000	(0 db) 6 mw	OM	
	200	Z1006-J	8000	(0 db) 6 mw	OM	
	200	Z1006-A	650	(0 db) 6 mw	OM	
	200	Z1004-J	180	(0 db) 6 mw	OM	
	200	Z1004-A	20	(0 db) 6 mw	OM	
	200	J1001-B	15	(0 db) 6 mw	OM	
	200	Z1012-F Z1009-2	*2.1	20 ua	TM (M2202) HI sensitivity	
	200	Z1008-A	*0.15	2 v DC	Z1012-E	Use electronic multimeter similar to item 2 of table 7-1

* R-f volts, measured with electronic multimeter and r-f probe (item 2 of table 7-1).

NOTES:

1. For measurements at 1 kc use a 0.47-mf capacitor in series with audio oscillator generator similar to item 4 of table 7-1.

2. For measurements at 200 kc use a 0.1-mf capacitor connected in series with an r-f signal generator similar to item 3 of table 7-1.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

I-F System. (See figure 7-2 for test point locations.)
A3 SHARP reception.
Input Signal: 200 kc, 30% modulated at 1000 cps.

UNIT	FREQUENCY KC	INPUT		OUTPUT		REMARKS
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION	
2 nd I-f	200	Z1012-F	*1.4	(0 db) 6 mw	OM	
	200	Z1012-F Z1009-2	*1.4	20 ua	TM (M2202) HI sensitivity	
	200	Z1008-J Z1014-A Z1010-A	*1.2	(0 db) 6 mw	OM	
	200	Z1008-A	*0.10	(0 db) 6 mw	OM	
	200	Z1008-A	*0.1	2 v DC	Z1012-E	Use electronic multimeter similar to item 2 of table 7-1.
	200	Z1006-J	20,000	(0 db) 6 mw	OM	
	200	Z1006-A	1600	(0 db) 6 mw	OM	
	200	Z1004-J	500	(0 db) 6 mw	OM	
	200	Z1004-A	46	(0 db) 6 mw	OM	
	200	J1001-B	25	(0 db) 6 mw	OM	
A3 BROAD reception. All stage measurements similar to A3 SHARP reception with the following exception:						
	200	J1001-B	38	(0 db) 6 mw	OM	

* R-f volts, measured with electronic multimeter and r-f probe (item 2 of table 7-1).

NOTES:

1. For measurements at 1 kc use a 0.47-mf capacitor in series with audio oscillator generator similar to item 4 of table 7-1.

2. For measurements at 200 kc use a 0.1-mf capacitor connected in series with an r-f signal generator similar to item 3 of table 7-1.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

I-F System.
A1 SHARP reception. (See figure 7-3 for test point locations.)
Input Signal: Unmodulated with BFO frequency adjusted for 1-kc beat note.

UNIT	FREQUENCY KC	INPUT		OUTPUT		REMARKS
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION	
1st I-F	200	Z901-A	10	6 mw	OM (M2202)	
	1600	Z901-A	12	6 mw	OM	
	1600	J901-B	40	(0 db) 6 mw	OM	
	1600	V551-1 (mixer)	3.5	(0 db) 6 mw	OM	

NOTES:

1. For measurements at 1 kc use a 0.47-mf capacitor in series with audio oscillator generator similar to item 4 of table 7-1.

2. For measurements at 200 kc use a 0.1-mf capacitor connected in series with an r-f signal generator similar to item 3 of table 7-1.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

PART 3: R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 1		DIAL SETTING 2.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM (M2202
	2.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	2.0	E3137		(0 db) 6 mw	OM
	2.0	E3136		(0 db) 6 mw	OM
Antenna	2.0	E3102		(0 db) 6 mw	OM
	2.0	J2202-B		(0 db) 6 mw	OM
Filter	2.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 1		DIAL SETTING 4.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM
	4.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	4.0	E3137		(0 db) 6 mw	OM
	4.0	E3136		(0 db) 6 mw	OM
Antenna	4.0	E3102		(0 db) 6 mw	OM
	4.0	E2202-B		(0 db) 6 mw	OM
Filter	4.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 2		DIAL SETTING 4.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM (M2202)
	4.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	4.0	E3137		(0 db) 6 mw	OM
	4.0	E3136		(0 db) 6 mw	OM
Antenna	4.0	E3102		(0 db) 6 mw	OM
	4.0	J2202-B		(0 db) 6 mw	OM
Filter	4.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 2		DIAL SETTING 8.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM
	8.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	8.0	E3137		(0 db) 6 mw	OM
	8.0	E3136		(0 db) 6 mw	OM
Antenna	8.0	E3102		(0 db) 6 mw	OM
	8.0	J2202-B		(0 db) 6 mw	OM
Filter	8.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L
					J4401-1

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 3		DIAL SETTING 8.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATIONS
Mixer	1.6	E552		(0 db) 6 mw	OM (M2202)
	8.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	8.0	E3137		(0 db) 6 mw	OM
	8.0	E3136		(0 db) 6 mw	OM
Antenna	8.0	E3102		(0 db) 6 mw	OM
	8.0	J2202-B		(0 db) 6 mw	OM
Filter	8.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L
					J4401-1

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 3		DIAL SETTING 16.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6 16.0 ...	E552 E552	....	(0 db) 6 mw (0 db) 6 mw	OM OM O4403 J551-4
R-F	16.0 16.0	E3137 E3136		(0 db) 6 mw (0 db) 6 mw	OM OM
Antenna	16.0 16.0	E3102 J2202-B		(0 db) 6 mw (0 db) 6 mw	OM OM
Filter	16.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402 J4402-K J4402-L V4401-1

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 4		DIAL SETTING 16.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM (M2202)
	16.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	16.0	E3137		(0 db) 6 mw	OM
	16.0	E3136		(0 db) 6 mw	OM
Antenna	16.0	E3102		(0 db) 6 mw	OM
	16.0	J2202-B		(0 db) 6 mw	OM
Filter	16.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L
					V4401-1

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 4		DIAL SETTING 24.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM
	24.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	24.0	E3137		(0 db) 6 mw	OM
	24.0	E3136		(0 db) 6 mw	OM
Antenna	24.0	E3102		(0 db) 6 mw	OM
	24.0	J2202-B		(0 db) 6 mw	OM
Filter	24.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L
					V4401-1

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DECIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 5		DIAL SETTING 24.0 mc			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM
	24.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	24.0	E3137		(0 db) 6 mw	OM
	24.0	E3136		(0 db) 6 mw	OM
Antenna	24.0	E3102		(0 db) 6 mw	OM
	24.0	J2202-B		(0 db) 6 mw	OM
Filter	24.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L
					V4401-1

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

R-F System. (See figure 7-3 for test point locations.)
A1 BROAD reception.
Gain: With no signal input connected to the receiver, set the GAIN control to obtain -10 db noise output level as indicated on the OUTPUT meter. Place the ADD DICIBELS switch in the -10 position to obtain this reading.
Input Signal: Unmodulated with the BFO frequency adjusted for an a-f output of 1 kc.

BAND 5		DIAL SETTING 32.0			
UNIT	FREQUENCY KC	INPUT		OUTPUT	
		LOCATION	LEVEL u VOLTS	LEVEL	LOCATION
Mixer	1.6	E552		(0 db) 6 mw	OM
	24.0	E552		(0 db) 6 mw	OM
	...	.....	....		O4403
					J551-4
R-F	24.0	E3137		(0 db) 6 mw	OM
	24.0	E3136		(0 db) 6 mw	OM
Antenna	32.0	E1102		(0 db) 6 mw	OM
	32.0	J2202-B		(0 db) 6 mw	OM
Filter	32.0	J4007		(0 db) 6 mw	OM
Oscillator	...	.....	....		E4402
					J4402-K
					J4402-L
					V4001-1

NOTES:

1. For all measurements, use an r-f signal generator similar to item 3 of table 7-1.
2. Use a 0.1-mf capacitor connected in series with the signal generator on all measurements except "Filter", in which case use a 390-ohm resistor connected in series with the signal generator.
3. Output level readings taken with the ADD DECIBELS switch in the 0 position.
4. All measurements made with the chassis pulled out and test cable connected.

TABLE 7-5. RECEIVER STAGE GAIN MEASUREMENTS (Continued)

PART 4: MISCELLANEOUS. (See figure 7-2 for test point locations.)

UNIT	OUTPUT		REMARKS
	LOCATION	LEVEL R-F VOLTS	
Crystal Calibrator	Z1201-A	1.2	Measured with electron tube multimeter (item 2 of table 7-1)
	Z1201-H	3.2	
	Z1201-J	8.0	
	Z1201-8	17.0	
	Z1202-J	8	
	V1202-8	20	
BFO*	Z1302-A	9.0	Measured with electron tube multimeter (item 2 of table 7-1)
	Z1302-J	4.5	
	J1301-B	3.5	
	V1301-2	5.0	
	V1301-7	17	
	Z1302-E	17	
	Z1301-1	8.5	

* Output frequency is 200 kc.

6. REPAIR.

a. RECEIVERS.

(1) REMOVING AND REPLACING ASSEMBLY COVERS AND ASSEMBLIES.

(a) REMOVING ASSEMBLY COVERS. - Remove the captive screws which hold the cover to the assembly. These captive screws have Phillips heads and are set in the cover.

CAUTION

When removing the cover from the first i-f assembly, first remove the assembly then remove the cover.

(b) REMOVING AND REPLACING ASSEMBLIES. - (Refer to figures 7-12 and 7-13.)

1. POWER SUPPLY AND CRYSTAL CALIBRATOR ASSEMBLIES.

Release the captive screws on the assembly and ease the assembly out of its socket.

When replacing the assembly, orient it to its position in the chassis. Use the connector on the assembly and corresponding socket on the chassis as guides. Seat the assembly, and tighten the captive screws.

2. AUDIO, SECOND I-F, AND BFO ASSEMBLIES.

Set the RECEPTION control to the A1 MEDIUM position, release the captive screws on the assembly, and lift the assembly out of the chassis.

When replacing the assembly, orient it to its position in the chassis. Use the connector on the assembly and corresponding socket on the chassis as guides. Set the RECEPTION control to the A1 MEDIUM position, and seat the assembly. Be sure that the crank arms in the assembly are set properly to engage the RECEPTION control bar. Tighten the captive screws.

3. ANTENNA, R-F, MIXER, OSC, AND FIRST I-F ASSEMBLIES.

Set the band switch to Band V, then place the chassis in the servicing position which will give access to the bottom of the receiver. Disconnect the tuning capacitor strap leads of the box to be removed. Release the three captive screws holding the box in position, and ease the box out. When removing the mixer or oscillator box from the receiver, remove link O4403 before releasing the captive screws. To replace the box, set the band switch to Band V and follow the removal procedure in reverse order.

(2) REMOVING AND REPLACING PLUG-IN SUB-ASSEMBLIES.

Two types of plug-in sub-assemblies are used in Radio Receiver R-618/FRR-32. The plug-in units as found in the BFO, crystal calibrator, first i-f, second i-f and audio assemblies; and the plug-in boards as found in the antenna, r-f, mixer, and oscillator assemblies.

(a) REMOVING A PLUG-IN UNIT. - First remove the assembly containing the plug-in unit; then depress the center of the release bar at the top of the unit, and twist the bar a quarter of a turn. Grip the center of the bar with thumb and index finger, and pull the unit out

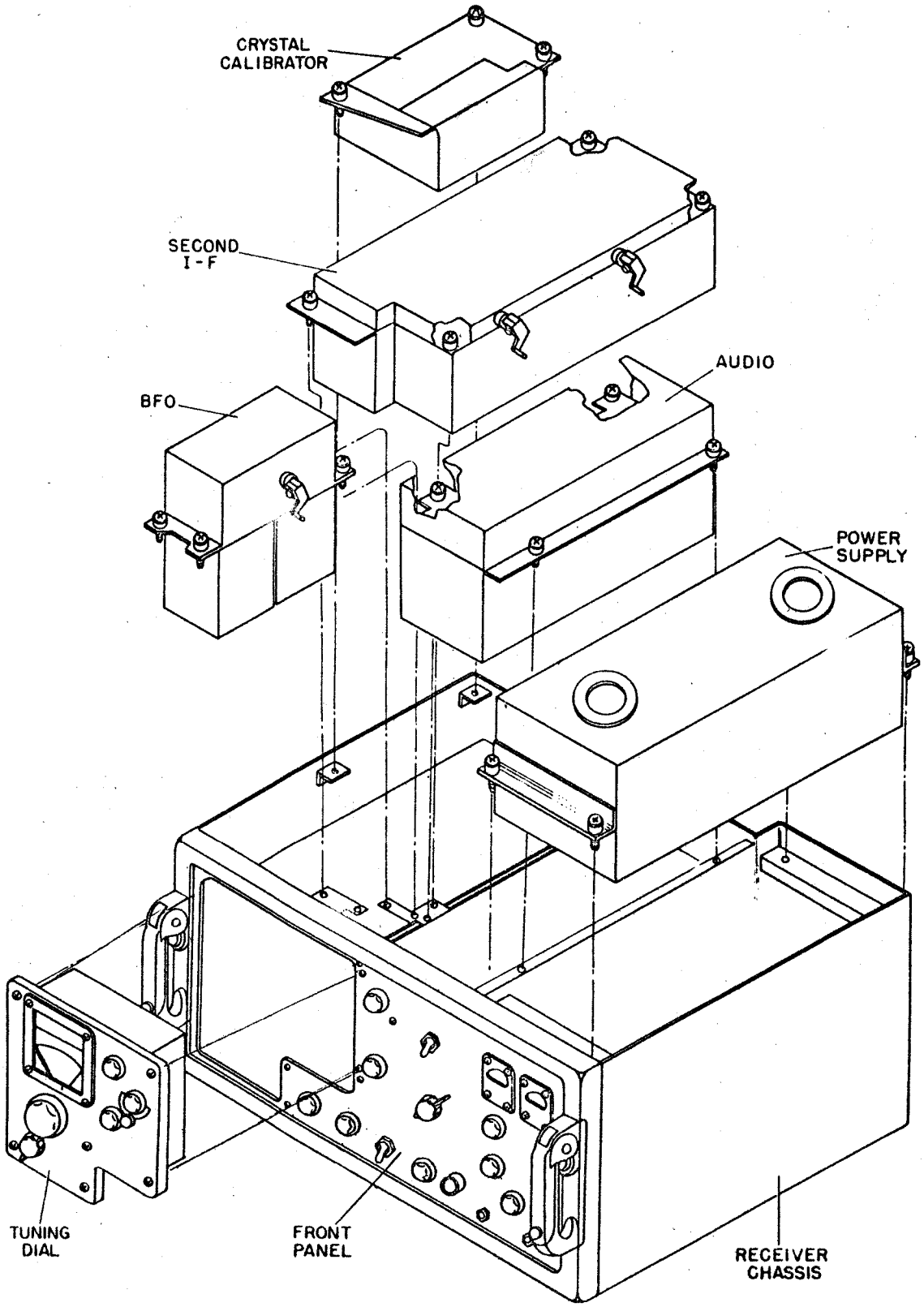


Figure 7-12. Removal and Replacement of Assemblies on Top Side of Receiver Chassis

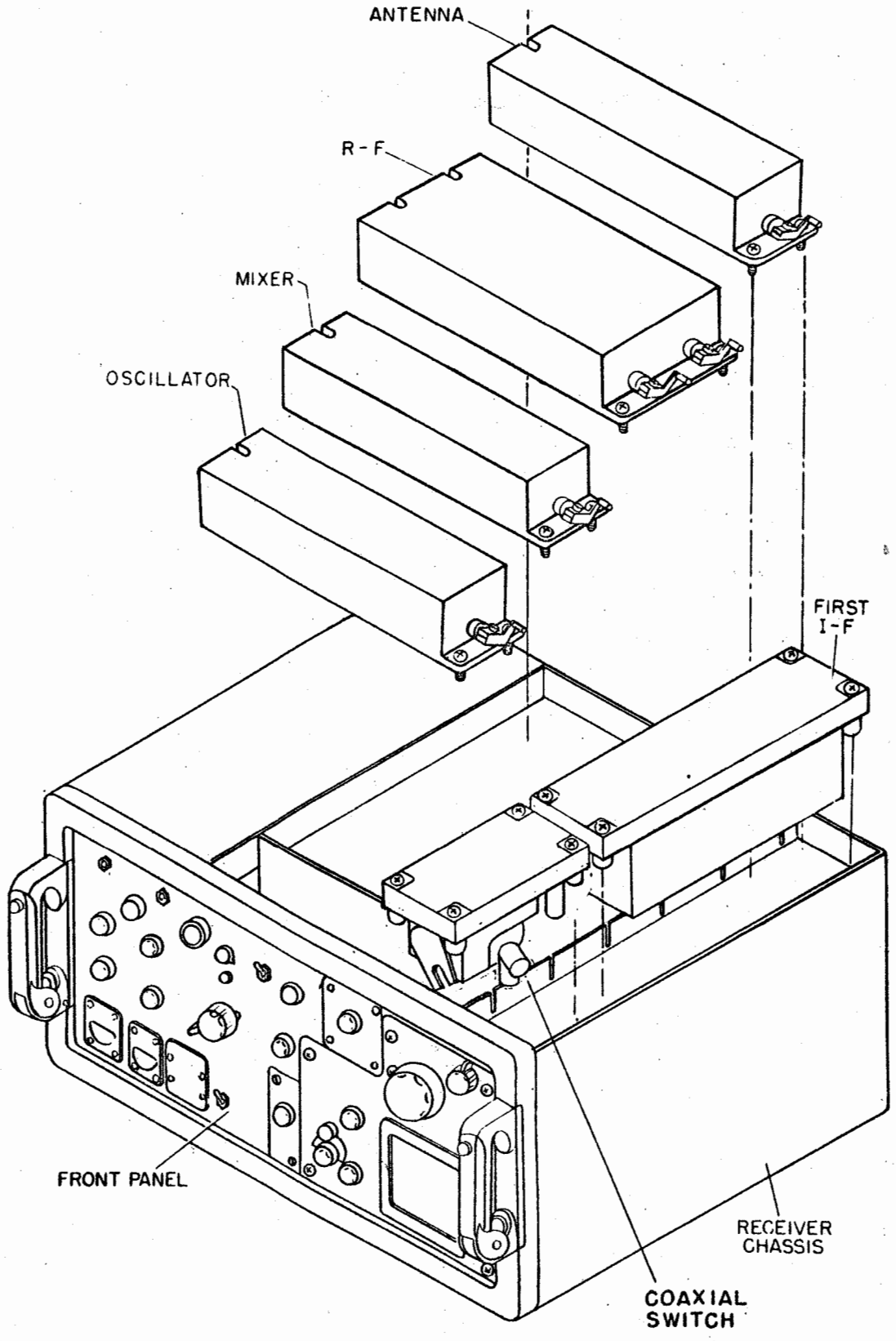


Figure 7-13. Removal and Replacement of Assemblies on Bottom Side of Receiver Chassis

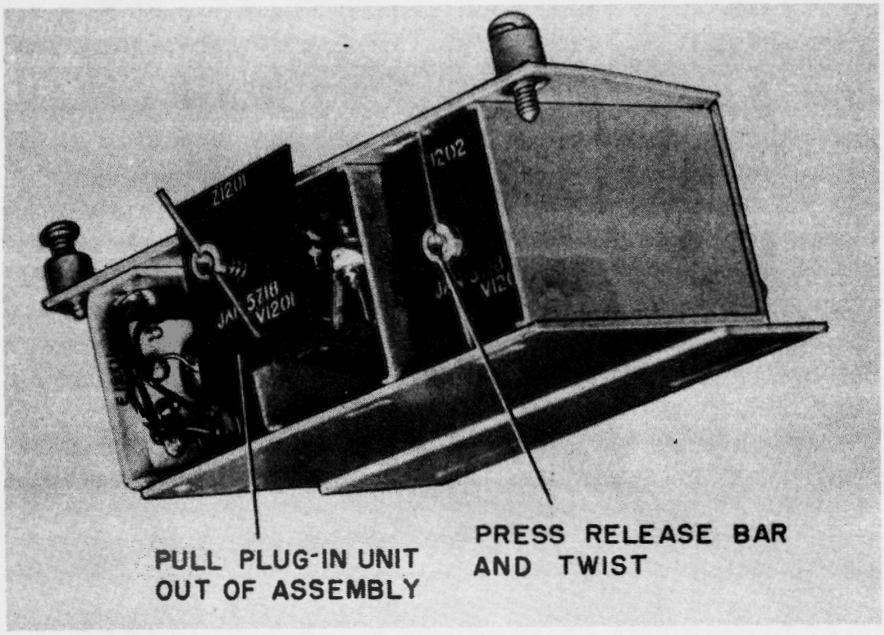


Figure 7-14. Removing a Plug-in Unit

of its position. In some cases where it is difficult to remove the plug-in unit, it may be necessary to also push gently on the opposite (socketed) end while removing. See figures 7-14 to 7-17.

(b) REPLACING A PLUG-IN UNIT. - Orient the plug-in unit so that the connecting pins on its base (labeled, A, B, C, D, etc.) line up with the corresponding socket terminals on the chassis. This will occur when the arrow on the top cover of the plug-in unit points to the white dot at the side wall of the corresponding compartment in the chassis. Push the unit in place, and, while depressing the release bar, twist the bar a quarter of a turn. The ends of the bar will then fit into the slotted holes in the metal compartment.

(c) REMOVING A PLUG-IN BOARD. - First remove the cover of the assembly, then pull the plug-in board from its position by gripping the metal bar and post of the ends of the board.

(d) REPLACING A PLUG-IN BOARD. - Turn the board so the pins fit over the holes in the assembly, and carefully insert the board in place. Replace the cover plate.

(3) CHANGING ELECTRON TUBES.

All electron tubes used in Radio Receiver R-618/FRR-32 are of the subminiature type, with exception of those in the power supply. The subminiature tubes are soldered into the subassemblies and cannot be tested in the conventional manner. The stage gain measurements given in table 7-5 are a good indication of the condition of the tubes.

It is recommended that a faulty stage be replaced with a spare (either a plug-in unit or a plug-in board) after trouble is isolated to a particular stage. However, procedure for changing these subminiature tubes is given below.

The electron tubes in the power supply are easily checked in a standard tube tester, and should be replaced with a spare of the same type when found to be faulty.

Two types of subminiature tubes are used in this equipment, the eight-pin base and four-pin base, shown in the inserts of the tables of voltage and resistance measurements.

NOTE

ALL TUBES OF A GIVEN TYPE SUPPLIED WITH THE EQUIPMENT SHALL BE CONSUMED PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK.

(a) REPLACING EIGHT-PIN TUBES. - Procedure for changing the eight-pin tubes on the plug-in boards (antenna, r-f, mixer, and oscillator assemblies) is different from that for changing the eight-pin tubes mounted in the plug-in units (second i-f and audio assemblies, etc.). Each procedure is described separately.

1. TUBES ON R-F BOARDS. - Refer to figures 7-15 to 7-17 and to the connection and schematic diagrams for the particular r-f board, then unsolder the tube leads at the terminals. Remove the subminiature tube from the metal shield, and replace it with a spare of the same type. Solder lead 1 to terminal 1, lead 2 to terminal 2, etc. The leads are numbered clockwise from the wide separation. Those leads that are not used should be cut off close to the bottom of the subminiature tube.

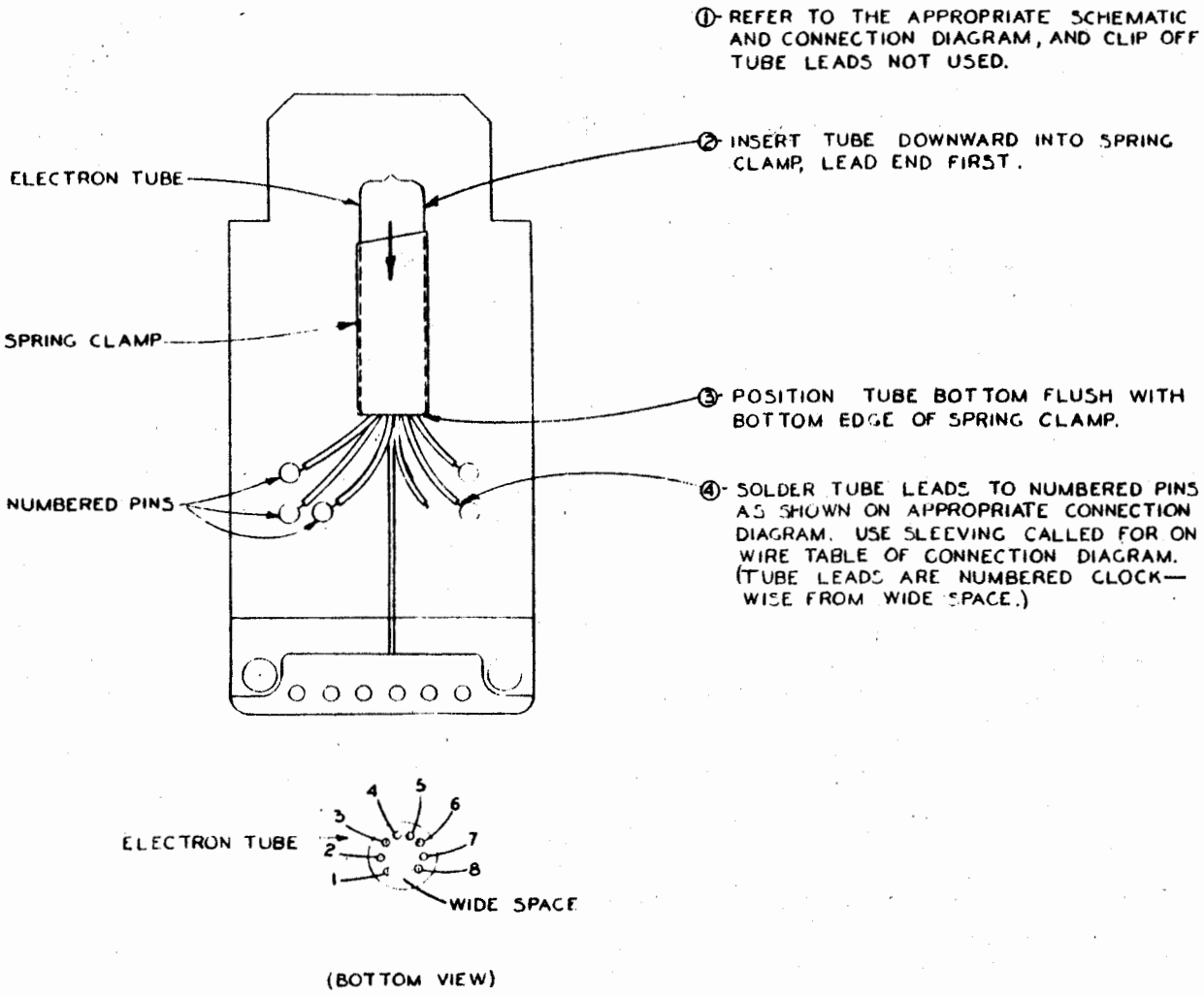


Figure 7-15. Eight-pin Electron Tube Replacement Plug-in Board

2. TUBES IN PLUG-IN UNITS. - Refer to figures 7-15 to 7-17 and to the appropriate connection and schematic diagrams. Remove the plug-in unit from the major assembly and unsolder the eight leads at the terminals on the tube base. Pull the tube through the hole in the base of the plug-in unit, and replace with a spare of the same type. Orient the tube so that the widest space between the leads is opposite the raised key on the socket. Then solder lead 1 to terminal 1, lead 2 to terminal 2, etc. Leads are numbered clockwise starting from the left of the key. Replace the plug-in unit in its assembly. In the particular instance of Z1109, which utilizes a type 5902 electron tube, depress the locking pin at the top of the unit, then insert the tube until its tip just clears the end of the pin. All other tube types are inserted to the extent that the base is approximately flush with the shield.

(b) REPLACING FOUR-PIN TUBES. - The four-pin tubes all are located in plug-in units. Refer to the appropriate connection and schematic diagrams, and to figures 7-15 to 7-17. Remove the plug-in unit from the assembly and unsolder the four leads at the terminals on the tube base. Pull the tube through the hole in the base of the plug-in unit, and replace it with a spare of the same type. Orient the tube so that the blue lead is nearest the blue dot on socket, and yellow lead is nearest the yellow dot on the socket. Then solder each of the four leads to the nearest terminal.

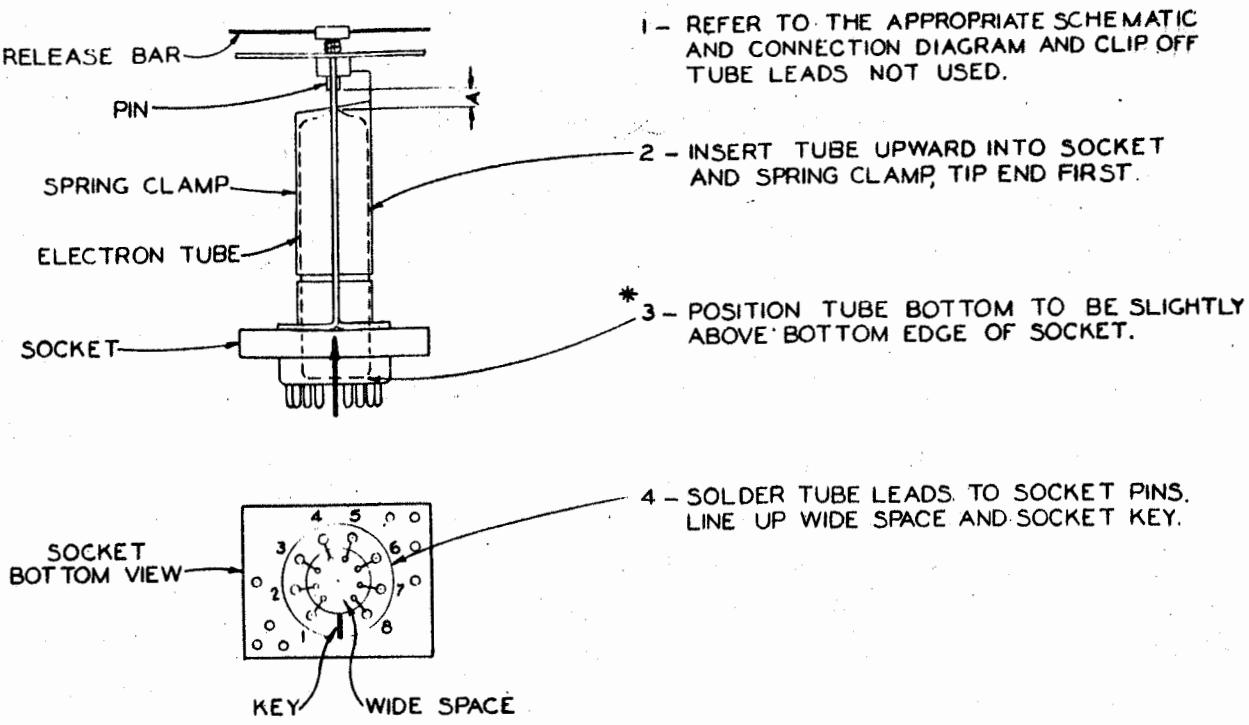


Figure 7-16. Eight-pin Electron Tube Replacement Plug-in Unit

The leads of the four-pin type subminiature tubes are numbered consecutively beginning from the blue lead (terminal 1) and proceeding clockwise to the yellow lead (terminal 4).

(4) REMOVING AND REPLACING PILOT LIGHT, DIAL LIGHTS AND CRYSTALS.

(a) PILOT LIGHT AND CRYSTALS. - First remove the pilot light cover or the cover of the assembly in which the crystal lies, then remove the bulb or crystal by use of the rubber plunger, H660, located near the Allen wrenches on the left inner wall of the chassis (see figure 7-18). This plunger has an opening at each end. Place the end having the proper size opening over the crystal or bulb and press on the plunger until it grips the crystal or bulb. Then remove the bulb or crystal by pulling or twisting the plunger as necessary.

(b) DIAL LIGHTS. - To change a dial light, proceed as follows:

1. Pull the receiver chassis out to servicing position. Behind the tuning dial, accessible from the upper side of the chassis, is the cover of the dial light compartment (marked I3801, I3802, X3801, X3802). This is shown in figure 7-18.

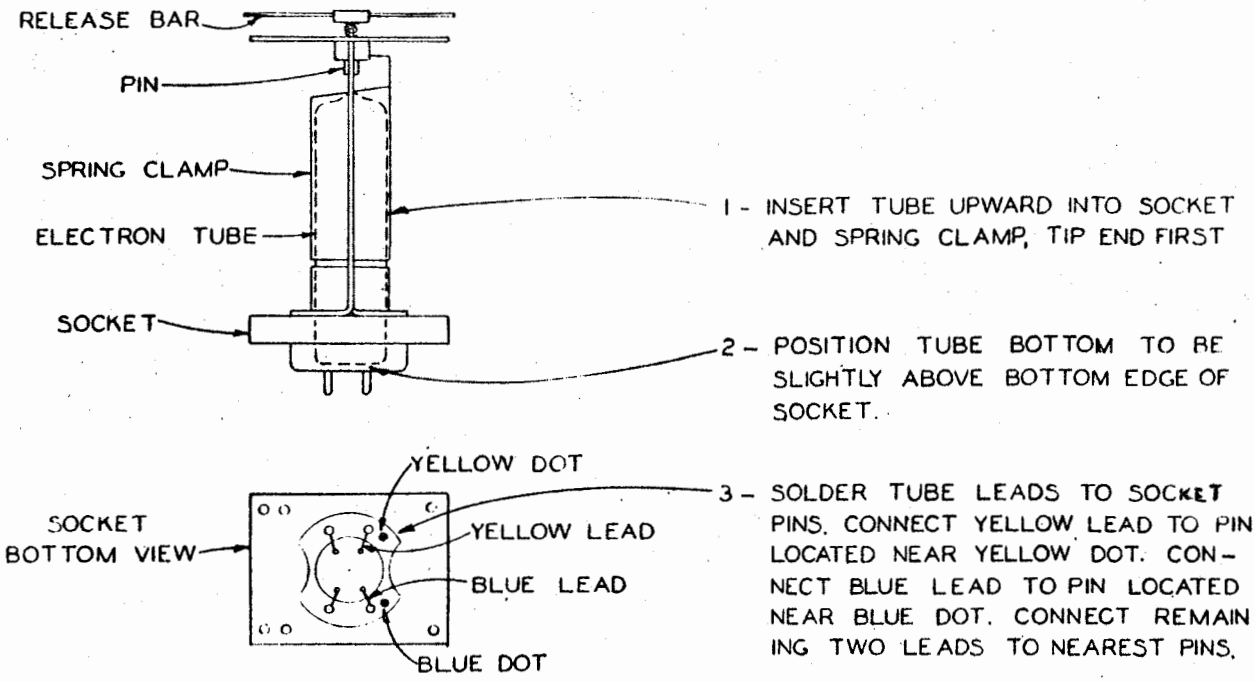


Figure 7-17. Four-pin Electron Tube Replacement Plug-in Unit

2. Loosen the two captive screws (A and B of figure 7-18) which retain the dial light cover. Slide the cover forward so that its two keyhole-shaped openings clear the captive screws, then lift off the cover.

3. Replace the bad bulb or bulbs by using the small plunger, H660, as described for pilot light and crystal removal. Then perform the adjustments given in step 4.

4. Refer to figure 7-19. Either one of the two lamps can be placed in operating position by means of the LAMPS switch, S3801, a front panel control. There is one pair of red-headed screws C, D on each side of the lamp support frame. In each pair, the larger of the two screws (C) moves the corresponding lamp forward or backward, while the smaller screw (D) moves the lamp upward or downward. The lamp is centered properly when a paper held between the focusing lens and the mirror, perpendicularly to the light beam, will show a well-defined circular illuminated area.

(5) REMOVING AND REPLACING THE TUNING DIAL. - (See figures 7-20 to 7-21).

When faulty operation of the mechanism require replacement of the tuning dial, procure the following tools: A screwdriver (6-inch blade), a Phillips head screwdriver (6-inch blade), and two pieces of fine string respectively 6 inches long and 2 feet long; then proceed as follows:

(a) Set the band switch to Band III, then slide the chassis out of its cabinet.

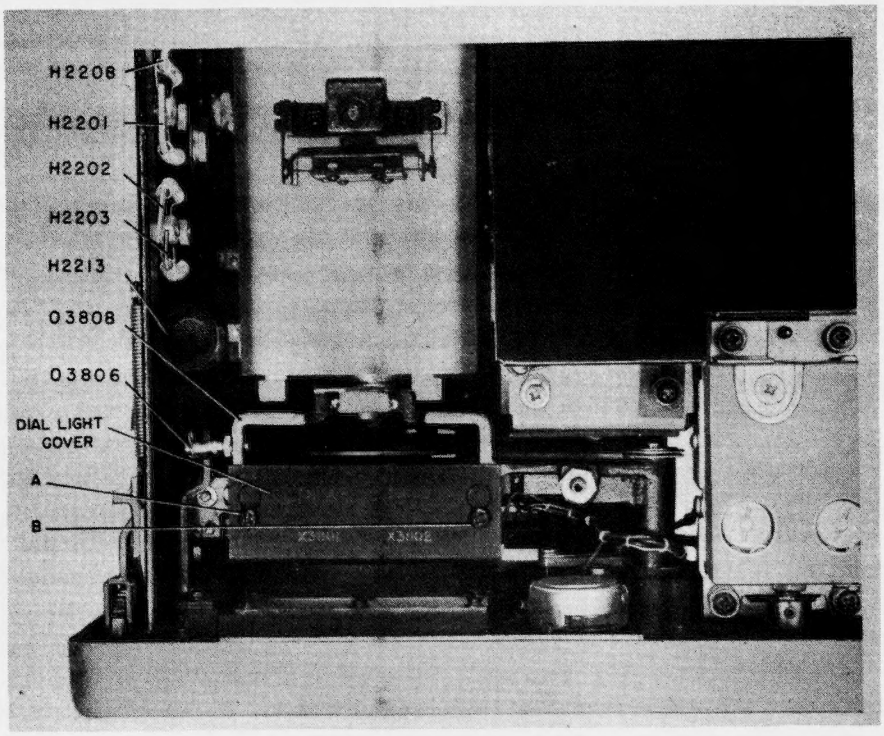


Figure 7-18. Lens-Arm Assembly and Dial Light Compartment, Top View

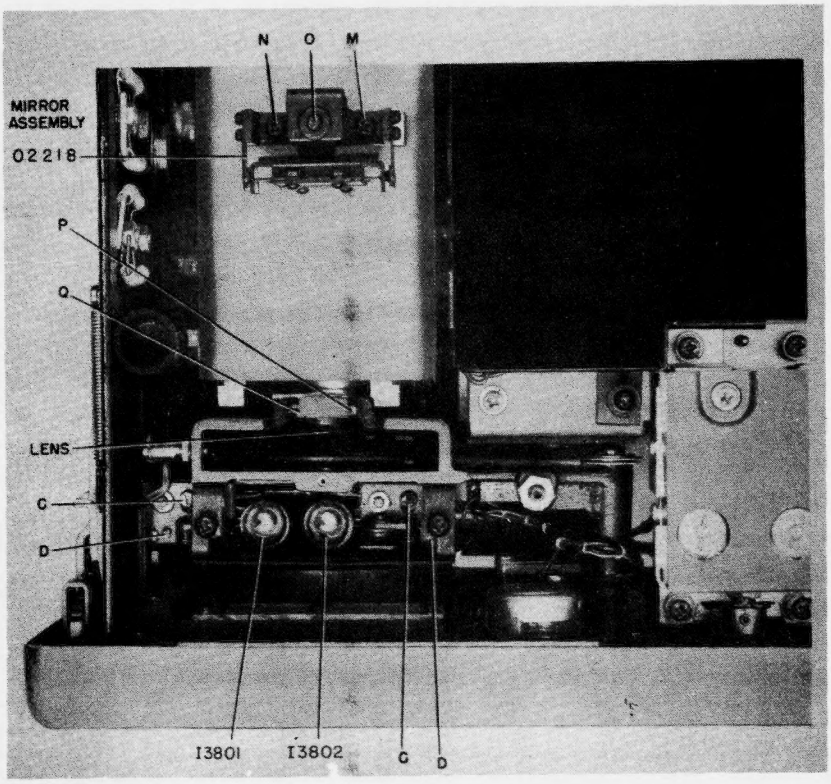


Figure 7-19. Lens-Arm Assembly and Dial Light Compartment, Cover Removed, Top View

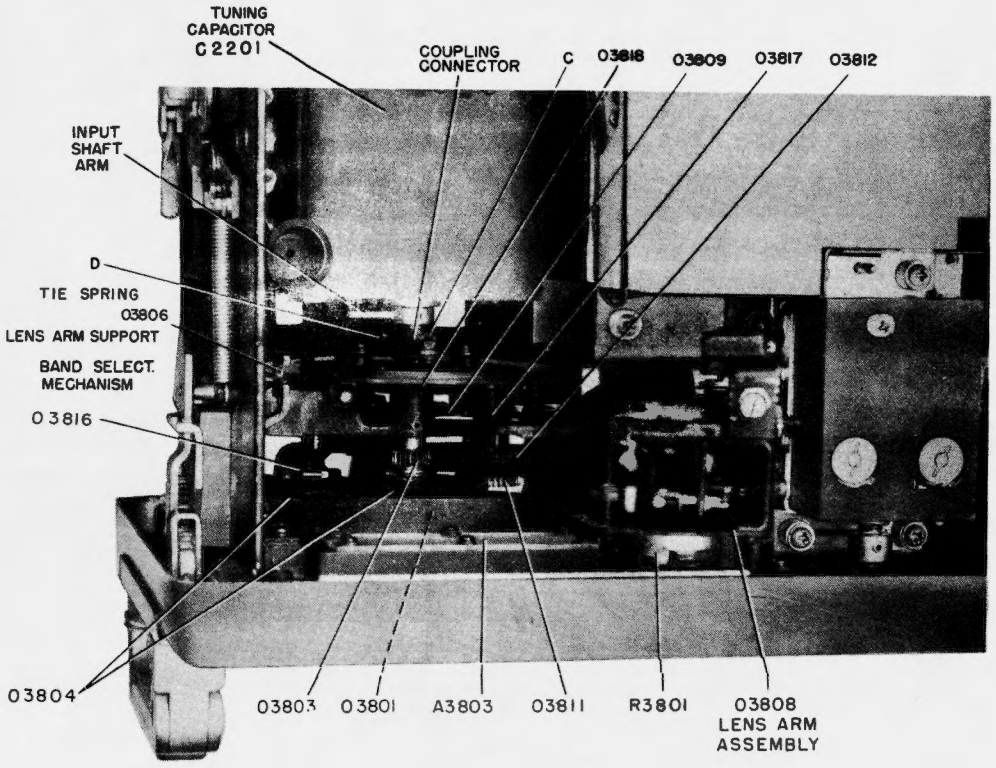


Figure 7-20. Dial Mechanism and Lens-Arm Assembly, Lifted, Top View

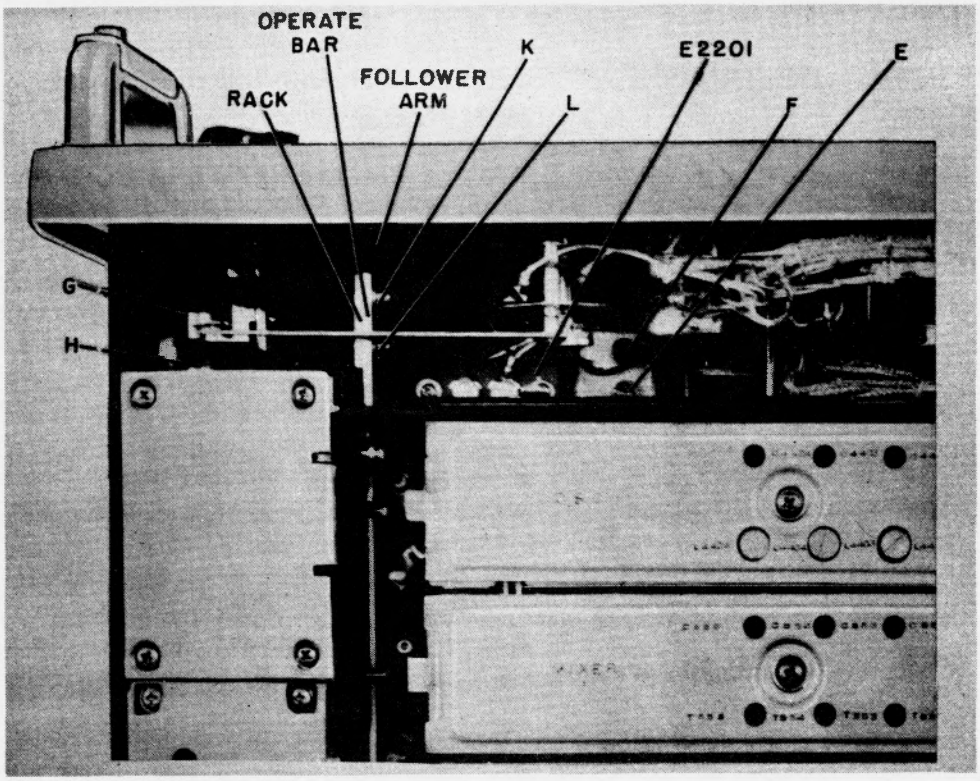


Figure 7-21. Dial Assembly, Bottom View

(b) On the top side of the chassis, unhook the spring O3806 (figure 7-18) from the left side of the lens arm assembly, O3808, and tie a 6-inch piece of string from the end of the spring to the bracket supporting the lens arm assembly, to prevent the spring from falling into the center of the chassis. Then swing the lens arm assembly open, and tie a piece of string from the end of the lens arm assembly to the right-hand front handle of the chassis.

(c) Refer to figure 7-20. Using one of the Allen wrenches that is clipped to the side of the chassis, loosen the two set screws C, D on the coupling connector between the tuning dial output shaft and the tuning capacitor input shaft.

(d) Remove the two strings connected in step (b), and return the lens arm assembly to its original position.

(e) Refer to figure 7-21. On the bottom side of the chassis, disconnect the two wires (spade connectors) on the dimmer terminal board.

(f) Loosen the four captive screws (marked E, F, G, H in figure 7-2) on the mounting brackets which hold the tuning dial to the chassis.

(g) Remove the rack from the operate bar by removing the two Allen-head screws (K, L in figure 7-21).

(h) Return the chassis to horizontal position and remove the six Phillips head screws from the front of the dial assembly.

(i) Ease the tuning dial assembly out of the receiver. Be careful not to catch or tear any of the grounding springs, gears, or mechanism of the dial.

(j) To replace the tuning dial, make certain that the band switch is set to Band III, and follow the reverse of the procedure just described, being careful that the tuning capacitor shaft and the dial coupling are aligned (extreme care must be exercised to insure that no strains are set up in the coupling). Check the gears and controls on the dial assembly for free movement. When replacing the rack on the operate bar, be sure the teeth mesh properly with little or no play. Do not tighten the set screw in the coupling or the captive screw in the mounting brackets until the dial is aligned.

(k) After the tuning dial has been installed, it will have to be aligned as outlined in paragraph 11 of this section. Start with step (c) of the procedure outlined in paragraph (6) below.

(6) ALIGNMENT OF THE TUNING DIAL. - (See figures 7-18 to 7-21.)

(a) Set the band switch to Band III.

(b) Loosen the Allen head set screws C, D on the coupling connector between the dial assembly output shaft and the tuning capacitor input shaft; also loosen the captive screws E, F, G, H in the mounting brackets.

(c) Set the tuning capacitor to maximum capacitance by turning the arm on the capacitor input shaft to the extreme counterclockwise position.

(d) Rotate the tuning knob of the dial assembly to the extreme counterclockwise position; then release the stop by lifting the follower arm (see figure 7-21) and continue to rotate the knob counterclockwise until the linear scale (lowest scale) reads 83.

(e) Tighten the coupling set screws and the captive screws in the bracket.

(f) Refer to figure 7-19. Adjust the mirror assembly so that the vertical line of the projected dial coincides with the index line on the screen, and the upper one of the two short horizontal lines is about 1/32 inch below the top of the window (the end screws M, N that mount the mirror assembly will allow adjustment of the vertical line, and the screw O, directly behind the mirror will adjust the centering of the horizontal lines).

(g) If the projected image is out of focus, adjust the projection lens to correct this by loosening the two set screws P, Q and moving the lens by hand until the image is in focus.

(h) Tighten the two set screws P and Q.

(i) Rotate the tuning knob until the zeroes of each scale on the tuning dial coincide.

(7) REMOVING AND REPLACING THE TUNING CAPACITORS.

First remove the tuning dial as outlined in sub-paragraph 6a(5) of this section, then remove the crystal calibrator assembly, and place the chassis in the servicing position so as to have access to the bottom of the receiver. Remove the tuning capacitor straps connected to the antenna, r-f, mixer, and oscillator. Remove the oscillator and first i-f boxes. Remove the three nuts which are threaded to the capacitor mounting studs, while holding the tuning capacitor. Ease the tuning capacitor out, being careful not to catch its straps on any of the other components. To replace the tuning capacitor use the reverse of the procedure just described.

(8) ALIGNMENT OF WAFER SWITCHES. - (See figures 7-23 and 7-24.)

(a) RECEPTION CONTROL SWITCHES. - Three wafer switches in the second i-f assembly, two in the audio assembly, and one in the BFO are moved when the RECEPTION control is rotated. If these switches are not properly aligned mechanically, the controlled effect for a particular emission will not be obtained. Use one of the two following rules to line up the wafer switches.

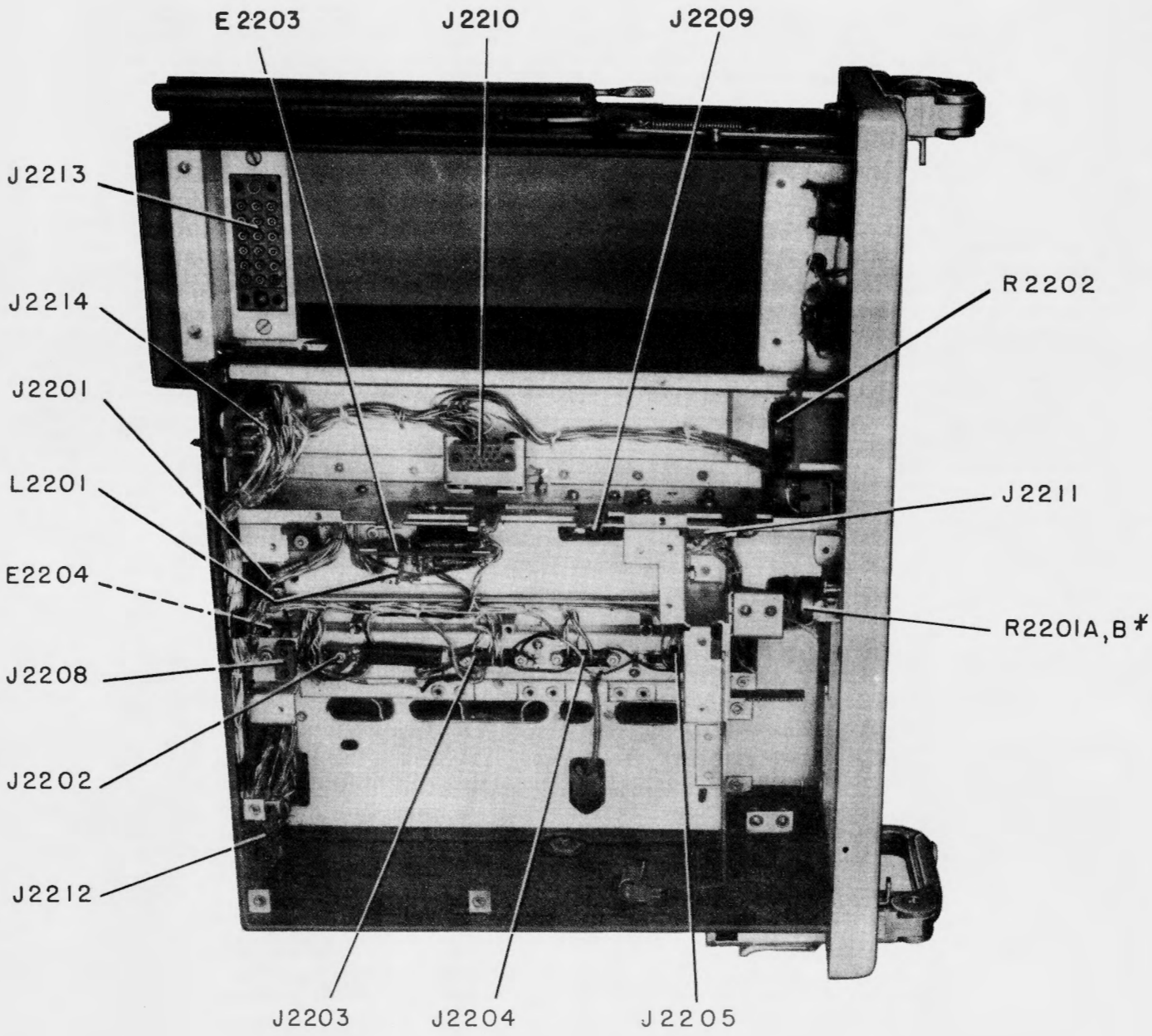
1. If the normal rotation of the wafer is counterclockwise when the RECEPTION control is switched through A1 BROAD, A1 SHARP, A1 MEDIUM, etc., set the RECEPTION control at A1 BROAD. Loosen the Allen screw that holds the switch arm to the shaft, and turn the shaft until the red dot on the rotor is lined up with the red dot on the switch stator. Then move the switch shaft one position counterclockwise, and tighten the Allen screw.

2. If the normal rotation of the wafer is clockwise when the RECEPTION control is switched through A1 BROAD, A1 SHARP, A1 MEDIUM, etc., set the RECEPTION control at A1 BROAD and loosen the Allen screw that holds the switch arm to the shaft. Turn the shaft until the black dot on the rotor is lined up with the black dot on stator. Then move the switch shaft one position clockwise, and tighten the Allen screw.

(b) BAND SELECTOR SWITCHES. - The band selector controls the wafer switches in the antenna, r-f, mixer, oscillator and 1st i-f assemblies by mechanical movement of the operate bar, which in turn moves the switch arm of each assembly to obtain the desired switching. Each switch has six detent positions, only the last five of which are used on these receivers. If a switch goes out of alignment, re-align it by the following procedure:

1. Remove the assembly or assemblies in which switch misalignment occurs.

2. For the antenna, r-f, mixer, and local oscillator assemblies, first set the switch to its extreme clockwise position; for the first i-f assembly, set the switch to its extreme counterclockwise position.



* TWO SECTION POTENTIOMETER
LETTERS A&B DENOTE FRONT AND REAR SECTIONS RESPECTIVELY

Figure 7-22. Receiver Chassis, Top View Assemblies Removed

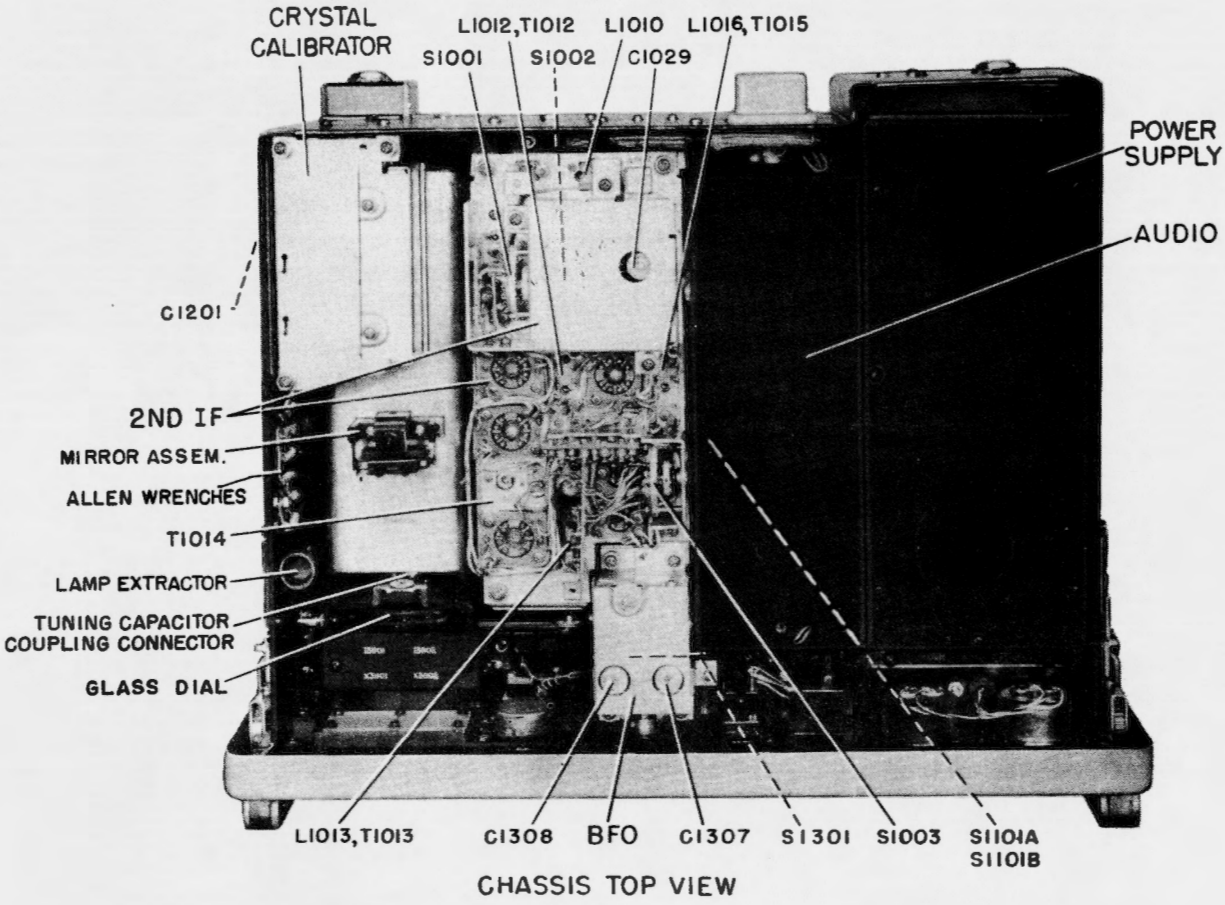


Figure 7-23. Receiver Component Locations, Top View

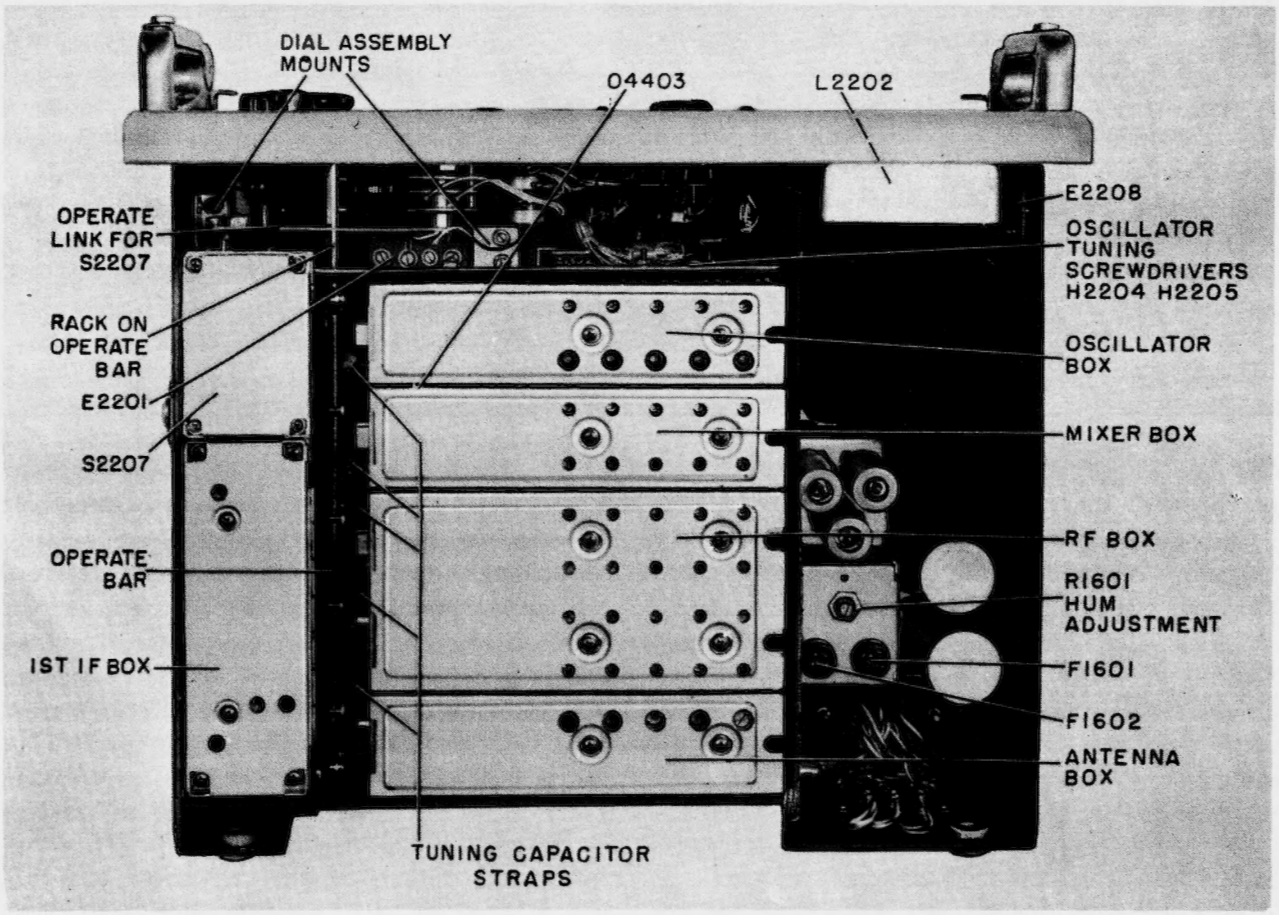


Figure 7-24. Receiver Component Locations, Bottom View

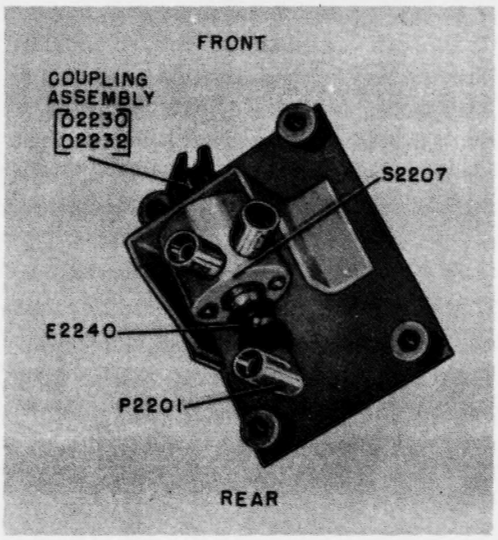


Figure 7-25. Coaxial Switch S2207, Underside View

3. Next, turn the switch back two positions. Loosen the Allen clamp screw on the switch arm, set the switch arm to a vertical position, and tighten the Allen clamp screw.

4. Set the band switch to Band III, then insert the assembly into its proper position in the chassis and engage the switch arm with the operate bar.

(9) RECEIVER ALIGNMENT.

When aligning the R-618/FRR-32 receivers, set the OSC switch to INT and follow the procedure given in this paragraph in the order given. Refer to figures 7-1, 7-2, 7-22, 7-23, 7-24, and 7-26 for the alignment points. Refer also to the appropriate schematic diagrams.

(a) LIST OF EQUIPMENT FOR RECEIVER ALIGNMENT.

1. An electronic voltmeter (similar to item 2 of table 7-1).

2. An oscilloscope (similar to item 6 of table 7-1).

3. A signal generator (similar to item 3 of table 7-1).

4. An audio oscillator (similar to item 4 of table 7-1).

5. A frequency meter (similar to item 5 of table 7-1).

6. 2 capacitors (1.0 mf approximately).

7. 1 capacitor (680 mmf approximately).

8. 1 capacitor (39 mmf approximately).

9. 1 jumper lead (6 inches of number 22 wire approximately).

(b) I-F ALIGNMENT.

1. Set the RECEPTION control to A1 MEDIUM, and the band switch to III.

2. Connect the electronic voltmeter as an output indicator measuring the d-c voltage at the detector output (Z1012-E and ground).

3. Connect the output of the signal generator to Z1008-A. Use a 1.0-mf capacitor in series with this and all signal generator connections in this paragraph (b). (Check the frequency with the frequency meter.)

4. Set the signal generator to a fixed frequency of 200 kc and adjust the signal level to obtain a reading on the voltmeter which lies within the 0 to 10-volt range (at all times throughout this procedure the signal generator level should be adjusted for a reading within the 0 to 10-volt range of the voltmeter).

5. Connect a shunting capacitor of approximately 680 mmf from Z1012-F to ground.

6. Tune L1013 for maximum detector output as indicated on the voltmeter.

7. Remove the shunting capacitor from Z1012-F and tune T1013 for maximum detector output.

8. Move the signal generator output to Z1006-A and connect the shunting capacitor to Z1008-A and ground.

9. Tune L1017 for maximum detector output.

10. Remove the shunting capacitor from Z1008-A and tune T1016 for maximum detector output.

11. Move the signal generator output to Z1004-A and connect the shunting capacitor to Z1006-A and ground.

12. Tune L1016 for maximum detector output.

13. Remove the shunting capacitor from Z1006-A and tune T1015 for maximum detector output.

14. Connect the shunting capacitor between Z1016-1 and ground.

15. Move the signal generator output lead to terminal A of Z901, and tune T901 for maximum detector output.

16. Remove the shunting capacitor from Z1016-1.

(c) I-F FILTER ALIGNMENT. - This procedure describes the alignment of the broad filter (Z1016) of the second i-f assembly, and band-pass filter of the first i-f assembly. The broad filter of the second i-f is a sealed unit but uses C1029 as its output trimmer capacitor.

Connect an electronic voltmeter (item 2 of table 7-1) to pin E of Z1012 and ground so as to read the d-c output of the detector, then proceed as follows:

1. BROAD FILTER OF SECOND I-F ASSEMBLY.

Step A. Set the RECEPTION control to A3 BROAD and the band switch to Band IV.

Step B. Connect a signal generator to the first i-f stage. Place a 1.0-mf capacitor in series with this for all generator connections in this paragraph (c).

Step C. Set the signal generator to a fixed frequency of 200 kc and adjust the signal level to obtain a reading on the 0 to 10-volt range of the voltmeter.

Step D. Adjust C1029 for a maximum output indication on the voltmeter.

2. FIRST I-F BAND PASS FILTER. - Set the band switch to Band IV and connect the signal generator to the R-F Mixer stage, then set the signal generator to a fixed frequency of 1600 kc and adjust C909 and C915 for a maximum output reading on the voltmeter.

(d) BFO ALIGNMENT.

1. Set the RECEPTION control to A1 BROAD, and turn the FREQ. VERNIER to its zero position.

2. Apply a 1000-cycle signal from an audio oscillator (similar to item 4 of table 7-1) to the horizontal input of an oscilloscope (similar to item 6 of table 7-1). Turn the oscilloscope sync off.

3. Connect the vertical input of the oscilloscope to pin J of Z1010, and apply a 200-kc signal to Z1004-A from a generator similar to AN/URM-25 Series.

4. Adjust C1307 for zero beat.

5. Set the RECEPTION control to FSK.

6. Adjust C1308 for a circular pattern on the oscilloscope.

(e) CRYSTAL CALIBRATOR ALIGNMENT. - Refer to figure 7-1 for position of adjustments, also to the appropriate schematic diagram. The following procedure gives the alignment for the crystal calibrator oscillator.

1. CRYSTAL CALIBRATOR OSCILLATOR.

Step A. Set the RECEPTION control to A1 MEDIUM.

Step B. Remove the crystal calibrator cover and connect a frequency meter (similar to item 5 of table 7-1), to the i-f output of the crystal calibrator, J1201-B.

Step C. Obtain the frequency reading of this output. The output of the crystal oscillator is rich in harmonics, therefore, tune the frequency meter to have a reading of the fundamental if at all possible. If the fundamental frequency of the crystal does not lie within the band of the frequency meter, then tune the frequency meter to the closest obtainable harmonic of the crystal oscillator. The crystal oscillator frequency is 200 kc.

Step D. If the frequency of the crystal calibrator is wrong, as determined in Step C, correct it by adjusting capacitor C1201.

NOTE

The crystals employed in the calibrator are approximately 0.01% high in frequency at normal room temperature in order that they may maintain their frequencies within tolerance over a wide range of ambient temperatures. A slight variation in frequency can be achieved by adjusting capacitor C1201. This capacitor is adjusted at the factory and normally will not require such adjustment.

Step E. Disconnect the frequency meter and replace the crystal calibrator cover.

(f) R-F SECTION ALIGNMENT.

1. GENERAL. - The procedure for aligning the R-F, Mixer, and Antenna consists of adjusting the trimmer capacitors in each stage for maximum output at the high alignment frequency of each band, then adjusting the inductances for maximum output at the low alignment frequency end of each band. The alignment for the oscillator involves a similar procedure, but uses a zero beat instead of maximum output. R-f signals should be obtained from a signal generator set (similar to item 3 of table 7-1) capable of supplying frequencies from 2 to 32 mc.

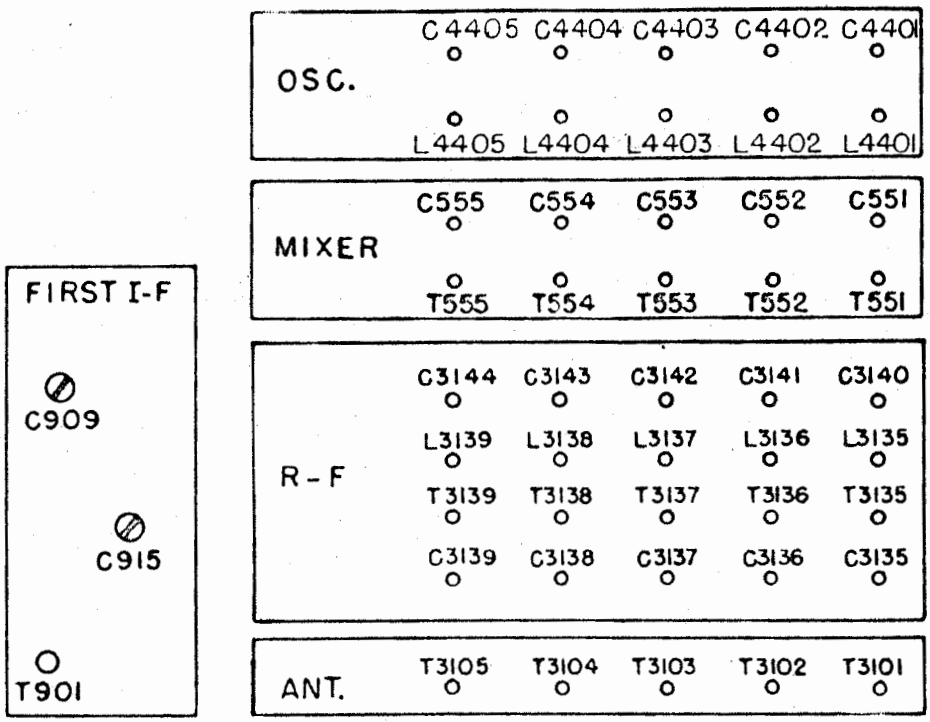


Figure 7-26. Receiver R-F Alignment Points

Locations of the trimmers and inductances are shown in figure 7-26. In addition, symbol numbers for the adjustments are marked on the equipment.

2. R-F ALIGNMENT PROCEDURE. - Set the receiver and generator according to the following conditions, then adjust the trimmers and capacitors in the oscillator, mixer, r-f, and antenna stages as directed in table 7-6.

If aligning the complete r-f section, first align the oscillator then align the antenna, r-f and mixer assemblies.

Step A. Set the RECEPTION control at A1 BROAD, and connect a jumper wire between terminals 2 and 3 of the CAL switch S2202. Turn the CAL switch to ON. Tune the receiver away from a calibration frequency and adjust the FREQ. VERNIER for zero beat. If an extraneous signal interfers with obtaining a beat note, detune the tuning dial to eliminate the signal. Remove the jumper wire.

Step B. An alternate method of adjusting the BFO without the use of a jumper (to be used in place of Step A) is as follows:

(1) Set the RECEPTION control to A1 BROAD and turn the CAL switch to ON. Tune the receiver away from a calibration frequency.

(2) Apply the output of the signal generator to ANT receptacle at the back of the receiver. Use an impedance adapter and an antenna simulator such as given under item 3 c˙ table 7-1, to make this connection.

(3) Apply a sufficiently high level of input at the r-f to obtain a beat note, and adjust the generator frequency to produce zero beat.

(4) Turn the CAL switch off. Adjust the FREQ. VERNIER to produce zero beat.

Step C. Set link O3101 of the receiver to a position so as not to connect to any of the terminals. Then connect a 39-mmf capacitor to terminal 3 of E3108, and ground.

Step D. Apply the output of the signal generator directly to same terminal that the 39-mmf capacitor was connected to in Step C.

Step E. Tune the generator and receiver to the alignment frequency specified in table 7-6 for the trimmer or inductance being adjusted. Check the frequency of the signal generator each time a new frequency is used. Use a frequency meter similar to item 5 of table 7-1 to make this check.

Step F. Set the ADD DECIBEL switch to -10 db position. Adjust the GAIN control in the receiver and output control of the generator for a reading of -10 db in the OUTPUT meter each time a new alignment frequency is used.

Step G. Put the ADD DECIBEL switch at the 0 db position, then adjust the trimmers and inductances in the oscillator section to produce zero beat at the indicated frequencies of table 7-6. After the oscillator has been aligned, check the calibration check points as given in Step J below.

Step H. When aligning the inductances of the oscillator stages, first unscrew and remove the oscillator caps, then adjust the oscillator slug by using the special screwdriver which clips behind the front apron of the chassis (see figure 7-24). Use the outer blade of the screwdriver to hold the plastic slug support, then adjust the slug with the inner blade of the screwdriver for zero beat as described. DO NOT ADJUST THE PLASTIC SUPPORT, AS THIS WAS FACTORY SET FOR PROPER TEMPERATURE COEFFICIENT.

Step I. Adjust the mixer, r-f, and antenna stages for maximum on the OUTPUT meter in the order given in table 7-6. If the OUTPUT meter reads full scale, attenuate the signal generator output before adjusting the trimmer or inductance to maximum.

NOTE

The adjustments set forth in table 7-6 should be made in groups. The groups are determined by the particular band being aligned. For instance the oscillator adjustments in Band I (1st group) are to be made and checked before going to the adjustments set forth for Band II, and the antenna, r-f and mixer tuned circuits of Band I (1st group) are to be made and rechecked before going to the adjustments set forth for Band II. Two examples are given below.

Example 1 is for antenna, r-f, and mixer alignment, and Example 2 is for oscillator alignment. When complete r-f section alignment is to be performed, align the oscillator first, then align the antenna, r-f, and mixer.

EXAMPLE 1: Antenna, R-f and Mixer adjustments in Band I (refer to table 7-6).

(1) With the RECEPTION control at A1, BROAD and the adjustments described in paragraph 2 Step A or Step B above have been made, connect the signal generator output to the ANT receptacle of the receiver.

(2) Set the band selector to Band I, the CAL ADJUST knob to exact center position, and lock it.

(3) Turn the tuning dial knob till the reading on the frequency scale of the dial assembly is 3.88 mc.

(4) Tune the signal generator to 3.88 mc and check this frequency with the frequency meter.

(5) Set the ADD DECIBEL switch to the -10 db position and adjust the GAIN control for a -10 db reading.

(6) Set the ADD DECIBEL switch to the 0 db position and adjust trimmers ANT COMP, C3135 and C3140 to obtain a maximum output as indicated on the output meter and phones.

(7) Turn the tuning dial knob till the reading on the frequency scale of the dial assembly is 2.0 mc.

(8) Tune the signal generator to 2.1 mc and check this frequency with the frequency meter.

(9) Set the ADD DECIBEL switch to the -10 db position and adjust the gain control for a -10 db reading.

(10) Set the ADD DECIBEL switch to the 0 db position and adjust L4401 for a maximum output as indicated on the output meter and phones.

(11) Repeat steps (2) through (9) until no further adjustment is necessary then go on to the next alignment step in table 7-6 using the same procedure with the frequencies and adjustments given in that table.

EXAMPLE 2: Oscillator alignment in Band I (refer to table 7-6).

(1) Follow the same procedure as given in example 1, and substitute oscillator alignment points and frequency as given in table 7-6, as per example steps 1 and 2 of table 7-6.

(2) After the complete oscillator adjustments have been made, recheck the adjustments for each band. They may require slight readjustment as there is a small amount of coupling between the tuned circuits of the oscillator.

(3) After the oscillator adjustments have been checked, perform the calibration checks given in Step J below.

Step J. After the oscillator has been aligned or checked for alignment, turn the CAL switch to ON, and check each calibration check point on each band that has been aligned to make sure that the CAL ADJUST knob is capable of causing the calibrator frequency markings to coincide with the point of zero beat note. If such is not the case on any particular band, perform the following correction adjustments.

(1) Set the CAL ADJUST knob to its center position.

(2) Check all of the calibration points on the band, and the number of divisions on the linear scale by which the zero beat note is displaced from the point where the calibration marker appears. Attach a negative prefix to this number if the zero beat note occurs at a dial position which is lower than the dial marker, and a positive prefix if the zero beat note occurs at dial position which is higher than the dial marker.

(3) Record the positive and negative extremes of the number obtained in step (2) above.

(4) Compute the average of the two readings. This is equal to one-half the algebraic sum of these readings.

(5) Set the tuning dial to the calibration marker at the low end of the band and note the linear scale reading.

(6) Turn the tuning dial knob till the linear scale's position is displaced by the number of divisions computed in step (4). (Take into account the proper sign.)

(7) Set the CAL ADJUST knob so that the calibration marker at the low end of the band coincides with the linear scale reading obtained in step (6). Lock the CAL ADJUST knob.

(8) Align the oscillator as given in paragraph 4 with the CAL ADJUST knob set to the position determined in step (7), then recheck the calibration check points as described in the first paragraph.

(9) If the calibration check points can still not be brought to coincidence by use of the CAL ADJUST knob, then align the tuning dial as described in sub-paragraph 6a(6).

EXAMPLE: (BAND III).

(1) With the CAL ADJUST knob set at its mid position, the 9.2-mc calibration marker appears at reading of 157 on the linear scale and the zero beat note occurs at a reading of 159 on the linear scale (a deviation of +2). In checking all the other check points, this is found to be the largest positive deviation.

(2) The 13.4-mc check point appears at a reading of 647 on the linear scale, and the zero beat note at 638 (a deviation of -9). In checking of all other check points this is found to be the largest negative deviation.

(3) The average deviation of these two extremes is (+2 -9)/2 = -2/2 = -3.5.

(4) Set the frequency dial to 8.0 mc (lowest check point of Band III) The linear scale reads 16.7

(5) Rotate the tuning knob till the linear scale reads 13.2 (16.7 -3.5 = 13.2).

(6) Adjust the CAL ADJUST knob until the frequency dial reads 8.0 mc, and lock it at this position.

(7) Align the oscillator with the CAL ADJUST knob locked in the position given in step (6).

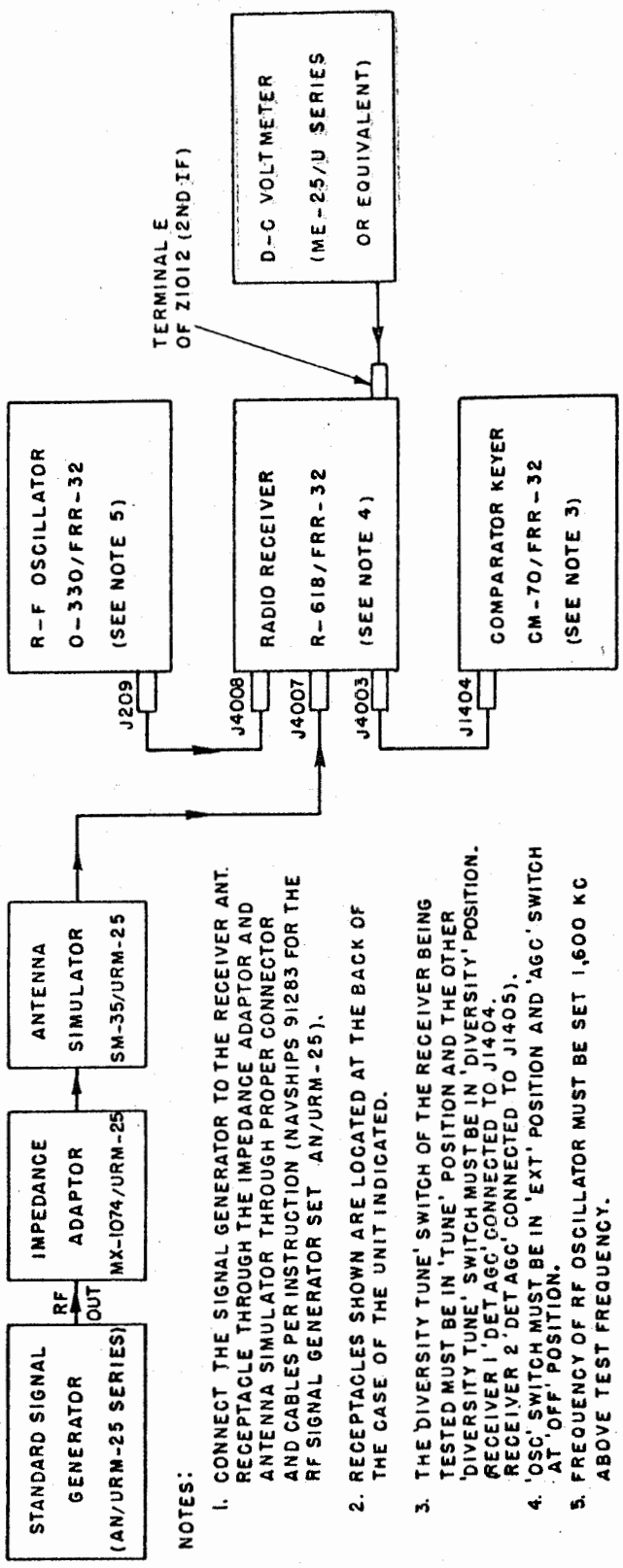


Figure 7-27. Test Set-up for Receiver Selectivity Measurements

TABLE 7-6. R-F ALIGNMENT PROCEDURE

STEP	GENERATOR AND RECEIVER FREQUENCY (MC)	ADJUST TRIMMER FOR ZERO BEAT	ADJUST INDUCTANCE FOR ZERO BEAT	SECTION	BAND
1	4.0	C4401		OSC	I
2	2.0		L4401	OSC	I
3	8.0	C4402		OSC	II
4	4.0		L4402	OSC	II
5	16.0	C4403		OSC	III
6	8.0		L4403	OSC	III
7	24.0	C4404		OSC	IV
8	16.0		L4404	OSC	IV
9	32.0	C4405		OSC	V
10	24.0		L4405	OSC	V
		MAXIMUM OUTPUT	MAXIMUM OUTPUT		
11	3.88	ANT COMP		ANT	I
12	3.88	C3135, C3140		RF	I
13	3.88	C551		MIX	I
14	2.1		T3101	ANT	I
15	2.1		L3135, T3135	RF	I
16	2.1		T551	MIX	I
17	7.76	ANT COMP		ANT	II
18	7.76	C3136, C3141		RF	II
19	7.76	C552		MIX	II
20	4.28		T3102	ANT	II
21	4.28		L3136, T3136	RF	II
22	4.28		T552	MIX	II
23	15.49	ANT COMP		ANT	III
24	15.49	C3137, C3142		RF	III
25	15.49	C553		MIX	III
26	8.32		T3103	ANT	III
27	8.32		L3137, T3137	RF	III
28	8.32		T553	MIX	III
29	23.62	ANT COMP		ANT	IV
30	23.62	C3138, C3143		RF	IV
31	23.62	C554		MIX	IV
32	16.32		T3104	ANT	IV
33	16.32		L3138, T3138	RF	IV
34	16.32		T554	MIX	IV
35	31.7	ANT COMP		ANT	V
36	31.7	C3139, C3144		RF	V
37	31.7	C555		MIX	V
38	24.3		T3105	ANT	V
39	24.3		L3139, T3139	RF	V
40	24.3		T555	MIX	V

(10) SELECTIVITY MEASUREMENT.

The curves shown in figure 7-28 are typical selectivity curves for the R-618/FRR-32 receiver. Typical curves are shown for each degree of selectivity for various frequencies. Overall selectivity above the highest frequency shown is effectively the i-f selectivity and will be the same as that at this frequency. These curves represent typical data; appreciable variation may occur from one set to another set without denoting trouble.

MEASUREMENT OF OVERALL SELECTIVITY. - Set up equipment as shown in the block diagram, figure 7-27.

For A1 BROAD, A1 SHARP, or A1 MEDIUM setting of RECEPTION control, set the GAIN control to produce 60 microwatts of noise into a 600-ohm load (0.19 volt or -20 db). Set output level controls to maximum, SILENCER control to minimum. For A3 SHARP or BROAD, or FSK setting of RECEPTION control, turn DIVERSITY GAIN BALANCE control to minimum.

Before checking selectivity on any band, set the tuning dial to the high-frequency alignment point for the antenna stage (see table 7-6).

Set the RECEPTION control to A1 BROAD and GAIN control to produce 60 microwatts output. Set the Standard Signal Generator to produce peak output at this frequency; then adjust the antenna trimmer to produce maximum output. On the low bands of the low-frequency receivers it may be necessary to repeat these steps until the maximum is reached.

Then set the TUNING control to desired measurement frequency, and the RECEPTION control to desired condition.

Set the Standard Signal Generator level to produce approximately 5 volts dc on the voltmeter. Find the peak of the selectivity curve by turning the signal generator, and determine whether characteristic has a single or double peak. If there is a single peak, set signal generator frequency to peak value and adjust level to produce 5 volts d-c output. Now increase input level in convenient steps (e.g., 2, 10, 100 and 1000 times resonant input). At each input level adjust frequency above and below resonance until the d-c voltmeter reads 5 volts. Record frequency. Selectivity curves are normally plotted in terms of the number of times resonant input (as set on the Standard Signal Generator) against the frequency deviation from resonance.

When the curve has a double peak, the minimum between the peaks should be employed as the resonant frequency. In this case, to plot a complete curve, two peaks should also be located. Often curves will be found to be asymmetrical. In this case it is convenient to choose a resonant frequency midway between the two frequencies which produces a standard output at two times the resonant input. Asymmetry does not necessarily indicate an incorrectly aligned set, since the tracking error normally present in the superheterodyne between oscillator and preselector can cause small asymmetries.

(11) CRYSTAL DATA.

Crystals are used in the first i-f, the crystal-controlled calibrator assemblies in each receiver. They are mounted in plug-in holders which are held in place by spring clips. Table 7-7 lists the specification of each crystal, and their physical locations are shown in the appropriate connection diagram.

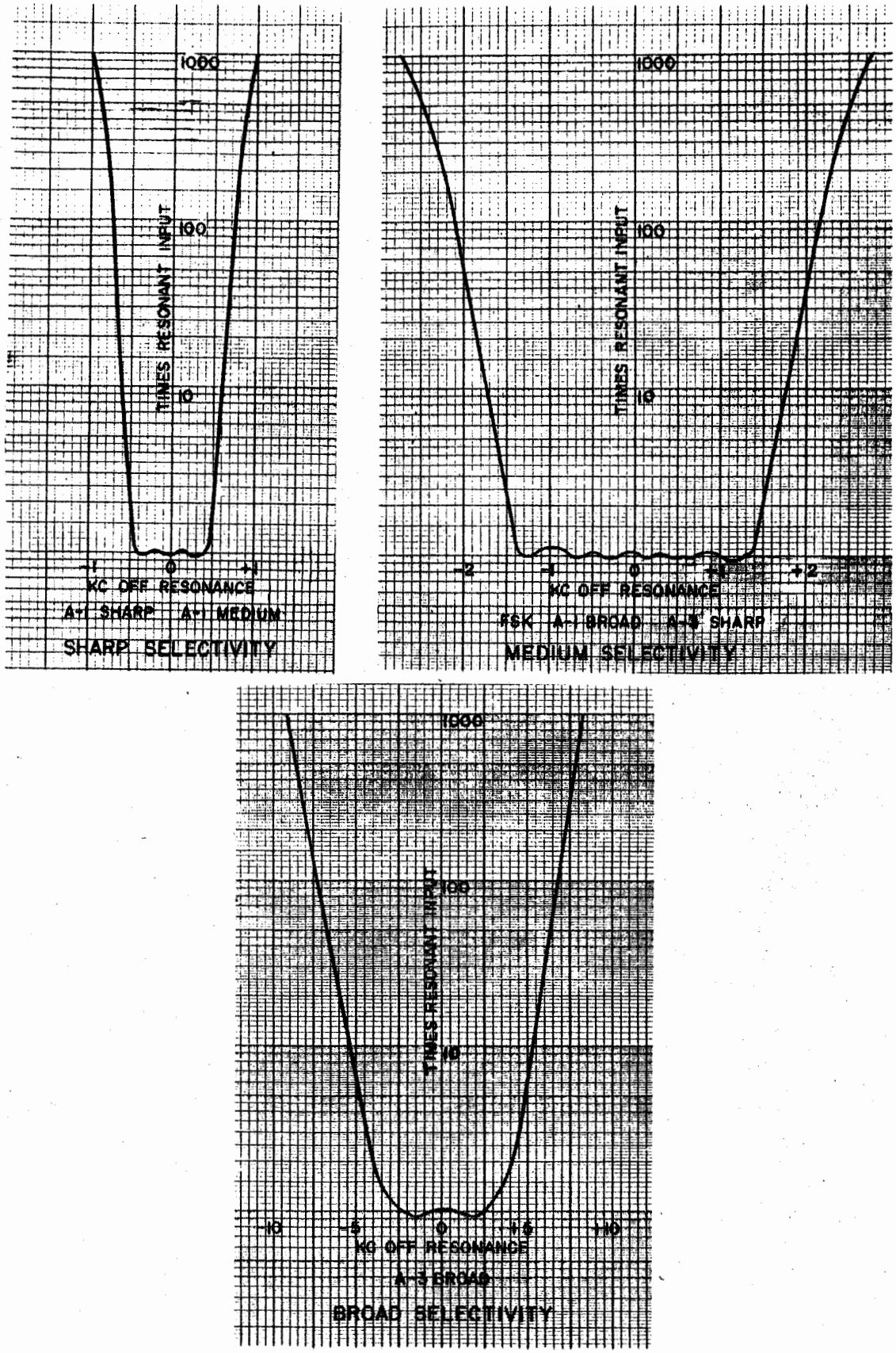


Figure 7-28. Receiver Selectivity Curves

TABLE 7-7. RECEIVER CRYSTAL DATA*

SYMBOL	FREQUENCY	TOLERANCE	TEMP RANGE	CRYSTAL HOLDER TYPE
		FIRST I-F ASSEMBLY		
Y901	1400 kc	±0.005%	-55°C to +90°C	HC-6/U
		CRYSTAL CALIBRATOR		
Y1201	200 kc	±0.012%	-40°C to +85°C	

* Refer to MIL-C-3098 Specification.

(12) WINDING DATA.

Winding data for all coils and transformers indicated by symbol numbers on the schematic diagrams is given in table 7-11. However, winding data for hermetically sealed filters, which are indicated by Z-numbers on the schematic diagram, are not given. These filters are to be replaced as whole units.

b. COMPARATOR KEYER.

(1) REMOVING AND REPLACING SUB UNITS.

(a) REMOVING COMPARATOR, TONE KEYER, OR MONITOR SUB UNIT. - Before removing either one of these sub units from the Comparator Keyer chassis, certain switch knobs must be disengaged These knobs are disengaged by simply pulling the knob forward which will release the coupling to the respective switch. The procedure for removing the Comparator sub unit starts with step 1, the Tone Keyer sub unit starts with step 2 and the Monitor sub unit starts with step 3 below.

1. Disengage the knobs of the two DIVERSITY TUNE switches, the RECEPTION switch, and the AGC TIME CONSTANT switch. Proceed to step 4.

2. Disengage the knob to the FREQUENCY switch and proceed to step 4.

3. Disengage the knob to the FUNCTION switch and proceed to step 4.

4. Each sub unit is held in place by three captive Phillips head screws, accessible from the top of the unit. One, a no. 8-32 screw, is located at the center of the rear of the chassis; the other two, size 1/4 inch, are located, one at each end of the front side of the assembly. Loosen these screws.

5. Grasp the sub unit assembly by the flange on the back and the flange on the front of the assembly and lift the unit up, vertically until it is clear of all obstructions.

(b) REMOVING THE POWER SUB UNIT.

1. Loosen the four captive hold-down screws; two no. 8-32 Phillips head screws located one on each side of the center of the assembly and the two 1/4 inch Phillips head screw located, one in the center at each end of the Power sub unit.

2. Grasp the sub unit assembly by the flange on each end and lift the unit up, vertically until it is clear of all obstructions.

(c) REPLACING THE SUB UNITS. - The replacement of a sub unit is made by simply lifting the assembly into position, aligning the guide pins located on the Comparator Keyer chassis with their mating holes on the sub unit assembly and then gently pressing the assembly into place. After this is done, tighten the captive Phillips head screws and engage the switch knobs where necessary. The switch knobs are engaged by simply pushing the knob in and rotating it until the coupling drive-pin engages in the slot on its mating plate.

(2) COMPARATOR KEYER ADJUSTMENTS. - The adjustments of the Comparator Keyer are to be made with the unit in servicing position and the chassis connected to its case by Test Cable Assembly Type CX-3262/U.

Readjustment is not necessary in all cases when tubes are changed in this unit but in those cases where readjustment is desirable, mention is made in the adjustment procedure.

(a) TONE KEYER FREQUENCY ADJUSTMENTS.

1. Set the Comparator Keyer RECEPTION switch to A1 position.

2. Place the CAL KEY switch in CAL position.

3. Turn R630 (accessible from top of unit) fully clockwise.

4. Connect the upper AF LINE PHONES jack to the vertical input connectors of an oscilloscope, similar to item 6 of table 7-1.

5. Connect an audio oscillator, similar to item 4 of table 7-1, to the horizontal input terminals of the same oscilloscope connected in step 4 above. The frequency adjustments outlined in this procedure are made with lissajous patterns.

6. Turn the power ON to the Comparator Keyer and allow at least a 10-minute warm-up period.

7. Adjust the AF LINE LEVEL potentiometer to an amplitude which gives low distortion as output.

8. Place the FREQUENCY control to 595 and adjust the audio oscillator to give an output of 595 cycles per second.

9. Note the pattern on the oscilloscope. Adjust R601 (accessible from the top of the Tone Keyer sub unit) to get an ellipse (circle) on the oscilloscope.

10. Repeat steps 8 and 9 for the remaining seven positions of the FREQUENCY switch. When the FUNCTION control is placed at 765, 935, 1105, 1275, 1445, 1615, and 1785, adjust the output of the audio oscillator to 765, 935, 1105, 1275, 1445, 1615, and 1785 cycles per second, respectively. Make necessary frequency corrections by adjusting potentiometers R603, R605, R607, R609, R611, R613, and R615 respectively. See figure 7-7 for location of components.

11. R630 should be adjusted with the Comparator Keyer operating as part of the overall system. It should be adjusted to produce a tone amplitude, at the LINE PHONES or speaker, comparable to the amplitude obtained when receiving modulated CW signals with the RECEPTION switch in A position.

(b) POWER SUB UNIT HUM ADJUSTMENT.

1. Place the RECEPTION switch in the A3 position.

2. Connect the upper MONITOR PHONES jack to the vertical input terminals of an oscilloscope.

3. Place the FUNCTION switch in DIV position.

4. Turn the power ON to the Comparator Keyer and allow at least 10 minutes warm-up period.

5. Adjust the MONITOR LEVEL potentiometer to half gain.

6. Adjust R403 (accessible from beneath the Power sub unit assembly, see figure 7-8, sheet 2) for minimum hum, as seen on the oscilloscope.

NOTE

R403 may need to be readjusted when V703 is changed.

(c) MONITOR SUB UNIT BFO ADJUSTMENT.

1. Connect the output connector of a Heterodyne Frequency Meter, similar to item 5 of table 7-1, to either RCVR 1 IF receptacle, at the rear of the Comparator Keyer case. Adjust the output of the meter to 200 kc.

2. Place the FUNCTION switch to IF 1 position.

3. Turn the power ON to the units and allow at least 10 minutes warm-up.

4. Connect the upper MONITOR PHONES jack to the vertical input connectors of an oscilloscope, similar to item 6 of table 7-1. Use slow sweep on the oscilloscope.

5. Turn the oscilloscope gain up and advance the MONITOR LEVEL control to get a beat pattern on the oscilloscope.

6. Adjust C707 (accessible from the top of the Monitor sub unit), with an insulated screwdriver for zero beat as seen on the oscilloscope. C707 shifts the oscillator only a few cycles per second either side of 200 kc.

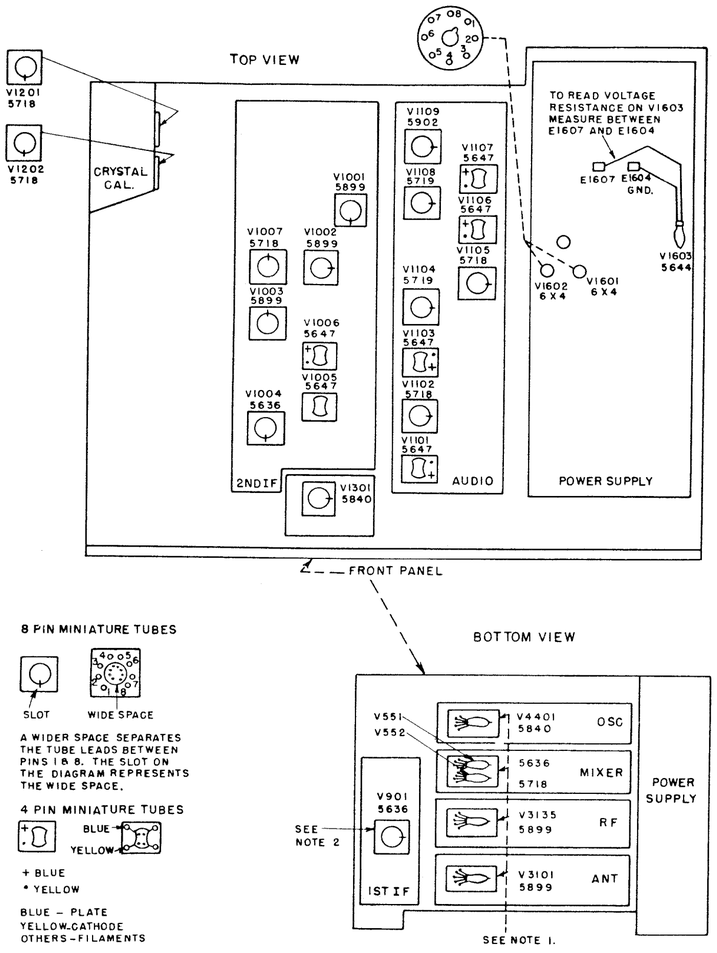
7. After zero beat has been obtained, adjust the frequency meter a few cycles off zero beat and adjust L701 (accessible from the top of the Monitor sub unit) for maximum amplitude on the oscilloscope.

NOTE

Readjustment of L701 may be necessary when V701 is changed.

C707 may need readjustment if V702 is changed.

TABLE 7-8. RECEIVER VOLTAGE AND RESISTANCE MEASUREMENTS



NOTE 1.- TAKE MEASUREMENTS ON NUMBERED PINS OF PLUG-IN BOARDS.

NOTE 2. - EIGHT-PIN MINIATURE TUBE; SEE TUBE LAYOUT FOR INFORMATION ON PIN NUMBERS.

TABLE 7-8. RECEIVER VOLTAGE AND RESISTANCE MEASUREMENTS (Continued)

Conditions for taking receiver voltage and resistance measurements:

Receiver connected for single receiver operation, including Test Cable Assembly CG-1101/FRR.
RECEPTION control set at A1 BROAD.
SILENCER control set at minimum.
All other controls set at maximum.
OSC switch set at INT.

RECEIVER VOLTAGE MEASUREMENTS TO CHASSIS GROUND (VOLTS)

TUBE SYMBOLS	PIN NUMBERS 1	2	3	4	5	6	7	8
V551	0	1.3	3.15*	-4	112	3.15*	107	....
V552	0	....	3.15*	....	2.3	3.15*	....	108
V901	-0.66	1.5	3.15*	0	107	3.15*	72	....
V1001	0	1.5	3.15*	1.5	87	3.15*	86	1.5
V1002	0	1.5	3.15*	1.5	88	3.15*	88	1.6
V1003	0	1.7	3.15*	1.7	88	3.15*	88	1.7
V1004	-9.5	2.3	3.15*	-2.1	80	3.15*	82	2.3
V1005	-23	2.9*	2.9*	0	....	....	....	....
V1006	0	2.9*	2.9*	0	....	....	....	....
V1007	0	0	3.15*	0	2.25	3.15*	3.6	100
V1101	0	100	100	0.3	....	....	....	....
V1102	0	0	3.15*	0	1.0	3.15*	0	37
V1103	75	100	100	75	....	....	....	....
V1104	0	0	3.15*	0	2.0	3.15*	0	90
V1105	0	0	3.15*	0	0.8	3.15*	0	37
V1106	11.0	3.15*	3.15*	11.0	....	....	....	....
V1107	11.0	3.15*	3.15*	11.0	....	....	....	....
V1108	0	0	3.15*	0	0.8	3.15*	1.5	70
V1109	0.15	9.0	3.15*	9.0	90	3.15*	100	9.0
V1201**	1.5	....	3.15*	....	2.8	3.15*	....	70
V1202**	-4.7	....	3.15*	....	2.8	3.15*	....	85
V1301	-2.5	2.5	3.15*	2.5	46	3.15*	74	2.5
V1601	210*	....	0	0	....	210*	165	....
V1602	210*	....	0	0	....	210*	165	....
V1603	86	....	....	0	....	....	....	....
V3101								
V3135								
V4401	-10	0	0	....	90	6.3*	92	....

* A-c volts. Measurements given in volts.

** CAL switch to ON.

TABLE 7-8. RECEIVER VOLTAGE MEASUREMENTS TO CHASSIS GROUND (Continued)

RESISTANCE MEASUREMENTS TO CHASSIS GROUND (ohms; K = 1000 ohms)

TUBE SYMBOLS	PIN NUMBERS 1	2	3	4	5	6	7	8
V551	450K	180	*	22K	70K	*	70K	....
V552	450K	....	*	....	460	*	....	70K
V901	10K	180	*	1.6	70K	*	83K	180
V1001	1 Meg	270	*	270	70K	*	70K	270
V1002	1 Meg	270	*	270	70K	*	70K	270
V1003	1 Meg	260	*	260	70K	*	70K	260
V1004	4700	1000	*	4700	120K	*	120K	1050
V1005	35K	*	*	*	....	....	....	....
V1006	*	*	*	0	....	....	....	....
V1007	70K	Inf	*	Inf	500	*	Inf	70K
V1101	47K	39K	39K	1.4 Meg	....	....	....	....
V1102	100K	Inf	*	Inf	900	*	Inf	120K
V1103	600K	39K	39K	400K	....	....	....	....
V1104	1 Meg	Inf	*	Inf	6200	*	Inf	300K
V1105	1 Meg	Inf	*	Inf	750	*	Inf	130K
V1106	500K	*	*	90K	....	....	....	....
V1107	500K	*	*	90K	....	....	....	....
V1108	1 Meg	Inf	*	Inf	12K	*	Inf	45K
V1109	450K	300	*	300	70K	*	70K	300
V1201**	2200K	....	*	....	470	*	....	50K
V1202**	33K	....	*	....	470	*	....	50K
V1301	85K	1000	*	1000	85K	*	90K	1000
V1601	60	....	0	0	....	60	36K	....
V1602	60	....	0	0	....	60	36K	....
V1603	40K	....	....	0	....	....	....	....
V3101								
V3135								
V4401	12K	*	0	....	70K	6.5	70K	....

* Less than one ohm.

** CAL switch to ON.

TABLE 7-9. TUBE OPERATING VOLTAGES AND CURRENTS

Tube Symbols	Tube Type	Function	Plate Volts	Plate Ma	Screen Volts	Screen Ma	Suppressor Volts	Cathode Volts	Grid Volts	Heater Volts AC
R-F OSCILLATOR										
		No information available								
COMPARATOR KEYER										
V401	6X4	Neg. Voltage Rectifier	245 ac	15	....	....	....	0	....	6.3
V402	6X4	1/2 Pos. Voltage Rectifier	340 ac	93	....	....	....	260v	....	6.3
V403	6X4	1/2 Pos. Voltage Rectifier	340 ac	93	....	....	....	260v	....	6.3
V404	6074	Neg. Voltage Regulator	0	8.5	....	....	....	-105	....	....
V405	6074	Pos. Voltage Regulator	105	10.8	....	....	....	0	....	....
V601A	5814	Oscillator	133	0.95	....	....	....	12.35	0	6.3
V601B		Amplifier	131	0.93	....	....	....	12.35	-0.33	6.3
V602A	5751	Cathode Follower	131	0.5	....	....	....	1002	0	6.3
V602B		Gating Tube	67	1	....	....	....	-5	-4.9	6.3
V603	5751	Amplifier	230	0.1	....	....	....	105	67	6.3
V701	5750	Mixer	210	1	48	3.8	2	2	0	6.3
V702	6136	BFO Oscillator	227	2	64	0.35	0	9.22	-17.2	6.3
V703	5814	A-F Amplifier	142	1.8	....	....	....	2.7	0	6.3
V704	6005	Power Amplifier	225	24	230	6	15	15	0	6.3
V801A	5751	Impulse Noise Limiter	0	0*	....	....	....	0	0	6.3
V801B		Amplifier	160	1.03	....	....	....	1.5	0	6.3
V802A	5751	Silencer	92	0.048	....	....	....	2.55	0	6.3
V802B		Silencer	77	0.043	....	....	....	77	77	6.3
V803A	5751	Amplifier	220	1.2	....	....	....	1.8	0	6.3
V803B		Limiter	11.7	0.19	....	....	....	11.0	11.7	6.3
V804A	5751	Limiter	11.7	0.19	....	....	....	11.0	11.7	6.3
V804B		Amplifier	135	0.19	....	....	....	2.4	0	6.3
V805	6005	Power Amplifier	225	24	230	6	15	15	0	6.3
RECEIVER 1 AND RECEIVER 2										
V551	5636	Mixer	112	2.2	107	5.5	-4.4	1.3	0	6.3
V552	5719	Mixer Cathode Follower	108	5.0	....	....	....	2.3	0	6.3
V901	5636	I-F Amplifier	107	3.6	72	3.1	0	1.5	-0.66	6.3
V1001	5899	2nd I-F Amplifier	120	5.5	120	....	0	1.6	....	6.3
V1002	5899	2nd I-F Amplifier	120	5.5	120	....	0	1.5	....	6.3
V1003	5899	2nd I-F Amplifier	120	6.3	120	....	0	1.7	....	6.3
V1004	5636	BFO Mixer	120	1.9	120	....	0	1.9	....	6.3
V1005	5647	Diode Detector	....	....	....	....	....	....	....	6.3
V1006	5647	Delay AGC	....	....	....	....	....	....	....	6.3
V1007	5718	2nd I-F Cathode Follower	120	4.8	....	....	....	2.2	....	6.3
V1101	5647	Noise Peak Limiter	....	....	....	....	....	....	....	6.3
V1102	5718	Audio Amplifier	120	1.2	....	....	....	1.0	....	6.3
V1103	5647	Silencer Diode	120	0.2	....	....	....	....	....	6.3
V1104	5719	D-C Amplifier	120	0.3	....	....	....	2.0	....	6.3
V1105	5718	Audio Amplifier	120	1.0	....	....	....	0.8	....	6.3
V1106	5647	Series Limiter	120	0.02	....	....	....	11.0	....	6.3
V1107	5647	Series Limiter	120	0.02	....	....	....	11.0	....	6.3
V1108	5719	Driver Amplifier	120	0.1	....	....	....	0.8	....	6.3
V1109	5902	Beam Power Output	120	29.7	120	2.0	0	9.0	....	6.3
V1201	5718	Crystal Calibrator	74	4.7	....	....	....	3.1	+1.6	6.3
V1202	5718	Crystal Calibrator	74	4.7	....	....	....	3.1	+1.6	6.3
V1301	5719	BFO	96	3.9	....	....	....	3.1	-5.3	6.3
V1601	6X4	Rectifier	220	....	....	....	....	....	....	6.3
V1602	6X4	Rectifier	220	....	....	....	....	....	....	6.3
V1603	5644	Voltage Regulator	120	5.0	....	....	....	....	....	....
V3101	5899	Antenna Preamplifier	101	7.0	100	1.6	....	1.4	0	6.3
V3135	5899	R-F Amplifier	106	4.7	106	2.0	....	1.9	0	6.3
V4401	5718	Oscillator	90	6.5	....	....	....	0	-10	6.3

* Depends on signal.

TABLE 7-10. TUBE CHARACTERISTICS

Tube Type	Filament Voltage (V)	Filament Current (A)	Plate Voltage (V)	Grid Bias (V)	Screen Voltage (V)	Plate Current (MA)	Screen Current (MA)	A-C Plate Resistance (OHMS)	Voltage Amplification Factor (MU)	Transconductance (Micromhos) Normal	Transconductance (Micromhos) Minimum	Emission IS (MA)	Emission Test Volt
0A2	SEE NOTE 1.												
5V4G	5	2	SEE NOTE 2.										
6AQ5	6.3	0.45	250	-12.5	250	45	4.5	52K		4100	3000	100	30
6BE6 Converter	6.3	0.3	250	-1.5	100	3	7.5	1 meg		440	280	50	15
Oscillator						20			21	7250	5500		
6C4	6.3	0.15	250	-8.5		10.5		7700	17	2200	1750	70	30
6X4W	6.3	0.6	SEE NOTE 3.									140	50
12AU7 Series Parallel	12.6 6.3	0.15 0.3	250	-8.5		10.5		7700	17	*2200	*1750	*70	*30
5636	6.3	0.15	100	0	100	5.6	4.1			3350	2700		
5644	SEE NOTE 4.												
5647	6.3	0.15	165									25	6
5718	6.3	0.15	100	0		8.5			27	5800	4800		
5719	6.3	0.15	100	0		0.73			70	1700	1400		
5750 Converter	6.3	0.3	250		100	2.5	7.6			500	430		
Oscillator										7800	6000		
5751 Series Parallel	12.6 6.3	0.175 0.35	250	-3		1			70	1200	900		
5814 Series Parallel	12.6 6.3	0.175 0.35	250	-8.5		10.5			17	*2200	*1750		
5840	6.3	0.15	100	0	100	7.5	2.4			5000	4100		
5899	6.3	0.15	100	0	100	7.2	2.2			4500	3800		
5902	6.3	0.45	110	0	110	30	2.2			4700	3200		
6005	6.3	0.45	250	-12.5	250	45	45			4100	3000		
6074	SEE NOTE 5.												
6136	6.3	0.3	250		150	10.6	4.3			5200			

Notes:

1. Starting voltage ..... 185 v DC min
   Operating Voltage ..... 150 v DC approx
   Operating current ..... 5 ma (min) to 30 ma (max).
2. For capacitor-input filter:
   A-C plate voltage per plate (rms) ..... 750 v
   D-C output current ..... 175 ma (max).
3. For capacitor-input filter:
   A-C plate voltage per plate (rms) ..... 650 v
   D-C output current ..... 75 ma (max).
4. Starting voltage ..... 130 v DC min
   Operating voltage ..... 95 v DC approx
   Operating current ..... 5 ma (min) to 25 ma (max).
5. Starting voltage ..... 133 v DC min
   Operating voltage ..... 108 v DC min
   Operating current ..... 5 ma (min) to 30 ma (max).

* Each unit separately

TABLE 7-11. COIL WINDING DATA

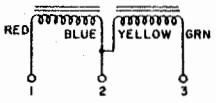
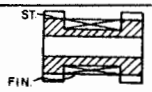
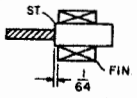
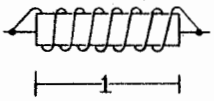
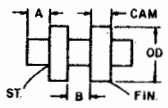
SYMBOL DESIGNATION	R.C.A. PART NO.	DIAGRAM DIM. IN INCHES	WINDING	WIRE SIZE	TURNS	D-C RESISTANCE IN OHMS	IMPEDANCE RATIO	HIPOT A-C VOLTS	REMARKS
L101 through L399		Information not available							
L401, L1601	8896292-1		2 sections connected to common terminal, series opposing	0.0071E	1800	160 ea section			Total L = 10 henries; tapped at 5 henries. One section rated 50 v rms at 119 ma, other section rated 5 v rms at 104 ma
L601, L702	474158-1	Not available at time of printing							
L701	474186-1	Not available at time of printing	1-pie universal	6 strands no. 44 AWG silk or nylon covered Litz wire	220	9.6			L = 440 to 800 uh at 790 kc. 1/2 in. dia ceramic coil form
L1013	746104-32	 Lead / Term: St / A; Tap / B; Fin / C	Random	1 strand 0.004	225-1/2, 121-1/4 turns to tap	9.8 term A to C 4.7 to tap			0.118 in. dia powdered iron coil form. See notes 2 and 3. L = 0.382 mh, term A to B; 0.29 mh term B to C at 200 kc. 30 sec 500 v rms 60 cycle flash test between windings
L1016, L1017	746104-31	Same as L1013	Random	1 strand 0.004	304-1/2, 162-1/4 turns to tap	13.6 6.5 to tap			0.118 in. dia powdered iron coil form. See notes 2 and 3. L = 0.769 mh, term A to B; 0.579 mh, term B to C at 200 kc. 30 sec 500 v rms 60 cycle flash test between windings
L2201	746104-9	 Lead / Term: St / A; Fin / B	Universal, 1/2 cross per turn, 1 section	1 strand 0.004	1045-1/2	50.2			0.125 in. dia powdered iron slug. Wind coil over 1 layer of tape, extend leads 1-1/2 in. beyond core. L = 6.35 mh at 200 kc. 30 sec 500 v rms 60 cycle flash test between windings
L2202	8813716-501		Single layer, close wound	No. 36 AWG Formex	125	3.456			38 mc self-resonant frequency. L = 30 uh. 1/4 in. dia phenolic coil form
L3135	746108-16	 Dim. / Lead / Term: A = 9/16, B = 3/64, CAM = 3/32, OD = 0.495; St / Fin; B / D	Universal, 4 crosses per turn, 3 sections	Litz wire (10 strands of 0.002 in. dia wire)	12 per section	1.35			0.455 in. dia steatite coil form. See notes 2, 3, and 5. L = 23.4 uh at 3 mc

TABLE 7-11. COIL WINDING DATA (Continued)

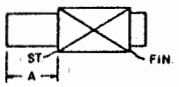
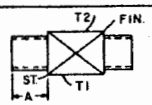
SYMBOL DESIG-NATION	R. C. A. PART NO.	DIAGRAM DIM. IN INCHES	WINDING	WIRE SIZE	TURNS	D-C RESIST-ANCE IN OHMS	IMPED-ANCE RATIO	HIPOT A-C VOLTS	REMARKS
L3136	746108-17	 Dim. A = 1/2 Lead — Term St — B Fin — D	Flat, RH, 44 turns per in. in groove	0.010 in. dia wire	20-2/3	0.284			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 5.21 uh at 6 mc
L3137	746108-18	Same as L3136 Dim. A = 3/4	Flat, RH, 24 turns per in. in groove	0.020 in. dia wire	8-2/3	0.037			0.455 in. dia steatite coil form. See notes 2, 3 and 5. L = 1.15 uh at 12 mc.
L3138	746108-19	Same as L3136 Dim. A = 21/32	Flat, RH, 13 turns per in. in groove	0.015 by 0.045 in. tinned copper strip	5-2/3	0.016			0.455 in. dia steatite coil form. See notes 2, 3, and 5. L = 0.367 uh at 20 mc
L3139	746108-20	Same as L3138	Flat, RH, 13 turns per in. in groove	0.015 by 0.045 in. copper strip	3-2/3	0.013			0.455 in. dia steatite coil form. See notes 4 and 5. L = 0.274 uh at 28 mc
L-4401	746105-11	 Dim. A = 7/16 Lead — Term St — A Tap 1 — D Tap 2 — E Fin — C	Flat, close wound	30 strands 0.002	31-2/3, tap 1 at 10.5, tap 2 at 18.4	0.28			0.312 in. dia ceramic coil form. See notes 2 and 4. L = 8.65 uh at 4.6 mc, term A to C
L4402	746105-12	Same as L4401 Dim. A = 29/64	Flat, close wound	1 strand 0.0159	17-2/3, tap 1 at 6-1/2, tap 2 at 11-1/3	0.09			0.312 in. dia ceramic coil form. See notes 2 and 4. L = 3.15 uh at 7.6 mc, term A to C
L4403	746105-13	Same as L4401 Dim. A = 23/32	Flat, 24 turns per in. in groove	1 strand 0.020	6-3/4, tap 1 at 2.9, tap 2 at 5-1/3	0.03			0.455 in. dia ceramic coil form. See notes 1, 2, 4, and 5. L = 0.95 uh at 13.6 mc, term A to C
L4404	746105-14	Same as L4401 Dim. A = 0.63 Lead — Term St — B Tap — D Fin — C	Flat, 13 turns per in. in groove	0.015 by 0.045	4-1/2, tap at 2	0.013			0.455 in. dia ceramic coil form. See notes 1, 2, 4, and 5. L = 0.372 uh at 21.6 mc, term B to C
L4405	746105-15	Same as L4401 Dim. A = 11/16 Lead — Term St — D Tap — B Fin — E	Flat, 13 turns per in. in groove	0.015 by 0.045	3, tap at 1-2/3	0.01			0.455 in. dia ceramic coil form. See notes 1, 2, 4, and 5. L = 0.255 uh at 29.6 mc, term D to E

TABLE 7-11. COIL WINDING DATA (Continued)

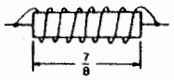
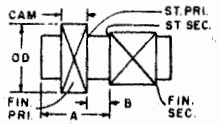
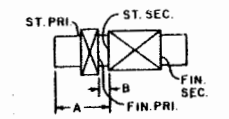
SYMBOL DESIG-NATION	R.C.A. PART NO.	DIAGRAM DIM. IN INCHES	WINDING	WIRE SIZE	TURNS	D-C RESIST-ANCE IN OHMS	IMPED-ANCE RATIO	HIPOT A-C VOLTS	REMARKS
L4408	8810453-501		Single layer close wound	No. 28 AWG Formex	50	0.2			0.25 in. dia iron coil form (insulated). L = 25 uh at 2 mc
T101, T102				Information not available					
T401		Not available at time of printing							
T402		Not available at time of printing							
T551	746108-1	 Dim. A = 1/2 B = 3/32 CAM (pri) = 5/32 OD (pri) = 0.565 Lead — Term Pri St — B Fin — E Sec St — D Fin — C	Primary Universal, 1-1/2 crosses per turn, 1 section Secondary flat, RH, 64 turns per in.	1 strand 0.004 1 strand 0.01	328 45-1/6	28.2 0.6			0.455 in. dia ceramic coil form. See notes 2 and 4. L = 24 uh at 3 mc, term C to D, pri shorted
T552	746108-2	Same as T551 Dim. A = 21/32 B = 1/16 CAM (pri) = 3/32 OD (pri) = 0.605	Primary Universal, 3 crosses per turn, 1 section Secondary flat, RH, 44 turns per in. in groove	3 strands 0.0025 1 strand	96-1/2 20-1/6	8.77 0.3			0.455 in. dia ceramic coil form. See notes 2 and 4. L = 5.45 uh at 6 mc, term C to D, pri shorted
T553	746108-3	Same as T551 Dim. A = 23/32 B = 7/64 CAM (pri) = 3/32 OD (pri) = 0.535	Primary Universal, 3 crosses per turn, 1 section Secondary flat, RH, 24 turns per in. in groove	3 strands 0.0025 1 strand 0.02	38-1/2 10-1/6	3.31 0.04			0.455 in. dia ceramic coil form. See notes 2 and 4. L = 1.29 uh at 12 mc, term C to D, pri shorted
T554	746108-4	 Dim. A = 21/32 B = 1/16 Lead — Term Pri St — B Fin — E Sec St — C Fin — D	Primary flat, RH, close wound Secondary flat, RH, 13 turns per in. in groove	1 strand 0.0063 0.015 by 0.045 soft copper	15-1/2 6-1/6	0.622 0.016			0.455 in. dia ceramic coil form. See notes 2 and 4. L = 0.434 uh at 20 mc, term C to D, pri open

TABLE 7-11. COIL WINDING DATA (Continued)

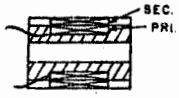
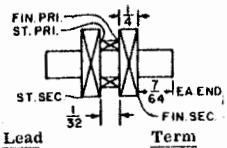
SYMBOL DESIG-NATION	R. C. A. PART NO.	DIAGRAM DIM. IN INCHES	WINDING	WIRE SIZE	TURNS	D-C RESIS-ANCE IN OHMS	IMPED-ANCE RATIO	HIPOT A-C VOLTS	REMARKS
T555	746108-5	Same as T554 Dim. Lead Term A = 1/2 Pri St B B = 1/16 Fin E Sec St D Fin A	Primary flat, RH, close wound Secondary flat, RH, 13 turns per in. in groove	1 strand 0.0063 0.015 by 0.045 tinned copper	7-2/3 4-1/2	0.313 0.013			0.455 in. dia ceramic coil form. See notes 2 and 4. L = 0.32 uh at 28 mc, term A to D, pri open
T601	474157-1	Not available at time of printing							
T602	474156-1	Not available at time of printing							
T701	474155-1	Not available at time of printing							
T702, T801	752554-1	Not available at time of printing							
T901	746104-25	 Lead Term Pri St A Fin C Sec St B Fin D	Primary Random Secondary Random	1 strand 0.004 1 strand 0.004	300-1/2 22-1/2	12.7 1.35			0.118 in. dia powdered iron coil form. Wind secondary over primary, use tape between layers. See notes 2 and 3. Pri L = 2.18 mh at 200 kc. 30 sec 500 v rms 60 cycle flash test between windings
T1013	746104-29	Same as T901	Primary Random Secondary Random	1 strand 0.004 1 strand 0.004	254-1/2 15-1/2	10.4 0.9			0.118 in. dia powdered iron coil form. Wind secondary over primary, use tape between layers. See notes 2 and 3. Pri L = 1.55 mh at 200 kc. 30 sec 500 v rms 60 cycle flash test between windings
T1014	746106-16	 Lead Term Pri St B Fin A Sec St E Fin C	Primary Random wound between pies of secondary Secondary Universal, 1 cross per turn, 2 sections	1 strand 0.004 30 strands 0.002	28 70 per section	1.7 1.13			0.247 in. dia powdered iron coil form. See notes 2 and 4. L = 0.27 mh at 200 kc, term C to E. 30 sec 300 v rms 60 cycle flash test between windings
T1015, T1016	746104-30	Same as T901	Primary Random Secondary Random	1 strand 0.004 1 strand 0.004	305-1/2 22-1/2	12.6 1.35			0.118 in. dia powdered iron coil form. Wind secondary over primary, use tape between layers. See notes 2 and 3. Pri L = 2.24 mh at 200 kc. 30 sec 500 v rms 60 cycle flash test between windings

TABLE 7-11. COIL WINDING DATA (Continued)

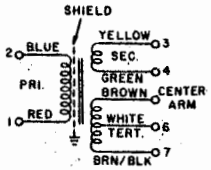
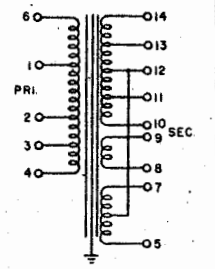
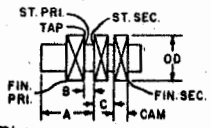
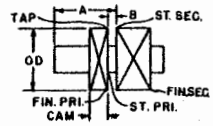
SYMBOL DESIG-NATION	R. C. A. PART NO.	DIAGRAM DIM. IN INCHES	WINDING	WIRE SIZE	TURNS	D-C RESIST-ANCE IN OHMS	IMPED-ANCE RATIO	HIPOT A-C VOLTS	REMARKS
T1101	8842479-1		Primary Secondary Tertiary Electro-static Shield	0.0035 Heavy Formex 0.0071 Heavy Formex 0.0071 Heavy Formex 0.002 Copper 0.4 x 3	90 210 246 tap at 123 1	327 7.62 10.8 1000			Insulate electrostatic shield with 3/4-inch tape, then wind with exposed side of electrostatic shield out, then secure with 1 turn of 1-3/32 inch tape
T1601	8889252-1		6-4 5-7 8-9 10-11 11-12-13 13-14	#23 Formex #32 Formex #26 Formex #25 Formex #2 x 15 Formex #20 Formex	390 tap 1 at 28 2 at 330 3 at 360 1530 tap at 765 16-1/2 33-1/2 20 tap at 10 10	4.0 4.0 163.0 0.49 0.95			All windings are 700 v test except the H. V. secondary which is 2300 v test
T1701	474159-1	Not available at time of printing							
T3101	748768-1	 Dim. A = 9/16 B = 11/64 C = 9/64 CAM = 0.093 OD (sec) = 0.49 Lead — Term Pri St — D Tap — C Fin — A Sec St — B Fin — E	Primary single-pie Universal wound, 3 crosses per turn Secondary 3-pie Universal wound, 4 crosses per turn	0.004 in. dia wire single glass silicone insulated Nylon in-sulated Litz wire (10 strands 0.002 in. dia wire)	38-1/2 tapped at 15-1/6 turns 12	3.83 term A to D 1.35			0.455 in. dia steatite coil form. See notes 2, 3, and 5. L = 24.6 uh at 2 mc, term B to E, pri open
T3102	748768-2	 Dim. A = 11/16 B = 5/16 CAM (pri) = 0.83 Terminals same as T3101	Primary single-pie Universal wound, 3 crosses per turn Secondary flat, RH, 44 turns per in. in groove	Single glass silicone insulated 0.004 in. dia bare Tinned copper 0.010 in. dia bare	23-1/2 21-1/2	2.32 0.27			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 5.5 uh at 4 mc, term B to E, pri open

TABLE 7-11. COIL WINDING DATA (Continued)

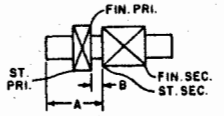
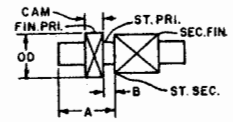
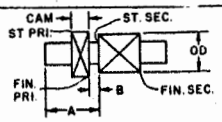
SYMBOL DESIG-NATION	R. C. A. PART NO.	DIAGRAM DIM. IN INCHES	WINDING	WIRE SIZE	TURNS	D-C RESIST-ANCE IN OHMS	IMPED-ANCE RATIO	HIPOT A-C VOLTS	REMARKS
T3103	748768-3	Same as T3102 Dim. A = 23/32 B = 7/32 CAM (pri) - 0.83 Terminals same as T3101	Primary single-pie Universal wound, 3 crosses per turn	Single glass silicone insulated 0.004 in. dia bare	22-1/2 tapped at 13-1/6	2.2			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 1.25 uh at 8 mc, term B to E, pri shorted
			Secondary flat, RH, 24 turns per in. in groove	Tinned copper 0.010 in. dia bare	9-1/2	0.038			
T3104	748768-4	 Dim. Lead Term A = 41/64 Pri St D B = 1/32 Fin A Sec St B Fin E	Primary flat, RH, close wound	Single glass silicone insulated 0.010 in. dia bare	14-1/2	0.221			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 0.53 uh at 16 mc, term B to E, pri open
			Secondary flat, RH, 13 turns per in. in groove	Tinned copper strip 0.015 in. by 0.045 in.	5-1/2	0.016			
T3105	748768-5	Same as T3104 Dim. Lead Term A = 41/64 Pri St D B = 1/16 Fin E Sec St B Fin A	Primary flat, RH, close wound	Single glass silicone insulated 0.010 in. dia bare	13-5/6	0.219			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 0.4 uh at 32 mc, term A to B, pri open
			Secondary flat, RH, 13 turns per in. in groove	Tinned copper strip 0.015 in. by 0.045 in.	4-1/6	0.013			
T3135	748768-6	 Dim. Lead Term A = 1/2 Pri St B B = 5/64 Fin E CAM (pri) = Sec St C 0.156 OD (pri) = 0.57 Fin D	Primary single-pie Universal wound, 1-1/2 crosses per turn	Formex insulated 0.004 in. dia	319-1/2	28.7			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 21.6 uh at 2 mc, term C to D, pri shorted
			Secondary flat, RH, 64 turns per in. in groove	Tinned copper 0.010 in. dia	45-1/6	0.602			
T3136	748768-7	Same as T3135 Dim. A = 21/32 B = 3/32 CAM (pri) = 0.125 OD (pri) = 0.615	Primary single-pie Universal wound, 2 crosses per turn	0.0025 in. dia single nylon insulated Litz	170-1/2	16.4			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 5.3 uh at 4 mc, term C to D, pri shorted
			Secondary flat, RH, 44 turns per in. in groove	Tinned copper 0.010 in. dia	20-1/6	0.266			
T3137	748768-8	Same as T3135 Dim. A = 23/32 B = 3/32 CAM (pri) = 0.093 OD (pri) = 0.535	Primary single-pie Universal wound, 3 crosses per turn	0.0025 in. dia single nylon insulated Litz	39-1/2	3.22			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 1.2 uh at 8 mc, term C to D, pri shorted
			Secondary flat, RH, 24 turns per in. in groove	Tinned copper 0.010 in. dia	10-1/6	0.038			

TABLE 7-11. COIL WINDING DATA (Continued)

SYMBOL DESIG-NATION	R. C. A. PART NO.	DIAGRAM DIM. IN INCHES	WINDING	WIRE SIZE	TURNS	D-C RESIST-ANCE IN OHMS	IMPED-ANCE RATIO	HIPOT A-C VOLTS	REMARKS
T3138	748768-9	 Dim. A = 21/32 B = 1/16 Terminals same as T3135	Primary flat, RH, close wound Secondary flat, RH, wound, 13 turns per in. in groove	Enameled nylon in-sulated 0.0063 in. dia Tinned copper strip 0.015 in. by 0.045 in.	15-1/2 6-1/6	0.587 0.017			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 0.42 uh at 16 mc, term C to D, pri open
T3139	748768-10	Same as T3138 Dim. A = 21/32 B = 7/64	Primary flat, RH, close wound Secondary flat, RH wound, 13 turns per in. in groove	Enameled nylon in-sulated 0.0063 in. dia Tinned copper strip 0.015 in. by 0.045 in.	7-2/3 4-1/6	0.312 0.013			0.455 in. dia steatite coil form. See notes 2, 4, and 5. L = 0.26 uh at 32 mc, term C to D, pri open

NOTES:

1. Wind coil over 1 layer of tape, and make taps by raising a loop in the conductor.
2. Wind continuously without break or splice, extend all leads 1/2 inch beyond end of coil form, strip and tin 5/8 inch of lead ends. Apply cement to outside edges of the coils, keep ends of coil form free of cement.
3. Fasten finish of each winding with tape (1/4 by 3/4) and moisten tape with acetone.
4. Fasten start and finish of each winding with tape (1/4 by 3/4) and moisten tape with acetone.
5. Apply lacquer to outside edge of coil after winding.

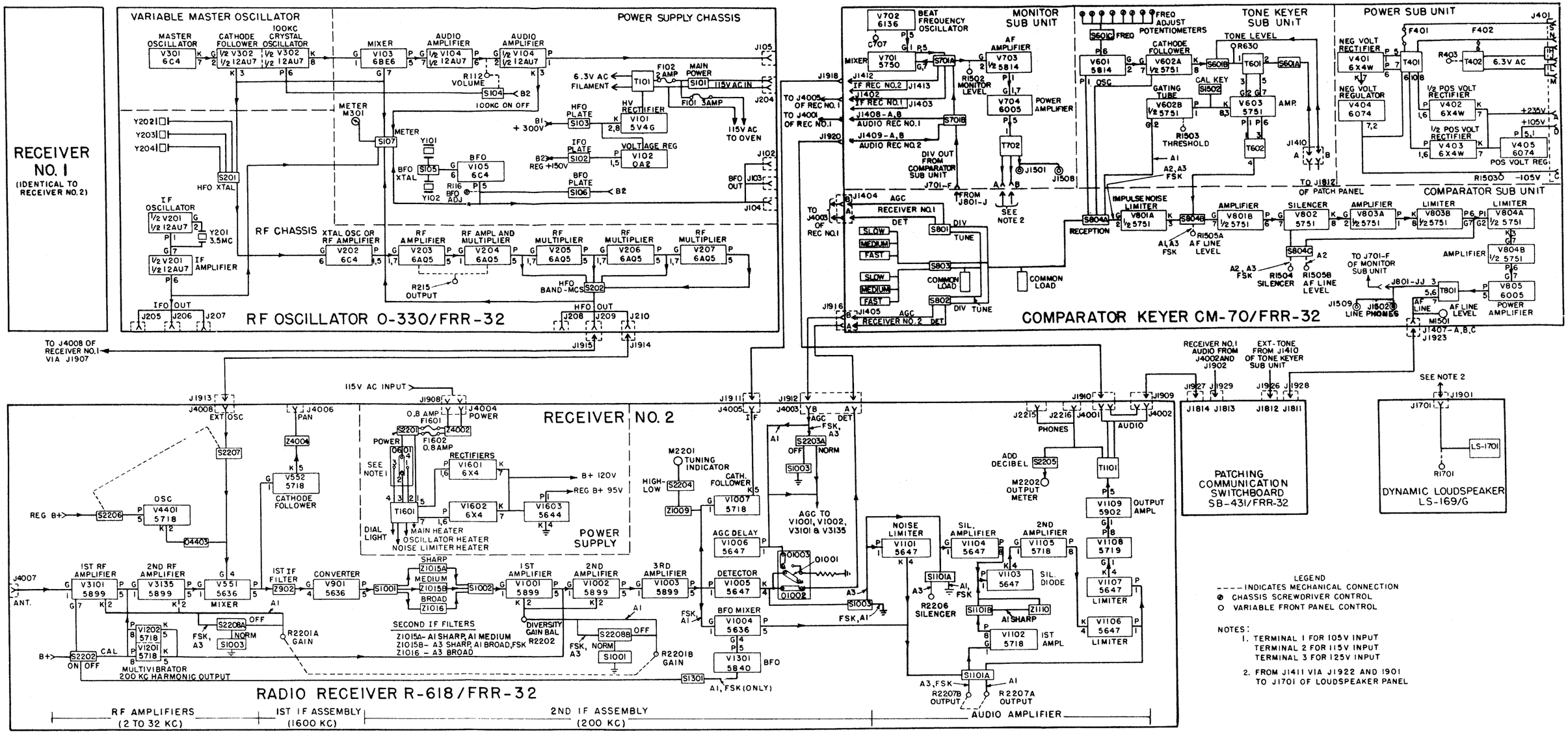
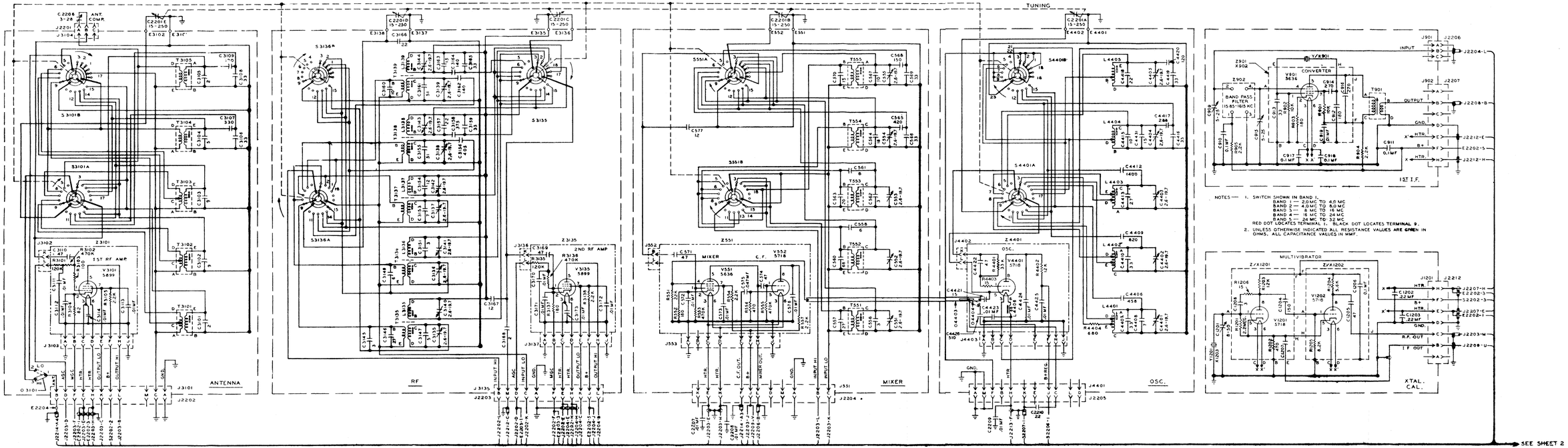
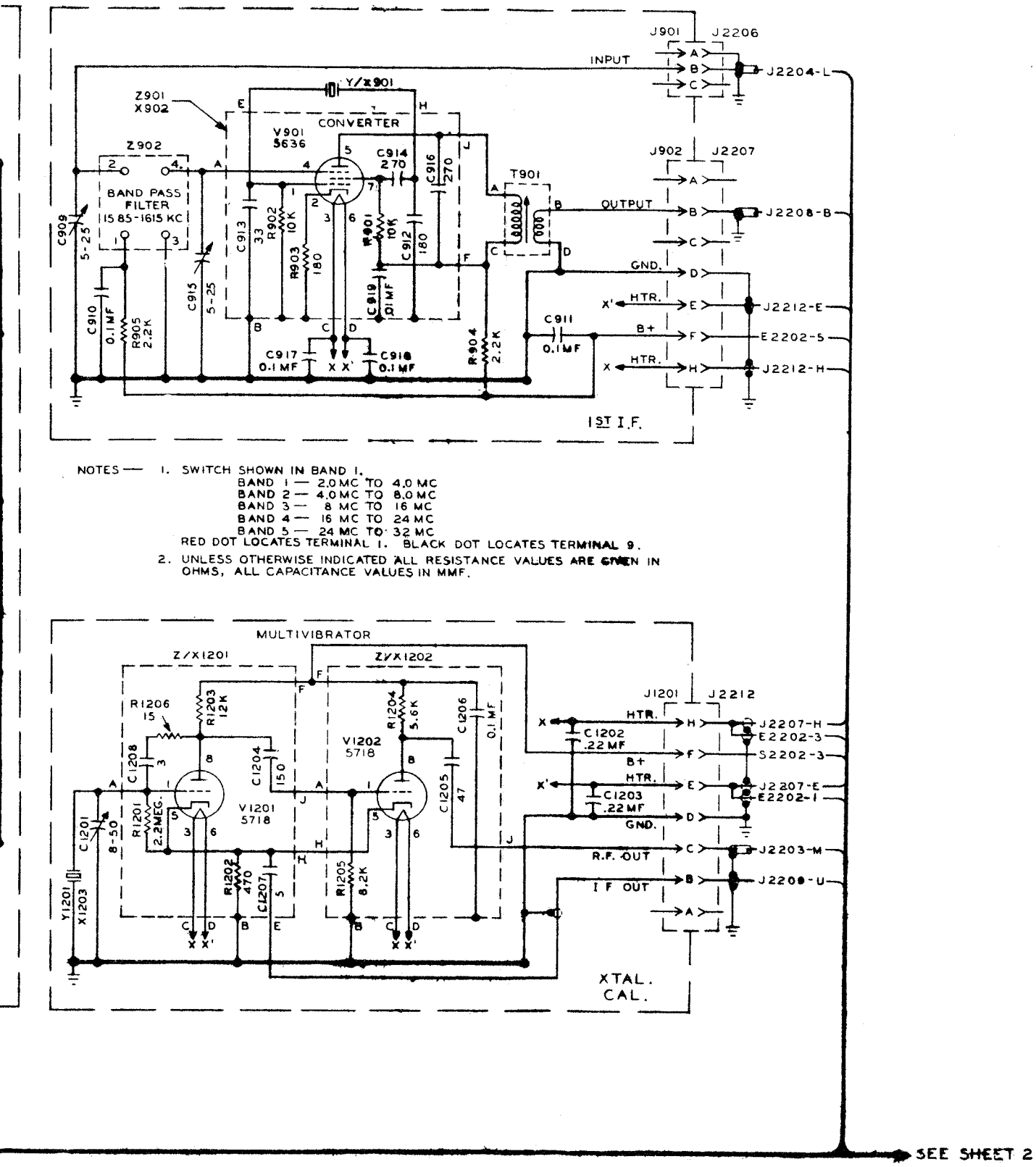


Figure 7-29. Servicing Block Diagram

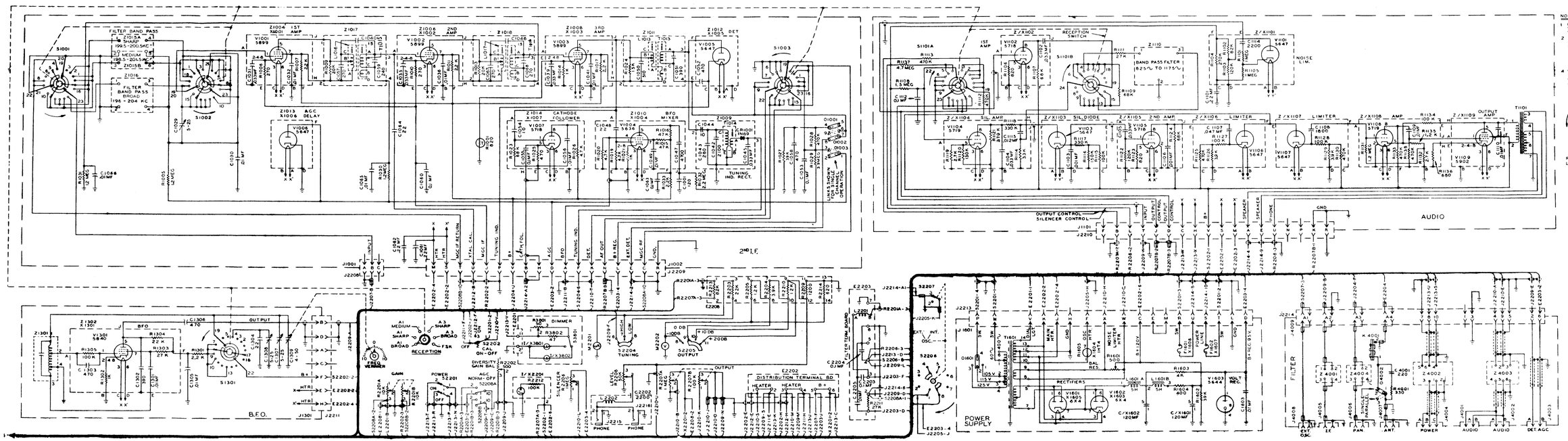

ANTENNA
RF
MIXER
OSC.
TUNING
1ST I.F.
XTAL. CAL.
1ST RF AMP
2ND RF AMP
MIXER
C.F.
CONVERTER
MULTIVIBRATOR
INPUT
OUTPUT
BAND PASS FILTER
15.85-16.5 MC
NOTES— 1. SWITCH SHOWN IN BAND 1.
BAND 1 — 2.0 MC TO 4.0 MC
BAND 2 — 4.0 MC TO 8.0 MC
BAND 3 — 8 MC TO 16 MC
BAND 4 — 16 MC TO 32 MC
RED DOT LOCATES TERMINAL 1. BLACK DOT LOCATES TERMINAL 9.
2. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE GIVEN IN OHMS. ALL CAPACITANCE VALUES IN MMF.
SEE SHEET 2

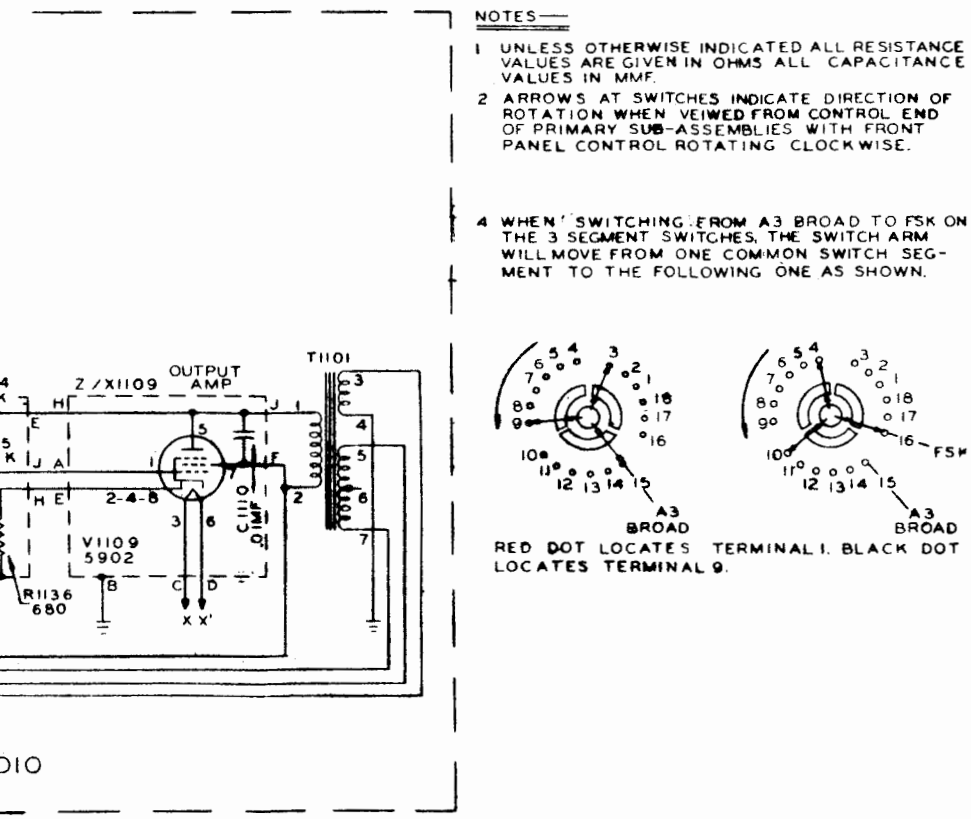


NOTES — 1. SWITCH SHOWN IN BAND 1.
BAND 1 — 2.0 MC TO 4.0 MC
BAND 2 — 4.0 MC TO 8.0 MC
BAND 3 — 8 MC TO 16 MC
BAND 4 — 16 MC TO 24 MC
BAND 5 — 24 MC TO 32 MC
RED DOT LOCATES TERMINAL 1. BLACK DOT LOCATES TERMINAL 9.

2. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE GIVEN IN OHMS, ALL CAPACITANCE VALUES IN MMF.

Figure 7-30. Radio Receiver R-618/FRR-32, Schematic Diagram (Sheet 1)


FILTER BAND PASS
2ND I.F.
AUDIO
B.F.O.
POWER SUPPLY
FILTER
RECEPTION
DIVERSITY GAIN BAL.
CAL ON-OFF
DIMMER
TUNING
OUTPUT
DISTRIBUTION TERMINAL BD
RECTIFIERS
OUTPUT CONTROL
SILENCER CONTROL
NOTES—
1. UNLESS OTHERWISE INDICATED ALL RESISTANCE VALUES ARE GIVEN IN OHMS ALL CAPACITANCE VALUES IN MMF.
2. ARROWS AT SWITCHES INDICATE DIRECTION OF ROTATION WHEN VIEWED FROM CONTROL END OF PRIMARY SUB-ASSEMBLIES WITH FRONT PANEL CONTROL ROTATING CLOCKWISE.
4. WHEN SWITCHING FROM A3 BROAD TO FSK ON THE 3 SEGMENT SWITCHES, THE SWITCH ARM WILL MOVE FROM ONE COMMON SWITCH SEGMENT TO THE FOLLOWING ONE AS SHOWN.
A3 BROAD
RED DOT LOCATES TERMINAL 1. BLACK DOT LOCATES TERMINAL 9.
A3 BROAD



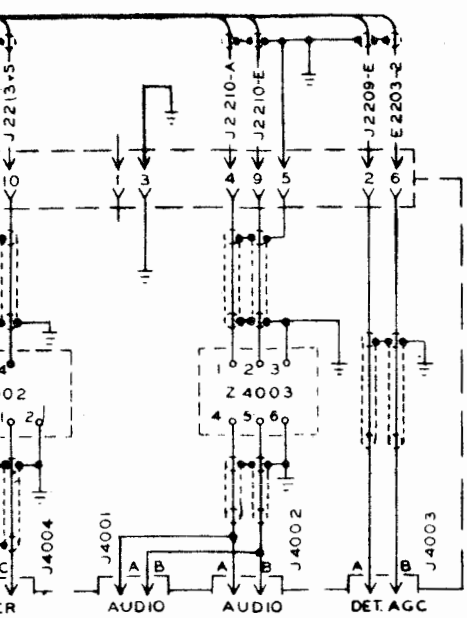
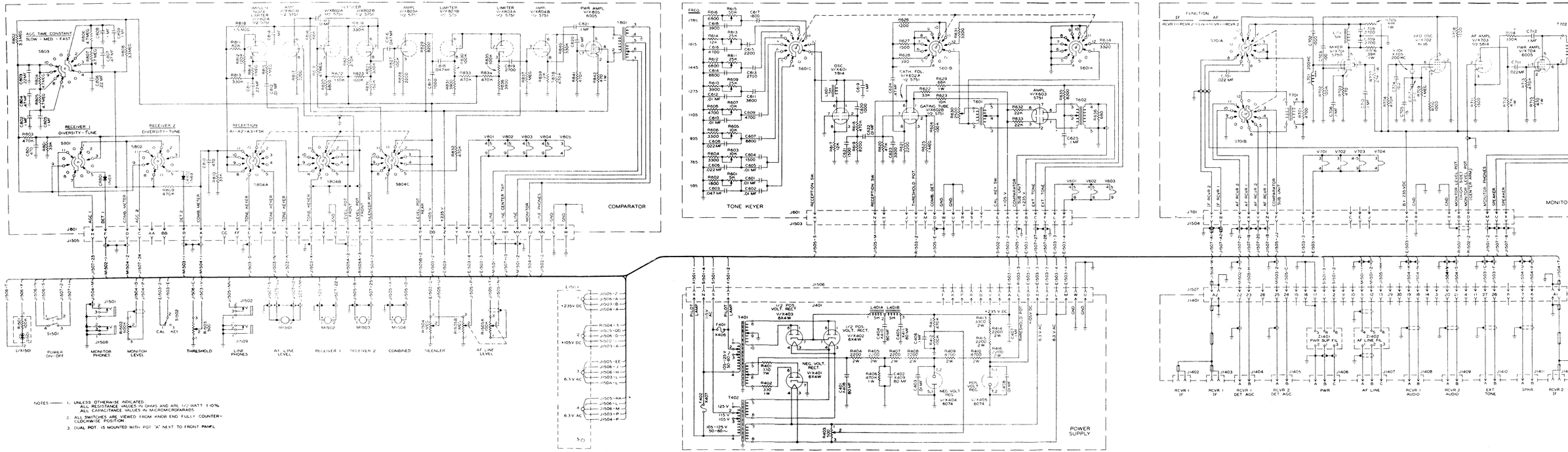


Figure 7-30. Radio Receiver R-618/FRR-32, Schematic Diagram (Sheet 2)



NOTES —— 1. UNLESS OTHERWISE INDICATED
ALL RESISTANCE VALUES IN OHMS AND ARE 1/2 WATT ±10%
ALL CAPACITANCE VALUES IN MICROMICROFARADS
2. ALL SWITCHES ARE VIEWED FROM KNOB END, FULLY COUNTER-CLOCKWISE POSITION
3. DUAL POT. IS MOUNTED WITH POT 'A' NEXT TO FRONT PANEL

Figure

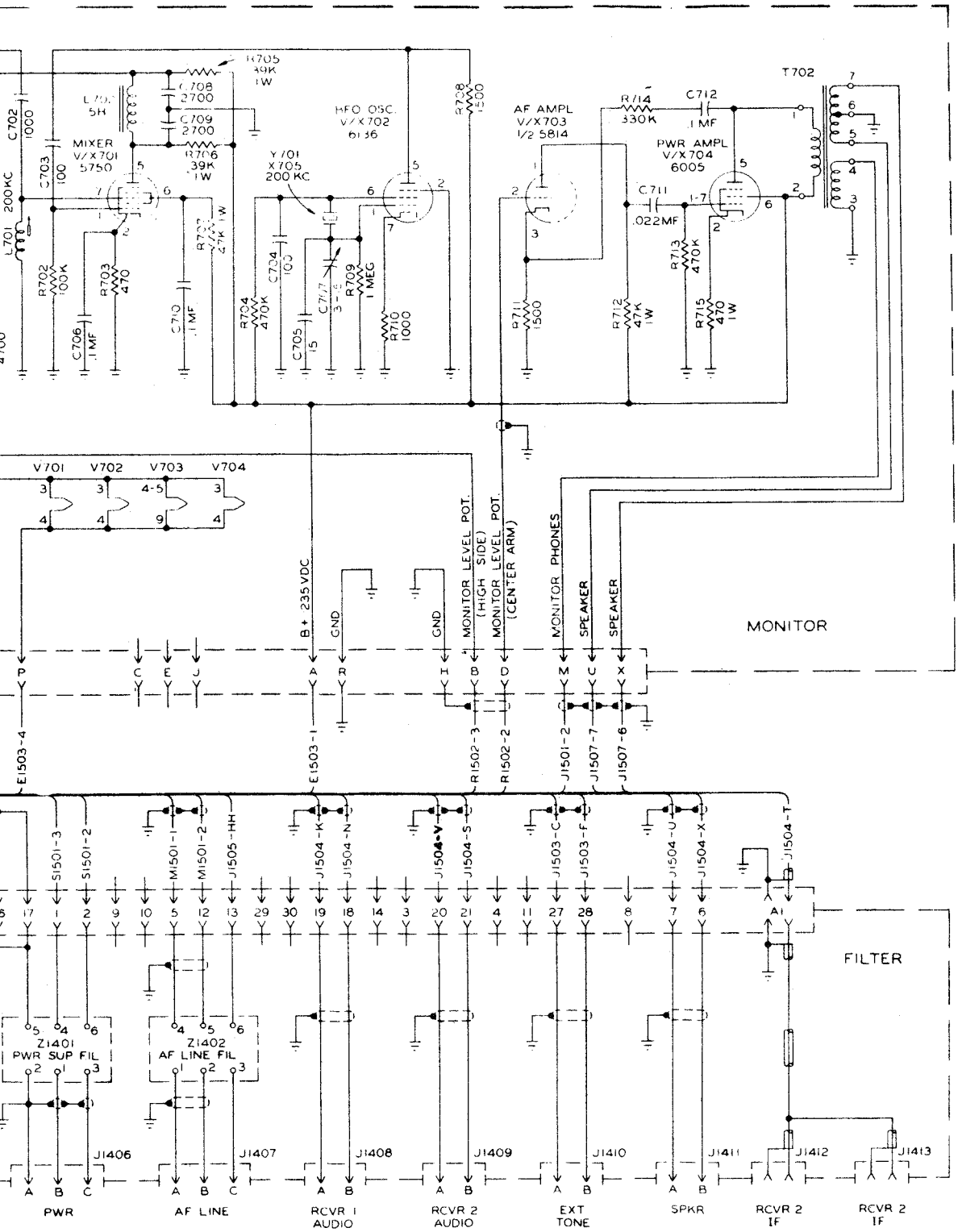


Figure 7-31. Comparator Keyer Schematic Diagram

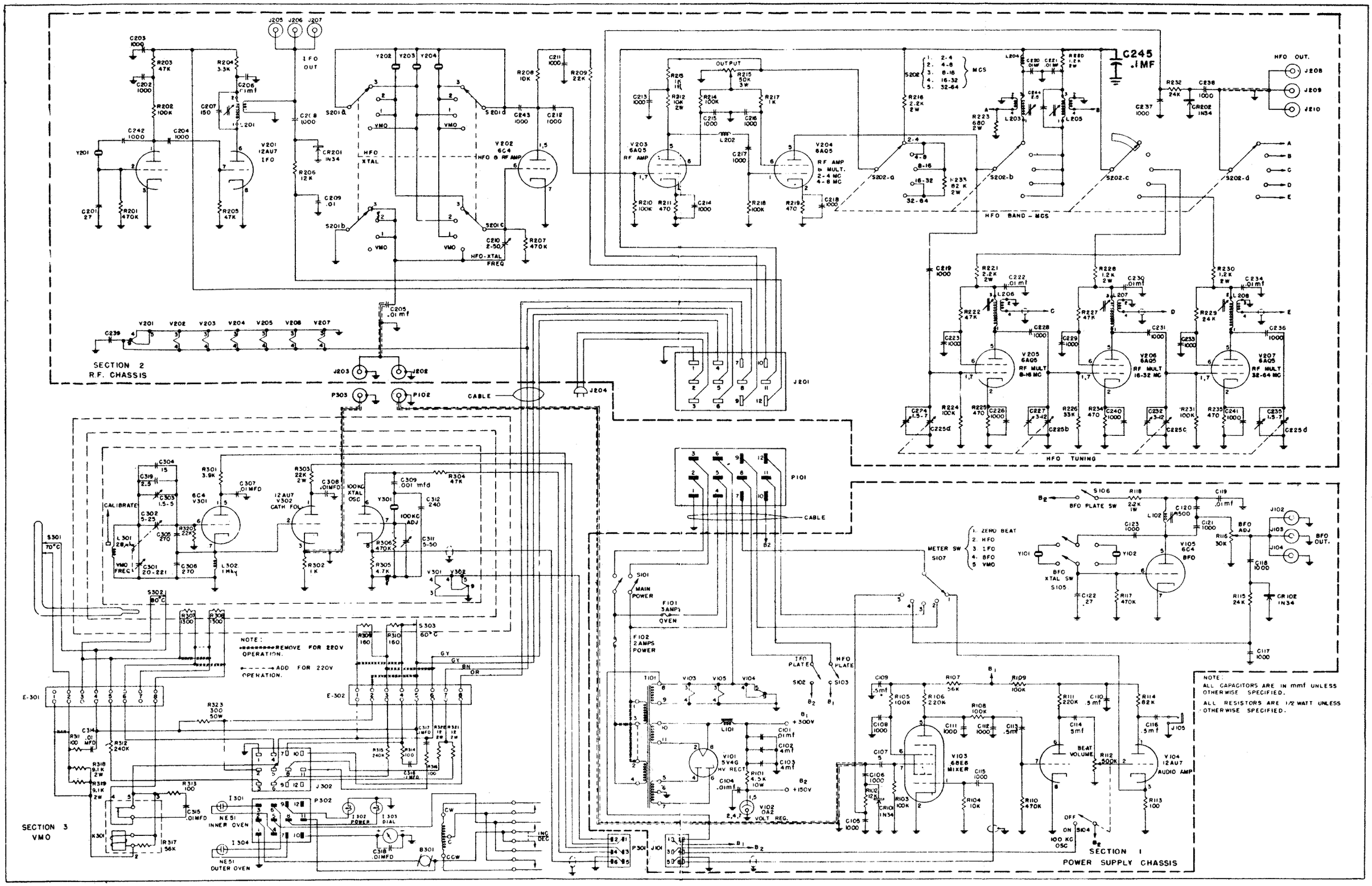


Figure 7-32. R-F Oscillator Schematic Diagram

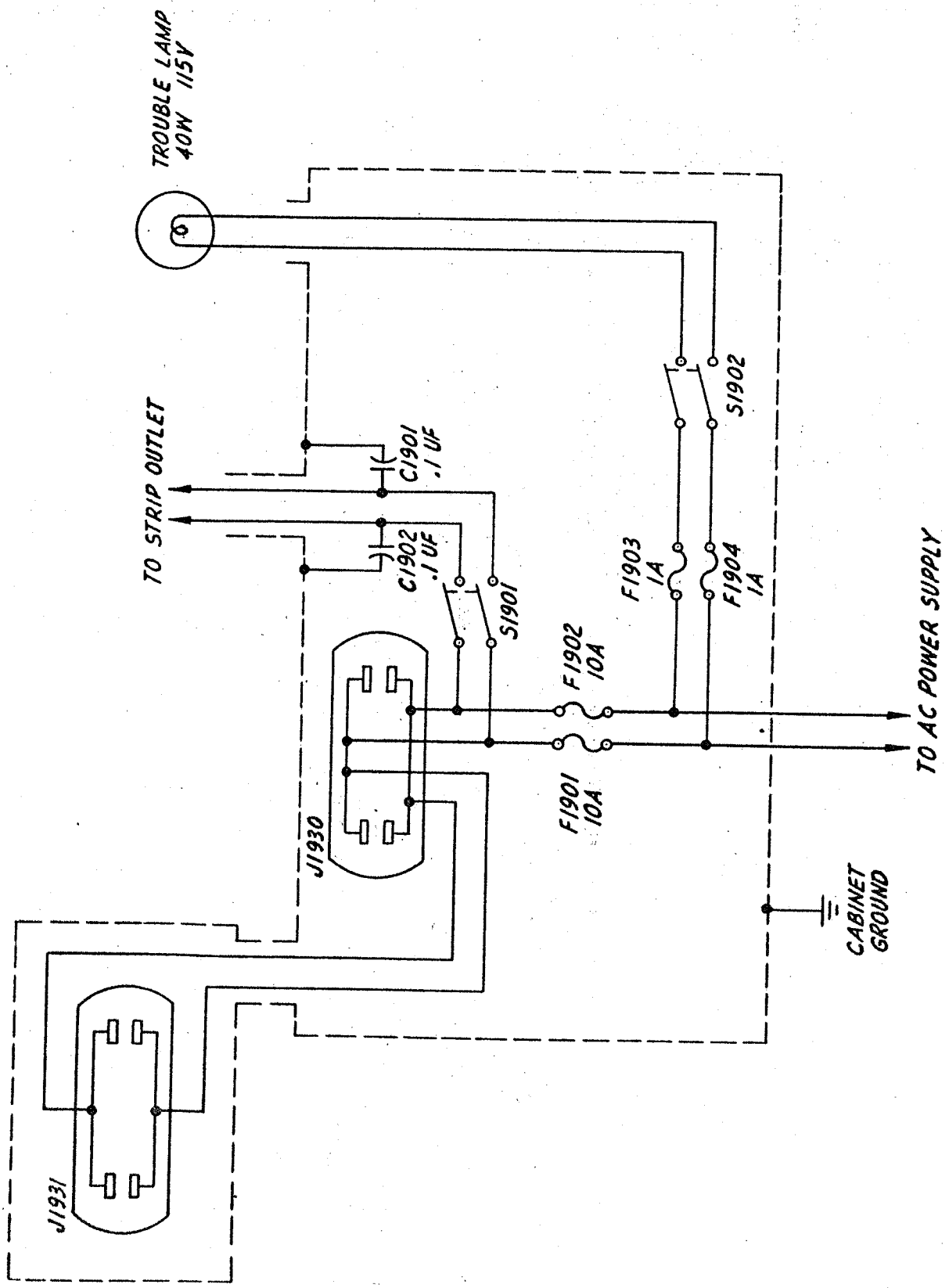


Figure 7-33. Switch Panel SA-238/G, Schematic Diagram

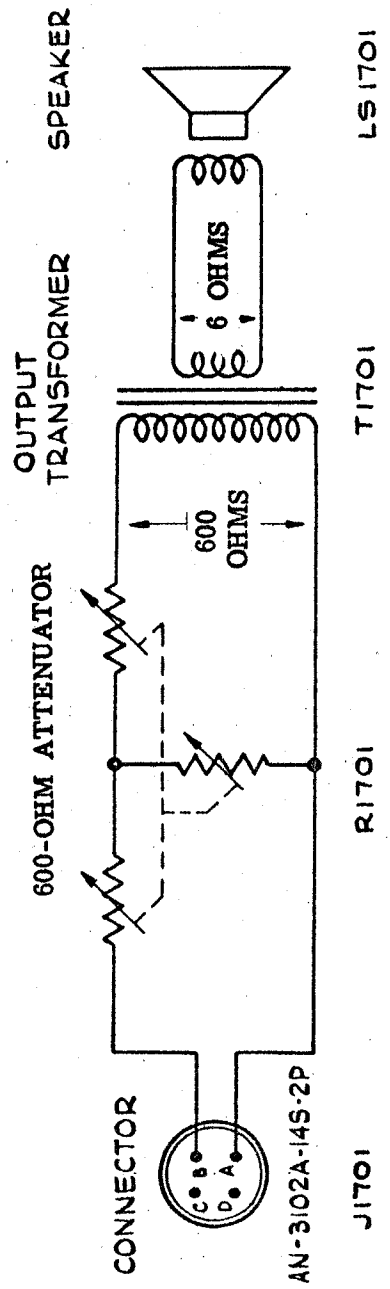
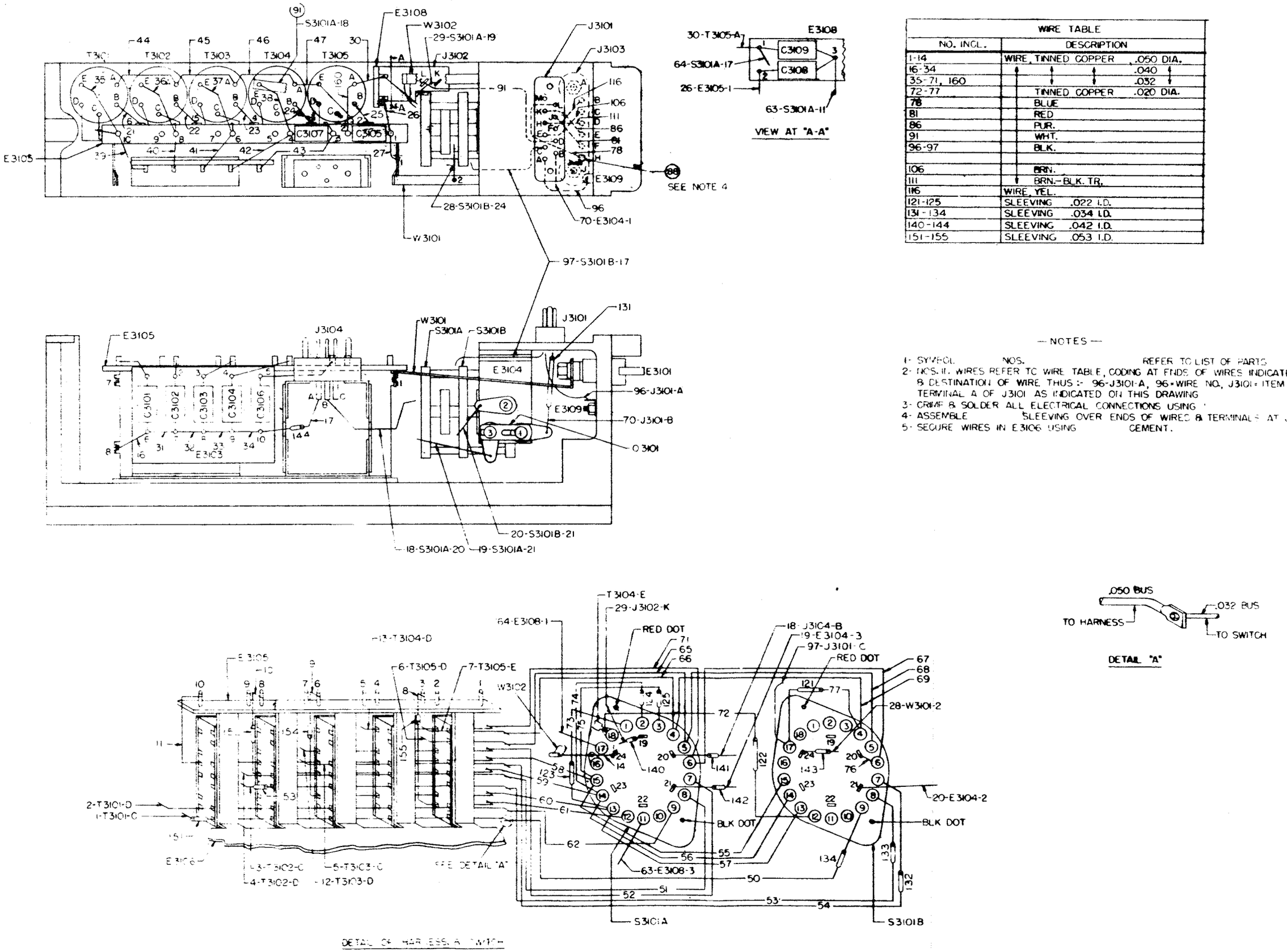


Figure 7-34. Loudspeaker Schematic Diagram

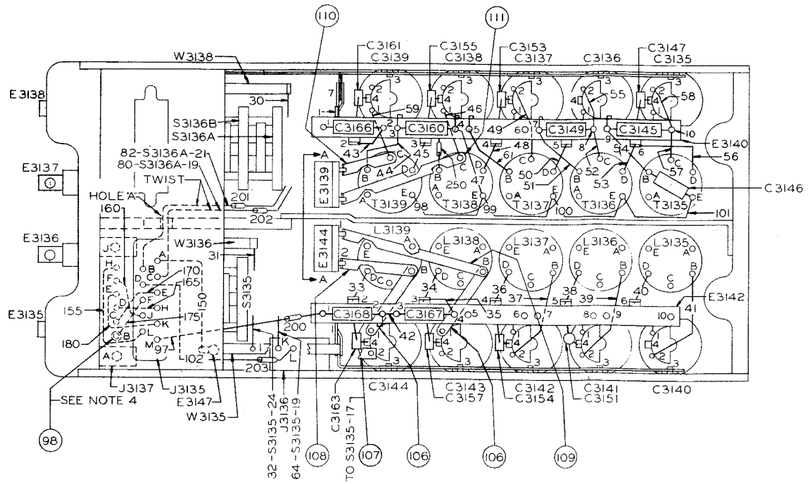


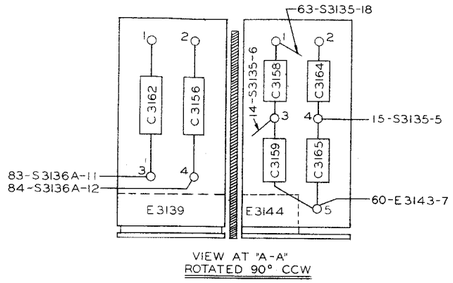
WIRE TABLE	
NO. INCL.	DESCRIPTION
1-14	WIRE, TINNED COPPER .050 DIA.
16-34	" " " .040 "
35-71, 160	" " " .032 "
72-77	TINNED COPPER .020 DIA.
78	BLUE
81	RED
86	PUR.
91	WHT.
96-97	BLK.
106	BRN.
111	BRN.-BLK. TR.
116	WIRE, YEL.
121-125	SLEEVING .022 I.D.
131-134	SLEEVING .034 I.D.
140-144	SLEEVING .042 I.D.
151-155	SLEEVING .053 I.D.

— NOTES —

1- SYMBOL NOS. REFER TO LIST OF PARTS.
2- NOS. 1-71, WIRES REFER TO WIRE TABLE, CODING AT ENDS OF WIRES INDICATE WIRE NO. & DESTINATION OF WIRE. THUS:- 96-J3101-A, 96=WIRE NO, J3101= ITEM J3101, A= TERMINAL A OF J3101 AS INDICATED ON THIS DRAWING.
3- CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS USING .
4- ASSEMBLE SLEEVING OVER ENDS OF WIRES & TERMINALS AT J3103.
5- SECURE WIRES IN E3106 USING CEMENT.

Figure 7-35. Antenna Box, Connection Diagram, R-618/FRR-32





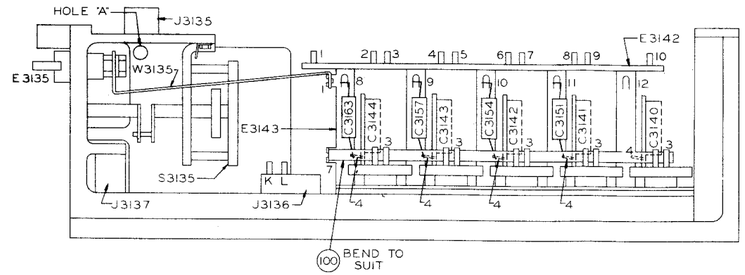
VIEW AT "A-A"
ROTATED 90° CCW

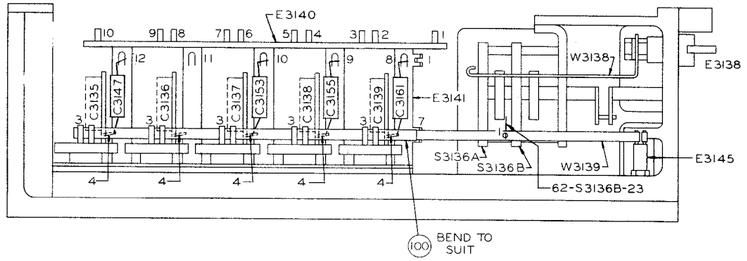
WIRE TABLE			
WIRE NO.	DESCRIPTION		ITEM NO.
1-15 INCL.	WIRE TINNED COPPER .050 DIA.	PS 105	96
30-65 INCL.	TINNED COPPER .040 DIA.		95
80-106 INCL.	TINNED COPPER .032 DIA.		94
120-133 INCL.	TINNED COPPER .020 DIA.	PS 105	93
150	BLACK	A-8829122-16	85
155	BLUE		88
160	RED		87
165	BROWN		86
170	BROWN-BLACK TR.		90
175	YELLOW		89
180	WIRE RED-BROWN TR.	A-8829122-16	92
200-203 INCL.	SLEEVING .034 I.D.	PS 753-B-2	103
220-233 INCL.	SLEEVING .022 I.D.	PS 753-B-1	97
240-243 INCL.	SLEEVING .042 I.D.	PS 753-B-3	105
250-251	SLEEVING .053 I.D.	PS 753-B-4	104

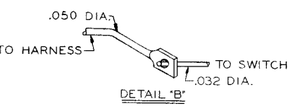
(1)

NOTES

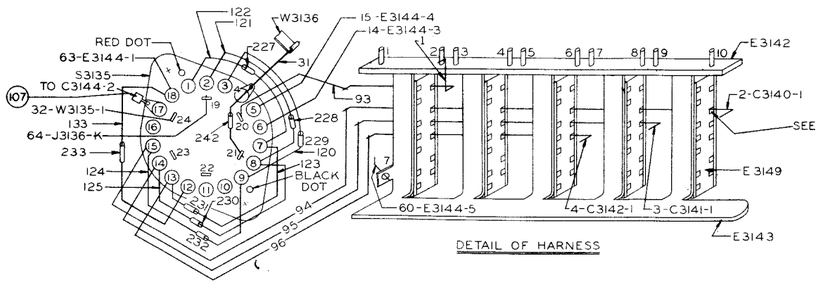
1. SYMBOL NUMBERS ITEM NUMBERS & NUMBERS IN BALLOONS REFER TO LIST OF PARTS 8822005-502.
2. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATE WIRE NO. & DESTINATION OF WIRE THUS: 10-T3137-B 10=WIRE NO T3137= TRANSFORMER T3137, B=TERMINAL B OF T3137 AS INDICATED ON THIS DRAWING.
3. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS USING ITEM 99 SOLDER.
4. ASSEMBLE ITEM 98 SLEEVING OVER ENDS OF WIRES & TERMINALS AT J3137.
5. SECURE WIRES IN E3149 USING ITEM 81 CEMENT.



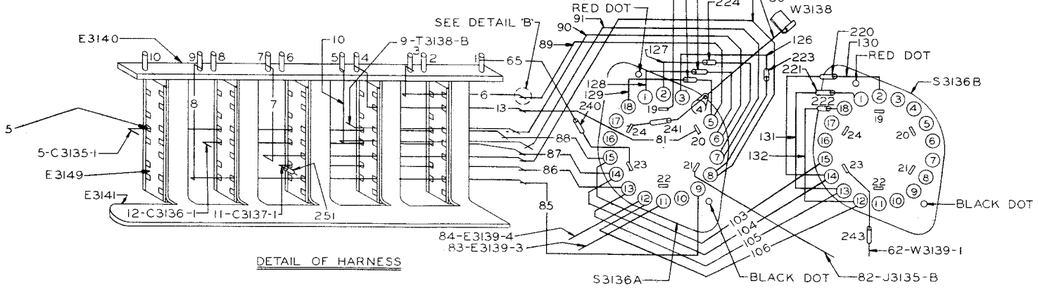




DETAIL 'B'



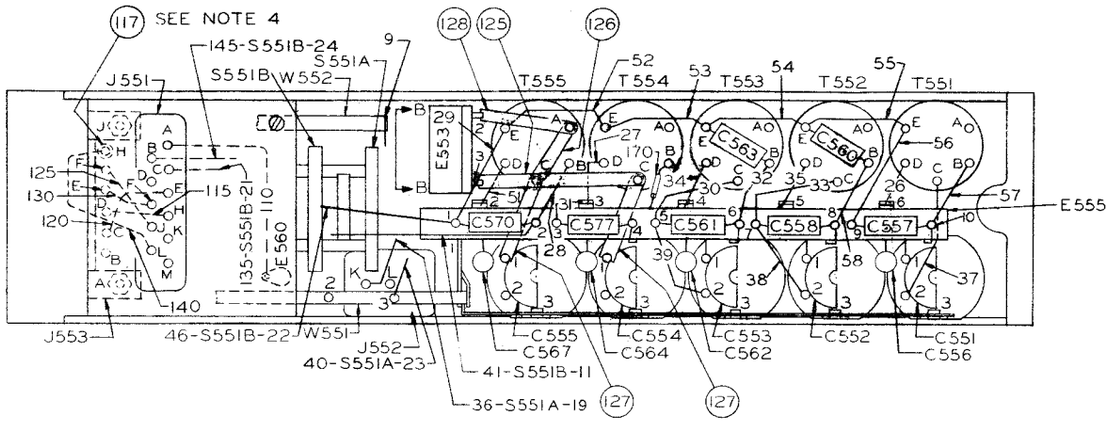
DETAIL OF HARNESS

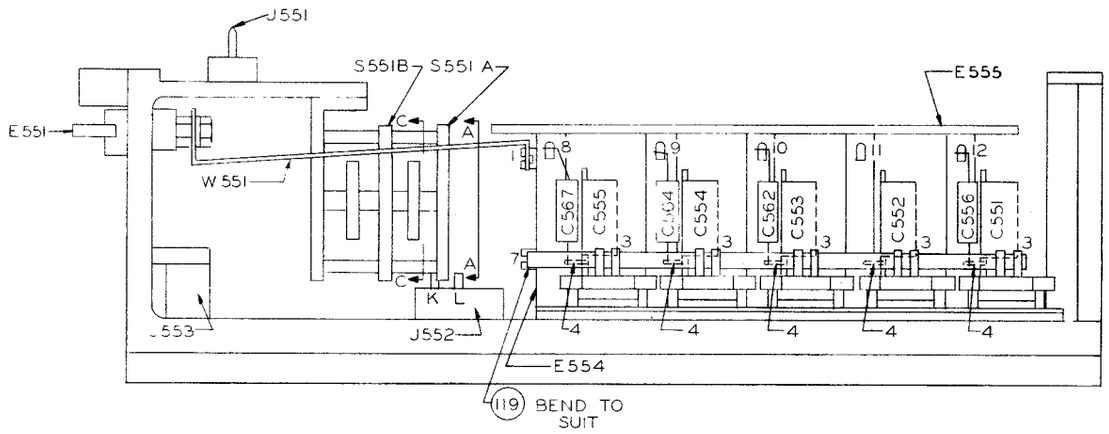


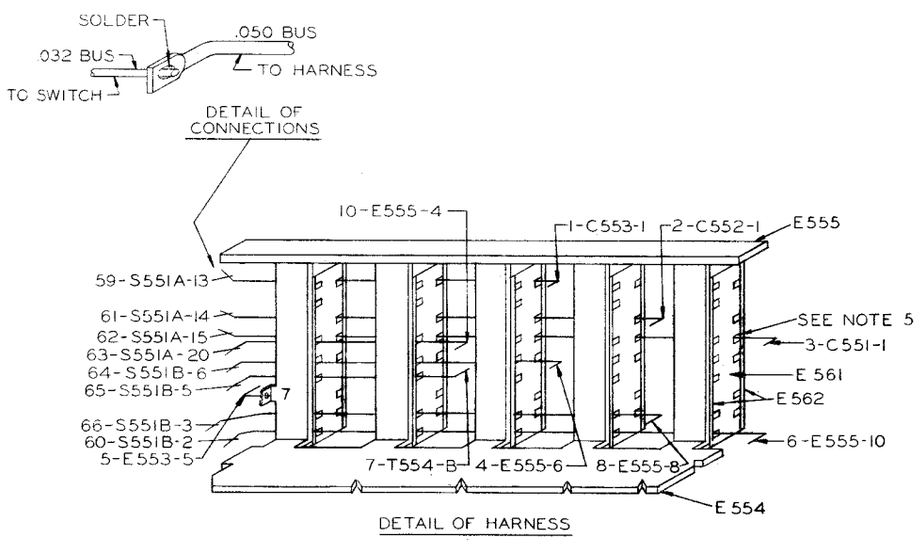
DETAIL OF HARNESS

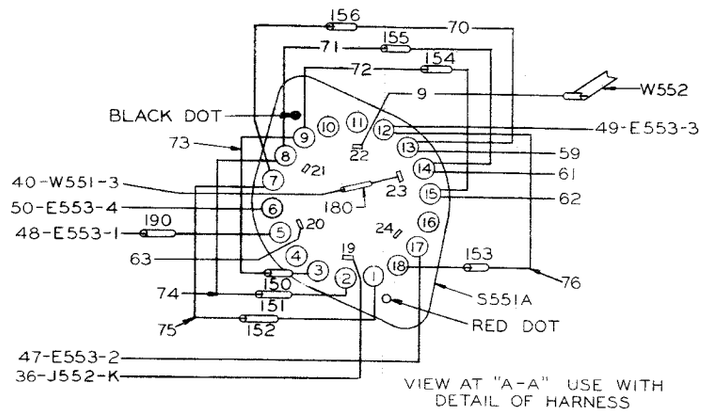
ORIGINAL

Figure 7-36. R-F Amplifier, Connection Diagram, R-618/FRR-32

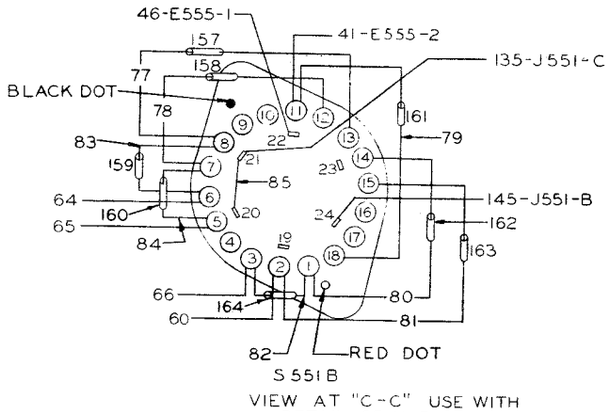




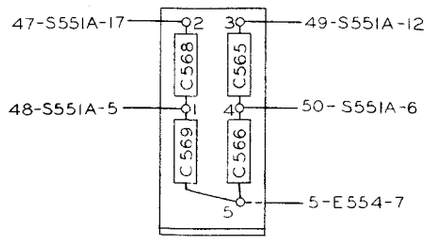




VIEW AT "A-A" USE WITH DETAIL OF HARNESS



VIEW AT "C-C" USE WITH DETAIL OF HARNESS



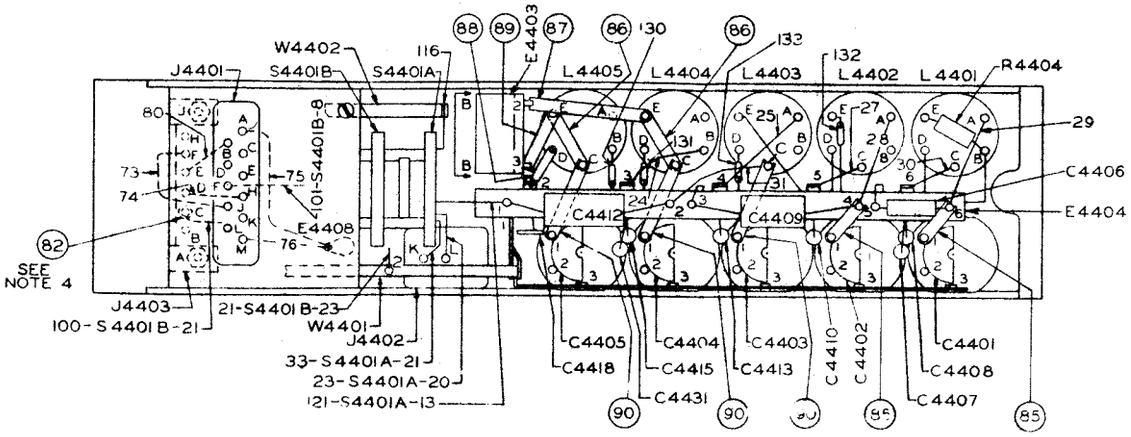
E 553
VIEW AT "B-B"
ROTATED 90° CCW

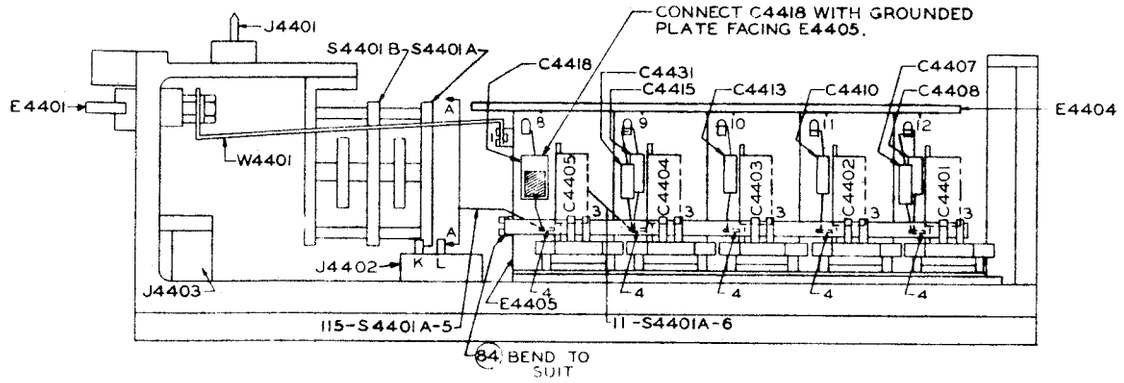
WIRE TABLE	
WIRE NO.	DESCRIPTION
1-10 INCL.	WIRE TINNED COPPER .050 DIA.
26-41	TINNED COPPER .040 DIA.
46-66	TINNED COPPER .032 DIA.
70-85 INCL.	TINNED COPPER .020 DIA.
110	BLACK
115	BROWN
120	BROWN-BLACK TR.
125	RED
130	YELLOW
135	RED-BROWN TR.
140	BLUE
145	WIRE BLUE-RED TR.
150-164 INCL.	SLEEVING .022 I.D.
170	SLEEVING .053 I.D.
180	SLEEVING .042 I.D.
190	SLEEVING .034 I.D.

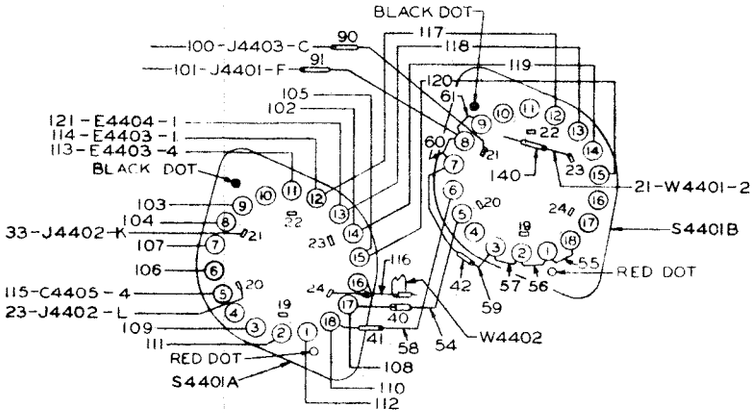
(1) NOTES:

1. SCHEMATIC SYMBOL NUMBERS, ITEM NUMBERS AND NUMBERS IN BALLOONS REFER TO LIST OF PARTS A-8835628-504.
2. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATE WIRE NO'S & DESTINATION OF WIRES THUS: 3-C551-1, 3= WIRE NO, C551=CAPACITOR C551, 1= TERMINAL 1 OF C551 AS INDICATED ON THIS DRAWING.
3. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS USING ITEM 118 SOLDER.
4. ASSEMBLE ITEM 117 SLEEVING OVER ENDS OF WIRES & TERMINALS AT J553.
5. SECURE WIRES IN E561 USING ITEM 81 CEMENT.

Figure 7-37. Mixer, Connection Diagram R-618/FRR-32





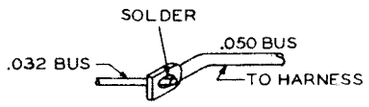


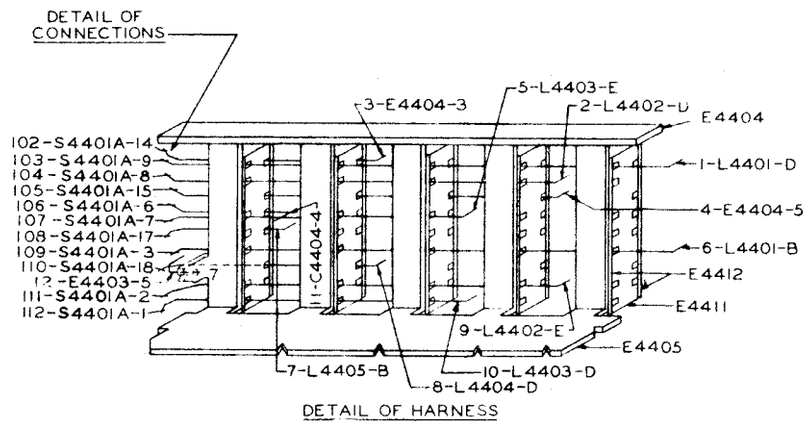
VIEW AT "A-A"
USE IN CONJUNCTION
WITH DETAIL OF HARNESS

WIRE TABLE		
WIRE NO.		DESCRIPTION
1-12	INCL.	WIRE TINNED COPPER .050 DIA.
21-33	INCL.	WIRE TINNED COPPER .040 DIA.
40-42	INCL.	SLEEVING .022 I.D.
54-61	INCL.	WIRE TINNED COPPER .020 DIA.
73		RED-ORN. TR.
74		BRN.-ORN. TR.
75-76		BLACK
80		WIRE RED
90-91		SLEEVING .034 I.D.
100-121	INCL.	WIRE TINNED COPPER .032 DIA.
130-133	INCL.	SLEEVING .053 I.D.
140		SLEEVING .042 I.D.

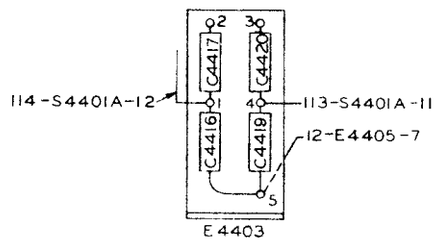
NOTES:
1- SYMBOL NOS. REFER TO LIST OF PARTS
2- NOS. IN WIRES REFER TO WIRE TABLE, CODING AT ENDS OF WIRES INDICATE WIRE NO. & DESTINATION OF WIRE THUS: 32-J4402-K, 32= WIRE NO., J4402 = ITEM J4402, K=TERMINAL K OF J4402 AS INDICATED ON THIS DRAWING.
3- CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS.
4- ASSEMBLE SLEEVING OVER ENDS OF WIRES & TERMINALS AT J4403.
5- SECURE WIRES IN E4411 USING CEMENT.

WIRE 80 TO BE CONNECTED FROM J4401-C TO J4403-H OTHERWISE SAME AS PT. 1



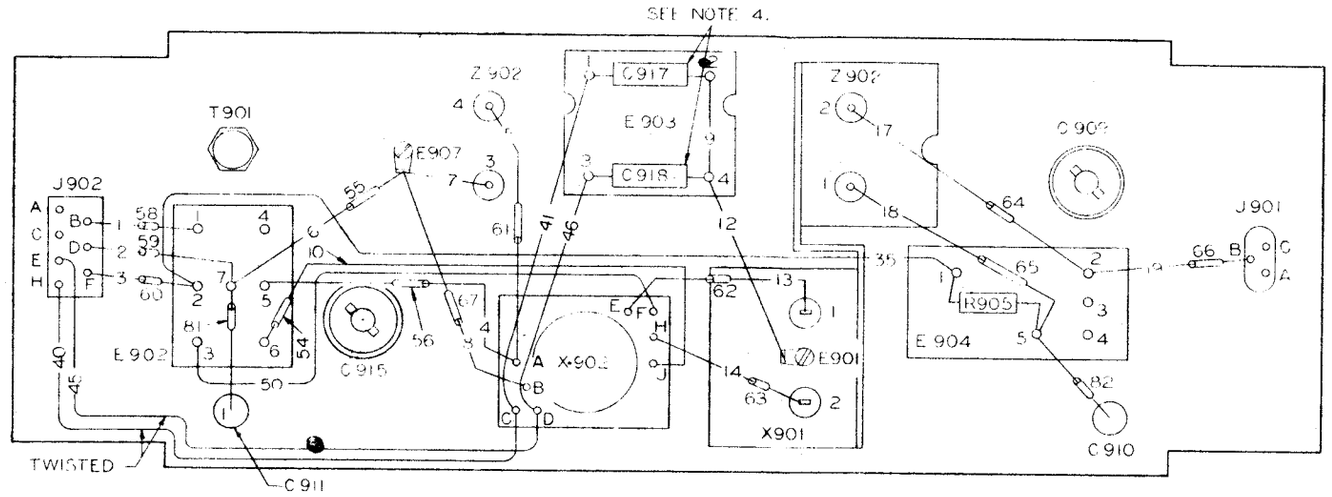


DETAIL OF HARNESS

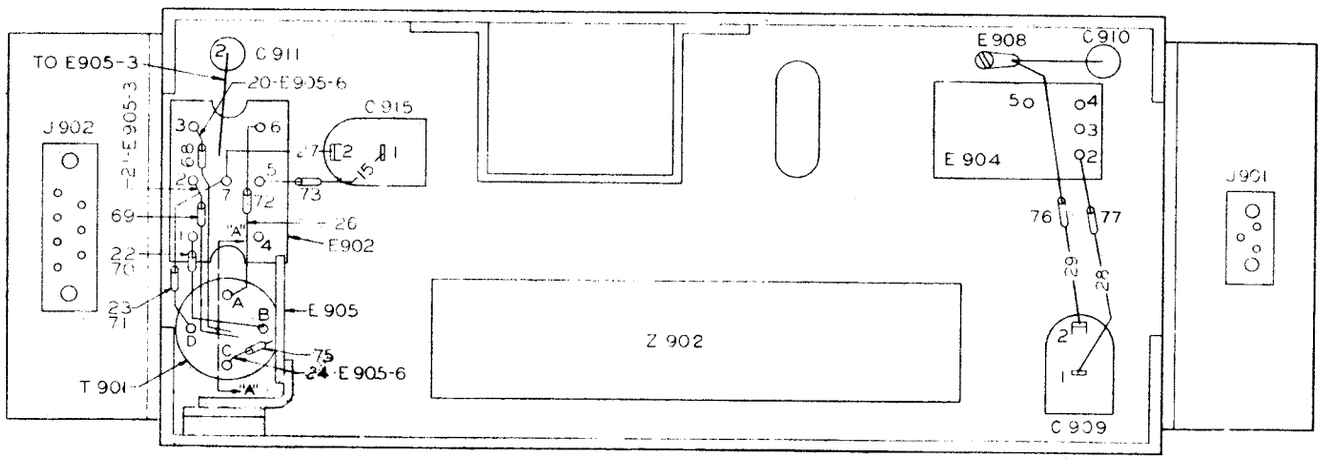


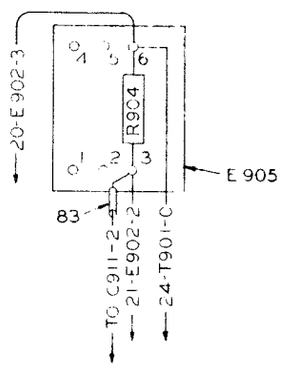
VIEW AT "B-B"
ROTATED 90° CCW

Figure 7-38. Oscillator, Connection Diagram, R-618/FRR-32



WIRE TABLE		
WIRE NO	DESCRIPTION	
1-29 INCL	WIRE TINNED COPPER .020 DIA.	PS 105
35	RED	A-68[illegible]-16
40-41	BRN.	
45-46	BRN.-BLK. TR	
50	WIRE ORN.	A-8E29122-16
54-77 INCL	SLEEVING .022 I.D.	PS 753-B-1
81-83 INCL	SLEEVING .034 I.D.	PS 753-B-2

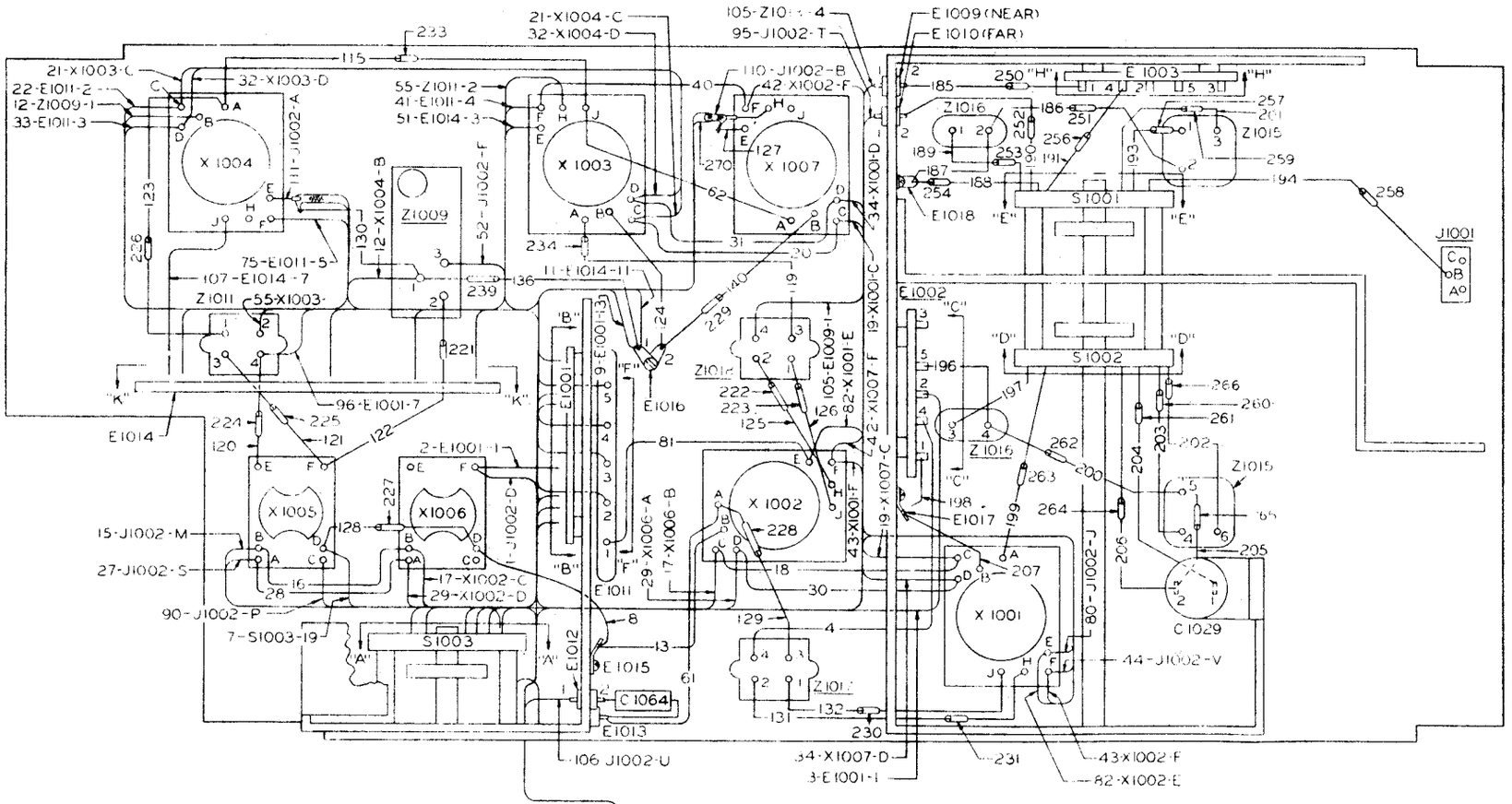


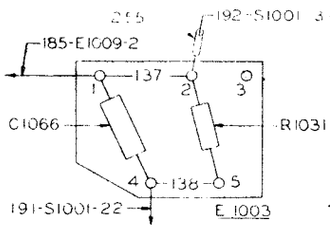


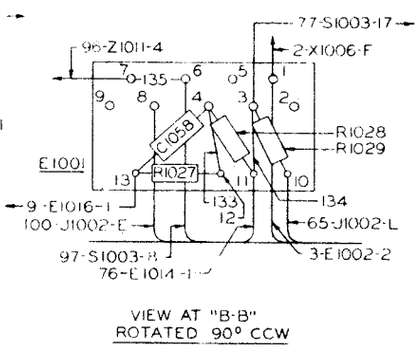
VIEW AT "A-A"
ROTATED 90° CCW

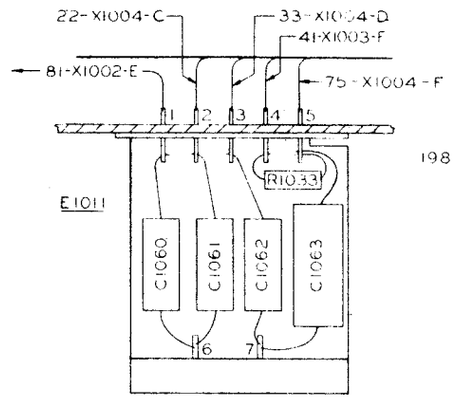
NOTES-
1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.
4. CASE OF CAPACITOR CONNECTED TO GROUND.

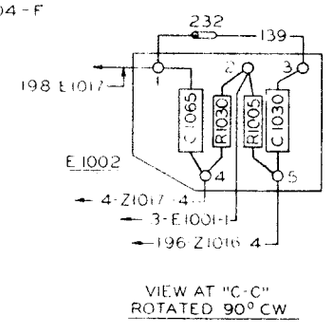
Figure 7-39. First I-F, Connection Diagram, R-618/FRR-32

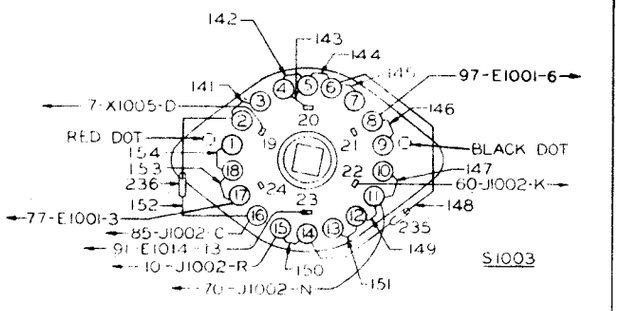


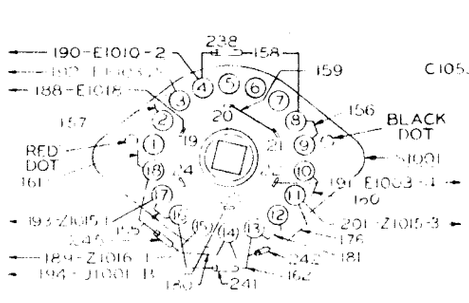


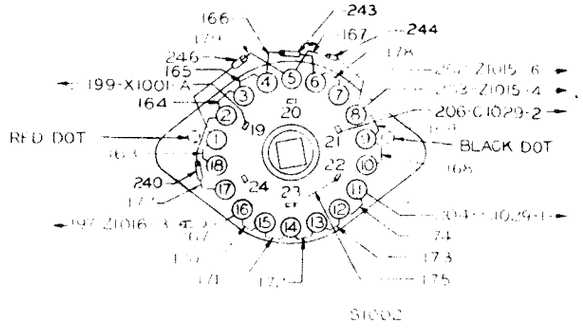








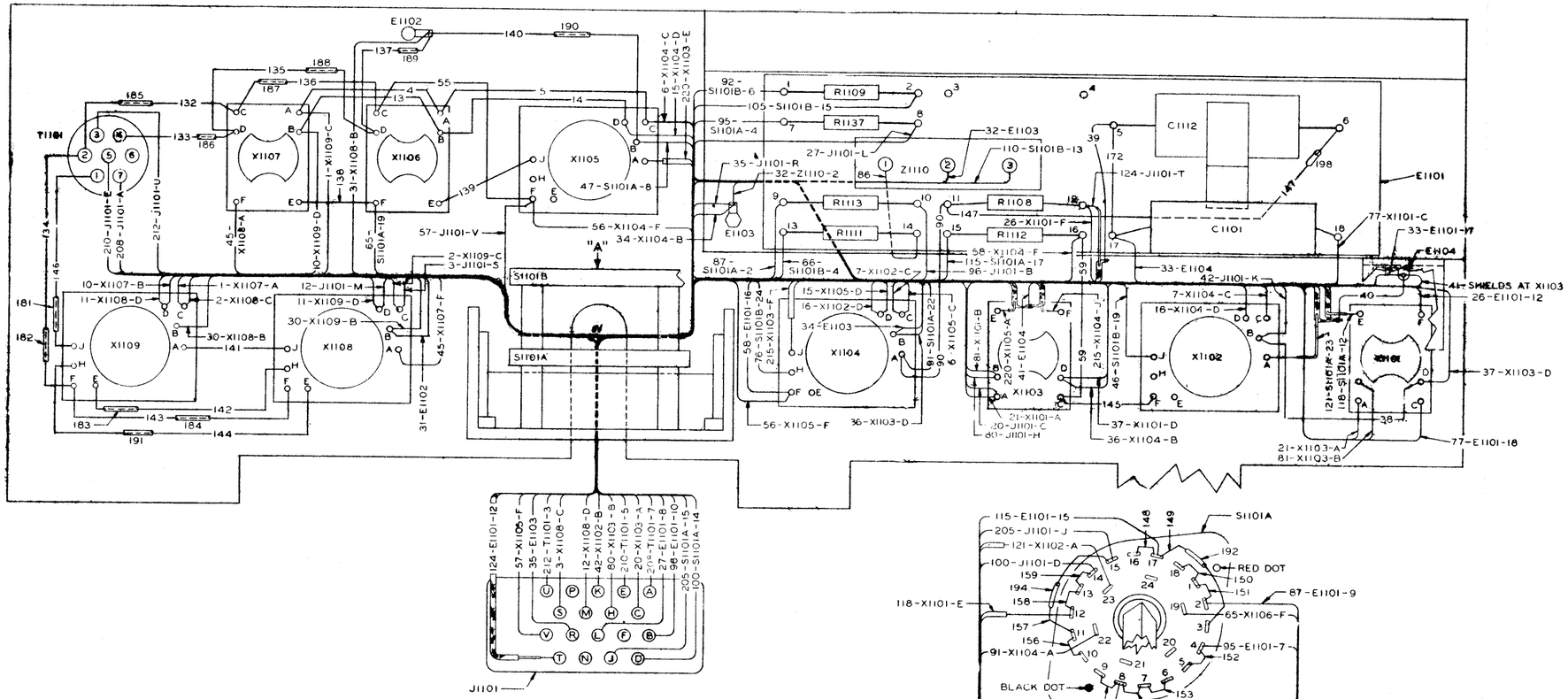




WIRE TABLE	
WIRE NO.	DESCRIPTION
1-4 INCL.	WIRE WHITE
7-14	BLK.
15-23	BRN. - GRN. TR.
27-34	BRN. - YEL. TR.
40-44 INCL.	RED
51-52	YEL.
55	ORN.
60-62 INCL.	GRN.
65	RED - ORN. TR.
70	WHT. - BRN. TR.
75-77 INCL.	RED - BLUE TR.
80-82 INCL.	YEL. - BLK. TR.
85	YEL. - BRN. TR.
90-91	YEL. - GRN. TR.
95-97 INCL.	YEL. - RED TR.
100	YEL. - ORN. TR.
105-107 INCL.	WIRE GRN. BLK. TR.
110	WIRE SHIELDED (YELLOW)
111	WIRE SHIELDED (PURPLE)
111-181 INCL.	WIRE TINNED COPPER .020 DIA.
185-207 INCL.	WIRE TINNED COPPER .032 DIA.
221-246 INCL.	SLEEVING .022 I.D.
250-267 INCL.	SLEEVING .034 I.D.
270	SLEEVING .095 I.D.

NOTES -
1. SCHEMATIC SYMBOL NUMBERS. LIST OF PARTS.
2. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS.
4. TIE CABLES USING LACING CORD WHERE NECESSARY.
5. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATE WIRE NUMBERS AND DESTINATION OF WIRES. THUS: 19-X1007-C, 19 = WIRE NO., X1007 = SOCKET X1007, C = TERMINAL OF SOCKET X1007 AS INDICATED ON THIS DRAWING.

Figure 7-40. Second I-F, Connection Diagram, R-618/FRR-32

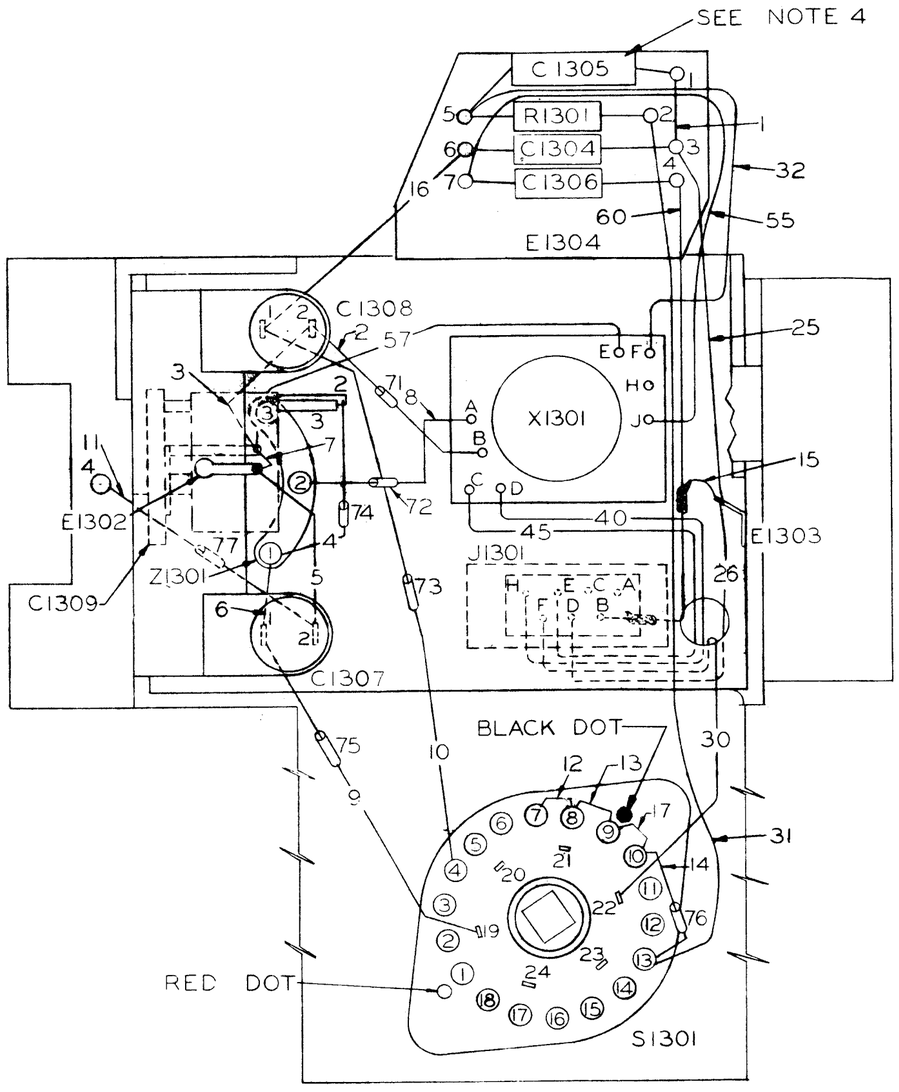


WIRE TABLE	
WIRE NO.	DESCRIPTION
1 - 7 INCL.	WIRE BROWN - GREEN TR.
10 - 16 INCL.	BROWN - YEL. TR.
20 - 21	BRN. - PURPLE TR.
26 - 27	WHITE
30 - 42 INCL.	BLACK
45 - 47 INCL.	GREEN
55 - 59 INCL.	RED
65 - 66	BLUE
76 - 77	YELLOW
80 - 81	BRN. - BLUE TR.
86 - 87	BLUE - BRN. TR.
90 - 92 INCL.	RED - GRN. TR.
95 - 96	RED - BLK. TR.
100	GRN. - BRN. TR.
105	YEL. - GRN. TR.
110	YEL. - BLK. TR.
115	BLUE - RED TR.
118	SHIELDED (WHITE)
121	SHIELDED (GRN. - YEL. TR.)
124	SHIELDED (GREEN)
132 - 172 INCL.	WIRE TINNED COPPER .020 DIA.
181 - 198 INCL.	SLEEVING .022 I.D.
205	WIRE GRN. - BLK. TR.
208	WHITE - BLACK TR.
210	WHITE - BROWN TR.
212	WHITE - RED TR.
215	SHIELDED (BLUE)
220	WIRE SHIELDED (YEL.)

NOTES

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. CABLE & LACE WIRES WHERE PRACTICAL USING LACING CORD.
3. ITEM NUMBERS & SCHEMATIC SYMBOL NUMBERS REFER TO LIST OF PARTS
4. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE. THUS: 58-E1101-16. 58=WIRE NUMBER. E1101= TERMINAL BOARD E1101. AND 16= TERMINAL 16 OF E1101 AS INDICATED ON THIS DRAWING.

Figure 7-41. Audio Amplifier, Connection Diagram, R-618/FRR-32

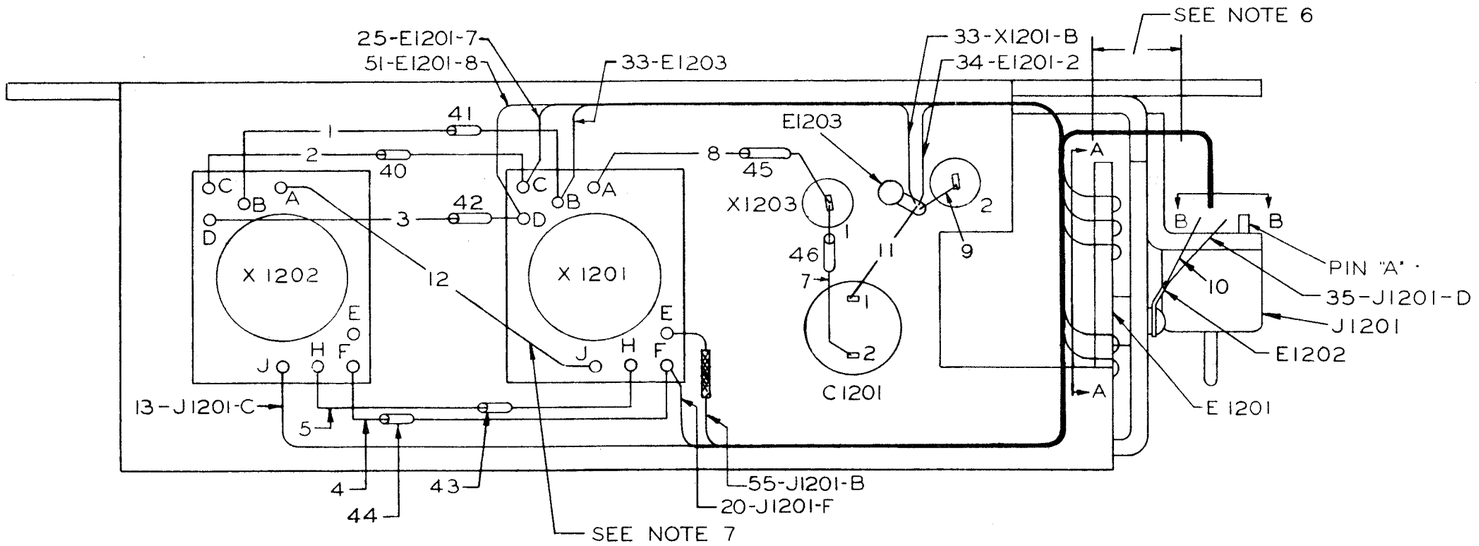


WIRE TABLE	
WIRE NO.	DESCRIPTION
1-17 INCL.	WIRE - TINNED COPPER .020 DIA.
25-26	BLACK
30-32 INCL.	RED
40	BROWN
45	BROWN-BLACK TR.
55	BLUE
57	ORANGE
60	WIRE - SHIELDED PURPLE
71-77 INCL	SLEEVING .022 I.D.

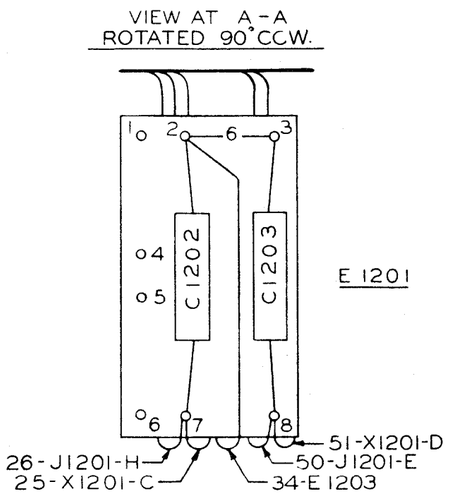
NOTES:

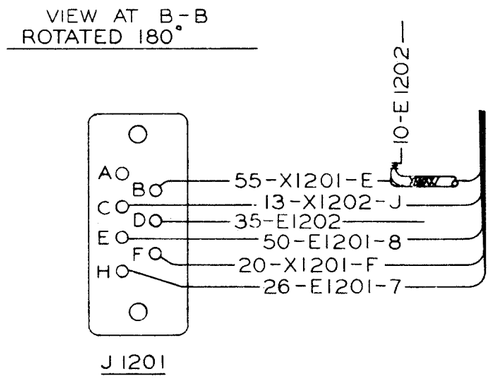
1. NUMBERS IN WIRES REFER TO WIRE TABLE.
2. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
4. CASE OF CAPACITOR CONNECTED TO GROUND.
5. SYMBOL NUMBERS REFER TO LIST OF PARTS

Figure 7-42. Beat Frequency Oscillator, Connection Diagram, R-618/FRR-32



WIRE TABLE	
WIRE NO.	DESCRIPTION
1-11 INCL.	WIRE, TINNED COPPER .020 DIA.
12-13 INCL.	GREEN
20	RED-YEL. TR.
25-26	BRN.-GRN. TR.
33-35 INCL.	WIRE BLACK
40-46 INCL.	SLEEVING .022 I.D.
50-51	WIRE, BRN.-YEL. TR.
55	WIRE, SHIELDED, GRN.-BLK. TR.



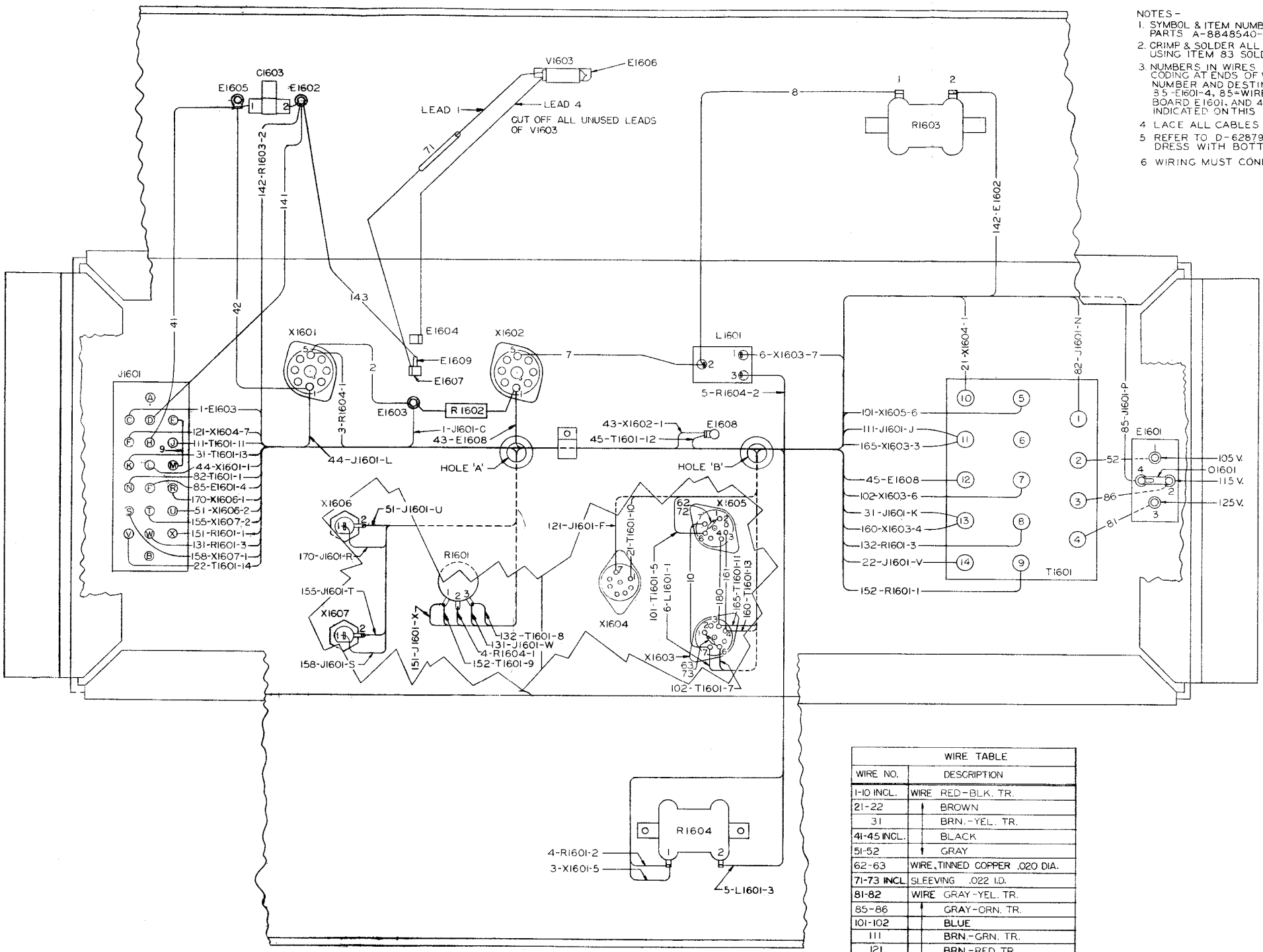


NOTES

1. SYMBOL NUMBERS REFER TO LIST OF PARTS
2. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.
4. CABLE & LACE WIRES WHERE PRACTICAL AS INDICATED USING LACING CORD.
6. TAPE CABLE WHERE INDICATED
7. DRESS WIRE 12 IN DIRECT LINE BETWEEN TERMINALS A & J

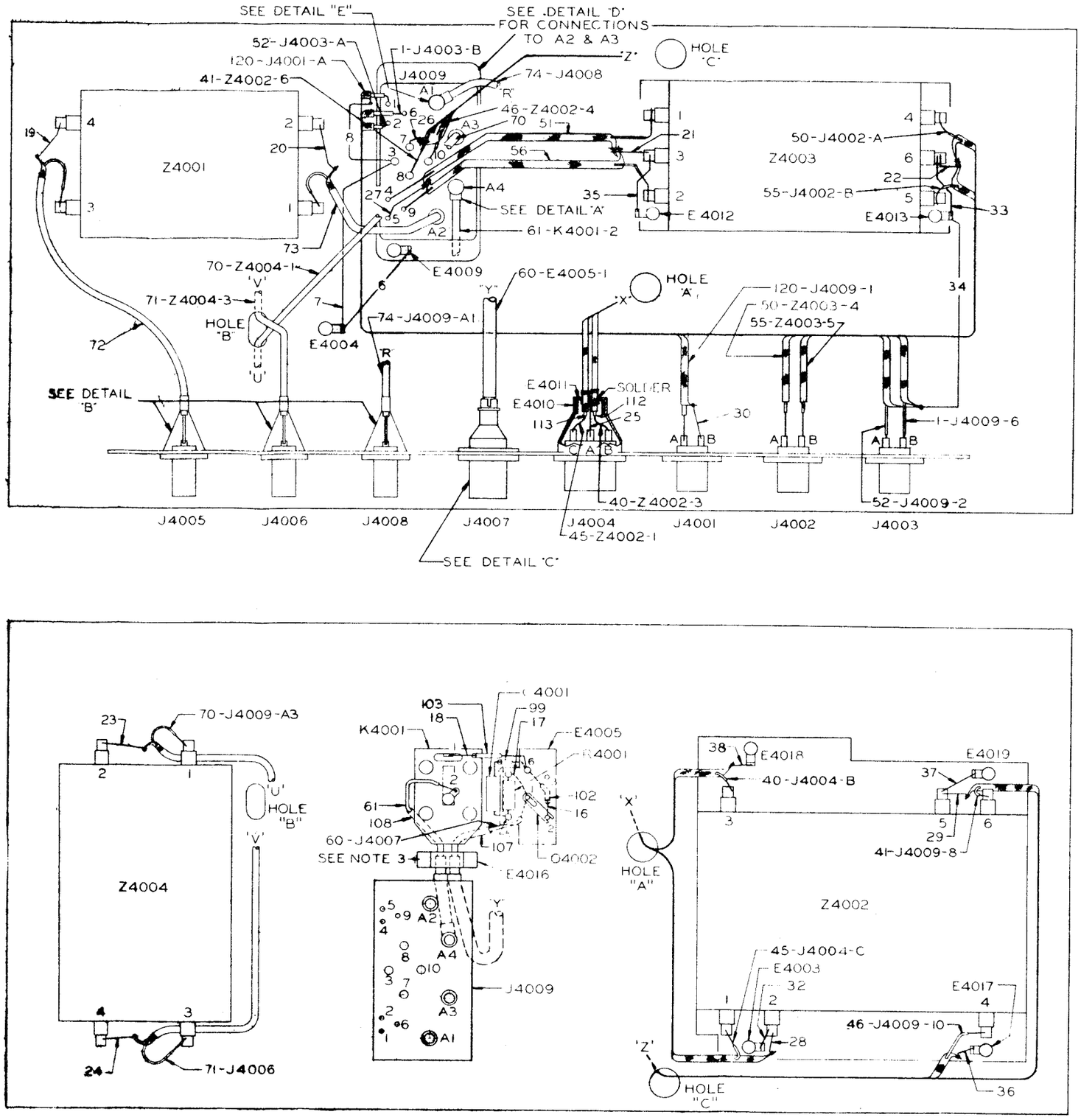
Figure 7-43. Crystal Calibrator, Connection Diagram, R-618/FRR-32

NOTES -
1. SYMBOL & ITEM NUMBERS REFER TO LIST OF PARTS A-8848540-501.
2. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS USING ITEM 83 SOLDER.
3. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRES, THUS: 85-E1601-4, 85=WIRE NUMBER, E1601=TERM BOARD E1601, AND 4=TERMINAL 4 OF E1601 AS INDICATED ON THIS DRAWING.
4. LACE ALL CABLES USING ITEM 82 LACING CORD.
5. REFER TO D-628795 FOR CLEARANCE OF LEAD DRESS WITH BOTTOM COVER IN PLACE.
6. WIRING MUST CONFORM WITH RCA DWG A-8827743.



WIRE TABLE	
WIRE NO.	DESCRIPTION
1-10 INCL.	WIRE RED-BLK. TR.
21-22	BROWN
31	BRN.-YEL. TR.
41-45 INCL.	BLACK
51-52	GRAY
62-63	WIRE, TINNED COPPER .020 DIA.
71-73 INCL.	SLEEVING .022 I.D.
81-82	WIRE GRAY-YEL. TR.
85-86	GRAY-ORN. TR.
101-102	BLUE
111	BRN.-GRN. TR.
121	BRN.-RED TR.
131-132	BRN.-PURPLE TR.
141-143	RED-ORN. TR.
151-152	BRN.-BLUE TR.
155	GRAY-BRN. TR.
158	GRAY-BLK. TR.
160-161	BRN.-YEL. TR.
165	BRN.-GRN. TR.
170	GRAY-RED TR.
180	WIRE TINNED COPPER .040 DIA.

Figure 7-44. Receiver Power Supply, Connection Diagram



WIRE TABLE	
WIRE NO.	DESCRIPTION
17	WIRE SHIELDED WHITE-RED TR
6-8 INCL.	BLACK
16-38 INCL	TINNED COPPER .032 DIA.
40-41	SHIELDED-GRAY
45-46	GRAY-BLACK TR
50-52 INCL	WHITE-BLACK TR
55-56	WIRE SHIELDED WHITE-BROWN TR
60-61	CABLE COAX
70-74 INCL	CABLE COAX
99-103 INCL	SLEEVING .034 I.D.
105-108 INCL	SLEEVING .148 I.D.
112-113	SLEEVING .076 I.D.
120	WIRE SHIELDED BLUE

NOTES:

1 CRIMP & SOLDER ALL ELECTRIAL CONNECTIONS

2 NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATE WIRE NUMBERS AND DESTINATION OF WIRES THUS 70-Z4004-1, 70=WIRE NO., Z4004=FILTER Z4004, 1=TERMINAL 1 OF Z4004 AS INDICATED ON THIS DRAWING.

3 SOLDER SHIELDS OF CABLES 60 & 61 TO CLAMP E4016.

4 SYMBOL NUMBERS REFER TO LIST OF PARTS

6 CABLE & LACE WIRES WHERE PRACTICAL USING LACING CORD

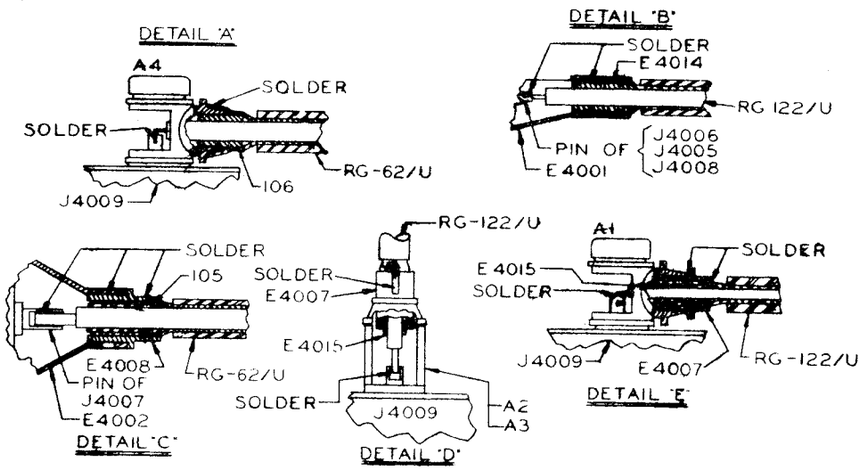
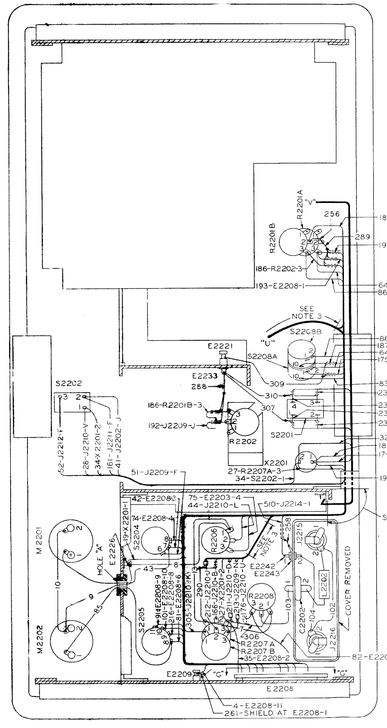
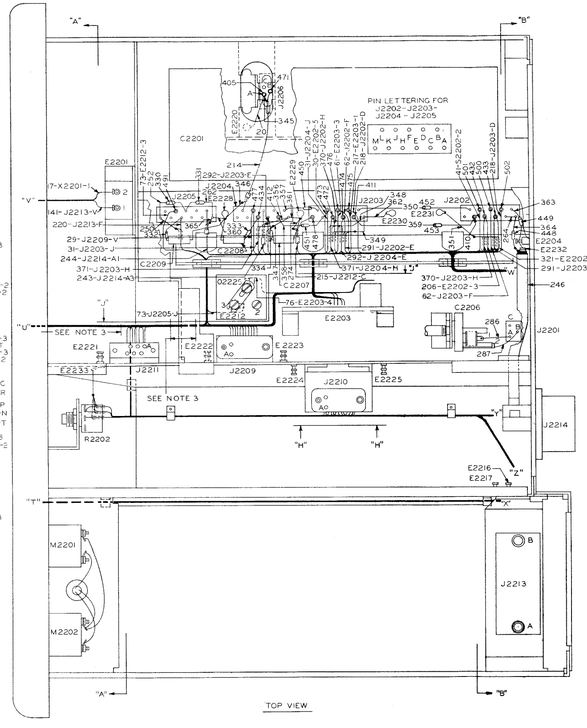
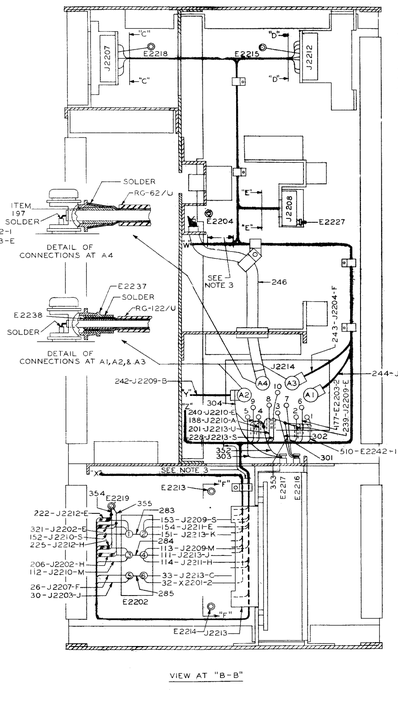
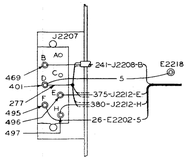


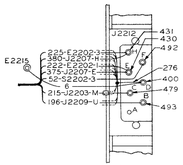
Figure 7-45. Receiver Filter Assembly, Connection Diagram

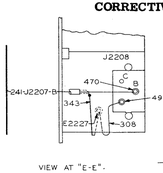


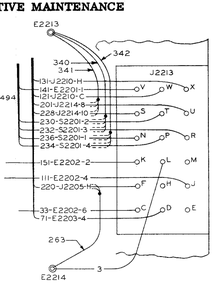


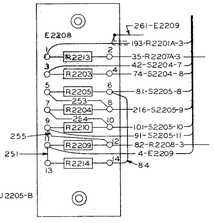


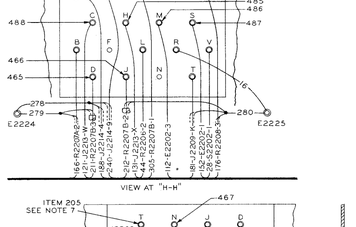


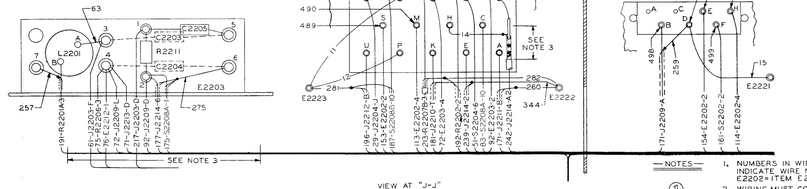












WIRE TABLE	
WIRE NO.	DESCRIPTION
3TO 20,30ITO 310	WIRE, BLK.
26 TO 35	RED
41TO 44	RED-BLK. TR.
51-52	RED-YEL. TR.
61 TO 64	YEL.
71 TO 76	RED-ORN. TR.
81 TO 86	YEL-BLK. TR.
91 TO 92	WHT.
101 TO 104	BLUE
111 TO 114	BRN-GRN. TR.
121	BRN.-PUR. TR.
131	BRN.-BLUE TR.
141	BRN.
151 TO 154	BRN.-YEL. TR.
161	RED-BRN. TR.
166	SHIELDED, RED-BLK. TR.
171	PURPLE
175 TO 177	WHT-RED TR.
181	ORN.
186 TO 188	YEL.-BRN. TR.
191 TO 193	YEL.
196	GRN.-BLK. TR.
201	GRAY
206	WIRE, SHIELDED, BRN.
211 TO 215	CABLE, COAXIAL
216 TO 218	WIRE, WHT.-BLK. TR.
220	SHIELDED BRN.-ORN. TR.
222	BRN.-YEL. TR.
225	BRN.-GRN. TR.
228	GRAY-BLK. TR.
230	-BRN. TR.
232	-RED TR.
234	-ORN. TR.
236	GRAY-YEL. TR.
239	WHT.-BLK. TR.
240	WIRE, SHIELDED WHT.-BRN. TR.
241 TO 244	CABLE, COAXIAL
246	CABLE, COAXIAL
250 TO 264	WIRE, TINNED COPPER .020 DIA.
274 TO 290	TINNED COPPER .032 DIA.
291-292	SHIELDED BRN.-BLK. TR.
321	WIRE, SHIELDED BRN.-BLK. TR.
330 TO 334	SLEEVING .022 I.D.
340 TO 365	WIRE, TINNED COPPER .032 DIA.
370 - 371	SHIELDED BRN.
375	SHIELDED BRN.-YEL. TR.
380	WIRE, SHIELDED BRN.-GRN. TR.
400 TO 405	TUBING, BLK. .085 I.D.
410 TO 412	SLEEVING, .095 I.D.
430 TO 434	TUBING, BLK. .106 I.D.
448 TO 453	SLEEVING, .034 I.D.
465 TO 479	TUBING, BLK. .095 I.D.
485 TO 502	TUBING, BLK. .066 I.D.
510	WIRE, SHIELDED BLUE

NOTES

1. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATE WIRE NO. & DESTINATION OF WIRE. THUS: 151-E2202-2, 151=WIRE NO., E2202=ITEM E2202, 2=TERM. 2 OF E2202 AS INDICATED ON THIS DRAWING.
2. WIRING MUST CONFORM WITH RCA DRAWING A-8827743.
3. TAPE CABLE WHERE INDICATED USING ITEM 183 TAPE.
4. CABLE & LACE WIRES AS INDICATED USING ITEM 185 CORD.
5. SYMBOL & ITEM NOS. REFER TO LIST OF PARTS A-8821493-503.
6. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS USING ITEM 148 SOLDER.
7. WITH EXCEPTIONS AS INDICATED, ASSEMBLE ITEM 205 TUBING OVER ENDS OF WIRES & TERMINALS AT J2209 & J2210.

Figure 7-46. Receiver Main Frame Connection Diagram

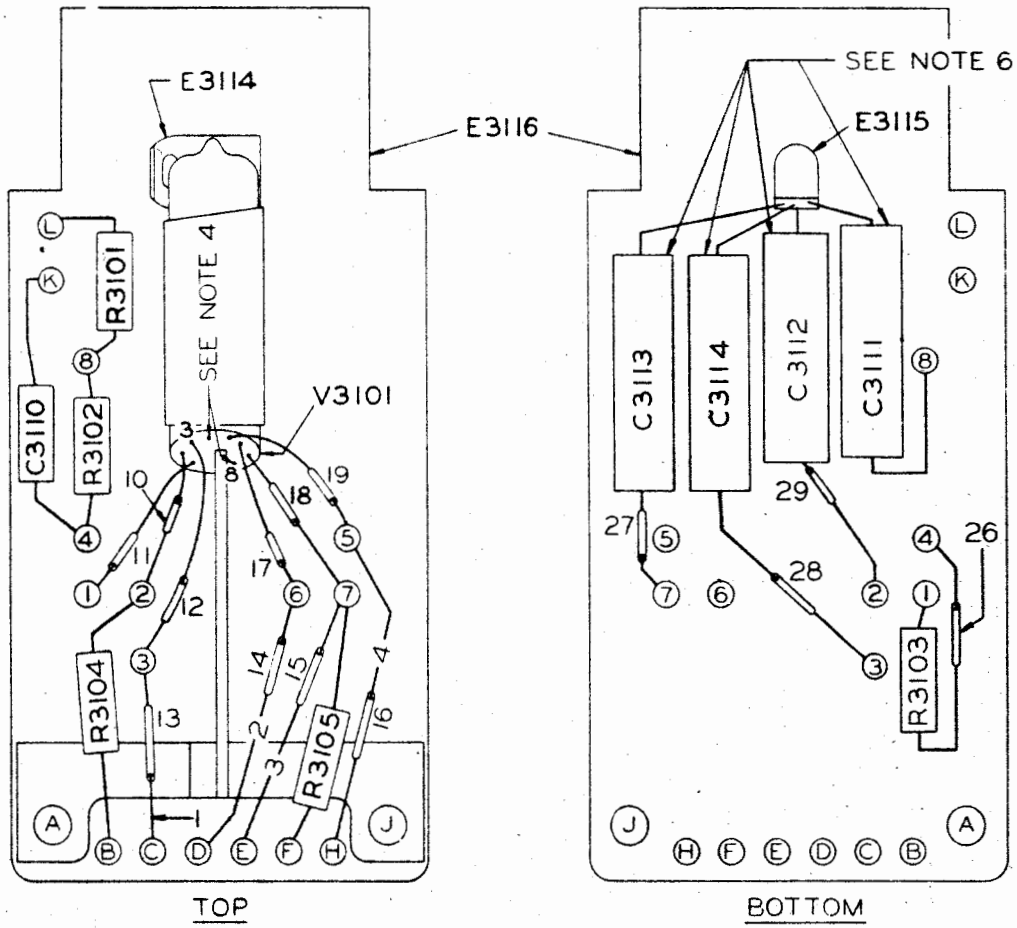


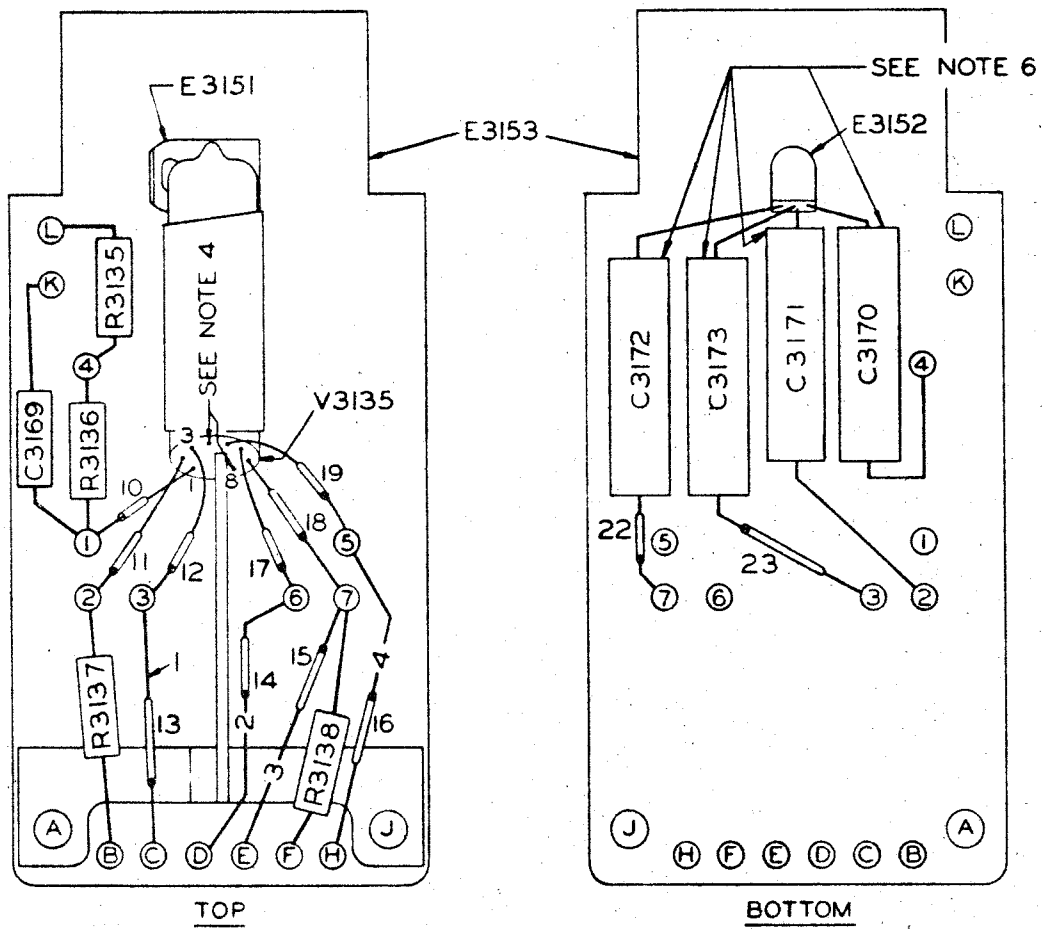
Figure 7-47. Antenna Plug-in Board, Z3101

Z3101

—NOTES —

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.
4. LEADS 4 AND 8 OF V3101 CUT OFF CLOSE TO BASE.
6. CASE OF CAPACITOR CONNECTED TO GROUND.

WIRE TABLE		
WIRE NO.	DESCRIPTION	
1-4 INCL.	WIRE TINNED COPPER	.020 DIA.
10-19 INCL.	SLEEVING	.022 I.D.
26-29 INCL.	SLEEVING	.034 I.D.



Z 3135

—NOTES —

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.
4. LEADS 4 AND 8 OF V3135 CUT OFF CLOSE TO BASE.

6. CASE OF CAPACITOR CONNECTED TO GROUND.

WIRE TABLE		
WIRE NO.	DESCRIPTION	
1-4 INCL.	WIRE TINNED COPPER	.020 DIA.
10-19 INCL.	SLEEVING	.022 I.D.
22-23	SLEEVING	.034 I.D.

Figure 7-48. R-F Plug-in Board, Z3135

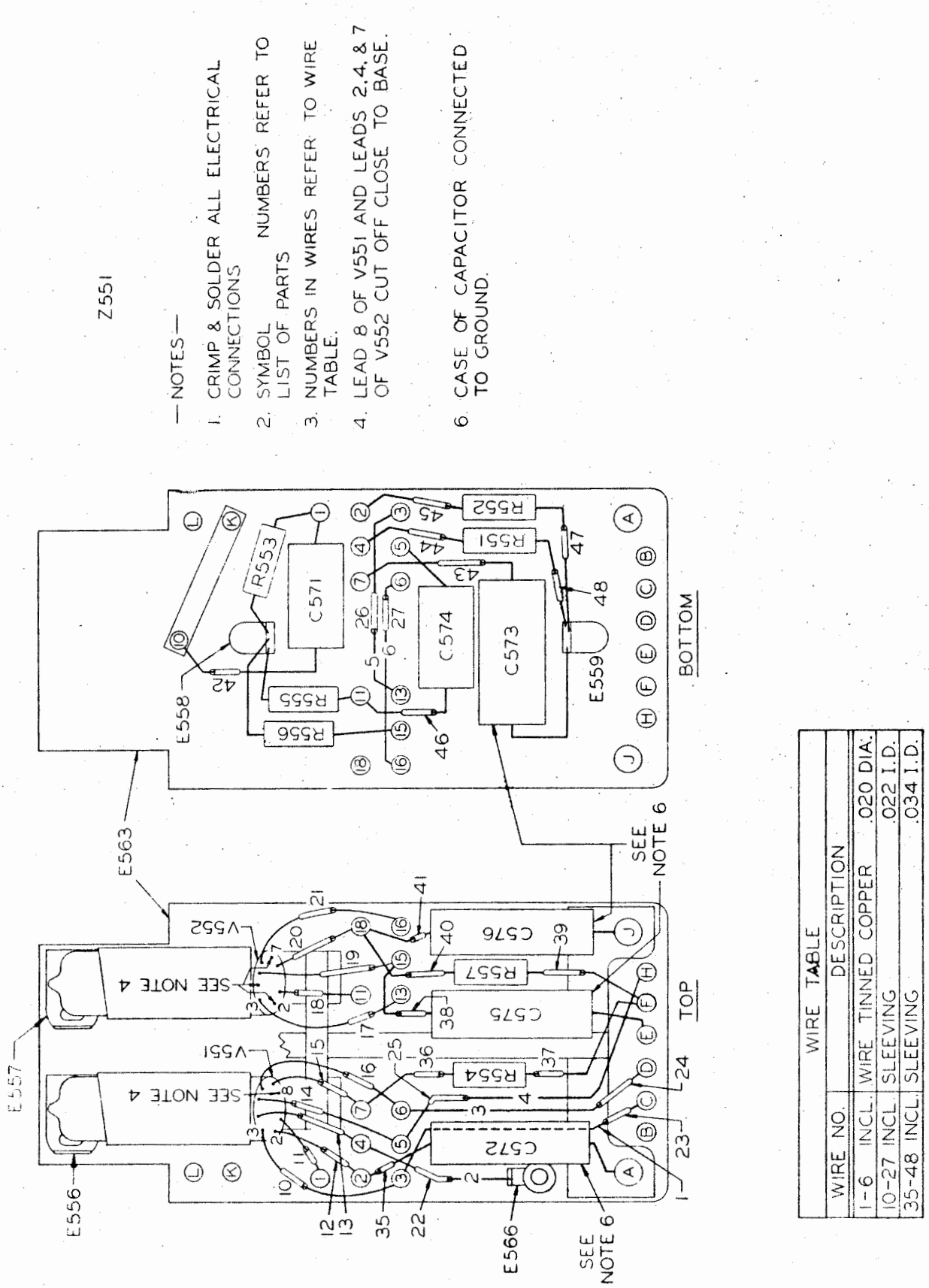


Figure 7-49. Mixer Plug-in Board, Z551

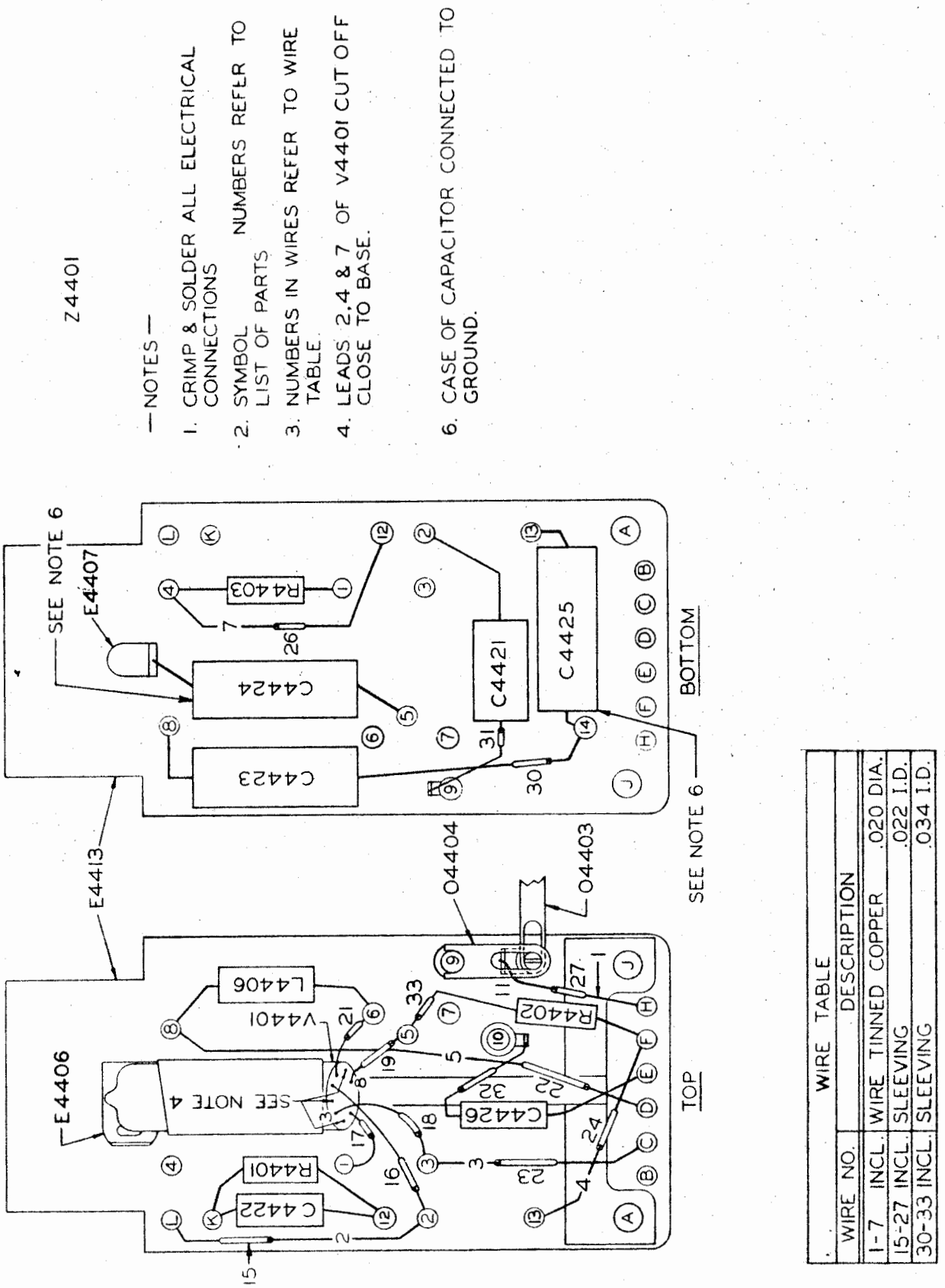


Figure 7-50. Oscillator Plug-in Board, Z4401

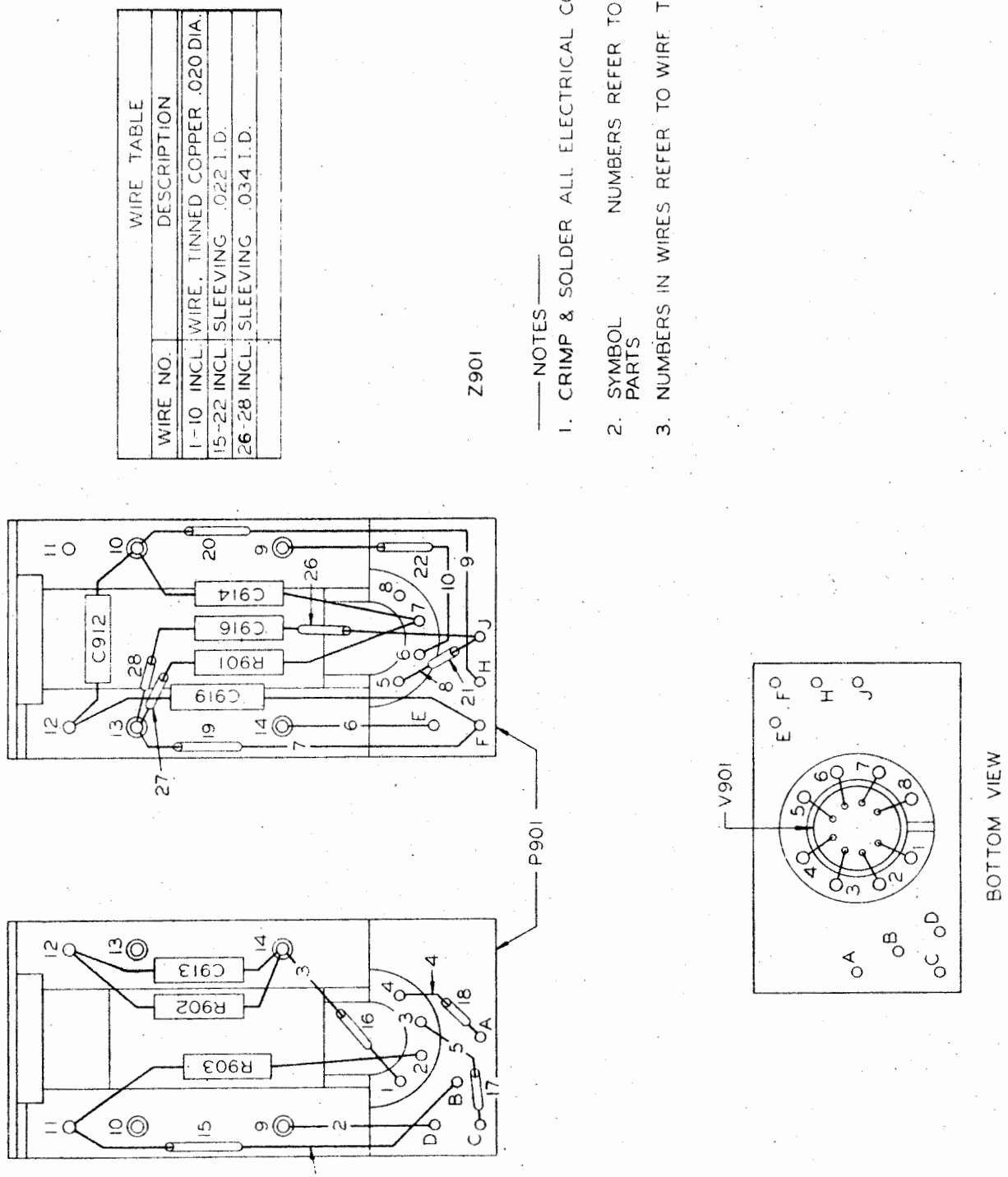


Figure 7-51. First I-F Plug-in Unit, Z901

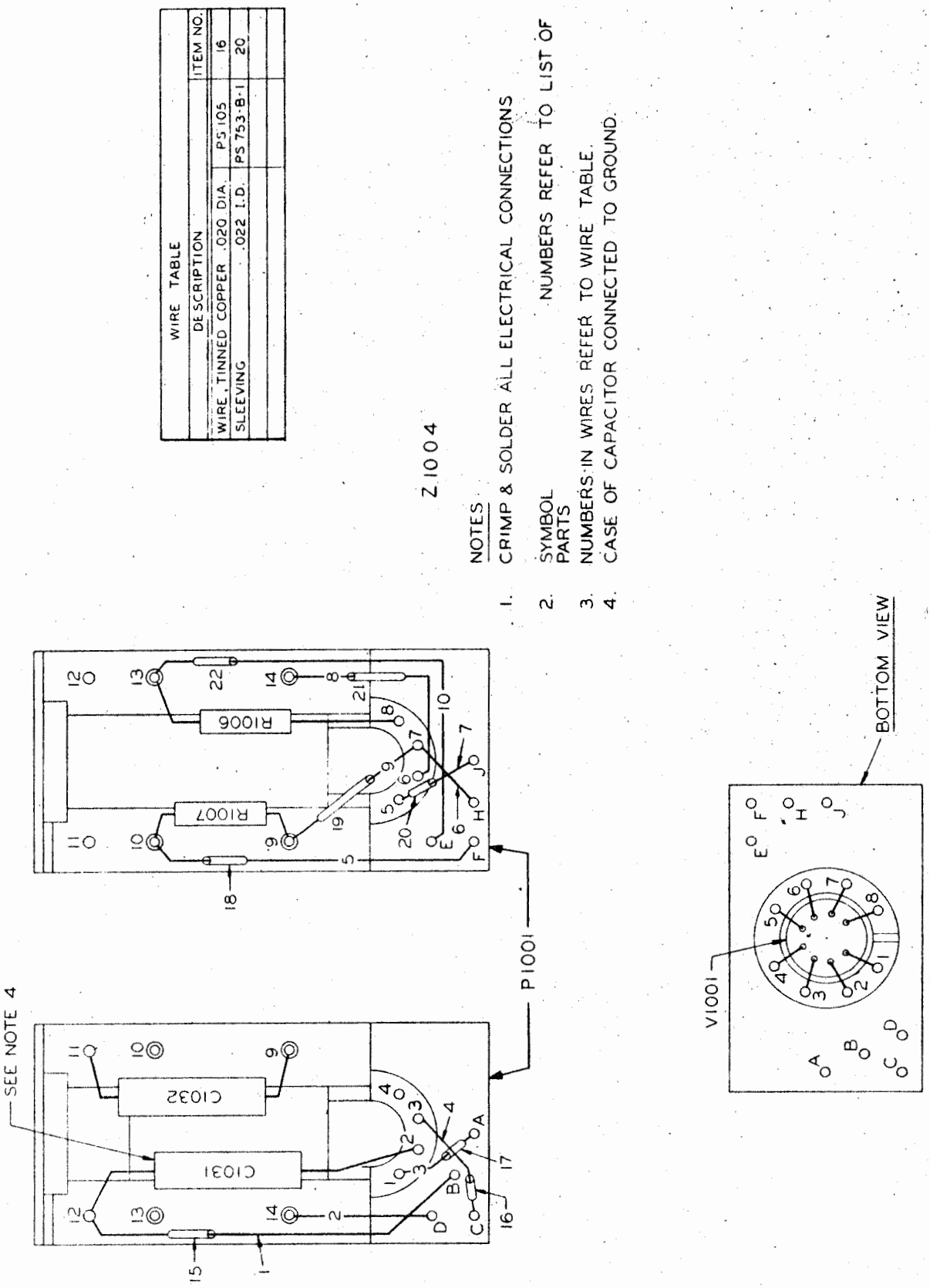


Figure 7-52. Second I-F Plug-in Unit, Z1004

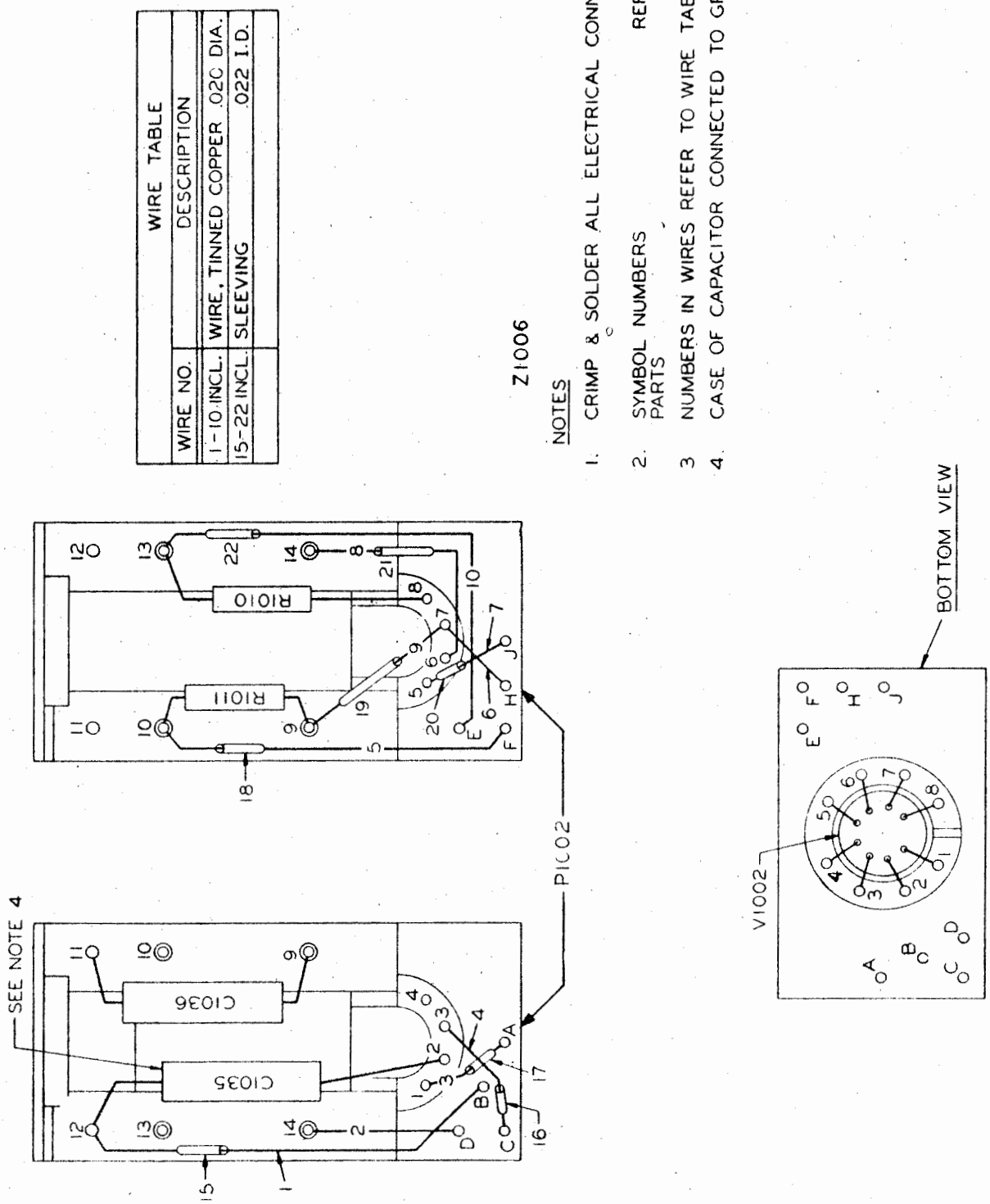


Figure 7-53. Second I-F Plug-in Unit, Z1006

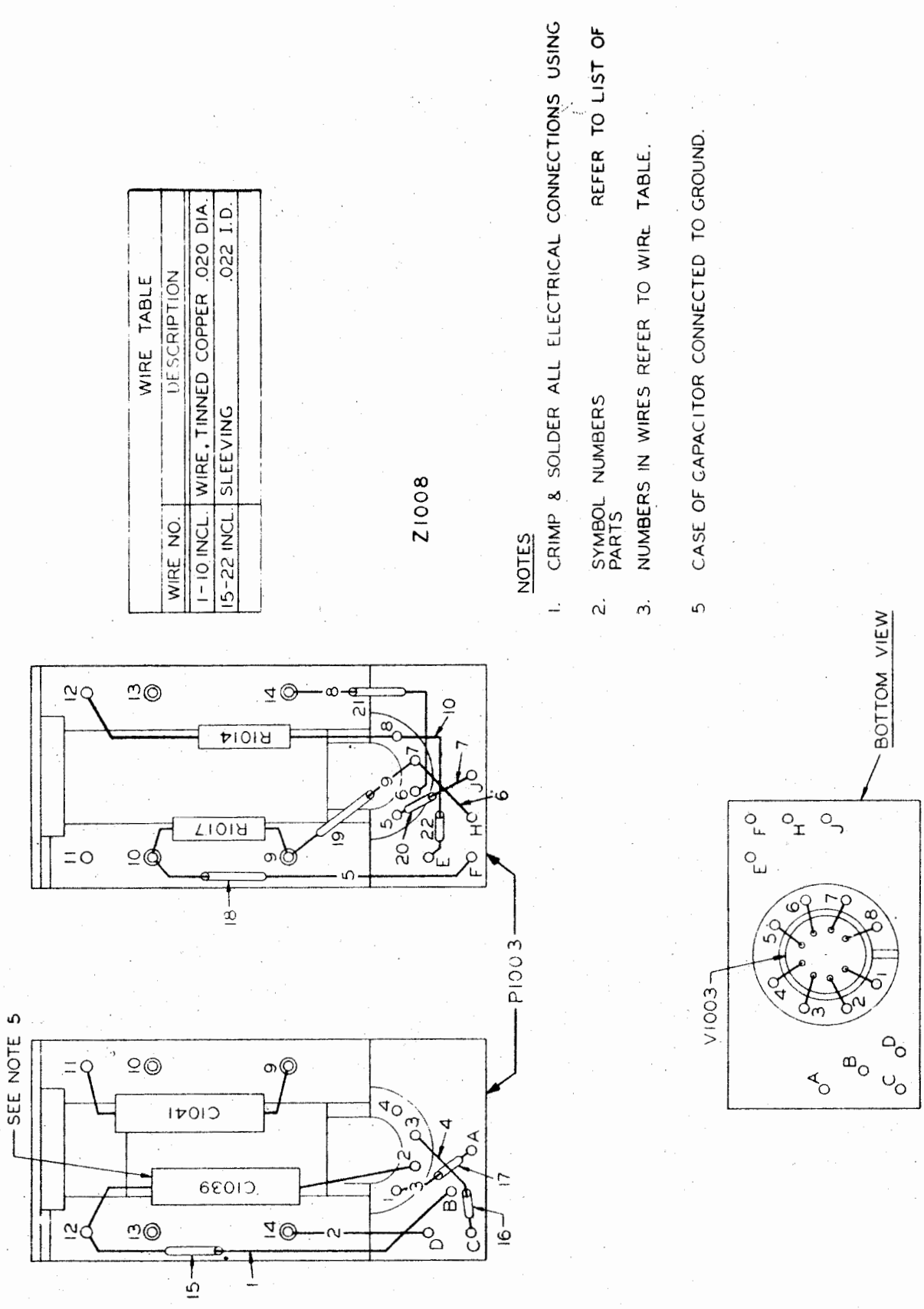
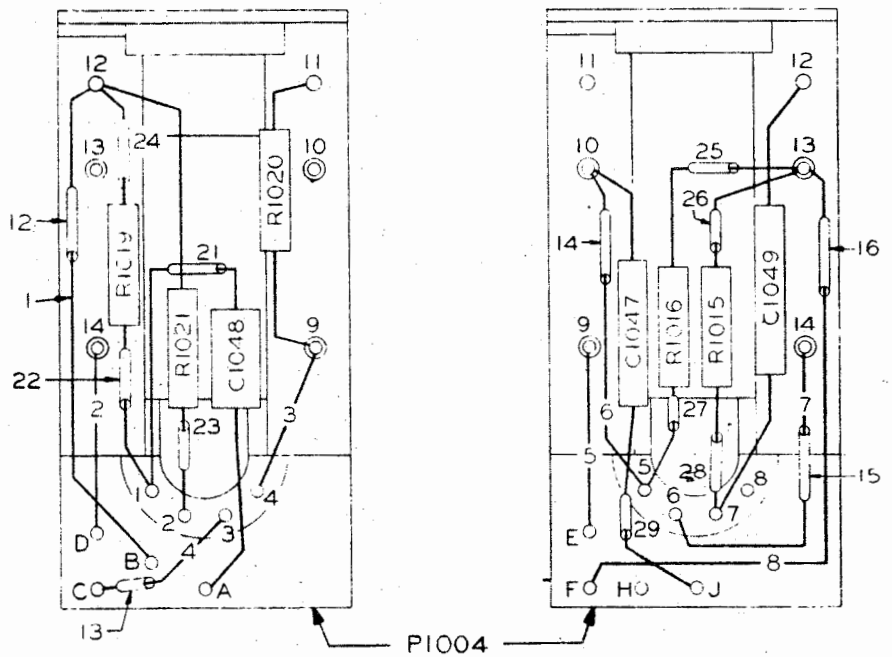


Figure 7-54. Second I-F Plug-in Unit, Z1008



WIRE TABLE	
WIRE NO.	DESCRIPTION
1-8 INCL.	WIRE, TINNED COPPER .020 DIA.
12-16 INCL.	SLEEVING .022 I.D.
21-29 INCL.	SLEEVING .034 I.D.

NOTES

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.

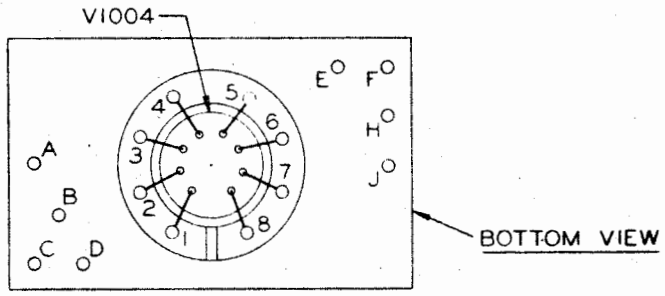


Figure 7-55. Second I-F Plug-in Unit, Z1010

WIRE TABLE	
WIRE NO	DESCRIPTION
1-7 INCL	WIRE TINNED COPPER .020 DIA.
11-12	SLEEVING .022 I.D.

Z 1012

NOTES

1 CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS

2 SYMBOL NOS. REFER TO LIST OF PARTS

3 NOS. IN WIRES REFER TO WIRE TABLE.

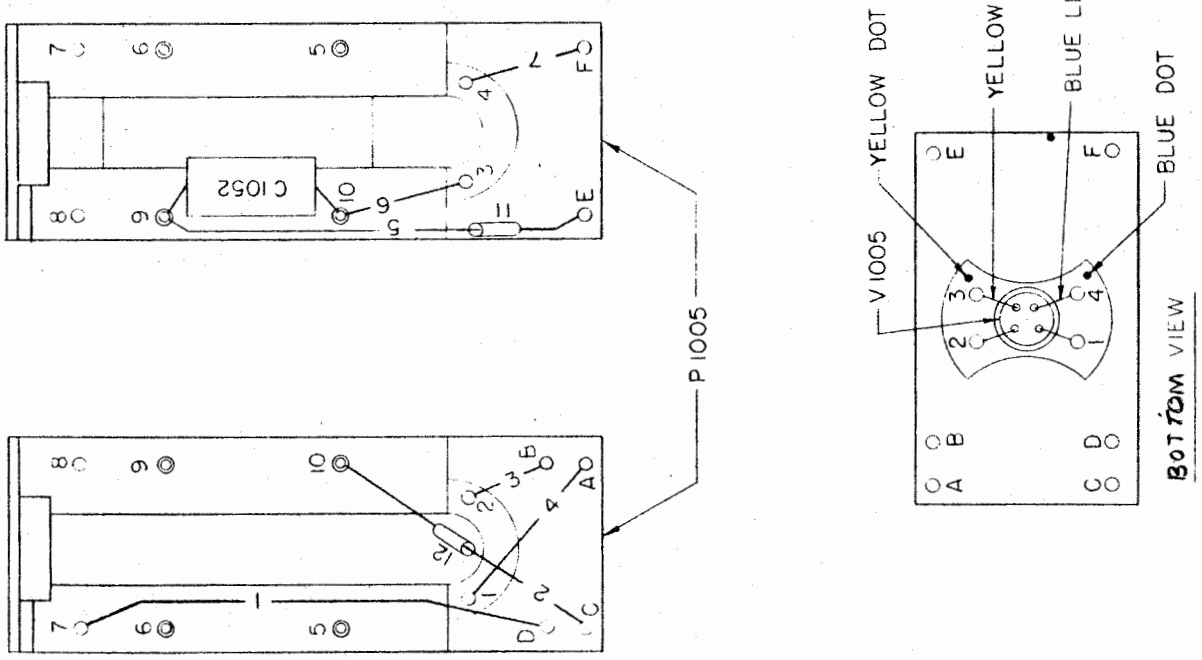


Figure 7-56. Second I-F Plug-in Unit, Z1012

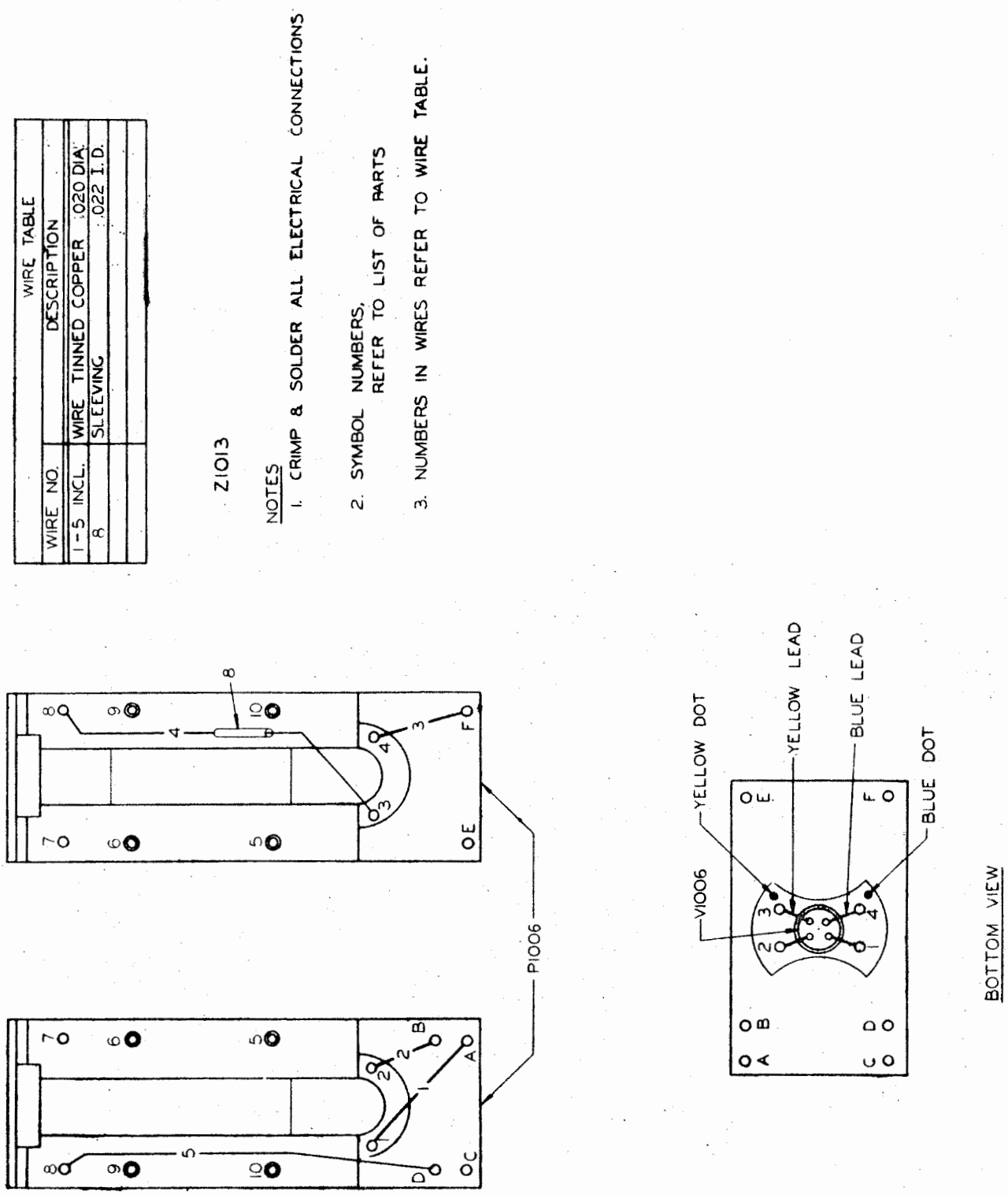


Figure 7-57. Second I-F Plug-in Unit, Z1013

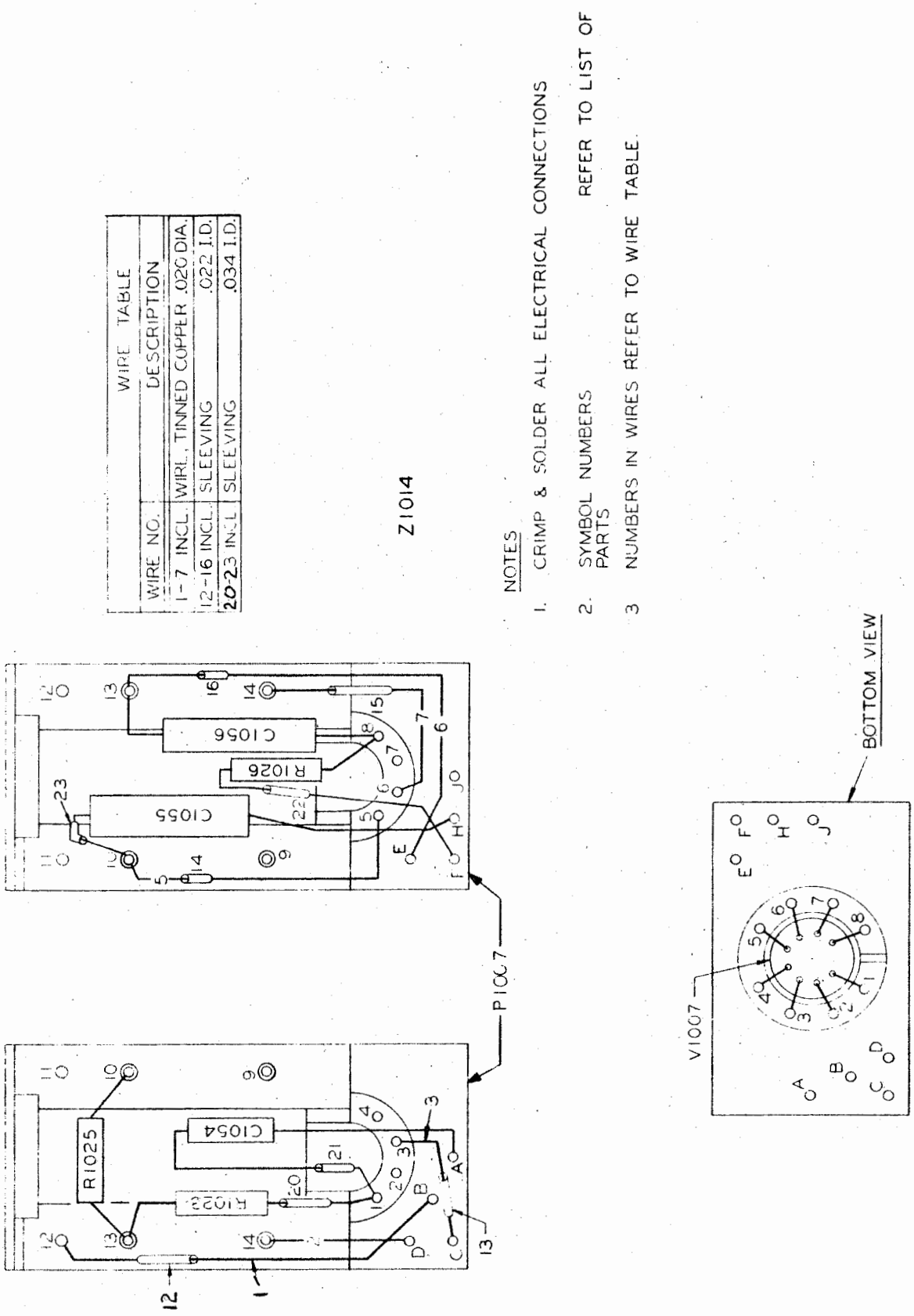


Figure 7-58. Second I-F Plug-in Unit, Z1014

WIRE TABLE	
WIRE NO	DESCRIPTION
1-6 INCL	WIRE-TINNED COPPER 20 GA
15-17 INCL	SLEEVING .022 ID
26-30 INCL	SLEEVING .034 ID

Z1101

NOTES.

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE

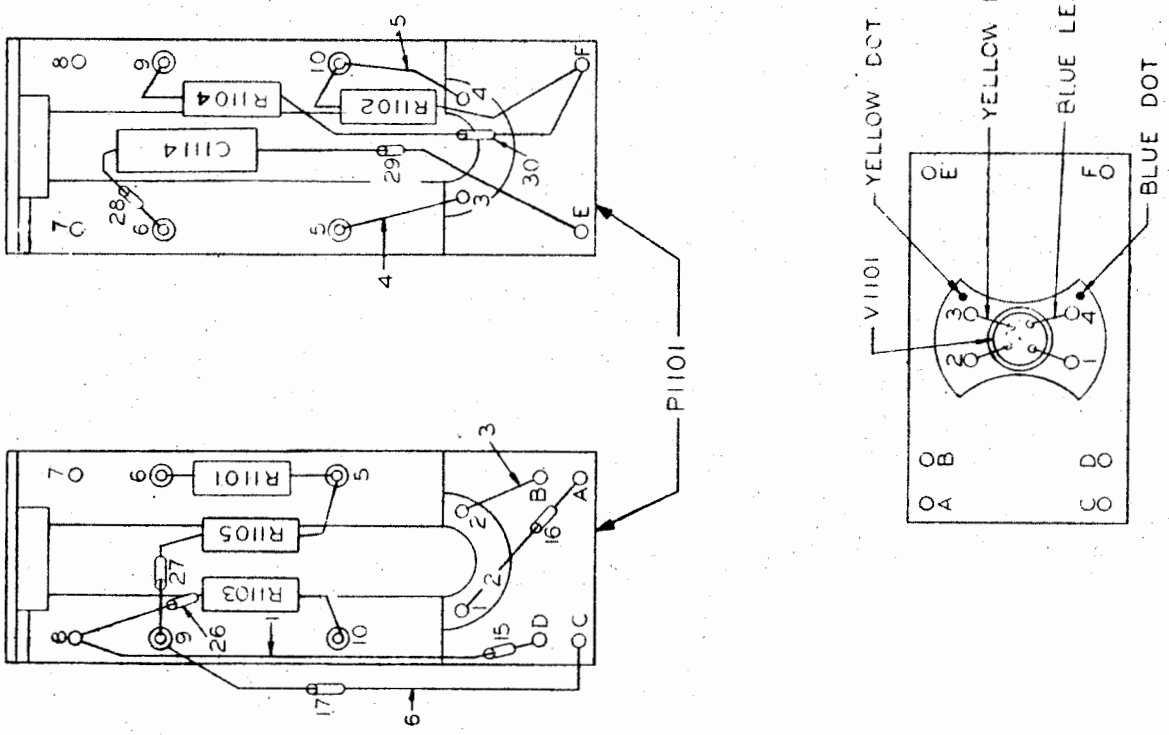


Figure 7-59. A-F Plug-in Unit, Z1101

WIRE TABLE	
WIRE NO.	DESCRIPTION
1-7 INCL.	WIRE - TINNED COPPER .020 DIA.
15-20 INCL.	SLEEVING 022 I.D.
30-33 INCL.	SLEEVING 034 I.D.

Z1102

NOTES:

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.

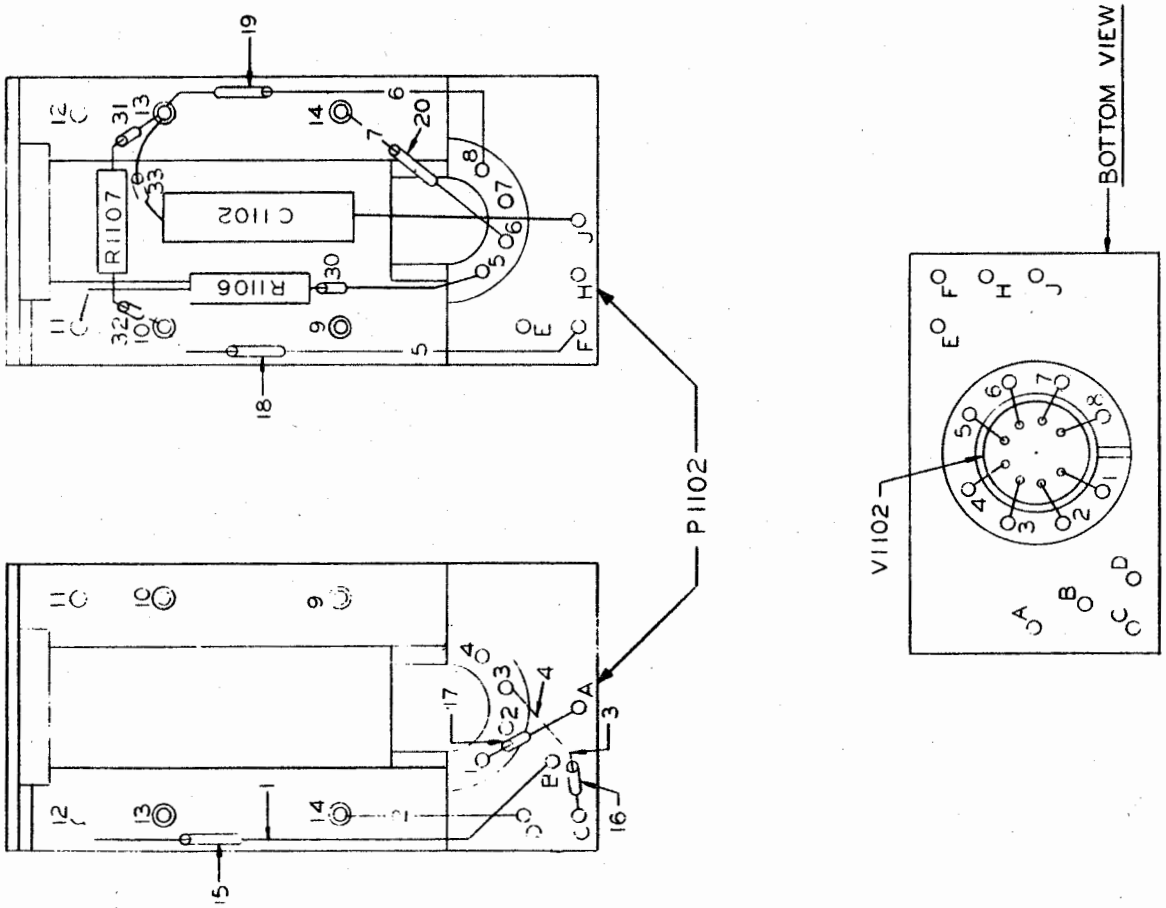


Figure 7-60. A-F Plug-in Unit, Z1102

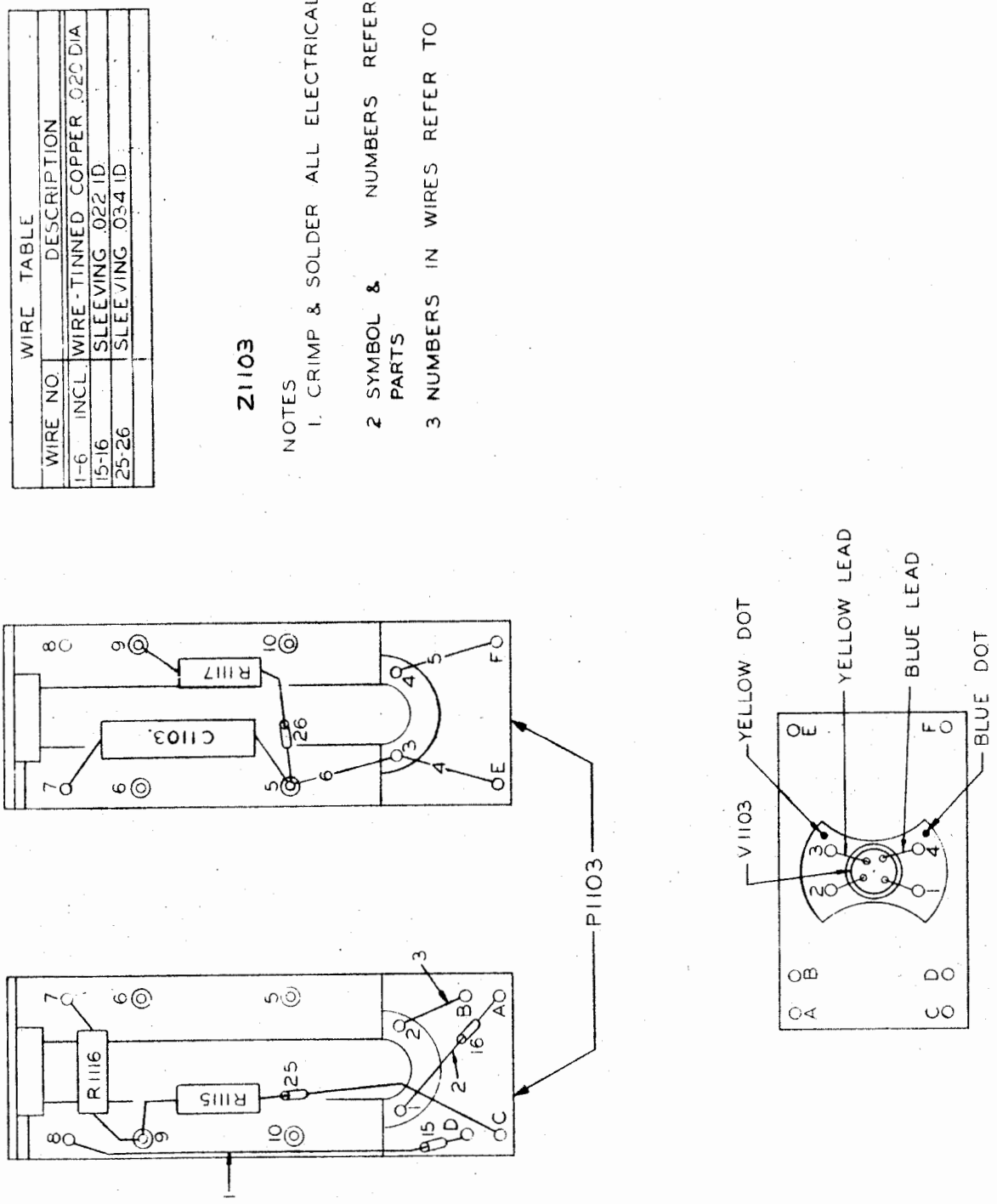


Figure 7-61. A-F Plug-in Unit, Z1103

WIRE TABLE	
WIRE NO.	DESCRIPTION
1-8 INCL	WIRE - TINNED COPPER 020 DIA
15-21 INCL	SLEEVING .022 ID
30-38 INCL	SLEEVING .034 ID

Z1104

NOTES

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.

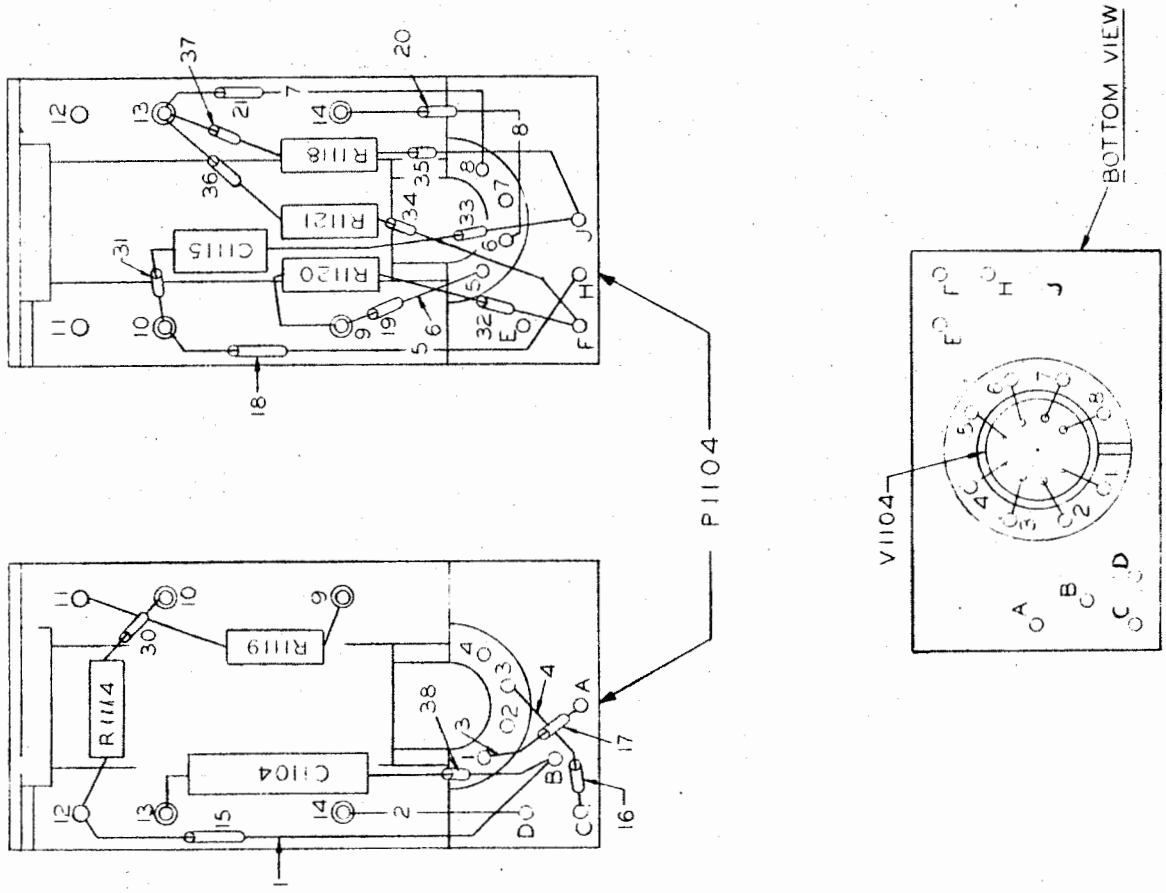
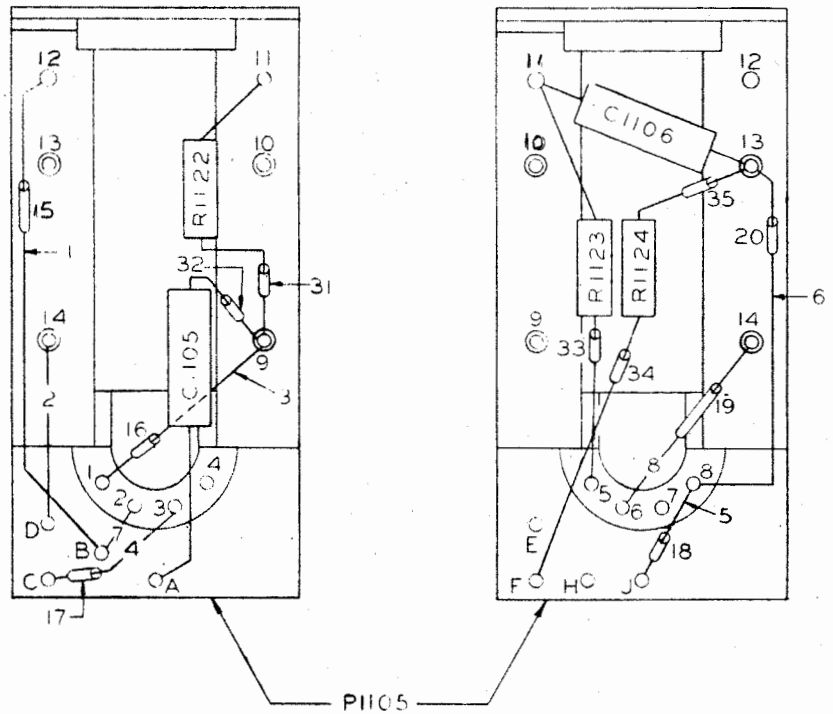


Figure 7-62. A-F Plug-in Unit, Z1104



WIRE TABLE	
WIRE NO	DESCRIPTION
1-8 INCL	WIRE - TINNED COPPER .020 DIA.
15-20 INCL	SLEEVING .022 I.D.
31-35 INCL	SLEEVING .034 I.D.

NOTES

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE

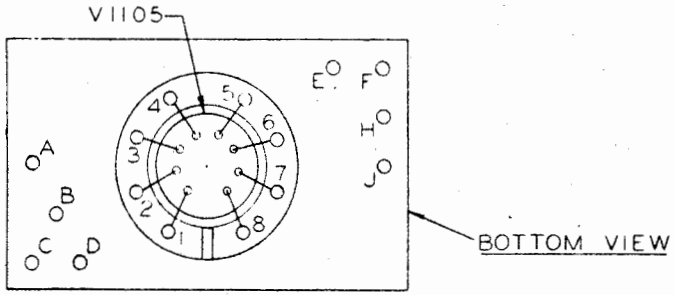
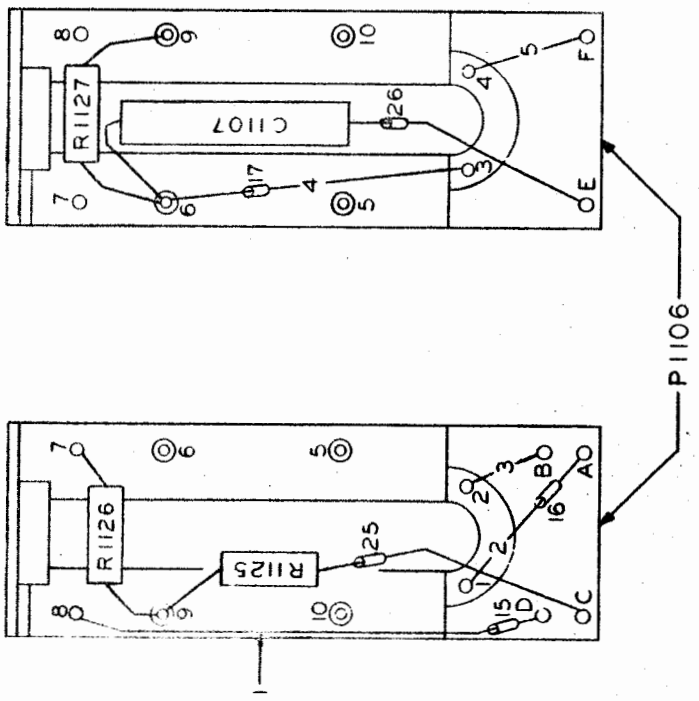


Figure 7-63. A-F Plug-in Unit, Z1105

WIRE TABLE	
WIRE NO.	DESCRIPTION
1-5 INCL.	WIRE - TINNED COPPER .020 DIA.
15-17 INCL.	SLEEVING .022 ID
25-26	SLEEVING .034 ID

Z1106

NOTES:
1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.



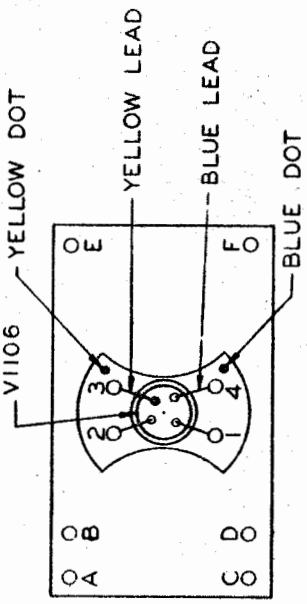


Figure 7-64. A-F Plug-in Unit, Z1106

WIRE TABLE	
WIRE NO	DESCRIPTION
1-5 INCL	WIRE, TINNED COPPER 020 DIA
15-18 INCL	SLEEVING 022 ID
25-26	SLEEVING 034 ID

Z1107

NOTES

1 CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS

2 SYMBOL NUMBERS REFER TO LIST OF PARTS

3 NUMBERS IN WIRES REFER TO WIRE TABLE.

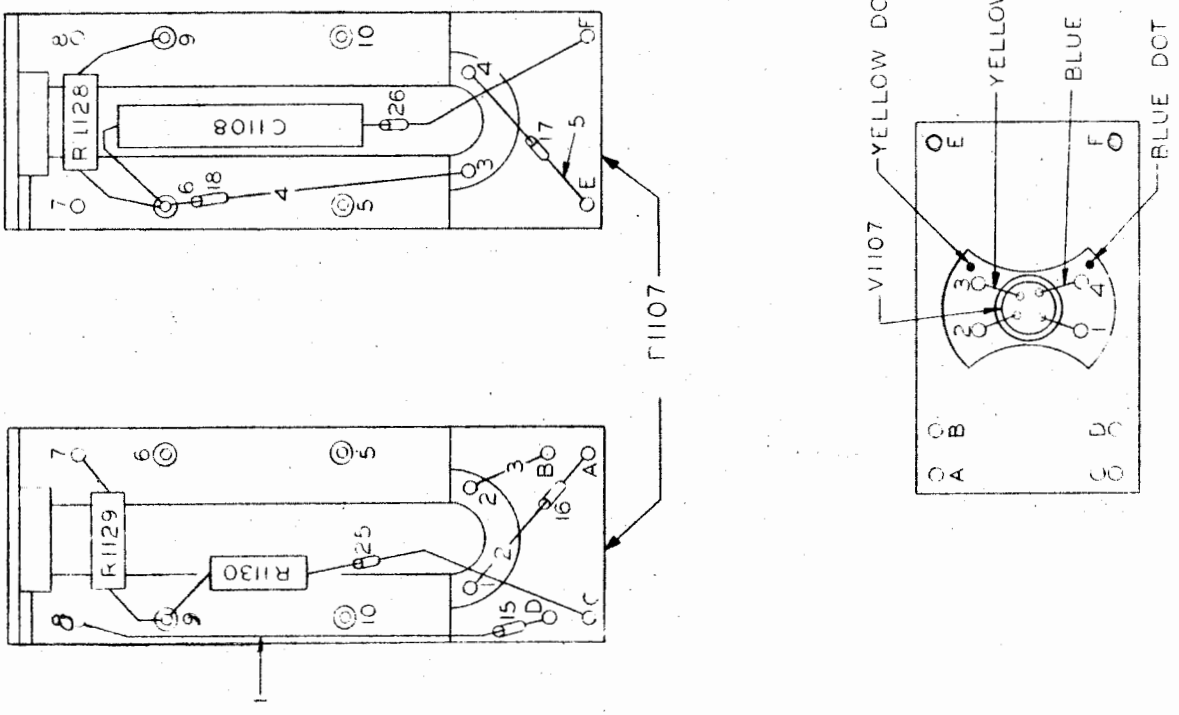


Figure 7-65. A-F Plug-in Unit, Z1107

WIRE TABLE	
WIRE NO.	DESCRIPTION
1-8 INCL	WIRE-TINNED COPPER .020 DIA
15-20 INCL	SLEEVING .022 I.D.
30-39 INCL	SLEEVING .034 I.D.

Z1108

NOTES:
1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SYMBOL NUMBERS REFER TO LIST OF PARTS
3. NUMBERS IN WIRES REFER TO WIRE TABLE.

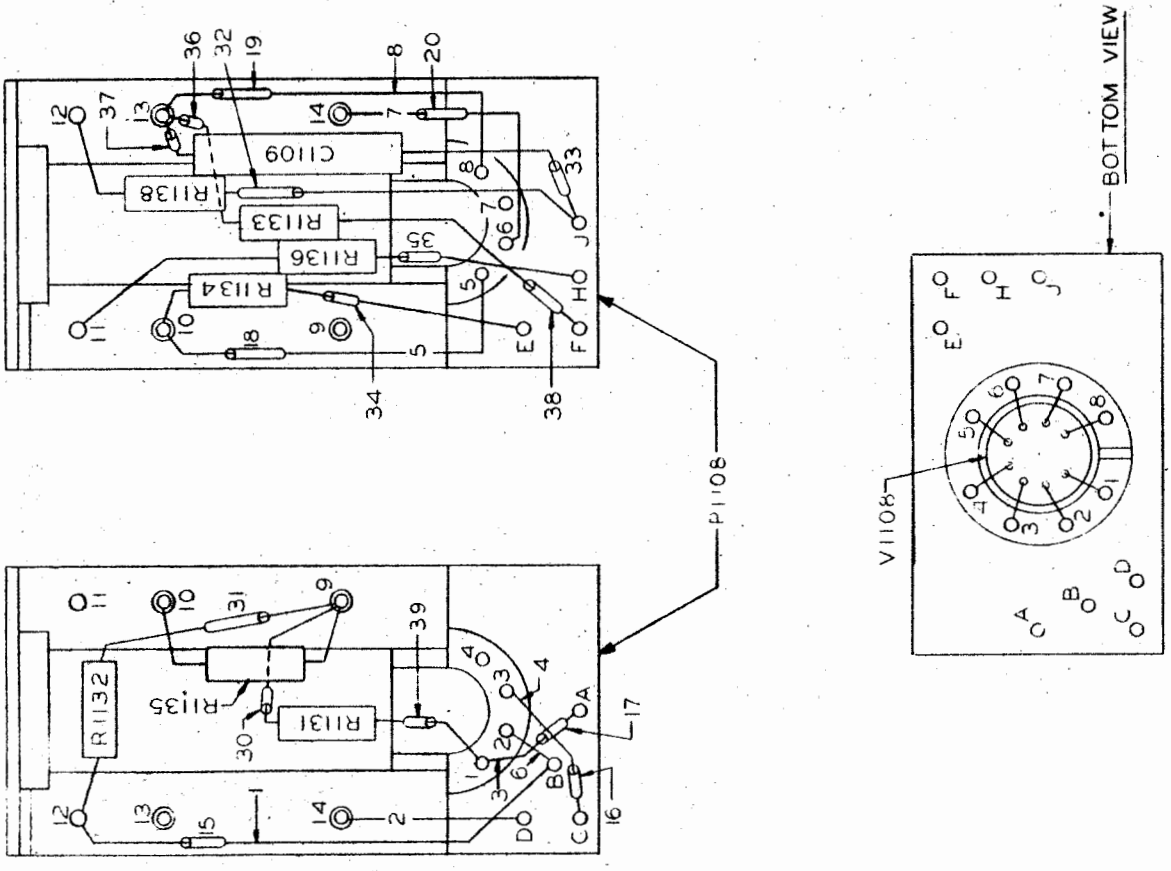


Figure 7-66. A-F Plug-in Unit, Z1108

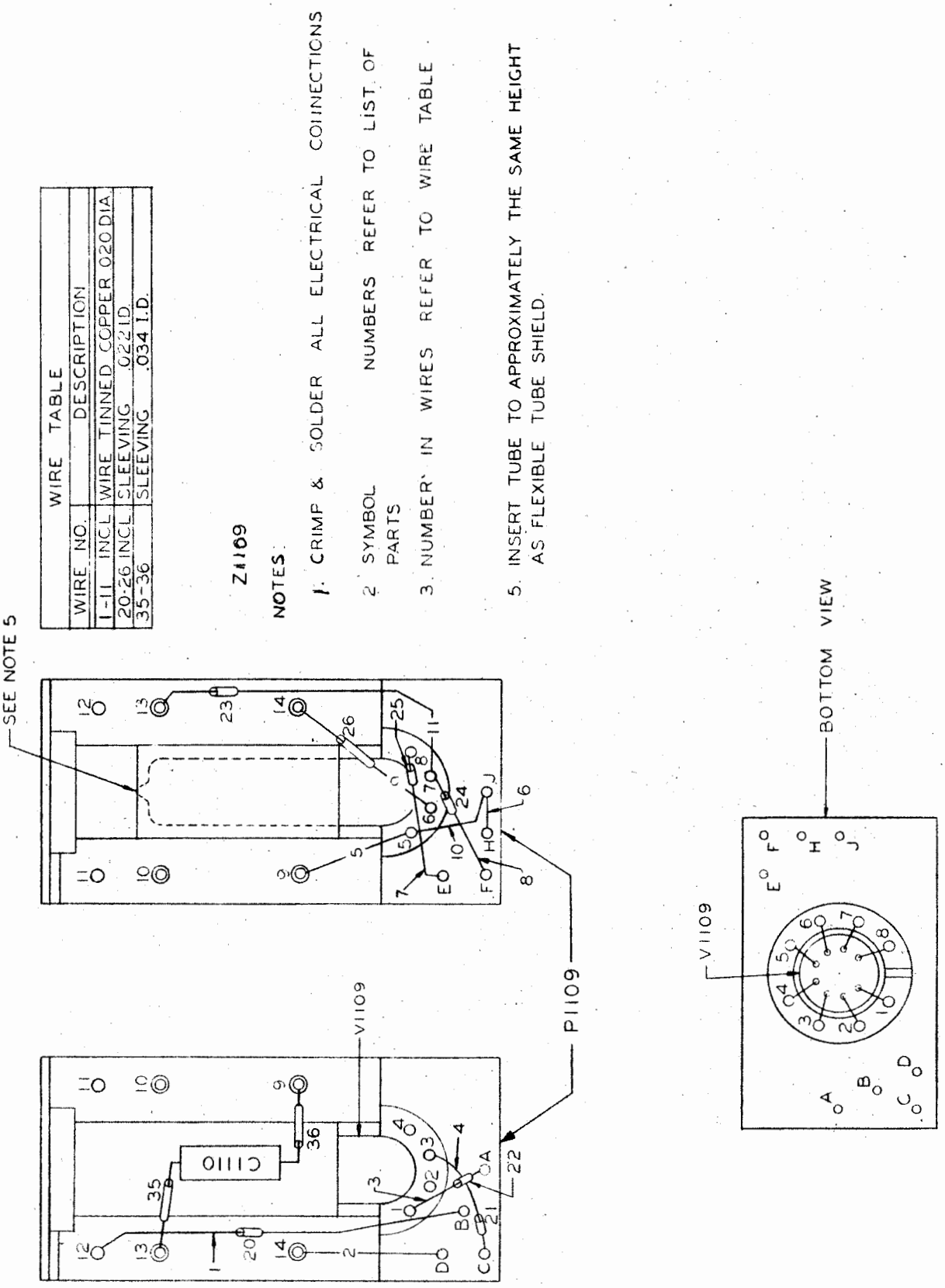


Figure 7-67. A-F Plug-in Unit, Z1109

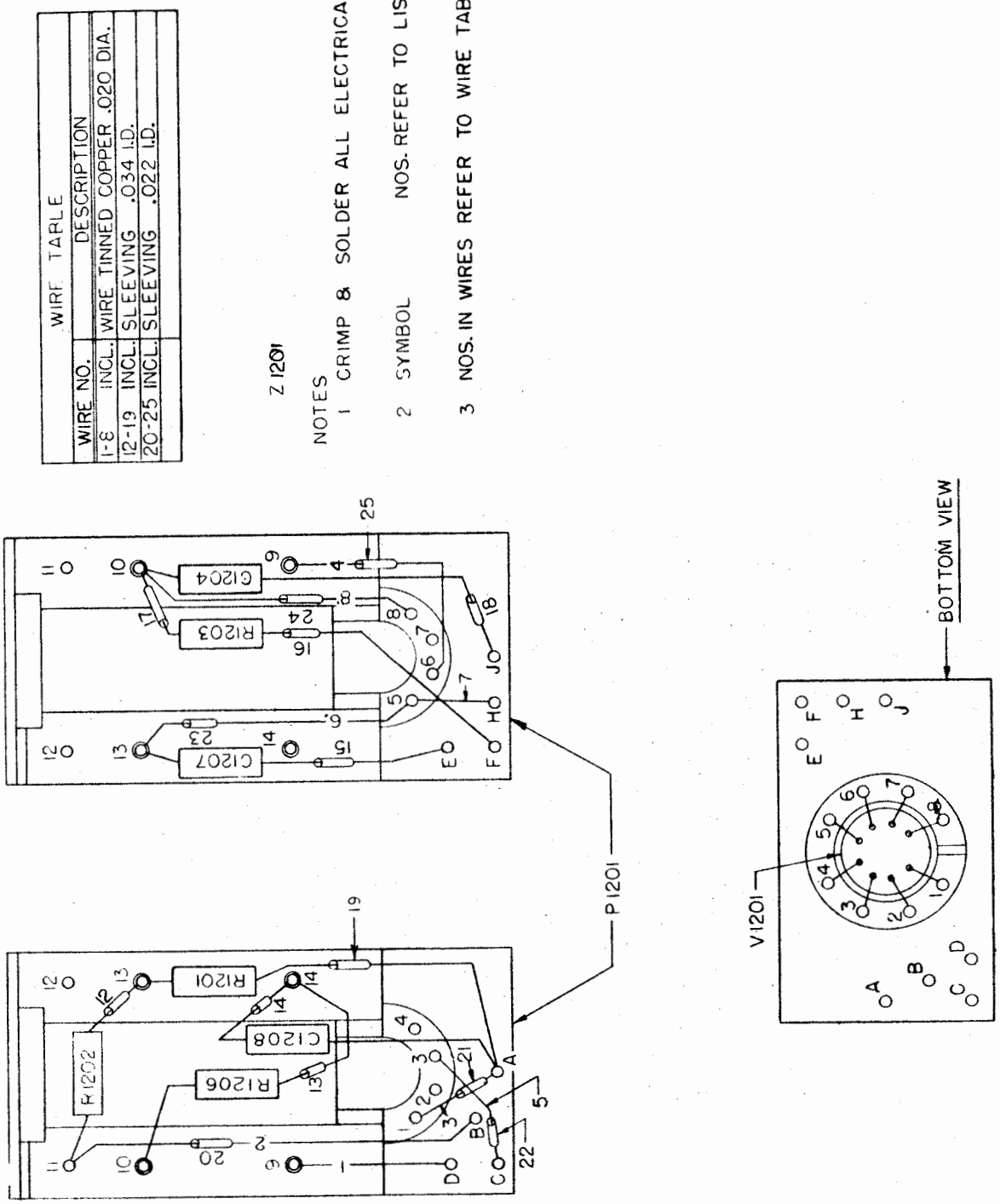


Figure 7-68. Crystal Calibrator Plug-in Unit, Z1201

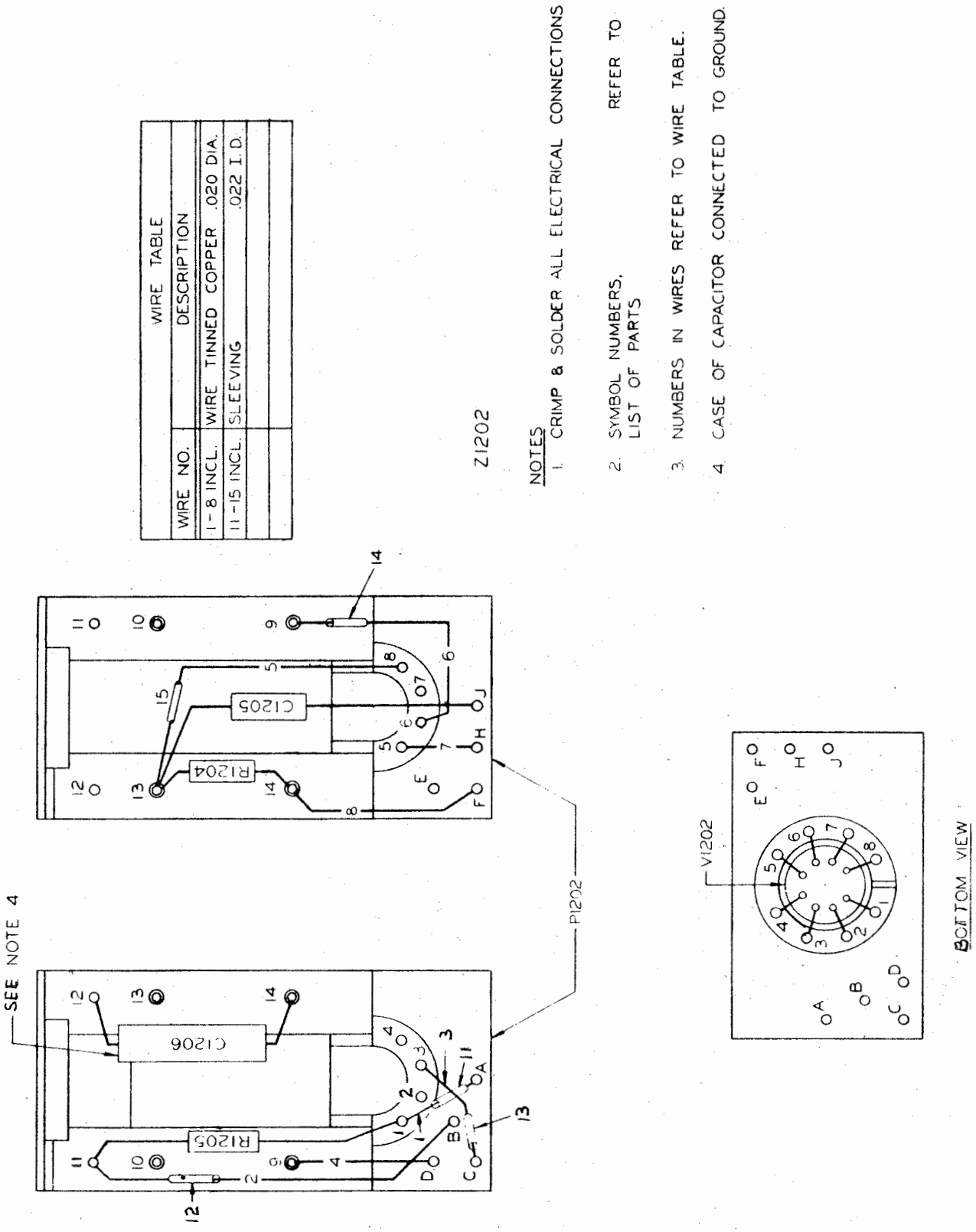


Figure 7-69. Crystal Calibrator Plug-in Unit, Z1202

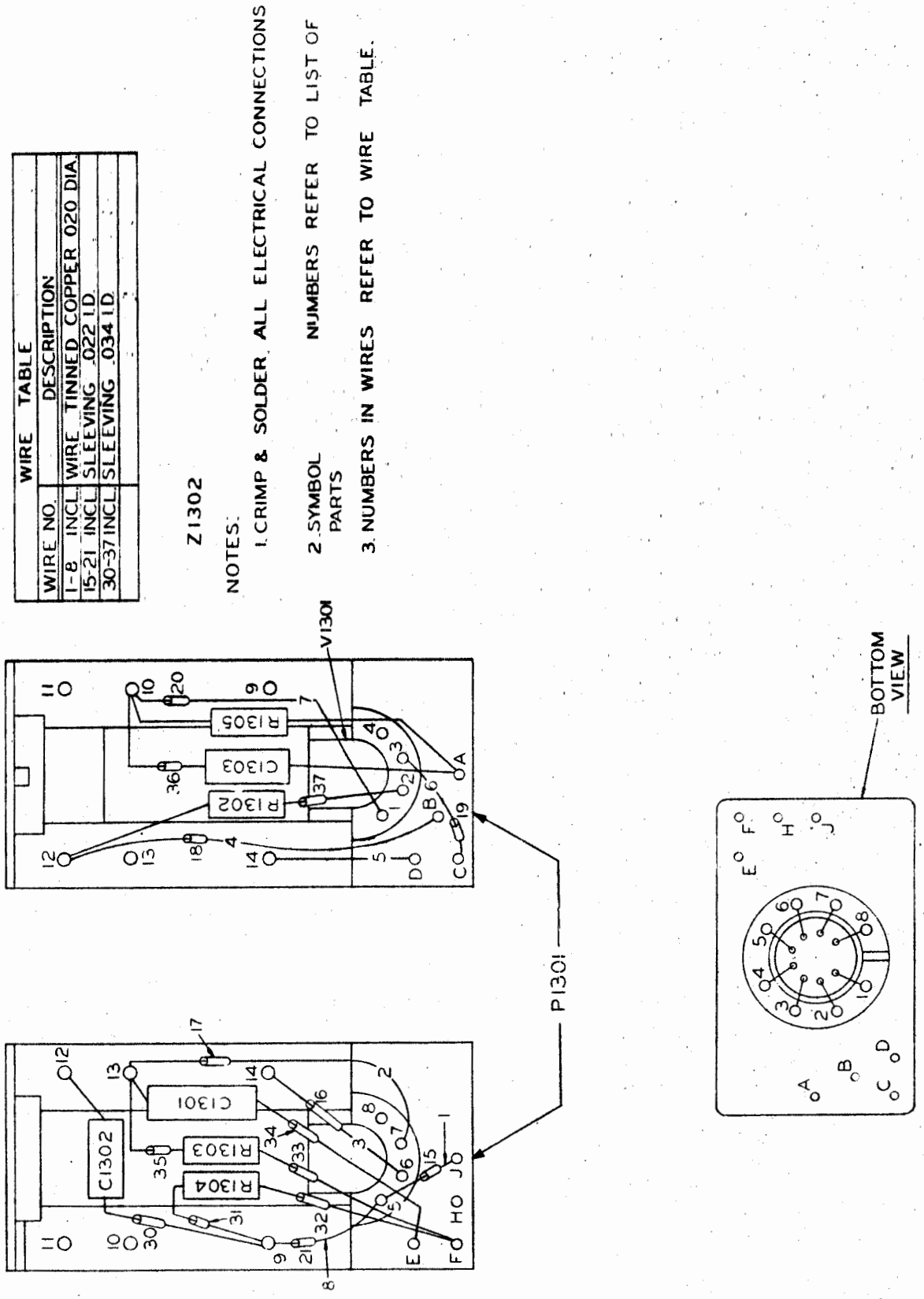
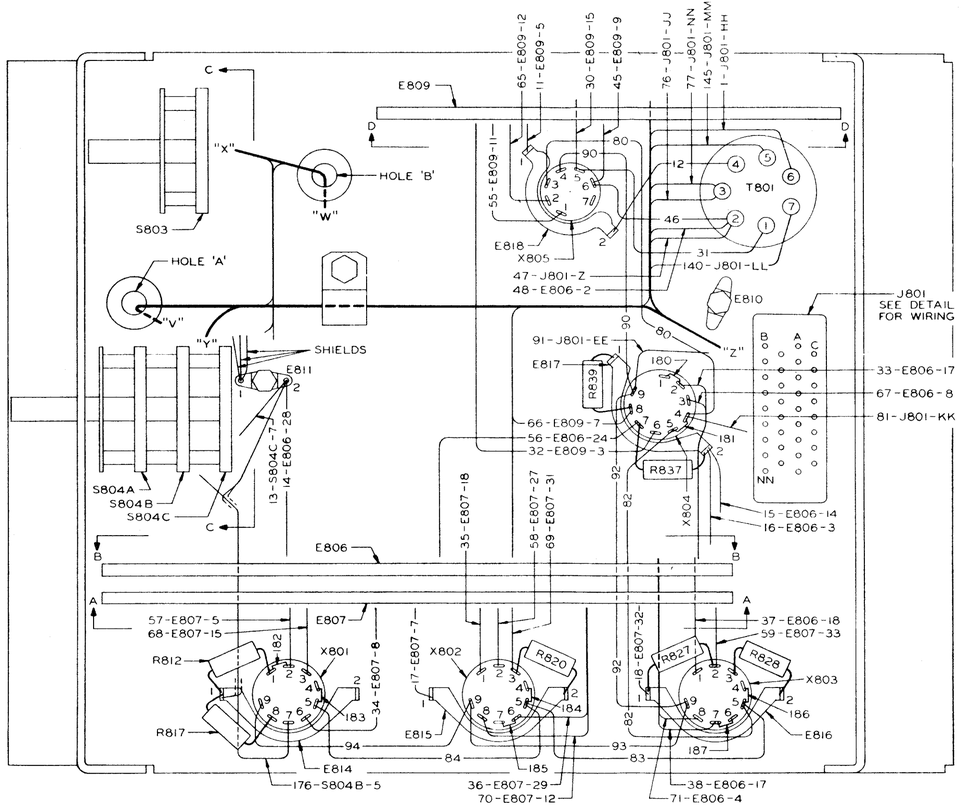
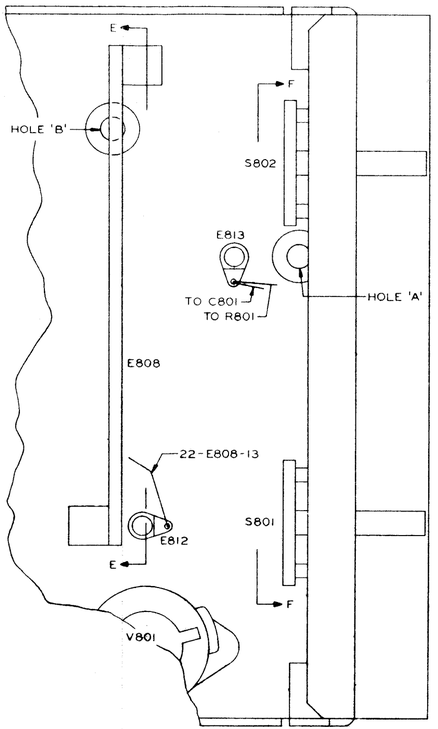


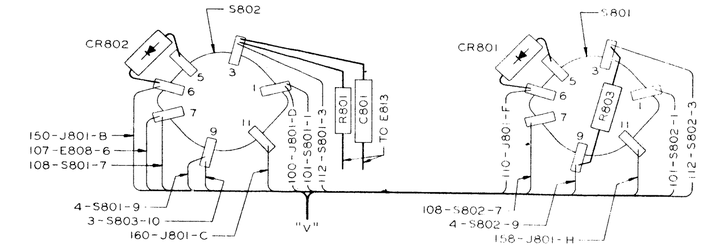
Figure 7-70. Beat Frequency Oscillator Plug-in Unit, Z1302



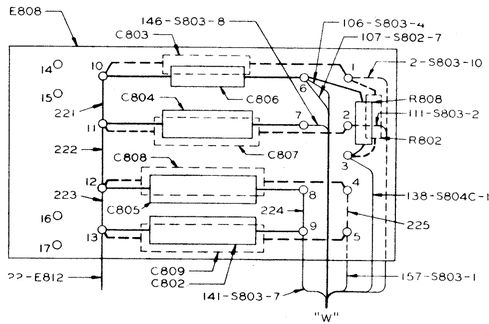
BOTTOM VIEW



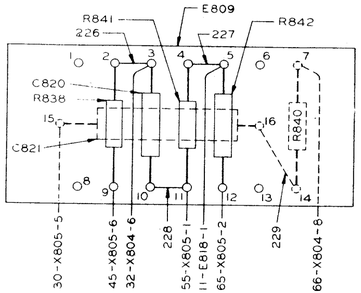
PARTIAL TOP VIEW



VIEW AT "F-F" ROTATED 90° CCW

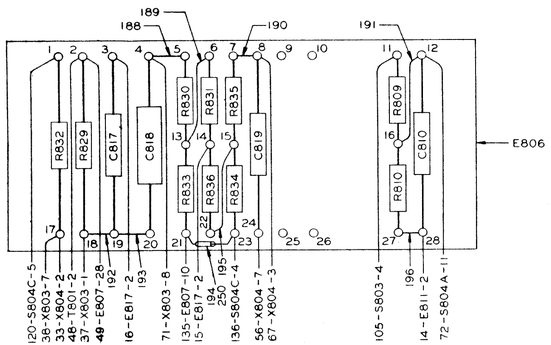


VIEW AT "E-E" ROTATED 90° CW

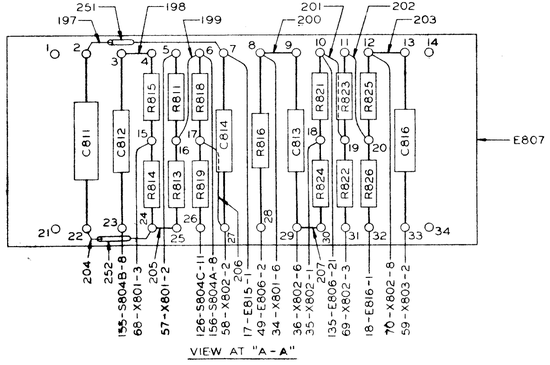


VIEW AT "D-D"

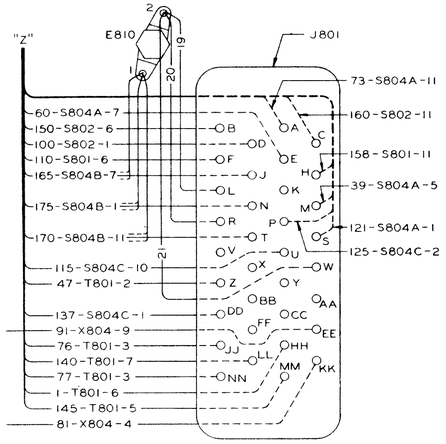
Figure 7-71. Comparator Sub Unit, Connection Diagram (Sheet 1)



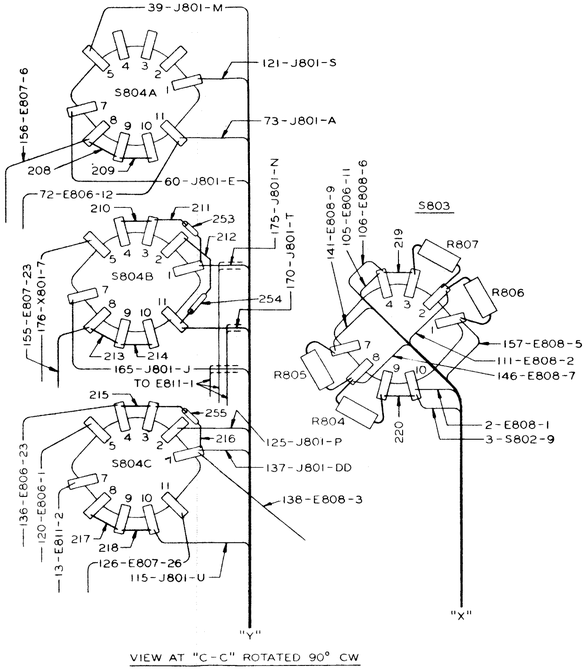
VIEW AT "B-B" ROTATED 180°



VIEW AT "A-A"



DETAIL OF WIRING AT J801



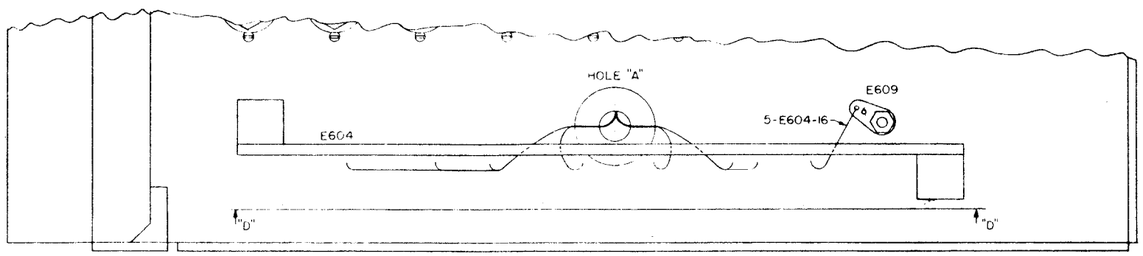
VIEW AT "C-C" ROTATED 90° CW

WIRE TABLE	
WIRE NO.	DESCRIPTION
1 - 4 INCL.	WIRE WHITE
11 - 22	BLACK
30 - 39	BLUE
45 - 49	RED
55 - 60	GREEN
65 - 73 INCL.	YELLOW
76 - 77	ORANGE
80 - 84 INCL.	BROWN
90 - 94 INCL.	BROWN-YELLOW TR.
100-101	BROWN-GREEN TR.
105-108 INCL.	GREEN-BLACK TR.
110-112 INCL.	GREEN-BROWN TR.
115	RED-BLACK TR.
120-121	RED-BLUE TR.
125-126	RED-BROWN TR.
135-138 INCL.	RED-ORANGE TR.
140-141	WHITE-BLACK TR.
145-146	WHITE-BROWN TR.
150	WHITE-RED TR.
155-158 INCL.	YELLOW-GREEN TR.
160	YELLOW-BROWN TR.
165	SHIELDED WHITE
170	SHIELDED YELLOW
175-176	SHIELDED GREEN
180-229 INCL.	WIRE TINNED COPPER .032 DIA.
250-255 INCL.	SLEEVING .034 I.D.

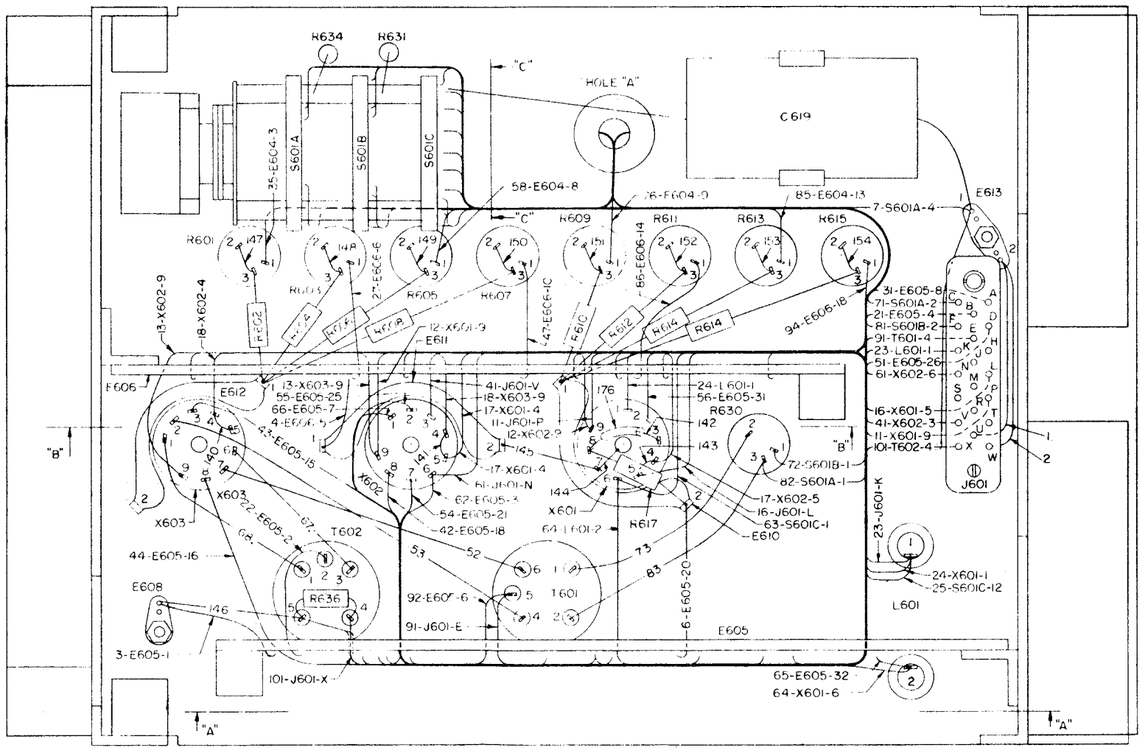
NOTES

1. CRIMP AND SOLDER ALL ELECTRICAL CONNECTIONS
2. SCHEMATIC SYMBOL NUMBERS REFER TO LIST OF PARTS
3. CABLE AND LACE WIRES AS INDICATED USING LACING CORD.
4. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 38-X803-7, 38=WIRE NUMBER, X803=SOCKET X803, AND 7=TERMINAL 7 OF X803 AS INDICATED ON THIS DRAWING.

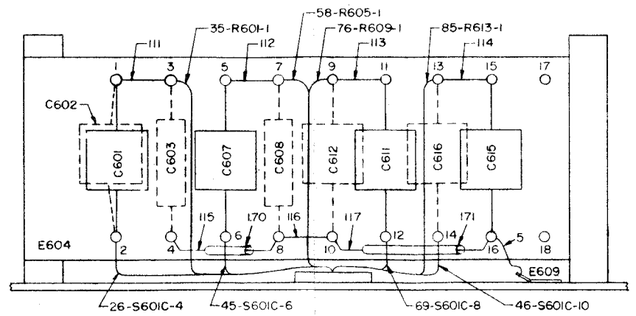
Figure 7-71. Comparator Sub Unit, Connection Diagram (Sheet 2)



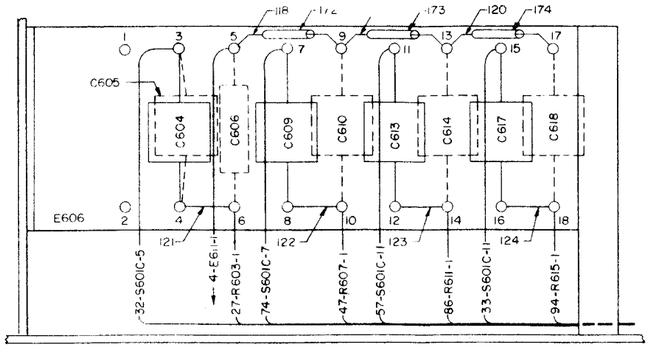
PARTIAL TOP VIEW



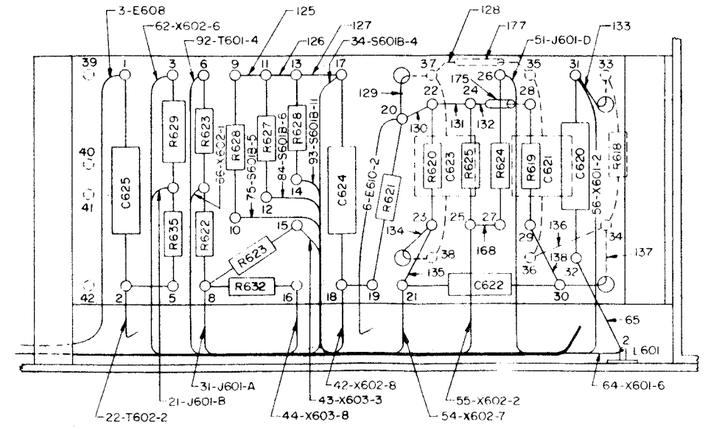
BOTTOM VIEW



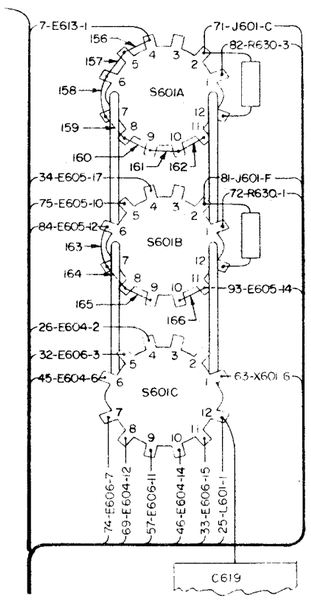
VIEW AT



VIEW AT "B-B"



VIEW AT "A-A"



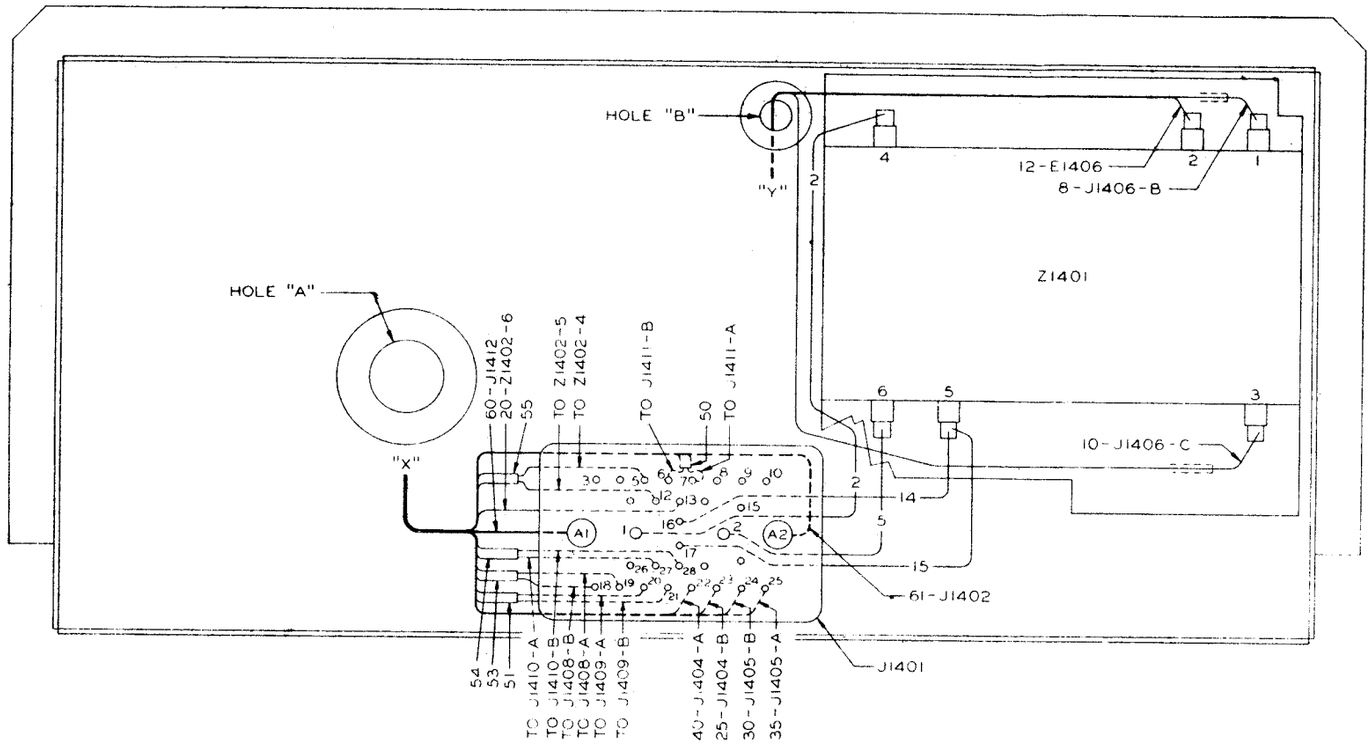
VIEW AT "C-C"

NOTES

1- CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS.
2- CABLE & LACE WIRES AS SHOWN, USING LACING CORD.
3- SYMBOL NOS. REFER TO LIST OF PARTS.
4- NOS. IN WIRES REFER TO WIRE TABLE, CODING AT ENDS OF WIRES INDICATES WIRE NO. & DESTINATION OF WIRE, THUS:- 25-L601-1, 25= WIRE NO., L601= ITEM L601 & 1= TERMINAL NO. 1 OF L601 AS INDICATED ON THIS DWG.

WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 6	WIRE, BLK.
11 TO 13	BRN.
16 TO 18	BRN./YEL. TR.
21 TO 27	RED
31 TO 35	RED/ORN. TR.
41 TO 47	YEL.
51 TO 58	GRN.
61 TO 69	BLUE
71 TO 76	PUR.
81 TO 86	GRAY
91 TO 94	WHT.
101	WHT., SHIELDED
111 TO 168	WIRE, TINNED COPPER .032 DIA.
170 TO 177	SLEEVING .034 I.D.

Figure 7-72. Tone Keyer Sub Unit, Connection Diagram



WIRE TABLE	
WIRE NO.	DESCRIPTION
2	WIRE GRAY
5	GRAY-BROWN TR.
8	SHIELDED GRAY
10	SHIELDED GRAY-BROWN TR.
12-15 INCL.	BLACK
20-21	WHITE
25	YELLOW-GREEN TR.
30	YELLOW-BROWN TR.
35	SHIELDED WHITE-BRN. TR.
40	WIRE SHIELDED GREEN-YEL. TR.
50-55 INCL.	CABLE COAXIAL
60-61	CABLE COAXIAL
70-71	WIRE TINNED COPPER .032 DIA.

— NOTES —

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 12-Z1401-2, 12= WIRE NUMBER, Z1401= FILTER Z1401, 2= TERMINAL 2 OF Z1401 AS INDICATED ON THIS DRAWING.
3. SCHEMATIC SYMBOL NUMBERS REFER TO LIST OF PARTS
4. CABLE AND LACE WIRES AS INDICATED USING LACING CORD.

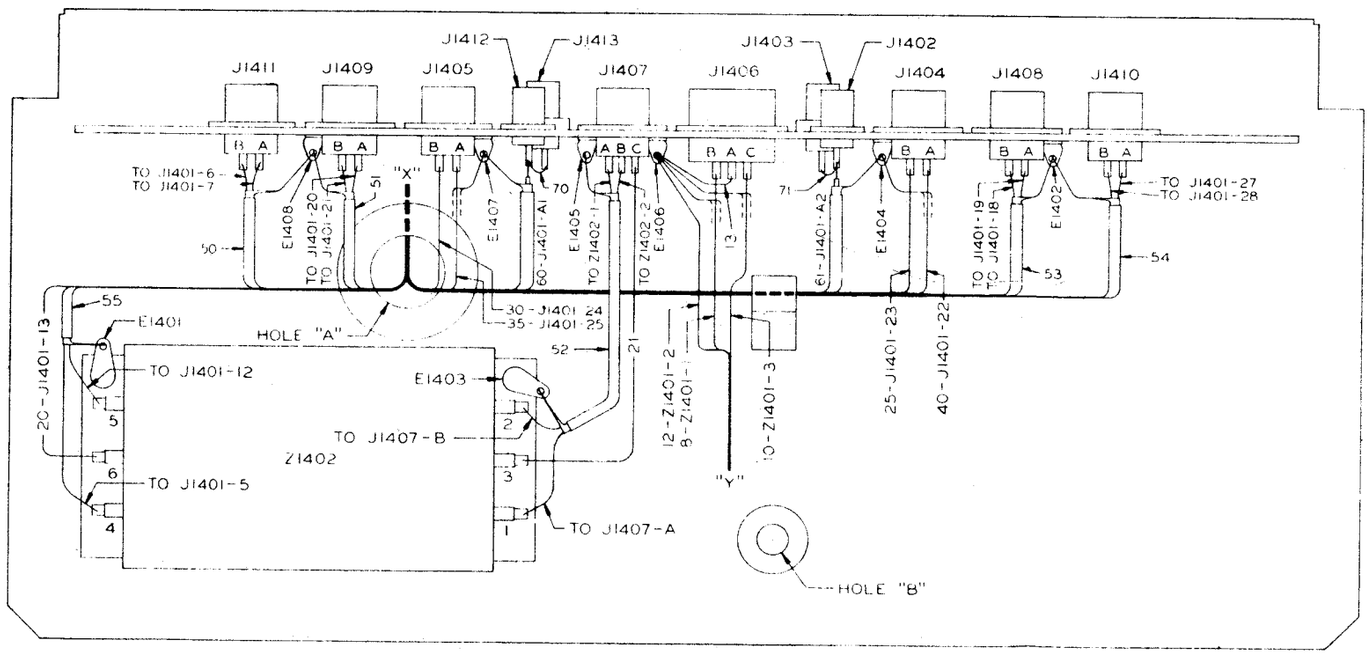
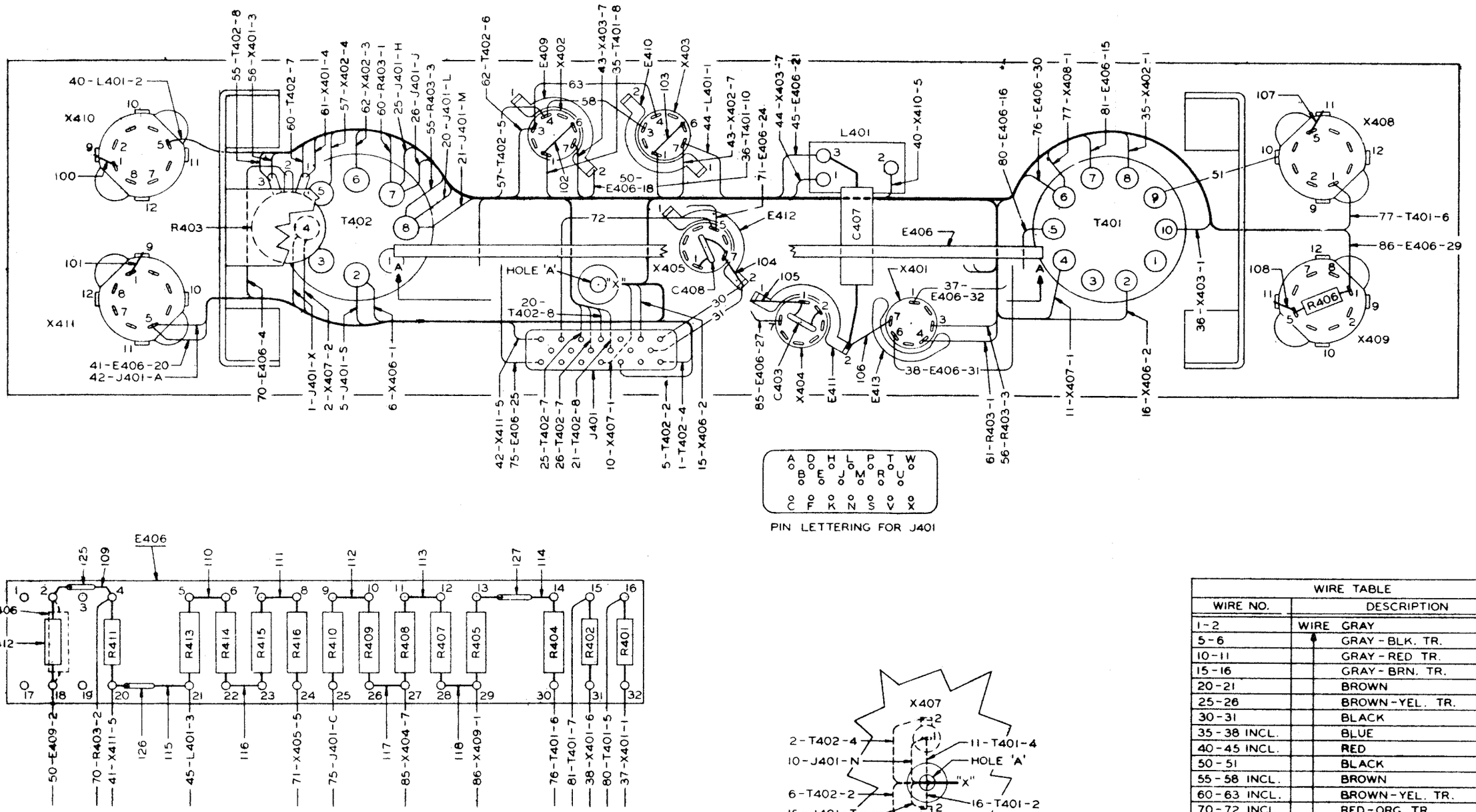
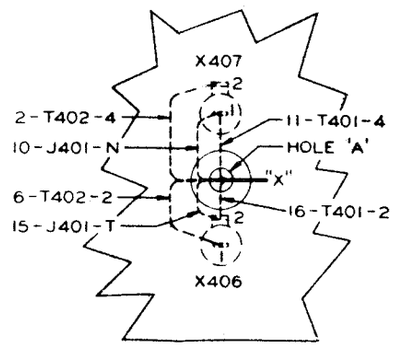


Figure 7-73. Comparator Keyer Filter Assembly, Connection Diagram



PIN LETTERING FOR J401

VIEW AT "A-A"



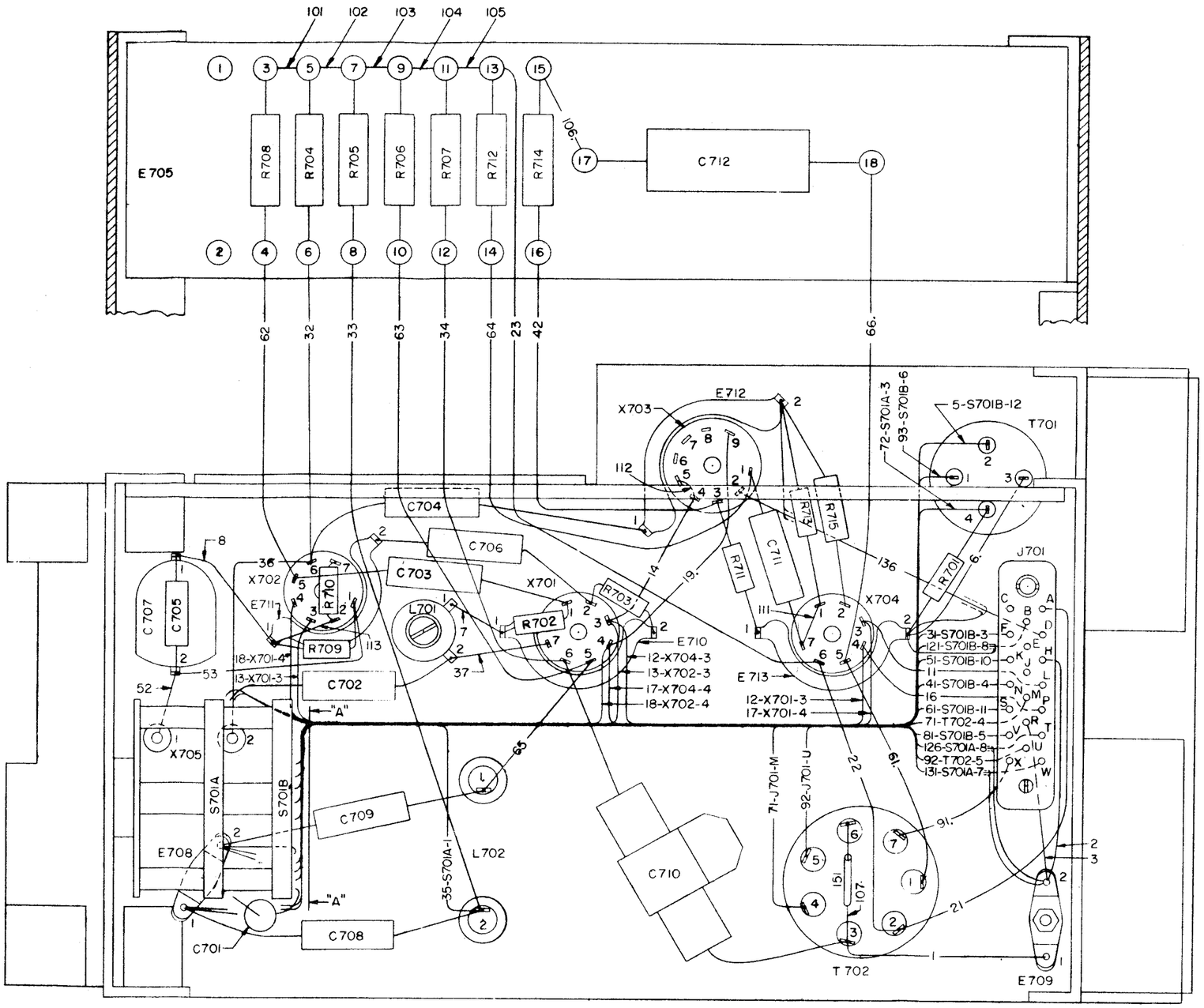
WIRING DETAIL OF SOCKETS
X406 & X407

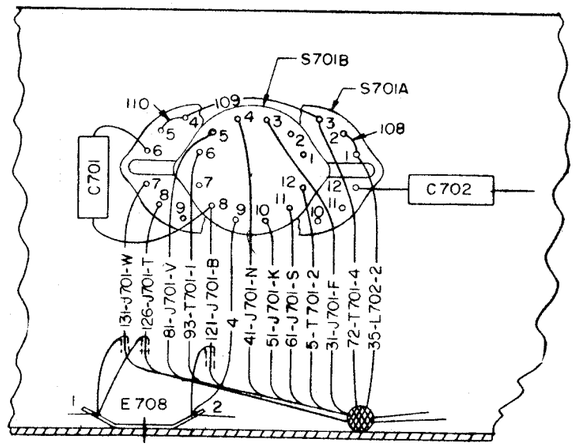
WIRE TABLE	
WIRE NO.	DESCRIPTION
1-2	WIRE GRAY
5-6	GRAY-BLK. TR.
10-11	GRAY-RED TR.
15-16	GRAY-BRN. TR.
20-21	BROWN
25-26	BROWN-YEL. TR.
30-31	BLACK
35-38 INCL.	BLUE
40-45 INCL.	RED
50-51	BLACK
55-58 INCL.	BROWN
60-63 INCL.	BROWN-YEL. TR.
70-72 INCL.	RED-ORG. TR.
75-77 INCL.	WHITE
80-81	WHITE-BLUE TR.
85-86	WHITE-YEL. TR.
110-118 INCL.	WIRE TINNED COPPER .032 DIA.
125-127 INCL.	SLEEVING .034 I.D.

NOTES

1. CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2. SCHEMATIC SYMBOL NUMBERS REFER TO LIST OF PARTS
3. TIE CABLES USING LACING CORD, WHERE NECESSARY
4. NUMBERS IN WIRES REFER TO WIRE TABLE CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE THUS; 62-X402-3, 62 = WIRE NUMBER, X402 = SOCKET X402. AND 3 = TERMINAL 3 OF X402 AS INDICATED ON THIS DRAWING.

Figure 7-74. Comparator Keyer Power Sub Unit, Connection Diagram





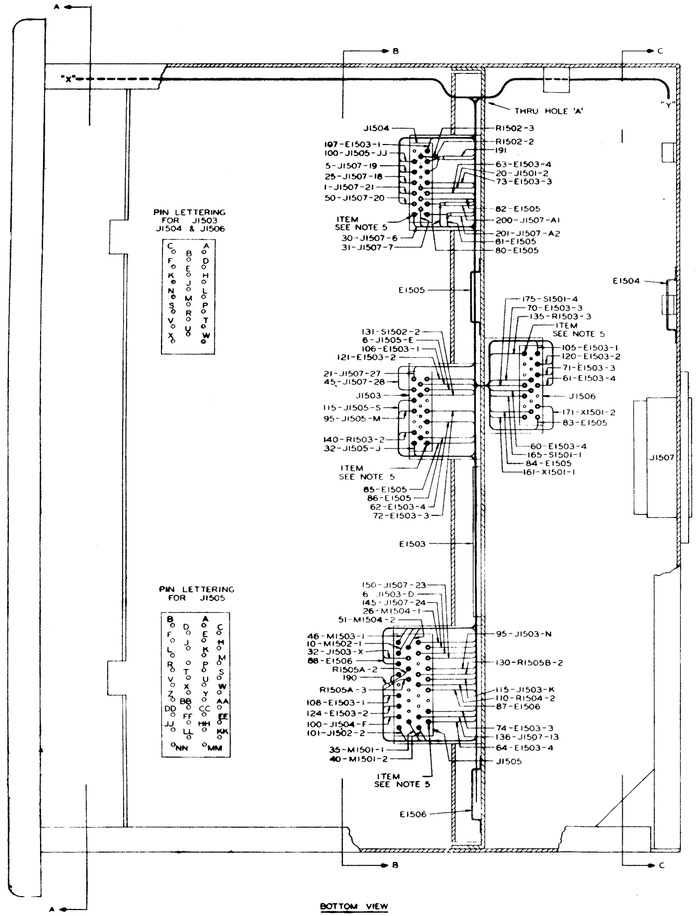
VIEW AT "A-A"

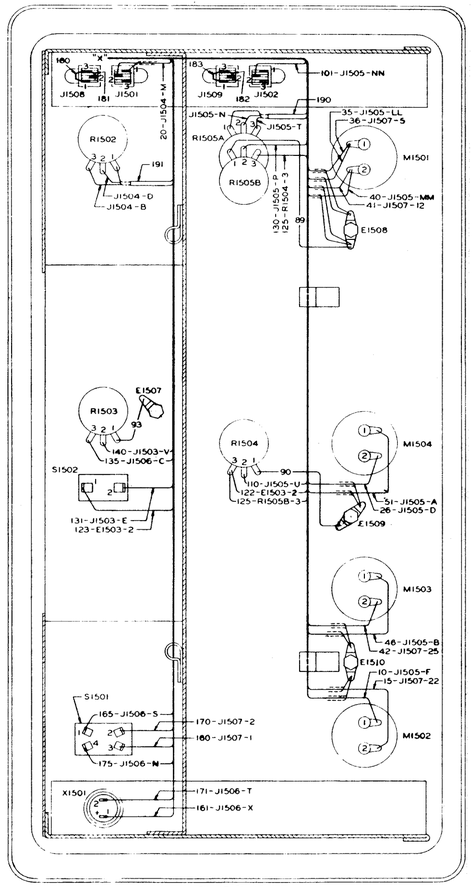
WIRE TABLE	
WIRE NO.	DESCRIPTION
1 TO 8	WIRE, BLK.
11 TO 14	BRN-YEL. TR.
16 TO 19	BRN.
21 TO 23	RED
31 TO 37	ORN.
41-42	YEL.
51 TO 53	GRN.
61 TO 66	BLUE
71-72	PUR.
81	GRAY
91 TO 93	WHT.
101 TO 113	TINNED COPPER .032 DIA.
121	WHT. SHIELDED
126	RED
131	BLUE
136	WIRE, GRN. SHIELDED
151	SLEEVING .034 I.D.

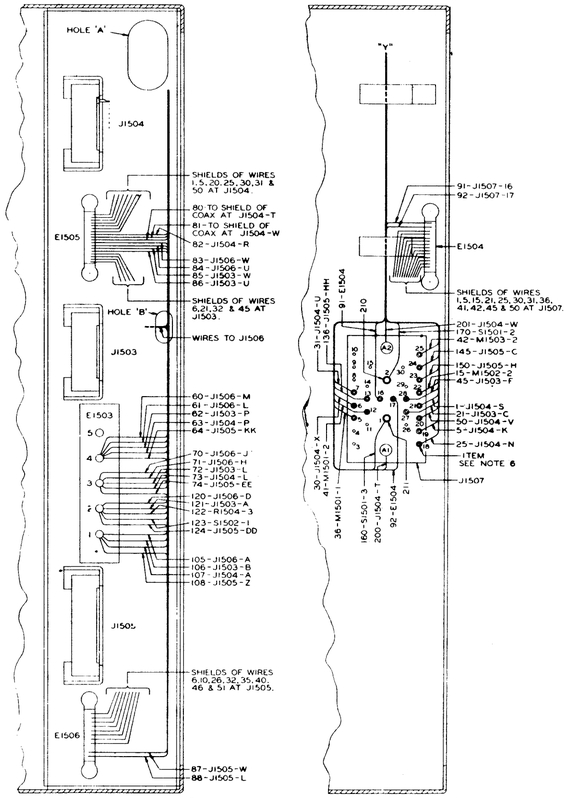
NOTES

1 - CRIMP & SOLDER ALL ELECTRICAL CONNECTIONS
2 - CABLE & LACE WIRES AS SHOWN, USING LACING CORD
3 - SYMBOL NOS REFER TO LIST OF PARTS
4 - NOS IN WIRES REFER TO WIRE TABLE, CODING AT ENDS OF WIRES INDICATES WIRE NO & DESTINATION OF WIRE, THUS 12-X701-3, 12=WIRE NO., X701= ITEM X701 & 3=TERMINAL NO.3 OF X701 AS INDICATED ON THIS DWG.

Figure 7-75. Comparator Keyer Monitor Sub Unit, Connection Diagram







WIRE TABLE	
WIRE NO.	DESCRIPTION
1	WIRE, SHIELDED, BLUE
5-6	GREEN
10	GRN.-BLK. TR.
15	GRN.-YEL. TR.
20-21	PURPLE
25-26	YELLOW
30-32 INCL.	WHITE
35-36	WHT.-BLK. TR.
40-42 INCL.	WHT.-BRN. TR.
45-46	WHT.-RED TR.
50-51	SHIELDED, BRN.-GRN. TR.
60-64 INCL.	BROWN
70-74 INCL.	BROWN-YEL. TR.
80-93 INCL.	BLACK
95	BLUE
100-101	ORANGE
105-108 INCL.	RED
110	RED-BLK. TR.
115	RED-BLUE TR.
120-125 INCL.	RED-ORANGE TR.
130-131	RED-BRN. TR.
135-136	WHITE
140	YELLOW
145	YEL.-BRN. TR.
150	YEL.-GRN. TR.
160-161	GRAY
165	GRAY-BLK. TR.
170-171	GRAY-BRN. TR.
175	GRAY-RED TR.
180-183 INCL.	WIRE, TINNED COPPER, .032 DIA.
190-191	CABLE, COAXIAL
200-201	CABLE, COAXIAL
210-211	TUBING, BLACK, .133 I.D.

NOTES

1. CRIMP AND SOLDER ALL ELECTRICAL CONNECTIONS USING SOLDER.
2. NUMBERS IN WIRES REFER TO WIRE TABLE. CODING AT ENDS OF WIRES INDICATES WIRE NUMBER AND DESTINATION OF WIRE. THUS: 72-E1503-3, 72=WIRE NUMBER, E1503=ITEM E1503, 3=TERMINAL 3 OF E1503 AS INDICATED ON THIS DRAWING.
3. SCHEMATIC SYMBOL NUMBERS REFER TO LIST OF PARTS.
4. CABLE & LACE WIRES AS INDICATED USING LACING CORD.
5. ASSEMBLE TUBING OVER ENDS OF WIRES AND TERMINALS AT J1503, J1504, J1505 & J1506.
6. WITH EXCEPTIONS AS INDICATED, ASSEMBLE BING OVER ENDS OF WIRES AND TERMINALS AT J1507.

Figure 7-76. Comparator Keyer, Main Frame, Connection Diagram

TABLE 8-1. WEIGHTS AND DIMENSIONS OF SPARE PARTS BOXES

EQUIPMENT SPARES						TENDER SPARES	STOCK SPARES
SPARE PARTS BOX	OVERALL DIMENSIONS IN.			VOLUME (cu ft)	WEIGHT (lb)		
	HEIGHT	WIDTH	DEPTH				
	18	12	12	1.5	55	None supplied	None supplied
	18	12	12	1.5	55		

TABLE 8-2. SHIPPING WEIGHTS AND DIMENSIONS OF SPARE PARTS BOXES

EQUIPMENT SPARES							TENDER SPARES	STOCK SPARES
SHIPPING BOX NO.	SPARE PARTS BOX NO.	OVERALL DIMENSIONS IN.			VOLUME (cu ft)	WEIGHT (lb)		
		HEIGHT	WIDTH	DEPTH				
6		34	28	23	12.7	140	None supplied	None supplied

TABLE 8-3. LIST OF MAJOR UNITS

SYMBOL GROUP	QUANTITY	NAME OF MAJOR UNIT	NAVY TYPE DESIGNATION
100-399	1	Oscillator, Radio Frequency	O-330/FRR-32
400-499, 600-899, 1400-1599	1	Comparator-Keyer	CM-70/FRR-32
500-599, 900-1399 1600-1699, 2200-2299, 3100-3199, 3800-3899, 4000-4099, 4400-4499	2	Receiving Set, Radio	R-618/FRR-32
1700-1799	1	Loudspeaker, Dynamic	LS-169/G
1800-1899	1	Switchboard, Patching, Communication	SB-431/FRR-32
1900-1999	1	Cabinet	CY-597A/G

TABLE 8-4. TABLE OF REPLACEABLE PARTS

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
	W/Spares F16-Q112130-200 W/o Spares F16-Q112130-100	RECEIVING SET, RADIO: (AN/FRR-32) A1, A2, A3, and FSK reception; 2 to 35 mc, 5 bands; 105, 115, or 125 v AC, 50 to 60 cycles per second, single phase, 85 W nominal; optical projection tuning scale calibrated in tenths from 2 to 35 mc in 5 bands located on both R-618/FRR-32's; 1 tuning scale calibrated in cycles per second located on the O-330/FRR-32; the R-618/FRR-32 has 1 tuning meter and 1 output meter located on front panel; the CM-70/FRR-32 has a total of four meters labled "AF LINE CURRENT", "RECEIVER 1", "RECEIVER 2", and "COMBINED"; the O-330/FRR-32 has 1 milliampere meter located on front panel to check oscillator output; the individual units are side rack mounted within Navy std 19 cabinet CY-597A/G; 87-9/16 in. lg by 22-3/8 in. wide by 24 in. deep overall; 87 electron tubes; double superheterodyne circuit; built-in beat frequency oscillator; c/o 2 AN Receiver, Radio Sets R-618/FRR-32, 1 AN Comparator-Keyer CM-70/FRR-32, 1 AN Loudspeaker, dynamic LS-169/G, 1 AN Oscillator, Radio Frequency O-330/FRR-32, 1 AN Switchboard, Patching, Communication SB-431/FRR-32, 1 AN Cabinet CY-597A/G for communication; RCA part/dwg C-753335-1	
100-399		OSCILLATOR, RADIO FREQUENCY: (O-330/FRR-32); frequency: 2 to 64 mc range; 3 channels, 2 to 64 mc variable high frequency oscillator; 450 to 457 kc beat frequency oscillator; 3.5 mc intermediate frequency oscillator; 2 W output for 2 to 4 mc range and 0.5 W power output for 4 to 6 mc range of high frequency oscillator; 6 v across 1000 ohms for beat frequency oscillator, 2 volts across 75 ohms for intermediate frequency oscillator; Colpetts circuit for variable high frequency oscillator; Pierce circuit for beat frequency oscillator; Pierce circuit for intermediate frequency oscillator; beat frequency oscillator crystal controlled; intermediate frequency oscillator crystal controlled; 110 or 220 v AC, 50 to 60 cycles, single phase, 100 W; integral power supply; integral coils; 19 in. lg by 16 in. wide by 1-1/2 in. high overall; eight 1/4 in. wide mounting slots arranged in 4 groups; 2 pair on left-hand edge and 2 pair on right-hand edge; rack mounted; high frequency oscillator calibration by means of 100 kc crystal oscillator; Technical Materiel Corp. Model VOX; RCA part/dwg B-474151-1	
400-499 600-899 1400-1599		COMPARATOR, KEYER: (CM-70/FRR-32); 150 to 5000 cycles frequency range; meter indicator and loudspeaker; external controls c/o reception switch w/A1, A2, A3, FSK positions; receiver 1, switch w/diversity and tune positions; receiver 2, switch w/diversity and tune positions, silencer control, AF line level control, monitor function switch w/IF Receiver 1, IF Receiver 2, AF diversity, AF Receiver 1, AF Receiver 2 positions, monitor level control, power On-Off switch, AGC time constant switch w/slow, medium and fast position keyer switch w/calibrate and key positions, keyer threshold control, keyer frequency switch w/595 cycles, 765 cycles, 935 cycles, 1105 cycles, 1275 cycles, 1445 cycles, 1615 cycles, 1785 cycles and external source positions; 105 v, 115 v, 125 v AC, 50 to 60 cycles per second, single phase 85 W; impedance, inputs: 50 ohms receiver 1 IF, 50 ohms receiver 2 IF, high impedance receiver 1 detector and AGC, high impedance receiver 2 detector and AGC, 600 ohms receiver 1 audio, 600 ohms receiver 2 audio, 600 ohms external tone; outputs: balanced 600 ohms AF line, 600 ohms to speaker; aluminum case; light Navy gray enamel finish on case; 19 in. lg by 18-3/16 in. wide by 8-23/32 in. high overall; eight 1/4 in. wide slots arranged in 4 pairs, 2 pair along left-hand edge and 2 pair along right-hand edge; relay rack mounting; accessories c/o interconnecting cable; combines detector outputs of two receivers of a diversity receiver system; provides tone modulation for CW reception, a BFO for two receivers and facilities for monitoring AF anf IF outputs of the receivers; provides outputs for headphones, loudspeaker, and external line; RCA part/dwg B-474148-1	
500-599 900-1399 1600-1699 2200-2299 3100-3199 3800-3899 4000-3099 4400-4499		RECEIVING SET, RADIO: (R-618/FRR-32); AM A1, A2, A3 and FSK; for communication; 2 mc to 35 mc in 5 bands; input 105, 115, 125 v; 50, 60, 400 cycle, 85 W nominal; mounted in aluminum cabinet; cabinet has 1 mounting bracket on ea side, ea bracket has 4 mounting slots 1/4 in. wide by 35/64 in. lg spaced 1-3/4 in, 2-1/4 in. 1-3/4 in. C to C; 18-7/16 in. lg by 19 in. wide by 8-23/32 in. high when closed, 34 in. lg approx when receiver is extended from cabinet; 28 tube double superheterodyne circuit; incl 8 connector plugs for external connections; 8 receptacles on back marked "IF", "PAN", "EXT. OSC", "ANT", "POWER", "AUDIO" "AUDIO", "DET" "AGC"; receiver may be extended from case and tilted to a vertical position on internal sliding rails; 2 locking type handles on front; may be rack or base mounted; incl BFO internal crystal calibrator, 3 degrees of RF and 3 deg of audio selectivity; spec MIL-R-15132-A (Ships), plus amendment no. 4 dated July 27, 1953 Type 3, Class C	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
1701-1799	N17-L-91319-5825	LOUDSPEAKER, DYNAMIC: (LS-169/G); permanent magnetic field; 3 to 4 ohms voice coil impedance; input: less than 6 W normal 6 W peak; cone type; 6 in. dia cone; output transformer included; primary impedance 600 ohms; 19 in. lg by 8-23/32 in. high by 4-3/8 in. deep overall; eight 1/4 in. wide mounting slots, 4 on left-hand edge and 4 on right-hand edge; relay rack mounting; not horn type; no accessories; 600-ohm attenuator w/knob control; Shallcross Type 410-4B1; input connector AN-3102A-14S-2P; speaker matching transformer, UTC Type B-3616; RCA part/dwg B-474149-1	
1800-1899		SWITCHBOARD, PATCHING, COMMUNICATION: (SB-431/FRR-32); 1 section; 14 connecting positions; 14 receptacles; 4 patch cords and plugs; patch cord w/terminating connectors; aluminum panel; light gray enamel finish; 19 in. lg by 1-1/16 in. wide by 10-15/32 in. high overall; 8 elliptical mounting holes 1/4 in. high by 7/16 in. wide, 4 on left-hand side and 4 on right-hand side spaced 18-5/16 in. C to C horizontally and 5-3/4 in., 1-3/4 in., 1-1/4 in. C to C vertically; provides interconnection between local diversity receiving system and external audio lines; RCA part/dwg B-474150-1	
1900-1999	N16-C-10639-2872	CABINET: (CY-597A/G); housing for radio receiving equipment; cold rolled steel, one coat zinc chromate primer, two coats gray enamel; w/contents; contains 1 switch panel Navy Type SA-238/G, 1 portable lamp, 1 front filler panel; 7 ft 3-9/16 in. high, 24 in. deep, 22-3/8 in. wide; incl 1 plug-in strip assembly, 4 interior vertical panel holding angle strips, 1 three-point catch w/cup and drop handle on rear door; Navy Type CY-597A/G, BuShips Dwg RE23J250; RCA part/dwg B-474152-1	
A-101 thru A-400		Not Used	
A-401	Shop Manufacture	BRACKET: supports connector; blocked "C" shape; aluminum, irident, yellow iridescent finish; 1-7/8 in. lg by 3/4 in. wide by 27/32 in. high overall; mounts by three 0.159 in. dia holes w/1 spaced centrally 1/4 in. up from bottom edge w/ the other 2 located in either flange 11/16 in. from center hole and 9/16 in. up from bottom edge; has two no. 2 drill slots on inside of flange 5/8 in. up from bottom edge and 1-1/4 in. C to C; RCA part/dwg B-8869346-1	Mounts Connector J-401
A-402	Shop Manufacture	POST, SUPPORTING: assists in supporting terminal board; aluminum alloy, iridite, yellow iridescent finish; rectangular shape; 2-1/4 in. lg by 5/16 in. wide by 5/16 in. high overall; mounts by single no. 6-32 tap hole 3/8 in. deep in one end; has two no. 4-40 tap holes spaced 1-3/16 in. C to C for attaching terminal board; RCA part/dwg A-8869347-1	Mounts Terminal Board E-406
A-403	Low Failure item - if required requisition from ESO referencing NavShips 900,180A	MOUNTING, FUSEHOLDER: mounts fuseholders for F-401 and F-402; aluminum alloy, iridite, yellow iridescent finish; generally "U" shape w/ 2 flanges bent toward ea other; 2 in. lg by 1 in. wide by 2 in. high overall approx; mounts by 2 self-clinching fasteners through two 0.213 in. dia holes spaced 1-7/16 in. C to C located 1 in ea flange; marked w/ F-401 and F-402 in black letters; has two 0.500 in. dia holes w/ one side flatted to accommodate fuse-holders spaced 17/32 in. from one end and 15/16 in. C to C; RCA part/dwg B-474167-1	Mounts Fuse Sockets X-406 and X-407
A-404 thru A-600		Not Used	
A-601	Shop Manufacture	POST, SUPPORTING: terminal board support; aluminum alloy, iridite, yellow iridescent finish; oblong w/sq cross section shape; 2-7/16 in. lg by 5/16 in. wide by 5/16 in. high overall; mounts to chassis by single no. 6-32 tap hole 3/8 in. deep; has two thru no. 4-40 tap holes spaced 1 in. C to C; RCA part/dwg A-8869350-1	Mounts Terminal Board E-606
A-602	Shop Manufacture	POST, SUPPORTING: terminal board support; aluminum alloy, iridite, yellow iridescent finish; oblong w/sq cross section shape; 2-1/16 in. lg by 5/16 in. wide by 5/16 in. high overall; mounts by two no. 6-32 tap holes 3/8 in. deep located 1 on ea end; has two 4-40 tap thru holes spaced 1-1/16 in. C to C for attaching terminal board; RCA part/dwg A-8869351-1	Mounts Terminal Board E-604

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
A-603	Shop Manufacture	POST, SUPPORTING: terminal board support; aluminum alloy, iridite, yellow iridescent finish; oblong w/sq cross section shape; 2-7/16 in. lg by 5/16 in. wide by 5/16 in. high overall; mounts to chassis by single no. 6-32 tap hole 3/8 in. deep; has two no. 4-40 tap thru holes spaced 1-1/4 in. C to C for attaching terminal board; RCA part/dwg A-8869352-1	Mounts Terminal Board E-605
A-604	Shop Manufacture	COVERS, TERMINAL BOARD: aluminum alloy, iridite, yellow iridescent finish; 5-1/8 in. lg by 1-1/8 in. wide by 2-1/8 in high overall; mounts to 2 supporting posts by two 0.1770 in. dia (no. 16 drill) holes on a 4-7/16 in. by 13/32 in. mounting center; RCA part/dwg B-474172-1	Encloses Terminal Board E-604
A-605	Low Failure Item - if required requisition from ESO referencing NavShips 900, 180A	MOUNTING, SWITCH: provides mounting for switch; aluminum alloy, iridite, yellow iridescent finish; "L" shape; 2 in. lg by 1 in. wide by 1/2 in. high overall; mounts to chassis by two no. 6-32 tap holes spaced 5/8 in. C to C located in flange; has 7/16 in. dia hole 1-5/8 in. up from bottom edge to accommodate bushing of switch; has oblong hole 0.265 in. lg by 0.1405 in. wide located 1-3/32 in. from bottom edge to accommodate switch key to prevent turning; RCA part/dwg A-8869349-1	Mounts Switch S-601
A-606 thru A-800		Not Used	
A-801	Shop Manufacture	POST, SUPPORTING: terminal board support; aluminum alloy, iridite, yellow iridescent finish; oblong w/sq cross section shape; 2-7/16 in. lg by 5/16 in. wide by 5/16 in. high overall; mounts to chassis by single no. 6-32 tap hub 3/8 in. deep; has two thru no. 4-40 tap holes spaced 1-1/2 in. C to C for attaching terminal board; RCA part/dwg A-8869348-1	Mounts Terminal Board
A-802		Same as A-605	Mounts Switch S-804
A-803	Shop Manufacture	POST, SUPPORTING: supports terminal board; aluminum alloy, iridite, yellow iridescent; oblong rectangular; 2-9/16 in. lg by 5/16 in. sq overall; mounts by two no. 6-32 tap by 3/8 in. deep holes located one in ea end; has two no. 4-40 tap thru holes spaced 1-1/2 in. C to C to accommodate terminal board; RCA part/dwg A-8869355-1	Mounts Terminal Board
A-804		Same as A-601	Mounts Terminal Board
A-805	Shop Manufacture	COVER, TERMINAL BOARD: aluminum alloy, iridite, yellow iridescent; 4-3/8 in. lg by 2-29/32 in. wide by 1-1/2 in. deep overall; mounts by two no. 6-32 by 19/32 in. lg Phillips head machine screws, 2 plain washers, and 2 lock washers thru two 0.251 in. dia holes on a 3-11/16 in. lg by 13/32 in. wide mounting center; mounting hardware supplied w/ part; used as a protective cover for terminal board; RCA part/dwg B-475317-1	Encloses Terminal Board
A-806 thru A-1001		Not Used	
A-1002	Shop Manufacture	BRACKET: switch mounting; "L" shape; aluminum, satin etch finish; 2-19/32 in. lg by 2-1/8 in. wide by 1-5/16 in. thick; 2 mounting holes 0.147 in. wide by 0.218 in. lg on 1.968 in. by 0.564 in. centers, two no. 4-40 tapped mounting holes on 1-5/8 in. centers w/ adjacent mounting slot; one 0.3125 in. dia bushing bracketed by two 0.109 in. dia countersunk holes on 1.187 in. centers for mounting switch; RCA part/dwg M-455712-501	Supports S-1003 and E-1012
A-1003	Shop Manufacture	COVER, CABLE: aluminum alloy; satin etch and clear water dip finish; 3-7/8 in. lg by 3-5/32 in. wide by 15/32 in. high overall; mounts by 3 integral mounting brackets provided w/ 0.250 in. dia hole which accommodates no. 6-32 by 9/16 in. lg machine screws; shields chassis wiring; RCA part/dwg B-462150-501	Shields Chassis Wiring
A-1004 thru A-1101		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
A-1102	Shop Manufacture	PLATE: brass; white nickel plate finish; rectangular shape; 9/16 in. lg by 0.312 in. wide by 0.0907 in. thick overall; one central mounting hole 0.128 in. dia for screw; RCA part/dwg A-8812294-1	Acts as Washer for Mounting S-1101
A-1103 thru A-1300		Not Used	
A-1301	Shop Manufacture	COVER, OSCILLATOR: aluminum alloy; satin etch, clear water dip lacquer finish; 2-13/32 in. lg by 1-13/16 in wide by 31/32 in. deep overall; mounts by means of a no. 6-32 by 9/16 in. lg round head screw through bushing near one edge and a hole for locating pin in end strip 0.166 in. dia; made from 0.032 in. thick sheet, w/ brass bushing staked in place and screw free to move in same, insulation on inside of one side strip; RCA part/dwg M-456847-501	Chassis Cover, BFO Unit
A-1302 thru A-1401		Not Used	
A-1402	Shop Manufacture	BRACKET: supports connector; generally "U" shape; aluminum alloy, iridite, yellow iridescent; 3-1/2 in. lg by 2-1/2 in. wide by 1-3/32 in. high overall; mounts by 2 self-clinching fasteners spaced 2-1/2 in. C to C in one edge and by two 0.284 in. lg by 0.159 in. wide slots in flange opposite edge w/ self-clinching fasteners; has 1/2 in. by 0.475 in. cutout in one flange; has 2-1/2 in. lg by 1-1/2 in. wide cutout in base of bracket; has four 5/32 in. radius slots (two on either side of base cutout) on a 2-7/8 in. lg by 1 in. center; RCA part/dwg B-474199-1	Mounts Connectors
A-1403 thru A-1500		Not Used	
A-1501	Shop Manufacture	MOUNTING, BRACKET: for mounting equipment to rack; aluminum alloy, light Navy gray enamel finish; rectangular shape; 12 in. lg by 8 in. wide by 7/8 in. thick; mounts by six 0.228 in. dia mounting holes; right-hand side: has 4 slots 35/64 in. deep by 0.250 in. wide in flange spaced 1-3/4 in., 2-1/4 in., 1-3/4 in. C to C for securing to rack; RCA part/dwg B-459848-1	Mounts Chassis
A-1502	Shop Manufacture	MOUNTING, BRACKET: for mounting equipment to rack; aluminum alloy, light Navy gray enamel finish; rectangular shape; 12 in. lg by 8 in. wide by 7/8 in. thick; mounts by six 0.228 in. dia mounting holes; left-hand side: has 4 slots 35/64 in. deep by 0.250 in. wide in flange spaced 1-3/4 in., 2-1/4 in., 1-3/4 in. C to C for securing to rack; RCA part/dwg B-459848-2	Mounts Chassis
A-1503	Low Failure item - if required requisition from ESO referencing NavShips 900,180A	DOOR: aluminum alloy, light Navy gray finish; rectangular shape; 6-3/16 in. lg by 2-5/32 in. wide by 0.091 in. thick overall; mounts to hinge by four no. 29 drill and countersunk holes for no. 4 filister head machine screws, spaced 5/16 in. in from ends and 2-1/16 in. C to C; ends opposite hinge rounded; has 15/64 in. dia hole located 3-13/32 in. from one end and 1-31/32 in. from edge of hinge end; RCA part/dwg B-474164-1	Access Plate for Recessed Controls
A-1504	Low Failure item - if required requisition from ESO referencing NavShips 900,180A	CATCH, FASTENER: "L" shape; 21/32 in. lg by 5/8 in. wide by 5/8 in. high overall; mounts to panel by two 0.098 in. dia holes on a 1/4 in. by 3/16 in. mounting center located in flange; has oblong raised portion on inside surface to accept latch pin; RCA part/dwg A-8869354-1	P/o Fastener Assembly
A-1505	Shop Manufacture	BRACKET: supports connector; "U" shape; aluminum alloy, iridite, yellow iridescent finish; 2-5/16 in. lg by 1-9/16 in. wide by 3/4 in. deep overall; mounts by three 0.159 in. dia (no. 21 drill) holes, one centrally located 1/4 in. up from bottom edge, other two holes located one in ea flange 9/16 in. up from bottom edge spaced 1-13/16 in. C to C; RCA part/dwg A-8869357-1	Mounts Connector
A-1506	Shop Manufacture	BRACKET: supports connector; generally "U" shape; aluminum alloy, iridite, yellow iridescent finish; 1-7/8 in. lg by 1-1/4 in. wide by 3/4 in. deep; mounts by three 0.159 in. dia (no. 21 drill) holes, one centrally located 1/4 in. up from bottom edge, other two holes located one in ea flange 9/16 in. up from bottom edge spaced 1-3/8 in. C to C; RCA part/dwg A-8869358-1	Mounts Connector

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
A-1507		Same as A-401	Mounts Connector
A-1508 thru A-1600		Not Used	
A-1601	N16-B-151921-134	SHIELD, TUBE SOCKET: brass, nickel plate finish; cylindrical shape; 1-11/32 in. lg by 0.900 in. dia overall; mounts by two no. 4-40 threaded studs 1/2 in. lg spaced 7/8 in. C to C; withstand 50-hr salt spray test; bayonet locking type; RCA part/dwg A-8888552-1	Secures X-1603, X-1604, X1605
A-1602	N16-S-34599-7750	SHIELD, ELECTRON TUBE: brass, nickel plate finish; cylindrical shape; 2-5/32 in. lg by 0.880 in. dia overall approx; bayonet mounting; spring located in top to stabilize position of tube; RCA part/dwg A-8888552-4	Shields and Secures V-1601, V-1602, V-1605
A-1603		Not Used	
A-1604	Shop Manufacture	PLATE, RETAINER: stainless steel passivating dip; rectangular; 3-23/32 in. lg by 1-1/4 in. wide by 0.093 in. thick; mounts by two 0.177 in. dia countersunk holes 3.218 in. C to C; has 2.593 in. lg by 0.968 in. wide opening in center of plate; RCA part/dwg A-8848961-1	Shields and Secures V-1601, V-1602, V-1605
A-1605 thru A-1700		Not Used	
A-1701	Shop Manufacture	BRACKET: "U" shape; aluminum alloy, light Navy gray finish; 2-1/2 in. lg by 1-1/4 in. wide by 7/8 in. high overall; mounts by four 0.216 in. dia holes on a 2 in. by 3/4 in. mounting center; has 13/16 in. dia holes in center; has four no. 4-40 tap holes on a 29/32 in. sq mounting center around center hole to secure connector; RCA part/dwg B-474175-1	Mounts Connector J-1701
A-1702	Shop Manufacture	BRACKET: "U" shape; aluminum alloy, light Navy gray finish; 3 in. lg by 1-7/8 in. wide by 7/8 in. high overall; mounts by four 0.216 in. dia holes on a 2-1/2 in. by 1-3/8 in. mounting center; has 1-1/2 in. dia hole in center; has four no. 4-40 tap holes on a 1-1/2 in. sq mounting center around center hole to secure transformer; RCA part/dwg B-474176-1	Mounts Transformer T-1701
A-1703 thru A-2200		Not Used	
A-2201	Shop Manufacture	BRACKET: c/o 1 bracket, 2 nuts, 2 bushings; "L" shape; 1 in. lg by 11/16 in. wide by 9/16 in. high overall approx; two no. 6-32 self-clinching nuts on 0.562 in. mounting center; nuts ring staked to bracket, bushing riveted to bracket; RCA part/dwg A-8834733-501	Supports Dial Assembly
A-2202		Same as A-1604	Supports J-2213
A-2203	Shop Manufacture	BRACKET; bracket w/ bushings, screws, nuts and washers; aluminum alloy satin etch and clear water dip finish, brass bushing white nickel finish, steel screw and nut, bronze lockwasher; rectangular w/ triangular sides; 1-1/2 in. lg by 1 in. wide by 9/16 in. deep, extending screw points; 2 stainless steel Phillips head no. 6-32 machine screws extend through bottom 0.5 in. C to C; two no. 6-32 self-clinching steel nuts 0.5 in. C to C press and ring stake in end bend-overs; 2 aluminum washers pressed into threads of 2 screws for assembly in bushing, screw must rotate freely after assembly; RCA part/dwg A-8834736-501	Supports Dial Assembly
A-2204	Shop Manfacture	PLATE, SPACER: stainless steel, passivating dip finish; rectangular shape; 1-3/4 in. lg by 7/16 in. wide by 0.093 in. thick; two 0.156 in. dia mounting holes on 1 in. mounting center; RCA part/dwg A-8838976-1	Supports J-2214
A-2205	Shop Manufacture	SHIM: phosphor bronze, white nickel finish; rectangular shape; 1 in. lg by 9/16 in. wide by 0.010 in. thick; mounts by 2 slots 3/8 in. high by 0.187 in. wide; RCA part/dwg A-8829159-3	Spacer for Dial Assembly (as required)
A-2206		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
A-2207	Shop Manufacture	COVER: c/o 1 cover, 1 plate, 1 grounding spring, 1 insulation strip; phosphor bronze white nickel plate; "U" shape; 5-3/16 in. lg by 1.883 in. wide by 7/8 in. high overall approx; mounts by two 0.173 in. dia holes spaced 3-1/3 in. C to C 1-21/64 in. down from edge; one "U" shape and two rectangular shape notches on one side, one "U" shape and three rectangular shape notches in other side; has four 0.102 in. dia holes spaced 7/32 in. from one edge vertically and 1-5/16 in. to centerline of first hole, 0.437 in. from center of first to center of second hole, 1.468 in. from center of second hole to center of third hole and 0.437 in from center of third hole to center of fourth hole horizontally; RCA part/dwg C-744574-505	Covers Chassis Wiring
A-2208	Shop Manufacture	BRACKET, MOUNTING: wedge shape; aluminum alloy, satin etched; 1-5/8 in. lg by 1-3/16 in. wide by 3/4 in. thick; two no. 6-32 integral mounting nuts on 1.031 in. mounting center; RCA part/dwg A-8849691-501	Supports J-2210
A-2209		Not Used	
A-2210	Shop Manufacture	BRACKET: "L" shape; aluminum alloy, satin etch and clear water dip; 1-3/8 in. lg by 5/8 in. wide by 5/8 in. high; two no. 6-32 integral mounting nuts on 0.812 in. mounting center; 2 "U" shape notches 3/16 in. wide by 3/16 in. lg on 1 in. centers for mounting receptacles; RCA part/dwg A-8834748-501	Supports J-2209
A-2211	Shop Manufacture	BRACKET: "L" shape; aluminum alloy, satin etch and clear water dip; 1-15/64 in. lg by 33/64 in. wide by 5/8 in. high; two no. 6-32 integral mounting nuts on 0.734 in. mounting center; 2 "U" shape notches 3/16 in. wide by 3/16 in. lg on 0.858 in. centers for mounting receptacle; RCA part/dwg A-8834749-501	Supports J-2011
A-2212	Shop Manufacture	BRACKET: c/o 1 plate, 1 bracket; "L" shape; 15/16 in. lg by 27/32 in. wide by 19/32 in. high approx overall; 2 mounting holes 0.166 in. dia on 0.500 in. mounting center; one hole 5/8 in. dia centrally located in plate, hole has one side flatted to 0.290 in. dia; RCA part/dwg A-8829113-501	Supports O-2225
A-2213	Shop Manufacture	COVER, CAPACITOR: aluminum alloy; rectangular shape; 2-15/32 in. lg by 1-3/4 in. wide by 1-11/32 in. high overall; mounts by 3 mounting flanges; one mounting flange has two, 0.166 in. dia holes spaced 1.437 in. C to C, a second mounting flange has two, 0.166 in. dia holes spaced 0.687 in. C to C and the third mounting flange has one 0.166 in. dia hole center on flange; 5/8 in. notch in one end; RCA part/dwg M-462173-501	Covers O-2225
A-2214	Shop Manufacture	SHIM: phosphor bronze, white nickel finish; rectangular shape; 1 in. lg by 9/16 in. wide by 0.005 in. thick; mounts by 2 slots 3/8 in. high by 0.187 in. wide; RCA part/dwg A-8829159-2	Spacer for Dial Assembly (as required)
A-2215	Shop Manufacture	COVER: principal parts c/o 1 insulation strip, 1 cover, 1 plate; phosphor bronze white nickel plate; "U" shape; 4-15/32 in. lg by 1-27/32 in. wide by 11/16 in. high overall; two 0.173 in. dia mounting holes on a 2-3/4 in. mounting center; has 2 "U" shape and 2 rectangular shaped notches in one side, and 2 "U" shape (1 large and 1 small) and 1 rectangular shaped notches in other side; the latter side also has an 11/16 in. high by 3/16 in. wide cutout one end and 5/8 in. high by 3/8 in. wide cutout other end; RCA part/dwg C-744574-504	Covers Chassis Wiring
A-2216		Same as A-1501	Provides Rack Mounting for Receiver
A-2217		Same as A-1502	Provides Rack Mounting for Receiver
A-2218 thru A-3100		Not Used	
A-3101	Shop Manufacture	BRACKET: c/o 1 bracket, 2 self-clinching nuts; aluminum alloy; rectangular shape; 1-3/16 in. lg by 1-11/64 in. wide by 7/16 in. high overall; two 0.166 in. dia holes spaced 1/2 in. C to C; RCA part/dwg M-462172-501	Supports J-3104
A-3102 thru A-3800		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
A-3801	Shop Manufacture	BEZEL: frame for dial window; aluminum alloy, black synthetic optical finish; rectangular; 3.328 in. lg by 3.218 in. wide outside by 2.531 in. by 2.641 in. inside by 0.091 in. thick; mounts by four 0.128 in. dia holes located on 2.875 in. by 2.484 in. mounting center; RCA part/dwg A-8844629-1	Secures A-3802
A-3802	Shop Manufacture	WINDOW: plastic, acrylic sheet; optical black synthetic finish on edges of window only; rectangular shape; 3.328 in. lg by 3.218 in. wide by 0.060 in. thick overall; mounts by four 0.128 in. dia holes, spaced on 2.875 in. by 2.484 in. mounting centers; heat resistant; RCA part/dwg A-8844281-1	Protects Dial Face
A-3803	Shop Manufacture	PLATE, INDEX: plastic, acrylic sheet, steel blast finish; rectangular shape; 2-25/32 in. lg by 1-1/16 in. wide by 0.060 in. thick overall; six 0.113 in. dia mounting holes on 2-1/2 in. by 13/16 in. mounting center; marked w/ black line 0.015 in. wide by 0.015 in. deep; RCA part/dwg A-8830110-1	Serves as Target for Optical Dial System
A-3804	Shop Manufacture	MOUNTING BRACKET: aluminum alloy, black alumilite finish; rectangular shape; 2 in. lg by 1-27/32 in. wide by 7/16 in. high by 0.091 in. thick; mounts by two 0.156 in. dia holes on 1.406 in. mounting center; 1 end w/flange 13/16 in. wide by 1/2 in. lg w/0.187 in. wide slot by 5/8 in. lg 1/4 in. from end to 3/8 in. wide by 11/32 in. lg to 76 deg bend to 3/8 in. wide by 2 in. lg to 29/32 in. wide by 17/32 in. lg to flange 0.091 in. thick, other end w/flange 1-27/32 in. wide by 7/16 in high; RCA part/dwg B-456878-1	Stabilizes O-3808
A-3805	Shop Manufacture	REFLECTOR, LIGHT: "L" shape; aluminum, black synthetic and white lacquer; 4 in. ID by 27/64 in. wide by 5/16 in. high by 0.032 in. thick; mounts by two 0.102 in. dia holes on 2-3/4 in. mounting center; RCA part/dwg A-8848190-1	Reflects Light to Logging Dial Scales
A-3806	Shop Manufacture	BRACKET: support for lamp compartment cover (left-hand); semi "U" shape; brass, optical black finish; 57/64 in. lg by 5/8 in. wide by 0.423 in. high overall approx; mounts by 6-32 by 1/4 in. lg machine screw w/ Phillips head drive; RCA part/dwg A-8821404-501; p/o O-3808	With A-3807, Mounts A-3808
A-3807	Shop Manufacture	BRACKET: support for lamp compartment cover (right-hand); semi "U" shape; brass, optical black finish; 57/64 in. lg by 5/8 in. wide by 0.423 in. high overall approx; mounts by no. 6-32 by 1/4 in. lg machine screw w/ Phillips head drive; RCA part/dwg A-8821404-502; p/o O-3808	With A-3806, Mounts A-3808
A-3808	Shop Manufacture	COVER: aluminum alloy, optical black, rectangular shape; 3-1/8 in. in. lg by 1-5/64 in. wide by 0.110 in. thick overall; mounts by 2 keyhole shape 0.296 in. wide by 0.398 in. lg holes spaced 2.625 in. C to C 3/4 in. up from flanged edge; marked I-3801, I-3802, X-3801, and X-3802; lower edge bent on a 1/32 in. radius to form 5/64 in. lg flange; RCA part/dwg A-8821403-3; p/o O-3808	Covers Top of Projection Lamp
A-3809	Shop Manufacture	PLATE, APERTURE: aluminum alloy, 0.032 in. thick, optical black finish; "L" shape; 3 in. lg by 17/32 in. wide by 1-5/64 in. high overall; four 0.120 in. dia mounting holes on 2-3/4 in. and 2-5/8 in. mounting center; 1 flange 1-17/32 in. lg by 3 in. wide w/two 0.120 in. dia holes located 1/8 in. from edge and 2-3/4 in. C to C and 5/32 in. from top edge, w/ hole 1 in. lg by 1/4 in. wide by 1 in. from edge and 1-1/32 in. from end, cutout 2-1/4 in. lg by 1/4 in. dia from bend line; other flange w/2 tabs on 1 ea end 1-5/64 in. lg by 3/8 in. wide w/ two 0.120 in. dia holes 2-5/8 in. C to C and 61/64 in. from bend line; RCA part/dwg B-456248-1	Covers Side and Bottom of Projection Lamp
A-3810 thru A-4000		Not Used	
A-4001	Shop Manufacture	MOUNTING BRACKET: steel, satin black synthetic finish; "U" shaped; 3-1/2 in. lg by 2-5/16 in. wide by 1-9/32 in. high by 0.0897 in. thick; four 0.173 in. dia mounting holes on a 2-7/8 in by 2-1/2 in. mounting center; cutout center of bracket 2-5/8 in. lg by 1-5/8 in. wide with 4 slots; 2 on each end, 0.281 in. lg by 0.280 in. wide; center bend 2-1/8 in. wide to 2 legs 1-9/32 in. to 2 flanges 13/32 in. lg; RCA part/dwg B-462114-1	Supports J-4009

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
B-101 thru B-300		Not Used	
B-301		MOTOR: reversiable; 2500 rpm; 115 v, 50/60 cycles AC, 35 W; Technical Materiel Corp. Part no. MO-100	V. M. O. Drive
C-101	N16-C-33622-5216	CAPACITOR, FIXED, MICA: JAN Type CM35A103K; 0.01 mf ±10%; 300 v DC working; characteristic A	B+ RF Filter
C-102	N16-C-49981-9983	CAPACITOR, FIXED, PAPER: JAN Type CP40C2DF405V; 4 mf +20% -10%; 600 v DC working; oil-filled and impregnated; hermetically sealed metal case	B+ Filter
C-103		Same as C-102	B+ Filter
C-104		Same as C-101	Regulated RF Bypass
C-105	For replacement use N16-C-31085-2046	CAPACITOR, FIXED, MICA: JAN Type CM20A102K; 1000 mmf ±10%; 500 v DC working; characteristic A	V. M. O. Meter Bypass
C-106		Same as C-105	V. M. O. Meter, RF Coupling
C-107	N16-C-25107-8751	CAPACITOR, FIXED, MICA: JAN Type CM20A050M; 5 mmf ±20%; 500 v DC working; characteristic A	V. M. O. Mixer Coupling
C-108		Same as C-105	Mixer Screen Bypass
C-109, C-110	For replacement use N16-C-53697-7440	CAPACITOR, FIXED, PAPER: dual unit; JAN Type CP69B4EF504K; 0.5 mf ±10% ea section; 600 v DC working; oil-filled and impregnated; hermetically sealed metal case	Mixer Plate Decoupling Audio Plate Decoupling
C-111		Same as C-105	Mixer Plate Filter
C-112		Same as C-105	Mixer Plate Filter
C-113	N16-C-47297-2854	CAPACITOR, FIXED, PAPER: JAN Type CP69B1EF504K; 0.5 mf ±10%; 600 v DC working; oil-filled and impregnated; hermetically sealed metal case	Mixer Output Coupling
C-114	N16-C-47297-3175	CAPACITOR, FIXED, PAPER: JAN Type CP53B1EF504K; 0.5 mf ±10%; 600 v DC working; oil-filled and impregnated; hermetically sealed metal case	Audio Output Coupling
C-115		Same as C-105	100 Kc Mixer Coupling
C-116		Same as C-114	Phones Coupling
C-117		Same as C-105	Bypass BFO Meter Decoupling
C-118		Same as C-105	BFO Meter Coupling
C-119		Same as C-101	BFO Plate Filter
C-120		CAPACITOR NETWORK, MICA: JAN Type CM20A102J and CM20A501J; 1500 mmf ±5%; 500 v DC working; characteristic A; c/o one 1000 mmf, one 500 mmf, paralleled	BFO Tank
C-121	For replacement use N16-C-31085-2046	CAPACITOR, FIXED, MICA: JAN Type CM20C102J; 1000 mmf ±5%; 500 v DC working; characteristic A	BFO Voltage Divider
C-122	N16-C-27075-8801	CAPACITOR, FIXED, MICA: JAN Type CM20C270J; 27 mmf ±5%; 500 v DC working; characteristic C	BFO Crystal Load
C-123		Same as C-105	BFO Crystal Coupling
C-124 thru C-200		Not Used	
C-201		Same as C-122	IFO Crystal Load
C-202		Same as C-105	IFO Plate Filter
C-203		Same as C-105	IFO Plate Filter

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-204		Same as C-105	IFO Grid Coupling
C-205		Same as C-101	V.M.O. Coupling
C-206		Same as C-101	IFO Amplifier Plate Filter
C-207	N16-C-28975-1601	CAPACITOR, FIXED, MICA: JAN Type CM20C151J; 150 mmf ±5%; 500 v DC working; characteristic C	IFO Amplifier Tank
C-208		Same as C-105	IFO Meter Coupling
C-209		Same as C-101	IFO Meter Bypass
C-210		CAPACITOR, VARIABLE: air dielectric; 3.5-54 mmf; 500 v DC working; Technical Materiel Corp. Part no. CT100	HFO Crystal Trimmer
C-211		Same as C-105	RF Amplifier Plate Filter
C-212		Same as C-105	RF Amplifier Grid Coupling
C-213		Same as C-105	RF Amplifier Plate Filter
C-214		Same as C-105	RF Amplifier Cathode Bypass
C-215		Same as C-105	RF Amplifier Screen Bypass
C-216		Same as C-105	RF Amplifier Screen Bypass
C-217		Same as C-105	RF Amplifier Grid Coupling
C-218		Same as C-105	RF Amplifier Cathode Bypass
C-219		Same as C-105	RF Multiplier Grid Coupling
C-220		Same as C-101	2-4 Mc Plate Filter
C-221		Same as C-101	4-8 Mc Plate Filter
C-222		Same as C-101	8-16 Mc Plate Filter
C-223		Same as C-105	RF Multiplier Screen Bypass
C-224	N16-C-63900-6761	CAPACITOR, VARIABLE: JAN Type CV11A070; ceramic; 1.5-7 mmf; 500 v DC working	4-8 Mc Trimmer
C-225		CAPACITOR, VARIABLE: air dielectric; 4 sections; Technical Materiel Corp. Part no. CB-100	HFO Tuning
C-226		Same as C-105	RF Multiplier Cathode Bypass
C-227	N16-C-63934-8129	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: JAN Type CV11A120; rotary, single section; 3 to 12 mmf; 500 v DC working; -500 mmf/mf/deg C temp coefficient; 41/64 in. lg by 5/8 in. wide by 21/32 in. high overall; 2 solder lug type terminals, centrally located, one on top and one on bottom; mounts by two 0.120 in. dia holes on a 0.438 in. mounting center; screwdriver slot adjustment; ceramic base; spec JAN-C-81; RCA part/dwg P-728680-101	8-16 Mc Trimmer
C-228		Same as C-105	16-32 Mc Grid Coupling
C-229		Same as C-105	16-32 Mc Screen Bypass
C-230		Same as C-101	16-32 Mc Plate Filter
C-231		Same as C-105	32-64 Mc Grid Coupling
C-232		Same as C-227	16-32 Mc Trimmer
C-233		Same as C-105	32-64 Mc Screen Bypass
C-234		Same as C-101	32-64 Mc Plate Filter
C-235		Same as C-224	32-64 Mc Trimmer
C-236		Same as C-105	32-64 Mc Coupling
C-237		Same as C-105	HFO Meter Filter

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-238		Same as C-105	HFO Meter Coupling
C-239		Same as C-105	RF Chassis Filament Bypass
C-240		Same as C-105	16-32 Mc Cathode Bypass
C-241		Same as C-105	32-64 Mc Cathode Bypass
C-242		Same as C-105	IFO Crystal Coupling
C-243		Same as C-105	HFO Crystal DC Blocking
C-244	N16-C-15514-3301	CAPACITOR, FIXED: ceramic; 2.5 mmf ±0.25 mmf; 500 v DC working; Technical Materiel Corp. Part no. CC101-1	4-8 Mc Trimmer
C-245		CAPACITOR, FIXED, PAPER DIELECTEIC: 1 section 100,000 mmf ±20%; 400 v DC working; hermetically sealed metal can; case dim. excluding terminals, 1-3/16 in. lg by 0.462 in. dia; 2 axial wire lead type terminals; insulated w/ plastic sleeving; wax impregnated; wax filled; internally grounded; terminal mounted; -40 deg C +85 deg C operating temp range; Sprague Electric Co. 78P10404S3; RCA part/dwg C-737181-433	Filter Bypass for HFO B+ Supply
C-246 thru C-300		Not Used	
C-301		CAPACITOR, VARIABLE, AIR DIELECTRIC: 21 to 220 mmf ±5%; Technical Materiel Corp. Part no. CB-106	V.M.O. Tuning
C-302		CAPACITOR, VARIABLE, AIR DIELECTRIC: 5.0 to 25.0 mmf ±5%; Technical Materiel Corp. Part no. CB105	V.M.O. Correction
C-303		CAPACITOR, VARIABLE, AIR DIELECTRIC: 2.8 to 11.0 mmf ±5%; Technical Materiel Corp. Part no. CB102-1	V.M.O. Trimmer
C-304		CAPACITOR, FIXED, MICA DIELECTRIC: 15 mmf; Technical Materiel Corp. Part no. CC102-2	V.M.O. Padder
C-305	N16-C-29608-2206	CAPACITOR, FIXED, MICA: JAN Type CM20D271J; 270 mmf ±5%; 500 v DC working; characteristic D	V.M.O. Grid Coupling
C-306		Same as C-305	V.M.O. Cathode Coupling
C-307	N16-C-33617-4746	CAPACITOR, FIXED, MICA: JAN Type CM35C103J; 0.01 mf ±5%; 300 v DC working; characteristic C	V.M.O. Plate Bypass
C-308		Same as C-101	Cathode Follower Plate Bypass
C-309		Same as C-105	100 Kc Plate Coupling
C-310		Not Used	
C-311		CAPACITOR, VARIABLE, AIR DIELECTRIC: 3.5 to 50 mmf; Technical Materiel Corp. Part no. CT103	100 Kc Adjust
C-312	N16-C-29449-8806	CAPACITOR, FIXED, MICA: JAN Type CM20C241J; 240 mmf ±5% 500 v DC working; characteristic C	100 Kc Output Coupling
C-313		Not Used	
C-314		Same as C-101	Inner Oven Thermostat Arc Suppressor
C-315		Same as C-101	Relay Arc Suppressor
C-316		CAPACITOR, FIXED, PAPER: 0.1 mf ±20%; 600 v DC working; plastic tubular case; Technical Materiel Corp. Part no. CN100-22	Outer Oven Thermostat Arc Suppressor
C-317		Same as C-316	Motor Switch Arc Suppressor
C-318		Same as C-101	Meter Bypass
C-319		Same as C-244	V.M.O. Temperature Compensation
C-320 thru C-400		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS / STANDARD NAVY / AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-401	N16-C-20119-1003	CAPACITOR, FIXED, ELECTROLYTIC: JAN Type CE51F800R; single section; 80 mf capacity; 450 v DC working; -40 to +65 deg C working temp range; hermetically sealed metal can; 4-13/16 in. lg by 1-1/2 in. dia; 4 pin type terminals, 15/32 in. lg, located on bottom, evenly spaced 90 deg apart; terminals mounted; plugs into a std octal socket; all external parts fungus resistant; spec JAN-C-62; RCA part/dwg P-735714-41	With R-404, R-405 Filters Rectified Current
C-402		Same as C-401	With R-407, R-408 Filters Rectified Current
C-403	N16-C-19140-9591	CAPACITOR, FIXED, CERAMIC DIELECTRIC: MIL Type CK63Y103Z; 10,000 mmf +100% -20%; 500 v DC working; temp coefficient, variable insulated, ceramic case; 3/4 in. dia by 5/32 in. thick; 2 rigid wire type terminals, 1-1/4 in. lg; terminals mounted; moisture resistant; RCA part/dwg A-990150-9	Filters Output from V-404
C-404		Same as C-401	With L-401 Filters Rectified Current
C-405		Same as C-401	With L-401 Filters Rectified Current
C-406	N16-C-45768-9253	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 100,000 mmf ±10%; 100 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 1 in. lg by 0.374 in. dia less terminals; 2 wire lead type terminals, one ea end; vitamin Q impregnated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/voltage, capacitance, tolerance, and vendor's name; insulated; Sprague Electric Co. Type 91P; RCA part/dwg C-737816-13	With R-411 Filters Rectified Current
C-407	N16-C-45773-7885	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 100,000 mmf ±10%; 400 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 1-1/2 in. lg by 0.462 in. dia; 2 wire lead type terminals, one ea end; vitamin Q impregnated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/voltage, capacitance, tolerance, and vendor's name; insulated; Sprague Electric Co. Type 91P; RCA part/dwg C-737816-93	With L-401 Filters Rectified Current
C-408		Same as C-403	Filters Output From V-405
C-409 thru C-550		Not Used	
C-551	N16-C-58716-4907	CAPACITOR, VARIABLE, AIR DIELECTRIC: plate meshing type; 1 section; 19.7 mmf max., 2.6 mmf min.; straight line capacitance; 707 v AC peak; 1-5/32 in. lg by 5/8 in. wide by 3/4 in. high less shaft and bushing; bushing, 1/4-32 thread by 5/16 in. lg; shaft dim. beyond bushing, 3/16 in. lg by 0.187 in. dia; screwdriver adjustment, 360 deg rotation either direction; ceramic insulation between rotor and stator; 2 solder lug terminals; single hole mounted by 1/4 in. dia bushing; 500 min. "Q"; lance terminal located left side of capacitor facing panel; marked permanently with RCA part/dwg no.; 21 brass silver plated plates; RCA part/dwg B-462181-1	Variable Trimmer, T-551 Secondary
C-552		Same as C-551	Variable Trimmer, T-552 Secondary
C-553		Same as C-551	Variable Trimmer, T-553 Secondary
C-554		Same as C-551	Variable Trimmer, T-554 Secondary
C-555		Same as C-551	Variable Trimmer, T-555 Secondary
C-556	N16-C-15528-5428	CAPACITOR, FIXED, CERAMIC DIELECTRIC: MIL Type CC20CJ030C; 3 mmf ±0.25 mmf; 500 v DC working; 0 mmf/mf/deg C, ±120 parts per million tolerance; uninsulated; 0.400 in. lg by 0.200 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; color coded; RCA part/dwg P-722401-56	Fixed Trimmer, T-551 Secondary
C-557	N16-C-27075-8741	CAPACITOR, FIXED, MICA DIELECTRIC: 27 mmf ±5%, 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-317	Loading, T-551 Primary
C-558	N16-C-99999-0038	CAPACITOR, FIXED, MICA DIELECTRIC: 6 mmf ±5%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-306	Top Coupling, T-552

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-559		Not Used	
C-560	N16-C-27999-1634	CAPACITOR, FIXED, MICA DIELECTRIC: 68 mmf ±5%; 500 v DC working; -200 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-327	Loading, T-553 Primary
C-561		Same as C-558	Top Coupling, T-553
C-562		Same as C-556	Fixed Trimmer, T-553 Secondary
C-563	N16-C-26732-9439	CAPACITOR, FIXED, MICA DIELECTRIC: 20 mmf ±5%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-314	Loading, T-553 Primary
C-564	N16-C-16043-9128	CAPACITOR, FIXED, CERAMIC DIELECTRIC: MIL Type CC20CH180G; 18 mmf ±2%; 500 v DC working; 0 mmf per mf per deg C ±60 parts per million tolerance; uninsulated; 0.400 in. lg by 0.200 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; color coded; RCA part/dwg P-722401-66	Fixed Trimmer, T-554 Secondary
C-565	N16-C-29971-5410	CAPACITOR, FIXED, MICA DIELECTRIC: 420 mmf ±1%; 300 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals one on ea end; terminals mounted; color coded; RCA part/dwg A-8824194-6	With C-566, Bandspread Network for T-554 Secondary
C-566	N16-C-27177-2063	CAPACITOR, FIXED, MICA DIELECTRIC: 33 mmf ±2%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-419	With C-565, Bandspread Network for T-554 Secondary
C-567	N16-C-15912-4628	CAPACITOR, FIXED, CERAMIC DIELECTRIC: JAN Type CC20CH100C; 10 mmf ±0.25 mmf; 500 v DC working; temp coefficient 0, tolerance ±60 parts per million per deg C; 0.400 in. lg by 0.200 in. dia; 2 radial wire lead terminals; terminals mounted; uninsulated; color coded; RCA part/dwg P-722401-63; p/o Z-1009	Fixed Trimmer, T-555 Secondary
C-568	N16-C-28969-1660	CAPACITOR, FIXED, MICA DIELECTRIC: 150 mmf ±1%; 500 v DC working; 0 to +70 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-744583-435	With C-569, Bandspread Network for T-551 Secondary
C-569		Same as C-566	With C-568, Bandspread Network for T-555 Secondary
C-570	N16-C-26437-6678	CAPACITOR, FIXED, MICA DIELECTRIC: 15 mmf ±2%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-412	Loading, T-555 Primary
C-571	N16-C-27577-1231	CAPACITOR, FIXED, MICA DIELECTRIC: 47 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-323; p/o Z-551	Grid Coupling, V-551
C-572	N16-C-42762-5397	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 10,000 mmf ±20%; 100 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 13/16 in. lg by 0.237 in. dia, less terminals; 2 wire lead type terminals, one on ea end; vitamin Q impregnated; grounded to case; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/voltage, capacitance, tolerance, and vendor's name; insulated; Sprague Electric Co. Type 91P; RCA part/dwg C-737816-347; p/o Z-551	Cathode Resistor Bypass V-551
C-573	N16-C-42765-4822	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 10,000 mmf ±20%; 400 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 13/16 in. lg by 0.297 in. dia, less terminals; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked w/capacitance, tolerance, working voltage, mfr's name; operating temp -55 deg C to +85 deg C; Sprague Electric Co. Catalog no. 81P10304S3; RCA part/dwg C-737816-427; p/o Z-551	Screen Bypass, V-551
C-574		Same as C-571; p/o Z-551	Grid Coupling, V-552

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-575	N16-C-44111-2270	CAPACITOR, FIXED, PAPER DIELECTRIC: single section, 47,000 mmf ±20%; 100 v DC working; hermetically sealed metal case w/ plastic sleeve; 15/16 in. lg by 0.374 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked permanently w/capacitance in MF, tolerance, rated working voltage and vendor's name; RCA part/dwg C-737816-351; p/o Z-551	Output Coupling, V-552 Cathode
C-576		Same as C-573; p/o Z-551	Plate Bypass, V-552
C-577	N16-C-15957-9125	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 12 mmf ±5%; 500 v DC working; -1400 parts per million per deg C temp coefficient, ±15% tolerance; insulated, ceramic jacket; 0.475 in. lg by 0.230 in. dia; 2 axial wire lead type terminals, 1-1/4 in. lg; terminals mounted; color coded; RCA part/dwg A-8825430-14	Compensates Mixer Coils
C-578 thru C-600		Not Used	
C-601	N16-C-33617-4758	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM35E103J; 10,000 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 5/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; RCA part/dwg P-722033-513	Series Padder, L-601/C-603
C-602		Same as C-601	Series Padder, L-601/C-603
C-603	N16-C-44111-1410	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 47,000 mmf ±10%; 400 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 1 in. lg by 0.462 in. dia less terminals; 2 wire lead type terminals, one on ea end; vitamin Q impregnated; no internal ground connections; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/voltage, capacitance, tolerance, and vendor's name; insulated; Sprague Electric Co, Type 91P47394S4; RCA part/dwg C-737816-91	Fixed Tuning Capacitor W/L-601
C-604	N16-C-31512-4579	CAPACITOR, FIXED, MICA DIELECTRIC: JAN Type CM30E152K; 1500 mmf ±10%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 53/64 in. lg by 53/64 in. wide by 9/32 in. deep; 2 wire lead type terminals, one on ea end; terminals mounted; color coded; spec JAN-C-5; RCA part/dwg P-722023-563	Series Padder, L-601/C-610
C-605		Same as C-601	Series Padder, L-601/C-606
C-606	N16-C-43160-3153	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 22,000 mmf ±10%; 400 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 1 in. lg by 0.374 in. dia; 2 axial wire lead type terminals, one on ea end; insulated; stabilized wax impregnated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; RCA part/dwg C-737816-89	Fixed Tuning Capacitor W/L-601
C-607	N16-C-33063-5358	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM35E682J; 6800 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 5/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722033-509	Series Padder, L-601/C-608
C-608		Same as C-606	Fixed Tuning Capacitor W/L-601
C-609	N16-C-32641-6343	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM35E472J; 4700 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 5/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg C-722033-505	Series Padder, L-601/C-610
C-610		Same as C-601	Fixed Tuning Capacitor W/L-601
C-611	N16-C-32351-4943	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM35E362J; 3600 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 5/16 in. deep; 2 wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722033-502	Series Padder, L-601/C-612

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-612		Same as C-601	Fixed Tuning Capacitor W/L-601
C-613	N16-C-32140-4699	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM30E272J; 2700 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 1/4 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722024-519	Series Padder, L-601/C-614
C-614		Same as C-607	Fixed Tuning Capacitor W/L-601
C-615	N16-C-31903-1099	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM30E222J; 2200 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 1/4 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722024-517	Series Padder L-601/C-616
C-616		Same as C-609	Fixed Tuning Capacitor W/L-601
C-617	N16-C-31665-6499	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM30E182J; 1800 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 1/4 in. deep; 2 axial wire lead type terminals; one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722024-515	Series Padder L-601/C-618
C-618	N16-C-32430-6143	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM35E392J; 3900 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 5/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722033-503	Fixed Tuning Capacitor W/L-601
C-619	N16-C-48814-3368	CAPACITOR, FIXED, PAPER DIELECTRIC: MIL Type CP05A1EE105K; 1 section; 1 mf ±10%; 400 v DC working; hermetically sealed metal case; 1-15/16 in. lg by 1.063 in. dia less terminals; 2 wire lead type terminals, one on ea end; insulated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; spec MIL-C-5; RCA part/dwg A-990421-159	Plate Bypass, V-601
C-620	N16-C-31085-4007	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM25E102J; 1000 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 1-1/16 in. lg by 7/16 in. wide by 3/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722015-547	Output Coupling, V-601
C-621		Same as C-604	P/o Output Coupling Filter, V-601
C-622	N16-C-42733-5956	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 10,000 mmf ±10%; 400 v DC working; hermetically sealed metal case w/plastic sleeve; 7/8 in. lg by 0.297 in. dia; 2 axial wire lead type terminals, 1-5/8 in. lg, one ea end; vitamin Q impregnated; no internal ground connections; marked w/capacitance, tolerance, working voltage, mfr's name; operating temp range -55 deg C to +85 deg C; Sprague Electric Co. Part 61P10594S4; RCA part/dwg C-737816-87; p/o Z-901	P/o Output Coupling Filter, V-601
C-623	For replacement use N16-C-32245-9294	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM30E332K; 3300 mmf ±10%; 500 V DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 53/64 in. lg by 53/64 in. wide by 9/32 in. deep; 2 wire lead type terminals, one on ea end; terminals mounted; color coded; spec JAN-C-5; RCA part/dwg P-722023-571	P/o Output Coupling Filter, V-601
C-624		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 470,000 mmf ±10%; 100 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 1-1/4 in. lg by 0.624 in. dia, less terminals; 2 wire lead type terminals, one on ea end; vitamin Q impregnated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/voltage, capacitance, tolerance, and vendor's name; insulated; Sprague Electric Co. Type 91P; RCA part/dwg C-737816-16	P/o Output Coupling, V-602A
C-625		Same as C-407	Plate Supply Filtering, V-603
C-626 thru C-700		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-701		Same as C-606	Output Coupling, V-701
C-702		Same as C-620	Fixed Tuning Capacitor W/L-701 Input Coupling, V-701
C-703	N16-C-28553-1607	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM25E101J; 100 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 1-1/16 in. lg by 7/16 in. wide by 3/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5; RCA part/dwg P-722015-523	Output Coupling, V-702
C-704		Same as C-703	P/o Feedback Network, V-702 Grid 1
C-705	N16-C-26447-8676	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM20B150K; 15 mmf ±10%; 500 v DC working; molded low loss bakelite case; 47/64 in. lg by 3/16 in. wide by 7/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5A; RCA part/dwg C-722002-104	P/o Feedback Network, V-702 Grid 2
C-706		Same as C-406	Cathode Resistor Bypass, V-701
C-707		Same as C-227	Variable Trimmer, P/o Feedback Network, V-702 Grid 2
C-708	N16-C-32140-4694	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM30D272J; 2700 mmf ±5%; 500 v DC working; -100 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 51/64 in. lg by 51/64 in. wide by 1/4 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5A; RCA part/dwg C-722022-519	Output Coupling Filter, V-701
C-709		Same as C-708	Output Coupling Filter, V-701
C-710		Same as C-407	Screen Bypass, V-701
C-711		Same as C-606	Output Coupling, V-703
C-712		Same as C-407	With R-714 Feedback Network, V-704 to V-703
C-713 thru C-800		Not Used	
C-801	N16-C-30109-3806	CAPACITOR, FIXED, MICA DIELECTRIC: MIL Type CM20D471J; 470 mmf ±5%; 500 v DC working; -100 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 47/64 in. lg by 7/16 in. wide by 3/16 in. deep; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; spec MIL-C-5A; RCA part/dwg C-722006-539	Filters Rectified Output, V-1005
C-802		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 1 mf ±10%; 100 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 2 in. lg by 0.624 in. dia; 2 axial wire lead type terminals, one on ea end; insulated; vitamin Q impregnated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; RCA part/dwg C-737816-17	P/o AGC Time Constant Filter Network
C-803		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 220,000 mmf ±10%; 100 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 1-1/4 in. lg by 0.462 in. dia, less terminals; 2 wire lead type terminals, one on ea end; vitamin Q impregnated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/voltage, capacitance, tolerance, and vendor's name; insulated; Sprague Electric Co. Type 91P; RCA part/dwg C-737816-15	P/o AGC Time Constant Filter Network
C-804		Same as C-624	P/o AGC Time Constant Filter Network
C-805		Same as C-802	P/o AGC Time Constant Filter Network

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-806		Same as C-803	P/o AGC Time Constant Filter Network
C-807		Same as C-624	P/o AGC Time Constant Filter Network
C-808		Same as C-802	P/o AGC Time Constant Filter Network
C-809		Same as C-802	P/o AGC Time Constant Filter Network
C-810		Same as C-801	Filters Rectified Output, V-1005
C-811		Same as C-803	Cathode Bias Filtering, V-801A
C-812		Same as C-622	Output Coupling, V-801A
C-813		Same as C-622	Output Coupling, V-801B
C-814		Same as C-406	Grid Bias Filtering, V-802A
C-815		Not Used	
C-816		Same as C-603	Output Coupling, V-802B
C-817	N16-C-31085-3694	CAPACITOR, FIXED, MICA: JAN Type CM30D102J; 1000 mmf ±5%; 500 v DC working; 53/64 in. lg by 53/64 in. wide by 9/32 in. high; axial wire leads; molded bakelite case; spec JAN-C-5; RCA part/dwg P-722022-509	Plate Bypass, V-803A
C-818		Same as C-603	Output Coupling, V-803A
C-819		Same as C-708	Output Coupling, V-804A
C-820		Same as C-622	Output Coupling, V-804B
C-821		Same as C-407	With R-840 Feedback Network, V-805 to V-804B
C-822 thru C-908		Not Used	
C-909	N16-C-64040-2005	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: rotary type; single section; 5 mmf min, 25 mmf max; 500 v DC working; temp coefficinet zero, tolerance ±150 parts per million per deg C; 3/4 in. lg by 17/32 in. wide by 19/32 in. thick overall; 2 solder lug type terminals, located on back at 90 deg to lgth, 3/4 in. apart; two no. 2-56 tapped mounting holes on 5/16 in. mounting center; screwdriver adjustment; ceramic base; fungus resistant; RCA part/dwg B-462179-2	Input Trimmer, Z-902
C-910	N16-C-45773-6723	CAPACITOR, FIXED, PAPER DIELECTRIC: single section; 100,000 mmf ±10%; 400 v DC working; hermetically sealed metal case; 1-1/8 in. lg by 0.400 in. dia, less terminals; 2 axial wire lead type terminals, one on ea end; stabilized wax impregnated; no internal ground; terminals mounted; marked w/capacity, tolerance, working voltage, and mfr's name; operating temp range -40 deg C to +85 deg C; Sprague Electric Co. Type 88P10494S2; RCA part/dwg C-737818-253	Screen Supply Filtering, V-551
C-911		Same as C-910	Plate Supply Filtering, V-901
C-912	N16-C-29133-3841	CAPACITOR, FIXED, MICA DIELECTRIC: 180 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-337; p/o Z-901	P/o Feedback Network, V-901 Grid 1
C-913	N16-C-27181-4341	CAPACITOR, FIXED, MICA DIELECTRIC: 33 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-319; p/o Z-901	P/o Feedback Network, V-901 Grid 2

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-914	N16-C-29608-2009	CAPACITOR, FIXED, MICA DIELECTRIC: 270 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high overall; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-341; p/o Z-901	Blocking Capacitor, Y-901
C-915		Same as C-909	Output Trimmer, Z-902
C-916		Same as C-914; p/o Z-901	Tunes T-901 Primary
C-917	N16-C-45768-7992	CAPACITOR, FIXED, PAPER DIELECTRIC: single section, 100,000 mmf ±10%; 100 v DC working; hermetically sealed metal case; 13/16 in. lg by 0.312 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked w/capacity, tolerance, working voltage and mfr's name; operating temp range -55 deg C to +85 deg C; RCA part/dwg C-737816-493	Heater Bypass, V-901
C-918		Same as C-917	Heater Bypass, V-901
C-919		Same as C-622; p/o Z-901	With R-904, Plate Supply Decoupling, V-901
C-920 thru C-1000		Not Used	
C-1001	For Replacement Use N16-C-28737-7001	CAPACITOR, FIXED, MICA DIELECTRIC: 120 mmf ±5%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-333	With R-1032, Filters 200 Kc
C-1002 thru C-1028		Not Used	
C-1029	N16-C-64040-2000	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: rotary type; single section; 25 mmf max, 5 mmf min; 500 v DC working; temp coefficient zero (NPO); 3/4 in. lg by 17/32 in. wide by 19/32 in. thick overall; 2 solder lug type terminals, located on back, 3/8 in. C to C at 90 deg to lgth; two 0.120 in. dia mounting holes spaced 5/16 in. C to C; screwdriver adjustment; fungus resistant; RCA part/dwg B-462179-1	Output Trimmer, Z-1001, Z-1002
C-1030	N16-C-42729-8483	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 10,000 mmf ±10%; 200 v DC working at 85 deg C, 150 v DC working at 125 deg C; molded phenolic case; 3/4 in. lg by 0.250 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C and +10% capacitance change at +125 deg C; Sprague Electric Co. Type No. 75P; RCA part/dwg C-737845-107	Ground Return, Z-1001, Z-1002
C-1031	N16-C-43632-8786	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 33,000 mmf ±10%; 100 v DC working; hermetically sealed metal case; 13/16 in. lg by 0.297 in. dia; 2 wire lead type terminals, one on ea end; one terminal glass seal insulated, one terminal grounded to case; vitamin Q impregnated; internally grounded; terminals mounted; operating temp range -55 deg C to +85 deg C; Sprague Electric Co. Type 81P Style 10; RCA part/dwg C-737816-330; p/o Z-1004	Cathode Resistor Bypass, V-1001
C-1032	N16-C-42732-6955	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 10,000 mmf ±10%; 300 v DC working; molded phenolic case; 1-1/16 in. lg by 0.195 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C and +10% capacitance change at +125 deg C; color coded; Sprague Electric Co. Type no. 65P; RCA part/dwg C-737845-74; p/o Z-1004	Screen Bypass, V-1001
C-1033, C-1034		Not Used	
C-1035		Same as C-1031; p/o Z-1006	Cathode Resistor Bypass, V-1002

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-1036		Same as C-1032; p/o Z-1006	Screen Bypass, V-1002
C-1037, C-1038		Not Used	
C-1039		Same as C-1031; p/o Z-1008	Cathode Resistor Bypass, V-1003
C-1040	N16-C-15978-6001	CAPACITOR, FIXED: ceramic dielectric; JAN Type CC20CH150G; 15 mmf ±2%; 500 v DC working; temp coefficient 0 (tolerance +60 -112) mmf per mf per deg C; 0.400 in. lg by 0.200 in. dia; two radial wire lead terminals; terminals mounted; ceramic insulation; color coded; RCA part/dwg P-722401-65; p/o Z-1018	Top Coupling, L-1016 to T-1015
C-1041		Same as C-1032; p/o Z-1008	Screen Bypass, V-1003
C-1042	N16-C-31833-7866	CAPACITOR, FIXED, MICA DIELECTRIC: 2100 mmf ±2%; 500 v DC working; 0 to +40 parts per million per deg C temp coefficient; molded thermosetting material completely enclosing all elements; 53/64 in. lg by 53/64 in. wide by 9/32 in. deep; 2 axial wire lead type terminals, 1-1/8 in. lg, located axially one on ea end; terminals mounted; color coded; capacitance drift shall not exceed 0.05% ±0.1 mmf marked w/RCA part/dwg B-465842-6; moisture proof sealing; RCA part/dwg B-465842-6; p/o Z-1009	With C-1043, Tunes T-1014 Primary
C-1043	N16-C-17822-5695	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 280 mmf ±1%; 500 v DC working; 1500 mmf per mf per deg C, negative, ±100 mmf tolerance uninsulated; 0.860 in. lg by 0.230 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; polystyrene lacquer coated, color coded, marked w/RCA part/dwg no.; RCA part/dwg C-748269-13; p/o Z-1009	With C-1042, Tunes T-1014 Primary
C-1044		Same as C-567	Coupling to T-1014
C-1045		Same as C-1031; p/o Z-1009	Filters Rectified Output of CR-1001
C-1046		Same as C-1040; p/o Z-1018	Top Coupling, L-1017 to T-1016
C-1047	N16-C-41064-1134	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 4700 mmf ±10%; 300 v DC working at 85 deg C; molded phenolic case; 3/4 in. lg by 0.200 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C and +10% capacitance change at +125 deg C; color coded; Sprague Electric Co. Type no. 75P; RCA part/dwg C-737845-193; p/o Z-1010	Output Coupling from V-1004 Plate
C-1048	For replacement use N16-C-26838-5145	CAPACITOR, FIXED, MICA DIELECTRIC: 22 mmf ±10%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-215; p/o Z-1010	Coupling to V-1004 Grid
C-1049		Same as C-1032; p/o Z-1010	Screen Bypass, V-1004
C-1050	N16-C-30188-3727	CAPACITOR, FIXED, MICA DIELECTRIC: 510 mmf ±5%; 300 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-348; p/o Z-1011	Tunes T-1013
C-1051	N16-C-29898-3409	CAPACITOR, FIXED, MICA DIELECTRIC: 390 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-345; p/o Z-1011	Tunes T-1013
C-1052	N16-C-30114-3006	CAPACITOR, FIXED, MICA DIELECTRIC: 470 mmf ±10%; 300 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-247; p/o Z-1012	Filters Rectified Output from V-1005

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-1053	N16-C-45770-1671	CAPACITOR, FIXED, PAPER DIELECTRIC: single section, 100,000 mmf ±10%; 200 v DC working; hermetically sealed metal case, insulated w/plastic sleeving; 1 in. lg by 0.374 in. dia; 2 axial wire lead type terminals, one on ea end; stabilized wax impregnation; no internal ground; terminals mounted; marked w/capacity, tolerance, rated working voltage, and vendor's name; operating temp range -40 deg C to +85 deg C; Sprague Electric Co. Code no. 56289, Type no. 88P10492-S4; RCA part/dwg C-737818-53	Coupling from V-1006 Cathode
C-1054	N16-C-26020-7691	CAPACITOR, FIXED, MICA DIELECTRIC: 10 mmf ±5%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-310; p/o Z-1014	Coupling to V-1007 Grid
C-1055	N16-C-45770-1762	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 100,000 mmf ±10%; 200 v DC working; hermetically sealed metal case; 1.0 in. lg by 0.462 in. dia; 2 wire lead type terminals, one on ea end; glass seal insulated; vitamin Q impregnated; no internal ground connections; terminals mounted; operating temp range -55 deg C to +85 deg C; Sprague Electric Co. Type 81-P and 91-P; RCA part/dwg C-737816-53; p/o Z-1014	Coupling from V-1007 Cathode
C-1056		Same as C-1032; p/o Z-1014	Plate Bypass, V-1007
C-1057		Same as C-914; p/o Z-1017	Tunes L-1016
C-1058	N16-C-30109-3330	CAPACITOR, FIXED, MICA DIELECTRIC: 470 mmf ±5%; 300 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-347	Filters Rectified Output from V-1005
C-1059	N16-C-29449-8642	CAPACITOR, FIXED, MICA DIELECTRIC: 240 mmf ±5%, 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-340; p/o Z-1017	Tunes L-1016
C-1060		Same as C-917	Filters Manual Gain Control
C-1061	N16-C-46200-7165	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 220,000 mmf ±10% 100 v DC working; hermetically sealed metal case; 1-1/16 in. lg by 0.400 in. dia; 2 axial wire lead type terminals; one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked w/capacitance, tolerance, working voltage, mfr's name; operating temp range -65 deg C to +85 deg C; Sprague Electric Co. Catalog no. 81P22491S1; RCA part/dwg C-737816-495	Filters Second IF Heaters
C-1062		Same as C-1061	Filters Second IF Heaters
C-1063	N16-C-45773-7410	CAPACITOR, FIXED, PAPER DIELECTRIC: single section; 100,000 mmf ±10%; 400 v DC working; hermetically sealed metal case; 1-5/16 in. lg by 0.400 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked w/capacity, tolerance, working voltage, and mfr's name; operating temp range -55 deg C to +85 deg C; RCA part/dwg C-737816-573	Plate Supply Filtering, V-1004
C-1064		Same as C-1048	Coupling from Calibrator Unit to V-1002
C-1065		Same as C-1030	AGC Filter, V-1002 Grid Current
C-1066		Same as C-1030	With R-1031 Line Current Constant Determination, V-1003 Grid Circuit
C-1067		Same as C-914; p/o Z-1017	Tunes L-1017
C-1068		Same as C-914; p/o Z-1017	Tunes L-1017
C-1069 thru C-1100		Not Used	
C-1101	N16-C-46200-6410	CAPACITOR, FIXED, PAPER DIELECTRIC: single section, 220,000 mmf ±10%; 100 v DC working; hermetically sealed metal case, insulated w/ plastic sleeving; 15/16 in. lg by 0.462 in. dia; 2 axial wire lead type terminals, one on ea end; stabilized wax impregnation; internally grounded; terminals mounted; marked w/ capacity, tolerance, working voltage, and mfr's name; operating temp range -40 deg C to +85 deg C; Sprague Electric Co. Type no. 88P22491S4; RCA part/dwg C-737818-335	Cathode Bias Filtering, V-1101

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-1102	N16-C-43633-4056	CAPACITOR, FIXED, PAPER DIELECTRIC: single section, 33,000 mmf ±10%; 400 v DC working; hermetically sealed metal case, w/plastic sleeve; 1 in. lg by 0.374 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin "Q" impregnated; no internal ground; terminals mounted; marked permanently w/capacitance in mf, tolerance, rated working voltage and vendor's name; RCA part/dwg C-737816-90; p/o Z-1102	Coupling from V-1102 Plate
C-1103	N16-C-39693-5927	CAPACITOR, FIXED, PAPER DIELECTRIC: one section, 1000 mmf ±10%; 400 v DC working at 85 deg C; molded phenolic case; 3/4 in. lg by 0.175 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C and +10% capacitance change at +125 deg C; color coded; Sprague Electric Co. Type no. 75P; RCA part/dwg C-737845-215; p/o Z-1103	Cathode Resistor Network Bypass, V-1103
C-1104		Same as C-1102; p/o Z-1104	Plate Bypass, V-1104
C-1105		Same as C-1102; p/o Z-1105	Coupling to V-1105 Grid
C-1106		Same as C-1103; p/o Z-1105	Plate Bypass, V-1105
C-1107	N16-C-44111-1211	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 47,000 mmf ±10%; 200 v DC working; hermetically sealed metal case, w/plastic insulating sleeve; 1 in. lg by 0.374 in. dia; 2 wire lead type terminals, one on ea end; vitamin Q impregnated; no internal ground connection; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/voltage, capacitance, tolerance, and vendor's name; insulated; Sprague Electric Co. Type 91P; RCA part/dwg C-737816-51; p/o Z-1106	Coupling to V-1106 Cathode
C-1108	N16-C-40024-4700	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 1800 mmf ±10%; 300 v DC working; molded phenolic case; 3/4 in. lg by 0.175 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C and +10% capacitance change at +125 deg C; Sprague Electric Co. Type no. 75P; RCA part/dwg C-737845-188; p/o Z-1107	Coupling from V-1107 Cathode
C-1109		Same as C-1032; p/o Z-1108	Coupling from V-1108 Plate
C-1110		Same as C-1030; p/o Z-1109	Screen Bypass, V-1109
C-1111		Not Used	
C-1112	N16-C-45770-1522	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 100,000 mmf ±10%; 200 v DC working; hermetically sealed metal case; 7/8 in. lg by 0.400 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin "Q" impregnated; oil filled; no internal ground; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/ capacity, tolerance, working voltage, and mfr's code and type; RCA part/dwg C-737860-125	Audio Input Filtering
C-1113		Not Used	
C1114	N16-C-40120-3671	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 2200 mmf ±10%; 300 v DC working at 85 deg C; molded phenolic case; 3/4 in. lg by 0.175 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C and +10% capacitance change at +125 deg C; color coded; Sprague Electric Co. Type no. 75P; RCA part/dwg C-737845-189	Output Coupling from V-1101 Cathode
C-1115	N16-C-42786-1080	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 12,000 mmf ±10%; 200 v DC working at 85 deg C, 150 v DC working at 125 deg C; molded phenolic case; 3/4 in. lg by 0.250 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C to +10% capacitance change at +125 deg C; color coded; Sprague Electric Co. Type no. 75P; RCA part/dwg C-737845-168; p/o Z-1104	Blocking Capacitor V-1104 Plate Circuit
C-1116 thru C-1200		Not Used	
C-1201	N16-C-64175-6209	CAPACITOR, VARIABLE, CERAMIC DIELECTRIC: rotary type, single section; 750 mmf per mf per deg C temp coefficient; 8 to 50 mmf; 500 v DC working; 3/4 in. lg by 17/32 in. wide by 19/32 in. high overall; 1 solder lug terminal, located at bottom; two 0.120 in. dia mounting holes on 5/16 in. mounting center; screwdriver adjustment; ceramic base; fungus resistant; RCA part/dwg B-462179-3 B-462179-3	Adjustment of Frequency of Y-1201

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-1202	N16-C-46200-9903	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 220,000 mmf ±20%; 100 v DC working; hermetically sealed metal case, w/plastic insulating sleeve; 1-3/16 in. lg by 0.462 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked w/capacitance, tolerance, working voltage, mfr's name; operating temp range -55 deg C to +85 deg C; Sprague Electric Co. Type no. 81P; RCA part/dwg C-737816-355	Heater Bypass, V-1201, V-1202
C-1203		Same as C-1202	Heater Bypass, V-1201, V-1202
C-1204	N16-C-28975-1526	CAPACITOR, FIXED, MICA DIELECTRIC: 150 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-335; p/o Z-1201	Output Coupling from V-1201 Plate
C-1205	N16-C-99999-0034	CAPACITOR, FIXED, MICA DIELECTRIC: 47 mmf ±20%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-123; p/o Z-1202	Output Coupling, V-1202 Plate
C-1206	N16-C-45803-3189	CAPACITOR, FIXED, PAPER DIELECTRIC: single section, 100,000 mmf ±20%; 200 v DC working; hermetically sealed metal case; 15/16 in. lg by 0.374 in. dia; 2 axial wire lead type terminals, one on ea end; stabilized wax impregnation; internally grounded; terminals mounted; marked w/capacity, tolerance, working voltage and mfr's name; operating temp range -40 deg C to +85 deg C; RCA part/dwg C-737818-393; p/o Z-1202	Plate Supply Filtering, V-1201, V-1202
C-1207	N16-C-99999-0033	CAPACITOR, FIXED, MICA DIELECTRIC: 5 mmf ±20%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-105; p/o Z-1201	Output Coupling from V-1201 and V-1202 Cathode
C-1208	N16-C-15528-5533	CAPACITOR, FIXED, CERAMIC: MIL Type CC21CJ030C; 3 mmf ±0.5 mmf; 500 v DC working; temp coefficient 0 mmf per mf per deg C, ±120 parts per million tolerance; ceramic insulation; 0.562 in. lg by 0.250 in. dia; 2 axial wire lead type terminals, 1-1/4 in. lg; terminals mounted; color coded; RCA part/dwg C-722407-56; p/o Z-1201	Feedback Coupling, V-1201
C-1209 thru C-1300		Not Used	
C-1301		Same as C-622; p/o Z-1301	Screen Coupling, V-1301
C-1302		Same as C-1051; p/o Z-1302	Plate Bypass, V-1301
C-1303		Same as C-1051; p/o Z-1302	Grid Bias Charging, V-1301
C-1304	N16-C-26838-5145	CAPACITOR, FIXED, MICA DIELECTRIC: 22 mmf ±5%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-315	With C-3108, Determines Frequency of Z-1301
C-1305	N16-C-42733-5793	CAPACITOR, FIXED, PAPER DIELECTRIC: single section, 10,000 mmf ±10%; 400 v DC working; hermetically sealed metal case, w/ plastic insulating sleeve; 13/16 in. lg by 0.297 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked w/capacity, tolerance, working voltage, and mfr's name; operating temp range -55 deg C to +85 deg C; RCA part/dwg C-737816-407	Plate Supply Filtering, V-1301
C-1306		Same as C-1058	Output Coupling from V-1301 Plate
C-1307		Same as C-1029	With C-1304, Determines Frequency of Z-1301
C-1308		Same as C-1029	With C-1304, Determines Frequency of Z-1301

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-1309	N16-C-60027-1001	CAPACITOR, VARIABLE, AIR DIELECTRIC: plate meshing type; single section; 47 (+3, -2) mmf max., 4 ±0.5 mmf min.; straight line capacity tuning characteristic; 500 v AC peak; 1-1/32 in. lg by 25/32 in. wide by 15/16 in. high, less shaft and bushing; bushing dim., 9/32 in. lg by 5/16 in. dia, 32 threads per in.; shaft dim. beyond bushing, 1/4 in. lg by 1/4 in. dia; shaft adjustment, 180 deg cw rotation; ceramic base; 2 solder lug type terminals; moisture and vibration resistant; RCA part/dwg B-462598-1	With C-1307, Determines Frequency of Z-1301
C-1310 thru C-1600		Not Used	
C-1601	N16-C-20267-5896	CAPACITOR, FIXED, ELECTROLYTIC: JAN Type CE51C121P; single section; 120 mmf; 350 v DC working; -40 to +85 deg C working temp range; hermetically sealed metal can; 1-3/8 in. dia by 4-1/4 in. high; 2 plug-in type terminals used and 2 not used, 3/32 in. high, located on base of case; phenolic insulation; plugs in std octal socket, even numbered pins omitted; dry electrolite; RCA part/dwg P-735712-42	Filters Output from V-1603 Current
C-1602		Same as C-1601	With L-1601, Filters Rectified Current
C-1603	N16-C-42767-5708	CAPACITOR, FIXED, PAPER DIELECTRIC: MIL Type CP29A1EF103M; single section; 10,000 mmf ±20%; 600 v DC working; hermetically sealed metal case; 1 in. lg by 7/16 in. dia; 2 axial wire lead type terminals, one on ea end; no internal ground; single tangential mounting bracket w/single 5/32 in. dia mounting holes; marked w/ mfr's name, MIL Type designation, capacity, and DC working voltage; RCA part/dwg K-984609-64	Filters Output from V-1603
C-1604 thru C-1900		Not Used	
C-1901		CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 100,000 mmf ±20%; 600 v DC working, 250 v AC working; hermetically sealed metal can; 1-3/8 in. lg by 0.562 in. dia; two solder lug type terminals; 9/32 in. lg, located one ea end; vitamin Q impregnated; vitamin "Q" filled; no internal ground connections, single 5/16-24NF thread by 5/16 in. lg mounting bushing, also supplied w/ lockwasher and hex nut; 5 amp feedthru type capacitor; spec MIL-C-11693 (Sig c); Sprague Electric Co. Type no. 102P25; RCA part/dwg B-459684-45	Main Power Line Bypass Filter
C-1902		Same as C-1901	Main Power Line Bypass Filter
C-1903 thru C-2200		Not Used	
C-2201		CAPACITOR, VARIABLE, AIR DIELECTRIC: plate meshing type; 5 sections; 235 mmf max; 15 mmf min; straight line tuning characteristic; 230 rms test voltage; 8-3/8 in. lg by 2.781 in. wide by 3-5/8 in. high, less shaft and bushing; bushing dim., 0.195 in. lg by 1/4 in. dia by 3-5/8 in. ID; shaft dim. beyond bushing, 41/64 in. lg by 1/4 in. dia; extension shaft adjustment, 187 deg cw rotation; ceramic insulation; 10 solder lug type terminals; two no. 6-32 tapped mounting holes on 1 in. mounting center in block on top and three no. 10-32 mounting studs on 1.953 in. by 7.437 in. mounting center on bottom; ea section shielded from all other sections; all sections shielded against liquids and gases for a differential up to ±3 psi; resistant to 200 hrs salt spray test; 25 plates per section, front section steel, other sections brass; RCA part/dwg C-744506-2	Gang Tuning Capacitor
C-2201A		P/o C-2201	
C-2201B		P/o C-2201	
C-2201C		P/o C-2201	
C-2201D		P/o C-2201	
C-2201E		P/o C-2201	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-2202	N16-C-99999-0043	CAPACITOR, FIXED, MICA DIELECTRIC: 1 section; 2200 mmf ±10%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; hermetically sealed brass case; 0.651 in. dia by 0.102 in. lg; 2 solder lug type terminals; mounts by non-removable brackets located 120 deg apart on one end; RCA part/dwg B-467255-1	Plate Supply Filtering
C-2203	N16-C-45802-4768	CAPACITOR, FIXED, PAPER DIELECTRIC: single section; 100,000 mmf ±20%; 100 v DC working; hermetically sealed metal case w/plastic sleeve; 15/16 in. lg by 0.374 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked permanently w/ the capacitance in MF, tolerance, rated working voltage, and the vendor's name; RCA part/dwg C-737816-353	Manual Gain Control Bypass
C-2204	N16-C-45770-1713	CAPACITOR, FIXED, PAPER DIELECTRIC: single section; 100,000 mmf ±10%; 200 v DC working; hermetically sealed metal case, insulated w/plastic sleeve; 15/16 in. lg by 0.462 in. dia; 2 axial wire lead type terminals, one on ea end; vitamin Q impregnated; internally grounded; terminals mounted; marked w/capacity, tolerance, working voltage, and mfr's name; operating temp range -55 deg C to +85 deg C; Sprague Electric Co. Type no. 81P10492S3; RCA part/dwg C-737816-373	Plate Supply Bypass
C-2205	N16-C-42729-2001	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section, 10,000 mmf ±10%; 100 v DC working at 125 deg C; molded phenolic case; 3/4 in. lg by 0.200 in. dia; 2 axial wire lead type terminals, one on ea end; pokar impregnated; no internal ground; terminals mounted; operating temp range -55 deg C to +125 deg C; -8% capacitance change at -55 deg C, +10% capacitance change at +125 deg C; color coded; Sprague Electric Co. Type no. 75P; RCA part/dwg C-737845-137	Automatic Gain Control Filtering and Time Constant
C-2206	N16-C-59261-4029	CAPACITOR, VARIABLE, AIR DIELECTRIC: plate meshing type; one section; 28 mmf, 3 mmf; ea section straight line capacity tuning characteristic; 500 v 60 cycles rms; 31/32 in. lg by 25/32 in. wide by 15/16 in. high, less shaft and bushing; bushing dim.,. 9/32 in. lg by 5/16 in. dia, 32 threads per in., shaft dim., 3/4 in. lg by 0.250 in. dia; extension shaft adjustment, 360 deg rotation either direction; ceramic insulation; 2 solder lug type, hot solder dipped terminals; single hole mounting by 5/16 in. 32 thread by 9/32 in. lg bushing; 500 min "Q"; 19 brass nickle plated plates; RCA part/dwg B-462598-2	Antenna Trimmer
C-2207		Same as C-572	Heater Bypass, Mixer Unit
C-2208		Same as C-572	Heater Bypass, Mixer Unit
C-2209		Same as C-572	Heater Bypass, Oscillator Unit
C-2210	N16-C-16146-3364	CAPACITOR, FIXED, CERAMIC DIELECTRIC: JAN Type CC26BH220J; 22 mmf ±5%; 500 v DC working; temp coefficient, 30 mmf per mf per deg C positive ±60 mmf tolerance; insulated body in accordance w/JAN-C-20A; 0.812 in. lg by 0.250 in. dia; 2 axial wire lead type terminals, 1-1/4 in. lg; terminals mounted; spec JAN-C-20A; RCA part/dwg C-722417-6	Suppressor Coupling, V-551
C-2211 thru C-3100		Not Used	
C-3101	N16-C-15432-5828	CAPACITOR, FIXED, CERAMIC DIELECTRIC: MIL Type CC20CK020C; 2 mmf to 3.25 mmf; 500 v DC working; 0 mmf per mf per deg C temp coefficient, ±250 mmf tolerance; uninsulated; 0.400 in. lg [illegible] dia; 2 radial wire lead type terminals, 1-1/4 in. [illegible] mounted; color coded; RCA part/dwg P-722401-55	Fixed Trimmer, T-3102
C-3102	N16-C-15880-4628	[illegible] FIXED, CERAMIC DIELECTRIC: MIL Type CC20CH090C; [illegible] 0.25 mmf, 500 v DC working; 0 mmf per mf per deg C [illegible] efficient, ±60 parts per million tolerance, uninsulated; [illegible] lg by 0.200 in. dia; 2 radial wire lead type terminals, [illegible] lg; terminals mounted; color coded; RCA part/dwg P-722401-62	Fixed Trimmer, T-3102
C-3103		Same as C-3102	Fixed Trimmer, T-3103

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-3104	N16-C-15624-4628	CAPACITOR, FIXED, CERAMIC DIELECTRIC: MIL Type CC20CH050C; 5 mmf ±0.25 mmf; 500 v DC working; 0 mmf per mf per deg C temp coefficient, +60 parts per million tolerance; uninsulated; 0.400 in. lg by 0.200 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; color coded; RCA part/dwg P-722401-58	Fixed Trimmer, T-3104
C-3105		Same as C-3101	Fixed Trimmer, T-3105
C-3106		Same as C-566	With C-3107 Bandspread Network for T-3104
C-3107	N16-C-29707-7628	CAPACITOR, FIXED, MICA DIELECTRIC: 330 mmf ±1%; 500 v DC working; 0 to +40 parts per million per deg C temp coefficient; capacitance drift 0.05% 0.1 mmf max; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. thick; 2 axial wire lead type terminals, 1-1/8 in. lg, centrally located one on ea end; terminals mounted; marked w/RCA part/dwg no., color coded; RCA part/dwg B-465842-19	With C-3106, Bandspread Network for T-3104
C-3108		Same as C-566	With C-3109, Bandspread Network for T-3105
C-3109	N16-C-28716-1433	CAPACITOR, FIXED, MICA DIELECTRIC: 120 mmf ±1%; 500 v DC working; 0 to +40 parts per million per deg C temp coefficient; molded thermosetting material completely enclosing all elements; 33/64 in. lg by 19/64 in. wide by 7/32 in. deep; 2 axial wire lead type terminals, 1-1/8 in. lg, one on ea end; terminals mounted; color coded, capacitance drift shall not exceed 0.05% ±0.1 mmf; marked w/RCA part/dwg no.; moisture proof sealing; RCA part/dwg B-465842-7	With C-3108, Bandspread Network for T-3105
C-3110		Same as C-571; p/o Z-3101	Grid Coupling, V-3101
C-3111		Same as C-572; p/o Z-3101	Automatic Gain Control Filtering, V-3101
C-3112		Same as C-572; p/o Z-3101	Cathode Resistor Bypass, V-3101
C-3113		Same as C-573; p/o Z-3101	Screen Bypass, V-3101
C-3114		Same as C-572; p/o Z-3101	Heater Bypass
C-3115 thru C-3134		Not Used	
C-3135		CAPACITOR, VARIABLE, AIR DIELECTRIC: plate meshing type; 1 section; 19.7 mmf max., 2.6 mmf min.; straight line capacitance; 707 v DC peak; 1-5/32 in. lg by 5/8 in. wide by 3/4 in. high, less shaft and bushing; bushing dim., 5/16 in. lg by 1/4 in. dia, 32 threads per in.; shaft dim., 3/16 in. lg by 0.187 in. dia; screwdriver adjustment, 360 deg rotation either direction; ceramic insulation between rotor and stator; 2 solder lug type terminals; single hole mounted by 1/4 in. dia bushing; 500 min. "Q"; lance terminal located right side of capacitor facing panel; marked permanently w/RCA part/dwg no.; 21 brass silver plated plates; RCA part/dwg B-462181-2	Variable Trimmer, T-3135 Secondary
C-3136		Same as C-3135	Variable Trimmer, T-3136 Secondary
C-3137		Same as C-3135	Variable Trimmer, T-3137 Secondary
C-3138		Same as C-3135	Variable Trimmer, T-3138 Secondary
C-3139		Same as C-3135	Variable Trimmer, T-3139 Secondary
C-3140		Same as C-551	Variable Trimmer, L-3135
C-3141		Same as C-551	Variable Trimmer, L-3136
C-3142		Same as C-551	Variable Trimmer, L-3137
C-3143		Same as C-551	Variable Trimmer, L-3138

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-3144		Same as C-551	Variable Trimmer, L-3139
C-3145		Same as C-556	Top Coupling, T-3135
C-3146		Same as C-557	Loading, T-3135 Primary
C-3147		Same as C-3104	Fixed Trimmer, T-3135 Secondary
C-3148		Not Used	
C-3149		Same as C-558	Top Coupling, T-3136
C-3150		Not Used	
C-3151		Same as C-556	Fixed Trimmer, L-3136
C-3152		Not Used	
C-3153	N16-C-15752-4628	CAPACITOR, FIXED, CERAMIC DIELECTRIC: JAN Type CC20CH070C; 7 mmf ±0.25 mmf; 500 v DC working; 0 mmf per mf per deg C temp coefficient; ±60 parts per million tolerance; uninsulated; 0.400 in. lg by 0.200 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; color coded; RCA part/dwg C-722401-60	Fixed Trimmer, T-3137 Secondary
C-3154	N16-C-26199-9182	CAPACITOR, FIXED, MICA DIELECTRIC: 12 mmf ±2%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-411	Fixed Trimmer, L-3137
C-3155	N16-C-27651-1267	CAPACITOR, FIXED, MICA DIELECTRIC: 51 mmf ±2%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-424	Fixed Trimmer, T-3138 Secondary
C-3156	N16-C-29941-4696	CAPACITOR, FIXED, MICA DIELECTRIC: 405 mmf ±1%; 300 v DC working; -20 to +100 parts per million per deg C; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, 1-7/16 in. lg by 0.032 in. dia; terminals mounted; color coded; RCA part/dwg A-8824194-5	Bandspread for T-3138
C-3157	N16-C-26833-3226	CAPACITOR, FIXED, MICA DIELECTRIC: 22 mmf ±2%; 500 v DC working; -20 to +100 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-737837-416	Fixed Trimmer, L-3138
C-3158	N16-C-29862-8448	CAPACITOR, FIXED, MICA DIELECTRIC: 375 mmf ±1%; 300 v DC working; -20 to +100 parts per million per deg C; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, 1-7/16 in. lg by 0.032 in. dia; terminals mounted; color coded; RCA part/dwg A-8824194-4	With C-3159, Bandspread Network for L-3138
C-3159		Same as C-566	With C-3158, Bandspread Network for L-3138
C-3160		Same as C-1054	Loading, T-3139 Primary
C-3161		Same as C-3155	Fixed Trimmer, T-3139 Secondary
C-3162	N16-C-28916-5043	CAPACITOR, FIXED, MICA DIELECTRIC: 140 mmf ±1%; 500 v DC working; -20 to +100 parts per million per deg C; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, 1-7/16 in. lg by 0.032 in. dia; terminals mounted; color coded; RCA part/dwg A-8824194-2	Bandspread for T-3139
C-3163		Same as C-570	Fixed Trimmer, L-3139
C-3164		Same as C-3162	With C-3165, Bandspread Network for L-3139
C-3165		Same as C-556	With C-3164, Bandspread Network for L-3139

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-3166	N16-C-16141-2572	CAPACITOR, FIXED, CERAMIC DIELECTRIC: JAN Type CC20UJ220G; 22 mmf ±2%; 500 v DC working; -750 mmf per mf per deg C; ±120 mmf tolerance; uninsulated; 0.400 in. lg by 0.200 in. dia; 2 axial wire lead type terminals, 1-1/4 in. lg by 0.025 in. dia; terminals mounted; RCA part/dwg C-722401-418	Compensates RF Transformers
C-3167		Same as C-577	Compensates RF Coils
C-3168		Same as C-3101	Input Coupling for Calibrator
C-3169		Same as C-571; p/o Z-3135	Grid Coupling, V-3135
C-3170		Same as C-572; p/o Z-3135	Automatic Gain Control Filtering, V-3135
C-3171		Same as C-572; p/o Z-3135	Cathode Resistor Bypass, V-3135
C-3172		Same as C-573; p/o Z-3135	Screen Bypass, V-3135
C-3173		Same as C-572; p/o Z-3135	Heater Bypass
C-3174 thru C-4000		Not Used	
C-4001	N16-C-99999-0042	CAPACITOR, FIXED, MICA DIELECTRIC: 220 mmf ±5%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg max by 19/64 in. wide max by 7/32 in. thick max; 2 axial wire lead type terminals, 1-1/8 in. lg, 0.032 in. dia; one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-339	With R-4001, Antenna Isolation Network
C-4002 thru C-4400		Not Used	
C-4401		Same as C-551	Variable Trimmer, L-4401
C-4402		Same as C-551	Variable Trimmer, L-4402
C-4403		Same as C-551	Variable Trimmer, L-4403
C-4404		Same as C-551	Variable Trimmer, L-4404
C-4405		Same as C-551	Variable Trimmer, L-4405
C-4406	N16-C-99999-0029	CAPACITOR, FIXED, MICA DIELECTRIC: 458 mmf ±1%; 300 v DC working; 0 to +40 parts per million per deg C temp coefficient; phenolic case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; marked w/RCA part/dwg no.; color coded; RCA part/dwg B-465842-3	Series Padder, V-4402, C-2201A
C-4407	N16-C-16299-7701	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 33 mmf ±2%; 300 v DC working; NPO temp coefficient; ±15 mmf tolerance; uninsulated; 0.460 in. lg by 0.230 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; polystyrene lacquer coated; color coded; marked w/RCA part/dwg no.; RCA part/dwg C-748269-9	Compensating Capacitor, L-4402
C-4408	N16-C-15752-4501	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 7 mmf ±0.25 mmf; 500 v DC working; 0 temp coefficient; ±15 mmf tolerance; uninsulated; 0.400 in. lg by 0.200 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; polystyrene lacquer coated; color coded; marked w/RCA part/dwg no.; RCA part/dwg C-748269-1	Compensating Capacitor, L-4401
C-4409	N16-C-99999-0030	CAPACITOR, FIXED, MICA DIELECTRIC: 1 section; 820 mmf ±1%; 500 v DC working; -0 to +50 parts per million per deg C temp coefficient; hermetically sealed plastic case; 51/64 in. lg by 7/32 in. wide by 15/32 in. high; 2 uninsulated wire lead type terminals; RCA part/dwg B-465842-4	Series Padder, L-4402, C-2201A
C-4410		Same as C-4407	Compensating Capacitor, L-4402
C-4411		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
C-4412	N16-C-99999-0031	CAPACITOR, FIXED, MICA DIELECTRIC: 1 section; 1400 mmf ±1%; 500 v DC working; -0 to +50 parts per million per deg C temp coefficient; hermetically sealed plastic case; 51/64 in. max lg by 7/32 in. max wide by 15/32 in. max high; 2 uninsulated wire lead type terminals; RCA part/dwg B-465842-5	Series Padder, L-4403, C-2201A
C-4413	N16-C-16236-5873	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 27 mmf ±2%; 300 v DC working; NPO temp coefficient; ±15 mmf tolerance; uninsulated; 0.460 in. lg by 0.230 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; polystyrene lacquer coated, color coded; marked w/RCA part/dwg no.; RCA part/dwg C-748269-7	Compensating Capacitor, L-4403
C-4414		Not Used	
C-4415	N16-C-99999-0063	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 10 mmf ±0.5 mmf; 500 v DC working; NPO temp coefficient; ±15 mmf tolerance; uninsulated; 0.400 in. lg by 0.200 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; polystyrene lacquer coated; color coded; marked w/RCA part/dwg no.; RCA part/dwg C-748269-2	Compensating Capacitor, L-4404
C-4416		Same as C-4407	With C-4417, Bandspread Network for L-4404
C-4417	N16-C-29651-6885	CAPACITOR, FIXED, MICA DIELECTRIC: 288 mmf ±1%; 500 v DC working; 0 to +40 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; marked w/RCA part/dwg no.; color coded; RCA part/dwg B-465842-17	With C-4416, Bandspread Network for L-4404
C-4418	N16-C-16139-5946	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 22 mmf ±2%; 500 v DC working; -150 mmf per mf per deg C temp coefficient; ±15 mmf tolerance; uninsulated; 0.520 in. lg by 0.395 in. wide by 3/32 in. thick; 2 wire lead type terminals, 1-1/4 in. lg; terminals mounted; color coded; lacquer coated; RCA part/dwg C-748269-21	Compensating Capacitor, L-4405
C-4419		Same as C-4407	With C-4420, Bandspread Network for L-4405
C-4420		Same as C-3109	With C-4419, Bandspread Network for L-4405
C-4421	N16-C-26442-8169	CAPACITOR, FIXED, MICA DIELECTRIC: 15 mmf ±5%; 500 v DC working; -200 to +200 parts per million per deg C temp coefficient; molded low loss bakelite case; 33/64 in. lg by 19/64 in. wide by 7/32 in. high; 2 axial wire lead type terminals, one on ea end; terminals mounted; color coded; RCA part/dwg C-748252-312; p/o Z-4401	Output Coupling, V-4401
C-4422		Same as C-571; p/o Z-4401	Grid Coupling, V-4401
C-4423	N16-C-42762-5402	CAPACITOR, FIXED, PAPER DIELECTRIC: 1 section; 10,000 mmf ±20 %; 100 v DC working; hermetically sealed metal case w/plastic insulating sleeve; 13/16 in. lg by 0.237 in. dia less terminals; 2 wire lead type terminals, one on ea end; vitamin Q impregnated; not internally grounded; terminals mounted; operating temp range -55 deg C to +85 deg C; marked w/capacitance, tolerance, working voltage and mfr's name; Sprague Electric Co. Catalog no. 81P10301S4; RCA part/dwg C-737816-27; p/o Z-4401	Heater Bypass, V-4401
C-4424		Same as C-573; p/o Z-4401	Screen Bypass, V-4401
C-4425		Same as C-573; p/o Z-4401	Plate Supply Filtering, V-4401
C-4426		Same as C-1050; p/o Z-4401	B+ Blocking Capacitor
C-4427 thru C-4430		Not Used	
C-4431	N16-C-15982-2389	CAPACITOR, FIXED, CERAMIC DIELECTRIC: 15 mmf ±2%; 500 v DC working; NPO temp coefficient; ±15 mmf tolerance; uninsulated; case dim., 0.460 in. lg by 0.230 in. dia; 2 radial wire lead type terminals, 1-1/4 in. lg; terminals mounted; polystyrene lacquer coated; color coded; marked w/RCA part/dwg no.; RCA part/dwg C-748269-12	Compensating Capacitor, L-4404

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
CR-101	N16-T-51734-0010	CRYSTAL UNIT, RECTIFYING: germanium; Technical Material Corp. Part no. 1N34	V. M. O. Output Rectifier
CR-102		Same as CR-101	BFO Output Rectifier
CR-103 thru CR-200		Not Used	
CR-201		Same as CR-101	IFO Output Rectifier
CR-202		Same as CR-101	HFO Output Rectifier
CR-203 thru CR-800		Not Used	
CR-801	N16-T-51769	CRYSTAL UNIT, RECTIFYING: JAN Type 1N69; germanium type; 0.04 amp max. continuous forward current; 0.125 amp max. peak forward current; 75 v peak inverse voltage; 0.8 mmf shunt capacitance; 1/2 in. lg by 0.250 in. dia, less terminals; terminals mounted; 2 axial wire lead type terminals, one on ea end; 60 v continuous DC reverse working voltage	Controls Direction if Current Flow Through Meter M-1502
CR-802		Same as CR-801	Controls Direction of Current Flow Through Meter M-1503
CR-803 thru CR-1000		Not Used	
CR-1001		Same as CR-801	Tuning Indicator Rectifier
E-101	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	BUSHING: strain relief; 0.406 in. lg; Technical Material Corp. Part no. CU-107-1	Phenolic Strain Relief for Power Cable
E-102 thru E-300		Not Used	
E-301		TERMINAL BOARD: barrier type; eight no. 6-32 by 1/4 in. binding head machine screw; Technical Materiel Corp. Part no. TM102-8	Inner Oven Connections
E-302		Same as E-301	Outer Oven Connections
E-303 thru E-400		Not Used	
E-401	N16-S-34607-6039	SHIELD, ELECTRON TUBE: JAN Type TS102U03; copper or brass, nickel plated; cylindrical shape; 0.930 in. OD by 2-1/4 in. high overall; bayonet slot mounted; incl compression spring; marked w/ mfr's name and JAN Type number; RCA part/dwg A-99147-3	Tube Shield for V-401
E-402		Same as E-401	Tube Shield for V-402
E-403		Same as E-401	Tube Shield for V-403
E-404		Same as E-401	Tube Shield for V-404
E-405		Same as E-401	Tube Shield for V-405
E-406	Shop Manufacture	TERMINAL BOARD: silicone glass; incl 32 stud type terminals; w/o barriers; 6-11/16 in. lg by 9/16 in. wide by 13/32 in. high overall; mounts by four 0.1360 in. dia (no. 29 drill) holes on a 3-13/16 in. by 1-3/16 in. mounting center; marked w/various capacitor and resistor symbol numbers in black letters; RCA part/dwg B-474166-1	Supports Capacitors and Resistors
E-407	Shop Manufacture.	CLAMP, ELECTRICAL: stainless steel, passivating dip; 1 spring type fastener; 1-7/8 in. lg by 1-3/4 in. wide by 5/8 in. thick overall; has single mounting ear w/hole to accommodate no. 10 machine screw located at 8 o'clock; centerline of hole is on a 29/32 in. radius from center of clamp; designed to hold material 1-3/8 in. max dia; clamping spring located at approx 10 o'clock; Birtcher Corp. Catalog no. 926C-39; RCA part/dwg A-8901604-1	Supports Capacitor

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-408	Shop Manufacture	CLAMP, ELECTRICAL: stainless steel; passivating dip; 1 spring type fastener; 1-7/8 in. lg by 1-3/4 in. wide by 5/8 in. thick overall; has single mounting ear w/hole to accommodate no. 10 machine screw located at 4 o'clock; centerline of hole is on a 29/32 in. radius from center of clamp; designed to hold material 1-3/8 in. max dia; clamping spring located at approx 2 o'clock; Birtcher Corp. Catalog no. 926C-32; RCA part/dwg A-8901603-1	Supports Capacitor
E-409	Shop Manufacture	NUT, STRAP: used to mount miniature and noval sockets, also serves as grounding lugs for convenience of wiring;brass, cadmium plated finish; 1.243 in. lg by 9/16 in. wide by 3/8 in. thich overall; mounts by two no. 4-40 tap holes spaced 0.875 in. C to C; Cinch Mfg. Corp. Catalog no. 1060; RCA part/dwg K-99145-8	Ground Connection for R-412 and C-408
E-410		Same as E-409	Ground Connection for C-403, C-407, X-401-7 and X-404-1
E-411		Same as E-409	Ground Connection for C-408, J-401, X-405
E-412 thru E-550		Not Used	
E-551	Shop Manufacture	TERMINAL, STUD: nut and washer connection; brass, silver plate; 1-1/16 in. lg by 7/32 in. wide by 0.125 in. thick overall; mounts by no. 4-40 by 13/32 in, lg shank; no. 4-40 tapped hole in flatted end; RCA part/dwg A-8846044-1	Mixer Unit Connection to C-2201B
E-552		Same as E-551	Mixer Unit Connection to C-2201B
E-553	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 5 brass post type terminals, hot solder dipped, 2 solder lug type terminals, hot solder dipped; w/o barriers; 1-11/16 in. lg by 21/32 in. wide by 19/32 in. high overall; mounted by two no. 4-40 self-clinching nuts on 0.375 in. mounting center of integral brackets; marked w/ C-568, C-569, C-565, and C-566; RCA part/dwg B-464024-506	Supports Capacitors and Wiring
E-554	Shop Manufacture	PLATE, ELECTRICAL GROUNDING: brass; silver plated; "Z" shaped; 3-31/32 in. lg by 1-39/64 in. wide by 7/8 in. high overall; mounts by two no. 0-80 tapped mounting holes on 0.578 in. mounting center; marked w/ C-551, C-552, C-553, C-554, C-555, C-556, C-562, C-564, and C-567; RCA part/dwg T-630899-10	Supports Wiring
E-555	N17-B-77936-2435	TERMINAL BOARD: laminated plastic board; incl 10 stud type terminals; w/o barriers; 4-1/8 in. lg by 1/4 in. wide by 0.253 in. thick overall; five 0.078 in. dia mounting holes spaced on 0.781 in. mounting centers; marked C-570, C-577, C-561, C-558, C-557; RCA part/dwg C-746176-515	Supports Capacitors and Wiring
E-556	Shop Manufacture	SHIELD, ELECTRON TUBE: phosphor bronze, spring temper, 0.010 in. thick, silver plate; cylindrical shape w/end tag extensions; 1-7/16 in. lg by 13/32 in. wide, 0.36375 in. OD by 3/8 in. high overall; mounts by 0.086 in. dia hole in one end, tag for rivet; to withstand 48-hr salt spray test; riveted and soldered electrical connections at tags serves as tube mount; National Machine Shop Inc. Type T3 (6873-3); RCA part/dwg A-8832370-2; p/o E-563	Supports V-551
E-557		Same as E-556; p/o E-563	Supports V-552
E-558	Procured on demand by nearest Naval Shore Supply Activity	TERMINAL, STUD: solder connection; brass, tin and zinc alloy finish; 7/16 in. lg by 3/32 in. dia overall; mounts by rivet-like action of split base of shank; RCA part/dwg A-8817183-2; p/o E-563	Supports Wiring
E-559		Same as E-558; p/o E-563	Supports Wiring
E-560	Shop Manufacture	TERMINAL, LUG: eye type; copper; hot solder dipped; no. 16 AWG wire accommodated; 15/64 in. lg by 7/32 in. wide by 15/64 in. high overall; soldered wire connection; 0.120 in. dia mounting hole in 7/32 in. dia end; made from 0.032 in. thick sheet, 3/16 in. wide wiring section; RCA part/dwg A-79534-10	Wiring Connection to Chassis

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-561	Shop Manufacture	INSULATOR PLATE: lustrex, clear or red; rectangular shape; 1-11/32 in. lg by 5/16 in. wide by 3/16 in. thick; mounts by two 0.073 in. dia holes spaced 0.578 in. C to C; has 13 slots; 6 one side, 7 other side; slots accommodate wire, slots 0.052 in. square; RCA part/dwg A-8834040-1	Supports Wiring
E-562	Shop Manufacture	INSULATOR, PLATE: teflon; rectangular shape; 1-11/32 in. lg by 5/16 in. wide by 1/32 in. thick overall; mounts by 2 holes 0.073 in. spaced 0.578 in. C to C; RCA part/dwg A-8834041-3	With E-561 Supports Wiring
E-563	For Reference Only	TERMINAL BOARD: laminated glass cloth, silicone resin board; 23 stud terminals, 1 solder lug terminal; w/o barriers; 3 in. lg by 1-7/16 in wide by 15/16 in. deep overall; mounted by two terminal pins at one end in corners, 0.093 in. dia, 1.156 in. C to C, 0.328 in. lg projecting; w/shield and shield mount, grounding straps; RCA part/dwg T-629844-508; p/o Z-551	Foundation for Z-551
E-564	Shop Manufacture	INSULATOR, PLATE: laminated glass cloth, white, silicone resin finish; rectangular shape w/chamfer one end; 4-3/32 in. lg by 9/16 in. wide by 0.010 in. thick overall; five 0.261 in. dia mounting holes spaced 0.781 in. C to C along centerline of plate; plate has 3/16 in. by 45 deg chamfer one end; RCA part/dwg A-8829184-1	Insulates E-564 from Chassis
E-565	Procured on demand by nearest Naval Shore Supply Activity	INSULATOR, STANDOFF: lustrex, clear or red; cylindrical pillar shape; 15/32 in. lg by 1/4 in. dia overall; mounts by single no. 4-40 tapped hole thru base of insulator; one end undercut 3/64 in. deep by 0.140 in. wide; Monsanto Chemical Co. Lustrex LXC: RCA part/dwg A-8810450-1	Supports Bus Wiring
E-566	Shop Manufacture	TERMINAL, STUD: solder connection; brass, tin and zinc alloy finish; 11/32 in. lg by 3/32 in. dia overall; mounts by rivet-like action of split base of shank; RCA part/dwg A-8817183-1; p/o E-563	Supports Wiring to E-563
E-567 thru E-600		Not Used	
E-601	N16-S-34576-6514	SHIELD, ELECTRON TUBE: JAN Type TS103U02; brass or copper, nickel plated; cylindrical shape; 0.95 in. ID, 1-15/16 in. high; bayonet slot mounted; incl compression spring; marked w/mfr's name and JAN type number; RCA part/dwg K-8888549-2	Tube Shield for V-601
E-602		Same as E-601	Tube Shield for V-602
E-603		Same as E-601	Tube Shield for V-603
E-604	Shop Manufacture	TERMINAL BOARD: silicone glass; incl 18 stud type terminals; w/o barriers; 4-3/4 in. lg by 1-11/16 in. wide by 13/32 in. high overall; mounts by four 0.1360 in. dia (no. 29 drill) holes on a 4-7/16 in. by 1-1/16 in. mounting center; marked w/various capacitor symbol numbers in black letters; RCA part/dwg B-474178-1	Supports Capacitors
E-605	Shop Manufacture	TERMINAL BOARD: silicone glass; incl 42 stud type terminals; w/o barriers; 5-1/8 in. lg by 2-1/16 in. wide by 3/8 in. high overall; mounts by four 0.1360 in. dia (no. 29 drill) holes on a 4-13/16 in. by 1-1/4 in. mounting center; marked w/various resistor and capacitor symbol numbers in black letters; has 32 terminals on one side and 10 terminals on other side of board; RCA part/dwg B-474179-1	Supports Capacitors and Resistors
E-606	Shop Manufacture	TERMINAL BOARD: silicone glass; incl 18 stud type terminals; w/o barriers; 4-3/4 in. lg by 1-11/16 in. wide by 13/32 in. high overall; mounts by four 0.1360 in. dia (no. 29 drill) holes on a 4-7/16 in. by 1-1/16 in. mounting center; marked w/various capacitor symbol numbers in black letters; RCA part/dwg B-474180-1	Supports Capacitors
E-607	N17-C-804831-0391	CLIP, ELECTRICAL: stainless steel; 1-1/16 in. lg by 1-1/4 in. wide by 19/32 in. thick; 1-1/8 in. normal jaw opening; has single 0.136 in. dia (no. 29 drill) hole centrally located in base for securing to chassis; P.R. Mallory and Co., Inc. Catalog no. TH-23; RCA part/dwg A-8901605-1	Supports Capacitor
E-608	N17-T-26687-3248	TERMINAL, LUG: round tongue end type; bronze; hot tin dipped finish; no. 11 AWG wire accommodated; 41/64 in. lg by 5/16 in. wide by 15/64 in. high overall; soldered wire connection; one 0.138 in. dia mounting hole on end; shakeproof; Shakeproof Inc. Catalog no. 2104-06-00; RCA part/dwg A-99061-5	Ground Connection for C-625, T-602-5, T-602 Shield Braid

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-609		Same as E-608	Ground Connection for C-612
E-610	Shop Manufacture	NUT, STRAP: for mounting miniature sockets, also serves as grounding lugs for sockets and capacitors for convenience of wiring; brass, cadmium plate finish; 1-15/32 in. lg by 5/8 in. wide by 3/8 in. deep overall; mounts by two no. 4-40 tapped holes spaced 1.125 in. C to C; Cinch Mfg. Corp. Part no. 20K14167; RCA part/dwg B-148271-5	Ground Connection for C-618, R-610, R-612, R-614, R-616, R-617
E-611		Same as E-610	Ground Connection for R-625, X-601
E-612		Same as E-610	Ground Connection for R-602, R-604, R-606, R-608
E-613	N17-T-26695-1753	TERMINAL, LUG: round tongue end type; phosphorous bronze; no. 14 AWG wire accommodated; 3/4 in. lg by 5/16 in. wide by 3/16 in. high overall; soldered wire connection; mounts by one centrally located 0.150 in. dia mounting hole; shakeproof; Shakeproof Inc. Part 2157-06-01; RCA part/dwg A-8903688-1	Ground Connection for C-619, J-601-U, J-601-W, S-601-C 1-8 (J-601-X) Shield Braid
E-614 thru E-700		Not Used	
E-701	N16-S-34557-8351	SHIELD, ELECTRON TUBE: JAN Type TS102U02; copper or brass; cylindrical shape; 1-3/4 in. lg by 0.930 in. OD overall; bayonet slot mounting; incl compression ring; marked w/mfr's name and JAN type number; RCA part/dwg A-99147-2	Tube Shield for V-701
E-702		Same as E-701	Tube Shield for V-702
E-703		Same as E-601	Tube Shield for V-703
E-704		Same as E-401	Tube Shield for V-704
E-705	Shop Manufacture	TERMINAL BOARD: silicone glass; incl 18 stud type terminals; w/o barriers; 5-13/16 in. lg by 1-1/2 in. wide by 3/8 in. high overall; mounts by four 0.1360 in. dia (no. 29 drill) holes on a 5-1/2 in. by 7/8 in. mounting center; marked w/various resistor and capacitor symbol numbers in black letters; RCA part/dwg B-474173-1	Supports Capacitors and Resistors
E-706	Shop Manufacture	CLAMP, ELECTRICAL: nylon; 1 bolt type fastener (bolt not supplied); 1.167 in. lg by 1/2 in. wide by 0.435 in. high overall; mounts by single 13/64 in. dia hole which also accepts bolt that supplies clamping action to the material to be held; designed to hold 3/8 in. max dia and 0.359 in. min dia material; Whitehead Metal Products Co., Inc. Type 6-6; RCA part/dwg A-8869387-5	Supports Capacitor
E-707	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	CLIP, ELECTRICAL: spring phosphor bronze; nickel plate; 11/16 in. lg by 0.446 in. wide by 7/32 in. high; 1/4 in. normal jaw opening; has one 0.120 in. dia (no. 31 drill) hole centrally located in base for mounting purposes; RCA part/dwg A-8869395-1	Supports Crystal Y-701
E-708		Same as E-613	Ground Connection for C-708, C-709, S-701
E-709		Same as E-613	Ground Connection for C-710, J-701, T-702
E-710		Same as E-409	Ground Connection for L-701, R-702, R-703
E-711		Same as E-409	Ground Connection for C-705, C-706, C-707, R-709
E-712		Same as E-610	Ground Connection for C-704, R-713, R-715
E-713		Same as E-409	Ground Connection for J-701, R-701, R-711, X-703
E-714 thru E-800		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-801		Same as E-601	Tube Shield for V-801
E-802		Same as E-601	Tube Shield for V-802
E-803		Same as E-601	Tube Shield for V-803
E-804		Same as E-601	Tube Shield for V-804
E-805		Same as E-401	Tube Shield for V-805
E-806	Shop Manufacture	TERMINAL BOARD: silicone glass board; incl 34 stud type terminals; w/o barriers; 4-7/8 in. lg by 2-1/4 in. wide by 3/8 in. high overall; mounts by four 0.1360 in. dia (no. 29 drill) holes on a 4-9/16 in. by 1-1/2 in. mounting center; marked w/various resistor and capacitor symbol numbers in black letters; RCA part/dwg B-474169-4	Supports Capacitors and Resistors
E-807	Shop Manufacture	TERMINAL BOARD: silicone glass board; incl 36 stud type terminals; w/o barriers; 4-7/8 in. lg by 2-1/4 in. wide by 3/8 in. high overall; mounts by four 0.1360 in. dia (no. 29 drill) holes on a 4-9/16 in. by 1-1/2 in. mounting center; marked w/various resistor and capacitor symbol numbers in black letters; RCA part/dwg B-474170-5	Supports Capacitors and Resistors
E-808	Shop Manufacture	TERMINAL BOARD: silicone glass board; incl 17 stud type terminals; w/o barriers; 4 in. lg by 2-1/4 in. wide by 13/32 in. high overall; mounts by four 0.1360 in. dia (no 29 drill) holes on a 3-11/16 in. by 1-1/2 in. mounting center; marked w/various resistor and capacitor symbol numbers in black letters; 6 terminals located on one side of board and 10 terminals located on other side of board; RCA part/dwg B-474171-1	Supports Capacitors and Resistors
E-809	Shop Manufacture	TERMINAL BOARD: silicone glass board; incl 16 stud type terminals; w/o barriers; 3-9/16 in. lg by 1-11/16 in. wide by 21/32 in. thick overall; mounts by four 0.1360 in. dia (no 29 drill) holes on a 3-1/4 in. by 1-1/16 in. mounting center; marked w/various resistor and capacitor symbols; has 12 terminals on one side of board and 4 terminals on other side of board; RCA part/dwg B-475300-1	Supports Capacitors and Resistors
E-810		Same as E-613	Ground Connection for J-801
E-811		Same as E-613	Ground Connection for C-810, R-810, S-804
E-812		Same as E-608	Ground Connection for C-802
E-813		Same as E-608	Ground Connection for R-801, C-801
E-814		Same as E-610	Ground Connection for C-811, R-812, R-817, X-801
E-815		Same as E-610	Ground Connection for C-814, R-820, R-826
E-816		Same as E-610	Ground Connection for R-827, R-828
E-817		Same as E-610	Ground Connection for C-817, R-831, R-836, R-837, R-839
E-818		Same as E-409	Ground Connection for R-841, R-842, T-801
E-819 thru E-900		Not Used	
E-901	Procured on demand by nearest Navel Short Supply Activity	TERMINAL, LUG: round tongue end type; 1/64 in. copper; hot solder dipped, must be smooth and free from lumps; no. 11 AWG wire accommodated; 0.2499 in. high by 0.2968 in. lg by 0.2187 in. wide overall; soldered wire connection; one 0.120 in. dia mounting hole and one 0.093 in. dia hole to accommodate wire; shakeproof; F.R. Zierick Co. Catalog no. 75 modified; RCA part/dwg A-79534-11	Wiring Connection to Chassis

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-902	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 7 brass, hot solder dipped feedthrough type terminals; w/o barriers; 27/32 in. lg by 5/8 in. wide by 0.273 in. thick overall; mounts by two 0.147 in. dia mounting holes on a 0.593 in. mounting center; RCA part/dwg A-8820937-501	Supports Wiring
E-903	Shop Manufacture	TERMINAL BOARD: laminated glass cloth board; 4 solder stud type terminals; 1-9/32 in. lg by 7/8 in. wide by 0.172 in. high overall; 4 mounting holes 0.089 in. dia on 41/64 in. by 1.031 in. mounting centers; marked C-917, C-918; ea end has oval shaped cutout; RCA part/dwg A-8820931-503	Supports Capacitors
E-904	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 5 brass, hot solder dipped feedthrough type terminals; w/o barriers; 1-15/32 in. lg by 11/16 in. wide by 0.273 in. thick overall; mounts by two 0.147 in. dia mounting holes on a 1-7/32 in. mounting center; marked w/ R-905 w/ 3/32 in. high std characters; RCA part/dwg A-8820935-503	Supports R-905 and Wiring
E-905	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 6 brass, hot solder dipped stud type terminals; w/o barriers; 15/16 in. lg by 29/32 in. wide by 7/16 in. thick overall; mounts by integral "L" shape bracket w/two no. 4-40 self-clinching nuts on 0.477 in. center; marked C-916 and R-904; RCA part/dwg A-8820950-503	Supports Resistors and Capacitors
E-906		Not Used	
E-907		Same as E-901	Wiring Connection to Chassis
E-908		Same as E-901	Wiring Connection to Chassis
E-909	Shop Manufacture	HOLDER, CRYSTAL UNIT: crystal holder; beryllium copper, white nickel plate finish; 7/16 in. lg by 23/32 in. high by 9/32 in. wide overall; max. inside length at base 13/32 in. lg; heat treated spring temper; single mounting hole 0.120 in. dia in center of base; RCA part/dwg A-8837459-1	Secures Y-901 in Socket
E-910 thru E-1000		Not Used	
E-1001	Shop Manufacture	TERMINAL BOARD: laminated; incl solder post type and solder post standoff type; 9 large terminals, 5 small terminals; w/o barriers; 1-25/32 in. lg by 1-1/32 in. wide by 7/16 in. thick overall; two 0.141 in. dia mounting holes, 1-3/8 in. C to C; RCA part/dwg A-8834048-501	Supports O-1001, O-1002, O-1003 Links
E-1002	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 5 stud type terminals; w/o barriers; 1-1/2 in. lg by 1-1/8 in. wide by 3/8 in. thick overall; mounts by two no. 4-40 Quintlock nuts on a 1.24 in. mounting center; marked C-1065, R-1030, R-1005, and C-1030; one corner beveled; RCA part/dwg A-8834049-502	Supports Resistors and Capacitors
E-1003	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 5 stud type terminals; w/o barriers; 1-1/2 in. lg by 1-1/8 in. wide by 3/8 in. thick overall; mounts by two no. 4-40 Quintlock nuts on a 1.25 in. mounting center; marked C-1066 and R-1031; one corner beveled; RCA part/dwg A-8834049-503	Supports Resistors and Capacitors
E-1004, E-1005		Not Used	
E-1006	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 4 single rivet type terminals; w/o barriers; 1-3/32 in. lg by 5/8 in. wide by 7/32 in. thick overall; two no. 2-56 tapped mounting holes 0.812 in. C to C; RCA part/dwg A-8833243-501; p/o Z-1011	Connections for Z-1011
E-1007	Shop Manufacture	TERMINAL BOARD: laminated glass cloth silicone resin board, 1/16 in. thick; incl 7 stud type terminals; w/o barriers; 1-25/32 in. lg by 31/32 in. wide by 0.355 in. deep overall; 3 mounting holes one in ea of 3 corners of board, 0.136 in. dia, 1.468 in. by 0.656 in. mounting center; marked w/ 3/32 in. high std characters std black synthetic C-1044, C-1043, CR1001, on one face of board and C-1045, C-1042 on other face; RCA part/dwg A-8848145-501; p/o Z-1009	Connections for Z-1009
E-1008		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-1009	Shop Manufacture	TERMINAL,STUD: soldered connections; brass, hot soldered dipped; 0.490 in. lg by 0.125 in. dia overall; mounts into 0.093 in. dia hole in panel and swaged into place; has a 0.040 in. dia three hole to accommodate wire thru chassis; Hugh H. Eby, Inc. Type no. 9774-1AK; RCA part/dwg B-468057-1	Supports Wiring
E-1010		Same as E-1009	Supports Wiring
E-1011	Shop Manufacture	TERMINAL BOARD: brass board; incl 5 feedthrough type, 2 single and solder lug post type terminals; w/o barriers; 2-3/8 in. lg by 1-7/8 in. wide by 19/32 in. high overall; two no. 2-56 tapped mounting holes on 1.625 in. mounting center; marked w/ C-1060, C-1061, C-1062 and C-1063; RCA part/dwg B-462142-501	Supports Wiring
E-1012	Shop Manufacture	TERMINAL, STUD: solder connections; brass, hot tin dip finish; 0.342 in. lg by 0.125 in. dia overall; mounts by 0.093 in. dia by 0.145 in. lg center portion; double ended; RCA part/dwg B-468057-7	Supports Wiring
E-1013		Same as E-1012	Supports Wiring
E-1014	Shop Manufacture	TERMINAL BOARD: laminated glass cloth silicone resin board; incl 13 post type brass hot solder dipped terminals; w/o barriers; 2-5/32 in. lg by 1-13/64 in. wide by 17/32 in. thick overall; two 0.147 in. dia mounting holes on 1.906 in. mounting center; marked w/ R-1032, C-1001, R-1001, and C-1053; RCA part/dwg B-465816-501	Mounts Resistors and Capacitors in Second IF
E-1015	N17-T-26623-4296	TERMINAL, LUG: round tongue end type; copper; hot solder dipped, free from lumps; no. 15 AWG wire accommodated; 1/2 in. lg by 7/32 in. wide by 1/64 in. thick overall; soldered wire connection; one 0.120 in. dia mounting hole one end and one 1/16 in. dia hole other end to accommodate wire; shakeproof; F. R. Zierick Co. Catalog no. 75; RCA part/dwg A-79534-1	Wiring Connection to Chassis
E-1016		Same as E-1015	Wiring Connection to Chassis
E-1017		Same as E-1015	Wiring Connection to Chassis
E-1018		Same as E-1015	Wiring Connection to Chassis
E-1019, E-1020		Not Used	
E-1021	Shop Manufacture	INSULATOR, PLATE: Dupont Tetrafluorethylene coated glass fabric, white; flat, rectangular, 1-3/32 in. lg by 5/8 in. wide by 0.010 in. thick overall; two 0.102 in. dia mounting holes on a 13/16 in. mounting center; RCA part/dwg A-8813771-1; p/o Z-1011	Insulates Wiring in Z-1011
E-1022		Not Used	
E-1023		Same as E-1006; p/o Z-1017	Connections for Z-1017
E-1024		Same as E-1006; p/o Z-1018	Connections for Z-1018
E-1025		Same as E-1021: p/o E-1023	Insulates Wiring in Z-1017
E-1026		Same as E-1021; p/o E-1024	Insulates Wiring in Z-1018
E-1027 thru E-1100		Not Used	
E-1101	Shop Manufacture	TERMINAL BOARD: laminated phenolic board; incl 18 solder post type terminals w/o barriers; 3-21/32 in. lg by 1 in. wide by 7.32 in. high overall; 2 mounting holes 0.147 in. dia spaced 3.093 in. C to C; no 2 terminals closer than 3/16 in.; RCA part/dwg A-8832397-501	Supports Resistors and Capacitors
E-1102	Procured on demand by nearest Naval Shore Supply Activity	TERMINAL, LUG: round tongue end type; 1/64 in. thick copper; hot solder dipped, must be smooth and free from lumps; no. 12 AWG wire accommodated; 0.2499 in. high by 0.2812 in. lg by 7/32 in. wide overall; soldered wire connection; one 0.120 in. dia mounting hole, one 0.080 in. dia hole to accommodate wire; shakeproof; F.R. Zierick Co. Catalog no. 75 modified; RCA part/dwg A-79534-7	Wiring Connection to Chassis

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-1103	Shop Manufacture	TERMINAL, LUG: round tongue end type; copper; hot solder dipped, free from lumps; no. 15 AWG wire accommodated; 1/2 in. lg by 7/32 in. wide by 1/64 in. thick overall; soldered wire connection; one 0.144 in. dia mounting hole one end and one 1/16 in. dia hole other end to accommodate wire; shakeproof; F. R. Zierick Co., Catalog no. 75; RCA part/dwg A-79534-3	Wiring Connection to Chassis
E-1104		Same as E-1102	Wiring Connection to Chassis
E-1105	Shop Manufacture	INSULATOR, PLATE: laminated glass cloth, silicone resin board, natural color; flat rectangular plate; 3-21/32 in. lg by 1-3/32 in. wide by 0.015 in. thick overall; two 0.156 in. dia mounting holes 3-1/8 in. C to C; 1 rectangular hole 1-1/8 in. lg by 5/16 in. wide centrally located 17/32 in. from end, 1 hole 0.406 in. dia w/center 1/2 in. from other end and 1/8 in. off centerline of plate; RCA part/dwg A-8822081-1	Insulates Terminals of E-1101
E-1106 thru E-1200		Not Used	
E-1201	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 8 stud type terminals; w/o barriers; 1-7/8 in. lg by 1 in. wide by 3/8 in. high overall; mounts by two swaged mounting nuts on a 1-1/2 in. mounting center; marked w/RCA part/dwg number w/ 3/32 in. high black synthetic std characters; RCA part/dwg A-8834702-503	Supports Resistors and Capacitors
E-1202		Same as E-1015	Wiring Connection to Wiring
E-1203		Same as E-1015	Wiring Connection to Chassis
E-1204 thru E-1301		Not Used	
E-1302	N17-T-26653-4296	TERMINAL, LUG: round tongue end type; brass, hot tin dipped; 0.6562 in. lg by 0.250 in. wide by 0.018 in. thick overall; soldered wire connection; one 0.123 in. mounting hole one end; shakeproof; RCA part/dwg K-67592-2	Wiring Connection to Chassis
E-1303		Same as E-560	Wiring Connection to Chassis
E-1304	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 7 solder lug type terminals; w/o barriers; 1-11/16 in. lg by 1-3/16 in. wide by 15/64 in. thick overall; two 0.140 in. dia mounting holes on 0.750 in. mounting centers; board marked w/ C-1305, R-1301, C-1304, and C-1306; RCA part/dwg B-464087-501	Supports Resistors and Capacitors
E-1305 thru E-1400		Not Used	
E-1401		Same as E-608	Ground Connection for J-1408, J-1410
E-1402		Same as E-608	Ground Connection for J-1402, J-1403, J-1404
E-1403		Same as E-613	Ground Connection for J-1406
E-1404		Same as E-608	Ground Connection for J-1407, Z-1401
E-1405		Same as E-608	Ground Connection for J-1405, J-1412, J-1413
E-1406		Same as E-608	Ground Connection for J-1409, J-1411
E-1407		Same as E-608	Ground Connection for Z-1402
E-1408		Same as E-608	Ground Connection for Z-1402
E-1409 thru E-1500		Not Used	
E-1501	N16-K-700284-190	KNOB: round; black molded phenolic; designed to accommodate shaft; 1/4 in. dia held in place by two no. 6-32 in. set screws; brass insert; marked w/groove 1/32 in. wide by 1/64 in. deep filled w/ white lacquer; 9/16 in. lg by 13/16 in. dia overall; 39/64 in. dia counterbore; 8 indents equally spaced; has integral pointer 3/64 in. lg on periphery; RCA part/dwg P-741622-501	Actuates Panel Controls

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-1502	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	KNOB: round; black molded phenolic; designed to accommodate 1/4 in. dia shaft; fastens by two no. 6-32 by 1/8 in. lg set screws in a 7/16 in. deep shaft hole; brass insert; w/o marking; 9/16 in. lg by 13/16 in. dia overall; has 39/64 in. dia by 3/32 in. deep counterbore; has eight equally spaced finger indents on OD of periphery; RCA part/dwg P-741622-503	Actuates Panel Controls
E-1503	Shop Manufacture	TERMINAL BOARD: silicone glass; incl 5 stud type terminals; w/o barriers; 3-1/8 in. lg by 3/4 in. wide by 27/64 in. high overall; mounts by two 0.149 in. dia (no. 25 drill) holes on centerline of board spaced 2-3/4 in. C to C; terminals marked 1 thru 5, left to right; RCA part/dwg A-8869380-1	Supports Wiring
E-1504	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	BUS BAR: brass, hot solder dipped; rectangular cross section shape; solid; cross-sectional dim., 11/64 in. wide by 0.020 in. thick stock; 2 in. lg overall; mounts by two 0.169 in. dia holes spaced 1-11/16 in. C to C; Zierick Mfg Corp. Catalog no. 20, part 167; RCA part/dwg A-8903687-102	Wiring Connection to Chassis
E-1505		Same as E-1504	Ground Connection for J-1503, J-1504, J-1506
E-1506		Same as E-1504	Ground Connection for J-1505
E-1507		Same as E-608	Ground Connection for R-1503
E-1508		Same as E-608	Ground Connection for J-1501, J-1502
E-1509		Same as E-613	Ground Connection for M-1504, R-1505
E-1510		Same as E-613	Ground Connection for M-1502, M-1503
E-1511		Same as E-608	Ground Connection for M-1501, R-1505
E-1512 thru E-1600		Not Used	
E-1601	Shop Manufacture	TERMINAL BOARD: phenolic board, laminated; incl 4 solder post terminals; 2-7/16 in. lg by 1-1/16 in. wide by 1/16 in. thick less terminals; two 0.147 in. dia mounting holes on 1-15/16 in. mounting centers; incl four no. 2-56 Phillips head screws; and 1 adjustable link on reverse side; RCA part/dwg A-8835634-501	Supports Primary Top Connections from T-1601
E-1602	Procured on demand by nearest Naval Shore Supply Activity	TERMINAL, STUD: 4800 v rms; solder connection; ceramic, type JAN-I-10, Grade L5, brass body; cadmium plated; 25/32 in. lg by 5/16 in. dia overall; mounted by no. 6-32 stud on one end by 1/4 in. lg; body ceramic silicone impregnated; Cambridge Thermionic Corp. Catalog X-1942-X; RCA part/dwg A-8831136-2	Supports Wiring
E-1603		Same as E-1602	Supports Wiring
E-1604	Shop Manufacture	POST, BINDING: no. 2-56 brass captive machine screw, nickel plated; brass base, silver plate; 0.8137 in. high by 0.275 in. wide by 1/4 in. deep; w/o mounting stud; tapped hole, 0.138 in. dia by 9/32 in. deep, 32 threads per in.; captive screw loosens 1/16 in. max. to accommodate wire; post has cut-out 0.156 in. lg by 0.169 in. deep, 0.250 in. from tap end; RCA part/dwg A-8812277-501	Wiring Connection to Chassis
E-1605	Procured on demand by nearest Naval Shore Supply Activity	TERMINAL, LUG: sq tongue end type; "L" shaped; brass, hot tin dipped; no. 13 AWG wire accommodated; 3/8 in. lg by 1/4 in. dia by 11/32 in. flange overall; solder wire connection; one 0.150 in. mounting hole one end, 0.078 in. dia hole for wire other end; Shakeproof no. 2585; RCA part/dwg K-67592-21	Wiring Connection to Chassis
E-1606	Shop Manufacture	CHASSIS: for AC power supply; aluminum chassis, synthetic satin black finish except top and inside; 11-1/4 in. lg by 4-1/8 in. wide by 2-1/4 in. thick approx overall; 4 mounting screws no. 8-32 thread by 3/4 in. lg on 10-3/4 in. by 3.0 in. mounting center; retained in 4 bushings; 2 ea riveted to L-shaped brackets welded to chassis; top exterior marked C-1601 and C-1602; top interior marked J-1601, X-1601, X-1602, L-1601, T-1601, E-1607, E-1603, E-1608, and R-1602; one side interior marked E-1605, C-1603, E-1602, E-1604, 5644, V-1603 and R-1603; other side marked R-1604; one end interior marked E-1601; incl 56 holes of various dim., 2 bracket assemblies welded to one end interior and 1 shield mount riveted to one side interior; RCA part/dwg T-628796-501	Supports V-1603

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-1607		Same as E-1604	Binding Post for Connection to V-1603
E-1608		Same as E-1605	Wiring Connection to Chassis
E-1609		Same as E-1605	Wiring Connection to Chassis
E-1610 thru E-1700		Not Used	
E-1701		Same as E-1501	Actuator Panel Controls
E-1702 thru E-1900		Not Used	
E-1901	N17-C-781366-0251	CLAMP, ELECTRICAL: aluminum, cadmium plated; 1 clamp type fastener employing 2 screws; 1-5/64 in. lg by 1-1/16 in. dia overall; mounts to cable by clamp and to connector by 3/4 in. 20 internal thread; designed to hold material w/ 7/16 in. max dia; fits shell size 14 or 14S; American Phenolic Corp. Catalog no. AN3057-6; Air Force - Navy Aeronautical standard, Dwg AN3057, Type AN-3057-6; RCA part/dwg B-458535-3	P/o W-1913
E-1902	N17-C-781255-0925	CLAMP, ELECTRICAL: aluminum, cadmium plated; 1 clamp type fastener employing 2 screws; 1 in. lg by 15/16 in. dia overall; mounts to cable by clamp and to connector by 5/8 in. 24 internal thread; designed to hold material w/ 5/16 in. max dia; fits shell size 10SL, 12 or 12S; America Phenolic Corp. Catalog no. AN3057-4; Air Force - Navy Aeronautical standard, Dwg AN3057; Type AN3057-4; RCA part/dwg B-458535-2	P/o W-1902
E-1903		Same as E-1902	P/o W-1903
E-1904	N17-C-781444-0504	CLAMP, ELECTRICAL: aluminum or brass cadmium plated; 1 clamp type fastener employing 2 screws; 1-1/8 in. lg by 1-3/16 in. dia overall; mounts to cable by clamp and to connector by 7/8 in. 20 internal thread; designed to hold material w/ 9/16 in. max dia; fits shell size 16 or 16S; American Phenolic Corp. Catalog no. AN3057-8; Air Force - Navy Aeronautical standard, Dwg AN3057; Type AN3057-8; RCA part/dwg B-458535-4	P/o W-1904
E-1905		Not Used	
E-1906		Same as E-1902	P/o W-1901
E-1907		Not Used	
E-1908		Same as E-1904	P/o W-1910
E-1909		Same as E-1902	P/o W-1908
E-1910		Same as E-1902	P/o W-1909
E-1911		Not Used	
E-1912		Same as E-1902	P/o W-1907
E-1913 thru E-1915		Not Used	
E-1916		Same as E-1902	P/o W-1907
E-1917		Same as E-1902	P/o W-1901
E-1918, E-1919		Not Used	
E-1920		Same as E-1902	P/o W-1909
E-1921		Same as E-1902	P/o W-1903
E-1922		Same as E-1902	P/o W-1913
E-1923		Same as E-1902	P/o W-1915

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-1924		Same as E-1904	P/o W-1916
E-1925		Same as E-1902	P/o W-1914
E-1926		Same as E-1902	P/o W-1914
E-1927		Same as E-1902	P/o W-1908
E-1928		Same as E-1902	P/o W-1915
E-1929		Same as E-1902	P/o W-1902
E-1930 thru E-2200		Not Used	
E-2201	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 2 combination screw and solder lyg type terminals; w/o barriers; 1-11/16 in. lg by 5/8 in. wide by 11/16 in. thick overall; two 0.136 in. dia mounting holes on 1.312 in. mounting centers; 2 terminals marked in black 1, 2; terminals to be hot solder dipped; RCA part/dwg B-458541-1	Connects Dial Lamp Wiring
E-2202	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 6 stud type terminals; w/o barriers; 2-5/16 in. lg by 3/4 in. wide by 7/16 in. thick overall; two no. 6-32 tapped holes on a 1-7/8 in. mounting center; terminals linked together in pairs; RCA part/dwg A-8836512-501	Supports Wiring
E-2203	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 8 stud type terminals; w/o barriers; 2-11/16 in. lg by 29/32 in. wide by 1-1/16 in. deep overall; one 0.156 in. dia mounting hole in ea of two brackets on 2.312 in. mounting centers; stencil 3/32 in. high std black characters; one 0.261 in. dia hole centrally located 19/32 in. from end of board, placed for coil mounting; RCA part/dwg B-459860-506	Supports Capacitors and Coil
E-2204		Same as E-1602	Supports Antenna Circuit Wiring
E-2205		Same as E-1501	Actuates Panel Controls
E-2206	Procured on demand by nearest Naval Shore Supply Activity	KNOB: round, w/8 equally spaced indents around knob w/bar extending 1/2 in. beyond periphery; black molded thermosetting plastic for 1/4 in. dia shaft; double no. 8-32 set screw Allen head, 135 deg apart; marked w/white line 1/32 in. wide; 1-5/8 in. lg by 1-1/16 in. dia by 7/8 in. high; brass insert; 3/4 in. deep shaft hole; counterbore 7/16 in. deep by 5/8 in. dia; RCA part/dwg M-446008-503	Actuates Reception Controls
E-2207	Shop Manufacture	INSULATOR, BUSHING: nylon; male or female; 0.115 in. lg by 1/4 in. dia overall; larger end 0.035 in. lg by 1/4 in. dia cutback to 0.156 in. dia by 0.080 in. lg; 0.116 in. ID; RCA part/dwg A-8812249-2	With E-2012 Insulates C-2001 from Chassis
E-2208	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; 1/16 in. thick; incl 14 stud type hot solder dipped terminals; w/o barriers; 2-5/8 in. lg by 1 in. wide by 11/32 in. deep overall; mounted by 2 brass spacers, one ea end, centrally placed no. 6-32 tapped hole, 2-3/16 in. C to C 1/8 in. lg at back; marked w/ 3/32 in. satin black std characters in accordance w/RCA part/dwg R-2203, R-2205, R-2204, R-2210, R-2209, R-2213, and R-2214; 2 rows 3/4 in. C to C, 7 terms ea 7/32 in. C to C evenly spaced; RCA part/dwg B-464035-506	Supports Resistors
E-2209	Shop Manufacture	TERMINAL, STUD: crimped wire connection; brass rod; silver plated; 3/8 in. lg by 3/16 in. dia overall; mounts by no. 4-40 tap by 5/32 in. deep hole; undercut 3/32 in. lg by 0.093 in. dia w/head 0.032 in. thick by 0.156 in. dia; tapped end has 35 pitch knurl approx 18 points; RCA part/dwg K-888927-1	Wiring Connection to Chassis
E-2210	Shop Manufacture	INSULATOR, PLATE: white, glass fabric (Dupont no. 405); tetrafluorethylene coated; flat rectangular shape; 2-7/64 in. lg by 5/8 in. wide by 0.005 in. thick; four 0.128 in. dia mounting holes spaced 5/16 in., 0.858 in., 5/16 in. C to C; "I" shape slit on same centerline as mounting holes 35/64 in. lg by 5/16 in. high; RCA part/dwg A-8825747-4	Protects Wiring
E-2211	Shop Manufacture	INSULATOR, PLATE: glass fabric, white; tetrafluorethylene coated; flat rectangular shape; 1-53/64 in. lg by 5/8 in. wide by 0.005 in. thick; four 0.128 in. dia mounting holes spaced 5/16 in., 0.578 in., 5/16 in. C to C; "I" shaped slit on same centerline as mounting holes 17/64 in. lg by 5/16 in. high; RCA part/dwg A-8825747-6	Protects Wiring

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-2212		Not Used	
E-2213		Same as E-2209	Wiring Connection to Chassis
E-2214		Same as E-2209	Wiring Connection to Chassis
E-2215		Same as E-2209	Wiring Connection to Chassis
E-2216		Same as E-2209	Wiring Connection to Chassis
E-2217		Same as E-2209	Wiring Connection to Chassis
E-2218		Same as E-2209	Wiring Connection to Chassis
E-2219		Same as E-2209	Wiring Connection to Chassis
E-2220	Shop Manufacture	TERMINAL, STUD: solder connection; brass rod, hot solder dipped; 11/16 in. lg by 1/4 in. across flats overall; mounts by no 6-32 thread by 11/32 in. lg mounting stud; RCA part/dwg A-891798-3	Wiring Connection to Chassis
E-2221		Same as E-2220	Wiring Connection to Chassis
E-2222		Same as E-2220	Wiring Connection to Chassis
E-2223		Same as E-2220	Wiring Connection to Chassis
E-2224		Same as E-2220	Wiring Connection to Chassis
E-2225		Same as E-2220	Wiring Connection to Chassis
E-2226		Same as E-2220	Wiring Connection to Chassis
E-2227		Same as E-2220	Wiring Connection to Chassis
E-2228	Shop Manufacture	TERMINAL, LUG: round tongue end type; brass, solder coat finish; no. 11 AWG wire accommodated; 11/16 in. lg by 9/32 in. wide by 0.016 in. thick overall; crimped and soldered wire connection; one 0.140 in. dia mounting hole at one end; Cinch Mfg Co. Catalog no. 1430; RCA part/dwg A-8819429-1	Wiring Connection to Chassis
E-2229	Shop Manufacture	TERMINAL, LUG: round tongue end type, bent; brass, hot solder dip finish; no. 11 AWG wire accommodated; 13/32 in. lg by 0.315 in. wide by 0.163 in. high overall; soldered wire connection; 0.145 in. dia mounting hole one end; 0.020 in. thick stock, bent to an angle of approx 60 deg 5/16 in. from center of mounting hole; Shakeproof, Inc. Catalog no. 2506-6 modified; RCA part/dwg K-880901-18	Wiring Connection to Chassis
E-2230		Same as E-2229	Wiring Connection to Chassis
E-2231		Same as E-2229	Wiring Connection to Chassis
E-2232	Shop Manufacture	INSULATOR, BUSHING: teflon, white; wax finish; 3/16 in. lg by 0.088 in. OD by 0.031 in. ID; mounts by association; insulator taper from 0.088 in. dia to 0.062 in. dia within a distance of 1/16 in.; RCA part/dwg A-8903605-1	Heat Insulator for Coaxial Cable
E-2233	Shop Manufacture	TERMINAL, LUG: round tongue end type; 1/64 in. thick copper, hot solder dipped, must be smooth and free of lumps; no. 15 AWG wire accommodated; 11/32 in. high by 5/32 in. lg by 7/32 in. wide overall; soldered wire connection; one 0.144 in. dia mounting hole and one 1/16 in. dia hole to accommodate wire; shakeproof; F.R. Zierick Co. Catalog no. 75 modified; RCA part/dwg A-79534-4	Wiring Connection to Chassis
E-2234	Shop Manufacture	INSULATOR, BUSHING: nylon rod, clear; round w/flatted sides, round shank; 1/2 in. lg by 11/16 in. wide by 3/4 in. high w/ 5/16 in. lg shank, 0.406 in. dia hole wide end, 0.375 in. dia hole small end; mounts by 5/8 in. -32 threads by 1/4 in. lg shank; RCA part/dwg A-8829143-1	Insulates Chassis from Cabinet
E-2235	Shop Manufacture	INSULATOR, BUSHING: nylon rod; cylindrical shape w/shoulder; 9/64 in. lg by 0.250 in. OD by 0.196 in. ID w/ 3/8 in. dia shoulder; mounts by 0.250 in. dia hole in chassis; Polmyer Corp., Type FM10001; RCA part/dwg A-8812249-1	With E-2207 Insulates C-2201 from Chassis

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-2236	Shop Manufacture	INSULATOR, WASHER: laminated glass silicone resin, natural; semi-gloss finish; round flat shape; 1/2 in. OD by 0.196 in. ID by 0.010 in. thick; mounts by association; 11,100 lbs per sq in. lengthwise tensile strength; 7000 lbs per sq in. flatwise compressive strength; RCA part/dwg A-8812249-3	With E-2235 Insulates C-2201
E-2237	Shop Manufacture	BUSHING: brass, hot solder dipped; female; 3/8 in. lg, 9/32 in. dia by 1/32 in. wide flange 5/32 in. from bottom, 0.250 in. OD below flange, 0.240 in. OD above flange, 0.191 in. ID thru hole, has four 0.025 in. wide by 11/64 in. deep sawcuts located at 90 deg, 180 deg, 270 deg and 360 deg; RCA part/dwg A-8813758-1	Assists in Wiring J-2214
E-2238	Procured on demand by nearest Naval Shore Supply Activity	INSULATOR, BUSHING: laminated phenolic tubing, brown; cylindrical, sleeve shape; 3/8 in. lg by 0.156 in. OD by 0.105 in. ID overall; ends chamfered 45 deg; RCA part/dwg A-8817118-1	Adapts Coaxial Cable RG-122/U
E-2239	Procured on demand by nearest Naval Shore Supply Activity	KNOB: round; black molded phenolic, designed to accommodate shaft; 1/4 in. dia by two no. 6-32 in. set screws; brass insert; 1/32 in. wide by 1/64 in. deep groove filled w/white lacquer on pointer; 9/16 in. lg by 13/16 in. dia overall; 39/64 in. counterbore; integral pointer 3/64 in. lg on periphery; 2 sides flattened parallel to pointer; RCA part/dwg P-741622-504	Actuates Panel Controls
E-2240	N17-C-99999-0327	CONNECTOR, PLUG: 1 contact; 1 connector mating end; male pin style contact; non-constant impedance rating; low loss plastic dielectric; straight shape; 5/8 in. lg by 0.340 in. dia overall; polarized; non-locking; 0.250 in. dia cable accommodated; American Phenolic Corp. Part no. 82-832; RCA part/dwg A-8862472-1	Connects Coaxial Cable to S-2207
E-2241		Same as E-2207	Insulates J-2201 from Chassis
E-2242 thru E-3100		Not Used	
E-3101		Same as E-551	Antenna Unit Connection to C-2201E
E-3102		Same as E-551	Antenna Unit Connection to C-2201C
E-3103	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 10 stud type hot solder dipped terminals; w/o barriers; 1-7/8 in. lg by 1-15/32 in. wide by 13/32 in. deep overall; mounts by means of "L" shaped aluminum bracket riveted to board at one side w/ 2 holes w/ no. 4-40 self-clinching steel nut inserts on bent side 0.968 in. C to C; marked w/ 3/32 in. satin black std characters; 2 row 3/4 in. C to C, 5 terminals in ea row 3/8 in. C to C evenly spaced; RCA part/dwg B-464055-504	Supports Capacitors
E-3104	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 3 hot tin dipped solder lug type terminals w/1 link; w/o barriers; 1-1/2 in. lg by 1 in. wide by 17/32 in. deep overall; mounts by means of "L" shaped bracket, aluminum, riveted to board at one end w/ 2 holes w/ no. 4-40- steel nut inserts on bent end 0.312 in. C to C; marked "ANT", "HI", "LO", and "O-3101" 3/32 in. black condensed characters; terminal lugs held by Phillips head brass screws no. 2-56 sems lock, peened and free to turn in triangle form 0.406 in. C to C base, at opposite end to mounting; RCA part/dwg B-462513-502	Supports O-3101
E-3105	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 10 stud type terminals; w/o barriers; 4-1/8 in. lg by 1/4 in. wide by 0.253 in. deep overall; 5 mounting holes 0.078 in. dia, 0.781 in. C to C w/ 1/2 in. at ea end; marked 1/16 in. high std characters; RCA part/dwg C-746176-506	Supports Capacitors
E-3106	Shop Manufacture	PLATE, ELECTRICAL GROUNDING: brass sheet, 0.0403 in. thick; silver plate and clear water dip finish; pronged "Z" shaped strip; 3-7/8 in. lg by 1-27/64 in. wide by 15/16 in. deep overall; mounts by means of 4 holes on centerline of solid section of strip 0.166 in. dia 0.968 in., 1.157 in., 0.500 in. C to C; marked on strip w/ 1/16 in. high std black characters, Antenna Box Assembly "E-3103" "J-3104" "E-3107"; strip terminal at one end; lance formation on ea prong; RCA part/dwg T-630899-15	Supports Wiring
E-3107		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-3108	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 3 stud type hot solder dipped terminals; w/o barriers; 1-5/8 in. lg by 9/16 in. wide by 1/2 in. deep overall; mounts by means of "L" shaped aluminum bracket riveted to board at one end w/ 2 holes 0.002 in. dia, 0.218 in. C to C in bent section; marked w/ 3/32 in. std satin black characters; 2 terminals centers 9/64 in. from end of board, 5/16 in. C to C, 1 terminal w/center 15/16 in. from other 2 and 15/64 in. from side; RCA part/dwg B-469478-502	Supports Capacitors
E-3109	Procured on demand by nearest Naval Shore Supply Activity	TERMINAL, LUG: eye type; copper, hot solder dipped; no. 16 AWG wire accommodated; 13/64 in. lg by 7/32 in. wide by 19/64 in. high overall; soldered wire connection; 0.120 in. dia mounting hole in 7/32 in. dia end; made from 1/64 in. thick sheet, 1/8 in. wide wiring section; F.R. Zierick Mfg Co. Catalog no. 75 modified; RCA part/dwg A-79534-6	Wire Connection to Chassis
E-3110		Not Used	
E-3111		Same as E-562	With E-3106 and E-3112 Supports Wiring
E-3112		Same as E-561	With E-3106 and E-3111 Supports Wiring
E-3113	Shop Manufacture	INSULATOR, PLATE: laminated glass cloth, silicone resin; natural; flat rectangular strip or plate; 3-3/4 in. lg by 9/16 in. wide by 0.010 in. thick overall; four 0.166 in. dia mounting holes on centerline of strip w/ centers 1/2 in., 1.468 in., 2.625 in. and 3.125 in. from end; RCA part/dwg A-8829184-4	Insulates E-3116 from Chassis
E-3114		Same as E-556; p/o Z-3101	Supports V-3101
E-3115	Procured on demand by nearest Naval Shore Supply Activity	TERMINAL, LUG: round torque end type, bent; brass, hot solder dip finish; no. 14 AWG wire accommodated; 7/32 in. lg by 3/16 in. wide by 7/32 in. high overall; soldered rivet or wire connection; 0.070 in. dia mounting and connection hole in one end; 0.015 in. thick stock "L" shaped right angle bend; RCA part/dwg A-8821462-1; p/o Z-3101	Connects Wiring to E-3114
E-3116	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 18 stud type and 1 "L" lug type terminals; w/o barriers; 3 in. lg by 1-7/16 in. wide by 1 in. deep overall; mounts at 2 spring terminals and 1 spring pin terminals at one end 1.156 in. C to C, pin at other end 2-5/8 in. from terminal centerline and 1 in. from outer edge; assembly incl shield mount and shield grounding strap; bracket across mounting terminals; RCA part/dwg C-748787-502; p/o Z-3101	Supports V-3101
E-3117 thru E-3134		Not Used	
E-3135		Same as E-551	RF Unit Connection to C-2201C, D
E-3136		Same as E-551	RF Unit Connection to C-2201C, D
E-3137		Same as E-551	RF Unit Connection to C-2201C, D
E-3138		Same as E-551	RF Unit Connection to C-2201C, D
E-3139	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 4 stud, 2 lug hot solder dipped terminals; w/o barriers; 1-13/16 in. lg by 21/32 in. wide by 11/16 in. deep overall; mounts by means of "L" shaped aluminum bracket riveted to board at one end w/ 2 holes w/no. 4-40 self-clinching steel nut inserts on bent end 11/32 in. C to C; marked w/ 3/32 in. satin black std characters; 4 stud terminals evenly spaced 1-13/32 in., 11/32 in. center w/ 2 lug terminals at back of 2 end posts 11/32 in. C to C; RCA part/dwg B-464047-507	Supports Capacitors

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-3140	Shop Manufacture	BOARD, TERMINAL: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 10 stud type brass hot solder dipped terminals; w/o barriers; 4-1/8 in. lg by 1/4 in. wide by 17/64 in. deep overall; five 0.078 in. dia mounting holes, 0.781 in. C to C in line evenly spaced w/reference to terminals; marked w/ 1/16 in. satin black std characters; terminals placed one ea end 3.875 in. C to C and 4 pair evenly between, center spacings 0.687 in., 0.156 in., 0.625 in., 0.156 in., 0.625 in., 0.156 in., 0.625 in., 0.156 in., 0.687 in., RCA part/dwg B-469419-502	Supports Capacitors
E-3141	Shop Manufacture	PLATE, ELECTRICAL GROUNDING: brass sheet 0.0403 in. thick silver plate and clear water dip finish; pronged "E" shaped strip; 3-31/32 in. lg by 1-27/64 in. wide by 15/16 in. deep overall; mounts by five 0.198 in. by 0.261 in. holes on centerline of strip, 0.781 in. C to C; marked w/ 1/16 in. high std black characters; C-3155, to C-3159, C-3147, C-3153, and C-3161; strip terminal at one end, lance formation on ea prong; RCA part/dwg T-630899-19	Supports Wiring
E-3142	Shop Manufacture	BOARD, TERMINAL: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 10 stud type brass hot solder dipped terminals; w/o barriers; 4-1/8 in. lg by 1/4 in. wide by 17/64 in. deep overall; five 0.078 in. dia mounting holes, 0.781 in. C to C in line evenly spaced with reference to terminals; marked w/ 1/16 in. satin black std characters; terminals placed one ea end 3.875 in. C to C and 4 pair evenly between, center spacings 0.687 in., 0.156 in., 0.625 in., 0.156 in., 0.625 in., 0.156 in., 0.625 in., 0.156 in., 0.687 in.; RCA part/dwg B-469419-504	Supports Capacitors
E-3143	Shop Manufacture	PLATE, ELECTRICAL GROUNDING: brass sheet, 0.0405 in. thick; silver plate and clear water dip finish; pronged "E" shape strip; 3-31/32 in. lg by 1-27/64 in. wide by 15/16 in. deep overall; mounts by five 0.261 in. by 0.198 in. holes on centerline of strip spaced 0.781 in. C to C; marked w/ 1/16 in. high std black characters; C-3140 to C-3144; C-3151, C-3154, C-3157, and C-3163; strip terminal at one end, lance formation on ea prong; RCA part/dwg T-630899-17	Supports Wiring
E-3144	Shop Manufacture	BOARD, TERMINAL: laminated glass cloth, silicone resin boards, 1/16 in. thick; incl 5 stud, 2 lug, hot solder dipped terminals; w/o barriers; 1-13/16 in. lg by 21/32 in. wide by 19/32 in. deep overall; mounts by means of "L" shaped aluminum bracket riveted to board at one end w/2 holes w/ no. 4-40 self-clinching steel nut inserts on bent end 0.375 in. C to C; marked w/ 3/32 in. satin black condensed characters; 4 stud terminals evenly spaced 0.406 in. by 45/64 in. toward one end w/"L" lugs on back of two end terminals, fifth stud terminal at corner opposite end; RCA part/dwg B-469475-502	Supports Capacitors and Resistors
E-3145	N17-I-99999-0012	TERMINAL, STUD: 14,000 v DC; 2 point solder connection; brass w/ molded thermosetting plastic body; hot tin dip finish; 9/16 in. lg by 1/4 in. OD, 1/4 in. across flats of hex mounting overall; mounts by threaded hole in end no. 4-40 by 7/32 in. deep w/hex molded nut shaped end; insulated standoff type, 100-hr salt spray test; Garde Mfg Co. Catalog no. 3449-8; RCA part/dwg A-8816317-103	Supports W-3139
E-3146		Same as E-564	Insulates E-3141 from Chassis
E-3147		Same as E-560	Connects Wiring to Chassis
E-3148		Same as E-562	With E-3141 Supports Wiring
E-3149		Same as E-561	With E-3141 and E-3148 Supports Wiring
E-3150		Not Used	
E-3151		Same as E-556; p/o E-3153	Supports V-3135
E-3152		Same as E-3115; p/o E-3153	Supports Wiring
E-3153	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; 17 stud type and one "L" lug type terminals; w/o barriers; 3 in. lg by 1-7/16 in. wide by 1 in. deep overall; mounts by 2 spring terminals and 1 spring pin terminal at one end 1.156 in. C to C, pin at other end 2-5/8 in. from terminal centerline and 1 in. from outer edge; marked w/ "1" to "7"; assem incl shield mount and shield grounding strap; brackets are on mounting terminals; RCA part/dwg C-748787-504; p/o Z-3135	Supports V-3135

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-3154 thru E-3800		Not Used	
E-3801		Same as E-1501	Knobs for "Dim" Cal. Adj." and "Lamps"
E-3802		Same as E-2206	Knob for Band Switch
E-3803	Low Failure item - if required requisition from ESO referencing NavShips 900,180A	KNOB: round shape, bakelite; black color; designed to accommodate shaft, 1.4 in. dia w/set screw fastening; brass insert; w/o markings; 7/8 in. lg by 1-1/2 in. dia overall; has finger indentations, one edge has raised boss "pointers"; RCA part/dwg A-8864599-1	Knob for Tuning Control
E-3804	N17-T-26681-2001	TERMINAL, LUG: spade type; sq tongue end; brass; hot solder dip finish; no. 12 AWG wire accommodated; 3/4 in. lg by 11/32 in. wide by 7/32 in. high overall; soldered wire connection; w/clamping ears; 1/8 in. dia insulation accommodated; 3/8 in. lg, 0.144 in. wide slot for mounting; RCA part/dwg K-61580-1	Connects Dial Assembly to Frame
E-3805		Same as E-3804	Connects Dial Assembly to Frame
E-3806		Same as E-2239	Knob for Lamp Shift
E-3807 thru E-4000		Not Used	
E-4001	N17-C-945001-202	SHELL, ELECTRICAL CONNECTOR: MIL Type MX-195/U; brass, silver plated; cone shaped, 0.875 in. lg by 0.687 in. wide by 0.687 in. deep overall; four 0.1094 in. dia mounting holes on 1/2 in. lg by 1/2 in. mounting center; weather proofed and non-constant impedance; RCA part/dwg P-719230-3	Supports Cabling to J-4005, J-4006
E-4002	N17-S-250051-154	SHELL, ELECTRICAL CONNECTOR: Navy Type C-49193; brass, silver plated finish; cylindrical w/sq flange shape; 1 in. lg by 1 in. wide by 3/4 in. high overall; four mounting holes in flange 0.125 in. dia on 0.719 in. mounting centers; marked w/Navy type no. prefixed by mfr prefix letter; four 0.125 in. dia holes equally spaced in top of cover and solder dipped to 3/16 in. min; 0.345 in. dia cable opening; RCA part/dwg P-255223-8	Supports Cabling to J-4007
E-4003		Same as E-1605	Wiring Connection to Chassis
E-4004		Same as E-1605	Wiring Connection to Chassis
E-4005	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 3 feedthru stud, 2 "L" lug, hot tin dipped terminals and 1 link; w/o barriers; 1-5/8 in. lg by 3/4 in. wide by 31/64 in. deep overall; two 0.136 in. dia mounting holes, one toward ea end of board 1.25 in. C to C evenly placed; mark 3 bushings forming central triangle "1" "2" "3" and "O-4002" "R-4001" on one side of board, also "C-4001" on other side of board between studs, using 3/32 in. high condensed characters, black; 3 brass silver plated bushings no. 2-56 tab, form triangle w/base at edge 21/32 in. C to C w/3 brass pan head Phillips machine screws, link and "L" terminals at "1" and "2", 3 feedthru terminals toward other edge of board all w/marking as shown on RCA part/dwg for both sides; RCA part/dwg C-750160-501	Supports Resistors and Two Links
E-4006		Not Used	
E-4007		Same as E-2237	Assists in Wiring J-4009
E-4008	Shop Manufacture	BUSHING: brass, hot solder dipped; female; 15/32 in. lg, 0.281 in. OD one end w/four 0.025 in. wide by 11/64 in. deep sawcuts spaced at 90 deg, 180 deg, 270 deg and 360 deg, other end has 0.345 in. OD, 0.234 in. ID thru hole; RCA part/dwg A-8813758-2	Assists in Wiring J-4009
E-4009		Same as E-1605	Wiring Connection to Chassis

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-4010	N17-C-945001-0292	SHELL, ELECTRICAL CONNECTOR: brass, silver plated finish; conical shape; 1-9/32 in. sq by 7/8 in. high overall; four 0.120 in. dia mounting holes on 31/32 in. by 31/32 in. mounting centers; Navy, Hood Type no. 49208; RCA part/dwg P-279000-3	Assists in Wiring J-4004
E-4011	Shop Manufacture	BUSHING: brass, hot solder dipped; female; 9/32 in. lg, 9/16 in. dia flange at closed end, 0.510 in. OD below flange, 0.460 in. ID, 0.300 in. lg by 0.156 in. wide hole centrally located in closed end; RCA part/dwg A-8813756-1	Assists in Wiring J-4009
E-4012		Same as E-1605	Wiring Connection to Chassis
E-4013		Same as E-1605	Wiring Connection to Chassis
E-4014	Procured on demand by nearest Naval Shore Supply Activity	INSULATOR, BUSHING: laminated phenolic tubing, brown; cylindrical, sleeve shape; 3/8 in. lg by 0.187 in. OD by 0.105 in. ID; both ends chamfered 45 deg; RCA part/dwg A-8817118-2	Adapts Coaxial Cable RG-122/U to J-4009
E-4015		Same as E-2238	Adapts Coaxial Cable RG-122/U to E-4001
E-4016	Shop Manufacture	CLAMP, ELECTRICAL: brass, hot solder dip finish; 1 in. lg by 1/4 in. wide by 1/4 in. high; mounts by two 0.147 in. dia mounting holes; designed to hold 7/16 in. lg by 7/32 in. high by 7/64 in. radius edge material; RCA part/dwg A-8824108-1	Supports Cabling of K-4001 and Ground Shield of Coaxial Cable
E-4017		Same as E-1605	Wiring Connection to Chassis
E-4018		Same as E-1605	Wiring Connection to Chassis
E-4019		Same as E-1605	Wiring Connection to Chassis
E-4020 thru E-4400		Not Used	
E-4401		Same as E-551	Oscillator Connection to C-2201A
E-4402		Same as E-551	Oscillator Connection to C-2201A
E-4403	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 5 stud, 4 lug, hot solder dipped terminals; w/o barriers; 1-13/16 in. lg by 21/32 in. wide by 19/32 in. deep overall; mounts by means of "L" shaped aluminum bracket riveted to board at one end w/2 holes w/no. 4-40 self-clinching steel nut inserts on bent end 0.375 in. C to C; marked "C-4417", "C-4416", "C-4420", "C-4419" 3/32 in. black condensed characters; 4 post terminals w/"L" lugs on back evenly spaced in one-half of board, centers 45/64 in. by 0.406 in., 1 stud terminal in corner at mounting end in line; RCA part/dwg B-464024-508	Supports Capacitors and Wiring
E-4404	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board; incl 6 stud type terminals; w/o barriers; 4-1/8 in. lg by 1/4 in. wide by 0.253 in. thick overall; five 0.078 in. dia mounting holes, spaced on 0.781 in. mounting centers; marked "C-4412" "C-4409" "C-4406"; RCA part/dwg C-746176-517	Supports Capacitors and Wiring
E-4405	Shop Manufacture	PLATE, ELECTRICAL GROUNDING: brass sheet 0.0403 in. thick; silver plate and clear water dip finish; pronged "Z" shaped strip; 3-31/32 in. lg by 1-27/64 in. wide by 15/16 in. deep overall; mounts by means of 5 holes on centerline of solid section of strip 0.261 in. by 0.198 in. ea, 0.781 in. C to C; "C-4407", "C-4410", "C-4413", "C-4415", "C-4408"; strip terminal at one end; lance formation on ea prong; RCA part/dwg T-630899-20	Supports Wiring
E-4406		Same as E-556; p/o Z-4413	Supports V-4401
E-4407		Same as E-3115; p/o E-4413	Wiring Connection
E-4408		Same as E-560	Wiring Connection to Chassis
E-4409		Same as E-565	Insulates E-4405 from Chassis

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
E-4410		Same as E-564	Insulate E-4405 from Chassis
E-4411		Same as E-561	Supports Wiring
E-4412		Same as E-562	With E-4411 Supports Wiring
E-4413	Shop Manufacture	TERMINAL BOARD: laminated glass cloth, silicone resin board, 1/16 in. thick; incl 22 stud type and 3 "L" lug type terminals; w/o barriers; 3 in. lg by 1-7/16 in. wide by 1 in. deep overall; mounts at 2 spring terminals and 1 spring pin; terminals at one end 1.156 in. C to C, pin at other end 2-5/8 in. from terminal centerline and 1 in. from outer edge; marked 3/32 in. high std characters, 1/16 in. high numerals "1" to "7" in legible black; assembly incl shield mount, 2 links, 2 grounding straps, bracket across mounting terminals; RCA part/dwg C-748787-501	Supports V-4401
F-101		FUSE, CARTRIDGE: 3.0 amp; Technical Materiel Part no. FU100-3	Oven Fuse
F-102		FUSE, CARTRIDGE: 2.0 amp; Technical Materiel Corp. Part no. FU100-2	Power Fuse
F-103 thru F-400		Not Used	
F-401	G5920-280-4465	FUSE, CARTRIDGE: MIL Type FO2G1R00A: 1 amp, 250 v; instantaneous; 2 ferrule type terminals, 1/4 in. lg by 1/4 in. dia; enclosed type glass body; one time; indicating; 1-1/4 in. lg, 1/4 in. dia overall; to carry 110% nominal current rating and blow within one hour at 135% nominal current rating; Bussman Mfg Co. Symbol AGC1; RCA part/dwg A-990141-9	Primary Power Fuse
F-402		Same as F-401	Primary Power Fuse
F-403 thru F-1600		Not Used	
F-1601	N17-F-14310-0380	FUSE, CARTRIDGE: 1 amp, 125 v; time delay, 135% for 0-1 hour and 200% for 60 sec max, 5 sec min; ferrule type; 1/4 in. dia; enclosed glass body; one time; indicating; clear glass window; 1-1/4 in. lg by 1/4 in. dia overall; Littelfuse Inc. cat. no. 313001, Type 3AG; RCA part/dwg A-896698-4	Primary Power Fuse
F-1602		Same as F-1601	Primary Power Fuse
F-1603 thru F-1900		Not Used	
F-1901		FUSE, PLUG: 10 amp, 125 v; National Electric Code type std screw base; instantaneous; continuous at 110% of rated load; 60 min blowing time at 135% of rated load; indicating; clear mica window; one time; 1-1/4 in. lg by 1-1/4 in. dia overall; RCA part/dwg A-99043-3	Main Power Line Fuse
F-1902		Same as F-1901	Main Power Line Fuse
F-1903	G5920-280-4465	FUSE, CARTRIDGE: 1 amp, 250 v; instantaneous; ferrule type terminals; 1/4 in lg by 0.250 in. dia; enclosed glass body; one time; indicating; clear glass body permits observance of element; 1-1/4 in. lg by 0.250 in. dia overall; Bussman Mfr. Co. Type 3AG1; RCA part/dwg A-990157-8	Fuse for X-1905
F-1904		Same as F-1903	Fuse for X-1905
H-401		GROMMET: rubber; fits 7/16 in. dia hole; 1/4 in. hole dia by 1/16 in. wide groove, 3/16 in. wide by 5/8 in. dia overall; RCA part/dwg C-746900-5	Protects Wiring
H-402 thru H-550		Not Used	
H-551	Shop Manufacture	INSULATOR, BUSHING: lustrex, clear or red; round; 5/32 in. lg by 0.189 in. OD w/9/32 in. dia by 3/32 in. wide shoulder w/bore 0.120 in. dia; friction mounted through hole 0.189 in. dia; RCA part/dwg A-8834776-2	Spacers for E-551, E-552

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
H-552	Shop Manufacture	INSULATOR, BUSHING: lustrex, clear or red; semi-polished; cylindrical w/flatted side; 3/16 in. lg by 7/16 in. OD by 0.120 in. ID w/7/16 in. lg shank; 0.189 in. dia by 3/64 in. wide hub on flatted side; RCA part/dwg A-8824106-1	Spacers for E-551, E-552
H-553 thru H-600		Not Used	
H-601		Same as H-401	Protects Wiring
H-602 thru H-800		Not Used	
H-801		Same as H-401	Protects Wiring
H-802 thru H-1300		Not Used	
H-1301	N16-G900096-0385	GROMMET: synthetic rubber; fits 5/16 in. dia hole; 3/16 in. dia center hole, 1/16 in. wide groove, 1/2 in. dia by 1/4 in. thick overall; RCA part/dwg K-57421-25	Protects Wiring
H-1302 thru H-1400		Not Used	
H-1401		GROMMET: rubber; fits 5/8 in. dia hole; 3/8 in. hole dia by 1/16 in. wide groove, 5/16 in. wide by 7/8 in. dia overall; RCA part/dwg P-746900-10	Protects Wiring
H-1402		GROMMET: rubber; fits 1-1/4 in. dia hole; 7/8 in. dia hole by 1/16 in. wide groove, 7/16 in. wide by 1-5/8 in. dia overall; RCA part/dwg P-746900-23	Protects Wiring
H-1403 thru H-1500		Not Used	
H-1501	N16-S-470001-128	SLIDE, DRAWER: permits withdrawal of chassis from cabinet; carbon steel, cadmium plated; carrying capacity, 22-1/2 pounds; 21-7/16 in. lg by 4-61/64 in. wide by 1-1/16 in. thick approx overall; to withstand 48-hr salt spray test; right-hand side; RCA part/dwg D-629837-1	Mounts Chassis
H-1502	N16-S-470001-129	SLIDE, DRAWER: permits withdrawal of chassis from cabinet; carbon steel, cadmium plated; carrying capacity, 22-1/2 pounds; 21-7/16 in. lg by 4-61/64 in. wide by 1-1/16 in. thick approx overall; to withstand 48-hr salt spray test; left-hand side; RCA part/dwg D-629837-2	Mounts Chassis
H-1503	Shop Manufacture	LATCH, FASTENER: cold rolled steel cadmium plate finish; rectangular shape base w/thimble type keeper; 1-15/16 in. lg by 5/8 in. wide by 0.890 in. high overall; three mounting holes, two no. 8-32 spaced 0.875 in. C to C, third hole 0.281 in. dia by 82 deg countersunk in line w/first pair and spaced 0.562 in. away; keeper 0.187 in. dia by 0.054 in. lg to 5/16 in. dia tip; RCA part/dwg A-8836509-501	P/o Front Panel Case Latching Assembly
H-1504	Low Failure item - if required requisition from ESO referencing NavShips 900,180A	HINGE: piano type; brass, light Navy gray finish; 6-13/16 in. lg by 1-1/16 in. wide by 3/16 in. high overall; non-removable pin; has eight no. 29 drill holes, four on bottom of hinge and four on top of hinge w/the four top holes countersunk to accommodate no. 4 filter head machine screws; flaps not swaged; RCA part/dwg B-474165-1	Mounts Door
H-1505	Procured on demand by nearest Naval Shore Supply Activity	PIN, CLEVIS: steel, cadmium or zinc finish; cylindrical w/wing type head; 23/32 in. lg by 3/4 in. wide by 11/32 in. thick overall; has 0.065 in. max dia hole 0.205 in. from head of pin to accommodate pin; Shakeproof Catalog AD-3 98-OW-2-9; RCA part/dwg K-8872143-3	P/o Fastener Assembly
H-1506	N42-P-11501-2500	PIN, GROOVED: spring steel, cadmium plated; cylindrical w/5/32 in. lg raised center portion; 0.312 in. lg by 0.069 in. dia overall; serrated; Shakeproof Inc., Catalog no. 98-2-CP; RCA part/dwg A-881194-6	P/o Fastener Assembly

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
H-1507		Same as H-1501	Withdrawing Chassis from Case
H-1508		Same as H-1502	Withdrawing Chassis from Case
H-1509		BUTTON, PLUG: brass, black nickel plate finish; fits 27/64 in. dia hole; 1/2 in. OD by 13/64 in. lg overall; button has rounded top w/flatted underside to which 6 mounting prongs are attached; United-Carr Fastener Corp. Catalog no. 48182; RCA part/dwg A-99051-139	Plugs Main Frame Chassis Hole
H-1510 thru H-1800		Not Used	
H-1801	Low Failure item if required requisition from ESO referencing NavShips 900,180A	HINGE: piano type; brass, light Navy gray finish; 17-1/4 in. lg by 1-1/16 in. wide by 3/16 in. high overall; non-removable pin; mounts by ten 0.159 in. dia holes, 5 on either side of hinge 11/16 in. C to C w/ bottom hole 3/16 in. up from bottom edge; spaced lengthwise 1/2 in. from either end 4-1/16 in. C to C; flaps not swaged; RCA part/dwg B-474177-1	Mounts Patching Panel
H-1802	Shop Manufacture	PANEL: panel to accommodate hinge of door; aluminum alloy, light Navy gray finish; oblong, flat rectangular shape; 18-3/4 in. lg by 1-3/4 in. wide by 3/16 in. thick; mounts by four 3/8 in. lg by 1/4 in. wide slots on an 18-1/4 in. by 1-1/4 in. mounting center; has five 0.159 in. dia (no. 21 drill) holes spaced 4-1/16 in. C to C 1-1/4 in. in from one end for mounting hinge; RCA part/dwg C-752562-1	Mounts Patching Panel
H-1803 thru H-2200		Not Used	
H-2201	G5120-224-2504	WRENCH: double end hex type; 5/64 in. max wide across flats; 2-3/64 in. lg by 25/32 in. wide by 5/64 in. thick overall; steel, cadmium plate finish, 90 deg offset; "L" shaped handle hex rod; for no. 8 Allen set screw and no. 4 cap screw; Allen Mfg Code no. 564; RCA part/dwg K-828505-31	Repair and Maintenance Use
H-2202	G5120-198-5398	WRENCH: double end hex type; 1/16 in. max across flats; 1-29/32 in. lg by 23/32 in. wide by 1/16 in. deep overall; steel, cadmium plate finish; 90 deg offset; "L" shaped handle, hex rod; for no. 6 set screw and no. 2 cap screw; Allen Mfg short series; RCA part/dwg K-828505-32	Repair and Maintenance Use
H-2203	G5120-198-5401	WRENCH: double end hex type; 0.050 in. max across flats; 1-29/32 in. lg by 25/32 in. wide by 0.050 in. thick overall; steel, cadmium plate finish; 90 deg offset; "L" shaped handle hex rod; for no. 4 Allen set screw; RCA part/dwg K-828505-33	Repair and Maintenance Use
H-2204	N16-T-750286-393	TOOL, ALIGNMENT: fiber; 7 in. lg by 7/32 in. dia overall; screwdriver on one end 7/32 in. wide by 0.025 in. thick; screwdriver opposite end 0.125 in. wide by 0.015 in. thick; 0.198 in. by 7/16 in. lg undercut located 5-11/32 in. from end; 2 in. lg 0.198 in. undercut on one end; moisture and fungus resistance; RCA part/dwg A-8825713-1	Alignment and Adjustment
H-2205	N16-T-751254-406	TOOL, ALIGNMENT: laminated phenolic tubing; 1.296 in. lg by 0.218 in. dia overall; 0.046 in. high by 0.218 in. wide by 0.040 in. thick screwdriver one end; 7/16 in. lg by 0.198 in. dia undercut located near one end; moisture and fungus resistant; RCA part/dwg A-8825734-1	Alignment and Adjustment
H-2206	Procured on demand by nearest Naval Shore Supply Activity	WASHER, SPRING, TENSION: phosphor bronze, spring temper, nickel plate; round; w/0.260 in. ID by 7/16 in. OD by 1/16 in. thick; material 0.010 in. thick; RCA part/dwg K-69129-101	Grounding for C-2201
H-2207	N42-R-02047-0465	RING, RETAINER: general purpose snap type retainer; steel, cadmium plated; open ring shape, groove dia 0.095 in., shaft dia 0.125 in.; 0.230 in. OD by 0.094 in. ID by 0.015 in. thick; mounts by application; Waldes-Kohinoor Co. Part 5133-12-S-MF; RCA part/dwg A-93605-103	Secures O-2223, O-2224
H-2208	G5120-242-7410	WRENCH: double end hex type; 3/32 in. across flats; 2-3/16 in. lg by 27/32 in. wide by 3/32 in. thick overall; steel, cadmium plate finish; 90 deg offset; "L" shaped handle, hex rod; for no. 10 and no. 12 set screws; Allen Mfg Code 332; RCA part/dwg K-828505-20	Repair and Maintenance Use

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
H-2209, H-2210		Not Used	
H-2211	Low Failure item If required requisition from ESO referencing NavShips 900,180A	RING, RETAINER: steel, cadmium plated; cylindrical washer shape; 0.298 in. OD by 0.168 in. ID by 0.015 in. thick; mounts around 0.188 in. dia shaft and OD of ring snap fits into groove 0.175 in. dia; Waldes Kohinoor Inc. Type 5000 series; RCA part/dwg B-458549-155	With H-2224 Retains Push Rod O-2224
H-2212	Procured on demand by nearest Naval Shore Supply Activity	BOLT, MACHINE: steel; Navy spec no. 46S18e Class 7 Type A, 30,000 lb per sq in. min yield strength, B-85 to B-95 Rockwell hardness; passivating dip finish; eccentric stud type head; slot drive; 9/16 in. dia shoulder, 0.093 in. thick, 0.102 in. thick shoulder, 0.060 in. width of slot, 0.053 in. depth of slot, eccentricity 0.032 in. between head and shank dia; 1/4-20, National Thread, 0.321 in. min lgth; 0.516 in. nominal lgth; paint sector red on top of head at edge at right angle to slot; RCA part/dwg A-8819444-1	Secures O-2014, O-2015
H-2213	Shop Manufacture	EXTRACTOR, LAMP: molded synthetic rubber; round tapered plug shape; 2-1/2 in. lg by 23/32 in. dia at one end, 15/32 in. dia at other end; 9/16 in. max dia by 9/16 in. lg tapered cup in large end, 3/8 in. max dia by 13/16 in. deep tapered cup in small end; w/vent hole connecting large end w/small hole; RCA part/dwg A-8832396-1	Install and Remove Dial Lamps
H-2214	Procured on demand by nearest Naval Shore Supply Activity	BUSHING: general purpose use on AC power supply; brass; female; 0.140 in. lg by 11/32 in. OD by 0.144 in. ID; RCA part/dwg K-59294-146	With A-2202 Supports J-2213
H-2215	Procured on demand by nearest Naval Shore Supply Activity	GROMMET: synthetic rubber; fits 17/32 in. dia hole; 21/64 in. dia center hole, groove width 1/16 in., 23/32 in. dia by 5/16 in. thick overall; RCA part/dwg K-57421-3	Protects Wiring
H-2216		Same as H-1301	Protects Wiring
H-2217	Procured on demand by nearest Naval Shore Supply Activity	BUSHING: brass, nickel plate; 0.115 in. lg by 1/4 in. dia max w/0.080 in. lg by 0.156 in. dia hub extending from one side, 0.116 in. ID; RCA part/dwg K-835783-32	Assists in Mounting Connector
H-2218		Not Used	
H-2219		Same as H-1501	Withdrawing Chassis from Cabinet
H-2220		Same as H-1502	Withdrawing Chassis from Cabinet
H-2221		Not Used	
H-2222	Procured on demand by nearest Naval Shore Supply Activity	WASHER, SPRING: phosphor bronze; round; 0.181 in. ID, 5/16 in. OD, 0.008 in. thick; 5/16 in. OD, 3/64 in. height of extrusion; RCA part/dwg K-99657-130	Stabilize O-2228
H-2223	Shop Manufacture	WASHER, FLAT: brass rod, white nickel plate; round; 0.257 in. ID by 0.190 in. OD by 1/2 in. thick; RCA part/dwg K-99638-142	Bearing Washer for O-2210
H-2224	Shop Manufacture	WASHER, FLAT: phosphoros bronze, nickel plate; round; 5/16 in. OD by 0.191 in. ID by 0.0201 in. thick; RCA part/dwg A-59218-128	Secures O-2213
H-2225 thru H-3100		Not Used	
H-3101		Same as H-551	Spacer for E-3101 and E-3102
H-3102		Same as H-552	Spacer for E-3101 and E-3102
H-3103 thru H-3134		Not Used	
H-3135		Same as H-552	Spacer for E-3135 thru E-3138

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
H-3136		Same as H-551	Spacer for E-3135 thru E-3138
H-3137 thru H-3800		Not Used	
H-3801	N17-R-651091-125	RING, RETAINER: steel, cadmium plate; tensile strength, 238,000 to 280,000 psi; ring shape; 0.800 in. dia by 0.035 in. thick overall; mounts by shaft hole 0.461 in. inside dia; ring provides w/apert lugs at free end for handling w/pointed nose pliers, ring is sprung into groove on shaft; Waldes external ring NAS-5 Catalog no. 5100-50; RCA part/dwg M-142510-154	To Secure O-3804
H-3802	N42-R-2047-527	RING, RETAINING: carbon steel, cadmium plated; "E" shape; 0.527 in. OD, 0.207 in. ID, 0.025 in. thick; mounts by application; Waldes Kohinoor Truarc no. 5133-25; RCA part/dwg A-93605-107	To Secure O-3803, O-3818, O-3814
H-3803	Procured on demand by nearest Naval Shore Supply Activity	RING, RETAINER: steel, cadmium plate finish; "E" shape; 0.335 in. OD by 0.025 in. thick overall; fits around 0.145 in. dia shaft; Waldes Kohinoor Part 5133-18-MF; RCA part/dwg A-93605-106	To Secure O-3805
H-3804	Procured on demand by nearest Naval Shore Supply Activity	WASHER, SPRING: spring steel, cadmium plate finish; round; 0.251 in. ID by 1/2 in. OD by 0.005 in. thick; 1/2 in. OD by 5/64 in. high extrusion; RCA part/dwg K-886211-5	To Stabilize O-3814
H-3805	Shop Manufacture	COLLAR, LOCKING: brass, chemical black finish; round washer shape; 7/16 in. dia by 1/8 in. thick overall; mounts by 0.144 in. dia axial hole; one side undercut to 0.187 in. dia by 0.005 in. deep; RCA part/dwg A-8849697-1	Locks O-3814 in Position
H-3806	Shop Manufacture	SCREW, THUMB: knurled thumb head; brass, nickel plated; no. 6-32; 1/2 in. lg; 1/2 in. lg thread portion; cone point; 3/8 in. dia head; RCA part/dwg K-99017-201	Locks Calibration Control
H-3807	Procured on demand by nearest Naval Shore Supply Activity	SCREW, MACHINE: slot drive; flat head; brass, chemical black and oil finish; no. 8-32 thread; 3/8 in. lg overall; threaded portion 3/16 in. lg; 1/16 in. thick by 7/16 in. dia head, screwdriver slotted; 0.249 in. dia by 0.125 in. lg shoulder; RCA part/dwg A-8849636-1; p/o O-3808	To Secure O-3727
H-3808	Procured on demand by nearest Naval Shore Supply Activity	WASHER, SPRING, TENSION: round, slight 'U' bend; phosphor bronze, SAE spec B103, alloy C, min tensile strength 105,000 lbs, Rockwell hardness (30T scale) 78 min; black nickel finish; 0.257 in. wide by 7/16 in. OD by 0.012 in. thick; washer formed on 1/2 in. radius of curvature; RCA part/dwg A-8864531-1; p/o O-3808	To Secure O-3827
H-3809	Procured on demand by nearest Naval Shore Supply Activity	WASHER, FLAT: brass, chemical black and black lacquer finish; round; 0.260 in. ±0.005 in. ID, 7/16 in. OD, 0.032 in. thick; RCA part/dwg K-55938-202; p/o O-3808	Bearing Between H-3807 and O-3827
H-3810	Procured on demand by nearest Naval Shore Supply Activity	RING, RETAINER: beryllium copper, std oil dipped; curved "E" shaped; 0.230 in. OD by 0.015 in. thick; mounts by 0.125 in. dia hole on shaft; RCA part/dwg B-449699-217; p/o O-3808	To Assemble O-3827
H-3811	N42-R-2052-0515	WASHER: crescent type; grip shaped ends; carbon spring steel; cadmium plated; center hole, 0.214 in. dia curve, (free dia) shoulders at ends of "C" ID increases to protrusions; outside, 0.33 in. dia approx 270 deg; internal shoulders 0.214 in. dia grip; 0.025 in. nominal material thickness; nominal shaft dia 0.25 in.; Waldes Kohinoor Inc. Truarc Retaining Ring no. 5103-25; RCA part/dwg B-449686-105; p/o O-3808	To Secure O-3801, O-3815
H-3812	Procured on demand by nearest Naval Shore Supply Activity	WASHER, SPRING: phosphor bronze, white nickel plated; round; 7/16 in. OD by 0.260 in. ID by 1/16 in. thick overall; material 0.005 in. thick; extra spring temper, double curvature thickness; to withstand 50-hr salt spray test; RCA part/dwg K-69129-117	Grounds Shaft of O-3816
H-3813 thru H-3815		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
H-3816	Procured on demand by nearest Naval Shore Supply Activity	WASHER, SPRING, TENSION: round, wave bend; beryllium copper; white nickel; 0.390 in. dia ID by 5/8 in. dia OD by 0.050 in. thick; RCA part/dwg A-8864594-1	Applies Pressure to Dial Collar
H-3817 thru H-4400		Not Used	
H-4401		Same as H-551	Spacer for E-4401
H-4402		Same as H-552	Spacer for E-4401
HR-101 thru HR-300		Not Used	
HR-301	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	HEATING ELEMENT: 35-3/4 in. lg by 4 in. wide; Technical Materiel Part no. RR-105	Heater Element Surrounding Oven Assembly
HR-302	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	HEATING ELEMENT: 29-1/2 in. lg by 4 in. wide; Technical Materiel Part no. RR-106	Heater Element Surrounding Out Oven Assembly
I-301	G6240-223-9100	LAMP, GLOW: 0.027 W, 65 v AC striking voltage, 90 v DC striking voltage; miniature bayonet base; bulb, T3-1/4, clear, daylight; no filaments; 2 anodes; 1-3/16 in. max overall height; any burning position; Mazda NE-51; for general use; RCA part/dwg K-872291-9	Inner Oven Indicator
I-302	G6240-057-2887	LAMP, INCANDESCENT: 6-8 v, 250 ma DC; bayonet base; Technical Materiel Corp. Part no. BI101-44	Power Indicator
I-303		Same as I-302	Dial Illuminator
I-304		Same as I-301	Outer Oven Indicator
I-305	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	COUNTER, MECHANICAL: 1-1/8 in. lg by 13/16 in. wide by 1-7/32 in. high overall; Technical Materiel Corp. Part no. PO-100	Revolution Counter
I-306 thru I-1500		Not Used	
I-1501		Same as I-301	Indicates "Power On"
I-1502 thru I-2200		Not Used	
I-2201		Same as I-301	Indicates "Power On"
I-2202 thru I-3800		Not Used	
I-3801	G6240-012-5588	LAMP, INCANDESCENT: 7 v, 2.87 W, 2 candle power; lamp, miniature bayonet base; bulb, G-4-1/2, clear, white; 2 carbon filaments, C-2R; 1-1/16 in. max overall height; over 25-hr rated life; any burning position; RCA part/dwg K-61114-12; p/o O-3808	Projection Lamp "Norm"
I-3802		Same as I-3801; p/o O-3808	Projection Lamp "Spare"
J-101		CONNECTOR: female contact; polarized; 6 contacts; chassis mounted; Technical Materiel Corp. Part no. JJ121-2	Power Supply Oven Interconnect

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-102	N17-C-73108-2575	CONNECTOR, COAXIAL: Type UG-604/U; female contact; BNC type; single hole mounted	BFO Output
J-103		Same as J-102	BFO Output
J-104		Same as J-102	BFO Output
J-105	N17-J-39248-4418	JACK, TELEPHONE: JAN Type JJ-034; for 2 conductor plug, shank, 0.253 in. dia by 1-1/32 in. lg; 1-9/32 in. lg by 15/16 in. wide by 49/64 in. high overall; bushing mounted; 3/8 in. dia mounting hole required; mounting accessories; 1 brass hex nut, 1 brass washer; spec JAN-J-641; RCA part/dwg A-8845654-2	Phone Input
J-106 thru J-200		Not Used	
J-201		CONNECTOR: female contact; polarized; 12 contacts; chassis mounted; Technical Materiel Corp. Part no. JJ118-2	Power Supply and RF Chassis
J-202		Same as J-102	V. M. O. Interconnect
J-203		Same as J-102	V. M. O. Interconnect
J-204		Not Used	
J-205		Same as J-102	IFO Output
J-206		Same as J-102	IFO Output
J-207		Same as J-102	IFO Output
J-208		Same as J-102	HFO Output
J-209		Same as J-102	HFO Output
J-210		Same as J-102	HFO Output
J-211 thru J-301		Not Used	
J-302		Same as J-201	Internal V. M. O. Connector
J-303 thru J-400		Not Used	
J-401	N17-C-73322-9170	CONNECTOR, RECEPTACLE: 20 round female contacts; polarized; straight type; 1-9/16 in. lg by 7/16 in. wide by 19/32 in. high overall; contacts rated at 5 amp; 3400 v rms breakdown voltage; rectangular body, aluminum anodized, locking type; mineral filled melamine insert; mounts by two no. 4-40 studs 39/64 in. lg spaced 1.250 in. C to C; De Jur Amsco Corp. Catalog no. 20-20S; RCA part/dwg B-474188-1	Plug-in Connector for Power Unit
J-402 thru J-550		Not Used	
J-551	N17-C-73572-8047	CONNECTOR, RECEPTACLE: 11 round male contacts; polarized; straight type; 1-29/64 in. lg by 3/8 in. wide by 59/64 in. thick overall; contacts rated at 5 amp, 1000 v peak; rectangular body, phenolic, enamel, locking type; molded thermosetting plastic insert; mounts by two no. 4-40 studs 5/16 in. lg on a 0.140 in. mounting center; 3/16 in. OD coupling nut w/no. 4-40 thread; contacts silver or gold plated; terminals hot tin dipped; RCA part/dwg B-455061-11	Plug-in Connector for Mixer Unit
J-552	N17-C-73126-3839	CONNECTOR, RECEPTACLE: 2 round female contacts; straight type; 13/16 in. lg by 15/32 in. wide by 0.343 in. high less protruding contacts and terminals; contacts rated at 5 amps, 1000 v rms; rectangular body, single step, molded mica thermosetting plastic; mounts by two 0.102 in. dia thru hole, 0.218 in. C to C on centerline 5/32 in. from end; 2 contacts 0.187 in. C to C marked "L" and "K" to be contact fit for 0.040 in. dia pins; silver plated w/ hot tin dipped terminal lugs extending to 37/64 in. at base, oriented parallel 45 deg; connector to withstand 48-hr salt spray test; RCA part/dwg A-8834712-1	Receptacle for Z-551

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-553	N17-C-73257-3744	CONNECTOR, RECEPTACLE: 8 round female contacts; 2 large, 6 small; straight type; 1.5 in. lg by 3/8 in. wide by 31/32 in. deep overall; contacts rated at 5 amp, 1000 v rms; rectangular body w/ round pillar type ends, molded thermosetting plastic, natural finish; mounts by two no. 4-40 mounting studs, 0.112 in. dia, 0.140 in. at shoulder, 0.376 in. lg spaced 1.156 in. C to C; 2 end contacts for 0.093 in. dia pins, 6 other contacts for 0.040 in. dia pins; contacting surfaces to be silver plated; terminal ends of contacts to be hot tin dipped; socket to withstand 48-hr salt spray test; RCA part/dwg A-8834708-1	Receptacle for Z-551
J-554 thru J-600		Not Used	
J-601	N17-C-73615-2810	CONNECTOR, RECEPTACLE: 20 round male contacts; polarized; straight type; 1-9/16 in. lg by 7/16 in. wide by 19/32 in. high overall; contacts rated at 5 amp, 3400 v rms voltage breakdown; rectangular body, aluminum, anodized, locking type; mineral filled melamine insert; mounts by two no. 4-40 studs 39/64 in. lg spaced 1.250 in. C to C; De Jur Amsco Corp. Catalog no. 20-20P; RCA part/dwg B-474188-2	Plug-in Connector for Tone Keyer Unit
J-602 thru J-700		Not Used	
J-701		Same as J-601	Plug-in Connector for Monitor Unit
J-702 thru J-800		Not Used	
J-801		CONNECTOR, RECEPTACLE: 34 round male contacts; polarized; straight type; 2 in. lg by 3/4 in. wide by 19/32 in. high overall; contacts rated at 5 amp, 3400 v rms breakdown voltage; rectangular body, aluminum, anodized, locking type; mineral filled melamine insert; mounts by 4 thru holes 0.112 in. dia (accommodates no. 4 Filister head screws), 48 threads per in. on a 0.468 in. by 1.687 in. mounting center; De Jur Amsco Corp. Catalog no. 34-20P; RCA part/dwg B-474187-2	Plug-in Connector for Comparator Unit
J-802 thru J-900		Not Used	
J-901	N17-C-73459-9862	CONNECTOR, RECEPTACLE: 3 round male contacts; polarized; straight type; 57/64 in. lg by 3/8 in. wide by 59/64 in. thick overall; contacts rated at 5 amps, 1000 v; rectangular body, phenolic, enamel, locking type; molded thermosetting plastic inserts; mounts by two no. 4-40 by 5/32 in. lg studs on a 0.140 in. mounting center; contacts silver or gold plated; terminals hot tin dipped; RCA part/dwg B-455061-13	Plug-in Connector for First IF Unit
J-902	N17-C-73531-3457	CONNECTOR, RECEPTACLE: 7 round male contacts; polarized, straight type; 1-11/64 in. lg by 3/8 in. wide by 59/64 in. thick overall; rectangular body, phenolic; mounts by two no. 4-40 by 5/16 in. lg mounting studs on 0.858 in. mounting center; contacts silver or gold plated, terminals hot tin dipped; RCA part/dwg B-455061-7	Plug-in Connector for First IF Unit
J-903 thru J-1000		Not Used	
J-1001		Same as J-901	Plug-in Connector for Second IF Unit
J-1002	N17-C-73605-6389	CONNECTOR, RECEPTACLE: 18 round male contacts; polarized; straight; 1-5/16 in. lg by 9/16 in. high by 27/32 in. wide overall; contacts rated at 10 amps, 4000 v AC (rms) breakdown between contacts; rectangular body, plastic, locking type; molded black bakelite insert; two no. 4-40 by 1/4 in. lg mounting studs on a 1 in. mounting center on terminal side; terminals and contacts identified by letters; contacts silver plated; resistant to salt water; Winchester Electronics Co. MRE-18P-G; RCA part/dwg B-449689-1	Plug-in Connector for Second IF Unit

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-1003 thru J-1100		Not Used	
J-1101		Same as J-1002	Plug-in Connector for Audio Unit
J-1102 thru J-1200		Not Used	
J-1201		Same as J-902	Plug-in Connector for Calibrator Unit
J-1202 thru J-1300		Not Used	
J-1301		Same as J-902	Plug-in Connector for BFO Unit
J-1302 thru J-1400		Not Used	
J-1401	N17-C-73345-4991	CONNECTOR, RECEPTACLE: 32 round female contacts; polarized; straight type; 3-3/8 in. lg by 1-11/16 in. wide by 29/32 in. high less protruding contacts; 28 contacts 10 amp, 2 contacts 40 amp, and 2 coaxial contacts; rectangular body, aluminum, anodize clear; molded phenolic insert; four 5/16 in. dia holes on a 2-7/8 in. by 1 in. mounting center; Cannon Electric Development Co. Catalog no. DPD-32C2-33S Type L; RCA part/dwg B-474189-1	Plug-in Connector to Comparator Keyer Chassis
J-1402		CONNECTOR, RECEPTACLE: 1 round male contact; polarized; straight type; 1.040 in. lg by 11/16 in. wide by 11/16 in. high overall; 50 ohms nominal impedance; cylindrical body w/sq mounting flange, brass, silver plated, locking type; thermosetting polmer insert; accommodates solid dielectric coaxial, 0.206 in. OD w/no. 20 AWG inner conductor; mounts by four no. 3-56 holes on 2 1/2 in. sq mounting center; weatherproof; (Navy Dwg no. RE49F331 w/ special male contact); RCA part/dwg A-8898632-501	Connection to Receiver 1 IF, J-4005
J-1403		Same as J-1402	Alternate Connection to Receiver 1 IF, J-4005
J-1404	N17-C-72595-1800	CONNECTOR, RECEPTACLE: Type AN3102A-10SL-4P; 2 round male contacts; polarized; straight type; 1-1/4 in. lg by 1 in. wide by 1 in. high overall; contacts rated at 200 v DC at sea level, 22 amps; cylindrical body w/sq mounting flange, aluminum, cadmium, plated, locking type; molded melamine insert; mounts by four 0.120 in. dia thru holes on a 23/32 in. by 23/32 in. mounting center; RCA part/dwg C-737841-97	Connection for Receiver 1 Det AGC, J4003
J-1405		Same as J-1404	Connection to Receiver 2 Det AGC, J-4003
J-1406	N17-C-72604-4794	CONNECTOR, RECEPTACLE: Type AN3102A-10SL-3P; 2 round male contacts; polarized; straight type; 1-3/8 in. lg by 1-9/32 in. wide by 1-9/32 in. high overall; contacts rated at 700 v DC at sea level, 22 amp; cylindrical body, w/sq mounting flange, aluminum, cadmium, plated, locking type; molded melamine insert; mounts by four 0.120 in. dia thru hole; RCA part/dwg C-737841-98	Connection to Primary Power Source
H-1407	N17-C-72602-9330	CONNECTOR, RECEPTACLE: Type AN3102A-10SL-8P; 3 round male contacts; polarized; straight type; 1-1/8 in. lg by 23/32 in. wide by 23/32 in. high less protruding contacts; contacts rated at 22 amp, 250 v DC; tee shape body, aluminum, cadmium plated, locking type; mineral filled melamine insert; four 0.120 in. dia mounting holes on a 23/32 in. sq mounting centers; 5/16 in. lg by 5/8-24 coupling nut; RCA part/dwg C-737841-57	Connection to AF Line, J1811
J-1408		Same as J-1404	Connection to Receiver 1 Audio, J-4001 or J-4002
J-1409		Same as J-1404	Connection to Receiver 2 Audio, J-4001 or J-4002
J-1410		Same as J-1404	Connection from External Tone, J-1812

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-1411		Same as J-1404	Connection to Speaker, J-1701
J-1412		Same as J-1402	Connection to Receiver 2 IF, J-4005
J-1413		Same as J-1402	Alternate Connection to Receiver 2 IF, J4005
J-1414 thru J-1500		Not Used	
J-1501		JACK, TELEPHONE: for 2 conductor plug; shank, 0.255 in. dia by 1 in. lg; 3-1/8 in. lg by 13/16 in. wide by 9/16 in. high overall; 9/16 in. sq mounting hole required; one 0.147 in. dia mounting hole to accommodate screw; Yaxley Mfg Co. Catalog no. X-219-J; RCA part/dwg K-817835-1	Headphone Panel Jack, Monitor
J-1502		Same as J-1501	Headphone Panel Jack, Line
J-1503		Same as J-401	Receptacle for Tone Keyer Unit
J-1504		Same as J-401	Receptacle for Monitor Unit
J-1505		Same as J-1401	Receptacle for Comparator Unit
J-1506		Same as J-601	Receptacle for Power Unit of Comparator Keyer
J-1507		CONNECTOR, RECEPTACLE: 32 round male contacts; polarized; straight type; 3-3/8 in. lg by 1-11/16 in. wide by 1-7/64 in. high less protruding contacts; 28 contacts 10 amps, 2 contacts 40 amps, and 2 coaxial contacts; rectangular body, aluminum, anodize clear; molded phenolic insert; four 5/16 in. dia holes on a 2-7/8 in. lg by 1 in. mounting center; Cannon Electric Development Co. DPD-32C2-34P Type L; RCA part/dwg B-474189-2	Receptacle for Main Chassis of Comparator Keyer
J-1508		Same as J-1501	Headphone Panel Jack, Monitor
J-1509		Same as J-1501	Headphone Panel Jack, Line
J-1510 thru J-1600		Not Used	
J-1601	N17-C-73606-7745	CONNECTOR, RECEPTACLE: 18 round male contacts; polarized; straight type; 2-23/32 in. lg by 1-3/32 in. wide by 1-5/32 in. thick, less protruding contacts; contacts rated at 10 amps, 4000 v AC rms; rectangular body, plastic, enamel, locking type; molded black bakelite insert; mounts by two no. 6-32 by 1-5/32 in. lg studs on a 2-5/32 in. mounting center; terminal and contacts identified by letters; Winchester Electronics Co. Catalog no. QRE-18P; RCA part/dwg M-146206-3	Plug-in Connector for Power Unit
J-1602 thru J-1700		Not Used	
J-1701	N17-C-72610-5434	CONNECTOR, RECEPTACLE: Type AN3102A-14S-2P; 4 round male contacts; straight type; 1-3/16 in. lg by 1-3/16 in. wide by 1-1/8 in. high, less protruding contacts; contacts rated at 22 amp, 250 v DC; tee shape body, aluminum, cadmium plated, locking type; mineral filled melamine insert; four 0.120 in. dia holes on a 29/32 in. sq mounting center; 7/8-20 coupling nut; RCA part/dwg C-737841-48	Connector for Speaker
J-1702 thru J-1800		Not Used	
J-1801		Same as J-1407	Spare Connector
J-1802		Same as J-1407	Spare Connector
J-1803		Same as J-1407	Spare Connector
J-1804		Same as J-1407	Spare Connector

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-1805		Same as J-1407	Spare Connector
J-1806		Same as J-1407	Spare Connector
J-1807		Same as J-1407	Spare Connector
J-1808		Same as J-1407	Spare Connector
J-1809		Same as J-1407	Spare Connector
J-1810		Same as J-1407	Spare Connector
J-1811		Same as J-1407	Connector for AF Line Output
J-1812		Same as J-1407	Connector for External Tone Input
J-1813		Same as J-1407	Connector for Receiver 1 Audio Output
J-1814		Same as J-1407	Connector for Receiver 2 Audio Output
J-1815 thru J-1900		Not Used	
J-1901	N17-C-72246-5434	CONNECTOR, RECEPTACLE: Type AN3102A-14S-2S; 4 round female contacts; straight type; 1-1/8 in. lg by 1-3/16 in. wide by 1-3/16 in. high, less protruding contacts; contacts rated at 22 amp, 250 v DC; tee shape body, aluminum, cadmium plated, locking type; mineral filled melamine insert; four 0.120 in. dia mounting holes on a 29/32 in. sq mounting center; 5/16 in. lg by 7/8-20 coupling nut; RCA part/dwg C-737841-47	P/o W-1913, Cable Connector for Speaker, J-1701
J-1902	N17-C-70326-9330	CONNECTOR, PLUG: Type AN3106A-10SL-3S; 3 round female contacts; polarized; straight type; 1-17/32 in. lg by 31/32 in. dia overall; contacts rated at 22 amp, 250 v DC; cylindrical body, aluminum, cadmium plated, locking type; mineral filled melamine insert; 1/4 in. dia max cable opening; RCA part/dwg C-737839-43	P/o W-1902, Cable Connector for Receiver 1 Audio, J-4002
J-1903		Same as J-1902	P/o W-1903, Cable Connector for Receiver 1 Audio, J-4001
J-1904	N17-C-70588-1529	CONNECTOR, PLUG: Type AN3106B-14S-7P; 3 round male contacts; polarized; straight type; 1-11/16 in. lg by 1-5/32 in. dia overall; contacts rated at 22 amp, 250 v DC; cylindrical body, aluminum, cadmium plated, locking type, split shell; mineral filled melamine insert; 3/8 in. dia max cable opening; RCA part/dwg C-737839-66	P/o W-1904, Cable Connector for Power, J-4004
J-1905	N17-C-71408-5333	CONNECTOR, PLUG: 1 round male contact; polarized; straight type; 1-1/64 in. lg by 9/16 in. dia overall; contacts rated at 1000 v peak; 50 ohms nominal impedance; cylindrical body, brass, silver plated, locking type, teflon insert; 0.212 in. dia cable opening; mounts to cable by coupling nut 0.375 in. across flats; weatherproof; RCA part/dwg A-8898625-501	P/o W-1906, Cable Connector for Receiver 1 IF J-4005
J-1906	N17-C-70319-1800	CONNECTOR, PLUG: Type AN3106A-10SL-4S; 2 round female contacts; polarized; straight type; 1-17/32 in. lg by 31/32 in. dia overall; contacts rated at 22 amp, 250 v DC; cylindrical body, aluminum, cadmium plated, locking type; mineral filled melamine insert; 1/4 in. dia max cable opening; RCA part/dwg C-737839-71	P/o W-1901, Cable Connector for Receiver 1 Det AGC, J-4003
J-1907		Same as J-1905	P/o W-1905, Cable Connector for External Oscillator, J-4008
J-1908		Same as J-1904	P/o W-1910, Cable Connector for Power, J-4004
J-1909		Same as J-1906	P/o W-1908, Cable Connector for Receiver 2 Audio, J-4002
J-1910		Same as J-1906	P/o W-1909, Cable Connector for Receiver 2 Audio, J-4001
J-1911		Same as J-1905	P/o W-1912, Cable Connector for Receiver 2 IF, J-4005

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-1912		Same as J-1906	P/o W-1907, Cable Connector for 2 Det AGC, J4003
J-1913		Same as J-1905	P/o W-1911, Cable Connector for External Oscillator, J-4008
J-1914		Same as J-1905	P/o W-1911, Cable Connector for HFO, J-210
J-1915		Same as J-1905	P/o W-1905, Cable Connector for HFO, J-209
J-1916		Same as J-1906	P/o W-1907, Cable Connector for Receiver 2 Det AGC, J-1405
J-1917		Same as J-1906	P/o W-1901, Cable Connector for Receiver 1 Det AGC, J-1404
J-1918		Same as J-1905	P/o W-1912, Cable Connector for Receiver 2 IF, J-1412
J-1919		Same as J-1905	P/o W-1906, Cable Connector for Receiver IF, J-1402
J-1920		Same as J-1906	P/o W-1909, Cable Connector for Receiver 2 Audio, J-1409
J-1921		Same as J-1906	P/o W-1903, Cable Connector for Receiver 1 Audio, J-1408
J-1922		Same as J-1906	P/o W-1913, Cable Connector for Speaker, J-1411
J-1923		Same as J-1902	P/o W-1915, Cable Connector for AF Line, J-1407
J-1924	N17-C-70328-4797	CONNECTOR, PLUG: Type AN3106A-16S-5S; 3 round female contacts; polarized; straight type; 1-11/16 in. lg by 1-1/4 in. dia; contacts rated at 22 amp, 250 v DC; cylindrical body, aluminum, cadmium plated, locking type; mineral filled melamine insert; 1/2 in. dia max cable opening; RCA part/dwg C-737839-70	P/o W-1916, Cable Connector for Power, J-1406
J-1925		Same as J-1906	P/o W-1914, Cable Connector External Tone, J-1410
J-1926		Same as J-1902	P/o W-1914, Cable Connector for External Tone, J-1812
J-1927		Same as J-1902	P/o W-1908, Cable Connector for Receiver 2 Audio, J-1814
J-1928		Same as J-1902	P/o W-1915, Cable Connector for AF Line, J-1811
J-1929		Same as J-1902	P/o W-1902, Cable Connector for Receiver 1 Audio, J-1813
J-1930	N17-C-73746-7636	CONNECTOR, RECEPTACLE: 4 female contacts; flat type; straight type; 2.625 in. lg excluding protruding terminals by 1.328 in. wide by 1.125 in. high; rectangular shape; brown bakelite case; molded black bakelite insert; 2 mounting slots, 5/16 in. lg by 3/16 in. wide slots, 3.281 in. C to C; has a 6-32 tapped hole located in center of connector; Federal spec W-R-151a; Hubbel Inc. Catalog 9575; RCA part/dwg B-456768-2	Convenience Outlet
J-1931		Same as J-1930	Convenience Outlet
J-1932 thru J-1941		Not Used	
J-1942	N17-C-73151-6286	CONNECTOR, RECEPTACLE: 2 flat female contacts; straight type; 2.5 in. lg by 1.75 in. wide by 1.375 in. deep overall; tee shape; composition black bakelite; bakelite insert; two 0.203 in. dia mounting holes, spaced 2.062 in. C to C Harvey Hubbel, Inc. Catalog no. 7332; RCA part/dwg A-8843737-1	Output Receptacle for Z-1901 and Z-1902

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-1943		CONNECTOR, PLUG: 2 flat male contacts; straight type; overall dim. excluding protruding contacts, 1.156 in. lg by 1.531 in. dia; contact rating, 10 amp, 250 v, 15 amp, 125 v; cylindrical shape; steel covered impact resisting composition; corrosion resistant finish; molded brass insert; 0.296 in. to 0.562 in. dia cable opening; has parallel blades; Harvey Hubbel, Inc. Catalog no. 7057; RCA part/dwg A-8901611-1	Input Receptacle for Z-1901 and Z-1902
J-1944 thru J-2200		Not Used	
J-2201	N17-C-73162-3774	CONNECTOR, RECEPTACLE: 3 round female contacts; polarized; straight type; 57/64 in. lg by 3/8 in. wide by 39/64 in. thick overall; contacts rated at 5 amps, 1000 v peak; rectangular shape body, phenolic, enamel, locking type; molded thermosetting plastic inserts; mounts by two no. 4-40 by 1/4 in. lg studs on a 0.578 in. mounting center; incl no. 4-40 coupling nut w/3/16 in. OD; contacts silver or gold plated; terminals hot tin dipped; RCA part/dwg B-455061-14	Plug-in Connector for Antenna Trimmer Connection
J-2202	N17-C-73288-1712	CONNECTOR, RECEPTACLE: 11 round female contacts; polarized; straight type; 1-29/64 in. lg by 3/8 in. wide by 39/64 in. thick overall; contacts rated at 5 amps, 1000 v peak; rectangular body, phenolic, enamel, locking type; molded thermosetting plastic inserts; mounts by two no. 4-40 by 1/4 in. lg mounting studs on a 1.140 in. mounting center; incl 3/16 in. OD no. 4-40 coupling nut; contacts silver or gold plated; terminals hot tin dipped; RCA part/dwg B-455061-12	Receptacle for Antenna Unit
J-2203		Same as J-2202	Receptacle for RF Unit
J-2204		Same as J-2202	Receptacle for Mixer Unit
J-2205		Same as J-2202	Receptacle for Oscillator Unit
J-2206		Same as J-2201	Receptacle for IF Unit (Input)
J-2207	N17-C-73242-6015	CONNECTOR, RECEPTACLE: 7 round female contacts; polarized; straight; 1-11/64 in. lg by 3/8 in. wide by 39/64 in. thick overall; contacts rated at 5 amps, 1000 v peak; rectangular body, phenolic, enamel, locking type; molded thermosetting plastic insert; mounts by two no. 4-40 by 1/4 in. lg mounting studs on a 0.858 in. mounting center; 3/16 in. OD no. 4-40 coupling nut; contacts silver or gold plated; terminals hot tin dipped; RCA part/dwg B-455061-8	Receptacle for First IF Unit
J-2208		Same as J-2201	Receptacle for Second IF Unit (Input)
J-2209	N17-C-73317-2189	CONNECTOR, RECEPTACLE: 18 round female contacts; polarized; straight; 1-5/16 in. lg by 9/16 in. high by 27/32 in. wide overall; contacts rated at 10 amps, 4000 v AC (rms) breakdown between contacts; rectangular body, plastic, locking type; molded bakelite insert; mounts by two no. 4-40 by 1/4 in. lg mounting studs on a 1 in. sq mounting center on terminal side; terminals and contacts identified by letters; contacts silver plated; resistant to salt spray; Winchester Electronics Co. MRE 18S-G; RCA part/dwg M-449689-2	Receptacle for Second IF Unit
J-2210		Same as J-2209	Receptacle for Audio Unit
J-2211		Same as J-2207	Receptacle for BFO Unit
J-2212		Same as J-2207	Receptacle for Calibrator Unit
J-2213	N17-C-73317-6429	CONNECTOR, RECEPTACLE: 18 round female contacts; polarized; straight type; 2-23/32 in. lg by 1-3/32 in. wide by 1-1/4 in. thick less protruding contacts; contacts rated at 10 amps, 4000 v AC rms; rectangular body, plastic, enamel, locking type; molded black bakelite insert; mounts by two no. 6-32 by 1-5/32 in. lg studs on a 2-5/32 in. mounting center; terminals and contacts identified by letters; Winchester Electronics Co. Catalog QRE 18S; RCA part/dwg M-146206-4	Receptacle for Power Unit

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNC.
J-2214	N17-C-73591-1360	CONNECTOR, RECEPTACLE: 14 round male contacts; polarized; straight type; 3-3/8 in. lg by 1-11/16 in. wide by 1-3/4 in. high overall; 6 small contacts at 10 amps, 4 medium contacts at 15 amps, 4 coaxial contacts at 10 amps; rectangular body, aluminum, cadmium plated; mica filled phenolic insert; mounts by four 0.152 in. dia countersunk holes on a 2-7/8 in. by 1 in. mounting center; coaxial terminals are 90 deg angular type; RCA part/dwg C-744589-3	Receptacle for Main Chassis
J-2215		Same as J-105	Headphone Panel Jack
J-2216		Same as J-105	Headphone Panel Jack
J-2217 thru J-3100		Not Used	
J-3101		Same as J-551	Plug-in Connector for Antenna Unit
J-3102		Same as J-552	Receptacle for Z-3101
J-3103		Same as J-553	Receptacle for Z-3101
J-3104		Same as J-901	Antenna Trimmer Connection for Antenna Unit
J-3105 thru J-3134		Not Used	
J-3135		Same as J-551	Plug-in Connector for RF Unit
J-3136		Same as J-552	Receptacle for Z-3135
J-3137		Same as J-553	Receptacle for Z-3135
J-3138 thru J-4000		Not Used	
J-4001		Same as J-1404	Connection for Audio Output
J-4002		Same as J-1404	Connection for Audio Output
J-4003		Same as J-1404	Connector for Det AGC Control Output
J-4004		Same as J-1406	Connection to Primary Power Source
J-4005	N17-C-73108-1267	CONNECTOR, RECEPTACLE: Type AN UG-290/U; 1 round female contact; polarized; straight; 1-1/32 in. lg by 11/16 in. wide by 11/16 in. high overall; 50 ohms nominal impedance; cylindrical body w/sq mounting flange, brass, silver plated; thermosetting polymer insert; accommodates solid dielectric coaxial cable, 0.206 in. OD w/no. 20 AWG inner conductor; four no. 3-56 tapped mounting holes on a 1/2 in. by 1/2 in. mounting center; Navy Dwg no. RE49F331; RCA part/dwg M-445813-1	Connection to FSK or Other Auxiliary Apparatus
J-4006		Same as J-4005	Connection to FSK or Other Auxiliary Apparatus
J-4007	N17-C-73108-5905	CONNECTOR, RECEPTACLE: Type AN UG-58/U; 1 round female contact; polarized; straight; 1-3/32 in. lg by 1 in. wide by 1 in. high by 5/8 in. dia overall; contacts rated at 5 amps, 500 v; 50 ohms nominal impedance, not constant; cylindrical body, brass, silver plated, locking type; polymeric synthetic resin; four 1/8 in. dia mounting holes, 0.075 in. deep, 23/32 in. by 23/32 in. mounting center; center conductor to be non-rotating; RCA part/dwg M-433647-1	Connection for Antenna
J-4008		Same as J-4005	Connection for External Oscillator

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
J-4009		CONNECTOR, RECEPTACLE: 14 round female contacts; polarized; straight type; 3-3/8 in. lg by 1-11/16 in. wide by 1-3/4 in. high less protruding contacts; 6 contacts 10 amp, 4 contacts 15 amps, 4 coaxial contacts 10 amps; grounded; rectangular body, aluminum, cadmium plated; mica filled phenolic insert; four 0.152 in. dia countersunk mounting holes on a 2-7/8 in. by 1 in. mounting center; 1 coaxial contact has 90 deg offset for attaching to cable; Cannon Electric Development Co. DPD-A14-338 Type G; RCA part/dwg C-744589-5	Plug-in Connection to Receiver Chassis
J-4010 thru J-4400		Not Used	
J-4401		Same as J-551	Plug-in Connector for Oscillator Unit
J-4402		Same as J-552	Receptacle for Z-4401
J-4403		Same as J-553	Receptacle for Z-4401
K-301		RELAY, SENSITIVE: 4500 ohms DC resistance; hermetically sealed; Technical Materiel Part no. A-123	Mercury Thermostat Control
K-302 thru K-4000		Not Used	
K-4001	N17-R-99999-0038	RELAY, THERMAL: SPST; normally closed; AC, 150 ma, 60 cycles to 32 mc; heater, AC, 5 watts; non-plug-in type terminals, 2 terminals for contacts; non-hermetically sealed; contacts remain closed at all times up to an ambient temp of 90 deg C; the relay shall open in one second or less for any current exceeding 150 ma; 1-5/8 in. lg by 1-1/16 in. wide by 19/32 in. high overall; mounts by four 0.140 in. dia mounting holes on a 0.687 in. by 0.812 in. mounting center; stops incorporated to limit spring travel to 0.025 in. max above closed contact position; slow acting, continuously adjustable to a minimum operating current at 100 ma; Royson Eng. Co. Type TC-1000; RCA part/dwg C-748210-1	Protects Antenna Input Circuit
L-101		REACTOR, FILTER: 10 henries, 125 ma DC; 1000 v rms test; Technical Materiel Corp. Part no. TF-5001	B+ Filter Choke
L-102		INDUCTOR, VARIABLE: 174-320 microhenries; Technical Materiel Corp. Part no. A-250	BFO Tank Coil
L-103 thru L-200		Not Used	
L-201		INDUCTOR, VARIABLE: Technical Materiel Corp. Part no. A-242	IFO Tank Coil
L-202		INDUCTOR, FIXED: Technical Materiel Corp. Part no. A-244	RF Amplifier Peaking Coil
L-203		INDUCTOR, VARIABLE: slug tuned; 26-44 microhenries; Technical Materiel Corp. Part no. A-245	Tank (2-4 Mc)
L-204		CHOKE, RF: 765 ±20% microhenries; Technical Materiel Corp. Part no. CL-100-5	RF Choke
L-205		INDUCTOR, VARIABLE: slug tuned; 7.4-13 microhenries; Technical Materiel Corp. Part no. A-246	Tank (4-8 Mc)
L-206		INDUCTOR, VARIABLE: slug tuned; 1.84-3 microhenries; Technical Materiel Corp. Part no. A-247	Tank (8-16 Mc)
L-207		INDUCTOR, VARIABLE: slug tuned; 0.5-0.84 microhenries; Technical Materiel Corp. Part no. A-248	Tank (16-32 Mc)
L-208		INDUCTOR, VARIABLE: slug tuned; 0.18-0.26 microhenries; Technical Materiel Corp. Part no. A-249	Tank (32-64 Mc)
L-209 thru L-300		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
L-301		INDUCATOR, VARIABLE: 0.27-0.29 microhenries; Technical Materiel Corp. Part no. A-243	V. M. O. Tank
L-302		CHOKE, RF: 1 mh; 50 ma; Technical Materiel Corp. Part no. CL-101-2	V. M. O. Cathode Choke
L-303 thru L-400		Not Used	
L-401	N16-R-29792-1061	REACTOR, FILTER CHOKE: 2 sections; 10 henries overall inductance, 104 ma overall current rating; tapped at 5 henries; ea half section 160 ohms ±10%, DC resistance; 200 v insulation test; hermetically sealed metal case; 5-5/16 in. lg by 1-29/32 in. wide by 1-7/8 in. high overall; four no. 8-32 mounting studs spaced 1-9/32 in. by 1-1/8 in. C to C; 3 solder tab standoff type terminals, 9/16 in. high, located on mounting end; 1 section, 50 v rms 119 ma rating, other section, 5 v rms at 104 ma; the sections are connected to a common terminal series opposing; ambient operating temp -55 deg C to +85 deg C; RCA part/dwg A-8896292-1	With C-404 and C-405, Filters Rectified Current
L-401A		P/o L-401	
L-401B		P/o L-401	
L-402 thru L-600		Not Used	
L-601		REACTOR, AUDIO: 1 section; 5 henries overall inductance, 13 ma DC max; 500 v DC to 1000 v DC test voltage; hermetically sealed metal case; 2-5/8 in. lg by 2.176 in. wide by 3-1/16 in. high overall; has four no. 6-32 inserts to accommodate screws for mounting placed on a 2.176 in. by 1.176 in. mounting center; 2 solder lug type terminals, located on top; terminals marked + and -; 40 "Q" from 590 to 1800 cycles per second; 20 "Q" or higher at 2 kc; -54 deg C to +65 deg C operating temp range, temp rise at rated loads shall not exceed 35 deg C; marked w/vendor's name and part no., standard Navy stock no., RCA part/dwg no.; spec MIL-T-27 Grade 1, Class A, family 20; RCA part/dwg B-474158-1	Oscillator Unit
L-602 thru L-700		Not Used	
L-701		COIL, RADIO FREQUENCY: 440-800 microhenries at 790 kc, 9.6 ohms, 23 ma; 220 turns, 6 strands no. 44 AWG wire, copper conductor, silk or nylon covered Litz wire; 1 pie universal winding; unshielded; ceramic form, powdered iron core; coil dim., excluding terminals mounting attachments, and tuning devices, 5/32 in. lg by 1/2 in. dia; coil form, 27/32 in. lg by 3/8 in. across flats overall; adjustable iron core, screwdriver adjustment through top of form; 4 solder lug type terminals, located outside of coil form; mounts by 0.190 in. -32 thread by 9/32 in. lg bushing; RCA part/dwg B-474186-1	With C-702, Resonates Input, V-701
L-702		Same as L-601	With C-708 and C-709, Filters Output, V-701
L-703 thru L-1012		Not Used	
L-1013	N16-C-76727-7769	COIL, RADIO FREQUENCY: 1.22 mh at 200 kc ±8%; 9.8 ohms DC resistance, 4.7 ohms to tap, 1.5 ma DC nominal; 225-1/2 turns no. 38 AWG copper wire, formex insulated; 1 random winding tapped at 121-1/4 turns; shielded; cylindrical, aluminum alloy, satin finish can; ceramic coil form; powdered iron core; coil dim. excluding terminals, mounting attachments and tuning devices, 0.572 in. OD shield by 0.601 in. lg; coil form 0.275 in. lg by 0.219 in. dia overall approx; adjustable iron core, screwdriver adjustment through end of shield; 4 stud type terminals, one not used, for soldering, on end of shield can; single mounting bushing 1/4-32 thread 3/8 in. lg approx; mark terminals "A", "B", "C", "D" on side of can (terminal "D" not used), mark w/ symbol, RCA part/dwg no., and standard Navy stock no.; 2nd Intermediate Frequency Unit "IF" Coil; sealed in container; to withstand 48-hr salt spray test; to operate -54 deg C to +85 deg C, 50 v dc to ground nominal; terminals "A" start, "B" tap, "C" finish; spec MIL-T-15305; RCA part/dwg C-746104-32; p/o Z-1011	Element of Z-1011

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
L-1014, L-1015		Not Used	
L-1016	N16-C-76743-2212	COIL, RADIO FREQUENCY: 2.34 mh at 200 kc ±8%; 13.6 ohms DC resistance, 6.5 ohms to tap, 10 ma DC nominal; 304-1/2 turns no. 38 AWG copper wire, formex insulated; 1 random winding tapped at 162-1/4 turns; shielded; cylindrical, aluminum alloy, satin finish can; ceramic coil form, powdered iron core; coil dim. excluding terminals, mounting attachments, and tuning devices, 0.572 in. OD shield by 0.601 in. lg; coil form, 0.275 in. lg by 0.219 in. dia overall approx; adjustable iron core, screwdriver adjustment through end of shield; 4 stud type terminals, one not used, for soldering, on end of shield can; single mounting bushing 1/4-32 thread 3/8 in. lg approx; mark terminals "A" "B" "C" "D" on side of can (terminal "D" not used), mark w/symbol, RCA part/dwg no. and standard Navy stock no.; 2nd intermediate frequency unit "IF" Coil; sealed in container; to withstand 48-hr salt spray test; to operate -54 deg C to +85 deg C, 120 v DC to ground nominal; terminals "A" start, "B" tap, "C" finish; spec MIL-T-15305; RCA part/dwg C-746104-31; p/o Z-1017	Element of Z-1007
L-1017		Same as L-1016; p/o Z-1018	Element of Z-1018
L-1018 thru L-1600		Not Used	
L-1601		Same as L-401	With C-1601, C-1602 Filters Rectified Current
L-1601A		P/o L-1601	
L-1601B		P/o L-1601	
L-1602 thru L-2200		Not Used	
L-2201	N16-C-99999-0045	COIL, RADIO FREQUENCY: 6.35 mh at 200 kc ±10%; 50.2 ohms DC resistance, 20 ma DC; 1045-1/2 turns no. 38 AWG copper wire, formex insulated; 1 universal winding, single pie; untapped; shielded; cylindrical, aluminum alloy, satin finish can; powered iron core; coil dim. excluding terminals, mounting attachments, and tuning devices, 0.572 in. dia by 0.601 in. lg; adjustable iron core, screwdriver adjustment through end of shield; 2 stud type terminals, for soldering, on end of can; single mounting bushing 1/4-32 thread, 1/4 in. lg approx; mark terminals on case, "A" "B", mark w/symbol, RCA part/dwg no., and standard Navy stock no.; choke coil for Beat Frequency Oscillator; sealed in container; to withstand 48-hr salt spray test; to operate -54 deg C to +85 deg C, 120 v DC to ground, nominal; RCA part/dwg C-746104-9	Manual Gain Control Filter Circuit
L-2202	N16-C-99999-0049	COIL, RADIO FREQUENCY: 30 microhenries at 2.5 mc, 3.456 ohms DC resistance, 25 ma; 125 turns no. 36 AWG copper wire, formex insulated; 1 single layer close wound winding, untapped; unshielded; solid phenolic form; air core; coil dim. excluding terminals, mounting attachments, and tuning devices, 1 in. lg by 0.2616 in. dia; coil form, 1 in. lg by 1/4 in. dia overall; 2 axial wire lead type terminals located one ea end; mounts by wire lead terminals 1-1/2 in. lg; marked w/RCA part/dwg no.; choke coil; 38 mc self-resonant frequency; RCA part/dwg A-8813716-501	With C-2202 Headphone Filter
L-2203 thru L-3134		Not Used	
L-3135	N16-C-76635-4241	COIL, RADIO FREQUENCY: 23.4 microhenries at 3.0 mc, 1.35 ohms DC resistance, 39 ma; 36 turns no. 44 AWG copper wire, uninsulated; one four-pie universal winding, untapped, unshielded; ceramic form; powdered iron core; coil dim. excluding terminals, mounting attachments, and tuning devices, 0.750 in. dia by 1-7/16 in. lg; coil form, 2-7/32 in. lg by 0.750 in. dia overall approx; adjustable iron core, screwdriver adjustment through top of can; 2 post type terminals, located inside coil form; marked w/RCA part/dwg no., standard Navy stock no., and nominal operating frequency; coil sealed in plastic, to withstand 48-hr salt spray test; RCA part/dwg C-746108-16	RF Unit Band 1

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
L-3136	N16-C-76588-5403	COIL, RADIO FREQUENCY: 5.21 microhenries at 6.0 mc, 0.284 ohm DC resistance, 100 ma; 20-2/3 turns no. 30 AWG copper wire, uninsulated; 1 single layer flat in groove winding; untapped, unshielded; ceramic form; powdered iron core; coil dim. excluding terminals, mounting attachment, and tuning devices, 0.750 in. dia by 1-7/16 in. lg; coil form, 2-7/32 in. lg by 0.750 in. dia overall; adjustable iron core, screwdriver adjustment through top of can; 2 post type terminals, located inside coil form; marked w/ RCA part/dwg no., standard Navy stock no., and nominal operating frequency; coil sealed in plastic, to withstand 48-hr salt spray; RCA part/dwg C-746108-17	RF Unit, Band 2
L-3137	N16-C-71967-5865	COIL, RADIO FREQUENCY: 1.15 microhenries at 12.0 mc, 0.037 ohm DC resistance, 404 ma; 8-2/3 turns no. 24 AWG copper wire, uninsulated; 1 single layer flat in groove winding; untapped, unshielded; ceramic form; powdered iron core; coil dim. excluding terminals, mounting attachment, and tuning devices, 0.750 in. dia by 1-7/16 in. lg; coil form, 2-7/32 in. lg by 0.750 in. dia overall; adjustable iron core, screwdriver adjustment through top of can; 2 post type terminals, located inside coil form; marked w/ RCA part/dwg no., standard Navy stock no., and nominal operating frequency; coil sealed in plastic, to withstand 48-hr salt spray test; RCA part/dwg C-746108-18	RF Unit, Band 3
L-3138	N16-C-71477-1022	COIL, RADIO FREQUENCY: 0.367 microhenry at 20.0 mc; 0.016 ohm DC resistance; 5-2/3 turns 0.015 in. by 0.045 in. AWG copper wire, uninsulated; 1 single layer flat in groove winding; untapped, unshielded; ceramic form; powdered iron core; coil dim. excluding terminals, mounting attachment, and tuning devices, 0.750 in. dia by 1-7/16 in. lg; coil form, 2-7/32 in. lg by 0.750 in. dia overall; adjustable iron core, screwdriver adjustment through top of can; 2 post type terminals, located inside coil form; marked w/ RCA part/dwg no., standard Navy stock no., and nominal operating frequency; coil sealed in plastic, to withstand 48-hr salt spray test; RCA part/dwg C-746108-19	RF Unit, Band 4
L-3139	N16-C-71737-7657	COIL, RADIO FREQUENCY: 0.274 microhenry at 28 mc, 0.013 ohm DC resistance, 853 ma; 3-2/3 turns no. 22 AWG copper wire, uninsulated; 1 single layer, flat-rh in groove winding; untapped, unshielded; steatite coil form; powdered iron core; coil form, 1-3/8 in. lg by 0.455 in. dia overall; adjustable iron core, screwdriver adjustment through top of case; 5 post type terminals (3 dummies), located at bottom; mounts by single mounting bushing 3/8 in. -32 thread by 9/32 in. lg; marked w/RCA part/dwg no., standard Navy stock no., and 28 mc nominal operating frequency; antenna coil; 24 mc to 32 mc frequency range; 290 mc self-resonant frequency; RCA part/dwg C-746108-20	RF Unit, Band 5
L-3140 thru L-4400		Not Used	
L-4401	N16-C-76611-4201	COIL, RADIO FREQUENCY: 8.65 microhenries at 4.6 mc, 0.28 ohm DC resistance, 120 ma; 31-2/3 turns no. 44 AWG copper wire, single nylon covered; 1 single layer flat-close wound winding; tapped; 1st tap at 10.5 turns, 2nd tap at 18.4 turns; unshielded; steatite forms; powdered iron core; coil form, 1-3/8 in. lg by 0.312 in. dia overall; adjustable iron core; screwdriver adjustment through top of case; 5 post type terminals, located at base of case; mounts by 3/8 in. -32 thread by 9/32 in. lg mounting bushing at top of case; marked w/symbol no., RCA part/dwg no., standard Navy stock no.; w/4.6 mc center tapped frequency; oscillator coil; 3.6 mc to 5.6 mc frequency range, 29 mc self-resonant frequency; RCA part/dwg C-746105-11	Oscillator Unit, Band 1
L-4402	N16-C-76569-8211	COIL, RADIO FREQUENCY: 3.15 microhenries at 7.6 mc, 0.09 ohm DC resistance, 253 ma; 17-2/3 turns no. 26 AWG copper wire, double cotton covered; 1 single layer flat-close wound winding; tapped; 1st tap at 6-1/2 turns, 2nd tap at 11-1/2 turns; unshielded; steatite form; powdered iron core; coil form, 1-3/8 in. lg by 0.312 in. dia overall; adjustable iron core, screwdriver adjustment through top of case; 5 post type terminals on bottom of case; mounts by 3/8-32 threads by 9/32 in. lg mounting bushing on top of case; marked w/symbol no., RCA part/dwg no., standard Navy stock no., and w/ 7.6 mc center tapped frequency; oscillator coil; 5.6 mc to 9.6 mc frequency range; 62 mc self-resonant frequency; RCA part/dwg C-746105-12	Oscillator Unit, Band 2

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
L-4403	N16-C-76529-8501	COIL, RADIO FREQUENCY: 0.95 microhenry at 13.6 mc, 0.03 ohm DC resistance, 400 ma; 6-3/4 turns no. 24 AWG copper wire, tin or lead alloy coated; 1 single layer, flat in groove winding; tapped; 1st tap at 2.9 turns, 2nd tap at 5-1/3 turns; unshielded; steatite form; powdered iron core; coil form, 1-3/8 in. lg by 0.455 in. dia overall; adjustable core, screwdriver adjustment through top of case; 5 post type terminals on bottom of case; mounts by 3/8-32 threads by 9/32 in. lg mounting bushing on top of case; marked w/symbol no., RCA part/dwg no., standard Navy stock no., and w/13.6 mc center tapped frequency; oscillator coil; 9.6 mc to 17.6 mc frequency range; 155 mc self-resonant frequency; RCA part/dwg C-746105-13	Oscillator Unit, Band 3
L-4404	N16-C-76520-7493	COIL, RADIO FREQUENCY: 0.372 microhenry at 21.6 mc, 0.013 ohm DC resistance, 400 ma; 4-1/2 turns no. 14 AWG copper wire, uninsulated; 1 single layer flat in groove winding, tapped; 1 tap on 2nd turn; unshielded; steatite form; powdered iron core; coil form dim., 1-3/8 in. lg by 0.455 in. dia overall adjustable iron core, screwdriver adjustment through top of case; 5 post type terminals on base of case; mounted by 3/8-32 thread by 9/32 in. mounting bushing on top of case; marked w/symbol no., RCA part/dwg no., standard Navy stock no., and w/21.6 mc center tapped frequency; oscillator coil, 17.6 mc to 25.6 mc frequency range; 250 mc self-resonant frequency; RCA part/dwg C-746105-14	Oscillator Unit, Band 4
L-4405	N16-C-76520-3501	COIL, RADIO FREQUENCY: 0.255 microhenry at 29.6 mc, 0.01 ohm DC resistance, 400 mc; 3-1/6 turns no. 14 AWG copper wire; uninsulated; 1 single layer-flat in groove winding; tapped; single tap at 1-2/3 turns; unshielded; steatite form; powdered iron core; 1-3/8 in. lg by 0.455 in. dia overall; adjustable iron core, screwdriver adjustment through top of case; 5 post type terminals at base of case; mounts by 3/8-32 by 9/32 in. lg mounting bushing at top of case; marked w/symbol no., RCA part/dwg no., standard Navy stock no., and w/29.6 mc center tapped frequency; oscillator coil; 25.6 mc to 33.6 frequency range; 400 mc self-resonant frequency; RCA part/dwg C-746105-15	Oscillator Unit, Band 5
L-4406	N16-C-99999-0048	COIL, RADIO FREQUENCY: 25 microhenries, 0.222 ohm DC resistance, 159 ma; 50 turns no. 28 AWG copper wire, formex insulated; 1 single layer flat winding; untapped; unshielded; insulated iron core; powdered iron core; coil dim., excluding terminals and mounting attachments, 7/8 in. lg by 0.2641 in. dia; coil form, 7/8 in. lg by 1/4 in. dia overall; 2 axial wire lead type terminals; terminals mounted; marked permanently w/RCA part/dwg no.; choke coil; 31 mc self-resonant frequency; RCA part/dwg A-8810453-501; p/o Z-4401	Heater Choke, V-4401
LS-1701	N17-L-91320-6861	LOUDSPEAKER, DYNAMIC: permanent magnet field; 3 to 4 ohms voice coil impedance; input: less than 6 W normal, 6 W peak; cone type; 6 in. dia cone; output transformer not incl; 3.170 in. lg by 6-21/32 in. dia max; mounts by four 0.297 in. lg by 0.203 in. wide holes on a 3-1/16 in. radius, 2 on top and 2 on bottom spaced 45 deg on either side of a vertical centerline; Jensen Mfg Co. Type 6 in. Model P6-T w/3/4 voice coil; RCA part/dwg A-8869344-1	Speaker
M-301		METER, MILLIMETER: 0-1 DC, 2-1/2 in. sq case; Technical Materiel Corp. Part no. MR100-1	Test Meter
M-302 thru M-1500		Not Used	
M-1501		METER, AUDIO LEVEL: panel mounted; rectifier type; single phase AC; marked in decibels, -12 db to +22 db range, major marking points are -12, -2 zero, and +8 db; rectangular, plastic case; flange size 1.750 in. sq by 1.151 in. body dim by 1.531 in. body depth from mounting surface excluding terminals; ±0.4 db between -12 and +8 db accuracy; one mw into 600 ohms for zero level; calibrated for magnetic panel, 1/8 in. thick steel; black scale markings on white background; self-contained; four 0.125 in. dia mounting holes on a 1.312 in. sq mounting center; 2 solder lug type terminals; impedance at zero on scale, 5000 ohms, damping factor at zero on scale, 5 to 20, lance black pointer, response time at zero, 1 sec; in accordance w/MIL-M-6A; International Instruments Inc. Type no. A-SP-192; RCA part/dwg B-474844-1	AF Line Level Meter

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
M-1502		AMMETER: MIL Type MR13S001DCMA; panel mounted; DC; marked in ma, 0 to 1 ma range, graduated in increments of 10, marked "DC"; marked in millivolts, 0 to 100 millivolts range, graduated in increments of 10, marked "DC"; rectangular plastic case; flange size, 1.750 in. sq, 1.51 in. body dim. by 1.125 in. body depth from mounting surface, excluding terminals; ±3% initial accuracy; 100 ohms nominal; 100 ±3 millivolts drop across terminals; calibrated for non-magnetic panel; white markings on black background; self-contained; four 0.125 in. dia mounting holes on a 1.312 in. sq mounting center; supplied w/ 4 no. 4-40 machine screws, 4 nuts, and 4 lockwashers; 2 solder lug type terminals; spec MIL-M-3823; scaleplate MIL Type MP13BA001DCMA; RCA part/dwg B-474840-3	Detector 1 Output Meter
M-1503		Same as M-1502	Detector 2 Output Meter
M-1504		Same as M-1502	Combined Detector Output Meter
M-1505 thru M-2200		Not Used	
M-2201	N17-M-18982-9120	AMMETER: JAN Type MR25B100DCUA; panel mounted; scale range 0 to 100 microamperes, graduated in increments of 5, DC; cylindrical, molded bakelite case; flush mounted; flange 1.770 in. lg by 1.770 in. wide by 0.406 in. thick; 1.510 in. dia body; 1.000 in. body depth excluding terminals; ±3% for full scale reading; calibrated for non-magnetic panel; white markings and pointer, black background; self-contained; four 0.140 in. dia mounting holes located on 1.312 in. by 1.312 in. mounting center; 2 solder lug type terminals; special scale markings; RCA part/dwg B-462567-1	Tuning Meter
M-2202	N17-M-22713-3543	METER, AUDIO LEVEL: JAN Type MR25B126SPEC; panel mounted; circuit application; AC type, designed for 25 cycles to 16,000 cycles, single phase, 2 wires; scale marked "DECIBELS", range -10 to 0 and 0 to +5, 10 scale divisions; cylindrical, plastic case; flush mounted; flange 1.770 in. lg by 1.770 in. wide by 0.406 in. thick; 1.510 in. body dia; 1 in. body depth from mounting surface; ±5% accuracy for full scale reading; sensitivity data; "0" on scale represents 0.6 v; 5000 to 5500 ohms resistance when indicating "0"; calibrated for non-magnetic panel; white markings and pointer on black background; self-contained; four 0.140 in. dia mounting holes on 1.312 in. by 1/312 in. mounting center; 2 solder lug type terminals; special scale marking; RCA part/dwg B-462566-1	Output Meter
N-101 thru N-300		Not Used	
N-301		PLATE, IDENTIFICATION: 1 plate; aluminum alloy; clear lacquer finish; reverse etch, anodized letters, dull black background; incribed w/nomenclature, "O-330/FRR-32 Oscilloscope, Radio Frequency;" voltage instructions, serial no. "A unit of Receiving Set, Radio AN/FRR-32", "Manufactured for Navy Department-Bureau of Ships by the Technical Material Corp." contractor and contract numbers; 3 in. lg by 2 in. wide by 0.03 in. thick overall; mounts by four 9/64 in. dia holes on a 2-3/4 in. by 1-3/4 in. mounting center; spec MIL-I-15024; RCA part/dwg B-475308-1	Nameplate
N-302 thru N-1500		Not Used	
N-1501		PLATE, IDENTIFICATION: 1 plate; aluminum alloy; light Navy gray finish; black letters by silk screen method on light Navy gray background; inscribed w/"RECEIVER 1", "RECEIVER 2", "COMBINED", "SILENCER", "AF LINE", "POWER", "ON", "OFF", "RECEPTION", "MONITOR", "FUNCTION"; twice inscribed w/ "DIVERSITY", "TUNE", "LEVEL", and "PHONES"; silencer and two level controls graduated from 1 to 10 in increments of 1 in cw direction; above reception plate is marked A1, A2, A3, and FSK; 15-7/8 in. lg by 7-19/32 in. wide by 0.032 in. thick overall; mounts by sixteen 0.1285 in. dia (no. 30 drill) holes on a 1-5/16 in. sq mounting center around centers of four 1-9/16 in. dia holes and by five 0.1405 in. dia (no. 28 drill) holes; one spaced 10-13/16 in. from one edge, 3-15/16 in. up from bottom edge; other holes spaced 15-7/64 in. from one edge, 5/8 in. from bottom to center of 1 hole, then 1-3/8 in. up to center of next hole then 1-7/16 in. up to center of following hole, then 1-3/8 in. up to center of last hole; has four 1-9/16 in. dia holes, seven 13/32 in. dia holes, four 15/32 in. dia holes, one 1/2 in. dia hole and one 23/32 in. dia hole to accommodate various control knobs; RCA part/dwg C-752557-1	Carries Panel Markings

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
N-1502		PLATE, IDENTIFICATION: 1 plate; aluminum alloy, reverse etch, anodized finish; silver letters, dull black background; inscribed w/ "CM-70/FRR-32 COMPARATOR-KEYER", "A UNIT OF RECEIVING SET, RADIO AN/FRR-32", "NAVY DEPARTMENT BUREAU OF SHIPS", contains power information, contractor, and contract no.; 2 in. lg by 2 in. wide by 1/32 in. thick overall; mounts by four 1/8 in. dia holes on a 1-3/4 in. sq mounting center; covered w/ coat of clear lacquer; RCA part/dwg B-475305-1	Nameplate
N-1503		ESCUTCHEON: indicates frequency, threshold, key, and AGC time constant; metal; flat, rectangular; 6-3/4 in. lg by 2-3/8 in. wide by 0.032 in. thick; mounts by three 13/32 in. dia holes and one 1/2 in. dia hole which accommodates the shafts of the different knobs; marked w/black letters; time constant marked slow, medium, and fast; threshold graduates from 0 to 10 in increments of 1 in a clockwise direction; frequency graduates from 595 kc to 1785 kc in increments of 170 kc in a clockwise direction; RCA part/dwg B-474163-1	Indicates Control Markings and Nomenclature
N-1504 thru N-1700		Not Used	
N-1701		PLATE, IDENTIFICATION: 1 plate; aluminum alloy; reverse etch, anodized finish; silver letters, dull black background; inscribed w/ "LS-169/G", "NAVY DEPARTMENT BUREAU OF SHIPS", gives contractor, contract no., and general instructions; 3 in. lg by 2 in. wide by 1/32 in. thick overall; mounts by four 1/8 in. dia mounting holes on a 2-3/4 in. by 1-3/4 in. mounting center; covered w/a coat of clear lacquer; RCA part/dwg B-475306-1	Nameplate
N-1702 thru N-1800		Not Used	
N-1801		PLATE, IDENTIFICATION: 1 plate; aluminum alloy; reverse etch, anodized finish; silver letters, dull black background; inscribed w/ "SB-431/FRR-32 SWITCHBOARD, PATCHING, COMMUNICATION"; "A UNIT OF RECEIVING SET, RADIO AN/FRR-32", "NAVY DEPARTMENT BUREAU OF SHIPS", contains contractor and contract no.; 3 in. lg by 2 in. wide by 1/32 in. thick overall; mounts by four 1/8 in. dia mounting holes on 2-3/4 in. by 1-3/4 in. dia mounting center; covered w/a coat of clear lacquer; RCA part/dwg B-475307-1	Nameplate
N-1802 thru N-1900		Not Used	
N-1901		PLATE, IDENTIFICATION: 1 plate; aluminum alloy, reverse etch, anodized finish; silver letters, lusterless orange background; inscribed w/ "AN/FRR-32 RECEIVING SET, RADIO", "NAVY DEPARTMENT BUREAU OF SHIPS", contains power information, contractor, and contract no.; 4 in. lg by 3 in. wide by 1/32 in. thick overall; mounts by four 1/8 in. dia mounting holes on a 3-3/4 in. by 2-3/4 in. mounting center; covered w/coat of clear lacquer; RCA part/dwg B-475304-1	Nameplate
N-1902 thru N-2202		Not Used	
N-2203	Procured on demand by nearest Naval Shore Supply Activity	DIAL, SCALE: frequency; scale, -10 to 0 and 0 to +10 left to right; graduated in increments of 10, frequency vernier, 180 deg; rectangular shape; 1-5/16 in. lg by 1-11/32 in. wide by 0.187 in. thick w/0.251 in. dia center hole; flange mounted; two 0.173 in. dia mounting holes on 1.562 in. C to C; aluminum alloy die casting; light Navy gray enamel finish; RCA part/dwg B-462597-2	Carries Frequency Vernier
N-2204 thru N-3800		Not Used	
N-3801	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	DIAL, SCALE: frosted aluminum; semi-circular round, flat shape; approx 2-1/2 in. lg by 7/8 in. wide by 1/32 in. thick; mounts by two 0.156 in. dia mounting holes on 2 in. mounting center; RCA part/dwg A-46311-1	Carries Frequency Vernier
O-101 thru O-200		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-201	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	COUPLING, FLEXIBLE: 3/4 in. lg by 1-1/8 in. OD overall; Technical Materiel Corp. Part no. MC-103	Flexible Coupling in Multiplier Chassis
O-202 thru O-300		Not Used	
O-301		GEAR: spur; Technical Materiel Corp. Part no. A-420	P/o Combination Gear Assembly, Mates W/ O-302
O-302		GEAR: spur; Technical Materiel Corp. Part no. A-421	P/o Combination Gear Assembly, Mates W/ O-301
O-303		GEAR: spur; Technical Materiel Corp. Part no. A-422	Pinion Gear Assembly, P/o Oscillator Sub-Assembly
O-304	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	SHAFT: phosphor bronze, flexible cable; 1-5/8 in. lg by 3/8 in. dia; motor drive flexible shaft; Technical Material Corp. Part no. MC-108	Motor Drive Shaft
O-305	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	COUPLING, FLEXIBLE: 13/16 in. lg by 1-1/4 in. OD overall; accommodates 1/4 in. dia shaft one side; Technical Materiel Corp. Part no. MC-104	Shafts from Front Panel Controls to Oven Interior
O-306	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	SHAFT: phosphor bronze, flexible cable; 1-5/8 in. lg by 0.072 in. dia; Technical Materiel Corp. Part no. MC-109	P/o Motor Assembly
O-307	Shop Manufacture	GASKET: "O" ring type; 4-1/4 in. OD by 3-3/4 in. ID overall; Technical Materiel Corp. Part no. RY-105	Neoprene Belt Drive from Motor to Counter Dial
O-308	Procured on demand by nearest Naval Shore Supply Activity	SPRING: helical extension type; 2 in. lg by 1/4 in. OD overall; hook type terminals; Technical Materiel Corp. Part no. SP-115	Motor Suspension Spring
O-309	Procured on demand by nearest Naval Shore Supply Activity	SPRING: loop type; 1-1/8 in. lg by 1-1/8 in. wide by 3/16 in. thick overall; Technical Materiel Corp. Part no. SP-100	P/o Oscillator Sub-Assembly
O-310 thru O-550		Not Used	
O-551	Shop Manufacture	BAR, ACTUATOR, ELECTRICAL SWITCH: chrome plated finish; rectangular shape; 1-29/64 in. lg by 13/32 in. wide by 39/64 in. high overall; mounts by insertion through bushing on oscillator; 1 coupling, 1 shaft; RCA part/dwg A-8834082-502	Shaft Extension for S-551
O-552		COUPLING, RIGID: split bearing type one end, pin type other end; shaft opening at bearing end 0.125 in. dia; mounts on 0.125 in. dia shaft; 1-1/64 in. lg by 11/16 in. wide by 0.483 in. high overall; aluminum coupling, integral stainless steel pin; satin etch finish on aluminum; pin 0.125 in. dia by 0.202 in. lg; "L" shape; sleeve end offset 110 deg from pin end, has 3/64 in. sawcut from shaft hole to end opposite pin to provide clamping action on shaft; spotface 9/32 in. dia by 1/32 in. deep at ea end of bearing drilling; RCA part/dwg A-8834099-501	Coupling for O-551
O-553 thru O-600		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-601	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	COUPLING, RIGID: flanged type; 0.252 in. dia shaft opening in center; has 0.125 in. wide by 7/32 in. deep slot in flange to accommodate pin of external coupling; mounts to shaft by two no. 6-32 set screws located at 12 and 9 o'clock; 7/8 in. OD by 1/4 in. thick overall; stainless steel, passivating dip; bushing shape w/ 7/8 in. OD by 0.062 in. wide flange, then to 7/16 in. dia by 0.190 in. to end; RCA part/dwg A-8901607-1	P/o Switch Coupling Assembly
O-602 thru O-700		Not Used	
O-701		Same as O-601	P/o Switch Coupling Assembly
O-702 thru O-800		Not Used	
O-801	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	COUPLING, RIGID: split flanged type; 0.252 in. dia shaft opening one end and has 7/32 in. lg by 1/8 in. wide cutout in flange; set screw mounting; 0.218 in. lg by 7/16 in. OD by 0.252 in. ID w/ 7/8 in. dia flange; stainless steel, passivating dip; has two no. 4-40 tapped holes to accommodate set screws; RCA part/dwg A-8844933-1	P/o Switch Coupling Assembly
O-802 thru O-1000		Not Used	
O-1001	Shop Manufacture	STRAP, CONNECTOR: for terminal link on oscillator box terminal board; silver plated brass; flat rectangular shape w/rounded ends except one end center notched, 29/64 in. lg by 3/16 in. wide by 0.032 in. thick overall; mounts by slot w/rounded ends 0.203 in. lg by 0.093 in. wide, end opposite notched end; RCA part/dwg A-8834059-2; p/o E-1001	Transfer Link, Antenna Circuit
O-1002		Same as O-1001; p/o E-1001	Detent Circuit Diversity Link
O-1003		Same as O-1001; p/o E-1001	AGC Circuit Diversity Link
O-1004	Shop Manufacture	BUSHING: jack mounting; brass, white nickel finish; male; 3/32 in. lg by 0.179 in. OD by 0.120 in. ID by 0.0345 in. thick by 9/32 in. OD shoulder; RCA part/dwg K-835783-29	Assists in Mounting J-1001
O-1005	Shop Manufacture	COLLAR, SPACING: brass, white nickel plate finish; round cylinder shape; 0.375 in. lg by 9/64 in. dia overall; mounts by axial center hole 0.096 in. dia; ends are flat and parallel; RCA part/dwg K-817605-120	Assists in Mounting S-1001, S-1002, S-1003
O-1006		Not Used	
O-1007	Shop Manufacture	COUPLING, RIGID: for switch operation on BFO chassis; cam shaped forging and round pin; aluminum, chemical treatment finish for forging; stainless steel pin, passivating dip finish; for 4 inch-ounces torque; "L" shaped; overall dim. 1.01 in. lg by 23/32 in. wide by 21/64 in. thick; mounts on switch shaft at 0.125 in. dia hole in split section of forging w/0.128 in. dia hole through split end for pin to hold shaft secure by compression; pin to be riveted securely in forging at "cam" end; RCA part/dwg A-8816321-501	With O-1008 Actuates S-1001, S-1002, S-1003
O-1008		Same as O-1007	With O-1007 Actuates S-1001, S-1002, S-1003
O-1009	Shop Manufacture	STUD: brass, white nickel plate; 1-3/8 in. lg; no. 2-56 thread full length; chamfer both ends; RCA part/dwg K-8852764-169	Assembles S-1001 and S-1002
O-1010 thru O-1300		Not Used	
O-1301		Same as O-1007	Shaft for S-1301
O-1302 thru O-1500		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-1501	Low Failure item - if required requisition from ESO referencing NavShips 900, 180A	GUIDE, SHAFT: guides shaft from knob to coupling flange; principal parts c/o 1 bushing, 1 disk, 1 spring coupling; brass, nickel plated; tee shape w/hexagon OD; 3/8 in. lg by 3/4 in. across flats; mounts on shaft and held in place by spring clamping in groove of shaft; RCA part/dwg A-8844928-501	P/o Switch Coupling Assembly
O-1502	Shop Manufacture	COUPLING, RIGID: flanged type; attached to 0.189 in. dia shaft one end and has 13/64 in. lg by 0.124 in. dia coupling pin spaced 0.328 in. from center of shaft to center of pin; mounts by 1/2 in. dia bushing and held in place by a spring, located in the bushing, clamping into 0.010 in. deep by 1/64 in. radius groove in shaft; 1-41/64 in. lg by 1/2 in. wide by 5/8 in. high overall; stainless steel, passivating dip; shaft has 1/32 in. by 45 deg chamfer on end opposite plate; c/o shaft, plate, pin; RCA part/dwg A-8869384-1	P/o Switch Coupling Assembly
O-1503	Shop Manufacture	RECEIVER, SUBASSEMBLY: principal parts c/o 1 gear, 1 hub, 1 plate; 4-7/8 in. lg by 1-13/32 in. wide by 49/64 in. thick overall; right-hand side; RCA part/dwg M-459861-501	P/o Handle-Latch Assembly
O-1504	Shop Manufacture	RECEIVER, SUBASSEMBLY: principal parts c/o 1 gear, 1 hub; 1 plate; 4-7/8 in. lg by 1-13/32 in. wide by 49/64 in. thick overall; left-hand side; RCA part/dwg M-459861-503	P/o Handle-Latch Assembly
O-1505	Shop Manufacture	PLATE, CATCH: locks chassis in case; rh; c/o 1 catch, 1 stud, 1 cable stud; irregular shape; 2-49/64 in. lg by 27/32 in. wide by 0.639 in. high overall approx; snap ring mounted at groove in studs; catch w/3/32 in. radial bend 1-5/32 in. from end by 0.140 in. high notched 0.265 in. deep by 0.203 in. wide by 1.847 in. from centerline of stud at centerline of 0.218 in. radial end; 2 studs riveted on same side of catch; RCA part/dwg M-459839-501	P/o Handle-Latch Assembly
O-1506	Shop Manufacture	PLATE, CATCH: locks chassis in case; lh; c/o 1 catch, 1 stud, 1 cable stud; irregular shape; 2-49/64 in. lg by 27/32 in. wide by 0.639 in. high overall; snap ring mounted at groove in studs; catch w/3/32 in. radial bend 1-5/32 in. from end by 0.140 in. high notched 0.265 in. deep by 0.203 in. wide, 1.187 in. from center line of stud at centerline of 0.218 in. radial end; 2 studs riveted on same side of catch; RCA part/dwg M-459839-502	P/o Handle-Latch Assembly
O-1507	Shop Manufacture	CATCH, FASTENER: secures chassis in cabinet; c/o 1 guide and block assembly, 1 gear, 1 pin, 1 stud; rectangular block welded to guide, gear riveted to guide; 1.6555 in. lg by 1.358 in. wide by 0.6827 in. high overall; right-hand side; RCA part/dwg M-459844-501	P/o Handle-Latch Assembly
O-1508	Shop Manufacture	CATCH, FASTENER: secures chassis in cabinet; c/o 1 guide and block assembly, 1 gear; rectangular block welded to guide, gear riveted to guide; 1.655 in. lg by 1.358 in. wide by 0.6827 in. high overall; left-hand side; RCA part/dwg M-459844-502	P/o Handle-Latch Assembly
O-1509	Shop Manufacture	PAWL: dog assembly; c/o 1 dog stop, 1 cable stud, 1 stud; rectangular generally w/one end turned on 0.030 radius extending up 0.218 in. on a 1/2 in. end; 3-1/32 in. lg by 23/32 in. wide by 0.265 in. high; 13/32 in. by 1.203 in. mounting center; hole 0.3775 in. dia 13/32 in. by 1.203 in. mounting center; right side; RCA part/dwg A-8835657-501	P/o Tilt Assembly
O-1510	Shop Manufacture	PAWL: dog assembly; c/o 1 dog stop, 1 cable stud, 1 stud; rectangular generally w/one end turned on 0.030 radius extending up 0.218 in. on a 1/2 in. end; 3-1/32 in. lg by 23/32 in. wide by 0.265 in. high; 13/32 in. by 1.203 in. mounting center; hole 0.3775 in. dia, 13/32 in. by 1.203 in. mounting center, left side; RCA part/dwg A-8835657-502	P/o Tilt Assembly
O-1511	Shop Manufacture	ARM: pawl release; principal parts c/o 1 push rod, 1 spring; stainless steel, passivating dip rod; beryllium copper spring white nickel plate; flat oblong shape w/90 deg bend one end; 5-1/2 in. lg by 3/8 in. wide by 11/16 in. high overall; mounts through slot in panel and is secured to stud on inside by 0.191 in. dia hole in end; spring is riveted to rod near end w/90 deg offset; RCA part/dwg A-8813733-501	P/o Tilt Assembly
O-1512	Shop Manufacture	SPRING: helical extension type; dog actuator; 0.035 in. dia music wire, cadmium plated; 1-7/8 in. lg by 0.250 in. OD; 35 turns approx; direction of turns optional; parallel hook terminals; terminals bent 0.180 in. radius on 1-5/8 in. center; RCA part/dwg B-453124-12	P/o Handle-Latch Assembly

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-1513	N17-S-46733-2361	SPRING: helical extension type; dog actuator; 0.029 in. dia music wire, cadmium plated; 1-1/16 in. lg by 0.187 in. OD; 21 active turns approx; direction of turns optional; parallel hook terminals; RCA part/dwg B-453124-13	P/o Handle-Latch Assembly
O-1514		Not Used	
O-1515	N16-H-150001-337	HANDLE ASSEMBLY: used to operate catch fastener; zinc die casting handle, gears brass, slide lock brass, white nickel finish; 4-7/8 in. lg by 1-11/16 in. wide by 1 in. thick overall; zinc die casting grip 3-1/2 in. lg by 5/16 in. wide, opens to 145 deg max; 2 mounting holes no. 10-32 tap by 3/8 in. dia on 3.312 in. mounting center; to withstand 48-hr salt spray test; RCA part/dwg C-746147-501	P/o Handle-Latch Assembly
O-1516		COUPLING, RIGID: flanged type; attached to 0.189 in. dia shaft one end and has 13/64 in. lg by 0.124 in. dia coupling pin spaced 0.328 in. from center of shaft to center of pin; mounts by 1/2 in. dia bushing and held in place by a spring, located in the bushing, clamping into 0.010 in. deep by 1/64 in. radius groove in shaft; 1-29/64 in. lg by 1/2 in. wide by 5/8 in. high overall; stainless steel, passivating dip; shaft has 1/32 in. by 45 deg chamfer on end opposite plate; c/o shaft, plate, pin; RCA part/dwg A-8869384-2	P/o Switch Coupling Assembly
O-1517 thru O-1600		Not Used	
O-1601	Shop Manufacture	STRAP, CONNECTOR: silver plated brass; flat rectangular shape w/ rounded ends except one end center notched; 21/32 in. lg by 7/32 in. wide by 0.032 in. thick overall; mounts by slot w/rounded ends 0.312 in. lg by 0.093 in. wide, end opposite notched end; RCA part/dwg A-8834059-1; p/o E-1601	Transfer Link, Antenna Circuit
O-1602, O-1603		Not Used	
O-1604	N16-G900143-0180	GROMMET: black synthetic rubber composition; fits 15/32 in. dia hole; 17/64 in. hole dia; 1/16 in. wide by 5/64 in. deep groove; 5/16 in. wide by 5/8 in. dia overall; RCA part/dwg K-57421-1	Protects Wiring
O-1605		Same as O-1604	Protects Wiring
O-1606 thru O-1700		Not Used	
O-1701		GRILLE: protects cone of loudspeaker; aluminum alloy, light Navy gray enamel; circular shape w/2 opposite sides flatted and parallel; 6-7/8 in. lg by 6-9/16 in. wide by 0.501 in. thick; mounts by 4 inserts on a 6-3/16 in. by 2-1/4 in. mounting center; part is symmetrical about centerline; RCA part/dwg B-474174-1	Speaker Grille
O-1702 thru O-2200		Not Used	
O-2201	Shop Manufacture	BUSHING: stainless steel, passivating dip finish; male and female; 5/32 in. lg by 7/16 in. OD overall; collar 0.058 in. lg by 7/16 in. OD undercut to 0.342 in. OD by 0.098 in. lg hub; collar end counterbored 3/32 in. deep by 0.281 in. dia to 0.171 in. ID by 0.063 in. lg; RCA part/dwg A-8834746-1	Retains O-2202
O-2202	Shop Manufacture	BAR, ACTUATOR, ELECTRICAL SWITCH: stainless steel, passivating dip; irregular shape; 8-31/64 in. lg by 1.781 in. wide by 0.093 in. thick overall; mounts by means of irregularly spaced unattached guide pins permitting bar to slide longitudinally; has 4 teeth 1/2 in. wide spaced 1.736 in., 2 in., 2.860 in. C to C; ea tooth has one 1/8 in. wide by 15/32 in. lg notch in end; 13 equally spaced teeth on edge at 1 end; 6 unequally spaced notches near center of same edge; 1 rectangular and 1 oval cutout through body; RCA part/dwg B-456851-2	Operates Reception Control Switches

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-2203	N16-G431136-0114	GEAR ASSEMBLY: reception switch drive; c/o 1 bracket, 1 spur gear, 1 shaft, 2 miter gears, 2 set screws, 2 taper pins, 4 washers, 1 washer; bronze; irregular shape; 2-1/4 in. lg by 1.967 in. wide by 1-3/8 in. thick; mounts by one no. 6-32 tapped hole 3/8 in. deep w/ 0.219 in. dia by 82 deg countersunk, two 0.156 in. dia clearance holes w/0.219 in. dia by 82 deg countersunk spaced 1.062 in. C to C; RCA part/dwg B-458183-501	Actuates O-2202
O-2204	Shop Manufacture	GEAR: rack type; stainless steel; straight teeth; 14-1/2 deg pressure angle; 9 teeth; diametral pitch 32; 1-1/16 in. lg by 1/2 in. max high by 0.093 in. wide overall; straight face; two mounting holes no. 6-32 tap thread spaced 0.562 in. C to C; pitch line parallel to mounting centerline and spaced 0.312 in. away; mates w/spur gear; RCA part/dwg A-8838927-1	Actuates O-2205
O-2205	Shop Manufacture	BAR, ACTUATOR, ELECTRICAL SWITCH: stainless steel, passivating dip finish; polish at seven slots; rectangular strip; 11-9/32 in. lg by 0.593 in. wide by 0.093 in. thick overall; mounts at one end, 1-1/4 in. lg cutdown 0.156 in. w/2 oval holes, 0.281 in. lg by 0.172 in. wide, 0.281 in. apart, centered on axis 0.187 in. from line of cut; 7 slots along straight side 0.156 in. wide, 11/32 in. deep w/rounded ends, centerlines at right angles to axis; RCA part/dwg B-462511-1	Operates Band Switches
O-2206	Shop Manufacture	BUSHING: stainless steel, passivating dip finish; male; 5/32 in. lg by 7/16 in. OD by 0.161 in. ID overall; w/0.250 in. OD by 0.098 in. lg shank; RCA part/dwg A-8834747-1	Retains O-2205
O-2207		Not Used	
O-2208	N17-C-98378-3921	COUPLING, FLEXIBLE: brass, nickel plated; rd, 15/16 in. lg by 23/32 in. sq; mounts by four no. 6-32 tapped holes, 2 located ea end; steatite insulated coupling; metal parts to withstand 48-hr salt spray test; accommodates 1/4 in. dia shaft; RCA part/dwg A-8876114-1	Couples O-2207 to C-2206
O-2209	Shop Manufacture	SHAFT: stainless steel, passivating dip finish, Navy spec 46S18E Class 7 Type A; 30,000 lbs per sq in. wire yield strength, B-85 to B-95 Rockwell hardness; round rod, central section reduced dia; 9-1/8 in. lg, 0.25 in. dia. at ends 0.156 in. dia reduced section overall; mounts in bushings at ends of shaft, one for coupling and one for knobs; RCA part/dwg A-8817156-1	Shaft Extension for C-2206
O-2210	Shop Manufacture	EXTENSION SHAFT: BFO extension shaft; brass, white nickel finish; round shaft 2 in. dia; 1-1/8 in. lg by 1/2 in. dia overall; hole drilled axially in large dia end 0.251 in. dia by 0.218 in. deep w/ no. 6-32 tap radial hole in side and slot 0.055 in. wide, 0.145 in. deep from end 90 deg from radial hole center; small dia section 0.250 in. dia by 13/16 in. lg by 1/64 in. by 45 deg chamfer end; RCA part/dwg A-8824188-1	Shaft Extension for Frequency Vernier Control
O-2211		Same as O-1515	Assists in Withdrawing Chassis from Cabinet
O-2212	Shop Manufacture	BUSHING: brass, white nickel plate, male and female; 1/2 in. hex head by 5/16 in. lg overall; RCA part/dwg K-806568-113	Panel Bearing for O-2207
O-2213		Same as O-1511	Manual Release for O-2214 and O-2215
O-2214		Same as O-1509	Secures Chassis in Servicing Positions
O-2215		Same as O-1510	Secures Chassis in Servicing Positions
O-2216		Same as O-1507	Secures Chassis in Cabinet
O-2217		Same as O-1508	Secures Chassis in Cabinet
O-2218	N16-M-250606-646	MIRROR: c/o 1 mounting bracket, 1 first surface mirror, 1 spring assembly, 21 trunions, 1 insulator, 1 frame, 1 holder; metal parts brass, black nickel plate; 2 in. lg by 1-1/8 in. wide by 1-1/2 in. high overall approx; 2 mounting holes 0.156 in. dia 1 in. C to C; adjustment screw is provided for adjusting angle of mirror; RCA part/dwg C-744514-501	Reflector for Optical Dial System

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-2219		Same as O-1503	Assists in Mounting O-2211
O-2220	Shop Manufacture	SPRING: helical compression type; for bar movement, reception switch operation; 0.032 in. dia music wire cadmium plate finish; 9/16 in. lg by 0.140 in. dia overall; 10 right-hand turns; ends ground straight; mounts w/ball at end in notch bar; RCA part/dwg B-470448-3	Spring Loading for O-2221
O-2221	G3110-100-6209	BALL, BEARING: stainless steel; round; 5/32 in. dia; mounts by insertion; RCA part/dwg K-76757-36	Secures Chassis in Cabinet
O-2222		SPRING: helical extension type; dog actuator; 0.035 in. dia music wire, cadmium plated; 0.187 in. OD by 1-1/16 in. lg (free lgth) overall; approx 25 active turns; parallel hook terminals; terminals mounted; barrel shape; RCA part/dwg B-468089-1	Spring Loading for O-2223, O-2224
O-2223		Same as O-1505	Secures Chassis in Cabinet
O-2224		SPRING: helical extension type; dog actuator; 0.035 in. dia music wire, cadmium plated; 0.250 in. OD by 1-7/8 in. lg (free lgth) overall; approx 35 active turns; parallel hook terminals; terminals mounted; barrel shape; RCA part/dwg B-468089-1	Spring Loading for O-2214 and O-2215
O-2225		Same as O-1601; p/o E-2212	Transfer Link Extension Oscillator Circuit
O-2226	Shop Manufacture	MOUNTING BLOCK: brass, white nickel plate finish; rectangular block shape; 11/16 in. lg by 1/2 in. high by 1/4 in. wide overall; one larger side has 2 mounting holes no. 6-32 tap 0.375 in. C to C; one narrow end has single hole 0.152 in. dia by 35/64 in. deep; front end is enlarged to 0.1568 in. dia by 5/32 in. deep; RCA part/dwg A-8849603-1	Retains O-2221, O-2222
O-2227		Same as O-1506	Secures Chassis in Cabinet
O-2228		Same as O-1504	Assists in Mounting O-2211
O-2229	N16-M-250598-449	MIRROR: front surface mirror on polished plate glass; 1-3/8 in. lg by 13/16 in. wide by 1/8 in. thick; non-magnifying; temp range from -54 deg C to +85 deg C; RCA part/dwg A-8836522-1; p/o O-2218	Mirror Element for O-2218
O-2230		COUPLING, RIGID: split flange type; 0.2515 in. dia shaft hole one end and has 0.1599 in. dia link pin other end; set screw mounting; 1 in. lg by 9/32 in. wide by 0.377 in. high; stainless steel, passivating dip; c/o 1 coupling, 1 bushing, and 1 link pin; RCA part/dwg B-471800-502	P/o Linkage Which Actuates S-2207
O-2231		LINK ROD, CONNECTING: steel; passivating dip finish; rectangular shape; 4-15/32 in. lg by 5/16 in. wide by 0.062 in. thick overall; two 0.1562 in. dia mounting holes 4.128 in. C to C; RCA part/dwg A-8862460-1	P/o Linkage Which Actuates S-2207
O-2232		COUPLING ASSEMBLY, RIGID: principal parts c/o 2 couplings, rigid, 1 bracket, 1 shaft, 4 set screws; irregular shape; 2-1/32 in. lg by 1 in. wide by 1-13/64 in. high overall; mounts by three no. 6-32 tapped holes in bracket; RCA part/dwg B-471801-501	P/o Linkage Which Actuates S-2207
O-2233		BUTTON, PLUG: brass; black nickel and satin black synthetic finish; 1/2 in. OD by 15/64 in. thick overall; 6 prongs to be inserted into 25/64 in. hole; for inserting into 0.078 in. min, 0.090 in. max in. thick material; United-Carr Fastener Catalog no. 48136; RCA part/dwg A-99051-143	Cover for Gain Balance Control
O-2234 thru O-3100		Not Used	
O-3101		Same as O-1601; p/o E-3104	Transfer Link, Antenna Circuit
O-3102		Same as O-552	Coupling for O-3103
O-3103		Same as O-551	Shaft Extension for S-3101
O-3104 thru O-3134		Not Used	
O-3135		Same as O-551	Shaft Extension for S-3135
O-3136		Same as O-552	Coupling for O-3135

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-3137 thru O-3800		Not Used	
O-3801	For Reference Only	GEAR ASSEMBLY: initial dial drive gear; principal parts c/o 1 shaft, 1 stop, 1 gear; phosphor bronze gear, chemical black and oil finish; circular gear on end of straight shaft; 1-5/32 in. lg by 0.4166 in. OD gear and 0.2496 in. dia shaft; shaft mounting w/triangular projection on stop circumference to hold in place; taper pin all the way through stop, gear and hub; 18 involute teeth, 48 deg diametral pitch on gear; RCA part/dwg M-460862-503	Initial Dial Drive Gear
O-3802	For Reference Only	SHAFT: stainless steel, passivating dip finish; cylindrical shape; 2-27/64 in. lg by 5/16 in. dia overall; mounted in panel by 0.2511 in. dia hole; shaft w/1 end 0.2511 in. dia by 3/16 in. lg to undercut 1/16 in. wide by 0.005 in. deep to 5/16 in. dia by 0.062 in. lg to undercut 1/16 in. wide by 0.005 in. deep to 0.2498 in. dia by 15/16 in. lg to undercut, 0.220 in. dia by 0.028 in. lg to 0.2498 in. dia by 0.985 in. lg to undercut 0.210 in. dia by 0.028 in. lg by 0.2498 in. dia by 0.066 in. lg w/1/64 in. by 45 deg chamfer on end of shaft, flat 1/4 in. lg by 1/32 in. deep located 1-33/64 in. from 0.2511 in. dia end; RCA part/dwg A-8842908-1	Shaft for O-3818
O-3803	For Reference Only	DIAL, SCALE: scale range inscription 0 to 99 clockwise, graduated in increments of 1 clockwise, scale length of 360 deg; 2.0 in. dia by 0.625 in. dia overall; mounts by 3 holes 0.0670 in. dia; countersunk 0.112 in. dia by 82 deg, spaced equally on radius of 0.406 in.; aluminum; satin black finish, calibrations and numbers finished w/ white printers ink; gear mounted on dial; RCA part/dwg A-8843836-503	Logging Dial Fine Scale
O-3804	For Reference Only	INDICATOR, SUBASSEMBLY, AZIMUTH AND RANGE SCALE: c/o 1 dial, 1 gear, 1 cam, 1 dial holder; cylindrical shape; 15/32 in. lg by 3-7/16 in. dia overall; mounts by 0.500 in. dia hole in gear; marked w/calibration marks and numbered from 0 to 1000 by hundredths; dial riveted to dial holder; RCA part/dwg A-8843837-503	Logging Dial Coarse Scale
O-3805	For Reference Only	FOLLOWER, DIAL: c/o 1 arm follower, 1 bushing, 1 stud roller, 1 roller follower; 1-13/16 in. lg by 1-7/32 in. wide by 39/64 in. high overall; mounts by 0.1875 in. dia hole in bushing; RCA part/dwg A-8841073-501	Steps Dial at End of Scale
O-3806	For Reference Only	SPRING: helical extension type; 0.018 in. dia music wire, cadmium plate finish; 1-1/16 in. lg free lgth by 3/16 in. OD; coil spring style 30 active turns; rh wound; 1 end hook type terminal, other end eye type terminal indexed 90 deg; RCA part/dwg B-456881-2	Secures Free End of O-3808
O-3807	For Reference Only	SPRING, EXTENSION: helical extension type; 0.15 in. dia music wire, cadmium plate finish; 11/16 in. free lgth, 0.171 in. OD, 0.100 in. ID; 23 terminals; parallel hook terminals; circular shaped loops at ends 5/8 in. circumference of circle 5/32 in. OD; mounts by end loops, centers 7/64 in. min from coil terminals; max load 0.6 lb, min load 0.4 lb; RCA part/dwg B-458190-2	Secures Free End of O-3805
O-3808	For Reference Only	ARM, LENS ASSEMBLY: c/o 1 lens arm, 1 slide assembly, 1 lens projection, 1 lens assembly, 1 bracket assembly, 1 bracket assembly, 1 cover, 2 lamps, 1 lamp holder, 1 lamp holder; rectangular shape; 5-19/32 in. lg by 1-11/16 in. wide by 2-1/16 in. high overall approx; RCA part/dwg A-8848529-503	Light Source for Optical Dial System
O-3809	For Reference Only	GEAR ASSEMBLY: c/o 1 spur gear 0.6666 in. OD, 2 spur gears 1.2916 in. OD, 2 springs; spur gear 0.6666 in. OD bronze; 2 spur gears 1.2916 in. OD brass; springs steel, chemical black and oil finish except 0.2500 in. dia hole; cylindrical shape; 1.2916 in. OD by 0.500 in. lg overall; mounts by 0.2500 in. dia hole in hub; 1 end w/ spur gear 0.6666 in. OD by 1.125 in. wide teeth, 48 pitch 30 teeth, 0.6850 in. pitch dia, counterbore 7/16 in. ID by 0.062 in. deep to 17/32 in. dia by 7/32 in. wide to 1 spur gear 1.2916 in. OD by 0.0403 in. thick to 0.015 in. separation between gear sections to 1 spur gear 1.2916 in. OD by 0.0403 in. thick, to 11/32 in. dia by 1/32 in. lg to 0.312 in. dia by 0.059 in. lg; 2 spur gears 1.2916 in. OD, 48 pitch, 60 teeth, 1.2500 in. pitch dia; have scissor action provided by 2 springs and staked to body; 0.2500 in. dia hole full length of hub; RCA part/dwg C-742436-1	Reduction Gear Between O-3817 and O-3818
O-3810	For Reference Only	SCREW, EXTERNALLY RELEIVED BODY: stainless steel, passivating dip finish; 25/32 in. lg; 2 shoulders; 0.2498 in. dia of shoulder under head 0.1872 in. dia of other shoulder; one end threaded 0.156 in. lg w/no. 8-32 thread; 1/32 in. wide by 0.005 in. deep undercut between head and shoulder and also between shoulders; RCA part/dwg A-8849689-1	Mounts O-3809

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-3811	For Reference Only	GEAR: spur type; stainless steel, passivating dip finish; material in accordance w/Navy spec 46S18E, Class 7 Type A; drives logging dial; straight teeth; 36 teeth; 48 diametral pitch, 0.7500 in. pitch dia; 1-15/64 in. lg by 0.7916 in. dia overall; straight face; mounts by 0.2498 in. dia by 1-3/32 in. lg integral shaft; RCA part/dwg A-8899845-1	Drives O-3804
O-3812	For Reference Only	GEAR ASSEMBLY: gear for dial assembly; c/o 1 hub, 2 spur gears, and 2 springs; gear and hub brass, spring steel; cylindrical shape; 2.1250 in. OD by 11/32 in. lg overall; mounts by 0.2500 in. dia hole in hub; 1 end w/hub 1/2 in. dia by 11/32 in. lg to 1 spur gear 2.1250 in. dia by 0.0403 in. thick to 0.015 in. separation between gear sections to 1 spur gear 2.1250 in. dia by 0.043 in. thick; gears are staked to hub; hub w/0.2500 in dia hole full lgth of hub; two no. 6-32 tapped holes 90 deg apart 3/32 in. from left-hand side of hub; gears have scissor action provided by 2 springs; 2 spur gears 2.1250 in. OD; 100 teeth 2.0833 in. pitch dia; straight teeth, 14-1/2 deg pressure angle; diametral pitch no. 48; RCA part/dwg B-453877-2	Reduces Backlash, Drive from O-3803 to O-3811 and O-3817
O-3813	Shop Manufacture	FOLLOWER, CAM: stainless steel, passivating dip finish; cylindrical shape; 2.519 in. lg by 0.1525 in. dia overall; mounts in 0.154 in. dia hole; 3/32 in. spherical radius on both ends; RCA part/dwg A-8834066-1	Linkage Between O-3816 and O-3808
O-3814	Shop Manufacture	ECCENTRIC: pivot for lens arm assembly; stainless steel w/chemical black finish on plate and passivating dip on eccentric; 2.875 in. lg by 1.156 in. dia overall; mounts by insertion in 0.250 in. dia bushing; 0.093 in. wide by 120 deg arc slot in plate; RCA part/dwg A-8849696-502	Displaces O-3808 for Calibration Adjustment
O-3815	For Reference Only	DIAL, SUBASSEMBLY: c/o 1 shaft, 1 pointer, 1 arm; stainless steel, chemical black finish; round shaft w/projecting bent rectangular strip; arm end straight triangular strip pointer; 2 in. lg shaft 9/16 in. wide by 1-25/64 in. high arm overall; panel mounted; incl shaft, pointer, arm; arm and pointer silver soldered to shaft at shoulders, 0.828 in. apart; RCA part/dwg A-8849699-501	Shifts "Normal/Space" Lamp Position
O-3816	For Reference Only	SWITCH, DRIVE, SUBASSEMBLY: principal parts c/o 1 housing, 1 pinion stem spur gear, 1 gear, 1 cam, 1 detent and gear, 1 shaft; 3-3/32 in. lg by 1-7/8 in. wide by 1-3/4 in. high overall; mounts by four 0.156 in. dia holes spaced on 0.875 in. by 0.531 in. mounting center; actuates follower cam and band switch; RCA part/dwg A-8848531-501	Actuates O-3813 and Band Switch System
O-3817	For Reference Only	GEAR: spur type; phosphor bronze rod, chemical black finish; shaft driving; straight teeth; 30 teeth; 48 pitch, 0.6250 in. pitch dia; 0.6666 in. OD, 0.250 in. bore, 0.125 in. thick; straight face; hub 0.437 in. dia by 7/32 in. lg; mounts by 0.250 in. dia hole; 2 holes in hub no. 4-40 tap 90 deg apart; RCA part/dwg A-8848919-1	Drives O-3809
O-3818	N16-S-117101-795	DIAL, SCALE: optical projection tuning scale; frequency range in 5 bands; band no. 1 - 2.00 to 4.00 mc, band no. 2 - 4.00 to 8.00 mc, band no. 3 - 8.00 to 16.00 mc, band no. 4 - 16.00 to 24.00 mc, band no. 5 - 24.00 to 32.00 mc; circular shape; 0.656 in. lg by 3.812 in. dia w/ 1/4 in. dia center hole; mounted by 1/4 in. dia shaft hole through hub; metal gear, glass scale; opaque on a transparent background; RCA part/dwg B-455040-3	Provides Projection Dial Scale Markings
O-3819	N17-A-25801-1048	ADAPTER, SWITCH ACTUATOR: leaf type actuator; non-adjustable; 1-3/32 in. lg by 23/32 in. wide by 5/8 in. high overall; two no. 4-40 tapped mounting holes spaced 0.875 in. C to C; stainless steel; Micro Switch Part no. JV-1; RCA part/dwg A-8835610-1	Actuates S-3801
O-3820	N17-C-98372-4537	COUPLING, FLEXIBLE: principal parts c/o 1 plate, 1 bellows, 1 hub; rectangular shape; 1-1/2 in. lg by 3/4 in. wide by 0.536 in. thick overall; mounts by two 0.147 in. dia holes on 1.250 in. mounting center; shall withstand up to 48 inch oz of torque; couples shaft by two no. 6-32 set screws; RCA part/dwg A-8864583-501	Couples O3818 to C-651
O-3821	N16-L-288001-110	LENS, PROJECTION: 0.551 in. focal lgth; lens speed diaphragmed to f/5; 2 set screws bearing on flats on outer circumference of brass lens holder tangential at right angles on 0.234 in. radii, hold lens in place in dial screen projecting equipment; 0.312 in. lg by 0.4995 in. OD overall; Bausch and Lomb Optical Co. lens 12KB, mounted in RCA brass holder black nickel finish; lens approx 5/32 in. dia diaphragmed to lens opening 0.109 in. dia in 3/16 in. thick end wall of 0.375 in. ID holder; lens held by spin over extension round concave circumference inside holder; RCA part/dwg A-8832303-1; p/o O-3808	Element of Optical Lens System

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-3822	N17-L-240023-551	LENS, CONDENSING: 0.375 in. dia focal lgth 0.321 in.; brass barrel mounted; 0.233 in. lg by 0.4905 in. dia overall; c/o 1 barrel, 2 lens, 1 spacer; Bausch and Lomb spectacle crown glass having index = 1.523; 2 spherical plano-convex lens are mounted in convex opposing positions; RCA part/dwg A-8832305-501; p/o O-3808	Element of Optical Lens System
O-3823	G3110-190-6594	BALL, BEARING: stainless steel; spherical; 0.187 in. dia; RCA part/dwg K-76757-39; p/o O-3808	Detent for O-3827
O-3824	Shop Manufacture	SPRING: helical compression type; detent spring for slide assembly; 0.020 in. dia music wire, cadmium plated; 9/16 in. lg by 0.171 in. OD; 8 turns; sq ends; mounts by insertions; right-hand winding; RCA part/dwg B-470448-2; p/o O-3808	Spring Loads, O-3823
O-3825	Shop Manufacture	ECCENTRIC: stainless steel, passivating dip; cylindrical shape; 3/4 in. lg by 0.187 in. dia; mounts by no. 6-32 by 5/16 in. lg threaded portion; large end 0.187 in. dia by 1/16 in. lg to undercut 0.120 in. dia by 0.040 in. wide to 0.187 in. dia by 0.273 in. lg to smaller end no. 6-32 thread by 3/8 in. lg; threaded portion parallel and offset 0.020 in. from large end centerline; large end has 1/32 in. wide by 1/32 in. deep screwdriver slot; RCA part/dwg A-8848172-1; p/o O-3808	Guide Pin for O-3808
O-3826	Shop Manufacture	ECCENTRIC: brass, chemical black and oil finish; cylindrical shape; 0.171 in. wide by 0.193 in. high by 9/32 in. lg; snap ring mounted in bushing; larger end 0.171 in. dia by 5/32 in. lg to offset smaller end; smaller end centerline parallel to larger end centerline and 0.046 in. away; smaller end 0.124 in. dia by 0.025 in. lg to undercut 0.095 in. dia by 0.040 in. lg to 0.124 in. dia by 0.060 in. lg to back of large end, smaller end joint to larger end cutaway to larger dia by 0.010 in lg, larger end has slot 1/32 in. wide by 1/32 in. deep on centerline; RCA part/dwg A-8834046-1; p/o O-3808	Assists in Adjustment of Projection Lamps
O-3827	Shop Manufacture	BRACKET: right angle bar w/projecting pins; 4-3/4 in. lg by 7/16 in. wide by 5/8 in. deep w/pins extending 11/64 in. on top; 7/16 in. by 5/8 in. aluminum alloy w/black aluminite finish; 1-7/16 in. lg opening in top 1-3/32 in. from end; 2 "V" slots and cutaway in 1-1/8 in. lg section at other end; 2 rounded end openings 1 in. lg in side; RCA part/dwg A-8834737-501; p/o O-3808	Supports Projection Lamps
O-3828	N16-R-33691-1474	RECEIVER SUBASSEMBLY: principal parts c/o 1 panel, 1 master dial gear train (less all electrical parts, band change gearing, lens assembly, all dials); frequency range 5 bands; band no. 1 - 2.0 mc to 4.0 mc, band 2 - 4.0 mc to 8.0 mc, band 3 - 8.0 mc to 16.0 mc, band 4 - 16.0 mc to 24.0 mc, band 5 - 24.0 mc to 32.0 mc; 7.437 in lg by 6.437 in. wide by 3-3/8 in. thick overall; six 0.218 in. dia mounting holes spaced 3/4 in. from ea side and on 6-1/2 in. by 5-1/2 in. by 4 in. by 2 in. by 1.437 in. by 2.937 in. mounting center; RCA part/dwg A-8848521-506	Main Tuning Panel
O-3829 thru O-4000		Not Used	
O-4001	Shop Manufacture	BUSHING: jack mounting; steel; male; 5/32 in. lg by 0.120 in. ID by 11/32 in. OD; 9/32 in. dia by 0.036 in. lg shoulder; RCA part/dwg K-835783-30	Assists in Mounting J-4009
O-4002		Same as O-1601; p/o E-4005	Switching Link for Diversity Operation Isolation Network
O-4003 thru O-4400		Not Used	
O-4401	Shop Manufacture	BAR, ACTUATOR, ELECTRICAL SWITCH: chrome plated finish; rectangular shape; 1-43/64 in. lg by 13/32 in. wide by 39/64 in. high overall; mounts by insertion through bushing on oscillator; c/o 1 coupling, 1 shaft, 1 spring; RCA part/dwg A-8834082-503	Shaft Extension for S-4401
O-4402		COUPLING, RIGID: split bearing type one end, pin type other end; shaft opening at bearing end 0.128 in. dia; mounts by 0.125 in. dia hole; 1-1/64 in. lg by 11/16 in. wide by 0.483 in. high overall; aluminum coupling, integral stainless steel pin, satin etch finish on aluminum; pin 0.125 in. dia by 0.202 in. lg, "L" shape; sleeve end off-set 110 deg from pin end; pin is nylon insulated; RCA part/dwg A-8834099-502	Coupling for O-4401

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
O-4403	Procured on demand by nearest Naval Shore Supply Activity	STRAP, CONNECTOR: for terminal link on oscillator box terminal board; silver plated brass; flat rectangular shape w/rounded ends except one end center notched; 31/32 in. lg by 3/16 in. wide by 0.032 in. thick overall; mounts by slot w/rounded ends 0.625 in. lg by 0.093 in. wide, end opposite notched end; RCA part/dwg A-8834059-3; p/o E-4413	Oscillator Output Link to Mixer
O-4404	Procured on demand by nearest Naval Shore Supply Activity	STRAP, CONNECTOR: silver plated brass; flat rectangular shape w/rounded ends except one end center notched; 17/32 in. lg by 3/16 in. wide by 0.032 in. thick overall; mounts by slot w/ rounded ends 0.203 in. lg by 0.093 in. wide, end opposite notched end; RCA part/dwg A-8834059-4; p/o E-4413	Internal External Oscillator Switching
P-101		CONNECTOR: male contact; polarized; 12 contacts, w/cable clamps; Technical Materiel Corp. Part no. PL102-1	PS-RF Interconnect
P-102	N17-C-71408-5333	CONNECTOR, COAXIAL: male contact; BNC type; for RG-58/U cable; Technical Materiel Corp. Part no. UG-88/U	V. M. O. Input
P-103 thru P-300		Not Used	
P-301		CONNECTOR: male contact; polarized; 6 contacts; Technical Materiel Corp. Part no. PL-100-1	V. M. O. Power Connector
P-302		Same as P-101	V. M. O. Connector
P-303		Same as P-102	V. M. O. Output
P-304 thru P-900		Not Used	
P-901	For Reference Only	CHASSIS; chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-901, JAN-5636, V-901, R-903, R-902, C-913, R-901, C-914, and C-912; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-20; p/o Z-901	Foundation for Z-901
P-902 thru P-1000		Not Used	
P-1001	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1004, JAN-5899, V-1001, C-1031, C-1032, R-1007, R-1006; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-8; p/o Z-1004	Foundation for Z-1004
P-1002	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1006, JAN-5899, V-1002, C-1035, C-1036, R-1011, and R-1010; 8 terminals on sq end; 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-9; p/o Z-1006	Foundation for Z-1006
P-1003	For Reference Only	CHASSIS; chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape, 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle held in place by locking device on top; marked w/ Z-1008, JAN-5899, V-1003, C-1039, C-1041, R-1017, and R-1014; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-10; p/o Z-1008	Foundation for Z-1008

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
P-1004	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall; approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1010, JAN-5636, V-1004, R-1020, R-1019, R-1021, C-1048, C-1047, R-1016, R-1015, and C-1049; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 grounded terminals; RCA part/dwg C-748226-11; p/o Z-1010	Foundation for Z-1010
P-1005	For Reference Only	CHASSIS; brass hot tin dipped frame, top plate material brass, black lacquer finish; phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.109 in. wide by 0.781 in. thick overall approx; mounts by insertion in receptacle, held by locking device at top; marked w/ Z-1012, JAN-5647, V-1005 and C-1052; 6 terminals on sq end, 4 terminals on rounded section, 4 insulated terminals and 2 ground terminals; RCA part/dwg C-748227-1; p/o Z-1012	Foundation for Z-1012
P-1006	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.109 in. wide by 0.781 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1013, JAN-5647, V-1006; 6 terminals on sq end, 4 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748227-2; p/o Z-1013	Foundation for Z-1013
P-1007	For Reference Only	CHASSIS; chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1014, JAN-5718, V-1007, R-1025, R-1023, C-1054, C-1055, R-1026, and C-1056; 8 terminals on sq end; 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-12; p/o Z-1014	Foundation for Z-1014
P-1008 thru P-1100		Not Used	
P-1101	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.109 in. wide by 0.781 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1101, JAN-5647, V-1101, C-1114, R-1104, R-1105, R-1102, and R-1101 and R-1103; 6 terminals on sq end, 4 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748227-3; p/o Z-1101	Foundation for Z-1101
P-1102	For Reference Only	CHASSIS; chassis on top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1102, JAN-5718, V-1102, R-1107, R-1106, and C-1102; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-13; p/o Z-1102	Foundation for Z-1102
P-1103	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.109 in. wide by 0.781 in. thick overall approx; mounts by insertion in receptacle, held in position by locking device on top; marked w/ Z-1103, JAN-5647, V-1103, R-1116, C-1103, R-1117, and R-1115; 6 terminals on sq end, 4 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748227-4; p/o Z-1103	Foundation for Z-1103
P-1104	For Reference Only	CHASSIS; chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1104, JAN-5719, V-1104, R-1114, C-1104, R-1119, R-1120, R-1121, R-1118, and C-1115; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-14; p/o Z-1104	Foundation for Z-1104

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
P-1105	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1105, JAN-5718, V-1105, C-1105, R-1122, R-1123, R-1124, and C-1106; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-15; p/o Z-1105	Foundation for Z-1105
P-1106	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.109 in. wide by 0.781 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1106, JAN-5647, V-1106, R-1127, R-1126, C-1107, and R-1125; 6 terminals on sq end, 4 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748227-5; p/o Z-1106	Foundation for Z-1106
P-1107	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.109 in. wide by 0.781 in. thick overall approx; mounts by insertion in receptacle, held in place by locking device on top; marked w/ Z-1107, JAN-5647, V-1107, R-1128, R-1129, C-1108, and R-1130; 6 terminals on sq end, 4 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748227-6; p/o Z-1107	Foundation for Z-1107
P-1108	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion into receptacle, held in place by locking device on top; marked w/ Z-1108, JAN-5719, V-1108, R-1132, R-1131, R-1135, R-1134, R-1136, C-1109, R-1133, R-1138; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-16; p/o Z-1108	Foundation for Z-1108
P-1109	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick; mounts by insertion in receptacle, held in place by locking device on top; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals; 2 ground terminals; RCA part/dwg C-748226-17; p/o Z-1109	Foundation for Z-1109
P-1110 thru P-1300		Not Used	
P-1301	For Reference Only	CHASSIS: chassis and top plate brass sheet, satin black synthetic finish; mica-filled phenolic base, handle for plunger music wire; rectangular shape; 2-1/2 in. lg by 1.281 in. wide by 1.109 in. thick overall approx; mounts by insertion in receptacle held in place by locking device on top; marked w/ Z-1302, JAN-5840, V-1301, R-1302, C-1303, R-1305, R-1304, R-1303, C-1301, C-1302; 8 terminals on sq end, 8 terminals on rounded section, 4 insulated terminals, 2 ground terminals; RCA part/dwg C-748226-7; p/o Z-1302	Foundation for Z-1302
P-1302 thru P-2200		Not Used	
P-2201		CONNECTOR, PLUG, ELECTRICAL: 1 contact; 1 connector mating end; single male, coaxial, plain style contact; 500 v DC working voltage; 500 v AC rms working voltage; 52 ohms nominal impedance rating; plastic dielectric; 90 deg angle shape; 1 in. lg by 1 in. wide by 5/8 in. high; bayonet latch type mounting; 0.250 in. dia max cable accommodated; cable accommodation at angle to contact face; water-tight; two 0.062 in. dia holes drilled 0.062 in. from cable end for soldering; RCA part/dwg A-8862473-1	Connects Coaxial Cable to S-2207
R-101		RESISTOR, FIXED, WIRE WOUND: 4500 ohms ±10%; 10 W; Technical Materiel Corp. Part no. RW104	B+ Dropping
R-102	N16-R-50309-0816	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF123K; 12,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-75	Diode Load (CR-101)
R-103	N16-R-50633-0765	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF104K; 100,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-86	Mixer Grid Leak
R-104	N16-R-50282-0725	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF103K; 10,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-74	Mixer Grid Leak

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-105		Same as R-103	Mixer Screen Dropping
R-106	N16-R-50714-0818	RESISTOR, FIXED, COMPOSITION: JAN Type RC20GF224K; 220,000 ohms ±10%; 1/2 W	Mixer Plate Load
R-107	N16-R-50516-0818	RESISTOR, FIXED, COMPOSITION: JAN Type RC20GF563K; 56,000 ohms ±10%; 1/2 W	Mixer Plate Filter
R-108		Same as R-103	Mixer Output Filter
R-109		Same as R-103	Audio Plate Filter
R-110	N16-R-50822-0761	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF474K; 470,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-84	Audio Grid Leak
R-111		Same as R-106	Audio Plate Load
R-112		RESISTOR, VARIABLE, COMPOSITION: JAN Type RV3BTRD504B; 500,000 ohms ±20%; 2 W; w/SPST switch S-104	Audio Volume Control
R-113	N16-R-49580-0766	RESISTOR, FIXED, COMPOSITION: JAN Type RC20GF101K; 100 ohms ±10%; 1/2 W	Audio Cathode
R-114	N16-R-50588-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF823K; 82,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-85	Audio Plate Load
R-115	For replacement use N16-R-50380-0438	RESISTOR, FIXED, COMPOSITION: JAN Type RC20GF243K; 24,000 ohms ±10%; 1/2 W	BFO Output Diode Load
R-116		RESISTOR, VARIABLE, COMPOSITION: JAN Type RV4ATSA353D; potentiometer; 35,000 ohms ±20%; 2 W	BFO Output Control
R-117		Same as R-110	BFO Grid Leak
R-118	N16-R-50013-0238	RESISTOR, FIXED, COMPOSITION: JAN Type RC30GF222K; 2200 ohms ±10%; 1 W	BFO Plate Filter
R-119 thru R-200		Not Used	
R-201		Same as R-110	IFO Grid Leak
R-202		Same as R-103	IFO Plate Load
R-203	N16-R-50479-0440	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF473K; 47,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; spec MIL-R-11A; RCA part/dwg C-722320-82	IFO Decoupling
R-204	N16-R-50066-0816	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF332K; 3300 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; spec MIL-R-11A; RCA part/dwg C-722320-68	IFO Decoupling
R-205		Same as R-203	IFO Amplifier Grid Leak
R-206		Same as R-102	IFO Output Diode
R-207		Same as R-110	HFO Grid Leak
R-208		Same as R-104	HFO Plate Load
R-209	N16-R-50372-0833	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF223K; 22,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; spec MIL-R-11A; RCA part/dwg C-722320-78	HFO Decoupling

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-210		Same as R-103	RF Amplifier Grid Leak
R-211	N16-R-49769-0799	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF471K; 470 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; spec MIL-R-11A; RCA part/dwg C-722320-58	RF Amplifier Cathode
R-212	N16-R-50283-0512	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF103K; 10,000 ohms ±10%; 2 W	RF Amplifier Plate Load
R-213	N16-R-49923-0233	RESISTOR, FIXED, COMPOSITION: JAN Type RC30GF102K; 1000 ohms ±10%; 1 W	RF Amplifier Decoupling
R-214		Same as R-103	RF Amplifier Screen Dropping
R-215		RESISTOR, VARIABLE, WIRE WOUND: 50,000 ohms ±10%; 3 W; Technical Materiel Corp. Part no. RA100	HFO Output Control
R-216	N16-R-50013-0466	RESISTOR, FIXED, COMPOSITION: MIL Type RC42GF222K; 2200 ohms ±10%; 2 W; F characteristic; 0.688 in. lg by 0.318 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.036 in. dia; color coded; RCA part/dwg C-722362-66	Screen Dropping
R-217	N16-R-49922-0730	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF102K; 1000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-62	Screen Dropping
R-218		Same as R-103	Multiplier Grid Leak
R-219		Same as R-211	Multiplier Cathode Bias
R-220	N16-R-49941-0511	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF122K; 1200 ohms ±10%; 2 W	Multiplier Decoupling
R-221		Same as R-216	8-16 Mc Multiplier Decoupling
R-222		Same as R-203	8-16 Mc Multiplier Screen Dropping
R-223	N16-R-49842-0511	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF681K; 680 ohms ±10%; 2 W	Amplifier Parasitic Suppressor
R-224		Same as R-103	8-16 Mc Multiplier Grid Leak
R-225		Same as R-211	8-16 Mc Multiplier Cathode Bias
R-226	N16-R-50417-0823	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF333K; 33,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; spec MIL-R-11A; RCA part/dwg C-722320-80	16-32 Mc Multiplier Grid Leak
R-227		Same as R-203	16-32 Mc Multiplier Screen Dropping
R-228		Same as R-220	16-32 Mc Multiplier Decoupling
R-229		Same as R-115	32-64 Mc Multiplier Screen Dropping
R-230		Same as R-220	32-64 Mc Multiplier Decoupling
R-231		Same as R-103	32-64 Mc Multiplier Grid Leak
R-232		Same as R-115	HFO Output Diode Load
R-233	N16-R-50589-0503	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF823K; 82,000 ohms ±10%; 2 W	Band Change Screen Dropping
R-234		Same as R-211	16-32 Mc Multiplier Cathode Bias

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-235		Same as R-211	32-64 Mc Multiplier Cathode Bias
R-236 thru R-300		Not Used	
R-301	N16-R-50094-0238	RESISTOR, FIXED, COMPOSITION: JAN Type RC30GF392K; 3900 ohms ±10%; 1 W	V. M. O. Plate Filter
R-302		Same as R-217	Cathode Follower Load
R-303	N16-R-50373-0423	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF223K; 22,000 ohms ±10%; 2 W	Cathode Follower Plate Filter
R-304		Same as R-203	100 Kc Plate Filter
R-305	N16-R-50129-0815	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF472K; 4700 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; spec MIL-R-11A; RCA part/dwg C-722320-70	100 Kc Cathode Load
R-306		Same as R-110	100 Kc Grid Leak
R-307		RESISTOR, FIXED, WIRE WOUND: heater element; 2 sections; 1300 ohms ea section; insulated; Technical Materiel Corp. Part no. RR-103-1	Inner Heater Element
R-308		Same as R-307	Inner Heater Element
R-309		RESISTOR, FIXED, WIRE WOUND: heater element; 2 sections; 160 ohms ea section; insulated; Technical Material Corp. Part no. RR-103-2	Outer Oven Heater
R-310		Same as R-309	Outer Oven Heater
R-311		Same as R-113	Inner Thermostat Arc Suppressor
R-312	N16-R-50722-0438	RESISTOR, FIXED, COMPOSITION: JAN Type RC20GF244J; 240,000 ohms ±5%; 1/2 W	Inner Oven Indicator Protector
R-313		Same as R-113	Relay Arc Suppressor
R-314		Same as R-113	Outer Oven Thermostat Arc Suppressor
R-315		Same as R-312	Outer Oven Indicator Protector
R-316		Same as R-113	Motor Switch Arc Suppressor
R-317		Same as R-107	Relay Bleeder
R-318	N16-R-50264-0131	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF912J; 9100 ohms ±5%; 2 W	Voltage Dropping
R-319	For replacement use N16-R-50264-0131	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF912K; 9100 ohms ±10%	Voltage Dropping Resistor
R-320		Same as R-209	V. M. O. Grid Leak
R-321	N16-R-49257-0486	RESISTOR, FIXED, COMPOSITION: JAN Type RC42GF120K; 12 ohms ±10%; 2 W	Power Indicator Series Dropping
R-322		Same as R-321	Dial Illuminating Series Dropping
R-323		RESISTOR, FIXED, WIRE WOUND: 300 ohms ±10%; 50 W; Technical Materiel Corp. Part no. RW105-14	Motor Series
R-324 thru R-400		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-401	For replacement use N16-R-49660-0716	RESISTOR, FIXED, COMPOSITION: MIL Type RC32GF221K; 220 ohms ±10%; 1 W; F characteristic; 0.562 in. lg by 0.225 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.032 in. dia; color coded; spec MIL-R-11A; RCA part/dwg C-722344-54	Voltage Dropping Resistor for Negative Voltage Supply
R-402		Same as R-401	Voltage Dropping Resistor for Voltage Supply
R-403	N16-R-87189-4960	RESISTOR, VARIABLE: JAN Type RV4ATSA501A; composition element; 1 section. 500 ohms ±10%; 2 W; std A taper; 3 solder lug type terminals; enclosed metal case; 1-5/32 in. dia by 21/32 in. deep; round, screwdriver slotted metal shaft w/ 0.047 in. wide by 0.063 in. deep slot, 1/4 in. dia by 5/8 in. lg, normal torque; insulated contact arm, no off position; mounts by 3/8 in. -32 thread by 0.375 in. lg bushing w/non-turn device at 9 o'clock; RCA part/dwg C-790090-29	Hum-bucking Adjustment Heater Circuit
R-404		Same as R-216	With C-401, Filters Rectified Current
R-405		Same as R-216	With C-401, Filters Rectified Current
R-406	N16-R-50823-0206	RESISTOR, FIXED, COMPOSITION: MIL Type RC32GF474K; 470,000 ohms ±10%; 1 W; F characteristic; 0.562 in. lg by 0.225 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.032 in. dia; color coded; RCA part/dwg C-722344-94	Voltage Dropping Resistor for Negative Voltage Supply
R-407		Same as R-216	With C-402, Filters Rectified Current
R-408		Same as R-216	With C-402, Filters Rectified Current
R-409	N16-R-50130-0511	RESISTOR, FIXED, COMPOSITION: MIL Type RC42GF472K; 4700 ohms ±10%; 2 W; F characteristic; 0.688 in. lg by 0.318 in. dia less terminals; insulated; resistant to humidity; 2 axial wire lead type terminals, 0.036 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722362-70	Voltage Dropping Resistor for Negative Voltage Supply
R-410		Same as R-409	Voltage Dropping Resistor for Negative Voltage Supply
R-411		Same as R-110	Voltage Dropping Resistor for Hum-bucking Circuit
R-412		Same as R-103	Voltage Dropping Resistor for Hum-bucking Circuit
R-413	N16-R-50067-0505	RESISTOR, FIXED, COMPOSITION: MIL Type RC42GF332K; 3300 ohms ±10%; 2 W; F characteristic; 0.688 in. lg by 0.318 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.036 in. dia; color coded; RCA part/dwg C-722362-68	Voltage Dropping Resistor for Positive Voltage Regulator V-405
R-414		Same as R-216	Voltage Dropping Resistor for Positive Voltage Regulator V-405
R-415		Same as R-216	Voltage Dropping Resistor for Positive Voltage Regulator V-405
R-416		Same as R-216	Voltage Dropping Resistor for Positive Voltage Regulator V-405
R-417 thru R-550		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-551	N16-R-50371-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF223J; 22,000 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 1.138 in. dia less terminals; insulated; resistant to humidity and salt water; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-191; p/o Z-551	No. 3 Grid Leak Resistor, V-551
R-552	N16-R-49642-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF181J; 180 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-141; p/o Z-551	Cathode Resistor, V-551
R-553	N16-R-50822-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF474K; 470,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-94; p/o Z-551	No. 1 Grid Leak Resistor, V-551
R-554	N16-R-50012-816	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF222K; 2200 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; RCA part/dwg C-722320-66; p/o Z-551	Screen Decoupling Resistor, V-551
R-555		Same as R-553; p/o Z-551	Grid Leak Resistor, V-552
R-556	N16-R-49768-0431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF471J; 470 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-151; p/o Z-551	Cathode Resistor, V-552
R-557		Same as R-554; p/o Z-551	Plate Decoupling Resistor, V-552
R-558 thru R-600		Not Used	
R-601		RESISTOR, VARIABLE: composition element; rotating brush type; 1 section, 5000 ohms ±20%; 1/3 W; std "U" taper; 3 solder lug type terminals; enclosed metal case; 29/64 in. lg by 1/2 in. dia; round, screwdriver slotted metal shaft, 0.125 in. dia by 7/16 in. lg; normal torque w/split bushing; insulated contact arm, no off position; mounted by 1/4 in. -32 by 3/8 in. lg bushing w/non-turn device located at 3 and 9 o'clock; Allen Bradley Co. Type G; RCA part/dwg B-474161-2	With C-603, Variable Frequency Adjustment
R-602	N16-R-49985-0813	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF182K; 1800 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-65	With C-603, Fixed Frequency Adjustment
R-603		RESISTOR, VARIABLE: composition element; rotating brush type; 1 section, 10,000 ohms ±20%; 1/3 W; std "U" taper; 3 solder lug type terminals; enclosed metal case; 29/64 in. lg by 1/2 in. dia; round, screwdriver slotted metal shaft, 0.125 in. dia by 7/16 in. lg; normal torque w/split bushing; insulated contact arm, no off position; mounted by 1/4-32 by 3/8 in. lg bushing w/non-turn device located at 3 and 9 o'clock; Allen Bradley Co. Type G; RCA part/dwg B-474161-3	With C-606, Variable Frequency Adjustment
R-604		Same as R-204	With C-606, Fixed Frequency Adjustment
R-605		Same as R-603	With C-608, Variable Frequency Adjustment
R-606		Same as R-204	With C-608, Fixed Frequency Adjustment
R-607		Same as R-603	With C-610, Variable Frequency Adjustment
R-608		Same as R-305	With C-610, Fixed Frequency Adjustment

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-609		RESISTOR, VARIABLE: composition element; rotating brush type; 1 section, 25,000 ohms ±20%; 1/3 W; std "U" taper; 3 solder lug type terminals; enclosed metal case; 29/64 in. lg by 1/2 in. dia; round, screwdriver slotted metal shaft, 0.125 in. dia by 7/16 in. lg; normal torque w/split bushing; insulated contact arm, no off position; mounted by 1/4-32 by 3/8 in. lg bushing w/non-turn device located at 3 and 9 o'clock; Allen Bradley Co. Type G; RCA part/dwg B-474161-4	With C-612, Variable Frequency Adjustment
R-610	N16-R-50093-0816	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF392K; 3900 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-69	With C-612, Fixed Frequency Adjustment
R-611		Same as R-609	With C-614, Variable Frequency Adjustment
R-612	N16-R-50201-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF682K; 6800 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-72	With C-614, Fixed Frequency Adjustment
R-613		Same as R-609	With C-616, Variable Frequency Adjustment
R-614		Same as R-102	With C-616, Fixed Frequency Adjustment
R-615		RESISTOR, VARIABLE: composition element; rotating brush type; 1 section, 50,000 ohms ±20%; 1/3 W; std "U" taper; 3 solder lug type terminals; enclosed metal case; 29/64 in. lg by 1/2 in. dia; round, screwdriver slotted metal shaft; 0.125 in. dia by 7/16 in. lg; normal torque w/split bushing; insulated contact arm, no off position; mounted by 1/4-32 by 3/8 in. lg bushing w/non-turn device located at 3 and 9 o'clock; Allen Bradley Co. Type G; RCA part/dwg B-474161-5	With C-618, Variable Frequency Adjustment
R-616		Same as R-612	With C-618, Fixed Frequency Adjustment
R-617		Same as R-102	Cathode Resistor, V-601
R-618		Same as R-110	Grid Leak Resistor, V-601
R-619	N16-R-50237-0815	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF822K; 8200 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-73	P/o Output Coupling Filter, V-601
R-620		Same as R-203	P/o Output Coupling Filter, V-601
R-621		Same as R-554	Cathode Resistor, V-602A
R-622		Same as R-226	Plate Load Resistor, V-602B
R-623		Same as R-104	Grid Bias Resistor, V-603
R-624		Same as R-103	Grid Decoupling Resistor, V-602B
R-625	N16-R-50975-0725	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF105K; 1 megohm ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-98	Grid Leak Decoupling, V-602B
R-626	N16-R-49940-0816	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF122K; 1200 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-63	With R-630, Fixed Output Adjustment, V-602A

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-627	N16-R-49967-0760	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF152K; 1500 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-64	With R-630, Fixed Output Adjustment, V-602A
R-628	N16-R-49733-0750	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF391K; 390 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-57	With R-630, Fixed Output Adjustment, V-602A
R-629	N16-R-50552-0999	RESISTOR, FIXED, COMPOSITION: MIL Type RC32GF683K; 68,000 ohms ±10%; 1 W; F characteristic; 0.562 in. lg by 0.225 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.032 in. dia; color coded; RCA part/dwg C-722344-84	Plate Decoupling Resistor, V-602B
R-630		RESISTOR, VARIABLE: composition element; rotating brush type; 1 section, 2500 ohms ±20%; 1/3 W; std "U" taper; 3 solder lug type terminals; enclosed metal case; 29/64 in. lg by 1/2 in. dia; round, screwdriver slotted metal shaft, 0.125 in. dia by 7/16 in. lg; normal torque w/split bushing; insulated contact arm, no off position; mounted by 1/4-32 by 3/8 in. lg bushing w/non-turn device located at 3 and 9 o'clock; Allen Bradley Co. Type G; RCA part/dwg B-474161-1	Variable Output Adjustment, V-602A
R-631		Same as R-204	External Tone Decoupling Resistor
R-632		Same as R-209	Cathode Resistor, V-603
R-633		Same as R-209	Cathode Resistor, V-603
R-634		Same as R-204	External Tone Decoupling Resistor
R-635		Same as R-619	Plate Decoupling Resistor, V-603
R-636	N16-R-49841-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF681K; 680 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-60	Loading Resistor, T-602 Secondary
R-637 thru R-700		Not Used	
R-701		Same as R-305	Loading Resistor, T-701
R-702		Same as R-103	Grid Leak Resistor, V-701
R-703		Same as R-211	Cathode Resistor, V-701
R-704		Same as R-110	Screen Decoupling Resistor, V-702
R-705	N16-R-50445-0151	RESISTOR, FIXED, COMPOSITION: MIL Type RC32GF393K; 39,000 ohms ±10%; 1 W; F characteristic; 0.562 in. lg by 0.225 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.032 in. dia; color coded; RCA part/dwg C-722344-81	Plate Decoupling Resistor, V-701
R-706		Same as R-705	Plate Decoupling Resistor, V-701
R-707	N16-R-50481-0101	RESISTOR, FIXED, COMPOSITION: MIL Type RC32GF473K; 47,000 ohms ±10%; 1 W; F characteristic; 0.563 in. lg by 0.225 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 0.125 in. lg by 0.032 in. dia; color coded; RCA part/dwg C-722344-82	Screen Decoupling Resistor, V-701
R-708		Same as R-627	Plate Load Resistor, V-702

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-709		Same as R-625	Grid Leak Resistor, V-702
R-710		Same as R-217	Cathode Resistor, V-702
R-711		Same as R-627	Cathode Resistor, V-703
R-712		Same as R-707	Plate Load Resistor, V-703
R-713		Same as R-110	Grid Leak Resistor, V-704
R-714	N16-R-50759-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF334K; 330,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-92	With C-712, Feedback Network, V-704 to V-703
R-715	N16-R-49770-0165	RESISTOR, FIXED, COMPOSITION: MIL Type RC32GF471K; 470 ohms ±10%; 1 W; F characteristic; 0.562 in. lg by 0.225 in. dia less terminals; insulated; resistant to humidity and salt water; 2 axial wire lead type terminals, 0.125 in. lg by 0.032 in. dia; color coded; RCA part/dwg C-722344-58	Cathode Resistor, V-704
R-716 thru R-800		Not Used	
R-801		Same as R-226	Diode Load Resistor, V-1005
R-802	N16-R-51110-0813	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF335K; 3.3 megohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-104	With R-803, AGC Delay Voltage Divider
R-803		Same as R-110	With R-802, AGC Delay Voltage Divider
R-804	N16-R-51173-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF475K; 4.7 megohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-106	P/o AGC Time Constant Filter Network
R-805		Same as R-804	P/o AGC Time Constant Filter Network
R-806		Same as R-804	P/o AGC Time Constant Filter Network
R-807		Same as R-804	P/o AGC Time Constant Filter Network
R-808		Same as R-802	With R-809, AGC Delay Voltage Divider
R-809		Same as R-110	With R-808, AGC Delay Voltage Divider
R-810		Same as R-226	Diode Load Resistor, V-1005
R-811		Same as R-114	With R-812, Dividing Network, V-801A Plate
R-812	N16-R-50651-0818	RESISTOR, FIXED, COMPOSITION: MIL TYPE RC20GF124K; 120,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-87	With R-811, Dividing Network, V-801A Plate
R-813		Same as R-714	With R-811, P/o Filter Network
R-814		Same as R-625	Cathode Return, V-801A
R-815		Same as R-625	Output Decoupling Resistor, V-801A

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-816	N16-R-50552-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF683K; 68,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-84	Plate Load Resistor, V-801B
R-817		Same as R-554	Cathode Resistor, V-801B
R-818	N16-R-51020-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF155K; 1.5 megohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-100	With C-814, P/o Filter Network
R-819		Same as R-804	P/o Silencer Control Network
R-820		Same as R-612	Cathode Resistor, V-802A
R-821	N16-R-50741-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF274K; 270,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-91	Plate Load Resistor, V-802A
R-822		Same as R-714	P/o Cathode Bias Network, V-802A
R-823		Same as R-103	P/o Cathode Bias Network, V-802B
R-824		Same as R-714	Plate Coupling Resistor, V-802A to V-802B
R-825		Same as R-714	P/o Cathode Bias Network, V-802B
R-826	N16-R-50678-0818	RESISTOR, FIXED, COMPOSITION: MIL Type RC20GF154K; 150,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722320-88	P/o Cathode Bias Network, V-802B
R-827		Same as R-103	Grid Leak Resistor, V-803A
R-828		Same as R-554	Cathode Resistor, V-803A
R-829		Same as R-619	Plate Load Resistor, V-803A
R-830		Same as R-103	P/o Cathode Bias Network, V-803B
R-831		Same as R-610	P/o Cathode Bias Network, V-803B
R-832		Same as R-110	P/o "Limiter" Control Network
R-833		Same as R-110	P/o Cathode Bias Network, V-803B
R-834		Same as R-110	P/o Cathode Bias Network, V-804A
R-835		Same as R-103	P/o Cathode Bias Network, V-804A
R-836		Same as R-610	P/o Cathode Bias Network, V-804A
R-837		Same as R-625	Grid Leak Resistor, V-804B
R-838		Same as R-110	Plate Load Resistor, V-804B
R-839		Same as R-102	Cathode Resistor, V-802B
R-840		Same as R-714	With C-821, P/o Feedback Network, V-805 to V-804B

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-841		Same as R-110	Grid Leak Resistor, V-805
R-842		Same as R-715	Cathode Resistor, V-805
R-843 thru R-900		Not Used	
R-901	For replacement use N16-R-50281-0438	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.140 in. dia less terminals; insulated; resistant to moisture; 2 axial wire lead type terminals, 1-1/2 in. lg; color coded; Allen Bradley Co. Type EB-1031; RCA part/dwg C-82283-74; p/o Z-901	No. 3 Grid Leak Resistor, V-901
R-902	N16-R-50282-0811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF103K; 10,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; RCA part/dwg C-722318-74; p/o Z-901	No. 1 Grid Leak Resistor, V-901
R-903	N16-R-49643-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF181K; 180 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; RCA part/dwg C-722318-53; p/o Z-901	Cathode Resistor, V-901
R-904	N16-R-50012-0816	RESISTOR, FIXED, COMPOSITION: 2200 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.140 in. dia less terminals; insulated; resistant to moisture; 2 axial wire lead type terminals, 1-1/2 in. lg; color coded; Allen Bradley Co. Type EB-2221; RCA part/dwg A-82283-66; p/o Z-901	Plate Decoupling Resistor, V-901
R-905		Same as R-904	Plate Decoupling Resistor, V-551
R-906 thru R-1000		Not Used	
R-1001	N16-R-99999-0037	RESISTOR, THERMAL: 820 ohms nominal resistance; 25 deg C ambient temp, 10 ma, 2 W; 5 volts max.; designed for DC; disk type; 1/2 in. dia by 11/64 in. thick; mounts by 2 radial wire leads 2 in. lg by 0.032 in. dia; Keystone Carbon Company Type L-7415-475-100; RCA part/dwg B-465817-1	Gain Compensation Resistor, V-1003
R-1002 thru R-1004		Not Used	
R-1005	N16-R-50993-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF125K; 1.2 megohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-99	AGC Decoupling Resistor, V-1001
R-1006	N16-R-49688-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF271K; 270 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-55; p/o Z-1004	Cathode Resistor, V-1001
R-1007		Same as R-904; p/o Z-1004	Screen Decoupling Resistor, V-1001
R-1008		Not Used	
R-1009	N16-R-50362-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF203J; 20,000 ohms ±5%; 1/2 W; F characteristic; 0.406 in. lg by 0.175 in. dia; insulated; resistant to salt water and humidity; 2 axial wire leads no. 21 AWG 1-1/2 in. lg; spec MIL-R-11A; RCA part/dwg P-722318-190	Loads L-1016
R-1010		Same as R-1006; p/o Z-1006	Cathode Resistor, V-1002
R-1011		Same as R-904, p/o Z-1006	Screen Decoupling, V-1002
R-1012		Not Used	
R-1013		Same as R-1009	Loads L-1017

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-1014	N16-R-49922-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF102K; 1000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals; RCA part/dwg C-722318-62; p/o Z-1008	With R-1001, Cathode Resistor, V-1003
R-1015	N16-R-50480-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF473K; 47,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-82; p/o Z-1010	Screen Dropping Resistor, V-1004
R-1016		Same as R-1015; p/o Z-1010	Plate Load Resistor, V-1004
R-1017		Same as R-904; p/o Z-1008	Screen Decoupling Resistor, V-1003
R-1018		Not Used	
R-1019	N16-R-50129-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF472K; 4700 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; RCA part/dwg C-722318-70; p/o Z-1010	No. 1 Grid Leak Resistor, V-1004
R-1020		Same as R-1019; p/o Z-1010	No. 3 Grid Leak Resistor, V-1004
R-1021		Same as R-1014; p/o Z-1010	Cathode Resistor, V-1004
R-1022		Not Used	
R-1023	N16-R-50551-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF683J; 68,000 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-203; p/o Z-1014	Grid Leak Resistor, V-1007
R-1024	N16-R-50335-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF153J; 15,000 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-187; p/o Z-1011	Loads L-1013
R-1025	N16-R-49769-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF471K; 470 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-58; p/o Z-1014	Cathode Resistor, V-1007
R-1026	N16-R-50129-0815	RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.140 in. dia less terminals; insulated; resistant to moisture; 2 axial wire lead type terminals, 1-1/2 in. lg; color coded; Allen Bradley Co. Type EB-4721; RCA part/dwg A-82283-70; p/o Z-1014	Plate Decoupling Resistor, V-1007
R-1027	N16-R-50444-0811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF393K; 39,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-81	Diode Load Resistor, V-1005
R-1028	N16-R-50821-0431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF474J; 470,000 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-223	With R-1029, AGC Delay Voltage Divider
R-1029	N16-R-51136-0431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF395J; 3.9 megohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-245	With R-1028, AGC Delay Voltage Divider
R-1030		Same as R-1005	AGC Decoupling and Time Constant

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-1031		Same as R-1005	With C-1066, Time Constant Circuit, V-1003 Grid
R-1032	N16-R-51065-0811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF225K; 2.2 megohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-102	Signal Reduction, V-1004 Plate
R-1033		Same as R-554	Plate Supply Decoupling Resistor, V-1004
R-1034 thru R-1100		Not Used	
R-1101	N16-R-50975-0811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF105K; 1 megohm ±10%; 1/2 W; rated at 40 deg C ambient temp; F characteristic; 0.375 in. lg by 0.138 in. OD; insulated; 2 wire lead type terminals; resistant to humidity; RCA part/dwg C-722318-98; p/o Z-1101	Output Coupling, V-1101 Cathode
R-1102	N16-R-50587-0431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF823J; 82,000 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-205	With R-1103, Dividing Network, V-1101 Plate
R-1103	N16-R-50533-0431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF623J; 62,000 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-209; p/o Z-1101	With R-1102, Dividing Network, V-1101 Plate
R-1104	N16-R-50741-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF274K; 270,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-91; p/o Z-1101	Detector Signal Filtering
R-1105		Same as R-1101; p/o Z-1101	Cathode Return, V-1101
R-1106	N16-R-49877-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF821K; 820 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-61; p/o Z-1102	Cathode Resistor, V-1102
R-1107	N16-R-50552-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF683K; 68,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-84; p/o Z-1102	Plate Load Resistor, V-1102
R-1108	N16-R-51019-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF155J; 1.5 megohm ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-235	Audio Input Filtering
R-1109		Same as R-1023	Gain Compensation in "Broad" Audio Operation
R-1110		Not Used	
R-1111	N16-R-50398-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF273J; 27,000 ohms ±5%; 1/2 W; BF characteristic; 0.138 in. dia by 0.375 in. lg less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-193	Dividing Impedance to Z-1110
R-1112		Same as R-553	Grid Leak Resistor, V-1102
R-1113		Same as R-553	P/o Limiter Control Network

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-1114	N16-R-50416-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF333J; 33,000 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-195; p/o Z-1104	Output Load Resistor, V-1104 Plate
R-1115	N16-R-50632-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF104J; 100,000 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-207; p/o Z-1103	With R-1116 and R-1117 Cathode Bias Network, V-1103
R-1116	N16-R-50677-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF154J; 150,000 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-211; p/o Z-1103	With R-1115 and R-1117 Cathode Bias Network, V-1103
R-1117	N16-R-50758-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF334J; 330,000 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-219; p/o Z-1104	With R-1115 and R-1116 Cathode Bias Network, V-1103
R-1118		Same as R-1117; p/o Z-1104	Coupling V-1104 Plate to V-1103 Plate
R-1119	N16-R-50038-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF272J; 2700 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-169; p/o Z-1104	Cathode Resistor, V-1104
R-1120	N16-R-50659-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF134J; 130,000 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-210; p/o Z-1104	With R-1119 Bias Network for V-1104 Cathode
R-1121	N16-R-50740-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF274J; 0.27 megohm ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-217; p/o Z-1104	Plate Load Resistor, V-1104
R-1122	N16-R-50651-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF124K; 120,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-87; p/o Z-1105	Grid Leak Resistor, V-1105
R-1123		Same as R-1106; p/o Z-1105	Cathode Resistor, V-1105
R-1124		Same as R-1107; p/o Z-1105	Plate Load Resistor, V-1105
R-1125		Same as R-553; p/o Z-1106	With R-1126 and R-1127 Cathode Bias Network, V-1106
R-1126	N16-R-50093-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF392K; 3900 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; RCA part/dwg C-722318-69; p/o Z-1106	With R-1125 and R-1127 Cathode Bias Network, V-1106
R-1127	N16-R-50633-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF104K; 100,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-86; p/o Z-1106	With R-1125 and R-1126 Cathode Bias Network, V-1106
R-1128		Same as R-1127; p/o Z-1107	With R-1129 and R-1130 Bias Network, V-1107
R-1129		Same as R-1126; p/o Z-1107	With R-1128 and R-1130 Cathode Bias Network, V-1107

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-1130		Same as R-553; p/o Z-1107	With R-1128 and R-1129 Cathode Bias Network, V-1107
R-1131		Same as R-1005; p/o Z-1108	Grid Leak Resistor, V-1108
R-1132		Same as R-1119; p/o Z-1108	Cathode Resistor, V-1108
R-1133		Same as R-553; p/o Z-1108	Plate Load Resistor, V-1108
R-1134		Same as R-1115	With R-1132, Feedback Network, V-1109 to V-1108
R-1135	N16-R-49939-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF122J; 1200 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-161; p/o Z-1108	Grid Leak Resistor, V-1109
R-1136	N16-R-49841-0818	RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.140 in. dia less terminals; insulated; resistant to salt water immersion; 2 axial wire lead type terminals, 1-1/2 in. lg; color coded; Allen Bradley Co. Type EB-6811; RCA part/dwg A-82283-60; p/o Z-1108	Cathode Resistor, V-1109
R-1137	N16-R-51172-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF475J; 4.7 megohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-247	P/o Silencer Contrast Network
R-1138		Same as R-553; p/o Z-1108	Grid Leak Resistor, V-1109
R-1139 thru R-1200		Not Used	
R-1201	N16-R-51064-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF225J; 2.2 megohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-239; p/o Z-1201	Grid Leak Resistor, V-1201
R-1202		Same as R-556; p/o Z-1201	Common Cathode Resistor, V-1201 and V-1202
R-1203	N16-R-50308-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF123J; 12,000 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-185; p/o Z-1201	Plate Load Resistor, V-1201
R-1204	N16-R-50164-0431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF562J; 5600 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-177; p/o Z-1202	Plate Leak Resistor, V-1202
R-1205	N16-R-50236-0431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF822J; 8200 ohms ±5%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-181; p/o Z-1202	Grid Leak Resistor, V-1202
R-1206	N16-R-49283-0811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF150K; 15 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-40; p/o Z-1201	Feedback Element, V-1201
R-1207 thru R-1300		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-1301	N16-R-50012-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF222K; 2200 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-66	Plate Supply Decoupling Resistor, V-1301
R-1302		Same as R-1014; p/o Z-1302	Cathode Resistor, V-1301
R-1303	N16-R-50399-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF273K; 27,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-79; p/o Z-1302	Screen Load Resistor, V-1301
R-1304	N16-R-50372-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF223K; 22,000 ohms ±10%; 1/2 W; F characteristic; 0.375 in. lg by 0.138 in. dia; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; RCA part/dwg C-722318-78; p/o Z-1302	Plate Load Resistor, V-1301
R-1305		Same as R-1127; p/o Z-1302	Grid Leak Resistor, V-1301
R-1306 thru R-1500		Not Used	
R-1501		P/o Z-1501 (Not Replaceable)	
R-1502	N16-R-88179-4798	RESISTOR, VARIABLE: JAN Type RV4ATRD504A; composition element; 1 section; 500,000 ohms ±10%; 2 W; std "A" taper; 3 solder lug type terminals; enclosed metal case; 1-5/32 in. dia by 21/32 in. lg; round metal shaft, 1/4 in. dia by 7/8 in. lg; normal torque; insulated contact arm, no off position; mounted by 3/8-32 by 0.375 in. lg bushing w/ non-turn device at 9 o'clock; RCA part/dwg C-790091-155	"Monitor Level" Control
R-1503		RESISTOR, VARIABLE: JAN Type RV4ATRD501A; composition element; 1 section; 500 ohms ±10%; 2 W; std "A" taper; 3 solder lug type terminals; enclosed metal case; 1-5/32 in. dia by 21/32 in. deep overall; round metal shaft, 1/4 in. dia by 7/8 in. lg from mounting surface; normal torque; insulated contact arm, no off position; mounted by 3/8-32 by 3/8 in. lg bushing w/non-turn device at 9 o'clock; terminals hot tin dipped; RCA part/dwg C-790091-29	"Threshold" Control
R-1504	N16-R-88009-4094	RESISTOR, VARIABLE: JAN Type RV4ATRD104A; composition element; 1 section; 100,000 ohms ±10%; 2 W; std "A" taper; 3 solder lug type terminals; enclosed metal case; 1-5/32 in. dia by 21/32 in. deep; round metal shaft, 1/4 in. dia by 7/8 in. lg; normal torque; insulated contact arm, no off position; mounted by 3/8-32 by 0.375 in. lg bushing w/non-turn device at 9 o'clock; RCA part/dwg C-790091-127	"Silencer" Control
R-1505	N16-R-88009-4094	RESISTOR, VARIABLE: JAN Type RV4ATRD105B; composition element; 1 section; 1 megohm ±10%; 2 W; std "A" taper; 3 solder lug type terminals; enclosed metal case; 1-5/32 in. dia by 21/32 in. lg; round metal shaft, 1/4 in. dia by 7/8 in. lg; normal torque; insulated contact arm, no off position; mounted by 3/8-32 by 0.375 in. lg bushing w/non-turn device at 9 o'clock; RCA part/dwg C-790091-169	"AF Line Level" Control
R-1506 thru R-1600		Not Used	
R-1601	N16-R-87192-5300	RESISTOR, VARIABLE: composition element; 1 section; 500 ohms ±20%; 2 W; std "A" taper; 3 solder lug type terminals; enclosed metal case; 1-1/16 in. dia by 9/16 in. deep; metal screwdriver slotted shaft w/ 0.047 in. wide by 0.063 in. deep slot, 1/4 in. dia by 1/2 in. lg from mounting surface, normal torque; insulated contact arm, w/off position at counterclockwise end of rotation; mounted by 3/8-32 by 3/8 in. lg bushing w/non-turn device located on 17/32 in. radius at 3 o'clock; operating temp range -50 deg C to +100 deg C; will withstand 1000 v between terminal and mounting bushing for 1 min., and 100 hour salt spray; terminal hot tin dipped; will withstand acceleration of 8G; Allen Bradley Co. Type JU 5012, SD3032; RCA part/dwg C-743461-26	Hum-bucking Adjustment V-1101 Heater Circuit

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-1602	N16-R-50445-501	RESISTOR, FIXED, COMPOSITION: MIL Type RC42BF393K; 39,000 ohms ±10%; 2 W; F characteristic; 0.688 in. lg by 0.318 in. dia less terminals; insulated; resistant to humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.036 in. dia; color coded; RCA part/dwg C-722360-81	Bleeder Resistor, C-1602
R-1603	N16-R-66214-9236	RESISTOR, FIXED, WIRE WOUND: MIL Type RW21G402; inductive winding; 4000 ohms ±5%; 22 W; 275 deg C continuous operating temp; 2 in. lg by 1-3/16 in. wide by 21/32 in. high less terminals; vitreous enamel covering, resistant to humidity; 2 tab type terminals, 13/32 in. lg by 7/32 in. wide by 1/64 in. thick; stack mounted; requires two 0.196 in. mounting holes on a 2-3/4 in. mounting center; RCA part/dwg P-722463-647	Voltage Dropping Resistor, V-1603
R-1604	N16-R-65846-3926	RESISTOR, FIXED, WIRE WOUND: MIL Type RW21G401; inductive winding; 400 ohms ±5%; 22 W; 275 deg C continuous temp; 2 in. lg by 1-3/16 in. wide by 21/32 in. high less terminals; baked vitreous enamel, resistant to humidity; 2 tab type terminals, 13/32 in. lg by 7/32 in. wide by 1/64 in. thick; stack mounted, requires two 0.196 in. dia mounting holes on a 2-3/4 in. mounting center; RCA part/dwg P-722463-637	Voltage Dropping Resistor for Plate Supply Voltage
R-1605	N16-R-85003-4144	RESISTOR, THERMAL: 14.4 ohms nominal resistance -40 deg C to +85 deg C ambient temp range; nominal operating current, 140 ma, 630 milliwatts; 160 ma max operating current, 11.2 v DC, 6.7 v range; designed to operate on AC and DC; ballast tube type; T5-1/2 bulb, 2-3/8 in. lg overall; octal base for socket mounting; to withstand 5000 hours of continuous operation; shock and vibration resistant; operating frequencies 50 cycles to 400 cycles; 7 pin base; Chatham Electronic Co. to RCA part/dwg B-464003-1; RCA part/dwg B-464003-1	Regulates Local Oscillator Heater Current
R-1606 thru R-1700		Not Used	
R-1701	N16-A-98500-5105	ATTENUATOR, VARIABLE: resistive bridge "T" type, wire-wound resistor; impedance, 600 ohms input, 600 ohms output; 30 kc to 200 kc frequency response; attenuation, 4 db to 40 db ±5%; variable in 10 steps; 3 in. lg by 2-1/8 in. dia less terminals; 2 solder lug terminals, located at 3 o'clock; mounts by single hole 3/8-32 by 13/32 in. lg bushing; linear attenuation taper 4 db per step; Shallcross Mfg Co. Type 410-4B1 bridged T; RCA part/dwg B-474160-1	"Level" Control for Loudspeaker
R-1702 thru R-2200		Not Used	
R-2201	N16-R-88919-1361	RESISTOR, VARIABLE, COMPOSITION: rotating brush type; 2 sections; 10,000 ohms first section, 10,000 ohms second section, ±20% both sections; 2 W max; Allen Bradley Co. "B" taper, first section; std "X" taper second section; 75% resistance at 15 deg rotation, 50% resistance at 25 deg rotation, 20% resistance at 40 deg rotation, 10% resistance at 50 deg rotation; 3 solder lug type terminals ea section; enclosed plastic case; 1-3/16 in. lg by 1-1/16 in. dia; round metal, brass nickel plated shaft, 1/4 in. dia by 3/4 in. lg; normal torque w/a non-turn device on bushing; insulated contact arm, w/o off position; mounted by 3/8-32 by 3/8 in. lg bushing w/ non-turn device located on 17/32 in. radius at 90 deg; resistant to salt water; marked w/RCA part/dwg no.; fungus proofed; Allen Bradley Co. Type JJ, Code 1; RCA part/dwg P-737807-23	RF Gain (Manual) Control
R-2201A		P/o R-2201	
R-2201B		P/o R-2201	
R-2202		Same as R-1601	Diversity Gain Balance Control
R-2203		Same as R-551	Multiplier for M-2201
R-2204	N16-R-50092-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF392J; 3900 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-173	+10 DB Multiplier for M-2202

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-2205		Same as R-1135	0 DB Multiplier for M-2202
R-2206	N16-R-88342-5310	RESISTOR, VARIABLE: composition element; 1 section; 1 megohm ±20%; 2 W; std "A" taper; 3 solder lug type terminals; enclosed metal case; round metal shaft, 1/4 in. dia by 3/4 in. lg from mounting surface; normal torque; insulated contact arm, w/o off position; mounted by 3/8-32 by 3/8 in. lg bushing w/non-turn device located on 17/32 in radius at 3 o'clock; operating temp range -50 deg C to +100 deg C; will withstand 1000 v between terminals and mounting bushing for 1 min, and 100 hour salt spray; terminal hot tin dipped; marked w/RCA part/dwg no. will withstand acceleration of 8G; Allen Bradley Co. Type JU1052, P3048; RCA part/dwg C-743461-28	"Silencer" Control
R-2207	N16-R-89219-1001	RESISTOR, VARIABLE: composition element; rotating brush type; 2 sections; 1 megohm first section, 100,000 ohms second section, ±10% first section, ±20% second section; 2 W ea section; std "C" taper; 3 solder lug type terminals ea section; enclosed plastic case; 1-3/16 in. lg by 1-1/16 in. dia; round, metal, brass nickel plated shaft 1/4 in. dia by 3/4 in. lg from mounting surface; normal torque; insulated contact arm, w/o off position; mounted by 3/8-32 by 3/8 in. lg bushing w/non-turn device located on 17/32 in. radius at 90 deg; operating temp range -55 deg C to +100 deg C; marked w/RCA part/dwg no.; 900 v test between terminals and mounting bushing; fungus proofed; resistant to salt water; Allen Bradley Co. Type JJ; RCA part/dwg P-737807-22	"Output" Control
R-2207A		P/o R-2207	
R-2207B		P/o R-2207	
R-2208	N16-R-87852-5365	RESISTOR, VARIABLE: composition element; 1 section; 50,000 ohms ±20%; 2 W; special Allen Bradley "B" taper; 88% resistance at 10% rotation, 65% resistance at 20% rotation, 45% resistance at 30% rotation, 10% resistance at 50% rotation; 3 solder lug type terminals; enclosed plastic case w/metal cover; round, metal shaft, 1/4 in. dia by 3/4 in. lg from mounting surface; normal torque; insulated contact arm, w/o off position; mounted by 3/8-32 by 3/8 in. lg bushing w/non-turn device located on 17/32 in. radius at 3 o'clock; operating temp range -50 deg C to +100 deg C; will withstand 1000 v between terminals and mounting bushing for 1 min. and 100 hours salt spray; terminals hot tin dipped; marked w/RCA part/dwg no.; will withstand acceleration of 8G; Allen Bradley Co. Type JB5032, P3048; RCA part/dwg C-743461-29	"Level" Control for Headphones
R-2209	N16-R-49940-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF122K; 1200 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-63	Headphone Circuit Termination
R-2210		Same as R-1203	20 DB Multiplier for M-2202
R-2211		Same as R-1303	AGC Decoupling and Time Constant
R-2212		Same as R-1501; p/o X-2201 (Not Replaceable)	
R-2213	N16-R-50588-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF823K; 82,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-85	Leg of Voltage Divider, R-2201
R-2214	N16-R-49822-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF621J; 620 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-154	Multiplier for M-2202
R-2215 thru R-3100		Not Used	
R-3101		Same as R-1122; p/o Z-3101	With R-3102, Grid Leak for V-3101

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-3102		Same as R-553; p/o Z-3101	With R-3101, Grid Leak for V-3101
R-3103	N16-R-49580-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF101K; 100 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-50; p/o Z-3101	Grid Decoupling, V-3101
R-3104	N16-R-49534-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF820J; 82 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-133; p/o Z-3101	Cathode Resistor, V-3101
R-3105		Same as R-554; p/o Z-3101	Screen Decoupling, V-3101
R-3106 thru R-3134		Not Used	
R-3135		Same as R-1122; p/o Z-3135	With R-3136, Grid Leak for V-3135
R-3136		Same as R-553; p/o Z-3135	With R-3135, Grid Leak for V-3135
R-3137		Same as R-552; p/o Z-3135	Cathode Resistor, V-3135
R-3138		Same as R-554; p/o Z-3135	Screen Decoupling, V-3135
R-3139 thru R-3800		Not Used	
R-3801	N16-R-87014-4509	RESISTOR, VARIABLE: composition element; 1 section; 50 ohms ±20%; 2 W; std "A" taper; 3 solder lug type terminals; enclosed metal case; round metal shaft, 1/4 in. dia by 3/4 in. lg from mounting surface, normal torque; insulated contact arm, w/o off position; mounted by 3/8-32 by 3/8 in. lg bushing w/non-turn device located on 17/32 in. radius at 3 o'clock; operating temp range -50 deg C to +100 deg C; will withstand 1000 v between terminals and mounting bushing for 1 min. and 100 hours salt spray; terminals hot tin dipped; marked w/RCA part/dwg no.; will withstand acceleration of 8G; Allen Bradley Co. Type JU5002, P3048; RCA part/dwg C-743461-27	Regulates Intensity of Projection Lamps
R-3802	N16-R-49438-238	RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%; 1 W; F characteristic; 0.562 in. lg by 0.225 in. dia less terminals; insulated; resistant to moisture; 2 axial wire lead type terminals, 1-1/2 in. lg by 0.041 in. dia; color coded; leads are copper or copper alloy wire, tin or lead alloy coated, readily solderable; Allen Bradley Co. Type GB; RCA part/dwg A-90496-46	Supplements R-3801
R-3803 thru R-4000		Not Used	
R-4001	N16-R-49706-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF331K; 330 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-56	With C-4001, Antenna Isolation
R-4002 thru R-4400		Not Used	
R-4401	N16-R-50417-811	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF333K; 33,000 ohms ±10%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to humidity and salt water immersion; 2 axial wire lead type terminals, 0.028 in. dia by 1.5 in. lg; color coded; RCA part/dwg C-722318-80; p/o Z-4401	Grid Leak Resistor for V-4401
R-4402		Same as R-102; p/o Z-4401	Plate Decoupling, V-4401
R-4403		Same as R-1206; p/o Z-4401	Grid Decoupling, V-4401

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
R-4404	N16-R-49840-431	RESISTOR, FIXED, COMPOSITION: MIL Type RC20BF681J; 680 ohms ±5%; 1/2 W; BF characteristic; 0.375 in. lg by 0.138 in. dia less terminals; insulated; resistant to salt water and humidity; 2 axial wire lead type terminals, 1.5 in. lg by 0.028 in. dia; color coded; RCA part/dwg C-722318-155	Cathode Resistor, V-4401
S-101	N17-S-73082-9028	SWITCH, TOGGLE: JAN Type ST22K; DPST: resistive load: 5 amps, 125 v AC or DC, 2 amps, 250 v AC or DC; inductive load: 3 amps, 125 v AC or DC, 1.5 amps, 250 v AC or DC; phenolic body; 1-9/32 in. lg by 23/32 in. wide by 23/32 in. deep less terminals, barriers, bushings, and handle; actuating bat type handle, 11/16 in. lg excluding length of bushing; locking action w/15/32 in. dia hole in cover guard for positioning handle; 4 solder lug type terminals located on back; single hole mounted by 15/32 in. dia bushing 32 threads per in., 15/32 in. lg from mounting surface; luminous handle; RCA part/dwg B-426780-110	Main Power Switch
S-102	N17-S-70777-8626	SWITCH, TOGGLE: JAN Type ST12A; SPST: resistive load: 5 amps, 125 v AC or DC, 2 amps, 250 v AC or DC; inductive load: 3 amps, 125 v AC or DC, 1.5 amps, 250 v AC or DC; phenolic body; 1-9/32 in. lg by 23/32 in. wide by 23/32 in. deep less terminals, barriers, bushings, and handle; actuating bat type handle, 11/16 in. lg excluding length of bushing; locking action w/15/32 in. dia hole in cover guard for positioning handle; 2 solder lug type terminals located on ea side on bottom; single hole mounted by 15/32 in. dia bushing, 32 thread per in., 15/32 in. lg from mounting surface; luminous handle; RCA part/dwg B-426780-101	IFO Plate
S-103		Same as S-102	HFO Plate
S-104	For Reference Only	SWITCH, ROTARY: SPST; p/o R-112	100 Kc Oscillator, On-Off
S-105	N17-S-74139-4844	SWITCH, TOGGLE: DPDT; JAN Type ST22N; 3 amp, 250 v; phenolic body	BFO Crystal
S-106		Same as S-102	BFO Plate
S-107		SWITCH, ROTARY: non-shorting; single section; 2 poles, 5 positions; Technical Materiel Corp. Part no. SW-107	Meter Switch
S-108 thru S-200		Not Used	
S-201		SWITCH, ROTARY: non-shorting; 2 sections, 2 poles, 4 positions; Technical Materiel Corp. Part no. SW-106	Crystal Switch
S-202		SWITCH, ROTARY: 4 sections; 5 positions; Technical Materiel Corp. Part no. SW-108	HFO Band Switch
S-203 thru S-300		Not Used	
S-301		SWITCH, THERMOSTATIC: mercury; operates at 70 deg C ±0.2 deg C; Technical Materiel Corp. Part no. SS101	Inner Oven Thermostat
S-302		SWITCH, THERMOSTATIC: bimetallic; operates at 80 deg C ±2 deg C; Technical Materiel Corp. Part no. SS100-3	Inner Oven Safety Thermostat
S-303		SWITCH, THERMOSTATIC: bimetallic; operates at 60 deg C ±2 deg C; Technical Materiel Corp. Part no. SS100-1	Outer Oven Thermostat
S-304		SWITCH, LEVER ACTION: 2 positions; 2 form as ea position; center off; momentary contact; Technical Materiel Corp. Part no. SW-103	Motor Control
S-305 thru S-550		Not Used	
S-551	N17-S-62405-6857	SWITCH, ROTARY: 2 sections; 6 positions; non-pile-up type; 6 pole, 6 throw; 500 v peak, 2 amps; silver contacts; ceramic body; 1.509 in. lg by 1 in. wide by 1-29/64 in. high; mounts by two no. 6-32 in. tapped holes on a 0.468 in. mounting center located in integral mounting bracket; round shaft w/0.925 in. dia by 3/16 in. lg crank type termination; crank has 5/16 in. swing, 0.395 in. lg by 1/2 in. dia; screw terminals on rotor, solder lug terminals on stator; has detent action; has red dot at 45 deg and black dot at 225 deg; shorting type contacts; RCA part/dwg C-743448-4	Band Switch, Mixer Unit

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
S-551A		P/o S-551	
S-551B		P/o S-551	
S-552 thru S-600		Not Used	
S-601		SWITCH, ROTARY: 3 sections; 9 switching positions possible; non-pile-up type; 3 poles, 9 throws; 125 v AC, 60 cycles, 3 amp; spring brass contacts; silver plated contact finish; ceramic section; 1-7/16 in. lg by 1-1/4 in. wide by 1-5/16 in. high overall; mounts by 3/8-32 thread by 5/16 in. lg bushing; also supplied w/two 3/8-32 thread nuts 9/16 in. across flats and two 3/8 in. internal tooth lockwashers; flatted type shaft, 3/8 in. lg by 1/4 in. dia; solder lug terminals; Oak Mfg Co. Type FC; RCA part/dwg B-474185-1	"Frequency" Switch
S-602 thru S-700		Not Used	
S-701		SWITCH, ROTARY: 2 sections; 5 switching positions possible; non-pile-up type; 4 poles, 5 throws; 125 v AC, 60 cycles, 3 amp; spring brass contacts; silver plated contact finish; ceramic section; 7/8 in. lg by 1-1/4 in. wide by 1-5/16 in. high; mounts by 3/8-32 thread by 5/16 in. lg bushing; supplied w/two 3/8-32 thread nuts 9/16 in. across flats and two 3/8 in. internal tooth washers; flatted type shaft, 3/8 in. lg by 1/4 in. dia; solder lug type terminals; Oak Mfg Co. Type FC; RCA part/dwg B-474181-1	"Function" Switch
S-702 thru S-800		Not Used	
S-801		SWITCH ROTARY: single section; 2 switching positions possible; non-pile-up type; 2 poles, 2 throws; 125 v AC, 60 cycles, 3 amp; spring brass contacts; silver plated contact finish; ceramic section; 9/16 in. lg by 1-1/4 in. wide by 1-5/16 in. high; mounts by 3/8-32 thread by 5/16 in. lg bushing; also supplied w/two 3/8-32 thread nuts 9/16 in. across flats and two 3/8 in. internal tooth lockwashers; flatted type shaft, 3/8 in. lg by 1/4 in. dia; solder lug terminals; Oak Mfg Co. Type FC; RCA part/dwg B-474184-1	"Receiver 1 Diversity Tune" Switch
S-802		Same as S-801	"Receiver 2 Diversity Tune" Switch
S-803		SWITCH, ROTARY: single section; 3 switching positions possible; non-pile-up type; 2 poles, 3 throws; 125 v AC, 60 cycles, 3 amp; spring brass contacts; silver plated contact finish; ceramic section; 9/16 in. lg by 1-1/4 in. wide by 1-5/16 in. high; mounts by 3/8-32 thread by 5/16 in. lg bushing; also supplied w/two 3/8-32 thread nuts 9/16 in. across flats and two 3/8 in. internal tooth lockwashers; flatted type shaft, 3/8 in. lg by 1/4 in. dia; solder lug terminals; Oak Mfg Co. Type FC; RCA part/dwg B-474183-1	"AGC Time Constant" Switch
S-804		SWITCH, ROTARY: 3 sections; 4 switching positions possible; non-pile-up type; 6 poles, 4 throws; 125 v AC, 60 cycles, 3 amp; spring brass contacts; silver plate contact finish; ceramic section; 1-5/16 in. lg by 1-1/4 in. wide by 1-5/16 in. high; mounts by 3/8-32 thread by 5/16 in. lg bushing; supplied w/two 3/8-32 thread nuts 9/16 in. across flats and two 3/8 in. internal tooth washers; flatted type shaft, 3/8 in. lg by 1/4 in. dia; solder lug type terminals; Oak Mfg Co. Type FC; RCA part/dwg B-474182-1	"Reception" Switch
S-805 thru S-1000		Not Used	
S-1001	N17-S-91897-8968	SWITCH, ROTARY: single section; 6 positions; non-pile-up type; 3 poles, 6 throws; 500 v peak, 2 amps; silver contacts; ceramic body; 1/2 in. lg by 1-7/16 in. high by 1 in. wide; mounts by two 0.086 in. mounting holes on a 1.187 in. mounting center; accommodates square shaft, 0.127 in. sq; screw terminal on rotor, solder lug terminal on stator; detent action; shorting type contacts; RCA part/dwg C-743426-2	Switches Inputs, Z-1001, Z-1002

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
S-1002		Same as S-1001	Switches Inputs, Z-1001, Z-1002
S-1003		Same as S-1001	Switches Output Circuits of Second IF Units
S-1004 thru S-1100		Not Used	
S-1101	N17-S-63719-3559	SWITCH, ROTARY: 2 sections; 5 poles, 18 positions; 2 amps, 500 v peak; brass, silver plated contacts; ceramic wafers; 1-47/64 in. lg by 1-21/32 in. high by 1-9/32 in. wide incl shaft; used w/external detent; solder lug terminals; one no. 4-40 self-clinching nut on ea side of bracket for mounting; shaft incl crank type coupling w/1-1/8 in. throw; Communications Products Type no. 55; RCA part/dwg C-748215-501	Diode Selection Audio Unit
S-1101A		P/o S-1101	
S-1101B		P/o S-1101	
S-1102 thru S-1300		Not Used	
S-1301	N17-S-91897-8969	SWITCH SECTION, ROTARY: single section; 2 poles, 9 positions; 18 silver contacts; 2 amps, 500 v peak; ceramic body; 1-7/16 in. lg by 1 in. wide by 1/2 in. high overall; detent action; screw type terminal on rotor, solder lug terminal on stator; two 0.086 in. dia mounting holes on 1.187 in. mounting center; 0.127 in. sq shaft hole centrally located in rotor; RCA part/dwg C-743426-3	Circuit Selection, BFO Unit
S-1302 thru S-1500		Not Used	
S-1501	N17-S-72828-2605	SWITCH, TOGGLE: JAN Type ST52K; DPST; 0.75 amp, 125 v; phenolic body; 1-21/64 in. lg by 3/4 in. wide by 49/64 in. deep, less terminals, barriers, bushings and handle; actuating bat type handle, 11/16 in. lg excluding length of bushing; locking action w/0.075 in. keyway in cover guard for positioning handle; 4 solder lug type terminals located on back; single hole mounted by 15/32-32 thread by 15/32 in. lg bushing; metal parts visible from front of panel incl external mounting nut to have dull non-glare, black nickel finish; exposed parts of solder lug terminals to be hot tin dipped; the direction of movement of the switch mechanism is opposite to that of the lever; RCA part/dwg B-433007-101	"Power" Switch
S-1502	N17-S-70777-8601	SWITCH, TOGGLE: JAN Type ST13A; SPST; 5 amps AC or DC, 125 v AC or DC; phenolic body; 1-9/32 in. lg by 23/32 in. wide by 31/32 in. deep less terminals, barriers, bushing and handle; actuating bat type handle, 11/16 in. lg excluding length of bushing; locking action w/0.075 in. dia keyway for positioning handle; 2 solder lug type terminals located on back; single hole mounted by 15/32 in. dia bushing 32 threads per in., 1/4 in. lg from mounting surface; metal parts visible from front of panel to have dull, non-glare, black nickel finish; luminous handle; RCA part/dwg B-426780-107	"Cal Key" Switch
S-1503 thru S-1900		Not Used	
S-1901		SWITCH, TOGGLE: double pole, single throw; 20 amp, 250 v DC; porcelain case; dim., excluding terminals, barriers, bushing and handle, 2.5 in. lg by 1.218 in. wide by 1.125 in. deep; actuating bat type handle, 1/4 in. lg; locking action; 3 screw type terminations, located 1 on top and 1 on bottom of the surface of the switch; flush mounting; 2 mounting holes spaced 3.281 in. C to C; bakelite handle; Harvey Hubbel, Inc. Catalog no. 8942	Main Power Switch
S-1902		SWITCH, TOGGLE: JAN Type ST52K (modified); double-pole, single-throw; 25 amp, 125 v AC; phenolic case; dim., excluding barriers, bushings and handle, 1-1/6 in. lg by 49/64 in. wide by 1-21/64 in. high; actuating bat type handle, 11/16 in. lg; locking action w/0.075 in. by 0.40 in. keyway in bushing; 4 solder lug type terminals, located on back; single hole mounting; 15/32 in. dia bushing, 32 threads per in., 15/32 in. lg from mounting surface; luminous handle; supplied w/two hex mounting nuts 9/16 in. across flats, 3/32 in. thick; the movement of the switch mechanism is opposite to that of the lever; has a dull, non-glare, black nickel finish; spec JAN-S-23; RCA part/dwg B-433007-1	Portable Lamp Switch

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
S-1903 thru S-2200		Not Used	
S-2201		Same as S-101	Main Power Switch
S-2202	N17-S-72018-7719	SWITCH, TOGGLE: JAN Type ST12D; SPDT; resistive load: 5 amps, 125 v AC or DC, 2 amps, 250 v AC or DC; inductive load: 3 amps, 125 v AC or DC, 1.5 amps, 250 v AC or DC; phenolic body; 1-9/32 in. lg by 23/32 in. wide by 23/32 in. deep less terminals, barriers, bushings, and handle; actuating bat type handle, 11/16 in. lg excluding length of bushing; locking action w/15/32 in. dia hole in cover guard for positioning handle; 3 solder lug type terminals located on back; single hole mounted by 15/32 in. dia bushing 32 thread per in., 15/32 in. lg from mounting surface; luminous handle; RCA part/dwg B-426780-104	Turns Calibration ON/OFF
S-2203		Not Used	
S-2204	N17-S-59672-7885	SWITCH, ROTARY: single section; 2 positions, max number of switching positions possible; non-pile-up type; 1 pole, 2 throws; no. 1 position momentary; spring silver alloy contacts on stator; solid silver contacts on rotor; laminated phenolic body; 7/8 in. lg by 1-1/4 in. dia; mounts by 3/8-32 thread by 3/8 in. lg mounting bushing; round shaft, 23/32 in. lg by 1/4 in. dia; solder lug type terminals; ambient temp range -54 deg C to +85 deg C; marked w/RCA part/dwg no.; shorting type contacts; Oak Mfg Co. Type no. F; RCA part/dwg M-458161-1	Controls Range of M-2201
S-2205	N17-S-60080-3251	SWITCH, ROTARY: single section; 4 positions, max number of switching positions possible; non-pile-up type; 1 pole, 4 throws; position no. 1 is momentary; spring silver alloy contacts on stator; solid silver contacts on rotor; stainless steel or nickel plated brass body, phenolic wafer; 7/8 in. lg by 1-1/4 in. dia; mounts by single hole, 3/8-32 thread by 3/8 in. lg mounting bushing; round type shaft, 23/32 in. lg by 1/4 in. dia; solder lug type terminals; ambient operating temp range -45 deg C to +85 deg C; marked w/RCA part/dwg no.; shorting type contacts; Oak Mfg Co. Type no. F; RCA part/dwg M-458170-1	Controls Range of M-2202
S-2206		SWITCH, ROTARY: single section; 8 positions, max number of switching positions possible; non-pile-up type; 2 poles, 2 throws; spring brass contacts on stator, hard brass on rotor; silver plated; laminated plastic wafer; 1-3/8 in. lg by 1-9/16 in. wide by 1-7/8 in. high; mounts by 3/8-32 thread by 3/8 in. lg mounting bushing; flatted type shaft, 3/4 in. lg by 1/4 in. dia; solder lug type terminals; shorting type contacts; no detents, no stops; Oak Mfg Co. Part no. 59706-AH1; RCA part/dwg B-471398-1	Switches B+ to Local Oscillator
S-2207		SWITCH, RADIO FREQUENCY TRANSMISSION LINE: 2 coupling positions; 50 ohms characteristic impedance; AC operating power; 24 v DC max, 32 mc, 50 W, single phase; brass silver plated case; 2-3/32 in. lg by 1-11/16 in. wide by 1-1/8 in. high overall; mounts by two no. 6-32 tapped holes spaced 0.875 in. C to C; has 70 db attenuation at 32 mc when switch is in open position; switch has a 45 deg throw; has positive detent mechanism, provided w/positive stops; operating torque to be 25 in. oz; Industrial Products Co. Dwg no. 1PC CS400; RCA part/dwg B-471399-1	Turns External Oscillator Input Signal On/Off
S-2208		SWITCH, ROTARY: 2 sections; 2 positions, max no. switching positions possible; non-pile-up type contacts; 2 poles, 2 throws; 110 v AC, 60 cycles, 1 amp; brass, silver plate contacts; melamine case; 1-25/64 in. lg by 1 in. dia, excluding protruding terminals; mounts by 1/4 in. lg, 3/8-32 thread bushing; supplied w/one 3/8 in. -32 hex mounting nut 3/32 in. thick by 9/16 in. across flats; flatted type shaft, 5/8 in. lg by 1/4 in. dia; solder lug type terminals; has split bushing to prevent turning located at 3 o'clock, supplied w/ non-turn washer; -55 deg C to +85 deg C operating ambient temp range; exposed metal parts to withstant 100-hr salt spray test; has internal stop provided to limit rotation to range of terminals required; Grayhill, 24 series Type 24YY2032-2; RCA part/dwg B-459699-1	AGC On/Off Switch
S-2208A		P/o S-2208	
S-2208B		P/o S-2208	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
S-2209 thru S-3100		Not Used	
S-3101	N17-S-65233-6617	SWITCH, ROTARY: 2 sections; 6 positions; non-pile-up type; 6 poles, 6 throws; 500 v peak, 2 amps; silver contacts; ceramic body; 1.5109 in. lg by 1 in. wide by 1-29/64 in. high; mounts by two no. 6-32 in. tapped holes on a 0.468 in. mounting center located in integral mounting bracket; round shaft w/0.925 in. dia by 3/16 in. lg crank type termination; crank has 5/16 in. swing; 0.395 in. lg by 1/2 in. dia; screw terminals on rotor; solder lug terminals on stator; has detent action; both sections have black dot at 45 deg and red dot at 225 deg; shorting type contacts; RCA part/dwg C-743448-1	Band Switch, for Antenna Tuning Unit
S-3101A		P/o S-3101	
S-3101B		P/o S-3101	
S-3102 thru S-3134		Not Used	
S-3135	N17-S-62311-2701	SWITCH, ROTARY: single section; 6 positions; non-pile-up type; 3 poles, 6 throws; 500 v peak, 2 amps; silver contacts; ceramic body; 0.9491 in. lg by 1 in. wide by 1-29/64 in. high; mounts by two no. 6-32 in. tapped holes on a 0.468 in. mounting center located in integral bracket; round shaft w/0.925 in. dia by 3/16 in. lg crank type termination; crank has 5/16 in. swing; 0.3906 in. lg by 1/2 in. dia; screw terminals on rotor, solder lug terminals on stator; has detent action; has black dot at 45 deg and red dot at 225 deg; shorting type contacts; RCA part/dwg C-743448-2	Band Switch for RF Unit Coils
S-3136		Same as S-3101	Band Switch for RF Unit Coils
S-3136A		P/o S-3136	
S-3136B		P/o S-3136	
S-3137 thru S-3800		Not Used	
S-3801	N17-S-69085-2701	SWITCH, SENSITIVE: SPDT: 10 amp, 115 v; plastic case; 1-3/32 in. lg by 5/8 in. wide by 13/32 in. high overall; plunger actuated; 11/64 in. lg by 7/64 in. wide by 7/64 in. high plunger; 6 to 14 oz operating pressure; 0.006 in. to 0.016 in. movement differential; 3/64 in. max pre-travel; 1/32 in. min over-travel; momentary; solder lug terminal, hot solder dipped; one 0.114 in. dia mounting hole and one 0.126 in. lg by 0.114 in. wide mounting hole on 0.875 in. by 0.406 in. mounting center; flat bosses around mounting holes for stack mounting; Micro Switch Type V3-1; RCA part/dwg K-8871821-2	Shifts "Normal/Spare" Lamp Connections
S-3802 thru S-4400		Not Used	
S-4401	N17-S-65233-6567	SWITCH, ROTARY: 2 sections; 6 positions; non-pile-up type; 6 poles, 6 throws; 500 v peak, 2 amps; silver contacts; ceramic body; 1.5109 in. lg by 1 in. wide by 1-29/64 in. high; mounts by two no. 6-32 in. tapped holes on a 0.468 in. mounting center located in integral mounting bracket; round shaft w/0.925 in. dia by 3/16 in. lg crank type termination; crank has 5/16 in. swing; 0.395 in. lg by 1/2 in. dia; screw terminals on rotor; solder lug terminals on stator; has detent action; has red dot at 45 deg and black dot at 225 deg; has shorting contacts; RCA part/dwg C-743448-3	Band Switch for Oscillator Unit Coils
S-4401A		P/o S-4401	
S-4401B		P/o S-4401	
T-101		TRANSFORMER, FILAMENT AND POWER: primary, 110/220 v, 50/60 cps; secondary no. 1, 5 v, 3 amps; secondary no. 2, 350-0-350 v, 125 ma; secondary no. 3, 6.3 v, 4.0 amps; hermetically sealed case; Technical Materiel Corp. Part no. TP004	Main Power Transformer

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
T-102		TRANSFORMER, POWER DISTRIBUTION: 4-1/4 in. lg by 4-3/8 in. wide by 5-7/8 in. high; hermetically sealed metal case; Technical Materiel Corp. Part no. TF-105	Main Power Transformer
T-103 thru T-400		Not Used	
T-401		TRANSFORMER, POWER, STEP-UP: hermetically sealed metal case; input: 105 v, 115 v, 125 v AC, 50/60 cycles per second, single phase; 2 output windings; no. 1 secondary 250 v, no. 2 secondary 330 v, no. 1 secondary 25 ma DC, no. 2 secondary 90 ma DC; primary has two taps, no. 1 and no. 2 secondary center tapped; impregnated; 3-3/4 in. lg by 3 in. OD by 3 in. sq mounting flange; 10 solder lug type terminals located on 1-13/16 in. dia on top of case; four 0.177 in. dia holes on a 2-3/8 in. sq mounting center; electrostatic shield between primary and secondary; temp rise at rated loads shall not exceed 35 deg C; operating temp range -54 deg C to +65 deg C; marked w/vendor's name and part no., standard Navy stock number; RCA part/dwg B-474153-1	Supplies Plate Voltages
T-402		TRANSFORMER, POWER, STEP-DOWN: hermetically sealed metal case; input: 115 v, 125 v, 105 v AC, 50/60 cycles per second, single phase; 2 output windings; no. 1 secondary, 6.3 v rms, no. 2 secondary, 6.3 v rms, no. 1 secondary, 1.2 amp, no. 2 secondary, 5 amp; primary has two taps; impregnated; 3-3/4 in. lg by 3 in. OD by 3 in. sq mounting flange; 8 solder lug type terminals located on top, set on 1-5/8 in. dia; mounts by four 0.177 in. dia mounting holes on a 2-3/8 in. sq mounting center; electrostatic shield between primary and secondary; temp rise at rated loads shall not exceed 35 deg C; operating temp range -54 deg C to +65 deg C; marked w/vendor's name and part no., standard Navy stock no.; RCA part/dwg B-474154-1	Supplies Heater Voltages
T-403 thru T-550		Not Used	
T-551	N17-T-82300-1979	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, single layer, flat, rh in groove winding; inductance of windings: primary, 2840 microhenries at 3.0 mc; secondary, 24.0 microhenries at 3.0 mc; primary, 328 turns of no. 38 wire; secondary 45-1/6 turns of no. 30 wire; DC resistance: primary, 28.2 ohms; secondary, 0.6 ohms; 2 mc to 4 mc frequency range; untapped; unshielded; 2-7/32 in. lg by 0.750 in. dia; steatite coil form, powdered iron core; coil form, 1-3/8 in. lg by 0.455 in. dia overall; adjustable iron core; screwdriver adjustment through top of case; mounts by a single 3/8 in. -32 thread by 9/32 in. lg mounting bushing; 5 post type terminals (1 dummy) located at bottom; marked w/RCA part/dwg no., standard Navy stock no., and 3 mc nominal operating frequency; metal parts to withstand 48-hr salt spray test; RCA part/dwg C-746108-1	Mixer Transformer, Band 1
T-552	N17-T-82282-2701	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, single layer, flat, rh in groove winding; inductance of windings: primary, 300 microhenries at 6 mc; secondary, 5.45 microhenries at 6 mc; primary, 96-1/2 turns of 3 strand no. 32 AWG wire; secondary, 20-1/6 turns of no. 30 AWG wire; DC resistance: primary, 8.77 ohms; secondary, 0.3 ohm; 4 mc to 8 mc frequency range; untapped; unshielded; 2-7/32 in. lg by 0.750 in. dia; steatite coil form, powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. dia; adjustable iron core; screwdriver adjustment through top of case; mounts by single 3/8 in -32 thread by 1/32 in. lg mounting bushing; 5 post type terminals (1 dummy) located at bottom; marked w/RCA part/dwg no., standard Navy stock no., and 6 mc nominal operating frequency; RCA part/dwg C-746108-2	Mixer Transformer, Band 2

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
T-553	N17-T-82269-9061	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, single layer, flat, rh in groove winding; inductance of windings: primary, 51 microhenries at 12 mc; secondary, 1.29 microhenries at 12 mc; primary, 140 turns of no. 38 AWG wire; secondary, 45-1/6 turns of no. 30 AWG wire; DC resistance; primary, 3.31 ohms, secondary, 0.04 ohm; 8 mc to 16 mc frequency range; untapped; unshielded; 2-7/32 in. lg by 0.750 in. dia; steatite form, powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. dia; adjustable iron core; screwdriver adjustment through top of case; mounts by single 3/8 in. -32 thread by 9/32 in. mounting bushing; 5 post type terminals (1 dummy) located at bottom; marked w/RCA part/dwg no., standard Navy stock no., and 12 mc nominal operating frequency; RCA part/dwg C-746108-3	Mixer Transformer, Band 3
T-554	N17-T-82267-5237	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single layer, flat, rh close wound; secondary, single layer, flat, rh in groove winding; inductance of windings: primary, 8 microhenries at 20 mc; secondary, 0.434 microhenry at 20 mc; primary, 15-1/2 turns of no. 34 AWG wire; secondary, 6-1/6 turns of 0.015 by 0.045 rectangular copper wire; DC resistance: primary, 0.622 ohm, secondary, 0.016 ohm; 16 mc to 24 mc frequency range; untapped; unshielded; 2-7/32 in. lg by 0.750 in. dia; steatite coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. dia; adjustable iron core; screwdriver adjustment through top of case; mounts by single 3/8 in. -32 thread by 9/32 in. lg mounting bushings; 5 post type terminals (1 dummy) located at bottom; marked w/RCA part/dwg no., standard Navy stock no., and 20 mc nominal operating frequency; coil sealed in phenolic case; RCA part/dwg C-746108-4	Mixer Transformer, Band 4
T-555	N17-T-82266-8723	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single layer, flat, rh wound; secondary, flat rh in groove; inductance: primary, 2.2 microhenries at 28 mc; secondary, 0.32 microhenry at 28 mc; primary, 7-2/3 turns no. 34 AWG copper wire; secondary, 4-1/2 turns of 0.015 in. by 0.045 in. copper wire; DC resistance: primary, 0.313 ohm; secondary, 0.013 ohm; 28 mc peak frequency; untapped; unshielded; 1-27/32 in. lg by 0.750 in. dia excluding adjustment screw; steatite coil form, powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. dia; adjustable iron core; screwdriver adjustment through top of case; mounts by 3/8 in. -32 thread by 9/32 in. lg bushing on one end; 5 stud type terminals located on bottom of case; marked w/RCA part/dwg no., standard Navy stock no., and nominal center frequency; metal parts to withstand 48-hr salt spray test; temp range, -54 deg C to +85 deg C; RCA part/dwg C-746108-5	Mixer Transformer, Band 5
T-556 thru T-600		Not Used	
T-601		TRANSFORMER, AUDIO FREQUENCY: plate coupling type; impedance: primary, 1600 ohms; secondary, 40,000 ohms, center tapped 18,000 ohms; primary rated 0 amp DC, secondary rated 0 amp DC; primary voltage 0 v DC; primary signal voltage, 2 v rms max; secondary voltage, 105 v DC, secondary signal voltage, 10 v rms max; upright metal case; iron core; 1-13/32 in. lg by 1-25/64 in. wide by 57/64 in. high overall; 1 to 5 ratio of turns primary to secondary; ±1 db from 500 to 2000 cycles per second frequency response; 5 solder lug type terminals located on top of case; mounts by two 0.120 in. dia holes spaced 1-1/8 in. C to C; 1% or less allowable distortion when operating at rated frequency response; 80% or better efficient when operating at rated frequency response; operating temp range -54 deg C to +64 deg C; temp rise at rated loads shall not exceed 35 deg C; impregnated; not shielded; RCA part/dwg B-474157-1	Input Coupling Transformer, V-603
T-602		TRANSFORMER, AUDIO FREQUENCY: plate coupling type; impedance: primary, 100,000 ohms; secondary, 600 ohms; primary center tapped; impedance 25,000 ohms; primary, 6 ma DC max in ea half; secondary, 0 amp DC; primary voltage, 250 v DC max; primary signal voltage, 2 v rms max; secondary, 0 v DC; upright metal case; iron core; 13/32 in. lg by 1-25/64 in. wide by 57/64 in. high overall; 12.9 to 1 ratio of turns, primary to secondary; 1 db from 500 to 2000 cycles per second frequency response; 5 solder lug type terminals located on top of case; mounts by two 0.120 in. dia holes spaced 1-1/8 in. C to C; 1% or less distortion when operating at rated frequency response; 80% or better efficient when operating at rated frequency response; operating temp range -54 deg C to +65 deg C; temp rise at rated loads shall not exceed 35 deg C; marked w/vendor's name and part no., standard Navy stock no., RCA part/dwg no.; impregnated, not shielded; RCA part/dwg B-474156-1	Output Coupling Transformer, V-603

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
T-603 thru T-700		Not Used	
T-701		TRANSFORMER, AUDIO FREQUENCY: input type; impedance: primary, 600 ohms; secondary, 4000 ohms; primary, 0 amp DC; secondary, 0 amp DC; primary signal voltage: 1 v rms normal, 8 v rms max; secondary signal voltage: 2.5 v rms normal, 12.5 v rms max; upright metal case; iron core; 1-13/32 in. lg by 1-25/64 in. wide by 57/64 in. high overall; 1 to 2.59 ratio of turns, primary to secondary; 1 db from 200 to 8000 cycles per second frequency response; 4 solder lug type terminals located on top of case; mounts by two 0.120 in. dia mounting holes spaced 1-1/8 in. C to C; 80% efficiency or better throughout operating conditions for frequency response; operating temp range -54 deg C to +65 deg C; temp rise at rated loads shall not exceed 35 deg C; 1% allowable distortion or less throughout operating conditions for frequency response; marked w/vendor's name and part no., standard Navy stock no., RCA part/dwg no.; impregnated; not shielded; RCA part/dwg B-474155-1	Input Coupling Transformer, V-703
T-702		TRANSFORMER, AUDIO FREQUENCY: plate coupling type; impedance: primary, 4100 ohms at 1000 cycles per second; secondary, 350 ohms resistive (includes tertiary); tertiary center tapped, 50 ohms impedance; primary, 0.030 amp DC; secondary and tertiary, 0 amp DC; 1000 v test voltage (360 v DC working voltage); upright metal case; iron core; 1-3/8 in. lg by 1-3/8 in. wide by 1-5/8 in. high overall; 1.5 W max audio operating level; 3-1/2 to 1 ratio of turns primary to secondary; 200 to 8000 cycles per second frequency range, not tuned; 7 solder lug type terminals located on top; four 0.1285 in. dia mounting holes on a 1-1/8 in. sq mounting center; marked w/vendor's name and part no. and RCA part/dwg no.; temp rise at rated loads shall not exceed 35 deg C; secondary and tertiary windings are electrostatically shielded; RCA part/dwg C-752554-1	Output Coupling Transformer, V-704
T-703 thru T-800		Not Used	
T-801		Same as T-702	Output Coupling Transformer, V-805
T-802 thru T-900		Not Used	
T-901	N17-T-67517-4424	TRANSFORMER, RADIO FREQUENCY: 2 random wound windings; inductance: primary, 2.18 mh at 200 kc ±8%; mutual, 0.173 mh at 200 kc ±10%; primary, 300-1/2 turns no. 38 AWG copper wire; secondary, 22-1/2 turns no. 38 AWG copper wire; DC resistance: primary, 12.7 ohms; secondary, 1.35 ohms; tuned 200 kc peak; untapped; cylindrical shielded can; aluminum alloy, satin finish; 0.601 in. lg by 0.572 in. dia less terminals, mounting attachments, and tuning devices; ceramic coil form; powdered iron core; overall coil form, 0.275 in. lg by 0.219 in. dia; adjustable iron core; screwdriver adjustment through end of shield can; single mounting bushing at end 1/4-32 thread, 3/8 in. lg; 4 stud type terminals on end of shield can; mark terminals "A" "B" "C" "D" on side of can; mark w/ symbol, RCA part/dwg no., standard Navy stock no.; sealed in container to withstand 48-hr salt spray test; to operate -54 deg C to +85 deg C, 120 v DC to ground nominal, 120 v between windings; RCA part/dwg C-746104-25	Output Transformer for First IF Unit
T-902 thru T-1012		Not Used	
T-1013	N17-T-67517-4469	TRANSFORMER, RADIO FREQUENCY: 2 random wound windings; inductance: primary, 1.55 mh at 200 kc ±8%; mutual, 0.092 mh at 200 kc ±10%; primary, 254-1/2 turns no. 38 AWG copper wire; secondary, 15-1/2 turns no. 38 AWG copper wire; DC resistance: primary, 10.4 ohms; secondary, 0.9 ohm; tuned 200 kc peak; untapped; cylindrical shielded can; aluminum alloy, satin finish; 0.601 in. lg by 0.572 in. dia less terminals, mounting attachments, and tuning devices; ceramic coil form; powdered iron core; overall coil form, 0.275 in. lg by 0.219 in. dia; adjustable iron core; screwdriver adjustment through end of shield can; single mounting bushing at end 1/4-32 thread, 3/8 in. lg; 4 stud type terminals on end of shield can; mark terminals "A" "B" "C" on side of can; mark w/symbol, RCA part/dwg no., standard Navy stock no.; sealed in container to withstand 48-hr salt spray test; to operate -54 deg C to +85 deg C, 50 v DC to ground nominal, 170 v between windings; RCA part/dwg C-746104-29; p/o Z-1011	Element of Z-1011

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
T-1014	N16-C-99999-0055	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, random wound between pies of secondary; secondary, 2 pie universal windings; inductance: secondary, 0.27 millihenry at 200 kc; primary, 28 turns of no. 38 AWG copper wire; secondary, 140 turns of 3 strand no. 44 copper wire; DC resistance: primary, 1.7 ohms, secondary, 1.13 ohms; 200 kc peak frequency; untapped; shielded, cylindrical can; aluminum, corrosion resistant coating; 1.357 in. lg by 0.720 in. dia less terminals, and mounting bushing; powdered iron coil form; powdered iron core; overall coil form, primary and secondary on same form, 0.750 in. lg by 0.596 in. OD by 0.471 in. ID; adjustable iron core; screwdriver adjustment through top of can; mounts by 3/8-32 thread by 0.401 in. lg mounting bushing; 6 post type terminals (2 dummies) at bottom of can; marked w/RCA part/dwg no., standard Navy stock no., and 200 kc nominal operating frequency; RCA part/dwg C-746106-16; p/o Z-1009	Tuning Indicator Circuit Transformer
T-1015	N17-T-67517-4374	TRANSFORMER, RADIO FREQUENCY: 2 random wound windings; inductance: primary, 2.24 mh at 200 kc ±8%; mutual, 0.175 mh at 200 kc ±10%; primary, 305-1/2 turns no. 38 AWG copper wire; secondary, 22-1/2 turns no. 38 AWG copper wire; DC resistance: primary, 12.6 ohms, secondary, 1.35 ohms; tuned 200 kc peak; untapped; cylindrical shielded can; aluminum alloy, satin finish; 0.601 in. lg by 0.572 in. dia less terminals, mounting attachments, and tuning devices; ceramic coil form; powdered iron core; overall coil form, 0.275 in. lg by 0.219 in. dia; adjustable iron core; screwdriver adjustment through end of shield can; single mounting bushing at end 1/4-32 thread, 3/8 in. lg; 4 stud type terminals on end of shield can; mark terminals "A" "B" "C" "D" on side of can; mark w/symbol, RCA part/dwg no., standard Navy stock no.; sealed in container, to withstand 48-hr salt spray test; to operate -54 deg C to +85 deg C, 120 v DC to ground nominal, 170 v between windings; RCA part/dwg C-746104-30; p/o Z-1017	Element of Z-1017
T-1016		Same as T-1015; p/o Z-1018	Element of Z-1018
T-1017 thru T-1100		Not Used	
T-1101	N17-T-64402-5501	TRANSFORMER, AUDIO FREQUENCY: plate coupling type; impedance: primary, 4100 ohms; secondary no. 1, 150 ohms; secondary no. 2, 200 ohms, center tapped; primary rated 20 ma DC; upright metal case; 1-3/32 in. lg by 1-1/32 in. wide by 2 in. high less terminals and studs; 0.5 W max audio operating level; 5.25 to 1 ratio of turns, primary to secondary, 4.5 to 1 ratio of turns, primary to tertiary; 2000 to 8000 cycles per second frequency response; not tuned; 7 solder lug type terminals located on bottom; four no. 6-32 by 9/32 in. lg mounting studs on 3/4 in. by 3/4 in. mounting centers; secondary and tertiary windings are electrostatically shielded; RCA part/dwg A-8842479-1	Couples V-1109 to Audio Output Circuits
T-1102 thru T-1600		Not Used	
T-1601	N17-T-73701-5366	TRANSFORMER, POWER, STEP-UP AND STEP-DOWN: hermetically sealed metal case; input: 103/113/123 v AC, 60 and 400 cycles, single phase; 3 output windings: no. 1 secondary 490 v, no. 2 secondary 5.3 v, no. 3 secondary 20.8 v, no. 1 secondary 119 ma, no. 2 secondary 27 ma, no. 3 secondary 6.05 amp, no. 1 secondary center tapped, no. 3 secondary tapped at 6.4 v at 900 ma which is a center tap for two other taps supplying 6.4 v at 5.0 amps; 1500 v insulation; 3-17/32 in. lg by 3-1/32 in. wide by 4-13/16 in. high; 14 solder lug standoff type terminals, 9/16 in. high located on bottom; four no. 8-32 by 7/16 in. lg mounting studs on 2-1/4 in. by 2-1/2 in. mounting centers; electrostatic shield between primary and secondary windings; designed for extensive arctic and tropical use; continuous operation; ambient temp range -55 deg C to +75 deg C; shock and vibration resistant; moisture and salt water resistant; RCA part/dwg K-8889252-1	Supplies Plate and Heater Voltages
T-6102 thru T-1700		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
T-1701		TRANSFORMER, AUDIO FREQUENCY: line type; impedance: primary, 600 ohms; secondary, 6 ohms; secondary rated 0 amp DC; 500 v rms test voltage; upright metal case; iron core; 2-1/2 in. lg by 1-13/16 in. wide by 1-13/16 in. deep overall; 5 W max audio operating level; 10 to 1 ratio of turns primary to secondary; 200 to 5000 cycles per second; 4 solder lug type terminals located on top; four 0.144 in. dia mounting holes on a 1-1/2 in. sq mounting center; operating temp range -54 deg C to +65 deg C; marked w/vendor's name and part no., standard Navy stock no., RCA part/dwg no.; impregnated, not shielded; RCA part/dwg B-474159-1	Speaker - Output Transformer
T-1702 thru T-3100		Not Used	
T-3101	N17-T-81327-1480	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, 3 pie; inductance of windings w/ frequency measurement: primary, 49.2 microhenries at 1/2 mc; secondary, 22.5 microhenries at 2 mc, primary shorted; primary, 87-1/3 turns single glass silicone insulated 0.004 in. bare dia; secondary, 36 turns, 10 strands 0.002 in. bare dia nylon insulated Litz; DC resistance: primary, 3.83 ohms, secondary, 1.35 ohms; 2 to 4 mc frequency range; primary tapped at 39-1/6 turns; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/ RCA part/dwg no.; hermetically sealed in bakelite container w/ cadmium plated brass head assembly; to withstand salt spray test; RCA part/dwg C-748768-1	Antenna Transformer, Band 1
T-3102	N17-T-81950-1922	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, 1 pie; inductance of windings w/ frequency measurement: primary, 14.7 microhenries at 200 kc; secondary, 5.2 microhenries at 4 mc, primary shorted; primary, 73 turns single glass silicone insulated 0.004 in. bare dia; secondary, 21-1/2 turns tinned copper wire 0.010 in. bare dia; DC resistance: primary, 2.32 ohms, secondary, 0.27 ohm; 4 to 8 mc frequency range; primary tapped at 29 turns; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form, powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove thread on coil form; RCA part/dwg C-748768-2	Antenna Transformer, Band 2
T-3103	N17-T-81791-1609	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, 1 pie; inductance of windings w/ frequency measurement: primary, 15.6 microhenries at 2 mc; secondary, 1.24 microhenries at 8 mc, primary shorted; primary, 36 turns single glass silicone insulated 0.004 in. bare dia; secondary, 9-1/2 turns tinned copper wire 0.010 in. bare dia; DC resistance: primary, 2.20 ohms, secondary, 0.038 ohm; 8 to 16 mc frequency range; primary tapped at 16-1/6 turns; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove thread on coil form; RCA part/dwg C-748768-3	Antenna Transformer, Band 3

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
T-3104	N17-T-82045-9861	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie flat close wound; secondary, 1 layer; inductance of windings w/ frequency measurement: primary, 5.87 microhenries at 3.5 mc; secondary, 0.533 microhenries at 16 mc, primary open; primary, 21-1/2 turns, single glass silicone insulated 0.01 in. bare dia; secondary, 6-1/2 turns tinned copper strip 0.015 in. by 0.045 in.; DC resistance: primary, 0.221 ohm, secondary, 0.016 ohm; 16 to 24 mc frequency range; untapped; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals (1 dummy) located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove threads on coil form; RCA part/dwg C-748768-4	Antenna Transformer, Band 4
T-3105	N17-T-82174-7749	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie flat close wound; secondary, 1 layer; inductance of windings w/ frequency measurement: primary, 5.5 microhenries at 4 mc; secondary, 0.40 microhenry at 24 mc, primary open; primary, 9-2/3 turns single glass silicone insulated 0.01 in. bare dia; secondary 4-1/6 turns tinned copper strip 0.015 in. by 0.045 in.; DC resistance: primary, 0.219 ohm, secondary, 0.013 ohm; 24 to 32 mc frequency range; untapped; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form, powdered iron core; overall dim. of coil form; 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 threaded bushing 9/32 in. lg on head; 5 stud type terminals located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E": mark with RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly, to withstand salt spray test; secondary wound in groove threads on coil form; RCA part/dwg C-748768-5	Antenna Transformer, Band 5
T-3106 thru T-3134		Not Used	
T-3135	N17-T-81883-8472	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, 1 layer; inductance of windings w/ frequency measurement: primary, 2700 microhenries at 0.190 mc; secondary, 21.6 microhenries at 2 mc, primary shorted; primary, 314-1/2 turns 0.004 in. dia formax insulated; secondary, 45-1/6 turns 0.010 in. dia tinned copper wire; DC resistance: primary, 28.7 ohms, secondary, 0.602 ohm; 2 to 4 mc frequency range; untapped; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals, "A" not used, located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove threads on coil form; RCA part/dwg C-748768-6	RF Transformer, Band 1
T-3136	N17-T-81667-9567	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, 1 layer; inductance of windings w/ frequency measurement: primary, 865 microhenries at 0.5 mc; secondary, 5.3 microhenries at 4 mc, primary shorted; primary, 96-1/2 turns 0.0025 in. dia single nylon Litz wire; secondary, 20-1/6 turns 0.010 in. dia tinned copper wire; DC resistance: primary, 16.4 ohms, secondary, 0.266 ohm; 4 to 8 mc frequency range; untapped; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals, "A" not used, located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove threads on coil form; RCA part/dwg C-748768-7	RF Transformer, Band 2

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
T-3137	N17-T-81730-6419	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, single pie universal winding; secondary, 1 layer; inductance of windings w/ frequency measurement: primary, 53.2 microhenries at 1.2 mc; secondary, 1.24 microhenries at 8 mc, primary shorted; primary, 38-1/2 turns 0.0025 in. dia single nylon Litz wire; secondary, 10-1/6 turns 0.010 in. dia tinned copper wire; DC resistance: primary, 3.22 ohms, secondary, 0.038 ohm; 8 to 16 mc frequency range; untapped; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form, powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screw-driver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals, "A" not used, located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove threads on coil form; RCA part/dwg C-748768-8	RF Transformer, Band 3
T-3138	N17-T-81427-5294	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, 1 flat close wound; secondary, 1 flat groove wound; inductance of windings w/frequency measurement: primary, 7.6 microhenries at 3 mc; secondary, 0.43 microhenry at 16 mc, primary open; primary, 15-1/2 turns 0.0063 in. dia enameled nylon insulated; secondary, 6-1/6 turns 0.015 in. by 0.045 in. tinned copper strip; DC resistance: primary, 0.587 ohm, secondary, 0.017 ohm; 16 to 24 mc frequency range; untapped; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screw-driver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals, "A" not used, located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/ dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove threads on coil form; RCA part/dwg C-748768-9	RF Transformer, Band 4
T-3139	N17-T-81810-1546	TRANSFORMER, RADIO FREQUENCY: 2 windings: primary, 1 flat close wound; secondary, 1 flat groove wound; inductance of windings w/frequency measurement: primary, 2.17 microhenries at 6 mc; secondary, 0.27 microhenry at 24 mc, primary open; primary, 7-5/6 turns 0.0063 in. dia enameled nylon insulated; secondary, 4-1/6 turns 0.015 in. by 0.045 in. tinned copper strip; DC resistance: primary, 0.312 ohm, secondary, 0.013 ohm; 24 to 32 mc frequency range; untapped; unshielded; 2-7/32 in. lg overall by 0.750 in. dia; ceramic coil form; powdered iron core; overall coil form, 1-3/8 in. lg by 0.455 in. OD by 0.391 in. ID; adjustable iron core; screwdriver adjustment through core, nut and head assembly on end; mounts by 3/8-32 thread by 9/32 in. lg bushing on head; 5 stud type terminals, "A" not used, located on bakelite end enclosure cap; terminals marked "A", "B", "C", "D", "E"; mark w/RCA part/dwg no.; hermetically sealed in bakelite container w/cadmium plated brass head assembly; to withstand salt spray test; secondary wound in groove threads on coil form; RCA part/dwg C-748768-10	RF Transformer, Band 5
V-101	N16-T-55474	TUBE, ELECTRON: 5V4G; octal; Technical Materiel Corp. Part no. 5V4G	HV Rectifier
V-102	N16-T-52001-3	TUBE, ELECTRON: 0A2; miniature 7 pin; Technical Materiel Corp. Part no. 0A2	Voltage Regulator
V-103	N16-T-75750	TUBE, ELECTRON: 6BE6; miniature 7 pin; Technical Materiel Corp. Part no. 6BE6	Mixer
V-104	N16-T-58241	TUBE, ELECTRON: 12AU7; miniature 9 pin; Technical Materiel Corp. Part no. 12AU7	Audio Amplifier
V-105	N16-T-56214	TUBE, ELECTRON: 6C4; miniature 7 pin; Technical Materiel Corp. Part no. 6C4	BFO
V-106 thru V-200		Not Used	
V-201		Same as V-104	IFO and IFO Amplifier
V-202		Same as V-105	HFO and RF Amplifier

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
V-203	N16-T-76005	TUBE, ELECTRON: 6AQ5; miniature 7 pin; Technical Materiel Corp. part no. 6AQ5	RF Amplifier
V-204		Same as V-203	RF Amplifier-Multiplier
V-205		Same as V-203	8-16 Mc Multiplier
V-206		Same as V-203	16-32 Mc Multiplier
V-207		Same as V-203	32-64 Mc Multiplier
V-208 thru V-300		Not Used	
V-301		Same as V-105	V. M. O.
V-302		Same as V-104	Cathode Follower and 100 Kc Crystal Oscillator
V-303 thru V-400		Not Used	
V-401	N16-T-56840-0050	ELECTRON TUBE: MIL Type 6X4W; ruggedized; dual tube; RMA glass envelope T-5-1/2; 7 pin type terminations located on bottom; miniature full-wave rectifier; RCA Type 6X4W ruggedized	Rectifies Negative-Supply Voltage
V-402		Same as V-401	With V-403, Rectifies Plate-Supply Voltage
V-403		Same as V-401	With V-402, Rectifies Plate-Supply Voltage
V-404	N16-T-76074	ELECTRON TUBE: MIL Type 6074; diode; glass envelope, T-5-1/2; 7 pin type termination located at bottom; voltage regulator	Regulates Negative-Supply Voltage
V-405		Same as V-404	Regulates Positive-Supply Voltage
V-406 thru V-550		Not Used	
V-551	N16-T-75636	ELECTRON TUBE: MIL Type 5636; pentode; glass envelope, T-3; 8 wire type terminations located on bottom; sub-miniature pentode mixer; Sylvania Electric Products Inc. Type 5636; p/o Z-551	Mixer
V-552	N16-T-75718	ELECTRON TUBE: MIL Type 5718; triode; glass envelope, T-3; 8 wire type terminations located on bottom; sub-miniature medium mu triode; Sylvania Electric Products, Inc. Type 5718; p/o Z-551	Mixer
V-553 thru V-600		Not Used	
V-601	N16-T-75814	ELECTRON TUBE: MIL Type 5814; miniature twin triode; RMA glass envelope, T-6-1/2 (6-7); 9 pin type terminations located on bottom; receiving; RCA Type 5814	Tone Oscillator (Both Halfs)
V-602	N16-T-75751	ELECTRON TUBE: MIL Type 5751; twin triode; RMA glass envelope, T-6-1/2; 9 pin type terminations located on bottom; receiving tube	
V-602A		P/o V-602	Cathode Follower Tone Output
V-602B		P/o V-602	Gating Tube
V-603		Same as V-602	Triggers Tone Amplifier (Both Halfs)
V-604 thru V-700		Not Used	
V-701	N16-T-75750	ELECTRON TUBE: MIL Type 5750; pentagrid converter; RMA glass envelope, T-5-1/2; 7 pin type terminations located on bottom; miniature receiving pentagrid converter	Mixer

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
V-702	N16-T-56203-0053	ELECTRON TUBE: MIL Type 6136; pentode; glass envelope T-5-1/2; 7 pin type terminations located on bottom; sharp cutoff pentode; General Electric Type 6136	BFO
V-703		Same as V-601	First AF Amplifier (Both Halfs)
V-704	N16-T-76005	ELECTRON TUBE: MIL Type 6005; tetrode; RMA glass envelope, T-5-1/2; 7 pin type terminations located on bottom; beam power tube; RCA Type 6AQ5W	Final AF Amplifier
V-705 thru V-800		Not Used	
V-801		Same as V-602 (c/o V-801A and V-801B)	
V-801A		P/o V-801	Input Noise Limiter
V-801B		P/o V-801	First AF Amplifier
V-802		Same as V-602 (c/o V-802A and V-802B)	
V-802A		P/o V-802	Silencer Control Amplifier
V-802B		P/o V-802	Silencer Diode
V-803		Same as V-602 (c/o V-803A and V-803B)	
V-803A		P/o V-803	Second AF Amplifier
V-803B		P/o V-803	Limiter Diode
V-804		Same as V-602 (c/o V-804A and V-804B)	
V-804A		P/o V-804	Limiter Diode
V-804B		P/o V-804	Third AF Amplifier
V-805		Same as V-704	Final AF Amplifier
V-806 thru V-900		Not Used	
V-901		Same as V-551; p/o Z-901	Second Converter, First IF Unit
V-902 thru V-1000		Not Used	
V-1001	N16-T-75899	ELECTRON TUBE: MIL Type 5899; pentode; RMA glass envelope, T-3; 8 wire type terminations located on bottom; sub-miniature semi-remote cutoff pentode; Sylvania Electric Products, Inc. Type 5899; p/o Z-1004	First Amplifier, Second IF Unit
V-1002		Same as V-1001; p/o Z-1006	Second Amplifier, Second IF Unit
V-1003		Same as V-1001; p/o Z-1008	Final Amplifier, Second IF Unit
V-1004		Same as V-551; p/o Z-1010	BFO Mixer
V-1005	N16-T-75647	ELECTRON TUBE: MIL Type 5647; single diode; RMA glass envelope, T-3; 8 wire type terminations located on bottom; sub-miniature single diode detector; Sylvania Electric Products, Inc. Type 5647; p/o Z-1012	Detector
V-1006		Same as V-1005; p/o Z-1013	AGC Delay Diode
V-1007		Same as V-552; p/o Z-1014	Cathode Follower Output Amplifier, Frequency Shift IF Output
V-1008 thru V-1100		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
V-1101		Same as V-1005; p/o Z-1101	Audio Noise Limiting
V-1102		Same as V-552; p/o Z-1102	First Audio Amplifier
V-1103		Same as V-1005; p/o Z-1103	Silencer Diode
V-1104	N16-T-75719	ELECTRON TUBE: MIL Type 5719; triode; RMA glass envelope, T-3; 8 wire type terminations located on bottom; sub-miniature high mu triode; Sylvania Electric Products, Inc. Type 5719; p/o Z-1104	Silencer Control Amplifier
V-1105		Same as V-552; p/o Z-1105	Second Audio Amplifier
V-1106		Same as V-1005; p/o Z-1106	Limiter Diode
V-1107		Same as V-1005; p/o Z-1107	Detector
V-1108		Same as V-1104	Third Audio Amplifier
V-1109	N16-T-75902	ELECTRON TUBE: MIL Type 5902; beam power; p/o Z-1109	Final Audio Amplifier
V-1110 thru V-1300		Not Used	
V-1301	N16-T-75840	ELECTRON TUBE: RMA Type 5840; sharp cutoff pentode; RMA metal envelope, T-3; 8 wire type terminations located on bottom; receiving tube; Sylvania Electric Products, Inc. Type 5840; p/o Z-1302	195-205 Kc Oscillator
V-1302 thru V-1600		Not Used	
V-1601		Same as V-401	With V-1602, Rectifies Plate-Supply Voltage
V-1602		Same as V-401	With V-1601, Rectifies Plate-Supply Voltage
V-1603	N16-T-75644	ELECTRON TUBE: MIL Type 5644; diode; glass envelope, T-3; 8 wire type terminations located at bottom; sub-miniature voltage regulator; Sylvania Electric Products, Inc. Type 5644	Regulates Local Oscillator Plate Voltage
V-1604 thru V-3100		Not Used	
V-3101		Same as V-1001; p/o Z-3101	Antenna Amplifier Unit
V-3102 thru V-3134		Not Used	
V-3135		Same as V-1001	RF Amplifier Unit
V-3136 thru V-4400		Not Used	
V-4401		Same as V-552; p/o Z-4401	Local Oscillator
W-101		CABLE, POWER, ELECTRICAL: 6 ft 1 in. lg; Technical Materiel Corp. Part no. CA-102-2	Power Cable, Permanently Secured to Chassis
W-102 thru W-550		Not Used	
W-551	Shop Manufacture	BUS BAR: copper strip, gold over silver plate; rectangular; solid; cross sectional dim., 11/32 in. flange height by 9/16 in. wide by 0.0201 in. thick; 2-9/16 in. lg overall; mounted by 0.120 in. dia hole one end and by insulator clamp other end; when viewed from hole end w/hole at top forms left hand "L"; RCA part/dwg A-8825740-1	Connects E-551 to Circuit Wiring
W-552	Shop Manufacture	BUS BAR: copper, silver plated; rectangular shape; solid; cross sectional dim., 1/2 in. wide by 0.0201 in. thick; 2-5/32 in. lg overall; mounted by standoff insulators and insulator clamps; RCA part/dwg A-8810449-1	Connects E-552 to Circuit Wiring

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS / STANDARD NAVY / AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
W-553 thru W-1900		Not Used	
W-1901		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG wire approx, stranded; 7 strands no. 28 AWG, polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene; tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; c/o 2 connectors, 2 clamps, 1 cable; overall lgth of assembly is 44 in.; audio connecting cable; JAN-C-17A for cable, Type RG-108A/U; MIL-C-5015 for connectors and clamps, Type AN3106A-10SL-4S, Type AN3057-4; RCA part/dwg B-476703-2	Receiver 1 Detector AGC Cable Connecting J-4003 to J-1404
W-1902		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG approx, stranded; 7 strands no. 28 AWG polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; c/o 1 connector, 1 clamp, 1 cable; overall lgth of cable is 42 in.; audio connecting cable; JAN-C-17A for cable; Type RG-108A/U; MIL-C-5015 for connector and clamp, Type no. AN3106A-10SL-4S, Type no. AN3057-4; RCA part/dwg B-476704-3	Receiver 1 Audio Cable Connecting J-4002 to J-1813
W-1903		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG approx, stranded; 7 strands no. 28 AWG polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; c/o 2 connectors, 2 clamps, 1 cable; overall lgth of assembly is 46 in.; power connecting cable; JAN-C-17A for cable; Type RG-108A/U; MIL-C-5015 for connectors and clamps, Type AN3106-A-10SL-4S, Type AN3057-4; RCA part/dwg B-476703-1	Receiver 1 Audio Cable Connecting J-4001 to J-1408
W-1904		CABLE, SPECIAL PURPOSE, ELECTRICAL. JAN Type RG-108A/U; 2 conductors; tinned copper wire no. 13 AWG, stranded; 7 strands no. 28 AWG, polyethylene insulated, gray jacket; materials in sequence from insulated conductors out; tinned copper braid; synthetic resin jacket; 1000 v rms max rated working voltage; round cross section; 0.245 in. dia overall; one end has 1 connector (AN3106A-16S-5S), 1 clamp (AN3057-8), 1 ferrule (Amphenol no. 9769-8); other end has 1 cap, plug (Hubbel no. 7057); power cable; RCA part/dwg B-476700-1	Receiver 1 Power Cable Connecting J-4001 to External Power
W-1905		CABLE, SPECIAL PURPOSE, ELECTRICAL: 1 conductor; tinned soft copper wire, 0.0375 in. dia, stranded; 19 strands no. 33 AWG, polyethylene insulated, white; 1 conductor; tinned copper braid no. 36 AWG; solid; synthetic resin jacket; gray; materials in sequence from insulated conductor out; polyethylene; tinned copper braid; synthetic resin jacket; 1900 v rms max operating voltage; round cross section; 0.195 in. dia max; c/o 1 cable, 2 connectors; 50 ohms impedance; 28.5 mmf/ft nominal capacitance, 13:2 db/100 ft max attenuation at 400 mc; 32 in. lg overall; connects receiver to external oscillator; JAN-C-17A for cable, Type RG-58C/U; MIL-C-3608 for connectors, Type UG-88/U; RCA part/dwg B-476707-4	Receiver 1 External Osc Cable Connecting J-4008 to J-209
W-1906		CABLE, SPECIAL PURPOSE, ELECTRICAL: 1 conductor; tinned soft copper wire, 0.0375 in. dia, stranded; 19 strands no. 33 AWG, polyethylene insulated, white; 1 conductor; tinner copper braid no. 36 AWG; solid; synthetic resin jacket, gray; materials in sequence from insulated conductor out; polyethylene; tinned copper braid; synthetic resin jacket; 1900 v rms max operating voltage; round cross section; 0.195 in. dia max; c/o 1 cable, 2 connectors; 50 ohms impedance; 28.5 mmf/ft nominal capacitance, 13.2 db/100 ft max attenuation at 400 mc; 52 in. lg overall; connects receiver to external oscillator; JAN-C-17A for cable, Type RG-58C/U; MIL-C-3608 for connectors, Type UG-88/U; RCA part/dwg B-476707-1	Receiver 1 IF Cable Connecting J-4005 to J-1402
W-1907		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG approx, stranded; 7 strands no. 28 AWG polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene; tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max c/o 2 connectors, 2 clamps, 1 cable; overall lgth of assembly is 30 in.; power connecting cable; JAN-C-17A for cable, Type RG-108A/U; MIL-C-5015 for connectors and clamps, Type AN3106A-10SL-4S, Type AN3057-4; RCA part/dwg B-476703-3	Receiver 2 Detector AGC Cable Connecting J-4003 to J-1405

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS — SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
W-1908		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG approx, stranded; 7 strands no. 28 AWG, polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene; tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; c/o 1 connector, 1 clamp, 1 cable; overall lgth of cable is 48 in.; audio connecting cable; JAN-C-17A for cable, Type RG-108A/U; MIL-C-5015 for connector and clamp, Type no. AN3106A-10SL-4S, Type no. AN3057-4; RCA part/dwg B-476704-2	Receiver 2 Audio Cable Connecting J-4002 to J-1814
W-1909		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG, stranded; 7 strands no. 28 AWG, polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene; tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; c/o 2 connectors, 2 clamps, 1 cable; overall lgth of assembly is 31 in.; power connecting cable; JAN-C-17A for cable, Type RG-108A/U; MIL-C-5015 for connectors and clamps, Type AN3106A-10SL-4S, Type AN3057-4; RCA part/dwg B-476703-4	Receiver 2 Audio Cable Connecting J-4001 to J-1409
W-1910		Same as W-1904	Receiver 2 Power Cable Connecting J-4004 to External Power
W-1911		CABLE, SPECIAL PURPOSE, ELECTRICAL: 1 conductor; tinned soft copper wire, 0.0375 in. dia, stranded; 19 strands no. 33 AWG, polyethylene insulated, white; 1 conductor; tinned copper braid no. 36 AWG; solid, synthetic resin jacket; gray; materials in sequence from insulated conductor out; polyethylene; tinned copper braid; synthetic resin jacket; 1900 v rms max operating voltage; round cross section; 0.195 in. dia max; c/o 1 cable, 2 connectors; 50 ohms impedance; 28.5 mmf/ft nominal capacitance, 13.2 db/100 ft max attenuation at 400 mc; 39 in. lg overall; connects receiver to external oscillator; JAN-C-17A for cable, Type RG-58C/U; MIL-C-3608 for connectors, Type UG-88/U; RCA part/dwg B-476707-3	Receiver 2 External Osc Cable Connecting J-4008 to J-210
W-1912		CABLE, SPECIAL PURPOSE, ELECTRICAL: 1 conductor; tinned soft copper wire, 0.0375 in. dia, stranded; 19 strands no. 33 AWG, polyethylene insulated, white; 1 conductor; tinned copper braid no. 36 AWG; solid; synthetic resin jacket; gray; materials in sequence from insulated conductor out; polyethylene; tinned copper braid; synthetic resin jacket; 1900 v rms max operating voltage; round cross section; 0.195 in. dia max; c/o 1 cable, 2 connectors; 50 ohms impedance; 28.5 mmf/ft nominal capacitance, 13.2 db/100 ft max attenuation at 400 mc; 41 in. lg overall; connects receiver to external oscillator; JAN-C-17A for cable, Type RG-58C/U; MIL-C-3608 for connectors, Type UG-88/U; RCA part/dwg B-476707-2	Receiver 2 IF Cable Connecting J-4005 to J-1412
W-1913		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG, stranded; 7 strands no. 28 AWG, polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene; tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; shielding soldered to ferrules; c/o 2 ferrules, 1 cable, 2 clamps, 2 connectors; 62 in. lg overall; speaker connecting cable; JAN-C-17A for cable, Type RG-108A/U; MIL-C-5015 for clamps and connectors, Type AN3057-6, Type AN3057-4, Type AN3106A-14S-2S, Type AN3106A-10SL-4S; RCA part/dwg B-476706-1	Speaker Cable Connecting J-1411 to J-1701
W-1914		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG approx, stranded; 7 strands no. 28 AWG, polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene; tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; c/o 1 connector, 1 clamp, 1 cable; overall lgth of cable is 67 in.; audio connecting cable; JAN-C-17A for cable, Type RG-108A/U; MIL-C-5015 for connector and clamp, Type no. AN 3106A-10SL-4S, Type no. AN3057-4; RCA part/dwg B-476704-1	External Tone Cable Connecting J-1812 to J-1410

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
W-1915		CABLE, SPECIAL PURPOSE, ELECTRICAL: 2 conductors; tinned copper wire no. 12 AWG, stranded; 7 strands no. 28 AWG, polyethylene insulated, white; materials in sequence from insulated conductors out; polyethylene; tinned copper braid shield; synthetic resin jacket; 500 v rms max operating voltage; oval cross section; 0.245 in. dia max; one in. of cable jacket removed from one end; shield braiding unraveled and twisted for one in., insulation stripped from conductors for 3/8 in.; c/o 1 cable, 1 clamp, 1 connector; 63 in. lg overall; audio frequency line connecting cable; JAN-C-17A for cable, Type RG-108A/U; MIL-C-5015 for connector and clamp, Type AN3106A-10SL-3S, Type AN3057-4; RCA part/dwg B-476705-1	AF Line Cable Connecting J-1407 to J-1811
W-1916		Same as W-1904	Power Cable Connecting J-1408 to External Power
W-1917		CABLE, SPECIAL PURPOSE, ELECTRICAL: JAN RG-108A/U; 2 connectors; tinned copper wire no. 13 AWG, stranded; 7 strands no. 28 AWG, polyethylene insulated, gray jacket; material in sequence from insulated conductors out; tinned copper braid; synthetic resin jacket; 1000 v rms max rated working voltage; round cross section; 0.245 in. dia overall; cable has one of the following on ea end, connector (AN3106A-10SL-3S); clamp (AN3057-4), ferrule (Amphenol no. 9769-4); interconnection patch cord; RCA part/dwg B-475322-1	Switchboard Panel Interconnections
W-1918		Same as W-1917	Switchboard Panel Interconnections
W-1919		Same as W-1917	Switchboard Panel Interconnections
W-1920		Same as W-1917	Switchboard Panel Interconnections
W-1921 thru W-3100		Not Used	
W-3101	Shop Manufacture	BUS BAR: copper strip, gold over silver plate; rectangular; solid cross sectional dim., 9/16 in. wide by 11/32 in. high by 0.0201 in. thick; 2-9/16 in. lg overall; mounted by 0.120 in. dia hole one end and by insulator clamp other end; when viewed from hole end w/hole at top forms right hand "L"; RCA part/dwg A-8825740-2	Connects E-3101 to Circuit Wiring
W-3102	Shop Manufacture	BUS BAR: copper strip, gold over silver plate; rectangular; solid cross sectional dim., 57/64 in. high by 1/2 in. wide by 0.0201 in. thick; 2-1/8 in. lg overall; has 0.120 in. dia mounting hole one end in flange and flange on other end has 1/32 in. radius mounting hook; when viewed from hole end w/hole up forms left hand "L"; RCA part/dwg A-8825741-2	Connects E-3102 to Circuit Wiring
W-3103 thru W-3134		Not Used	
W-3135		Same as W-551	Connects E-3135 to Circuit Wiring
W-3136	Shop Manufacture	BUS BAR: copper; gold plate over silver plate; solid; cross sectional dim., 1/8 in. by 0.020 in.; 1-15/32 in. lg overall; mounts by 0.120 in. dia hole one end and 1/16 in. lg by 1/32 in. radius hook other end; one end bent at right angle 23/64 in. high, other end bent at right angle 21/64 in. high; RCA part/dwg A-8827784-2	Connects E-3136 to Circuit Wiring
W-3137	Shop Manufacture	BUS BAR: copper; rectangular cross section; solid; cross sectional dim., 1/8 in. wide w/1/4 in. sq at one end; 0.020 in. thick; 1-7/32 in. lg overall; one 0.120 in. dia hole in center of sq end for mounting; "L" shaped 1-3/16 in. lg side w/sq at end, silver and gold plate finish; RCA part/dwg A-8816319-2	Connects E-3137 to Circuit Wiring
W-3138	Shop Manufacture	BUS BAR: copper, gold plate over silver; solid; cross section dim., 1/8 in. by 0.020 in.; 2-5/32 in. lg overall; mounts by 0.120 in. dia hole one end and by 7/64 in. lg by 1/32 in. radius hook other end; 11/32 in. high and bent to a right angle on a 1/32 in. radius viewed from front has left hand "L" shape; RCA part/dwg A-8829176-3	Connects E-3138 to Circuit Wiring

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
W-3139	Shop Manufacture	BUS BAR: copper; rectangular cross section; solid; cross sectional dim., 1/8 in. wide by 0.020 in. thick; 2-9/16 in. lg overall; one 0.046 in. dia hole 1-1/2 in. from end, bent over ends in fork terminals; bent over 3/16 in. at ea end 1/32 in. inside radius, silver and gold plate finish; RCA part/dwg A-8816319-1	Connects E-3139 to Circuit Wiring
W-3140 thru W-4400		Not Used	
W-4401		Same as W-551	Connects E-4401 to Circuit Wiring
W-4402	Shop Manufacture	BUS BAR: copper; rectangular cross section; solid; cross sectional dim., 1/8 in. wide w/1/4 in. wide section at end, 0.0201 in. thick; 2-3/32 in. lg overall, 53/64 in. deep; 0.120 in. dia hole at 1/4 in. wide end for mounting; bent w/hook at one end and mount at other, silver plate and gold plate finish; RCA part/dwg A-8825741-3	Connects E-4402 to Circuit Wiring
X-401	N16-S-62603-6702	SOCKET, ELECTRON TUBE: JAN Type TS102P01; 7 beryllium copper, silver plated contacts; miniature size; incl metal shock shield, 0.800 in. dia by 5/8 in. high; incl center shield 0.156 in. ID; round shape w/2 mounting ears diametrically opposite; 1-1/8 in. lg by 0.800 in. wide by 25/32 in. high less terminals; molded plastic body; one piece saddle mounting; 5/8 in. dia chassis hole required, two 0.125 in. dia mounting holes spaced 7/8 in. C to C; inside surface of solder lugs hot tin dipped; orientation indicated on shield mounting between contact no. 1 and no. 4; resistant to salt water; RCA part/dwg A-99146-3	Socket for V-401
X-402		Same as X-401	Socket for V-402
X-403		Same as X-401	Socket for V-403
X-404		Same as X-401	Socket for V-404
X-405		Same as X-401	Socket for V-405
X-406	N17-F-74267-5075	FUSE HOLDER: extractor post type; max electrical rating of holder, 250 v, 15 amps; accommodates one 3AG cartridge type fuse; overall dim. of fuse, 1-1/4 in. lg by 1/4 in. dia; bakelite case; bright alloy plated clip type contacts; 2-9/64 in. lg by 11/16 in. dia overall; 2 solder lug type terminals; 1/2-24 thread by 1/2 in. lg mounting, mounts in hole 1/2 in. dia w/flat on one side to 0.473 in.; screw cap marked w/word "fuse", mounting hardware, neoprene washer and zinc plate nut; RCA part/dwg K-99088-2	Socket for F-401
X-407		Same as X-406	Socket for F-402
X-408	N16-S-63515-4151	SOCKET, ELECTRON TUBE: JAN Type TS101P01; 8 beryllium copper, silver plated contacts; medium size, octal; oval shape; 1-7/8 in. lg by 1-3/8 in. wide by 5/8 in. high less terminals; molded plastic body; above chassis mounting; 1-7/64 in. dia chassis hole required; two 0.150 in. dia mounting holes spaced 1.5 in. C to C; RCA part/dwg A-99393-1	Socket for C-401
X-409		Same as X-408	Socket for C-402
X-410		Same as X-408	Socket for C-404
X-411		Same as X-408	Socket for C-405
X-412 thru X-600		Not Used	
X-601	N16-S-64063-6713	SOCKET, ELECTRON TUBE: JAN Type TS103P01; 9 beryllium copper, silver plated contacts; miniature type; incl metal shock shield, 0.940 in. dia by 5/8 in. high; incl center shield, 0.180 in. dia; oval shape; 25/32 in. lg by 1-3/8 in. wide by 0.940 in. high less terminals; molded plastic, type MFE body; one piece saddle mounting, 3/4 in. dia chassis hole required; two 0.125 in. dia mounting holes spaced 1.125 in. C to C; marked w/JAN type number; RCA part/dwg A-8888548-1	Socket for V-601
X-602		Same as X-601	Socket for V-602

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
X-603		Same as X-601	Socket for V-603
X-604 thru X-700		Not Used	
X-701		Same as X-401	Socket for V-701
X-702		Same as X-401	Socket for V-702
X-703		Same as X-601	Socket for V-703
X-704		Same as X-401	Socket for V-704
X-705	N16-S-54287-5051	SOCKET, CRYSTAL: Navy Type 491932; accommodates crystal holder CR-7, 0.048 in. pin dia spaced 0.486 in. C to C; oblong shape body; 55/64 in. lg by 3/8 in. wide by 3/8 in. high less terminals; steatite body; axial mounting; one 1/8 in. dia mounting hole centered axially; marked w/Navy Type no. 491932 prefixed by mfr designation letters; RCA part/dwg K-8893205-1	Socket for Y-701
X-706 thru X-800		Not Used	
X-801		Same as X-601	Socket for V-801
X-802		Same as X-601	Socket for V-802
X-803		Same as X-601	Socket for V-803
X-804		Same as X-601	Socket for V-804
X-805		Same as X-401	Socket for V-805
X-806 thru X-900		Not Used	
X-901		Same as X-705	Socket for Y-901; P/o E-901
X-902	N17-C-73265-1514	CONNECTOR, RECEPTACLE: 8 round female contacts; polarized; straight type; 1-1/4 in. lg by 1 in. wide by 1/4 in. thick overall; contacts rated at 5 amps, 1000 v rms; rectangular phenolic body; phenolic insert; mounts by two 0.128 in. dia holes on a 0.687 in. by 0.937 in. mounting center; has 0.765 in. dia holes in center; RCA part/dwg C-744593-2	Socket for Z-901
X-903 thru X-1000		Not Used	
X-1001		Same as X-902	Socket for Z-1004
X-1002		Same as X-902	Socket for Z-1006
X-1003		Same as X-902	Socket for Z-1008
X-1004		Same as X-902	Socket for Z-1010
X-1005	N17-C-73224-1698	CONNECTOR, RECEPTACLE: 6 round female contacts; straight type; 1 in. lg by 3/4 in. wide by 0.286 in. high overall; contacts rated at 5 amps, 1000 v rms; rectangular phenolic body; molded melamine insert; mounts by two 0.128 in. dia holes on a 0.562 in. by 0.812 in. mounting center; RCA part/dwg C-744591-2	Socket for Z-1012
X-1006		Same as X-1005	Socket for Z-1013
X-1007		Same as X-902	Socket for Z-1014
X-1008 thru X-1100		Not Used	
X-1101		Same as X-1005	Socket for Z-1101

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
X-1102		Same as X-902	Socket for Z-1102
X-1103		Same as X-1005	Socket for Z-1103
X-1104		Same as X-902	Socket for Z-1104
X-1105		Same as X-902	Socket for Z-1105
X-1106		Same as X-1005	Socket for Z-1106
X-1107		Same as X-1005	Socket for Z-1107
X-1108		Same as X-902	Socket for Z-1108
X-1109		Same as X-902	Socket for Z-1109
X-1110 thru X-1200		Not Used	
X-1201		Same as X-902	Socket for Z-1201
X-1202		Same as X-902	Socket for Z-1202
X-1203		Same as X-705	Socket for Y-1201
X-1204 thru X-1300		Not Used	
X-1301		Same as X-902	Socket for Z-1302
X-1302 thru X-1500		Not Used	
X-1501	N17-L-76737-2765	LIGHT, INDICATOR: supplied w/3/8 in. dia, colorless lens; smooth face, frosted on back; threaded mounting; accommodates T-3 lamp; miniature bayonet base; 120 v, 12 ma; brass black nickel plated enclosed shell; 2-9/32 in. lg by 7/8 in. dia overall; one 11/16 in. dia mounting hole required; accommodates up to 1/4 in. thick panel; lampholder horizontally mounted; lamp replaceable from front of panel; 2 solder lug type terminals located on opposite sides of base, both insulated from shell; 100,000 ohms dropping resistor included; mechanical shutter type adjustable to complete blackout; RCA part/dwg B-460884-1	Socket for I-1501
X-1502 thru X-1600		Not Used	
X-1601		Same as X-408	Socket for C-1601
X-1602		Same as X-408	Socket for C-1602
X-1603	N16-S-62603-6446	SOCKET, ELECTRON TUBE: Navy Type 471675; 7 axial type beryllium copper, silver plated contacts; miniature size, mica filled; w/o metal shock shield, incl center shield 0.0937 in. ID; oval shape; 1-1/8 in. lg by 0.766 in. wide by 21/32 in. high less terminals; molded thermosetting plastic body; below chassis wafer mounting; mounts by two 0.125 in. dia mounting holes spaced 7/8 in. C to C; marked w/Navy Type no. 471675; RCA part/dwg K-8890605-1	Socket for V-1602
X-1604		Same as X-1603	Socket for R-1605
X-1605		Same as X-1603	Socket for V-1601
X-1606		Same as X-406	Socket for F-1601
X-1607		Same as X-406	Socket for F-1602
X-1608 thru X-1900		Not Used	

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
X-1901		FUSE HOLDER: plug type; 600 v, 1.1 amp; accommodates 1 plug type fuse; 1-1/4 in. lg by 1-1/4 in. dia overall; porcelain body; screw type brass contacts; 2-11/32 in. lg by 1-5/8 in. wide by 1-19/32 in. high overall; 3 screw type terminals; requires one 1-3/8 in. dia hole and two no. 8-32 mounting screws on a 1-13/16 in. mounting center; Bryant Electric Co. Catalog no. 4063; RCA part/dwg A-99014-1	Fuse Holder for F-1901
X-1902		Same as X-1901	Fuse Holder for F-1902
X-1903	N17-F-74267-5075	FUSE HOLDER: extractor post type; max rating of holder, 125 v AC, 15 amp; accommodates 1 cartridge type fuse, 1-1/4 in. lg by 1/4 in. dia overall; phenolic body in accordance w/JAN-P-14; brass clip type contacts; 2-9/64 in. lg by 11/16 in. dia overall; 2 solder lug type terminals; requires 0.505 in. dia hole w/one side flatted 0.473 in.; mounts by 1/2 in. 24 thread bushing, supplied w/ zinc plated nut and neoprene washer; Bussman Mfg Co. Type HKP; RCA part/dwg A-897868-1	Fuse Holder for F-1903
X-1904		Same as X-1903	Fuse Holder for F-1904
X-1905		LAMPHOLDER: accommodates mogul screw base lamp; max rating, 110 or 220 v, 25-40 W; plastic and rubber body; 13-1/4 in. lg by 3-3/4 in. dia overall; push switch; 2 wire pigtail type terminations; portable; has hook located at top for ease of use; Daniel Woodhead Company Protex no. 120	Lampholder for Portable Trouble Shooting Lamp
X-1906 thru X-2200		Not Used	
X-2201		Same as X-1501	Socket and Lens for I-2201
X-2202 thru X-3800		Not Used	
X-3801	N17-L-51629-1001	LAMPHOLDER: accommodates miniature bayonet base lamp; 10 v, 1/2 amp; brass body; 1-5/8 in. lg by 3/4 in. wide by 1-1/8 in. high overall; 1 stud type and 1 spring type terminals; two 1/8 in. wide by 1/4 in. lg mounting holes spaced 5/8 in. C to C; mounting bracket located perpendicular to and beside socket; socket is on right side when mounted; socket position is adjustable by means of set screw; adjustment has spring return; RCA part/dwg M-458193-501; p/o O-3808	Socket for I-3801
X-3802	N17-L-51629-1003	LAMPHOLDER: accommodates miniature bayonet base lamp; 10 v, 1/2 amp; brass body; 1-5/8 in. lg by 3/4 in. wide by 1-1/8 in. high overall; 1 stud type and 1 spring type terminals; two 1/8 in. wide by 1/4 in. lg mounting holes spaced 5/8 in. C to C; mounting bracket located perpendicular to and beside socket; socket is on left side when mounted; socket position is adjustable by means of set screw; adjustment has spring return; RCA part/dwg M-458193-502; p/o O-3808	Socket for I-3802
XF-101		FUSE HOLDER: extractor post type; for single AGC type fuse; Technical Materiel Corp. Part no. FH100-2	Socket for F-101
XF-102		Same as XF-101	Socket for F-102
XI-301		LIGHT, INDICATOR: w/clear white lens; for miniature bayonet base T-3-1/4 bulb; Technical Materiel Corp, Part no. TS106-2	Socket for I-301
XI-302		LIGHT, INDICATOR: w/red frosted lens; for miniature bayonet base T-3-1/4 bulb; Technical Materiel Corp. Part no. TS106-1	Socket for I-302
XI-303		LAMPHOLDER: w/o lens; for miniature bayonet base T-3-1/4 bulb; Technical Materiel Corp. Part no. TS107-1	Socket for I-303
XI-304		Same as XI-301	Socket for I-304
XK-301		Same as X-408	Socket for K-301
XV-101		Same as X-408	Socket for V-101
XV-102		Same as X-401	Socket for V-102

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
XV-103		Same as X-401	Socket for V-103
XV-104		Same as X-601	Socket for V-104
XV-105		Same as X-401	Socket for V-105
XV-106 thru XV-200		Not Used	
XV-201		Same as X-601	Socket for V-201
XV-202		Same as X-401	Socket for V-202
XV-203		Same as X-401	Socket for V-203
XV-204		Same as X-401	Socket for V-204
XV-205		Same as X-401	Socket for V-205
XV-206		Same as X-401	Socket for V-206
XV-207		Same as X-401	Socket for V-207
XV-208 thru XV-300		Not Used	
XV-301		Same as X-401	Socket for V-301
XV-302		Same as X-601	Socket for V-302
XY-101		SOCKET, CRYSTAL: 0.487 in. spacing, for 0.050 in. pins; Technical Materiel Corp. Part no. TS104-1	Socket for Y-101
XY-102		Same as XY-101	Socket for Y-102
XY-103 thru XY-201		Not Used	
XY-202		Same as XY-101	Socket for Y-202
XY-203		Same as XY-101	Socket for Y-203
XY-204		Same as XY-101	Socket for Y-204
XY-205 thru XY-300		Not Used	
XY-301		SOCKET, CRYSTAL: 0.487 in. spacing, for 0.095 in. pins; Technical Materiel Corp. Part no. TS105-1	Socket for Y-301
Y-101		CRYSTAL UNIT: quartz (supplied only on customer's request); Technical Materiel Corp. Part no. CR-25/U	BFO Crystal
Y-102		CRYSTAL UNIT: quartz (supplied only on customer's request); Technical Materiel Corp. Part no. CR-25/U	BFO Crystal
Y-103 thru Y-200		Not Used	
Y-201		CRYSTAL UNIT: quartz; 3.5 mc wire leads; Technical Materiel Corp. Part no. CR-18/U	IFO Crystal
Y-202		CRYSTAL UNIT: quartz (supplied only on customer's request); Technical Materiel Corp. Part no. CR-18/U	HFO Crystal
Y-203		CRYSTAL UNIT: quartz (supplied only on customer's request); Technical Materiel Corp. Part no. CR-18/U	HFO Crystal
Y-204		CRYSTAL UNIT: quartz (supplied only on customer's request); Technical Materiel Corp. Part no. CR-18/U	HFO Crystal

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
Y-205 thru Y-300		Not Used	
Y-301		CRYSTAL UNIT: quartz; 100 kc; Technical Materiel Corp. Part no. CR100	100 Kc Oscillator
Y-302 thru Y-700		Not Used	
Y-701		CRYSTAL UNIT: quartz; MIL Type CR-46/U; one crystal plate included; 200 kc nominal frequency; Bliley or MIL crystal holder, Bliley BH6A, MIL HC-6/U; 2 pins located on bottom 0.486 in. C to C; solid type; 0.050 in. dia by 0.273 in. lg; oblong metal body w/2 sides parallel and 2 sides rounded; 0.758 in. lg by 0.750 in. wide by 0.345 in. thick; marked on side w/CR-46/U, mfr code no.; marked on top w/ frequency in kc; air gap not adjustable; parallel resonance; load capacitance 20 mmf ±0.5 mmf; test w/holder ungrounded; ±0.01% tolerance of nominal frequency over the range of -40 deg C to +70 deg C; -40 deg C to +70 deg C range, ±2 deg C; spec MIL-C-3098A	Crystal for BFO, V-702
Y-702 thru Y-900		Not Used	
Y-901	N16-C-96826-7063	CRYSTAL UNIT: quartz; MIL Type CR-18/U; 1 crystal plate included; 1400 kc nominal frequency of plate; Sig. crystal holder type HC-6/U, 2 pins located on bottom spaced 0.486 in. C to C; solid type; 0.050 in. dia by 0.243 in. lg; oval shape molded thermosetting plastic body; 0.788 in. lg by 0.720 in. wide by 0.345 in. thick; marked CR-18/U; air gap not adjustable; hermetically sealed; ±0.005% tolerance of nominal frequency measured over temp range of -55 deg C to +90 deg C; crystal plate etched; -55 deg C to +90 deg C range; RCA part/dwg K-8832372-3	Crystal for Second Local Oscillator, First IF Unit
Y-902 thru Y-1200		Not Used	
Y-1201	N16-C-96249-9999	CRYSTAL UNIT: quartz; 1 crystal plate; 200 kc normal frequency; 2 pins located on bottom 0.486 in. C to C; solid type; 0.050 in. dia by 0.243 in. lg; rectangular oval shape aluminum case; 1.031 in. lg by 0.750 in. wide by 0.345 in. high; marked w/RCA part/dwg no., standard Navy stock no., vendor's code no., and identifying no.; air gap not adjustable; frequency tolerance ±0.012%; -40 deg C to +85 deg C; RCA part/dwg A-8837466-5	Crystal for Calibrator
Z-101 thru Z-550		Not Used	
Z-551	N16-A-91201-1027	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 terminal board assembly, 2 capacitors, silver mica, 4 capacitors, paper, 7 resistors, 2 tubes; 3 in. lg by 1-7/16 in. wide by 3/4 in. high overall; plug-in mounted; provides mounting for two tubes and associated components of frequency converter; RCA part/dwg A-8838478-503	Plug-in Subassembly, Oscillator Unit
Z-552 thru Z-900		Not Used	
Z-901	N16-C-91201-1018	CONVERTER, SUBASSEMBLY: mounts tube and associated components for use in frequency converter; c/o 1 chassis and connector, 1 latch, 5 capacitors, 3 resistors, 1 electron tube; 6.3 v 150 ma heater, 120 v DC power supply, input frequency 1600 kc, output frequency 200 kc; rectangular shape; 2-1/2 in. lg by 1-1/4 in. wide by 1-7/64 in. thick overall; mounts by plugging into socket, held in place by latch located on top; when used w/external crystal provides oscillation at 1400 kc required for frequency conversion; RCA part/dwg A-8833233-503	Plug-in Subassembly, First IF Unit

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
Z-902	N16-F-32681-1001	FILTER, BAND PASS: 1600 kc operating frequency, 1588 kc to 1612 kc band width; 100,000 ohms input impedance, 100,000 ohms output impedance; 3-55/64 in. lg by 29/32 in. wide by 2-1/16 in. high overall; rectangular metal case; mounts by two 0.156 in. dia holes spaced 2.718 in. C to C; 4 solder lug type terminals; RCA part/dwg A-8833252-506	Selectivity Filter, First IF Unit
Z-903 thru Z-1003		Not Used	
Z-1004	N16-A-38801-1127	AMPLIFIER, SUBASSEMBLY: c/o 1 chassis, 1 connector, 1 latch, 2 capacitors, 1 resistor, 1 tube; 2-15/32 in. lg by 1-1/4 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v, 150 ma heater; cathode connection provided for manual gain control; tube is semi-remote cutoff type to allow for automatic gain control; RCA part/dwg A-8848518-501	Plug-in Subassembly, First Amplifier, Second IF Unit
Z-1005		Not Used	
Z-1006	N16-A-38801-1102	AMPLIFIER, SUBASSEMBLY: c/o 1 chassis, 1 connector, 1 latch, 2 capacitors, 2 resistors, 1 tube; 2-15/32 in. lg by 1-1/4 in. wide by 1-7/64 in. high; mounts by plugging into socket, held in place by latch located on top; 6.3 v, 150 ma heater; cathode connection provided for manual gain control; tube is semi-remote cutoff type to allow for automatic gain control; used as a stage for intermediate frequency voltage amplifier; RCA part/dwg A-8848518-502	Plug-in Subassembly, Second IF Amplifier, Second IF Unit
Z-1007		Not Used	
Z-1008	N16-A-38801-1128	AMPLIFIER, SUBASSEMBLY: c/o 1 chassis, 1 connector, 1 latch, 3 capacitors, 4 resistors, 1 tube; 2-15/32 in. lg by 1-1/4 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch located on top; cathode connection provided for manual gain control; 2 outputs provided at different levels of gain; used as IF volt amplifier; RCA part/dwg A-8848518-503	Plug-in Subassembly, Final Amplifier, Second IF Unit
Z-1009	N16-R-33591-1476	RECTIFIER, TUNING INDICATOR: principal parts c/o 4 capacitors, 1 crystal, 1 terminal board, 1 transformer, 1 frame assembly; 200 kc single phase; 2-1/4 in. lg by 1-63/64 in. wide by 5/8 in. high overall; mounts by three 0.140 in. dia mounting holes on a 1.468 in. by 0.656 in. mounting center, 0.218 in. from edge of flange; RCA part/dwg A-8848509-501	Tuning Indicator, Rectifier Circuitry
Z-1010	N16-A-38801-1104	AMPLIFIER, SUBASSEMBLY: c/o 1 chassis, 1 connector, 1 latch, 3 capacitors, 4 resistors, 1 tube; 2-15/32 in. lg by 1-1/4 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch located on top; provision is made for mixing BFO signal with input signal; used as IF volt amplifier and mixer; RCA part/dwg A-8848518-504	Plug-in Subassembly, BFO Mixer
Z-1011	Assemble from Component Parts	TRANSFORMER, INTERMEDIATE FREQUENCY: 200 kc peak frequency; couples 3rd IF amplifier to detector; shielded; 2-1/16 in. lg by 1-7/32 in. wide by 5/8 in. high overall; steatite coil form; powdered iron core; double tuned; adjustable iron core; mounts by two no. 2-56 by 1/4 in. lg screws; 4 feedthru type and 10 stud type terminals; c/o 1 frame assembly, 2 capacitors, 1 terminal board, 1 coil, 1 resistor, 1 transformer; RCA part/dwg A-8848510-503	Couples V-1003 to V-1005
Z-1012	N16-A-38801-1168	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis and plug assembly, 1 capacitor, 1 JAN 5647 tube; 2-1/2 in. lg by 1-1/4 in. wide by 0.781 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma; RCA part/dwg A-8832360-505	Plug-in Subassembly Detector
Z-1013	N16-R-33591-1379	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis and plug assembly, 1 JAN 5647 tube; 2-1/2 in. lg by 1-1/4 in. wide by 0.781 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma, 10 v DC bias; RCA part/dwg A-8832360-506	Plug-in Subassembly AGC Delay Diode
Z-1014	N16-A-38801-1103	AMPLIFIER, SUBASSEMBLY: c/o 1 chassis, 1 connector, 1 latch, 3 capacitors, 4 resistors, 1 tube; 2-15/32 in. lg by 1-1/4 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch located on top; RCA part/dwg A-8848518-505	Plug-in Subassembly, Cathode Follower Amplifier Frequency Shift IF Output

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
Z-1015	N16-F-32631-2017	FILTER, BAND PASS: 200 kc center operating frequency; 199.5 kc to 200.5 kc ±0.15 kc band width at 6 db attenuation for first band pass; 200 kc center operating frequency; 198.5 kc to 201.5 kc ±0.3 kc band width at 6 db attenuation for second band pass; impedance: 810 ohms input, 30,000 ohms output; 3-13/16 in. lg by 2-7/16 in. wide by 1-1/4 in. deep overall; rectangular metal case; mounts by four no. 6-32 thread by 3/8 in. lg studs on a 2-3/8 in. by 1-3/8 in. by 39/64 in. mounting center; 6 stud type terminals; vacuum sealed; -40 deg C to +85 deg C operating temp range; marked in red or white 1/8 in. high characters; to withstand 48-hr salt spray test; c/o two filters; first filter sharp band pass, second filter medium band pass; BuShips 16E4 (ships) MIL-T-27 40T9; RCA part/dwg A-8903610-1	
Z-1015A		P/o Z-1015	Shop Selectivity Filter, 2nd IF Unit
Z-1015B		P/o Z-1015	Medium Selectivity Filter, 2nd IF Unit
Z-1016	N16-F-32633-1903	FILTER, BAND PASS: 200 kc operating frequency, 196 kc to 204 kc at 6 db down; impedance: 50,000 ohms input, 50,000 ohms output; 2-15/32 in. lg by 1-9/32 in. wide by 2.415 in. high overall; rectangular, metal case; mounts by four no. 4-40 tapped nuts located two on one edge, 1.718 in. C to C and two on other edge 0.610 in. from centerline of the first two, spaced 0.660 in. C to C; 4 feedthru type terminals; electrical components aligned and then cover is spot soldered to frame assembly; RCA part/dwg A-8832387-503	Broad Selectivity Filter, 2nd IF Unit
Z-1017		TRANSFORMER, INTERMEDIATE FREQUENCY: 200 kc peak frequency; interstage; unshielded; 1-7/32 in. lg by 5/8 in. wide by 2-1/16 in. high overall; ceramic coil form; powdered iron core; double tuned; adjustable iron core tuning; mounts by two no. 2-56 thread by 1/4 in. lg machine screws and two no. 2 split lock washers located in diagonally opposite corners of top on a 7/8 in. by 3/8 in. mounting center; 12 stud type and 4 feedthru type terminals; c/o 3 capacitors, 1 terminal board, 1 insulator, 1 coil, radio frequency, 1 resistor, 1 transformer, radio frequency; RCA part/dwg A-8848510-505	Couples V-1001 to V-1002
Z-1018		TRANSFORMER, INTERMEDIATE FREQUENCY: 200 kc peak frequency; interstage; unshielded; 1-7/32 in. lg by 5/8 in. wide by 2-1/16 in. high overall; ceramic coil form; powdered iron cores; double tuned; adjustable iron core tuning; mounts by two no. 2-56 thread by 1/4 in. lg machine screws and two no. 2 split washers; located in diagonally opposite corners of top on a 7/8 in. by 3/8 in. mounting center; 12 stud type and 4 feedthru type terminals; c/o 3 capacitors, 1 terminal board, 1 coil, radio frequency, 1 resistor, 1 transformer, radio frequency, 1 insulator; RCA part/dwg A-8848510-506	Couples V-1002 to V-1003
Z-1019 thru Z-1100		Not Used	
Z-1101	N16-A-38801-1108	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis and plug assembly, 1 capacitor, 5 resistors, 1 JAN 5647 tube; 2-1/2 in. lg by 1-1/4 in. wide by 0.781 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma, 120 v DC bias; RCA part/dwg A-8832360-501	Plug-in Subassembly, Audio Noise Limiter
Z-1102	N16-A-38801-1113	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis, 1 connector, 1 latch, 1 capacitor, 2 resistors, 1 electron tube; 2-1/2 in. lg by 1-9/32 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma, 120 v DC; RCA part/dwg A-8833206-501	Plug-in Subassembly, Silencer Diode
Z-1103	N16-A-38801-1111	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis and plug assembly, 1 capacitor, 3 resistors, 1 JAN 5647 tube; 2-1/2 in. lg by 1-1/4 in. wide by 0.781 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma, 120 v DC bias; RCA part/dwg A-8832360-502	Plug-in Subassembly, Silencer Diode
Z-1104	N16-A-38801-1114	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis, 1 connector, 1 latch, 1 capacitor, 4 resistors, 1 electron tube; 2-1/2 in. lg by 1-9/32 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch on top; 6.3 v heater at 150 ma, 120 v DC; RCA part/dwg A-8833206-502	Plug-in Subassembly, Silencer Diode

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
Z-1105	N16-A-38801-1112	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis, 1 connector, 1 latch assembly, 2 capacitors, 3 resistors, 1 tube; 2-15/32 in. lg by 1-9/32 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma, 120 v DC; RCA part/dwg A-8833206-503	Plug-in Subassembly, Second Audio Amplifier
Z-1106	N16-A-38801-1107	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis and plug assembly, 1 capacitor, 3 resistors, 1 tube; 2-1/2 in. lg by 1-1/4 in. wide by 0.781 in. high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma, 120 v DC bias; RCA part/dwg A-8832360-503	Plug-in Subassembly, Limiter Diode
Z-1107	N16-A-38801-1106	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 chassis and plug assembly, 1 capacitor, 3 resistors; 2-1/2 in. lg by 1-1/4 in. wide by 0.781 in high overall; mounts by plugging into socket, held in place by latch located on top; 6.3 v heater at 150 ma, 120 v DC bias; RCA part/dwg A-8832360-504	Plug-in Subassembly, Limiter Diode
Z-1108	N16-A-38801-1110	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 capacitor, 1 chassis and plug assembly, 7 resistors, 1 tube; 2-1/2 in. lg by 1.109 in. wide by 1.281 in. high overall; plug-in mounting; marked w/3/32 in. high std characters; used as a voltage amplifier; RCA part/dwg A-8833206-504	Plug-in Subassembly, Third Audio Amplifier
Z-1109	N16-A-38801-1109	AMPLIFIER, SUBASSEMBLY: principal parts c/o 1 capacitor, 1 chassis and plug assembly, 1 tube; 2-1/2 in. lg by 1.109 in. wide by 1.281 in. high overall; plug-in mounting; marked w/3/32 in. high std characters; used as a power output amplifier; RCA part/dwg A-8833206-505	Plug-in Subassembly Final Audio Amplifier
Z-1110	N16-F-32088-9827	FILTER BAND PASS: 1 kc operating frequency; 825 to 1175 cycles band width; 30,000 ohms input impedance; 30,000 ohms output impedance; 4-17/32 in. lg by 1.0 in. wide by 2-9/16 in. high incl mounting studs; rectangular metal case; four no. 6-32 by 5/16 in. lg mounting studs on 4-1/8 in. by 23/32 in. mounting centers; 3 lug type terminals; designed for extensive arctic and tropical service; shock and vibration resistant; 135 v DC; 10 v peak input signal level; ambient temp range -54 deg C to +85 deg C; moisture and salt water resistant; RCA part/dwg K-8890585-2	Controls Response of Audio Circuit
Z-1111 thru Z-1200		Not Used	
Z-1201	N16-C-99999-0007	OSCILLATOR, SUBASSEMBLY: principal parts c/o 3 capacitors, 1 chassis and plug assembly, 4 resistors, 1 tube; 2-1/2 in. lg by 1.109 in. wide by 1-9/16 in. high overall; plug-in mounting; marked w/3/32 in. high std characters; oscillator for multivibrator assembly; RCA part/dwg A-8820919-503	Plug-in Subassembly, Calibrator Oscillator
Z-1202	N16-C-14435-1030	AMPLIFIER, SUBASSEMBLY: principal parts c/o 2 capacitors, 2 resistors, 1 chassis and plug assembly, 1 tube; 2-1/2 in. lg by 1.109 in. wide by 1-9/16 in. high overall; plug-in mounting; marked w/ 3/32 in. high std characters; amplifier for multivibrator assembly; RCA part/dwg A-8820919-504	Plug-in Subassembly, Calibrator Amplifier
Z-1203 thru Z-1300		Not Used	
Z-1301	N16-C-74615-6431	COIL, RADIO FREQUENCY: 2.34 mh at 200 kc, 20.2 ohms DC resistance, 0.1022 amp; 456 turns no. 20 AWG copper wire, uninsulated; one 4 pie universal winding; tapped; 1st tap located at end of first pie, 2nd tap located at end of second pie; shielded by rounded copper cadmium plated shield; steatite form; powdered iron core; coil dim. less terminals, mounted attachments, and tuning devices, 2-1/4 in. dia by 1-1/8 in. lg; 4 solder lug type terminals located on end; mounts by 2 integral mounting brackets on bottom of can; ea bracket has mounting slot 1/2 in. wide by 0.281 in. lg slots on 1.375 in. mounting centers; hermetically sealed; 48-hr salt spray test; RCA part/dwg C-746103-1	Resonant Circuit for BFO Unit
Z-1302	N16-O-66001-1015	OSCILLATOR, SUBASSEMBLY: principal parts c/o 1 chassis and plug connector, 3 capacitors, 4 resistors, 1 electron tube; 2-1/2 in. lg by 1-9/32 in. wide by 1-7/64 in. high overall; mounts by plugging into socket, held in place by latch located on top; requires filament current 6.3 v AC at 150 ma, 120 v DC; fixed frequency 200 kc +3 kc -0 kc; RCA part/dwg A-8833227-502	Plug-in Subassembly for BFO Unit

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
Z-1303 thru Z-1400		Not Used	
Z-1401	N16-F-99999-0091	FILTER, LOW-PASS: 0 to 400 cycles pass band, 14 kc to 400 mc rejection band; 5-5/8 in. lg by 5-19/32 in. wide by 1-15/32 in. deep; rectangular metal case; six 0.173 in. dia mounting holes, 3 in ea of two flangee, 4 holes on 4-13/16 in. by 1-7/8 in. mounting centers, other two spaced 5-7/32 in. C to C; 6 solder lug type terminals; for use in 105 to 125 v AC primary power sources; max power input to power supply 90 watts; balanced w/respect to ground; 250 v DC min hi-pot; ambient temp range -55 deg C to +85 deg C; moisture proof; vibration and shock resistant; RCA part/dwg A-8832381-1	Filters Power Line Circuit
Z-1402	N16-F-44106-2081	FILTER, LOW-PASS: 8000 cycle cut-off frequency; 50 ohms input impedance; 50 ohms output impedance; 5-5/16 in. lg by 2-5/8 in. wide by 1-9/16 in. high overall; rectangular metal case; four 0.173 in. dia mounting holes 4-13/16 in. by 1-7/8 in. mounting centers; 6 solder lug type terminals; operating temp range -54 deg C to +85 deg C; marked w/RCA part/dwg no., class, grade, schematic, standard Navy stock no., and pertinent electrical information; terminals to be marked 1, 2, 3, 4, 5, 6; no. 3 and 6 (ground) in center; RCA part/dwg A-8832378-1	Filters Audio Output Circuit
Z-1403 thru Z-1900		Not Used	
Z-1901		FILTER, LOW-PASS: 70 kc cut-off frequency; 50 ohms input impedance, 50 ohms output impedance; 5/8 in. lg by 1-1/4 in. wide by 1-1/4 in. high overall; rectangular, metal case; mounts by two 0.187 in. dia holes spaced 2-3/8 in. C to C; 2 solder lug type terminals; -55 deg C to +85 deg C operating temp range; operates in any mounting position; hermetically sealed; marked w/RCA part/dwg no., voltage rating, current rating, and frequency rating; fungi resistant for tropical use; RCA part/dwg P-746087-20	Power Line Filter for External Oscillator
Z-1902		Same as Z-1901	Power Line Filter for External Oscillator
Z-1903 thru Z-3100		Not Used	
Z-3101	N16-A-38801-5592	AMPLIFIER, SUBASSEMBLY: principal parts c/o 5 capacitors, 1 terminal board assembly, 5 resistors, 1 tube; 3 in. lg by 1-7/16 in. wide by 1 in. deep overall; plug-in mounting; marked w/3/32 in. high std characters w/numerals 1 to 7 to be 1/16 in. high; used as plug-in board in antenna box assembly; RCA part/dwg A-8822020-503	Plug-in Subassembly, RF Unit
Z-3102 thru Z-3134		Not Used	
Z-3135	N16-A-38801-5593	AMPLIFIER, SUBASSEMBLY: principal parts c/o 5 capacitors, 1 terminal board assembly, 4 resistors, 1 tube; 3 in. lg by 7/16 in. wide by 1 in. deep overall; plug-in mounting; marked w/3/32 in. high std characters; numerals 1 to 7 to be 1/16 in. high; used as plug-in RF Box Assembly; RCA part/dwg A-8822020-504	Plug-in Subassembly, RF Unit
Z-3136 thru Z-4000		Not Used	
Z-4001	N16-F-32633-2649	FILTER, BAND PASS: 175 kc to 225 kc band width; 200 ohms input impedance; 70 ohms output impedance; 4 in. lg by 3-5/8 in. wide by 1-9/16 in. deep overall; rectangular metal case; four 0.173 in. dia mounting holes on 3-1/8 in. by 1-3/4 in. mounting centers; 4 lug type terminals; min hi-pot 250 v terminals 1 and 3 to ground; temp tange -54 deg C to +85 deg C; hermetically sealed; capable of withstanding long periods of arctic and tropical service; shock and vibration resistant; RCA part/dwg A-8832380-1	Filters Output Circuit from Second IF

TABLE 8-4. TABLE OF REPLACEABLE PARTS (Continued)

RADIO RECEIVING SET AN/FRR-32

REF. SYMBOL	STOCK NUMBERS SIGNAL CORPS STANDARD NAVY AIR FORCE	NAME OF PART AND DESCRIPTION	LOCATING FUNCTION
Z-4002		Same as Z-1401	Filters Output Power Line Circuit
Z-4003		Same as Z-1402	Filters Audio Output Circuit
Z-4004	N16-F-32662-8001	FILTER, BAND PASS: 100 kc to 1700 kc band width; 200 ohms input impedance, 70 ohms output impedance; 5-1/2 in. lg by 3 in. wide by 25/32 in. deep overall; rectangular metal case; four 0.173 in. dia mounting holes on 5 in. by 2-1/4 in. mounting centers; 4 solder lug type terminals; min hi-pot 250 v terminals 1 and 3 to ground; temp range -54 deg C to +85 deg C; hermetically sealed; capable of withstanding long periods of arctic and tropical service; RCA part/dwg A-8832379-1	Filters Output Circuit from First IF
Z-4005 thru Z-4400		Not Used	
Z-4401	N16-O-66211-3344	OSCILLATOR SUBASSEMBLY: principal parts c/o 6 capacitors, 1 terminal board assembly, 1 choke coil, 3 resistors, 1 tube; 3 in. lg by 7/16 in. wide by 1 in. high overall; plug-in mounting; marked w/3/32 in. high std characters numerals 1 to 7 to be 1/16 in. high; used as an oscillator plug-in board assembly in RF oscillator box; RCA part/dwg A-8815781-501	Plug-in Subassembly, Oscillator Unit

TABLE 8-5. MAINTENANCE PARTS KIT FOR RADIO RECEIVING SET AN/FRR-32

SYMBOL NO.	SPARE PARTS BOX NO.	QUANTITY PER EQUIPMENT	SYMBOL NO.	SPARE PARTS BOX NO.	QUANTITY PER EQUIPMENT
C-316		2	T-102		1
C-319		1	T-401		1
C-619		1	T-402		1
C-624		2	T-602		1
C-802		2	T-701		1
C-803		2	T-702		1
C-2210		1	T-1601		1
C-3155		1	T-1701		1
F-101		5	T-3101		1
F-102		10	T-3102		1
J-101		1	T-3103		1
J-201		1	T-3104		1
J-801		1	T-3105		1
J-1507		1	Y-301		1
J-4009		1	Y-701		1
K-301		1	Y-901		1
K-4001		1	Y-1201		1
L-701		1	Z-551		1
P-301		1	Z-901		1
R-101		1	Z-1004		1
R-215		1	Z-1006		1
R-307		1	Z-1008		1
R-309		1	Z-1010		1
R-323		1	Z-1012		1
R-601		1	Z-1013		1
R-603		2	Z-1014		1
R-609		2	Z-1101		1
R-615		1	Z-1102		1
R-630		1	Z-1103		1
R-1001		1	Z-1104		1
R-1503		1	Z-1105		1
R-1504		1	Z-1106		1
R-1605		1	Z-1107		1
S-301		1	Z-1108		1
S-302		1	Z-1109		1
S-303		1	Z-1201		1
S-304		1	Z-1202		1
S-801		1	Z-1302		1
S-803		1	Z-3101		1
S-2206		1	Z-3135		1
T-101		1	Z-4401		1

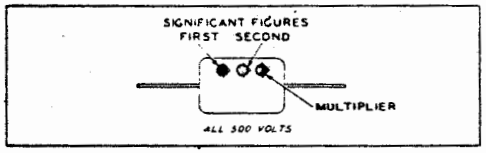
TABLE 8-6. CROSS REFERENCE PARTS LIST

Not applicable

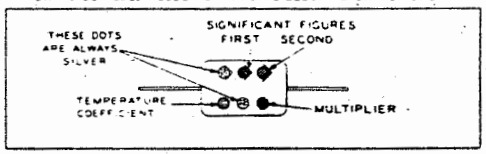
TABLE 8-7. APPLICABLE COLOR CODES AND MISCELLANEOUS DATA

CAPACITOR COLOR CODES

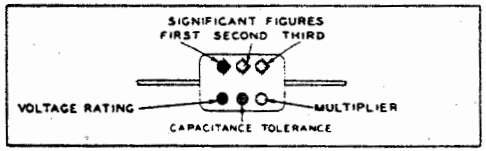
RMA 3-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



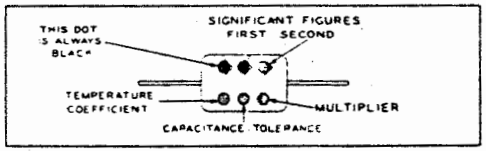
JAN 6-DOT COLOR CODE FOR PAPER-DIELECTRIC CAPACITORS



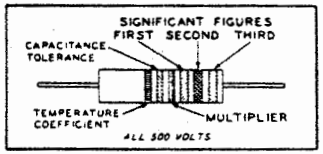
RMA 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS



JAN 6-DOT COLOR CODE FOR MICA-DIELECTRIC CAPACITORS

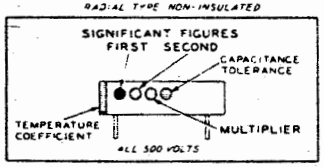


RMA COLOR CODE FOR TUBULAR CERAMIC-DIELECTRIC CAPACITORS

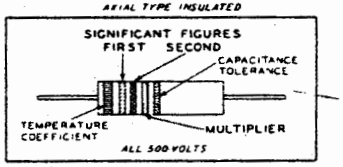


JAN COLOR CODE FOR FIXED CERAMIC-DIELECTRIC CAPACITORS

RADIAL TYPE NON-INSULATED



AXIAL TYPE INSULATED



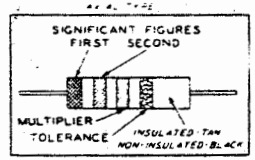
RMA: RADIO MANUFACTURERS ASSOCIATION
JAN: JOINT ARMY-NAVY

RESISTORS		CAPACITORS						
TOLERANCE	MULTIPLIER	SIGNIFICANT FIGURE	COLOR	MULTIPLIER: RMA MICA AND CERAMIC-DIELECTRIC	MULTIPLIER: JAN MICA AND PAPER-DIELECTRIC	MULTIPLIER: JAN CERAMIC DIELECTRIC	VOLTAGE RATING	TEMPERATURE COEFFICIENT
	1	0	BLACK	1	1	1		A
	10	1	BROWN	10	10	10	100	B
	100	2	RED	100	100	100	200	C
	1000	3	ORANGE	1000	1000	1000	300	D
	10000	4	YELLOW	10000			400	E
	100000	5	GREEN	100000			500	F
	1000000	6	BLUE	1000000			600	G
	10000000	7	VIOLET	10000000			700	
	100000000	8	GRAY	100000000		0.01	800	
	1000000000	9	WHITE	1000000000		0.1	900	
5	0.1		GOLD	0.1	0.1		1000	
10	0.01		SILVER	0.01	0.01		2000	
20			NO COLOR				500	

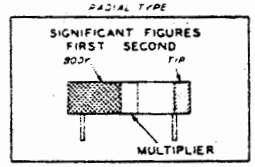
RESISTOR COLOR CODES

RMA COLOR CODE FOR FIXED COMPOSITION RESISTORS

AXIAL TYPE

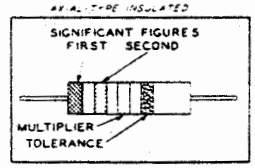


RADIAL TYPE



JAN COLOR CODE FOR FIXED COMPOSITION RESISTORS

AXIAL TYPE INSULATED



RADIAL TYPE NON-INSULATED

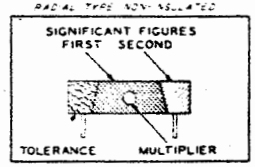


TABLE 8-8. LIST OF MANUFACTURERS

ABBREVIATION	PREFIX	NAME	ADDRESS
AB	CBZ	Allen Bradley	3614 Walnut Street Philadelphia, Pa.
	CAYT	Allen Mfg Co.	100 Sheldon Street Hartford, Conn.
AMP	CPH	American Phenolic Corp.	1830 S. 54th Street Chicago, Ill.
BHE	CAIS	Birtcher Corp.	4371 Valley Blvd Los Angeles, Calif.
BRY	CYD	Bryant Electric Co.	Bridgeport, Conn.
BUS	CFA	Bussman Mfg Co.	2538 University Street St. Louis, Mo.
	CAMQ	Cambridge Thermionic Corp.	445 Concord Avenue Cambridge 38, Mass.
	CED	Cannon Electronic Development Co.	3291 Humbold Street Los Angeles, Calif.
	CAHG	Chatham Electronic Co.	473 Washington Street Newark, N. J.
CIN	CMG	Cinch Mfg Co.	3701 N. Broad Street Philadelphia, Pa.
	CPD	Communications Products Co.	Marlboro, N. J.
DJA	CDJ	DeJur-Amsco Corp.	45-01 Northern Blvd Long Island City, N. Y.
		Garde Mfg Co.	538 Eddy Street Providence, R. I.
	CG	General Electric Co.	1405 Locust Street Philadelphia, Pa.
	CBDW	Grayhill Co.	1 No. Pulaski Road Chicago, Ill.
	CHU	Harvey Hubbell, Inc.	447 Concord Avenue Bridgeport, Conn.
	CARO	Industrial Products Co.	Brookfield Street Dansbury, Conn.

TABLE 8-8. LIST OF MANUFACTURERS (Continued)

ABBREVIATION	PREFIX	NAME	ADDRESS
ININ	CBNJ	International Instruments, Inc.	331 East Street New Haven, Conn.
	CJS	Jensen Radio Mfg Co.	6601 S. Laramie Avenue Chicago 38, Ill.
KYC		Keystone Carbon Co.	St Mary's, Pa.
	CLF	Littelfuse, Inc.	1865 Miner Street Desplaines, Ill.
MCS	CMU	Micro Switch Corp.	3345 W. Hunting Park Avenue Philadelphia, Pa.
MON		Monsanto Chemical Co.	St. Louis, Mo.
NEMS		National Machine Shop, Inc.	919 Jessup Blair Drive Silver Springs, Md.
OAK	COC	Oak Mfg Co.	1260 Clybourne Street Chicago, Ill.
PLCR		Polmyer Corp	Reading, Pa.
	CRV	Radio Corp. of America RCA Victor Division	Tube Dept, Bldg 1-6 Camden, N. J.
		Royson Engineering Co.	Jacksonville Road & Montgomery Avenue Hatboro, Pa.
SH	CAXO	Shakeproof, Inc.	405 Lexington Avenue New York, N. Y.
SLC		Shallcross Mfg Co.	10 Jackson Avenue Collingdale, Pa.
SAJ	CSF	Sprague Electric Co.	North Adams, Mass.
SLE	CHS	Sylvania Electric Products Co.	1740 Broadway New York 19, N. Y.
		Technical Materiel Corp.	Mamaronick, N. Y.
UC	CUF	United Carr Fastener	Cambridge 42, Mass.
UNT	CUT	United Transformer	150 Varick Street New York, N. Y.

TABLE 8-8. LIST OF MANUFACTURERS (Continued)

ABBREVIATION	PREFIX	NAME	ADDRESS
		Waldes Kohinoor Co.	Austil Place Long Island City, N. Y.
WIQ		Winchester Electronics Co.	Glenbrook, Conn.
	CBKE	Daniel Woodhead Co.	15 N. Jefferson Avenue Chicago, Ill.
	CMA	Yaxley Mfg Co. (Division of P. R. Mallory)	1343 Arch Street Philadelphia, Pa.
	ZE	Zierick Mfg. Corp.	Beechwood & Rockdale New Rochelle, N. Y.

INDEX

D

T

SUBJECT	PAGE	FIGURE	TABLE
Z			
Z551 mixer plug-in board	7-151	7-49	-------
Z901 first i-f plug-in unit	7-153	7-51	-------
Z1004 second i-f plug-in unit	7-154	7-52	-------
Z1006 second i-f plug-in unit	7-155	7-53	-------
Z1008 second i-f plug-in unit	7-156	7-54	-------
Z1010 second i-f plug-in unit	7-157	7-55	-------
Z1012 second i-f plug-in unit	7-158	7-56	-------
Z1013 second i-f plug-in unit	7-159	7-57	-------
Z1014 second i-f plug-in unit	7-160	7-58	-------
Z1101 a-f plug-in unit	7-161	7-59	-------
Z1102 a-f plug-in unit	7-162	7-60	-------
Z1103 a-f plug-in unit	7-163	7-61	-------
Z1104 a-f plug-in unit	7-164	7-62	-------
Z1105 a-f plug-in unit	7-165	7-63	-------
Z1106 a-f plug-in unit	7-166	7-64	-------
Z1107 a-f plug-in unit	7-167	7-65	-------
Z1108 a-f plug-in unit	7-168	7-66	-------
Z1109 a-f plug-in unit	7-169	7-67	-------
Z1201 crystal calibrator plug-in unit	7-170	7-68	-------
Z1202 crystal calibrator plug-in unit	7-171	7-69	-------
Z1302 beat frequency oscillator plug-in unit	7-172	7-70	-------
Z3101 antenna plug-in board	7-149	7-47	-------
Z3135 i-f plug-in board	7-150	7-48	-------
Z4401 oscillator plug-in board	7-152	7-50	-------