RESTRICTED

TM 11-805

WAR DEPARTMENT

TECHNICAL MANUAL

TRANSMITTING COMPONENTS

OF

RADIO SET SCR-197-C,
RADIO SET SCR-197-D

AND

RADIO SET SCR-197-F

JUNE 8, 1942

TM 11-805

TECHNICAL MANUAL

FOR

TRANSMITTING COMPONENTS

OF

RADIO SET SCR-197-C,

RADIO SET SCR-197-D

AND

RADIO SET SCR-197-F

Prepared under direction of the
Chief Signal Officer

RESTRICTED

NOTICE:—This document contains information effecting the national defense of the United States within the meaning of the Espionage Act (U. S. C. 50:31, 32). The transmission of this document or the revelation of its contents in any manner to any unauthorized person is prohibited.

The information contained in documents marked RESTRICTED will not be communicated to the public or to the press, but it may be communicated to any person known to be in the service of the United States, and to persons of undoubted loyalty and discretion who are cooperating in Governmental work (AR 380-5).

WAR DEPARTMENT
Washington, June 8, 1942.

This Technical Manual, published by Federal Telegraph Company, on orders No. 1500-NY-40, 1905-NY-41 and 2150-PHILA-42, is furnished for the information and guidance of all concerned.

By order of the Secretary of War:
G. C. MARSHALL,
Chief of Staff.

Official:
J. A. ULIO,
Major General,
The Adjutant General.

Preface to be Used for Radio Set SCR-197-F Only

It will be noted that the text of this instruction book is written only for Radio Sets SCR-197-C and SCR-197-D. There has been no instruction book text written for Radio Set SCR-197-F. However, since the transmitting components of Radio Set SCR-197-F are very similar to those of Radio Set SCR-197-D, the instruction book for the "D" equipment, with the addition of this preface, is applicable to the "F" equipment.

In using this book in connection with the "F" equipment the following differences in Signal Corps nomenclature must be noted:

Signal Corps Nomenclature for Radio Set SCR-197-F only	Corresponding Nomenclature Used in This Instruction Book
Radio Transmitter BC-325-C	Radio Transmitter BC-325-B
Control Unit RM-7-C	Control Unit RM-7-B
Power Control Panel BD-92-C	Power Control Panel BD-92-B
Generator GN-42-C	Generator GN-42-B
Microphone T-28-D	Microphone T-28-B
Microphone T-38-B	Microphone T-38-A
Truck K-18-F	Truck K-18-D
Order No. 2150-Phila-42	Orders No. 1500-NY-40 and No. 1905-NY-41

The Transmitting Components of Radio Set SCR-197-F are different than those of Radio Set SCR-197-D in the following seven details:

(1) Fuses have been replaced by magnetic circuit breakers.
(2) Thermostats used in transmitter oscillator and rectifier compartments are of an adjustable type.
(3) Phenolic Crystal Holders FT-171-B are used.
(4) An additional factory-adjusted trimmer capacitor has been added in the oscillator circuit.
(5) The antenna is constructed of steel instead of aluminum.
(6) The floodlights and their plugs are of a different type of construction.
(7) The power cable is provided with plugs and clips, so no tools are necessary for making connections.

Schematic diagrams for Radio Transmitter BC-325-C and for Power Control Panel BD-92-C and associated equipment are included at the end of this preface.

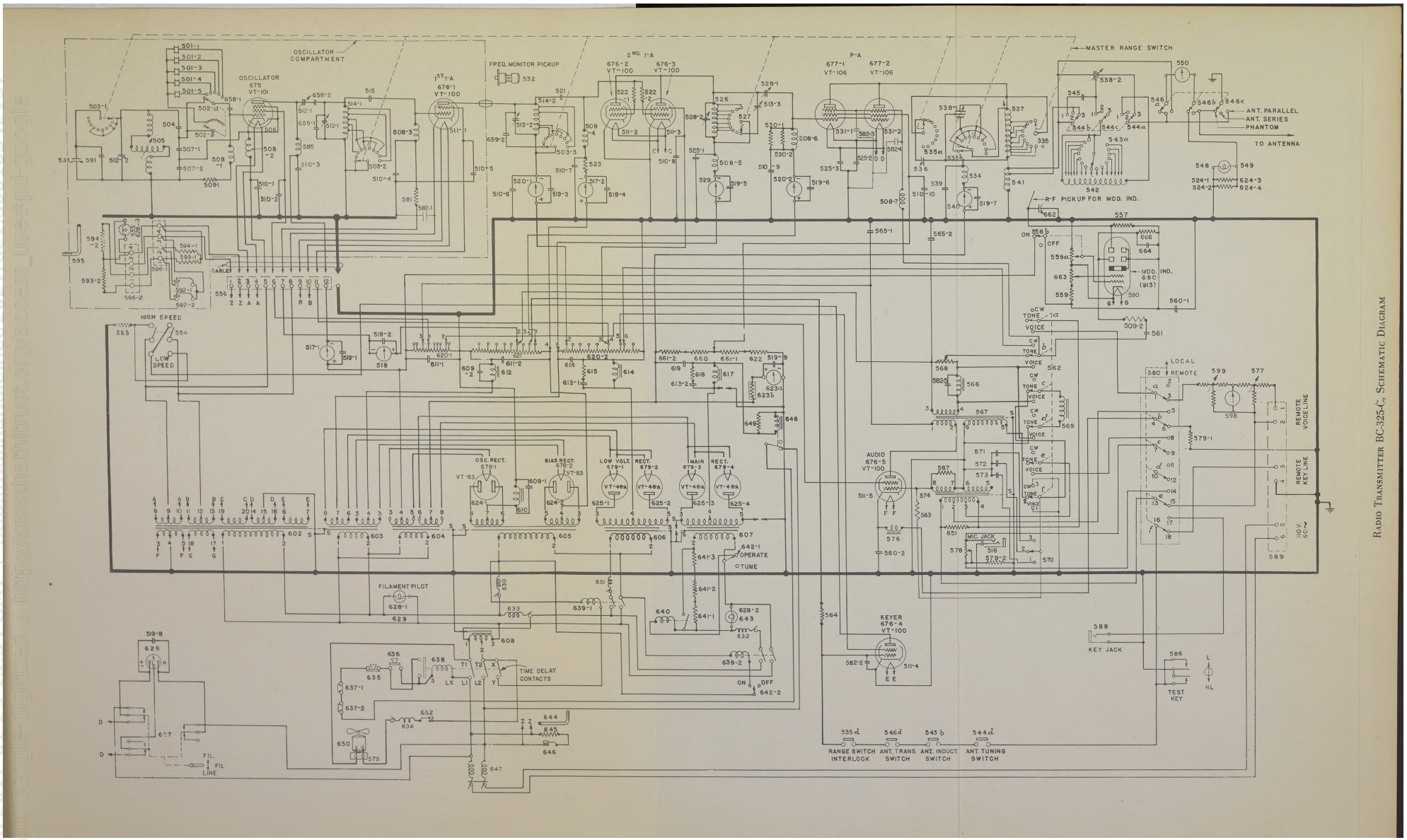
The component parts in the SCR-197-F equipment that differ from parts in the SCR-197-D equipment are described in the following table:

Ref. No. Of Part In "F" Equipment	Ref. No. Of Part In "D" Equipment	Description Of Part In "F" Equipment	Operating Method Required	Affected Pages Of Instruction Book
102-1 102-2	102-1 102-2	Circuit breaker, 1 pole, 15 amp, 110 volts a-c, time delay curve C, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0711-15	After overload, reset circuit breaker to ON	44, 92, 95
104-2 104-1	103 104	Circuit breaker, 2 pole, 50 amp, 110 volts a-c, time delay curve C, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0322-50	After overload, reset circuit breaker to ON	29, 44, 92, 95
204	204	Connection box, per Federal Telegraph Co. Dwg. F-29331-12		1, 6, 10, 28, 33, 45, 92, 96, 101
204a	204a	Surface cabinet, without knockouts, 6″ wide x 6″ deep x 12″ high, Columbia type A		45, 101
Not Used	204c			
204c	204d, 204e	Circuit breaker, 3 pole, 50 amp, 220 volts a-c, time delay curve C, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0342-50	After overload, reset circuit breaker to ON in lieu of replacing fuses	1, 28, 33, 45, 92, 96, 101

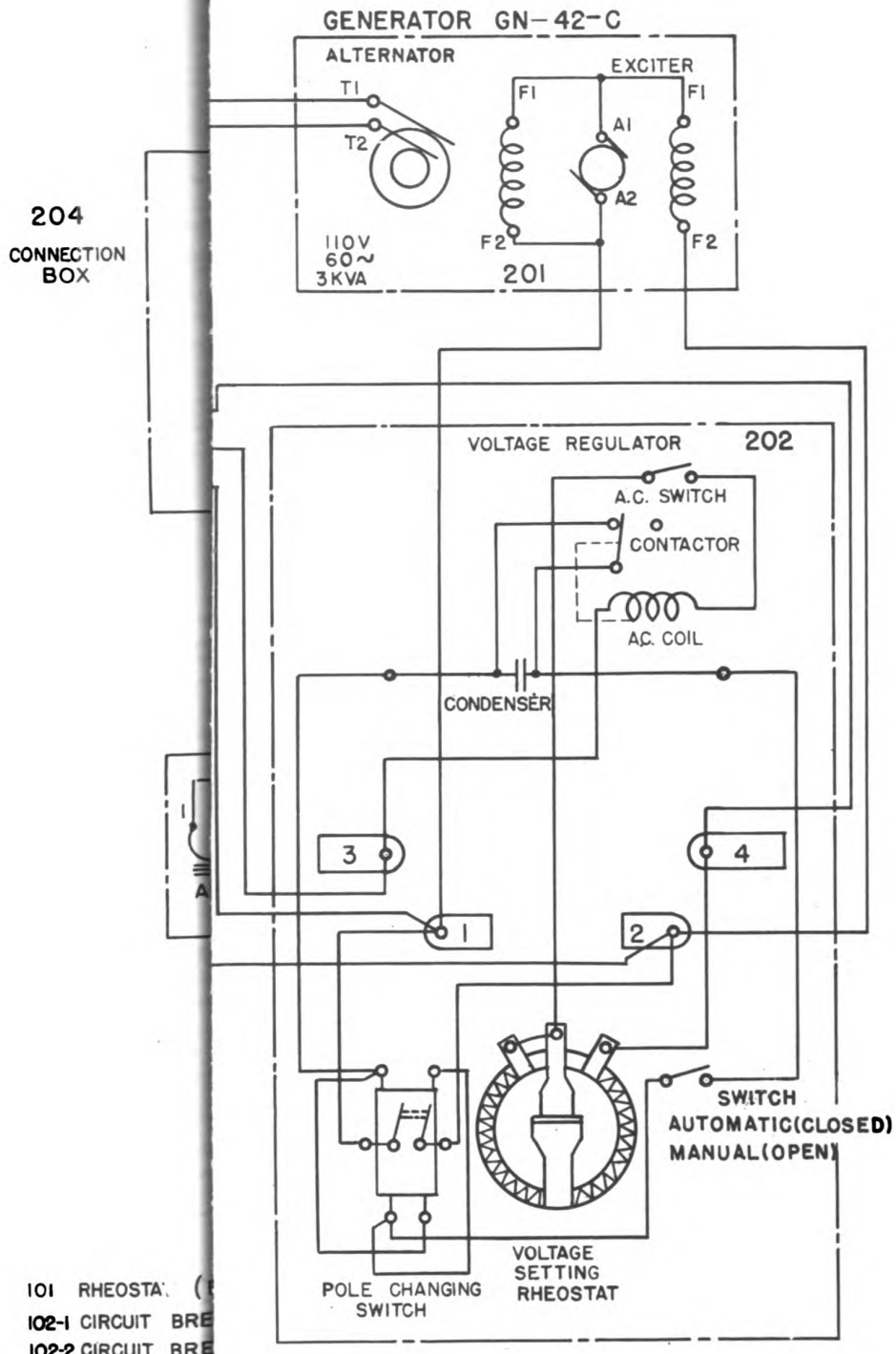
Ref. No. Of Part In "F" Equipment	Ref. No. Of Part In "D" Equipment	Description Of Part In "F" Equipment	Operating Method Required	Affected Pages Of Instruction Book
205		Power cable, per Federal Telegraph Co. Dwg. F-30322-2	Plug a-c power cable in 110 volt or 220 volt receptacle on rear of truck instead of connecting into connection box	6, 10, 45
205a	205	Cable, 75 ft. long, twisted two No. 6 AWG conductors, 600 volts		45
205b	Not Used	Plug, female, 2 pole, watertight, with clamping nut, jute packing, Crouse Hinds type BPR8132		
205c	Not Used	Clip, copper, with rubber insulator, Mueller Electric type 11 clip with type 13 insulator		
205d	Not Used	Same as 205c		
206-1 206-2	Not Used	Receptacle, 2 pole, 30 amp, Crouse Hinds type QE-8302	Plug in a-c power cable in lieu of connecting same into connection box	6, 10, 45, 92, 96
307-1 307-2	307-1 307-2	Floodlight, 200 watts, manufactured by Westinghouse per Federal Telegraph Company Dwg. F-33704-12, complete with 5 ft. rubber covered cord terminated with a watertight plug, Crouse Hinds type WP722		1, 46, 101
308-1 308-2	308-1 308-2	Plug receptacle, female, 2 wire—2 pole, with threaded cap and gasket, Crouse Hinds type DS-81		46
316-1 316-2 316-3 316-4	Not Used	Socket cap, angle type, for $\frac{3}{8}$" nipple, Hubbell cat. no. 20 (Function—part of truck compartment light fixture)		46
320-1 320-2 320-3 320-4	320-1 320-2 320-3 320-4	Fixture rosette, $2\frac{1}{2}$" with bushing for $\frac{3}{8}$" nipple, complete with $\frac{3}{8}$" nipple $\frac{3}{4}$" long and lock nut, National Electric cat. no. 430		47
362	362	Accessory spares: 3 ea. parts 654 and 655, **1 ea. Insulators IN-102-A and IN-103**		48
Not Used	433			51
433	434 435	Circuit breaker, 1 pole, 1.5 amp, 110 volts a-c, time delay curve 2 parts white nickel plated, stratosphere oil in delay chamber	After overload, reset circuit breaker to ON in lieu of replacing fuse	1, 51, 91, 94
501-1 501-2 501-3 501-4 501-5	501-1 501-2 501-3 501-4 501-5	Crystal in phenolic holder, frequencies in range 750-2250 kc, per Federal Telegraph Co. Spec. F-29724-1		52
504	504	Capacitor, fixed, mica, .00135 μf $\pm 2\%$ at 26° C, 1000 volts d-c working, Cornell-Dubilier type 6H		52

Ref. No. Of Part In "F" Equipment	Ref. No. Of Part In "D" Equipment	Description Of Part In "F" Equipment	Operating Method Required	Affected Pages Of Instruction Book
507-1 507-2	507-1 507-2	Capacitor fixed, mica, .00123 μf $\pm$2% at 26° C, 1000 volts d-c working, Cornell-Dubilier type 6H		52
533	Not Used	Capacitor, variable, 100 $\mu\mu$f max., spacing .02", Federal Telegraph Co. F-27050-12-10 (Function—Osc. grid tank trimmer)	Factory set and should require no attention in field	15, 55, 90, 93
545	545	Capacitor, fixed, air, 100 $\mu\mu$f spacing .125", Federal Telegraph Co. F-27030-12-1		56
591	591	Capacitor, fixed, mica, .00098 μf $\pm$5% at 26° C, 1000 volts d-c working, Cornell-Dubilier type 6H		58
592-1 592-2	592-1 592-2	Thermostat, normally closed, adjustable, max. temp. 300° F.	Adjustable from outside osc. compartment. Factory set and should require no attention in field	58, 90, 93
Not Used	630			61
634	631-1	Circuit breaker, 1 pole, 2.5 amp, 110 volts a-c, time delay curve 2, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0411-2.5	After overload, reset to ON in lieu of replacing fuse	2, 3, 9, 33, 61, 90, 93
631	631-2	Circuit breaker, 1 pole, 4.5 amp, 110 volts a-c, time delay curve 2, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0411-4.5	After overload, reset to ON in lieu of replacing fuse	2, 3, 9, 24, 33, 61, 90, 93
633	632	Circuit breaker, 1 pole, 8 amp, 110 volts a-c, time delay curve 2, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0411-8	After overload, reset to ON in lieu of replacing fuse	2, 3, 9, 23, 33, 61, 90, 93
630	633	Circuit breaker, 1 pole, 3.5 amp, 110 volts a-c, time delay curve 2, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0411-3.5	After overload, reset to ON in lieu of replacing fuse	2, 3, 9, 33, 61, 90, 93
632	634	Circuit breaker, 1 pole, 25 amp, 110 volts a-c, time delay curve 2, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0411-25	After overload, reset to ON in lieu of replacing fuse	2, 3, 9, 24, 33, 61, 90, 93
646	646	Thermostat, normally closed, adjustable, max. temperature 300° F.	Adjustable from outside rectifier compartment. Factory adjusted and should require no attention in field	62
647	647	Circuit breaker, 2 pole, 40 amp, 110 volts a-c, time delay curve C, parts white nickel plated, stratosphere oil in delay chamber, Heinemann type 0322-40		23, 62

NOTE: In Radio Transmitter BC-325-C, coil 514-2 is assembled over an absorption loop which is fastened to the shelf. This loop should not be removed, or the 2nd IA may oscillate when operating at low frequencies.



RADIO TRANSMITTER BC-325-C, SCHEMATIC DIAGRAM



101 RHEOSTA (
102-1 CIRCUIT BRE
102-2 CIRCUIT BRE
104-1 CIRCUIT BRE
104-2 CIRCUIT BRE
105 METER (VO
106 METER (FRE
107 METER (AM
108 RECEPTACLE
109 LAMP

NOTE
FOR DATA ON PARTS SEE TABLE
OF REPLACEABLE PARTS

POWER CONTROL PANEL BD-92-C AND ASSOCIATED EQUIPMENT, SCHEMATIC DIAGRAM

SAFETY NOTICE

●

THIS EQUIPMENT EMPLOYS HIGH VOLTAGES THAT ARE DANGEROUS AND MAY BE FATAL IF CONTACTED BY OPERATING PERSONNEL. IT IS, THEREFORE, IMPERATIVE THAT SAFETY REGULATIONS BE OBSERVED AT ALL TIMES.

Safety interlocks are provided on the two doors that give access to Radio Transmitter BC-325-B. These interlocks remove all voltage from the interior of the radio transmitter when the doors are open with the exception of 110 volts AC on the incoming line terminal block, the oscillator compartment heater, and the rectifier compartment heater. This voltage can be removed from both of the compartment heaters by throwing the main power switch on the panel of the radio transmitter to the "OFF" position. Always ground any part before touching it.

The Control Unit RM-7-B also employs voltages that are dangerous. Protection for operating personnel is provided by the necessity of removing the power cord from its receptacle at the side of the control unit before the chassis can be withdrawn from its cabinet. Always ground any part before touching it.

The Power Control Panel BD-92-B and its associated connection box have 110 volts or 220 volts AC in them so that all power should be removed before they are opened and any part that is to be touched should first be grounded.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS, Continued

I GENERAL DESCRIPTION

1. USE

The transmitting components of Radio Set SCR-197-C are installed in Truck K-18-C and those of Radio Set SCR-197-D are installed in Truck K-18-D. Each truck comprises a complete portable radio transmitting station for ground use by large field organizations.

2. CHARACTERISTICS

The transmitting components of Radio Set SCR-197-C or Radio Set SCR-197-D are intended to provide radio transmission over a frequency range of 1,500 to 18,000 kilocycles using continuous waves, tone modulated waves or voice modulated waves. Power for the operation of the various units can be supplied from a commercial source of 110 or 220 volts, 60 cycles, single phase or from the included emergency generator. Keying and voice modulating of the transmitter can be done either from the operating position in the truck or from a remote position up to 7½ miles away that is linked to the truck by metallic commercial telephone lines or wire W-110 lines.

3. LIST OF COMPONENTS

The total weight of all the transmitting components is approximately 1,520 pounds.

Quantity	Article	Dimensions (inches) Height	Width	Depth	Unit Weight Lbs.
1	Antenna (9 sections)				20.5
1	Guy GY-31				
1	Insulator IN-102 (spare for Mast Section MS-65)				
1	Mast Brace MP-40				
1	Insulator IN-103 (spare for Mast Brace MP-40)				
1	Mast Base MP-39				
5	Stake GP-2				
1	Autotransformer	8¾	12	10¾	102
1	Cable, Power		75 ft. long		
1	Connection Box	14¼	10	6½	4
3	Fuse, 35 Amp. (one in use—two spare)				
3	Fuse, 60 Amp. (one in use—two spare)				
2	Control Unit RM-7-B	10 5/16	17 7/8	11 3/16	66
2	Dust Cover				
6	Fuse, 1.0 Amp. (one in use and two spares for each control unit)				
3	Microphone T-28-C				
1	Microphone T-38-A				
2	Telephone handset with mtg. cradle				
6	Tube VT-95 (one in use and two spares for each control unit)				
6	Tube VT-76 (one in use and two spares for each control unit)				
6	Tube VT-80 (one in use and two spares for each control unit)				
1	Fan, Truck Ventilating	12 3/8	10	8 1/8	10
2	Floodlight	18¼	14½	14 3/8	14
1	Generator GN-42-B	16 11/16	17¾	32	270

Quantity	Article	Dimensions (inches) Height	Width	Depth	Unit Weight Lbs.
2	Ground Rods		4 ft. long		
2	Ground Rod Cable		8 ft. long		
2	Hammer HM-1				3
1	Power Control Panel BD-92-B	29½	17	7 5/64	63
1	Auxiliary Frequency Meter Assembly	10	5½	5⅝	6
1	Radio Transmitter BC-325-B	67 7/8	32 1/8	22 5/16	834
3	Air Filter (spare for inlet air)				
3	Air Filter (spare for outlet air)				
1	Dust Cover				
9	Fuse, 1.6 Amp. (3 in use—6 spare) } Fuse complement for SCR-197-C				
3	Fuse, 3.2 Amp. (1 in use—2 spare) } Fuse complement for SCR-197-C				
3	Fuse, 12 Amp. (1 in use—2 spare) } Fuse complement for SCR-197-C				
6	Fuse, 1.6 Amp. (2 in use—4 spare) } Fuse complement for SCR-197-D				
3	Fuse, 4.5 Amp. (1 in use—2 spare) } Fuse complement for SCR-197-D				
3	Fuse, 2.0 Amp. (1 in use—2 spare) } Fuse complement for SCR-197-D				
3	Fuse, 12 Amp. (1 in use—2 spare) } Fuse complement for SCR-197-D				
15	Tube VT-100 (5 in use—10 spare)				
3	Tube VT-101 (1 in use—2 spare)				
6	Tube VT-106 (2 in use—4 spare)				
12	Tube VT-46-A (4 in use—8 spare)				
6	Tube VT-83 (2 in use—4 spare)				
3	Tube, comm. type 913 (1 in use—2 spare)				
1	Receiver, Monitor	8½	10½	18½	28
3	Tube, comm. type 80 (1 in use—2 spare)				
3	Tube, comm. type 6F6G (1 in use—2 spare)				
3	Tube, comm. type 6J5GT (1 in use—2 spare)				
3	Tube, comm. type 6H6 (1 in use—2 spare)				
3	Tube, comm. type 6SQ7 (1 in use—2 spare)				
9	Tube, comm. type 6SK7 (3 in use—6 spare)				
3	Tube, comm. type 6K8 (1 in use—2 spare)				
2	Reel DR-4				25
2	Storage Chest (normally mounted over truck rear wheel fender wells)	12	17¾	39	20
1	Voltage Regulator	13	6	4 9/16	7.5

4. DESCRIPTION OF MAJOR COMPONENTS

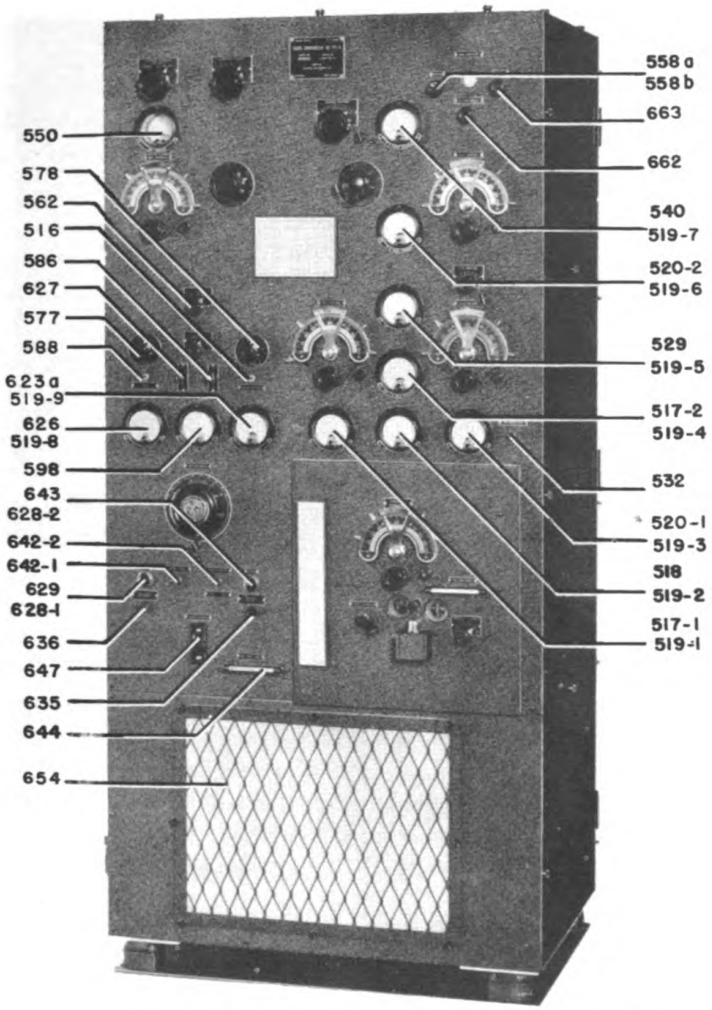


FIG. 1 RADIO TRANSMITTER BC-325-B, FRONT VIEW

a. Radio Transmitter BC-325-B

(1) Radio Transmitter BC-325-B which is shown in Fig. 1 contains in its single cabinet all the electrical circuits necessary to produce within the frequency range of 1500-18000 kc., a CW signal of approximately 400 watts or a voice or tone modulated signal of 50 watts sideband power. All power supplies are included and require only a 110 volt, 60 cycle, single phase source for operation.

(2) Internally, the cabinet of Radio Transmitter BC-325-B is of a shelf-type construction with a center bulkhead running vertically to divide all but the bottom compartment in half. This latter compartment contains the ventilating fan, the larger transformers, chokes, and filter capacitors of the four power supplies, along with a fuse block and terminal board, while the compartment directly above on the left hand side houses the smaller power supply components, the rectifier tube housing and the power control relays. The second compartment up on the left, viewing the cabinet from the front, has in it the keyer tube and audio-modulator stage, and on the upper shelf on the same side is the antenna coupling network. On the right side of the radio transmitter the heat insulated oscillator box, which also houses the first intermediate amplifier tube, is just above the large bottom compartment. The shelf above the oscillator box is divided by a shield that runs laterally to the center bulkhead and the first intermediate amplifier plate tank occupies the front section with the second intermediate amplifier being located in the rear. The top shelf on the right side contains the power amplifier and cathode ray modulation indicator. Both the right and left sides of the transmitter cabinet are equipped with hinged doors which have safety interlocks for the protection of operating personnel. On the right side of the front panel are the radio frequency tuning controls and on the left are the power switches, the line voltage control knob, the CW, tone and voice selecting knob and operating controls and the antenna tuning dial and knobs. Dust filters at the bottom of the front panel and in

the top of the transmitter cabinet clean the air that is circulated by the ventilating fan.

(3) Meters are provided to read the current or voltage of all important circuits. These include the oscillator plate current, the first intermediate amplifier plate and grid currents, the second intermediate amplifier plate and grid currents, the power amplifier plate and grid currents, antenna current, filament and line voltages, audio input level, and plate voltage to the power amplifier.

(4) Adequate overload protection devices are included in the various circuits. Fuses, mounted in the lower left section of the transmitter and accessible from the left side door, protect the filament, bias, and plate voltage supplies. The main high voltage plate supply includes an overload relay of the automatic reset type. The mercury vapor rectifiers are protected from premature application of plate voltage by a thirty second time delay relay that is set into action when the main power START switch is pushed.

(5) A dust cover is provided to protect the radio transmitter when not in use. This slips over the entire transmitter cabinet and is held in place by snap fasteners at the rear.

FIG. 2 CONTROL UNIT RM-7-B, FRONT VIEW

b. Control Unit RM-7-B

(1) The Control Unit RM-7-B shown in Fig. 2 is of a chassis type construction and is mounted in a metal cabinet. It is designed as a keying or voice modulating unit for Radio Transmitter BC-325-B and is to be used at either one of two operating locations. These two locations are in the truck with the transmitter, and in the trailer at a remote point up to 7½ miles away. A single switch located in the rear on the left hand side of the chassis is set, depending on which of the two operating locations is being used. Access to this switch is gained by removing the chassis from the cabinet.

(2) The control unit when set for remote operation in the trailer provides two operating positions. From either of these it is possible to key or voice modulate the transmitter with a microphone and key plugged into the appropriate front panel jacks. Either of the two operating positions is selected by a two-position switch located in the center of the front panel. Also on the front panel are two means of radio receiver disabling for each operating position. When the key is depressed, the two jacks labelled RELAY CONTACTS are open-circuited for the purpose of opening the minus B voltage lead on a radio receiver, while the remaining two jacks labelled BC-342 make available 12 volts at a quarter of an ampere to operate an external relay. A switch in the lower center of the front panel removes radio receiver disabling when such is not desired. Audio gain from the microphones of either of the two operating positions can be controlled by a potentiometer knob that is mounted on the front panel, while the level of audio gain is indicated by the meter in the upper center. 110 volts for the operation of the remote control unit is fed into the male receptacle on the lower right hand side of the cabinet, while the two audio lines and ground return which connect the truck and trailer operating positions are brought into the six prong male receptacle at the lower left.

(3) When set for local operation in the truck, the control unit may be used as an operating position from which it is possible to key and voice modulate the radio transmitter. It may also be used for feeding the remote lines from the trailer control unit through to the transmitter. The latter occurs on position 1 of the operating position switch, while the former is on position 2. Local keying and voice modulating is accomplished from a key and microphone plugged into the appropriate jacks on the position 2 side of the front panel, while the corresponding jacks on the position 1 side connect through lines to the terminal board in the lower left hand side of the transmitter. Radio receiver disabling is not available when the control unit is set for operation in the truck. The two audio lines from the trailer control unit are brought through fairlead openings in the rear of the truck and are connected to the terminal boards located on the lower rear corner of each inner truck side wall. The terminal boards are then connected through the truck inter-wiring to the plug on the lower left hand side of the control cabinet.

(4) Each control unit includes the chassis of Telephone EE-8 or EE-8-A, making telephone communication possible over one of the audio lines between truck and trailer. The ringing generator handle of the telephone unit is mounted on the front panel of the control unit, while the handset mounts in a separate cradle.

(5) A dust cover which slips over the control unit is provided to protect the unit when it is not in use.

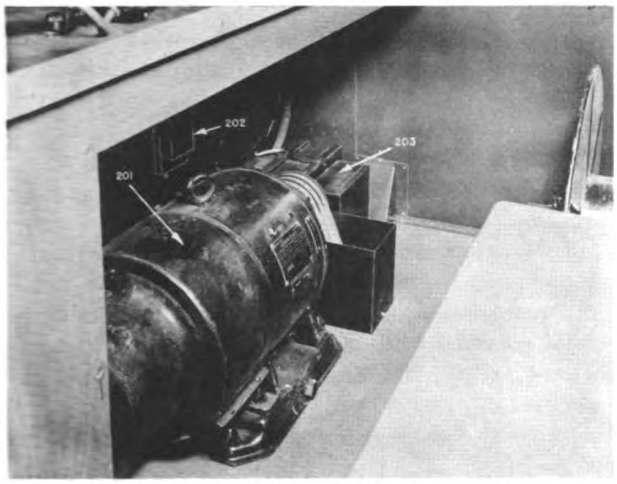


FIG. 3 GENERATOR GN-42-B, VIEW OF INSTALLATION

c. Generator GN-42-B

(1) Generator GN-42-B shown in Fig. 3 is intended as an emergency source of power for Radio Transmitter BC-325-B and its associated equipment and is driven by the truck motor from a separate power takeoff unit. The clutch lever engaging this power takeoff unit is located on the floor at the driver's side in the truck cab. The rating on the generator is as follows:

Output voltage	110 V. AC, 60 cycles, single phase
Output power	3 KVA at 80% power factor
Speed	1800 RPM

(2) Generator GN-42-B is located in the truck under the operating bench toward the rear, and slightly above the generator on the operating bench apron is located the voltage regulator which is employed in the generator field circuit to maintain a constant voltage output under conditions of varying load (see ¶10). The wiring of the generator to Radio Transmitter BC-325-B and other equipment is accomplished through Power Control Panel BD-92-B which is described in the following paragraph.

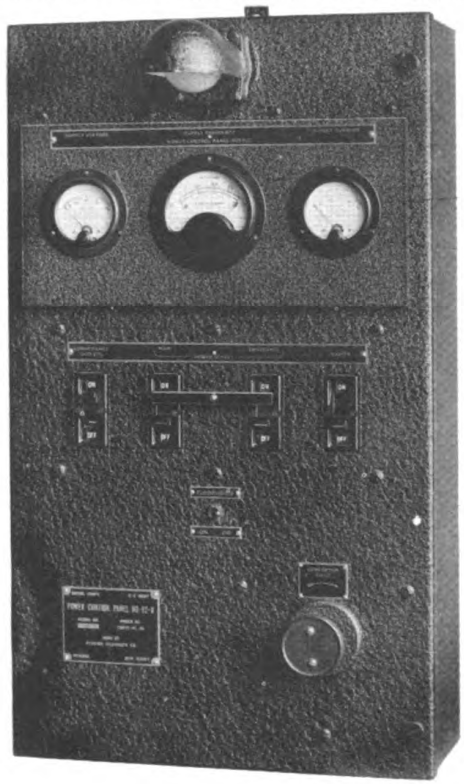


FIG. 4 POWER CONTROL PANEL BD-92-B, FRONT VIEW

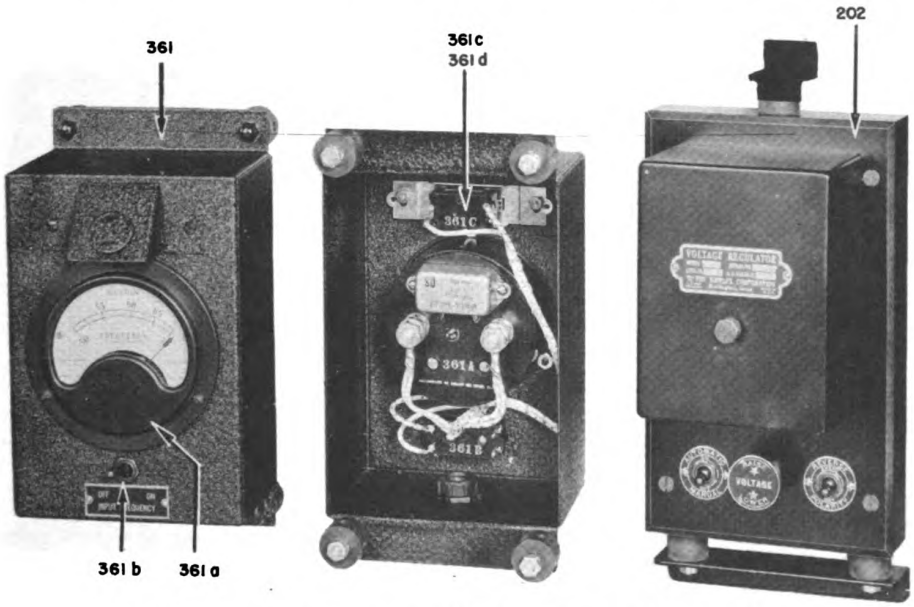


FIG. 5 AUXILIARY FREQUENCY METER, FRONT AND REAR VIEWS: AND VOLTAGE REGULATOR, FRONT VIEW

d. Power Control Panel BD-92-B and Its Associated Equipment

Associated with the power control panel, which is mounted on the rear wall of the truck, is a connection box located at the rear of the operating bench, an auxiliary frequency meter mounted on the right wall of the truck cab, an autotransformer, and 75 ft. of rubber covered power cord. A front panel view of the Power Control Panel BD-92-B is shown in Fig. 4 and the voltage regulator and auxiliary frequency meter in Fig. 5. When a commercial power source is used, the power is fed by means of the 75 ft. power cord through a fairlead opening in the rear of the truck to the appropriate terminals in the connection box. Separate terminals are provided for 110 or 220 volts. The link between the connection box and the power control panel is made through an autotransformer which is located on the floor directly to the rear of the generator and provides 110 volts to the power control panel regardless of whether 110 or 220 volts is supplied to the connection box. A tap switch located on the bottom of the connection box selects various taps on the autotransformer so that the voltage to the power control panel may be maintained at 110 volts. The range of variation provided by these taps is approximately 10 per cent high or low. Line protection is provided by two fuses in the connection box. At the top of the power control panel are located three meters which indicate the voltage, current, and frequency of the power being supplied. Directly below the meters are four switches which control the lights in the truck, the convenience outlets on the left hand side of the power control panel and on the front of the operating bench, the main power from a commercial source, and emergency power from the truck generator. A safety interlock device is provided to prevent both main and emergency power from being applied at the same time. In the lower right hand corner of the panel is a rheostat control for the field current of the emergency generator exciter. Thermal circuit breakers within the power control panel protect either source of power being used at the time. All wiring which is done either to or from the power control panel is fed through an opening in the bottom of the panel and terminated on an internal terminal board. The frequency meter in the cab of the truck is paralleled with that on the power control panel and is convenient for allowing the truck driver to maintain the motor speed at the proper value for the generation of 60 cycles.

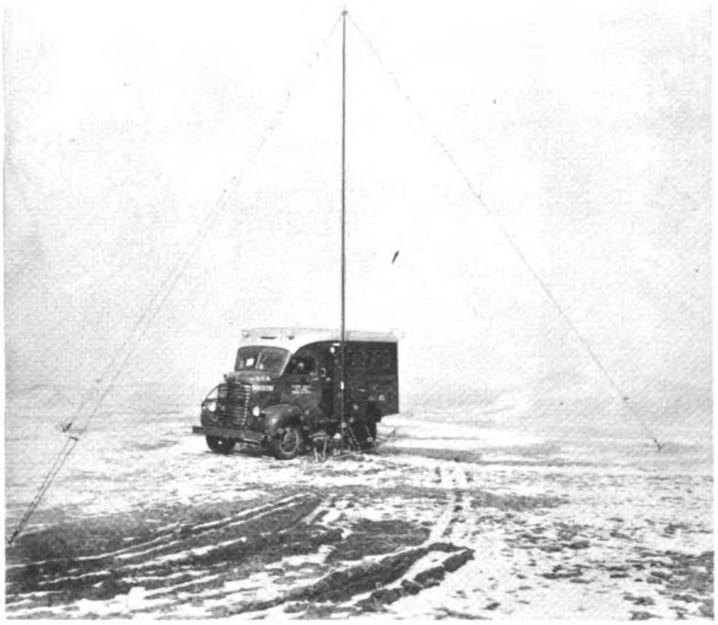


FIG. 6 TRUCK, EXTERNAL VIEW SHOWING ERECTED ANTENNA

e. Antenna

The antenna employed in conjunction with Radio Transmitter BC-325-B is of the vertical tapered mast type and is guyed in three directions for stability in high wind. It is composed of nine fitted sections which, when disassembled, are readily mounted in the brackets provided for the purpose at the rear of the truck. When erected for use the antenna stands vertical from a ground base plate held in place by two stakes, up the left wall of the truck, being supported from the wall by a porcelain standoff insulator as shown in Fig. 6. The guy ropes extend from a plate located about two-thirds of the distance up the antenna, to stakes driven 120 degrees apart in the ground at a suitable distance from the base. Electrical connection between the antenna and Radio Transmitter BC-325-B is made from a spade lug terminated lead attached to the antenna, to a bowl insulator in the truck wall. When in operation, the truck is electrically grounded by means of two ground rods. One of these is driven into the ground on the left hand side of the truck while the other is driven at the rear. Winged nut connections are provided at these two locations on the truck chassis and are connected to the ground rods by means of 8 ft. rubber-covered cords. The ground rods when not in use are mounted in a bracket at the front on the inner left wall of the truck.

f. Ventilating Unit and Floodlights

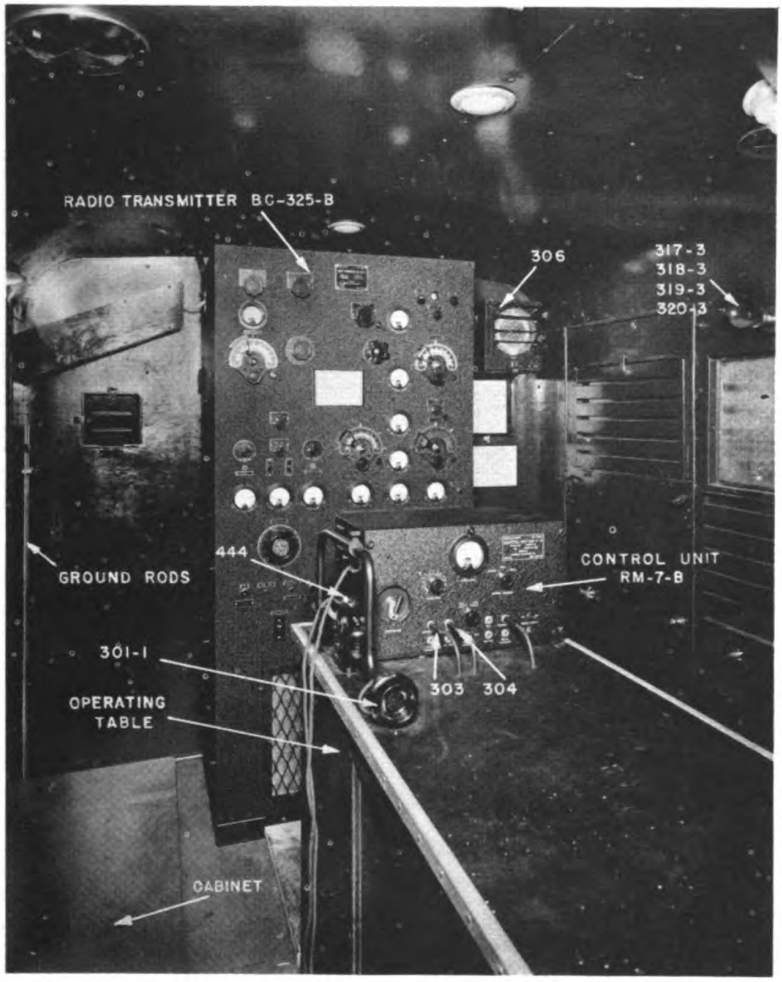


FIG. 7 INSTALLATION IN TRUCK, VIEW LOOKING TOWARDS FRONT

(1) A ventilating unit is mounted to the right of the radio transmitter on the cab body partition as seen in Fig. 7. This unit incorporates a 1500 watt heater unit and fan. It is possible to run the fan alone, but under no circumstances can the heater be operated without the fan, as a protective cut-out automatically turns off the heater if the fan fails. The cut-out can be reset by pressing a button on the front of the unit when the cause of the fan failure has been remedied.

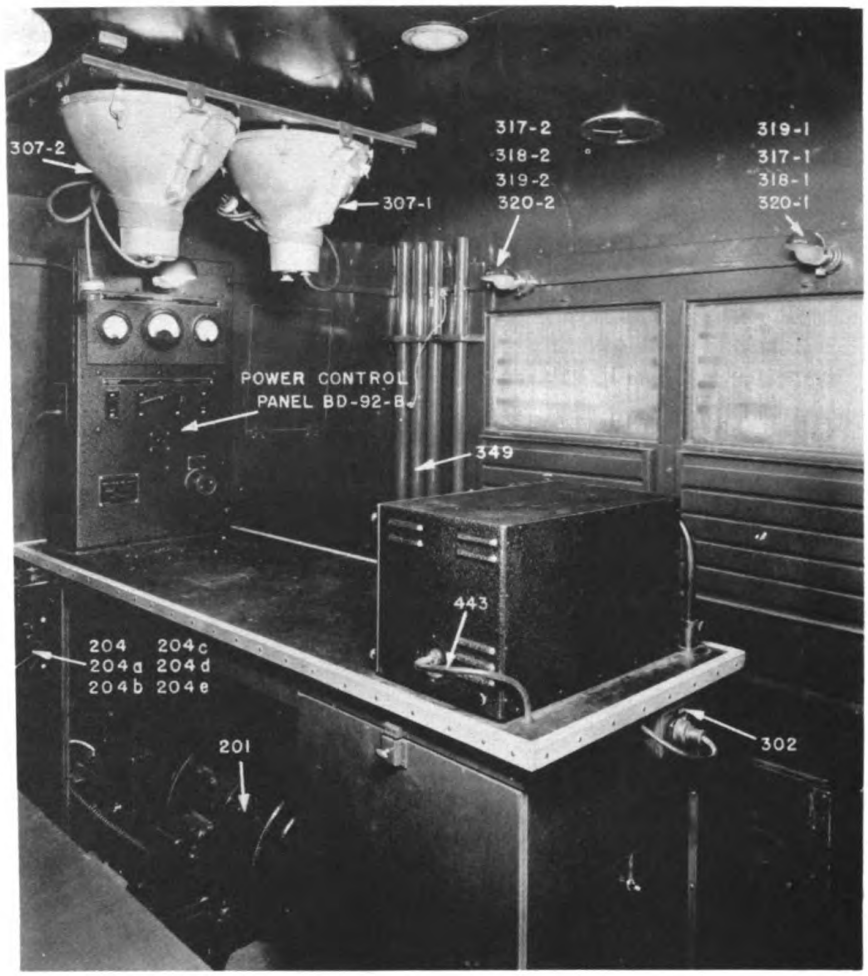


FIG. 8 INSTALLATION IN TRUCK, VIEW LOOKING TOWARDS REAR

(2) Floodlights are provided which operate from mounting brackets on the two rear upper corners of the truck. Power cords from the lights are plugged into capped outlets that are located near the bracket mountings. The floodlights are controlled by a toggle switch on the front panel of the Power Control Panel BD-92-B, and when not in use, are mounted from a rack on the ceiling of the truck as shown in Fig 8.

g. Installation

The installation of the transmitting components is seen in Figs. 7 and 8. The square, wood cover over each rear wheel well on either side of the truck has a hinged top. These serve as benches for the operating table and also for storage chests. An additional cabinet is built under the front end of the operating table with shelves and a drawer for spare tubes, fuses, etc. The other installed components already described in previous paragraphs are also identified in the two figures.

h. List of Power Input Requirements

Component	Power Input (Watts)
Radio Transmitter BC-325-B	2100
Control Unit RM-7-B	60
Heater-Ventilator Unit	1500
Floodlights (2)	400
Truck Lights (5)	250

II EMPLOYMENT

5. INITIAL PROCEDURE

In selecting an operating position for the truck, it is required that there be a 50 ft. lane free of overhead obstruction extending outward from the left door, for the assembling and erection of the antenna mast. A clear circular area of approximately 36 ft. radius must also be available around the base of the antenna for the installation of the guy stakes. If a commercial source of power is to be used in operating the transmitting equipment, it must be no further than 70 ft. away in order to use the supplied power cord. This need not be of any consideration, however, if the emergency generator is to be operated.

6. PREPARATION FOR USE

a. All the principal components are factory mounted in the truck, these components being Radio Transmitter BC-325-B, Control Unit RM-7-B set for local operation, emergency Generator GN-42-B with voltage regulator, and the Power Control Panel BD-92-B with the connection box and autotransformer. All components have been factory inspected for proper operation, but should be checked for tightness of screws, injury to wiring or meters, etc.

b. An inspection should be made to determine that the correct tube is installed in each socket. Tubes with Signal Corps type numbers marked on them have been tested before procurement and meet rigid Government Specifications. The corresponding commercial tubes not marked with Signal Corps type numbers may or may not be the equivalent in quality. Following is a list of the complete tube complement:

RADIO TRANSMITTER BC-325-B TUBE COMPLEMENT:

Position	Signal Corps Tube	Manufacturer's Type No.
Oscillator	VT-101	837
1st intermediate amplifier	VT-100	807
Keyer	VT-100	807
2nd intermediate amplifier (2 required)	VT-100	807
Power amplifier (2 required)	VT-106	803
Bias rectifier	VT-83	83
Oscillator rectifier	VT-83	83
Low voltage rectifier (2 required)	VT-46-A	866-A
High voltage rectifier (2 required)	VT-46-A	866-A
Modulator	VT-100	807
Modulation indicator	——	913

CONTROL UNIT RM-7-B TUBE COMPLEMENT:

Position	Signal Corps Tube	Manufacturer's Type No.
Microphone amplifier	VT-76	76
Microphone amp. rectifier	VT-80	80
Receiver disabling relay control	VT-95	2A3

c. Check all fuses to see that they are tight in their fittings and of the correct rating. The complete fuse complement is given in the following list.

RADIO TRANSMITTER BC-325-B FUSE COMPLEMENT:

	Circuit	Circuit Symbol	Current Rating	Voltage Rating	Bussman Mfg. Co. Catalog No.
Fuse complement for SCR-197-C	Oscillator and bias rectifiers	631-1	1.6 amp. Fusetron	250	4016
	Plate of low voltage rectifier	631-2	1.6 amp. Fusetron	250	4016
	Ventilating fan	631-3	1.6 amp. Fusetron	250	4016
	All filament transformers	632	3.2 amp. Fusetron	250	4032
	Plate of high voltage rectifiers	634	12 amp. Fusetron	250	412
Fuse complement for SCR-197-D	Oscillator and bias rectifiers	633	2.0 amp. Fusetron	250	402
	Plate of low voltage rectifier	631-2	1.6 amp. Fusetron	250	4016
	Ventilating fan	631-1	1.6 amp. Fusetron	250	4016
	All filament transformers	632	4.5 amp. Fusetron	250	4045
	Plate of high voltage rectifiers	634	12 amp. Fusetron	250	412

CONTROL UNIT RM-7-B FUSE COMPLEMENT:

Circuit	Circuit Symbol	Current Rating	Voltage Rating	Catalog No.
Main line	434	1 amp.	250	Littelfuse 3AG Cat. No. 1040

CONNECTION BOX FUSE COMPLEMENT:

Circuit	Circuit Symbol	Current Rating	Voltage Rating	Style or Catalog No.
110 V. supply	204-d	60 amp.	250	Ferrule type (renewable)
220 V. supply	204-e	35 amp.	250	Ferrule type (renewable)

d. If a commercial source of 110 or 220 volts is used current is fed into the connection box through the 75 ft. rubber covered power cord. The power cord may be fed through the fairlead opening at the rear of the truck down through the opening in the top of the connection box and to the appropriate inside terminals. However, before connecting to any power source always measure the voltage to verify that it is 110 or 220 volts. Then make certain that the connection is properly made (see ¶11) as shown on Fig. 50. After throwing the switch on the side of the connection box and the switch marked MAIN on the power control panel, observe the voltmeter and frequency meter on the power control panel; 110 volts and 60 cycles should be indicated. Should the voltage be not more than 10 per cent above or below 110 volts, it can be brought to within 5 per cent of the proper value by adjustment of the tap switch on the underneath side of the connection box. The truck is then supplied with voltage for the operation of any of the components.

e. If a remote operating position is to be used, it is necessary that two audio lines connect the remote position with the truck. For remote control distances up to 1500 feet the two Reels DR-4 of Wire W-110 which are mounted on stands at either side of the rear of the truck may be used. Fairlead openings in the rear wall of the truck are located so that the wires may be conveniently run through them, and each reel of wire is provided with an axle and crank to facilitate laying and reeling in the wire. Cranking may be done from either the inside or the outside of the truck as holes through the truck sidewalls are provided for the purpose of external cranking. Having run the two lines to the desired remote position, they may be connected in the truck and in the trailer, making sure that line 1 and line 2 correspond at the truck and trailer positions. The lines at the truck end are connected to the terminal boards located on either side wall adjacent to the wire reels and are plainly marked as line 1 or line 2. Should the desired remote position be more than 1500 feet away, commercial audio lines will have to be used. However, the same precaution, that line 1 and line 2 correspond at both ends, must be observed.

f. To erect the antenna, the nine mast sections are removed from their brackets and are laid end to end on the ground, ready for assembling at right angles to the left hand wall of the truck. The mast section numbers reading outward from the truck should be as follows: Mast Section MS-65, containing Insulator IN-102, Mast Section MS-66, Mast Section MS-67, Mast Section MS-68, Mast Section MS-69, Mast Section MS-70, Mast Section MS-71, Mast Section MS-72, and Mast Section MS-73. The Mast Brace MP-40 should then be mounted in place on the left hand wall of the truck. Directly under the mast brace the antenna base plate Mast Base MP-39 is staked to the ground with two Stakes GP-2 so that the antenna extending from the mast base up through the mast brace, will be in a true vertical line. Starting with the Mast Section MS-65, being connected to the mast base, the antenna may be assembled outwards, making sure that all intersection leads are connected to the wing nut fasteners. Mast Section MS-71 contains the guy rope mounting plate which should be put in place with guy ropes attached, the latter being laid alongside the antenna. With the mast base firmly staked to the ground, the operator should then lift the antenna somewhere near the middle and hoist it to a vertical position by walking along its length toward the truck, insert it into the mast brace, and close the locking gate. The guy wires are staked 120 degrees apart at a distance of 36½ ft. from the base of the antenna and pulled fairly tight. Attaching the spade lug tipped connection from the antenna to the bowl insulator in the left hand wall of the truck makes the antenna ready for service.

g. Remove the copper ground rods from their mounting bracket in the front left corner of the truck and drive them into the ground, placing one near the antenna and the other at the rear of the truck. The rods are then connected by means of the eight-foot rubber-covered ground leads to the wing nut connections on the truck chassis members.

7. OPERATION

a. Generator GN-42-B

(1) If a commercial source of power has been connected, it is only necessary to throw the switch on the

power control panel labelled MAIN to make operation possible. Otherwise, the emergency generator will have to be put into operation. To do this the truck motor is started and with the truck gears in neutral and the foot clutch disengaged, the gear lever for the generator power takeoff located on the cab floor at the driver's side is pulled up. Following this the foot clutch pedal should be let out and the generator set into rotation. By throwing the switch labelled EMERGENCY on the power control panel at the rear of the truck and the switch on the frequency meter in the cab, the driver has a visual indication of the frequency being generated, and the hand throttle on the steering column is adjusted until the frequency is 60 cycles ± 5%. The hand throttle may have to be reset from time to time as the motor speed varies while warming up or during variation of the load on the generator. When operating from the emergency generator, the power control panel ammeter should never read more than 28 amperes. This represents the rated full load on the generator and can be exceeded when too many extra components, such as lights, ventilating unit, etc., are operated simultaneously. CAUTION: *The emergency power supply transmission system must not be engaged or operated with the truck in motion.*

(2) The voltage regulator 202 must next be adjusted for automatic voltage control. This is done in the following manner:

First Step —Before starting the Generator move the automatic-manual switch to the manual position.

Second Step—Set the voltage control knob AE-4 in the neutral position as shown in Fig 26.

Third Step —Turn the exciter field rheostat 101, which is located on the Power Control Panel BD-92-B, all the way counterclockwise.

Fourth Step—See that the A-C main switch 103 marked EMERGENCY on the power control panel is ON.

Fifth Step —Adjust the exciter field rheostat 101, so that approximately 70 per cent of normal voltage or 77 volts is indicated on the power control panel voltmeter 105 when no load current is being drawn.

Sixth Step —Move the automatic-manual switch on the regulator to the automatic position and adjust the voltage control knob AE-4 until the power control panel voltmeter 105 indicates normal voltage plus 2 per cent or 112 volts. The generator and voltage regulator are now ready for operation.

b. Radio Transmitter BC-325-B (see Fig. 1)

(1) Before attempting to operate the radio transmitter, put the Tune-Operate switch 642-1 in the TUNE position, the antenna coupling control at zero, and the CW-Tone-Voice switch 562 on CW.

(2) Make sure both transmitter doors are held tightly closed by the thumb screws so that the door interlocks are engaged. Put the main power switch 647 in the ON position. Push the green START button 636 and the main power relay will be heard to close. The mechanical time delay will also be set in operation. After thirty seconds have elapsed plate voltage is automatically applied and tuning may proceed.

(3) Crystal or master oscillator control of the transmitter is selected by the Crystal-MO switch. Five crystal positions are available. A list of the frequencies of these crystals is given on the chart on the oscillator panel. The chart also indicates the Range Switch position with which each crystal is to be used. For master oscillator control, the chart has a 50 kc. point calibration for the entire master oscillator range. *Note—all frequencies given on the panel chart are fundamental oscillator grid frequencies.* Fig. 29 indicates the relation between fundamental oscillator grid frequency and transmitter output frequency.

(4) *Crystal Control*—Set the range switch to position indicated on oscillator panel chart. Translate from fundamental oscillator grid frequency to transmitter output frequency with Fig. 29. Obtain approximate oscillator grid dial setting from Figs. 30, 31, 32, and 33. *Note—Figs. 30, 31, 32, and 33 give calibration in terms of transmitter output frequency.* Press the test key 586 (see Fig. 1) and tune by the oscillator grid dial. As the dial is turned, a dip in oscillator plate current will be noted when the crystal oscillates. The correct setting of the grid tuning control is slightly to the high frequency (higher dial numbers) side of the minimum dip.

(5) *Master Oscillator Control*—Set the oscillator grid dial to the desired frequency from the approximate calibration of Figs. 30, 31, 32, and 33 or from the more accurate 50 kc point calibrations of the oscillator panel chart. *Note—The 50 kc point calibration is in terms of fundamental oscillator grid frequency.* Refer to Fig. 29 to translate to transmitter output frequency.

(6) Restore the test key 586 to the center position. Refer to Figs. 34 to 43, inclusive, for the approximate dial settings of all plate circuit tuning controls. Set the plate dials of the oscillator, 1st intermediate amplifier, 2nd intermediate amplifier, and power amplifier. Set the power amplifier grid coupling control to approximately 30. Press the test key 586 (see Fig. 1) and tune by the oscillator plate dial for resonance as indicated by a maximum 1st intermediate amplifier grid current. Retune as rapidly as possible the plate dials of each amplifier stage to exact resonance as indicated by minimum plate current for the

stage being tuned. Note that resonance of the oscillator plate circuit is indicated by a *maximum* of grid current in the 1st intermediate amplifier while exact resonance of all the other plate circuits occurs with *minimum* plate current of the stage being tuned.

(7) To operate the transmitter into the phantom antenna, consult the curves and chart of Fig. 44. This figure gives the settings for the antenna capacitor, antenna tuning switch, antenna inductor tap switch and the antenna transfer switch. Set the controls in accordance with Fig. 44. Increase the antenna coupling control until a rise in power amplifier plate current is noted and current is indicated on the antenna ammeter. Retune the antenna capacitor until a maximum current is read on the antenna ammeter. Increase the antenna coupling control until 150 ma. is indicated on the power amplifier plate milliammeter.

(8) To operate the transmitter into the vertical transmitting antenna, the curves and charts of Figs. 45 and 46 should be consulted. The tuning procedure is exactly as has been described for the phantom antenna under (7).

(9) With a plate current of 150 ma. in the power amplifier, put the transmitter on full power by throwing the Tune-Operate switch 642-1 to the OPERATE position. The power amplifier plate current will increase to about 300 ma. and the high voltage voltmeter will read about 2000 volts. *Reduce the antenna coupling if the power amplifier plate current is greater than 350 ma. which is the maximum allowable value.* Adjust the power amplifier grid coupling control for from 40 ma. to 50 ma. grid current in the power amplifier. For each adjustment of the grid coupling control, retune the 2nd intermediate amplifier plate control to exact resonance.

(10) *Keying*—With the CW-Tone-Voice Switch 562 on CW position, the transmitter may be keyed from any one of three operating positions, which are: (*a*) the front panel of the transmitter (*b*) the Control Unit RM-7-B located on the operating table in the truck (*c*) the Control Unit RM-7-B located in the trailer. For keying speeds of less than 80 wpm, put the High-Low speed keying switch in the LOW position. For keying speeds between 80 and 200 wpm, put the switch in the HIGH position. The High-Low speed keying switch is mounted on a phenolic panel on the second left side shelf of the transmitter. Access to this switch is gained by opening the left side transmitter door.

(*a*) To key from the panel of the transmitter, a key is plugged into the panel jack 588 (see Fig. 1) marked KEY and the Local-Remote switch is put on the LOCAL position. The latter switch is not numbered in Fig. 1, but is located directly below switch 562.

(*b*) To key from the Control Unit RM-7-B located in the truck, the Local-Remote switch on the transmitter panel is thrown to the REMOTE position. A key is plugged in the jack labeled KEY on the right side of the panel of the control unit and the position selecting switch in the center of the control unit panel is thrown to POSITION 2.

(*c*) To key from the Control Unit RM-7-B in the trailer, the Local-Remote switch on the transmitter panel is thrown to REMOTE. The position selecting switch on the panel of the control unit in the truck is put on POSITION 1. Keys are plugged into the jacks labeled KEY on the left and right side of the panel of the control unit in the trailer and either is selected by the position selecting switch of this same control unit.

(11) For voice modulation, the CW-Tone-Voice switch 562 (see Fig. 1) is thrown to the VOICE position. This automatically connects the modulator into the circuit and adjusts the power amplifier suppressor voltage for phone operation. The power amplifier plate current should drop to approximately one-half the CW value when going to voice. Readjust the power amplifier grid coupling control to obtain a grid current of 30 ma. on the power amplifier. With each change in the power amplifier grid coupling control, retune the 2nd intermediate amplifier plate dial to resonance. When the keying circuit is closed the transmitter can be voice modulated from any one of three operating positions which are: (*a*) the panel of the transmitter (*b*) the panel of the control unit in the truck (*c*) the panel of the control unit in the trailer.

(*a*) To talk from the transmitter panel plug a microphone into the jack labeled MICROPHONE and set all switches as mentioned for keying from this same location in paragraph (10) (a). The audio level from this microphone is controlled by the local gain control 578 (see Fig. 1) on the transmitter panel.

(*b*) To talk from the panel of the control unit in the truck, plug a microphone into the jack labeled MICROPHONE on the right hand side of the panel and adjust all switches as mentioned for keying from this same location in paragraph (10) (b). The audio level from this microphone can be varied by means of the gain control on the control unit or with the remote gain control on the transmitter panel. *The power level meter 598 on the transmitter panel should read less than —5 db on peaks.* —5 db corresponds to 100 per cent modulation.

(*c*) To talk from the panel of the control unit in the trailer, plug microphones in the jacks labeled MICROPHONE on the right and left side of the control unit panel. Set all switches in the same positions as described for keying in paragraph (10) (*c*). The audio level from these microphones can be varied with the control unit panel gain control 577 or with the remote gain control on the transmitter panel. *The power level meter 598 on the transmitter panel should read less than —5 db on peaks.* —5 db corresponds to 100 per cent modulation.

(12) The modulation indicator with its controls is located in the upper right hand corner of the transmitter

panel and gives visual indication of the percentage of modulation. To set in operation, turn the intensity switch 558-b (see Fig. 1) in a clockwise direction until a slight click is heard, indicating that the On-Off Switch is in the ON position. With the transmitter keying circuit closed, but no modulation present, the intensity control 558-a is increased until a vertical line is visible on the cathode ray tube. R-F control 662 is then varied until the vertical line occupies approximately ¾ of the diameter of the screen and the focusing control 663 is adjusted until the line becomes sharp and clear. The transmitter may then be modulated and a trapezoidal pattern will result, the length of which on the horizontal axis increases with modulation. The exact percentage of modulation is obtained by the ratio:

$$\frac{D_1 - D_2}{D_1 + D_2} \times 100$$

where D_1 is the length of the longer vertical side and D_2 is the length of the shorter vertical side of the pattern. At 100 per cent modulation where D_2 becomes zero, the pattern is a triangle. *The modulation indicator should never be run at high intensities or with just a spot indication, as either of these two conditions results in a burned screen.*

(13) For tone modulation, the CW-Tone-Voice switch 562 (see Fig. 1) is thrown to the TONE position. Three audio tones are available and are selected on a selector switch, which is located on a phenolic panel behind the left door of the transmitter. Position 1 on the selector switch gives an audio tone of approximately 550 cycles, position 2—950 cycles and position 3—1450 cycles. The percentage of tone modulation is controlled by a gain control located on the same panel with the selector switch. The power amplifier plate current is approximately one-half the CW value when tone is being used. The transmitter may be keyed from any one of the three operating positions described under CW operation.

NOTE: In tuning the Power Amplifier plate circuit it is possible, on some ranges, to tune to a harmonic frequency instead of the fundamental frequency. Since this harmonic or false dip is due to tank circuit leads and stray capacities, it may be found either above or below the dial setting of the fundamental frequency.

Therefore in tuning this stage, the P.A. tuning dial should be rotated sufficiently to be sure that the correct P.A. plate current dip is found.

The P.A. plate circuit should always be first tuned up with the antenna coupling set at zero in which case the false tuning point will result in a plate current dip much less pronounced than the correct or fundamental dip.

If the operator inadvertently tunes to the false dip, this will become evident in attempting to load up the transmitter, as the output will be much less than normal and the efficiency very poor. If, however, the stage is correctly tuned, these harmonic frequency tuning points cannot cause any spurious radiation.

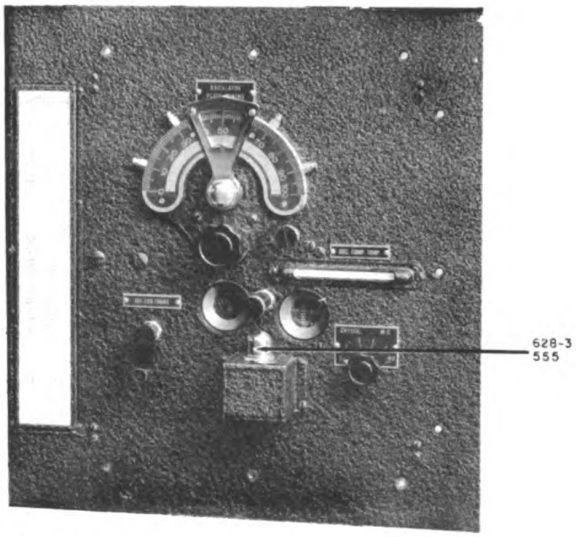


FIG. 9 RADIO TRANSMITTER BC-325-B, FRONT VIEW OF OSCILLATOR

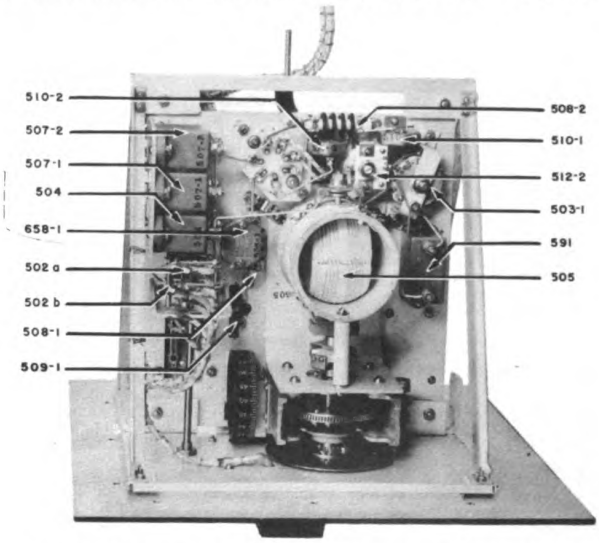


FIG. 10 RADIO TRANSMITTER BC-325-B, BOTTOM VIEW OF OSCILLATOR

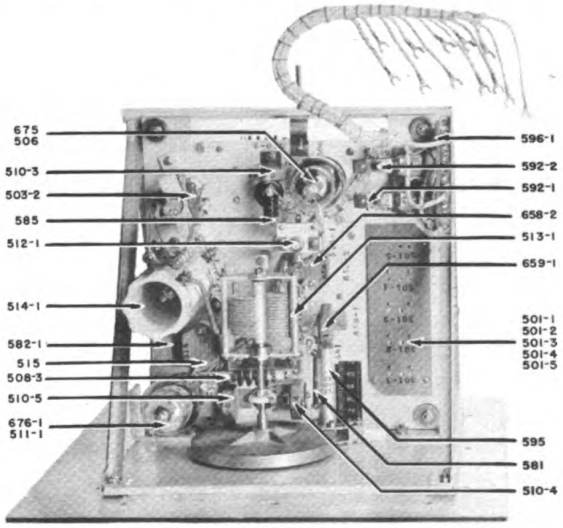


FIG. 11 RADIO TRANSMITTER BC-325-B, TOP VIEW OF OSCILLATOR

III DETAILED FUNCTIONING OF PARTS

8. RADIO TRANSMITTER BC-325-B (see Fig. 48)

a. Oscillator

(1) The oscillator is of the Colpitts type utilizing a Tube VT-101 (commercial type 837) a pentode tube with the fundamental frequency being generated between screen and grid and with the plate circuit resonated at the second harmonic. Feedback voltage of the proper phase and magnitude for self-oscillation in MO operation is obtained across capacitor 507-2 which forms part of the grid tank tuning capacity. For crystal control, switch 502 puts the desired crystal in series with the oscillator grid where it acts as a band pass filter at the crystal frequency and stabilizes the oscillation at that point. The grid tank circuit comprised of variometer 505, capacitors 504, 507-1, 507-2 and 591 and a small variable padding capacitor 512-2 is arranged to cover the frequency range of 750-2250 kc in two bands, 750-1300 kc and 1300-2250 kc. The lower of these two bands is used on positions 1, 2, 3, 5 and 7 of the main range switch 503 with section 1 (503-1) of this latter switch putting capacitor 591 across the tank. On positions 4, 6, 8, 9 and 10, capacitor 591 is omitted and the range of the higher band is covered. The grid of the oscillator tube is coupled through capacitor 658-1 across approximately two-thirds of the grid tank. The d-c grid return current goes to ground through the r-f choke 508-1 and a resistor 509-1, the voltage drop across the latter supplying part of the oscillator bias. The cathode of the oscillator tube is maintained above r-f ground potential by r-f choke 508-2, while the low potential end of this choke is by-passed for radio frequency by means of capacitor 510-1. The d-c cathode return is connected to the HIGH-LOW speed keying switch 554 through terminal board 556. With this latter switch in the HIGH position, the cathode is returned to ground through resistor 553. In the LOW position the cathode returns to ground through keyer tube 676-4. The series cathode resistance of either resistor 553 and the plate resistance of the keyer tube are approximately equal and provide additional bias for the oscillator tube. The screen is by-passed to ground for radio frequency by capacitor 510-2 and receives its positive d-c voltage from lead 1 on the bleeder resistor 620-1 of the oscillator rectifier power supply. The plate of the oscillator tube receives d-c voltage through D-C milliammeter 517-1, which is by-passed by capacitor 519-1, and r-f choke 585, by-passed at its low potential end to ground by capacitor 510-3. The plate of the oscillator tube is coupled by means of series capacitors 512-1 and 658-2 to the plate tank circuit which is comprised of capacitors 659-1 and 513-1, inductor 514-1, and range switch section 503-2. Variable coupling capacitor 512-1 is factory set and locked and should not be tampered with. The oscillator plate tank is always operated at twice the grid frequency. There are five taps on inductor 514-1. These are wired to their appropriate positions on the section 503-2 of the main range switch. Detailed views of the oscillator are shown in Figs. 9, 10 and 11.

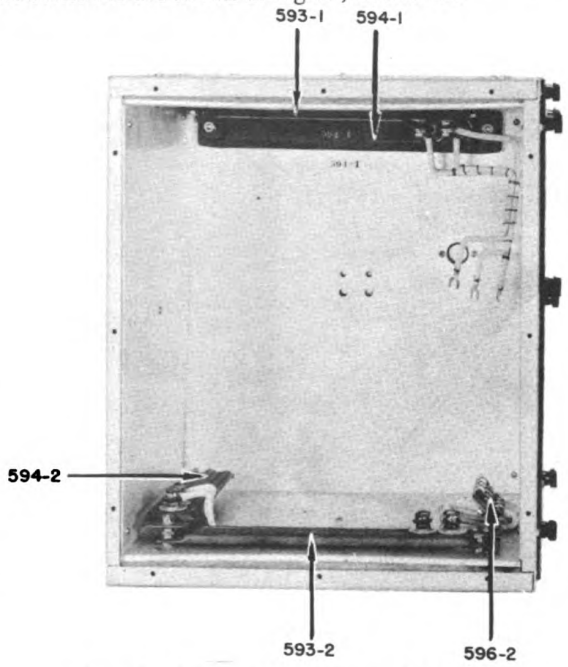


FIG. 12 RADIO TRANSMITTER BC-325-B, OSCILLATOR COMPARTMENT BOX

(2) The oscillator compartment shown in Fig. 13 is thermally insulated and temperature controlled to approximately 63°C. by heater elements 593-1, 593-2, 594-1 and 594-2 and thermostats 592-1 and 592-2. These heaters operate from 110 volts a.c. which is supplied from the terminal board 556 through the cable at the rear of the oscillator compartment. Heaters 593-1 and 593-2 have a combined capacity of 175 watts and are controlled by thermostat 592-2 which regulates at a temperature of approximately 63°C, while heaters 594-1 and 594-2 have a combined capacity of 700 watts and are controlled by thermostat 592-1 to regulate at approximately 45°C. The purpose of the latter two heaters is to rapidly heat the oscillator box. Because their controlling thermostat regulates at a temperature of approximately 45°C., these heaters do not operate when the box is at the required temperature of 63°C, the smaller heat capacity heaters with their thermostats regulating the compartment temperature at the latter value. A thermometer 595, the scale of which is located on the oscillator panel, gives visual indication of the internal box temperature. All crystal

compartment heaters are put into operation when the power switch 647 is thrown to ON.

b. First Intermediate Amplifier

The first intermediate amplifier Tube VT-100, a beam power commercial type 807, is located in the oscillator compartment. The grid is coupled to the plate circuit of the oscillator by means of coupling capacitor 515. The d-c fixed bias for this grid is furnished from the bleeder 621 of the bias power supply. In series with the bias lead are a d-c milliammeter 518 by-passed by capacitor 519-2, resistor 581 and r-f choke 508-3. Resistor 581 provides additional regulating bias while the r-f choke, in conjunction with the by-pass capacitor 510-4, serves to keep the r-f voltage out of the d-c bias supply. The screen is by-passed to ground by capacitor 510-5 and receives its positive d-c voltage from the bleeder 620-2 of the low voltage power supply. Capacitor 582-1 by-passes the cathode to ground. The d-c return of the cathode is made through resistor 553 in the LOW position of keying speed switch 554 or through the keyer tube in the HIGH position of this same switch. The plate tank circuit which is comprised of capacitor 659-2 and 513-2, inductor 514-2, and section 503-3 of the range switch is located on the shelf directly above the oscillator compartment. The lead connecting the plate of the first intermediate amplifier tube to its tank circuit is fed through a feed-through insulator on the top of the oscillator box. The inductor 514-2 has four taps which are connected to range switch section 503-3 along with the extra padding capacitor 659-2. Plate voltage is fed to the low R-F potential end of the plate inductor from the bleeder 620-2 of the low voltage rectifier and is by-passed to ground by capacitor 510-6. D-C milliammeter 520-1 in series with the voltage lead indicates the first intermediate amplifier plate current and is by-passed by capacitor 519-3.

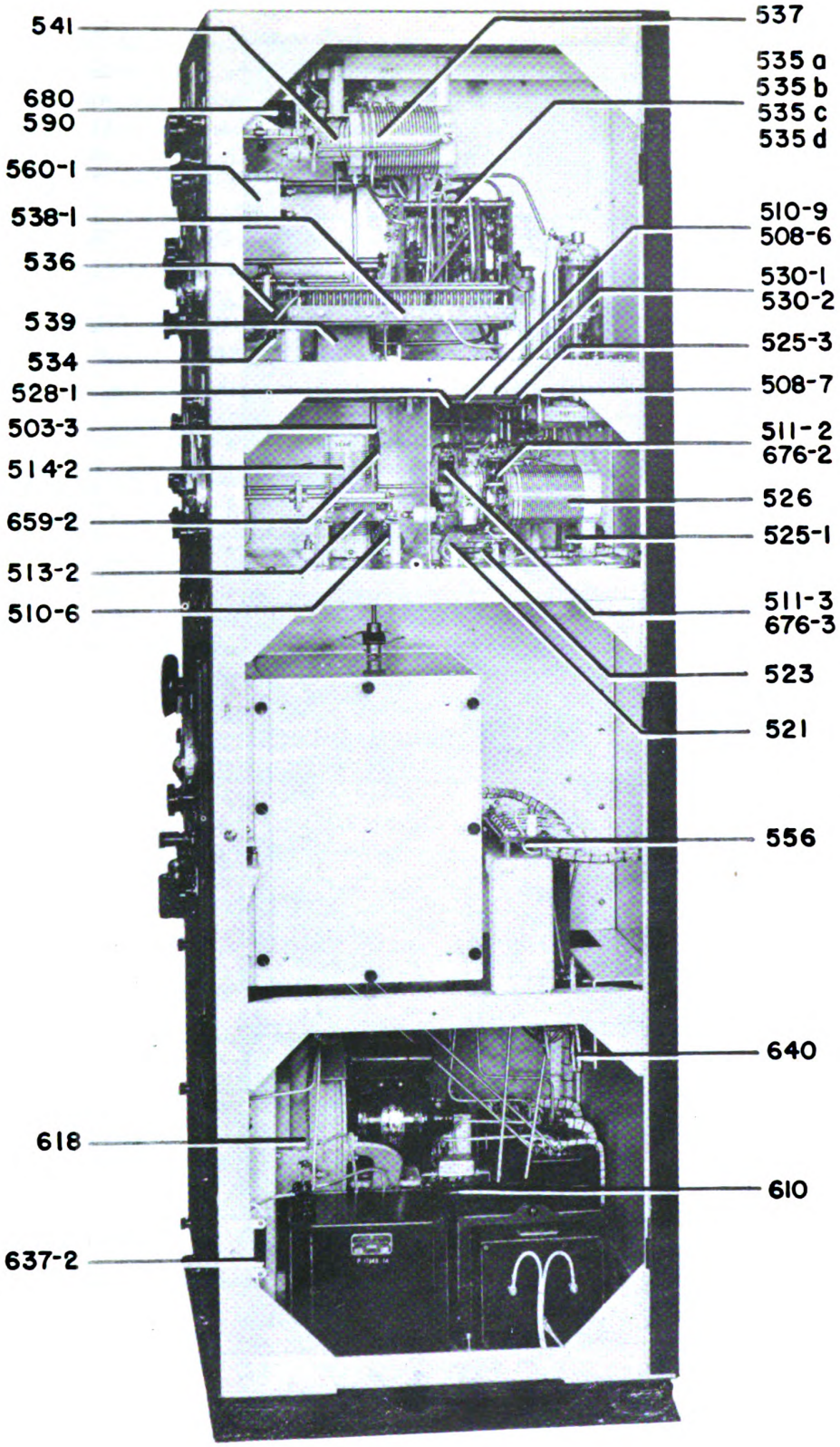


FIG. 13 RADIO TRANSMITTER BC-325-B, RIGHT SIDE INTERIOR VIEW

c. Second Intermediate Amplifier

The second intermediate amplifier consists of two Tubes VT-100, beam power commercial type 807, connected in parallel. Their grids are coupled to the plate circuit of the first intermediate amplifier by coupling capacitor 521. Resistors 522-1 and 522-2 are in series with each grid to prevent parasitic oscillation. Fixed bias for the grids of this stage is furnished from bleeder 621 of the bias power supply and is fed through the meter 517-2, which is by-passed by capacitor 519-4, resistor 523 and the r-f choke 508-4. The r-f choke 508-4 in conjunction with the by-pass capacitor 510-7 serves to keep r-f voltage from the bias supply, and resistor 523 furnishes additional regulating bias. The screens are by-passed by capacitor 510-8, and receive d-c voltage from the bleeder resistor 620-2. The plates are connected to the tank circuit which consists of capacitors 528-2 and 513-3, inductor 526, and range switch section 527. The padding capacitor 513-3 is connected to the range switch section 527 for the purpose of furnishing additional capacity on some frequency ranges. Padding capacitor 513-3 is factory adjusted and locked and requires no further adjustment. D-C plate voltage is applied at the low potential end of the plate inductor through the d-c milliammeter 529 and r-f choke 508-5. The purpose of the combination of r-f choke 508-5 and by-pass capacitor 525-1 is to keep r-f from the d-c plate supply. Meter 529 is by-passed by capacitor 519-5.

d. Power Amplifier

The power amplifier consists of two pentode Tubes VT-106, commercial type 803, connected in parallel. The two grids are coupled to the plate tank of the second intermediate amplifier by means of variable capacitor 528-1 which is adjustable from the front panel. Fixed bias is supplied from the bleeder resistor 621 of the bias power supply, with the d-c milliammeter 520-2 indicating the rectified d-c grid current. The combination of resistors 530-1 and 530-2 and r-f choke 508-6 are for the purpose of lowering the input impedance sufficiently to prevent any tendency toward self-oscillation. The two screens are by-passed to ground by capacitor 510-10 and receive d-c voltage from the bleeder of the high voltage power supply at the junction of resistors 661-1 and 660. Suppressor grids are also paralleled but separately by-passed to ground by capacitor 582-3 and 582-4. The d-c suppressor voltage lead is isolated by r-f choke 508-7 and connects to the rotor of section b of the CW-Tone-Voice switch 562. This switch connects positive voltage from lead 6 on bleeder 620-2 for CW operation and negative voltage from lead 3 of bleeder 621 for tone or voice. The plate tank circuit of the power amplifier is comprised of the capacitor 538-1 and 536, the inductor 537, and the three sections of the main range switch 535a, 535b, and 535c. Main tuning capacitor 538-1 is of the dual section type, the sections being used in parallel or singly on various range switch taps. Padding capacitor 536 is also employed on certain ranges, being incorporated in the circuit by range switch section 535a. This capacitor has been factory adjusted and locked and requires no further adjustment. Plate voltage to the power amplifier is supplied by the high voltage power supply through d-c milliammeter 540, which indicates the plate current. The r-f choke 534 in conjunction with by-pass capacitor 539 serves to keep the r-f voltage of the tank from the d-c supply. The filaments are by-passed to ground by capacitor 525-2 and 525-3 and receive their voltage from terminals 14 and 16 of transformer 602.

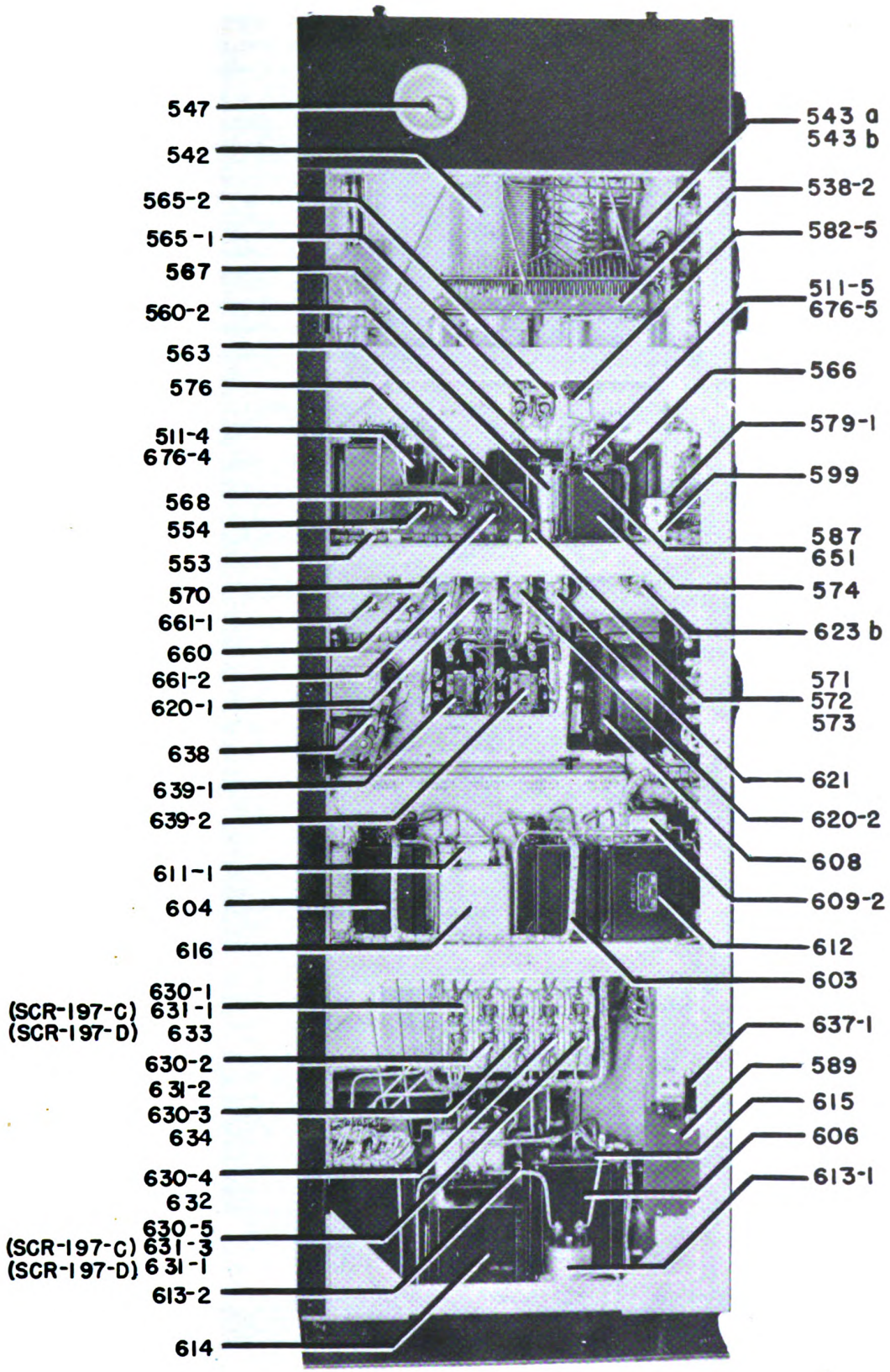


FIG. 14 RADIO TRANSMITTER BC-325-B, LEFT SIDE INTERIOR VIEW

e. Antenna Coupling Network

(1) The antenna circuit is inductively coupled to the power amplifier tank by means of the coupling coil 541. When the antenna transfer switch 546 is in the position marked PHANTOM, the coupling network is a series tuned circuit with the series loop being made up of coupling coil 541, dummy load elements 548, 524-1 and 524-2, antenna ammeter 550, and other capacitive and inductive elements depending upon the position to which the antenna tuning switch 544 has been set. In position 1 of switch 544 the high capacity section of variable capacitor 538-2 and the parallel capacitance of capacitor 545 are in series with the inductor 542. The inductor 542 is equipped with a shorting type tap switch 543a which has sixteen positions and allows a corresponding number of inductance values to be selected. In position 2 of the antenna tuning switch 544, only the high capacitance section of the variable capacitor 538-2 is in series with inductor 542. In position 3 of this switch, only the low capacitance section of capacitor 538-2 is employed, the inductor 542 being entirely eliminated from the circuit.

(2) When operating into the real antenna with the antenna transfer switch 546 set in the ANTENNA SERIES position, tuning is accomplished in the same manner as previously described for the phantom antenna. Antenna ammeter 550 indicates the current at the base of the antenna.

(3) When operating the antenna with the antenna transfer switch 546 on the ANTENNA PARALLEL position, the antenna is connected through ammeter 550 directly to the high potential end of the coupling coil 541. The antenna circuit is parallel tuned by selecting combinations of capacitance and inductance with antenna tuning switch 544.

f. Voice-Tone Modulating Circuit

The audio frequency Tube VT-100, commercial type 807, serves the dual purpose of an amplifier-modulator tube for voice modulation or a tone oscillator capable of producing three audio frequencies for modulated CW. Transformer coupling is employed in both the grid and plate circuits of this stage. Plate transformer 567 has three windings which are employed as follows: The winding between terminals 1 and 2 is in the plate circuit of the tube, with terminal 2 going to the plate, and terminal 1 to the d-c plate voltage at the bleeder resistor 620-1 of the oscillator power supply. Capacitor 565-1 provides an audio by-pass across the d-c supply. The winding between terminals 3 and 4 couples into the suppressor of the power amplifier when modulation is employed. The suppressor is placed in series with this winding by means of the CW-Tone-Voice switch section 562b. Chokes 566 and 569 and capacitor 564 serve as an audio filter to give the desired characteristics for voice modulation. It should be noted that choke 569 is placed in parallel with choke 566 by switch sections 562c and 562d when voice is being used, and is removed for tone. This is done to give the desired voice characteristics, but allows a greater degree of high frequency attenuation on tone for the suppression of undesired audio harmonics. Potentiometer 568 provides the correct load resistance for the audio tube and also serves as a gain control for tone modulation. The winding of the plate transformer between terminals 5 and 6 provides feedback for the tone oscillator. In the TONE position of switch 562, this winding is parallel tuned to the three desired tone frequencies of 550, 950 and 1450 cycles per second by choke 569 and capacitors 573, 572 and 571, respectively, and is coupled back to the grid through resistor 563. The three latter capacitors are selected by the tone frequency selector switch 570. The grid transformer 574 has three windings. The one between terminals 7 and 8 connects the grid of the audio tube to ground and is loaded by resistor 587. The winding of terminals 1 and 4 is for voice input and has two taps at terminals 2 and 3 so that either a microphone or 600 ohm line may be matched. The third winding, terminals 5 and 6, is not used. A 600 ohm input is connected to terminals 1 and 4 when the Local-Remote switch 580 is in the REMOTE position. This input is connected to the terminal board 589 and in turn to the control unit RM-7-B, and has two T-pad attenuators across it with an audio level meter 598 inserted at their common point. T-pad 577 provides panel control for the audio signal coming over the control line. T-pad 599 is factory set and sealed so that 100 per cent modulation of the transmitter is accomplished with an audio level indication of minus 5 db. With the Local-Remote switch 580 in the LOCAL position, modulation from the front panel jack 516 is possible. This jack is connected from terminal 3 to ground, and terminal 1 returns to ground through resistor 579-2. Rheostat 578 is connected across terminals 1 and 3 and acts as a gain control for the local microphone. D-C microphone current is supplied by having the cathode current of the audio tube flow to ground through the center tap of the microphone winding at terminal 2 and through choke 576. The balanced nature of the microphone circuit prevents the d-c microphone current from causing any saturation in the input winding.

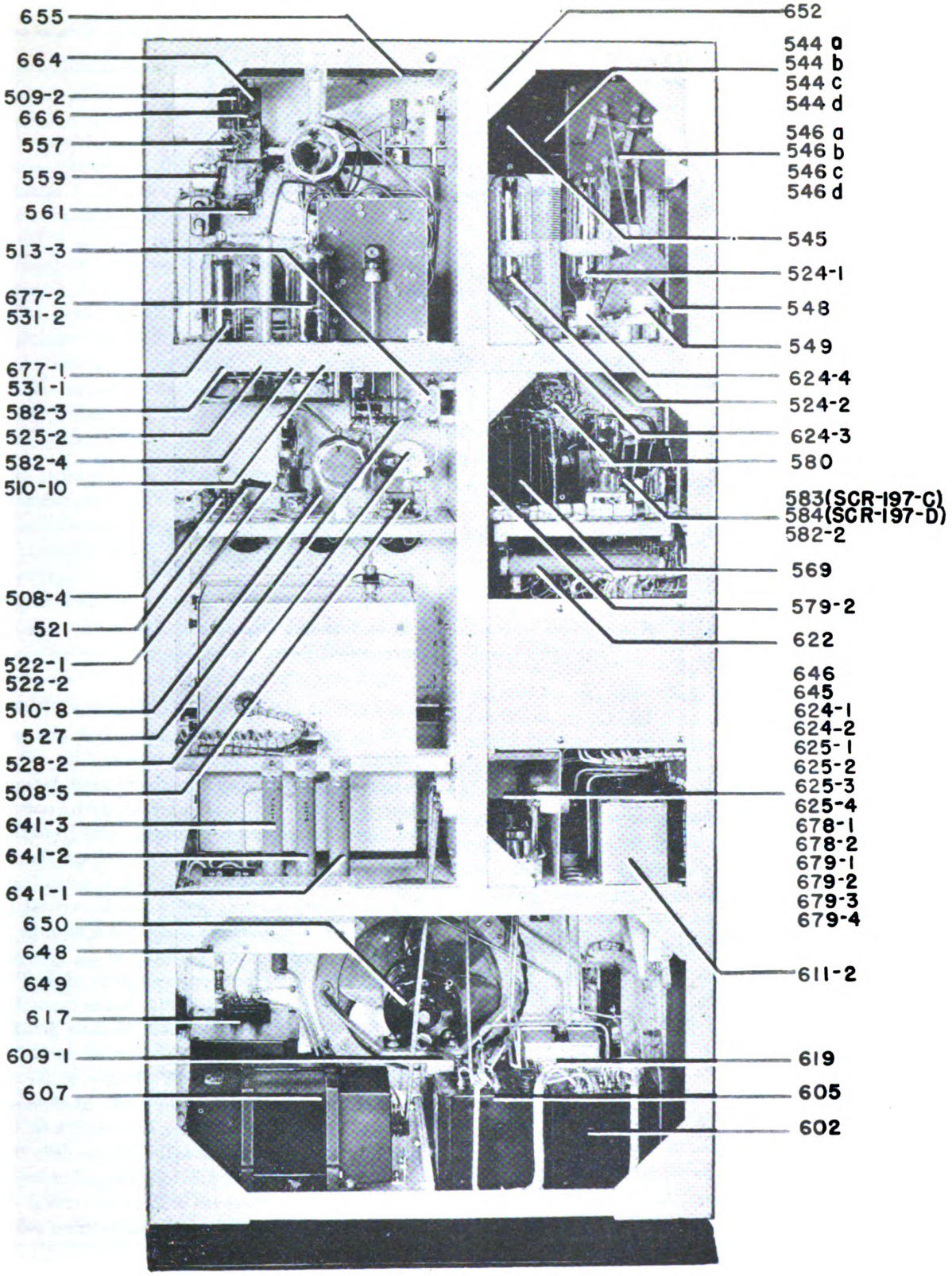


FIG. 15 RADIO TRANSMITTER BC-325-B, REAR INTERIOR VIEW

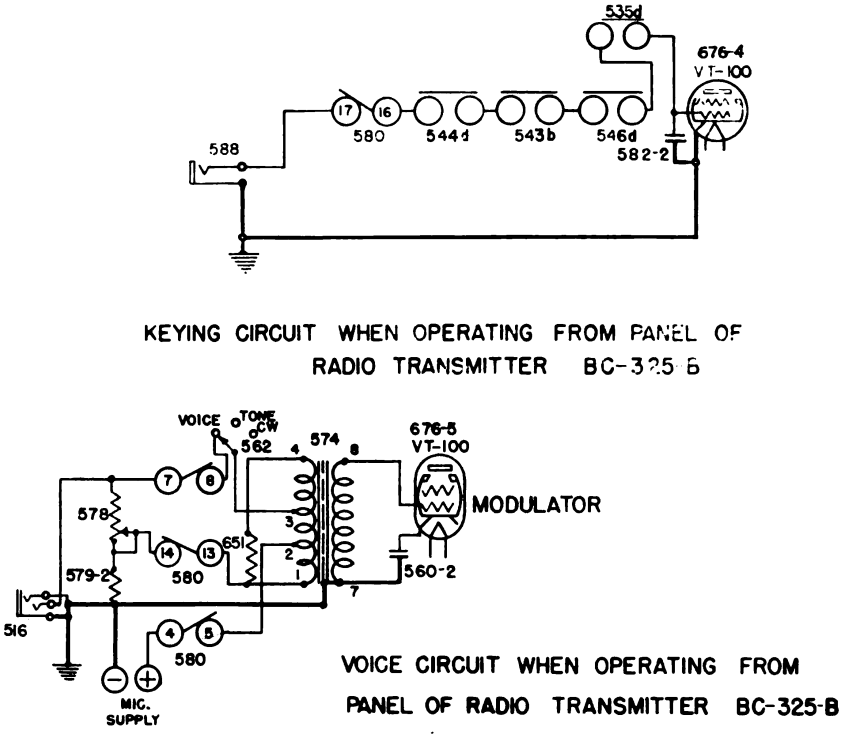


FIG. 16 RADIO TRANSMITTER BC-325-B, FUNCTIONAL DIAGRAM OF KEY AND MICROPHONE CIRCUITS FROM PANEL

g. Keyer Tube

The keyer Tube VT-100, commercial type 807, is placed in series with either the oscillator or first intermediate amplifier cathode by the High-Low speed keying switch 554. In the LOW speed position, the oscillator is keyed and in the HIGH speed position, the intermediate amplifier is keyed. The cathode current of the stage being keyed is conducted through the keyer tube to ground. In the key up position, the grid of the keyer tube is biased to cut-off with a negative voltage from the bleeder resistor 621. In the key down position the grid is shorted to ground by the key contacts. Resistor 583 or 584 prevents the key from shorting the bias supply. The grid of the keyer tube is by-passed to ground by capacitor 582-2. The keying circuit has in series with it four contactors numbered 535d, 543b, 546d and 544d (see Fig. 16). These contactors are located in order on the range switch, antenna transfer switch, antenna inductor switch, and antenna tuning switch, and are for the purpose of preventing arcing on these switches by interrupting the r-f output as the switches are rotated. Test key 586 is permanently connected to the grid of the keyer tube.

h. Modulation Indicator

The modulation indicator is a commercial type 913 cathode-ray tube. The d-c voltage to supply the various elements of this tube is obtained from the bleeder resistor 620-1 and is connected through the ON-OFF switch 558b to the voltage divider comprised of resistor 559, potentiometer 663, and potentiometer 558a. The cathode is connected above ground to the junction between potentiometer 663 and 558a, allowing a negative potential to be put upon the intensity controlling grid from the arm of the potentiometer 558a. Positive voltage for the focusing anode is obtained from the arm of potentiometer 663. The accelerating anode and a single vertical and horizontal deflection plate are connected within the tube, and are at the maximum d-c potential of the voltage divider. Audio is fed from the suppressor grids of the Power Amplifier to the horizontal deflection plates through blocking capacitor 561 and resistor 509-2. Resistor 509-2 works in conjunction with resistor 665 to act as an audio voltage divider and capacitor 664 is directly across the audio deflection plates as an r-f by-pass. Modulated carrier voltage is picked up by the rod located near the power amplifier tank and applied to the vertical deflection plates. Variable capacitor 662 provides a variable impedance to ground for controlling the amount of vertical deflection, and resistor 557 prevents any charge from collecting on the vertical deflection plates.

i. Power Supplies

(1) The rectifier tube compartment is equipped with a heater and controlling thermostat which applies heat when the ambient temperatures is below 25 degrees C. so that

the correct range of operating temperatures for mercury vapor type tubes is always available.

(2) The oscillator voltage supply employs Tube VT-83 (commercial type 83 mercury vapor rectifier) in a full-wave, single-phase, rectifying circuit. The high voltage is supplied from terminals 6 and 8 of transformer 605, and the filament voltage for the rectifier tubes is obtained from terminals 3 and 5 of transformer 604. The negative side of the rectified voltage from tap 7 of transformer 605 is connected to ground through filter choke 610. This choke is tuned by capacitor 609-1 to a frequency of 120 cycles, which is the chief ripple frequency in the rectified voltage. The center tap of the filament winding, terminal 4 of transformer 604, is the positive side of the rectified voltage. A tapped bleeder resistor 620-1 is connected across the d-c output for the purpose of providing different values of voltage and adequate regulation. Capacitor 611-1 gives further filtering of undesired ripple.

(3) The negative bias voltage supply employs Tube VT-83 (commercial type 83 mercury vapor rectifier) in a single-phase full-wave circuit with the high voltage coming from terminals 3 and 5 of transformer 605, and the filament voltage from terminals 3 and 5 of transformer 603. A tuned filter consisting of choke 612 and capacitor 609-2 is employed. The tapped bleeder resistor 621 provides various values of negative voltage for bias purposes, and the capacitor 611-2, which is shunted across it, gives additional filtering of undesired ripple.

(4) The two Tubes VT-46-A in the low voltage supply are of the mercury vapor type (commercial type 866-A) and are in a full-wave, single-phase circuit. Filament voltage for these two tubes is obtained from terminals 6 and 8 of transformer 603. High voltage is supplied from terminals 3 and 5 of transformer 606. The tuned filter consisting of choke 614, capacitor 613-1 and resistor 615 resonates at 120 cycles, the predominate ripple frequency, and resistor 615 prevents dangerous peaks of current from being drawn from the rectifier tube. Capacitor 616 gives additional filtering.

(5) The main high voltage supply is of the single-phase, full-wave type employing Tubes VT-46-A as rectifiers (commercial type 866-A's). Choke 617, capacitor 613-2 and resistor 618 form the resonant filter in the negative high voltage lead. Terminals 3 and 5 of transformer 607 are the high voltage leads, and the rectifier tube filaments are supplied from terminals 6 and 8 of transformer 604. The bleeder is comprised of the series resistors 661-2, 660, 661-1, 622. The capacitor 619 paralleled with the bleeder serves the purpose of supplying additional ripple filtering. The overload relay, in series with the negative return of the power supply, passes all current being supplied. In case of overload, the relay operates to draw the contacts into an open circuit position. This removes all line voltage from the transmitter. The resistor 649, which is paralleled with the overload relay coil, serves to make the relay trip within the proper range of values. When an overload has caused the overload relay to operate, it is necessary to push the START switch 636 and repeat the 30 second time delay cycle before the transmitter can again be operated. Resistors 641-1, 641-2, and 641-3, which are shunted by the contacts of relay 640, are in series with the primary of the high voltage transformer 607 to give reduced voltage for tuning purposes. The coil of the relay 640 is energized by 110 volts a.c. and is controlled by the TUNE-OPERATE switch 642-1. Meter 623a, which is by-passed by capacitor 519-9 and is located on the front panel of the radio transmitter, indicates the output voltage of this main high voltage supply.

j. Power Control Circuits

(1) When the MAIN power switch 647, located on the radio transmitter panel, is thrown ON, 110 volts is immediately applied to the crystal box and rectifier compartment heaters. 110 volts is also available for the energizing of the time delay relay 638, providing the door interlocks 637-1 and 637-2 are engaged. The green START switch button 636 is next pushed, closing contacts T-1, L-1 and T-2, L-2 of the time delay relay and setting into action the time delay contacts X, Y. Closing contacts T-1, L-1 and T-2, L-2 applies voltage to the primaries of the filament transformers 602, 603, and 604 so that tube filaments start to heat. After thirty seconds have elapsed from the time that the START button is pushed, the time delay contacts X, Y automatically close, energizing relay 639-1 which applies primary voltage to the oscillator, bias, and low voltage power supplies. If the main power supply OFF-ON switch 642-2 is in the ON position, relay 639-2 is energized and primary voltage is applied to the main high voltage supply. All power is then on and the transmitter is ready for operation.

(2) Voltmeter 626, having low and high voltage ranges, is connected by filament-line switch 627 to read, in the FILAMENT position the voltage across the filaments of the power amplifier and in the LINE position the voltage at the main power switch 647.

k. Circuit Protection

A 25 ampere circuit breaker of the thermal type is incorporated in the main power switch 647 and provides overall protection to the a-c power line. In addition to this, various circuits in the transmitter are separately fused. A fuse is in series with the motor for ventilating fan 650. Fuse 632 is in the primary circuit of the three filament transformers 602, 603 and 604. It should be noted that the high voltage transformers 605, 606 and 607 cannot receive primary voltage when fuse 632 is blown, thus protecting all tubes against application of plate voltage without filament voltage. The primary of the high

voltage transformer 605 of the oscillator and bias power supplies is protected by a fuse. If this fuse blows no primary voltage is applied to low voltage and main high voltage supplies, thus providing protection to all stages in case of bias failure. Fuse 631-2 protects the primary of transformer 606 of the low voltage power supply. The main high voltage supply has the double protection of the fuse 634 and the overload relay 648 which has been previously described in the description of the main high voltage power supply.

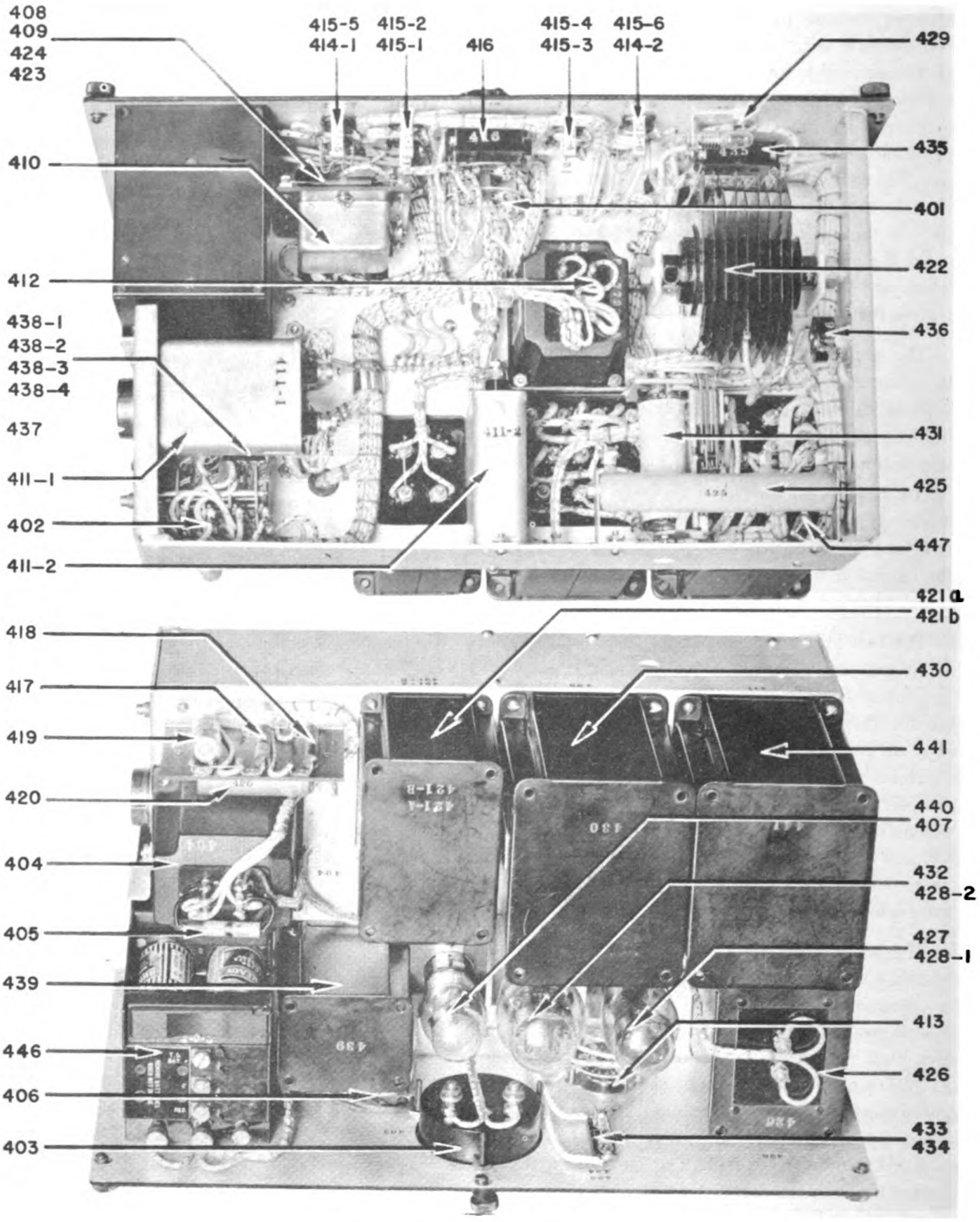


FIG. 17 CONTROL UNIT RM-7-B, VIEWS OF CHASSIS REMOVED FROM CABINET

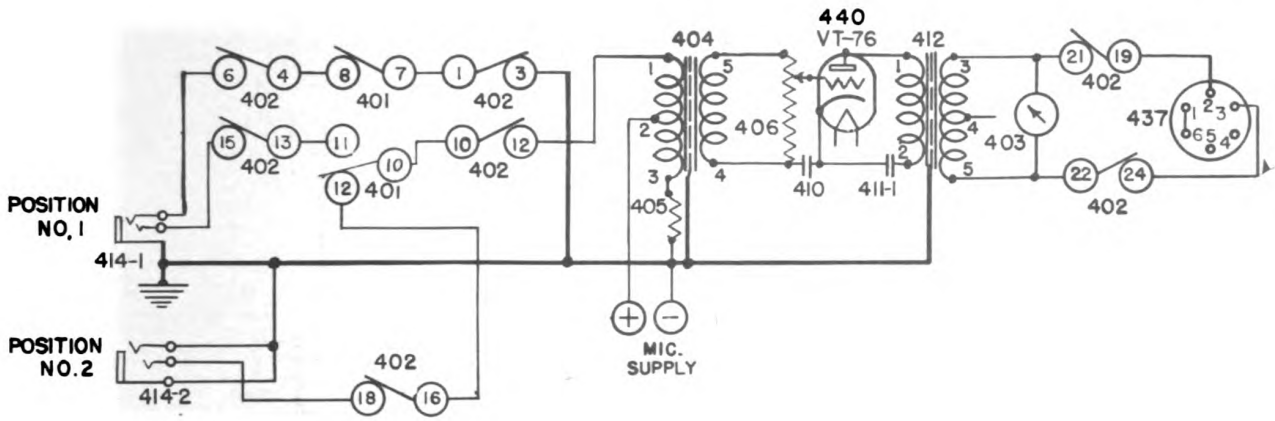


FIG. 18 CONTROL UNIT RM-7-B, ADJUSTED FOR REMOTE OPERATION, VOICE CIRCUIT

9. CONTROL UNIT RM-7-B (see Figs. 17 and 49)

a. Remote Operation (Switch 402 on back of chassis turned to REMOTE position)

(1) Voice—Fig. 18 shows the voice circuit of the Control Unit RM-7-B adjusted for remote operation. Functionally the control unit is a stage of audio amplification between either of the two microphone jacks 414-1 and 414-2 and the outgoing line plug 437. This figure shows the switch contact positions which complete the circuit.

The audio amplifier employs Tube VT-76 (commercial type 76). Transformer coupling is employed in both the plate and grid circuits. The primary of the grid transformer 404 is balanced to ground with the microphone between terminal 1 and ground, and resistor 405 between terminal 3 and ground. D-C microphone voltage is applied to the center tap of the primary winding at terminal 2. The potentiometer 406 across the secondary of the grid transformer is employed as a gain control. The plate transformer 412 matches the plate of the audio tube to a 600 ohm line. The capacitors 410 and 411-1 bypass the low potential ends of the secondary of the grid transformer 404 and the primary of the plate transformer 412, to the cathode of the tube. Meter 403 across the secondary of the plate transformer 412 indicates audio level.

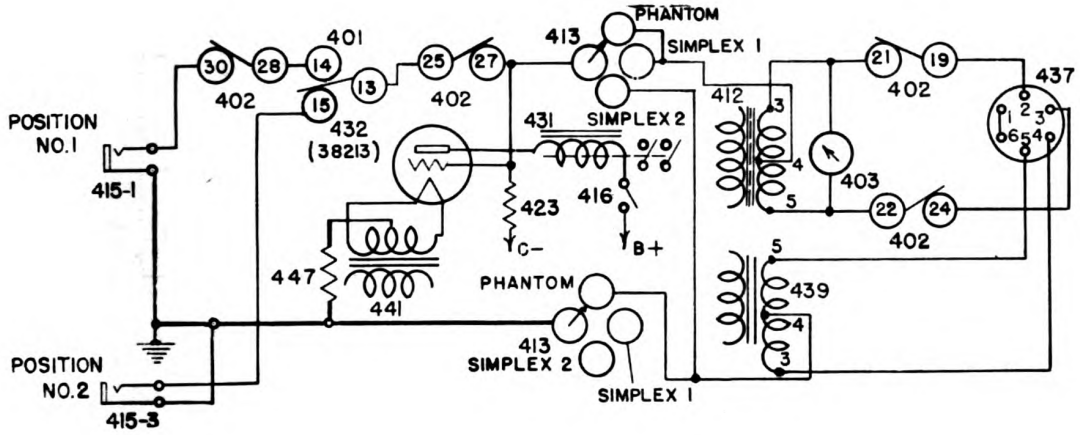


FIG. 19 CONTROL UNIT RM-7-B, ADJUSTED FOR REMOTE OPERATION, KEYING CIRCUIT

(2) Keying—Fig. 19 shows the keying circuit of the Control Unit RM-7-B adjusted for remote operation. Functionally, the control unit conducts the keying pulses from either of the keying jacks 415-1 and 415-3 to the outgoing line plug 437. Fig. 19 shows the contact positions of switches 401 and 402 which complete the keying circuit. Three different methods of conducting the keying pulses through the Control Unit RM-7-B are selected by the Phantom-Simplex 1-Simplex 2 switch 413. The contacts of relay 431, which is controlled by tube 432, are wired to the receiver disabling jacks labeled BC-342 and RELAY CONTACTS on the control unit panel.

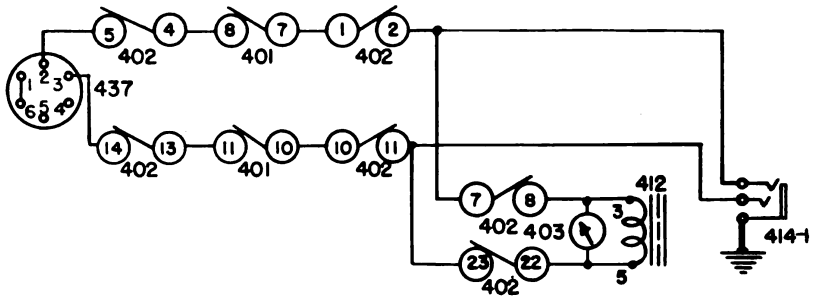


FIG. 20 CONTROL UNIT RM-7-B, ADJUSTED FOR LOCAL OPERATION, VOICE CIRCUIT, OPERATING POSITION 1

b. Local Operation (Switch 402 on back of chassis turned to LOCAL position).

(1) Voice

(*a*) Operating Position 1—Fig. 20 shows the voice circuit of Control Unit RM-7-B adjusted for local operation and with the front panel position selecting switch on POSITION 1. Functionally, the control unit serves to conduct the voice currents coming over the control line to plug 437 through to the jack 414-1. The cable going to Radio Transmitter BC-325-B plugs into jack 414-1. Fig. 20 indicates the contacts of switches 401 and 402 which complete the circuit. Audio gain meter 403 is across the control line and indicates the audio level being conducted over it.

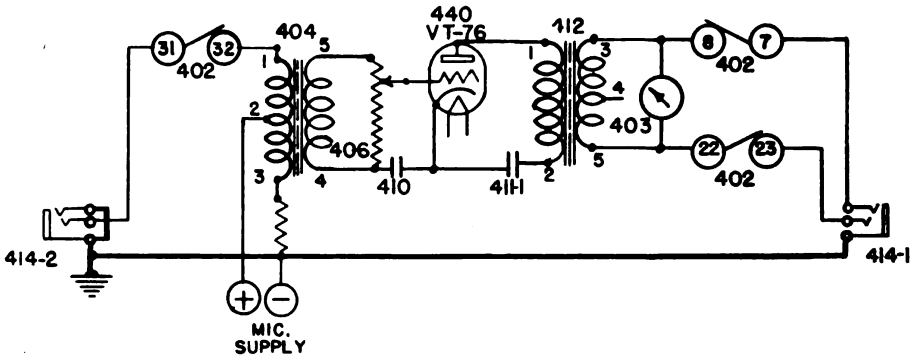


FIG. 21 CONTROL UNIT RM-7-B, ADJUSTED FOR LOCAL OPERATION, VOICE CIRCUIT, OPERATING POSITION 2

(*b*) Operating Position 2—Fig. 21 shows the voice circuit of Control Unit RM-7-B adjusted for local operation and with the front panel position selecting switch on POSITION 2. Functionally, the control unit is a stage of audio amplification between the microphone jack 414-2 and jack 414-1. The cable to Radio Transmitter BC-325-B plugs into the latter jack. Fig. 21 shows the contacts of switch 402 which complete the circuit. The audio tube 440 and its associated circuit have been previously described in the section describing remote operation.

(2) Keying

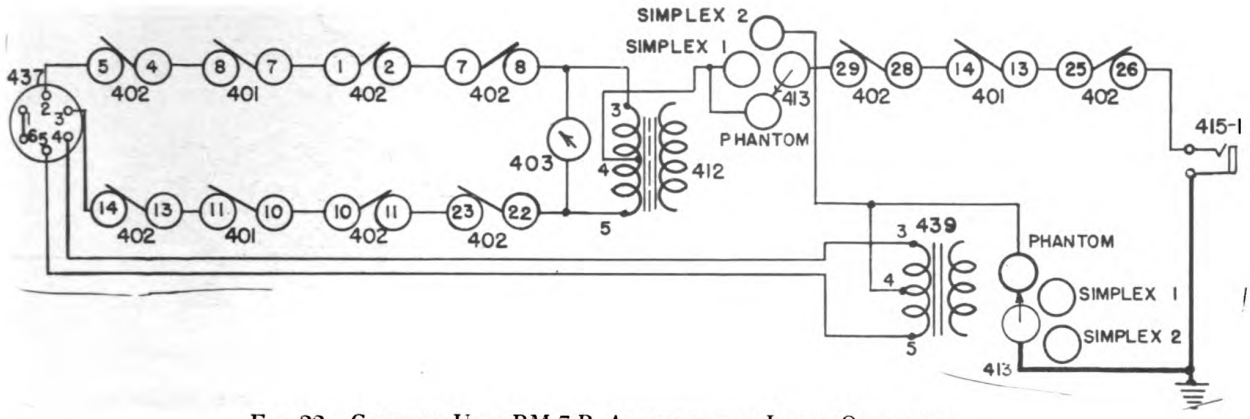


FIG. 22 CONTROL UNIT RM-7-B, ADJUSTED FOR LOCAL OPERATION, KEYING CIRCUIT, OPERATING POSITION 1

(*a*) Operating Position 1—Fig. 22 shows the keying circuit of Control Unit RM-7-B adjusted for local operation and with the front panel position selecting switch on POSITION 1. The control unit conducts the keying pulses coming over the control lines to plug 437 through to jack 415-1. The keying cable to Radio Transmitter BC-325-B plugs into the jack 415-1. Three different methods of conducting the keying pulses through the Control Unit RM-7-B are selected by the Phantom-Simplex 1-Simplex 2 switch 413. The contacts of switches 401 and 402 which complete the circuit are shown in Fig. 22.

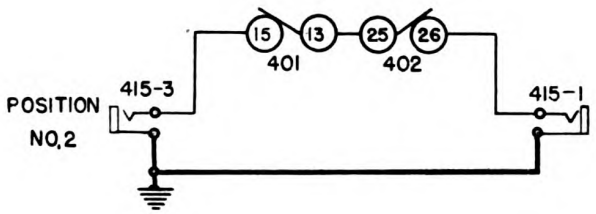


FIG. 23 CONTROL UNIT RM-7-B, ADJUSTED FOR LOCAL OPERATION, KEYING CIRCUIT, OPERATING POSITION 2

(*b*) Operating Position 2—Fig. 23 shows the keying circuit of Control Unit RM-7-B adjusted for local operation and with the front panel position selecting switch 401 on POSITION 1. The control unit conducts the keying pulses from keying jack 415-3 through to jack 415-1. The keying cable from Radio Transmitter BC-325-B plugs into the jack 415-1. Fig. 23 shows the contacts of switches 401 and 402 which complete the circuit.

c. Power Supplies

There are two sources of power in the Control Unit RM-7-B, the first of which utilizes Tube VT-80 (commercial type 80) in a single-phase, full-wave rectifier circuit. Transformer 430 supplies the plate and filament voltages for this rectifier, and the filter, consisting of choke 426 and capacitor 411-2. is of the choke input type. Bleeder resistor 425 is grounded through a tap connection so that some negative voltage for bias purposes is available. The second source of power employs rectifier 422 which is of the copper oxide type. The alternating voltage to this rectifier is obtained from transformer 441. The filter connected to rectifier 422 is also of the choke input type except that it consists of two sections. The first section is made up of choke 421a and capacitor 420, and the second section is comprised of choke 421b and capacitor 419. Resistors 417 and 418 are in series across the d-c output of this supply in the form of a divider, making two values of output voltage possible. The lower value from the junction of resistors 417 and 418 is that which is supplied to the microphone and the full voltage is supplied to the jack labeled BC-342.

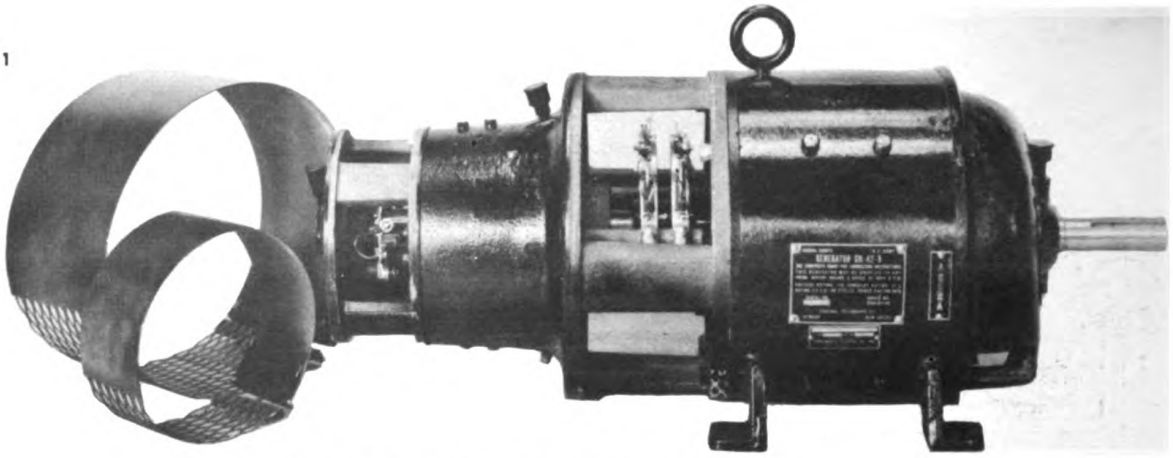


FIG. 24 GENERATOR GN-42-B, DETAILED VIEW

10. GENERATOR GN-42-B AND VOLTAGE REGULATOR (See Fig. 24)

a. The circuit of the generator and the associated voltage regulator are represented schematically in Fig. 50. Generator GN-42-B is designed to furnish 110 volts, 60 cycles and has a rated capacity of 3 KVA (see paragraph 4c). The voltage output of the generator can be controlled manually with the rheostat 101 located on the Power Control Panel BD-92-B or automatically with the voltage regulator 202. Automatic or manual voltage control is selected by a switch on the panel of the voltage regulator.

b. The voltage regulator 202 (see Fig. 5) is of the vibrator type. The vibrating contacts are connected to short-circuit the generator field voltage control rheostat 101 in the closed position. The vibration of the contacts is controlled by the a-c voltage output of the generator. If the a-c voltage drops, the vibrating contact will short-circuit the field resistance of the generator until the voltage increases to its normal value. If the a-c voltage rises, the field resistance will not be shorted until the voltage drops to its normal value. The regulator thus compensates for changes in voltage output. The pole-changing switch permits the polarity on the vibrator contacts to be reversed periodically, thus preventing excessive pitting of the contacts.

11. POWER CONTROL PANEL BD-92-B AND ASSOCIATED EQUIPMENT

a. Connection Box and Autotransformer

Power Control Panel BD-92-B is a distribution point for power going to various units of the installation. Associated with it are the connection box 204 and the autotransformer 203, as shown in the schematic diagram of Fig. 50. The connection box 204 is the incoming termination for a commercial source of 110 or 220 volts. Inside the box is a three-pole single-throw knife type switch which is operated by an arm that extends through the box wall. The three contacts of this switch provide the terminals for either 110 or 220 volts, the center contact of the three being common, while the one on the left is for 110 volts and the one on the right 220 volts. Across each of these pairs of terminals is a spark gap to provide protection against any surge that might occur on the line. The blades of the 220 volt section of the main switch are connected through fuse 204d to the extremities of the autotransformer 203 at terminals 1 and 7. The remaining 5 taps on the autotransformer connect to the five positions of the tap switch 204b in the connection box. The 110 volt section of the main switch connects through fuse 204e to position 3 of the tap switch 204b and terminal 1 of the autotransformer. Two leads, one coming from the rotor of the tap switch and the other from the common section of the main switch, connect to terminals 1 and 2 on the terminal board on the Power Control Panel BD-92-B. The autotransformer always provides 110 volts into the power control panel regardless of whether 110 volts or 220 volts is fed into the connection box. The 110 volts supplied to the control panel is adjustable in 5 per cent steps by means of the tap switch 204b.

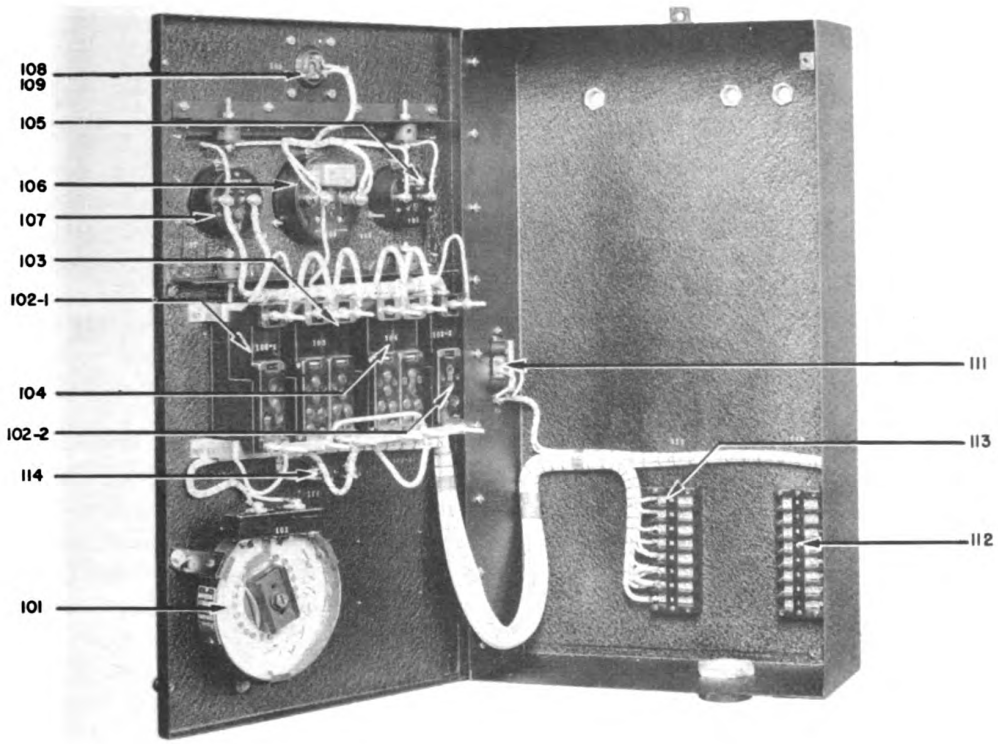


FIG. 25 POWER CONTROL PANEL BD-92-B, INTERIOR VIEW

b. Power Control Panel BD-92-B

As previously described, the output of the autotransformer connects to terminals 1 and 2 of the terminal board in Power Control Panel BD-92-B, and the Generator GN-42B is connected to terminals 3 and 4. The two pairs of terminals are then connected to switches 104 and 103, respectively, in the Power Control Panel BD-92-B. An interior view of Power Control Panel BD-92-B is shown in Fig. 25. Switches 103 and 104 have a thermal circuit breaker incorporated in each switch. A safety mechanism on the front panel prevents the switches 103 and 104 from being engaged simultaneously. From either switch 103 or 104, power is supplied through the ammeter 107 directly to Radio Transmitter BC-325-B and the heater ventilator unit 306. Voltage to the convenience outlets at the end of the operating table and to the outlets on the power control panel is obtained from terminals 11 and 12 of the power control panel terminal board through the switch 102-2, which is a single pole breaker type with a thermal fuse incorporated. The truck lights are connected to the terminals 15 and 16 in the power control panel through switch 102-1, which is identical to switch 102-2. The receptacles on the rear exterior of the truck for the floodlight plugs connect to terminals 13 and 14 through the double-pole single-throw toggle switch 114. Voltmeter 105 and frequency meter 106 are connected permanently across the power source to indicate the voltage and frequency being furnished from the control panel at all times.

12. CHARACTERISTICS OF VACUUM TUBES

SIGNAL CORPS TYPE NO.	VT-106	VT-100	VT-101	VT-46-A	VT-83		VT-76	VT-95	VT-80
COMMERCIAL TYPE NO.	803	807	837	866A	83	913	76	2A3	80
Type	Pentode	Beam power	Pentode	Mercury vapor half wave rectifier	Mercury vapor full wave rectifier	Cathode ray	Triode	Triode	High vacuum full wave rectifier
D-C plate voltage (volts max.)	2000	600	500				250	250	
D-C suppressor volt. (volts max.)	500		200						
D-C screen voltage (volts max.)	600	300	200						
D-C grid voltage (volts max.)	−500	−200	−200						
A-C filament volt. (volts normal)	10.0	6.3	12.6	2.5	5.0	6.3	6.3	2.5	5.0
D-C plate current (ma max.)	175(CW) 110(mod)	100	80	250	225				125
D-C grid current (ma max.)	50	5	8						
A-C filament current (amps normal)	5	0.9	0.7	5	3	0.6	0.3	2.5	2
Plate input (watts normal)	350(CW) 180(mod)	60	32						
Suppressor input (watts max.)	10		5						
Screen input (watts max.)	30	3.5	8						
Plate dissipation (watts max.)	125	25	12						

IV MAINTENANCE

13. SERVICE

A competent service man should be able to repair correctly any damage likely to occur in the field except the complete breakdown of component parts which necessitates replacement from spare parts. The repair of more complicated components, such as the voltage regulator, or a microphone, should not be attempted in the field, but be completed in an authorized repair depot. Experience and proper maintenance are the greatest aids toward satisfactory and continued operation of this equipment.

14. CLEANLINESS

Cleanliness is essential to the best operation of the component units of this installation. The various components may be kept free from dust or dirt by the use of a soft clean cloth, suitable brushes or compressed air blower if available. Oily cloth or waste should never be used for cleaning.

15. RELAY AND REGULATOR CONTACTS

a. The contacts on the relays and contactors in Radio Transmitter BC-325-B should, in general, require little attention. If dust should collect between contacts, it may be cleaned out by passing a sheet of paper between them. Rough sandpaper, emery cloth or a file should never be used on contact surfaces as the finish of such surfaces may be materially damaged. In unusual cases where the contacts of relays or contactors become extremely pitted or rough in service and it becomes necessary to smooth them, only a very fine grade (000 or 0000) of sandpaper should be used. This will prevent sticking of the contacts which might otherwise cause damage to the equipment.

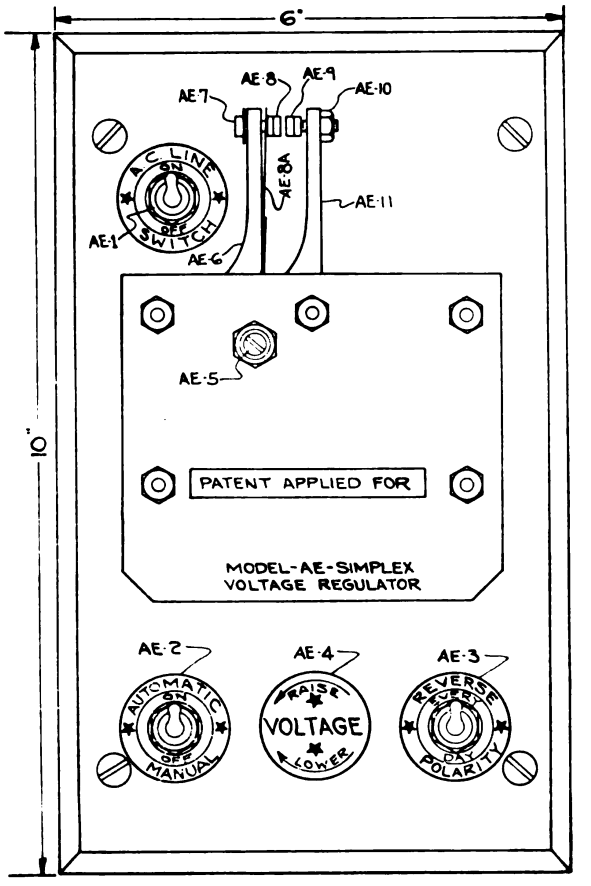


FIG. 26 VOLTAGE REGULATOR, FRONT VIEW WITH COVER REMOVED

b. (See Fig. 26) The contacts AE-8 and AE-9 of voltage regulator 202 may have to be replaced occasionally as wear indicates. These contacts may be replaced as follows:

First —Loosen set screw AE-5 sufficiently to lift contact arm AE-6 from its socket.

Second—Remove cap nut AE-7 and replace contact AE-8.

Third —Replace cap nut AE-7, making it fairly tight. *Caution should be observed in handling these very small parts, as they can be easily broken.* Be sure to use the lockwasher under contact AE-8 as this will prevent the contact from working loose.

Fourth—To remove contact AE-9, loosen locknut AE-10.

Fifth —Replace contact AE-9 and set same so that when contact AE-9 is firmly against contact AE-8, both arms will appear parallel to each other. These contacts must face one another evenly and squarely. This may be accomplished by correctly setting contact arm AE-6, which can be set higher or lower, and contact AE-8, which may be shifted back and forth to the desired position. *Use great care in replacing contact AE-8 so that sensitive springs AE-8A will not in any way be damaged or deformed.*

Sixth —Tighten locknut AE-10 carefully, as it may easily be broken by excessive twisting.

16. LUBRICATION

a. The heater-ventilating unit should be lubricated with a light oil of Grade SAE-10 after 1,000 operating hours or an elapsed time of three months.

b. The truck ventilating fan 357 should be lubricated with General Electric fan motor oil, or equal, every 3,000 hours of operating time or after a lapse of 90 days.

c. The transmitter ventilating fan 650 should be lubricated with Socony Vacuum special light bearing oil, or equal, after 3,000 hours of operating time or a lapse of 90 days.

d. About once a year the grease in the bearing housing of the Generator GN-42-B should be removed and replenished with New York and New Jersey Lubricant Company's #S-59, or equal. In cleaning out the grease, the simplest method is to remove the ball bearing caps and scrape out the grease with a clean lintless cloth. Then repack the bearing housing practically full with the #S-59 grease. It is recommended that the grease cups be checked after 1,000 hours of operating time or after a lapse of 30 days. The ball bearings in this motor generator set are of the double lubri-seal type and should never come in contact with solvents such as kerosene, gasoline, etc., of any kind. No cleansing of these bearings will ever be required other than wiping the shields and outside surfaces with a clean lintless cloth. Grease guns should never be used to lubricate the bearing housings. The easiest and safest method is the one described above.

17. TROUBLE LOCATION

a. Trouble in any of the transmitting components is most easily localized by carefully noting all symptoms such as incorrect panel meter readings, blown fuses, incorrect operation of control circuits, etc. After localizing the trouble, a systematic investigation of voltages, currents, circuit elements, and tubes in the circuit involved will generally reveal the fault. In general, the meters most useful in trouble shooting are an ohmmeter that measures up to 1 megohm in several ranges, a voltmeter that also has several ranges to read up to 1000 volts a.c. and d.c., and a milliammeter to measure up to 500 ma. Such instruments are available singly or in combination in the Standard Signal Corps Test Set I-56-A.

b. As an aid in localizing trouble, the following is a list of average panel meter readings for Radio Transmitter BC-325-B and Power Control Panel BD-92-B:

Meter Title	Meter Part No.	Typical Reading
(1) *Radio Transmitter BC-325-B*		
Oscillator plate current	517-1	10 to 40 ma
1st I-A grid current	518	1 to 5 ma
1st I-A plate current	520-1	20 to 40 ma
2nd I-A grid current	517-2	4 to 10 ma
2nd I-A plate current	529	40 to 90 ma
P-A grid current	520-2	50 ma (CW) 25 ma (tone, voice)
P-A plate current	540	300 ma (CW) 150 ma (tone, voice)
Antenna current	550	See fig. 45
Filament-Line (Fil.-Line selector switch in mid or up position)	626	On red line
Filament-Line (Fil.-Line selector switch in down position)	626	110 V. ± 5%
(2) *Power Control Panel BD-92-B*		
Supply voltage	105	110 V. ± 5%
Supply frequency	106	60 cycles ± 2%

c. The following is a chart of possible troubles and their causes.

Symptom	Likely cause
(1) *Power Control Panel BD-92-B*	
No indication on panel meters when emergency generator is in operation and switch on panel labelled EMERGENCY is thrown on.	Generator is not rotating due to failure in truck power takeoff system, belt drive, or pulleys. Worn generator brushes.
No indication on panel meters when external source of voltage is connected into connection box and connection box switch and switch labelled MAIN on panel are thrown ON.	Fuse 204d or 204e blown in connection box.
(2) *Radio Transmitter BC-325-B*	
Contactor 638 does not click in when input power and start switches on panel are engaged.	Door interlocks are open.
Contactor 638 closes but no filament voltage present on any stage.	Fuse 632 blown.
Filament voltage on every stage but no plate, screen, or bias voltage.	Fuse 631-1 blown.
Filament and bias on every stage but plate voltage only on oscillator.	Fuse 631-2 blown.
No P-A plate voltage indicated on panel meter when plate standby switch is thrown to ON position.	Fuse 634 blown.
Radio transmitter ventilating fan does not operate when ambient temperature is above 30 degrees C.	Fuse 631-3 is blown.
Failure of any R-F stage to tune to a plate current dip.	Tuning of some stage is not according to tuning charts of Figs. 28 and 41. Range switch not set to correct range.
Phantom antenna will not load.	One or several of phantom antenna elements 548, 524-1, or 524-2, are blown.
	Tuning of loading circuit not as shown on Fig. 42.
Antenna will not load.	Tuning of loading circuit not as shown on Figs. 43 and 44.
Will not modulate from microphone plugged into transmitter panel jack.	CW-Tone-Voice switch on panel not thrown to VOICE. Local-Remote switch not thrown to LOCAL.
Will not key from panel Test Key.	Interlock contacts on one or several of range switch, antenna transfer switch, antenna inductor tap switch, or antenna tuning switch are dirty or not making proper contact.
Will not key with key plugged into radio transmitter panel jack.	Same as above.
	Local-Remote switch not thrown to LOCAL position.
(3) *Control Unit RM-7-B* (for LOCAL operation)	
Will not key or voice modulate radio transmitter from appropriate jack on the position 2 side of panel.	Local-Remote switch on transmitter not thrown to REMOTE.
	Local-Remote switch on control unit chassis not thrown to LOCAL.
	Position selecting switch on panel of control unit not thrown to position 2.
(4) *Control Unit RM-7-B* (for REMOTE operation)	
Will not key or voice modulate radio transmitter from appropriate jacks on position 1 side of panel.	Local-Remote switch on radio transmitter panel not thrown to REMOTE position.
	Position selecting switch on associated local control unit not thrown to POSITION 1.
	Local-Remote switch on chassis of remotely operated control unit not set for REMOTE.
	Position selecting switch on remotely operated control unit not set to POSITION 1.
	Line 1 and line 2 do not correspond at local and remote control unit.
	Simplex 1, Simplex 2, and Phantom selecting switches on both local and remote control units are not set to corresponding positions.
Will not key or voice modulate transmitter from appropriate jacks on position 2 side of panel.	All likely causes given above for position 1 side of panel, except the fourth likely cause would be with position selecting switch not thrown to POSITION 2.

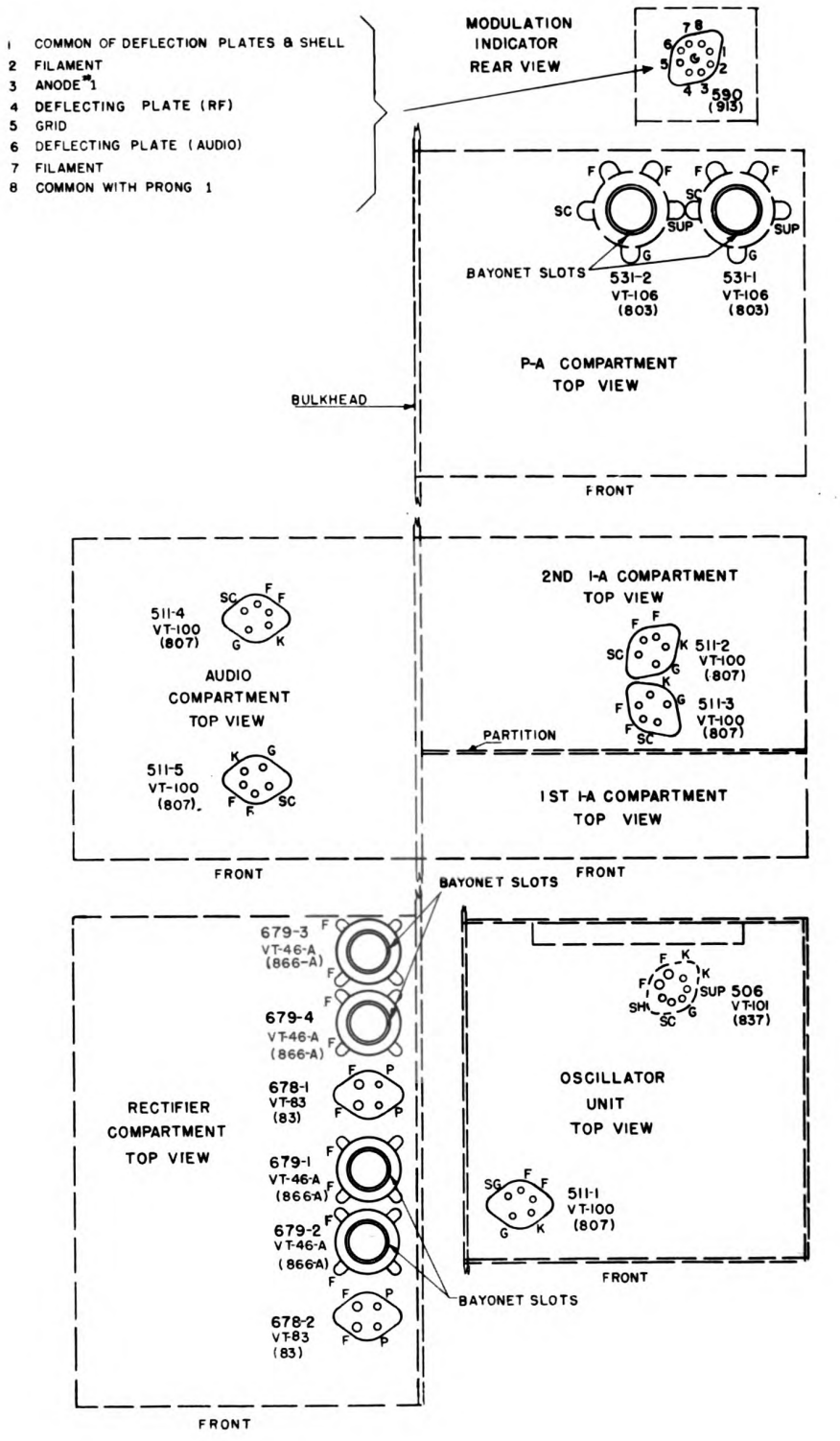


FIG. 27 RADIO TRANSMITTER BC-325-B, DIAGRAM SHOWING TUBE SOCKET LOCATIONS RELATIVE TO CHASSIS

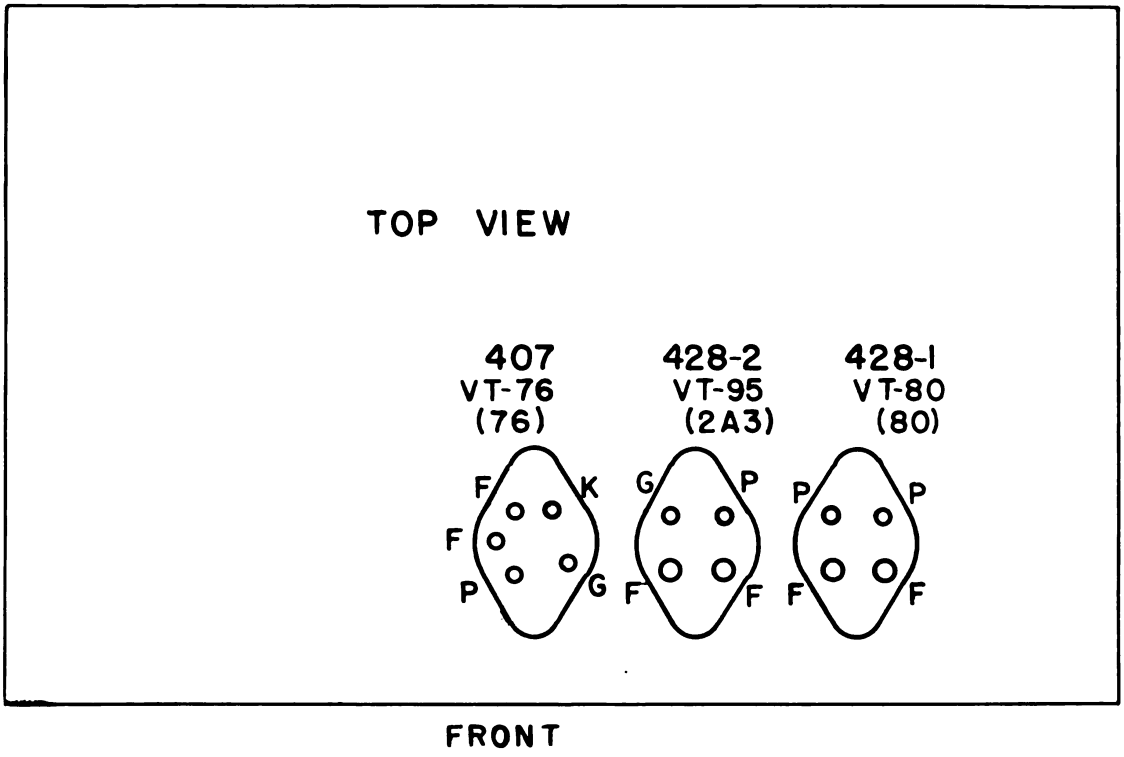


FIG. 28 CONTROL UNIT RM-7-B, DIAGRAM SHOWING TUBE SOCKET LOCATIONS RELATIVE TO CHASSIS

d. Chart of Typical Voltages and Currents for All Tube Elements and Where Measured

Note: **These measurements made with full power output unless otherwise noted.**

Tube Element	Voltage	Where Measured	Current	Where Measured
		(1) RADIO TRANSMITTER BC-325-B		
Oscillator tube 675				
Plate	460 V D-C	Terminal 12 of osc. term. board 556 to chassis	10-40 ma D-C	Transmitter panel meter
Screen	250 V D-C	Terminal 6 of osc. term. board 556 to chassis	8 ma D-C	In series with cable lead to term. 6 of osc. term. board 556
Filament	12.6 V A-C	Across terminals 4 and 5 of osc. term. board 556	0.7 A A-C	In series with cable lead to term. 4 of osc. term. board 556
1st intermediate amplifier tube 676-1				
Plate	500 V D-C	Rotor of 1st I-A plate tuning capacitor 513-2 to chassis	20-40 ma D-C	Transmitter panel meter
Screen	170 V D-C	Terminal 11 of osc. term. board 556 to chassis	12 ma D-C	In series with cable lead to term. 11 of osc. term. board 556
Grid	−100 V D-C	Terminal 7 of osc. term. board 556 to chassis	1-5 ma D-C	Transmitter panel meter
Filament	6.3 V A-C	Across terminals 9 and 10 of osc. terminal board 556	0.9 A A-C	In series with cable lead to term. 9 of osc. term. board 556
2nd intermediate amplifier tubes 676-2,3				
Plate	600 V D-C	From lead (1) on bleeder resistor 620-2 to chassis	40-90 ma D-C	Transmitter panel meter
Screen	185 V D-C	From lead (3) on bleeder resistor 620-2 to chassis	30 ma D-C	In series with lead (3) on bleeder resistor 620-2
Grid	−170 V D-C	From lead (4) on bleeder resistor 621 to chassis	4-10 ma D-C	Transmitter panel meter
Filaments	6.3 V A-C	Across filament contacts at 2nd I-A tube socket	1.8 A A-C	In series with lead at term. 20 of fil. transformer 602
Power amplifier tubes 677-1,2				
Plate (CW)	2000 V D-C	Transmitter panel meter	300 ma D-C	Transmitter panel meter
Plate (tone voice)	2000 V D-C	Transmitter panel meter	150 ma D-C	Transmitter panel meter
Suppressor (CW)	80 V D-C	From lead (6) on bleeder resistor 620-2 to chassis	5 ma D-C	In series with lead (6) on bleeder resistor 620-2
Suppressor (tone voice)	−110 V D-C	From lead (3) on bleeder resistor 621 to chassis	0 ma D-C	In series with lead (3) on bleeder resistor 621
Screen	400 V D-C	From lead at junction of bleeder resistors 660 and 661-1 to chassis	140 ma D-C	In series with lead connecting to junction of bleeder resistors 660 and 661-1

Tube Element		Voltage	Where Measured	Current	Where Measured
Power amplifier tubes 677-1,2 (Cont'd.)					
Grid (CW)		−150 V D-C	From tap (1) on bleeder resistor 621 to chassis	50 ma D-C	Transmitter panel meter
Grid (tone voice)		−150 V D-C	From tap (1) on bleeder resistor 621 to chassis	25 ma D-C	Transmitter panel meter
Filament		10 V A-C	Across terminals 14 and 16 of transformer 602	10 A A-C	In series with lead to term. 14 of transformer 602
Keyer tube 676-4					
Plate		14 V D-C	From plate cap of keyer tube to chassis	20-50 ma D-C	In series with lead to plate of keyer tube
Screen		110 V D-C	From lead (5) on bleeder resistor 620-2 to chassis	22 ma D-C	In series with lead (5) on bleeder resistor 620-2
Grid (key up)	(SCR-197-C)	−85 V D-C	From voltage end of grid resistor 583 to chassis	0	
	(SCR-197-D)	−115 V D-C	From voltage end of grid resistor 584 to chassis		
Filament		6.3 V A-C	Across terminals 6 and 7 of transformer 602	0.9 A A-C	In series with lead on term. 6 of transformer 602
Audio tube 676-5					
Plate		300 V D-C	From plate cap on tube to chassis	15 ma D-C	In series with lead (3) on bleeder resistor 620-1
Screen		85 V D-C	From lead (2) on bleeder resistor 620-1 to chassis	5 ma D-C	In series with lead (2) on bleeder resistor 620-1
Cathode		5 V D-C	Cathode contact at socket of audio tube to chassis		
Filament		6.3 V A-C	Across terminals 3 and 5 of transformer 602	0.9 A A-C	In series with lead on term. (3) of transformer 602
Osc. rectifier tube 678-1					
Plates (2)		500 V A-C	From terminals 6 to 7 and from term. 7 to 8 of transformer 605		
Filament		5 V A-C	Across terminals 3 and 5 of transformer 604	3 A A-C	In series with lead on term. (3) of transformer 604
Bias rectifier tube 678-2					
Plates (2)		210 V A-C	From terminals 3 to 4 and terminals 4 to 5 on transformer 605		
Filament		5 V A-C	Across terminals 3 and 5 of transformer 603	3 A A-C	In series with lead on term. (3) of transformer 603

Tube Element	Voltage	Where Measured	Current	Where Measured
Low volt. rect. tubes 679-1,2				
Plate (679-1)	675 V A-C	Across terminals 3 and 4 of transformer 606		
Plate (679-2)	675 V A-C	Across terminals 4 and 5 of transformer 606		
Fil. (679-1,2)	2.5 V A-C	Across terminals 6 and 8 of transformer 603	10 A A-C	In series with lead on term. (6) of transformer 603
High voltage rect. tubes 679-3 and 679-4				
Plate (679-3)	2250 V A-C	Across terminals 3 and 4 of transformer 607		
Plate (679-4)	2250 V A-C	Across terminals 4 and 5 of transformer 607		
Fil. (679-3, 679-4)	2.5 V A-C	Across terminals 6 and 8 of transformer 604	10 A A-C	In series with lead on term. (6) of transformer 604
(2) CONTROL UNIT RM-7-B				
Mic. amplifier tube 440				
Plate	240 V D-C	From terminal 2 on transformer 412 to chassis	5.8 ma D-C	In series with lead on term. 2 of transformer 412
Cathode	11.5 V D-C	Across resistor 409		
Filament	6.3 V A-C	Across terminals 12 and 13 of transformer 441	0.3 A A-C	In series with lead on term. 12 of transformer 441
Keyer tube 432				
Plate	240 V D-C	From either side of coil of relay 431 to chassis		
Grid	−37 V D-C	Across capacitor 424		
Filament	2.5 V A-C	Across terminals 5 and 7 of transformer 441	2.5 A A-C	In series with lead on term. 5 of transformer 441
Rectifier tube 427				
Plates (2)	430 V A-C	Across terminals 8 and 9 and 9 and 10 of transformer 430		
Filaments	5.0 V A-C	Across terminals 5 and 7 of transformer 430	2.0 A A-C	In series with lead on term. 5 of transformer 430

e. Continuity Checks for Cables and Terminal Boards

Note: **All measurements made with switches 103 and 104 OFF.**

Part	Part No.	Term. or Lead No.	Switch Adjustments When Measuring	Where Measured To	Resistance (Ohms)
			(1) RADIO TRANSMITTER BC-325-B		
Oscillator terminal board	556	1	Switch 647 ON	To terminal 6 on terminal board 589	0
		2	Switch 647 ON	To terminal 5 on terminal board 589	0
		3		To terminal 8 on transformer 602	0
		4		To terminal 10 on transformer 602	0
		5	LOW position on keying speed switch 554	To plate cap of keyer tube 676-5	0
		5	HIGH position on keying speed switch 554	To chassis	600
		6		To lead 1 on bleeder resistor 620-1	0
		7		To lead 2 on bleeder resistor 621	0
		8	LOW position on keying speed switch 554	To chassis	600
		8	HIGH position on keying speed switch 554	To plate cap of keyer tube 676-5	0
		9		To terminal 11 on transformer 602	0
		10		To terminal 13 on transformer 602	0
		11		To lead 4 on bleeder resistor 620-2	0
		12		High potential end of bleeder resistor 620-1	0
Oscillator compartment cable		1		To terminal 1 of terminal board 596-1	0
		2		To terminal 1 of terminal board 596-1	0
		3		To filament prong contact on oscillator tube socket	0
		4		To filament prong contact on oscillator tube socket	0
		5		To cathode prong contact on oscillator tube socket	11
		6		To screen prong contact on oscillator tube socket	0
		7		To grid prong contact on 1st I-A tube socket	25000
		8		To cathode prong contact on 1st I-A tube socket	0
		9		To filament prong contact on 1st I-A tube socket	0
		10		To filament prong contact on 1st I-A tube socket	0

Part	Part No.	Term. or Lead No.	Switch Adjustments When Measuring	Where Measured To	Resistance (Ohms)
Oscillator compartment cable (cont'd.)		11		To screen prong contact on 1st I-A tube socket	0
		12		To plate cap on osc. tube	0
Incoming power and lines terminal board	589	1	Local-Remote switch 580 on REMOTE and CW-Tone-Voice switch 562 on VOICE	To terminal 4 of transformer 574	600
		2	Same as for term. 1	To terminal 1 of transformer 574	0
		3	Local-Remote switch 580 on REMOTE	To grid prong contact on keyer tube socket	0
		4		To chassis	0
		5		To main power switch 647	0
		6		To main power switch 647	0
Panel microphone jack	516	Tip	Local-Remote switch 580 on LOCAL and CW-Tone-Voice switch 562 on VOICE	To terminal 3 on transformer 574	0
		Ring		To chassis	0
		Sleeve		To chassis	0
Panel key jack	588	Tip	Local-Remote switch 580 set to LOCAL	To grid prong contact at keyer tube socket	0
		Sleeve		To chassis	0
(2) CONTROL UNIT RM-7-B					
AC input receptacle	436	Prong 1	On-Off power switch on ON position	To terminal 1 of transformer 430	0
		Prong 2	On-Off power switch on ON position	To terminal 4 of transformer 430	0
Audio lines receptacle (control unit set for local operation)	437	1		To chassis	0
		2	Position selecting switch 401 set to POSITION 1	To ring contact of position 1 mic. jack 414-1	0
		3	Position selecting switch 401 set to POSITION 1	To tip contact of position 1 mic. jack 414-1	0
		4		To terminal 3 of transformer 439	0
		5		To terminal 5 of transformer 439	0
		6		To chassis	0
Audio lines receptacle (control unit set for remote operation)	437	1		To chassis	0
		2		To terminal 3 of transformer 412	0
		3		To terminal 5 of transformer 412	0
		4		To terminal 3 of transformer 439	0
		5		To terminal 5 of transformer 439	0
		6		To chassis	0

f. Data for Checking Transformers, Chokes, and Inductors

Note: **Resistances less than 1 ohm are given as zero.**

Component	Part No.	Winding Terminals	D-C Resistance (Ohms)	Q	Inductance
		(1) RADIO TRANSMITTER BC-325-B			
Oscillator variometer	505				
		Windings aiding		240 (3 mc)	34 μh
		Windings bucking		124 (3 mc)	9 μh
Oscillator plate inductor	514-1			340 (3 mc)	30 μh
1st I-A plate inductor	514-2			340 (3 mc)	29 μh
2nd I-A plate inductor	526			440 (3 mc)	43 μh
P-A plate inductor	537			430 (3 mc)	22 μh
Antenna coupling inductor	511			230 (6 mc)	2.2 μh
Antenna loading inductor	512			425 (1.5 mc)	100 μh
Audio cathode choke	576		280		20 henries
Audio attenuating choke	566		55		1 henry
Audio tone freq. determining choke	569		55		0.85 henry
Audio plate transformer	567	1,2	250		
		3,4	650		
		5,6	100		
Audio input transformer	574	1,4	70		
		5,6	100		
		7,8	12,500		
Filter choke	617		40		7 henries
Filter choke	614		55		7 henries
Filter choke	612		32		5 henries
Filter choke	610		28		5 henries
Power transformer	607	1,2	0		
		3,5	150		
Power transformer	606	1,2	0		
		3,5	90		

Component	Part No.	Winding Terminals	D-C Resistance (Ohms)	Q	Inductance
Power transformer	605	1,2	0		
		3,5	50		
		6,8	75		
Filament transformer	604	1,2	0		
		3,5	0		
		6,8	0		
Filament transformer	603	1,2	0		
		3,5	0		
		6,8	0		
Filament transformer	602	1,2	0		
		3,5	0		
		6,7	0		
		8,10	0		
		11,13	0		
		14,16	0		
		17,18	0		
		19,20	0		
	(2) CONTROL UNIT RM-7-B				
Filter choke	426		270		30 henries
Filter choke	421a	1,2	6		0.2 henry
Filter choke	421b	3,4	100		5 henries
Power transformer	430	1,4	10		
		5,7	0		
		8,10	750		
Power transformer	441	1,4	15		
		5,7	0		
		9,11	0		
		12,13	0		
Audio input transformer	404	1,3	30		
		5,4	12,000		
Audio output transformer	412	1,2	2,300		
		3,5	58		
Telephone transformer	439	1,2	30		
		3,5	38		

g. Procedure for Removing Parts

(1) *Generator Belts*—To replace the three V-belts which connect the power take-off to Generator GN-42-B, first remove the top of the cover over the generator pulley by loosening the two winged nuts on the sides. The four bolts that mount the generator to the base plate are next loosened leaving the generator free in the base plate slots. Turning the head of the belt tension adjusting bolt which is located on the left end of the base plate, in a clockwise direction loosens the belts and they may be slipped off the pulleys. When replacing belts it should be noted that the three comprise a matched set so that all three should be replaced at the same time. The new belts are worked over the power take-off pulley and then the generator pulley, following which, the tension bolt is turned in a counterclockwise direction to tighten the belts until they can be deflected about one inch by pushing on them in the middle of the span between the two pulleys. The four generator base bolts are then tightened and the pulley cover replaced.

(2) *Oscillator Chassis of Radio Transmitter BC-325-B*—To remove the oscillator chassis, the cable coming from the latter is first disconnected from the terminal board 596. The panel is next released by removing the twelve (three under calibration chart) screws around the panel edges. The shock mount angles are then all that hold the chassis. The two front shock mount angles are freed from the chassis by removing the two screws which pass through clearance holes in each angle and the box, to tapped holes in the chassis. To free the angle on the left, which is mounted against the center bulkhead of the transmitter, use a screwdriver having at least a sixteen inch shank. The rear shock mount angle is loosened by removing one cap screw and a nut from a threaded stud. By pulling from the panel and at the same time feeding the cable through the hole in the box, the oscillator chassis may then be removed from the transmitter. Replacing the oscillator is accomplished by reversing the described procedure.

V SUPPLEMENTARY DATA AND TABLE OF REPLACEABLE PARTS

18. TABLE OF REPLACEABLE PARTS

The names of manufacturers appearing in the last column of the following table are in most cases abbreviated. For the complete name of manufacturers and their addresses, see the list at the end of this table.

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			a. POWER CONTROL PANEL BD-92-B		
101		Rheostat	Field rheostat, 1000 ohms, 0.9 to 0.36 amp., 600 V max.		F-18197-2 Ward Leonard cat. 66-2328 12537.62-37
102-1		Circuit	1 pole, 15 amp., 125 V A-C	Truck lights,	G.E. type AF-1
102-2		breaker		Conv. outlets	
103		Circuit breaker	2 pole, 35 amp., 230 V A-C	Emergency power supply	G.E. type AF-1
104		Circuit breaker	2 pole, 50 amp., 230 V A-C	Commercial power supply	G.E. type AF-1
105		Voltmeter IS-156	0-150 V, 60 cycle	Line voltmeter	Weston type 476
106		Frequency Meter IS-154	Frequency range 50 to 70 cycles per second	Input power frequency	Weston type 814
107		Ammeter IS-159	0 to 50 amp., 60 cycles	Line ammeter	Weston type 476
108		Receptacle	Lamp	Panel light	Crouse-Hinds cat. no. LOB-102
109		Lamp	50 W, 115 V, inside frosted, standard screw base, rough service	Panel light	G.E. type A-19
111		Receptacle	Duplex, 10 amp., 250 V A-C, complete with outlet plate	Convenience outlet	Hubbell, receptacle cat. no. 9575, with plate cat. no. 6854
112		Terminal block	8 Circuit	Inter-unit wiring connections	F-12530-12-4

* F.T.Co. drawing no. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			a. POWER CONTROL PANEL BD-92-B (Cont.)		
113		Terminal block	8 circuit	Inter-unit wiring connections	F-12530-12-4
114		Switch	DPST, 250 V, 6 amp.	Floodlight control	Cutler-Hammer cat. no. 8620
			b. POWER EQUIPMENT		
201		Generator GN-42-B	3 KVA, 110 V, 60 cycle, 1 phase, 1800 RPM	Emergency power supply	F-17292-1 Continental Electric Co.
202		Voltage regulator	Simplex model A-E	Regulating emergency generator output	F-17748-1 Simplex Corp.
203		Transformer	Auto transformer, pri. 220/110 V, sec. 99/104.5/110/115.5/121, 4.5 KVA	Com. power supply control	F-17830-1 Kenyon Trans. Co.
204		Connection box	110/220 V input power connection		F-18198-12
204a		Box	Safety switch		Wemco cat. no. DF-322-S
204b		Switch	1P5T, 40 amp., 125 V		Ohmite model 412
204c		Arrester	Lightning arrestor gap		F-18894-1
204d		Fuse	Cartridge, renewable, 35 amp., 250 V		Jefferson-Union type no. 380-035
204e		Fuse	Cartridge, renewable, 60 amp., 250 V		Jefferson-Union type no. 380-060
205		Cable	Power cable, 75 ft. long of 2-cond. #6 B&S, 133 strands, twin parallel, 600 V	Com. power connecting	Hazard Insulated Wire Co.
			c. INSTALLATION ITEMS		
301-1 301-2 301-3		Microphone T-28-C	Microphone T-28-C. A complete assembly, consisting of: 1 each Kellogg type No. 117-C non-positional transmitter with special mouth piece, mounted on a Kellogg type no. 28 support arm, complete with a two conductor, flexible cord attached to a Kellogg three circuit plug similar to Signal Corps Plug PL-68	For voice operation	Kellogg

* F.T.Co. drawing no. unless otherwise state

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. INSTALLATION ITEMS (Cont.)		
302		Receptacle	Duplex, 10 amp., 250 V A-C complete with outlet plate	Convenience outlet	Hubbell Receptacle cat. no. 9575 with plate cat. no. 6854
303		Plug	3-Circuit with *Black* shell, similar to Signal Corps Plug PL-68, to fit Signal Corps Jack JK-33-A.	Microphone line to transmitter	Kellogg
304	2Z7147	Plug PL-47	2-Circuit with *Black* shell, to fit Signal Corps Jack JK-34-A	Key line to transmitter	W.E. type 47-B
306		Heater-Ventilating unit	1500 W heater equipped with fan and protective thermostat	Compartment heat control	F-18186-1 Electric Air Heater Co. type AAT
307-1 307-2		Floodlight	Narrow beam, weatherproof and focusing, with horizontal spread ribbed glass lens, 200 W with ALZAK aluminum reflector, complete with 200 W, 115 V lamp type PS-30, supplied with a base flange permitting both vertical and horizontal adjustment; complete with a 5 ft. power cord and a 2-wire cap protected by a Bryant metal cap style no. 3797.	Site illumination	Westinghouse type CAK-12 style no. 890651
308-1 308-2		Outlet	Weatherproof, flush, complete with threaded metal cap and receptacle body.	Floodlight connections	Bryant cat. no. 3795
309		Condulet	2-Gang, tandem, ¾ in.	Floodlight connections	Crouse-Hinds Co. type FS cat. no. FS-27
314		Bushing	Antenna bushing	Ant. connection assem.	F-18970-2
317-1 317-2 317-3 317-4	6Z7821	Reflector	Pear shape, to accommodate a 50 W, 115 V, standard screw base lamp	Compartment lighting	Hubbell cat. no. 5429
318-1 318-2 318-3 318-4		Lamp	50 W, 115 V, inside frosted, standard screw base, rough service	Compartment lighting	G.E. type A-19

* F.T.Co. drawing no. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			c. INSTALLATION ITEMS (Cont.)		
319-1 319-2 319-3 319-4		Socket fixture	Lamp base fitting	Compartment lighting	National Elec. Prod. Corp. cat. no. 400X
320-1 320-2 320-3 320-4		Lamp body	Standard, med. base, fluted catch, brass shell key socket, 250 V, 250 W.	Compartment lighting	Hubbell cat. no. 61
329-1 329-2		Terminal block	2 Circuit	Control line termination	F-18730-1
347		Mast Base MP-39	Mast mounting base	Antenna support	F-19322-2
348		Mast Brace MP-40	Mast clamp and insulator assembly	Antenna support	F-18765-2
349		Antenna assembly	Antenna assembly consisting of: Mast Section MS-65 Mast Section MS-66 Mast Section MS-67 Mast Section MS-68 Mast Section MS-69 Mast Section MS-70 Mast Section MS-71 Mast Section MS-72 Mast Section MS-73 Guy GY-31		F-18195-1
350		Receiver	Hallicrafter Sky Champion less tubes, with a shock mounting similar to that of Control Unit RM-7-B, and a small nameplate indicating MONITOR RECEIVER	Monitor for trans. output	F-18398-1
351-1 351-2 351-3		Tube VT-117	Vacuum	Monitor receiver	RCA 6SK7
352		Tube	Vacuum	Monitor receiver	RCA 6K8

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			c. INSTALLATION ITEMS (Cont.)		
353		Tube	Vacuum	Monitor receiver	RCA 6J5GT
354		Tube VT-103	Vacuum	Monitor receiver	RCA 6SQ7
355		Tube VT-90	Vacuum	Monitor receiver	RCA 6H6
356	2V280	Tube VT-80	Vacuum	Monitor receiver	RCA 80
357		Fan	Non-oscillating, for 110 V, 60 cycles, 1 phase	Truck compartment ventilating	G.E. cat. no. 49x950
361		Frequency meter assem.		Auxiliary in cab	F-18418-12
361a		Frequency Meter IS-154	Frequency range 50 to 70 cycles per second, 110 V, flush mtg., $4\frac{9}{16}$ in. O.D., black bakelite case		Weston type 814
361b		Switch	DPST, 250 V, 6 amp.		Cutler-Hammer cat. no. 8620
361c		Panel light	Night light		Leviton Mfg. Co. cat. no. 758
361d		Lamp	120 V, 6 W, candelabra screw base		Mazda type S-6
362		Accessory spares	1 set of accessory spare parts, consisting of the following: 2 ea. Parts 204d, 204e, 434, 631-1, 631-2, 632 and 634 3 ea. Parts 654 and 655 1 ant. base insulator assembly and 1 ant. retaining insulator 1 Part 631-3 (SCR-197-C only) 1 Part 633 (SCR-197-D only)	Equipment maintenance	
363		Microphone T-38-A	Kellogg, type no. 117-C, non-positional transmitter, with special mouthpiece, mounted in a special Kellogg type no. 116 desk stand having a beaver-tail type of grip-to-talk area, complete with one cord terminated in a no. 247 plug and one cord terminated with a plug similar to a Signal Corps Plug PL-58	For voice operation	Kellogg
364		Tube	Vacuum	Monitor receiver	RCA 6F6G
			d. CONTROL UNIT RM-7-B		
401		Switch	Phenolic, 6PDT, 2 gangs (each gang 3PDT) silver plated contacts, Centralab	Position changeover	F-13430-2-3

* F.T.Co. drawing no. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			d. CONTROL UNIT RM-7-B (Cont.)		
402		Switch	Phenolic, 12PDT, 4 gangs (each gang 3PDT), silver plated contacts, Centralab	LOCAL-REMOTE set-up switch	F-13430-2-6
403		Power Level Indicator IS-158	Minus 10.0 to plus 5 db, based on 0.006 W in 600 ohm circuit, slow-acting, scale to be marked both in db and milliwatts	Audio-Level indicator	Weston model 301
404		Transformer	Audio transformer, pri. 80 ohms C.T., 40 ma D-C. Sec. 250,000 ohms, 300-5000 cycles. Input level: −15 db.	Mic. amp. input	F-17724-1
405		Resistor	Fixed, 2 W, 40 ohms	Mic. balancing	IRC type BW-2
406		Potentiometer	100,000 ohms, type "C" taper, increase resistance in clockwise direction	Audio gain control	IRC type CS
407		Tube socket	Ceramic, 5 contacts	Mic. amp.	E.F. Johnson cat. no. 225S
408	3Z4608	Resistor RS-208	Fixed, 1 W, 0.1 megohm	Mic. amp. grid	IRC type BT-1
409		Resistor	Fixed, 1 W, 2000 ohm	Mic. amp. cathode	IRC type BW-1
410		Capacitor	Fixed, 2 μf, 600 V D-C W.	Mic. amp., grid coupling	C-D type DY-6200
411-1 411-2		Capacitor	Fixed, 4 μf, 600 V D-C W.	Power supply filter	C-D type TJ-6040
412		Transformer	Audio transformer, pri. 20,000 ohms, 4 ma D-C. Sec. 600 ohms C.T., 300-5000 cycles	Mic. amp. output	F-17722-1
413		Switch	Phenolic, 2P3T, single gang	Phantom-Simplex	F-13430-2-5
414-1 414-2	2Z5533A	Jack JK-33-A	3 circuit	Microphone	SC-D-2332-C
415-1 415-2 415-3 415-4 415-5 415-6	2Z5534A	Jack JK-34-A	2 circuit	Key, relay contacts, BC-342	SC-D-2339-B

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			d. CONTROL UNIT RM-7-B (Cont.)		
416		Switch	SPST, "A" dimension of 11/32 in., with black oxidized finish, bakelite insulation	Rec. control	Cutler-Hammer cat. no. 8621
417		Resistor	Fixed, 2 W, 75 ohm	Rec. dis. pwr. supply bleeder	IRC type BW-2
418		Resistor	Fixed, 2 W, 30 ohm	Microphone supply bleeder	IRC type BW-2
419		Capacitor	Fixed, 40 μf, +100% −0%, 25 V D-C W.	Microphone supply filter	C-D type BRG-10003-1
420		Capacitor	Fixed, 500 μf, +100% −0%, 25 V D-C W.	Rec. dis. relay power supply filter	C-D type BRG-10002-1
421a		Reactor	0.2 h, 350 ma D-C, 6.0 ohm max.	Rec. dis. relay power supply	F-17726-1
421b		Reactor	5 h, 70 ma D-C, 100 ohms max.	Mic. pwr. supply	F-17726-1
422		Rectifier	1 phase, full-wave bridge type, copper oxide, 0.330 amp. at 12 V D-C	Rec. dis. relay power supply	Westinghouse type 4RX30
423		Resistor	Fixed, 2 W, 250,000 ohm	Keyer tube grid resistor	IRC type BT-2
424		Capacitor	Fixed, 0.0005 μf, ±10%, 500 V D-C W.	Keyer tube grid by-pass	C-D type I-WLS
425		Resistor	Fixed, 60 W, 13,000 ohm, with a tap at 3000 ohms, mounting type 702, terminals type 219	Mic. amp. pwr. supply bleeder	Ward-Leonard type 5-B vitrohm green enamel
426		Reactor	30 h, 60 ma D-C, 275 ohms max.	Mic. amp. pwr. supply filter	F-17720-1
427	2T80	Tube VT-80	Vacuum, rectifier	Power supply rectifier	Comm. type 80
428-1 428-2		Tube sockets	Ceramic, 4 contacts	Pwr. supply & keyer tube	E.F. Johnson cat. no. 224
429		Light	Pilot light, complete with screw base bulb for 6.3 V and red jewel cap	Power input indicator	Yaxley type 310-R and lamp cat. no. 171

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			d. CONTROL UNIT RM-7-B (Cont.)		
430		Transformer	Power transformer, pri. 110/220 V, 60 cycle Sec. #1: 5.1 V, 2.0 amp. C.T. Sec. #2: 370-0-370 V, C.T.	Plate and fil. of mic. amp. rect.	F-17718-1
431		Relay	Right hand, complete with R.H. mounting bracket, 1000 ohm coil, contact assembly two form "C" (2 make and 2 break) silver contacts	Rec. relay control	C.P. Clare and Co. type A-3098
432	2V2A3	Tube VT-95	Vacuum, audio	Keyer tube for rec. dis. relay control	Comm. type 2A3
433		Mounting	Fuse mounting	Power supply fuse mounting	Littelfuse type AG cat. no. 1060
434	3Z1926	Fuse FU-26	1 amp., 250 V	Power supply fuse	Littelfuse type 3AG cat. no. 1040
435		Switch	DPST, with "A" dimension $1\frac{1}{32}$ in.	Input power switch	Cutler-Hammer cat. no. 8620
436		Socket	Male, 2 contacts, for 2 amp. at 250 V, locking type	Input power connector	Hubbell cat. no. 7466
437		Connector	Male, insert of Bakelite Corp. #3200 material, 6 contacts	Control lines connector socket	American Phenolic Corp. type P-06-M
438-1 438-2 438-3 438-4		Capacitor	Fixed, 0.002 μf, $\pm 10\%$, 600 V D-C W	Line by-pass	C-D type 4 LS-12020
439		Transformer	Repeater coil, audio, Ratio—1:1, with center tap on secondary	Repeater coil for Telephone EE-8	F-17834-1
440	2T76	Tube VT-76	Vacuum	Mic. amp.	Comm. type 76
441		Transformer	Power, pri. 110/220 V, 60 cycles Sec. #1: 2.6 V, 2.5 amp. C.T. Sec. #2: 25.8 V, 0.400 amp., tapped at 17.4 V and 21.6 V Sec. #3: 6.4 V, 0.500 amp.	Fil. of mic. amp. and keyer tubes, rec. dis. pwr. sup.	F-17752-1
443		Power cord	8 ft., 2-conductor no. 16, 250 V type SJ, with a Hubbell cat. no. 7464 locking type, female plug on one end and a Harvey Hubbell 10 amp. 250 V no. 9972 rubber finger grip cap (male) on the other	For Control Unit RM-7-B	F-18874-1

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			d. CONTROL UNIT RM-7-B (Cont.)		
444		Control cord	5 ft. long, 5-conductor, complete with an Amer. Phenolic Corp. type O6F-1 (female) connector on one end and a 5-contact terminal strip on the other end	For control lines	F-18875-3
446		Telephone EE-8	Telephone EE-8 complete with Handset TS-9-A and Plug PL-58	Interphone channel	
447		Resistor	Fixed, 2 W, 1000 ohm	Keyer tube current limiting	IRC type BW-2
			e. RADIO TRANSMITTER BC-325-B		
501-1 501-2 501-3 501-4 501-5		Crystals and holders	Holders of ceramic, hermetically sealed	Freq. determination with crystal control operation	Premier Crystal Laboratories types 180 CF or 180 GF, depending on frequency, F-21576-1
502a 502b		Switch	2 pole, 6 position, 2 gang, ceramic	Crystal selector	F-9632-2-33
503-1 503-2 503-3		Switch	1 pole, 10 position, 1 gang, ceramic	Osc. grid and plate, 1st I-A plate, range switch	F-9632-2-34
504		Capacitor	Fixed, mica, 0.0015 μf, plus or minus 2%, 1000 volts D-C, W	Grid tank capacity in osc.	C-D type 234-6LS
505		Variometer		Osc. grid tank inductor	F-18146-2
506		Tube socket	Ceramic	Osc. tube	E.F. Johnson cat. no. 227
507-1 507-2		Capacitor	Fixed, mica, 0.00137 μf, plus or minus 2% at 26° C., 1000 volts D-C, W	Osc. grid tank capacitor	C-D type 1096-6LS
508-1 508-2 508-3 508-4		R-F choke		Osc. grid Osc. cathode 1st I-A grid 2nd I-A grid	F.W. Sickles type 1225

* F.T.Co. drawing no. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
508-5				2nd I-A plate	
508-6				P-A grid	
508-7				P-A suppressor	
509-1		Resistor	2-Watt, 150,000 ohms	Osc. grid leak	IRC type BT-2
509-2				Mod. ind. aud. div.	
510-1		Capacitor	Fixed, mica, 0.01 μf, plus or minus 10%, 500 volt. D-C. W	Osc. cath by-pass	C-D type 9LS-11010
510-2				Osc. S grid "	
510-3				Osc. plate "	
510-4				1st I-A grid "	
510-5				1st I-A S " "	
510-6				1st I-A plate "	
510-7				2nd I-A grid "	
510-8				2nd I-A SG "	
510-9				P-A C grid "	
510-10				P-A S grid "	
511-1		Tube socket	Ceramic	1st I-A	E.F. Johnson
511-2				2nd I-A	cat. no. 225S
511-3				2nd I-A	
511-4				Keyer	
511-5				Audio	
512-1		Capacitor	Variable, 35 μμf max., spacing = 0.030 inches	Osc. plate coupling;	Cardwell type
512-2				osc. grid tank trimmer	ZR-35-AS
513-1		Capacitor	Variable, 260 μμf max., spacing = 0.03 inches; to be equipped	Osc. plate tuning	Cardwell type
513-2			with ball bearings front support and single (adjustable) rear support	1st I-A tuning	MR-260-BS
513-3				2nd I-A padding	
514-1		Coil	Tank inductor	Osc. plate	F-17762-2-1
514-2				I-A plate	
515		Capacitor	Fixed, mica, 0.00003 μf plus or minus 10%, 600 V D-C W	1st I-A grid coupling	C-D type 9LS-14030
516	2Z5533A	Jack JK-33-A	3 circuit	Local mic.	SC-D-2332-C
517-1		Ammeter	0-50 ma D-C 3½ inch	Osc. plate current	Weston model 301
517-2		IS-142		2nd I-A grid current	

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
518		Ammeter IS-132	0-10 ma D-C	1st I-A grid current	Weston model 301
519-1 519-2 519-3 519-4 519-5 519-6 519-7 519-8 519-9		Capacitor	Fixed, mica, 0.006 μf, plus or minus 10%, 600 V D-C W	Meter by-pass; Osc. plate 1st I-A grid 1st I-A plate 2nd I-A grid 2nd I-A plate P-A grid P-A plate Fil. voltmeter Plate "	C-D type 4LES-12060
520-1 520-2		Ammeter IS-141	0-100 ma D-C	1st I-A plate current P-A grid current	Weston model 301
521		Capacitor	Fixed, mica, 0.00005 μf, plus or minus 10%, 600 V D-C W	2nd I-A grid coupling	C-D type 9LS-14050
522-1 522-2		Resistor	Fixed, 3 watt, 25 ohm, carbon	2nd I-A grid suppressor	Continental Carbon type D3
523		Resistor	Fixed, 2 watt, 15000 ohms	2nd I-A grid resistor	IRC type BT-2
524-1 524-2		Phantom ant.	250 watt, 73 ohm		Ohmite type D-250
525-1 525-2 525-3		Capacitor	Fixed, mica, 0.01 μf, plus or minus 5%, 1000 V D-C W	2nd I-A plate by-pass P-A fil. by-pass	C-D type 677-15LS
526		Coil	Tank inductor	2nd I-A plate	Dwg. F-18262-3
527		Switch	1 pole, 10 position, 1 gang, ceramic	2nd I-A plate inductor	Dwg. F-17188-2
528-1 528-2		Capacitor	Variable, 150 μμf max., spacing = 0.070 inches, to be equipped with ball bearing front support and single ball (adjustable) rear support	P-A grid coupling 2nd I-A plate	Cardwell type MT-150-GS
529		Ammeter IS-143	0-250 ma D-C	2nd I-A plate current	Weston model 301

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
530-1 530-2		Resistor	Fixed, 5-watt, 20,000 ohms	P-A grid loading	Continental Carbon type D-5
531-1 531-2		Tube socket	Ceramic, 5 contact	P-A tubes	E. F. Johnson cat. no. 216 S
532		Binding post	Nickel plated	Freq. monitor pick-up	Amer. Radio Hardware Inc. no. 1756
534		R-F choke		P-A plate	F.W. Sickles cat. no. 1226
535a		Switch	1 pole, 10 position, 1 gang, shorting type	P-A plate capacitor range	F-18396-12
535b 535c		Switch	1 pole, 10 position, 1 gang	P-A fixed capacitor P-A plate inductor range	F-18396-12
535d		Interlock		In keying circuit	F-18838-2-3
536		Capacitor	Variable with lock, 160 $\mu\mu$f, 0.125 in. spacing	P-A tank padding	Cardwell type XD-160-XS
537		Coil	Tank inductor	P-A plate	F-18261-3
538-1 538-2		Capacitor	Variable, 2 stators; spacing 0.125 in., #1 (front) = 210 $\mu\mu$f; #2 (rear) = 110 $\mu\mu$f, to be equipped with ball bearings front and single ball (adjustable) rear support	P-A plate tuning Ant. tuning	Cardwell
539		Capacitor	Fixed, mica, 0.004 μf, $\pm$5%, 3000 V D-C W	P-A plate by-pass	C-D type PL-1046-30-BL
540	3F208	Ammeter IS-8	0-500 ma D-C	P-A plate ammeter	Weston model 301
541		Coil		Ant. coupling	F-18788-12
542		Coil		Ant. loading	F-18256-12
543a 543b		Switch Interlock	1 pole, 11 position, 1 gang, micalex	Ant. loading coil, taps In keying circuit	F-18392-12 F-18838-2-6

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
544a 544b 544c		Switch	3 pole, 3 position, 1 gang, micalex	Ant. tuning	F-18274-12
544d		Interlock		In keying circuit	F-18838-2-2
545		Capacitor	Air dielectric, 100 $\mu\mu$f, .125 air gap	Ant. padding	Cardwell JD-100-OS
546a 546b 546c		Switch	3 pole, 3 position, 1 gang, micalex	Ant. transfer	F-18274-12-2
546d		Interlock		In keying circuit	F-18838-2-2
547		Insulator assem.	High power lead-in insulator, ceramic	Ant. bushing	Isolantite, Inc. type 306
548		Lamp	50 W, 120 V, medium screw base, rough service	Phantom ant.	G.E. type A-19
549		Socket	Medium screw base	Phantom ant.	Bryant cat. no. 37, pg. 24, item 9102
550		Ammeter IS-169	0-5.0 amp. R-F (1.5 to 18 mc) expanded scale type	Ant. ammeter	Weston model 425
553		Resistor	Fixed, 4.8 W, 600 ohms	Osc. cathode	IRC type DF
554		Switch	DPDT, 1 gang	Keying speed control	F-9632-2-38
555		Panel light	For standard Mazda S-6 lamp, 110 V	Osc. dial light	Leviton cat. no. 758
556		Terminal block	11 terminal	Osc. comp. input connections	F-18474-2
557		Resistor	Fixed, 1 W, 1 megohm	Mod. ind. RF def. plate	IRC type BT-1
558a 558b		Potentiometer	40,000 ohms with switch	Mod. ind., grid adjustment INTENSITY & off-on switch	IRC type CS
559		Resistor	Fixed, 2 W, 130,000 ohms	Mod. ind. pwr. supply divider	IRC type BT-2

* F.T.Co. drawing no. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
560-1 560-2		Capacitor	Fixed, 4 μf, 600 V D-C W	Mod. ind. pwr. supply filter, audio cathode by-pass	C-D type TJ-6040
561		Capacitor	Fixed, mica, .02μf, 600 V D-C W	Mod. ind. aud. cplg.	C-D type 4LS-11020
562		Switch	6 pole, 3 position, 3 gang, ceramic	CW-Tone-Voice selector	F-9632-2-43
563		Resistor	Fixed, 1 W, 3 megohm	Tone osc. feedback	IRC type BT-1
565-1 565-2	3D245	Capacitor CA-245	Fixed, 1 μf, ±10%, 600 V D-C W	Audio plate by-pass P-A supp. supply by-pass	C-D type TJ-6010
566		Choke	Audio choke, 1 henry	Audio output filter	F-17704-1
567		Transformer	Audio transformer, three windings winding ratios: 1:1; 1:1	Audio output and modulating	F-17708-1
568		Potentiometer	20,000 ohms, wirewound	Tone gain control	F-6464-2-29
569		Choke	Audio choke, 0.85 henry	Audio osc. tone reactor	F-17706-1
570		Switch	1 pole, 3 position, 1 gang, ceramic	Audio osc. tone freq. selector	F-9632-2-36
571		Capacitor	Fixed, mica, 0.0135 μf, ±2%	Audio osc. tone frequency determining	C-D type 1118-15LS
572		Capacitor	Fixed, mica, 0.033 μf, ±2%	Audio osc. tone frequency determining	C-D type 1098-15LS
573		Capacitor	Fixed, mica, 0.1 μf, ±2%	Audio osc. tone frequency determining	C-D type 721-15LS
574		Transformer	Audio, 3 windings, 600 ohms/600 ohms/grid	Audio input	F-17710-1
575		Terminal block	2 circuit	Fan connections	H. B. Jones #2-22
576		Reactor	Filter reactor, 20 henries	Mic. pwr. supply	F-17750-1
577		Attenuator	600/600 ohms, "T" pad, 9 steps of 3 db each, plus an infinite position; 0 db level at 0.006 W	Audio input gain control (remote operation)	Daven Co., similar to type T-250

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description		Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)			
578		Attenuator	150 ohms, 2 W		Audio input gain control (local operation)	IRC type W
579-1 579-2		Resistor	Fixed, 2 W, 40 ohms		Audio cathode Mic. balancing	IRC type BW-2
580		Switch	6 poles, 2 positions, 2 gang, ceramic		Local-Remote selector	F-9632-2-37
581		Resistor	Fixed, 25,000 ohms, 2 W		1st I-A grid leak	IRC type BT-2
582-1 582-2 582-3 582-4 582-5		Capacitor	Fixed, 0.0005 μf, $\pm$10%, 600 V D-C W		1st I-A cath. by-pass keyer tube grid by-pass P-A supp. by-pass P-A supp. by-pass Audio filter tuning	C-D type 4LS-13050
583		Resistor	Fixed, 2 W, 250,000 ohms	(SCR-197-C only)	Keyer tube grid	IRC type BT-2
584		Resistor	Fixed, 5 W, 10,000 ohms	(SCR-197-D only)	Keyer tube grid	Continental type 5-D
585		R-F choke			Osc. plate	Coto-Coil type C-I-12
586		Switch	Switchboard key		Test key	Amer. Auto. Elec. Sales Co. type DA-76
587		Resistor	Fixed, 2 W, 300,000 ohms		Audio input grid shunt	IRC type BT-2
588	2Z5534A	Jack JK-34-A	2 circuit		Key (local)	SC-D-2339-B
589		Terminal block	8 circuit		External connections	F-12530-12-4
590		Tube socket	8 contact, octal, ceramic		Mod. ind.	American Phenolic Corp. cat. no. RSS8
591		Capacitor	Fixed, 0.00109 μf, $\pm$2%, 1000 V D-C W		Osc. grid tank padding	C-D type 1133-6LS
592-1 592-2		Thermostat	Normally closed, temperature range plus 30°C to plus 80°C		Osc. heater box temp. control	George Ulanet Co. type ASK-BB-300
593-1 593-2		Heater	350 W, 230 V		Osc. compartment	Edwin L. Wiegand Co. cat. no. SE-1003
594-1 594-2		Heater	350 W, 115 V		Osc. compartment	Edwin L. Wiegand Co. cat. no. SE-1003

* F.T.Co. drawing no. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
595		Thermometer	Plus 40°C to plus 70°C, protected for over-shoot to plus 100°C	Osc. compartment	F-18984-1
596-1 596-2		Terminal block	4 contact	Osc. comp. heater connections	F-19930-1
598		Power Level Indicator IS-158-A	−10.0 to +5 db, based on 0.006 W into 600 ohm circuit, scale marked both in db and milliwatts	Audio level	Weston type 301
599		Attenuator	T-pad, 600 ohms	Audio level adjustment	IRC type J
602		Transformer	Filament, Pri. 110 V, 1 phase, 60 cycle Sec. #1: 10.2 V, C.T., 10 amp. Sec. #2: 12.7 V, C.T., 0.7 amp. Sec. #3: 6.4 V, C.T., 0.9 amp. Sec. #4: 6.4 V, C.T., 1.8 amp. Sec. #5: 6.4 V, 0.9 amp. Sec. #6: 6.4 V, 1.8 amp. Sec. #7: 6.4 V, 0.6 amp.	R-F tube filaments	F-17702-1
603		Transformer	Filament, Pri. 110 V, 1 phase, 60 cycle Sec. #1: 2.5 V, C.T., 10 amp. Sec. #2: 5 V, C.T., 3 amp.	Low voltage rect. and bias rect. filaments	F-17754-1
604		Transformer	Filament, Pri. 110 V, 1 phase, 60 cycle Sec. #1: 2.5 V, C.T., 10 amp. Sec. #2: 5 V, C.T., 3 amp.	Main rect. and osc. rect. filament	F-17314-1
605		Transformer	Power	Bias and osc. rect. plate	F-17712-1
606		Transformer	Power	Low voltage rect. plate	F-17336-1
607		Transformer	Power	Main rect. plate	F-17338-1
608		Transformer	Variable, input 88-132 V, output 110 V	Input power control	F-17832-1
609-1 609-2		Capacitor	Fixed, 0.35 μf, ±3%, 1000 V D-C W	Osc. rect. filter Bias rect. filter	C-D type MC-550
610		Reactor	Filter, 5 henries	Osc. rect. filter	F-17714-1

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
611-1 611-2		Capacitor	Fixed, 20 μf, 600 V D-C W	Osc. rect. filter Bias rect. filter	C-D type PC-1070
612		Reactor	Filter, 5 henries	Bias rect. filter	F-17716-1
613-1 613-2		Capacitor	Fixed, 0.25 μf, ±3%, 3000 V D-C W	Low voltage rect. filter Main rect. filter	C-D type MC-551
614		Reactor	Filter, 7.0 henries	Low voltage rect. filter	F-17340-1
615		Resistor	Fixed, 12 W, 500 ohm	Low voltage rect. peak current limiting	IRC type DJ
616		Capacitor	Fixed, 12 μf, 1000 V D-C W	Low voltage rect. filter	C-D type TJ-10120
617		Reactor	Filter, 7.0 henries	Main rect. filter	F-17342-1
618		Resistor	Fixed, 90 W, 1000 ohms	Main rect. peak current limiting	W.L. type 6 WX vitrohm green enamel
619		Capacitor	Fixed, 12 μf, 2500 V D-C W	Main rect. filter	C-D type TJ-25120
620-1 620-2		Resistor	Fixed, 160 W, 1600 ohm, with ten taps	Dividers; osc. rect., low volt. rect.	W.L. type D
621		Resistor	Fixed, 160 W, 700 ohm, with ten taps	Bias rect. divider	W.L. type D
622		Resistor	Fixed, 160 W, 9000 ohm	Main rect. divider	W.L. type D
623a		Voltmeter IS-155	0-3000 V D-C resistor type multiplier (1000 ohms per volt)	Plate voltmeter	Weston model 301
623b		Multiplier	Tubular resistor	For Voltmeter IS-155	
624-1 624-2 624-3 624-4		Tube socket	Ceramic	Osc. Rect. Bias rect. Phantom ant. Phantom ant.	E.F. Johnson cat. no. 224
625-1 625-2 625-3 625-4		Tube socket	Ceramic	Low voltage rect. Low voltage rect. Main rect. Main rect.	E.F. Johnson cat. no. 209

* F.T.Co. Drawing No. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
626		Voltmeter IS-157	0-150 V A-C (60 cycles), low-high scale with *internal* multiplier	Filament-Line voltage	Weston model 476
627		Switch	Switchboard key (3PDT)	Filament-Line voltmeter transfer	American Automatic Elec. Sales Co. type DA
628-1		Lamp	120 V candelabra base, clear	Fil. ON light	Standard Mazda type S6
628-2				Plate ON light	
628-3				Osc. dial light	
629		Indicator light assem.	For standard Mazda S6 lamp, 110 V with *green* faceted jewel cap	Fil. ON light	Dial Light Co. of Amer. Inc. cat. no. 100-F
630-1		Fuse block	Single pole, 250 V, 30 amp. barrier type, porcelain base	Osc. bias rect.	Bryant Electric Co. #3929
630-2				Low volt, rect.	
630-3				Main rect.	
630-4				Filaments	
630-5				Fan	
631-1		Fuse	Cartridge, 1.6 amp., 250 V (SCR-197-C) (SCR-197-D)	Osc. bias rect. Vent. fan	Bussman #4016
631-2				Low volt rect.	
631-3			(Used on SCR-197-C only)	Vent. fan	
632		Fuse	Cartridge, 3.2 amp., 250 V (SCR-197-C)	Filament	Bussman #4032
			Cartridge, 4.5 amp., 250 V (SCR-197-D)	Filament	Bussman #4045
633		Fuse	Cartridge, 2.0 amp., 250 V (Used on SCR-197-D only)	Osc. bias rect.	Bussman #402
634		Fuse	Cartridge, 12 amp., 250 V	Main rect.	Bussman #412
635		Switch	Push button, 1 amp., 250 V	STOP	G.E. cat. no. 4324194 G-1 (red)
636		Switch	Push button, 1 amp., 250 V	START	G.E. cat. no. 4324194 G-1 (green)
637-1		Interlock	Safety	Access door	Bryant cat. no. LD-4600
637-2					
638		Contactor	To have a time delay of 27 to 30 seconds, coil to operate from 110 V, 60 cycles, with 2 normally open contacts for 30 amps., time delay contact and one auxiliary normally open contact for 1 amp.	Fil. control with plate time delay	Monitor Controller Co. similar to type SP-1104 dwg. P:SK-121339

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
639-1 639-2		Contactor	DPSB, coil for 110 V, 60 cycles	Osc. bias, low volt. rects., main plate rect.	Struthers-Dunn Inc. type CX3011
640		Contactor	DPSB, coil for 110 V, 60 cycles	Tune-Operate	Struthers-Dunn Inc. type CX3012
641-1 641-2 641-3		Resistor	Fixed, 160 W, 5 ohms	Main rect. pri. dropping	W.L. type D
642-1 642-2		Switch	SPST, 6 A., 250 V	Tune-Operate Plate standby	Cutler Hammer cat. 8621
643		Indicator light assem.	For standard Mazda S6 lamp, 110 V with *red* faceted jewel cap	Plate ON light	Dial Light Co. of Amer. Inc. cat. # 100-F
644		Thermometer	Temp. range minus 35°C to plus 65°C with overshoot protection to 100°C	Rect. tube compartment	F-18508-1
645		Heater	500 W, 230 V	Rect. tube compartment	Edwin L. Wiegand Co. cat. no. SE-1205
646		Thermostat	Contacts to close at 25°C plus or minus 3° and open at temperature not over 35°C	Rect. tube compartment	Spencer Thermostat Co. type C-4351-17
647		Switch	2 pole, 25 amp., 230 V A-C	Main line	G.E. type AF-1
648		Relay	Contacts for 250 V A-C 0.25 amp., SEESAW armature to be adjustable for pick-up over range of 0.2 to 0.4 amp.	Overload	Struthers-Dunn Inc. type BSB-1 style CX-3013
649		Resistor	Fixed, 4.8 W, 26 ohms	Main rect. overload shunting	IRC type DF
650		Vent. fan	10″ diameter fan with direct attached 1/20 HP 1750 RPM, 50/60 cycle, 110 V, 1 phase motor	Ventilation	F-17586-1
651		Resistor	Fixed, 2 W, 600 ohm	Audio input terminating	IRC type BW-2
652		Thermostat	Contacts to open at 18°C ±3°; to close at temperature not over 25°C	Ventilating fan control	Spencer Thermostat Co. type C-4351-17

* F.T.Co. drawing no. unless otherwise stated

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
654		Air filter	Replacement pad, 15 1/16 x 20 1/16 x 1", with adhesive; composed of same fibres as used in 1" thick dustop fiberglass air filter.	Inlet air	F-20744-1
655		Air filter	Replacement pad, coarse glass wool air filter mat with adhesive, ½ in. thick	Outlet air	F-18410-1
658-1 658-2		Capacitor	Fixed, mica, 0.0005 μf, ±5%, 600 V D-C W	Osc. grid coupling Osc. plate blocking	C-D type 9LS-13050
659-1 659-2		Capacitor	Fixed, mica, 0.000135 μf, ±5%, 1200 V D-C W	Osc. plate tank 1st I-A plate tank	C-D type 9LS
660		Resistor	Fixed, 160 W, 4600 ohms, with five taps	Main rect. divider	W.L. type D
661-1 661-2		Resistor	Fixed, 160 W, 4600 ohms	Main rect. divider	W.L. type D
662		Capacitor	Variable, 140 μμf	Mod. ind. R-F control	Cardwell type ZU-140-AS
663		Potentiometer	40,000 ohms	Mod. Ind. FOCUS control	IRC type CS
664		Capacitor	Fixed, mica, 0.00025 μf, 600 V D-C W	Mod. ind. R-F by-pass	C-D type 9LS-13025
666		Resistor	Fixed, 1W, 60,000 ohms	Mod. ind. def. plate	IRC BT-1
675	2T101	Tube VT-101	Vacuum	Osc.	Comm. type 837
676-1 676-2 676-3 676-4 676-5	2T100	Tube VT-100	Vacuum	1st I-A 2nd I-A 2nd I-A Keyer Audio	Comm. type 807
677-1 677-2	2V803	Tube VT-106	Vacuum	Power amp.	Comm. type 803
678-1 678-2	2V83	Tube VT-83	Rectifier, mercury vapor	Osc. rect.; Bias rect.	Comm. type 83

* F.T.Co. drawing no. unless otherwise stated

18. TABLE OF REPLACEABLE PARTS (Cont.)

Ref. No.	Stock No.	Name of Part	Description	Function	*Drawing No.
			e. RADIO TRANSMITTER BC-325-B (Cont.)		
679-1 679-2 679-3 679-4	2T46A	Tube VT-46-A	Rectifier, mercury vapor	Low volt. rect. Low volt. rect. Main rect. Main rect.	Comm. type 866-A
680		Tube	Cathode ray	Modulation indicator	Comm. type 913

Quan. Used	Stock No.	Name of Part	Description	Function	Drawing No.
			f. MISCELLANEOUS MECHANICAL PARTS		
5		Shock mount	Lord mounting, J-1181-3A, insert tapped 5/8"-11 thread, zinc chromate primer and black Duco finish	Transmitter shock absorber	F-18188-1 item 31
3		Shock mount	Lord mounting, 150P12, copper flash and dull white nickel plate	Oscillator compartment shock absorber	F-18188-1 item 30
4		Shock mount	Federal Telegraph Co. cushion connector	Power control panel meter shock absorber	F-18522-1-1
4		Shock mount	Federal Telegraph Co. cushion connector	Auxiliary freq. meter shock absorber	F-18522-1-4
4		Shock mount	Federal Telegraph Co. cushion connector	Control unit shock absorber	F-18522-1-2
4		Shock mount	Federal Telegraph Co. cushion connector	Monitor receiver shock absorber	F-18522-1-3
3		Shock mount	Federal Telegraph Co. cushion connector	Voltage regulator shock absorber	F-3052-12-70 # 40 durometer hardness
9'-6"		Gasket	Minor Rubber Co. # 394 rubber refrigerator gasket	Weather strip, oscillator, power control meter panel	
2		Gasket	Armstrong Cork Co. CORPRENE gasket 7/8" x 11" x 1/16" thick	Heat seal, oscillator door	F-18353-12 item 7

* F.T.Co. drawing no. unless otherwise stated

Quan. Used	Stock No.	Name of Part	Description	Function	Drawing No.
			f. MISCELLANEOUS MECHANICAL PARTS (Cont.)		
2		Gasket	Armstrong Cork Co. CORPRENE gasket 7/8" x 13 5/16" x 1/16" thick	Heat seal, oscillator door	F-18353-12 item 5
1		Detent	Federal Telegraph Co. detent assembly, 10 position	Frequency range index	F-18838-2-3
2		Detent	Federal Telegraph Co. detent assembly, 3 position	Antenna transfer index Antenna tuning index	F-18838-2-2
1		Detent	Federal Telegraph Co. detent assembly, 16 position	Ant. inductance tap. index	F-18838-2-5
5		Knob	Kurz-Kasch bakelite knob, S-309-3, nickel pl. set screw, nickel pl. bushing faced flush	Tuning dial knobs	
2		Knob	Kurz-Kasch bakelite knob S-308-3, nickel pl. set screw, nickel pl. bushing	Mod. ind. controls	
9		Knob	Federal Telegraph Co.—knob and pointer	Panel controls	F-18209-1-1
4		Knob	Federal Telegraph Co.—knob and pointer	Antenna transfer Antenna tuning Antenna induct. tap Antenna coupling	F-18209-1-2
1		Knob	Federal Telegraph Co.—knob and pointer	Freq. range control	F-20724-1
1		Knob	Federal Telegraph Co.—knob with engraved arrow	Intensity control	F-22197-1
1		Coupling coil	Federal Telegraph Co. coupling coil assem. (includes coil)	P-A coupling coil	F-18788-12
8 1/2"		Sleeve	Mitchell-Rand asbestos sleeving #835	Phantom ant. clamp	
1		Frame	Federal Telegraph Co. intake filter frame assem.	Intake, front	F-18504-2
1		Screen	Federal Telegraph Co. intake filter—rear screen	Intake, rear	F-21120-2-1
2		Screen	Federal Telegraph Co. outlet filter screens	Exhaust	F-18117-2
1		Window	Federal Telegraph Co. meter window	Antenna meter	F-9110-1-3
1		Inner wiring duct	Federal Telegraph Co. inner wiring channel	Interconnecting wire	F-19022-2-1

18. TABLE OF REPLACEABLE PARTS (Cont.)

Quan. Used	Stock No.	Name of Part	Description	Function	Drawing No.
			f. MISCELLANEOUS MECHANICAL PARTS (Cont.)		
1		Outer wiring duct	Federal Telegraph Co. outer wiring channel	Interconnecting wire	F-19021-2-1
2		Ground rod	Federal Telegraph Co. ground rod	Ground rod	F-24015-1
2		Bushing	1½" I.P.S. extra heavy brass pipe 5" long straight thread on each end 1¼" min. dull white nickel plate	Reel axle extension	
1		Gasket	Federal Telegraph Co. gasket washer	Reel axle extension bushing	F-12206-1-13
1		Cap	Federal Telegraph Co. cap assembly	Reel axle extension bushing	F-18846-1
2		Window	Federal Telegraph Co. window	Osc. dials	F-17858-1
1		Window	Federal Telegraph Co. window	Dummy load observation	F-19936-1
1		Cover	Federal Telegraph Co. tuning chart cover	Trans. tuning chart	F-19027-1
1		Cover	Federal Telegraph Co. window	Osc. tuning chart	F-19004-1
2		Frame	Federal Telegraph Co. tuning chart frame 6 7/16" long	Trans. tuning chart	F-19695-1-1
2		Frame	Federal Telegraph Co. tuning chart frame 4 7/8" long	Trans. tuning chart	F-19695-1-2
2		Frame	Federal Telegraph Co. card holder strip 12 5/16" long	Osc. tuning chart	F-19007-1-1
2		Frame	Federal Telegraph Co. card holder strip 2 9/16" long	Osc. tuning chart	F-19007-1-2
1		Chart	Federal Telegraph Co. tuning chart	Trans. tuning	F-19030-2
3		Chart	Federal Telegraph Co. calibration card	Osc. tuning	F-19005-2
30		Insulating beads	Struthers Dunn no. 7A fish spine beads	Flexible antenna connection	
1		Plate	United Carr Fastener DOT plug button # 50668	Freq. meter lamp access plate	
1		Bumper	Atlantic India Rubber Works recess bumper block # 23	Trans. right door	
1		Catch	National Lock Co. elbow catch # 3348 nickel pl.	Heater-Ventilating unit cover	

18. TABLE OF REPLACEABLE PARTS (Cont.)

Quan. Used	Stock No.	Name of Part	Description	Function	Drawing No.
			f. MISCELLANEOUS MECHANICAL PARTS (Cont.)		
5		Conduit	½" S.S. steel flexible conduit, black Duco finish	Generator connection	
1		Circuit label	Federal Telegraph Co. circuit label—complete equipment installed in Truck K-18-B		F-23567-2
1		Circuit label	Federal Telegraph Co. circuit label—Radio Transmitter BC-325-B		F-24332-12
1		Circuit label	Federal Telegraph Co. circuit label—Control Unit RM-7-B		F-18876-2
1		Circuit label	Federal Telegraph Co. circuit label—power equipment		F-23566-1
1		Circuit label	Federal Telegraph Co. circuit label—heater-ventilating unit		F-18953-1
1		Lubrication chart	Federal Telegraph Co. composite lubrication chart		F-19327-2
3		Insulator	Isolantite insulator # 337-L-2 ¾" dia. x 2" long, 2 # 10-32 tapped holes	Standoff insulator	
12		Insulator	Isolantite insulator # 337-L-1 ¾" dia. x 1" long, 2 # 10-32 tapped holes	Standoff ins.	
16		Insulator	Isolantite insulator # 337-L-1½ ¾" dia. x 2" long, 2 # 10-32 tapped holes	Standoff ins.	
5		Insulator	Isolantite insulator # 337-L-2½ ¾" dia. x 2½" long, 2 # 10-32 tapped holes	Standoff ins.	
1		Insulator	Isolantite insulator # 337-L-4 ¾" dia. x 4" long, 2 # 10-32 tapped holes	Standoff ins.	
9		Insulator	Isolantite insulator # 323-L-½ ½" dia. x ½" long, 2 # 8-32 tapped holes	Standoff ins.	
25		Insulator	Isolantite insulator # 323-L-1 ½" dia. x 1" long, 2 # 8-32 tapped holes	Standoff ins.	
3		Insulator	Isolantite insulator # 323-L-2 ½" dia. x 2" long, 2 # 8-32 tapped holes	Standoff ins.	
2		Insulator	Isolantite insulator # 395-L-1 ⅜" dia. x 1" long, 2 # 6-32 tapped holes	Standoff ins.	
2		Insulator	Isolantite insulator # 397-L-⅝ ½" dia. x ⅝" long, 2 # 6-32 tapped holes	Standoff ins.	
10		Insulator	Isolantite insulator # 397-L-¾ ½" dia. x ¾" long, 2 # 6-32 tapped holes	Standoff ins.	
4		Insulator	Isolantite insulator # 397-L-1 ½" dia. x 1" long, 2 # 6-32 tapped holes	Standoff ins.	
6		Insulator	Isolantite insulator # 397-L-2 ½" dia. x 2" long, 2 # 6-32 tapped holes	Standoff ins.	

18. TABLE OF REPLACEABLE PARTS (Cont.)

Quan. Used	Stock No.	Name of Part	Description	Function	Drawing No.
			f. MISCELLANEOUS MECHANICAL PARTS (Cont.)		
2		Insulator	Isolantite insulator # 348-L-4 1" dia. x 4" long, 2¼" 20 tapped holes	Standoff ins.	
1		Insulator	Isolantite insulator # 815 1⅜" x 1⅜" Sq. x ¼" thick coupling, 8—# 4-40 tapped holes	Variometer shaft coupling	
6		Insulator	Alsimag insulator # 1142 ¾" dia. x 7¼" long 2¼" holes	Antenna guy rope	
9		Insulating bushing	Alsimag bushing # 1173	Lead through bushing	
2		Insulating bushing	Alsimag bushing # 1174	Lead through bushing	
9		Insulating bushing	Alsimag bushing # 1175	Lead through bushing	
1		Bearing	Marlan-Rockwell Corp. # 308MFF	Generator, pulley end	
1		Bearing	Marlan-Rockwell Corp. # 306MFF	Generator, slip ring end	
1		Bearing	Marlan-Rockwell Corp. # 203SFF	Exciter, closed end	
4		Brushes	National Carbon Co. type SA35 ⅜"x1"x1½"	A-C generator	
2		Brushes	National Carbon Co. type SA35 ⅜"x⅝"x1⅛"	Exciter	
1		Pillow block	SKF Industries # SAF1607A pillow block for 1⅛" shaft	P.T.O. drive shaft bearing front	SA-607
1		Pillow block	SKF Industries # SAF1607A pillow block for 1⅛" shaft bearing to be stabilized	P.T.O. drive shaft bearing rear	SA-607
1		Power take-off unit	H. S. Watson Co. # 1821-1	Generator drive	C-290
3		V belt	Allis Chalmers Mfg. Co. type B-55, 19.5 in.	Generator drive	
1		Pulley	Allis Chalmers Mfg. Co. 5.6 in. P.D., 3B groove Flexsteel sheave, G23 bushing, 1⅛" bore, keyway 5/16 x 3/16 in. deep	P.T.O. drive shaft pulley	
1		Pulley	Allis Chalmers Mfg. Co. 5.4 in. P.D., 3B groove Flexsteel sheave, G23 bushing, 1¼" bore, keyway ¼ x 5/32 in. deep	Generator pulley	

g. List of Manufacturers—Names and Addresses

Allis Chalmers Manufacturing Co., Milwaukee, Wisc.

American Auto Electric Sales Co., 1031 W. Van Buren St., Chicago, Ill.

American Lava Corp., Globe Indemnity Bldg., Newark, N. J.

American Phenolics Corp., 1250 W. Van Buren St., Chicago, Ill.

American Radio Hardware Co., 476 Broadway, New York City, N. Y.

Armstrong Cork Co., 1010 Concord St., Lancaster, Pa.

Atlantic India Rubber Works, 1453 W. Van Buren St., Chicago, Ill.

Bussman Manufacturing Co., Union at Jefferson St., St. Louis, Mo.

Bryant Electric Co., Bridgeport, Conn.

C. P. Clair and Co., 4903 Lawrence Ave., Chicago, Ill.

Continental Carbon Inc., 13900 Lorraine Ave., Cleveland, Ohio

Continental Electric Co. Inc., 325 E. Ferry St., Newark, N. J.

Cornell Dubilier Corp., Hamilton Blvd., S. Plainfield, N. J.

Coto Coil Co. Inc., Providence, R. I.

Crouse Hind's Co., Hills and Clary St., Syracuse, N. Y.

Cutler Hammer Inc., 1333 West St., Milwaukee, Wis.

Daven Co., 160 Summit St., Newark, N. J.

Dial Light Co. of America, 92 West St., New York, N. Y.

Electric Air Heater Co., 451 S. Byrkit St., Misawaka, Ind.

Federal Telegraph Co., 200 Mt. Pleasant Ave., Newark, N. J.

General Electric Co., Schenectady, N. Y.

Harvey Hubbell Inc., 1930 Thomas St., Bridgeport, Conn.

Hazard Insulated Wire Works Div., 1898 Hazle St., Wilkes-Barre, Pa.

Isolantite Inc., 343 Cortlandt St., Belleville, N. J.

International Resistance Co., 401 N. Broad St., Philadelphia, Pa.

Jefferson Union Co., 910 25th St., Bellwood, Ill.

E. F. Johnson Co., Waseca, Minn.

Kellogg Switchboard and Supply Co., 6650 S. Cicero Ave., Chicago, Ill.

Kenyon Transformer Co., 840 Barry St., New York City, N. Y.

Kurz Kasch Inc., 1417 S. Broadway, Dayton, Ohio

Leviton Manufacturing Co., Greenpoint Ave., Brooklyn, N. Y.

Littelfuse Inc., 4765 Ravenswood Ave., Chicago, Ill.

Lord Manufacturing Co., 1639 W. 12th St., Erie, Pa.

Marlan Rockwell Corp., 338 Peach St., N. E., Atlanta, Ga.

Minor Rubber Co. Inc., 218 Market St., Newark, N. J.

Mitchell Rand Insulation Co. Inc., 51 Murray St., New York, N. Y.

Monitor Controller Co., Baltimore, Md.

National Carbon Co. Inc., 30 E. 42nd St., New York, N. Y.

National Electric Products Corp., 6th and Duquesne Way, Pittsburgh, Pa.

National Lock Co., Rockford, Ill.

Ohmite Manufacturing Co., 4835 W. Flournoy St., Chicago, Ill.

Premier Crystal Labs., 12 Park Row, New York, N. Y.

R.C.A. Manufacturing Co., Camden, N. J.

F. W. Sickle Co., 300 Main St., Springfield, Mass.

Simplex Corp., Burlington, Iowa

SKF Industries Inc., Front and Erie St., Philadelphia, Pa.

Spencer Thermostat Co., 40 Forest St., Attleboro, Mass.

Struthers Dunn Inc., 1315 Cherry St., Philadelphia, Pa.

George Ulanet Co., 90 E. Kinney St., Newark, N. J.

United Carr Fastner Corp., 31 Ames St., Cambridge, Mass.

Ward Leonard Manufacturing Corp., Mt. Vernon, N. Y.

H. S. Watson Co., Toledo, Ohio

Western Electric Co., 195 Broadway, New York, N. Y.

Westinghouse Electric and Manufacturing Co., Hill St., E. Pittsburgh, Pa.

Weston Electrical Instrument Corp., 614 Frelinghuysen Avenue, Newark, N. J.

Edwin L. Wiegand Co., 7506 Thomas Blvd., Pittsburgh, Pa.

Yaxley Manufacturing Div., 3029 E. Washington, Indianapolis, Ind.

19. LIST OF IDENTICAL ITEMS USED IN MORE THAN ONE PRINCIPAL COMPONENT

Description	Principal Component in Which Contained	Reference Number
Capacitor, fixed, 4uf, 600 V. D-C W. C-D type TJ-6040	Control Unit RM-7-B	411-1
		411-2
	Radio Transmitter BC-325-B	560-1
		560-2
Jack JK-33-A, 3 circuit	Control Unit RM-7-B	414-1
		414-2
	Radio Transmitter BC-325-B	516
Jack JK-34-A, 2 circuit	Control Unit RM-7-B	415-1
		415-2
		415-3
		415-4
		415-5
	Radio Transmitter BC-325-B	588
Lamp, 120 V., 6W, candelabra screw base, Mazda type S-6	Installation item	361d
	Radio Transmitter BC-325-B	628-1
		628-2
		628-3
Lamp, 50W, 115V., inside frosted, standard screw base, rough service, G.E. type A-19	Power Control Panel BD-92-B	109
	Installation item	318-1
		318-2
		318-3
		318-4
	Radio Transmitter BC-325-B	548
Light, panel, Leviton Mfg. Co. cat. no. 758	Installation item	361c
	Radio Transmitter BC-325-B	555
Receptacle, duplex, 10 amp., 250 V., complete with outlet plate	Power Control Panel BD-92-B	111
	Installation item	302
Switch, DPST, 250 V., 6 amp.	Power Control Panel BD-92-B	114
	Installation item	361b
	Control Unit RM-7-B	435
Terminal block, 8 circuit, F.T.Co. drawing no. F-12530-12-4	Power Control Panel BD-92-B	112
		113
	Radio Transmitter BC-325-B	589
Tube socket, ceramic, 5 contacts, E. F. Johnson cat. no. 225S	Control Unit RM-7-B	407
	Radio Transmitter BC-325-B	511-1
		511-2
		511-3
		511-4
		511-5
Tube socket, ceramic, 4 contacts, E. F. Johnson cat. no. 224	Control Unit RM-7-B	428-1
		428-2
	Radio Transmitter BC-325-B	624-1
		624-2
		624-3
		624-4

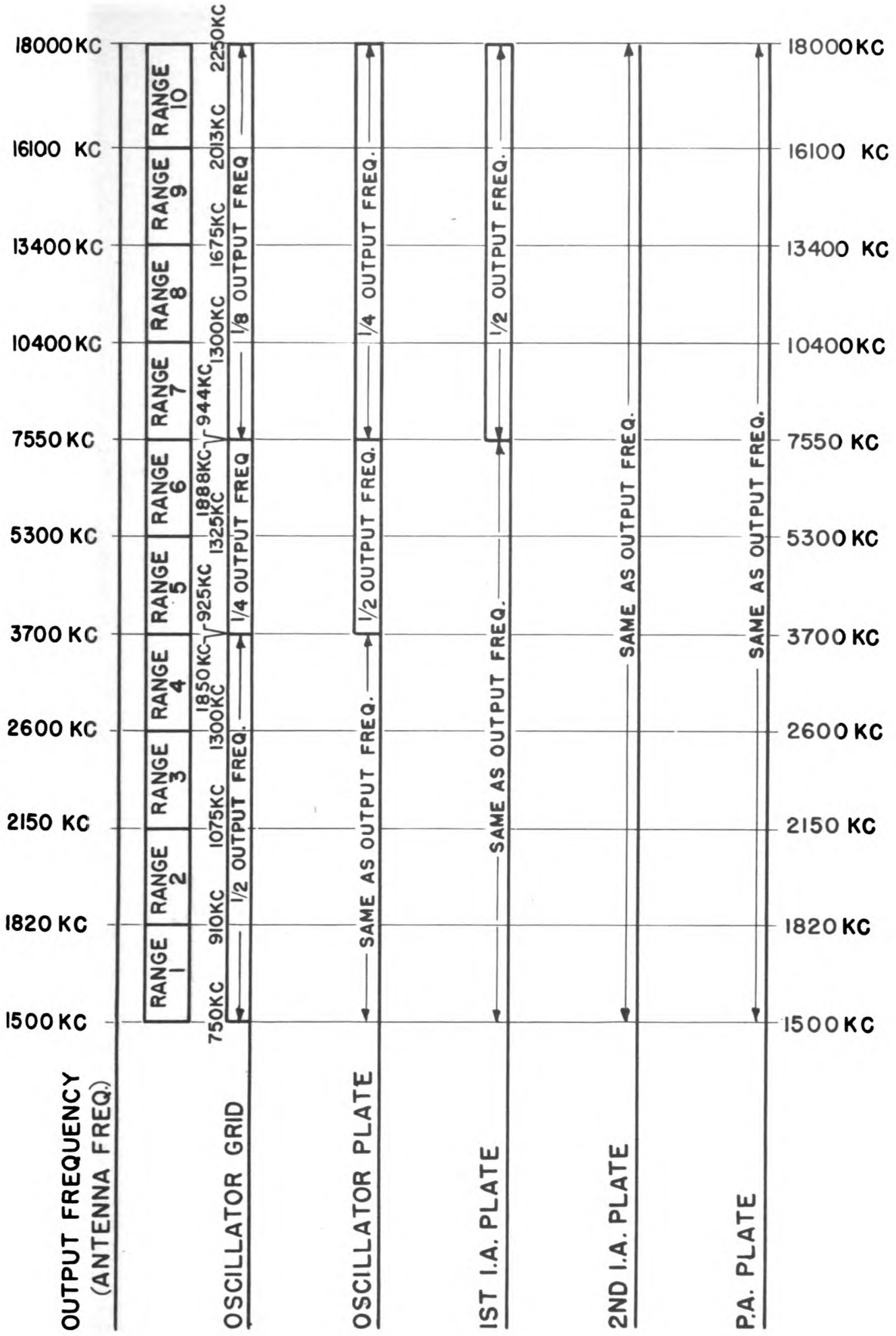


FIG. 29 RADIO TRANSMITTER BC-325-B. CHART SHOWING FREQUENCY RANGE OF EACH STAGE ON ALL RANGE SWITCH POSITIONS

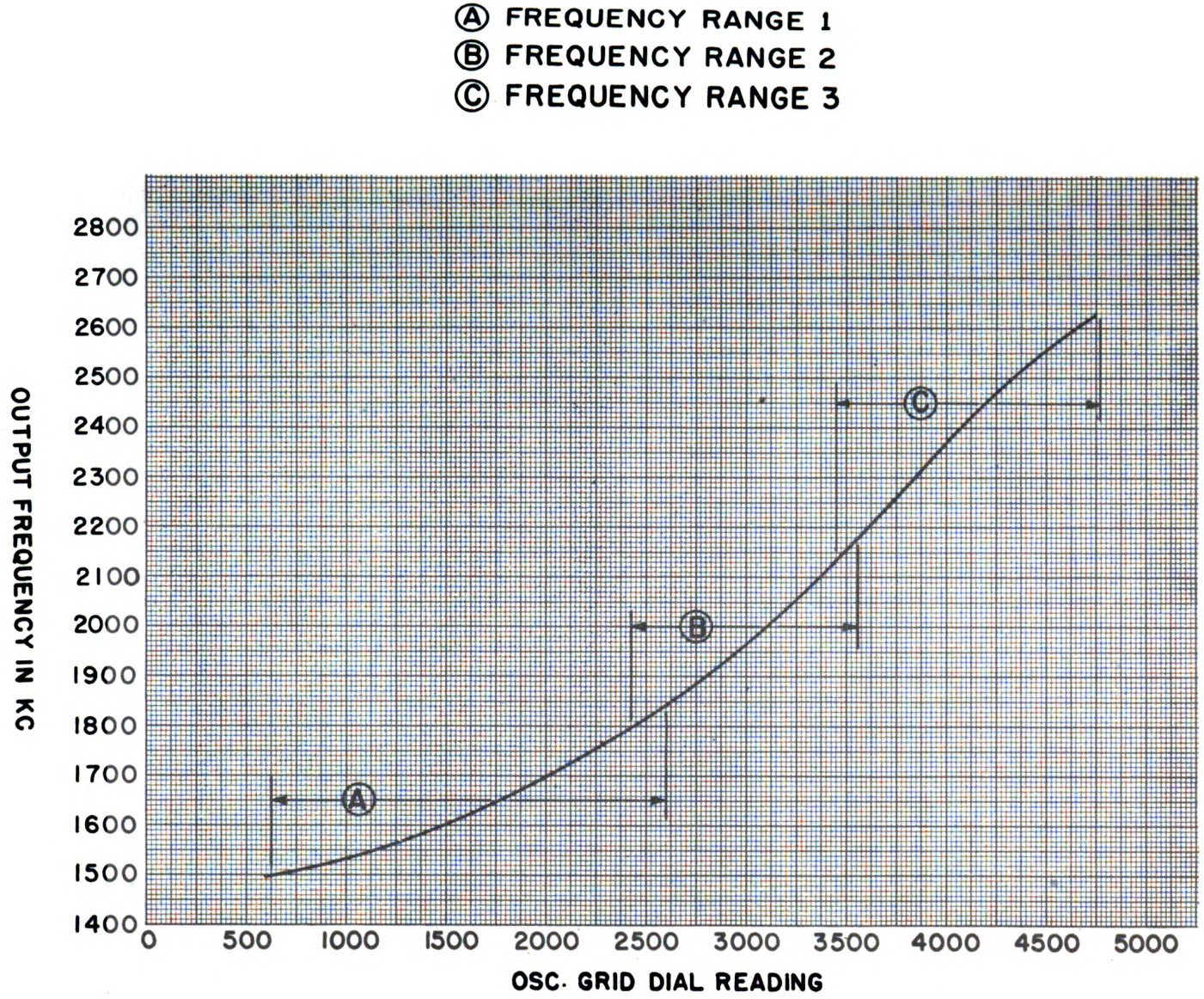


FIG. 30 APPROXIMATE MASTER OSCILLATOR CALIBRATION FOR FREQUENCY RANGES 1, 2 AND 3

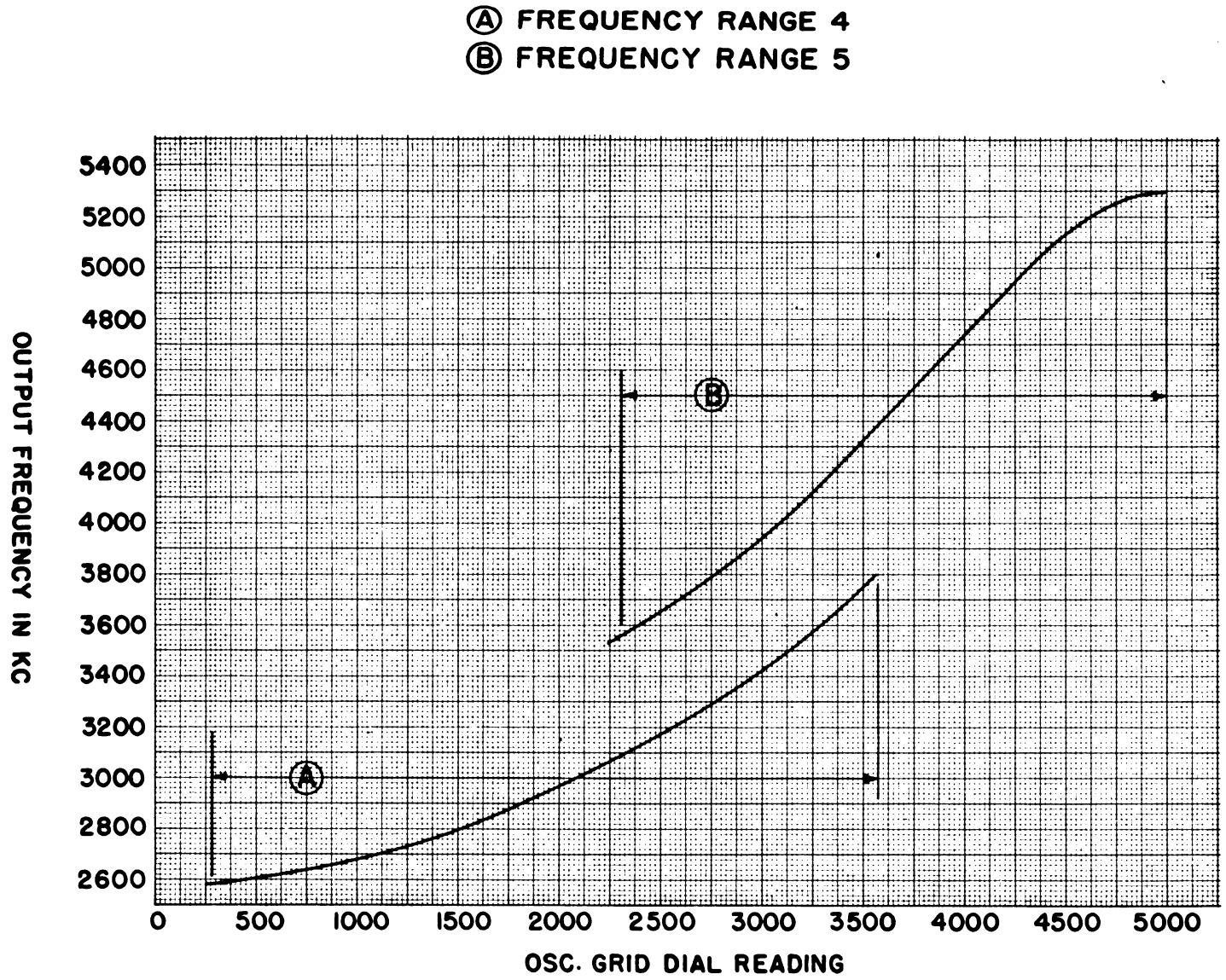


FIG. 31 APPROXIMATE MASTER OSCILLATOR CALBIRATION FOR FREQUENCY RANGES 4 AND 5

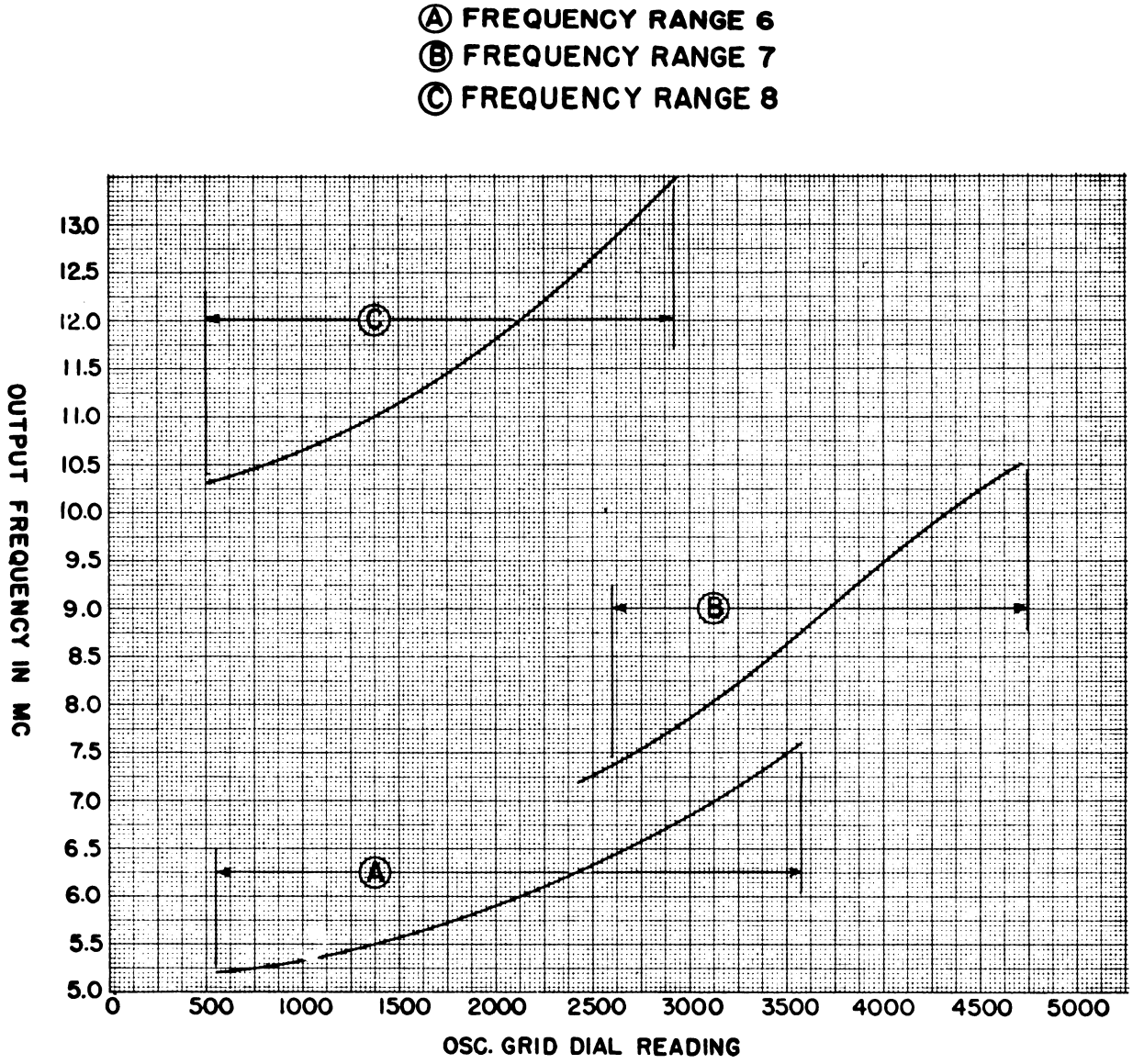


FIG. 32 APPROXIMATE MASTER OSCILLATOR CALIBRATION FOR FREQUENCY RANGES 6, 7 AND 8

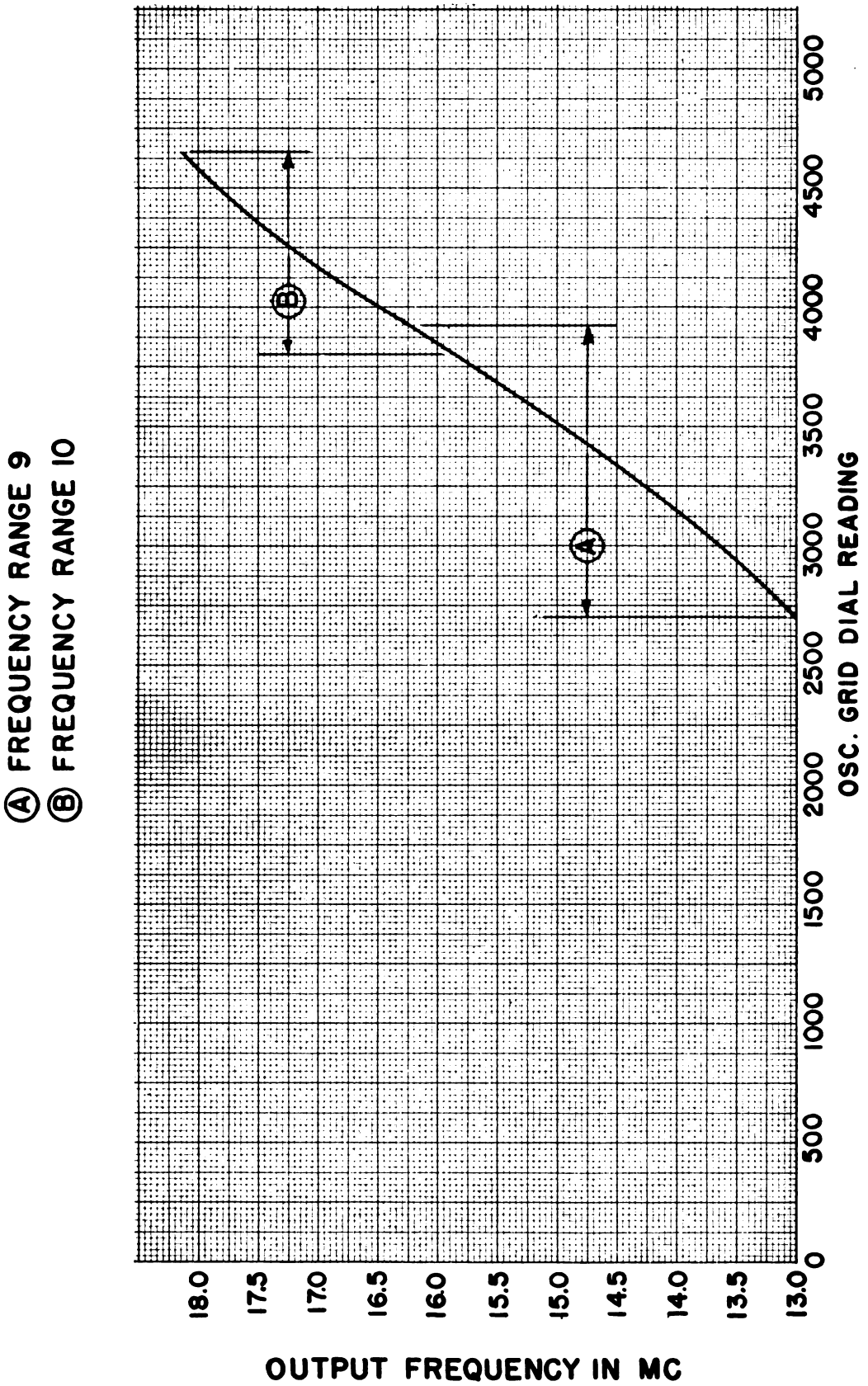


FIG. 33 APPROXIMATE MASTER OSCILLATOR CALIBRATION FOR FREQUENCY RANGES 9 AND 10

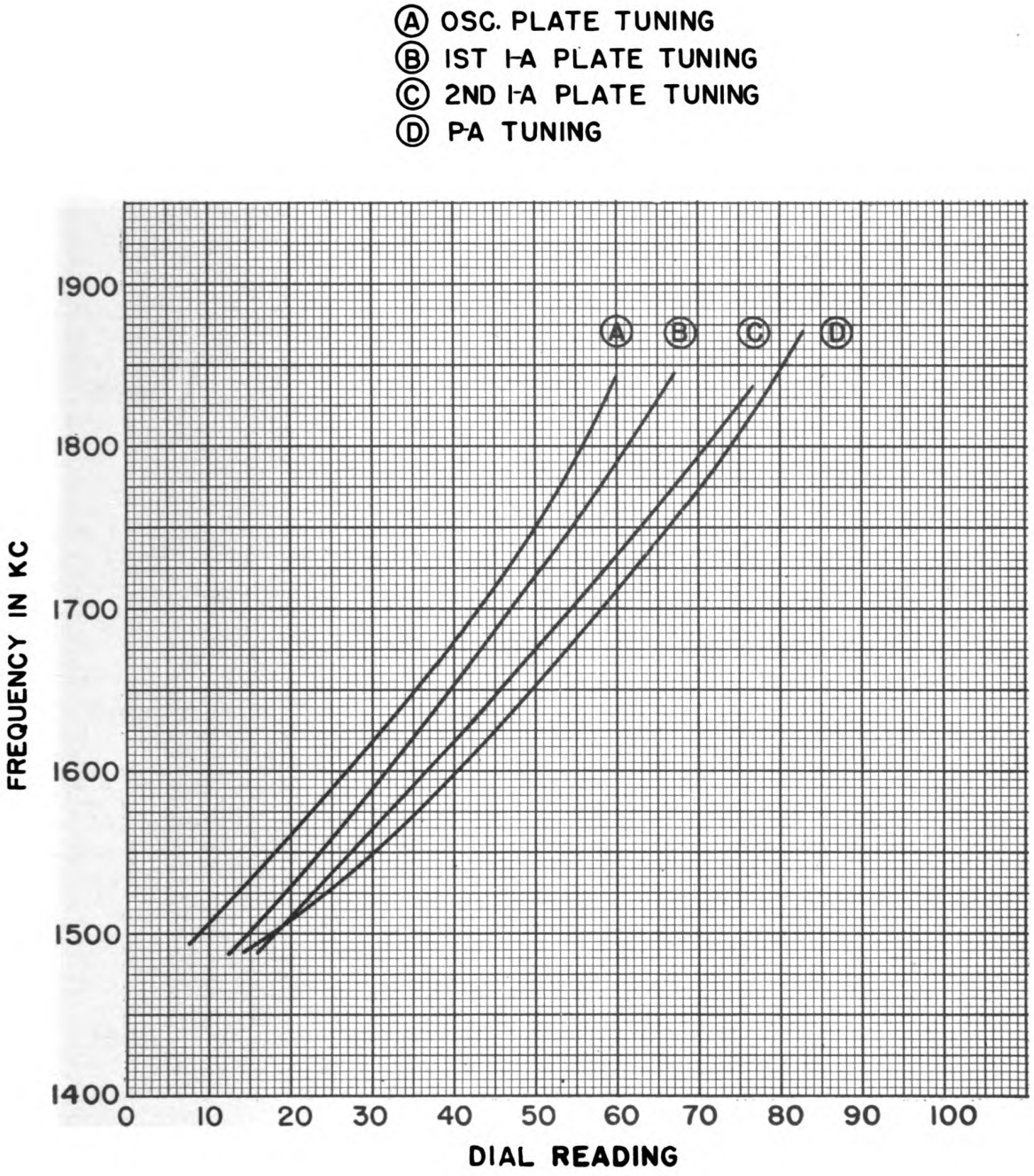


FIG. 34 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 1

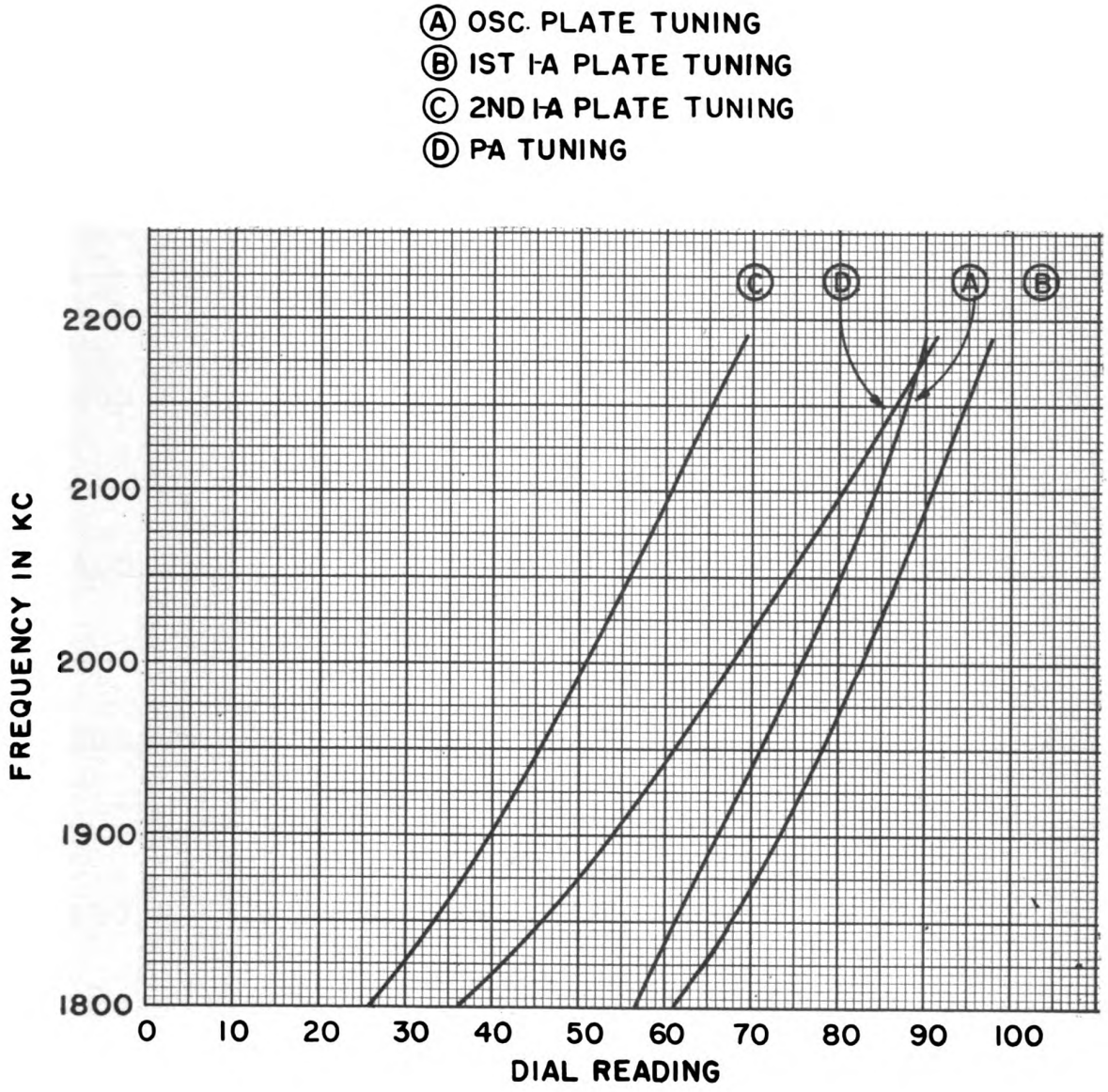


FIG. 35 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 2

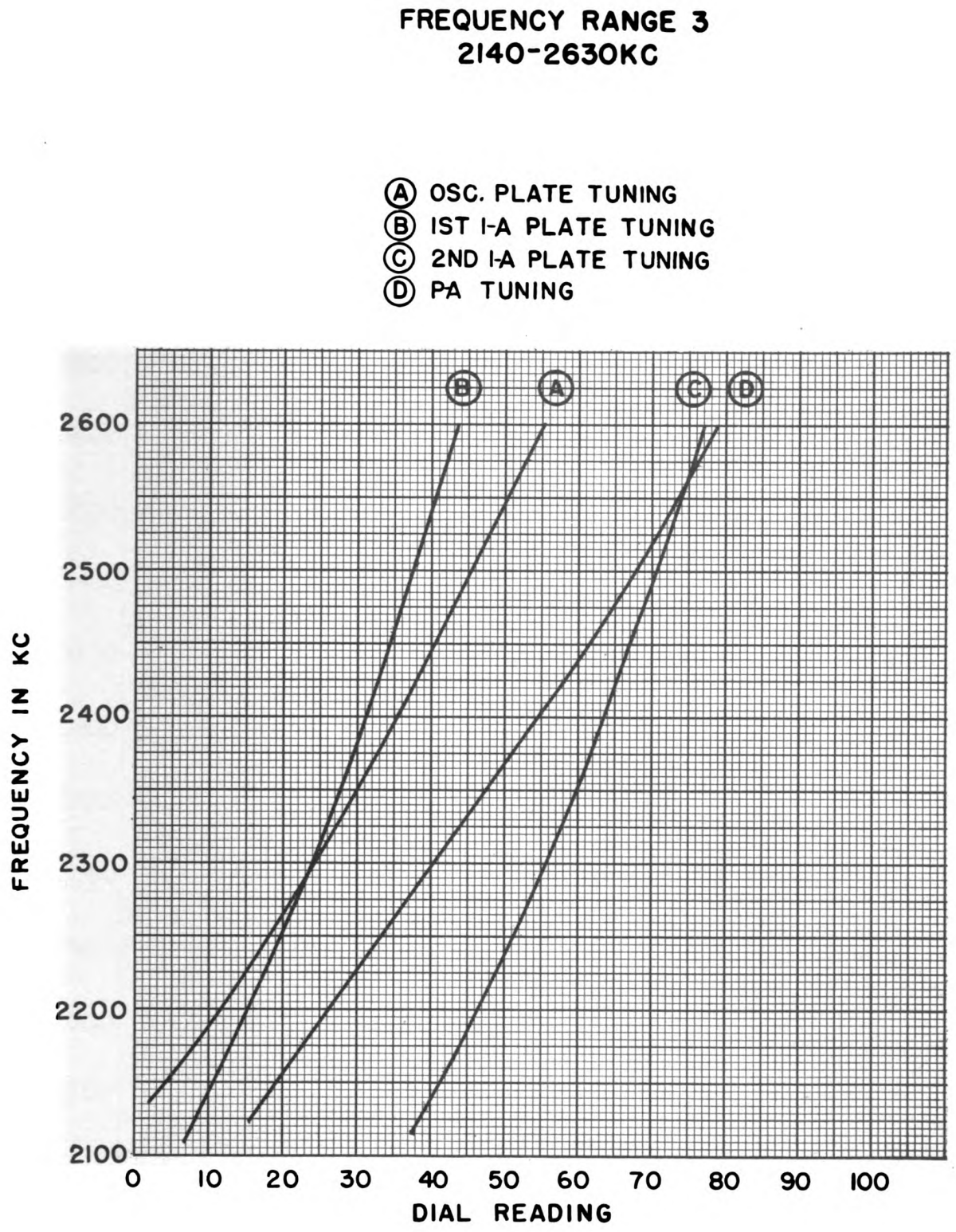


FIG. 36 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 3

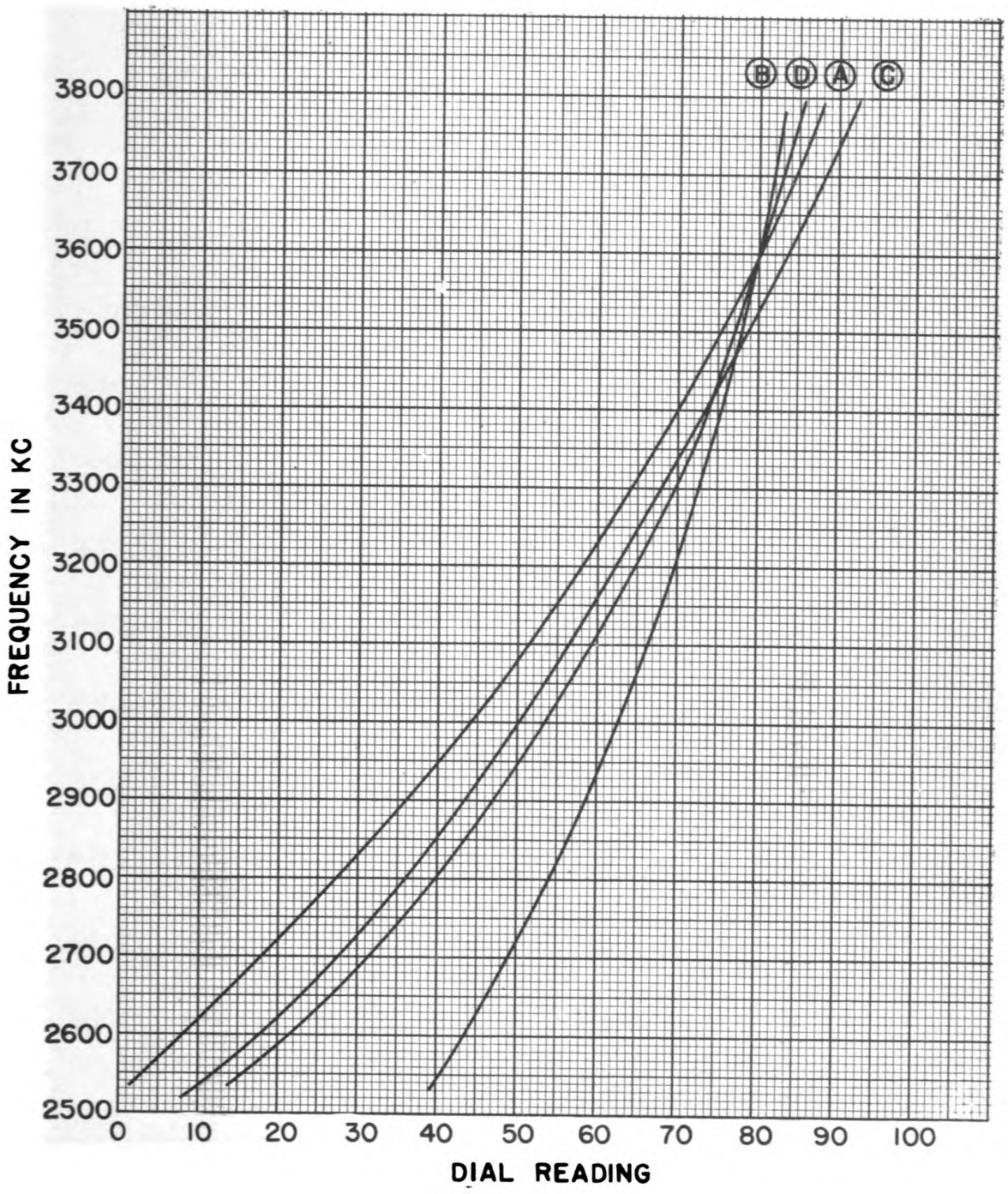


FIG. 37 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 4

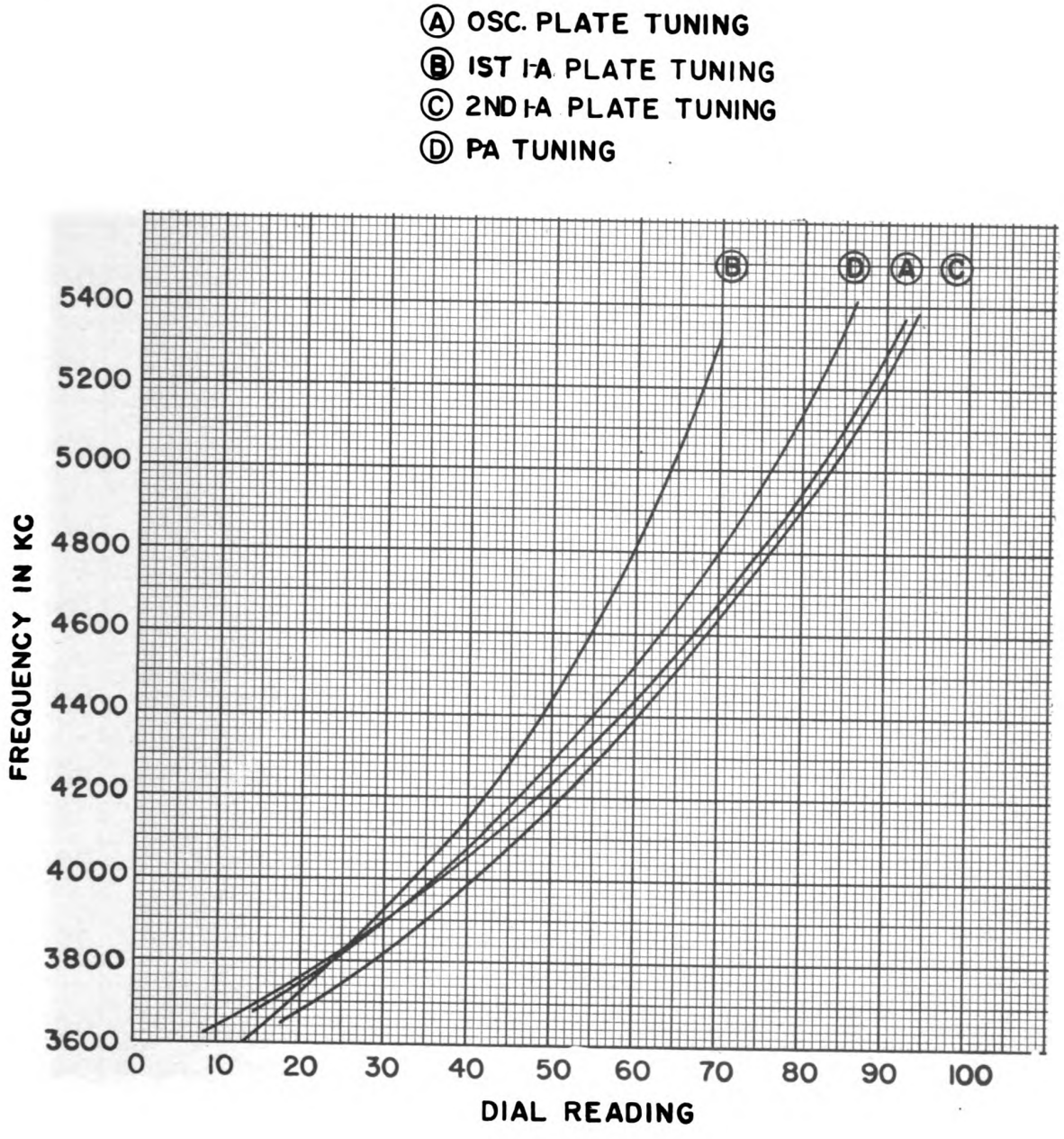


FIG. 33 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 5

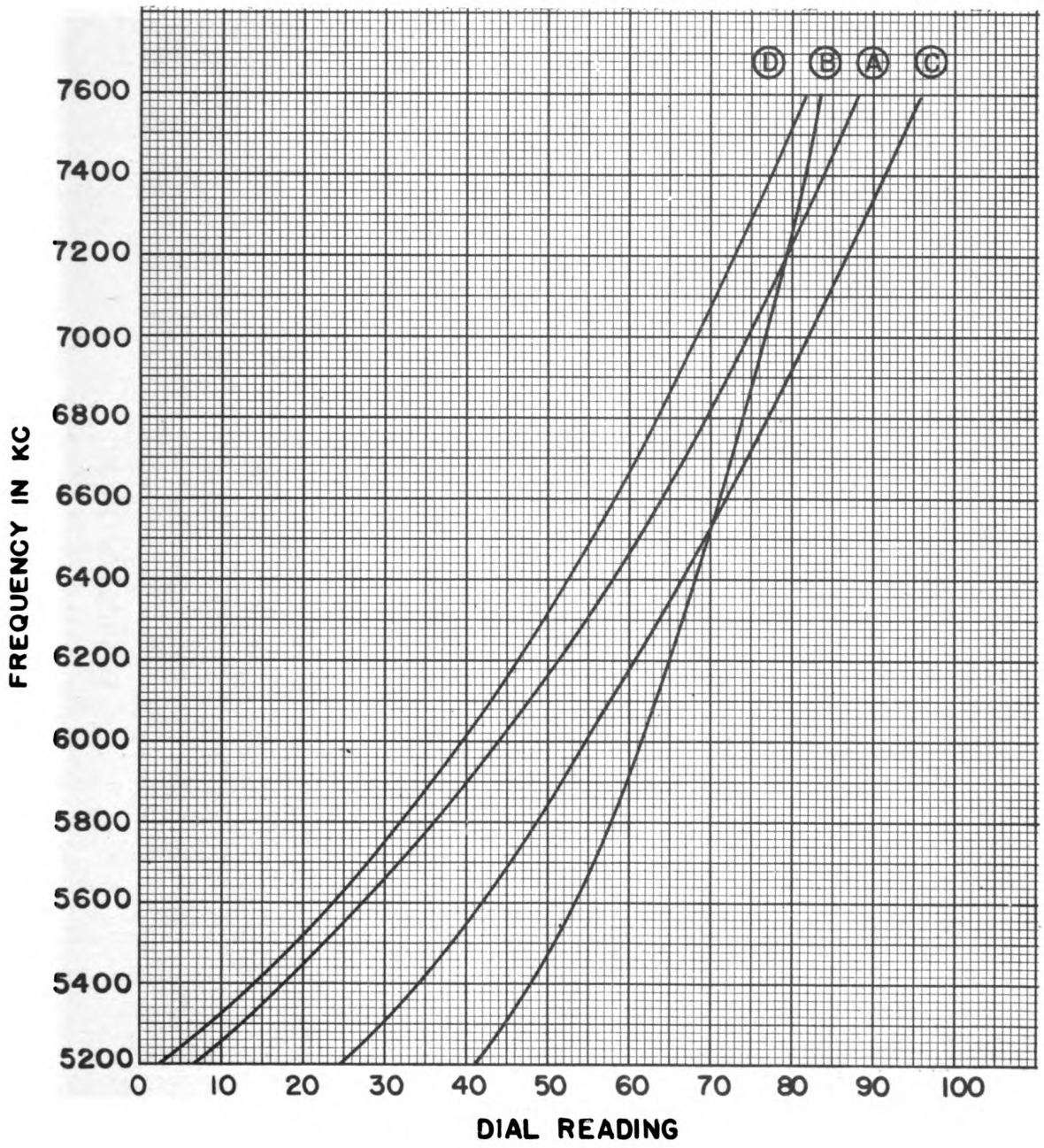


FIG. 39 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 6

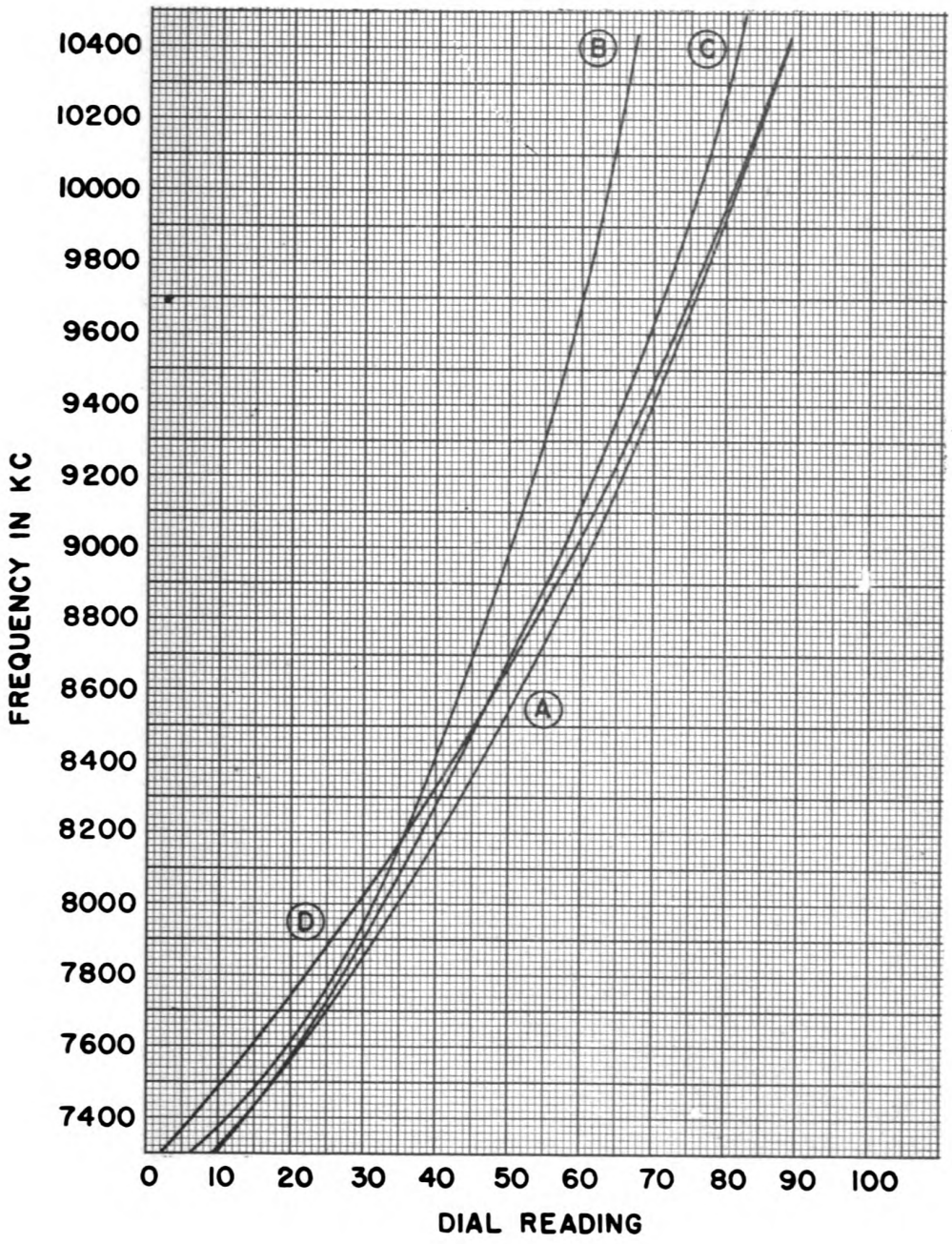


FIG. 40 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 7

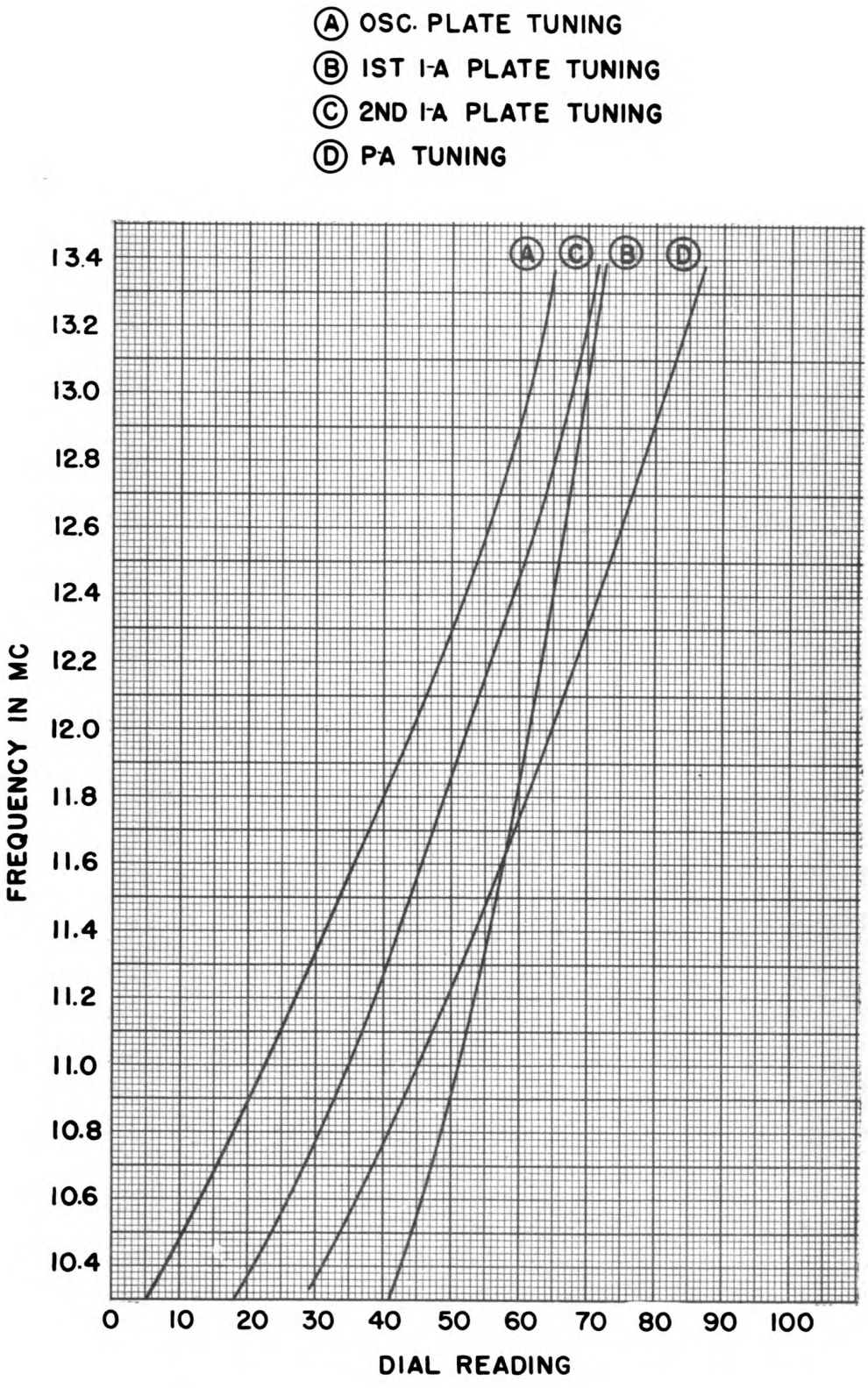


FIG. 41 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 8

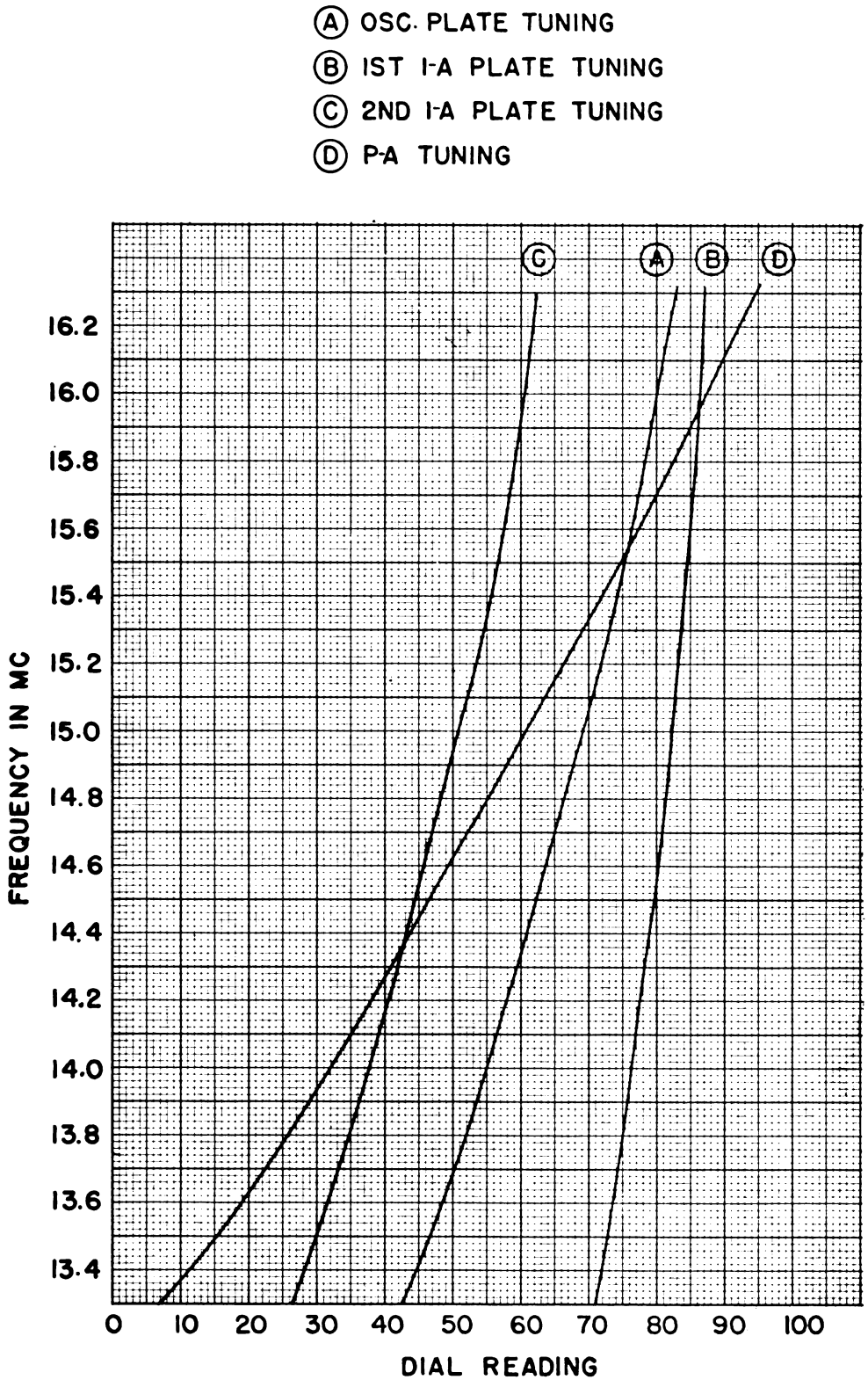


FIG. 42 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 9

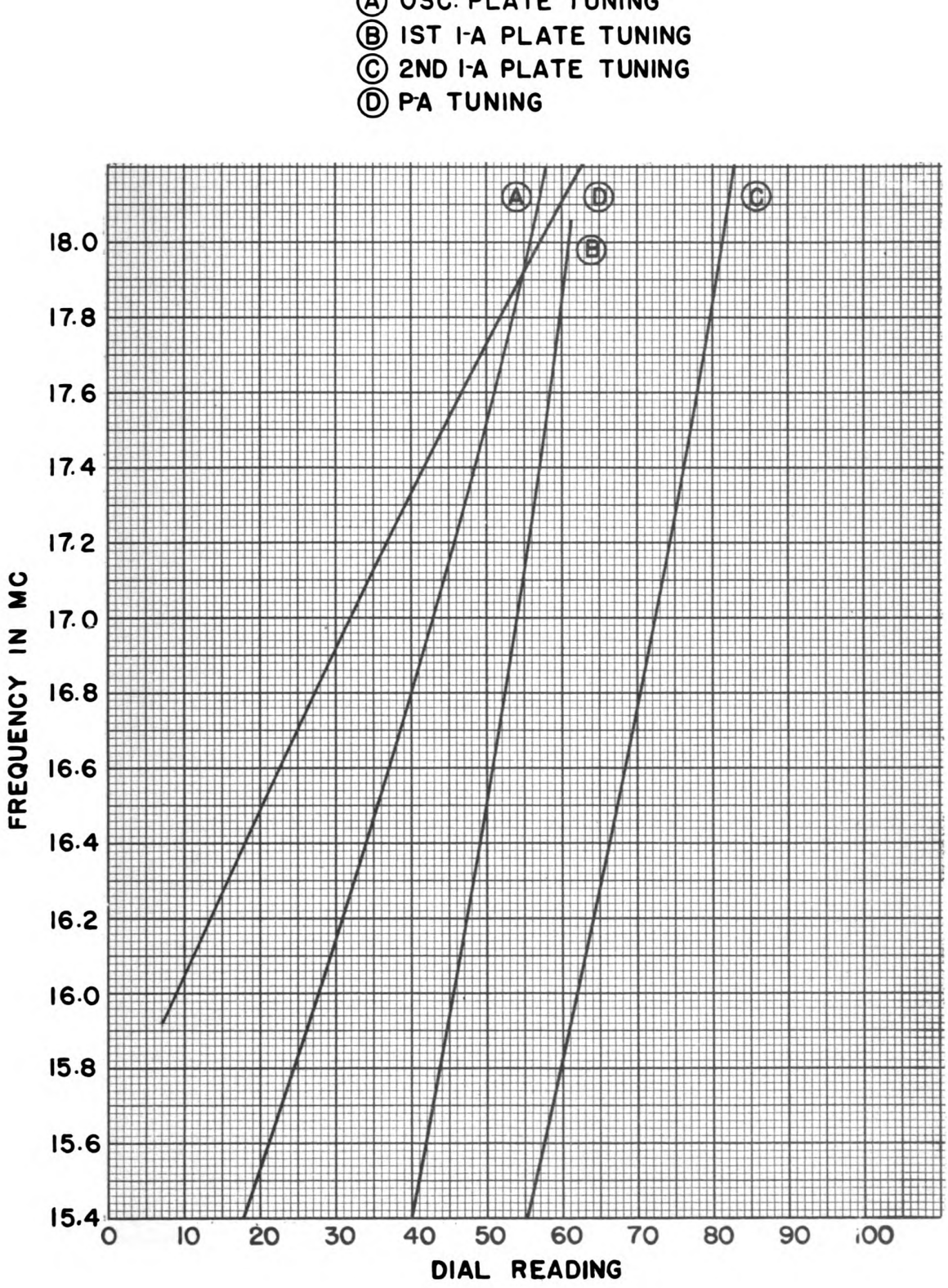


FIG. 43 APPROXIMATE CALIBRATION FOR TUNED R-F STAGES, FREQUENCY RANGE 10

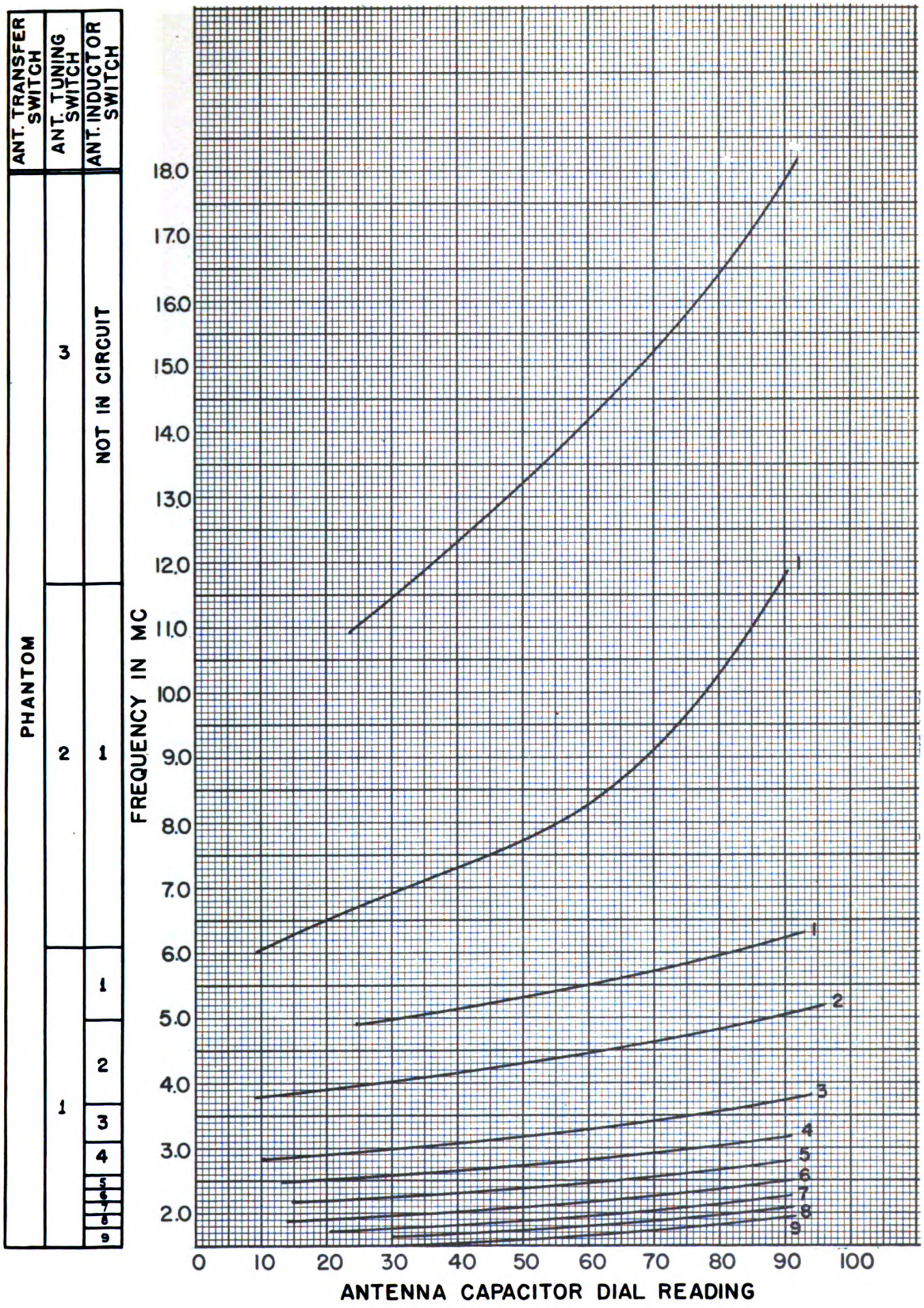


FIG. 44 APPROXIMATE PANEL CONTROL SETTINGS FOR LOADING PHANTOM ANTENNA

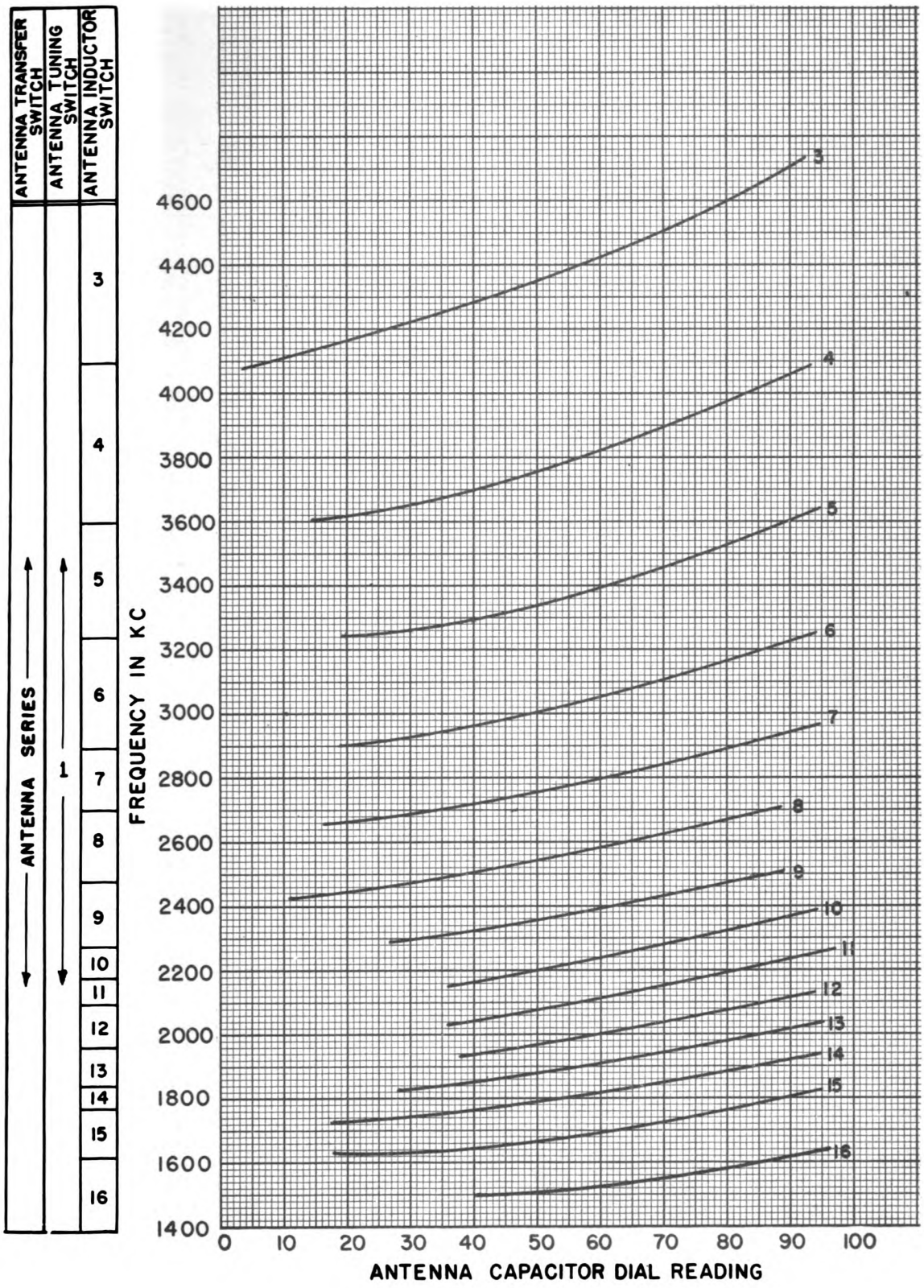


FIG. 45 APPROXIMATE PANEL CONTROL SETTINGS FOR LOADING ANTENNA, FREQUENCIES 1500-4600 KC

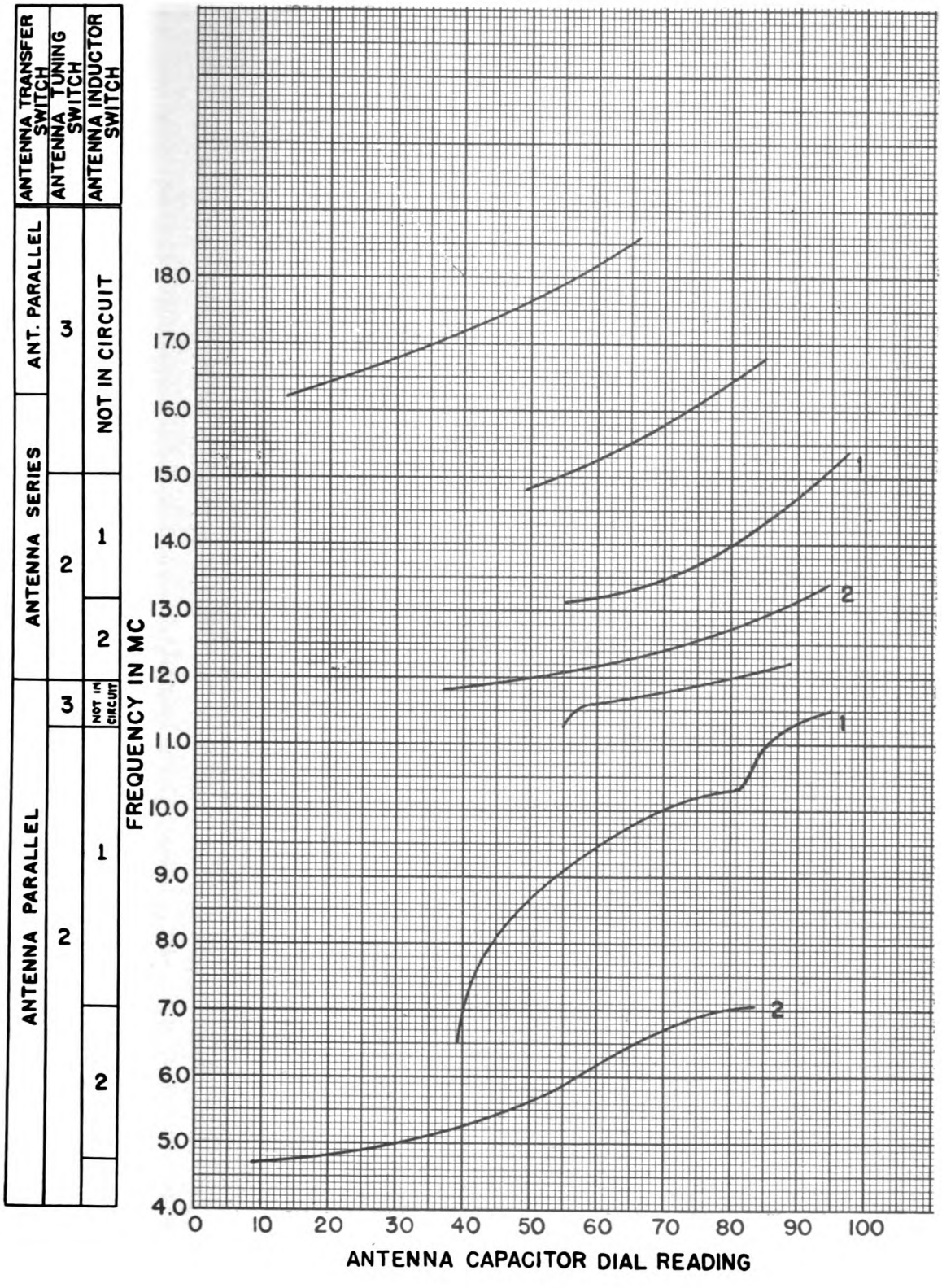


FIG. 46 APPROXIMATE PANEL CONTROL SETTINGS FOR LOADING ANTENNA, FREQUENCIES 4600-18000 KC

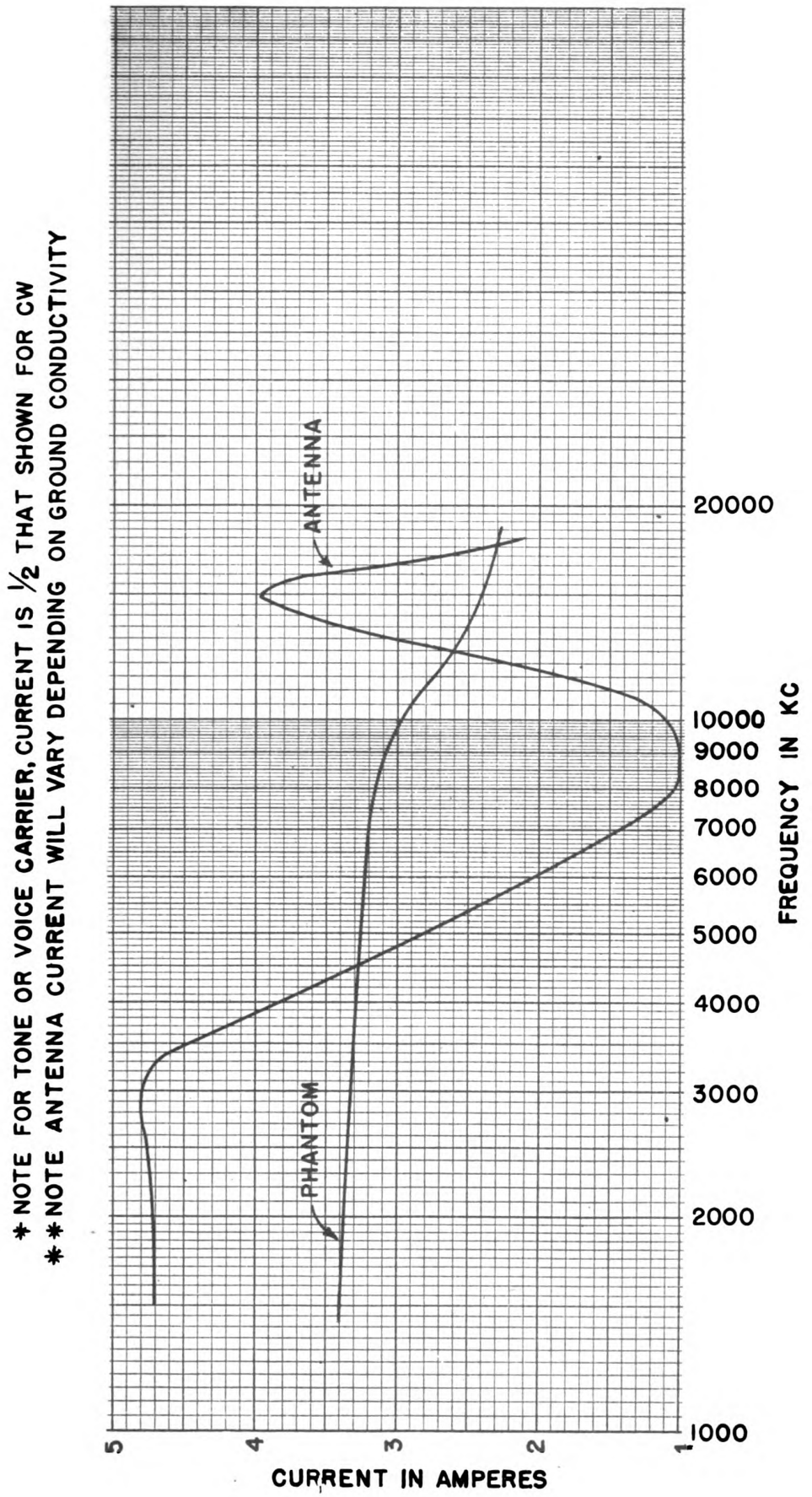
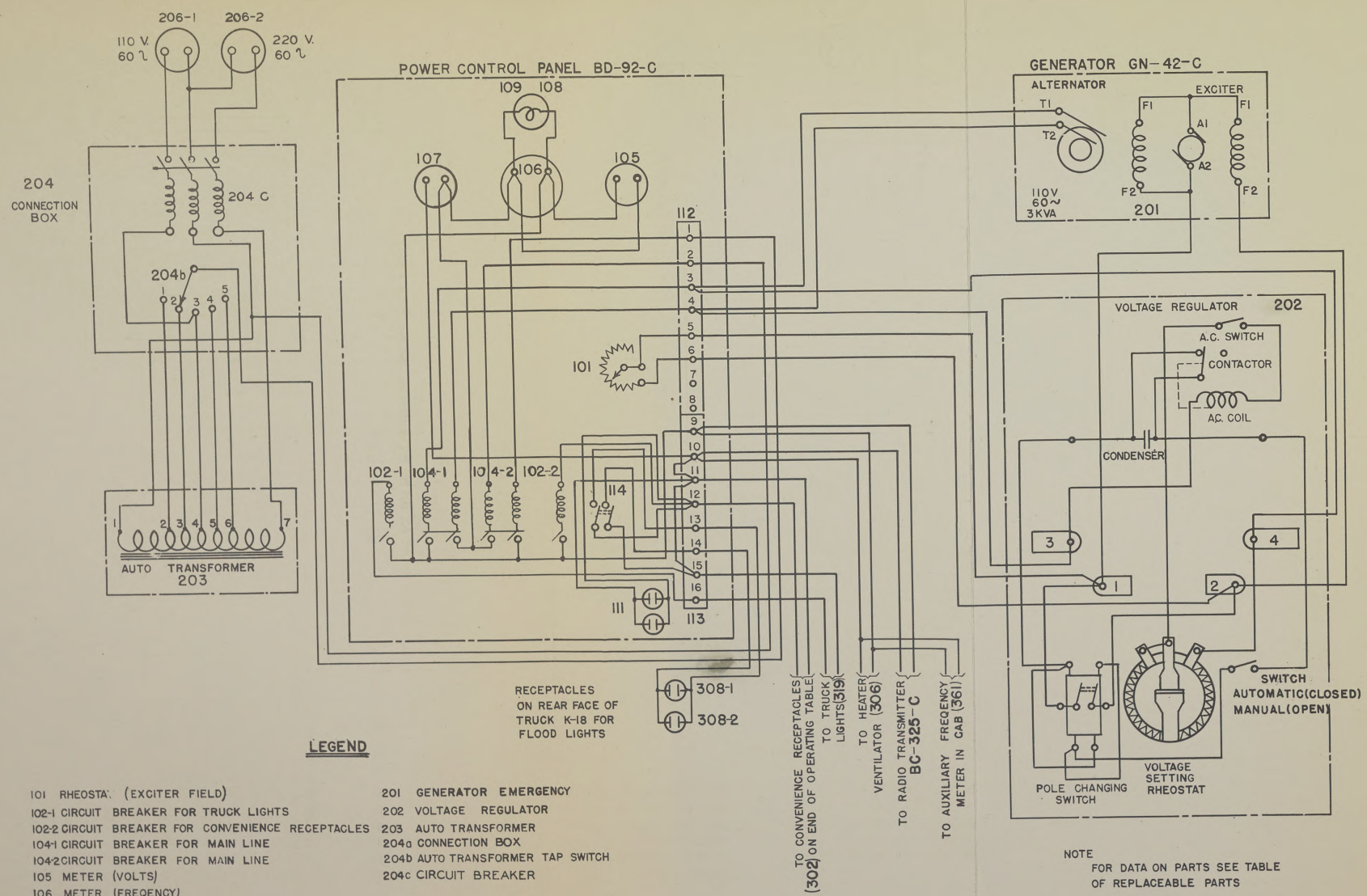


FIG. 47 CURVE OF APPROXIMATE ANTENNA CURRENT FOR NORMAL OUTPUT AS A FUNCTION OF FREQUENCY



LEGEND

101 RHEOSTAT (EXCITER FIELD)
102-1 CIRCUIT BREAKER FOR TRUCK LIGHTS
102-2 CIRCUIT BREAKER FOR CONVENIENCE RECEPTACLES
104-1 CIRCUIT BREAKER FOR MAIN LINE
104-2 CIRCUIT BREAKER FOR MAIN LINE
105 METER (VOLTS)
106 METER (FREQENCY)
107 METER (AMPERES)
108 RECEPTACLE (LAMP)
109 LAMP

201 GENERATOR EMERGENCY
202 VOLTAGE REGULATOR
203 AUTO TRANSFORMER
204a CONNECTION BOX
204b AUTO TRANSFORMER TAP SWITCH
204c CIRCUIT BREAKER

NOTE
FOR DATA ON PARTS SEE TABLE OF REPLACEABLE PARTS

POWER CONTROL PANEL BD-92-C AND ASSOCIATED EQUIPMENT, SCHEMATIC DIAGRAM

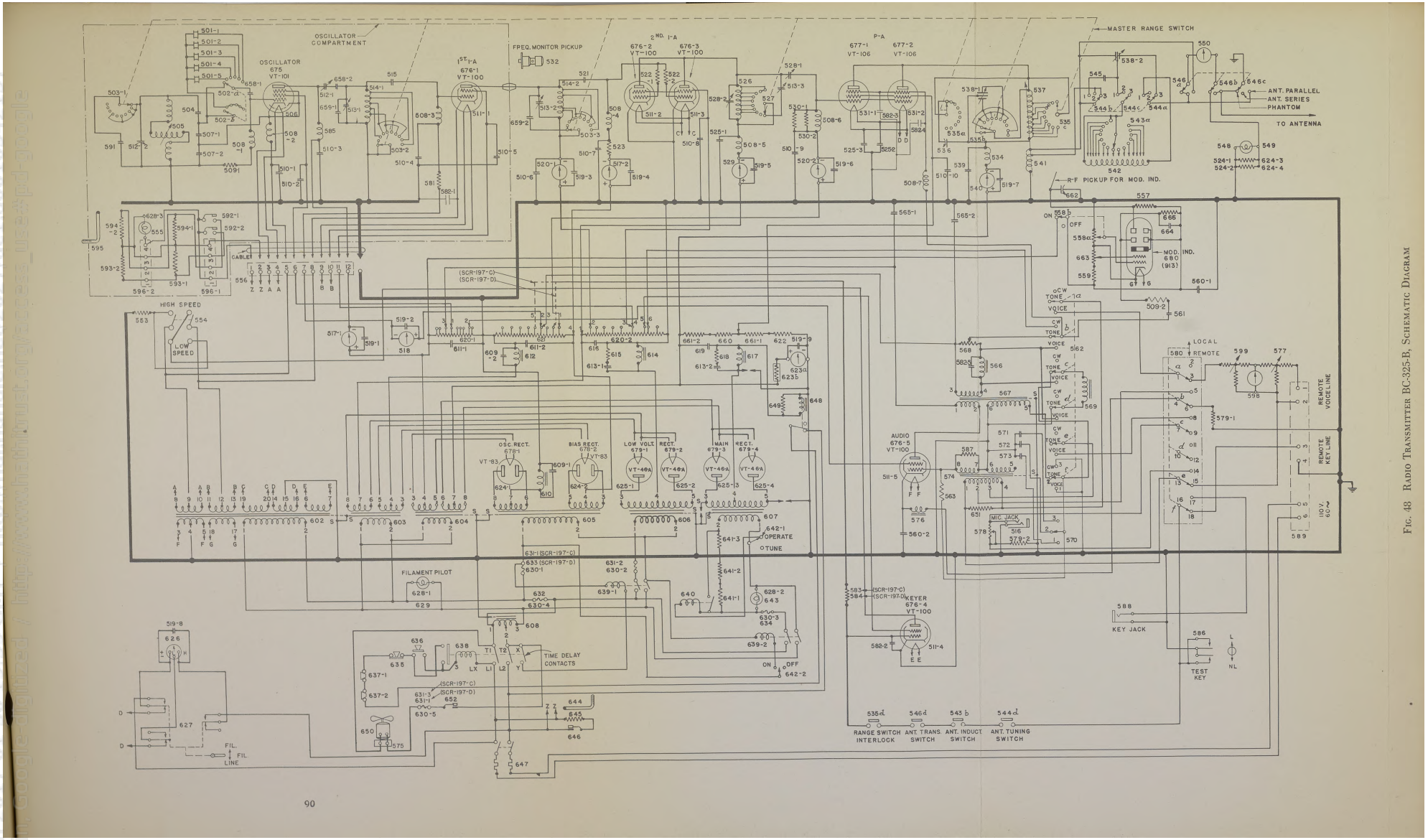


FIG. 48 RADIO TRANSMITTER BC-325-B, SCHEMATIC DIAGRAM

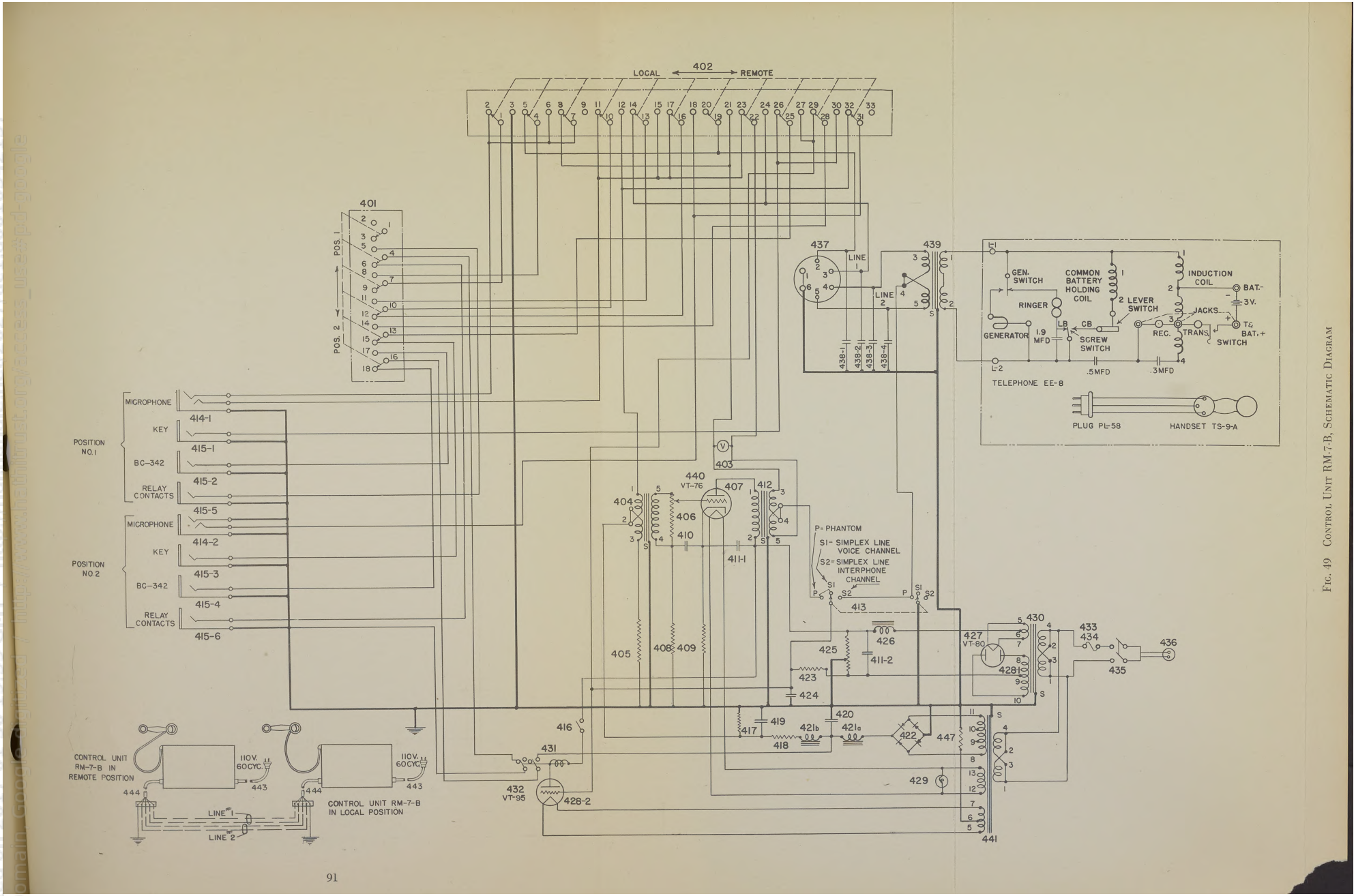
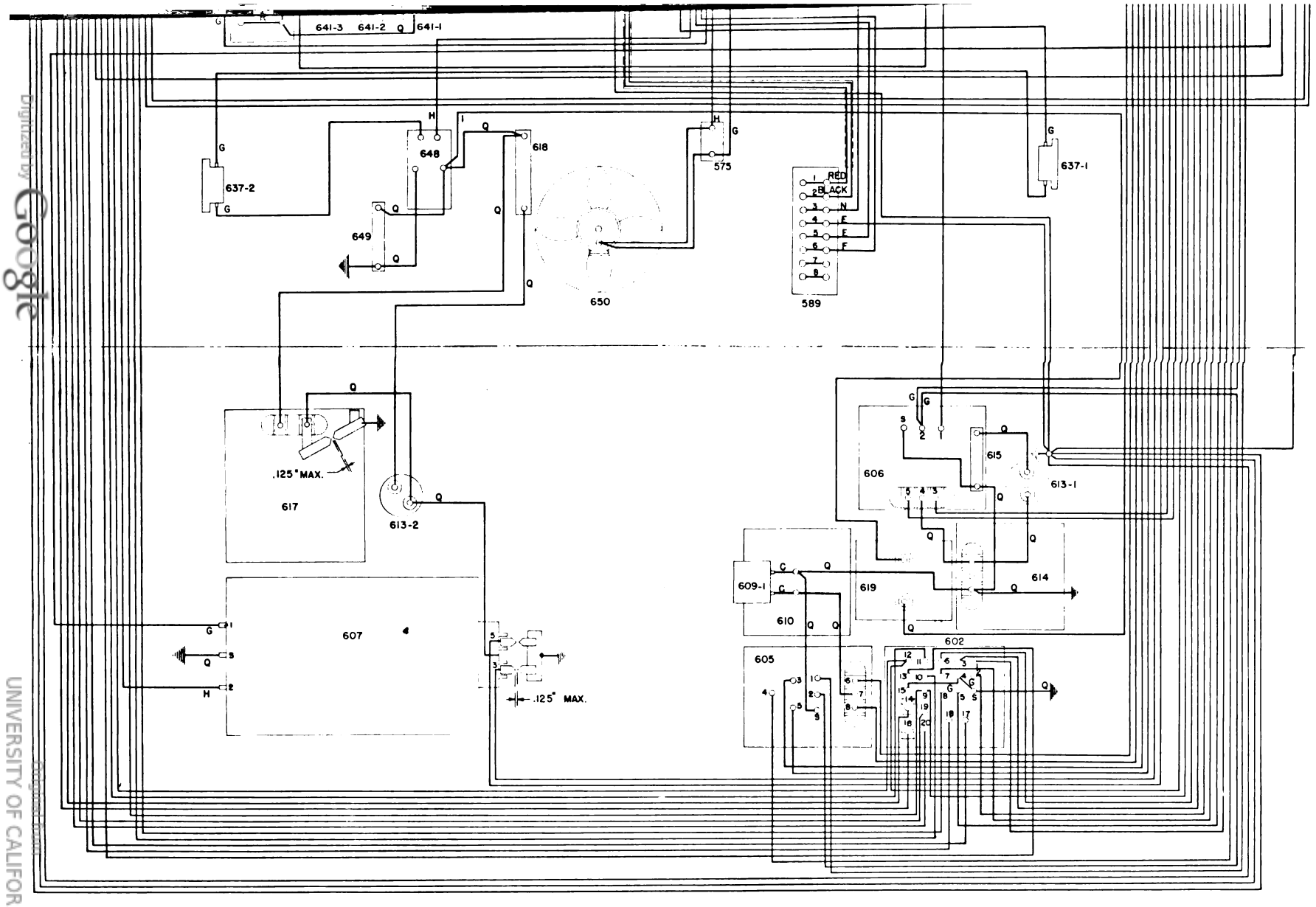


FIG. 49 CONTROL UNIT RM-7-B, SCHEMATIC DIAGRAM



WIRING AS VIEWED FROM REAR OF TRANSMITTER

FIG. 51 RADIO TRANSMITTER BC-325-B. WIRING DIAGRAM

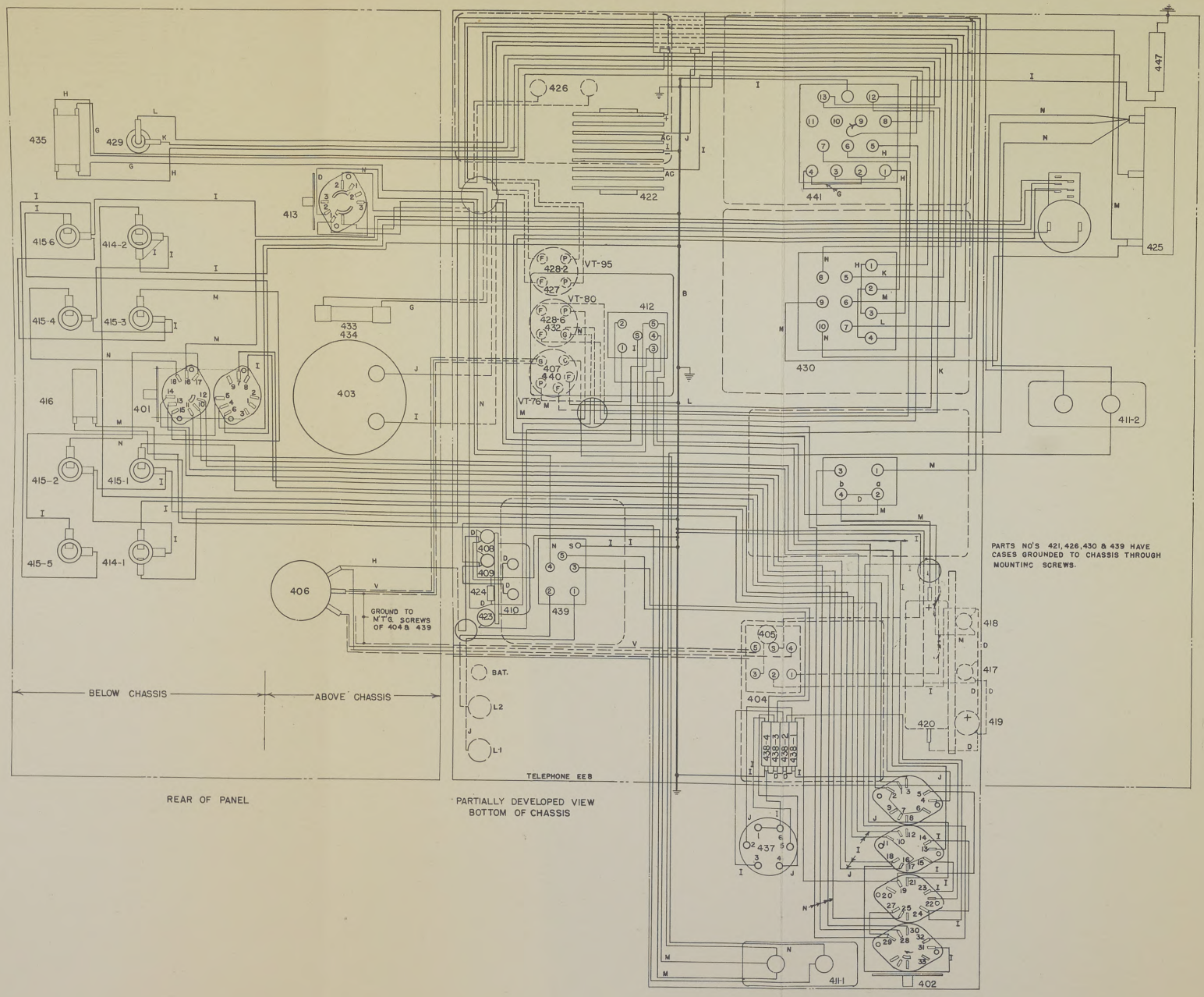
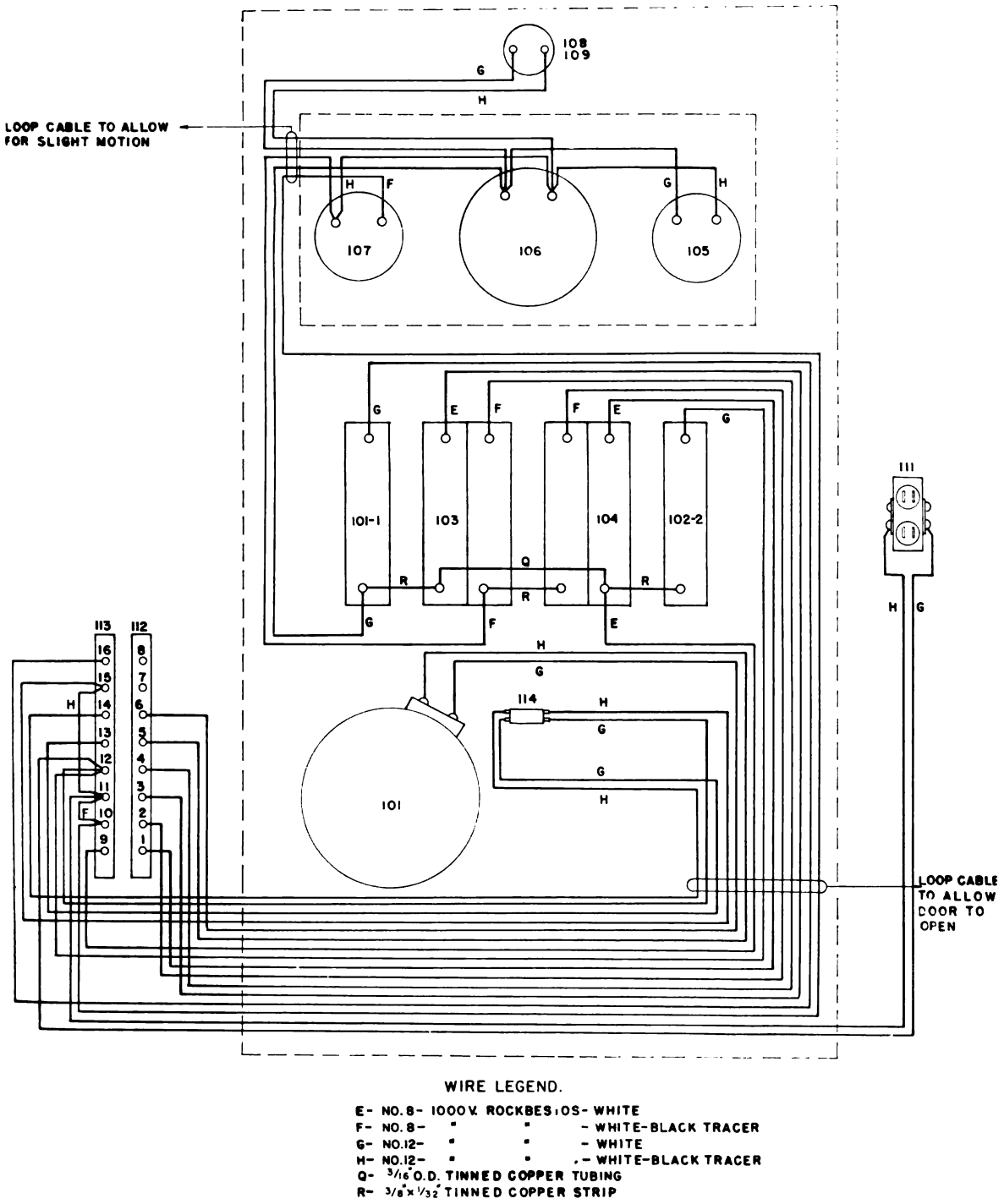


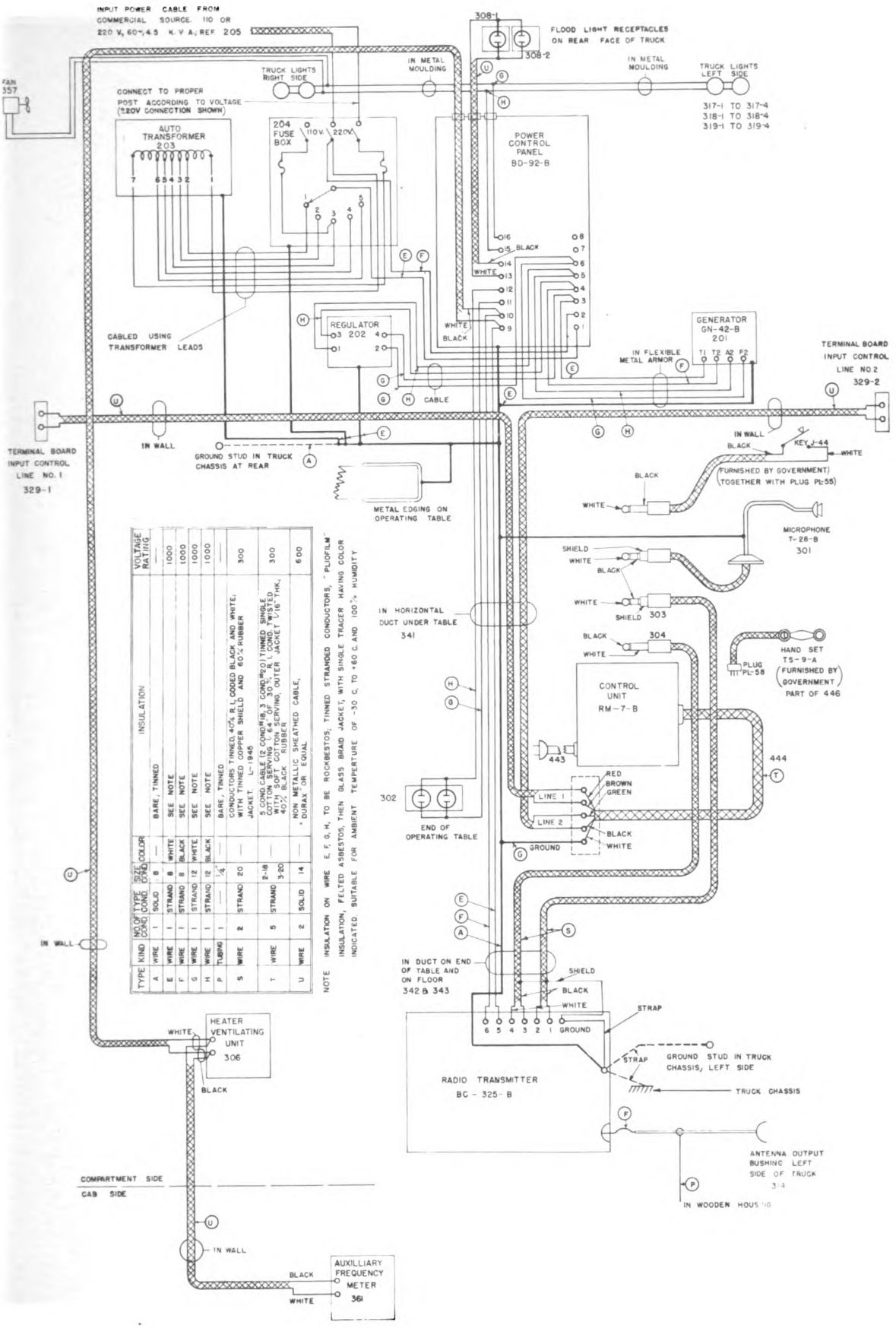
FIG. 52 CONTROL UNIT RM-7-B, WIRING DIAGRAM



WIRE LEGEND.

E- NO.8- 1000V. ROCKBESTOS- WHITE
F- NO.8- " " - WHITE-BLACK TRACER
G- NO.12- " " - WHITE
H- NO.12- " " - WHITE-BLACK TRACER
Q- 3/16" O.D. TINNED COPPER TUBING
R- 3/8" x 1/32" TINNED COPPER STRIP

FIG. 53 POWER CONTROL PANEL BD-92-B, WIRING DIAGRAM



TYPE	KIND	NO. OF COND.	TYPE COND.	SIZE COND.	COLOR	INSULATION	VOLTAGE RATING
A	WIRE	1	SOLID	8	—	BARE, TINNED	—
E	WIRE	1	STRAND	8	WHITE	SEE NOTE	1000
F	WIRE	1	STRAND	8	BLACK	SEE NOTE	1000
G	WIRE	1	STRAND	12	WHITE	SEE NOTE	1000
H	WIRE	1	STRAND	12	BLACK	SEE NOTE	1000
P	TUBING	1	—	1/4	—	BARE, TINNED	—
S	WIRE	2	STRAND	20	—	CONDUCTORS TINNED, 41% R.L. CODED BLACK AND WHITE; WITH TINNED COPPER SHIELD AND 60% RUBBER JACKET. L-1945	300
T	WIRE	5	STRAND	2-18 3-20	—	5 COND. CABLE (2 COND. #18, 3 COND. #20) TINNED SINGLE COTTON SERVING (64 OF 30%, R.L. COND. TWISTED 41% SOFT COTTON SERVING, OUTER JACKET 1/16" THK, 40% BLACK SYNTHETIC RUBBER	300
U	WIRE	2	SOLID	14	—	NON METALLIC SHEATHED CABLE, "DURAX" OR EQUAL	600

NOTE INSULATION ON WIRE E, F, G, H, TO BE ROCKBESTOS, TINNED STRANDED CONDUCTORS, "PLIOFILM" INSULATION, FELTED ASBESTOS, THEN GLASS BRAID JACKET, WITH SINGLE TRACER HAVING COLOR INDICATED. SUITABLE FOR AMBIENT TEMPERTURE OF -30 C. TO +60 C. AND 100% HUMIDITY

FIG. 54 WIRING DIAGRAM OF INTER-UNIT CONNECTIONS

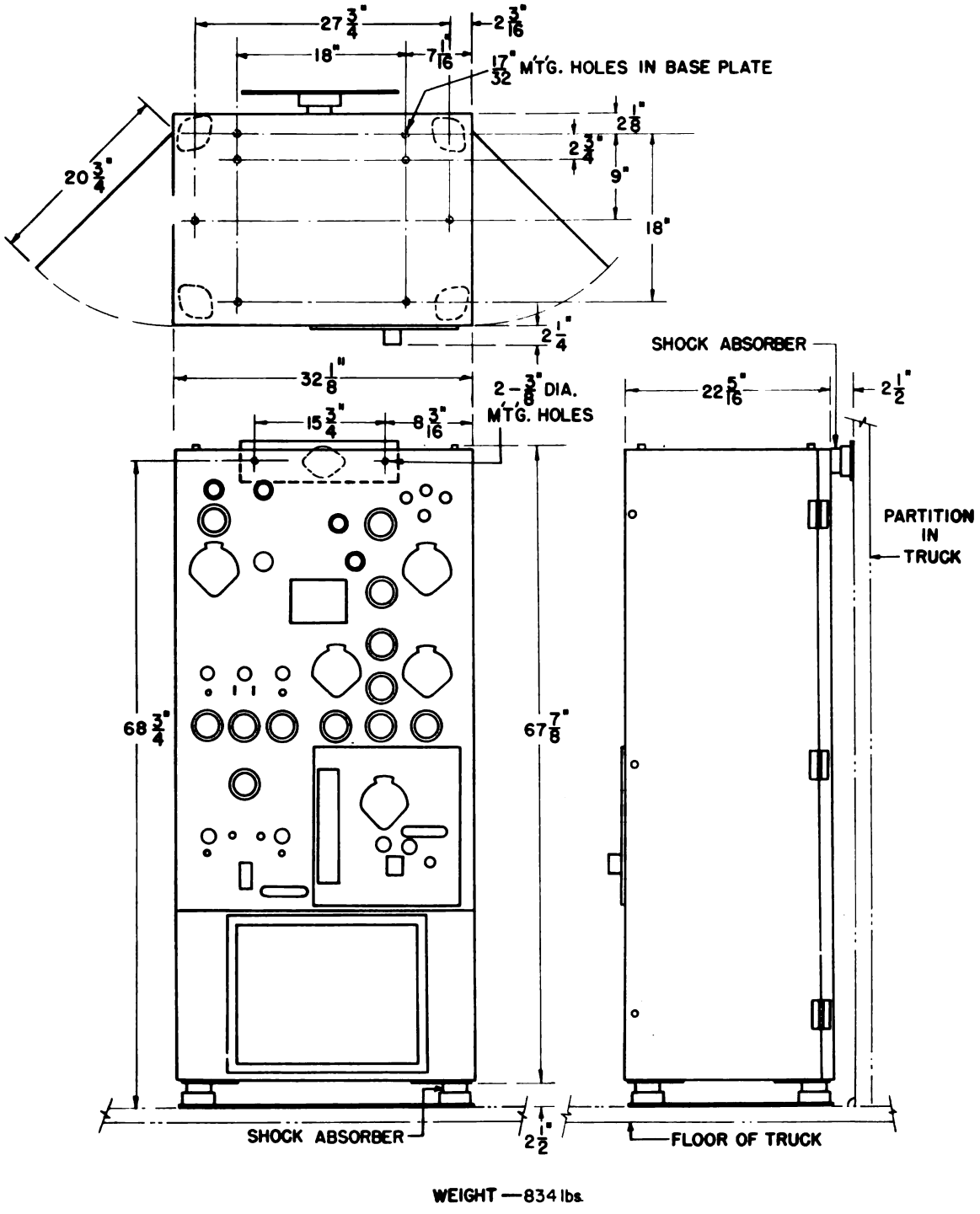


FIG. 55 RADIO TRANSMITTER BC-325-B, OUTLINE DIMENSIONAL SKETCH

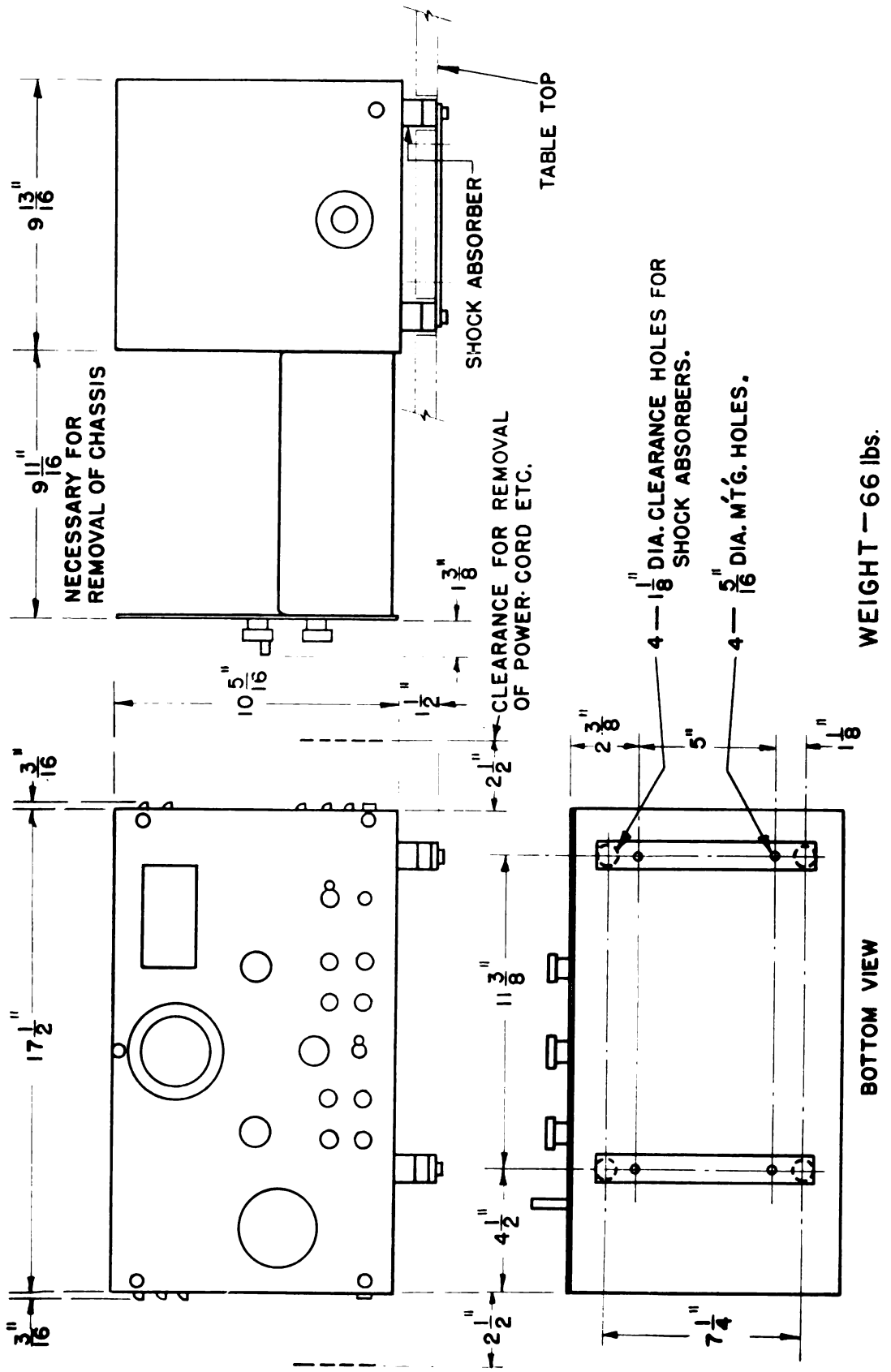


FIG. 56 CONTROL UNIT RM-7-B, OUTLINE DIMENSIONAL SKETCH

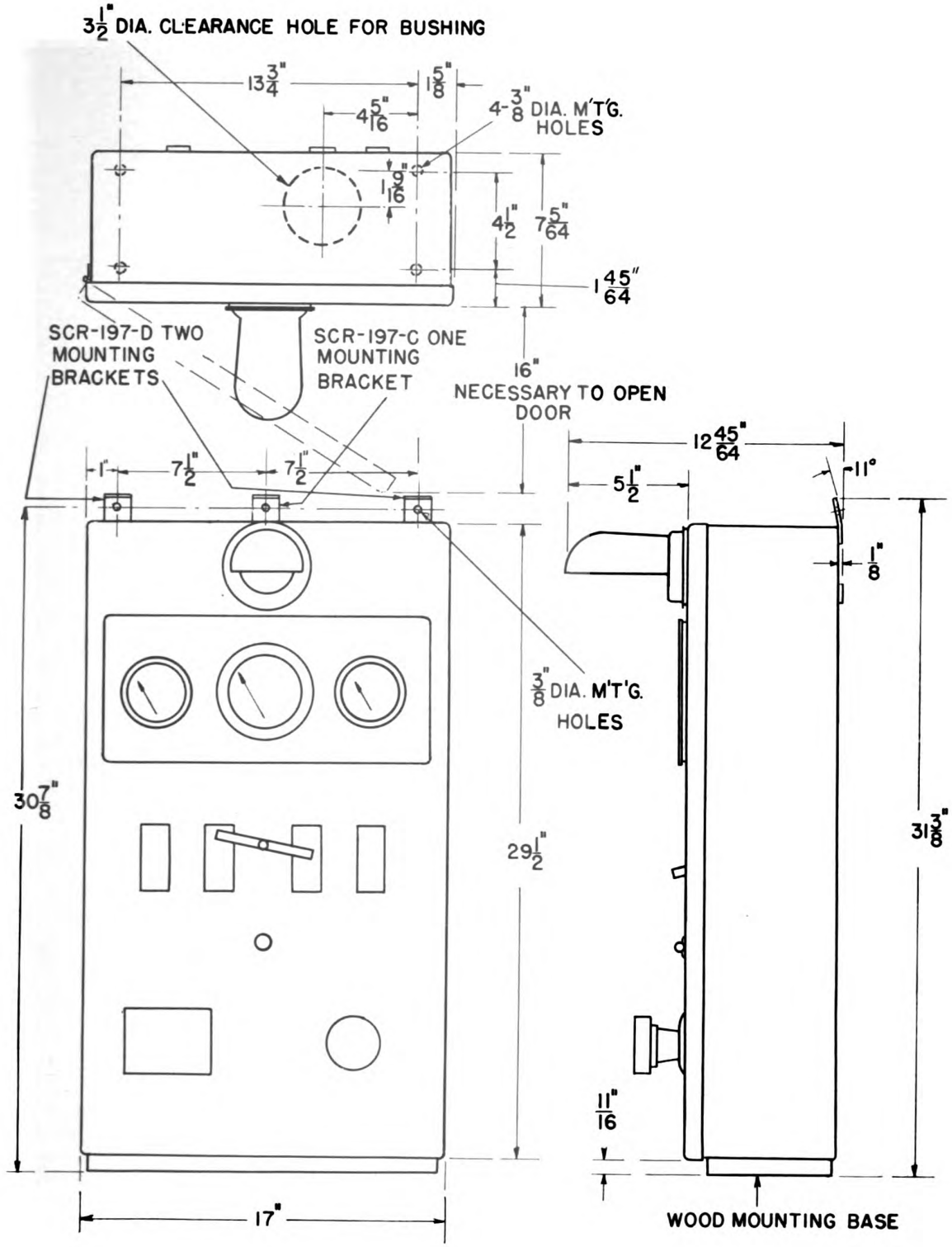
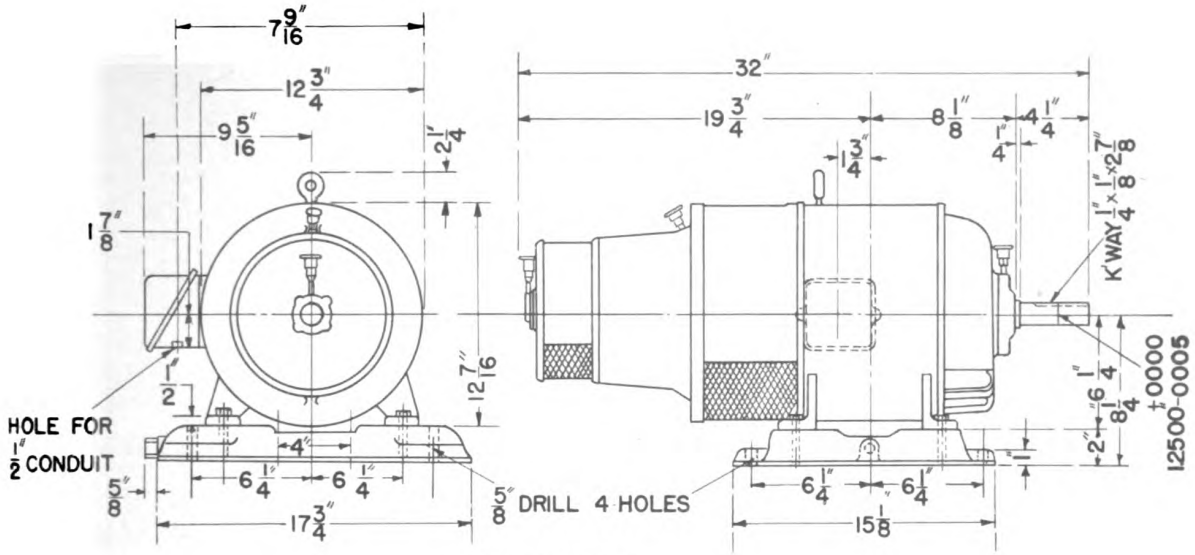
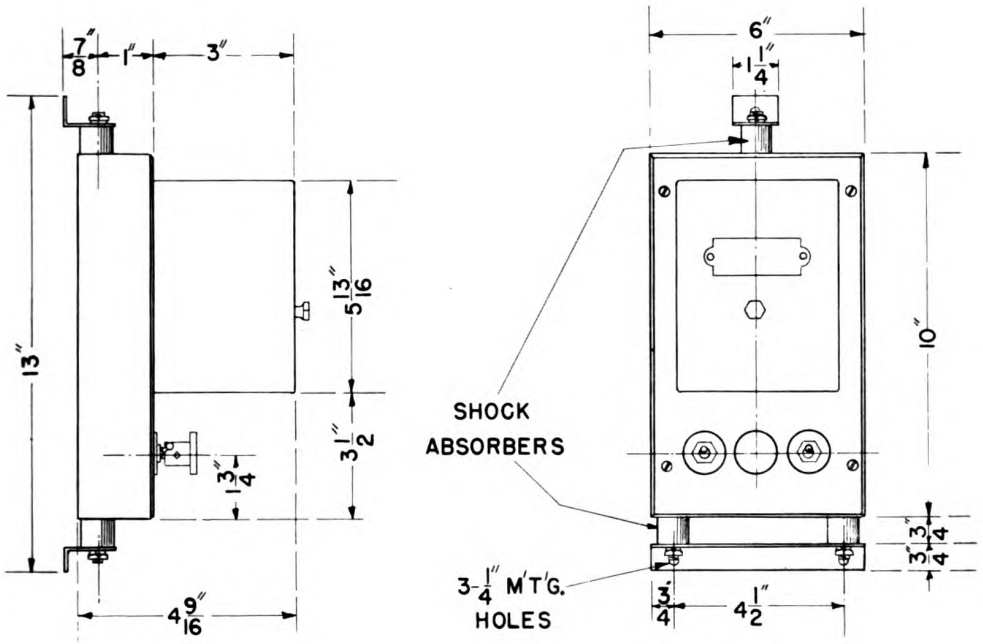


FIG. 57 POWER CONTROL PANEL BD-92-B, OUTLINE DIMENSIONAL SKETCH



WEIGHT 282 lbs.

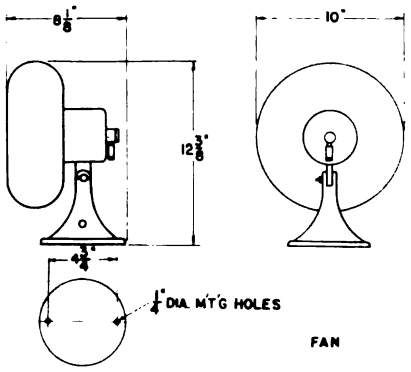
GENERATOR GN-42-B



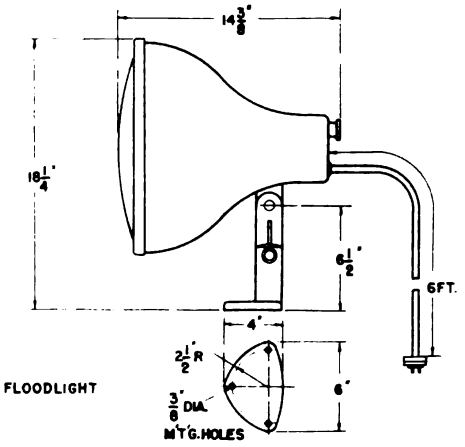
WEIGHT 7.69 lbs.

VOLTAGE REGULATOR

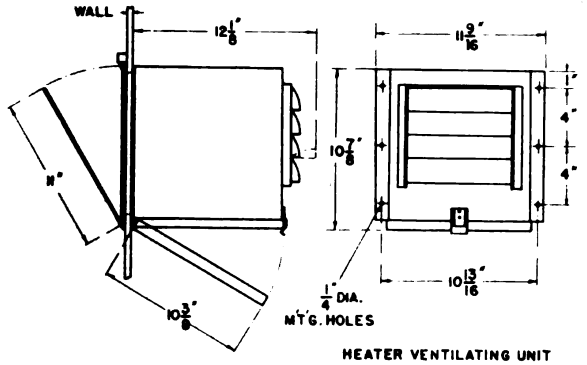
FIG 58 GENERATOR GN-42-B, OUTLINE DIMENSIONAL SKETCH



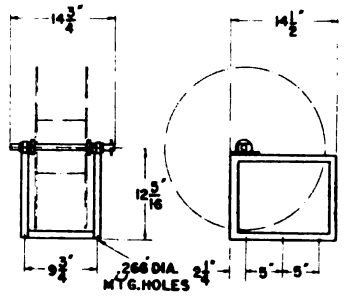
FAN



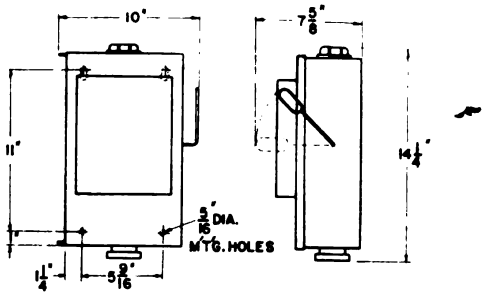
FLOODLIGHT



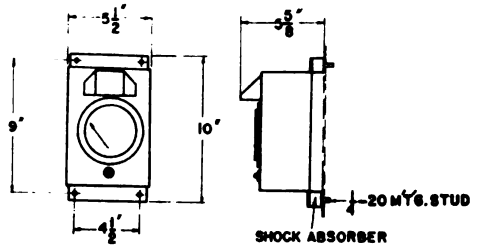
HEATER VENTILATING UNIT



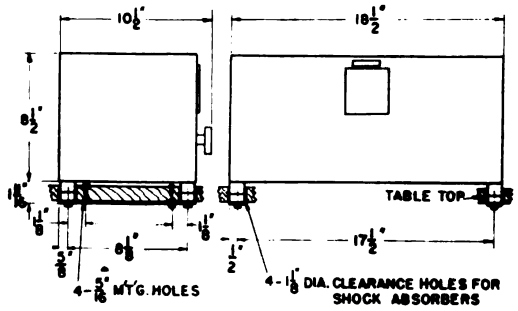
REEL STAND



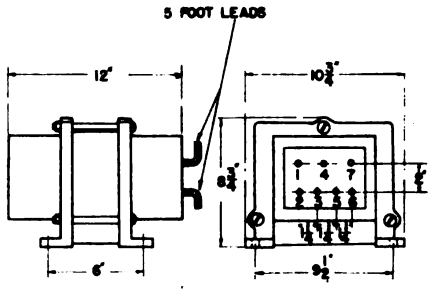
CONNECTION BOX



FREQUENCY METER



MONITOR RECEIVER



AUTO TRANSFORMER

FIG. 59 OUTLINE DIMENSIONAL SKETCH OF MISCELLANEOUS EQUIPMENT